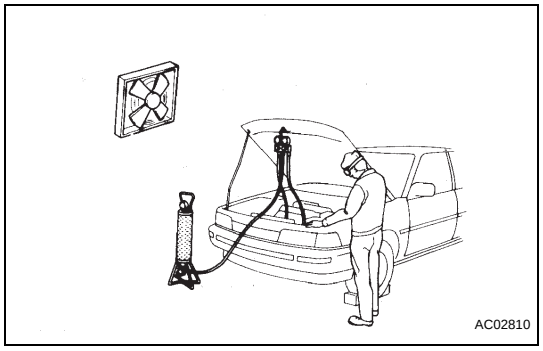
AIR CONDITIONING SYSTEM

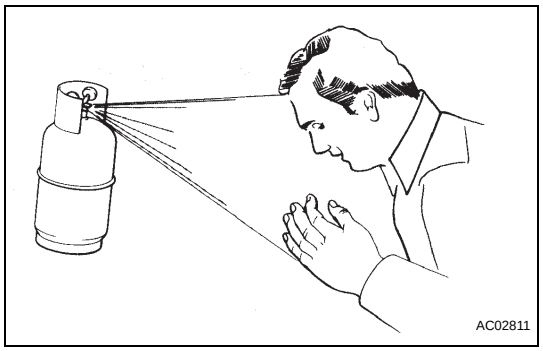
PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

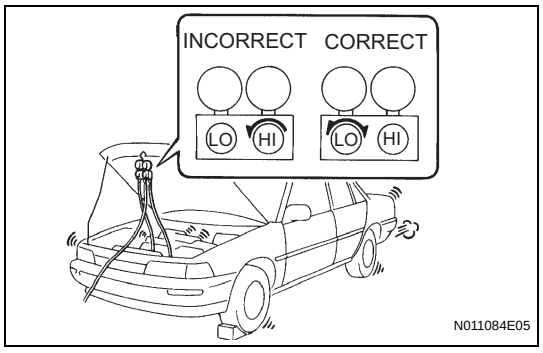
System	See procedure
Power window control system (with Jam protection function)	IN-23
Sliding roof system	



1. **DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR NEAR AN OPEN FLAME**
2. **ALWAYS WEAR PROTECTIVE GLASSES**



3. **AVOID SKIN OR EYE CONTACT WITH LIQUID REFRIGERANT**
   If liquid refrigerant comes in contact with your eyes or skin:
   (a) Rinse the area thoroughly with 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 IT TO OPEN FLAME**
5. **DO NOT DROP OR STRIKE CONTAINER OF REFRIGERANT**



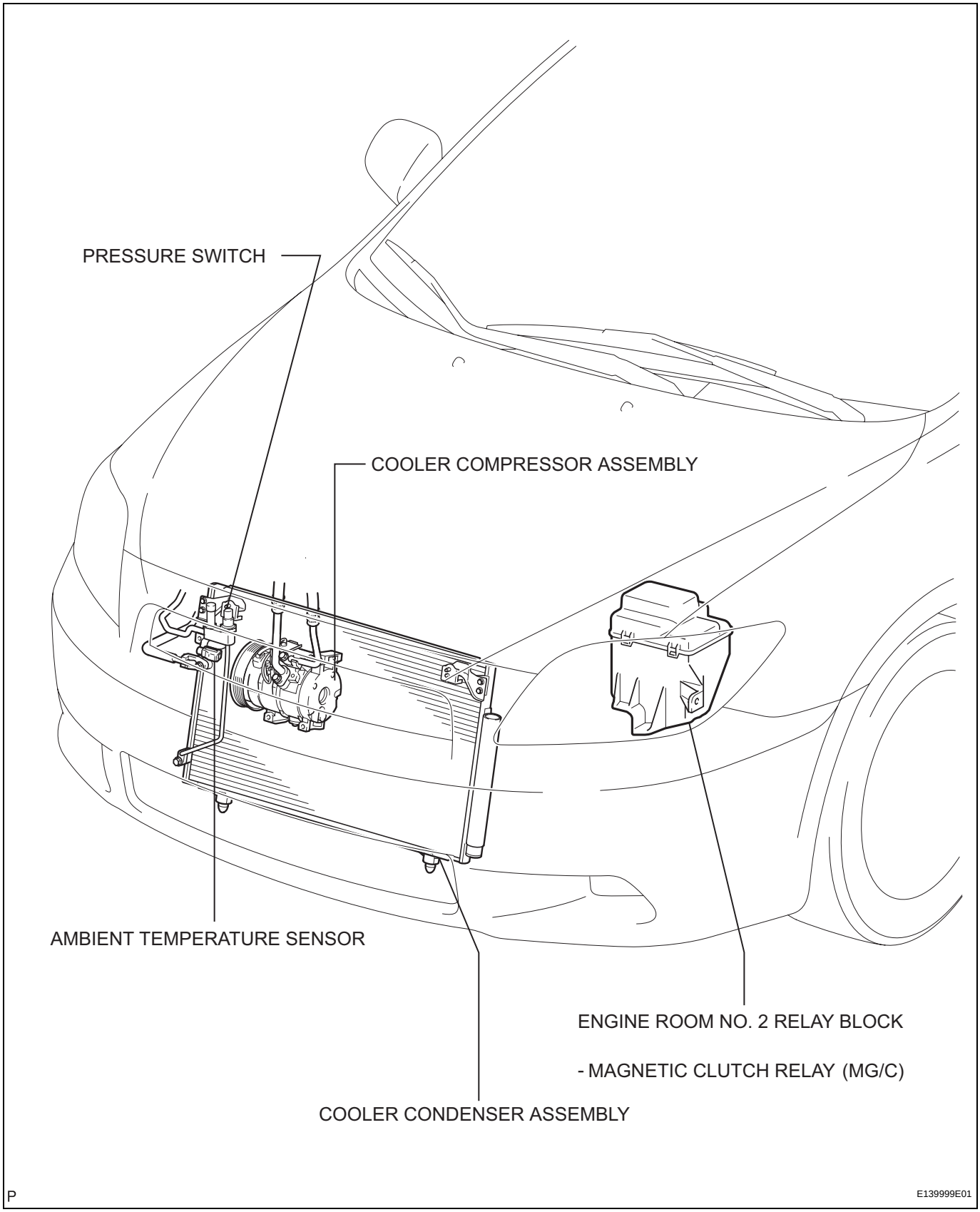
6. **DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT SYSTEM**
   If there is not enough refrigerant in the refrigerant system, oil lubrication will be insufficient and the compressor may burn out. Care should be taken to avoid this.
7. **DO NOT OPEN HIGH PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATING**
   Open and close only the low pressure valve. If the high pressure valve is opened, refrigerant flows in the reverse direction and causes the charging cylinder to rupture.
8. **BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT**
   Overcharged refrigerant will cause problems such as insufficient cooling, poor fuel economy, engine overheating, etc.

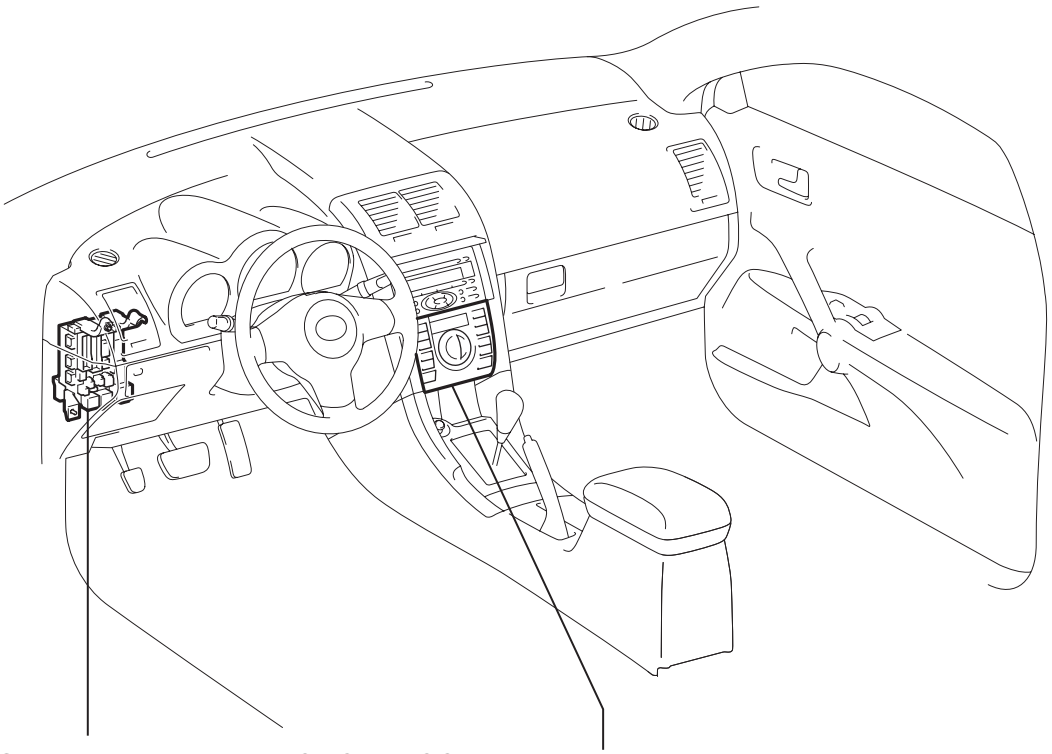
9. DO NOT OPERATE ENGINE AND COMPRESSOR WITHOUT REFRIGERANT IN REFRIGERANT SYSTEM

NOTICE:

This may damage the inside of the compressor because the compressor parts move regardless of whether the A/C system is turned on or off.

PARTS LOCATION



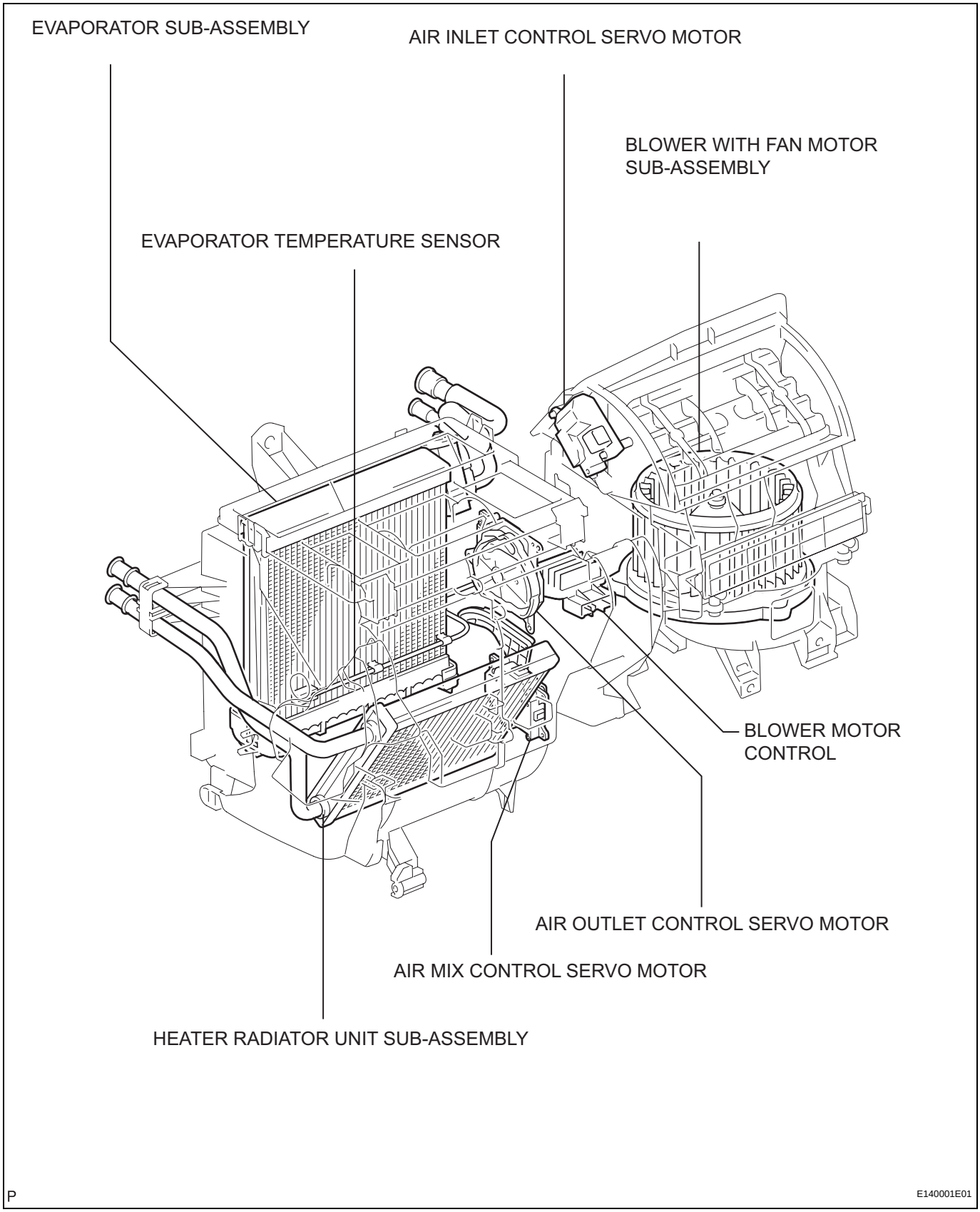


INSTRUMENT PANEL JUNCTION BLOCK
- HEATER RELAY
- IG1 RELAY (IG1)

HEATER CONTROL ASSEMBLY
(A/C AMPLIFIER ASSEMBLY)

P

E140000E01


EVAPORATOR SUB-ASSEMBLY
AIR INLET CONTROL SERVO MOTOR
BLOWER WITH FAN MOTOR SUB-ASSEMBLY
EVAPORATOR TEMPERATURE SENSOR
BLOWER MOTOR CONTROL
AIR OUTLET CONTROL SERVO MOTOR
AIR MIX CONTROL SERVO MOTOR
HEATER RADIATOR UNIT SUB-ASSEMBLY
P
E140001E01

AC

PROBLEM SYMPTOMS TABLE

Check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.
HINT:
Inspect the "Fuse" and "Relay" before inspecting the suspected area as shown in the table below.
Inspect each malfunction circuit in numerical order for the corresponding symptom.
If the malfunction still exists even after checking and confirming that all the circuits are normal, replace the A/C amplifier.

Air Conditioning System:

Symptom	Suspected Area	See page
Whole functions of the A/C system do not operate	1. Heater control & accessory assembly	AC-71
	2. A/C amplifier assembly	AC-7
	3. Wire harness or connector	-
Air Flow Control: No blower operation	1. Blower w/ fan motor sub-assembly	AC-42
	2. Heater control & accessory assembly	AC-71
	3. A/C amplifier assembly	AC-7
	4. Wire harness or connector	-
Air Flow Control: No blower control	1. Blower w/ fan motor sub-assembly	AC-42
	2. Heater control & accessory assembly	AC-71
	3. A/C amplifier assembly	AC-7
	4. Wire harness or connector	-
Air Flow Control: Insufficient air comes out	1. Blower w/ fan motor sub-assembly	AC-42
	2. Heater control & accessory assembly	AC-71
	3. A/C amplifier assembly	AC-7
	4. Wire harness or connector	-
Temperature Control: No cool air comes out	1. Volume of refrigerant	AC-11
	2. Drive belt tension	EM-6
	3. Refrigerant pressure	AC-11
	4. Cooler compressor assembly	AC-53
	5. Pressure switch	AC-66
	6. Air mix control servo motor	AC-49
	7. Heater control & accessory assembly	AC-71
	8. A/C amplifier assembly	AC-7
	9. Wire harness or connector	-
Temperature Control: No warm air comes out	1. Engine coolant volume	CO-6
	2. Air mix control servo motor	AC-49
	3. Heater control & accessory assembly	AC-71
	4. Heater radiator unit sub-assembly	-
	5. A/C amplifier assembly	AC-7
	6. Wire harness or connector	-
Temperature Control: Output air is warmer or cooler than the set temperature or response is slow	1. Heater control & accessory assembly	AC-7
	2. Air mix control servo motor	AC-49
	3. A/C amplifier assembly	AC-7
Temperature Control: No temperature control	1. Heater control & accessory assembly	AC-71
	2. Air mix control servo motor	AC-49
	3. A/C amplifier assembly	AC-7

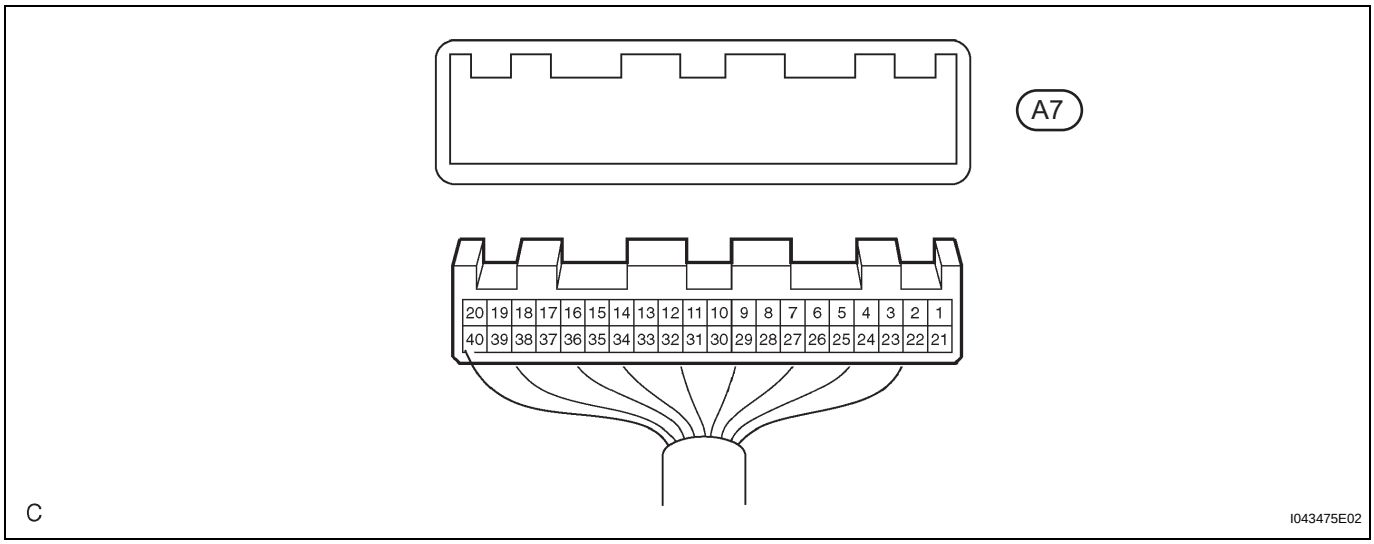
Symptom	Suspected Area	See page
No air inlet control	1. Air inlet servo motor	AC-45
	2. Heater control & accessory assembly	AC-71
	3. A/C amplifier assembly	AC-7
	4. Wire harness or connector	-
No air outlet control	1. Heater control & accessory assembly	AC-71
	2. Air outlet control servo motor	AC-47
	3. A/C amplifier assembly	AC-7
	4. Wire harness or connector	-
Engine idle up does not occur, or is continuous	1. Cooler compressor assembly	AC-53
	2. Heater control & accessory assembly	AC-71
	3. A/C amplifier assembly	AC-7
Brightness does not change when rheostat volume or light control switch is turned	1. Wire harness or connector	-

TERMINALS OF ECU

1. CHECK AIR CONDITIONING AMPLIFIER ASSEMBLY

(a) Disconnect the connector from the air conditioning amplifier assembly.

(b) Measure the voltage and resistance according to the value(s) in the table below.

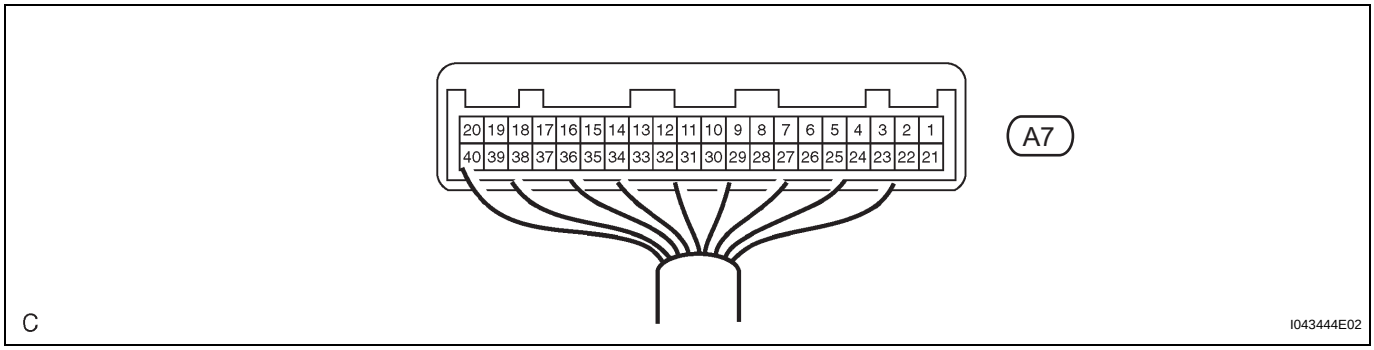


Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (A7-12) - Body ground	W-B - Body ground	Ground for main power supply	Always	Below 1 Ω
IG (A7-20) - GND (A7-12)	P - W-B	Power source (IG)	Ignition switch: ON	10 to 14 V
+B (A7-40) - GND (A7-12)	V - W-B	Power source (Backup)	Always	10 to 14 V

If the results are not as specified, inspect the circuits connected to the other parts.

(c) Connect the connector to the air conditioning amplifier assembly.

(d) Measure the voltage and resistance according to the value(s) in the table below.

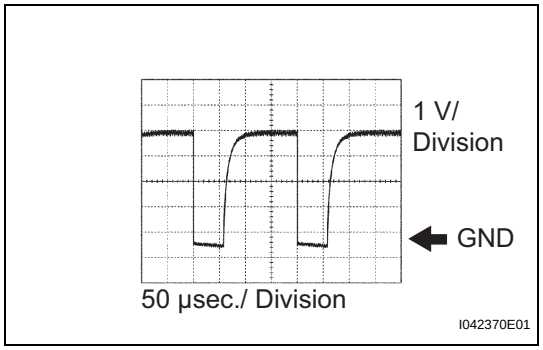


Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AOF (A7-1) - GND (A7-12)	W - W-B	Air vent mode control servo motor operation voltage	Ignition switch: ON Mode switch: DEF	10 to 14 V
			Ignition switch: ON Mode switch: FACE	Below 1 V
AOD (A7-2) - GND (A7-12)	LG - W-B	Air vent mode control servo motor operation voltage	Ignition switch: ON Mode switch: FACE	10 to 14 V
			Ignition switch: ON Mode switch: DEF	Below 1 V

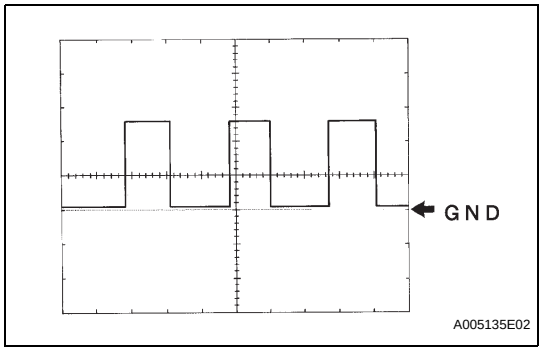
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
REC (A7-3) - GND (A7-12)	L - W-B	Air inlet control servo motor operation voltage	Ignition switch: ON R/F switch: FRESH	10 to 14 V
			Ignition switch: ON R/F switch: RECIRCULATION	Below 1 V
FRS (A7-4) - GND (A7-12)	R - W-B	Air inlet control servo motor operation voltage	Ignition switch: ON R/F switch: RECIRCULATION	10 to 14 V
			Ignition switch: ON R/F switch: FRESH	Below 1 V
RrDEF (A7-5) - GND (A7-12)	P - W-B	Rear defogger relay signal	Ignition switch: ON DEF switch: OFF	10 to 14 V
			Ignition switch: ON DEF switch: ON	Below 1 V
MGC (A7-6) - GND (A7-12)	BR - W-B	Magnetic clutch relay operation signal	Ignition switch: ON Magnetic clutch: OFF	10 to 14 V
			Ignition switch: ON Magnetic clutch: ON	Below 1 V
BLC (A7-9) - GND (A7-12)	L - W-B	Blower motor speed control signal	Ignition switch: ON Blower switch: ON	Pulse generation (See waveform 1)
AC1 (A7-10) - GND (A7-12)	P - W-B	Magnetic clutch signal	Ignition switch: ON Magnetic clutch: OFF	10 to 14 V
			Ignition switch: ON Magnetic clutch: ON	Below 1 V
FrHR (A7-11) - GND (A7-12)	BR - W-B	A/C switch relay signal	Ignition switch: ON Blower switch: LO A/C switch: OFF	10 to 14 V
			Ignition switch: ON Blower switch: LO A/C switch: ON	Below 1 V
GND (A7-12) - Body ground	W-B - Body ground	Ground for main power supply	Always	Below 1 Ω
TP (A7-13) - GND (A7-12)	B - W-B	Air vent mode control servo motor position signal	Ignition switch: ON Set temperature switch: MAXHOT → MAXCOOL	0.7 to 4.3 V
S5-TP (A7-14) - SG-TP (A7-30)	V - Y	Power supply for air mix control servo motor	Ignition switch: ON	4.5 to 5.5 V
ACT (A7-16) - GND (A7-12)	LG - W-B	Magnetic clutch ON permission signal	Ignition switch: ON Magnetic clutch: OFF	10 to 14 V
			Ignition switch: ON Magnetic clutch: ON	Below 1 V
ILL- (A7-17) - GND (A7-12)	W - W-B	Ground for illumination	Ignition switch: ON	Below 1 Ω
SPD (A7-18) - GND (A7-12)	O - W-B	Vehicle speed signal	Ignition switch: ON Turn front wheel slowly	Pulse generation (See waveform 2)
ILL+ (A7-19) - ILL- (A7-17)	R - W	Power supply for illumination	Ignition switch: ON Light control switch: OFF	10 to 14 V
			Ignition switch: ON Light control switch: ON	Below 1 V
IG (A7-20) - GND (A7-12)	P - W-B	Power source (IG)	Ignition switch: ON	10 to 14 V
AMC (A7-21) - GND (A7-12)	G - W-B	Air mix control servo motor operation voltage	Ignition switch: ON Set temperature switch: MAXCOOL	10 to 14 V
			Ignition switch: ON Set temperature switch: MAXHOT	Below 1 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AMH (A7-22) - GND (A7-12)	GR - W-B	Air mix control servo motor operation voltage	Ignition switch: ON Set temperature switch: MAXHOT	10 to 14 V
			Ignition switch: ON Set temperature switch: MAXCOOL	Below 1 V
TAM (A7-23) - GND (A7-12)	P - W-B	A/C ambient temperature sensor signal	Ignition switch: ON Ambient temperature: 25°C (77°F)	1.35 to 1.75 V
			Ignition switch: ON Ambient temperature: 40°C (104°F)	0.85 to 1.25 V
TE (A7-24) - GND (A7-12)	LG - W-B	Evaporator temperature sensor signal	Ignition switch: ON Evaporator temperature: 0 °C (32°F)	2.0 to 2.4 V
			Ignition switch: ON Evaporator temperature: 15°C (59°F)	1.4 to 1.8 V
HAZ (A7-25) - GND (A7-12)	O - W-B	Hazard switch signal	Hazard switch: OFF	10 to 14 V
			Hazard switch: ON	Below 1 V
SECU (A7-27) - GND (A7-12)	B - W-B	Security indicator signal	Security indicator comes on or blink (when theft deterrent system and engine immobilizer system is set)	10 to 14 V
			Security indicator does not come on	Below 1 V
SG-TPM (A7-29) - Body ground	G - Body ground	Ground for air vent mode control servo motor	Always	Below 1 Ω
SG-TP (A7-30) - Body ground	Y - Body ground	Ground for air mix control servo motor	Always	Below 1 Ω
SG-TAM (A7-31) - Body ground	B - Body ground	Ground for ambient temperature sensor	Always	Below 1 Ω
SG-TE (A7-32) - Body ground	B - Body ground	Ground for evaporator temperature sensor	Always	Below 1 Ω
TPM (A7-33) - GND (A7-12)	V - W-B	Air vent mode control servo motor position signal	Ignition switch; ON Mode switch: FACE → DEF	0.7 to 4.3 V
S5-TPM (A7-34) - SG-TPM (A7-29)	L - G	Air vent mode control servo motor position signal	Ignition switch: ON	10 to 14 V
A/BON (A7-35) - GND (A7-12)	Y - W-B	Passenger airbag ON indicator signal	Ignition switch: ON Passenger airbag ON indicator comes on	10 to 14 V
			Ignition switch: ON Passenger airbag ON indicator does not comes on	Below 1 V
A/BOFF (A7-36) - GND (A7-12)	BR - W-B	Passenger airbag OFF indicator signal	Ignition switch: ON Passenger airbag OFF indicator comes on	10 to 14 V
			Ignition switch: ON Passenger airbag OFF indicator does not comes on	Below 1 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
PRS (A7-37) - GND (A7-12)	G - W-B	Pressure switch signal	Ignition switch: START Refrigerant pressure: Normally	Below 1 V
			Ignition switch: START Refrigerant pressure: Less than 0.19 MPa (2.0 kgf/cm^2, 28 psi) or more than 1.34 MPa (13.7 kgf/cm^2, 195 psi)	10 to 14 V
SEAT (A7-38) - IG (A7-20)	P - P	Passenger seat belt warning light signal	Ignition switch: ON Passenger seat belt warning comes on	10 to 14 V
			Ignition switch: ON Passenger seat belt warning does not comes on	Below 1 V
+B (A7-40) - GND (A7-12)	V - W-B	Power source (Backup)	Always	10 to 14 V



(1) Waveform 1:
Measure the waveform between terminals A7-9 (BLC) and A7-12 (GND).
OK:
A waveform should be output as shown in the illustration.
HINT:
Waveform cycle varies with the blower level.



(2) Waveform 2:
Measure the waveform between terminals A7-9 (BLC) and A7-12 (GND).
OK:
A waveform should be output as shown in the illustration.
HINT:
As vehicle speed increases, the cycle of the signal waveform becomes narrow.

REFRIGERANT

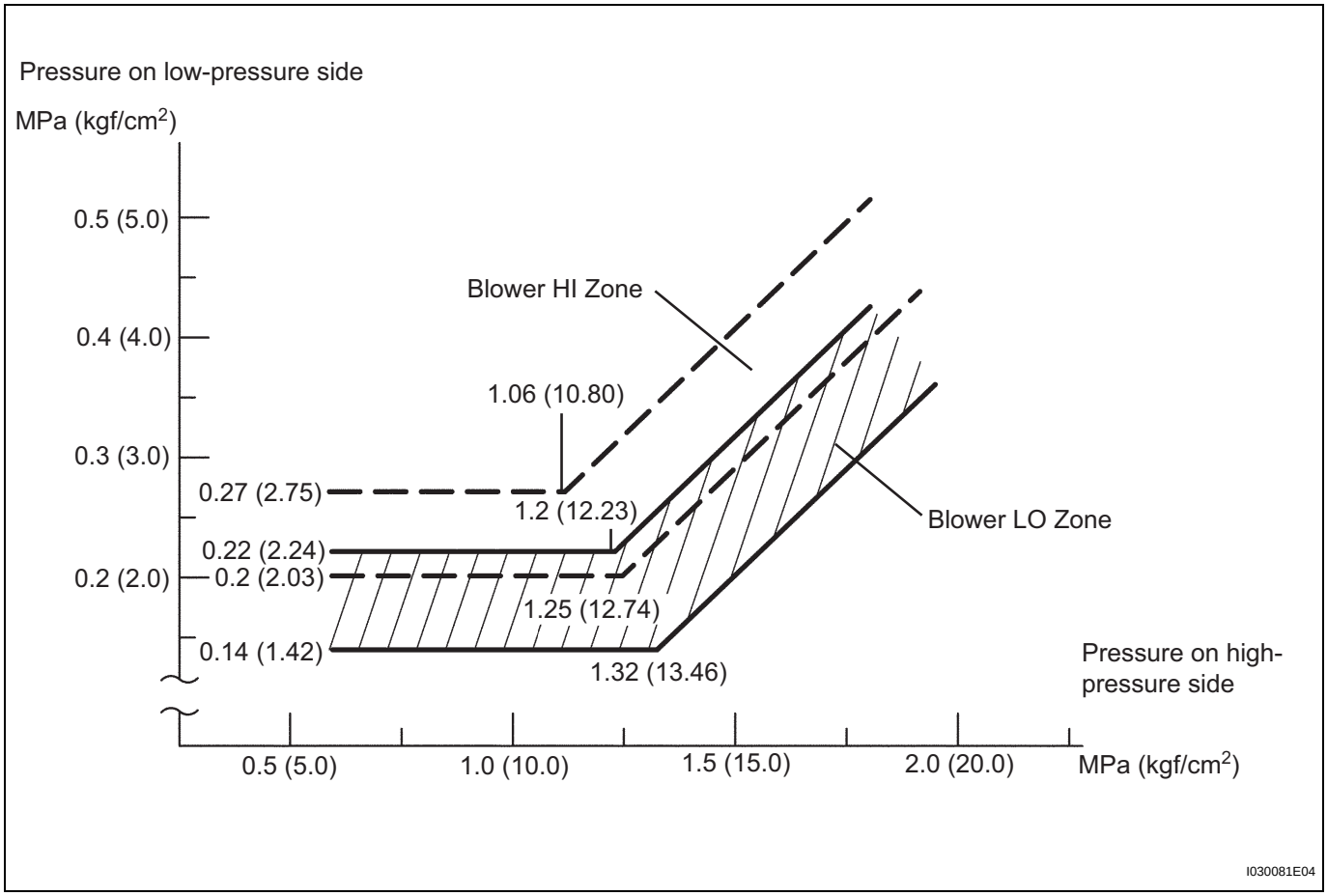
ON-VEHICLE INSPECTION

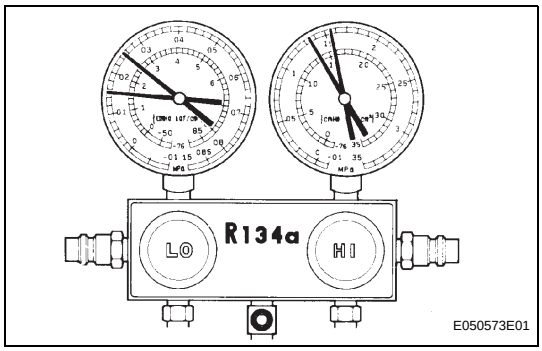
1. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

(a) This method uses a manifold gauge set to locate problem areas. Read the manifold gauge pressure when these conditions are established. Test conditions:

- Temperature at the air inlet is 30 to 35°C (86 to 95°F).
- Engine is running at 1,500 rpm.
- All doors are fully open.
- Blower speed control switch is at HI.
- Temperature control switch is at MAX COOL.
- A/C switch is ON.

Gauge readings (Reference)

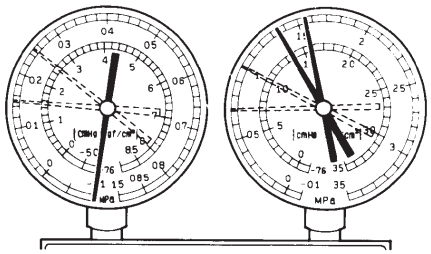




(1) Normally functioning refrigeration system
Gauge reading

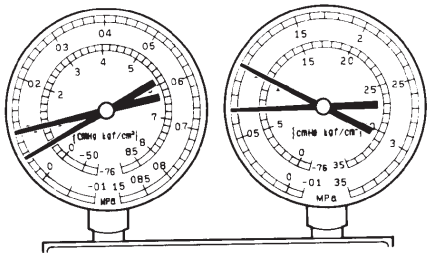
Pressure side	Refrigerant volume
Low	0.15 to 0.25 MPa (1.5 to 2.5 kgf/cm^2)
High	1.37 to 1.57 MPa (14 to 16 kgf/cm^2)

(2) The A/C system periodically changes between normal and improper function due to moisture in the refrigerant system.



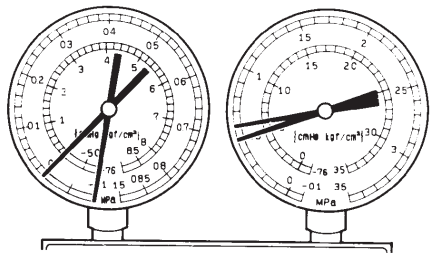
Symptoms	Probable Cause	Diagnosis	Corrective Actions
During operation, pressure on low-pressure side cycles between normal and vacuum	Moisture in refrigeration system freezes at expansion valve orifice, causing temporary stop of cycle. However, when melted, normal state is restored	- Drier is overly saturated - Moisture in refrigeration system freezes at expansion valve orifice and blocks refrigerant circulation	1. Replace cooler drier 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 cooling.



Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure low on both low and high-pressure sides - Cooling performance insufficient	Gas leakage from refrigeration system	- Insufficient refrigerant - Refrigerant leakage	1. Check for gas leakage and repair if necessary 2. Supply appropriate volume of new refrigerant 3. If indicated pressure value close to 0 when connected to gauge, create vacuum after inspecting and repairing the location of leakage

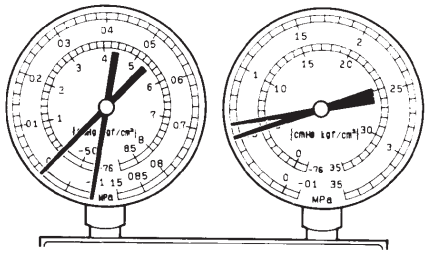
(4) The A/C system does not function effectively due to poor circulation of the refrigerant.



I022119

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- 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

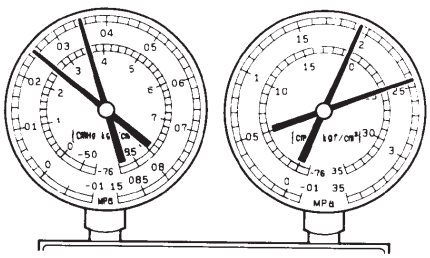
(5) The A/C system does not function intermittently because the refrigerant does not circulate.



I022120

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- 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	- Refrigerant flow obstructed by moisture or dirt in refrigeration system - Refrigerant flow obstructed by gas leakage from expansion valve	Refrigerant does not circulate	1. Check expansion valve 2. Clean expansion valve by blowing air 3. Replace condenser 4. Evacuate air and charge 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 overcharged refrigerant or insufficient cooling of the condenser.

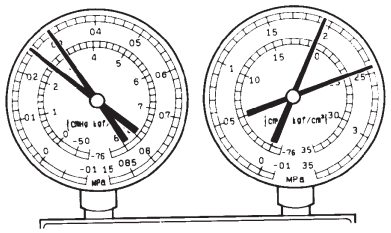


I022121

AC

Symptoms	Probable Cause	Diagnosis	Corrective Actions
Pressure extremely high on both low and high-pressure sides	- Excessive refrigerant - Cooling performance of condenser insufficient	- Condenser is dirty - Condenser fan motor is malfunctioning - Excessive refrigerant	1. Clean condenser 2. Check condenser fan motor operation 3. If 1 and 2 normal, check the amount of refrigerant and supply appropriate volume of refrigerant

(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.

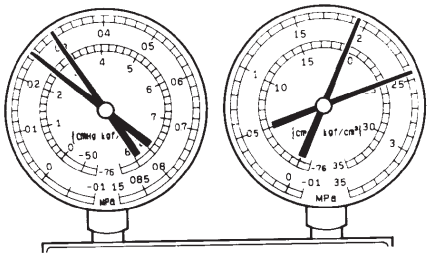


HINT: These gauge indications occur when the refrigeration system opens and the refrigerant is charged without vacuum purging

I022122E03

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure extremely high on both low and high-pressure sides - Low-pressure piping is too hot to touch	Air in refrigeration system	- Air in refrigeration system - Vacuum purging insufficient	1. Check if compressor oil is dirty or insufficient 2. Evacuate air and charge new refrigerant

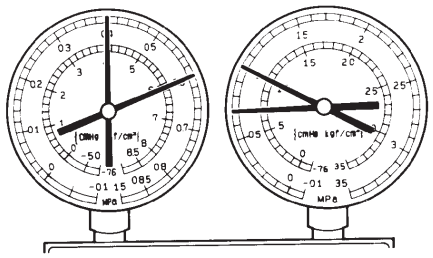
(8) The A/C system does not function effectively due to an expansion valve malfunction.



I022123

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure extremely high on both low and high-pressure sides - Frost or condensation on piping on low-pressure side	Problem with expansion valve	- Excessive refrigerant in low pressure piping - Expansion valve too wide open	Replace expansion valve

(9) The A/C system does not function due to a defective compressor.



I022124

Symptoms	Probable Cause	Diagnosis	Corrective Actions
- Pressure extremely high on both low and high-pressure sides - Pressure extremely low on high-pressure side	Internal leakage in compressor	- Compression failure - Leakage from damaged valve or broken sliding parts	Repair or replace compressor

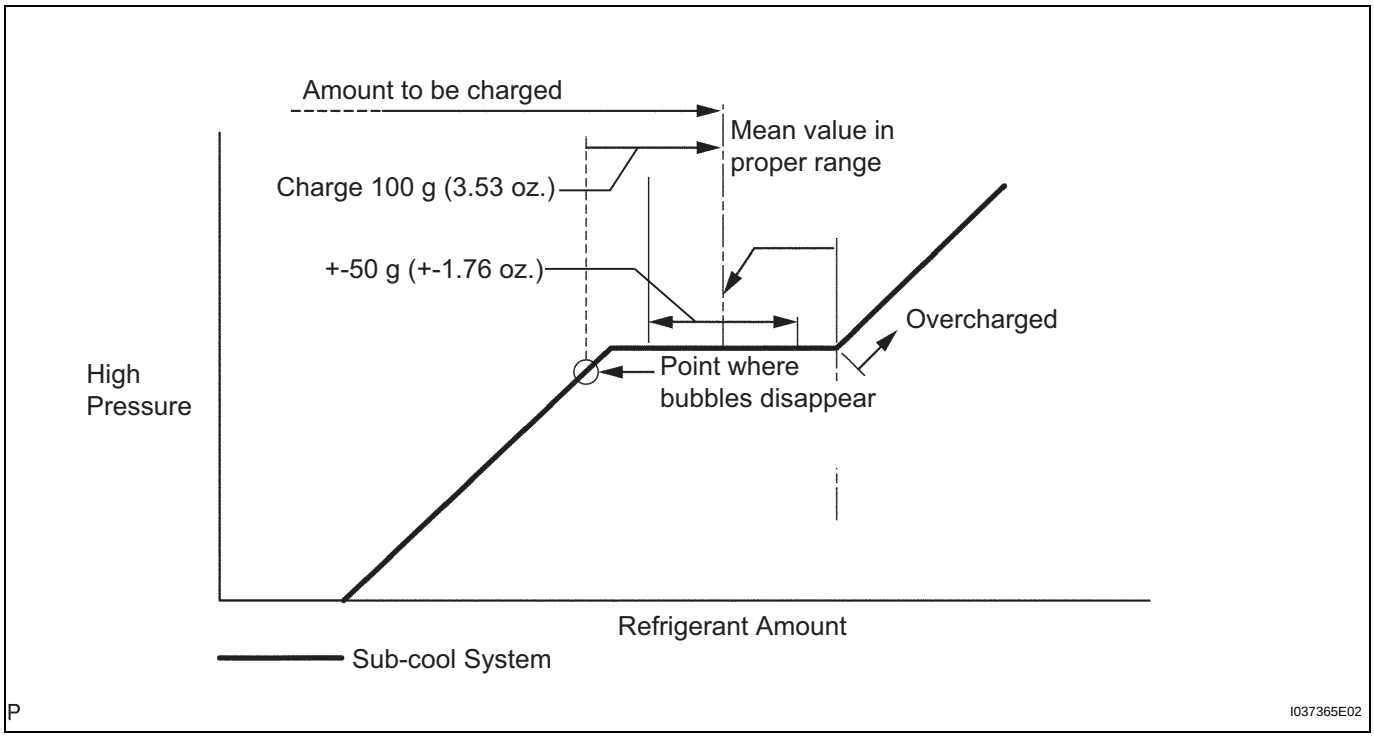
REPLACEMENT

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

(a) Start up the engine.
(b) A/C switch is ON.
(c) Operate the cooler compressor with an engine speed of approximately 1,000 rpm for 5 to 6 minutes to circulate the refrigerant and collect the compressor oil remaining in each component into the cooler compressor.
(d) Stop the engine.
(e) Using SST, discharge the refrigerant gas.
SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)

2. CHARGE REFRIGERANT

(a) Perform vacuum purging using a vacuum pump.
(b) Charge refrigerant HFC-134a (R134a).
Standard:
430 +-30 g (15.2 +-1.1 oz.)
SST 07110-58060 (07117-58060, 07117-58070, 07117-58080, 07117-58090, 07117-78050, 07117-88060, 07117-88070, 07117-88080)



NOTICE:

- **Do not operate the cooler compressor before charging refrigerant as the cooler compressor will not work properly without any refrigerant, and will overheat.**

- **Approximately 100 g (3.53 oz.) of refrigerant may need to be charged after bubbles disappear. The refrigerant amount should be checked by measuring its quantity, and not with the sight glass.**

3. WARM UP ENGINE

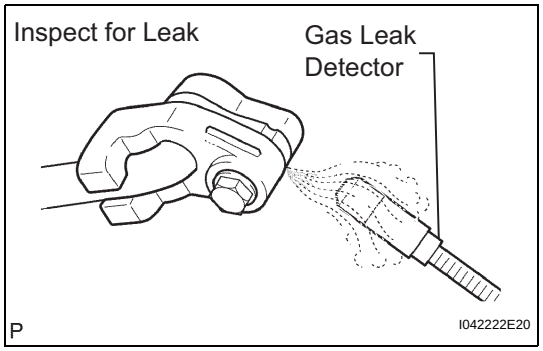
(a) Warm up the engine at less than 1,850 rpm for 2 minutes or more after charging the refrigerant.
NOTICE:
Be sure to warm up the compressor when turning the A/C switch ON after removing and installing the cooler refrigerant lines (including the compressor), to prevent damage to the compressor.

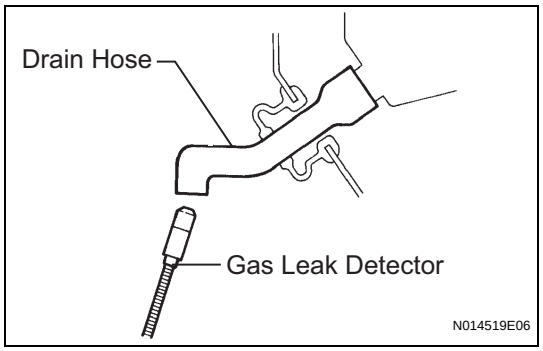
4. INSPECT FOR REFRIGERANT LEAK

(a) After recharging with refrigerant gas, inspect for refrigerant leak gas using a halogen leak detector.

(b) Carry out the test under the following conditions:
- IG OFF
- Secure good ventilation (the gas leak detector may react to volatile gases which are not refrigerant, such as evaporated gasoline and exhaust gas).
- Repeat the test 2 or 3 times.
- Make sure that there is some refrigerant remaining in the refrigeration system. When the compressor is off: approx. 392 to 588 kPa (4 to 6 kgf/cm2, 57 to 85 psi)

(c) Using a gas leak detector, inspect for refrigerant leak from the refrigerant lines..





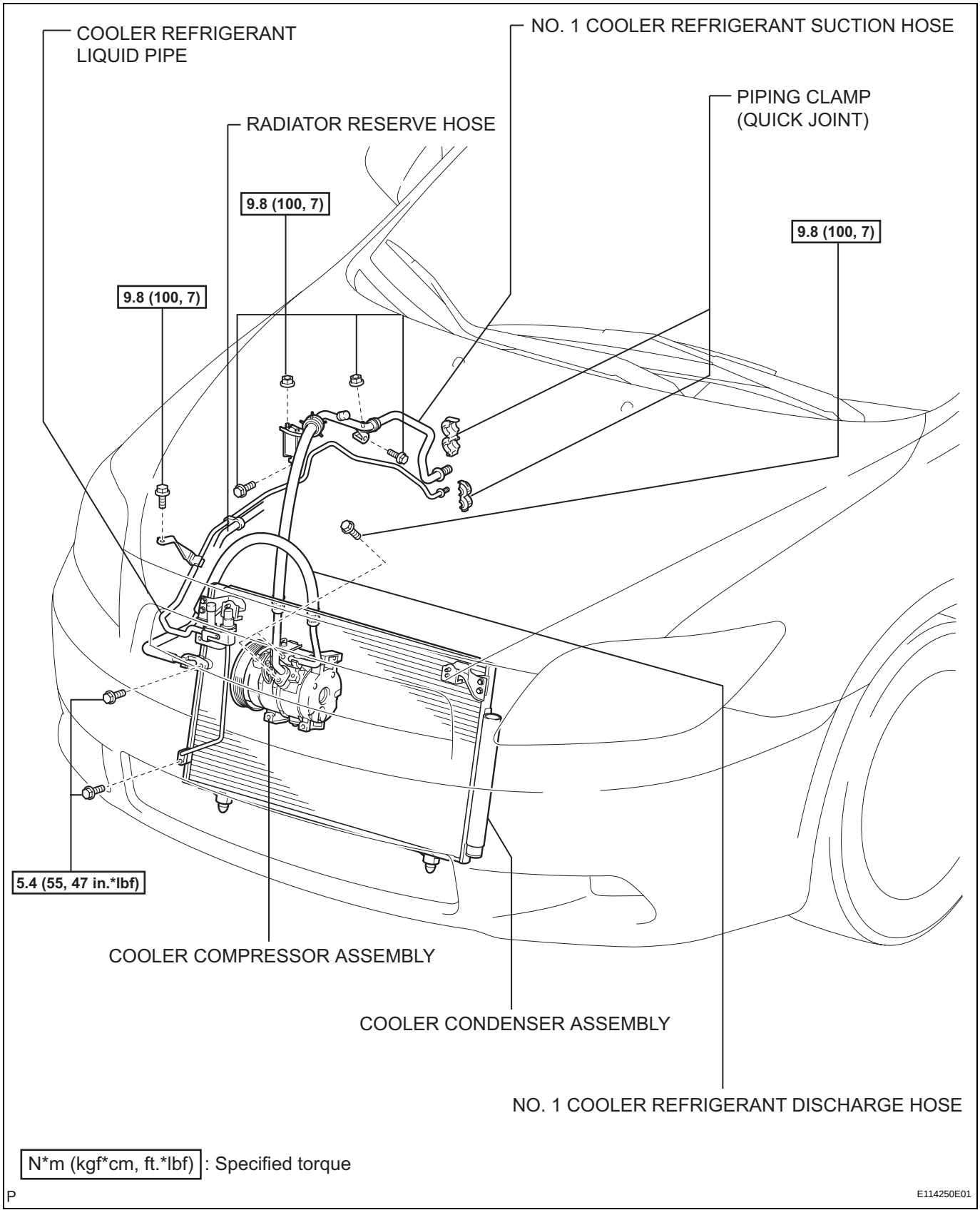
(d) Bring the gas leak detector close to the drain hose with the detector's power off, and then turn the detector on.
NOTICE:
- **After the blower motor has stopped, let the cooling unit stand for more than 15 minutes.**
- **Bring the gas leak detector sensor under the drain hose.**
- **When bringing the gas leak detector close to the drain hose, make sure that the gas leak detector does not react to volatile gases. If it is not possible to avoid interference from volatile gases, the vehicle should be lifted up to allow testing.**

(e) If a gas leak is not detected from the drain hose, remove the blower motor control from the cooling unit. Insert the gas leak detector sensor into the unit and perform the test.

(f) Disconnect the pressure switch connector and leave it for approximately 20 minutes. Bring the gas leak detector close to the pressure switch and perform the test.

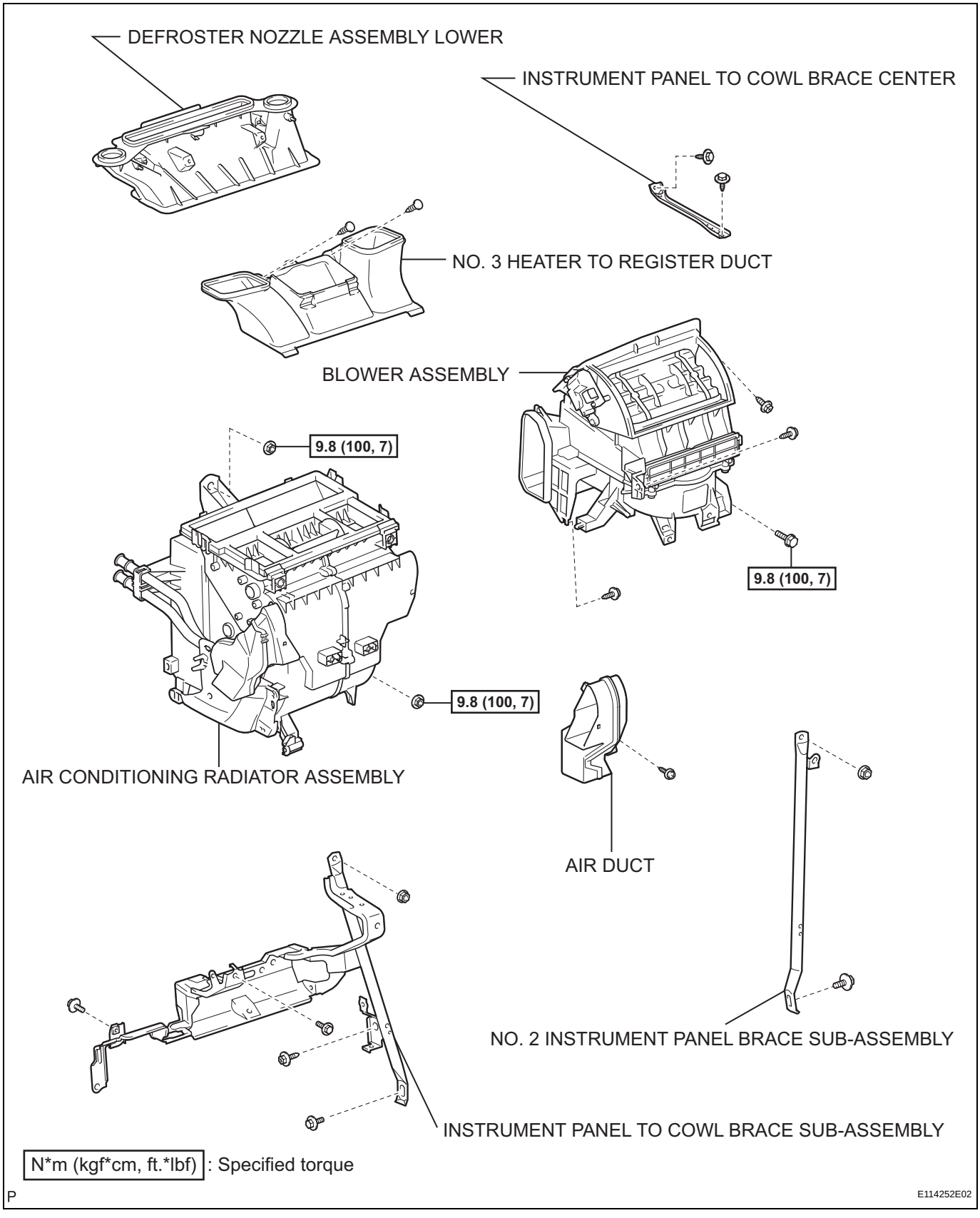
REFRIGERANT LINE

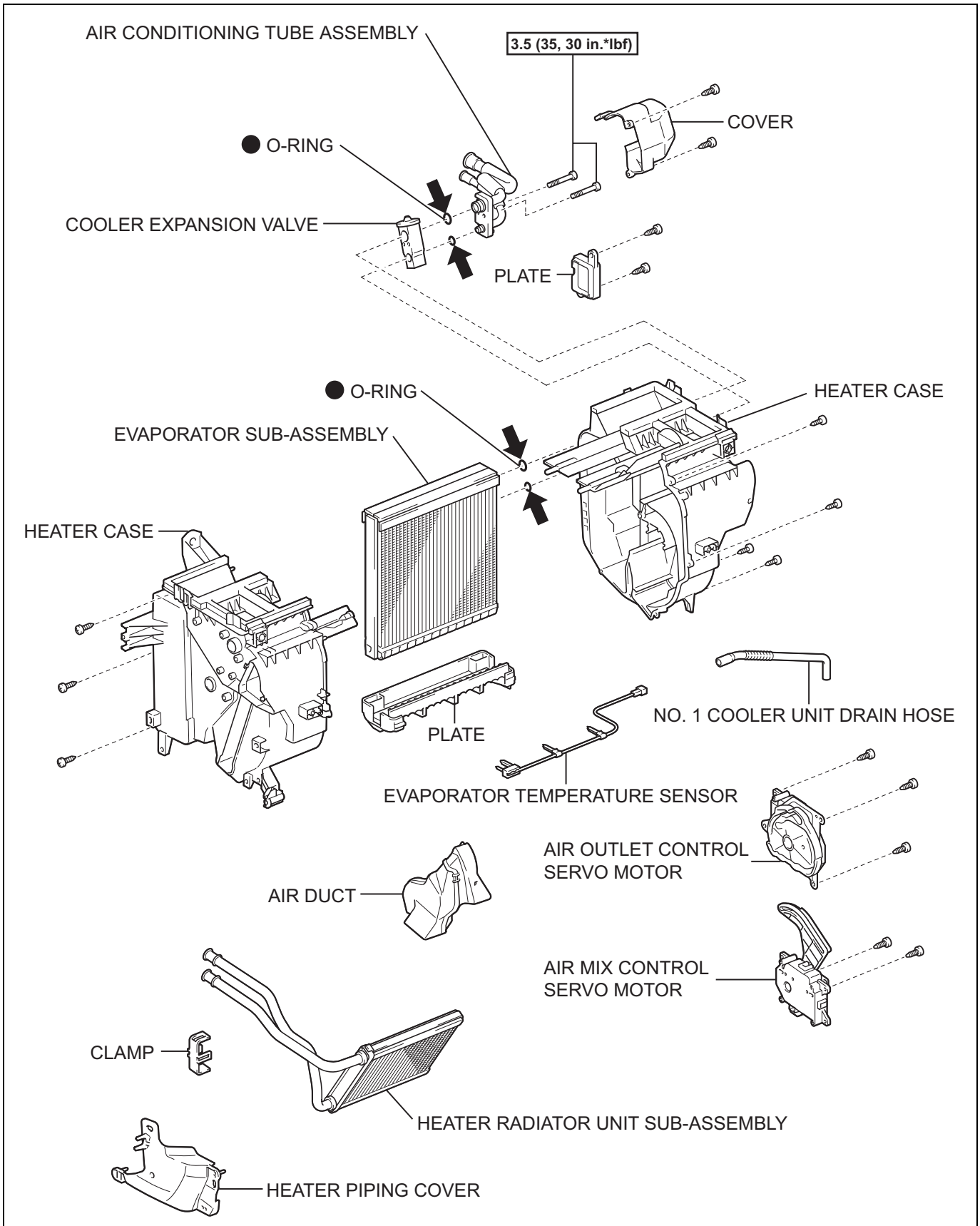
COMPONENTS



AIR CONDITIONING UNIT

COMPONENTS




AIR CONDITIONING TUBE ASSEMBLY
3.5 (35, 30 in.*lbf)
COVER
O-RING
COOLER EXPANSION VALVE
PLATE
O-RING
HEATER CASE
EVAPORATOR SUB-ASSEMBLY
HEATER CASE
PLATE
NO. 1 COOLER UNIT DRAIN HOSE
EVAPORATOR TEMPERATURE SENSOR
AIR OUTLET CONTROL SERVO MOTOR
AIR DUCT
AIR MIX CONTROL SERVO MOTOR
CLAMP
HEATER RADIATOR UNIT SUB-ASSEMBLY
HEATER PIPING COVER
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
Compressor oil ND-OIL 8 or equivalent
E114253E01

AC

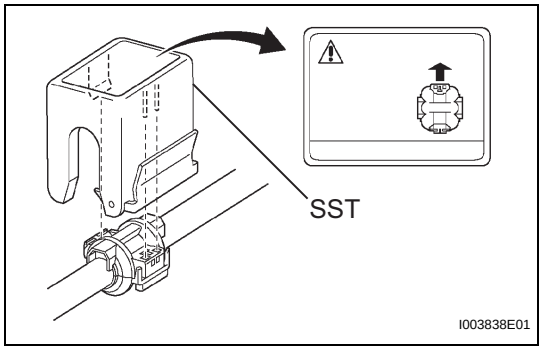
P

REMOVAL

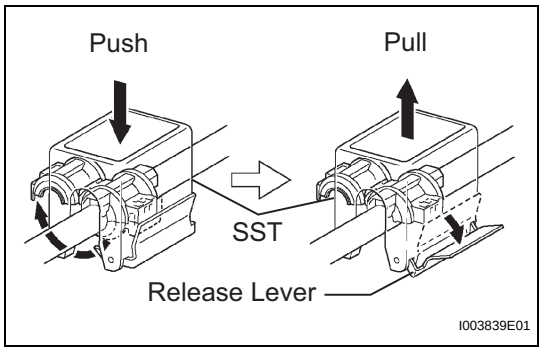
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page AC-15)**

3. **DISCONNECT NO. 1 COOLER REFRIGERANT SUCTION HOSE**

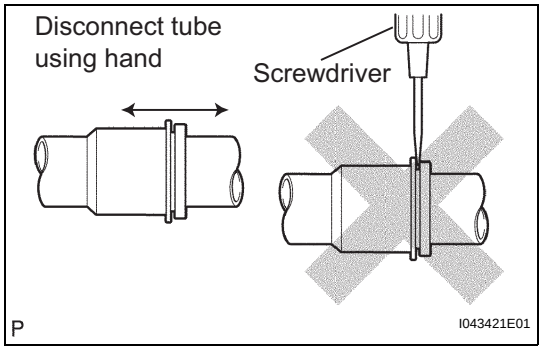


(a) Install SST on the piping clamp.
SST 09870-00025
HINT:
Confirm the correct direction of the piping clamp claw and SST by checking the illustration on the caution label.



(b) Push down SST and release the clamp lock.
NOTICE:
Be careful not to deform the tube when pushing SST.

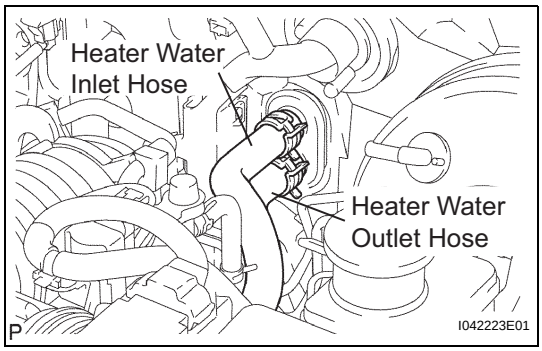
(c) Pull SST slightly and push the release lever, and then remove the piping clamp with SST.



(d) Disconnect the cooler refrigerant suction hose.
NOTICE:
- **Do not use a screwdriver or similar tool to disconnect the hose.**
- **Seal the openings of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering them.**

(e) Remove the 2 O-rings from the cooler refrigerant suction hose.

4. **DISCONNECT COOLER REFRIGERANT LIQUID PIPE**
SST 09870-00015
HINT:
Disconnection of the cooler refrigerant liquid pipe is the same as for the cooler refrigerant suction hose.



5. DISCONNECT HEATER WATER INLET HOSE

(a) Using pliers, grip the claws of the clip and slide the clip.

(b) Disconnect the heater water inlet hose.

6. DISCONNECT HEATER WATER OUTLET HOSE

HINT:

Disconnection of the heater water outlet hose is the same as for the heater water inlet hose.

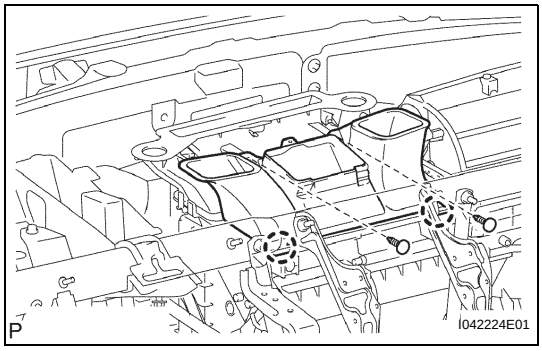
7. REMOVE INSTRUMENT PANEL SUB-ASSEMBLY UPPER

(a) Remove the instrument panel sub-assembly upper (see page IP-4).

8. REMOVE INSTRUMENT PANEL SUB-ASSEMBLY LOWER

(a) Remove the instrument panel sub-assembly lower (see page IP-16).

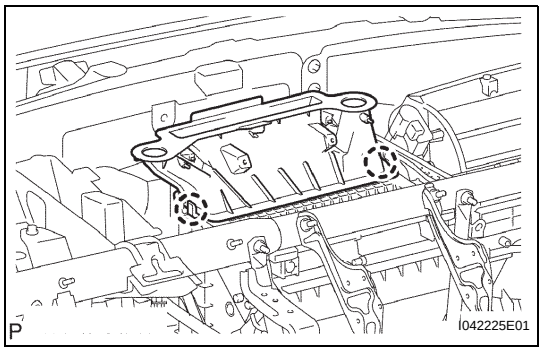
9. REMOVE ECM (See page ES-407)



10. REMOVE NO. 3 HEATER TO REGISTER DUCT

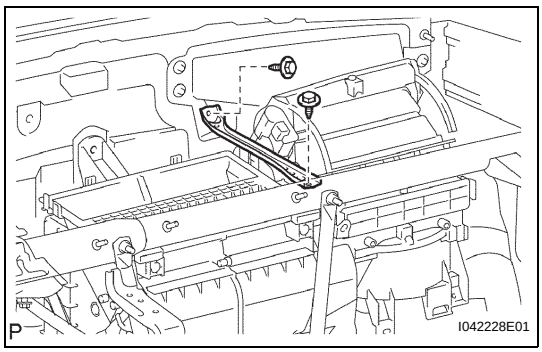
(a) Remove the 2 clips.

(b) Detach the 2 claws and remove the heater to register duct.



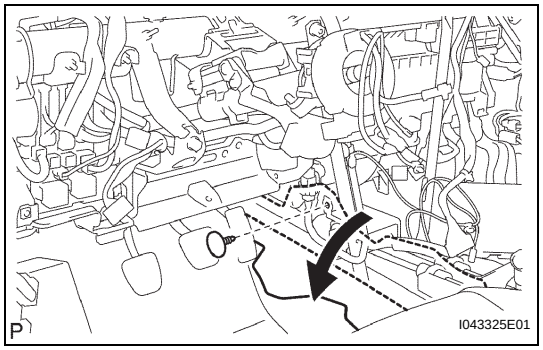
11. REMOVE DEFROSTER NOZZLE ASSEMBLY LOWER

(a) Detach the 2 claws and remove the defroster nozzle assembly lower.



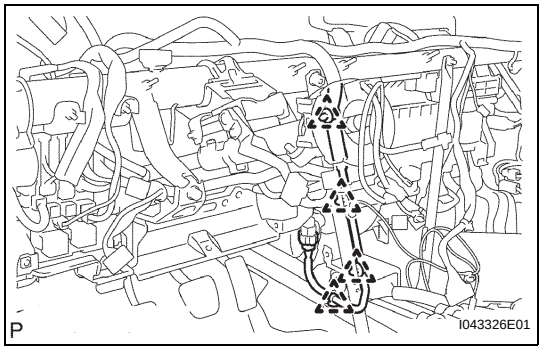
12. REMOVE INSTRUMENT PANEL TO COWL BRACE CENTER

(a) Remove the 2 bolts and instrument panel to cowl brace center.

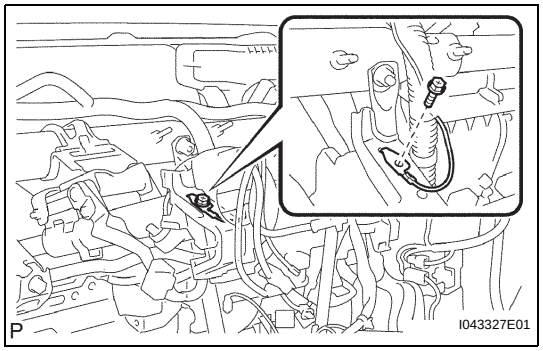


13. REMOVE INSTRUMENT PANEL TO COWL BRACE SUB-ASSEMBLY

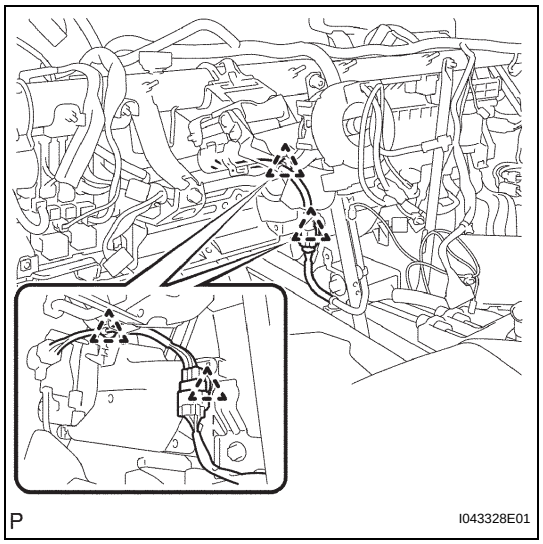
(a) Remove the clip and fold the floor carpet back.



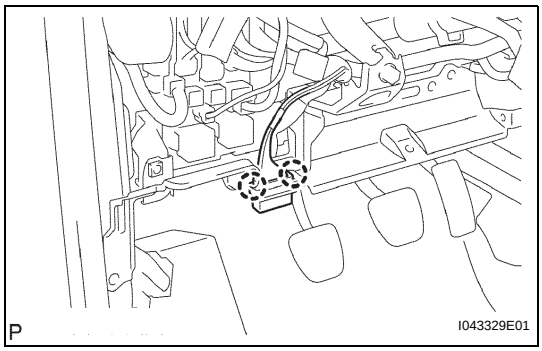
(b) Disconnect the 4 clamps and disconnect the wire harness.



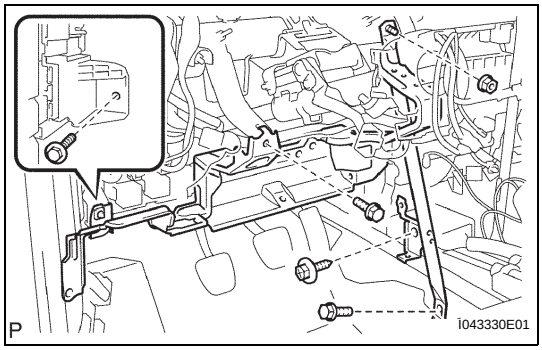
(c) Remove the bolt and disconnect the ground wire.



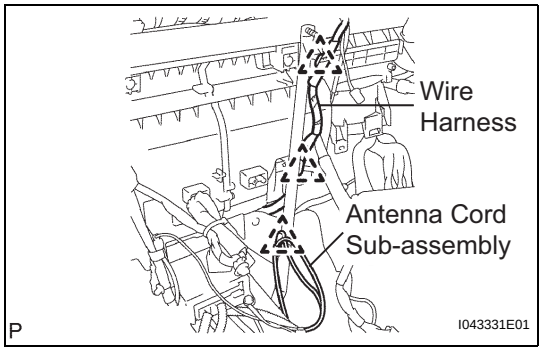
(d) Disconnect the 2 clamps and disconnect the wire harness.



(e) Detach the 2 claws and disconnect the connector.



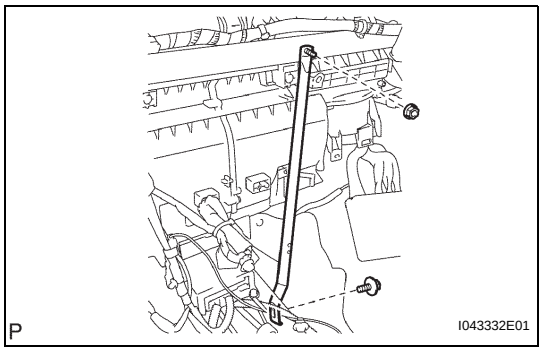
(f) Remove the 3 bolts, nut, screw and instrument panel to cowl brace sub-assembly.



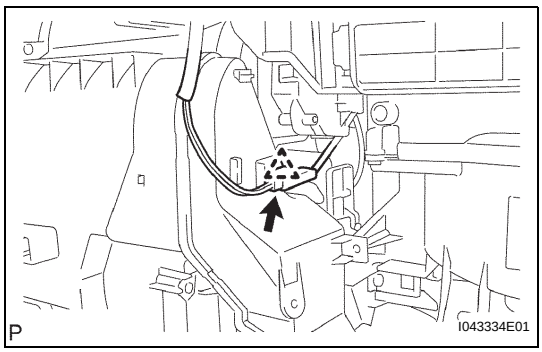
14. REMOVE NO. 2 INSTRUMENT PANEL BRACE SUB-ASSEMBLY

(a) Disconnect the 2 clamps and separate the wire harness.

(b) Disconnect the clamp and separate the antenna cord sub-assembly.

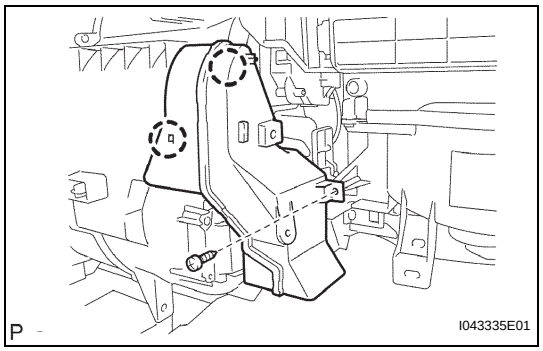


(c) Remove the bolt, nut and instrument panel brace.



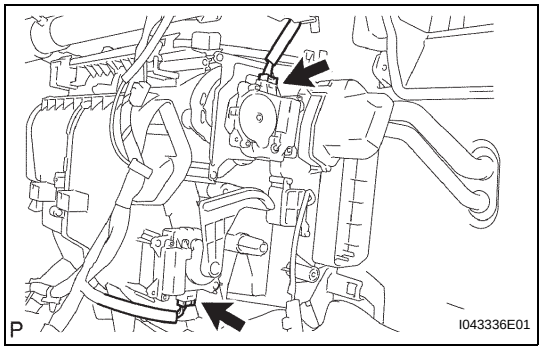
15. REMOVE AIR DUCT

(a) Remove the connectors from the air duct and disconnect the connector.

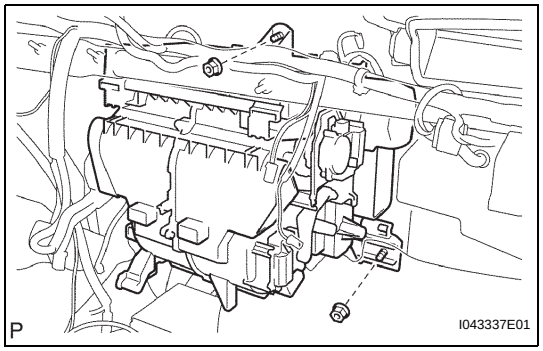


(b) Remove the screw.
(c) Detach the 2 claws and remove the air duct.

16. REMOVE BLOWER ASSEMBLY (See page AC-38)

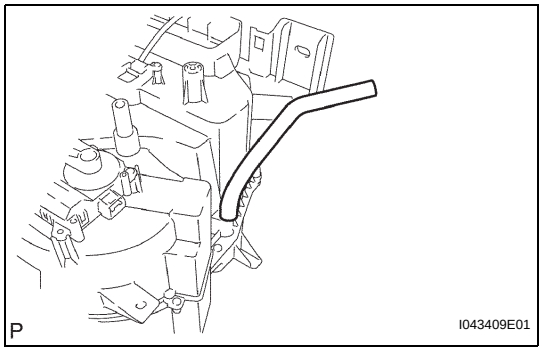


17. REMOVE AIR CONDITIONING RADIATOR ASSEMBLY
(a) Remove the 2 connectors.

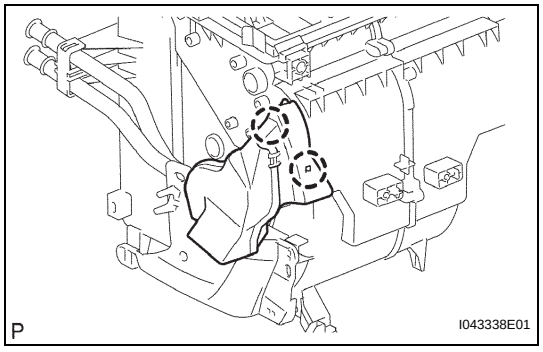


(b) Remove the 2 nuts and the air conditioning radiator.

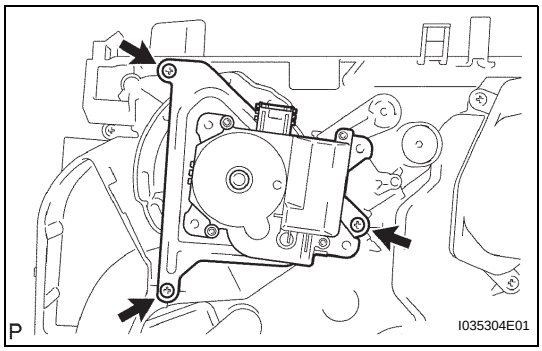
DISASSEMBLY



1. REMOVE NO. 1 COOLER UNIT DRAIN HOSE
(a) Remove the cooler unit drain hose.

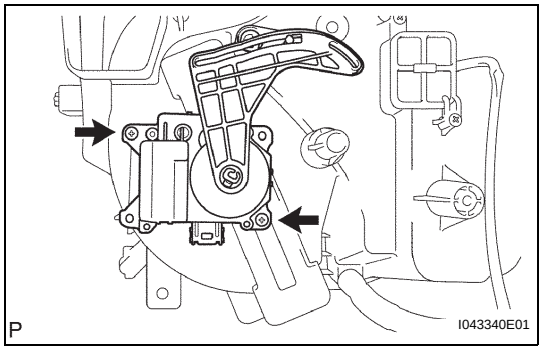


2. REMOVE AIR DUCT
(a) Detach the 2 claws and remove the air duct.



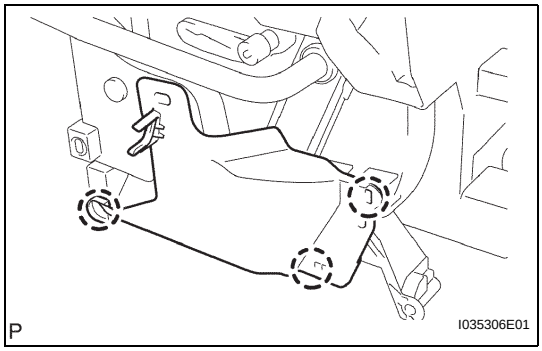
3. REMOVE AIR OUTLET CONTROL SERVO MOTOR

(a) Remove the 3 screws and air outlet control servo motor.



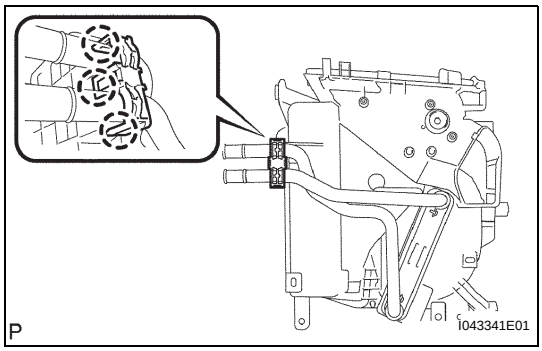
4. REMOVE AIR MIX CONTROL SERVO MOTOR

(a) Remove the 2 screws and air mix control servo motor.



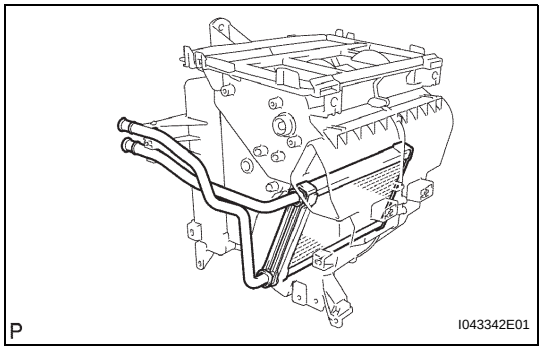
5. REMOVE HEATER PIPING COVER

(a) Detach the 3 claws and remove the heater piping cover.

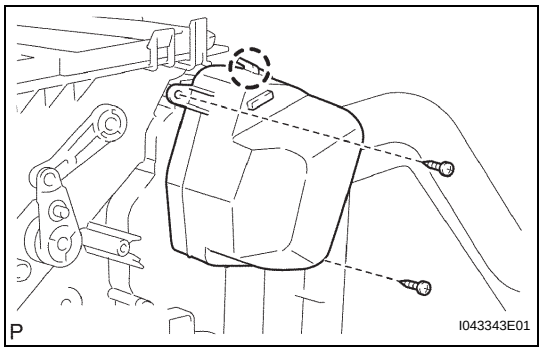


6. REMOVE HEATER RADIATOR UNIT SUB-ASSEMBLY

(a) Detach the 3 claws and remove the clamp.



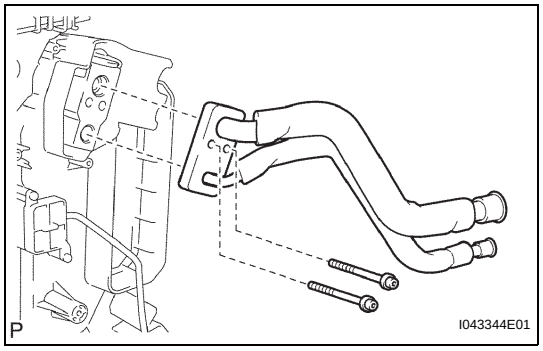
(b) Remove the heater radiator unit.



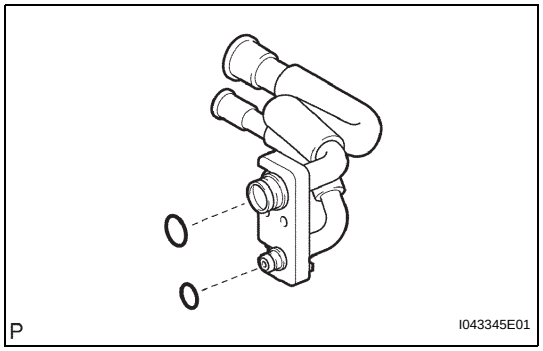
7. REMOVE AIR CONDITIONING TUBE ASSEMBLY

(a) Remove the 2 screws.

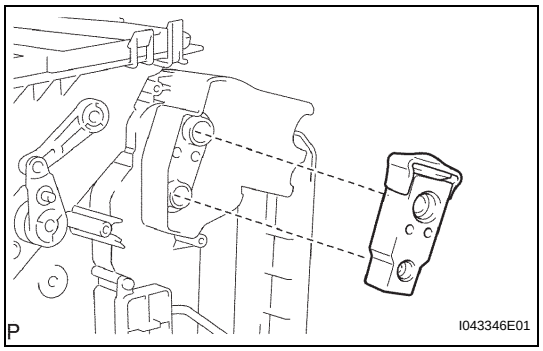
(b) Detach the claw and remove the cover.



(c) Using a 4 mm hexagon wrench, remove the 2 hexagon bolts and air conditioning tube.

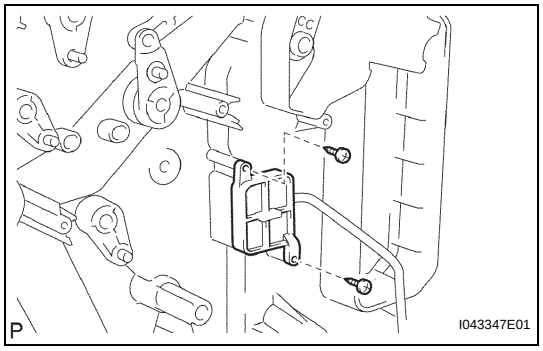


(d) Remove the 2 O-rings from the air conditioning tube.



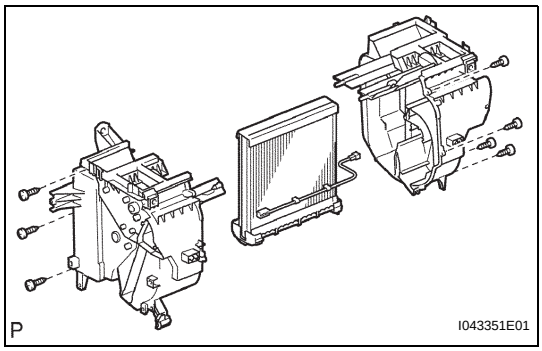
8. REMOVE COOLER EXPANSION VALVE

(a) Remove the cooler expansion valve from the cooler evaporator.

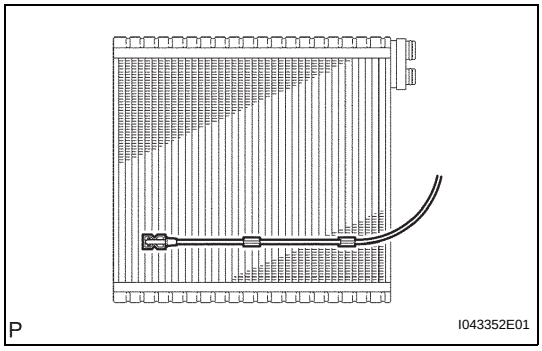


9. REMOVE EVAPORATOR TEMPERATURE SENSOR

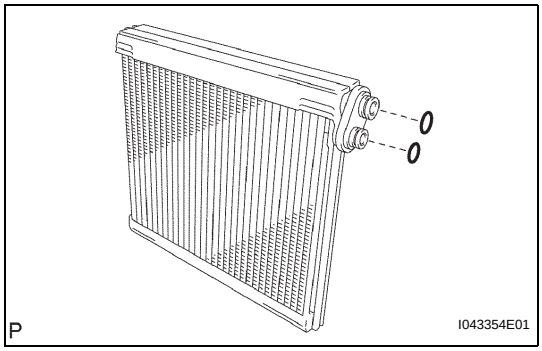
(a) Remove the 2 screws and plate.



(b) Remove the 7 screws, cooler evaporator and evaporator temperature sensor.

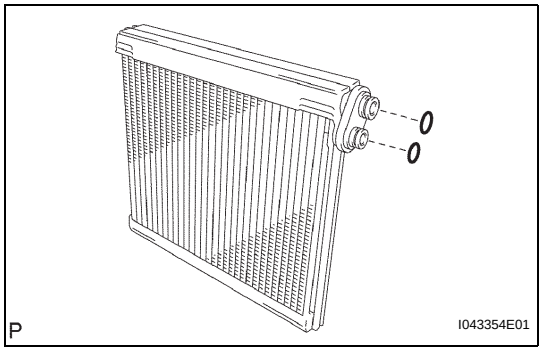


(c) Remove the evaporator temperature sensor from the cooler evaporator.



10. REMOVE EVAPORATOR SUB-ASSEMBLY

(a) Remove the 2 O-rings from the cooler evaporator.

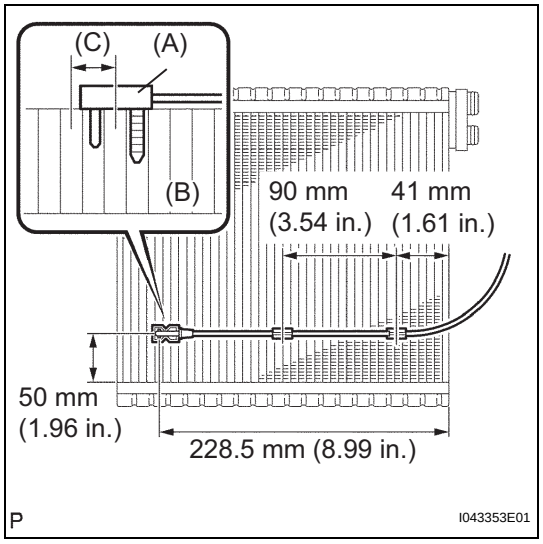


REASSEMBLY

1. INSTALL COOLER EVAPORATOR SUB-ASSEMBLY

(a) Sufficiently apply compressor oil to 2 new O-rings and the fitting surface of the cooler evaporator.
Compressor oil:
ND-OIL 8 or equivalent

(b) Install the 2 O-rings on the cooler evaporator.



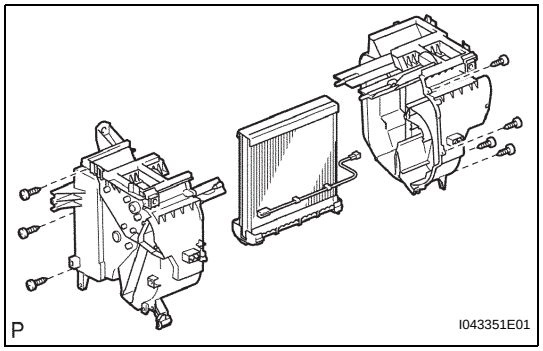
2. INSTALL EVAPORATOR TEMPERATURE SENSOR

(a) Install the evaporator temperature sensor as shown in the illustration.

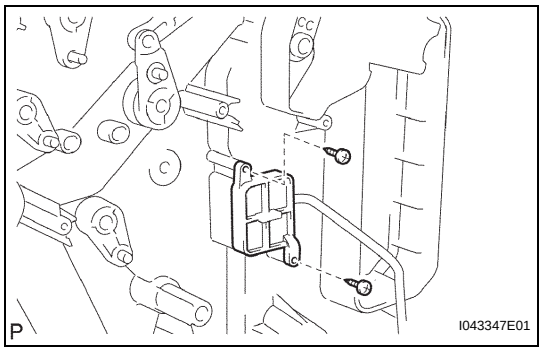
(b) Check that the sensor sticks to the evaporator surface as shown in the illustration (A: Sensor, B: Evaporator).

NOTICE:

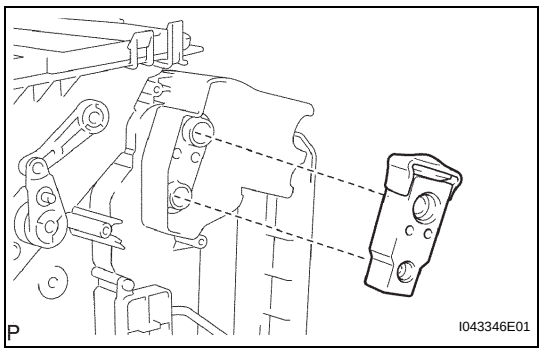
If reusing the evaporator, DO NOT insert the sensor to the position that it had been inserted before. Insert it between position C shown in the illustration.



(c) Install the cooler evaporator on the heater case with the 7 screws.

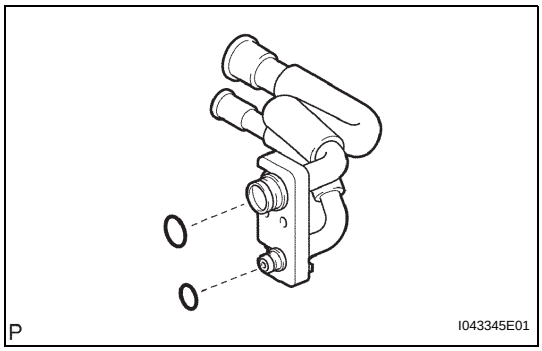


(d) Install the plate with the 2 screws.



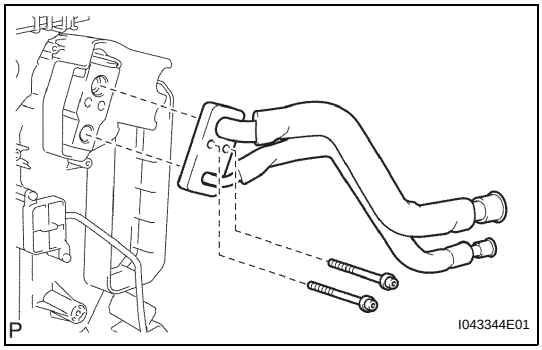
3. INSTALL COOLER EXPANSION VALVE

(a) Install the cooler expansion valve to the cooler evaporator.

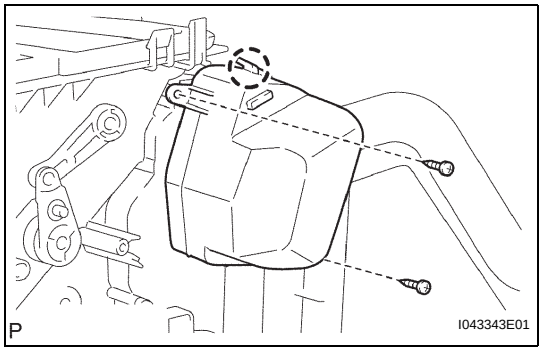


4. INSTALL AIR CONDITIONING TUBE ASSEMBLY

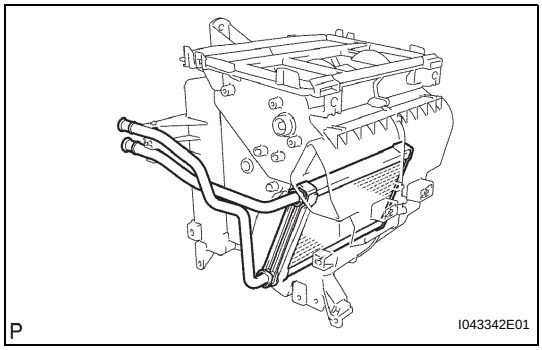
(a) Sufficiently apply compressor oil to 2 new O-rings and the fitting surface of the air conditioning tube.
Compressor oil:
ND-OIL 8 or equivalent



(b) Using a 4 mm hexagon wrench, install the air conditioning tube with the 2 hexagon bolts.
Torque: 3.5 N*m (35 kgf*cm, 30 in.*lbf)

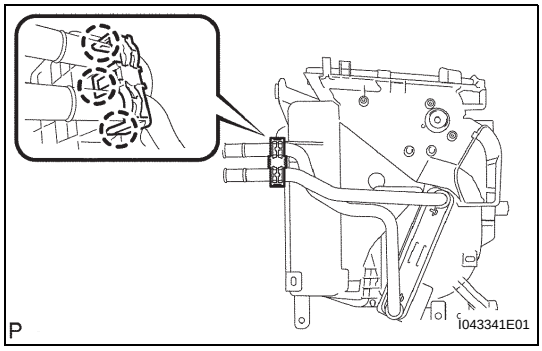


(c) Install the cover with the claw and 2 screws.

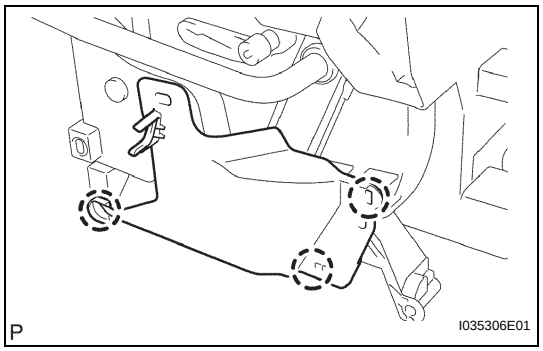


5. INSTALL HEATER RADIATOR UNIT SUB-ASSEMBLY

(a) Install the heater radiator unit.

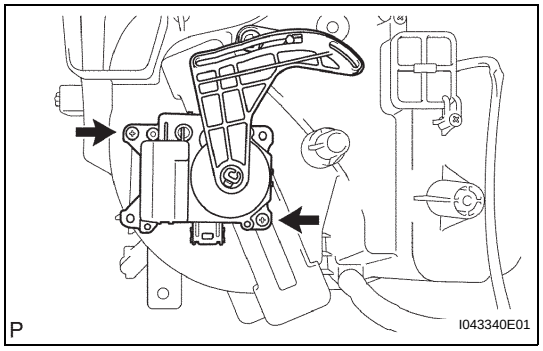


(b) Attach the 3 claws and install the clamp.



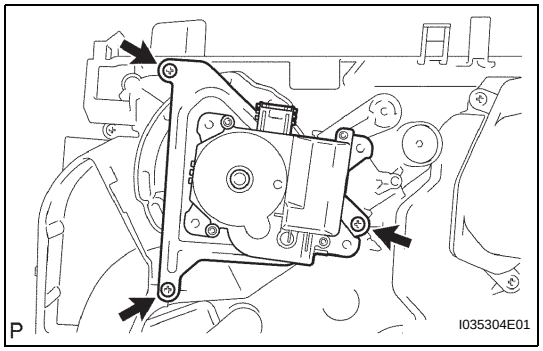
6. INSTALL HEATER PIPING COVER

(a) Attach the 3 claws and install the heater piping cover.



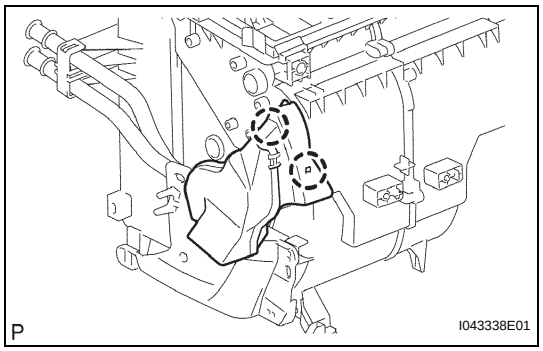
7. INSTALL AIR MIX CONTROL SERVO MOTOR

(a) Install the air mix control servo motor with the 2 screws.



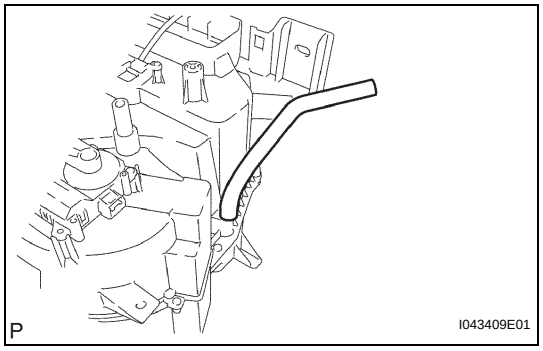
8. INSTALL AIR OUTLET CONTROL SERVO MOTOR

(a) Install the air outlet control servo motor with the 3 screws.



9. INSTALL AIR DUCT

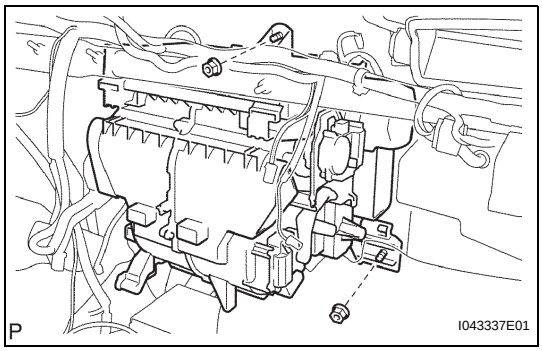
(a) Attach the 2 claws and install the air duct.



10. INSTALL NO. 1 COOLER UNIT DRAIN HOSE

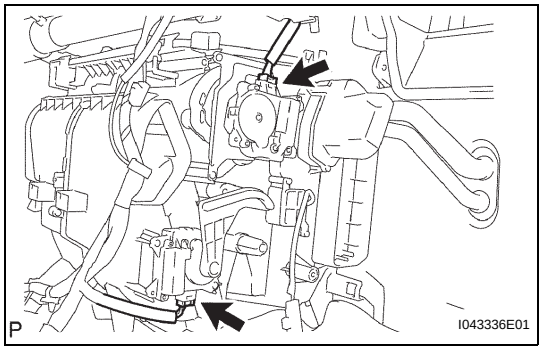
(a) Install the cooler unit drain hose.

INSTALLATION



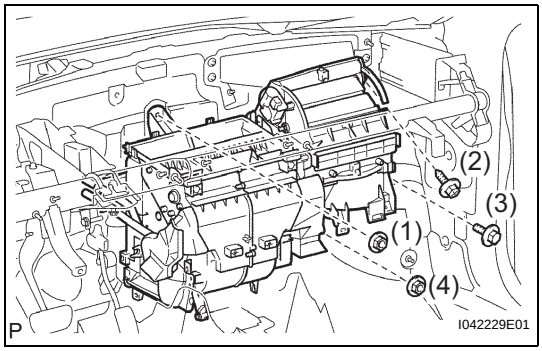
1. INSTALL AIR CONDITIONING RADIATOR ASSEMBLY

(a) Temporarily tighten the air conditioning radiator with the 2 nuts.



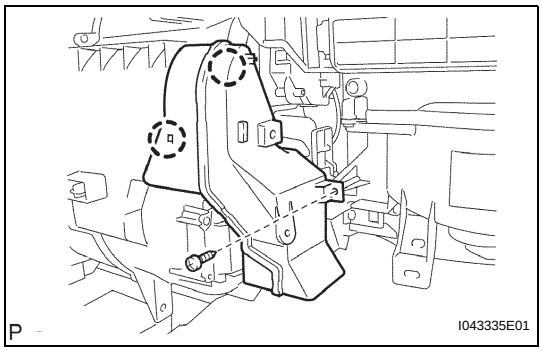
(b) Connect the 2 connectors.

2. INSTALL BLOWER ASSEMBLY (See page AC-40)



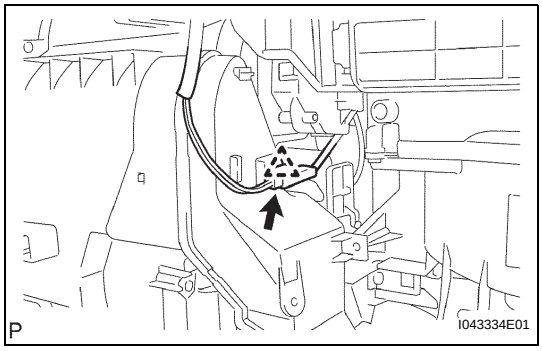
3. INSTALL AIR CONDITIONING UNIT ASSEMBLY

(a) Fully tighten the air conditioner unit with the bolt, screw and 2 nuts.
Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)
NOTICE:
Tighten in the order indicated in the illustration.



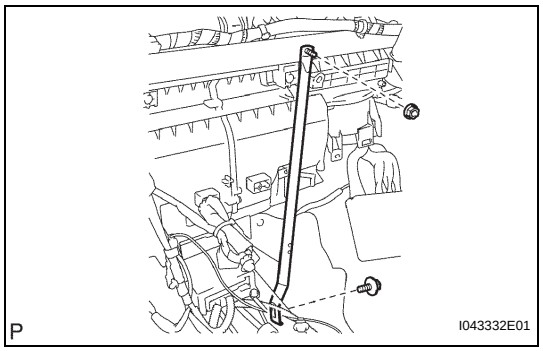
4. INSTALL AIR DUCT

(a) Attach the 2 claws and install the air duct.



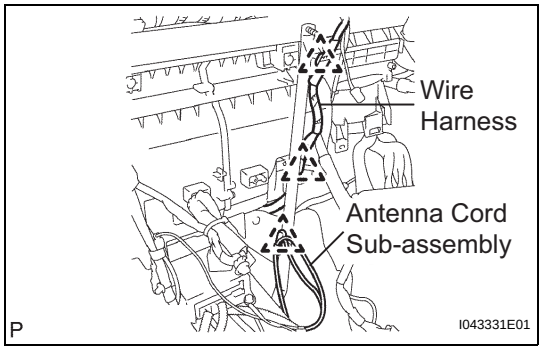
(b) Install the screw.

(c) Connect the connector and install the connector to the air duct.

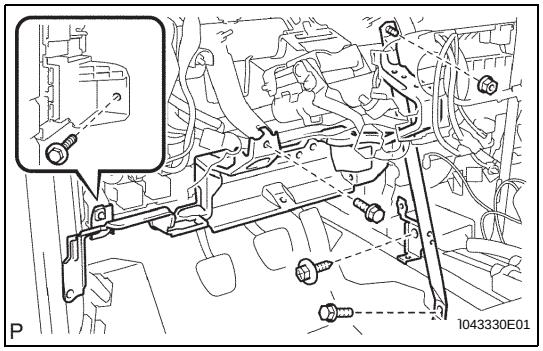


5. INSTALL NO. 2 INSTRUMENT PANEL BRACE SUB-ASSEMBLY

(a) Install the instrument panel brace with the bolt and nut.

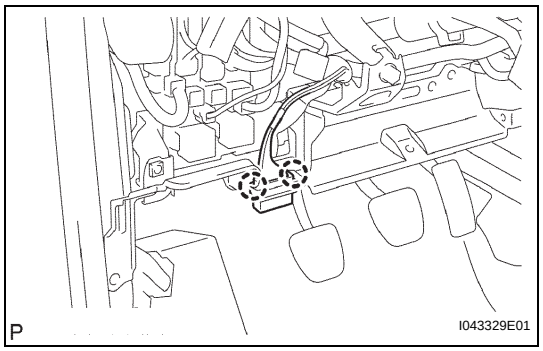


(b) Install the antenna cord and attach the clamp.
(c) Install the wire harness and attach the 2 clamps.

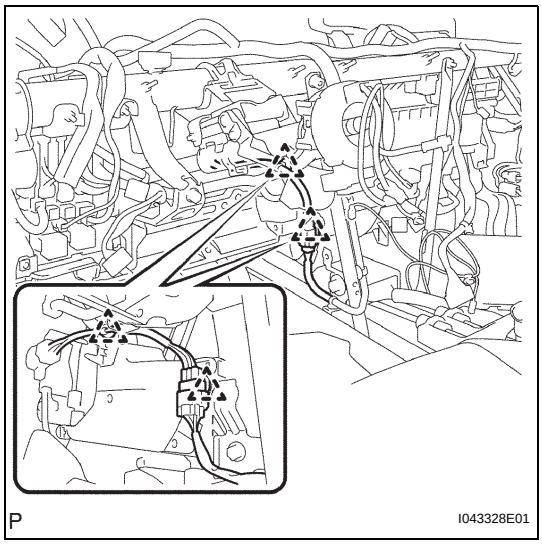


6. INSTALL INSTRUMENT PANEL TO COWL BRACE SUB-ASSEMBLY

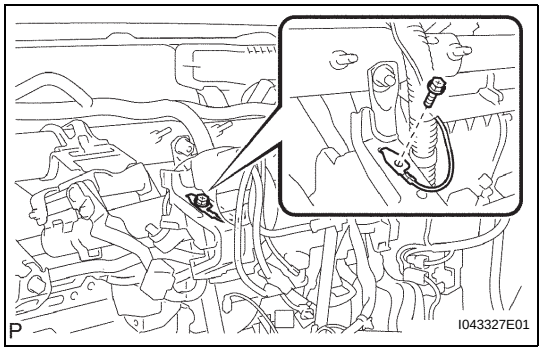
(a) Install the instrument panel to cowl brace with the 3 bolts and nut.



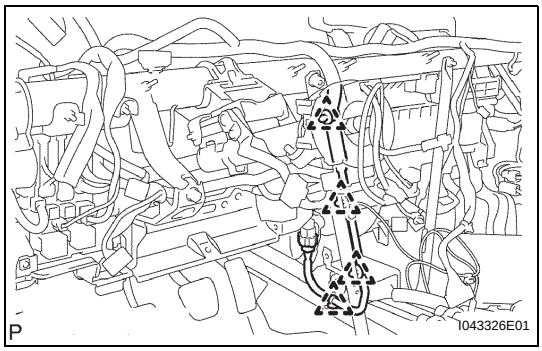
(b) Attach the 2 claws to install the connector.



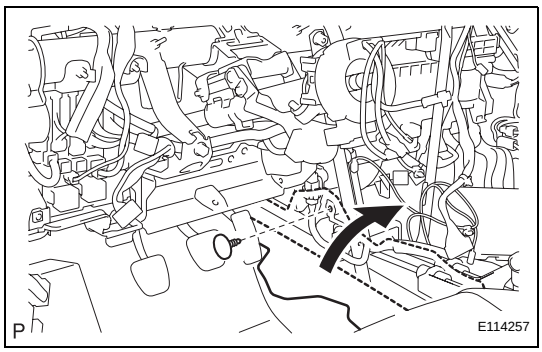
(c) Install the wire harness and attach the 2 clamps.



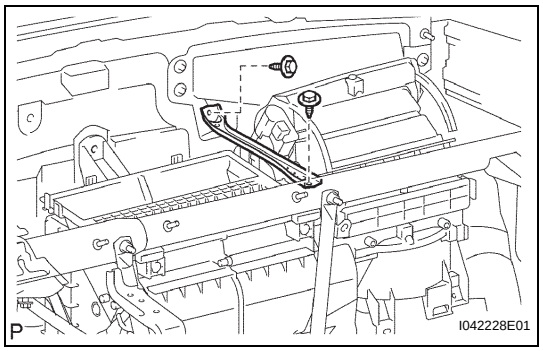
(d) Install the ground wire with the bolt.



(e) Install the wire harness and attach the 4 clamps.

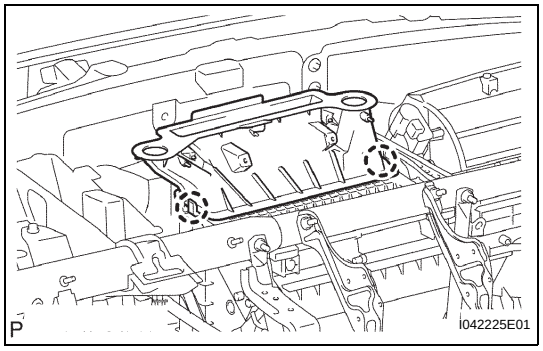


(f) Reposition the floor carpet and install the clip.



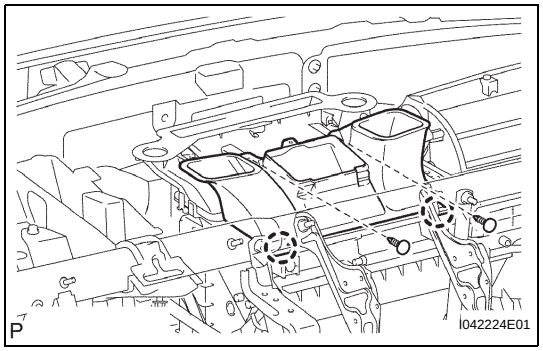
7. INSTALL INSTRUMENT PANEL TO COWL BRACE CENTER

(a) Install the instrument panel to cowl brace center with the 2 bolts.



8. INSTALL DEFROSTER NOZZLE ASSEMBLY LOWER

(a) Attach the 2 claws and install the defroster nozzle assembly lower.



9. INSTALL NO. 3 HEATER TO REGISTER DUCT

(a) Attach the 2 claws and install the heater to register duct.

(b) Install the 2 clips.

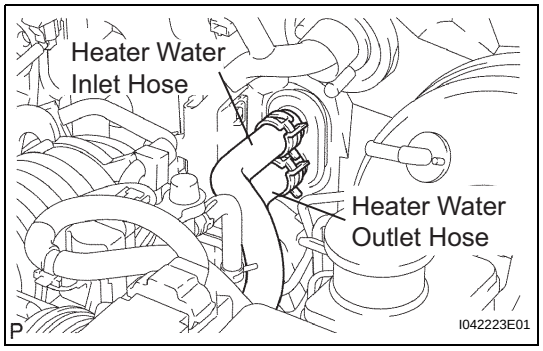
10. INSTALL ECM (See page ES-408)

11. INSTALL INSTRUMENT PANEL LOWER ASSEMBLY

(a) Install the instrument panel lower assembly (see page IP-21).

12. INSTALL INSTRUMENT PANEL SUB-ASSEMBLY UPPER

(a) Install the instrument panel sub-assembly upper (see page IP-9).



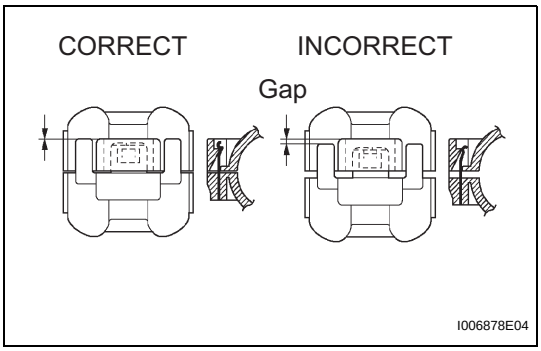
13. CONNECT HEATER WATER OUTLET HOSE

(a) Connect the water hose and attach the clip.

14. CONNECT HEATER WATER INLET HOSE

HINT:

Use the same procedures described for the water hose.



15. **INSTALL COOLER REFRIGERANT LIQUID PIPE**
    (a) Remove the attached vinyl tape from the pipe.
    (b) Sufficiently apply compressor oil to new 2 O-rings and the fitting surface of the cooler refrigerant liquid pipe A.
    Compressor oil:
    ND-OIL 8 or equivalent
    (c) Install the 2 O-rings on the cooler refrigerant liquid pipe.
    (d) Install the cooler refrigerant liquid pipe and piping clamp.
    HINT:
    After the connection, check that the claw of the piping clamp is engaged.

16. **INSTALL NO. 1 COOLER REFRIGERANT SUCTION HOSE**
    (a) Remove the attached vinyl tape from the pipe.
    (b) Sufficiently apply compressor oil to new 2 O-rings and the fitting surface of the cooler refrigerant suction hose.
    Compressor oil:
    ND-OIL 8 or equivalent
    (c) Install the 2 O-rings on the cooler refrigerant suction hose.
    (d) Install the cooler refrigerant suction hose and the piping clamp.
    HINT:
    After the connection, check that the claw of the piping clamp is engaged.

17. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

18. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

19. **INSPECT SRS WARNING LIGHT**
    (a) Check the SRS warning light (see page RS-11).

20. **ADD ENGINE COOLANT (See page CO-6)**

21. **CHARGE REFRIGERANT (See page AC-15)**

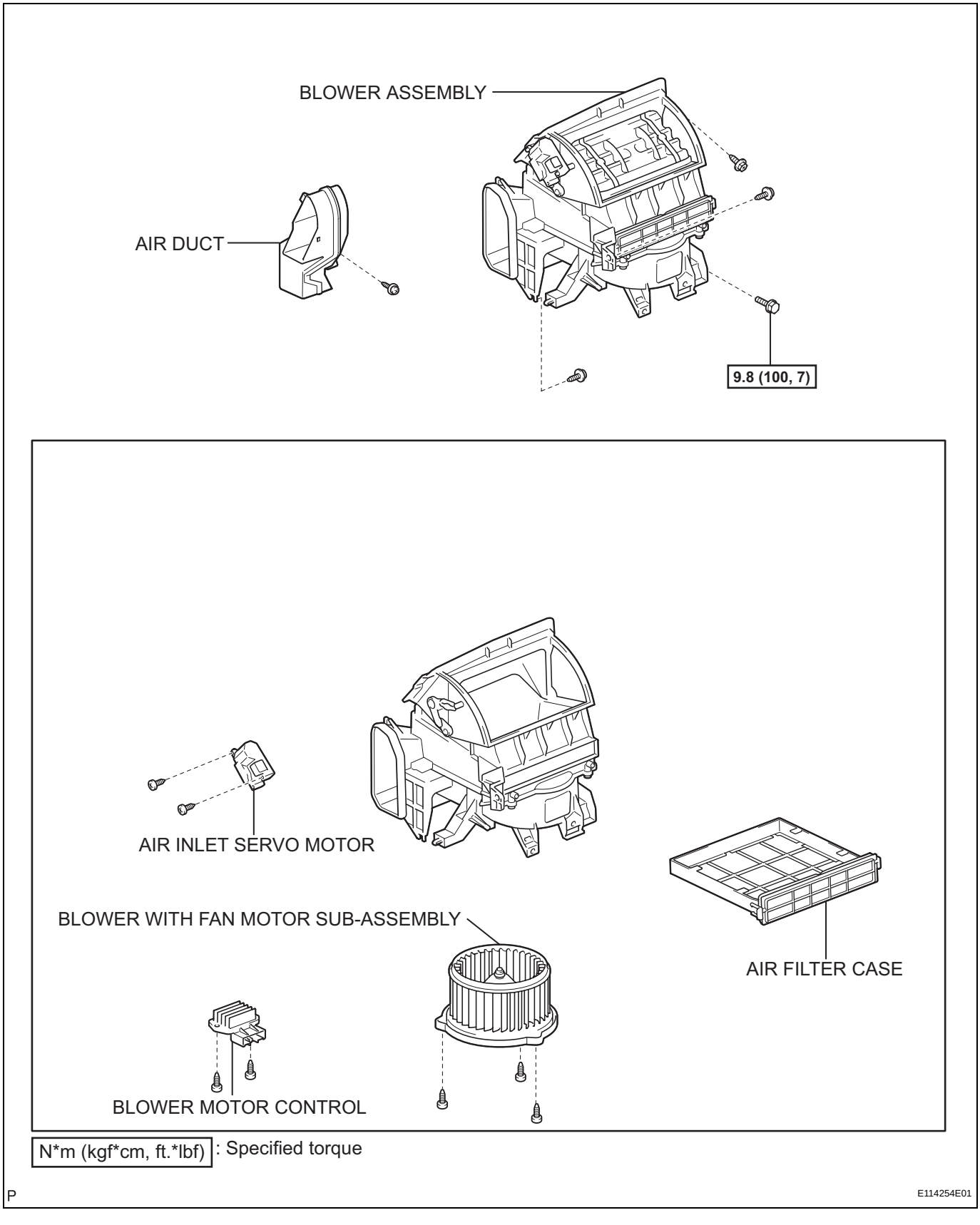
22. **WARM UP ENGINE (See page AC-16)**

23. **INSPECT FOR ENGINE COOLANT LEAK (See page CO-1)**

24. **INSPECT FOR REFRIGERANT LEAK (See page AC-16)**

BLOWER UNIT

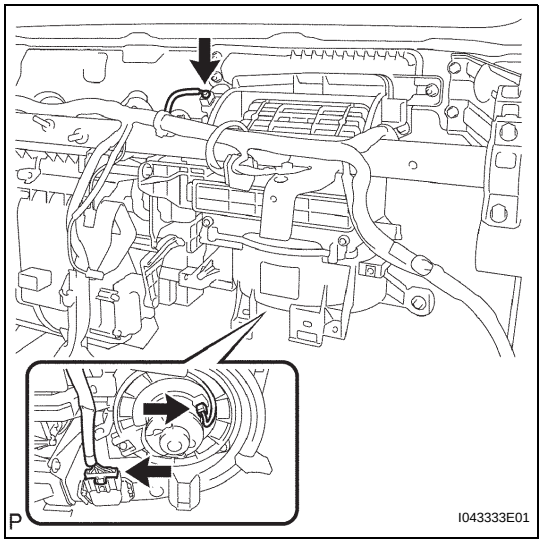
COMPONENTS



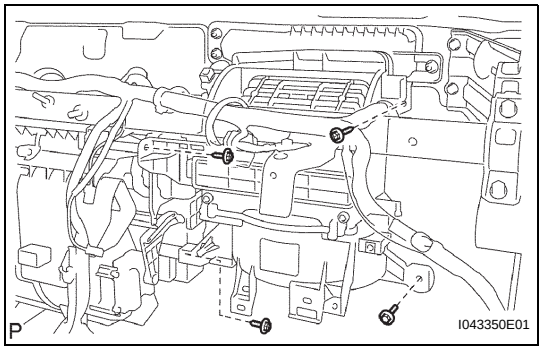
AC

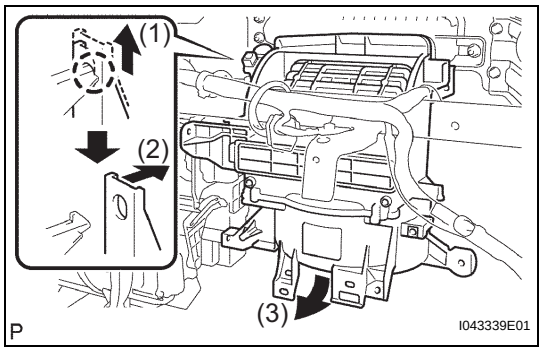
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE INSTRUMENT PANEL SUB-ASSEMBLY UPPER**
   (a) Remove the instrument panel sub-assembly upper (see page IP-4).
3. **REMOVE INSTRUMENT PANEL SUB-ASSEMBLY LOWER**
   (a) Remove the instrument panel sub-assembly lower (see page IP-16).
4. **REMOVE ECM (See page ES-407)**
5. **REMOVE AIR DUCT (See page AC-24)**
6. **REMOVE BLOWER ASSEMBLY**
   (a) Disconnect the 3 connectors.



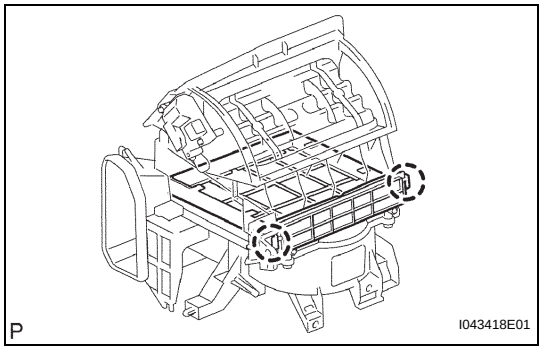
(b) Remove the 3 screws and bolt.





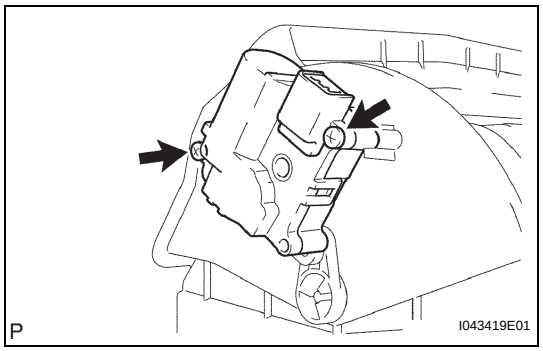
(c) Detach the claw and remove the blower in the order shown in the illustration.

DISASSEMBLY



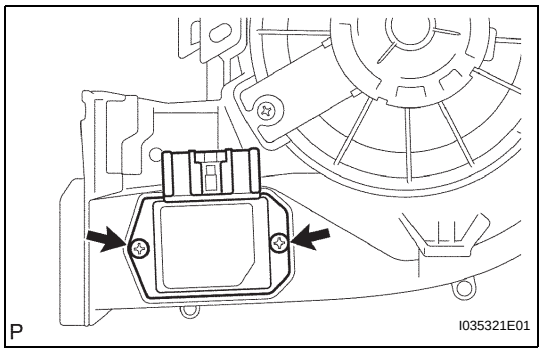
1. REMOVE AIR FILTER CASE

(a) Detach the 2 claws and remove the air filter case.



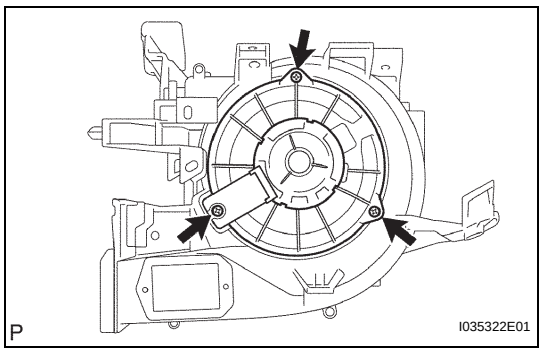
2. REMOVE AIR INLET SERVO MOTOR

(a) Remove the 2 screws and air inlet servo motor.



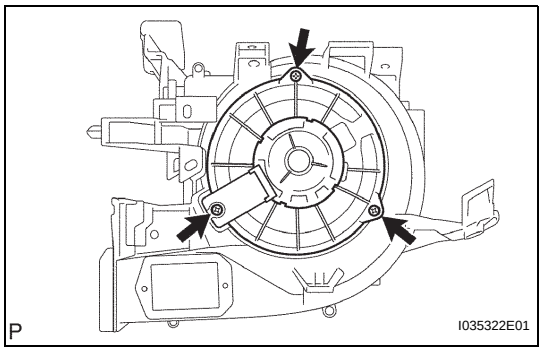
3. REMOVE BLOWER MOTOR CONTROL

(a) Remove the 2 screws and blower motor control.



4. REMOVE BLOWER WITH FAN MOTOR SUB-ASSEMBLY

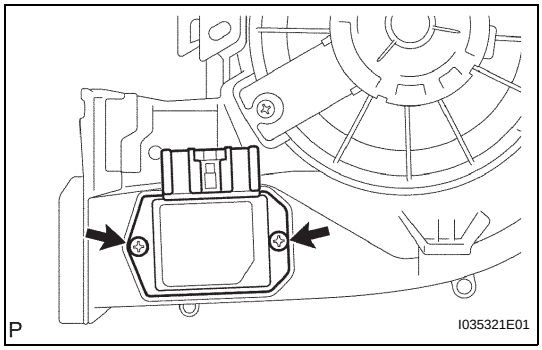
(a) Remove the 3 screws and blower w/ fan motor.



REASSEMBLY

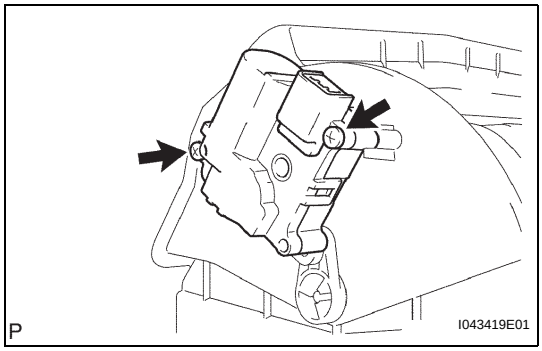
1. INSTALL BLOWER WITH FAN MOTOR SUB-ASSEMBLY

(a) Install the blower motor with the 3 screws.



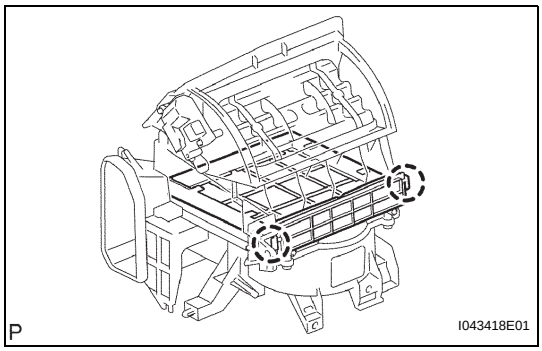
2. INSTALL BLOWER MOTOR CONTROL

(a) Install the blower motor control with the 2 screws.



3. INSTALL AIR INLET SERVO MOTOR

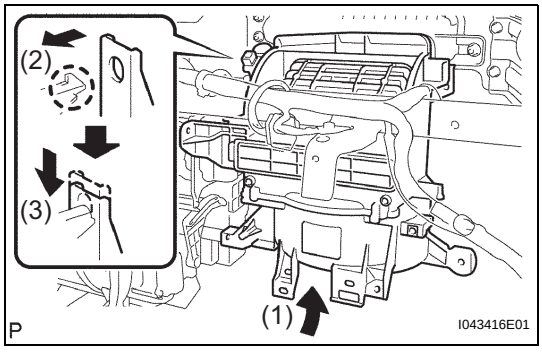
(a) Install the air inlet servo motor with the 2 screws.



4. INSTALL AIR FILTER CASE

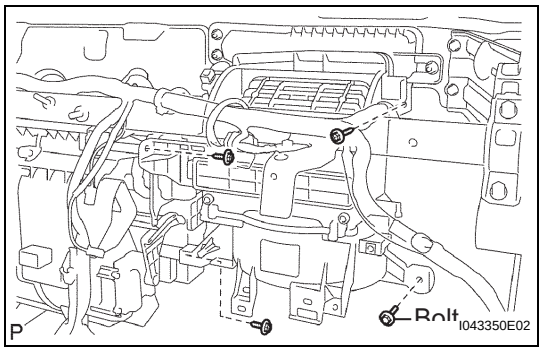
(a) Install the air filter case and attach the 2 claws.

INSTALLATION

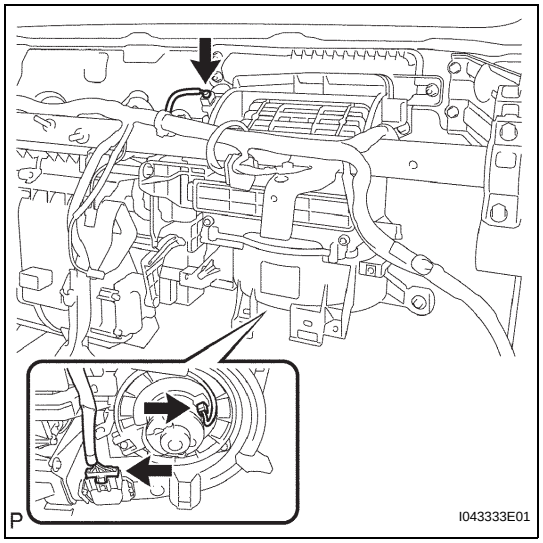


1. INSTALL BLOWER ASSEMBLY

(a) Install the blower assembly with the claw in the order shown in the illustration.



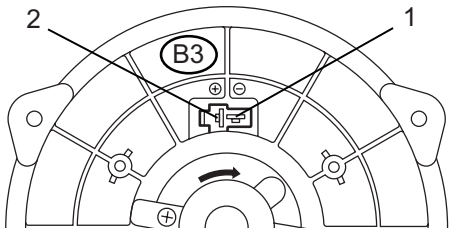
(b) Install the blower assembly with the bolt and 3 screws.
Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf) for bolt



(c) Connect the 3 connectors.

2. **INSTALL AIR DUCT (See page AC-32)**
3. **INSTALL ECM (See page ES-408)**
4. **INSTALL INSTRUMENT PANEL SUB-ASSEMBLY LOWER**
   (a) Install the instrument panel sub-assembly lower (see page IP-21).
5. **INSTALL INSTRUMENT PANEL SUB-ASSEMBLY UPPER**
   (a) Install the instrument panel sub-assembly upper (see page IP-9).
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
7. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
8. **INSPECT SRS WARNING LIGHT**
   (a) Check the SRS warning light (see page RS-11).

Component without harness connected:
(Blower with Fan Motor Sub-assembly)



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E135525E02

BLOWER MOTOR

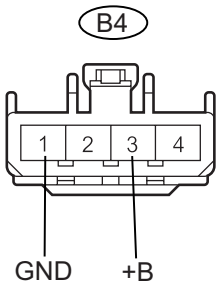
ON-VEHICLE INSPECTION

1. INSPECT BLOWER WITH FAN MOTOR SUB-ASSEMBLY

(a) Disconnect the B3 blower with fan motor connector.

(b) Connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2, and then check that the motor operates smoothly.
If the operation is not as specified, replace the blower motor.

Front view of wire harness connector:
(to Blower Motor Control)



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E135526E01

BLOWER RESISTOR

ON-VEHICLE INSPECTION

1. INSPECT BLOWER MOTOR CONTROL

(a) Disconnect the B4 blower motor control connector.

(b) Measure the voltage of the wire harness side connector.

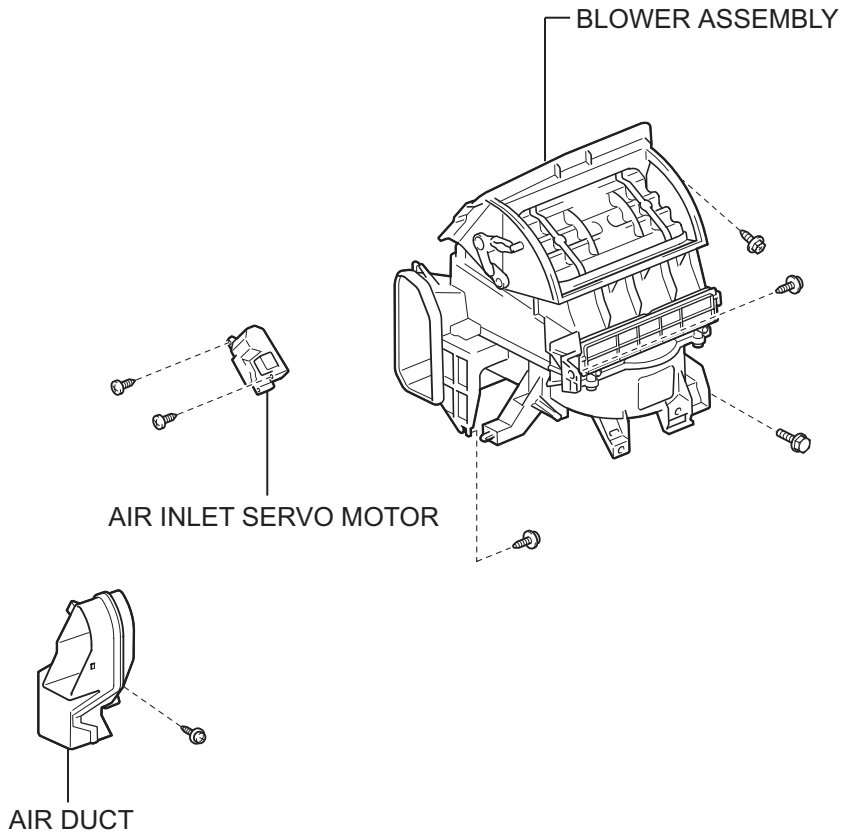
Standard voltage

Tester Connection	Condition	Specified Condition
B4-3 (+B) - B4-1 (GND)	Blower switch: OFF	10 to 14 V
B4-3 (+B) - B4-1 (GND)	Blower switch: LO	Below 1 V

If the voltage is not as specified, replace the blower motor control.

AIR INLET CONTROL SERVO MOTOR

COMPONENTS



E114259E01

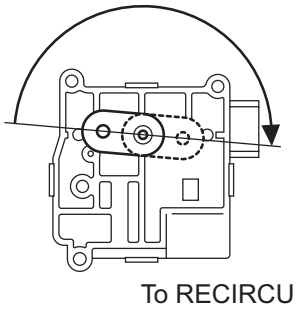
REMOVAL

1. **REMOVE BLOWER ASSEMBLY**
   (a) Remove the blower assembly (see page AC-38).
2. **REMOVE AIR INLET SERVO MOTOR (See page AC-39)**

INSPECTION

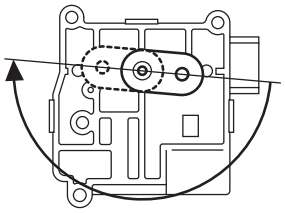
1. **INSPECT AIR INLET SERVO MOTOR**
   (a) Inspect the servo motor operation.
      (1) Connect the positive (+) lead from the battery to terminal D1-3 and negative (-) lead to terminal D1-2, and then check that the arm turns to the "FRESH" side smoothly.
      (2) Connect the positive (+) lead from the battery to terminal D1-3 and negative (-) lead to terminal D1-1, and then check that the arm turns to the "RECIRCULATION" side smoothly.
      If the operation is not as specified, replace the air inlet servo motor.

Air Inlet Servo Motor:

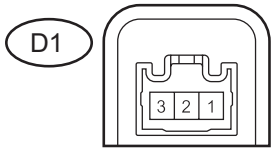


To RECIRCULATION

To FRESH



Component without harness connected: (Air Inlet Servo Motor)



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E135527E01

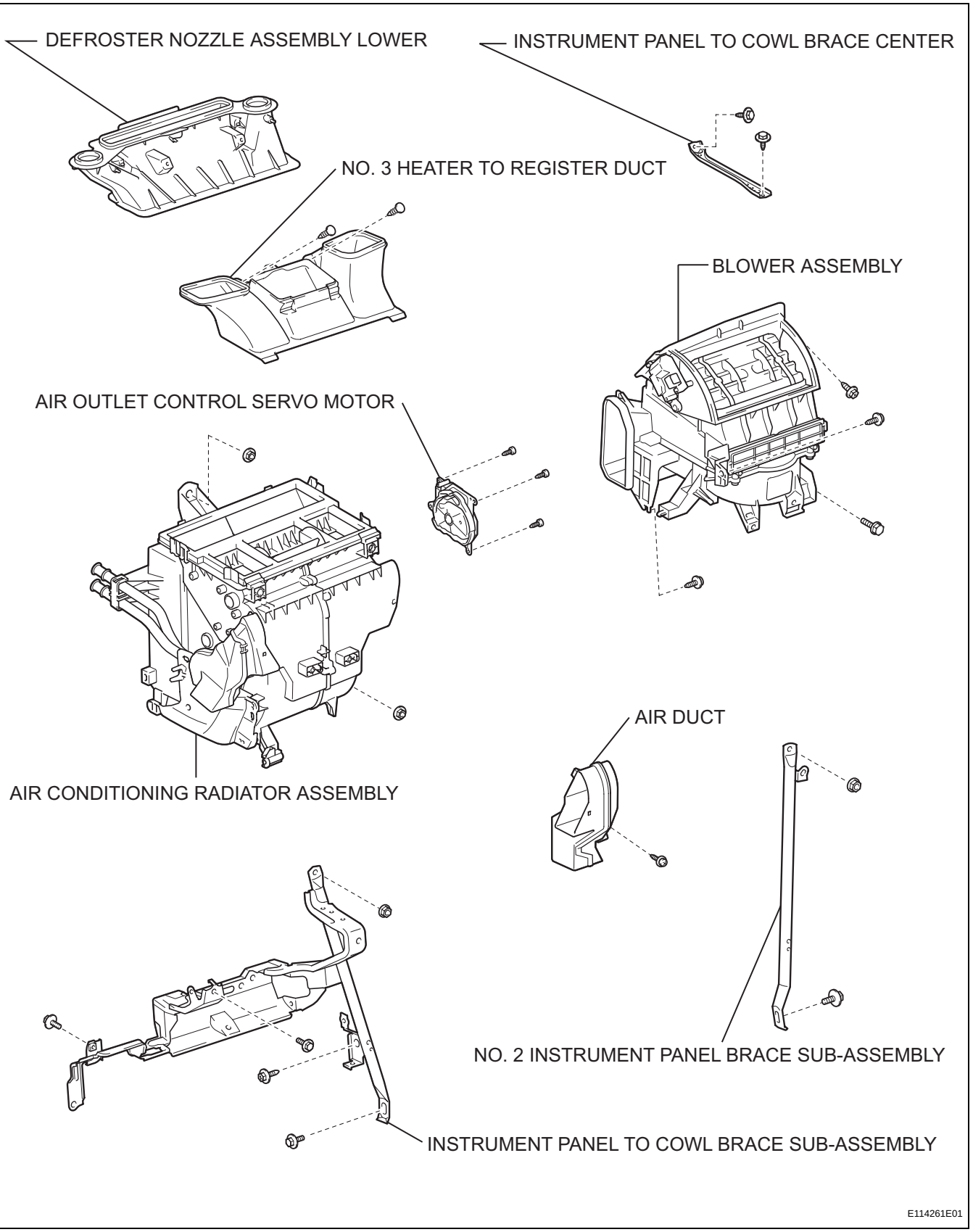
INSTALLATION

1. **INSTALL AIR INLET SERVO MOTOR (See page AC-40)**

2. **INSTALL BLOWER ASSEMBLY**
   (a) Install the blower assembly (see page AC-40).

AIR OUTLET CONTROL SERVO MOTOR

COMPONENTS



AC

P

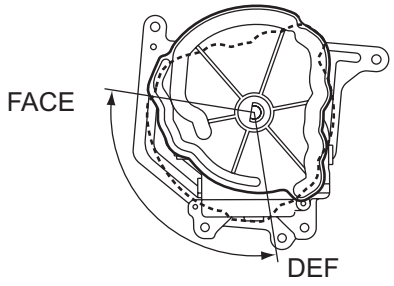
REMOVAL

1. **REMOVE AIR CONDITIONING RADIATOR ASSEMBLY**
   (a) Remove the air conditioning radiator assembly (see page AC-21).
2. **REMOVE AIR OUTLET CONTROL SERVO MOTOR (See page AC-26)**

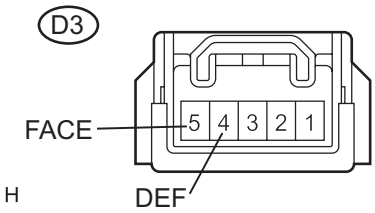
INSPECTION

1. **INSPECT AIR OUTLET CONTROL SERVO MOTOR**
   (a) Inspect the servo motor operation.
      (1) Connect the positive (+) lead from the battery to terminal D3-5 (FACE) and negative (-) lead to terminal D3-4 (DEF), and then check that the lever turns to the "FACE" position smoothly.
      (2) Connect the positive (+) lead from the battery to terminal D3-4 (DEF) and negative (-) lead to terminal D3-5 (FACE), and then check that the lever turns to the "DEF" position smoothly.
      If the operation is not as specified, replace the air outlet control servo motor.

Air Outlet Control Servo Motor:



Component without harness connected: (Air Outlet Control Servo Motor)



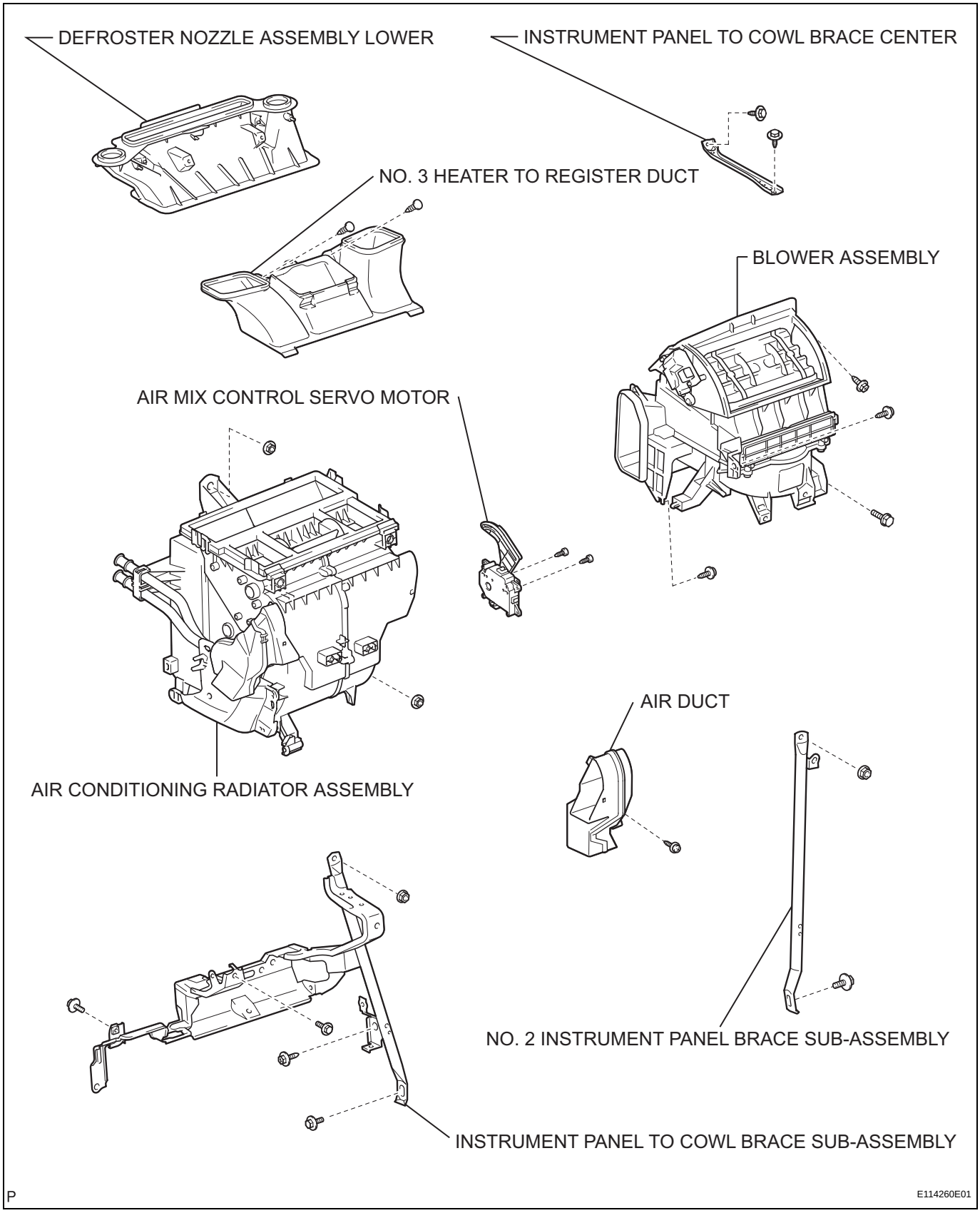
E135528E01

INSTALLATION

1. **INSTALL AIR OUTLET CONTROL SERVO MOTOR (See page AC-31)**
2. **INSTALL AIR CONDITIONING RADIATOR ASSEMBLY**
   (a) Install the air conditioning radiator assembly (see page AC-32).

AIR MIX CONTROL SERVO MOTOR

COMPONENTS



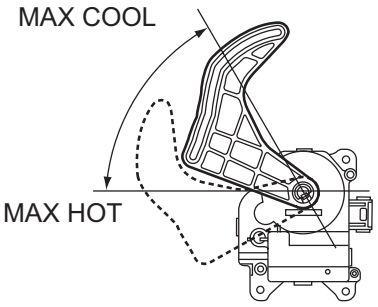
REMOVAL

1. **REMOVE AIR CONDITIONING RADIATOR ASSEMBLY**
   (a) Remove the air conditioning radiator assembly (see page AC-21).
2. **REMOVE AIR MIX CONTROL SERVO MOTOR (See page AC-26)**

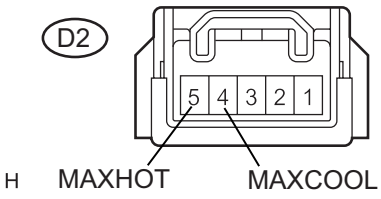
INSPECTION

1. **INSPECT AIR MIX CONTROL SERVO MOTOR**
   (a) Inspect the servo motor operation.
      (1) Connect the positive (+) lead from the battery to terminal D2-5 (MAXHOT) and negative (-) lead to terminal D2-4 (MAXCOOL), and then check that the lever turns to the "MAXHOT" position smoothly.
      (2) Connect the positive (+) lead from the battery to terminal D2-4 (MAXCOOL) and negative (-) lead to terminal D2-5 (MAXHOT), and then check that the lever turns to the "MAXCOOL" position smoothly.
      If the operation is not as specified, replace the air mix control servo motor.

Air Mix Control Servo Motor:



Component without harness connected: (Air Mix Control Servo Motor)

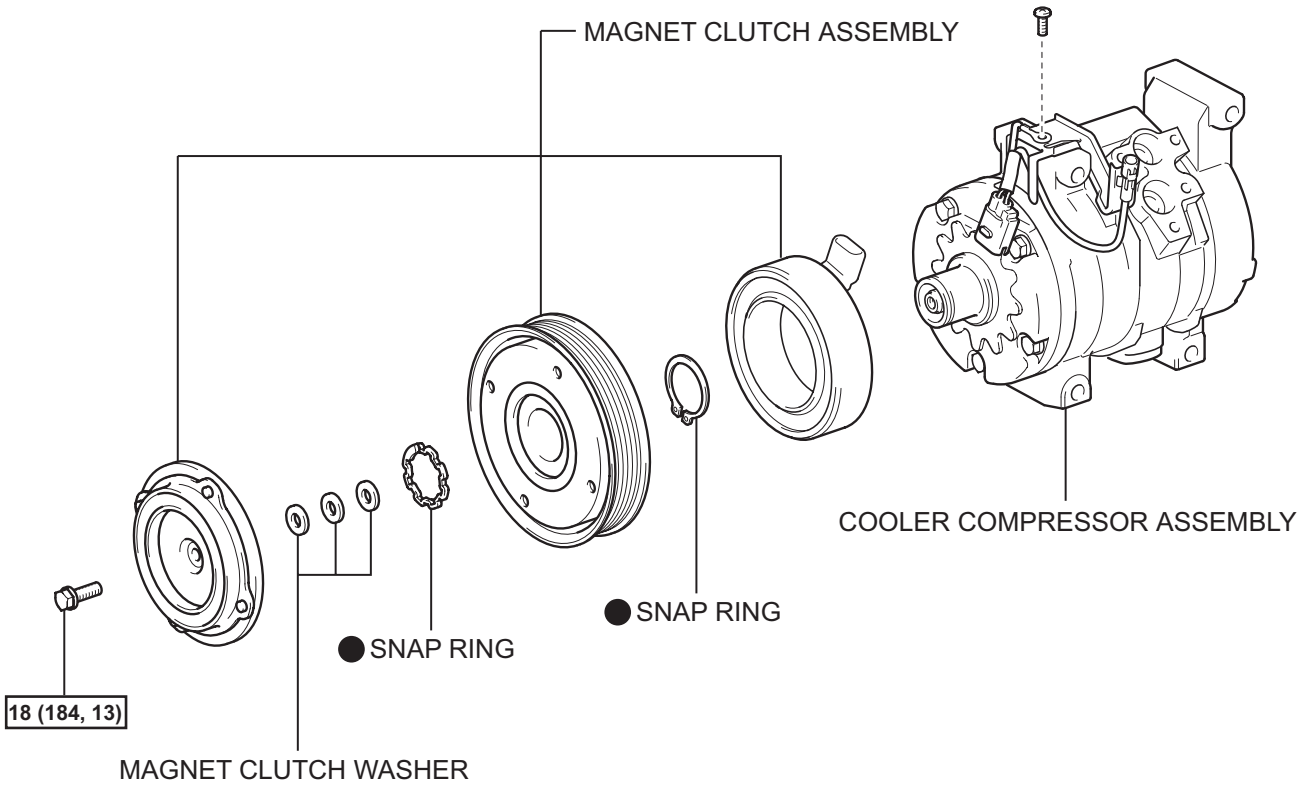


INSTALLATION

1. **INSTALL AIR MIX CONTROL SERVO MOTOR (See page AC-31)**
2. **INSTALL AIR CONDITIONING RADIATOR ASSEMBLY**
   (a) Install the air conditioning radiator assembly (see page AC-32).

COMPRESSOR AND MAGNETIC CLUTCH

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

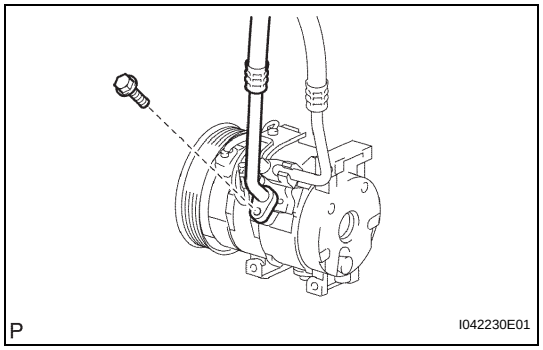
● Non-reusable part

E114255E01

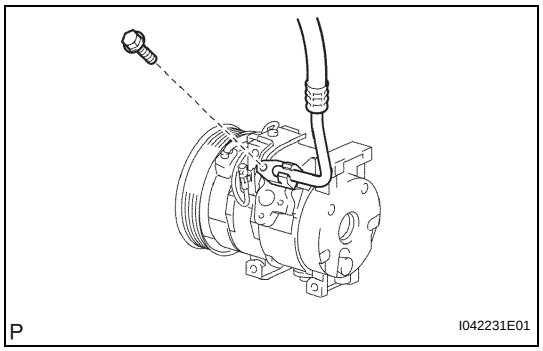
REMOVAL

1. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page AC-15)**

2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



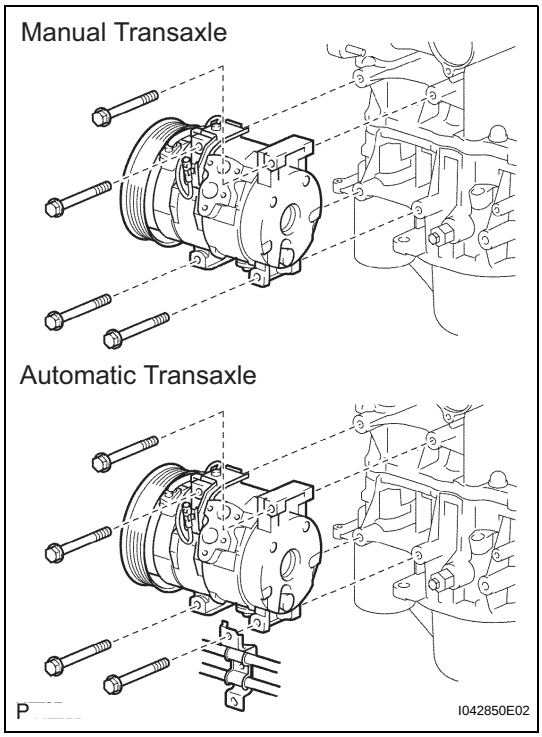
3. **DISCONNECT NO. 1 COOLER REFRIGERANT SUCTION HOSE**
   (a) Remove the bolt and disconnect the cooler refrigerant suction hose from the cooler compressor.
   (b) Remove the O-ring from the cooler refrigerant suction hose.
   NOTICE:
   Seal the openings of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering them.



4. **DISCONNECT NO. 1 COOLER REFRIGERANT DISCHARGE HOSE**
   (a) Remove the bolt and disconnect the cooler refrigerant discharge hose from the cooler compressor.
   (b) Remove the O-ring from the cooler refrigerant discharge hose.
   NOTICE:
   Seal the openings of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering them.

5. **REMOVE ENGINE UNDER COVER RH**

6. **REMOVE FAN AND GENERATOR V BELT (See page EM-6)**

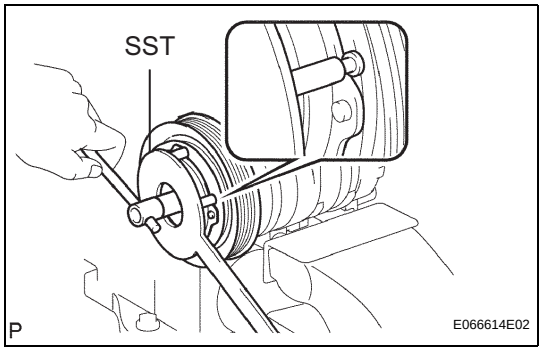


7. REMOVE COOLER COMPRESSOR ASSEMBLY

(a) Disconnect the connector.

(b) Remove the 4 bolts and cooler compressor.

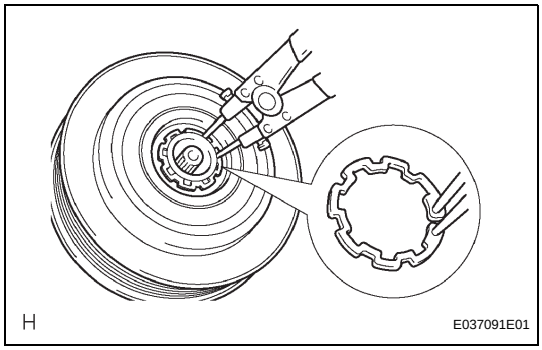
DISASSEMBLY



1. REMOVE MAGNET CLUTCH ASSEMBLY

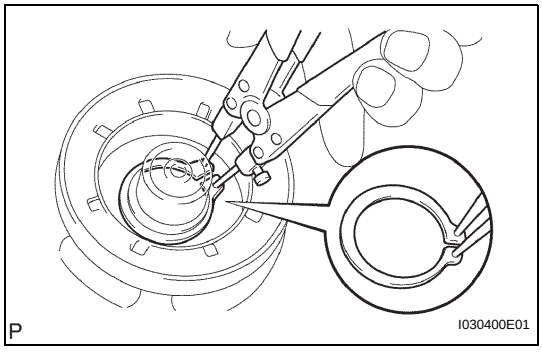
(a) Using SST, hold the magnet clutch hub.
SST 95047-10400

(b) Remove the bolt, magnet clutch hub and magnet clutch washer.
HINT:
There is no set number of magnet clutch washers since they are used for adjusting.

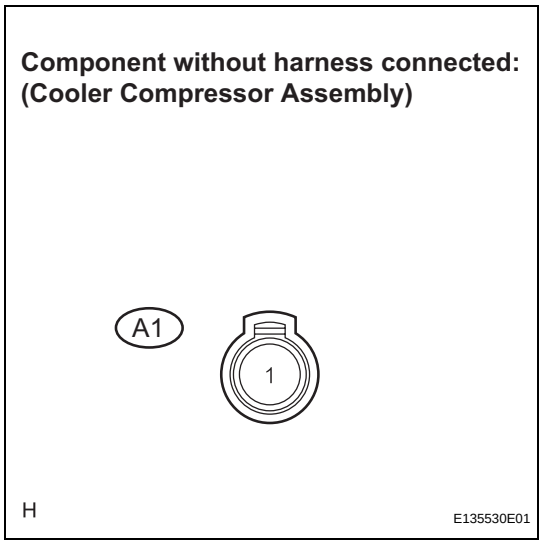


(c) Using a snap ring expander, remove the snap ring and magnet clutch rotor.
NOTICE:
Do not damage the seal cover of the bearing when removing the snap ring.

(d) Disconnect the connector.



(e) Using a snap ring expander, remove the snap ring and magnet clutch starter.

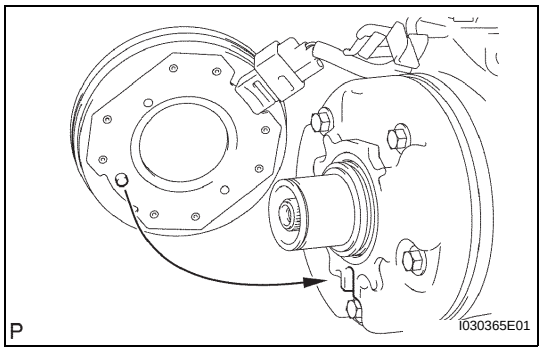


INSPECTION

1. INSPECT COOLER COMPRESSOR ASSEMBLY

(a) Connect the positive (+) lead from the battery to terminal A1-1 and the negative (-) lead to the body ground.

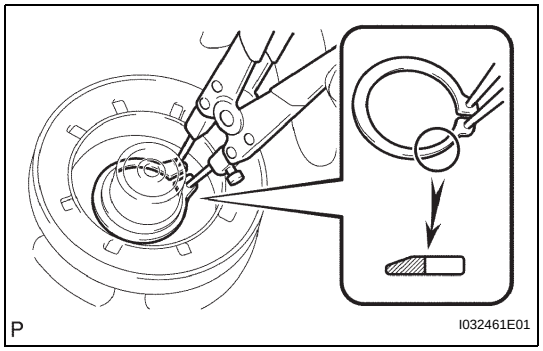
(b) Check that the magnetic clutch is engaged.
If the operation is not as specified, replace the magnet clutch.



REASSEMBLY

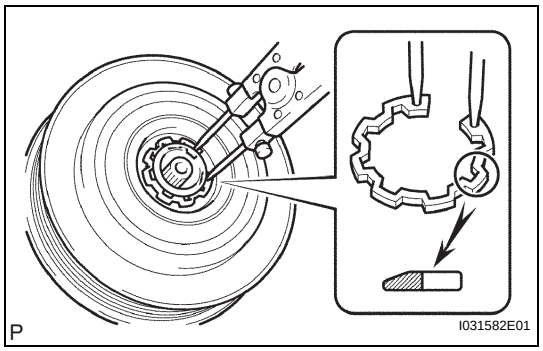
1. INSTALL MAGNET CLUTCH ASSEMBLY

(a) Matching the parts shown in the illustration, install the magnet clutch starter.



(b) Using a snap ring expander, install a new snap ring with the chamfered side facing up.
NOTICE:
Do not damage the seal cover of the bearing when installing the snap ring.

(c) Connect the connector.

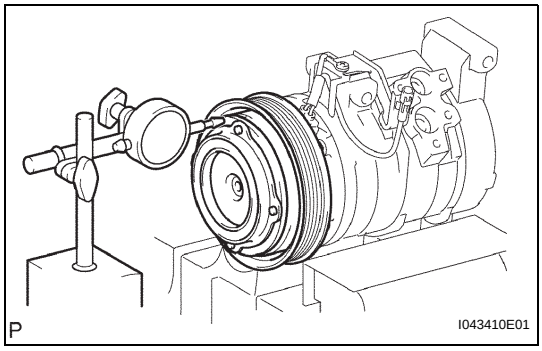


(d) Using a snap ring expander, install the magnet clutch rotor and a new snap ring with the chamfered side facing up.
NOTICE:
- **Do not expand the snap ring by more than 30.5 mm (1.2 in.) when installing it.**
- **Do not damage the seal cover of the bearing when installing the snap ring.**

(e) Install the magnet clutch washer and magnet clutch hub.
NOTICE:
Do not change the combination of the magnet clutch washers used before disassembly.

(f) Using SST, hold the magnet clutch hub and install the bolt.
SST 95047-10400
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)

NOTICE:
Make sure that there is no foreign matter or oil on the compressor shaft, bolt, and clutch hub.



2. INSPECT MAGNETIC CLUTCH CLEARANCE

(a) Set the dial indicator to the magnet clutch hub.

(b) Connect the battery positive (+) lead to the terminal of the magnet clutch connector and the negative (-) lead to the earth wire. Turn the magnet clutch on and off and measure the clearance.

Standard clearance:
0.35 to 0.60 mm (0.014 to 0.023 in.)

If the measured value is not within the standard range, remove the magnet clutch hub and adjust it with magnet clutch washers.

NOTICE:
Adjustment should be performed with 3 or less magnet clutch washers.

(c) Remove the compressor and magnetic clutch from the vise.

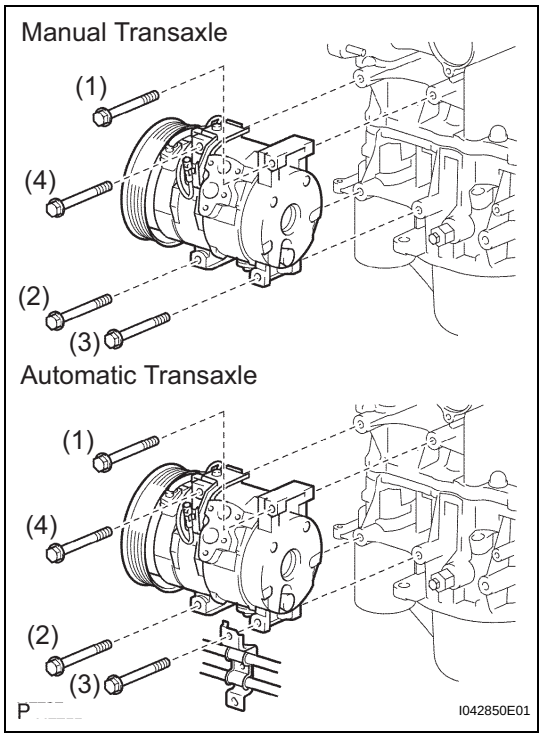
3. ADJUST COMPRESSOR OIL

(a) When replacing the cooler compressor with a new one, after gradually removing the refrigerant gas from the service valve, drain the following amount of oil from the new cooler compressor before installation.

Standard:
(Oil capacity inside new cooler compressor: 140 + 15 cc (4.7 + 0.5 fl. oz.)) - (Remaining oil amount in the removed cooler compressor) = (Oil amount to be removed when replacing)

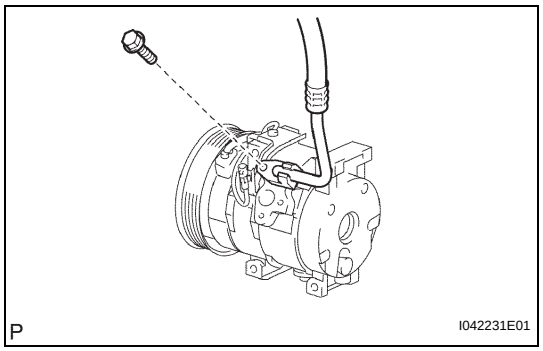
NOTICE:

- **When checking the compressor oil level, observe the precautions for the cooler removal/installation.**
- **Since compressor oil remains in the pipes of the vehicle, if a new cooler compressor is installed without removing some oil inside, the oil amount becomes excessive, preventing heat exchange in the refrigerant cycle and causing refrigerant failure.**
- **If the remaining oil in the removed cooler compressor is too small in volume, check for oil leakage.**
- **Be sure to use ND-OIL 8 for compressor oil.**

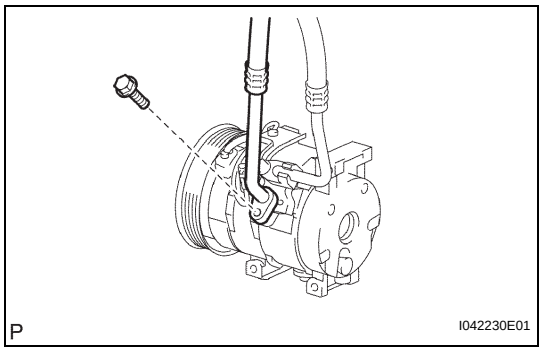


INSTALLATION

1. **INSTALL COOLER COMPRESSOR ASSEMBLY**
   (a) Install the cooler compressor with the 4 bolts.
   Torque: 25 N*m (255 kgf*cm, 18 ft.*lbf)
   NOTICE:
   Tighten the bolts in the order shown in the illustration to install the cooler compressor.
   (b) Connect the connector.



2. **INSTALL NO. 1 COOLER REFRIGERANT DISCHARGE HOSE**
   (a) Remove the attached vinyl tape from the hose.
   (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the cooler compressor.
   Compressor oil:
   ND-OIL 8 or equivalent
   (c) Install the O-ring on the cooler refrigerant discharge hose.
   (d) Install the cooler refrigerant discharge hose on the cooler compressor with the bolt.
   Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)



3. **INSTALL NO. 1 COOLER REFRIGERANT SUCTION HOSE**
   (a) Remove the attached vinyl tape from the hose.
   (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the cooler compressor.
   Compressor oil:
   ND-OIL 8 or equivalent
   (c) Install the O-ring on the cooler refrigerant suction hose.
   (d) Install the cooler refrigerant suction hose on the cooler compressor with the bolt.
   Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)

4. **INSTALL FAN AND GENERATOR V BELT (See page EM-6)**

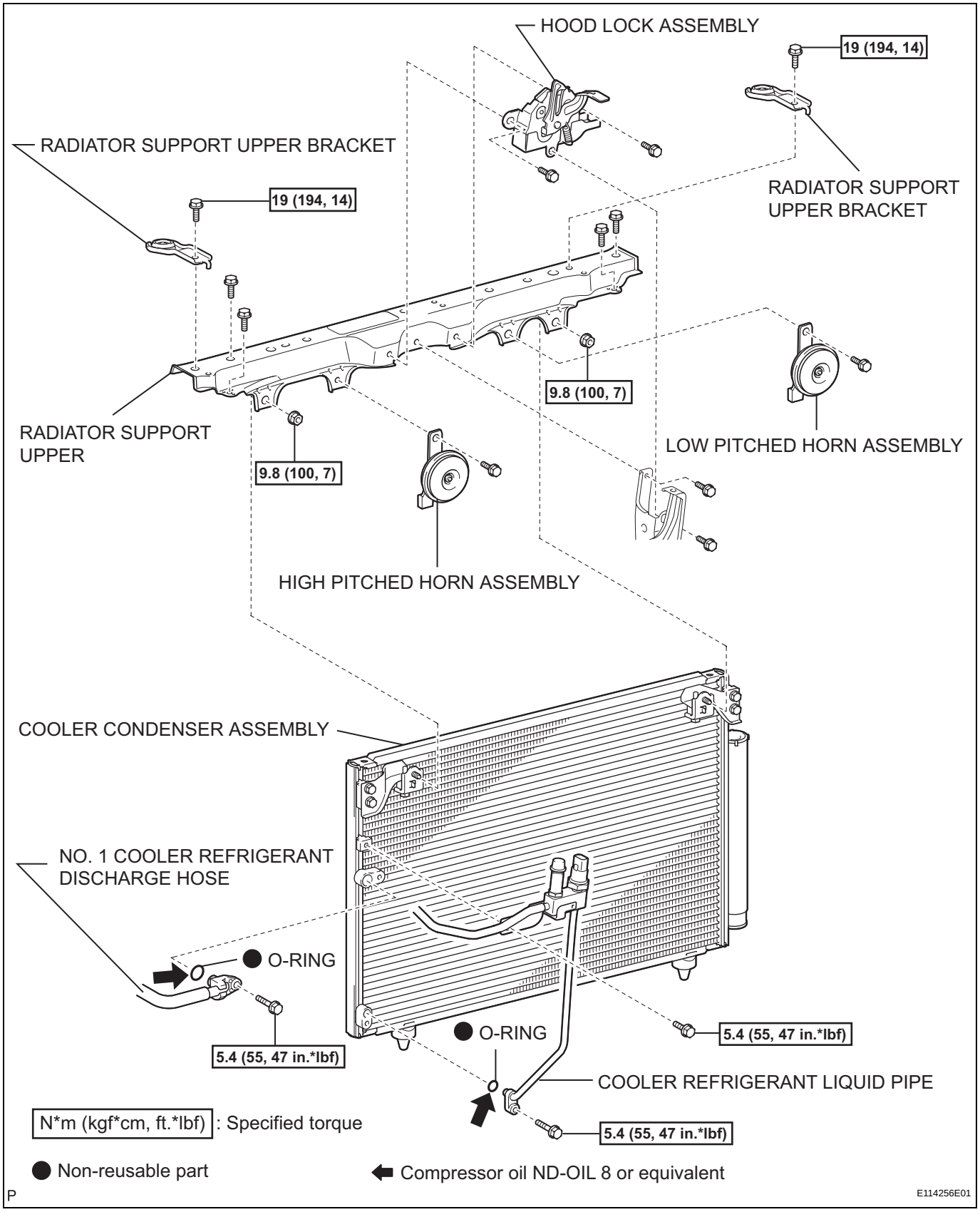
5. **INSTALL ENGINE UNDER COVER RH**

6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

7. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
8. **CHARGE REFRIGERANT (See page AC-15)**
9. **WARM UP ENGINE (See page AC-16)**
10. **INSPECT FOR REFRIGERANT LEAK (See page AC-16)**

CONDENSER

COMPONENTS



AC

ON-VEHICLE INSPECTION

1. INSPECT COOLER CONDENSER ASSEMBLY

(a) If the fins of the cooler condenser are dirty, clean them with water. Dry the fins with compressed air.
NOTICE:
Do not damage the fins of the condenser.

(b) If a fin of the cooler condenser is bent, straighten it using a screwdriver or pliers.

2. CHECK CONDENSER FOR LEAKAGE OF REFRIGERANT

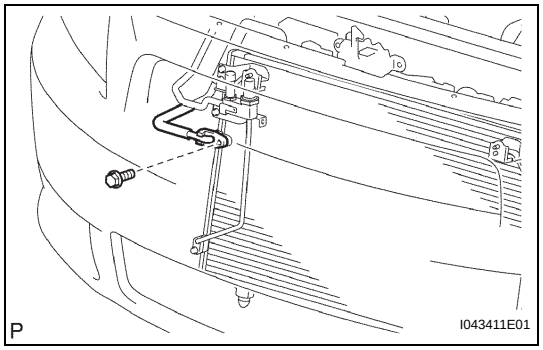
(a) Using a halogen leak detector, check the pipe joints for gas leakage.

(b) If gas leakage is detected in a joint, check the torque of the joint.

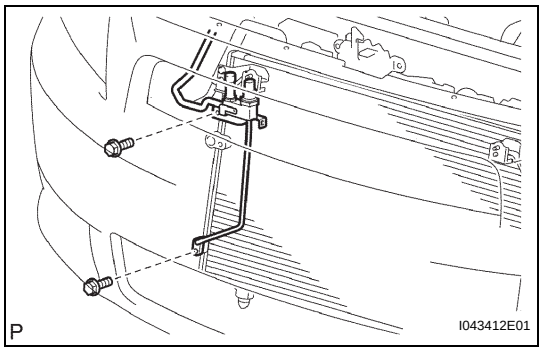
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

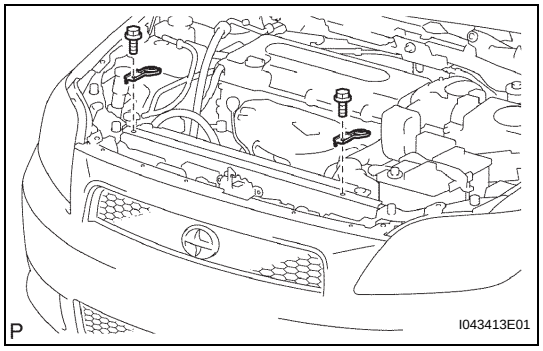
2. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page AC-15)**



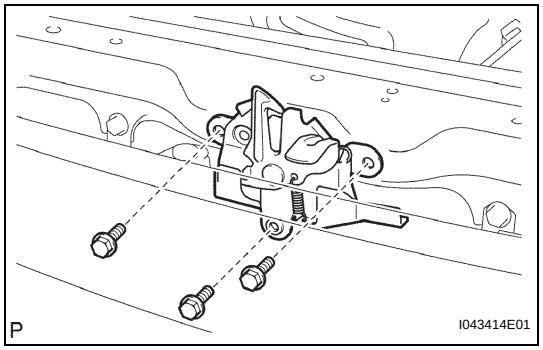
3. **DISCONNECT NO. 1 COOLER REFRIGERANT DISCHARGE HOSE**
   (a) Remove the bolt and disconnect the cooler refrigerant discharge hose from the cooler condenser.
   (b) Remove the O-ring from the cooler refrigerant discharge hose.
   NOTICE:
   Seal the openings of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering them.



4. **DISCONNECT COOLER REFRIGERANT LIQUID PIPE**
   (a) Remove the 2 bolts and disconnect the cooler refrigerant liquid pipe from the cooler condenser.
   (b) Remove the O-ring from the cooler refrigerant liquid pipe.
   NOTICE:
   Seal the openings of the disconnected parts using vinyl tape to prevent moisture and foreign matter from entering them.



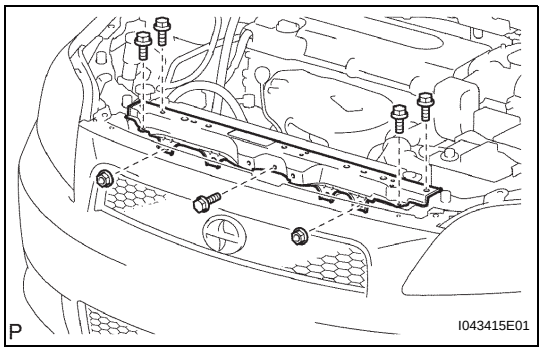
5. **REMOVE RADIATOR SUPPORT UPPER BRACKET**
   (a) Remove the 2 bolts and 2 brackets.



6. **REMOVE HOOD LOCK ASSEMBLY**
   (a) Remove the 3 bolts and hood lock.

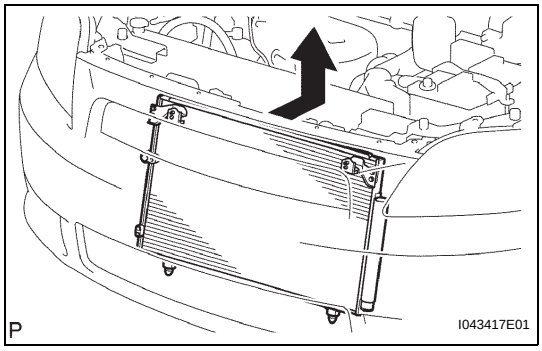
7. **REMOVE LOW PITCHED HORN ASSEMBLY (See page HO-5)**

8. **REMOVE HIGH PITCHED HORN ASSEMBLY (See page HO-7)**



9. REMOVE RADIATOR SUPPORT UPPER

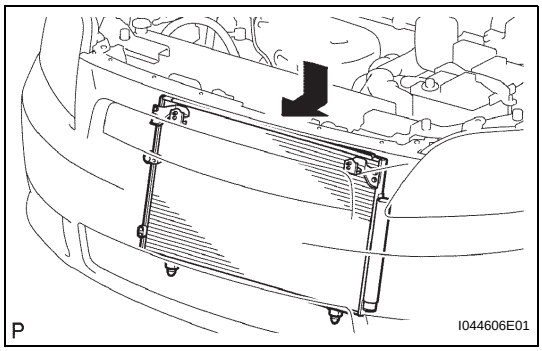
(a) Remove the 5 bolts, 2 nuts and radiator support upper.



10. REMOVE COOLER CONDENSER ASSEMBLY

(a) Remove the cooler condenser.

INSTALLATION



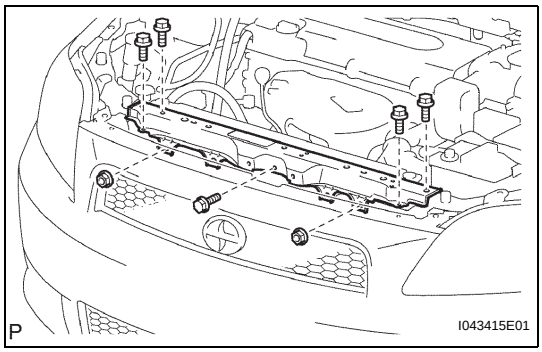
1. INSTALL COOLER CONDENSER ASSEMBLY

(a) Install the cooler condenser.

HINT:

If the condenser is replaced with a new one, add compressor oil to the new condenser.

Capacity:
40 cc (1.4 fl. oz.)
Compressor oil:
ND-8 or equivalent



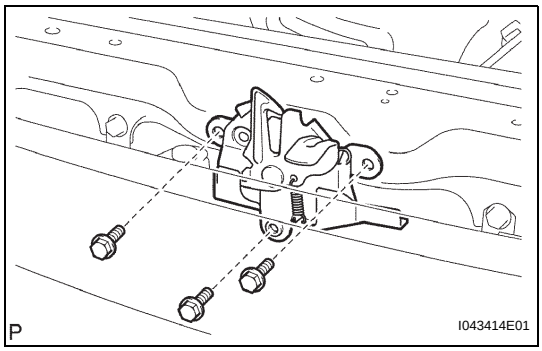
2. INSTALL RADIATOR SUPPORT UPPER

(a) Install the radiator support upper with the 5 bolts and 2 nuts.

Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)

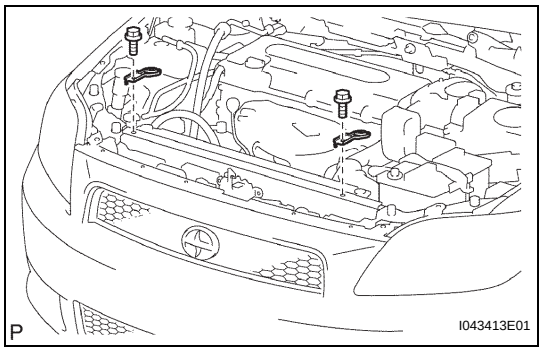
3. INSTALL HIGH PITCHED HORN ASSEMBLY (See page HO-8)

4. INSTALL LOW PITCHED HORN ASSEMBLY (See page HO-6)

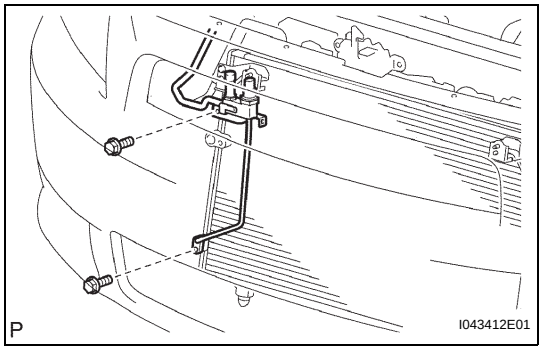


5. INSTALL HOOD LOCK ASSEMBLY

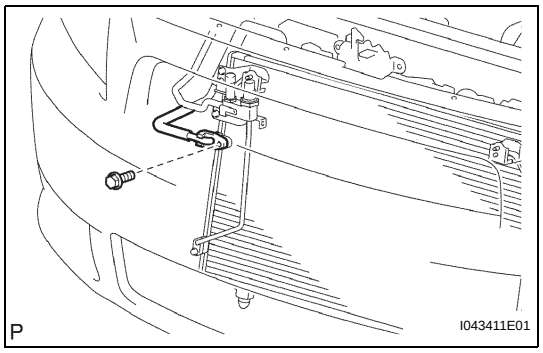
(a) Install the hood lock with the 3 bolts.



6. **INSTALL RADIATOR SUPPORT UPPER BRACKET**
   (a) Install the 2 brackets with the 2 bolts.
   Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)



7. **INSTALL COOLER REFRIGERANT LIQUID PIPE**
   (a) Remove the attached vinyl tape from the pipe and the connecting part of the cooler condenser.
   (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the pipe joint.
   Compressor oil:
   ND-OIL 8 or equivalent
   (c) Install the O-ring on the cooler refrigerant liquid pipe.
   (d) Install the cooler refrigerant liquid pipe on the cooler condenser with the 2 bolts.
   Torque: 5.4 N*m (55 kgf*cm, 47 in.*lbf)



8. **INSTALL NO. 1 COOLER REFRIGERANT DISCHARGE HOSE**
   (a) Remove the attached vinyl tape from the hose and the connecting part of the cooler condenser.
   (b) Sufficiently apply compressor oil to a new O-ring and the fitting surface of the hose joint.
   Compressor oil:
   ND-OIL 8 or equivalent
   (c) Install the O-ring on the cooler refrigerant discharge hose.
   (d) Install the cooler refrigerant discharge hose on the cooler condenser with the bolt.
   Torque: 5.4 N*m (55 kgf*cm, 47 in.*lbf)

9. **ADJUST HOOD SUB-ASSEMBLY (See page ED-1)**

10. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

11. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

12. **CHARGE REFRIGERANT (See page AC-15)**

13. **WARM UP ENGINE (See page AC-16)**

14. **INSPECT FOR REFRIGERANT LEAK (See page AC-16)**

AMBIENT TEMPERATURE SENSOR

ON-VEHICLE INSPECTION

1. INSPECT AMBIENT TEMPERATURE SENSOR

(a) Disconnect the A6 ambient temperature sensor connector.

(b) Measure the resistance between terminals 1 and 2 of the A/C ambient temperature sensor at each temperature, as shown in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
A6-1 - A6-2	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

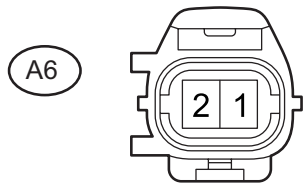
NOTICE:

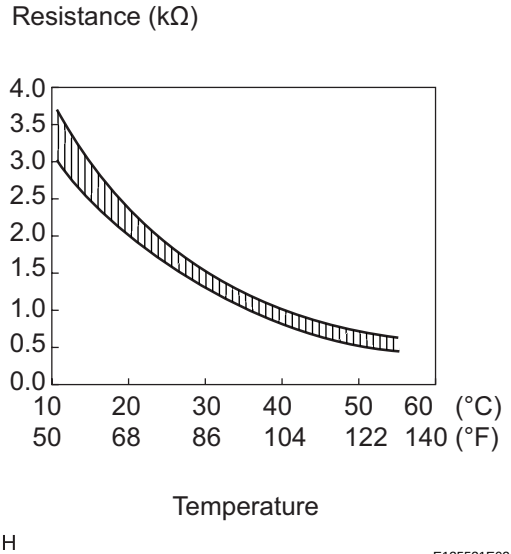
- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be almost the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases (see the graph). If the resistance value is not as specified, replace the sensor.

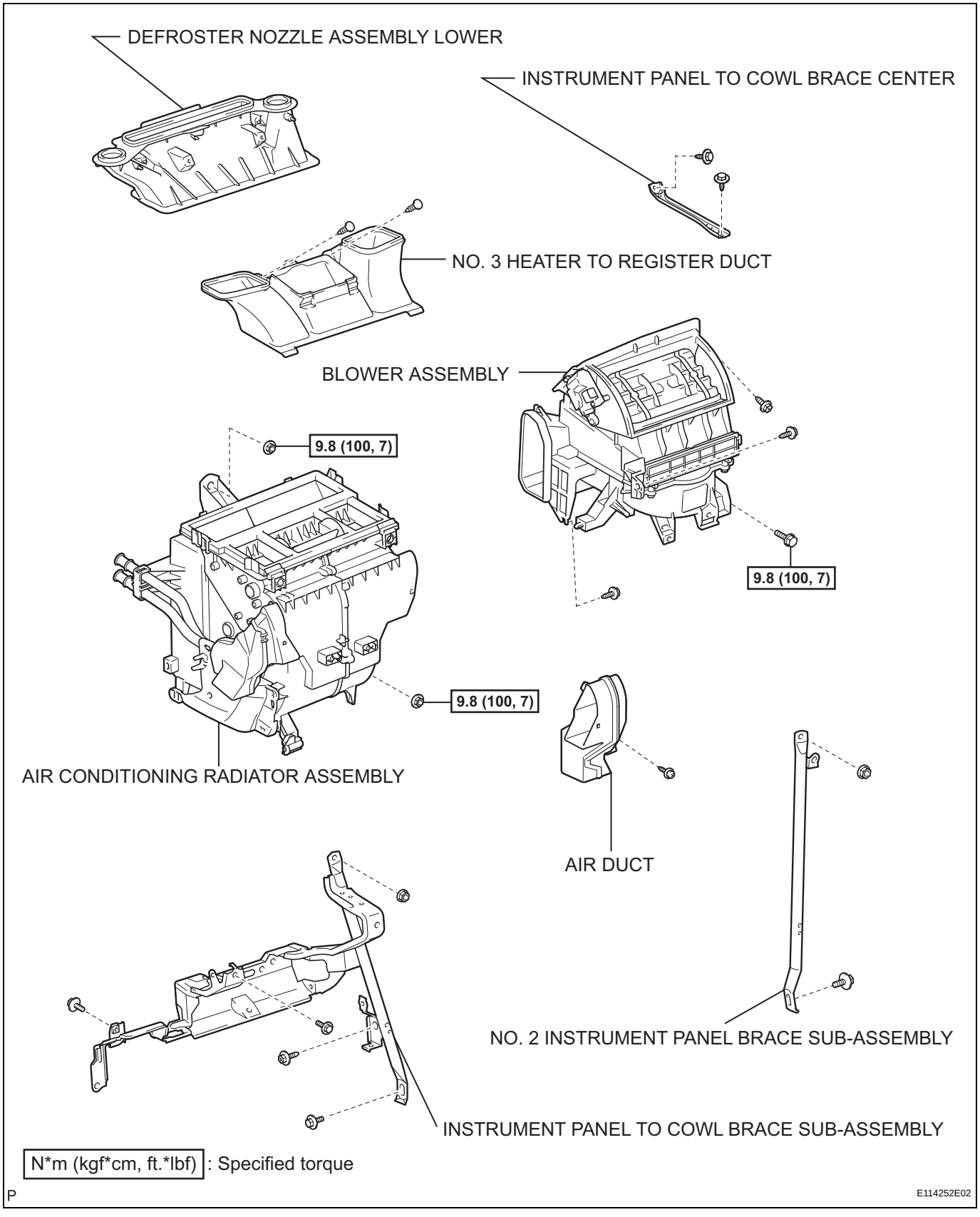
Component without harness connected: (Ambient Temperature Sensor)

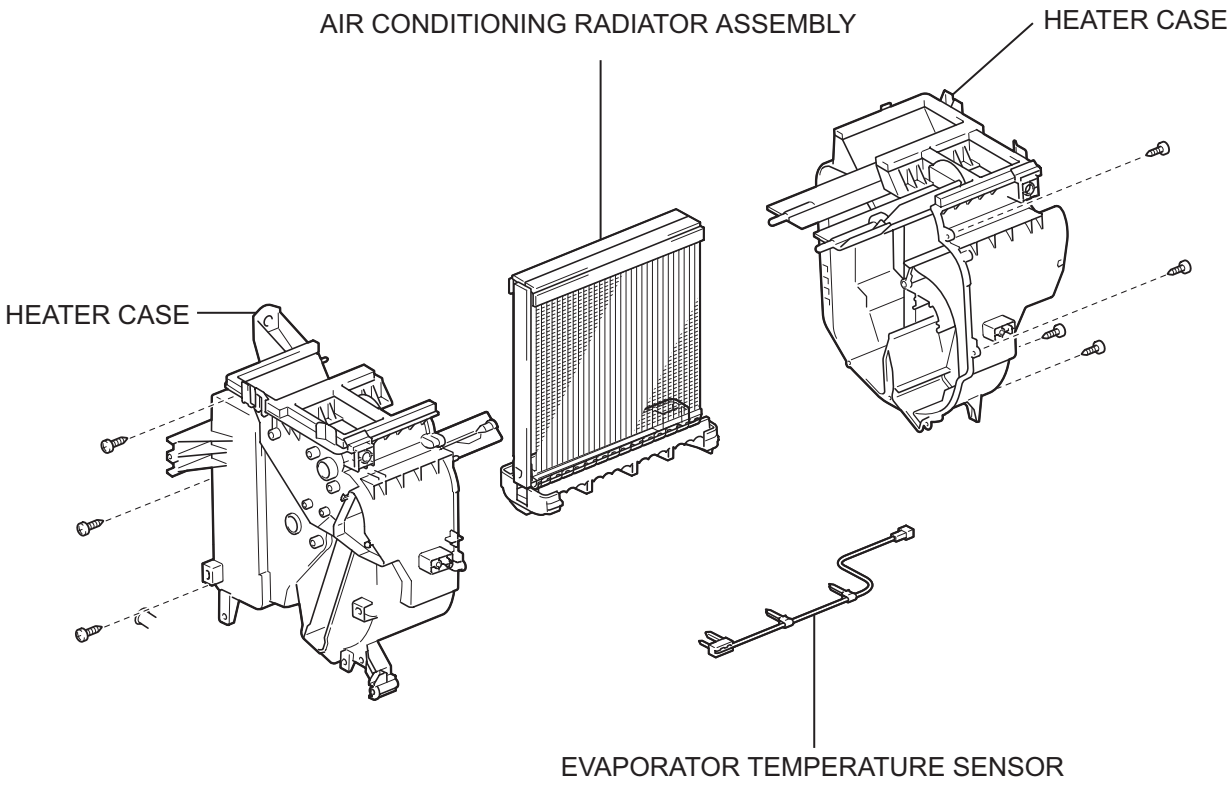




EVAPORATOR TEMPERATURE SENSOR

COMPONENTS




AIR CONDITIONING RADIATOR ASSEMBLY
HEATER CASE
HEATER CASE
EVAPORATOR TEMPERATURE SENSOR
E114258E01

REMOVAL

1. **REMOVE AIR CONDITIONING RADIATOR ASSEMBLY**
   (a) Remove the air conditioning radiator assembly (see page AC-21).
2. **REMOVE EVAPORATOR TEMPERATURE SENSOR (See page AC-27)**

INSPECTION

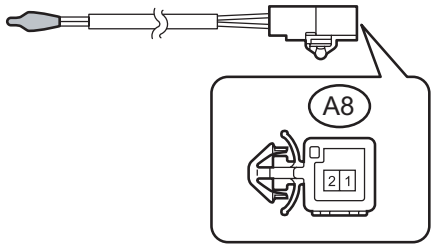
1. **INSPECT EVAPORATOR TEMPERATURE SENSOR**
   (a) Measure the resistance according to the value(s) in the table below.
   Standard resistance

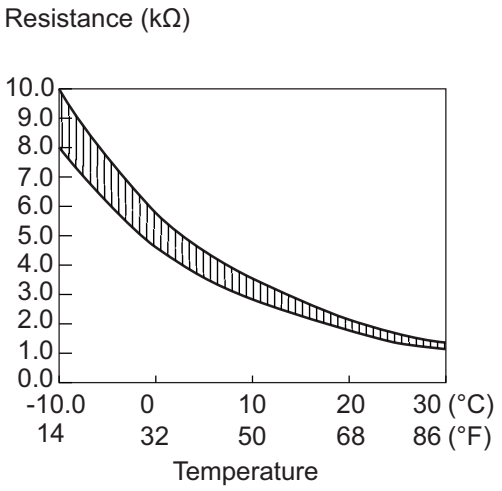
Tester Connection	Condition	Specified Condition
A8-1 - A8-2	-10°C (14°F)	7.40 to 9.20 kΩ
	-5°C (23°F)	5.65 to 7.00 kΩ
	0°C (32°F)	4.35 to 5.40 kΩ
	5°C (41°F)	3.40 to 4.20 kΩ
	10°C (50°F)	2.68 to 3.30 kΩ
	15°C (59°F)	2.10 to 2.60 kΩ
	20°C (68°F)	1.66 to 2.10 kΩ
	25°C (77°F)	1.32 to 1.66 kΩ
	30°C (86°F)	1.05 to 1.35 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 almost the same as the ambient temperature.**

HINT:
As the temperature increases, the resistance decreases (see the graph). If the resistance value is not as specified, replace the sensor.

Evaporator Temperature Sensor:



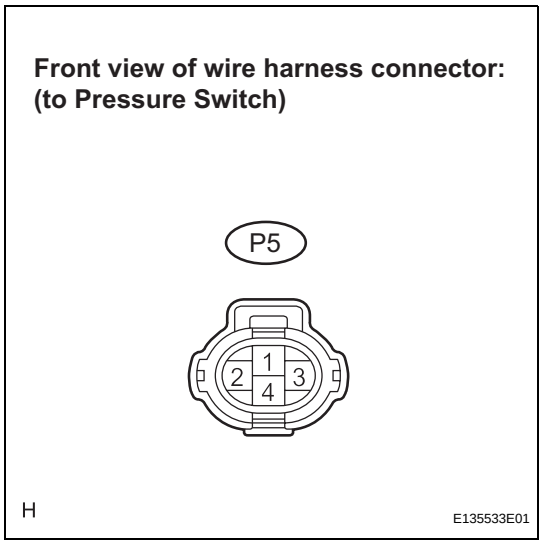


H

E135532E03

INSTALLATION

1. **INSTALL EVAPORATOR TEMPERATURE SENSOR (See page AC-29)**
2. **INSTALL AIR CONDITIONING RADIATOR ASSEMBLY**
   (a) Install the air conditioning radiator assembly (see page AC-32).



PRESSURE SWITCH

ON-VEHICLE INSPECTION

1. INSPECT PRESSURE SWITCH (for magnet clutch control)

(a) Check the air conditioning operation.

(1) Disconnect the P5 pressure switch connector.

(2) Connect terminals P5-1 and P5-4 of the connector of the pressure switch on the vehicle wire harness side using a service wire.

(3) Start the engine.

(4) Turn the air conditioning switch on and check that the magnet clutch is turned on.

(5) Check that the magnet clutch is turned off when disconnecting terminals P5-1 and P5-4 (that were connected in the previous step).

Standard:

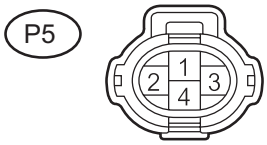
Terminals P5-1 and P5-4 are connected: magnet clutch is on

Terminals P5-1 and P5-4 are disconnected: magnet clutch is off

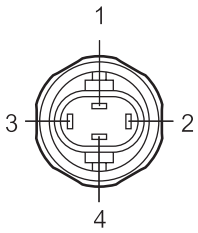
Replace the pressure switch if the magnet clutch is operated normally.

Inspect and repair the wire harness between the pressure switch and the ECM.

Front view of wire harness connector: (to Pressure Switch)



Component without harness connected: (Pressure Switch)



1226 kPa (12.5 kgf/cm^2 , 178psi)

OFF
(10 kΩ or higher)

ON
(Below 1 Ω)

1520 kPa (15.5 kgf/cm^2 , 220psi)

H

E135534E01

2. INSPECT PRESSURE SWITCH (for cooling fan control)

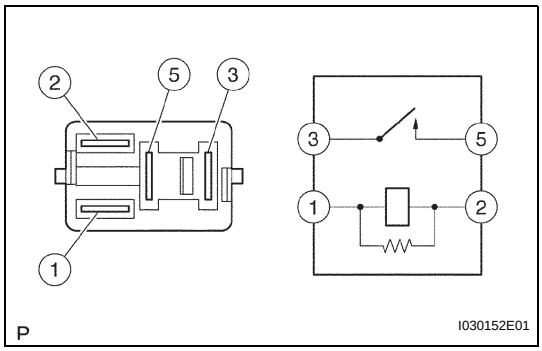
(a) Set the manifold gauge.
HINT:
The switch turns the condenser fan on or off in accordance with pressure in the cycle so that heat exchange in the condenser can be performed effectively within the normal pressure range.

(b) Disconnect the P5 pressure switch connector and connect terminals P5-1 and P5-4 using a tool such as a service wire.

(c) Connect the positive (+) lead from the ohmmeter to terminal P5-2 and the negative (-) lead to terminal P5-3.

(d) Start the engine and turn the air conditioning switch on.

(e) Check that the continuity between terminals P5-2 and P5-3 changes in accordance with the refrigerant pressure as shown in the illustration.
If the operation is not as specified, replace the pressure switch.



MAGNETIC CLUTCH RELAY

ON-VEHICLE INSPECTION

1. INSPECT MAGNET CLUTCH RELAY (Marking: MG/C)

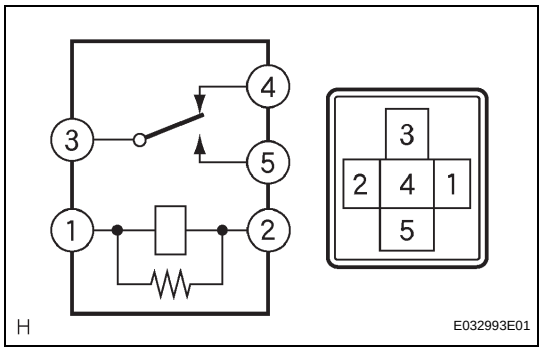
(a) Remove the magnet clutch relay from the No. 2 engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
3 - 5	Always	10 kΩ or higher
3 - 5	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

If the resistance is not as specified, replace the magnet clutch relay.



HEATER RELAY

ON-VEHICLE INSPECTION

1. INSPECT HEATER RELAY (Marking: HTR)

(a) Remove the heater relay from the instrument panel junction block.

(b) Measure the resistance according to the value(s) in the table below.

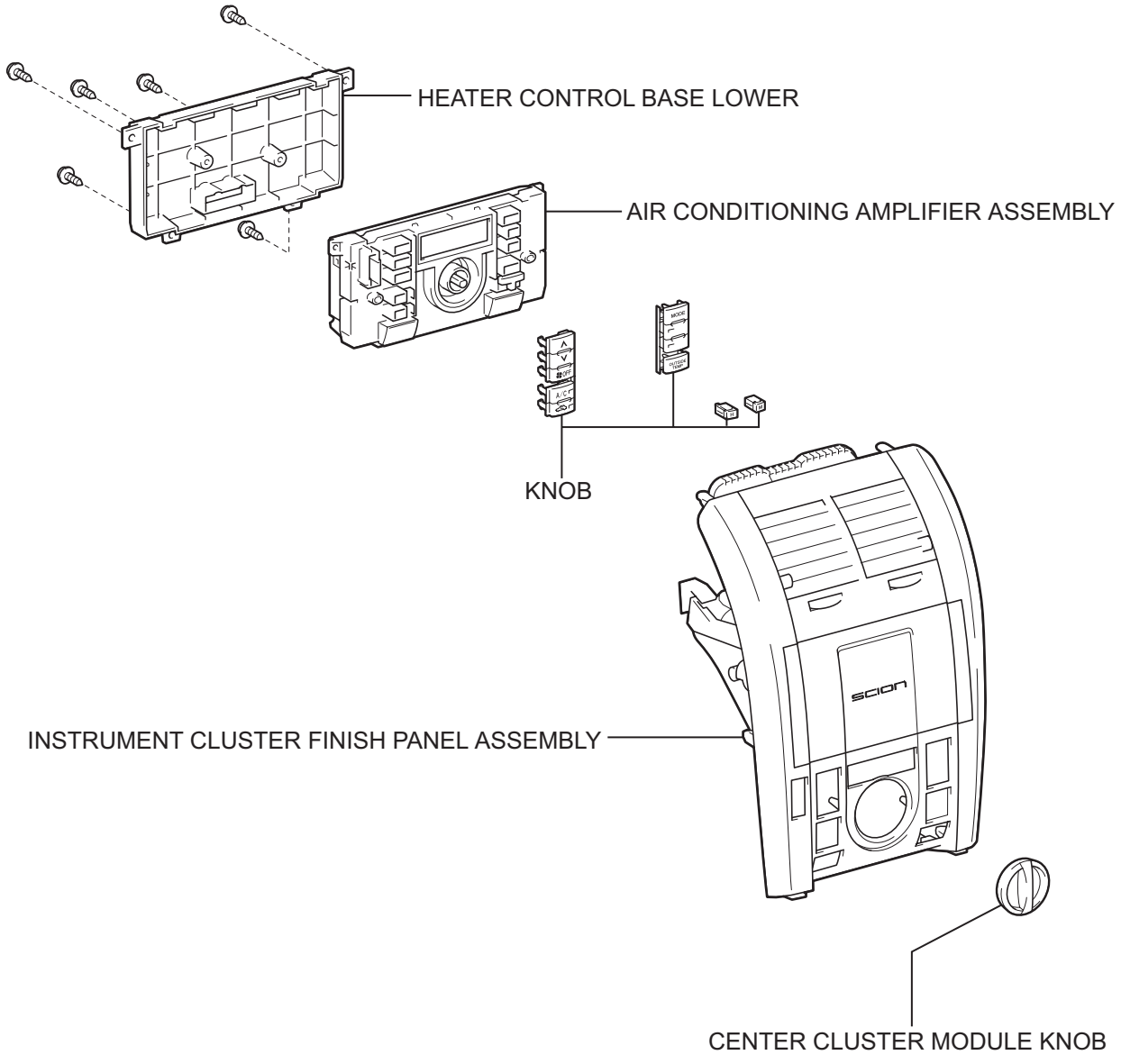
Standard resistance

Tester Connection	Condition	Specified Condition
3 - 4	Always	Below 1 Ω
3 - 4	Battery voltage is applied to terminals 1 and 2	10 kΩ or higher
3 - 5	Always	10 kΩ or higher
3 - 5	Battery voltage is applied to terminals 1 and 2	Below 1 Ω

If the resistance is not as specified, replace the heater relay.

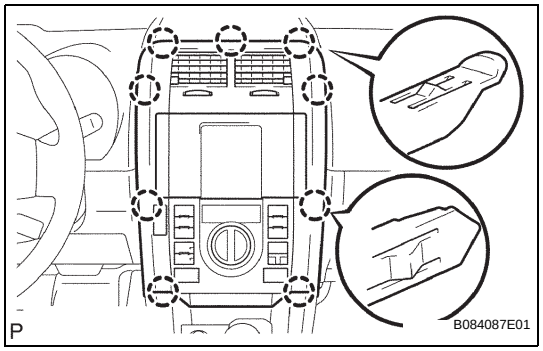
HEATER CONTROL ASSEMBLY

COMPONENTS



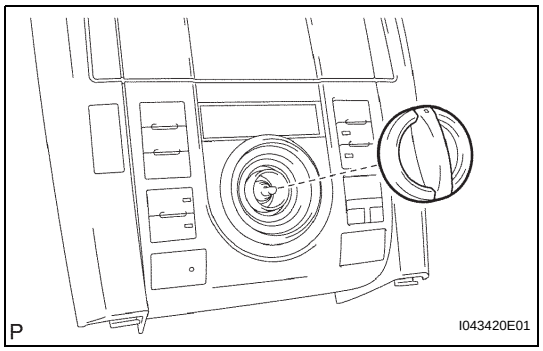
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-5)**
3. **REMOVE CONSOLE PANEL UPPER FRONT (See page IP-5)**
4. **REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY**
   (a) Detach the 9 claws.
   NOTICE:
   If the heater control is removed with the cover open, it may be broken. Be sure the cover is closed when removing it.
   (b) Disconnect the connector, then remove the heater control.

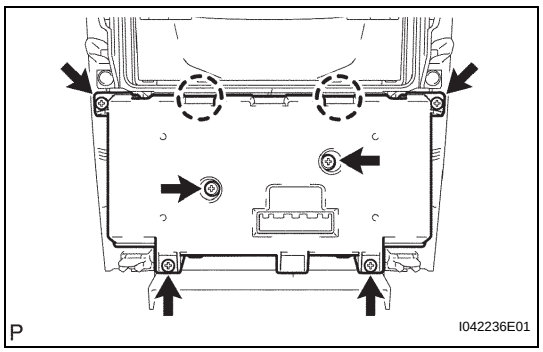


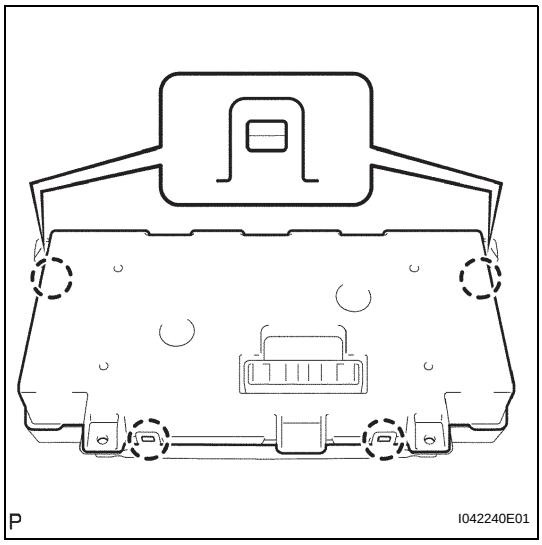
DISASSEMBLY

1. **REMOVE CENTER CLUSTER MODULE KNOB**
   (a) Remove the center cluster module knob.

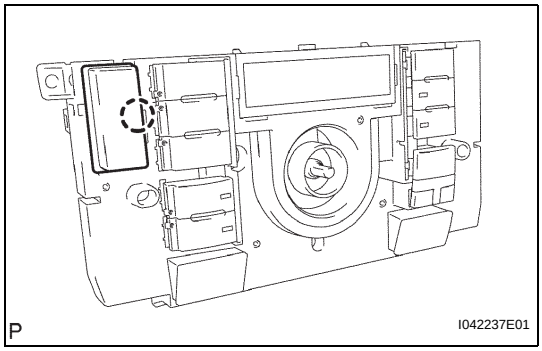


2. **REMOVE HEATER CONTROL BASE LOWER**
   (a) Remove the 6 screws.
   (b) Detach the 2 claws and remove the heater control panel.



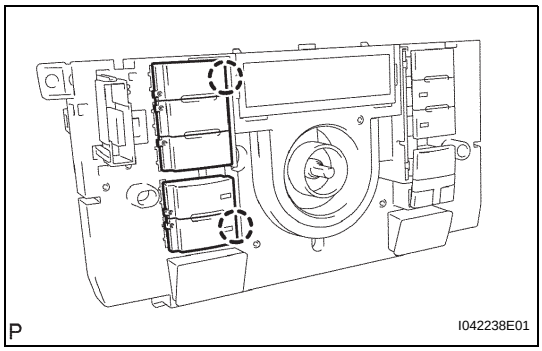


(c) Detach the 4 claws and remove the heater control base lower.

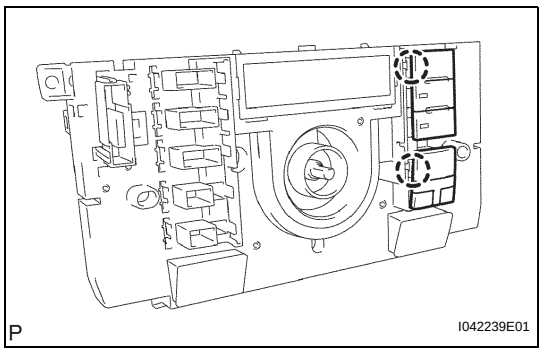


3. REMOVE AIR CONDITIONING AMPLIFIER ASSEMBLY

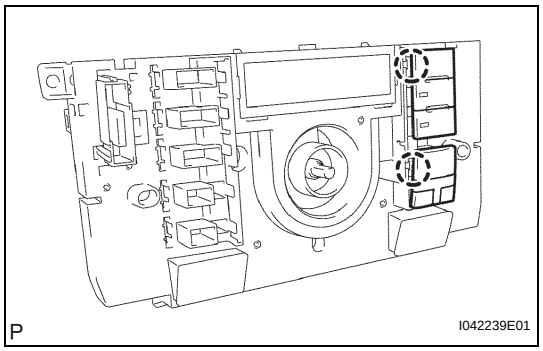
(a) Detach the claw and remove the knob.



(b) Detach the 2 claws and remove the knob.



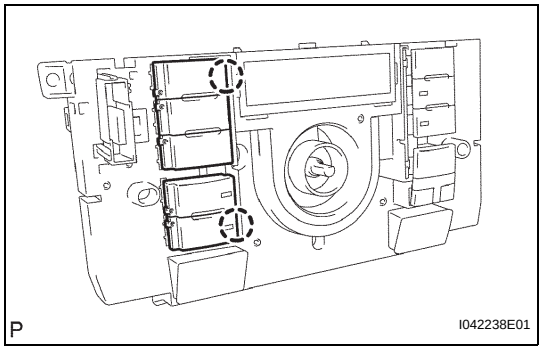
(c) Release the 2 claws and remove the knob.



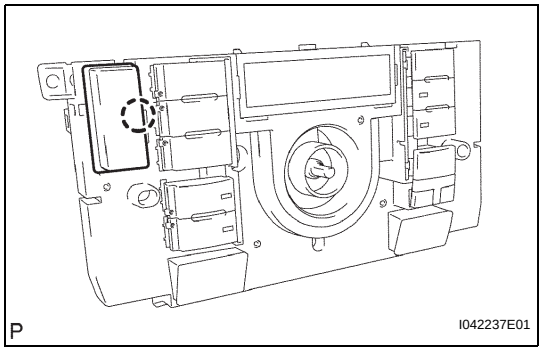
REASSEMBLY

1. INSTALL AIR CONDITIONING AMPLIFIER ASSEMBLY

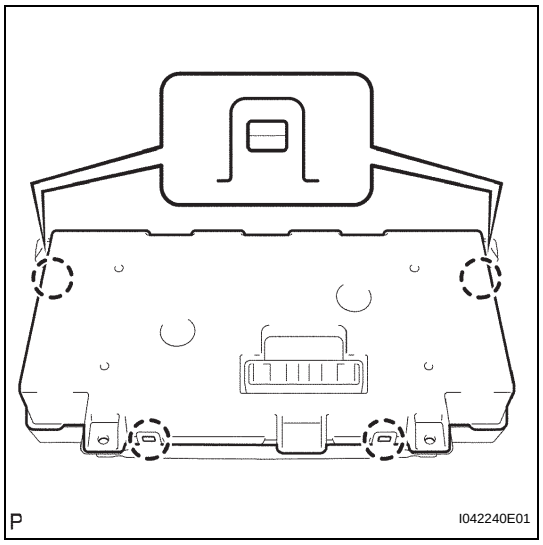
(a) Attach the 2 claws to install the knob.



(b) Attach the 2 claws to install the knob.

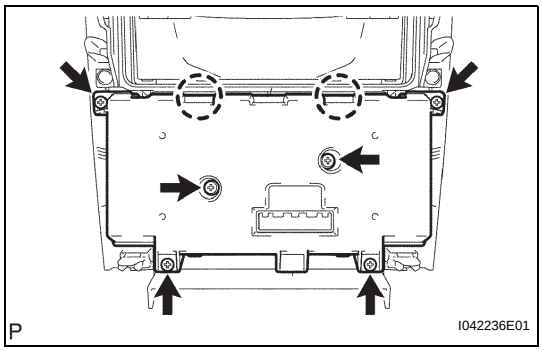


(c) Attach the claw to install the knob.

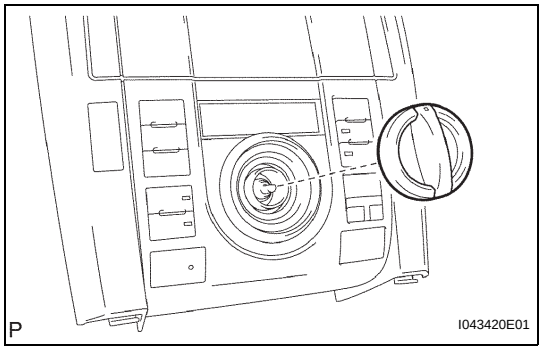


2. INSTALL HEATER CONTROL BASE LOWER

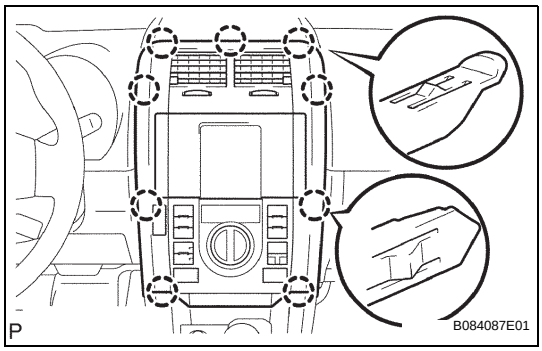
(a) Attach the 4 claws to install the heater control base lower.



(b) Attach the 2 claws to install the heater control base.
(c) Install the 6 screws.



3. INSTALL CENTER CLUSTER MODULE KNOB
(a) Install the center module knob.



INSTALLATION

1. INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY
(a) Connect the connector.
(b) Attach the 9 claws to install the instrument cluster finish panel.

2. INSTALL CONSOLE PANEL UPPER FRONT (See page IP-11)

3. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-12)

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

5. PERFORM INITIALIZATION
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

AUDIO AND VISUAL SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-)battery terminal, initialize the following systems after the cable is reconnected.

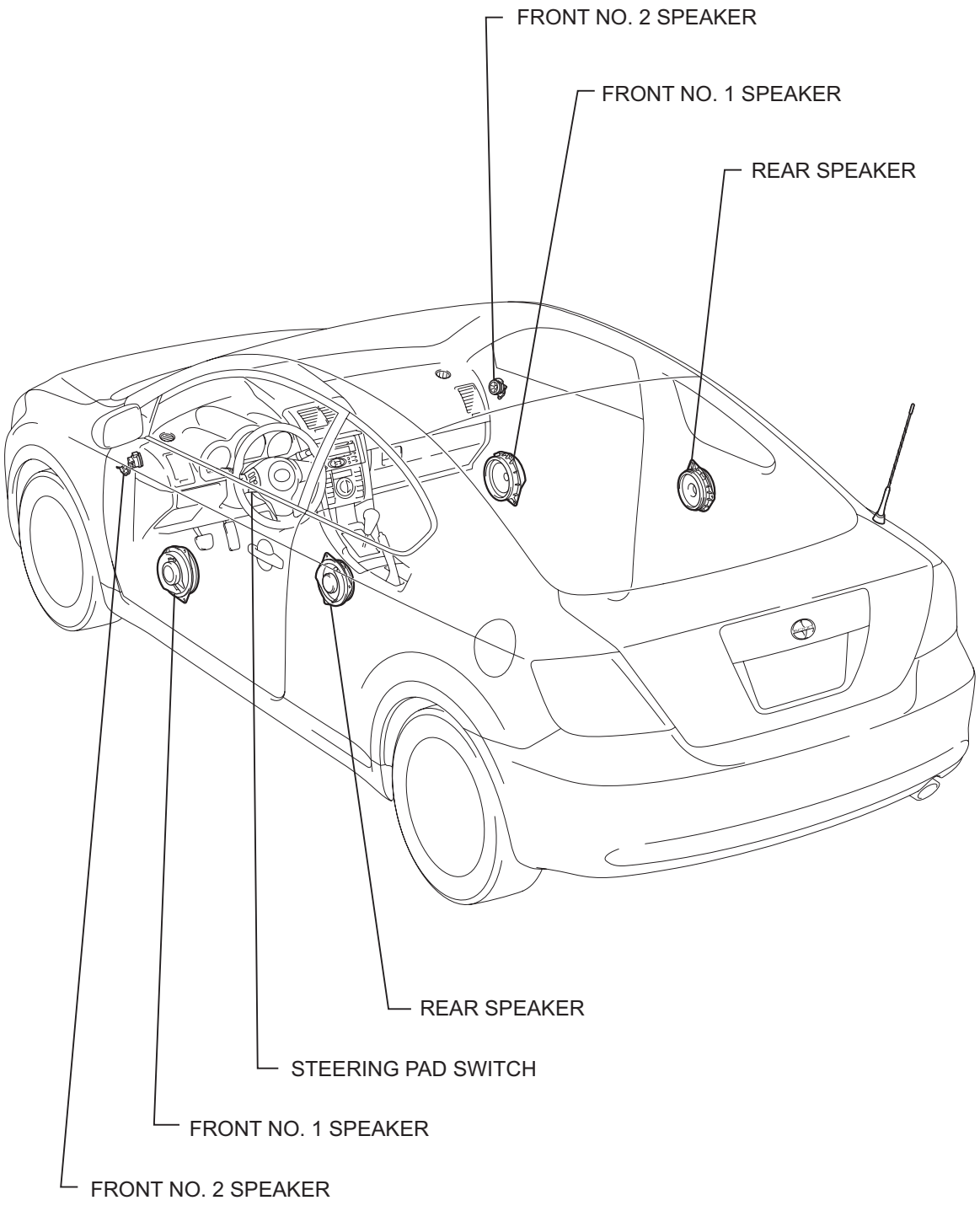
System	See Procedure
Power Window Control System (with Jam Protection Function)	IN-23
Sliding Roof System	

1. OBSERVE HANDLING AND OPERATIONAL PRECAUTIONS

(a) Fasten the earth bolt securely when the antenna cord is removed or installed.
HINT:
Failure to fasten the earth bolt securely causes noise when receiving radio waves.

(b) Do not touch the cone paper of the speaker.

PARTS LOCATION



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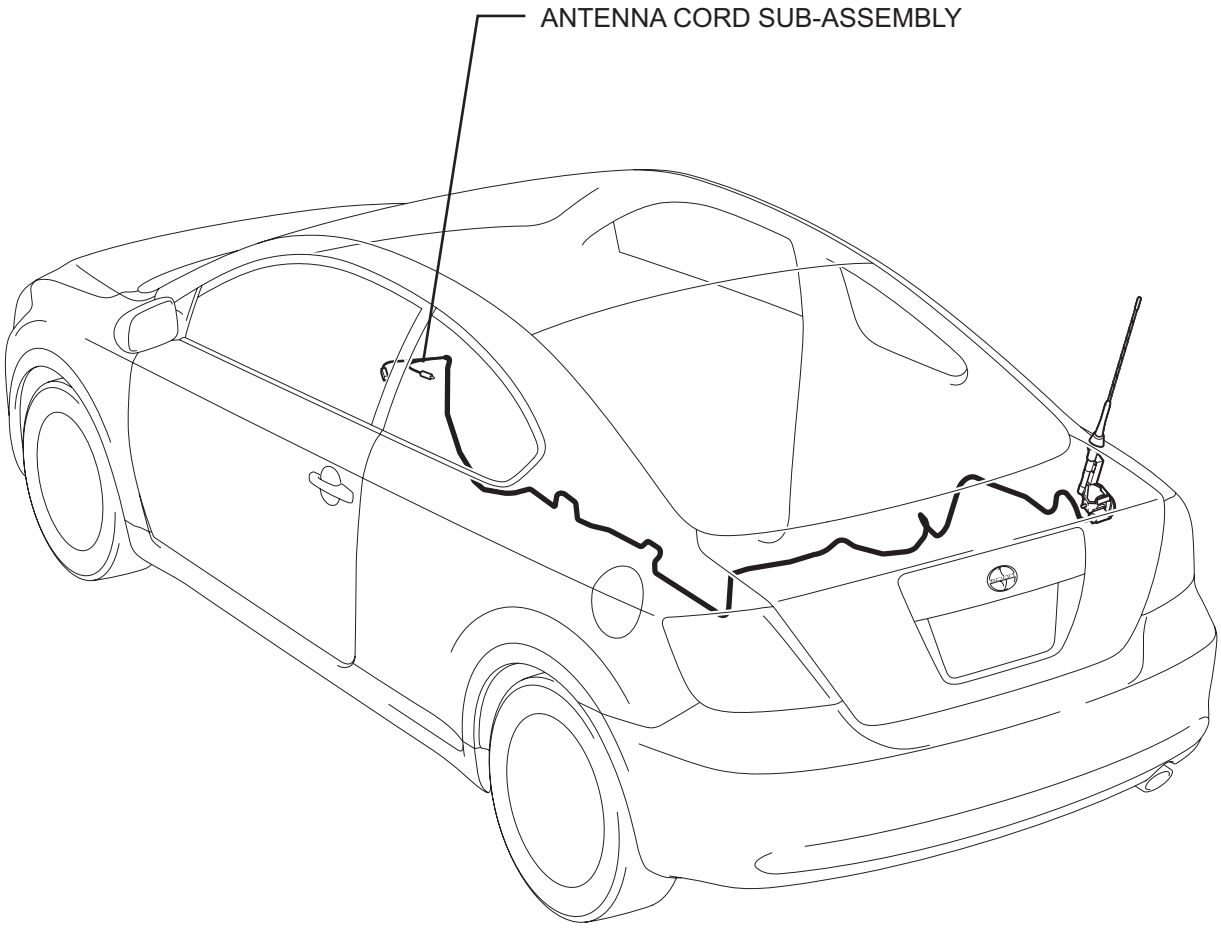
AV

RADIO ANTENNA CORD

COMPONENTS



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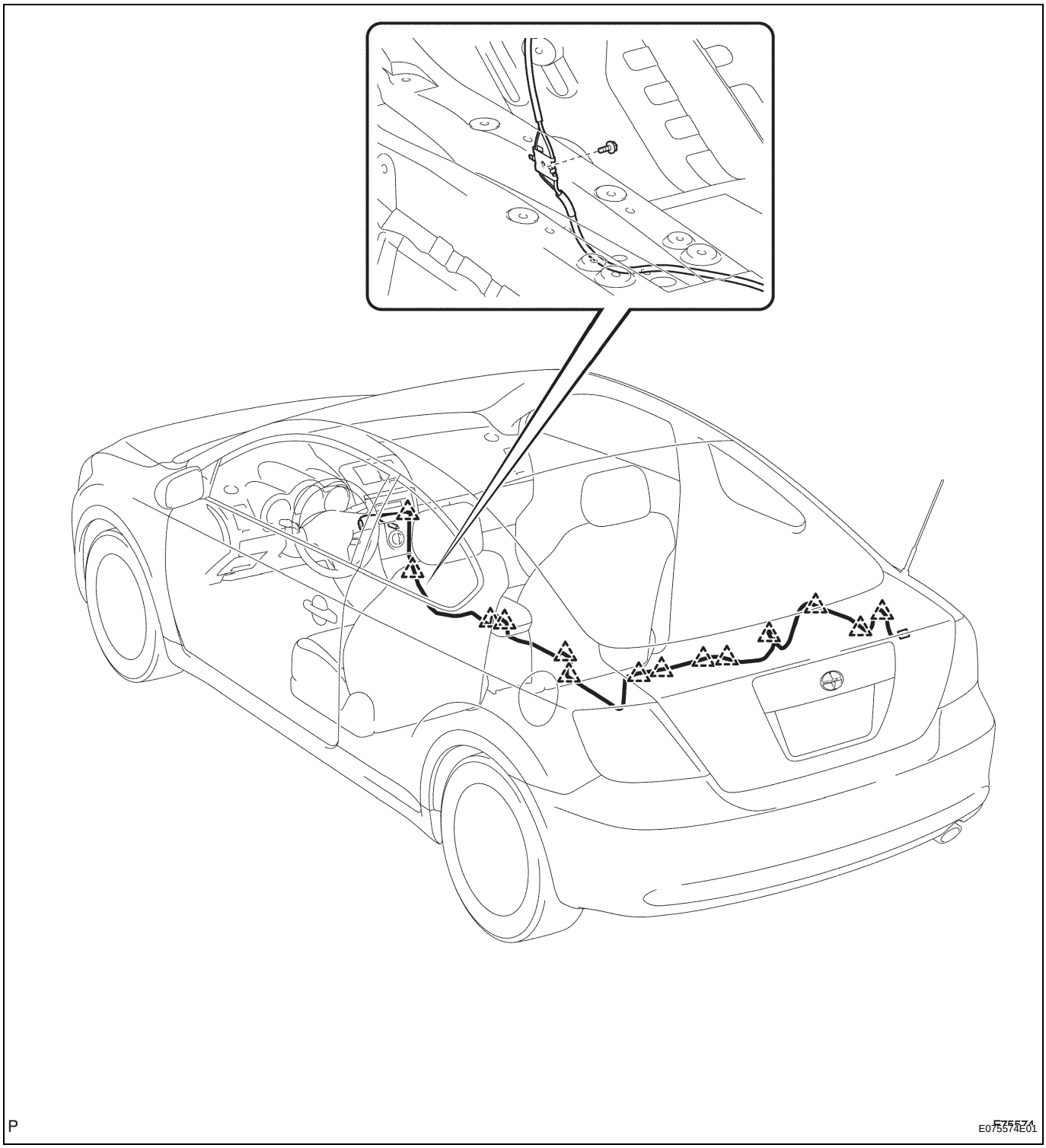
REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. REMOVE TONNEAU COVER ASSEMBLY
3. REMOVE DECK BOARD SUB-ASSEMBLY
4. REMOVE BACK DOOR SCUFF PLATE (See page IR-8)
5. REMOVE DECK FLOOR BOX LH (See page IR-8)
6. REMOVE DECK FLOOR BOX RH (See page IR-8)
7. REMOVE ROPE HOOK ASSEMBLY
8. REMOVE REAR NO. 1 FLOOR BOARD (See page IR-9)
9. REMOVE SEAT TRACK BRACKET COVER OUTER RH (See page SE-5)
10. REMOVE SEAT TRACK BRACKET COVER INNER RH (See page SE-5)
11. REMOVE FRONT SEAT ASSEMBLY RH (See page SE-5)
12. REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)
13. REMOVE REAR SEATBACK ASSEMBLY RH (See page SE-18)
14. REMOVE LAP BELT OUTER ANCHOR COVER
15. REMOVE FRONT SEAT OUTER BELT ASSEMBLY RH (See page SB-10)
16. REMOVE FRONT DOOR SCUFF PLATE RH (See page IR-9)
17. REMOVE NO. 1 LUGGAGE COMPARTMENT TRIM HOOK
18. REMOVE NO. 1 SIDE TRIM ASSEMBLY RH (See page IR-10)
19. REMOVE NO. 2 LUGGAGE COMPARTMENT TRIM HOOK
20. REMOVE DECK TRIM SIDE PANEL ASSEMBLY RH (See page IR-11)
21. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-5)
22. REMOVE UPPER CONSOLE PANEL (See page IP-5)
23. REMOVE CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-18)

24. **REMOVE CONSOLE BOX REAR ASSEMBLY (See page IP-18)**

25. **REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY (See page AC-71)**

26. **REMOVE ANTENNA CORD SUB-ASSEMBLY**
    (a) Remove the bolt.
    (b) Detach all clamps and remove the antenna cord.



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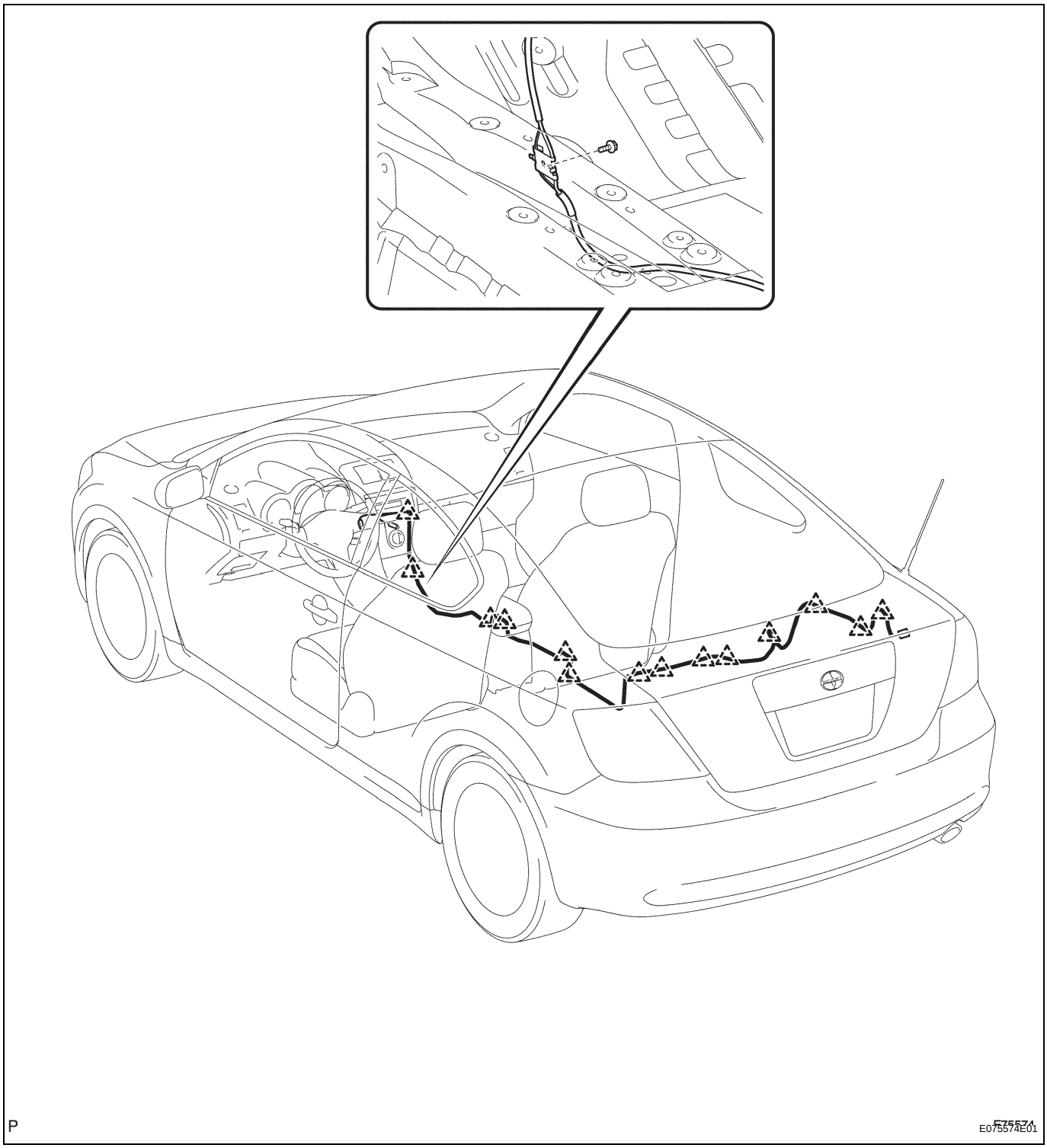
INSTALLATION

1. **INSTALL ANTENNA CORD SUB-ASSEMBLY**
   (a) Attach all clamps to install the antenna cord.
   (b) Install the bolt.



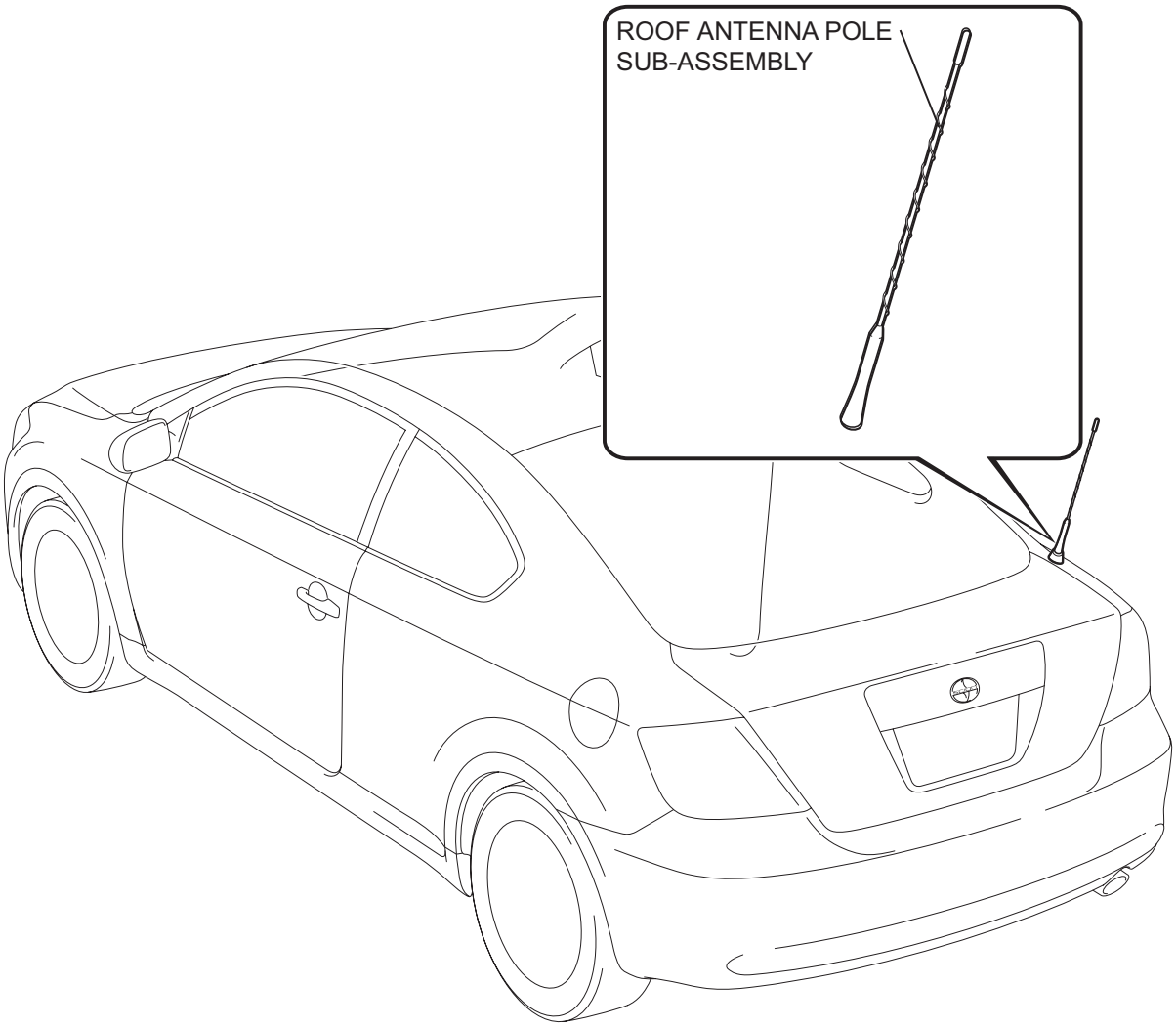
2. **INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY (See page AC-74)**
3. **INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-22)**

4. **INSTALL CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-23)**
5. **INSTALL UPPER CONSOLE PANEL (See page IP-11)**
6. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-12)**
7. **INSTALL DECK TRIM SIDE PANEL ASSEMBLY RH (See page IR-18)**
8. **INSTALL NO. 2 LUGGAGE COMPARTMENT TRIM HOOK**
9. **INSTALL NO. 1 SIDE TRIM ASSEMBLY RH (See page IR-19)**
10. **INSTALL NO. 1 LUGGAGE COMPARTMENT TRIM HOOK**
11. **INSTALL FRONT DOOR SCUFF PLATE RH (See page IR-20)**
12. **INSTALL FRONT SEAT OUTER BELT ASSEMBLY RH (See page SB-11)**
13. **INSTALL LAP BELT OUTER ANCHOR COVER**
14. **INSTALL REAR SEATBACK ASSEMBLY RH (See page SE-28)**
15. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**
16. **INSTALL FRONT SEAT ASSEMBLY (See page SE-11)**
17. **INSTALL SEAT TRACK BRACKET COVER INNER RH (See page SE-12)**
18. **INSTALL SEAT TRACK BRACKET COVER OUTER RH (See page SE-12)**
19. **INSTALL REAR NO. 1 FLOOR BOARD (See page IR-20)**
20. **INSTALL ROPE HOOK ASSEMBLY**
21. **INSTALL DECK FLOOR BOX RH (See page IR-20)**
22. **INSTALL DECK FLOOR BOX LH (See page IR-20)**
23. **INSTALL BACK DOOR SCUFF PLATE (See page IR-21)**
24. **INSTALL DECK BOARD SUB-ASSEMBLY**
25. **INSTALL TONNEAU COVER ASSEMBLY**
26. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
27. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

AV

RADIO ANTENNA POLE

COMPONENTS



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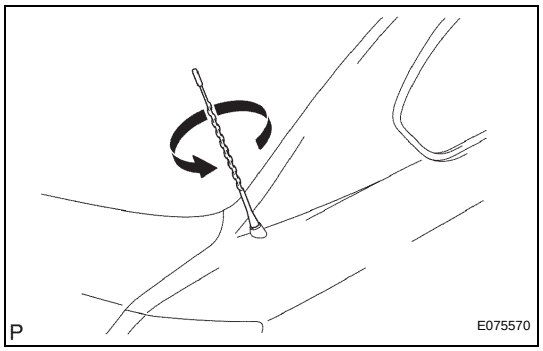


REMOVAL

1. REMOVE ROOF ANTENNA POLE SUB-ASSEMBLY

(a) Remove the antenna pole by turning it counterclockwise.

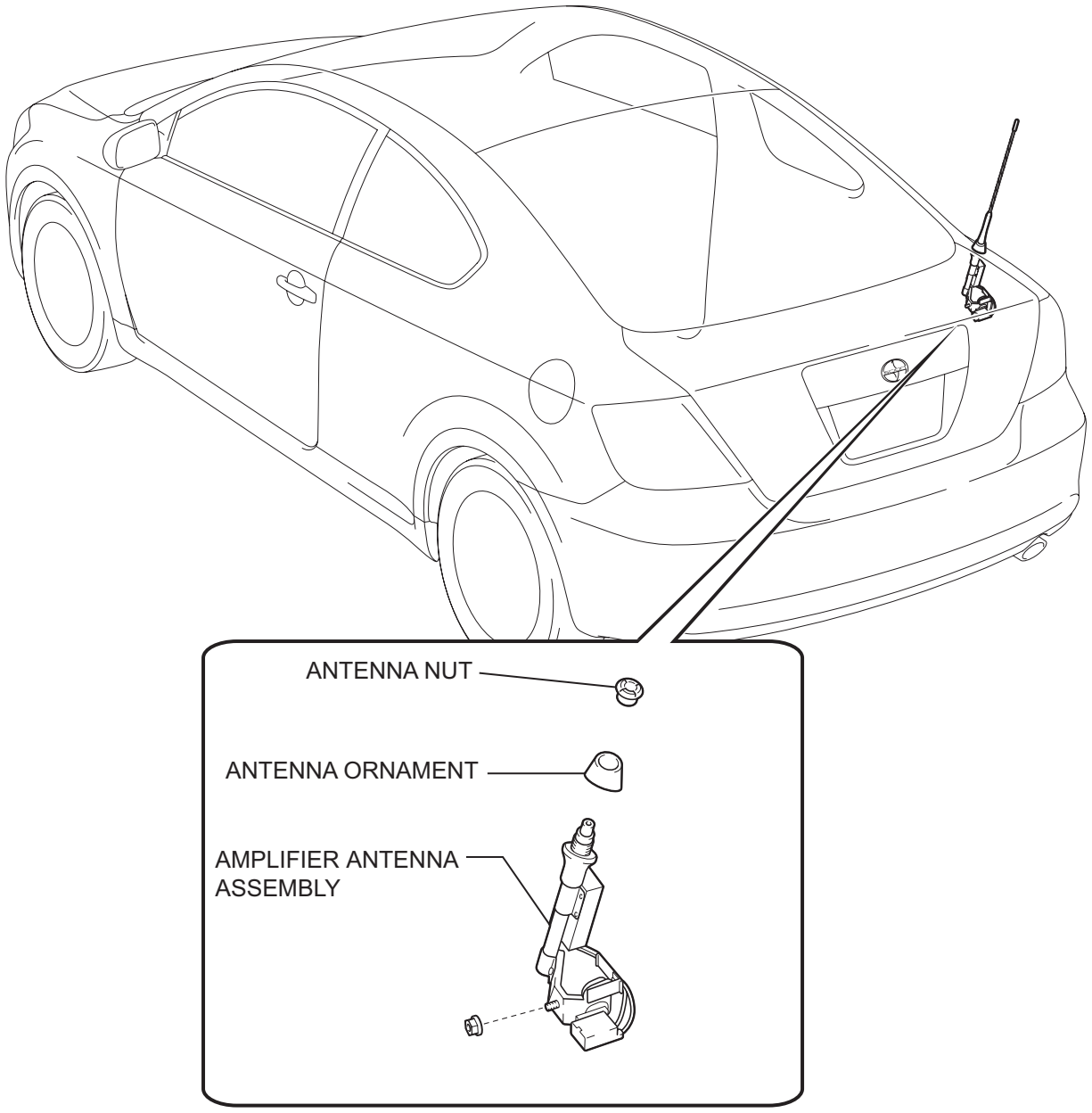
INSTALLATION

1. INSTALL ROOF ANTENNA POLE SUB-ASSEMBLY

(a) Install the antenna pole by turning it clockwise.

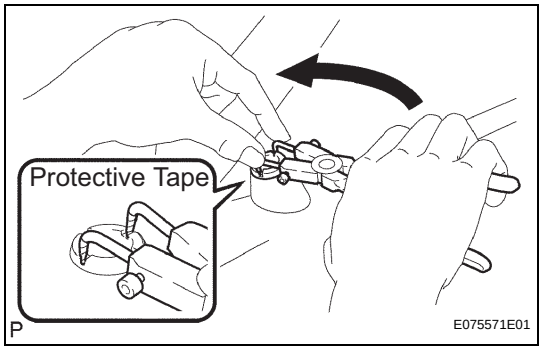
AMPLIFIER ANTENNA

COMPONENTS



REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE TONNEAU COVER ASSEMBLY**
3. **REMOVE DECK BOARD SUB-ASSEMBLY**
4. **REMOVE BACK DOOR SCUFF PLATE (See page IR-8)**
5. **REMOVE DECK FLOOR BOX LH (See page IR-8)**
6. **REMOVE DECK FLOOR BOX RH (See page IR-8)**
7. **REMOVE ROPE HOOK**
8. **REMOVE REAR NO. 1 FLOOR BOARD (See page IR-9)**
9. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
10. **REMOVE REAR SEATBACK ASSEMBLY RH (See page SE-18)**
11. **REMOVE FRONT DOOR SCUFF PLATE RH (See page IP-19)**
12. **REMOVE NO. 1 LUGGAGE COMPARTMENT TRIM HOOK**
13. **REMOVE NO. 1 SIDE TRIM ASSEMBLY RH (See page IR-10)**
14. **REMOVE NO. 2 LUGGAGE COMPARTMENT TRIM HOOK**
15. **REMOVE DECK TRIM SIDE PANEL ASSEMBLY RH (See page IR-11)**
16. **REMOVE ROOF ANTENNA POLE SUB-ASSEMBLY**
17. **REMOVE ANTENNA NUT**
    (a) Using snap ring pliers, remove the antenna nut as shown in the illustration.
    HINT:
    Wrap the tip of the snap ring pliers with protective tape to prevent damage to the parts.



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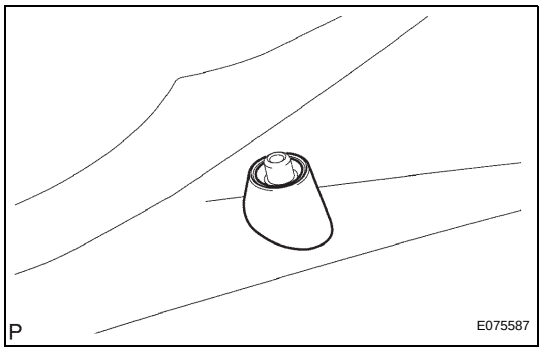
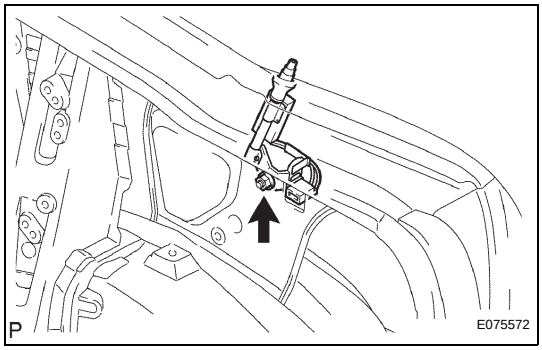


18. REMOVE ANTENNA ORNAMENT

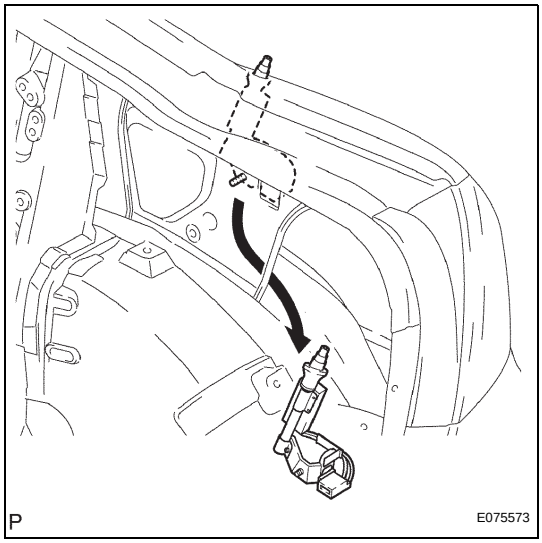
(a) Remove the antenna ornament.



19. REMOVE AMPLIFIER ANTENNA ASSEMBLY

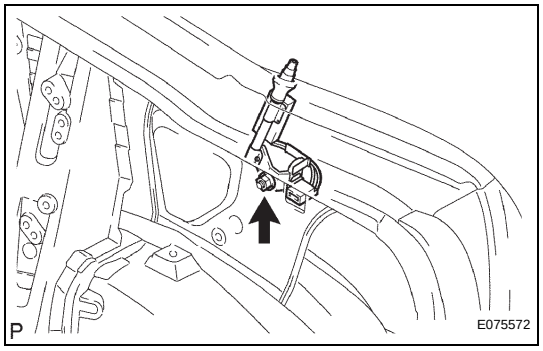
(a) Disconnect the connector.

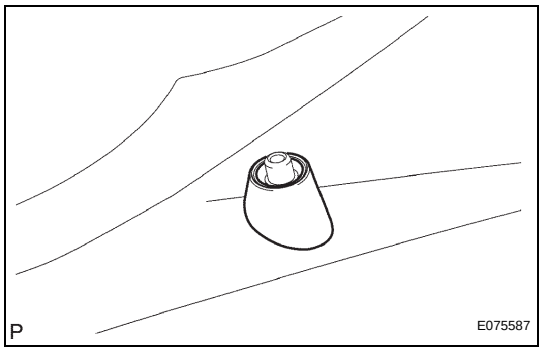
(b) Remove the nut.



(c) Remove the amplifier antenna in the direction shown by the arrow in the illustration.

INSTALLATION





1. **INSTALL AMPLIFIER ANTENNA ASSEMBLY**
   (a) Install the amplifier antenna to its original position.
   (b) Install the nut.
   (c) Connect the connector.
2. **INSTALL ANTENNA ORNAMENT**
   (a) Install the antenna ornament.
3. **INSTALL ANTENNA NUT**
   (a) Using snap ring pliers, install the antenna nut.
   HINT:
   Wrap the tip of the snap ring pliers with protective tape to prevent damage to the parts.
4. **INSTALL ROOF ANTENNA POLE SUB-ASSEMBLY**
5. **INSTALL DECK TRIM SIDE PANEL ASSEMBLY RH (See page IR-18)**
6. **INSTALL NO. 1 LUGGAGE COMPARTMENT TRIM HOOK**
7. **INSTALL NO. 1 SIDE TRIM ASSEMBLY RH (See page IR-19)**
8. **INSTALL NO. 2 LUGGAGE COMPARTMENT TRIM HOOK**
9. **INSTALL FRONT DOOR SCUFF PLATE RH (See page IP-22)**
10. **INSTALL REAR SEATBACK ASSEMBLY RH (See page SE-18)**
11. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**
12. **INSTALL REAR NO. 1 FLOOR BOARD (See page IR-20)**
13. **INSTALL ROPE HOOK**
14. **INSTALL DECK FLOOR BOX RH (See page IR-20)**
15. **INSTALL DECK FLOOR BOX LH (See page IR-20)**
16. **INSTALL BACK DOOR SCUFF PLATE (See page IR-21)**
17. **INSTALL DECK BOARD SUB-ASSEMBLY**
18. **INSTALL TONNEAU COVER ASSEMBLY**

19. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

20. PERFORM INITIALIZATION

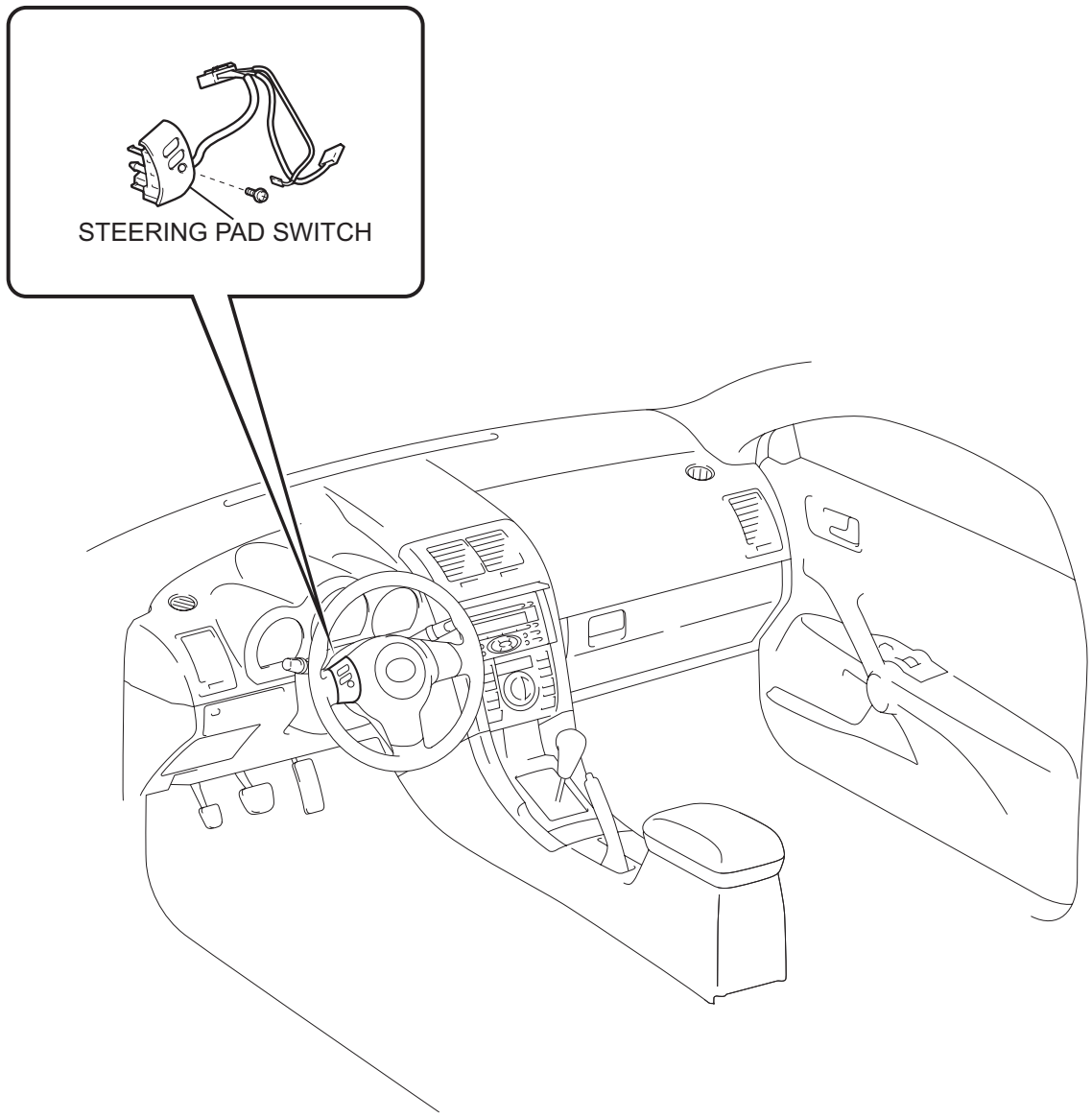
(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

STEERING PAD SWITCH

COMPONENTS



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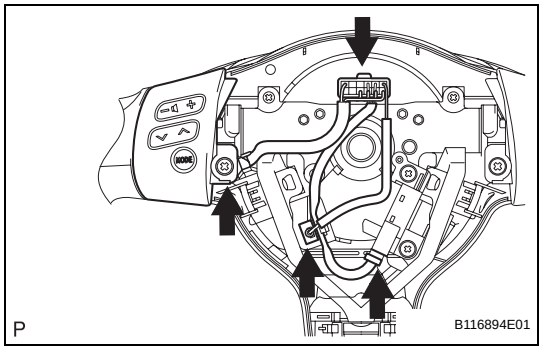
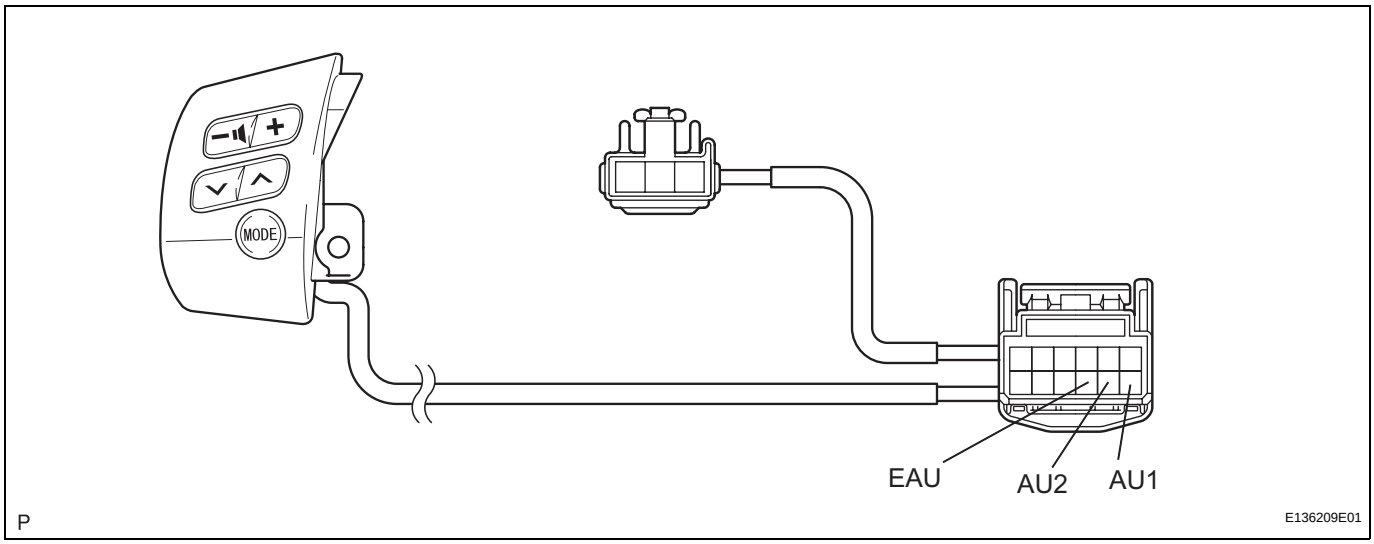
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE STEERING PAD ASSEMBLY (See page RS-345)**
3. **REMOVE STEERING PAD SWITCH**
   (a) Disconnect all connectors.
   (b) Remove the screw.
   (c) Remove the steering pad switch.



INSPECTION

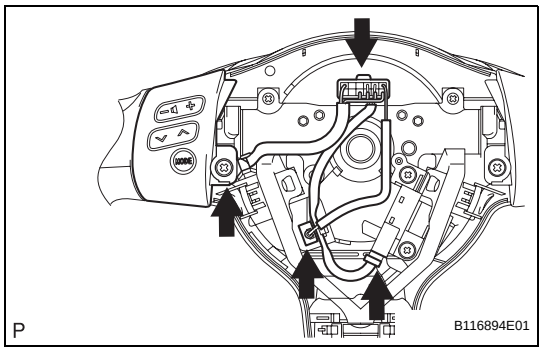
1. **INSPECT STEERING PAD SWITCH LH**
   (a) Measure the resistance according to the values in the table below.



Standard resistance

Tester connection	Condition	Specified condition
AU1 - EAU	No switch is pushed	Approx. 100 kΩ
AU1 - EAU	SEEK+ switch: push	Approx. 0 Ω
AU1 - EAU	SEEK- switch: push	Approx. 0.3 kΩ
AU1 - EAU	VOL+ switch: push	Approx. 1 kΩ
AU1 - EAU	VOL- switch: push	Approx. 3.1 kΩ
AU2 - EAU	No switch is pushed	Approx. 100 kΩ
AU2 - EAU	MODE switch: push	Approx. 0 Ω

If the result is not as specified, replace the steering pad switch LH.

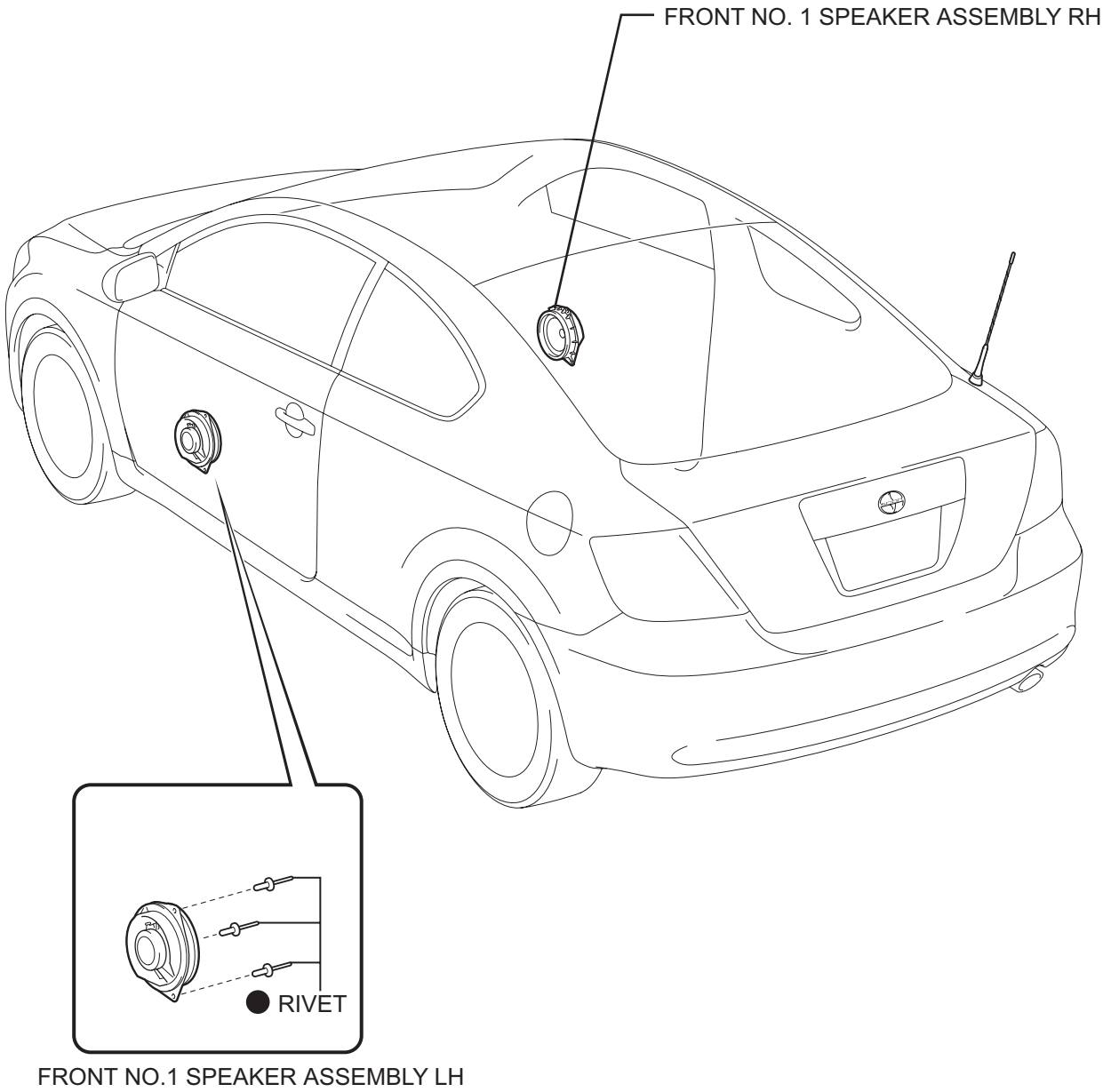


INSTALLATION

1. **INSTALL STEERING PAD SWITCH**
   (a) Install the steering pad switch.
   (b) Install the screw.
   (c) Connect all connectors.
2. **INSTALL STEERING PAD ASSEMBLY (See page RS-346)**
3. **INSPECT STEERING PAD ASSEMBLY (See page RS-346)**
4. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
5. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

FRONT NO. 1 SPEAKER

COMPONENTS



● Non-reusable part

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ON-VEHICLE INSPECTION

1. INSPECT FRONT NO. 1 SPEAKER

HINT:

Remove interior parts so that the front No. 1 speaker can be seen.

(a) Check the speaker installation.

OK:

The speaker is securely installed.

If the result is not as specified, reinstall the front No. 1 speaker.

(b) Visually check the speaker.

OK:

The cone paper of the speaker is not torn.

If the result is not as specified, replace the front No. 1 speaker.

(c) Speaker resistance check

(1) Disconnect the front No. 1 speaker connector.

(2) Measure the resistance between the terminals of the speaker.

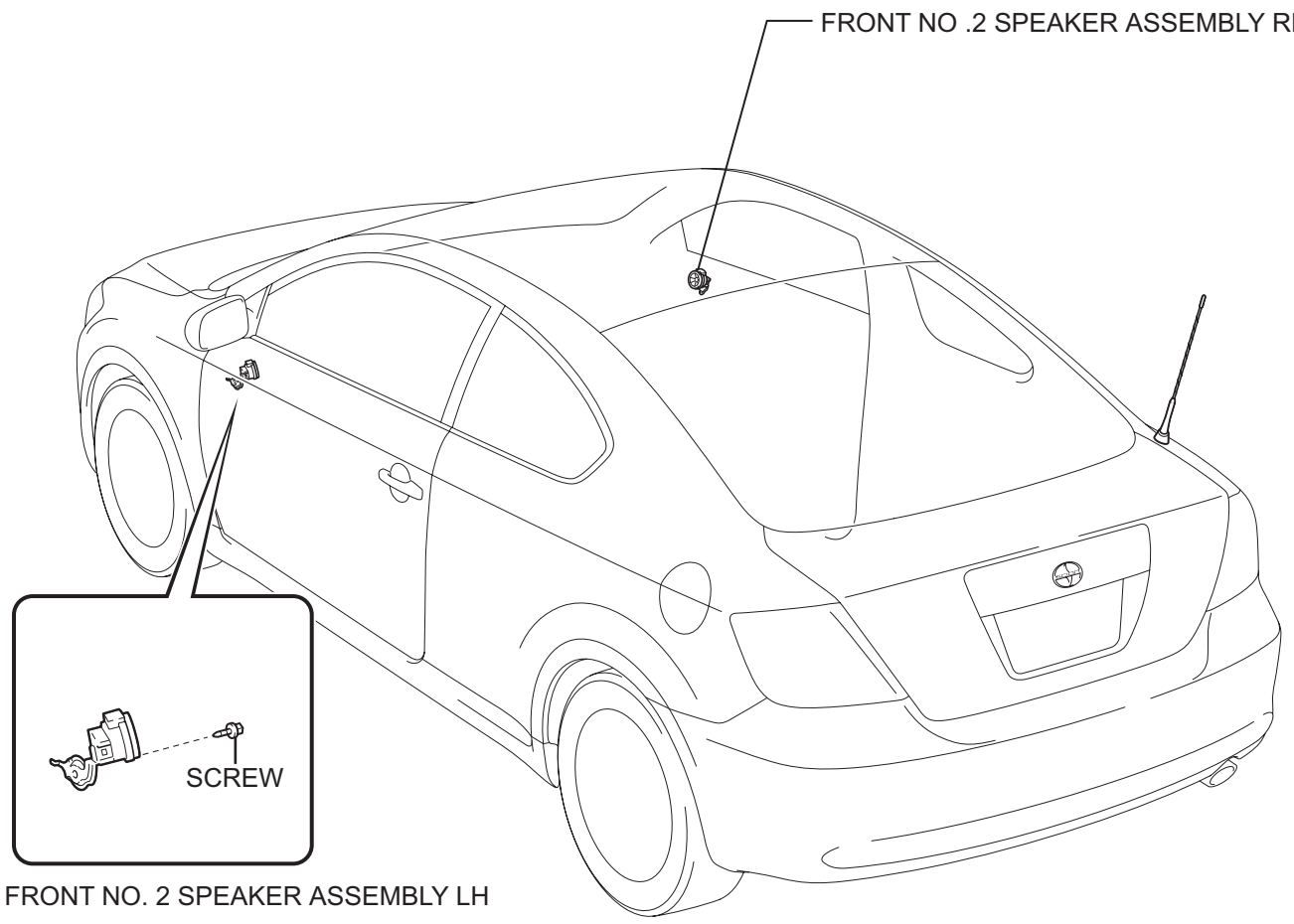
Standard resistance:

Approximately 4 Ω

If the result is not as specified, replace the front No. 1 speaker.

FRONT NO. 2 SPEAKER

COMPONENTS



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ON-VEHICLE INSPECTION

1. INSPECT FRONT NO. 2 SPEAKER

HINT:

Remove interior parts so that the front No. 2 speaker can be seen.

(a) Check the speaker installation.

OK:

The speaker is securely installed.

If the result is not as specified, reinstall the front No. 2 speaker.

(b) Visually check the speaker.

OK:

The cone paper of the speaker is not torn.

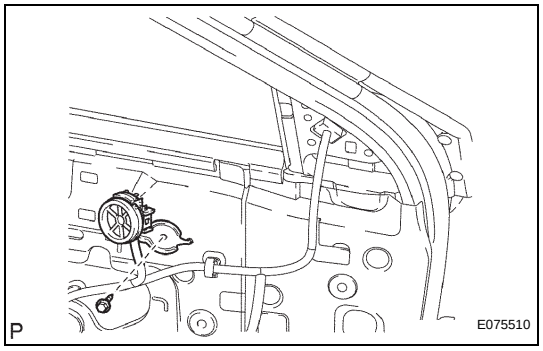
If the result is not as specified, replace the front No. 2 speaker.

REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH (See page ED-8)**
3. **REMOVE ASSIST GRIP COVER LH (See page ED-8)**
4. **REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH (See page ED-9)**
5. **REMOVE FRONT NO. 2 SPEAKER ASSEMBLY LH**
   (a) Disconnect the connector.
   (b) Remove the screw and speaker.



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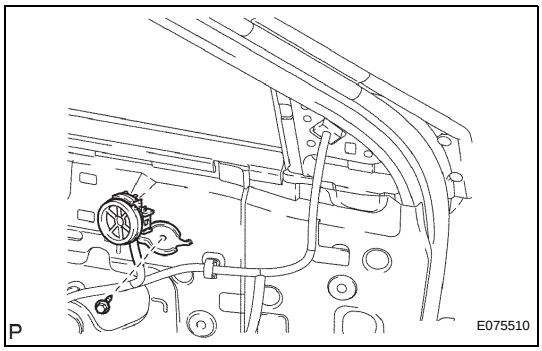
INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

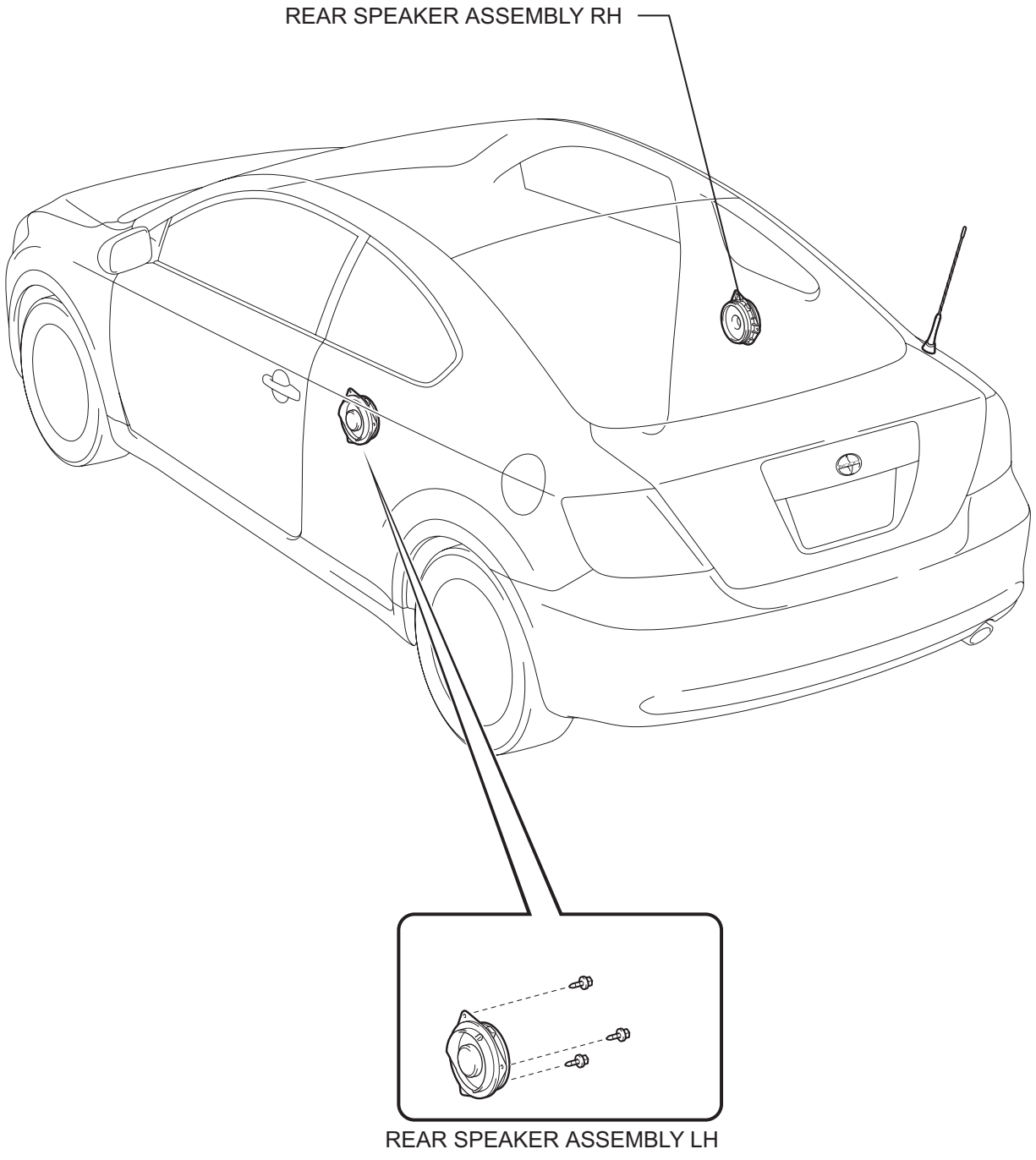


1. **INSTALL FRONT NO .2 SPEAKER ASSEMBLY LH**
   (a) Install the speaker with the screw.
   (b) Connect the connector
2. **INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH (See page ED-19)**
3. **INSTALL ASSIST GRIP COVER LH (See page ED-21)**
4. **INSTALL FRONT DOOR LOWER FRAME BRACKET GARNISH LH (See page ED-21)**
5. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
6. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

AV

REAR SPEAKER

COMPONENTS



ON-VEHICLE INSPECTION

1. INSPECT REAR SPEAKER

HINT:

Remove interior parts so that the rear speaker can be seen.

(a) Check the speaker installation.

OK:

The speaker is securely installed.

If the result is not as specified, reinstall the rear speaker.

(b) Visually check the speaker.

OK:

The cone paper of the speaker is not torn.

If the result is not as specified, replace the rear speaker.

(c) Speaker resistance check

(1) Disconnect the rear speaker connector.

(2) Measure the resistance between the terminals of the speaker.

Standard resistance:

Approximately 4 Ω

If the result is not as specified, replace the rear speaker.

REMOVAL

HINT:

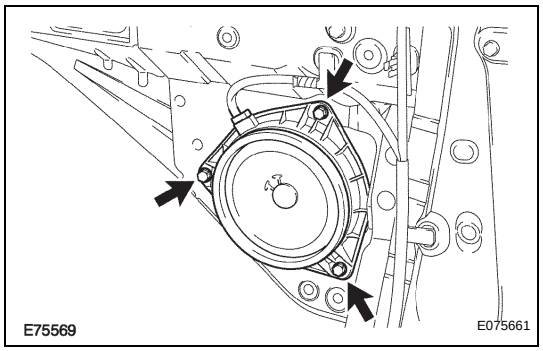
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE TONNEAU COVER ASSEMBLY**
3. **REMOVE BACK DOOR SCUFF PLATE (See page IR-8)**
4. **REMOVE DECK FLOOR BOX LH (See page IR-8)**
5. **REMOVE DECK FLOOR BOX RH (See page IR-8)**
6. **REMOVE ROPE HOOK ASSEMBLY**
7. **REMOVE NO. 1 REAR FLOOR BOARD (See page IR-9)**
8. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
9. **REMOVE REAR SEATBACK ASSEMBLY LH (See page SE-17)**
10. **REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-9)**
11. **REMOVE LUGGAGE NO. 1 COMPARTMENT TRIM HOOK**
12. **REMOVE SIDE NO. 1 TRIM ASSEMBLY LH (See page IR-10)**
13. **REMOVE REAR SPEAKER ASSEMBLY LH**
    (a) Disconnect the connector.
    (b) Remove the 3 screws and rear speaker.

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. **INSTALL REAR SPEAKER ASSEMBLY LH**
   (a) Install the rear speaker with the 3 screws.
   (b) Connect the connector.
2. **INSTALL SIDE NO. 1 TRIM ASSEMBLY LH (See page IR-19)**
3. **INSTALL LUGGAGE COMPARTMENT TRIM HOOK NO.1**
4. **INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-20)**
5. **INSTALL REAR SEATBACK ASSEMBLY LH (See page SE-28)**
6. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**
7. **INSTALL NO. 1 REAR FLOOR BOARD (See page IR-20)**
8. **INSTALL ROPE HOOK ASSEMBLY**
9. **INSTALL DECK FLOOR BOX RH (See page IR-20)**
10. **INSTALL DECK FLOOR BOX LH (See page IR-20)**
11. **INSTALL BACK DOOR SCUFF PLATE (See page IR-21)**
12. **INSTALL DECK BOARD SUB-ASSEMBLY**
13. **INSTALL TONNEAU COVER ASSEMBLY**
14. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
15. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

AUTOMATIC TRANSAXLE SYSTEM

PRECAUTION

NOTICE:
When the negative (-) battery cable is disconnected, initialize the following systems after the cable is reconnected.

System Name	See procedure
Power Window Control System (with Jam Protection Function)	IN-23
Sliding Roof System	IN-23

NOTICE:
Perform the RESET MEMORY (AT initialization) when replacing the automatic transaxle assembly, engine assembly or ECM (See page AX-15).
HINT:
RESET MEMORY can not be completed by only disconnecting the battery cable.

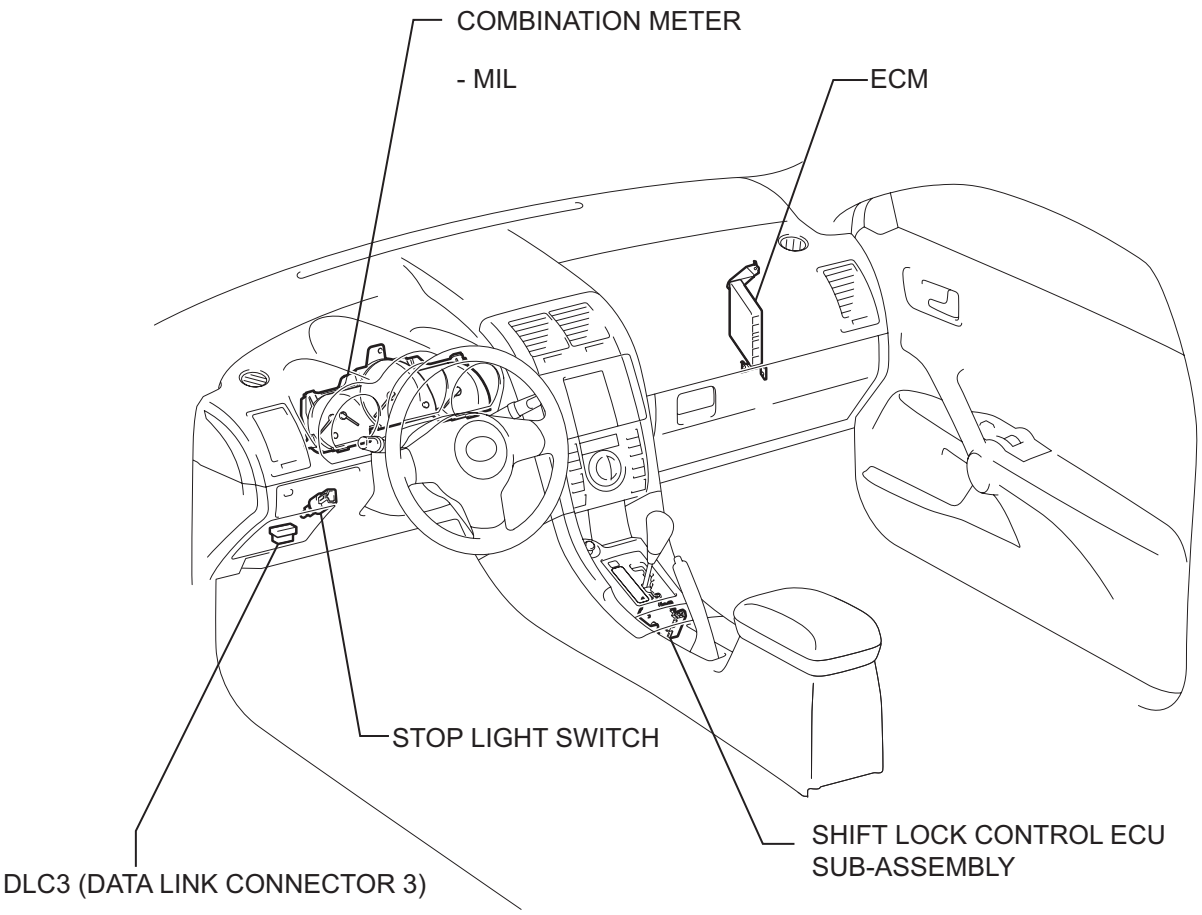
1. **The automatic transaxle is composed of highly precision-finished parts which need careful inspection before reassembly. Even a small nick could cause fluid leakage or affect the performance. The instructions here are organized so that you work on only one component group at a time. This will help 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**
2. **All disassembled parts should be washed clean and any fluid passages and holes should be blown through with compressed air.**
3. **Dry all parts with compressed air. Never use a shop rag or a piece of cloth to dry them.**
4. **When using compressed air, always aim away from yourself to prevent accidentally spraying ATF or kerosene in your face.**
5. **Only recommended automatic transaxle fluid or kerosene should be used for cleaning.**

6. **After cleaning, the parts should be arranged in the correct order for efficient inspection, repair, and reassembly.**
7. **When disassembling a valve body, be sure to match each valve together with the corresponding spring.**
8. **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.**
9. **All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with ATF prior to reassembly.**
10. **All gaskets and rubber O-rings should be replaced with new ones.**
11. **Do not apply adhesive cements to gaskets and similar parts.**
12. **Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.**
13. **When replacing a worn bushing, the sub-assembly containing the bushing must also be replaced.**
14. **Check thrust bearings and races for wear or damage. Replace them as necessary.**
15. **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.

DEFINITION OF TERMS

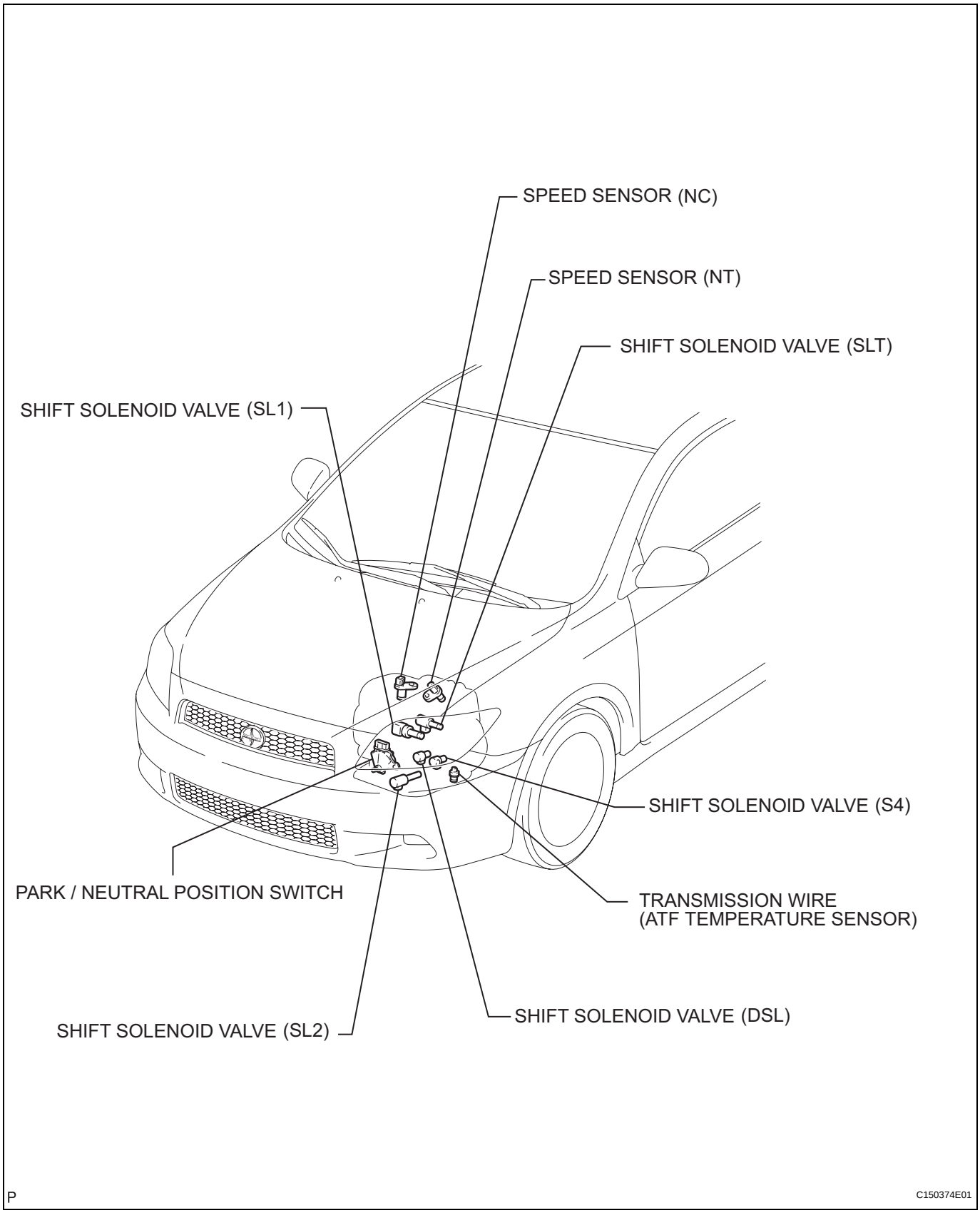
Term	Definition
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and its details).
Related DTCs	Diagnostic code
Typical enabling condition	Preconditions that allow the ECM to detect malfunctions. With all preconditions satisfied, the ECM sets 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 ECM to detect malfunctions.
Frequency of operation	The number of times that the ECM checks for malfunctions per driving cycle. "Once per driving cycle" means that the ECM detects malfunction only one time during a single driving cycle. "Continuous" means that the ECM detects malfunction every time when enabling condition is met.
Duration	The minimum time that the ECM 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 ECM 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 ECM illuminates MIL the instant the ECM determines that there is a malfunction. "2 driving cycle" means that the ECM 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.

PARTS LOCATION



P

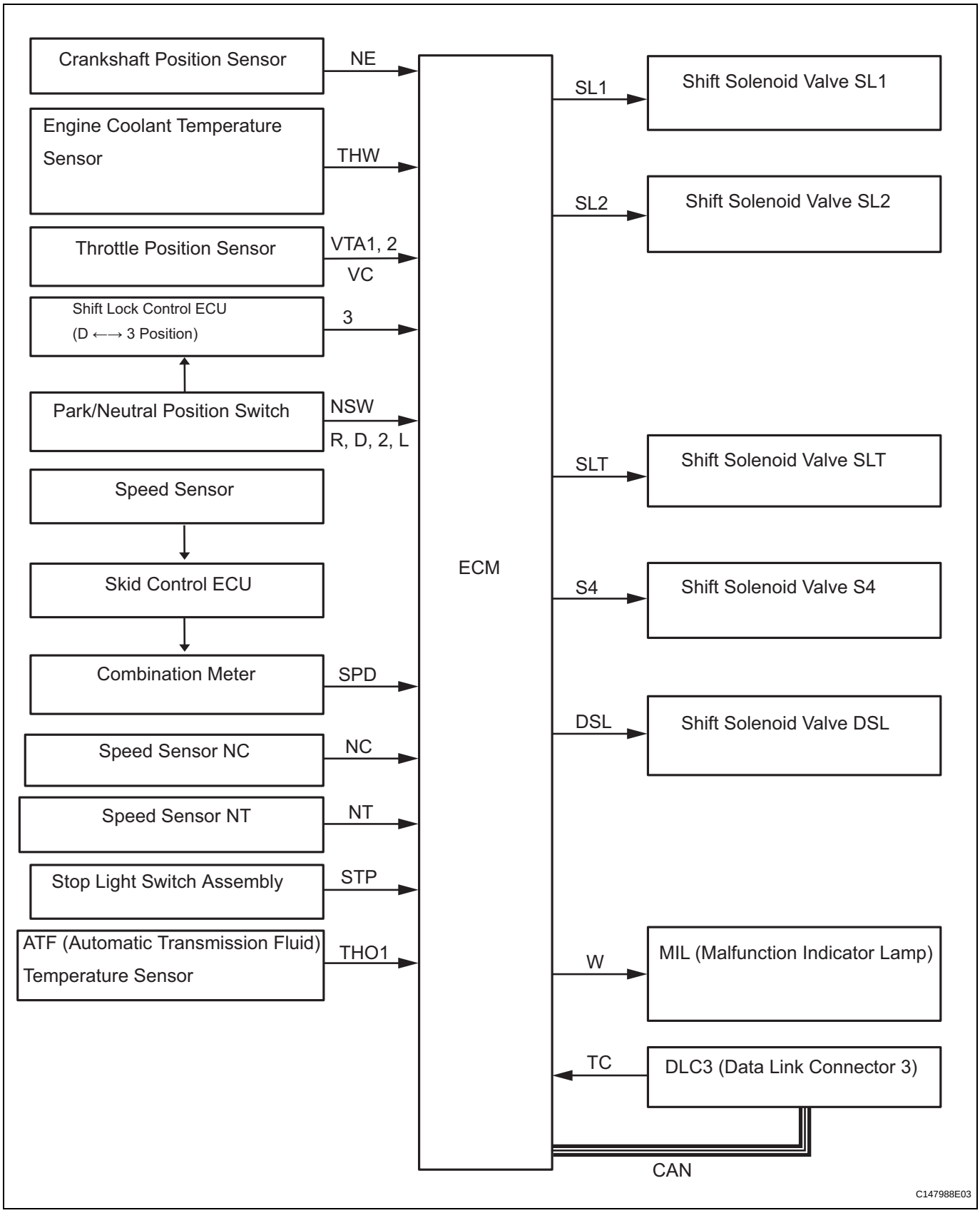
C125015E01


SPEED SENSOR (NC)
SPEED SENSOR (NT)
SHIFT SOLENOID VALVE (SLT)
SHIFT SOLENOID VALVE (SL1)
SHIFT SOLENOID VALVE (S4)
PARK / NEUTRAL POSITION SWITCH
TRANSMISSION WIRE
(ATF TEMPERATURE SENSOR)
SHIFT SOLENOID VALVE (DSL)
SHIFT SOLENOID VALVE (SL2)
P
C150374E01

AX

SYSTEM DIAGRAM

The configuration of the electronic control system in the U241E automatic transaxles is as shown in the following chart.



AX

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) The ECT (Electronic controlled automatic transmission/transaxle) is an automatic transmission/transaxle that electronically controls shift timing using the ECM. The ECM 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.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- The ECM 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.
- The intelligent tester can be used at steps 3, 4, 6, and 9.

1	**Vehicle Brought to Workshop**

NEXT

2	**Customer Problem Analysis**

NEXT

3	**Connect the intelligent tester to DLC3**

NEXT

4	**Check and Clear DTCs and Freeze Frame Data**

AX

HINT:
(See page AX-26).

NEXT

5	**Visual Inspection**

NEXT

6	**Setting the Check Mode Diagnosis**

HINT:
(See page AX-27).

NEXT

7	**Problem Symptom Confirmation**

HINT:
(See page AX-10).

	Symptom does not occur: Go to step 8

Symptom occurs: Go to step 9

8	Symptom Simulation

HINT:
(See page IN-26).

NEXT

9	DTC Check

HINT:
(See page AX-26).

DTC is not output: Go to step 10

DTC is output: Go to step 17

10	Basic Inspection

HINT:
(See page AX-104, AX-110 and AX-133).

NG → Go to step 19

OK

11	Mechanical System Test

HINT:
(See page AX-12).

NG → Go to step 16

OK

12	Hydraulic Test

HINT:
(See page AX-14).

NG → Go to step 16

OK

13	Manual Shifting Test

HINT:
(See page AX-15).

NG → Go to step 15

AX

OK

14	Problem Symptoms Table Chapter 1

HINT:
(See page AX-19).

NG → Go to step 18

OK

15	Problem Symptoms Table Chapter 2

HINT:
(See page AX-19).

NEXT

16	Part Inspection

→ Go to step 19

17	DTC Chart

HINT:
(See page AX-33).

NEXT

18	Circuit Inspection

NEXT

19	Repair or Replace

NEXT

20	Confirmation Test

NEXT

End

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

NOTICE:

Perform the test at the ATF (Automatic Transmission Fluid) temperature 50 to 80°C (122 to 176°F) in the normal operation.

(a) D position test:

Shift into the D position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

Check that 1 → 2, 2 → 3 and 3 → 4th(O/D) up-shifts take place, and that the shift points conform to the automatic shift schedule (See page SS-20).

HINT:

4th(O/D) Gear Up-shift Prohibition Control

- Engine coolant temperature is 55°C (131°F) or less and vehicle speed is at 70 km/h (43 mph) or less.
- ATF temperature is 5°C (41°F) or less.

Lock-up Prohibition Control

- Brake pedal is depressed.
- Accelerator pedal is released.
- Engine coolant temperature is 60°C (140°F) or less.

3rd Gear Lock-up Prohibit Control

- There is no 3rd gear lock-up function in the 4 position.

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3 and 3 → 4th(O/D) up-shifts.

(3) Check for abnormal noise and vibration.

Check for abnormal noise and vibration when up-shifting from 1 → 2, 2 → 3 and 3 → 4th(O/D) while driving with the shift lever in the D position, and check while driving in the lock-up condition.

HINT:

The check for the cause of abnormal noise and vibration must be done thoroughly as it could also be due to loss of balance in the differential, torque converter clutch, etc.

AX

(4) Check kick-down operation.
Check vehicle speeds when the 2nd to 1st, 3rd to 2nd and 4th(O/D) to 3rd kick-downs take place while driving with the shift lever in the D position. Confirm that each speed is within the applicable vehicle speed range indicated in the automatic shift schedule (See page SS-20).
(5) Check abnormal shock and slip at kick-down.
(6) Check the lock-up mechanism.
- Drive in D position (4th(O/D) gear), at a steady speed (lock-up ON).
- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

HINT:
- There is no lock-up function in the 1st and 2nd gear.
- If there is a big jump in engine speed, there is no lock-up.

(b) 2 position test:
Shift into the 2 position and fully depress the accelerator pedal and check the following points.
(1) Check up-shift operation.
Check that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page SS-20).
HINT:
There is no 3rd up-shift and lock-up in the 2 position.
(2) Check engine braking.
While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noise during acceleration and deceleration, and for shock at up-shift and down-shift.

(c) L position test:
Shift into the L position and fully depress the accelerator pedal and check the following points.
(1) Check no up-shift.
While running in the L position, check that there is no up-shift to 2nd gear.
HINT:
There is no lock-up in the L position.
(2) Check engine braking.
While running in the L position, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noise during acceleration and deceleration.

(d) R position test:
Shift into the R position, lightly depress the accelerator pedal, and check that the vehicle moves backward without any abnormal noise or vibration.
CAUTION:
Before conducting this test ensure that the test area is free from people and obstruction.

(e) P position test:
Stop the vehicle on the grade (more than 5°) and after shifting into the P position, release the parking brake. Then, check that the parking lock pawl holds the vehicle in place.

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 transaxle 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 50 to 80°C (122 to 176°F).**
- **Do not continuously run this test for longer than 10 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.**

(1) Chock the 4 wheels.

(2) Connect the intelligent tester 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:

2570 +- 150 rpm

AX

Evaluation:

Problem	Possible cause
(a) Stall engine speed is low in D position	• Engine power output may be insufficient • Stator one-way clutch not operating properly HINT: If the value is less than the specified value by 600 rpm or more, the torque converter could be faulty.
(b) Stall engine speed is high in D position	• Line pressure is too low • Forward clutch slipping • U/D (Underdrive) clutch slipping • U/D (Underdrive) one-way clutch is not operating properly • No. 2 one-way clutch 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:

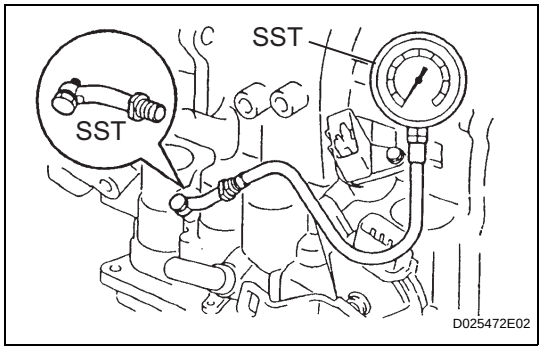
- **Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 50 to 80°C (122 to 176°F).**

- **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 intelligent tester 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	• Line pressure is too low • Forward clutch worn • No.1 one-way clutch is not operating properly • U/D (Underdrive) one-way clutch is not operating
N → R time lag is longer	• Line pressure is too low • Direct clutch worn • 1st and reverse brake worn • U/D (Underdrive) one-way clutch not operating properly



HYDRAULIC TEST

AX

1. PERFORM HYDRAULIC TEST

(a) Measure the line pressure.
NOTICE:
- **Perform the test at the normal operating ATF (Automatic Transmission Fluid) temperature: 50 to 80°C (122 to 176°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 10 seconds.**

(1) Warm up the ATF:

(2) Remove the test plug on the front side of the transaxle case and connect SST.
SST 09992-00095 (09992-00231, 09992-00271)
(3) Fully apply the parking brake and chock the 4 wheels.
(4) Connect the intelligent tester to the DLC3.
(5) Start the engine and check idling speed.
(6) Keep your left foot pressing firmly on the brake pedal and shift into D position.
(7) Measure the line pressure when the engine is idling.
(8) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
(9) In the same way, 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	372 to 412 kPa (3.8 to 4.2 kgf/cm^2, 54 to 60 psi)	672 to 742 kPa (6.9 to 7.6 kgf/cm^2, 97 to 108 psi)
Stall test	931 to 1,031 kPa (9.5 to 10.5 kgf/cm^2, 135 to 150 psi)	1,768 to 1,968 kPa (18.0 to 20.0 kgf/cm^2, 256 to 285 psi)

Evaluation:

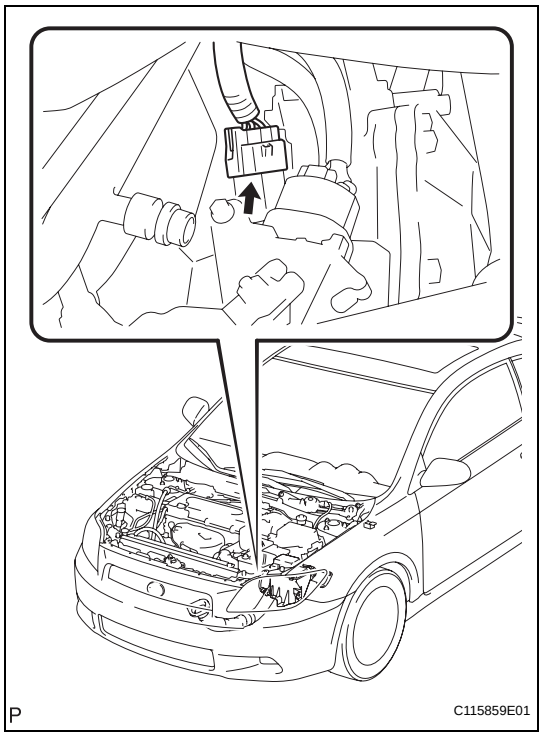
Problem	Possible cause
If the measured values at all positions are higher	• Line pressure control solenoid (SLT) defective • Regulator valve detective
If the measured values at all positions are lower	• Line pressure control solenoid (SLT) defective • Regulator valve detective • Oil pump defective • U/D (Underdrive) direct clutch defective
If pressure is low in the D position only	• D position circuit fluid leak • Forward clutch defective
If pressure is low in the R position only	• R position circuit fluid leak • Direct clutch defective • 1st and reverse brake defective

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 transaxle.
- If any abnormalities are found in the following test, the problem is in the transaxle itself.



(a) Disconnect the transmission wire connector.

(b) Inspect the manual driving operation.
Check that the shift and gear positions correspond to the table below.
Check that the gear change corresponds to the shift position.

Shift Position	Gear Position
D	3rd
2	3rd
L	3rd
R	Reverse
P	Pawl Lock

HINT:
If the gear positions of the L, 2 and D are difficult to distinguish, do the following road test (See page AX-10).
If any abnormality is found in the above test, the problem is in the transaxle itself.

(c) Connect the transmission wire connector.

(d) Clear the DTC (See page AX-26).

AX

INITIALIZATION

1. RESET MEMORY

NOTICE:

- **Perform the RESET MEMORY (AT initialization) when replacing the automatic transaxle assembly, engine assembly or ECM.**
- **The RESET MEMORY can be performed only with the Intelligent tester.**

HINT:

The ECM memorizes the condition that the ECT controls the automatic transaxle assembly and engine assembly according to those characteristics. Therefore, when the automatic transaxle assembly, engine assembly, or ECM has been replaced, it is necessary to reset the memory so that the ECM can memorize the new information.

Reset procedure is as follows.

(a) Turn the ignition switch off.

(b) Connect the intelligent tester to the DLC3.

(c) Turn the ignition switch to the ON position and push the intelligent tester main switch on.

(d) Select the item "DIAGNOSIS / ENHANCED OBD II".

(e) Perform the reset memory procedure from the ENGINE menu.

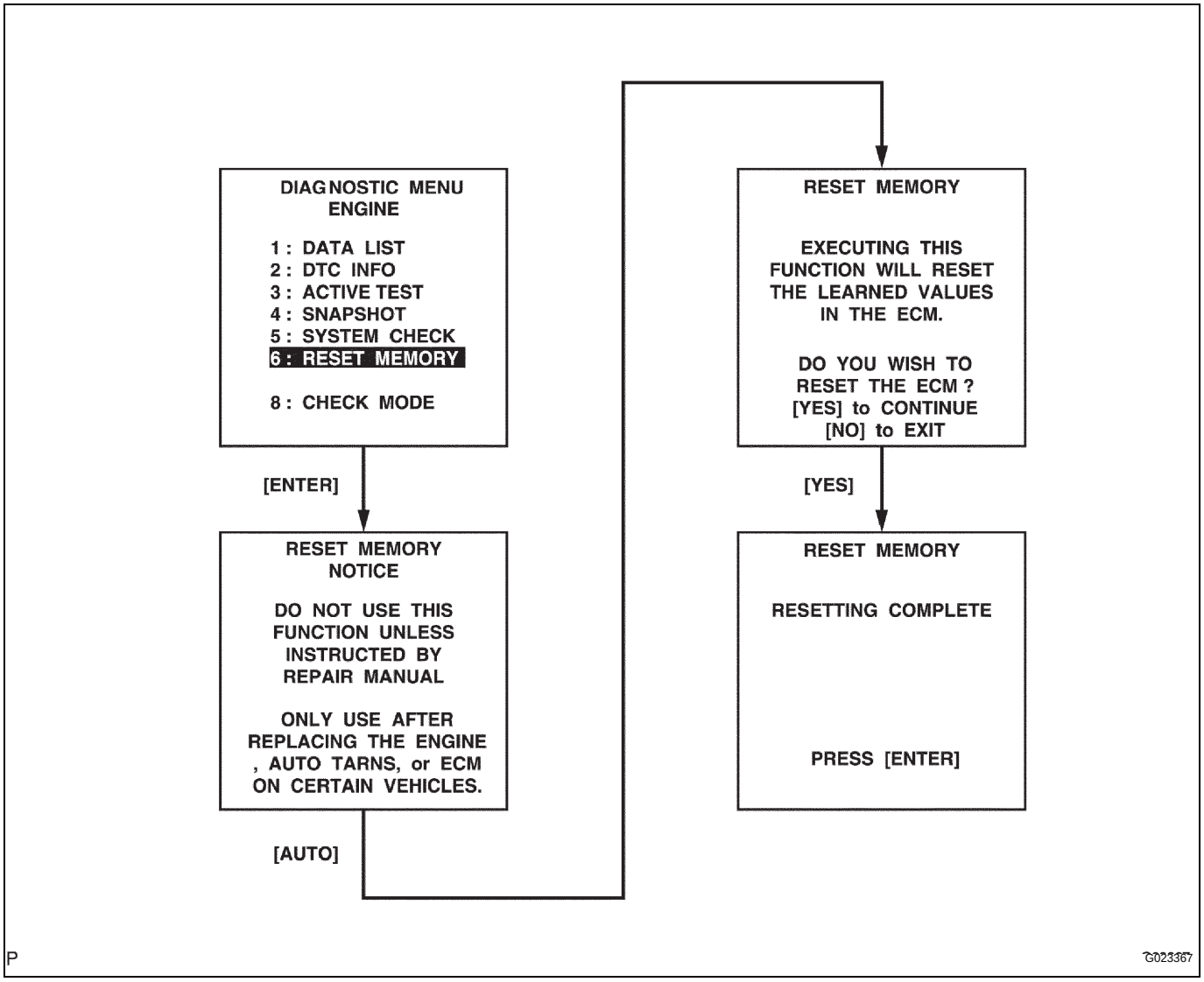
CAUTION:

After performing the RESET MEMORY, be sure to perform the ROAD TEST (See page AX-10) described earlier.

HINT:

The ECM is learned by performing the ROAD TEST.

(1) Tester menu flow:


DIAGNOSTIC MENU
ENGINE
1 : DATA LIST
2 : DTC INFO
3 : ACTIVE TEST
4 : SNAPSHOT
5 : SYSTEM CHECK
6 : RESET MEMORY
8 : CHECK MODE
[ENTER]
RESET MEMORY
NOTICE
DO NOT USE THIS FUNCTION UNLESS INSTRUCTED BY REPAIR MANUAL
ONLY USE AFTER REPLACING THE ENGINE , AUTO TARNS, or ECM ON CERTAIN VEHICLES.
[AUTO]
RESET MEMORY
EXECUTING THIS FUNCTION WILL RESET THE LEARNED VALUES IN THE ECM.
DO YOU WISH TO RESET THE ECM ?
[YES] to CONTINUE
[NO] to EXIT
[YES]
RESET MEMORY
RESETTING COMPLETE
PRESS [ENTER]
P
G023367

AX

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

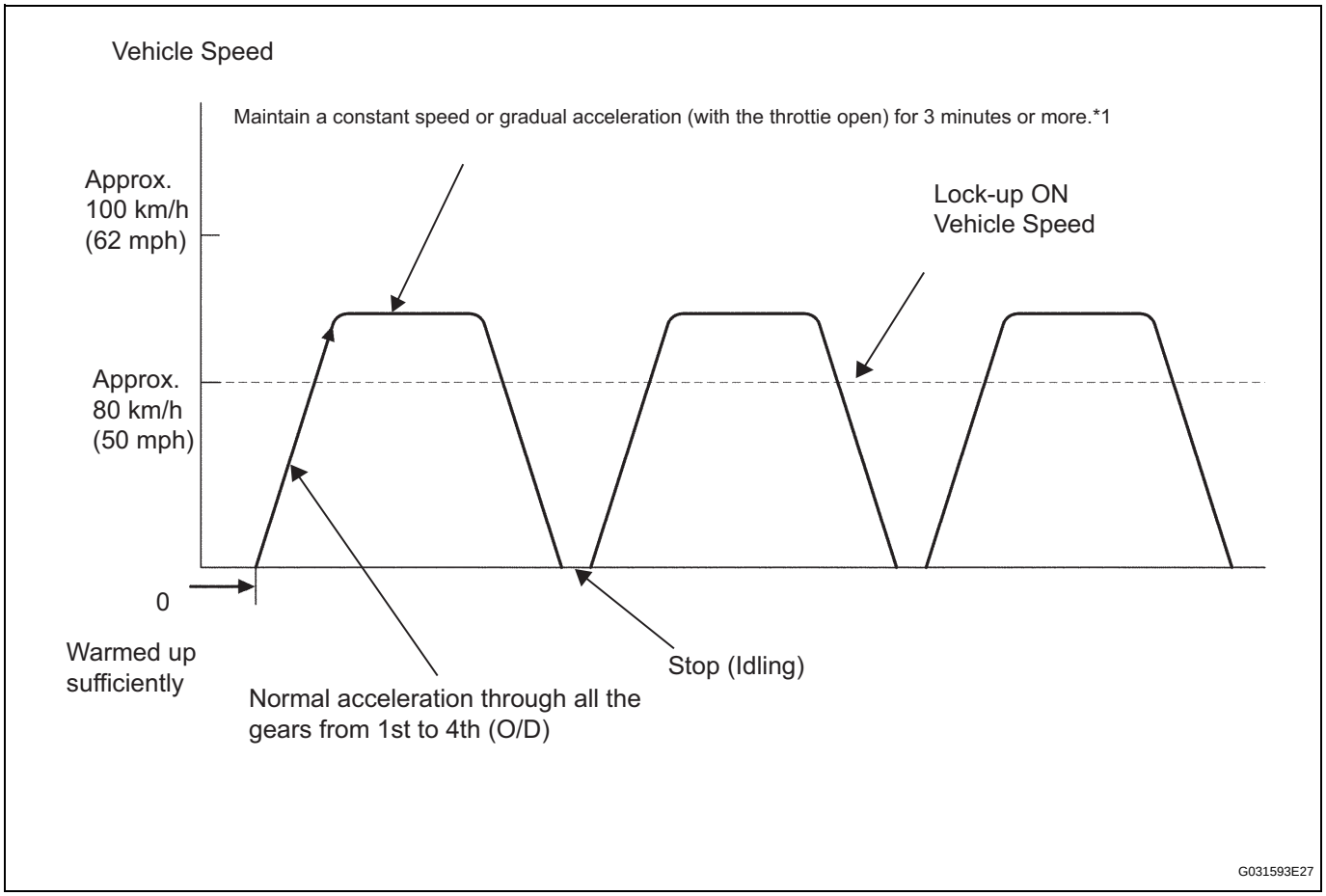
- Warm up the engine sufficiently. (Engine coolant temperature is 60°C (140°F) or higher)
- Drive the vehicle when the atmospheric temperature is -10°C (14°F) or higher. (Malfunction is not detected when the atmospheric temperature is less than -10°C (14°F))

Driving note

- Drive the vehicle through all gears. Stop → 1st → 2nd → 3rd → 4th (O/D) → 4th (lock-up ON).
- Repeat the above driving pattern three times or more.

NOTICE:

- **The monitor status can be checked using the OBD II scan tool or intelligent tester. When using the intelligent tester, monitor status can be found in the "ENHANCED OBD II / DATA LIST" or under "CARB OBD II".**
- **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.

AX

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.
- When the circuit on which mark *1 is attached is a malfunction, DTC could be output.

Chapter 1:

Refer to the table below when the trouble cause is considered to be electrical 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 ECM.

1. Chapter 1: Electronic Circuit Matrix Chart

Symptom	Suspected Area	See page
No up-shift (1st -> 2nd)	ECM	IN-34
No up-shift (2nd -> 3rd)	ECM	IN-34
No up-shift (3rd -> 4th)	1. Park/neutral position switch circuit *1	AX-36
	2. ECM	IN-34
No down-shift (4th -> 3rd)	ECM	IN-34
No down-shift (3rd -> 2nd)	ECM	IN-34
No down-shift (2nd -> 1st)	ECM	IN-34
No lock-up or No lock-up off	ECM	IN-34
Shift point too high or too low	ECM	IN-34
Up-shift to 4th from 3rd while shift lever is 3 position	1. Park/neutral position switch circuit *1	AX-36
	2. ECM	IN-34
Up-shift to 4th from 3rd while engine is cold	1. Engine coolant temp. sensor circuit *1	ES-47
	2. ECM	IN-34
Harsh engagement (N -> D)	ECM	IN-34
Harsh engagement (Lock-up)	ECM	IN-34
Harsh engagement (Any driving position)	ECM	IN-34
Poor acceleration	ECM	IN-34
Engine stalls when starting off or stopping	ECM	IN-34
Malfunction in shifting	1. Park/neutral position switch circuit *1	AX-36
	2. ECM	IN-34

2. Chapter 2: On-Vehicle Repair and Off-Vehicle Repair

Symptom	Suspected Area	See page
Vehicle does not move in any forward positions and reverse positions	1. Manual valve	AX-118
	2. Valve body assembly	AX-118
	3. Front and rear planetary gear *2	-
	4. U/D planetary gear *2	-
	5. U/D one-way clutch (F2) *2	-
	6. Forward clutch (C1) *2	-
	7. U/D brake (B3) *2	-

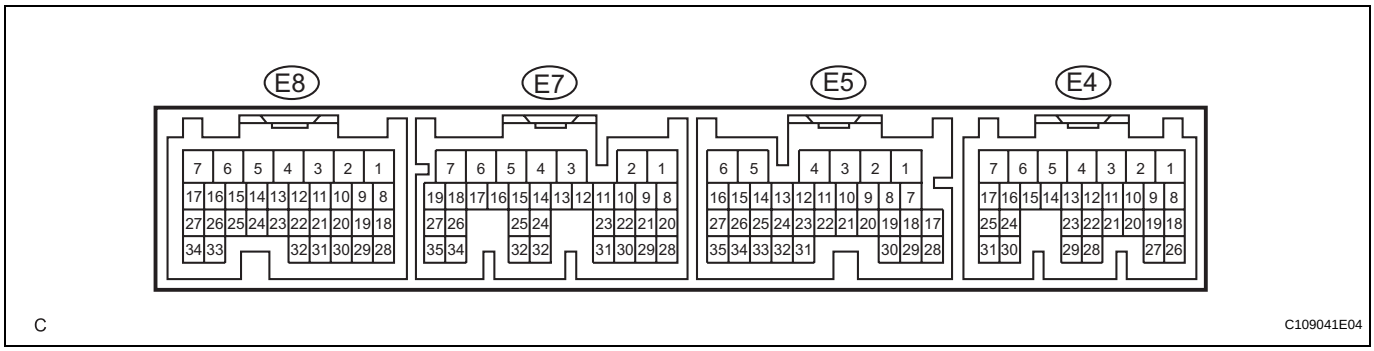
Symptom	Suspected Area	See page
Vehicle does not move in R position	1. Front and rear planetary gear unit *2	-
	2. U/D planetary gear unit *2	-
	3. Direct clutch (C2) *2	-
	4. U/D brake (C3) *2	-
	5. 1st and reverse brake (B2) *2	-
No up-shift (1st -> 2nd)	1. Valve body assembly	AX-118
	2. No. 1 one-way clutch (F1) *2	-
	3. 2nd brake (B1) *2	-
No up-shift (2nd -> 3rd)	1. Valve body assembly	AX-118
	2. Direct clutch (C2) *2	-
No up-shift (3rd -> 4th)	1. Valve body assembly	AX-118
	2. U/D clutch (C3) *2	-
No down-shift (4th -> 3rd)	Valve body assembly	AX-118
No down-shift (3rd -> 2nd)	Valve body assembly	AX-118
No down-shift (2nd -> 1st)	Valve body assembly	AX-118
No lock-up or No lock-up off	1. Valve body assembly	AX-118
	2. Torque converter clutch	AX-152
Harsh engagement (N -> D)	1. C1 accumulator *2	-
	2. Valve body assembly	AX-118
	3. Forward clutch (C1) *2	-
	4. U/D one-way clutch (F2) *2	-
	5. No. 1 one-way clutch (F1) *2	-
Harsh engagement (N -> R)	1. Valve body assembly	AX-118
	2. Direct clutch (C2) *2	-
	3. 1st and reverse brake (B2) *2	-
Harsh engagement (Lock-up)	1. Valve body assembly	AX-118
	2. Torque converter clutch	AX-152
Harsh engagement (2nd -> 3rd)	Valve body assembly	AX-118
Harsh engagement (3rd -> 4th)	Valve body assembly	AX-118
Harsh engagement (4th -> 3rd)	Valve body assembly	AX-118
Slip or shudder (Forward position: After warm-up)	1. Oil strainer	AX-118
	2. Torque converter clutch	AX-152
	3. Forward clutch (C1) *2	-
	4. Direct clutch (C2) *2	-
	5. U/D brake (C3) *2	-
	6. No. 1 one-way clutch (F1) *2	-
	7. U/D one-way clutch (F2) *2	-
Slip or shudder (R position)	1. Oil strainer	AX-118
	2. Direct clutch (C2) *2	-
	3. 1st and reverse brake (B2) *2	-
Slip or shudder (1st)	No. 1 one-way clutch (F1) *2	-
Slip or shudder (2nd)	1. U/D one-way clutch (F2) *2	-
	2. 2nd brake (B1) *2	-
Slip or shudder (3rd)	Direct clutch (C2) *2	-
Slip or shudder (4th)	U/D clutch (C3) *2	-
No engine braking (1st to 3rd: D position)	U/D brake (B3) *2	-
No engine braking (1st: L position)	1st and reverse brake (B2) *2	-
No engine braking (2nd: 2 position)	2nd brake (B1) *2	-

Symptom	Suspected Area	See page
Poor acceleration (All position)	1. Torque converter clutch	AX-152
	2. U/D planetary gear *2	-
Poor acceleration (4th)	1. U/D clutch (C3) *2	-
	2. U/D planetary gear *2	-
Large shift shock or engine stalls when starting off or stopping	Torque converter clutch	AX-152
No kick-down	Valve body assembly	AX-118

HINT:
*2: U241E AUTOMATIC TRANSAXLE Repair Manual Pub. No. RM840U.

TERMINALS OF ECM

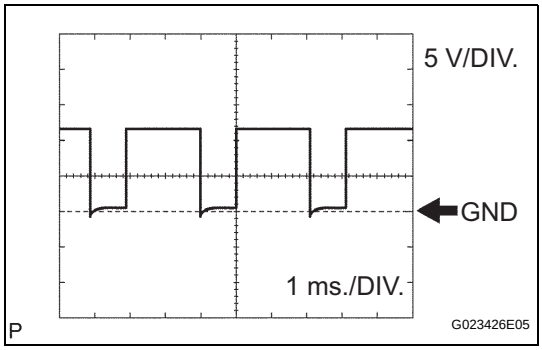
1. ECM



HINT:
Each ECM 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 ECM terminals.

Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
D (E5-21) - E1 (E8-3)	W - L	D shift position switch signal	Ignition switch to the ON position and shift lever D and 3 position	10 to 14 V
			Ignition switch to the ON position and shift lever except D and 3 position	Below 1 V
R (E5-11) - E1 (E8-3)	P - L	R shift position switch signal	Ignition switch to the ON position and shift lever R position	10 to 14 V
			Ignition switch to the ON position and shift lever except R position	Below 1 V
SPD (E5-8) - E1 (E8-3)	V - L	Speed signal	Vehicle speed 20 km/h (12mph)	Pulse generation (See waveform 7)
STP (E5-4) - E1 (E8-3)	L - L	Stop light switch signal	Brake pedal is depressed	7.5 to 14 V
			Brake pedal is released	Below 1.5 V
3 (E5-19) - E1 (E8-3)	G - L	3 shift position switch signal	Ignition switch to the ON position and shift lever 3 position	10 to 14 V
			Ignition switch to the ON position and shift lever except 3 position	Below 1 V
2 (E5-10) - E1 (E8-3)	R - L	2 shift position switch signal	Ignition switch to the ON position and shift lever 2 position	10 to 14 V
			Ignition switch to the ON position and shift lever except 2 position	Below 1 V
L (E5-9) - E1 (E8-3)	LG - L	L shift position switch signal	Ignition switch to the ON position and shift lever L position	10 to 14 V
			Ignition switch to the ON position and shift lever except L position	Below 1 V
NSW (E4-30) - E1 (E8-3)	Y - L	Park neutral switch signal	Ignition switch to the ON position and shift lever P and N position	Below 2 V
			Ignition switch to the ON position and shift lever except P and N position	10 to 14 V
DSL (E7-9) - E1 (E8-3)	Y - L	DSL solenoid signal	Vehicle speed 65 km/h (40mph), lock-up (ON to OFF)	Pulse generation (See waveform 2)

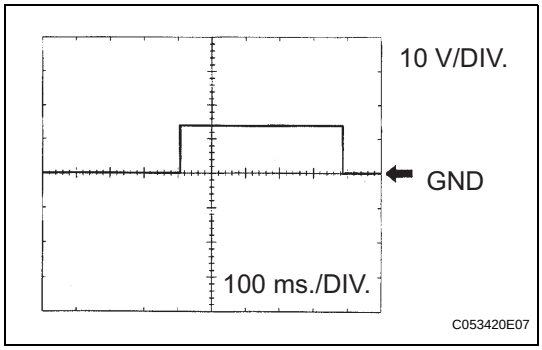
Symbols (Terminals No.)	Wiring Color	Terminal Description	Condition	Specified Condition
S4 (E7-8) - E1 (E8-3)	V - L	S4 solenoid signal	Ignition switch to the ON position	Below 1 V
			4th gear	10 to 14 V
			Except 4th gear	Below 1 V
SL2+ (E7-14) - SL2- (E7-15)	LG - V	SL2 solenoid signal	Engine idle speed	Pulse generation (See waveform 3)
			Ignition switch to the ON position	Below 1 V
			1st or 2nd gear	10 to 14 V
			3rd or O/D gear	Below 1 V
SL1+ (E7-11) - SL1- (E7-10)	B - P	SL1 solenoid signal	Engine idle speed	Pulse generation (See waveform 4)
			Ignition switch to the ON position	10 to 14 V
			1st gear	10 to 14 V
			Except 1st gear	Below 1 V
NC+ (E7-34) - NC- (E7-26)	R - G	Speed sensor (NC) signal	Vehicle speed 30 km/h (19mph): (3rd gear) Engine speed 1,400 rpm	Pulse generation (See waveform 5)
NT+ (E7-35) - NT- (E7-27)	L - LG	Speed sensor (NT) signal	Vehicle speed 20 km/h (12mph)	Pulse generation (See waveform 6)
SLT+ (E7-12) - SLT- (E7-13)	BR - GR	SLT solenoid signal	Engine idle speed	Pulse generation (See waveform 1)
THO1 (E7-24) - E2 (E8-28)	G - R	ATF temperature sensor signal	ATF temperature: 115°C (239°F) or more	Below 1.5 V



(a) Waveform 1

Reference:

Terminal	SLT+ - SLT-
Tool setting	5 V/DIV., 1ms./DIV.
Vehicle condition	Engine idle speed

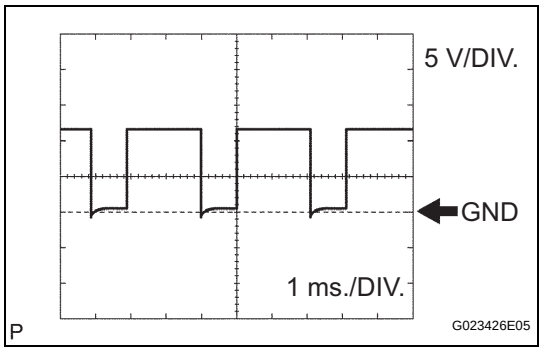


(b) Waveform 2

Reference:

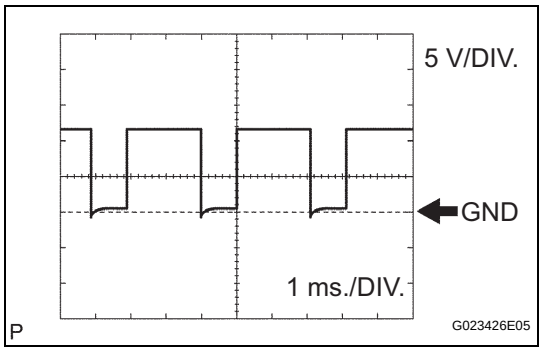
Terminal	DSL - E1
Tool setting	10 V/DIV., 100ms./DIV.
Vehicle condition	Vehicle speed 65 km/h (40 mph), lock-up (ON to OFF)

AX



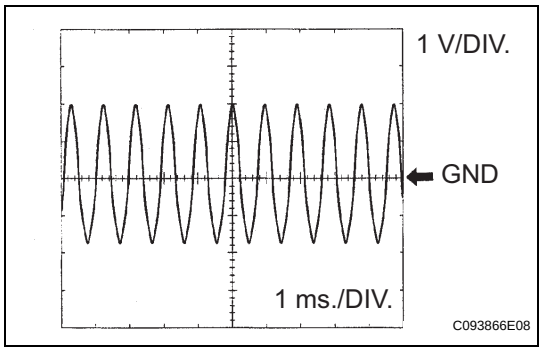
(c) Waveform 3
Reference:

Terminal	SL2+ - SL2-
Tool setting	5 V/DIV., 1ms./DIV.
Vehicle condition	Engine idle speed



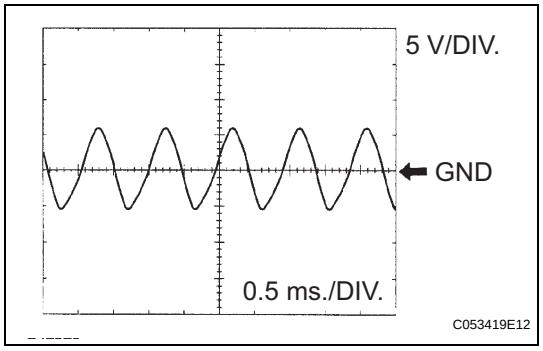
(d) Waveform 4
Reference:

Terminal	SL1+ - SL1-
Tool setting	5 V/DIV., 1ms./DIV.
Vehicle condition	Engine idle speed



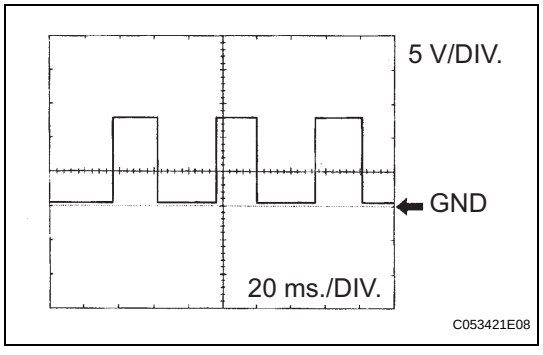
(e) Waveform 5
Reference:

Terminal	NC+ - NC-
Tool setting	1 V/DIV., 1ms./DIV.
Vehicle condition	Vehicle speed 30 km/h (19 mph): (3rd gear) Engine speed 1.400 rpm



(f) Waveform 6
Reference:

Terminal	NT+ - NT-
Tool setting	5 V/DIV., 0.5ms./DIV.
Vehicle condition	Vehicle speed 20 km/h (12 mph)



(g) Waveform 7
Reference:

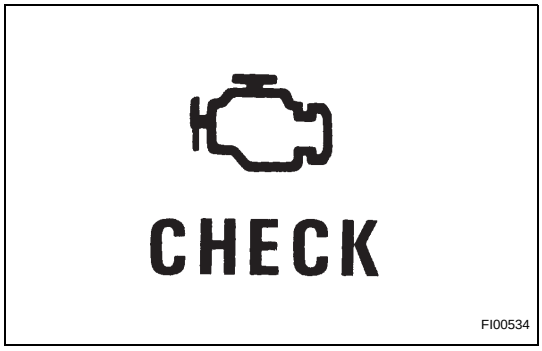
Terminal	SPD - E1
Tool setting	5 V/DIV., 20ms./DIV.
Vehicle condition	Vehicle speed 20 km/h (12 mph)

AX

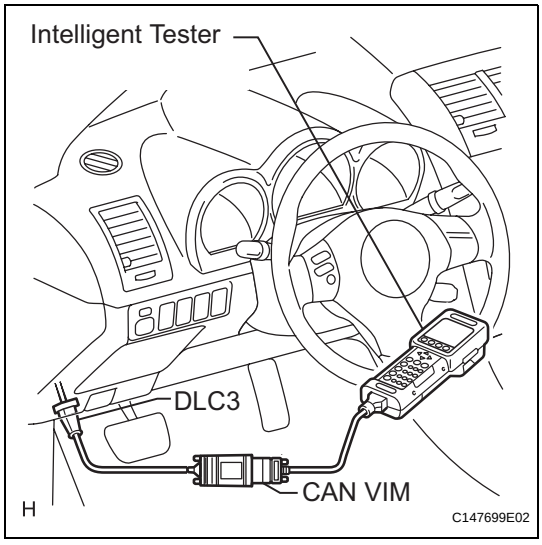
DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is to connect an OBD II scan tool complying with SAE J1987 or a intelligent tester to the vehicle, and read off various data output from the vehicle's ECM.



(b) OBD II regulations require that the vehicle's on-board computer illuminate the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in the drive system components which affect the vehicle emissions. In addition to illuminating the MIL when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory (See page AX-33).
If the malfunction does not occur in 3 consecutive trips, the MIL goes off but the DTCs remain in the ECM memory.



(c) To check the DTCs, connect the OBD II scan tool or intelligent tester to the DLC3 of the vehicle. The OBD II scan tool or intelligent tester also enables you to erase the DTCs and check freeze frame data and various forms of engine data (For operating instructions, see the instruction book).

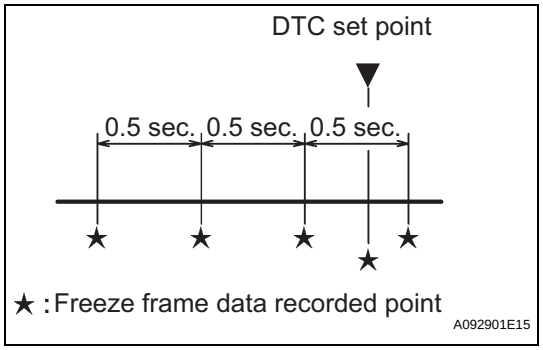
(d) The DTCs include SAE controlled codes and Manufacturer controlled codes. SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by a manufacturer within the prescribed limits (See page AX-33).

(e) The diagnosis system operates in "normal mode" during the normal vehicle use. In normal mode, "2-trip detection logic" is used to ensure accurate detection of malfunction. "Check mode" is also available to technicians as an option. In check mode, "1-trip detection logic" is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent malfunction.

(f) *2 trip detection logic: When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). IF the ignition switch is turned off and then turned on again, and same malfunction is detected again, the MIL will illuminate.

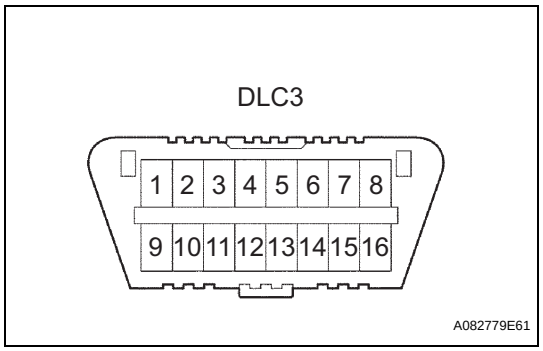
(g) The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air/fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

(h) The intelligent tester displays freeze frame data recorded at five different points: 1) 3 times before the DTC is set, 2) once when the DTC is set, and 3) once after the DTC is set. The data can be used to simulate the vehicle's condition around the time of the malfunction. The data may be helpful in determining the cause of a malfunction. It may also be helpful in determining whether a DTC is being caused by a temporary malfunction.



2. INSPECT THE DLC3

(a) The vehicle's ECM uses ISO 15765-4for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4format.



Terminals of DLC 3

Symbol	Terminal No.	Name	Reference Terminal	Result	Condition
SIL	7	Bus "+" line	5 - Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	Below 1 Ω	Always
SG	5	Signal ground	Body ground	Below 1 Ω	Always
BAT	16	Battery positive	Body ground	11 to 14 V	Always
CANH	6	CAN bus line	CANL	54 to 69 Ω	IG switch OFF*
CANH	6	HIGH-level CAN bus line	Battery positive	6 kΩ or higher	IG switch OFF*
CANH	6	HIGH-level CAN bus line	CG	200 Ω or higher	IG switch OFF*
CANL	14	LOW-level CAN bus line	Battery positive	6 kΩ or higher	IG switch OFF*
CANL	14	LOW-level CAN bus line	CG	200 Ω or higher	IG switch OFF*

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.**

AX

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

HINT:

The DLC3 is the interface prepared for reading various data from the vehicle's ECM. After connecting the cable of the intelligent tester to the CAN VIM, turn the ignition switch ON and turn the tester ON. If a communication failure message is displayed on the tester screen (on the tester: UNABLE TO CONNECT TO VEHICLE), a problem exists in either the vehicle or tester. In order to identify the location of the problem, connect the tester to another vehicle.

- If the communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If the communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

3. CHECK BATTERY VOLTAGE

(a) Measure the battery voltage.

Battery voltage:

11 to 14 V

If voltage is below 11 V, replace the battery before proceeding.

4. CHECK MIL

(a) Check that the MIL illuminates when turning the ignition switch to the ON position.

HINT:

If the MIL does not light up, troubleshoot the combination meter.

(b) When the engine is started, the MIL should go off. If the lamp remains on, it means that the diagnosis system has detected a malfunction or abnormality in the system.

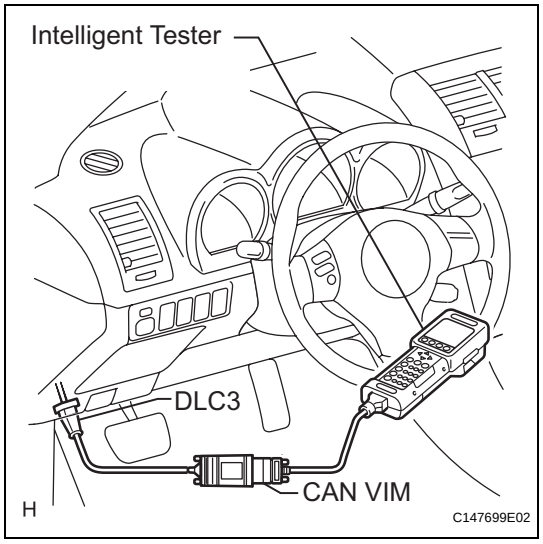
DTC CHECK / CLEAR

1. DTC CHECK (NORMAL MODE)

NOTICE:

When the diagnostic system is switched from the normal mode to the check mode, all the DTCs and freeze frame data recorded in the normal mode will be erased. So before switching modes, always check the DTCs and freeze frame data, and note them down.

DTCs which are stored in the ECM can be displayed with the intelligent tester or generic OBD II scan tool. These scan tools can display pending DTCs and current DTCs. Some DTC aren't stored if the ECM doesn't detect a malfunction during consecutive driving. However, the detected malfunction during once driving is stored as pending DTC.



(a) Checking DTCs using the OBD II scan tool or intelligent tester.

(1) Connect the intelligent tester to the Controller Area Network Vehicle Interface Module (CAN VIM). Then connect the CAN VIM to the Data Link Connector 3 (DLC3).

(2) Turn the ignition switch to the ON position.

(3) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES (or PENDING CODE).

(4) Use the OBD II scan tool or intelligent tester to check the DTCs and freeze frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book).

NOTICE:

When simulating symptoms with an OBD II scan tool (excluding intelligent tester) to check the DTCs, use the normal mode. For codes on the DTCs chart which are subject to "2 trip detection logic".

Turn the ignition switch off after the symptom is simulated once. Then repeat the simulation process again. When the problem has been simulated twice, the MIL illuminates and the DTCs are recorded in the ECM.

2. DTC CLEAR

(a) Connect the intelligent tester to the CAN VIM. Then connect the CAN VIM to the DLC3.

(b) Turn the ignition switch to the ON position.

(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CLEAR CODES and press YES.

AX

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)

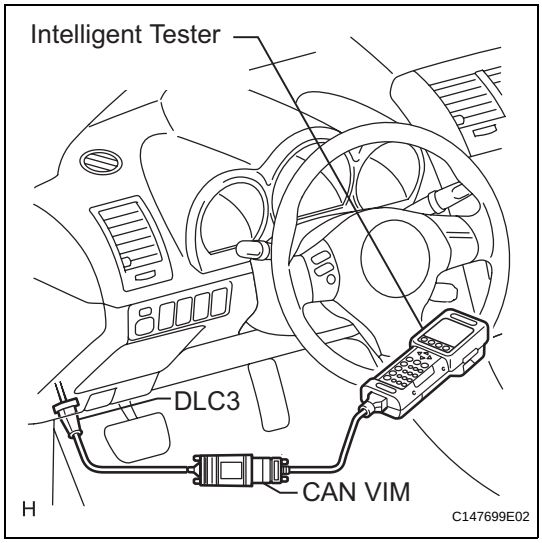
HINT:
Intelligent tester only: Compared to the normal mode, the check mode is more sensitive for detecting malfunctions. Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.

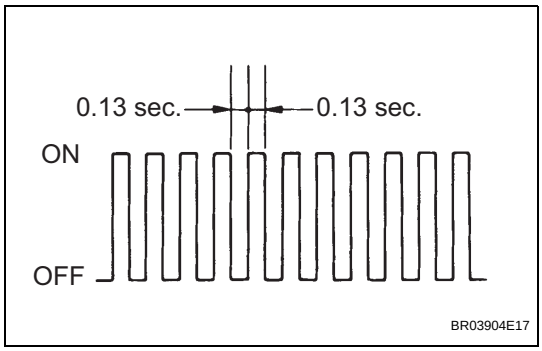
(a) Procedure for Check Mode using the intelligent tester.

(1) Check the initial conditions.
- Battery positive voltage 11 V or more
- Throttle valve fully closed
- Transaxle in the P or N position
- A/C switch is off

(2) Turn the ignition switch off.

(3) Connect the intelligent tester together with the Controller Area Network Vehicle Interface Module (CAN VIM) to the DLC3.





(4) Turn the ignition switch to the ON position and turn the intelligent tester main switch on.

(5) Select the item "DIAGNOSIS / ENHANCED OBD II / CHECK MODE" (Check that the MIL flashes).

NOTICE:
All DTCs and freeze frame data recorded will be erased if: 1) the intelligent tester 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 to the ON position to ACC position or turned OFF.

(6) Start the engine (the MIL goes off after the engine starts).

(7) Perform "MONITOR DRIVE PATTERN" for the ECT test (See page AX-17). (Or, simulate the conditions of the malfunction described by the customer).

NOTICE:
Leave the ignition switch to the ON position until you have checked the DTCs, etc.

AX

(8) After simulating malfunction conditions, use the intelligent tester diagnosis selector to check the DTCs and freeze frame data, etc.
(9) When you use intelligent tester: Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
(10) After checking the DTC, inspect the applicable circuit.
(11) (See page AX-33) to confirm the details of the DTCs.

2. DTC CLEAR

(a) Connect the intelligent tester to the CAN VIM. Then connect the CAN VIM to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CLEAR CODES and press YES.

FAIL-SAFE CHART

1. FAIL-SAFE

This function minimizes the loss of the ECT functions when any malfunction occurs in a sensor or solenoid.

(a) ATF (Automatic Transmission Fluid) temperature sensor:
When the ATF temperature sensor has a malfunction, O/D upshift is prohibited.

(b) Counter gear speed sensor NC (Speed sensor NC):
When the counter gear speed sensor has a malfunction, O/D upshift is prohibited.

(c) Shift solenoid valve DSL:
When the solenoid valve DSL has a malfunction, the current to the solenoid valve is stopped.
This stops lock-up control, then fuel economy decreases.

(d) Shift solenoid valve SL1, SL2 and S4:
Fail safe function:
If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid "ON" and "OFF" in order to shift into the gear positions shown in the table below.
Manual shifting as shown in the following table must be done (In case of a short circuit, the ECM stops sending the current to the short circuited solenoid).
Even if starting the engine in the fail-safe mode, the gear position remains in the same position.
HINT:

- *1: Actual gear shift (gear position) under fail-safe operation.
- OFF: OFF (the ECM stops sending current to a malfunctioning solenoid valve)
- →: Condition in the electrical malfunction is shown on the left of "→".
  Condition in the fail-safe mode is shown on the right of "→".

Normal	Solenoid Valve	SL1	ON	OFF	OFF	OFF
		SL2	ON	ON	OFF	OFF
		S4	OFF	OFF	OFF	ON
	Gear Position		1st	2nd	3rd	4th (O/D)
SL1 Malfunction	Solenoid Valve	SL1	OFF			
		SL2	ON	ON	OFF → ON	OFF → ON
		S4	OFF	OFF	OFF → ON	ON
	Gear Position *1		2nd	2nd	3rd	3rd
SL2 Malfunction	Solenoid Valve	SL1	ON → OFF	OFF	OFF	OFF
		SL2	OFF			
		S4	OFF	OFF	OFF	ON
	Gear Position *1		3rd	3rd	3rd	4th (O/D)
S4 Malfunction	Solenoid Valve	SL1	ON	OFF	OFF	OFF
		SL2	ON	ON	OFF	OFF
		SL4	OFF			
	Gear Position *1		1st	2nd	3rd	3rd

SL1 and SL2 Malfunction	Solenoid Valve	SL1	OFF			
		SL2	OFF			
		S4	OFF	OFF	OFF	ON
	Gear Position *1		3rd	3rd	3rd	4th (O/D)
SL1 and S4 Malfunction	Solenoid Valve	SL1	OFF			
		SL2	ON	ON	OFF → ON	OFF → ON
		S4	OFF			
	Gear Position *1		2nd	2nd	2nd	2nd
SL2 and S4 Malfunction	Solenoid Valve	SL1	ON → OFF	OFF	OFF	OFF
		SL2	OFF			
		S4	OFF			
	Gear Position *1		3rd	3rd	3rd	3rd
SL1, SL2 and S4 Malfunction	Solenoid Valve	SL1	OFF			
		SL2	OFF			
		S4	OFF			
	Gear Position *1		3rd	3rd	3rd	3rd

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

According to the DATA LIST displayed by the intelligent tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor 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 intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.

(d) Turn the ignition switch to the on position.

(e) Turn on the tester.

(f) Select the item "DIAGNOSIS / OBD/MOBD / ENGINE AND ECT / DATA LIST".

(g) According to the display on the tester, read the "DATA LIST".

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
STOP LIGHT SW	Stop Light Switch Status/ON or OFF	• Brake Pedal is depressed: ON • Brake Pedal is released: OFF	-
PNP SW (NSW)	PNP Switch Status/ON or OFF	Shift lever position is; P and N: ON Except P and N: OFF	When the shift lever position displayed on the Intelligent tester differs from the actual position, adjustment of the PNP switch or the shift cable may be incorrect. HINT: When the failure still occurs even after adjusting these parts (See page AX-36).
REVERSE	PNP Switch Status/ON or OFF	Shift lever position is; R: ON Except R: OFF	↑
DRIVE	PNP Switch Status/ON or OFF	Shift lever position is; D and 3: ON Except D and 3: OFF	↑
3RD	PNP Switch Status/ON or OFF	Shift lever position is; 3: ON Except 3: OFF	↑
2ND	PNP Switch Status/ON or OFF	Shift lever position is; 2: ON Except 2: OFF	↑
LOW	PNP Switch Status/ON or OFF	Shift lever position is; L: ON Except L: OFF	↑
SHIFT	Actual Gear Position/1st, 2nd, 3rd or 4th (O/D)	Shift lever position is; • L: 1st • 2: 1st or 2nd • 3: 1st, 2nd or 3rd • D (O/D ON): 1st, 2nd, 3rd or 4th (O/D)	-
LOCK UP	Lock Up Status/ON or OFF	• Lock Up: ON • Except Lock Up: OFF	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
LOCK UP SOL	Lock Up Solenoid Status/ON or OFF	• Lock Up: ON • Except Lock Up: OFF	-
SOLENOID (SLT)	Shift Solenoid SLT Status/ON or OFF	• Accelerator pedal is depressed: OFF • Accelerator pedal is released: ON	-
AT OIL TEMP1	ATF Temp. Sensor Value/min.: -40°C (-40°F), max.: 215°C (419°F)	• After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak	If the value is "-40°C (-40°F)" or "215°C (419°F)", ATF temp. sensor circuit is opened or shorted.
SPD (NC)	Counter Gear Speed/display: 50 r/min	HINT: 4th (O/D) when shift lever position is D position (After warming up the engine); • Intermediate shaft speed (NC) becomes close to the engine speed.	-
SPD (NT)	Input Turbine Speed/display: 50 r/min	HINT: • Lock-up ON (After warning up the engine): Input Turbine speed (NT) equal to the engine sped. • Lock-up OFF (Idling at N position): Input Turbine speed (NT) nearly equal to the engine speed.	-

2. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the intelligent tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Push the "ON" button of the intelligent tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ENGINE AND ECT / ACTIVE TEST".
(g) According to the display on tester, perform the "ACTIVE TEST".

AX

Tester Display	Test Part	Control Range	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	1st / 2nd / 3rd / 4th	Possible to check the operation of the shift solenoid valves.

Tester Display	Test Part	Control Range	Diagnostic Note
LOCK UP	[Test Details] Control the shift solenoid DSL to set the automatic transaxle to the lock-up condition. [Vehicle Condition] • Throttle valve opening angle: Less than 35% • Vehicle Speed: 58 km/h (36 mph) or more	ON / OFF	Possible to check the DSL operation.
SOLENOID (SL1)	[Test Details] Operate the shift solenoid SL1 [Vehicle Condition] • Vehicle Stopped. • Shift lever P or N position	ON / OFF	-
SOLENOID (SL2)	[Test Details] Operate the shift solenoid SL2 [Vehicle Condition] • Vehicle Stopped. • Shift lever P or N position	ON / OFF	-
SOLENOID (S4)	[Test Details] Operate the shift solenoid S4 [Vehicle Condition] • Vehicle Stopped. • Shift lever P or N position	ON / OFF	-
SOLENOID (DSL)	[Test Details] Operate the shift solenoid DSL [Vehicle Condition] • Vehicle Stopped. • Shift lever P or N position	ON / OFF	-
SOLENOID (SLT)*	[Test Details] Operate the shift solenoid SLT and raise the line pressure. [Vehicle Condition] • Vehicle Stopped. • IDL: ON HINT: OFF: Line pressure up (When the active test of "SOLENOID (SLT)" is performed, the ECM commands the SLT solenoid to turn off). ON: No action (normal operation)	ON / OFF	-

*: "SOLENOID (SLT)" in the ACTIVE TEST is performed to check the line pressure changes by connecting the SST to the automatic transaxle, which is used in the HYDRAULIC TEST (See page AX-14) as well.
HINT:
The pressure values in ACTIVE TEST and HYDRAULIC TEST are different from each other.

DIAGNOSTIC TROUBLE CODE CHART

If a DTC is displayed during the DTC check, check the parts listed in the table below and proceed to the page given.
HINT:

- *1: Comes on MIL (Malfunction Indicator Lamp) light up
- *2: "DTC stored" mark means ECM memorizes the malfunction code if the ECM detects the DTC detection condition.
- This DTC may be output when the clutch, brake and gear components etc. inside the automatic transmission are damaged.

AUTOMATIC TRANSAXLE SYSTEM

DTC Code	Detection Item	Trouble Area	MIL *1	Memory *2	See page
P0705	Transmission Range Sensor Circuit Malfunction (PRNDL Input)	1. Open or short in park/neutral position switch circuit 2. Park/neutral position switch 3. ECM	Comes on	DTC stored	AX-36
P0710	Transmission Fluid Temperature Sensor "A" Circuit	1. Open or short in ATF temperature sensor circuit 2. Transmission wire (ATF temperature sensor) 3. ECM	Comes on	DTC stored	AX-44
P0711	Transmission Fluid Temperature Sensor "A" Performance	1. Transmission wire (ATF temperature sensor)	Comes on	DTC stored	AX-49
P0712	Transmission Fluid Temperature Sensor "A" Circuit Low Input	1. Short in ATF temperature sensor circuit 2. Transmission wire (ATF temperature sensor) 3. ECM	Comes on	DTC stored	AX-44
P0713	Transmission Fluid Temperature Sensor "A" Circuit High Input	1. Open in ATF temperature sensor circuit 2. Transmission wire (ATF temperature sensor) 3. ECM	Comes on	DTC stored	AX-44
P0717	Turbine Speed Sensor Circuit No Signal	1. Open or short in transmission revolution sensor NT (speed sensor NT) circuit 2. Transmission revolution sensor NT (speed sensor NT) 3. ECM 4. Automatic transaxle assembly	Comes on	DTC stored	AX-53
P0724	Brake Switch "B" Circuit High	1. Short in stop light switch circuit 2. Stop light switch 3. ECM	Comes on	DTC stored	AX-57

DTC Code	Detection Item	Trouble Area	MIL *1	Memory *2	See page
P0741	Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve DSL)	1. Shift solenoid valve DSL remains open or closed 2. Valve body is blocked 3. Torque converter clutch 4. Automatic transaxle (clutch, brake or gear etc.) 5. Line pressure is too low	Comes on	DTC stored	AX-60
P0746	Pressure Control Solenoid "A" Performance (Shift Solenoid Valve SL1)	1. Shift solenoid valve SL1 remains open or closed 2. Valve body is blocked 3. Automatic transaxle (clutch, brake or gear etc.)	Comes on	DTC stored	AX-66
P0748	Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)	1. Open or short in shift solenoid valve SL1 circuit 2. Shift solenoid valve SL1 3. ECM	Comes on	DTC stored	AX-70
P0766	Shift Solenoid "D" Performance (Shift Solenoid Valve S4)	1. Shift solenoid valve S4 remains open or closed 2. Valve body is blocked 3. Automatic transaxle (clutch, brake or gear, etc.)	Comes on	DTC stored	AX-74
P0776	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)	1. Shift solenoid valve SL2 remains open or closed 2. Valve body is blocked 3. Automatic transaxle (clutch, brake or gear etc.)	Comes on	DTC stored	AX-78
P0778	Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)	1. Open or short in shift solenoid valve SL2 circuit 2. Shift solenoid valve SL2 3. ECM	Comes on	DTC stored	AX-82
P0793	Intermediate Shaft Speed Sensor "A"	1. Open or short in transmission revolution sensor NC (speed sensor NC) circuit 2. Transmission revolution sensor NC (speed sensor NC) 3. ECM	Comes on	DTC stored	AX-86
P0982	Shift Solenoid "D" Control Circuit Low (Shift Solenoid Valve S4)	1. Short in shift solenoid valve S4 circuit 2. Shift solenoid valve S4 3. ECM	Comes on	DTC stored	AX-90

DTC Code	Detection Item	Trouble Area	MIL *1	Memory *2	See page
P0983	Shift Solenoid "D" Control Circuit High (Shift Solenoid Valve S4)	1. Open in shift solenoid valve S4 circuit 2. Shift solenoid valve S4 3. ECM	Comes on	DTC stored	AX-90
P2714	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)	1. Shift solenoid valve SLT remains closed 2. Valve body is blocked 3. Automatic transaxle (clutch, brake or gear etc.)	Comes on	DTC stored	AX-93
P2716	Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)	1. Open or short in shift solenoid valve SLT circuit 2. Shift solenoid valve SLT 3. ECM	Comes on	DTC stored	AX-97
P2769	Torque Converter Clutch Solenoid Circuit Low (Shift Solenoid Valve DSL)	1. Short in shift solenoid valve DSL circuit 2. Shift solenoid valve DSL 3. ECM	Comes on	DTC stored	AX-101
P2770	Torque Converter Clutch Solenoid Circuit High (Shift Solenoid Valve DSL)	1. Open in shift solenoid valve DSL circuit 2. Shift solenoid valve DSL 3. ECM	Comes on	DTC stored	AX-101

DTC	P0705	Transmission Range Sensor Circuit Malfunction (PRNDL Input)

DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0705	(A) Any 2 or more signals of the following are ON simultaneously (2-trip detection logic) • NSW input signal is ON. • R input signal is ON. • D input signal is ON. • 2 input signal is ON. • L input signal is ON. (B) All switches are OFF simultaneously for NSW, R, D, 2 and L positions (2-trip detection logic). (C) Both 1 and 2 are met (2-trip detection logic) 1. One of the following is met (a) NSW input signal is ON. (b) R input signal is ON 2. One of the following is met (a) 3 input signal is ON. (b) L input signal is ON.	• Open or short in park/neutral position switch circuit • Park/neutral position switch • ECM

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 ECM.
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 ECM according to the shift position (R, D, 2 or L).
The ECM determines that there is a problem with the switch or related parts if in receives more than 1 position signal simultaneously. The ECM will turn on the MIL and store the DTC.

AX

MONITOR STRATEGY

Related DTCs	P0705: Park/neutral position switch/Verify switch input
Required sensors/Components	Park/neutral position switch
Frequency of operation	Continuous
Duration	2 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present.	None
Ignition switch	ON
Battery voltage	10.5 V or more

TYPICAL MALFUNCTION THRESHOLDS

1. One of the following conditions is met: Condition (A), (B) and (C)

Condition (A):

If 2 or more of the following signal outputs exist at the same time

NSW switch	ON

R switch	ON
D switch	ON
2 switch	ON
L switch	ON

Condition (B):

All of following conditions are met

NSW switch	OFF
R switch	OFF
D switch	OFF
2 switch	OFF
L switch	OFF

Condition (C):

Both (i) and (ii) are met

(i) One of the following is met

NSW switch	ON
R switch	ON

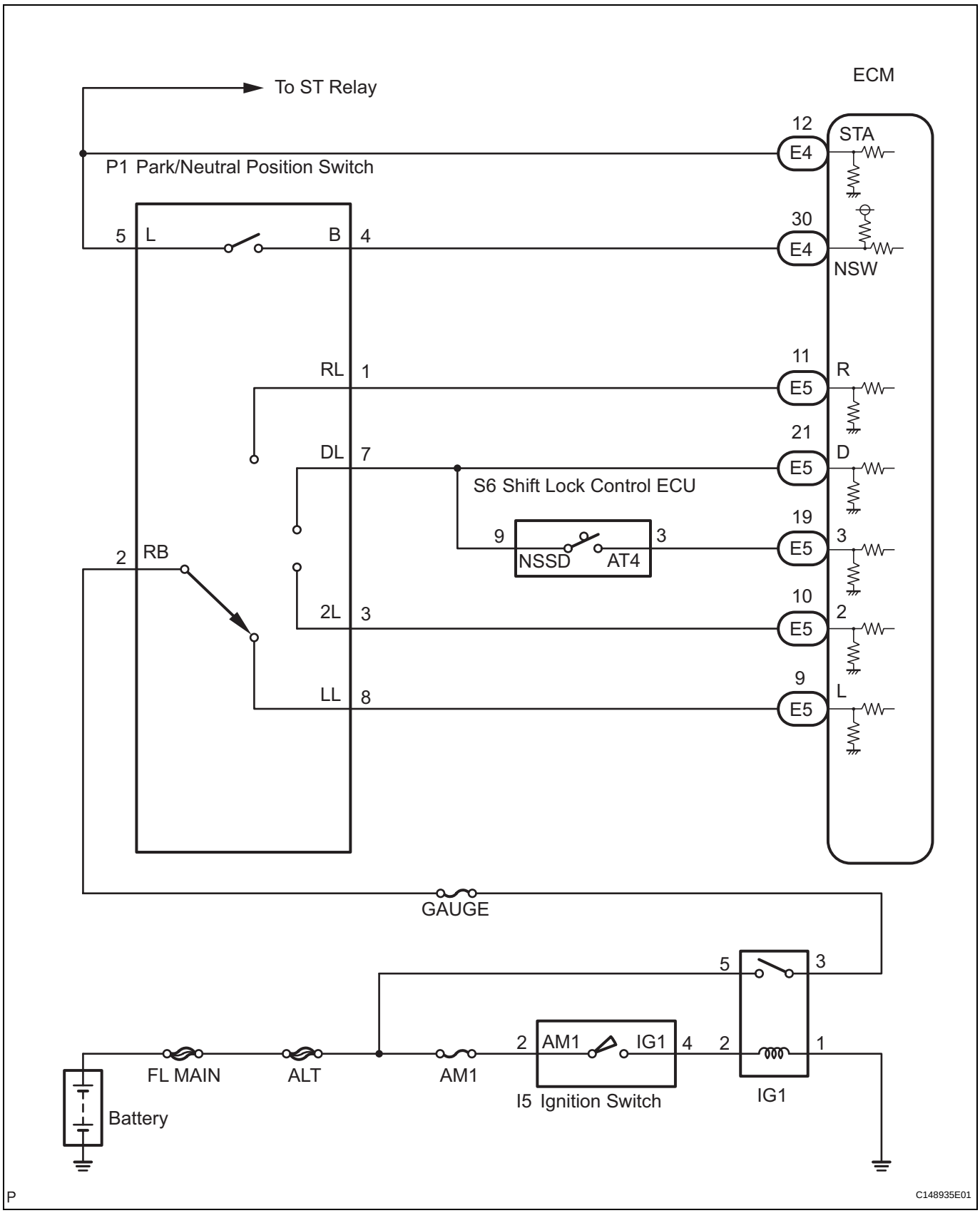
(ii) One of the following is met

3 switch	ON
L switch	ON

COMPONENT OPERATING RANGE

Park/neutral Position switch	The park/neutral position switch sends only one signal to the ECM.

WIRING DIAGRAM



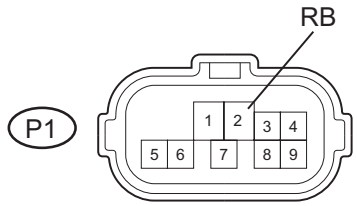
AX

INSPECTION PROCEDURE

1 CHECK HARNESS AND CONNECTOR (BATTERY - PARK/NEUTRAL POSITION)

Wire Harness Side:

(Connector Front View):



Y C117645E32

(a) Disconnect the park/neutral position switch connector.
(b) Turn the ignition switch to the ON position.
(c) Measure voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
2 - Body ground	10 to 14 V

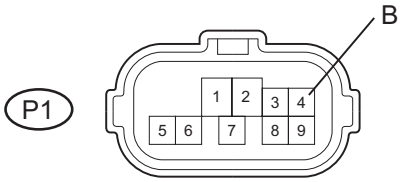
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK HARNESS AND CONNECTOR (OUTPUT SIGNAL)

Wire Harness Side:

(Connector Front View):



Y C117645E33

(a) Turn the ignition switch to the ON position.
(b) Measure voltage according to the value(s) in the table below.

Standard voltage

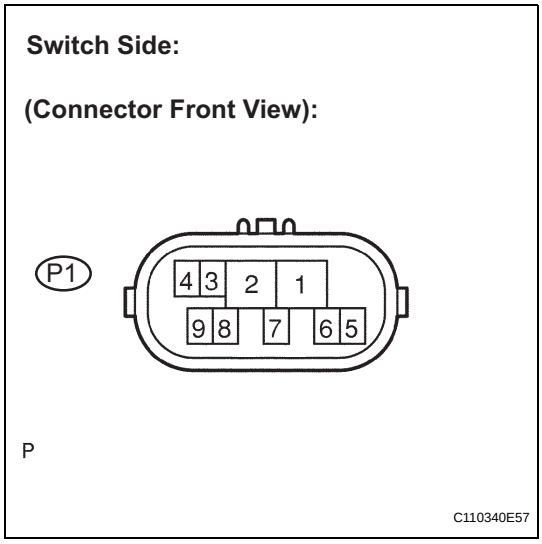
Tester Connection	Specified Condition
4 - Body ground	10 to 14 V

NG → **Go to step 8**

OK

AX

3 INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY



(a) Measure resistance according to the value(s) in the table below when the shift lever is moved to each position.

Standard resistance

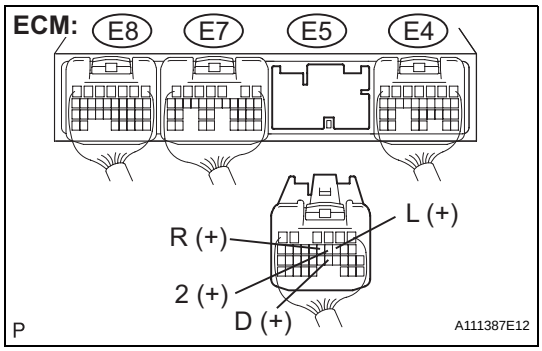
Shift Position	Tester Connection	Specified Condition
P	2 - 6 and 4 - 5	Below 1 Ω
Except P		10 kΩ or higher
R	2 - 1	Below 1 Ω
Except R		10 kΩ or higher
N	2 - 9 and 4 - 5	Below 1 Ω
Except N		10 kΩ or higher
D and 3	2 - 7	Below 1 Ω
Except D and 3		10 kΩ or higher
2	2 - 3	Below 1 Ω
Except 2		10 kΩ or higher
L	2 - 8	Below 1 Ω
Except L		10 kΩ or higher

NG → **REPLACE PARK/NEUTRAL POSITION SWITCH ASSEMBLY**

OK

4 CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)

AX



(a) Connect the park/neutral position switch connector.
(b) Disconnect the ECM connectors.
(c) Turn the ignition switch to the ON position, and measure the voltage according to the value(s) in the table below when the shift lever is moved to each position.

Standard voltage

Shift Position	Tester Connection	Specified Condition
R	E5-11 (R) - Body ground	10 to 14 V*
Except R		Below 1 V
D and 3	E5-21 (D) - Body ground	10 to 14 V
Except D and 3		Below 1 V
2	E5-10 (2) - Body ground	10 to 14 V
Except 2		Below 1 V
L	E5-9 (L) - Body ground	10 to 14 V
Except L		Below 1 V

HINT:

*: The voltage will drop slightly due to lighting up of the back up light.

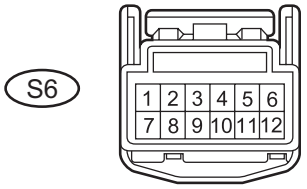
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

5 CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - SHIFT LOCK CONTROL ECU)

Wire Harness Side:

(Connector Front View):



C148300E01

(a) Disconnect the connector of shift lock control ECU sub-assembly.

(b) Turn the ignition switch to the ON position, and measure the voltage according to the value(s) in the table below when the shift lever is moved to each position.

Standard voltage

Shift Position	Tester Connection	Specified Condition
D and 3	9 - Body ground	10 to 14 V
Except D and 3		Below 1 V

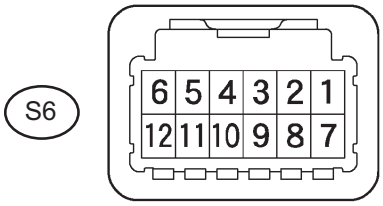
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

6 INSPECT SHIFT LOCK CONTROL ECU SUB-ASSEMBLY

Switch Side:

(Connector Front View):



C148936E01

(a) Measure the resistance according to the value(s) in the table below when the shift lever is moved to each position.

Standard resistance

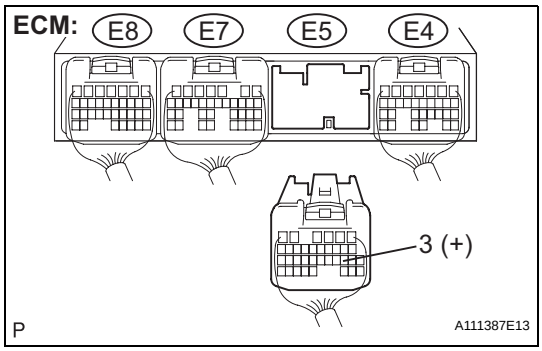
Shift Position	Tester Connection	Specified Condition
3 and 2	3 - 9	Below 1 Ω
Except 3 and 2		10 kΩ or higher

NG → REPLACE SHIFT LOCK CONTROL ECU SUB-ASSEMBLY

OK

AX

7	CHECK HARNESS AND CONNECTOR (SHIFT LOCK CONTROL ECU SUB-ASSEMBLY - ECM)



(a) Connect the connector of shift lock control ECU sub-assembly.
(b) Turn the ignition switch to the ON position, and measure the voltage according to the value(s) in the table below when the shift lever is moved to each position.

Standard voltage

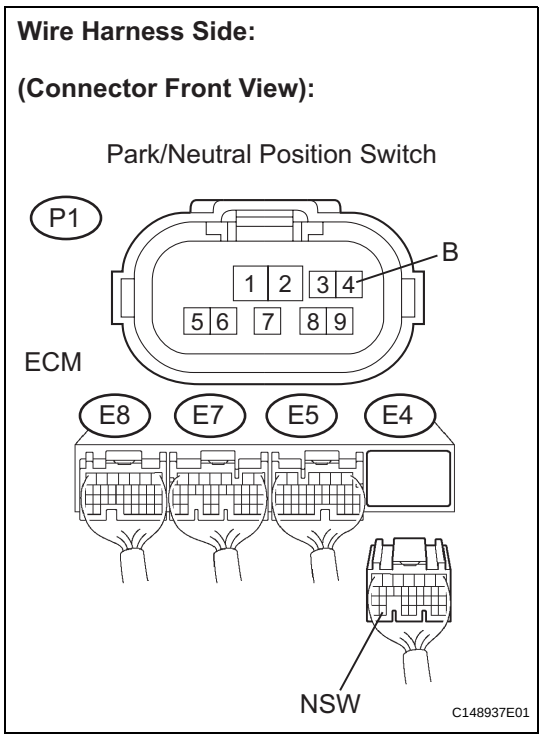
Shift Position	Tester Connection	Specified Condition
3	E5-19 (3) - Body ground	10 to 14 V
Except 3		Below 1 V

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM

8	CHECK HARNESS AND CONNECTOR (PARK/NEUTRAL POSITION SWITCH - ECM)



(a) Turn the ignition switch off.
(b) Disconnect the ECM connectors.
(c) Measure resistance according to the value(s) in the table below.

Standard resistance (Check for open)

Tester Connection	Specified Condition
P1-4 (B) - E4-30 (NSW)	Below 1 Ω

Standard resistance (Check for short)

Tester Connection	Specified Condition
P1-4 (B) or E4-30 (NSW) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM

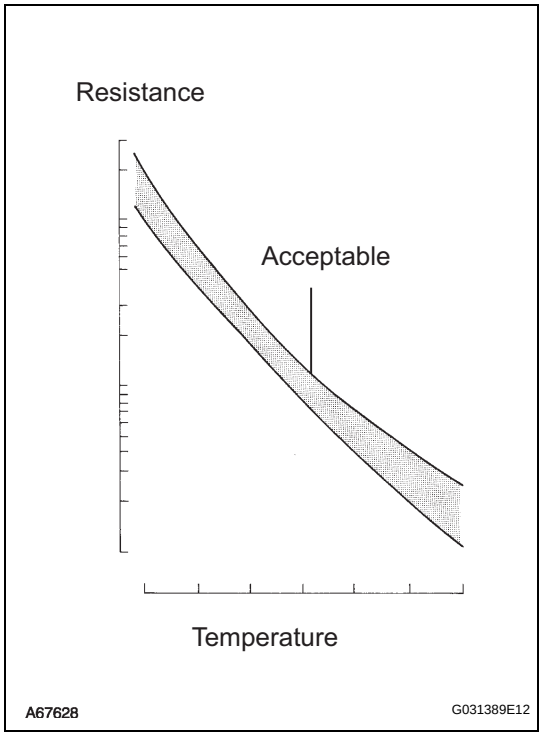
DTC	**P0710**	**Transmission Fluid Temperature Sensor "A" Circuit**

DTC	**P0712**	**Transmission Fluid Temperature Sensor "A" Circuit Low Input**

DTC	**P0713**	**Transmission Fluid Temperature Sensor "A" Circuit High Input**

DESCRIPTION

The ATF (Automatic Transmission Fluid) temperature sensor converts the fluid temperature into a resistance value which is input into the ECM.
The ECM applies a voltage to the temperature sensor through ECM terminal THO1 (THO).
The sensor resistance changes with the transmission fluid temperature. As the temperature becomes higher, the sensor resistance decreases.
One terminal of the sensor is grounded so that the sensor resistance decreases and the voltage goes down as the temperature becomes higher.
The ECM calculates the fluid temperature based on the voltage signal.



DTC No.	DTC Detection Condition	Trouble Area
P0710	(a) and (b) are detected momentarily within 0.5 sec. when neither P0712 nor P0713 is detected (1-trip detection logic) (a) ATF temperature sensor resistance is less than 79 Ω. (b) ATF temperature sensor resistance is more than 156 kΩ. HINT: Within 0.5 sec., the malfunction switches from (a) to (b) or from (b) to (a)	• Open or short in ATF temperature sensor circuit • Transmission wire (ATF temperature sensor) • ECM

DTC No.	DTC Detection Condition	Trouble Area
P0712	ATF temperature sensor resistance is less than 79 Ω for 0.5 sec. or more (1-trip detection logic)	• Short in ATF temperature sensor circuit • Transmission wire (ATF temperature sensor) • ECM
P0713	ATF temperature sensor resistance is more than 156 kΩ when 15 minutes or more have elapsed after the engine start DTC is detected for 0.5 sec. or more (1-trip detection logic)	• Open in ATF temperature sensor circuit • Transmission wire (ATF temperature sensor) • ECM

MONITOR DESCRIPTION

These DTCs indicate an open or short in the automatic transmission fluid (ATF) temperature sensor (TFT sensor) circuit. The automatic transmission fluid (ATF) temperature sensor converts ATF temperature to an electrical resistance value. Based on the resistance, the ECM determines the ATF temperature, and the ECM detects an opens or shorts in the ATF temperature circuit. If the resistance value of the ATF temperature is less than 79 Ω *1or more than 156 kΩ *2, the ECM interprets this as a fault in the ATF sensor or wiring. The ECM will turn on the MIL and store the DTC.
*1: 150°C (302°F) or more is indicated regardless of the actual ATF temperature.
*2: -40°C (-40°F) is indicated regardless of the actual ATF temperature.
HINT:
The ATF temperature can be checked on the intelligent tester display.

MONITOR STRATEGY

Related DTCs	P0710: ATF temperature sensor/Range check (Chattering) P0712: ATF temperature sensor/Range check (Low resistance) P0713: ATF temperature sensor/Range check (High resistance)
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	0.5 sec.
MIL operation	Immediate
Sequence of operation	None

AX

TYPICAL ENABLING CONDITIONS

P0710: Range check (Chattering)
P0712: Range check (Low resistance)

The monitor will run whenever these DTCs are not present.	None
The typical enabling condition is not available.	-

P0713: Range check (High resistance)

The monitor will run whenever this DTC is not present.	None
Time after engine start	15 min. or more

TYPICAL MALFUNCTION THRESHOLDS

P0710: Range check (Chattering)

TFT (Transmission fluid temperature) sensor resistance	Less than 79 Ω or More than 156 kΩ

P0712: Range check (Low resistance)

TFT sensor resistance	Less than 79 Ω

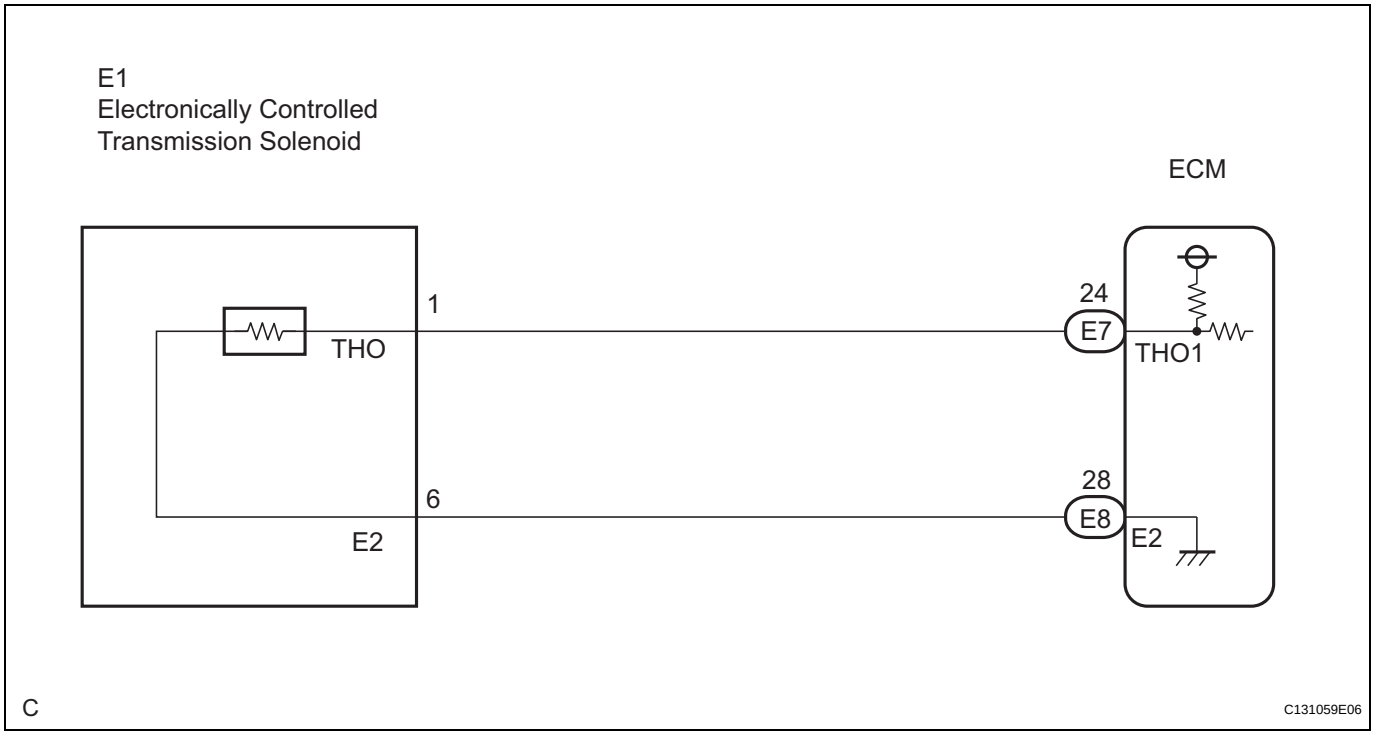
P0713: Range check (High resistance)

TFT sensor resistance	More than 156 kΩ

COMPONENT OPERATING RANGE

TFT sensor.	Atmospheric temperature to approx. 130°C (266°F)

WIRING DIAGRAM



INSPECTION PROCEDURE

AX

HINT:

According to the DATA LIST displayed by the OBD II scan tool or intelligent tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

In the table below, the value listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether apart is faulty or not.

1. READ DATA LIST

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / DATA LIST".
(g) According to the display on the tester, read the "DATA LIST".

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
AT OIL TEMP1	ATF Temp. Sensor Value/min.: -40°C (-40°F), max.: 215°C (419°F)	• After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak	If the value is "-40°C (-40°F)" or "215°C (419°F)", ATF temp. sensor circuit is opened or shorted.

HINT:

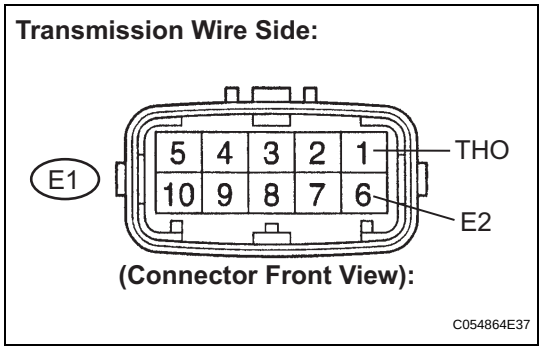
When DTC P0712 is output and OBD II scan tool or intelligent tester output is 150°C (302°F), there is a short circuit.

When DTC P0713 is output and OBD II scan tool or intelligent tester output is -40°C (-40°F), there is an open circuit.
Measure the resistance between terminal THO1 (THO) and body ground.

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

HINT:
If a circuit related to the ATF temperature sensor become open, P0713 is immediately set (in 0.5 second).
When P0713 is set, P0711 cannot be detected.
It is not necessary to inspect the circuit when P0711 is set.

1 INSPECT TRANSMISSION WIRE (ATF TEMPERATURE SENSOR)



(a) Disconnect the transmission wire connector from the transaxle.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
1 (THO) - 6 (E2)	79 Ω to 156 kΩ
1 (THO) - Body ground	10 kΩ or higher
6 (E2) - Body ground	↑

HINT:
If the resistance is out of the specified range with either the ATF temperature shown in the table below, the driveability of the vehicle may decrease.

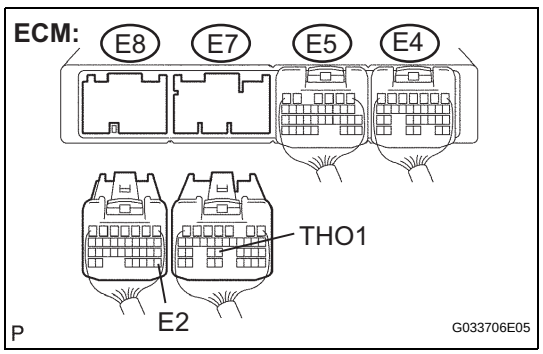
ATF Temperature	Specified Condition
10°C (50°F)	5 to 8 kΩ
25°C (77°F)	2.5 to 4.5 kΩ
110°C (230°F)	0.22 to 0.28 kΩ

AX

NG → **REPAIR OR REPLACE TRANSMISSION WIRE**

OK

2 CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)



(a) Connect the transmission wire connector to the transaxle.
(b) Disconnect the ECM connectors.
(c) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
E7-24 (THO1) - E8-28 (E2)	79 Ω to 156 kΩ

(d) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for short)

Tester Connection	Specified Condition
E7-24 (THO1) - Body ground	10 kΩ or higher
E8-28 (E2) - Body ground	

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

DTC	P0711	Transmission Fluid Temperature Sensor "A" Performance

DESCRIPTION

The ATF (Automatic Transmission Fluid) temperature sensor converts the fluid temperature into a resistance value which is input into the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0711	Condition A (2-trip detection logic): First, ECM checks for following conditions: (a) 17 minutes or more after engine is started and after 9 km (5.6 miles) or more of driving, ECT is -15°C (5°F) or more (b) After starting engine and certain period of time has elapsed, ECT and IAT are -10°C (14°F) or more If conditions are met, ECM then checks if ATF temperature is less than 20°C (68°F). If so, ECM interprets this as fault and illuminates MIL. Condition B (2-trip detection logic): First, ECM checks for following conditions: (a) ECT is 60°C (140°F) or more (b) After starting engine and certain period of time has elapsed, ECT is less than 35°C (95°F) If conditions are met, ECM then checks if ATF temperature is 100°C (212°F) or more. If so, ECM interprets this as fault and illuminates MIL.	• Open or short in ATF temperature sensor circuit • Transmission wire (ATF temperature sensor) • ECM

MONITOR DESCRIPTION

This DTC indicates that there is a problem with output from the 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 ECM determines the ATF temperature, detects open or short circuits of the ATF temperature circuit, and detects faults in the ATF temperature sensor.
Condition A (2-trip detection logic):
First, the ECM checks for the following conditions:
(a) 17 minutes or more after the engine is started and after 9 km (5.6 miles) or more of driving, the ECT is -15°C (5°F) or more.
(b) After starting the engine and a certain period of time has elapsed, the ECT and IAT are -10°C (14°F) or more.
If the conditions are met, the ECM then checks if the ATF temperature is less than 20°C (68°F). If so, the ECM interprets this as a fault and illuminates the MIL.
Condition B (2 -trip detection logic):
First, the ECM checks for the following conditions:
(a) ECT is 60°C (140°F) or more.
(b) After starting the engine and a certain period of time has elapsed, the ECT is less than 35°C (95°F).
If the conditions are met, the ECM then checks if the ATF temperature is 100°C (212°F) or more. If so, the ECM interprets this as a fault and illuminates the MIL.

AX

MONITOR STRATEGY

Related DTCs	P0711: ATF temperature sensor/Rationality check
Required sensors/Components	ATF temperature sensor (TFT sensor)
Frequency of operation	Continuous
Duration	3 sec.: Condition (A) 10 sec.: Condition (B)
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present.	None

Condition (A):

Time After engine start	17 min. or more
ECT	-15°C (5°F) or more
Driving distance after engine start	9 km (5.6 mile) or more
IAT (Intake air temperature) (12 sec. after starting engine)	-10°C (14°F) or more
ECT (12 sec. after starting engine)	-10°C (14°F) or more

Condition (B):

ECT (Current temperature)	60°C (140°F) or more
ECT (12 sec. after engine start)	Less than 35°C (95°F)

TYPICAL MALFUNCTION THRESHOLDS

Condition (A):

ATF temperature sensor	Less than 20°C (68°F)

Condition (B):

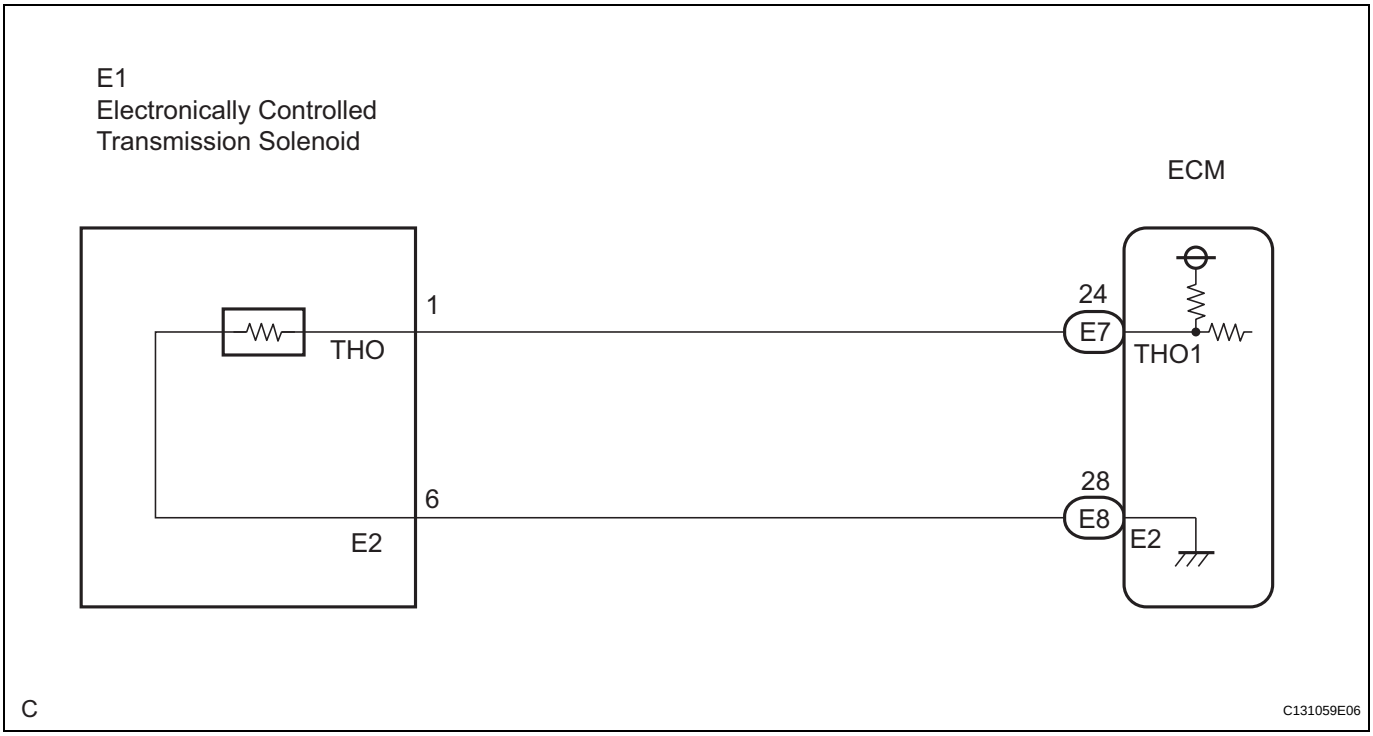
ATF temperature sensor	100°C (212°F) or more

COMPONENT OPERATING RANGE

ATF temperature sensor	Atmospheric temperature to approx. 130°C (266°F)

WIRING DIAGRAM

AX



INSPECTION PROCEDURE

HINT:

According to the DATA LIST displayed by the OBD II scan tool or intelligent tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

NOTICE:

In the table below, the value listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether apart is faulty or not.

1. READ DATA LIST

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / DATA LIST".
(g) According to the display on the tester, read the "DATA LIST".

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
AT OIL TEMP1	ATF Temp. Sensor Value/min.: -40°C (-40°F), max.: 215°C (419°F)	• After Stall Test; Approx. 80°C (176°F) • Equal to ambient temperature when cold soak	If the value is "-40°C (-40°F)" or "215°C (419°F)", ATF temp. sensor circuit is opened or shorted.

HINT:

When DTC P0712 is output and OBD II scan tool or intelligent tester output is 150°C (302°F), there is a short circuit.

When DTC P0713 is output and OBD II scan tool or intelligent tester output is -40°C (-40°F), there is an open circuit.

Measure the resistance between terminal THO1 (THO) and body ground.

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
150°C (302°F) or more	Short circuit

AX

HINT:

If a circuit related to the ATF temperature sensor becomes open, P0713 is immediately set (in 0.5 second).

When P0713 is set, P0711 cannot be detected.

It is not necessary to inspect the circuit when P0711 is set.

1	CHECK CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0711)

(a) Connect the OBD II scan tool or the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and push the OBD II scan tool or the intelligent tester main switch ON.
(c) When you use intelligent tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
(d) Read the DTCs using the OBD II scan tool or the intelligent tester.

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 GO TO DTC CHART**

A

2	CHECK TRANSMISSION FLUID LEVEL

OK:
Automatic transmission fluid level is correct.

NG → **ADD FLUID**

OK

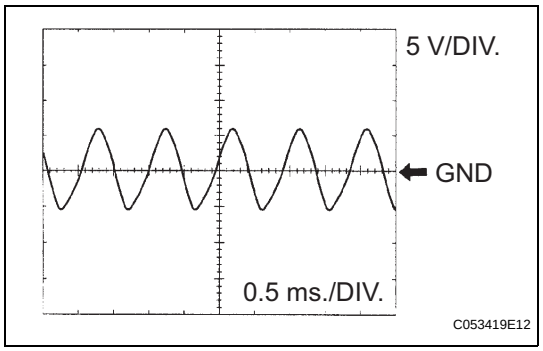
REPLACE TRANSMISSION WIRE (ATF TEMPERATURE SENSOR)

DTC	P0717	Turbine Speed Sensor Circuit No Signal

DESCRIPTION

This sensor detects the rotation speed of the input turbine. By comparing the input turbine speed signal (NT) with the counter gear speed sensor signal (NC), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. Thus, providing smooth gear shift.

DTC No.	DTC Detection Condition	Trouble Area
P0717	ECM detects conditions (a), (b) and (c) continuously for 5 sec. or more: (1-trip detection logic) (a) Vehicle speed: 50 km/h (31 mph) or more (b) Park/neutral position switch (NSW, R and L) is OFF (c) Speed sensor (NT): less than 300 rpm	• Open or short in transmission revolution sensor NT (speed sensor NT) circuit • Transmission revolution sensor NT (speed sensor NT) • ECM • Automatic transaxle assembly



Reference (Using an oscilloscope):
Check the waveform between terminals NT+ and NT- of the ECM connector.
Standard: Refer to the illustration.

Terminal	Tool setting	Vehicle condition
NT+ - NT-	5 V/DIV., 0.5ms./DIV.	Vehicle speed 20 km/h (12 mph)

AX

MONITOR DESCRIPTION

The NT terminal of the ECM detects a revolution signal from the speed sensor (NT) (input RPM). The ECM calculates a gearshift comparing the speed sensor (NT) with the speed sensor (NC).
While the vehicle is operating in 2nd, 3rd or 4th gear in the shift position of D, if the input shaft revolution is less than 300 rpm *1although the output shaft revolution is more than 1,000 rpm *2, the ECM detects the trouble, illuminates the MIL and stores the DTC.
*1: Pulse is not output or is irregularly output.
*2: The vehicle speed is 50 km/h (31 mph) or more.

MONITOR STRATEGY

Related DTCs	P0717: Speed sensor (NT) / Verify pulse input
Required sensors/Components	Speed sensor (NT), Speed sensor (NC)
Frequency of operation	Continuous
Duration	5 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	P0500: VSS P0748: Shift solenoid SL1 P0778: Shift solenoid SL2 P0982, P0983: Shift solenoid S4
Shift change	Shift change is completed and before starting next shift change operation
ECM selected gear	2nd, 3rd or 4th
Output shaft rpm	1,000 rpm or more
NSW switch	OFF
R switch	OFF
L switch	OFF
Engine	Running
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

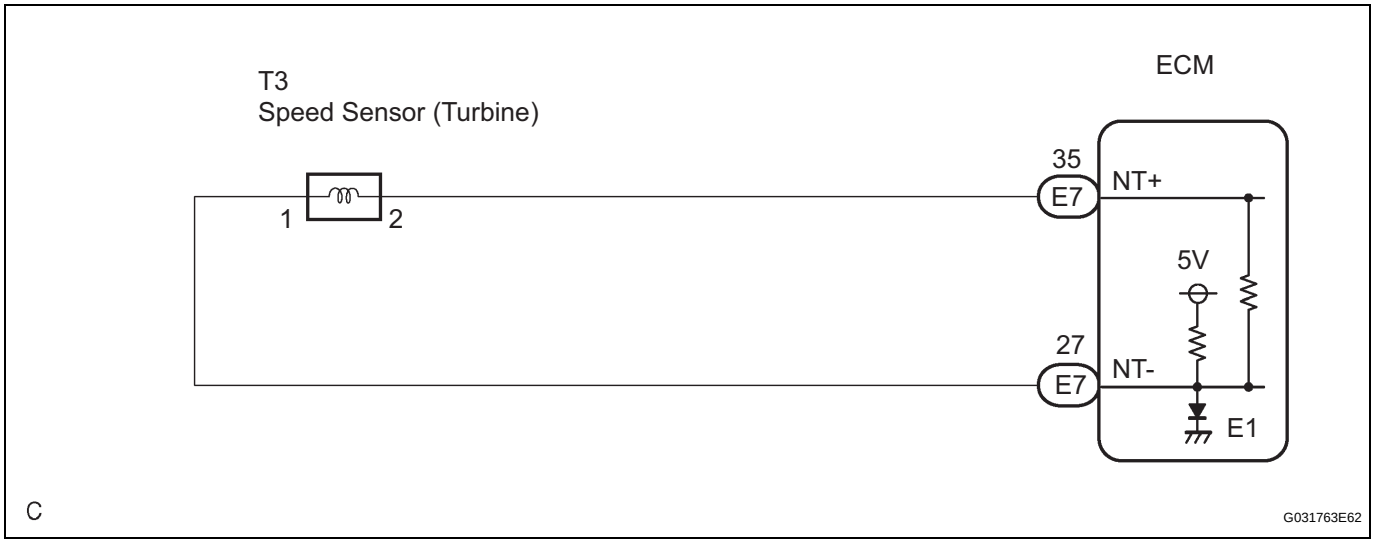
TYPICAL MALFUNCTION THRESHOLDS

Sensor signal rpm	Less than 300 rpm

COMPONENT OPERATING RANGE

Speed sensor (NT)	Turbine speed is equal to engine speed with lock-up ON

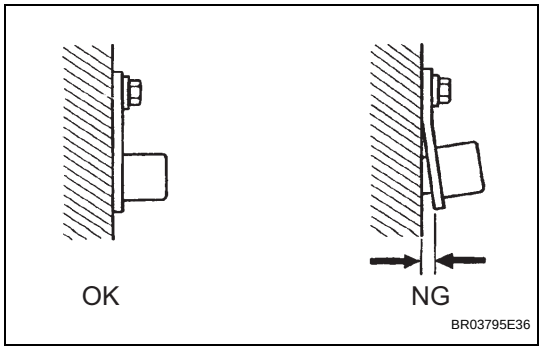
WIRING DIAGRAM



AX

INSPECTION PROCEDURE

1 INSPECT SPEED SENSOR INSTALLATION

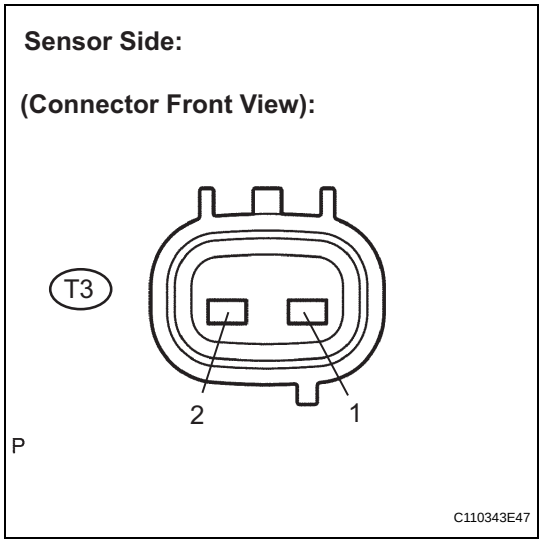


(a) Check the speed sensor installation.
OK:
The installation bolt is tightened properly and there is no clearance between the sensor and transaxle case.

NG → **REPLACE SPEED SENSOR (NT)**

OK

2 INSPECT SPEED SENSOR (NT)



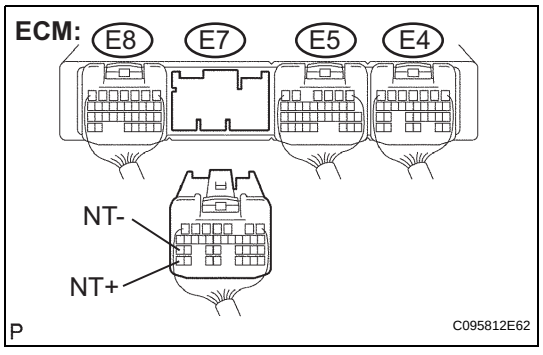
(a) Disconnect the speed sensor connector from the transaxle.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition 20 °C (68 °F)
1 - 2	560 to 680 Ω

NG → **REPLACE SPEED SENSOR (NT)**

OK

3 CHECK HARNESS AND CONNECTOR (SPEED SENSOR - ECM)



(a) Connect the speed sensor connector.
(b) Disconnect the ECM connector.
(c) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
E7-35 (NT+) - E7-27 (NT-)	560 to 680 Ω

(d) Measure the resistance according to the value(s) in the table below.

AX

Standard resistance (Check for short)

Tester Connection	Specified Condition
E7-35 (NT+) - Body ground	10 kΩ or higher
E7-27 (NT-) - Body ground	

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

DTC	P0724	Brake Switch "B" Circuit High

DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling while driving in lock-up condition when brakes are suddenly applied.
When the brake pedal is depressed, this switch sends a signals to the ECM. Then the ECM cancels the operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detection Condition	Trouble Area
P0724	The stop light switch remains ON even when the vehicle is driven in a STOP (less than 3 km/h (2 mph) and GO (30 km/h (19 mph) or more) fashion 5 times. (2-trip detection logic).	• Short in stop light switch circuit • Stop light switch • ECM

MONITOR DESCRIPTION

This DTC indicates that the stop light switch remains on. When the stop light switch remains ON during "stop and go" driving, the ECM interprets this as a fault in the stop light switch and the MIL comes on and the ECM stores the DTC. The vehicle must stop (less than 3 km/h (2 mph)) and go (30 km/h (19 mph) or more) 5 times for two driving cycles in order to detect a malfunction.

MONITOR STRATEGY

Related DTCs	P0724: Stop light switch/Rationality
Required sensors/Components	Stop light switch, Vehicle speed sensor
Frequency of operation	Continuous
Duration	GO and STOP 5 times
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	None
Ignition switch	ON
Starter	OFF
Battery voltage	8 V or more
GO (Vehicle speed is 30 km/h (18.63 mph) or more)	Once
STOP (Vehicle speed is less than 3 km/h (1.86 mph))	Once

TYPICAL MALFUNCTION THRESHOLDS

Brake switch	Remain ON during GO and STOP 5 times

WIRING DIAGRAM

See page ES-215

INSPECTION PROCEDURE

1	READ VALUE OF DATA LIST

HINT:
According to the DATA LIST displayed by the OBD II scan tool or intelligent tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / DATA LIST".
(g) According to the display on the tester, read the "DATA LIST".

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
STOP LIGHT SW	Stop Light Switch Status/ON or OFF	• Brake pedal is depressed: ON • Brake pedal is released: OFF	-

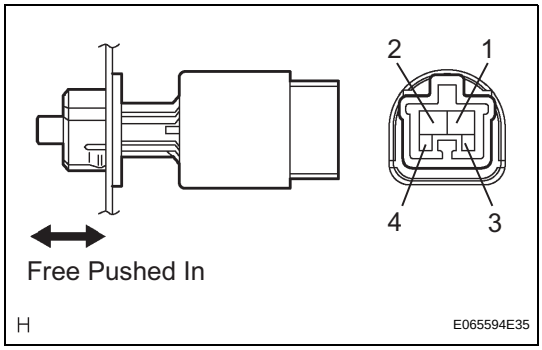
NOTICE:
In the table below, the value listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether apart is faulty or not.

AX

OK → **Go to step 3**

NG

2	INSPECT STOP LIGHT SWITCH ASSEMBLY



(a) Remove the stop light switch assembly.
(b) Measure the resistance according to the value(s) in the table below.

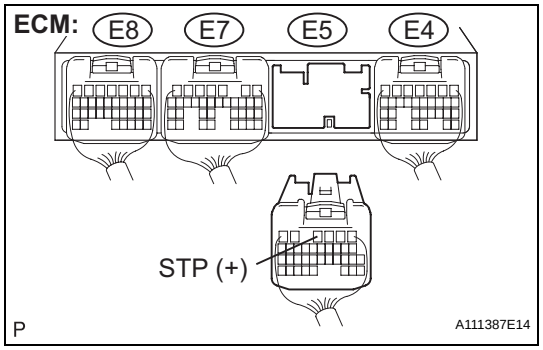
Standard resistance

Switch position	Tester Connection	Specified Condition
Switch pin free	1 - 2	Below 1 Ω
Switch pin pushed in	↑	10 kΩ or higher
Switch pin free	3 - 4	10 kΩ or higher
Switch pin pushed in	↑	Below 1 Ω

NG → **REPLACE STOP LIGHT SWITCH ASSEMBLY**

OK

3	CHECK HARNESS AND CONNECTOR (STOP LIGHT SWITCH ASSEMBLY - ECM)



(a) Install the stop light switch assembly.
(b) Disconnect the ECM connector.
(c) Measure the voltage according to the value(s) in the table below when the brake pedal is depressed and released.

Standard voltage

Condition	Tester Connection	Specified Condition
Brake pedal is depressed	E5-4 (STP) - Body ground	10 to 14 V
Brake pedal is released		Below 1 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

AX

DTC	P0741	Torque Converter Clutch Solenoid Performance (Shift Solenoid Valve DSL)

SYSTEM DESCRIPTION

The ECM uses the signals from the throttle position sensor, air-flow meter, turbine (input) speed sensor, intermediate (counter) shaft speed sensor and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.
Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect a mechanical problems of the shift solenoid valve DSL, valve body and torque converter clutch.

DTC No.	DTC Detection Condition	Trouble Area
P0741	Lock-up does not occur when driving in lock-up range Lock-up remains ON in lock-up OFF range (2-trip detection logic)	• Shift solenoid valve DSL remains open or closed • Valve body is blocked • Torque converter clutch • Automatic transaxle (clutch, brake or gear etc.) • Line pressure is too low

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on the speed sensor (NT), speed sensor (NC), engine rpm, engine load, engine temperature, vehicle speed, transmission temperature, and gear selection. The ECM determines the lock-up status of the torque converter by comparing the engine rpm (NE) to the input turbine rpm (NT). The ECM calculates the actual transmission gear by comparing input turbine rpm (NT) to counter gear rpm (NC). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to the shift solenoid DSL. When the DSL is turned on, it applies pressure to the lock-up relay valve and locks the torque converter clutch.
If the ECM detects no lock-up after lock-up has been requested or if it detects lock-up when it is not requested, the ECM interprets this as a fault in the shift solenoid valve DSL or lock-up system performance. The ECM will turn on the MIL and store the DTC.
HINT:
Example:
When any of the following is met, the system judges it as a malfunction.

- There is a difference in rotation between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up.
  (Engine speed is at least 100 rpm greater than input turbine speed.)
- There is no difference in rotation between the input side (engine speed) and output side (input turbine speed) of the torque converter when the ECM commands lock-up off.
  (The difference between engine speed and input turbine speed is less than 35 rpm.)

MONITOR STRATEGY

Related DTCs	P0741: Shift solenoid valve DSL/OFF malfunction Shift solenoid valve DSL/ON malfunction
Required sensors/Components	Shift solenoid valve DSL, Speed sensor (NT), Speed sensor (NC), Crankshaft position sensor (NE), Throttle position sensor (VPA1), Mass air flow sensor (MAF), Transmission temperature sensor (THO1), Engine coolant temperature sensor (ECT)
Frequency of operation	Continuous
Duration	OFF malfunction 3.5 sec. ON malfunction 1.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ALL:

The monitor will run whenever this DTC is not present.	P0115 - P0118 (ECT sensor) P0125 (Insufficient ECT for closed loop) P0500 (VSS) P0748, P0778 (Shift solenoid valve (range))
ECT (Engine coolant temperature)	60°C (140°F) or more
Transmission range	"D"
TFT (Transmission fluid temperature)	-20°C (-4°F) or more
TFT sensor circuit	Not circuit malfunction
ECT sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Intermediate shaft speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve S4 circuit	Not circuit malfunction
Shift solenoid valve DSL circuit	Not circuit malfunction
Electronic throttle system	Not circuit malfunction

OFF malfunction:

ECM lock-up command	ON
ECM selected gear	3rd or 4th
Vehicle speed	25 km/h (15.5 mph) or more

ON malfunction:

ECM lock-up command	OFF
ECM selected gear	3rd or 4th
Throttle valve opening angle	8% or more
Vehicle speed	25 to 60 km/h (15.5 to 37.3 mph)

AX

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met: OFF malfunction or ON malfunction

ON malfunction:

Engine speed - input (turbine) speed	100 rpm or more

OFF malfunction:

2 detections are necessary per driving cycle:
1st detection; temporary flag ON
2nd detection; pending fault code ON
Vehicle speed must be under 10 km/h (6.2 mph) once before 2nd detection

Difference between engine speed and input (turbine) speed	Less than 35 rpm

INSPECTION PROCEDURE

HINT:
Performing the ACTIVE TEST using the intelligent tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.
It is possible to display the DATA LIST during the ACTIVE TEST.

1. PERFORM ACTIVE TEST

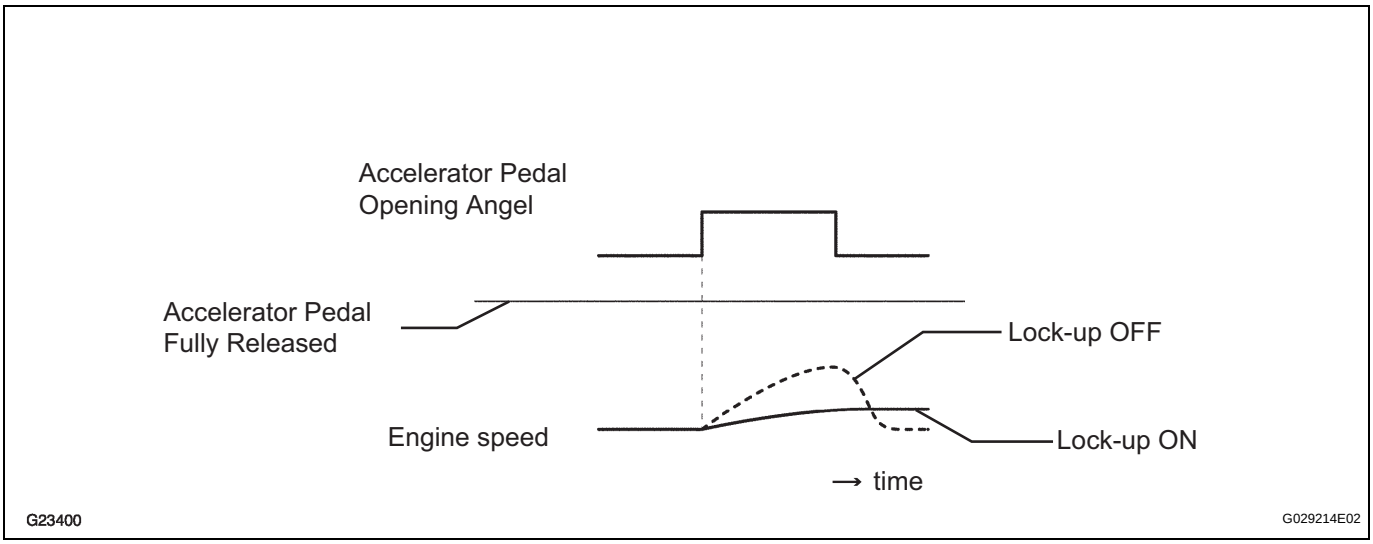
(a) Warm up the engine.

(b) Turn the ignition switch off.
(c) Connect the intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / ACTIVE TEST".
(g) According to the display on the tester, perform the "ACTIVE TEST".

Tester Display	Test Part	Control Range	Diagnostic Note
LOCK UP	[Test Details] Control the shift solenoid DSL to set the automatic transaxle to the lock-up condition. [Vehicle Condition] • Throttle valve opening angle: Less than 35% • Vehicle Speed: 58 km/h (36 mph) or more	ON / OFF	Possible to check the DSL operation.

HINT:
- This test can be conducted when the vehicle speed is 58 km/h (36 mph) or more.
- This test can be conducted in the 3rd or O/D 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.)



AX

1	CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0741)

(a) Connect the OBD II scan tool or the intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(b) Turn the ignition switch to the ON position and turn the OBD II scan tool or the intelligent tester main switch ON.
(c) When you use intelligent tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
(d) Read the DTCs using the OBD II scan tool or the intelligent tester.

Result

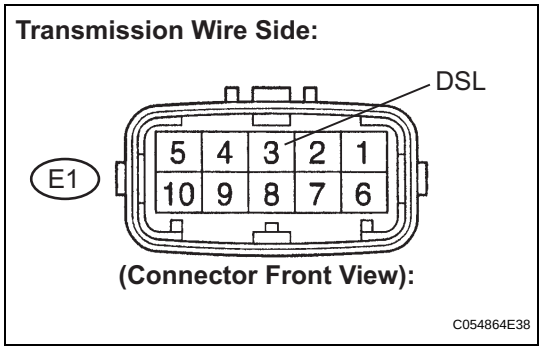
Display (DTC output)	Proceed to
Only "P0741" is output	A
"P0741" and other DTCs	B

HINT:
If any other codes besides "P0741" are output, perform the troubleshooting for those DTCs first.

B → GO TO DTC CHART

A

2 INSPECT TRANSMISSION WIRE (DSL)



(a) Disconnect the transmission wire connector from the transaxle.
(b) Measure the resistance according to the value(s) in the table below.

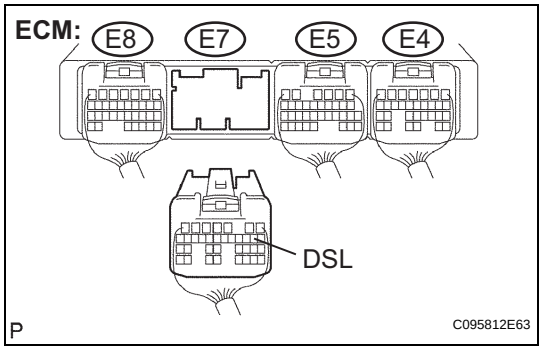
Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
3 - Body ground	11 to 13 Ω

NG → Go to step 4

OK

3 CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)



(a) Connect the transmission wire connector.
(b) Disconnect the ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
E7-9 (DSL) - Body ground	11 to 13 Ω

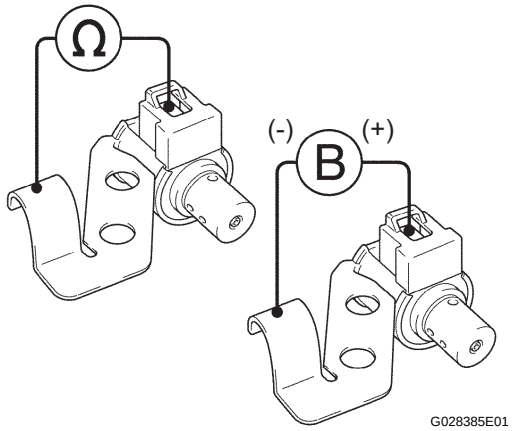
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

AX

4	INSPECT SHIFT SOLENOID VALVE (DSL)

Shift Solenoid Valve DSL:



(a) Remove the shift solenoid valve DSL.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (DSL) - Solenoid Body (DSL)	11 to 13 Ω

(c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid valve makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (DSL)**

OK

5	CHECK TRANSMISSION WIRE

OK:

The connectors and pins are securely installed.
There is no open or short on the wire harness.

NG → **REPAIR OR REPLACE TRANSMISSION WIRE**

AX

OK

6	INSPECT TRANSMISSION VALVE BODY ASSEMBLY

OK:

There are no foreign objects on each valve and they operate smoothly.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK

7	INSPECT TORQUE CONVERTER CLUTCH ASSEMBLY

OK:

The torque converter clutch operates normally.

NG → **REPLACE TORQUE CONVERTER CLUTCH ASSEMBLY**

OK

REPAIR AUTOMATIC TRANSAXLE ASSEMBLY

DTC	P0746	Pressure Control Solenoid "A" Performance (Shift Solenoid Valve SL1)

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or 4th gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transaxle (clutch, brake or gear etc.).

DTC No.	DTC Detection Condition	Trouble Area
P0746	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	• Shift solenoid valve SL1 remains open or closed • Valve body is blocked • Automatic transaxle (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution, intermediate (counter) shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd or 4th gear position). When the gear position commanded by the ECM and the actual gear position are not the same, the ECM illuminates the MIL.
HINT:
Example:
When either condition (a) or (b) is met, the ECM detects a malfunction.
(a) The ECM commands the 1st gear, but the actual gear is 2nd.
(b) The ECM commands the 2nd gear, but the actual gear is 1st.

MONITOR STRATEGY

Related DTCs	P0746: Shift solenoid valve SL1/OFF malfunction Shift solenoid valve SL1/ON malfunction
Required sensors/Components	Shift solenoid valve SL1, Speed sensor (NT), Speed sensor (NC), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	OFF malfunction, ON malfunction (A) 0.8 sec. ON malfunction (B) 1 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

ALL:

The monitor will run whenever this DTC is not present.	P0115 - P0118 (ECT sensor) P0125 (Insufficient ECT for closed loop) P0500 (VSS) P0748, P0778 (Shift solenoid valve (range))
ECT (Engine coolant temperature)	60°C (140°F) or more
Transmission range	"D"
TFT (Transmission fluid temperature)	-20°C (-4°F) or more
TFT sensor circuit	Not circuit malfunction
ECT sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Intermediate shaft speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction

Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve S4 circuit	Not circuit malfunction
Electronic throttle system	Not circuit malfunction

OFF malfunction:

ECM selected gear	1st
Vehicle speed	10 to 40 km/h (6.2 to 24.9 mph)
Throttle valve opening angle	3.5% or more (varies with engine speed)

ON malfunction (A):

ECM selected gear	2nd
Vehicle speed	10 km/h (6.2 mph) or more
Throttle valve opening angle	3.5% or more (varies with engine speed)

ON malfunction (B):

ECM lock-up command	OFF
ECM selected gear	3rd or 4th

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met:
OFF malfunction, or ON malfunction (A) and (B)
2 detections are necessary per driving cycle:
1st detection; temporary flag ON
2nd detection; pending fault code ON

OFF malfunction:

Input (turbine) speed/Intermediated shaft speed	1.49 to 1.63

ON malfunction (A):

Input (turbine) speed/Intermediated shaft speed	2.72 to 2.86

ON malfunction (B):

Engine speed - Input (turbine) speed	250 rpm or more

AX

INSPECTION PROCEDURE

HINT:
Performing the ACTIVE TEST using the intelligent tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.
It is possible to display the DATA LIST during the ACTIVE TEST.

1. PERFORM ACTIVE TEST

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / ACTIVE TEST / SHIFT".
(g) According to the display on the tester, perform the "ACTIVE TEST".
HINT:
While driving, the shift position can be forcibly changed with the intelligent tester.

Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (See page AX-29).

Tester Display	Test Part	Control Range	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "←" button: Shift up • Press "→" button: Shift down	1st / 2nd / 3rd / 4th	Possible to check the operation of the shift solenoid valves.

HINT:
- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The shift position commanded by the ECM is shown in the DATA LIST / SHIFT display on the intelligent tester.

1 CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0746)

(a) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(b) Turn the ignition switch to the ON position and turn the OBD II scan tool or the intelligent tester main switch ON.
(c) When you use intelligent tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
(d) Read the DTCs using the OBD II scan tool or the intelligent tester.

Result

AX

Display (DTC output)	Proceed to
Only "P0746" is output	A
"P0746" and other DTCs	B

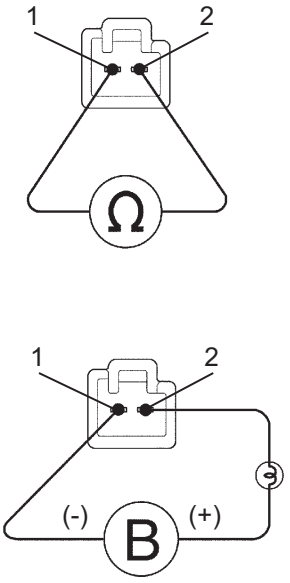
HINT:
If any other codes besides "P0746" are output, perform the troubleshooting for those DTCs first.

B → GO TO DTC CHART

A

2 **INSPECT SHIFT SOLENOID VALVE SL1**

Shift Solenoid Valve SL1:



D025466E26

(a) Remove the shift solenoid valve SL1.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

(c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE SL1**

OK

3 **INSPECT 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 CLUTCH ASSEMBLY**

OK:

The torque converter clutch operates normally.

NG → **REPLACE TORQUE CONVERTER CLUTCH ASSEMBLY**

OK

REPAIR OR REPLACE AUTOMATIC TRANSAXLE ASSEMBLY

AX

DTC	P0748	Pressure Control Solenoid "A" Electrical (Shift Solenoid Valve SL1)

DESCRIPTION

Shifting from 1st to 4th (O/D) is performed in combination with "ON" and "OFF" operation of the shift solenoid valves SL1 and SL2 which is controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

DTC No.	DTC Detection Condition	Trouble Area
P0748	The ECM checks for an open or short in the shift solenoid valve SL1 circuit while driving and shift gears. (1-trip detection logic) • Output signal duty equals to 100%. (NOTE: SL1 output signal duty is less than 100% under normal condition.)	• Open or short in shift solenoid valve SL1 circuit • Shift solenoid valve SL1 • ECM

MONITOR DESCRIPTION

The ECM 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 ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other normal shift solenoid valves "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.) (See page AX-29).

MONITOR STRATEGY

Related DTCs	P0748: Shift solenoid valve SL1/Range check
Required sensors/Components	Shift solenoid valve SL1
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence of operation	None

AX

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	None
Battery voltage	11 V or more
Ignition switch	ON
Starter	OFF

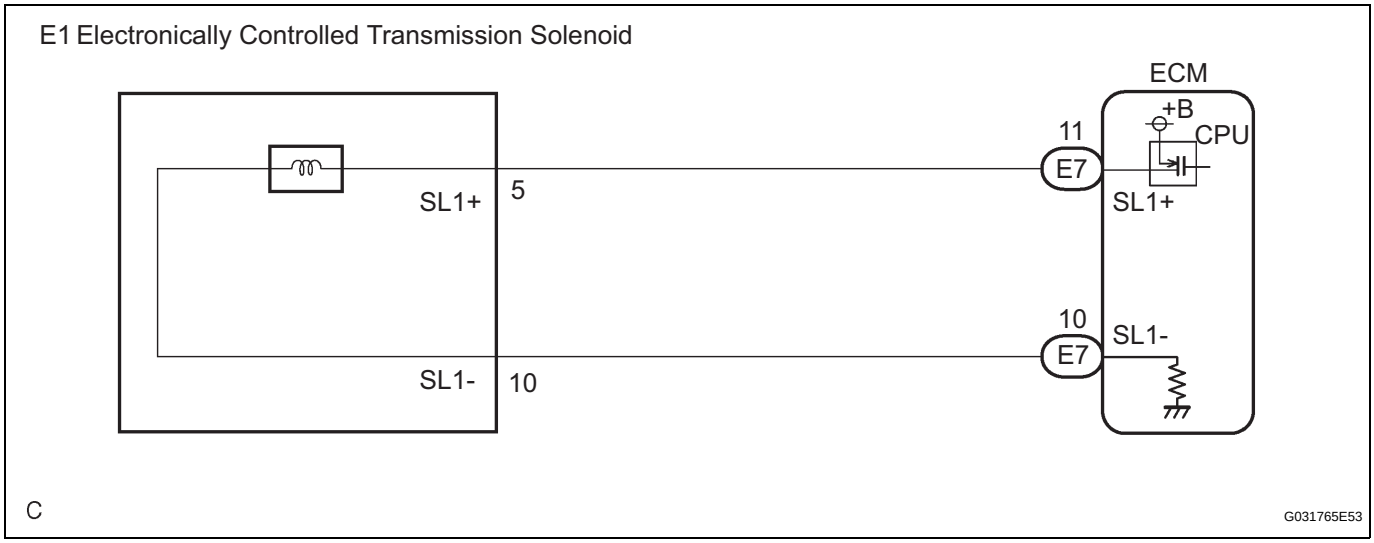
TYPICAL MALFUNCTION THRESHOLDS

Solenoid status from MIC	Fail (Open or Short)

COMPONENT OPERATING RANGE

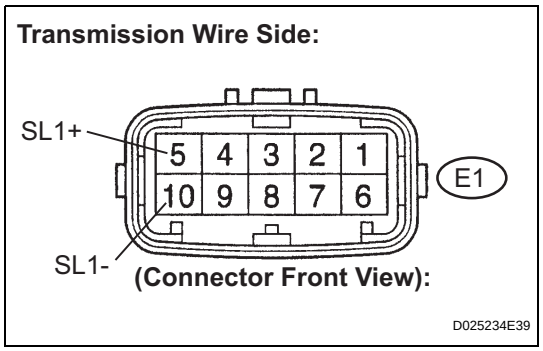
Output signal duty	Less than 100%

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT TRANSMISSION WIRE (SL1)



(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
5 (SL1+) - 10 (SL1-)	5.0 to 5.6 Ω

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for short)

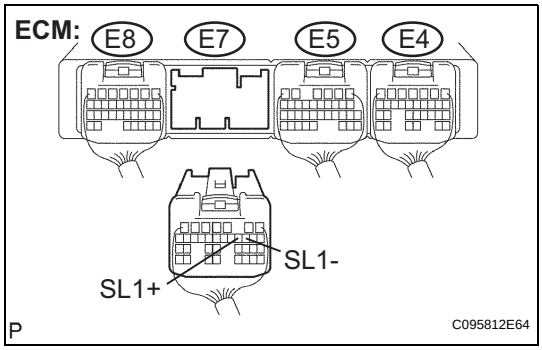
Tester Connection	Specified Condition
5 (SL1+) - Body ground	10 kΩ or higher
10 (SL1-) - Body ground	↑

NG → Go to step 3

OK

AX

2	CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)



(a) Connect the transmission connector to the transaxle.
(b) Disconnect the connector from the ECM.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
E7-11 (SL1+) - E7-10 (SL1-)	5.0 to 5.6 Ω

(d) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for short)

Tester Connection	Specified Condition
E7-11 (SL1+) - Body ground	10 kΩ or higher
E7-10 (SL1-) - Body ground	

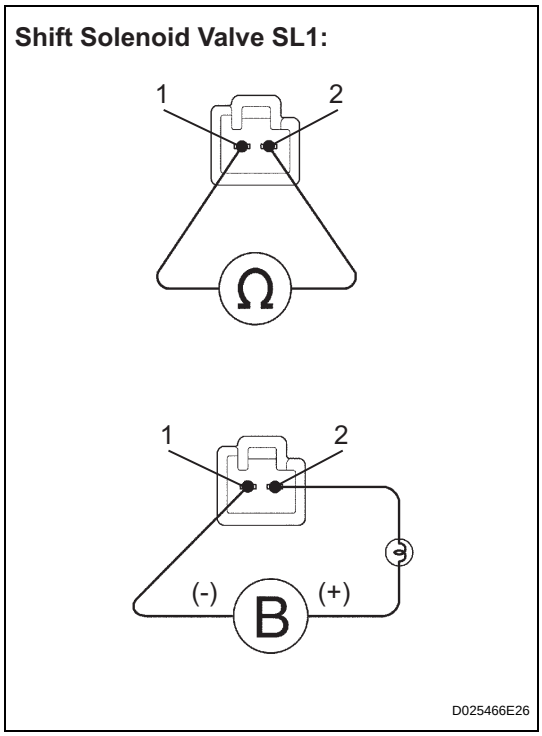
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

3	INSPECT SHIFT SOLENOID VALVE SL1

AX



(a) Remove the shift solenoid valve SL1.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

(c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE SL1**

OK

REPAIR OR REPLACE TRANSMISSION WIRE

DTC	P0766	Shift Solenoid "D" Performance (Shift Solenoid Valve S4)

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or 4th (O/D) gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transaxle (clutch, brake or gear etc.).

DTC No.	DTC Detection Condition	Trouble Area
P0766	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	• Shift solenoid valve S4 remains open or closed • Valve body is blocked • Automatic transaxle (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution, intermediate (counter) shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd or 4th (O/D) gear position). When the gear position commanded by the ECM and the actual gear position are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0766: Shift solenoid valve S4/OFF malfunction Shift solenoid valve S4/ON malfunction
Required sensors/Components	Shift solenoid valve S4, Speed sensor (NT), Speed sensor (NC), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	2 driving cycles
Sequence of operation	None

AX

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present.	P0115 - P0118 (ECT sensor) P0125 (Insufficient ECT for closed loop) P0500 (VSS) P0748, P0778 (Shift solenoid valve (range))
ECT (Engine coolant temperature)	60°C (140°F) or more
Transmission range	"D"
TFT (Transmission fluid temperature)	-20°C (-4°F) or more
TFT sensor circuit	Not circuit malfunction
ECT sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Intermediate shaft speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve S4 circuit	Not circuit malfunction
Electronic throttle system	Not circuit malfunction

ON malfunction (A):

ECM selected gear	3rd

Vehicle speed	10 km/h (6.2 mph) or more
Throttle valve opening angle	5% or more
Calculated load	19.5% or more

OFF malfunction (B):

ECM selected gear	4th
Vehicle speed	10 km/h (6.2 mph) or more
Throttle valve opening angle	5% or more
Calculated load	19.5% or more

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met:
OFF malfunction or ON malfunction
2 detections are necessary per driving cycle:
1st detection; temporary flag ON
2nd detection; pending fault code ON

ON malfunction (A):

Intermediate shaft speed/Output speed	0.95 to 1.09

OFF malfunction (B):

Intermediate shaft speed/Output speed	1.34 to 1.48

INSPECTION PROCEDURE

HINT:
Performing the ACTIVE TEST using the intelligent tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one method to shorten labor time.
It is possible to display the DATA LIST during the ACTIVE TEST.

1. PERFORM ACTIVE TEST

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / ACTIVE TEST / SHIFT".
(g) According to the display on the tester, perform the "ACTIVE TEST".
HINT:
While driving, the shift position can be forcibly changed with the intelligent tester.
Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (See page AX-29).

Tester Display	Test Part	Control Range	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	1st / 2nd / 3rd / 4th	Possible to check the operation of the shift solenoid valves.

HINT:
• This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.

AX

- The shift position commanded by the ECM is shown in the DATA LIST / SHIFT display on the intelligent tester.

1	CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0766)

(a) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(b) Turn the ignition switch to the ON position and turn the OBD II scan tool or the intelligent tester main switch ON.
(c) Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
(d) Read the DTCs using the OBD II scan tool or the intelligent tester.

Result

Display (DTC output)	Proceed to
Only "P0766" is output	A
"P0766" and other DTCs	B

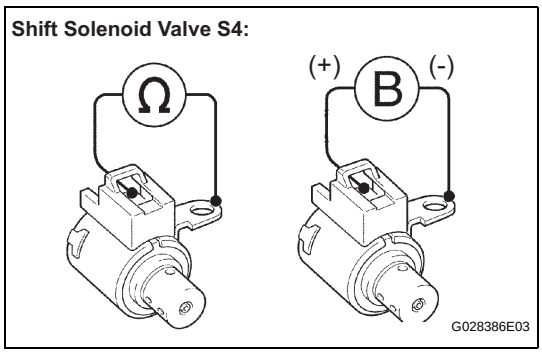
HINT:
If any other codes besides "P0766" are output, perform the troubleshooting for those DTCs first.

B → **GO TO DTC CHART**

A

2	INSPECT SHIFT SOLENOID VALVE S4

AX



(a) Remove the shift solenoid valve S4.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S4) - Solenoid Body (S4)	11 to 15 Ω

(c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE S4**

OK

3	INSPECT 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 CLUTCH ASSEMBLY

OK:

The torque converter clutch operates normally.

NG → REPLACE TORQUE CONVERTER CLUTCH ASSEMBLY

OK

REPAIR OR REPLACE AUTOMATIC TRANSAXLE ASSEMBLY

DTC	P0776	Pressure Control Solenoid "B" Performance (Shift Solenoid Valve SL2)

SYSTEM DESCRIPTION

The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or 4th (O/D) gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical problems of the shift solenoid valves, valve body or automatic transaxle (clutch, brake or gear etc.).

DTC No.	DTC Detection Condition	Trouble Area
P0776	The gear required by the ECM does not match the actual gear when driving (2-trip detection logic)	• Shift solenoid valve SL2 remains open or closed • Valve body is blocked • Automatic transaxle (clutch, brake or gear etc.)

MONITOR DESCRIPTION

The ECM commands gear shifts by turning the shift solenoid valves "ON/OFF". According to the input shaft revolution, intermediate (counter) shaft revolution and output shaft revolution, the ECM detects the actual gear position (1st, 2nd, 3rd or 4th (O/D) gear position). When the gear position commanded by the ECM and the actual gear position are not the same, the ECM illuminates the MIL and stores the DTC.

MONITOR STRATEGY

Related DTCs	P0776: Shift solenoid valve SL2/OFF malfunction Shift solenoid valve SL2/ON malfunction
Required sensors/Components	Shift solenoid valve SL2, Speed sensor (NT), Speed sensor (NC), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	0.8 sec.
MIL operation	2 driving cycles
Sequence of operation	None

AX

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present.	P0115 - P0118 (ECT sensor) P0125 (Insufficient ECT for closed loop) P0500 (VSS) P0748, P0778 (Shift solenoid valve (range))
ECT (Engine coolant temperature)	60°C (140°F) or more
Transmission range	"D"
TFT (Transmission fluid temperature)	-20°C (-4°F) or more
TFT sensor circuit	Not circuit malfunction
ECT sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Intermediate shaft speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve S4 circuit	Not circuit malfunction
Electronic throttle system	Not circuit malfunction

OFF malfunction:

ECM selected gear	1st

Vehicle speed	10 to 40 km/h (6.2 to 24.9 mph) or more
Throttle valve opening angle	5% or more 3.5% or more at engine speed 1,900 rpm (vary with engine speed)

ON malfunction:

ECM selected gear	3rd or 4th
Vehicle speed	10 km/h (6.2 mph) or more
Throttle valve opening angle	3.5% or more at engine speed 1,900 rpm (Varies with engine speed)

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met: OFF malfunction or ON malfunction

2 detections are necessary per driving cycle:
1st detection; temporary flag ON
2nd detection; pending fault code ON

OFF malfunction:

Input (turbine) speed/Intermediate shaft speed	0.93 to 1.07

ON malfunction:

Input (turbine) speed/Intermediate shaft speed	1.49 to 1.63

INSPECTION PROCEDURE

1. PERFORM ACTIVE TEST

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / ACTIVE TEST / SHIFT".
(g) According to the display on the tester, perform the "ACTIVE TEST".
HINT:
While driving, the shift position can be forcibly changed with the intelligent tester.
Comparing the shift position commanded by the ACTIVE TEST with the actual shift position enables you to confirm the problem (See page AX-29).

Tester Display	Test Details	Control Range	Diagnostic Note
SHIFT	[Test Details] Operate the shift solenoid valve and set the each shift position by yourself. [Vehicle Condition] • IDL: ON • Less than 50 km/h (31 mph) [Others] • Press "→" button: Shift up • Press "←" button: Shift down	1st / 2nd / 3rd / 4th	Possible to check the operation of the shift solenoid valves.

HINT:
- This test can be conducted when the vehicle speed is 50 km/h (31 mph) or less.
- The shift position commanded by the ECM is shown in the DATA LIST / SHIFT display on the intelligent tester.

AX

1	CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P0776)

(a) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(b) Turn the ignition switch to the ON position and turn the OBD II scan tool or the intelligent tester main switch ON.
(c) When you use intelligent tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES".
(d) Read the DTCs using the OBD II scan tool or the intelligent tester.

Result

Display (DTC output)	Proceed to
Only "P0776" is output	A
"P0776" and other DTCs	B

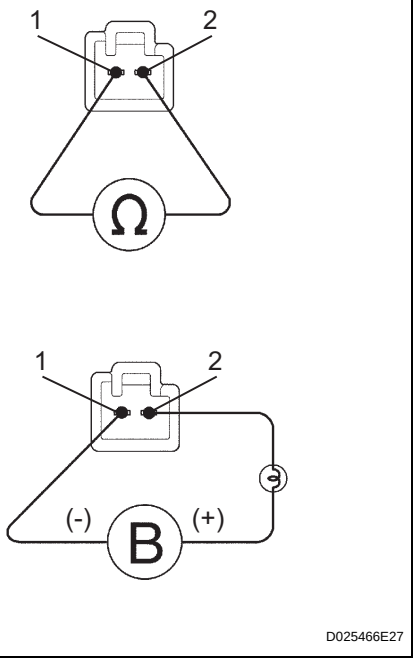
HINT:
If any other codes besides "P0776" are output, perform the troubleshooting for those DTCs first.

B → **GO TO DTC CHART**

A

2	INSPECT SHIFT SOLENOID VALVE SL2

Shift Solenoid Valve SL2:



(a) Remove the shift solenoid valve SL2.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

(c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.
OK:
The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE SL2**

OK

3	INSPECT TRANSMISSION VALVE BODY ASSEMBLY

OK:

There are no foreign objects on each valve and they operate smoothly.

NG → **REPAIR OR REPLACE TRANSMISSION VALVE BODY ASSEMBLY**

OK

4	INSPECT TORQUE CONVERTER CLUTCH ASSEMBLY

OK:

The torque converter clutch operates normally.

NG → **REPLACE TORQUE CONVERTER CLUTCH ASSEMBLY**

OK

REPAIR OR REPLACE AUTOMATIC TRANSAXLE ASSEMBLY

DTC	P0778	Pressure Control Solenoid "B" Electrical (Shift Solenoid Valve SL2)

DESCRIPTION

Shifting from 1st to O/D is performed in combination with "ON" and "OFF" operation of the shift solenoid valves SL1 and SL2 which is controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

DTC No.	DTC Detection Condition	Trouble Area
P0778	ECM checks for an open or short circuit in shift solenoid valves SL2 (1-trip detection logic) Hybrid IC for solenoid indicates fail.	• Open or short in shift solenoid valve SL2 circuit • Shift solenoid valve SL2 • ECM

MONITOR DESCRIPTION

The ECM 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 ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other normal shift solenoid valves "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.)
(See page AX-29).

MONITOR STRATEGY

Related DTCs	P0778: Shift solenoid valve SL2/Range check
Required sensors/Components	Shift solenoid valve SL2
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence of operation	None

AX

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	None
Solenoid current cut status	Not cut
Battery voltage	11 V or more
Ignition switch	ON
Starter	OFF

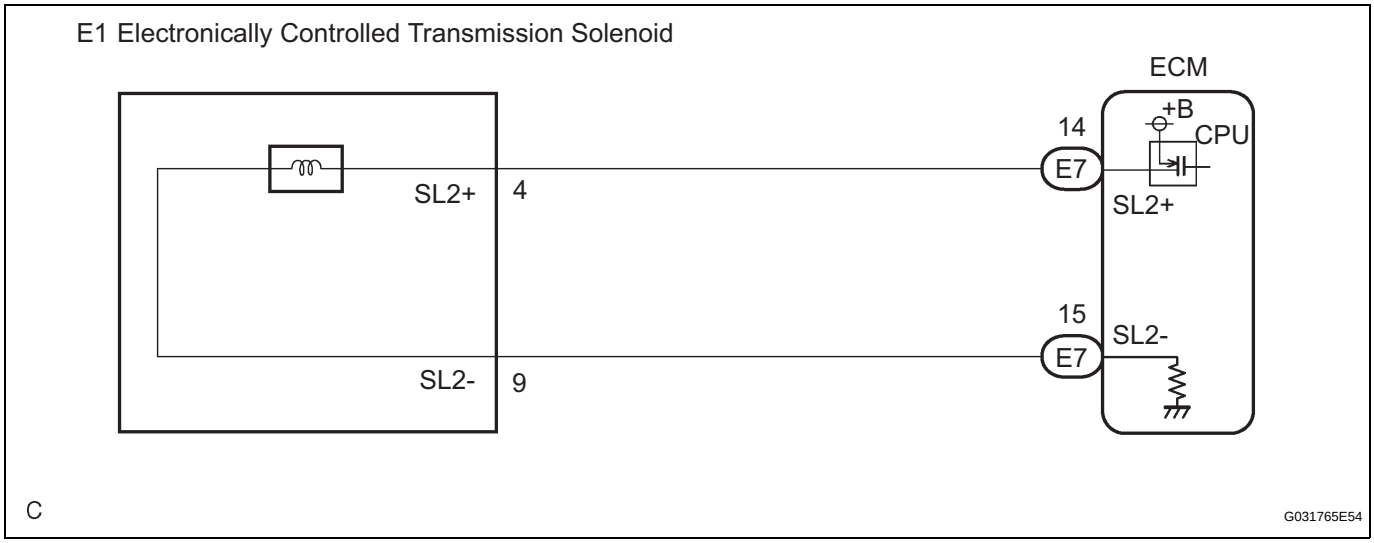
TYPICAL MALFUNCTION THRESHOLDS

Output signal duty	100%

COMPONENT OPERATING RANGE

Output signal duty	Less than 100%

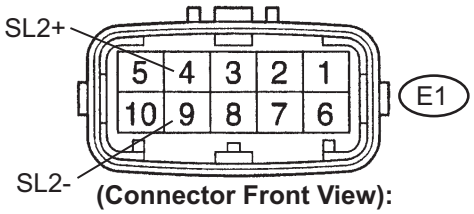
WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT TRANSMISSION WIRE (SL2)

Transmission Wire Side:



(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
4 (SL2+) - 9 (SL2-)	5.0 to 5.6 Ω

(c) Measure the resistance according to the value(s) in the table below.

OK

Standard resistance (Check for short):

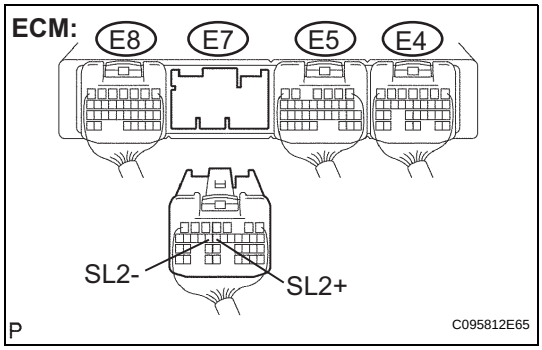
Tester Connection	Specified Condition
4 (SL2+) - Body ground	10 kΩ or higher
9 (SL2-) - Body ground	↑

NG → **Go to step 3**

OK

AX

2 CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)



(a) Connect the transmission connector to the transaxle.
(b) Disconnect the connector from the ECM.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
E7-14 (SL2+) - E7-15 (SL2-)	5.0 to 5.6 Ω

(d) Measure the resistance according to the value(s) in the table below.

OK:

Standard resistance (Check for short)

Tester Connection	Specified Condition
E7-14 (SL2+) - Body ground	10 kΩ or higher
E7-15 (SL2-) - Body ground	

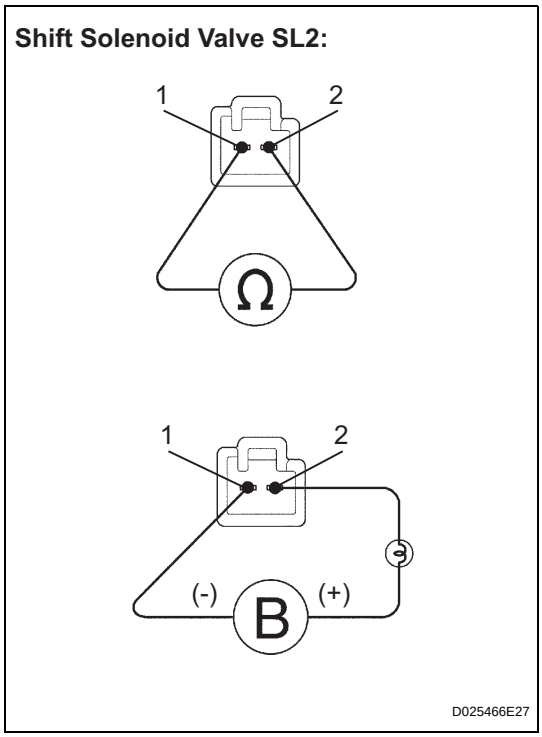
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK ↓

REPLACE ECM

AX

3 INSPECT SHIFT SOLENOID VALVE SL2



(a) Remove the shift solenoid valve SL2.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

(c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE SL2**

OK

REPAIR OR REPLACE TRANSMISSION WIRE

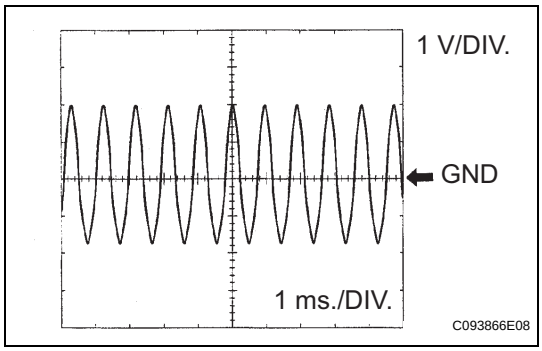
DTC	P0793	Intermediate Shaft Speed Sensor "A"

DESCRIPTION

This sensor detects the rotation speed of the counter gear. By comparing the counter gear speed signal (NC) with the direct clutch speed sensor signal (NT), the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure according to various conditions. Thus smooth gear shifting is performed.

DTC No.	DTC Detection Condition	Trouble Area
P0793	ECM detects conditions (a), (b) and (c) continuously for 5 sec. or more: (1-trip detection logic) (a) Vehicle speed: 50 km/h (31 mph) or more (b) Park/neutral position switch (NSW) is OFF (c) Speed sensor (NC): less than 300 rpm	• Open or short in transmission revolution sensor NC (speed sensor NC) circuit • Transmission revolution sensor NC (speed sensor NC) • ECM

Reference (Using an oscilloscope):
Check the waveform between terminals NC+ and NC- of the ECM connector.



Refer to the illustration:

Terminal	NC+ - NC-
Tool setting	1 V/DIV., 1ms./DIV.
Vehicle condition	Vehicle speed 30 km/h (19 mph): (3rd gear) Engine speed 1,400 rpm

AX

MONITOR DESCRIPTION

The NC terminal of the ECM detects a revolution signal from the speed sensor (NC) (counter gear rpm). The ECM calculates a gearshift comparing the speed sensor (NT) with the speed sensor (NC).
While the vehicle is operating in 2nd, 3rd or 4th (O/D) gear in the shift position of D, if the counter gear revolution is less than 300 rpm *1although the output shaft revolution is more than 1,000 rpm *2, the ECM detects the trouble, illuminates the MIL and stores the DTC.
*1: Pulse is not output or is irregularly output.
*2: The vehicle speed is 50 km/h (31 mph) or more.

MONITOR STRATEGY

Related DTCs	P0793: Speed sensor (NC)/Verify pulse input
Required sensors/Components	Speed sensor (NC), Speed sensor (NT), Park/neutral position switch
Frequency of operation	Continuous
Duration	5 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	P0500 (VSS) P0748, P0778 (Shift solenoid valve(range))
Engine	Running
NSW switch	OFF
Output shaft rpm	1,000 rpm or more

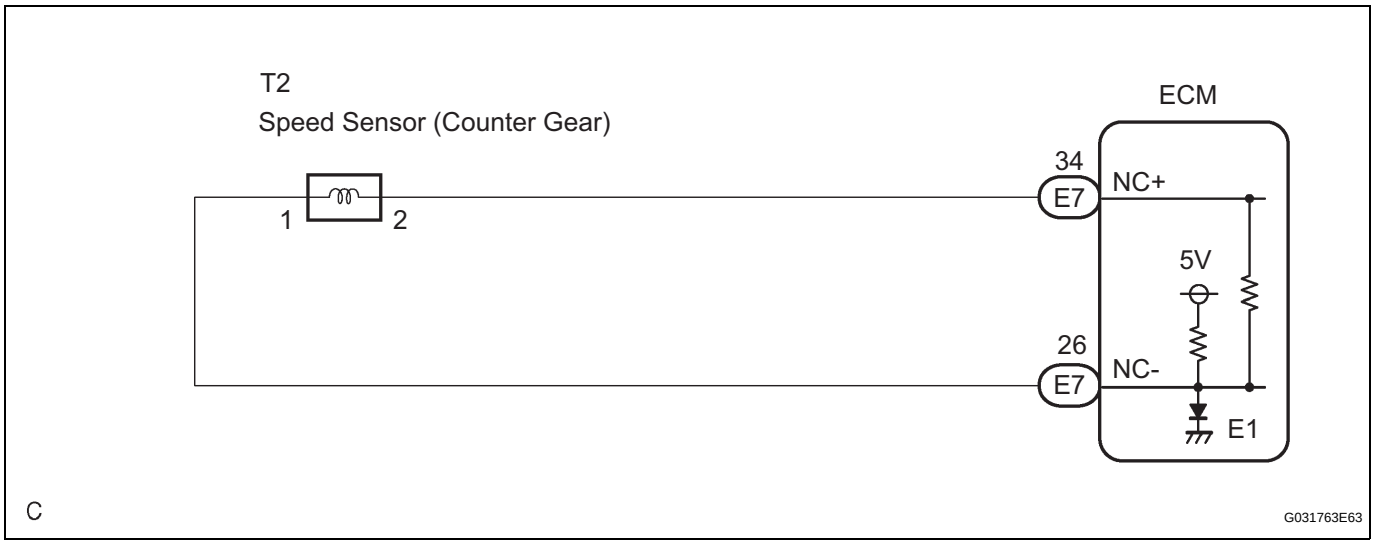
TYPICAL MALFUNCTION THRESHOLDS

Sensor signal rpm	Less than 300 rpm

COMPONENT OPERATING RANGE

Counter gear speed sensor (NC)	HINT: 4th (O/D) when shift lever position is D position (After warming up the engine); • Intermediate shaft speed (NC) becomes close to the engine speed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1. DATA LIST

HINT:

According to the DATA LIST displayed by the OBD II scan tool or intelligent tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten labor time.

READ DATA LIST

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn on the tester.
(f) Select the item "DIAGNOSIS / OBD/MOBD / ECT / DATA LIST".

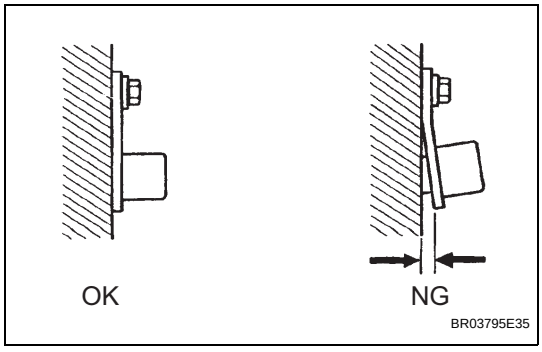
AX

(g) According to the display on the tester, read the "DATA LIST".

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
SPD (NC)	Counter Gear Speed/display: 50 r/min	HINT: 4th (O/D) when shift lever position is D position (After warming up the engine); • Intermediate shaft speed (NC) becomes close to the engine speed.	-

HINT:
- SPD (NC) is always 0 while driving:
  Open or short in the sensor or circuit.
- SPD (NC) 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.

1 INSPECT SPEED SENSOR INSTALLATION

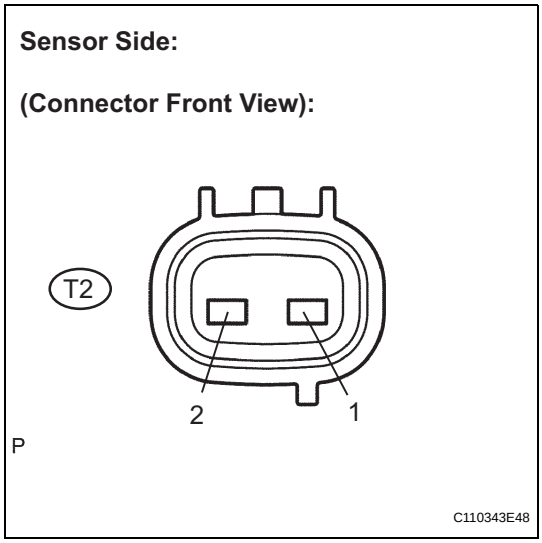


(a) Check the speed sensor installation.
OK:
The installation bolt is tightened properly and there is no clearance between the sensor and transaxle case.

NG → **REPLACE SPEED SENSOR (NC)**

OK

2 INSPECT SPEED SENSOR (NC)



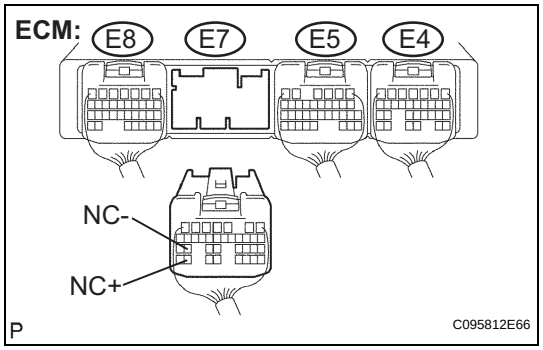
(a) Disconnect the speed sensor connector from the transaxle.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	560 to 680 Ω

NG → **REPLACE SPEED SENSOR (NC)**

OK

3	CHECK HARNESS AND CONNECTOR (SPEED SENSOR - ECM)



(a) Connect the speed sensor connector.
(b) Disconnect the ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
E7-34 (NC+) - E7-26 (NC-)	560 to 680 Ω

(d) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for short)

Tester Connection	Specified Condition
E7-34 (NC+) - Body ground	10 kΩ or higher
E7-26 (NC-) - Body ground	

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

AX

DTC	P0982	Shift Solenoid "D" Control Circuit Low (Shift Solenoid Valve S4)

DTC	P0983	Shift Solenoid "D" Control Circuit High (Shift Solenoid Valve S4)

DESCRIPTION

Shifting from 1st to O/D is performed in combination with "ON" and "OFF" operation of the shift solenoid valves SL1 and SL2 which is controlled by the ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

DTC No.	DTC Detection Condition	Trouble Area
P0982	ECM detects short in solenoid valve S4 circuit 2 times when solenoid valve S4 is operated (1-trip detection logic)	• Short in shift solenoid valve S4 circuit • Shift solenoid valve S4 • ECM
P0983	ECM detects open in solenoid valve S4 circuit 2 times when solenoid valve S4 is not operated (1-trip detection logic)	• Open in shift solenoid valve S4 circuit • Shift solenoid valve S4 • ECM

MONITOR DESCRIPTION

The ECM 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 ECM detects the problem and illuminates the MIL and stores the DTC. And the ECM performs the fail-safe function and turns the other normal shift solenoid valves "ON/OFF" (In case of an open or short circuit, the ECM stops sending current to the circuit.) (See page AX-29).

MONITOR STRATEGY

AX

Related DTCs	P0982: Shift solenoid valve S4/Range check (Low resistance) P0983: Shift solenoid valve S4/Range check (High resistance)
Required sensors/Components	Shift solenoid valve S4
Frequency of operation	Continuous
Duration	0.064 sec. or more
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P0982: Range check (Low resistance):

The monitor will run whenever this DTC is not present.	None
Shift solenoid valve S4	ON
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

P0983: Range check (High resistance):

The monitor will run whenever this DTC is not present.	None
Shift solenoid valve S4	OFF
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

P0982: Range check (Low resistance):

Shift solenoid valve S4 resistance	8 Ω or less

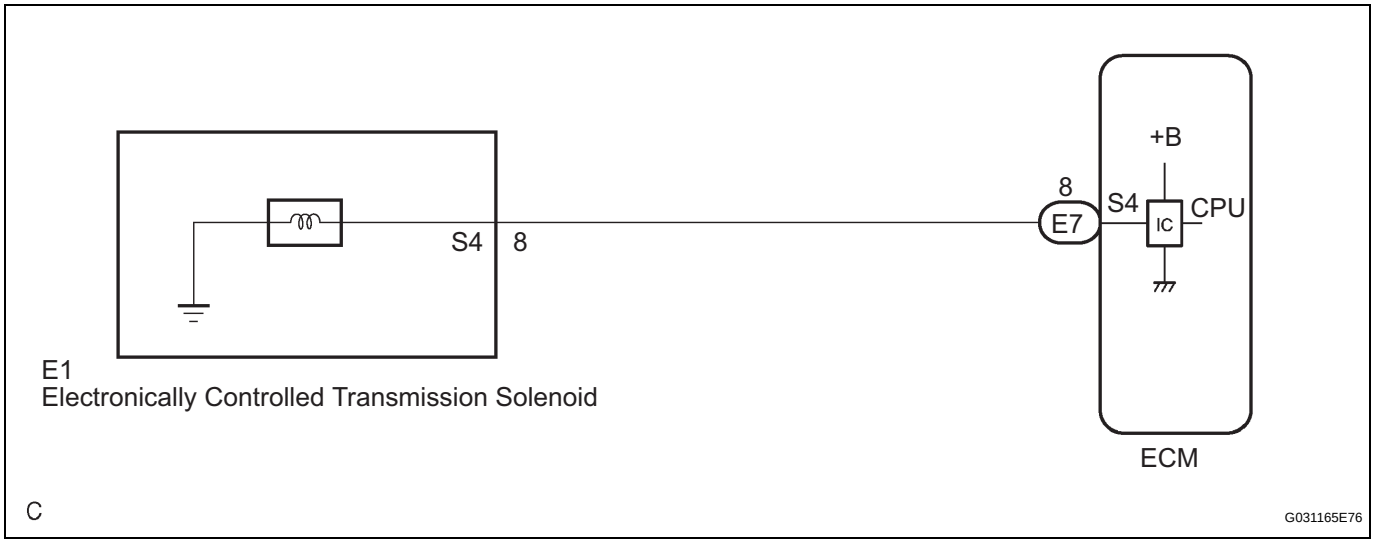
P0983: Range check (High resistance):

Shift solenoid valve S4 resistance	100 kΩ or more

COMPONENT OPERATING RANGE

Shift solenoid valve S4	Resistance: 11 to 15 Ω at 20°C (68°F)

WIRING DIAGRAM

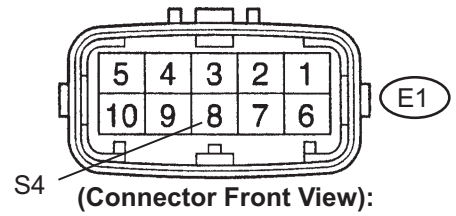


AX

INSPECTION PROCEDURE

1	INSPECT TRANSMISSION WIRE (S4)

Transmission Wire Side:



(Connector Front View):

D025234E41

(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

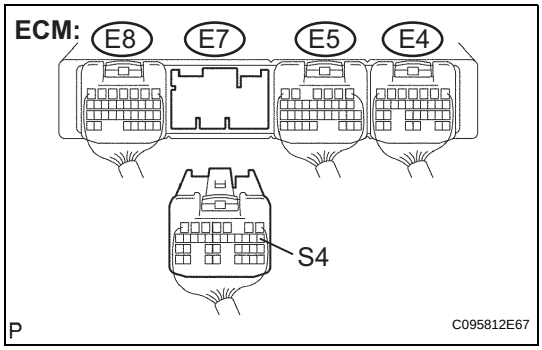
Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
8 - Body ground	11 to 15 Ω

NG → **Go to step 3**

OK

2	CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)



(a) Connect the transmission connector to the transaxle.
(b) Disconnect the connector from the ECM.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

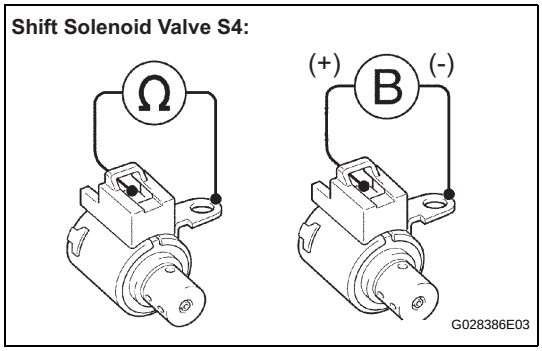
Tester Connection	Specified Condition 20°C (68°F)
E7-8 (S4) - Body ground	11 to 15 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

3	INSPECT SHIFT SOLENOID VALVE S4



(a) Remove the shift solenoid valve S4.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (S4) - Solenoid Body (S4)	11 to 15 Ω

(c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE S4**

OK

REPAIR OR REPLACE TRANSMISSION WIRE

AX

DTC	P2714	Pressure Control Solenoid "D" Performance (Shift Solenoid Valve SLT)

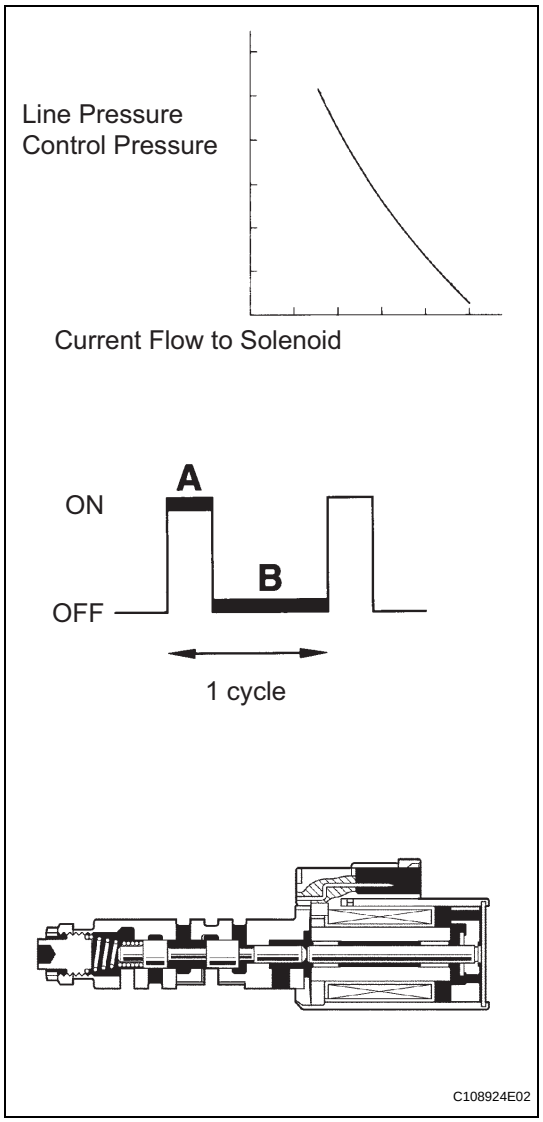
SYSTEM DESCRIPTION

The linear solenoid valve (SLT) controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the duty ratio (*) of the SLT solenoid valve to control hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs.

(*): Duty Ratio

The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then

Duty Ratio= A/(A+B) x 100(%)



DTC No.	DTC Detection Condition	Trouble Area
P2714	ECM detects a malfunction on SLT (ON side) according to the revolution difference of the turbine, intermediate and the output shaft, and also by the oil pressure. (2-trip detection logic)	• Shift solenoid valve SLT remains closed • Valve body is blocked • Automatic transaxle (clutch, brake or gear, etc.)

MONITOR DESCRIPTION

In any forward position, when the difference between the revolutions of the turbine, Intermediate and output shaft exceeds the specified value (varies with Intermediate, output speed) determined by the ECM, the ECM illuminates the MIL and outputs the DTC.
When shift solenoid valve SLT remains on, the oil pressure goes down and the clutch engagement force decreases.
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	P2714: Shift solenoid valve SLT/ON malfunction
Required sensors/Components	Shift solenoid valve SLT, Speed sensor (NT), Speed sensor (NC), Crankshaft position sensor (NE)
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

The monitor will run whenever this DTC is not present.	None
Transmission range	"D"
TFT (Transmission fluid temperature)	-10°C (14°F) or more
TFT sensor circuit	Not circuit malfunction
ECT sensor circuit	Not circuit malfunction
Turbine speed sensor circuit	Not circuit malfunction
Intermediate shaft speed sensor circuit	Not circuit malfunction
Output speed sensor circuit	Not circuit malfunction
Shift solenoid valve SL1 circuit	Not circuit malfunction
Shift solenoid valve SL2 circuit	Not circuit malfunction
Shift solenoid valve S4 circuit	Not circuit malfunction
Shift solenoid valve DSL circuit	Not circuit malfunction
Shift solenoid valve SLT circuit	Not circuit malfunction
Electronic throttle system	Not circuit malfunction

ON malfunction (a):

ECM gearshift command	1st
Input (turbine) speed	300 rpm or more
Output speed	300 rpm or more

ON malfunction (b):

ECM gearshift command	2nd
Input (turbine) speed	300 rpm or more
Output speed	300 rpm or more

ON malfunction (c):

ECM gearshift command	3rd
Input (turbine) speed	300 rpm or more
Output speed	300 rpm or more

ON malfunction (d):

ECM gearshift command	4th
Input (turbine) speed	300 rpm or more
Output speed	300 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

[ON malfunction]

Detection condition: Total accumulated time of ON malfunctions (a), (b), (c) and (d) is 1 second or more

ON malfunction (a):

NT - NC x 1st gear ratio (without counter gear and under drive gear) NT: Input (turbine) speed NC: Intermediate shaft speed	More than 300 rpm at intermediate shaft speed of 1,000 rpm (Conditions vary with intermediate shaft speed)
Duration	0.85 seconds or more

ON malfunction (b):

NT - NC x 2nd gear ratio (without counter gear and under drive gear)	More than 300 rpm at intermediate shaft speed of 1,000 rpm (Conditions vary with intermediate shaft speed)
Duration	0.85 seconds or more

ON malfunction (c):

NT - NC x 3rd gear ratio (without counter gear and under drive gear)	More than 300 rpm at intermediate shaft speed of 1,000 rpm (Conditions vary with intermediate shaft speed)
Duration	0.85 seconds or more

ON malfunction (d):

NC - NO x under drive gear ratio (Low or High)	More than 300 rpm at output speed of 1,000 rpm (Conditions vary with output speed)
Duration	0.85 seconds or more

INSPECTION PROCEDURE

AX

1	CHECK OTHER DTCS OUTPUT (IN ADDITION TO DTC P2714)

(a) Connect the OBD II scan tool or intelligent tester together with the CAN VIM (controller area network vehicle interface module) to the DLC3.
(b) Turn the ignition switch to the ON position and turn the OBD II scan tool or the intelligent tester main switch ON.
(c) When you use intelligent tester:
Select the item "DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES"
(d) Read the DTCs using the OBD II scan tool or the intelligent tester.

Result

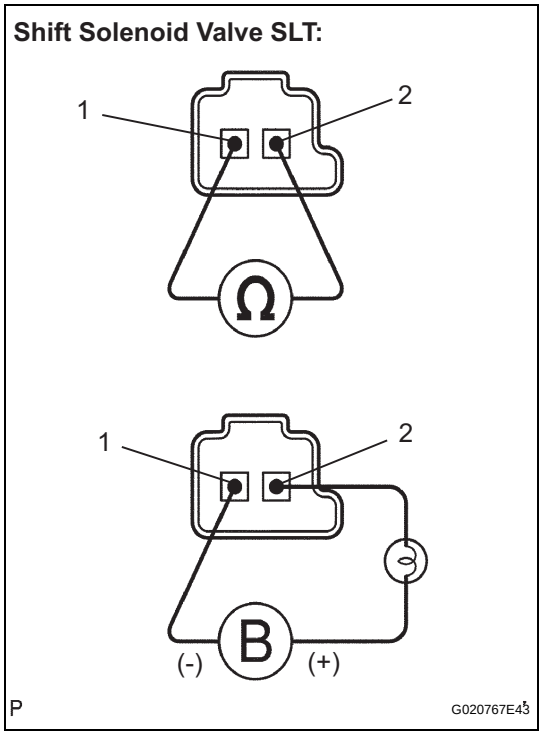
Display (DTC output)	Proceed to
Only "P2714" is output	**A**
"P2714" and other DTCs	**B**

HINT:
If any other codes besides "P2714" are output, perform troubleshooting for those DTCs first.

B → **GO TO DTC CHART**

A

2 INSPECT SHIFT SOLENOID VALVE SLT



(a) Remove the shift solenoid valve SLT.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

(c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.
OK:
The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE SLT**

OK

AX

3 INSPECT 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 CLUTCH ASSEMBLY

OK:
The torque converter clutch operates normally.

NG → **REPLACE TORQUE CONVERTER CLUTCH ASSEMBLY**

OK

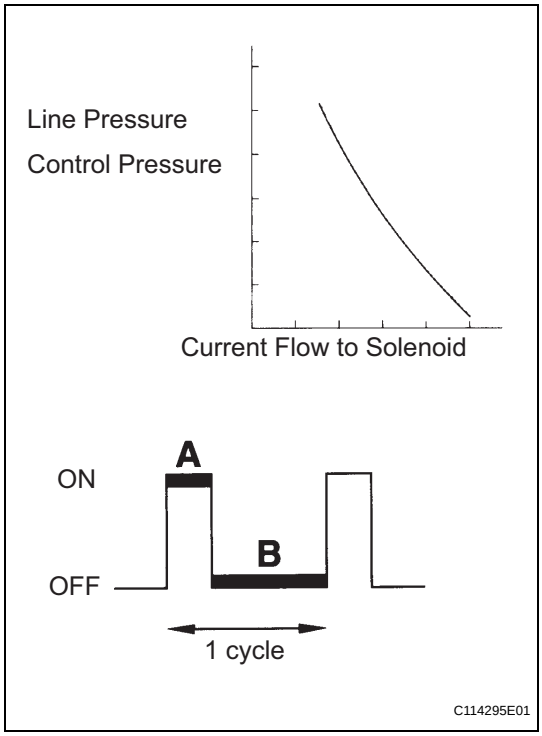
REPAIR OR REPLACE AUTOMATIC TRANSAXLE ASSEMBLY

DTC	P2716	Pressure Control Solenoid "D" Electrical (Shift Solenoid Valve SLT)

DESCRIPTION

The linear solenoid valve (SLT) controls the transmission line pressure for smooth transmission operation based on signals from the throttle position sensor and the vehicle speed sensor. The ECM adjusts the duty cycle of the SLT solenoid valve to control hydraulic line pressure coming from the primary regulator valve. Appropriate line pressure assures smooth shifting with varying engine outputs.
(*): Duty Ratio
The duty ratio is the ratio of the period of continuity in one cycle.
For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then
Duty Ratio = A/(A + B) x 100(%)

DTC No.	DTC Detection Condition	Trouble Area
P2716	Open or short is detected in shift solenoid valve SLT circuit for 1 second or more while driving (1-trip detecting logic).	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM



MONITOR DESCRIPTION

When an open or short in the linear solenoid valve (SLT) circuit is detected, the ECM interprets this as a fault. The ECM will turn on the MIL and store the DTC.

MONITOR STRATEGY

Related DTCs	P2716: Shift solenoid valve SLT/Range check
Required sensors/Components	Shift solenoid valve SLT
Frequency of operation	Continuous
Duration	1 sec.
MIL operation	Immediate
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	None
Solenoid current cut status	Not cut
Battery voltage	11 V or more
Ignition switch	ON
Starter	OFF
CPU commanded duty ratio to SLT	19% or more

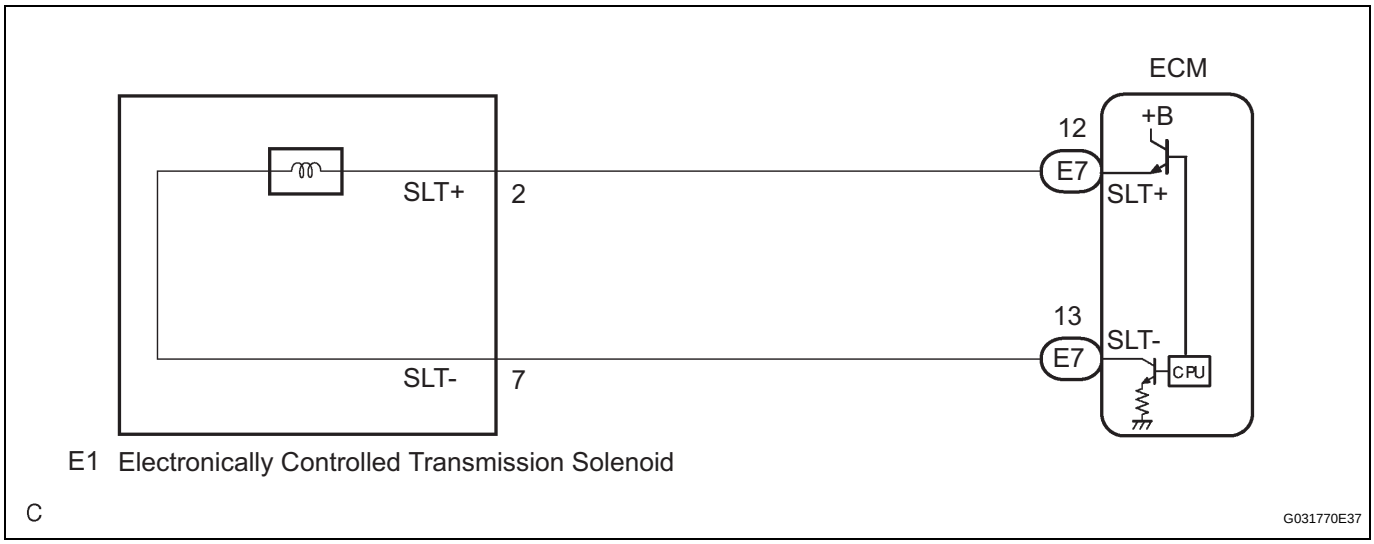
TYPICAL MALFUNCTION THRESHOLDS

Solenoid status from IC	Fail (Open or short)

COMPONENT OPERATING RANGE

Shift solenoid valve SLT	Resistance: 5.0 to 5.6 Ω at 20°C (68°F)

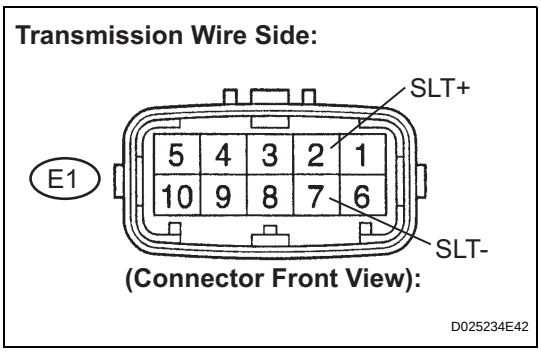
WIRING DIAGRAM



AX

INSPECTION PROCEDURE

1	INSPECT TRANSMISSION WIRE (SLT)



(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
2 (SLT+) - 7 (SLT-)	5.0 to 5.6 Ω

(c) Measure the resistance according to the value(s) in the table below.

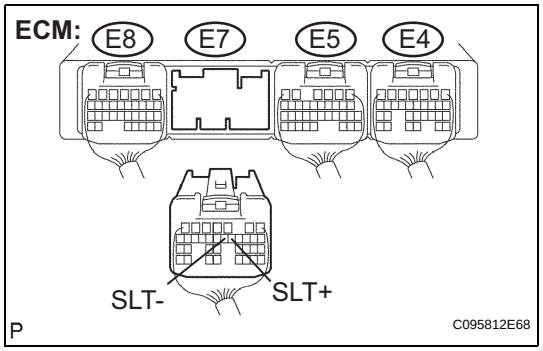
Standard resistance (Check for short)

Tester Connection	Specified Condition
2 (SLT+) - Body ground	10 kΩ or higher
7 (SLT-) - Body ground	↑

NG → **Go to step 3**

OK

2 CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)



(a) Connect the transmission wire connector to the transaxle.
(b) Disconnect the ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
E7-12 (SLT+) - E7-13 (SLT-)	5.0 to 5.6 Ω

(d) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for short)

Tester Connection	Specified Condition
E7-12 (SLT+) - Body ground	10 kΩ or higher
E7-13 (SLT-) - Body ground	

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

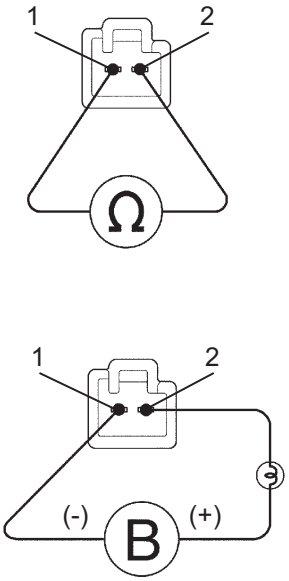
OK

REPLACE ECM

AX

3	INSPECT SHIFT SOLENOID VALVE SLT

Shift Solenoid Valve SLT:



D025466E28

(a) Remove the shift solenoid valve (SLT).
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
1 - 2	5.0 to 5.6 Ω

(c) Connect the positive (+) lead with a 21 W bulb to terminal 2 and the negative (-) lead to terminal 1 of the solenoid valve connector, then check the movement of the valve.

OK:

The solenoid makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE SLT**

OK

REPAIR OR REPLACE TRANSMISSION WIRE

AX

DTC	P2769	Torque Converter Clutch Solenoid Circuit Low (Shift Solenoid Valve DSL)

DTC	P2770	Torque Converter Clutch Solenoid Circuit High (Shift Solenoid Valve DSL)

DESCRIPTION

The shift solenoid valve DSL is turned "ON" and "OFF" by signals from the ECM in order to control the hydraulic pressure operation, the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC No.	DTC Detection Condition	Trouble Area
P2769	ECM detects short in solenoid valve DSL circuit (0.1 sec.) when solenoid valve DSL is operated (2-trip detection logic)	• Short in shift solenoid valve DSL circuit • Shift solenoid valve DSL • ECM
P2770	ECM detects open in solenoid valve DSL circuit (0.1 sec.) when solenoid valve DSL is not operated (2-trip detection logic)	• Open in shift solenoid valve DSL circuit • Shift solenoid valve DSL • ECM

MONITOR DESCRIPTION

Torque converter lock-up is controlled by the ECM based on engine rpm, engine load, engine temperature, vehicle speed, transmission temperature, and shift range selection. The ECM determines the lock-up status of the torque converter by comparing the engine rpm (NE) to the input turbine rpm (NT). The ECM calculates the actual transmission gear by comparing input turbine rpm (NT) to counter gear rpm (NC). When conditions are appropriate, the ECM requests "lock-up" by applying control voltage to the shift solenoid DSL. When the DSL is opened, it applies pressure to the lock-up relay valve and locks the torque converter clutch. If the ECM detects an open or short in the DSL solenoid circuit, the ECM interprets this as a fault in the DSL solenoid or circuit. The ECM will turn on the MIL and store the DTC.

MONITOR STRATEGY

AX

Related DTCs	P2769: Shift solenoid valve DSL/Range check (Low resistance) P2770: Shift solenoid valve DSL/Range check (High resistance)
Required sensors/Components	Shift solenoid valve DSL
Frequency of operation	Continuous
Duration	0.064 sec. or more
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

P2769: Range check (Low resistance):

The monitor will run whenever this DTC is not present.	None
Shift solenoid valve DSL	ON
Solenoid current cut status	Not cut
Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

P2770: Range check (High resistance):

The monitor will run whenever this DTC is not present.	None
Shift solenoid valve DSL	ON
Battery voltage	8 V or more
Ignition switch	ON

Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

P2769: Range check (Low resistance):

Shift solenoid valve DSL resistance	8 Ω or less

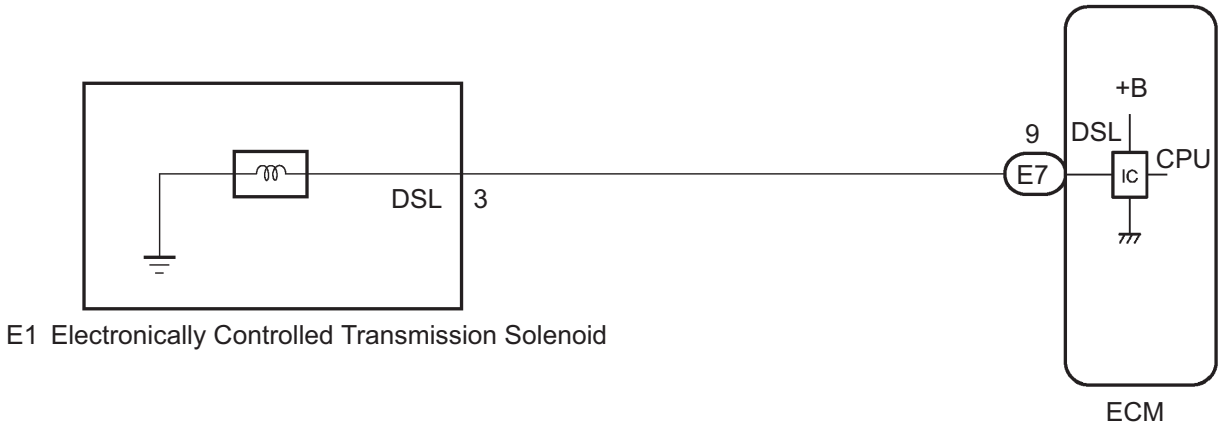
P2770: Range check (High resistance):

Shift solenoid valve DSL resistance	100 kΩ or more

COMPONENT OPERATING RANGE

Shift solenoid valve DSL	Resistance: 11 to 13 Ω at 20°C (68°F)

WIRING DIAGRAM

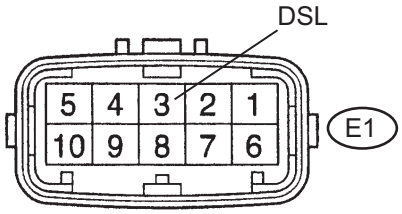


AX

INSPECTION PROCEDURE

1	INSPECT TRANSMISSION WIRE (DSL)

Transmission Wire Side:



(Connector Front View):

D025234E43

(a) Disconnect the transmission wire connector from the transaxle.

(b) Measure the resistance according to the value(s) in the table below.

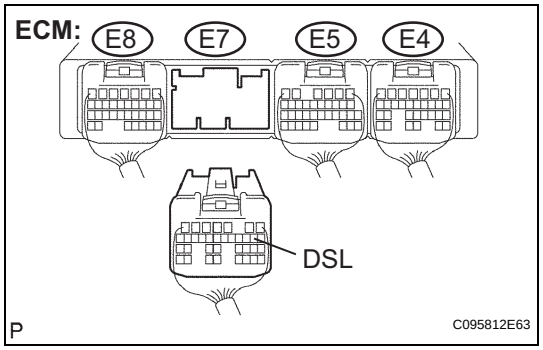
Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
3 - Body ground	11 to 13 Ω

NG → **Go to step 3**

OK

2 CHECK HARNESS AND CONNECTOR (TRANSMISSION WIRE - ECM)



(a) Connect the transmission wire connector.
(b) Disconnect the ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

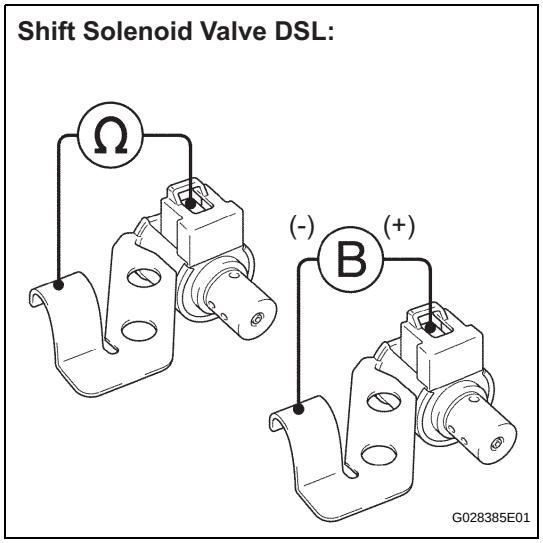
Tester Connection	Specified Condition 20°C (68°F)
E7-9 (DSL) - Body ground	11 to 13 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

3 INSPECT SHIFT SOLENOID VALVE (DSL)



(a) Remove the shift solenoid valve DSL.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition 20°C (68°F)
Solenoid Connector (DSL) - Solenoid Body (DSL)	11 to 13 Ω

(c) Connect the positive (+) lead to the terminal of the solenoid connector, and the negative (-) lead to the solenoid body.

OK:

The solenoid valve makes an operating sound.

NG → **REPLACE SHIFT SOLENOID VALVE (DSL)**

OK

REPAIR OR REPLACE TRANSMISSION WIRE

AX

AUTOMATIC TRANSAXLE FLUID

ON-VEHICLE INSPECTION

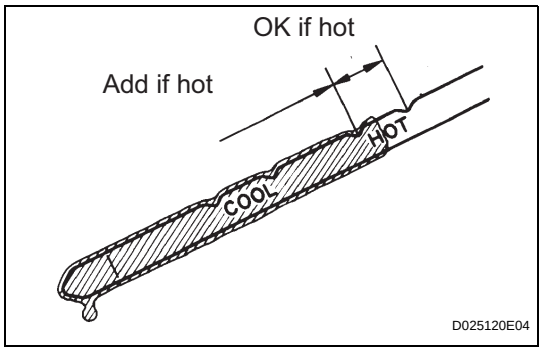
1. CHECK THE FLUID LEVEL

HINT:

Drive the vehicle so that the engine and transaxle are at the normal operating temperature.

Standard fluid temperature:

70 to 80°C (158 to 176°F)



(a) Park the vehicle on a level surface and set the parking brake.

(b) With the engine idling and the brake pedal depressed, shift the shift lever into all positions from the P to the L position, and return it to the P position.

(c) Pull out the dipstick and wipe it clean.

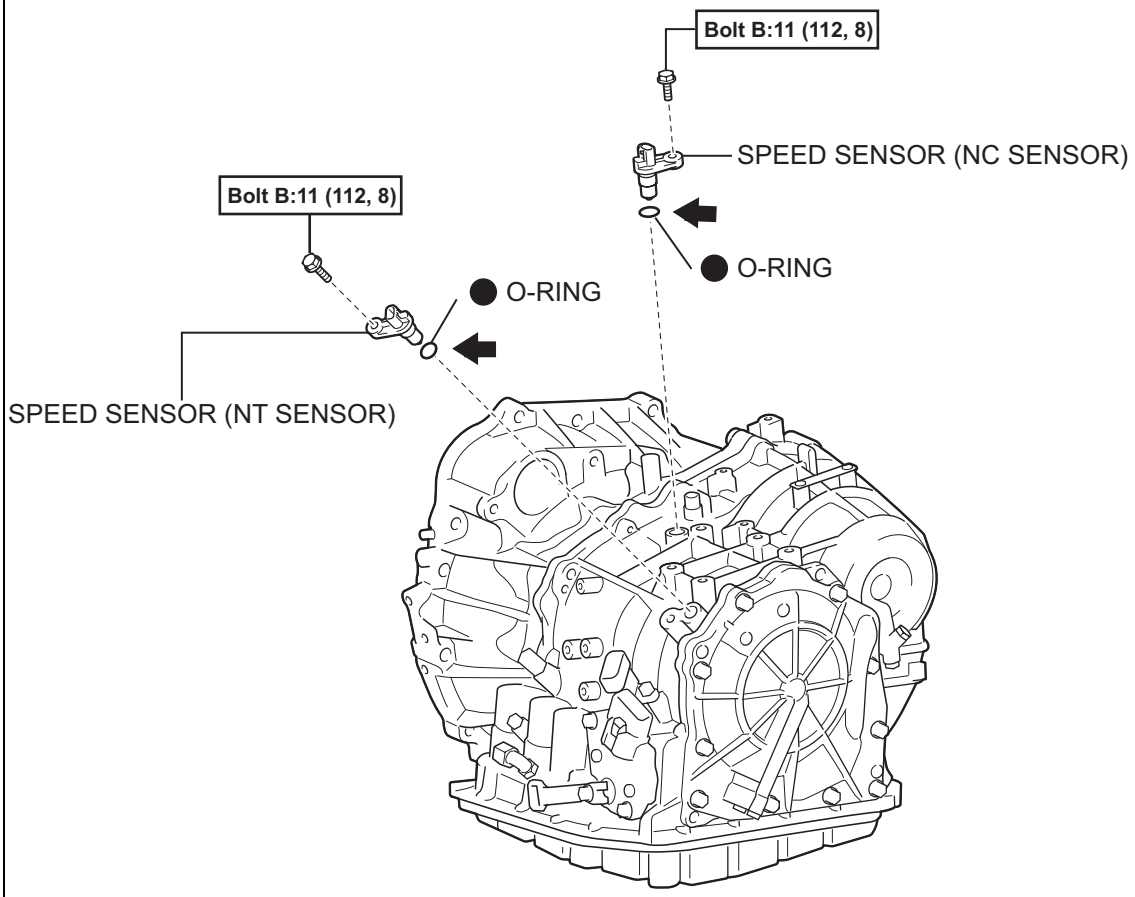
(d) Push it back fully into the pipe.

(e) Pull it out again and check that the fluid level is within the HOT range.

If there are leaks, it is necessary to repair or replace O-rings, FIPGs, oil seals, plugs or other parts.

TRANSMISSION REVOLUTION SENSOR

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

ATF

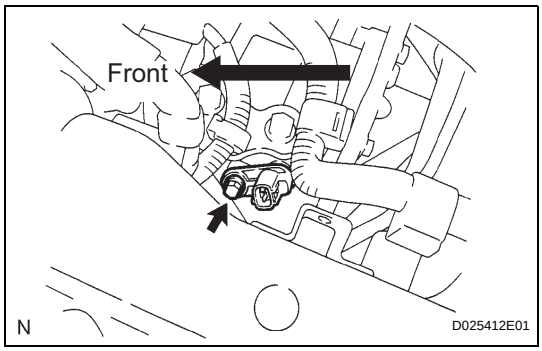
P

C113790E02

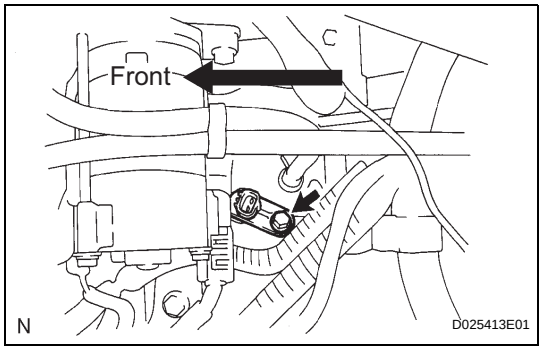
AX

REMOVAL

1. **REMOVE BATTERY**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE BATTERY CARRIER (See page AX-147)**
3. **REMOVE AIR CLEANER ASSEMBLY (See page EM-94)**
4. **REMOVE SPEED SENSOR (NT SENSOR)**
   (a) Disconnect the sensor connector.
   (b) Remove the bolt and sensor.

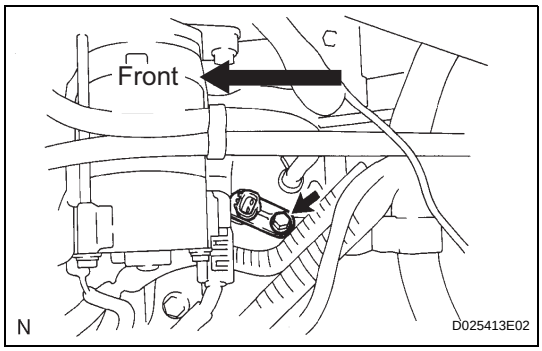


5. **REMOVE SPEED SENSOR (NC SENSOR)**
   (a) Disconnect the sensor connector.
   (b) Remove the bolt and sensor.

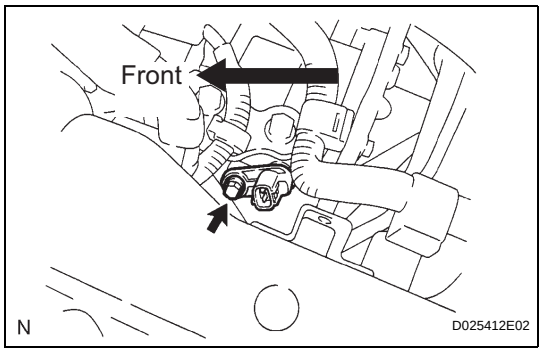


INSTALLATION

1. **INSTALL SPEED SENSOR (NC SENSOR)**
   (a) Coat a new O-ring with ATF and install it to the sensor.
   (b) Install the sensor with the bolt.
   Torque: 11 N*m (112 kgf*cm, 8 ft.*lbf)
   (c) Connect the sensor connector.



2. **INSTALL SPEED SENSOR (NT SENSOR)**
   (a) Coat a new O-ring with ATF and install it to the sensor.
   (b) Install the sensor with the bolt.
   Torque: 11 N*m (112 kgf*cm, 8 ft.*lbf)
   (c) Connect the sensor connector.
3. **INSTALL AIR CLEANER ASSEMBLY**
   Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
4. **INSTALL BATTERY CARRIER (See page EM-107)**
5. **INSTALL BATTERY (See page AX-160)**



AX

6. PERFORM INITIALIZATION

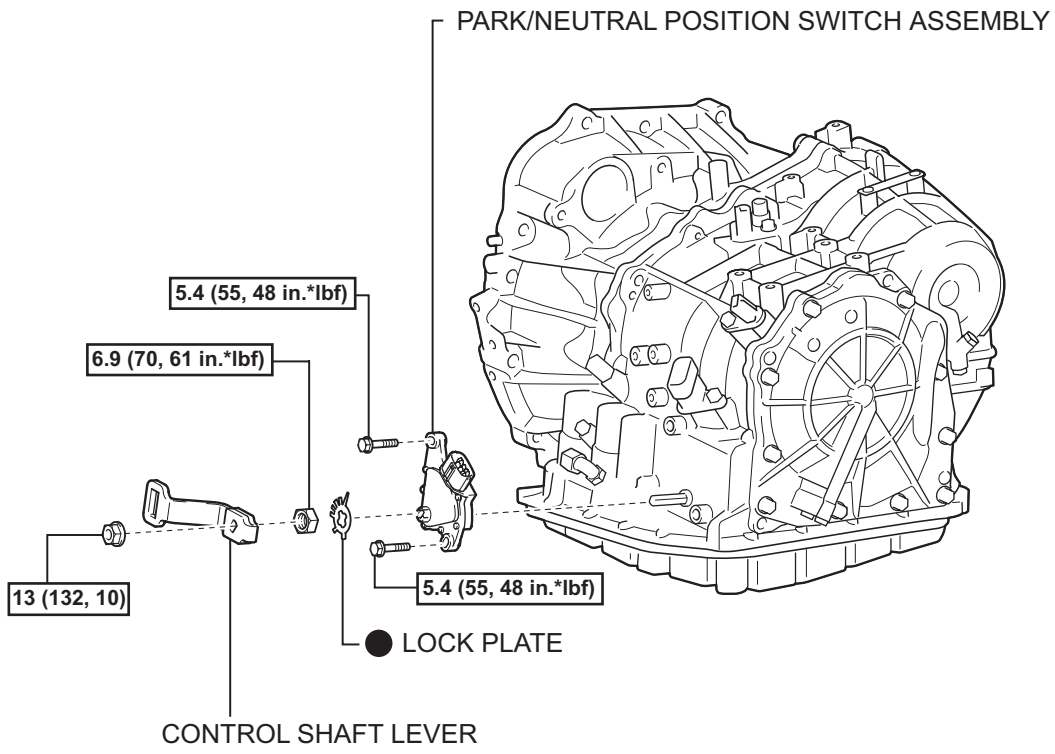
(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

PARK / NEUTRAL POSITION SWITCH

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

C113791E02

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

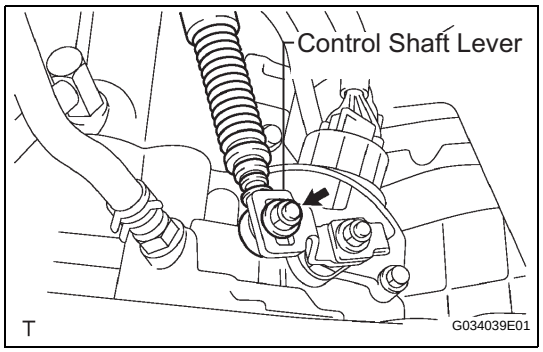
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE ENGINE UNDER COVER LH

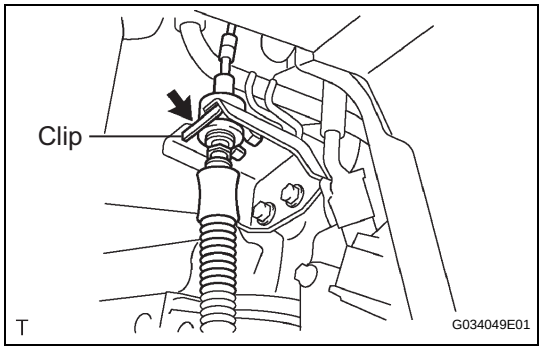
3. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Remove the nut from the control shaft lever.

(b) Disconnect the control cable from the control shaft lever.

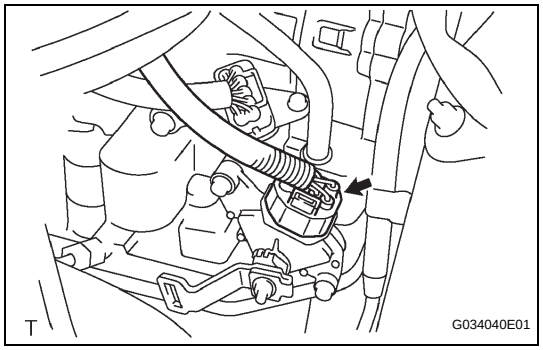


(c) Remove the clip and disconnect the control cable from the control cable bracket.

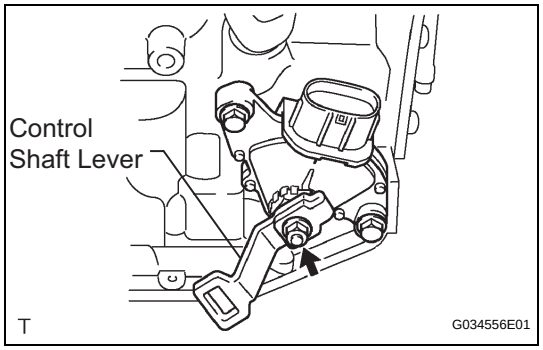


4. REMOVE PARK/NEUTRAL POSITION SWITCH ASSEMBLY

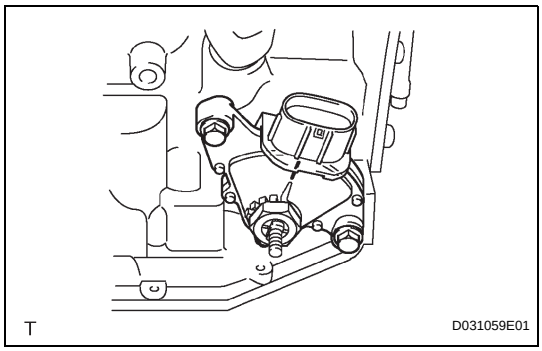
(a) Disconnect the switch connector.



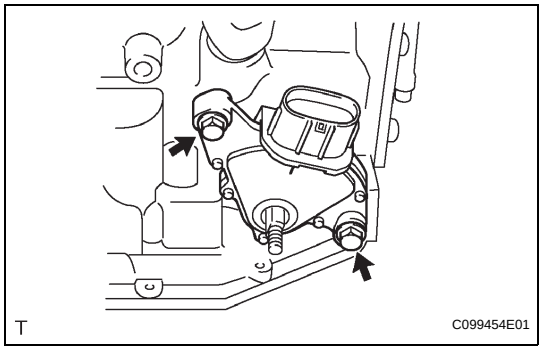
(b) Remove the nut, washer and control shaft lever.



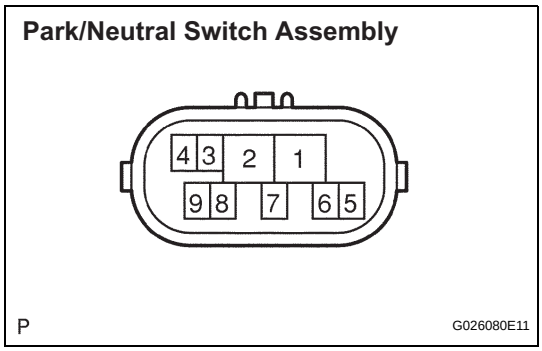
AX



(c) Pry up the lock plate and remove the nut and lock plate.



(d) Remove the 2 bolts and pull out the position switch.



INSPECTION

1. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Shift position R	Below 1 Ω
1 - 2	Any shift position except R	10 kΩ or higher

AX

ADJUSTMENT

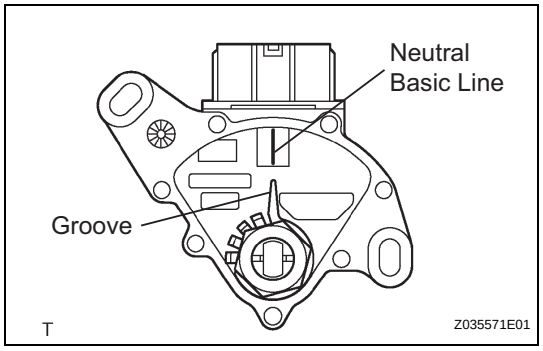
1. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

(a) Apply the parking brake and turn the ignition switch to the ON position.

(b) Depress the brake pedal and check that the engine starts when the shift lever is set in the N or P position, but does not start in other positions.

(c) Check that the back-up light comes on and the reverse warning buzzer sounds when the shift lever is set in the R position, but do not function in other positions.

If a failure is found, check the switch for continuity.



2. ADJUST PARK/NEUTRAL POSITION SWITCH ASSEMBLY

(a) Loosen the 2 bolts of the switch and move the shift lever to the N position.

(b) Align the groove and neutral basic line.

(c) Hold the switch in position and tighten the 2 bolts.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

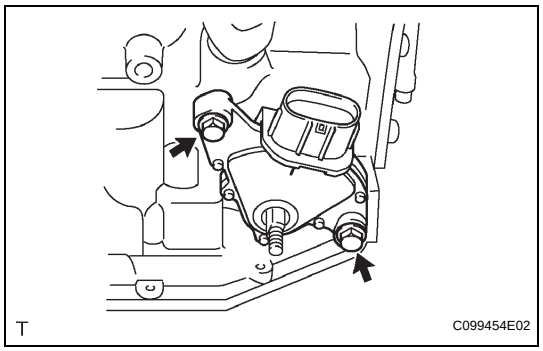
(d) After adjustment, perform the inspection described in the switch procedures.

INSTALLATION

1. INSTALL PARK/NEUTRAL POSITION SWITCH ASSEMBLY

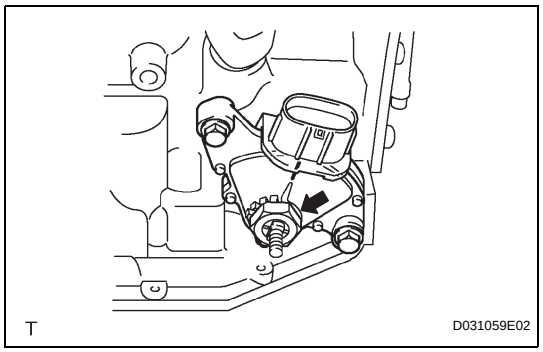
(a) Install the switch to the manual valve shaft.

(b) Temporarily install the 2 bolts.

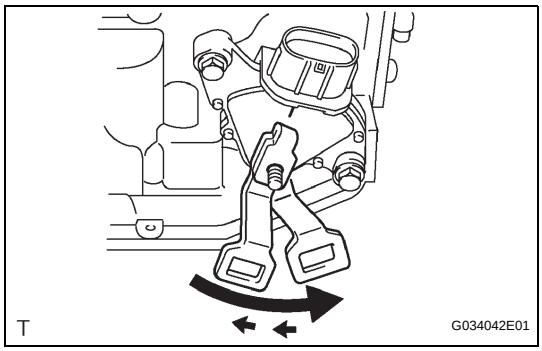


(c) Place a new lock plate and tighten the nut.
Torque: 6.9 N*m (70 kgf*cm, 61 in.*lbf)

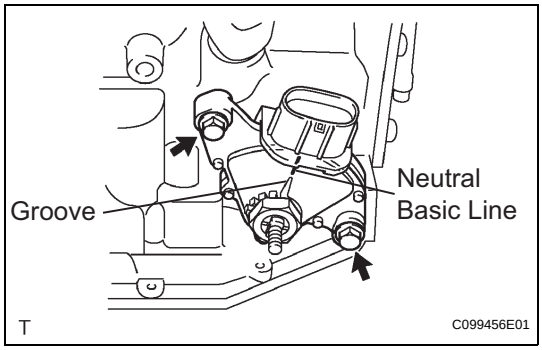
(d) Temporarily install the control shaft lever.



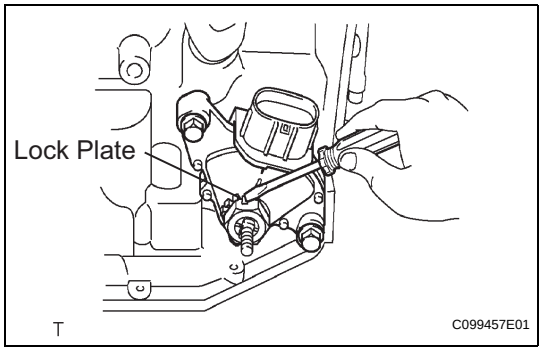
AX



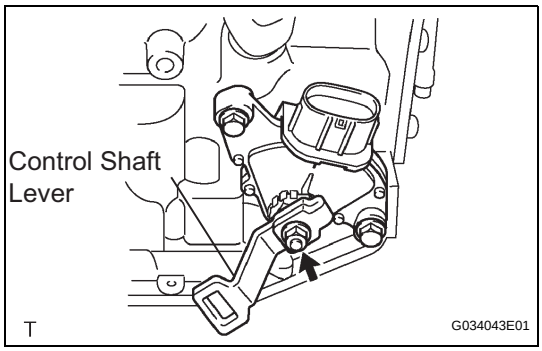
(e) Turn the lever counterclockwise until it stops, then turn it clockwise 2 notches.
(f) Remove the control shaft lever.



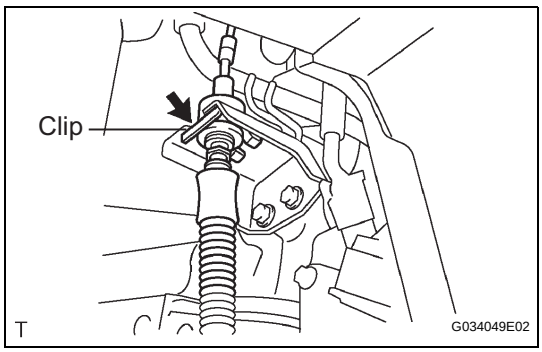
(g) Align the groove with the neutral basic line.
(h) Hold the switch in position and tighten the 2 bolts.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



(i) Using a screwdriver, stake the nut with the lock plate.



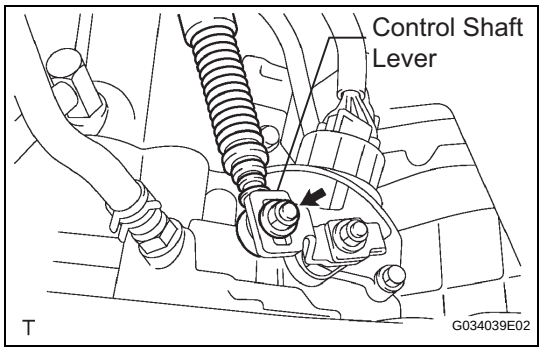
(j) Install the control shaft lever, with the washer and nut.
Torque: 13 N*m (132 kgf*cm, 10 ft.*lbf)
(k) Connect the switch connector.



2. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Install the control cable and clip to the control cable bracket with the clip.

AX



(b) Temporarily install the control cable to the control shaft lever with the nut.

3. INSTALL ENGINE UNDER COVER LH

4. ADJUST SHIFT LEVER POSITION

(a) Adjust the shift lever position (see page AX-133).

5. INSPECT SHIFT LEVER POSITION

(a) Inspect the shift lever position (see page AX-133).

6. INSPECT PARK/NEUTRAL POSITION SWITCH ASSEMBLY

(a) Inspect the park/neutral position (see page AX-110).

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

8. PERFORM INITIALIZATION

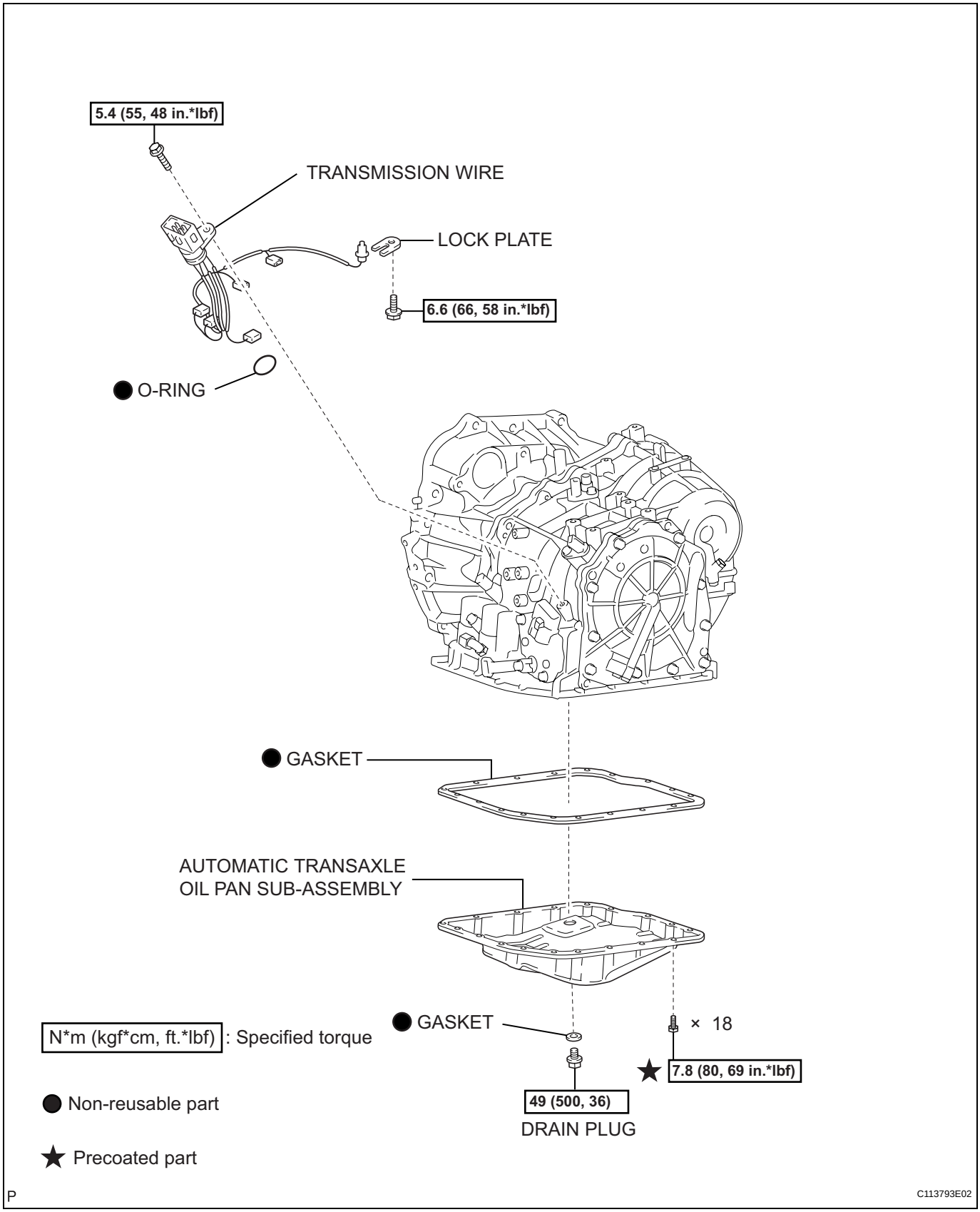
(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

TRANSMISSION WIRE

COMPONENTS



AX

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE ENGINE UNDER COVER LH

3. DRAIN AUTOMATIC TRANSAXLE FLUID

(a) Remove the drain plug and gasket, and drain the ATF.

(b) Install a new gasket and the drain plug.

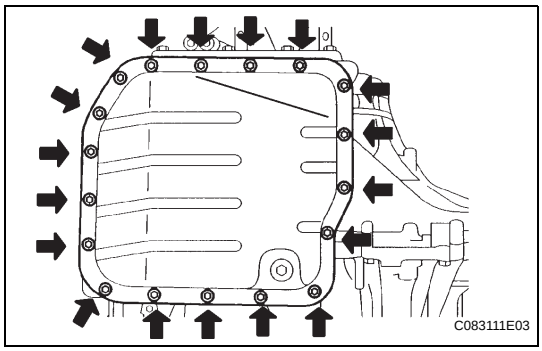
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)

4. REMOVE AUTOMATIC TRANSAXLE OIL PAN SUB-ASSEMBLY

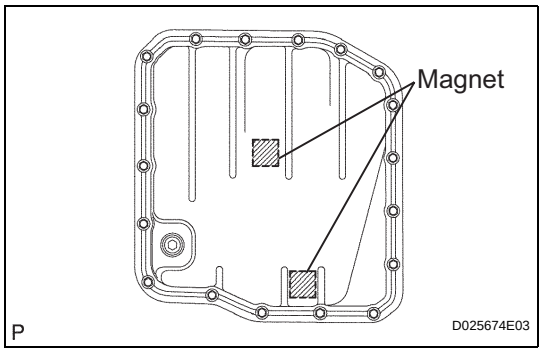
(a) Remove the 18 bolts, oil pan and gasket.

NOTICE:

Some fluid will remain in the oil pan. Remove all of the oil pan bolts, and carefully remove the oil pan assembly. Discard the gasket.



(b) Remove the 2 magnets from the oil pan.



(c) Examine the particles in the oil pan.

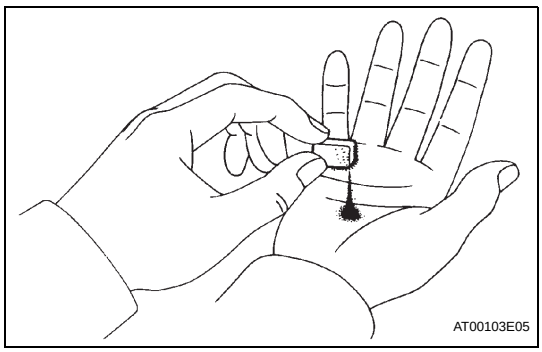
(1) Collect any steel chips with the removed magnets. Look at the chips and particles in the oil pan and on the magnets carefully to see the type of wear which might be found in the transaxle.

Steel (magnetic):

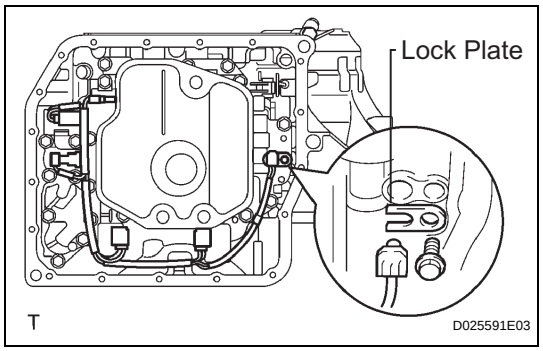
bearing, gear and plate wear

Brass (non-magnetic):

bearing wear



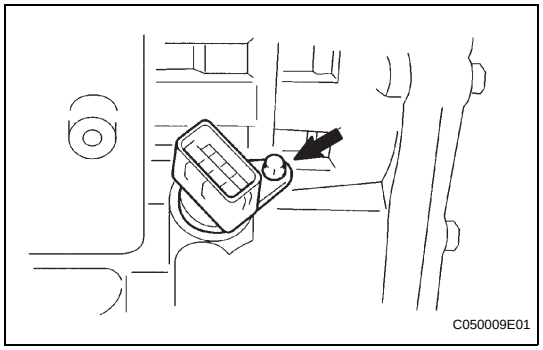
AX



5. DISCONNECT TRANSMISSION WIRE

(a) Disconnect the 5 solenoid valve connectors.

(b) Remove the bolt and lock plate, and disconnect the ATF temperature sensor.

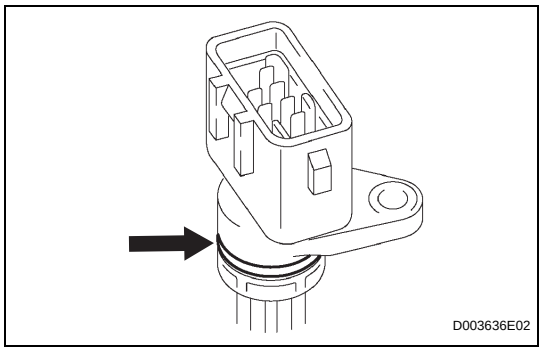


6. REMOVE TRANSMISSION WIRE

(a) Disconnect the transmission wire connector.

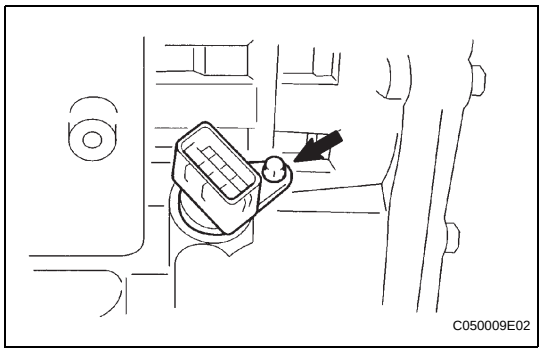
(b) Remove the bolt and transmission wire.

INSTALLATION

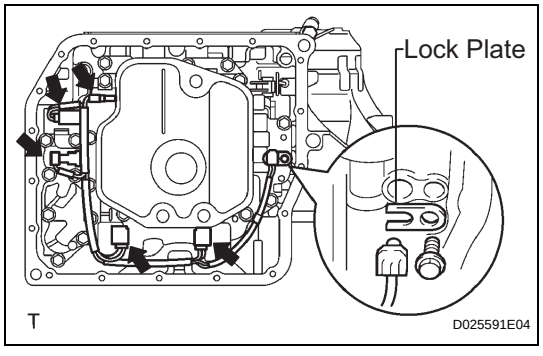


1. INSTALL TRANSMISSION WIRE

(a) Coat a new O-ring and install it to the wire.



(b) Install the wire with the bolt.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



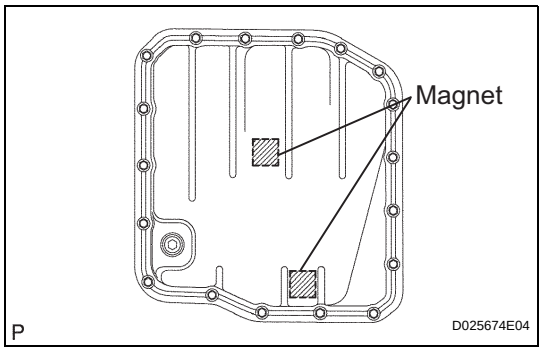
2. CONNECT TRANSMISSION WIRE

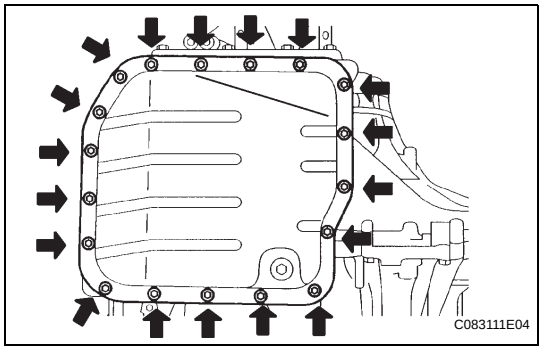
(a) Coat a new O-ring with ATF and install it to the ATF temperature sensor.

(b) Install the ATF temperature sensor with the lock plate and bolt.
Torque: 6.6 N*m (67 kgf*cm, 58 in.*lbf)

(c) Connect the 5 solenoid valve connectors.

AX





3. INSTALL AUTOMATIC TRANSAXLE OIL PAN SUB-ASSEMBLY

(a) Install the 2 magnets in the oil pan.

(b) Apply seal packing or equivalent to the 18 bolts.

Seal packing:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

NOTICE:
Apply seal packing or equivalent to the bolts and tighten them within 10 minutes after application because the bolts should be seal bolts.

(c) Install a new gasket and the oil pan to the transaxle case with the 18 bolts.

Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)

4. INSTALL ENGINE UNDER COVER LH

5. ADD AUTOMATIC TRANSAXLE FLUID

Fluid type:
Toyota Genuine ATF WS
Standard capacity:
3.5 liters (3.7 US qts, 3.1 Imp. qts)

6. INSPECT AUTOMATIC TRANSAXLE FLUID

(a) Inspect the fluid (see page AX-104).

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

8. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

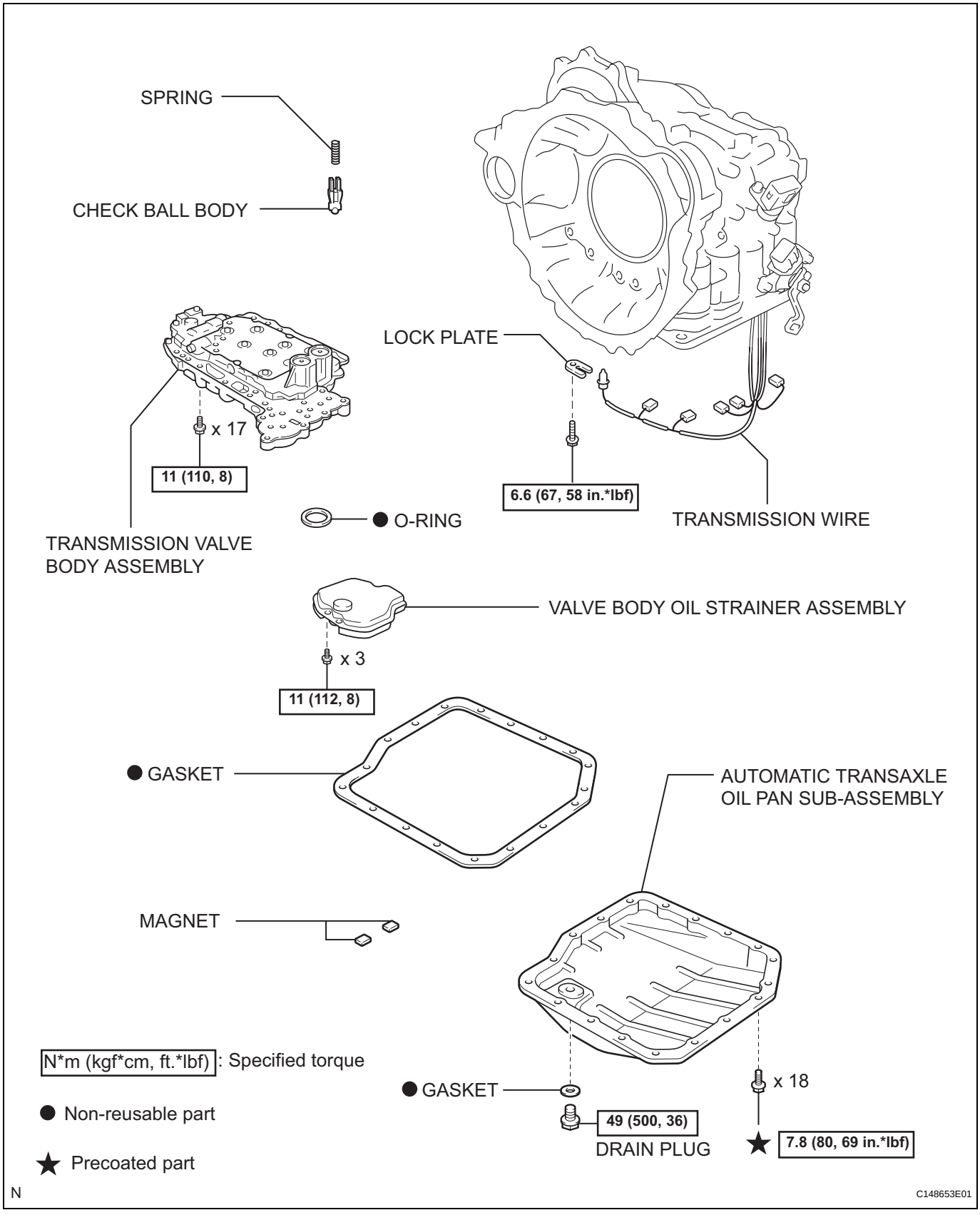
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

9. RESET MEMORY

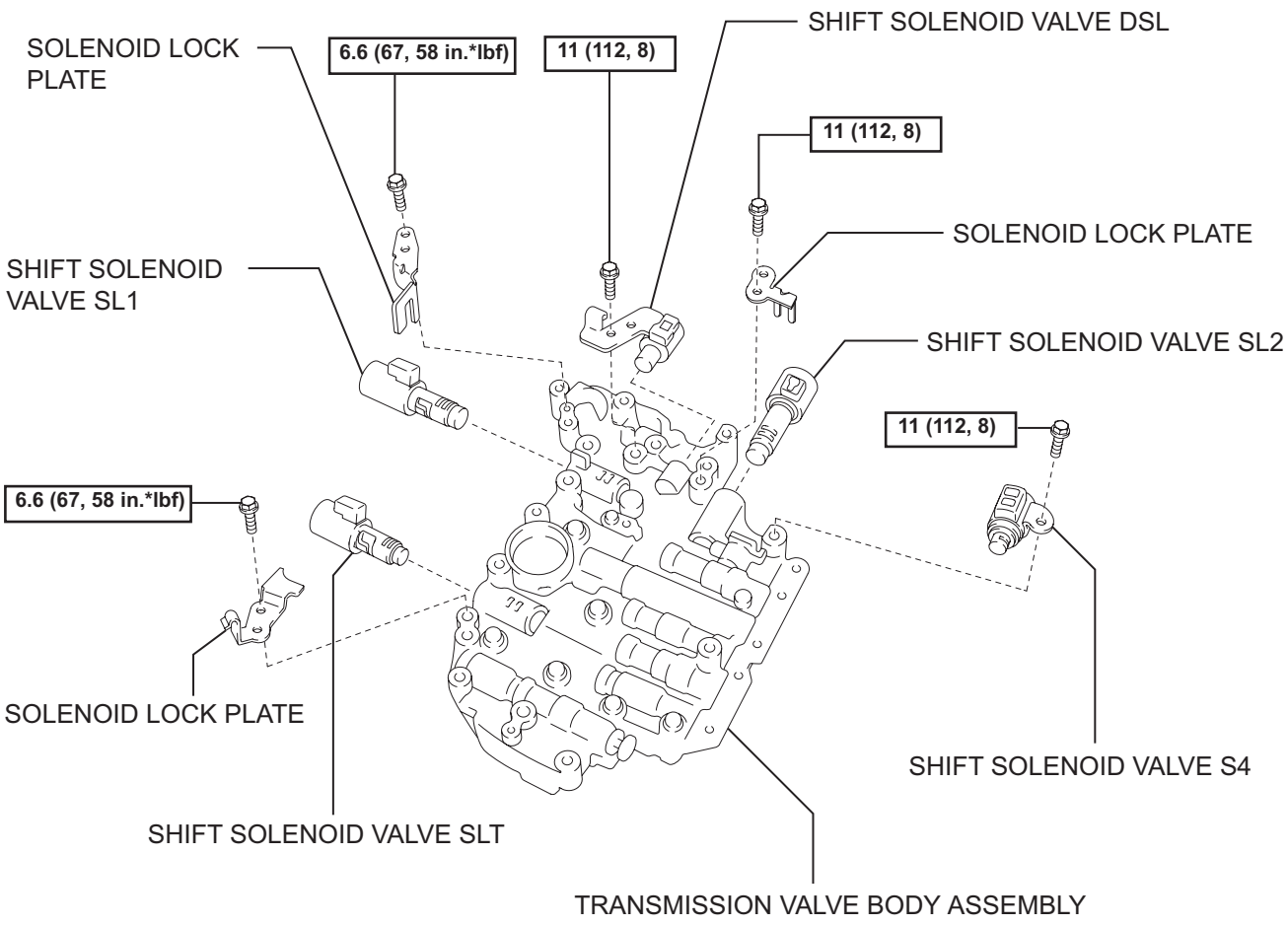
AX

VALVE BODY ASSEMBLY

COMPONENTS



AX



N*m (kgf*cm, ft.*lbf): Specified torque

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AX

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE ENGINE UNDER COVER LH

3. DRAIN AUTOMATIC TRANSAXLE FLUID

(a) Remove the drain plug and gasket, and drain the ATF.

(b) Install a new gasket and the drain plug.

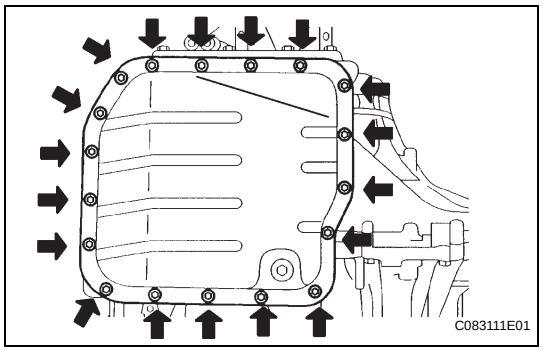
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)

4. REMOVE AUTOMATIC TRANSAXLE OIL PAN SUB-ASSEMBLY

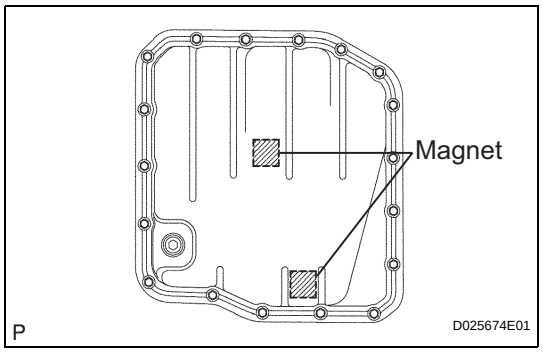
(a) Remove the 18 bolts, oil pan and gasket.

NOTICE:

Some fluid will remain in the oil pan. Remove all of the oil pan bolts, and carefully remove the oil pan assembly. Discard the gasket.



(b) Remove the 2 magnets from the oil pan.



(c) Examine the particles in the oil pan.

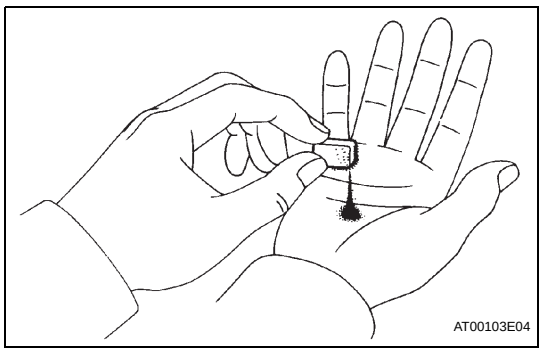
(1) Collect any steel chips with the removed magnets. Look at the chips and particles in the oil pan and on the magnets carefully to see the type of wear which might be found in the transaxle.

Steel (magnetic):

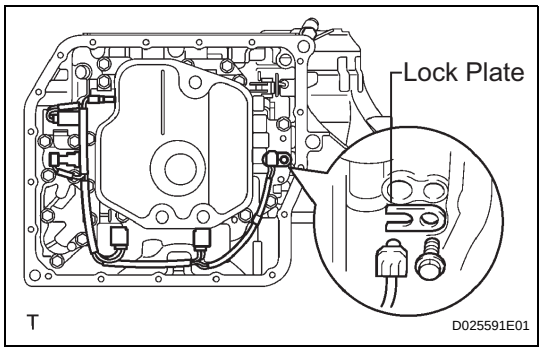
bearing, gear and plate wear

Brass (non-magnetic):

bearing wear



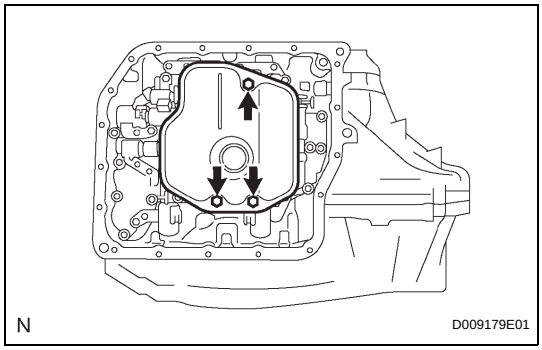
AX



5. DISCONNECT TRANSMISSION WIRE

(a) Disconnect the 5 solenoid valve connectors.

(b) Remove the bolt and lock plate, and separate the ATF temperature sensor.

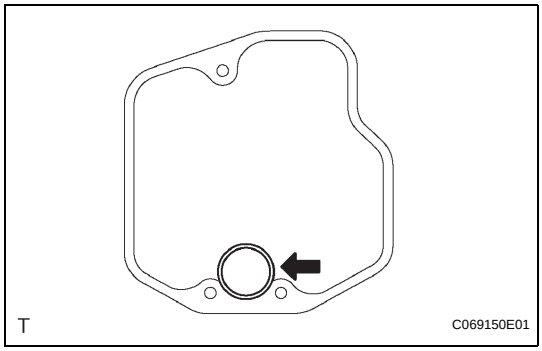


6. REMOVE VALVE BODY OIL STRAINER ASSEMBLY

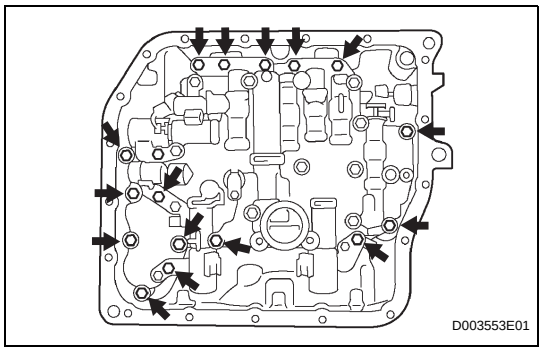
(a) Remove the 3 bolts and oil strainer.

NOTICE:

Be careful as some fluid will come out of the oil strainer.



(b) Remove the O-ring from the oil strainer.

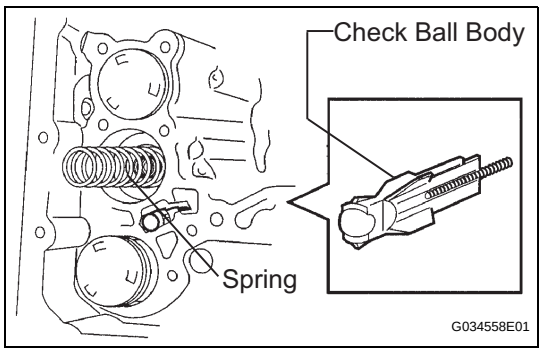


7. REMOVE TRANSMISSION VALVE BODY ASSEMBLY

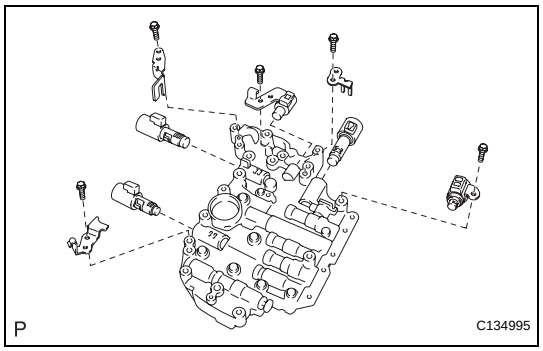
(a) Support the valve body, and remove the 17 bolts and valve body.

NOTICE:

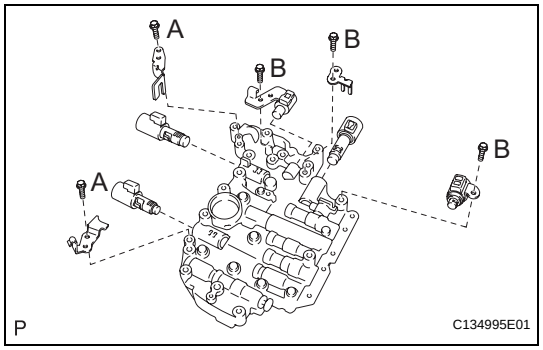
Be careful not to drop the check ball body and spring.



(b) Remove the check ball body and spring.



(c) Remove the 5 bolts, 3 plates and 5 shift solenoid valves.



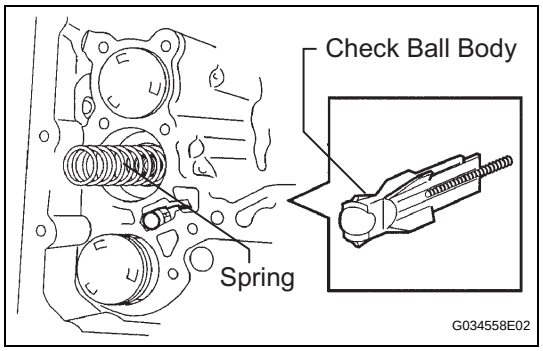
INSTALLATION

1. INSTALL TRANSMISSION VALVE BODY ASSEMBLY

(a) Install the 5 shift solenoid valves with the 5 bolts and 3 plates.

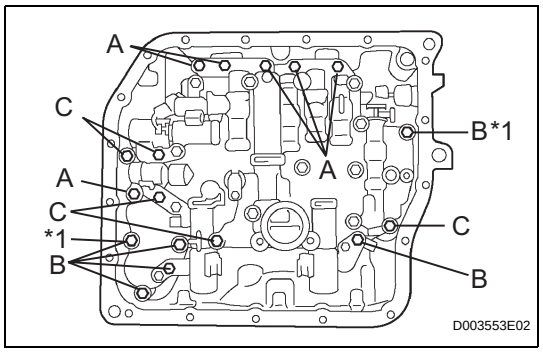
Torque: 6.6 N*m (67 kgf*cm, 58 in.*lbf) for bolt A
11 N*m (112 kgf*cm, 8 ft.*lbf) for bolt B

Bolt length:
12 mm (0.47 in.) for bolt A
45 mm (1.77 in.) for bolt B



(b) Install the spring and check ball body.

AX



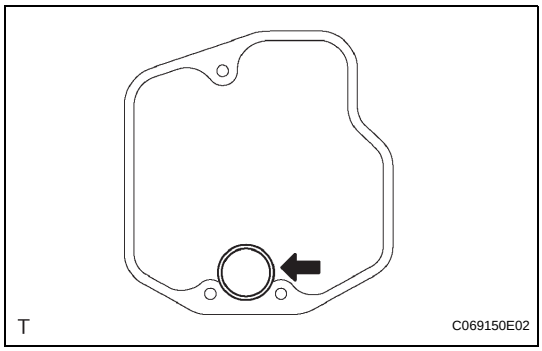
(c) Align the groove of the manual valve with the pin of the lever.

(d) Install the valve body with the 17 bolts.

Torque: 11 N*m (110 kgf*cm, 8 ft.*lbf)

NOTICE:

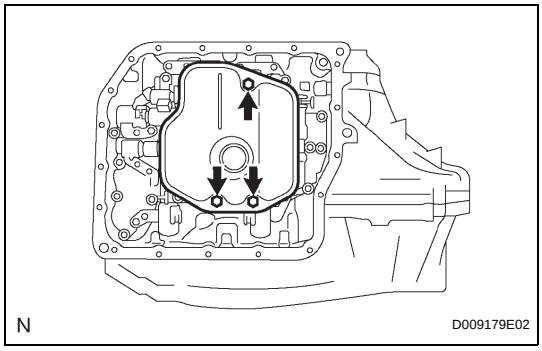
- **Push the valve body against the accumulator piston spring and the check ball body to install it.**
- **First, temporarily tighten the bolts marked with a *1 in the illustration because they are positioning bolts.**
  for bolt length:
  25 mm (0.984 in.) for bolt A
  41 mm (1.614 in.) for bolt B
  45 mm (1.771 in.) for bolt C



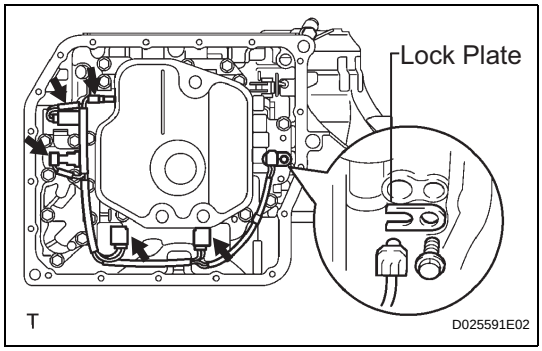
2. INSTALL VALVE BODY OIL STRAINER ASSEMBLY

(a) Coat a new O-ring with ATF.

(b) Install the O-ring to the oil strainer.



(c) Install the oil strainer with the 3 bolts.
Torque: 11 N*m (112 kgf*cm, 8 ft.*lbf)

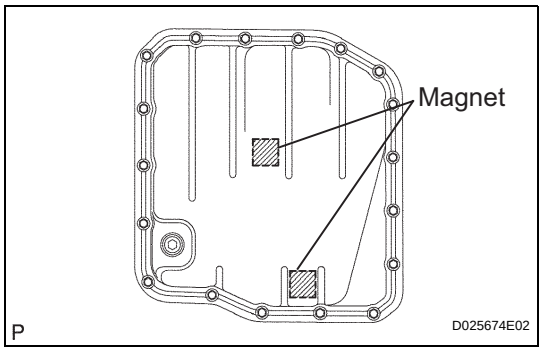


3. INSTALL TRANSMISSION WIRE

(a) Coat a new O-ring with ATF and install it to the ATF temperature sensor.

(b) Install the ATF temperature sensor with the lock plate and bolt.
Torque: 6.6 N*m (67 kgf*cm, 58 in.*lbf)

(c) Connect the 5 solenoid valve connectors.

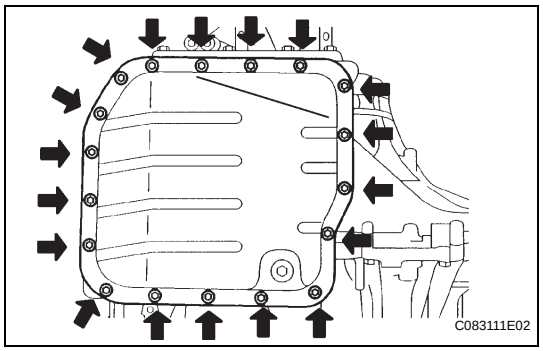


4. INSTALL AUTOMATIC TRANSAXLE OIL PAN SUB-ASSEMBLY

(a) Install the 2 magnets in the oil pan.

(b) Apply seal packing or equivalent to the 18 bolts.
Seal packing:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent
NOTICE:
Apply seal packing or equivalent to the bolts and tighten them within 10 minutes after application because the bolts should be seal bolts.

AX



(c) Install a new gasket and the oil pan to the transaxle case with the 18 bolts.
Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)

5. **INSTALL ENGINE UNDER COVER LH**

6. **ADD AUTOMATIC TRANSAXLE FLUID**
Fluid type:
Toyota Genuine ATF WS
Standard capacity:
3.5 liters (3.7 US qts, 3.1 lmp. qts)

7. **INSPECT AUTOMATIC TRANSAXLE FLUID**
(a) Inspect the fluid (see page AX-104).

8. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

9. **PERFORM INITIALIZATION**
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

10. **RESET MEMORY**

SHIFT LOCK SYSTEM

ON-VEHICLE INSPECTION

1. CHECK SHIFT LOCK OPERATION

(a) Move the shift lever to the P position.
(b) Turn the ignition switch to the LOCK position.
(c) Check that the shift lever cannot be moved to any position other than P.
(d) Turn the ignition switch to the ON position, depress the brake pedal and check that the shift lever can be moved to another position.
If the operation cannot be done as specified, inspect the shift lock control unit.

2. CHECK SHIFT LOCK RELEASE BUTTON OPERATION

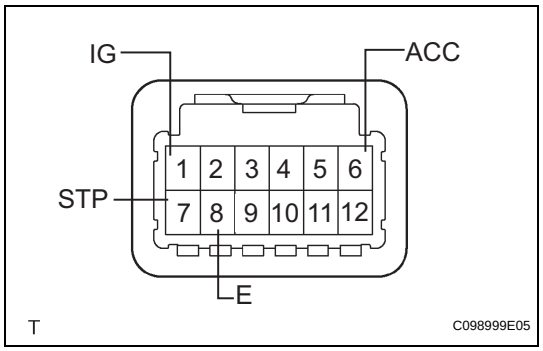
(a) Using a screwdriver, remove the shift lock release cover.
(b) When operating the shift lever with the shift lock release button pressed, check that the lever can be moved to any position other than P.
If the operation cannot be done as specified, check the shift lever assembly installation condition.

3. CHECK KEY INTER LOCK OPERATION

(a) Turn the ignition switch to the ON position.
(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 the LOCK position.
(d) Move the shift lever to the P position, turn the ignition key to the LOCK position and check that the ignition key can be removed.
If the operation cannot be done as specified, inspect the shift lock control unit.

4. INSPECT SHIFT LOCK CONTROL ECU ASSEMBLY

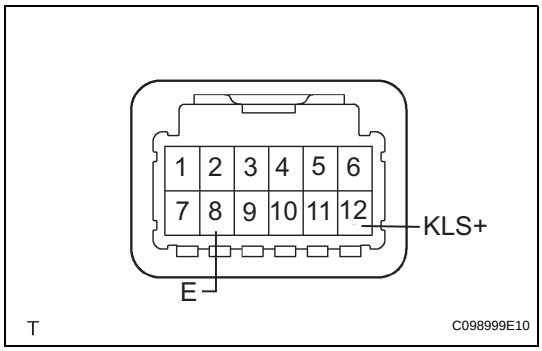
(a) Disconnect the S6 ECU connector.
(b) Measure the voltage of the connector.



Standard voltage

Tester Connection	Measuring Condition	Specified Condition
6 (ACC) - 8 (E)	Ignition switch ACC	10 to 14 V
6 (ACC) - 8 (E)	Ignition switch OFF	Below 1 V
7 (STP) - 8 (E)	Depress brake pedal	10 to 14 V
7 (STP) - 8 (E)	Release brake pedal	Below 1 V
1 (IG) - 8 (E)	Ignition switch ON	10 to 14 V
1 (IG) - 8 (E)	Ignition switch OFF	Below 1 V

AX



(c) Reconnect the S6 ECU connector.
(d) Using a voltmeter, measure the voltage between terminals 12 (KLS+) and 8 (E).

Standard Voltage

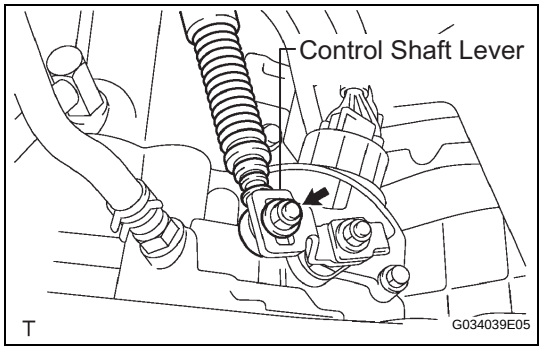
Tester Connection	Measuring Condition	Specified Condition
12 (KLS+) - 8 (E)	Ignition switch ACC and shift lever P position	Below 1 V
12 (KLS+) - 8 (E)	Ignition switch ACC and shift lever not in P position	7.5 to 11 V
12 (KLS+) - 8 (E)	Ignition switch ACC and shift lever not in P position (After approx. 1 second)	6 to 9 V

If the result is not as specified, replace the shift lock control ECU.

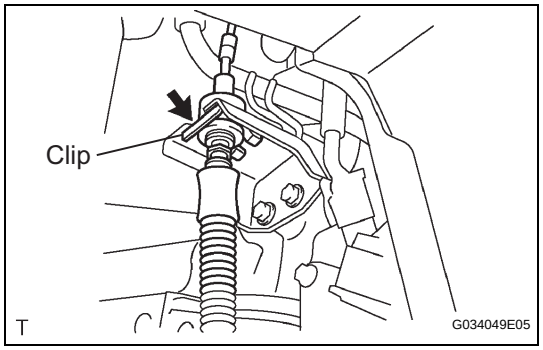
TRANSMISSION CONTROL CABLE ASSEMBLY

REMOVAL

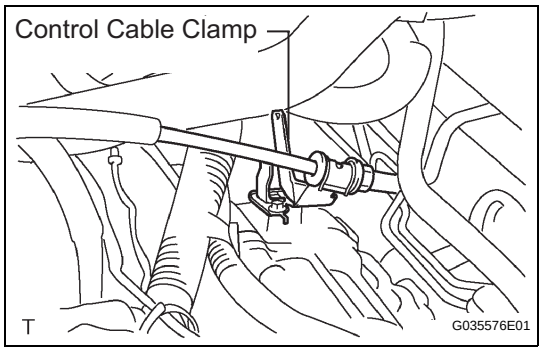
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE AIR CONDITIONING RADIATOR ASSEMBLY (See page AC-25)**
3. **REMOVE EXHAUST PIPE ASSEMBLY**
   (a) Remove the exhaust pipe (see page EX-2).
4. **REMOVE ENGINE UNDER COVER LH**
5. **DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY**
   (a) Remove the nut from the control shaft lever.
   (b) Disconnect the cable from the control shaft lever.



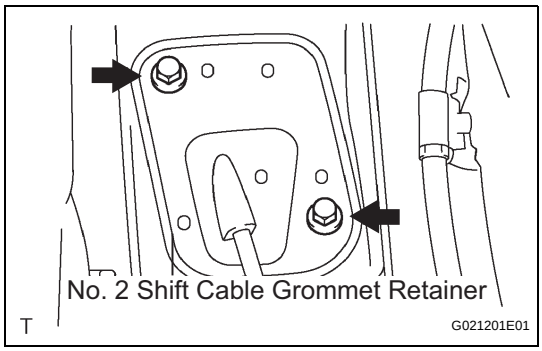
   (c) Remove the clip and disconnect the cable from the control cable bracket.



   (d) Disconnect the cable from the control cable clamp.

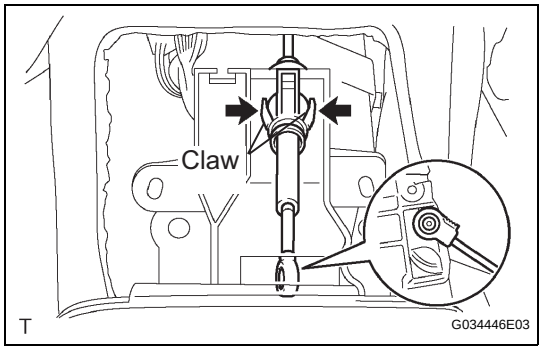


AX

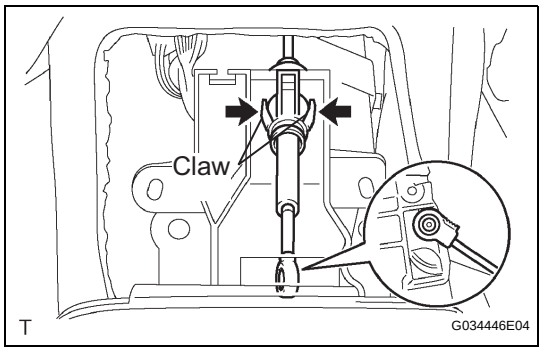


6. REMOVE TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Remove the 2 bolts and disconnect the No. 2 shift cable grommet retainer.



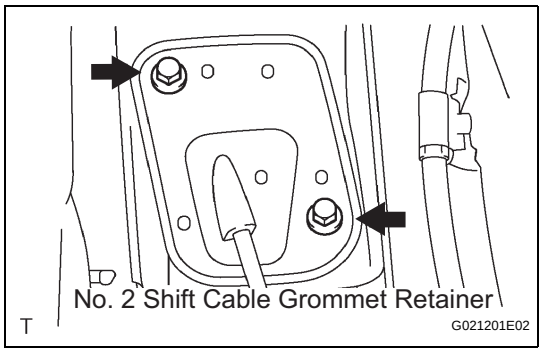
(b) Disconnect the floor shift cable from the transmission floor shift assembly.
(c) Pull out the cable from the body.
(d) Remove the No. 2 shift cable grommet retainer.



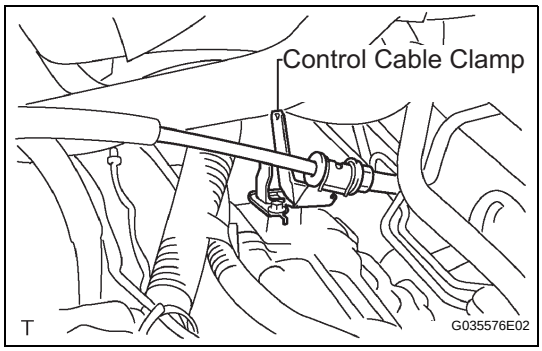
INSTALLATION

1. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Put the cable into the body.
(b) Install the No. 2 shift cable grommet retainer to the floor shift cable.
(c) Install the floor shift cable as shown in the illustration.
HINT:
Securely engage the claws.



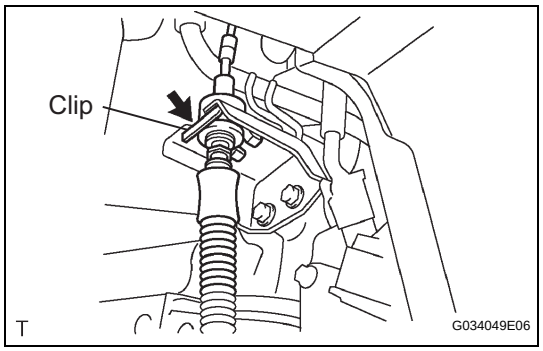
(d) Install the No. 2 shift cable grommet retainer with the 2 bolts.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



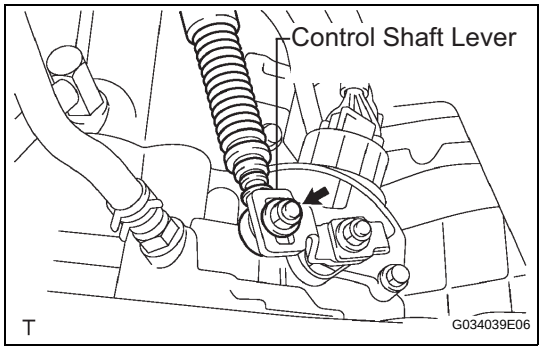
2. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Connect the cable to the control cable clamp.

AX



(b) Connect the cable to the bracket with the clip.



(c) Temporarily install the cable to the control shaft lever with the nut.

3. **INSTALL AIR CONDITIONING RADIATOR ASSEMBLY (See page AC-32)**

4. **INSTALL EXHAUST PIPE ASSEMBLY**
   (a) Install exhaust pipe (see page EX-3).

5. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

6. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

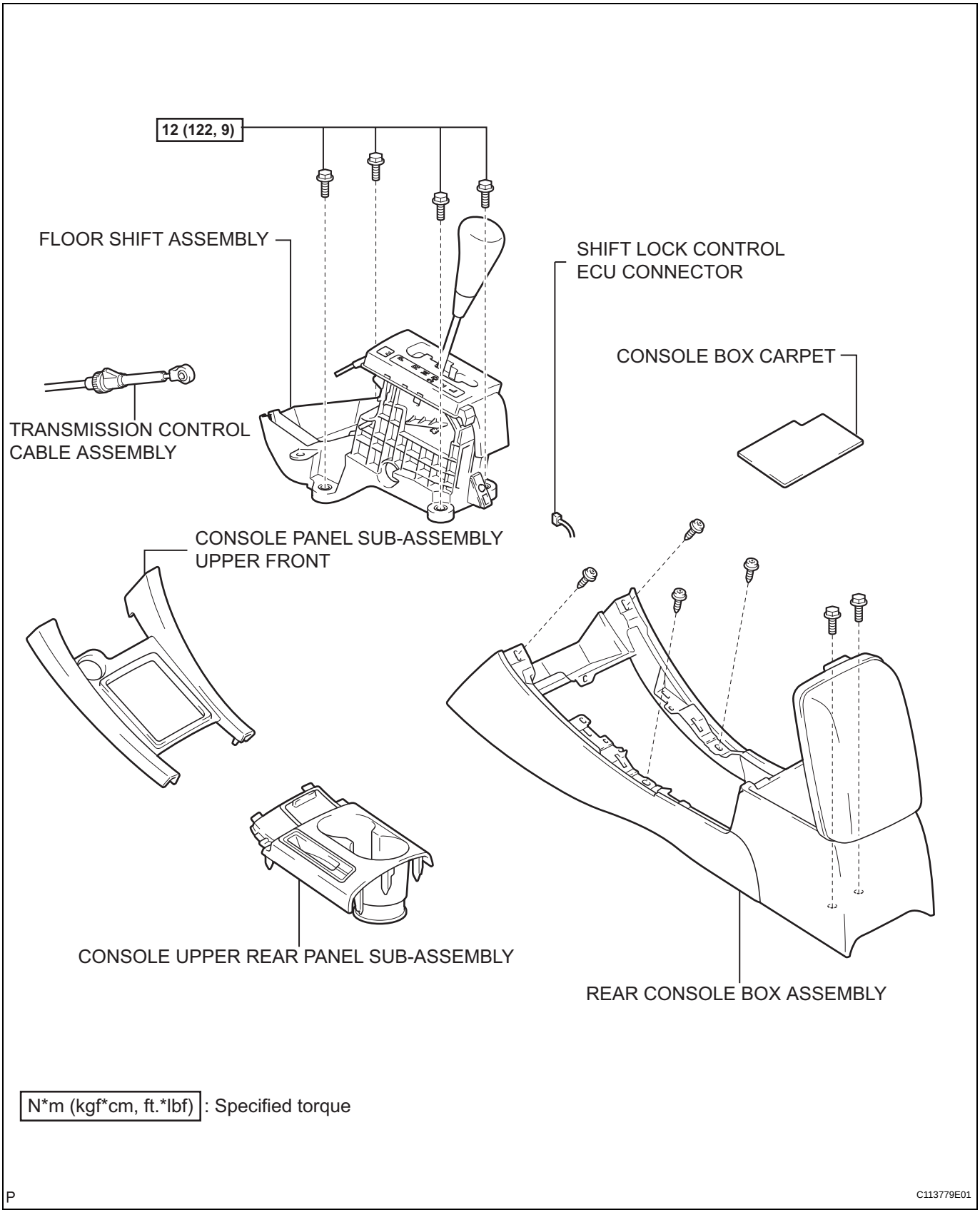
7. **INSPECT SHIFT LEVER POSITION (See page AX-133)**

8. **ADJUST SHIFT LEVER POSITION (See page AX-134)**

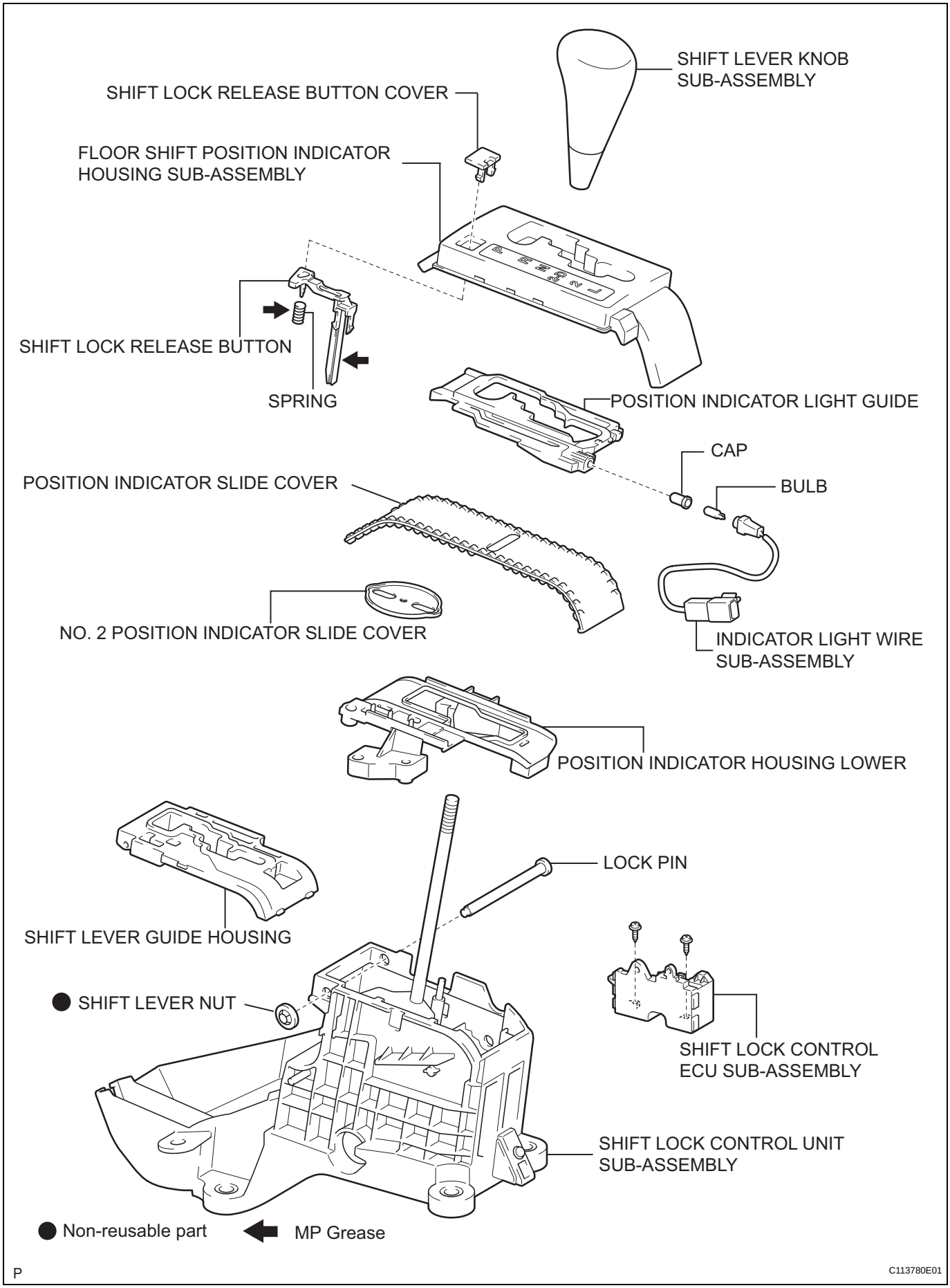
9. **INSTALL ENGINE UNDER COVER LH**

FLOOR SHIFT ASSEMBLY

COMPONENTS



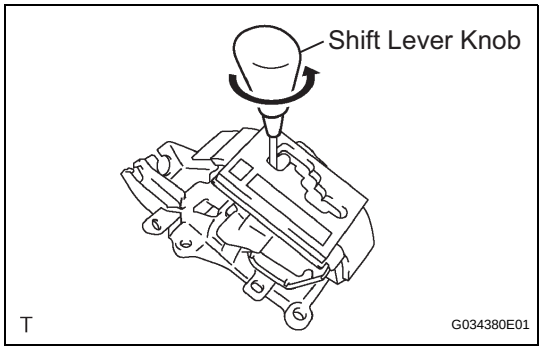
AX


SHIFT LEVER KNOB SUB-ASSEMBLY
SHIFT LOCK RELEASE BUTTON COVER
FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSEMBLY
SHIFT LOCK RELEASE BUTTON
SPRING
POSITION INDICATOR LIGHT GUIDE
CAP
BULB
POSITION INDICATOR SLIDE COVER
NO. 2 POSITION INDICATOR SLIDE COVER
INDICATOR LIGHT WIRE SUB-ASSEMBLY
POSITION INDICATOR HOUSING LOWER
LOCK PIN
SHIFT LEVER GUIDE HOUSING
SHIFT LEVER NUT
SHIFT LOCK CONTROL ECU SUB-ASSEMBLY
SHIFT LOCK CONTROL UNIT SUB-ASSEMBLY
Non-reusable part
MP Grease
P
C113780E01

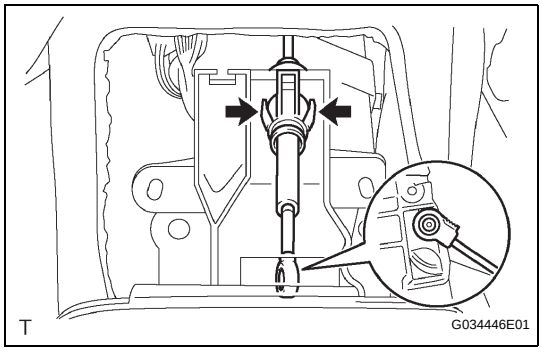
AX

REMOVAL

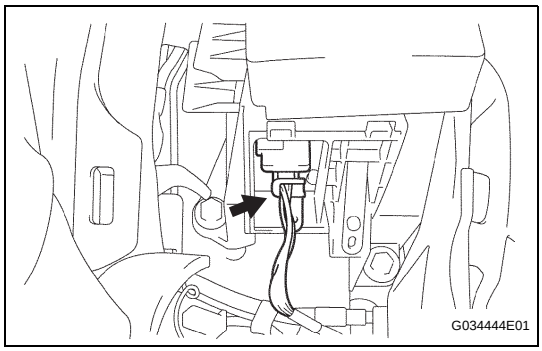
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE CONSOLE UPPER FRONT PANEL SUB-ASSEMBLY (See page IP-5)**
3. **REMOVE CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-18)**
4. **REMOVE REAR CONSOLE BOX ASSEMBLY (See page IP-18)**
5. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY**
   (a) Remove the knob.



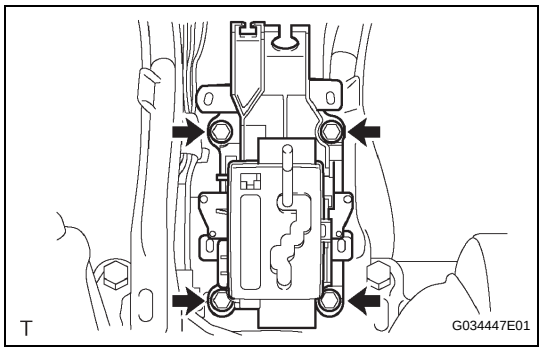
6. **DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY**
   (a) Disconnect the cable from the floor shift.



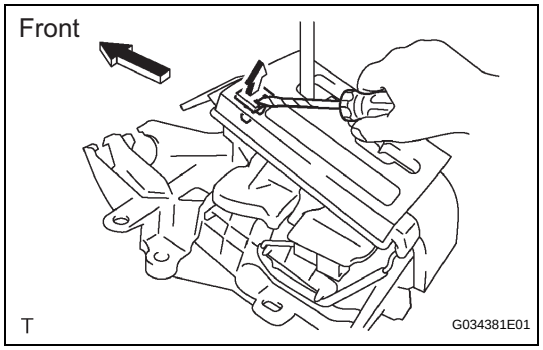
7. **REMOVE SHIFT LEVER ASSEMBLY**
   (a) Disconnect the shift lock control ECU connector.



AX



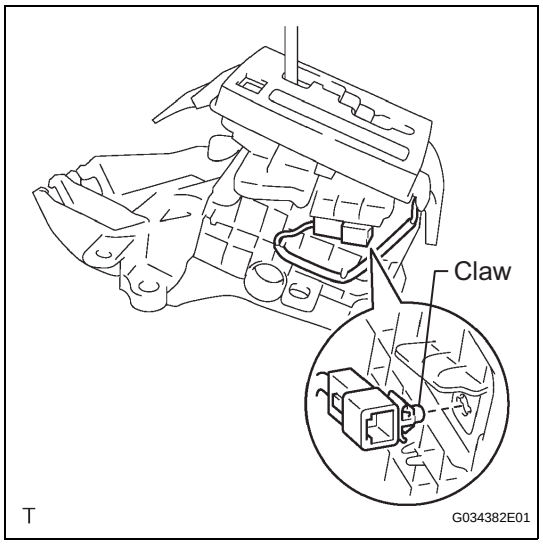
(b) Remove the 4 bolts and floor shift assembly.



DISASSEMBLY

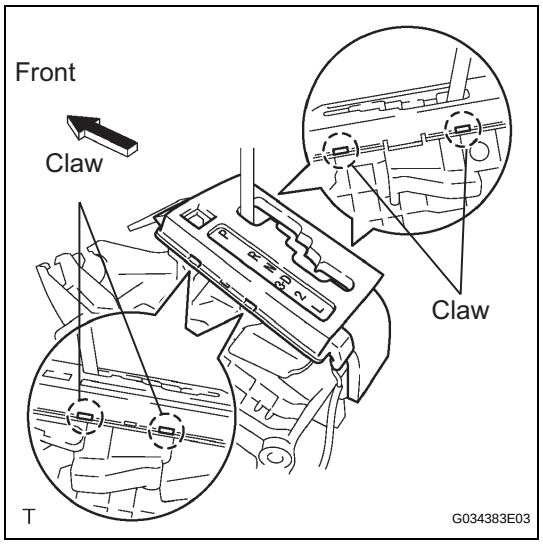
1. REMOVE SHIFT LOCK RELEASE BUTTON COVER

(a) Using a screwdriver, remove the cover from the position indicator housing.
HINT:
Tape the screwdriver tip before use.



2. DISCONNECT INDICATOR LIGHT WIRE SUB-ASSEMBLY

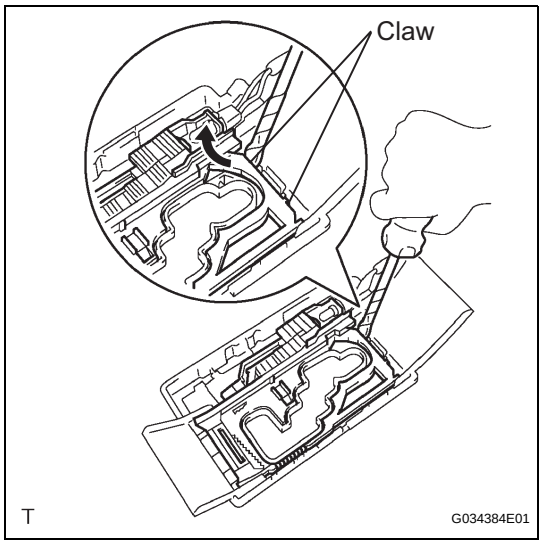
(a) Disconnect the wire connector from the floor shift.



3. REMOVE FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSEMBLY

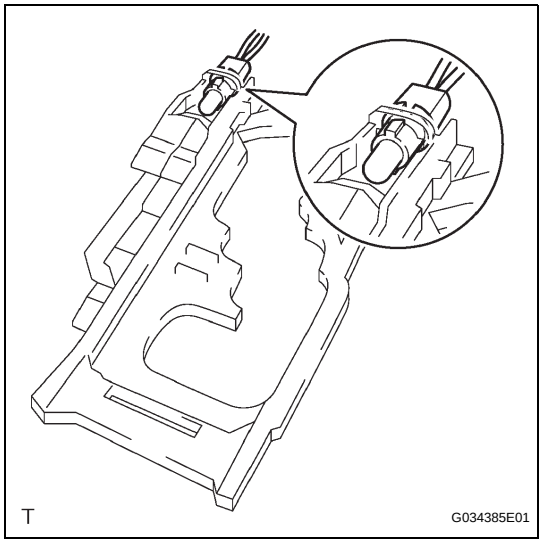
(a) Using a screwdriver, remove the housing from the shift lock control unit.
HINT:
Tape the screwdriver tip before use.

AX



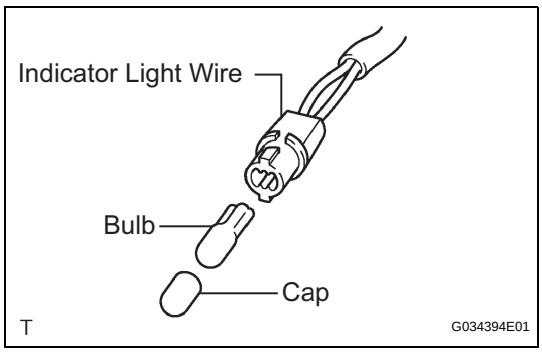
4. REMOVE POSITION INDICATOR LIGHT GUIDE

(a) Using a screwdriver, remove the guide from the floor shift position indicator housing sub-assembly.
HINT:
Tape the screwdriver tip before use.

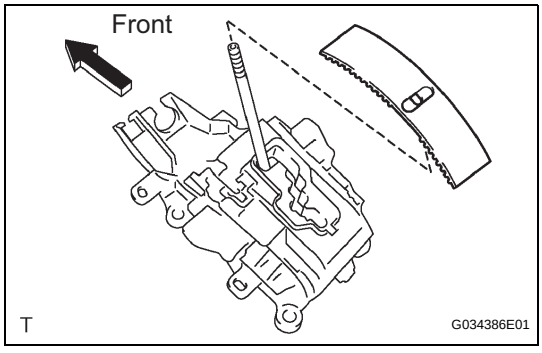


5. REMOVE INDICATOR LIGHT WIRE SUB-ASSEMBLY

(a) Remove the wire from the position indicator light guide.

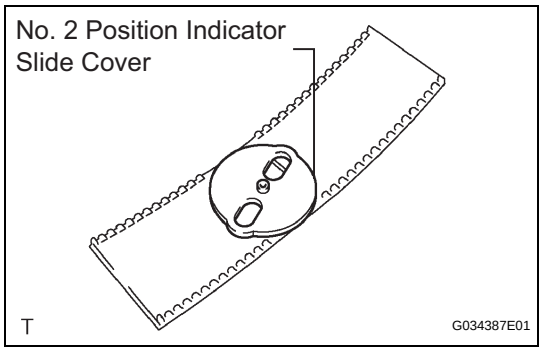


(b) Remove the bulb from the wire.
(c) Remove the cap from the bulb.



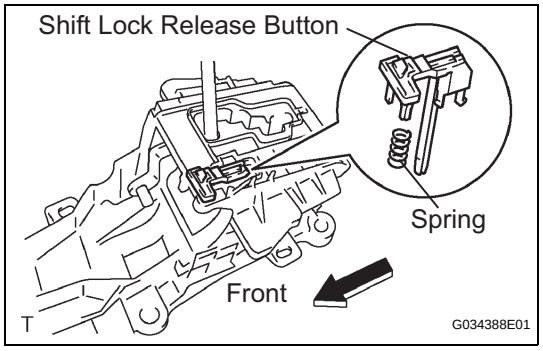
6. REMOVE POSITION INDICATOR SLIDE COVER

(a) Remove the cover from the shift lock control unit.



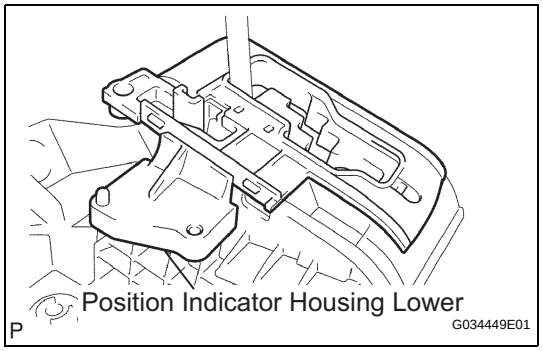
7. REMOVE POSITION INDICATOR SLIDE COVER

(a) Remove the cover from the position indicator slide cover.



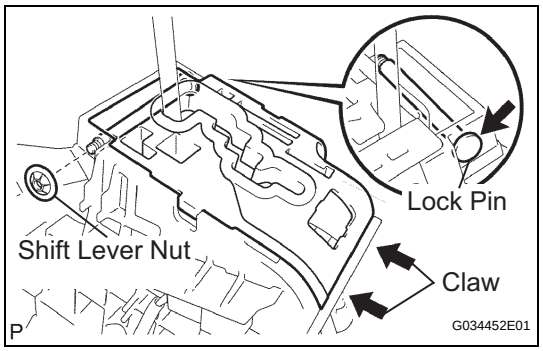
8. REMOVE SHIFT LOCK RELEASE BUTTON

(a) Remove the button and spring from the shift lock control unit.



9. REMOVE POSITION INDICATOR HOUSING LOWER

(a) Remove the housing from the shift lock control unit.

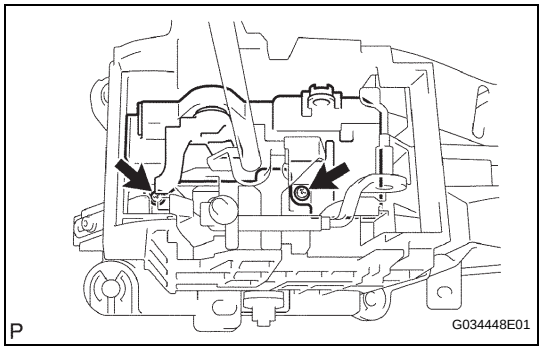


10. REMOVE SHIFT LOCK CONTROL ECU SUB-ASSEMBLY

(a) Remove the shift lever nut and lock pin from the shift lock control unit.

(b) Remove the shift lever guide housing from the shift lock control unit.

NOTICE:
First remove the shift lever nut and lock pin. Then disengage the 2 claws.



(c) Remove the 2 screws and ECU.

AX

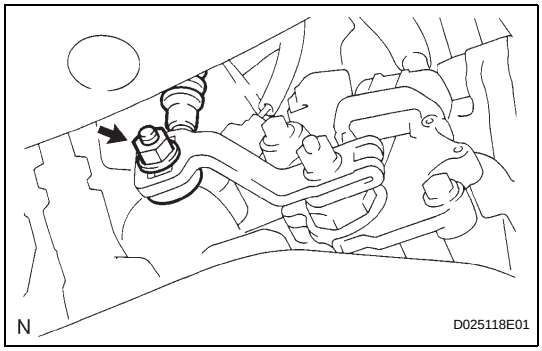
ADJUSTMENT

1. INSPECT SHIFT LEVER POSITION

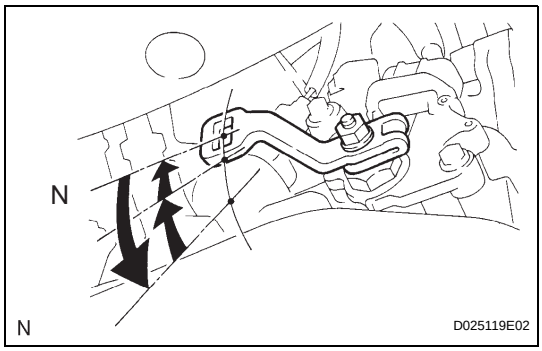
(a) When the shift lever is moved from the P to R position with the ignition switch ON and the brake pedal depressed, make sure that the shift lever moves smoothly and moves correctly into the position.

(b) Start the engine and make sure that the vehicle moves forward when shifting from the N to D position and moves rearward when shifting to the R position.

2. ADJUST SHIFT LEVER POSITION



(a) Remove the nut and disconnect the control cable from the control shaft lever.



(b) Turn the control shaft lever counterclockwise until it stops.

(c) Turn the control shift lever clockwise 2 notches to set it to the N position.

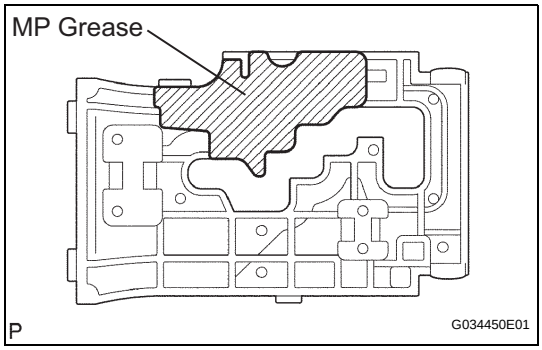
(d) Move the shift lever to the N position and install the control cable to the control shaft lever with the nut while pushing the end of the control cable up.
Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)
NOTICE:
- **The shift lever cannot be moved if the end of the control cable is pushed up to fan.**
- **Tighten the nut while the control cable is properly stretched.**

(e) After adjustment, check that the shift lever moves smoothly and the shift lever and gear operate correctly.

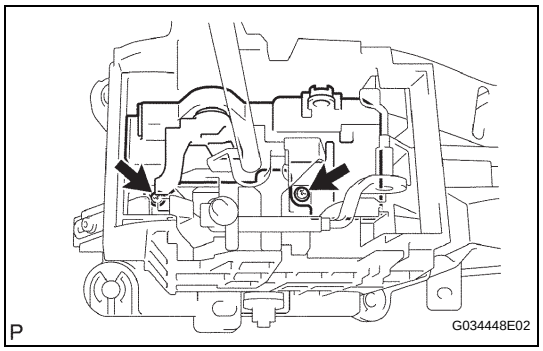
REASSEMBLY

1. INSTALL SHIFT LOCK CONTROL ECU SUB-ASSEMBLY

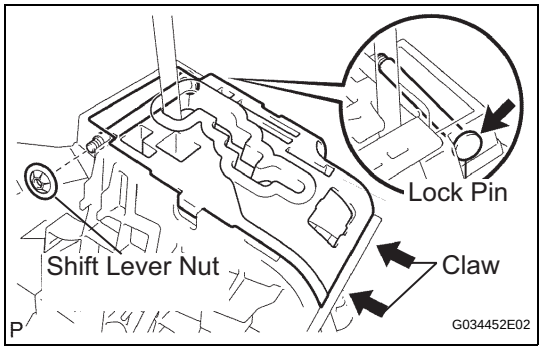
(a) Apply MP grease to the hatched area of the shift lever guide housing as indicated in the illustration.



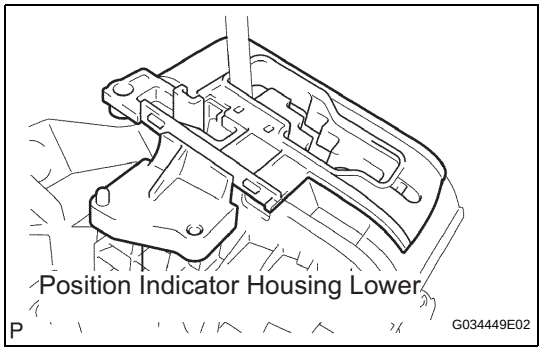
AX



(b) Install the ECU with the 2 screws.

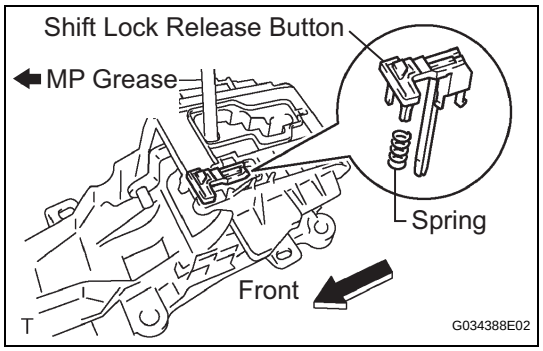


(c) Install the shift lever guide housing with the shift lever lock pin and a new shift lever nut.
NOTICE:
- **Install the shift lever nut and lock pin after first engaging the 2 claws.**
- **Securely engage the claws.**



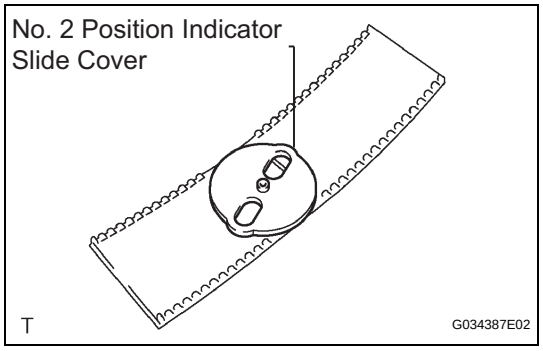
2. INSTALL POSITION INDICATOR HOUSING LOWER

(a) Install the housing to the shift lock control unit.



3. INSTALL SHIFT LOCK RELEASE BUTTON

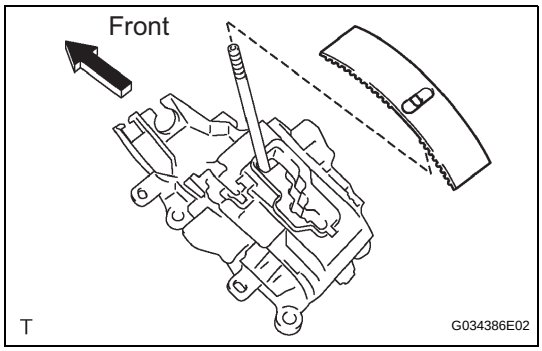
(a) Apply MP grease to the button and spring.
(b) Install the button and spring to the shift lock control unit.



4. INSTALL POSITION INDICATOR SLIDE COVER

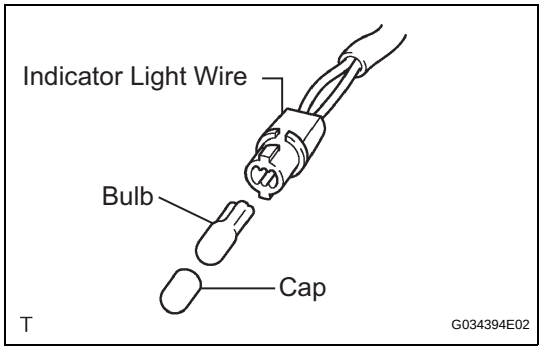
(a) Install the cover to the position indicator slide cover.

AX



5. INSTALL POSITION INDICATOR SLIDE COVER

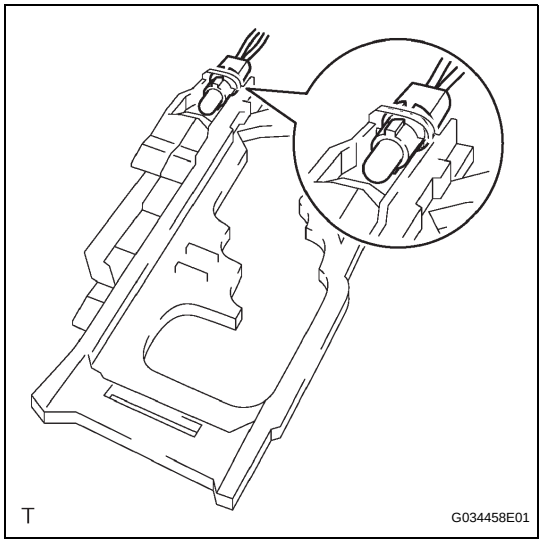
(a) Install the cover to the shift lock control unit.



6. INSTALL INDICATOR LIGHT WIRE SUB-ASSEMBLY

(a) Install the bulb to the indicator light wire.

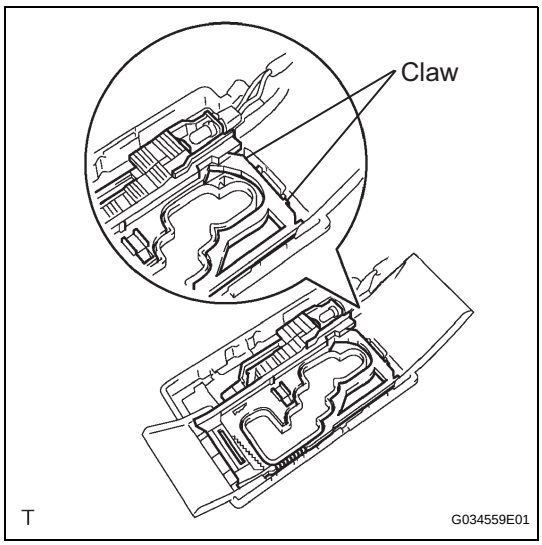
(b) Install the cap to the bulb.



(c) Install the wire to the position indicator light guide.

NOTICE:

Make sure that the indicator light wire is securely installed to the position indicator light guide.



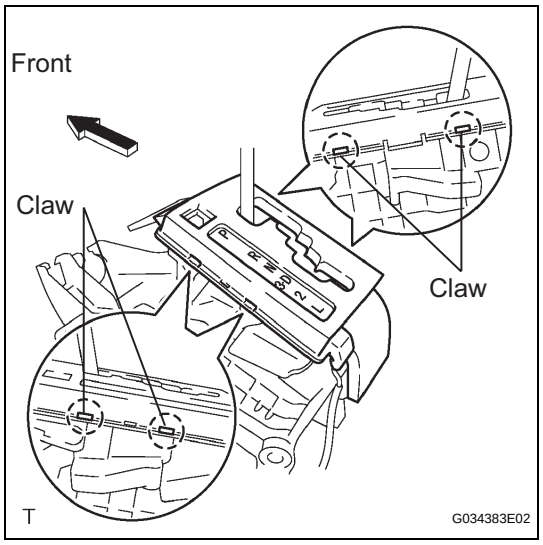
7. INSTALL POSITION INDICATOR LIGHT GUIDE

(a) Install the guide to the floor shift position indicator housing.

HINT:

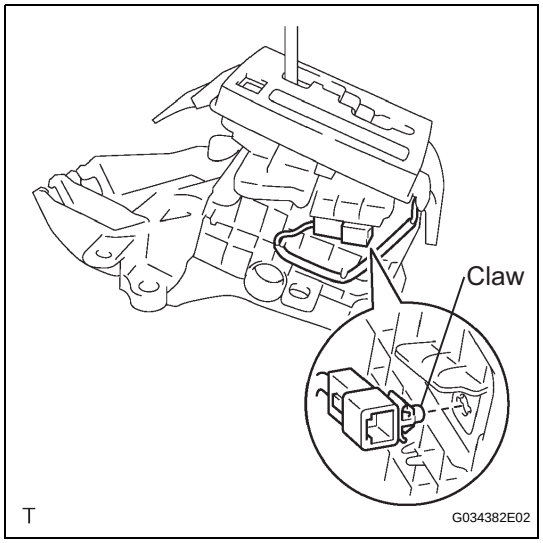
Securely engage the claws.

AX



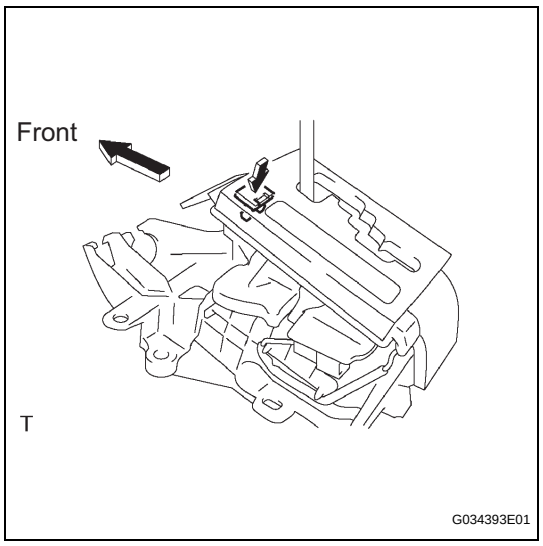
8. INSTALL FLOOR SHIFT POSITION INDICATOR HOUSING SUB-ASSEMBLY

(a) Install the housing to the shift lock control unit.
HINT:
Securely engage the 4 claws.



9. CONNECT INDICATOR LIGHT WIRE SUB-ASSEMBLY

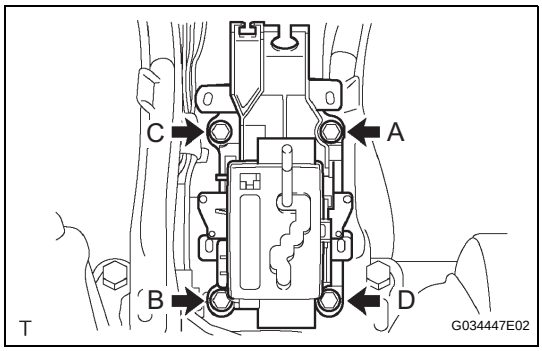
(a) Connect the wire connector to the floor shift.
NOTICE:
Make sure that the indicator light wire is securely installed to the floor shift.



10. INSTALL SHIFT LOCK RELEASE BUTTON COVER

(a) Install the cover to the floor shift position indicator housing.

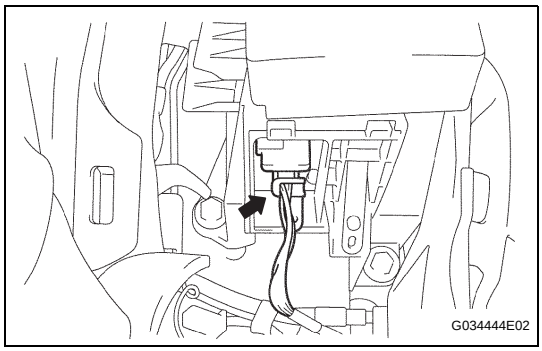
AX



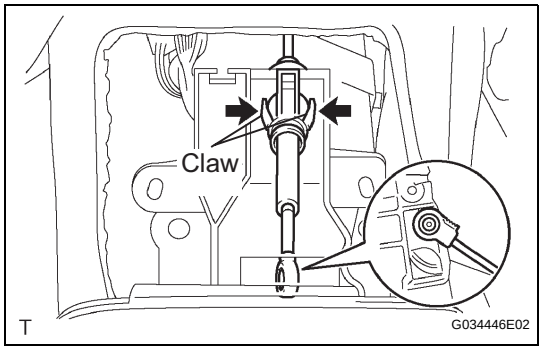
INSTALLATION

1. INSTALL SHIFT LEVER ASSEMBLY

(a) Install the lever with the 4 bolts.
Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)
HINT:
Tighten the bolts in the following order: A, B, C and D.
NOTICE:
Be careful not to put the wires of the indicator light of the shift lock system between the floor shift assembly and the floor while installing the transmission floor shift lever assembly.

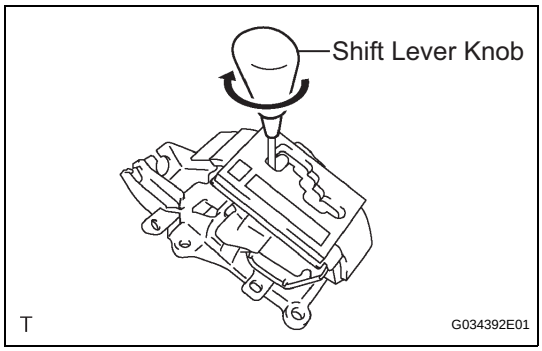


(b) Connect the shift lock control ECU connector.



2. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Install the cable to the floor shift assembly.
HINT:
Securely engage the claws.



3. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY

4. INSTALL CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-23)

5. INSTALL CONSOLE UPPER FRONT PANEL SUB-ASSEMBLY (See page IP-11)

6. INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-22)

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

8. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

AX

9. INSPECT SHIFT LEVER POSITION

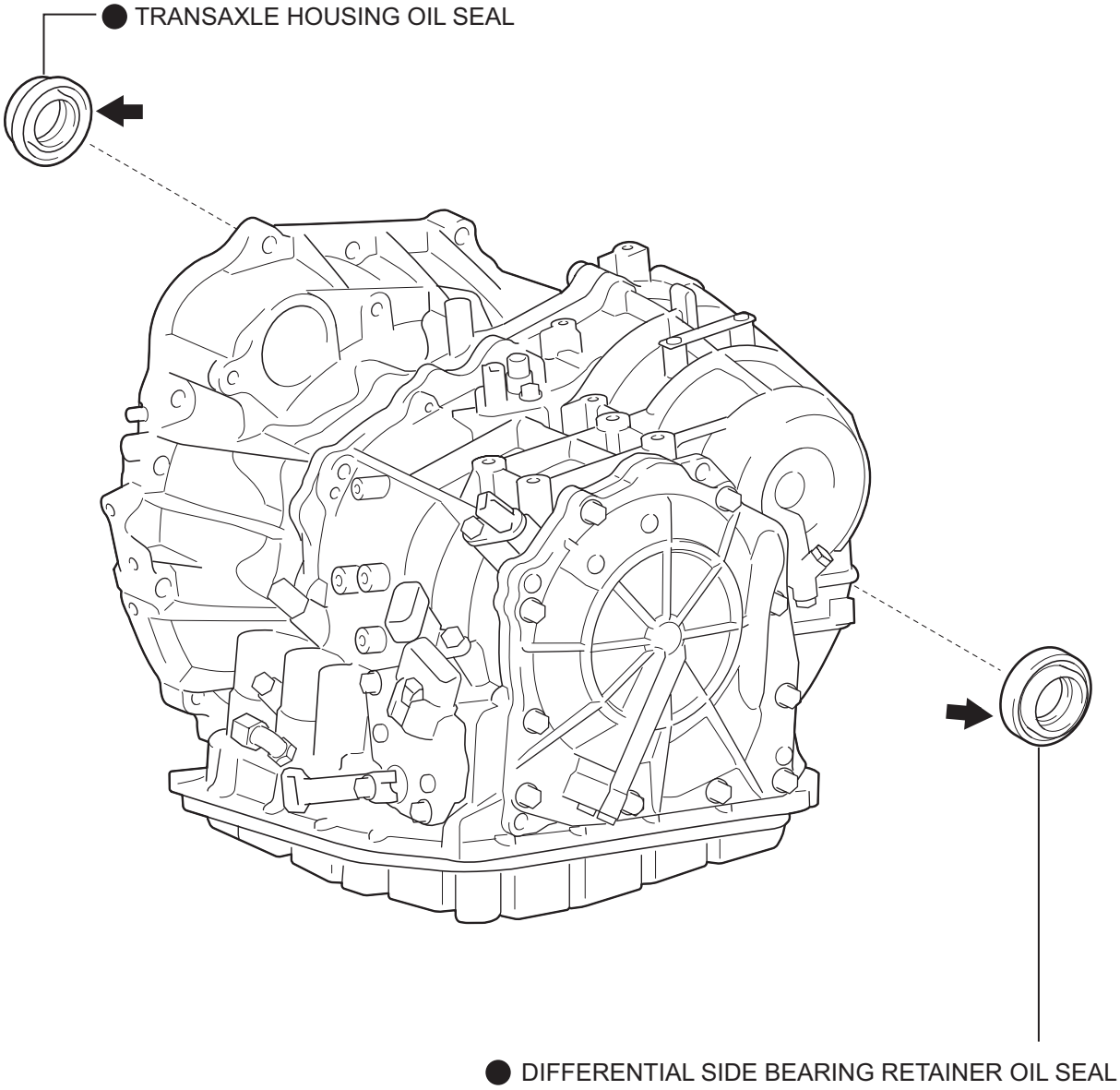
(a) Inspect the shift lever position (see page AX-133).

10. ADJUST SHIFT LEVER POSITION

(a) Adjustment the shift lever position (see page AX-133).

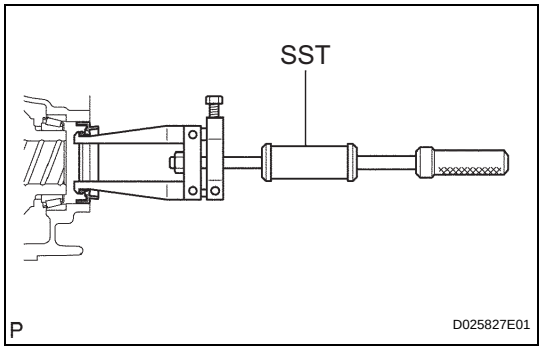
DIFFERENTIAL OIL SEAL

COMPONENTS

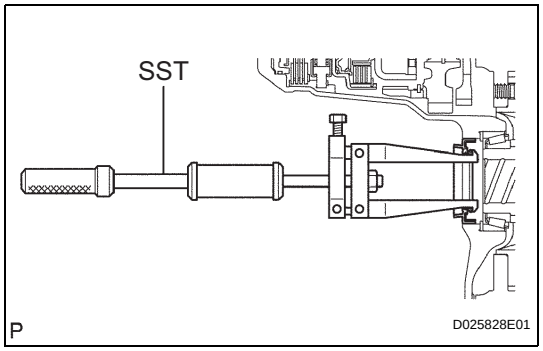


REMOVAL

1. **REMOVE FRONT WHEEL**
2. **REMOVE ENGINE UNDER COVER RH**
3. **REMOVE ENGINE UNDER COVER LH**
4. **DRAIN AUTOMATIC TRANSAXLE FLUID**
   (a) Remove the drain plug and gasket, and drain the ATF.
   (b) Install a new gasket and the drain plug.
   Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)
5. **REMOVE FRONT DRIVE SHAFT ASSEMBLY RH**
   (a) Remove the drive shaft (see page DS-5).
6. **REMOVE FRONT DRIVE SHAFT ASSEMBLY LH**
   (a) Remove the drive shaft (see page DS-5).
7. **REMOVE TRANSAXLE HOUSING OIL SEAL**
   (a) Using SST, tap out the oil seal.
   SST 09308-00010

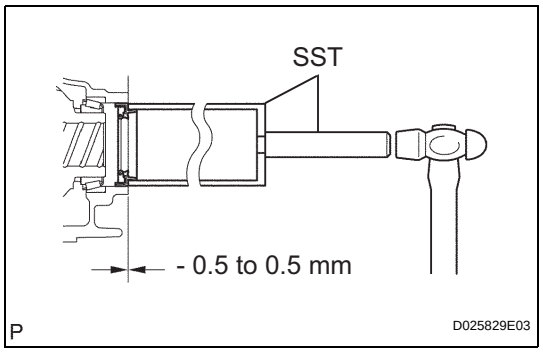


8. **REMOVE DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL**
   (a) Using SST, tap out the oil seal.
   SST 09308-00010

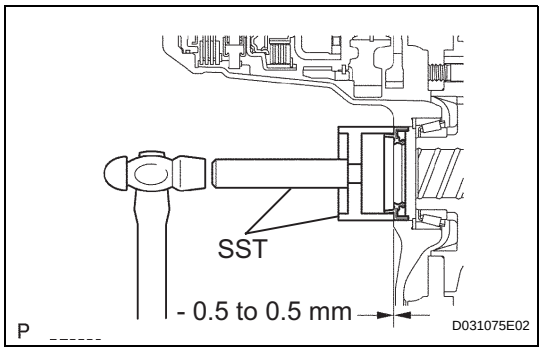


INSTALLATION

1. **INSTALL TRANSAXLE HOUSING OIL SEAL**
   (a) Using SST and a hammer, tap in a new oil seal.
   Standard depth:
   - 0.5 to 0.5 mm (- 0.020 to 0.020 in.)
   SST 09316-60011 (09316-00011), 09950-70010 (09951-07200)
   (b) Coat the lip of the oil seal with MP grease.



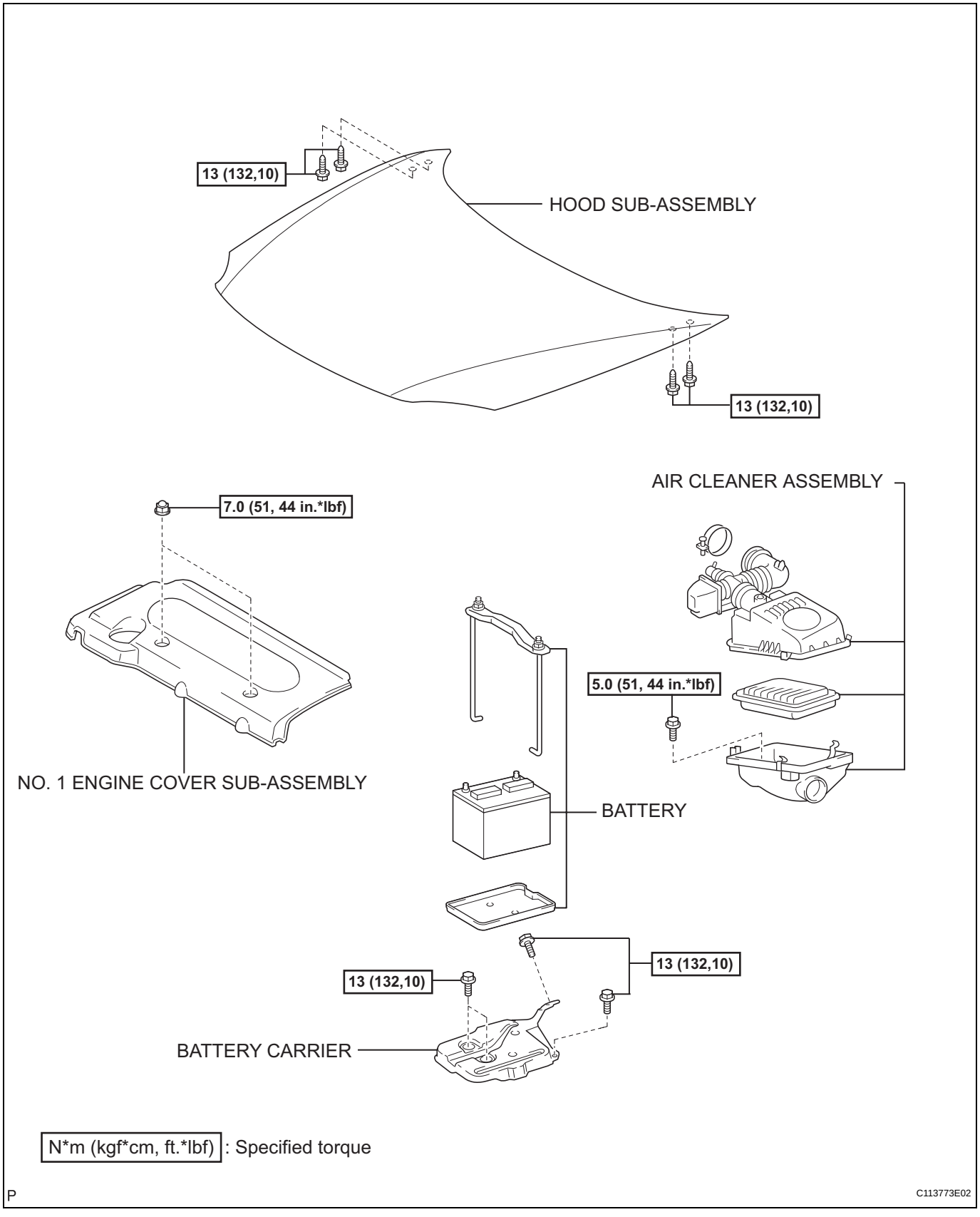
AX



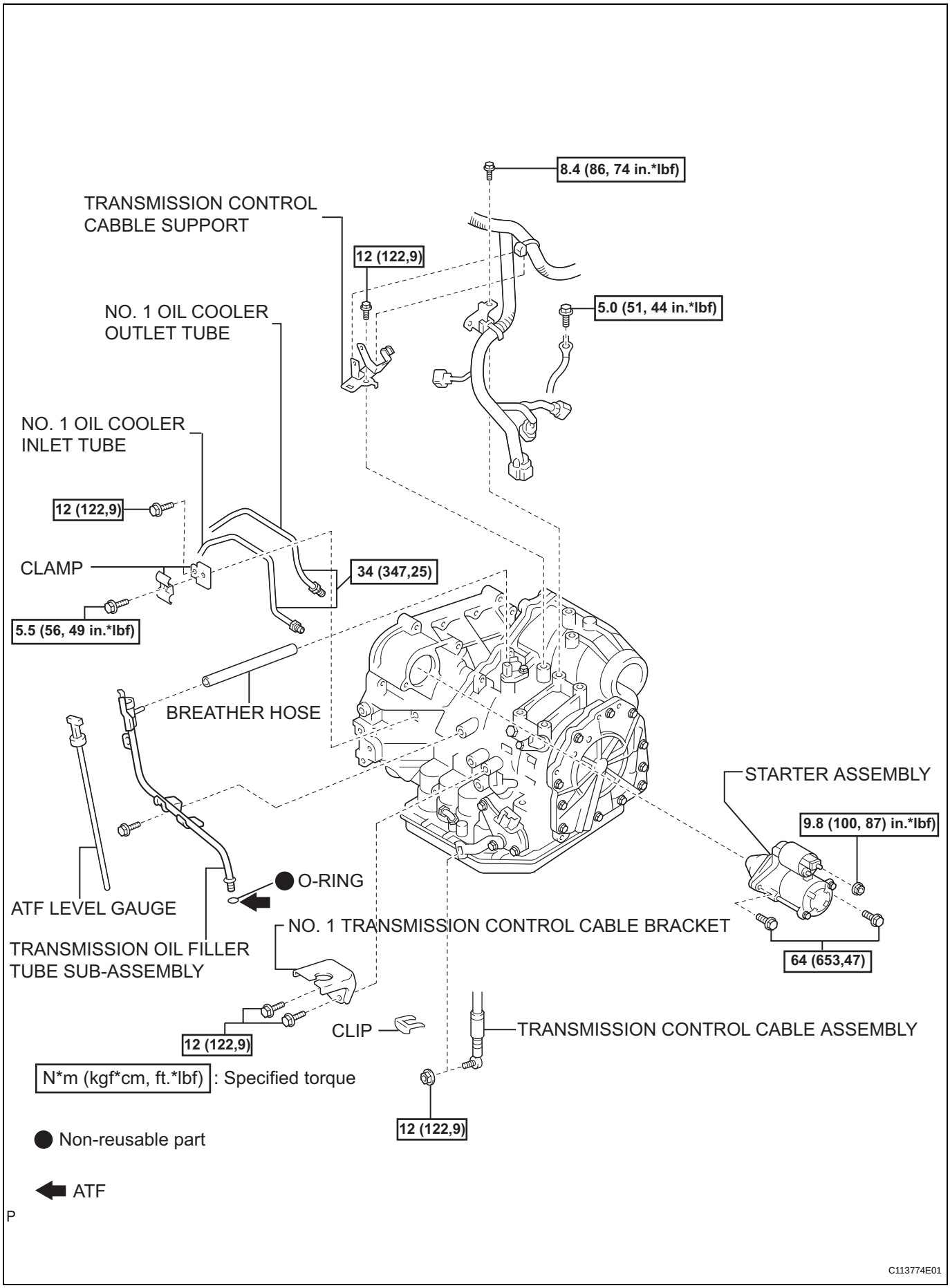
2. **INSTALL DIFFERENTIAL SIDE BEARING RETAINER OIL SEAL**
   (a) Using SST and a hammer, tap in a new oil seal.
   SST 09649-17010, 09950-70010 (09951-07150)
   Standard depth:
   - 0.5 to 0.5 mm (- 0.020 to 0.020 in.)
   (b) Coat the lip of the oil seal with MP grease.
3. **INSTALL FRONT DRIVE SHAFT ASSEMBLY LH**
   (a) Install the drive shift (see page DS-16).
4. **INSTALL FRONT DRIVE SHAFT ASSEMBLY RH**
   (a) Install the drive shift (see page DS-16).
5. **INSTALL ENGINE UNDER COVER RH**
6. **INSTALL ENGINE UNDER COVER LH**
7. **INSTALL FRONT WHEEL**
   Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)
8. **ADD AUTOMATIC TRANSAXLE FLUID**
   Fluid type:
   Toyota Genuine ATF WS
   Standard capacity:
   3.5 liters (3.7 US qts, 3.1 Imp. qts)
9. **INSPECT AUTOMATIC TRANSAXLE FLUID**
   (a) Inspect the fluid (see page AX-104).

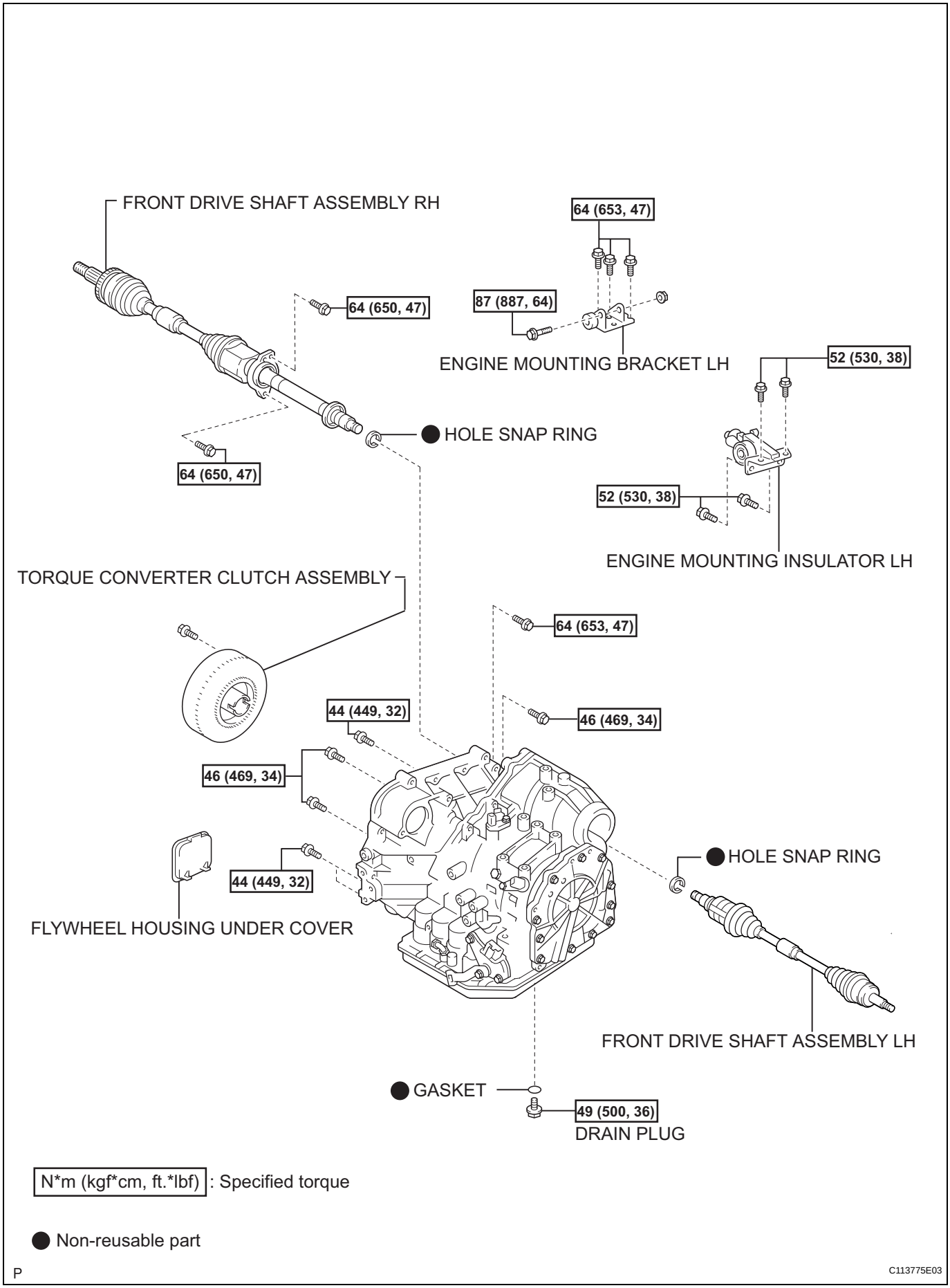
AUTOMATIC TRANSAXLE ASSEMBLY

COMPONENTS

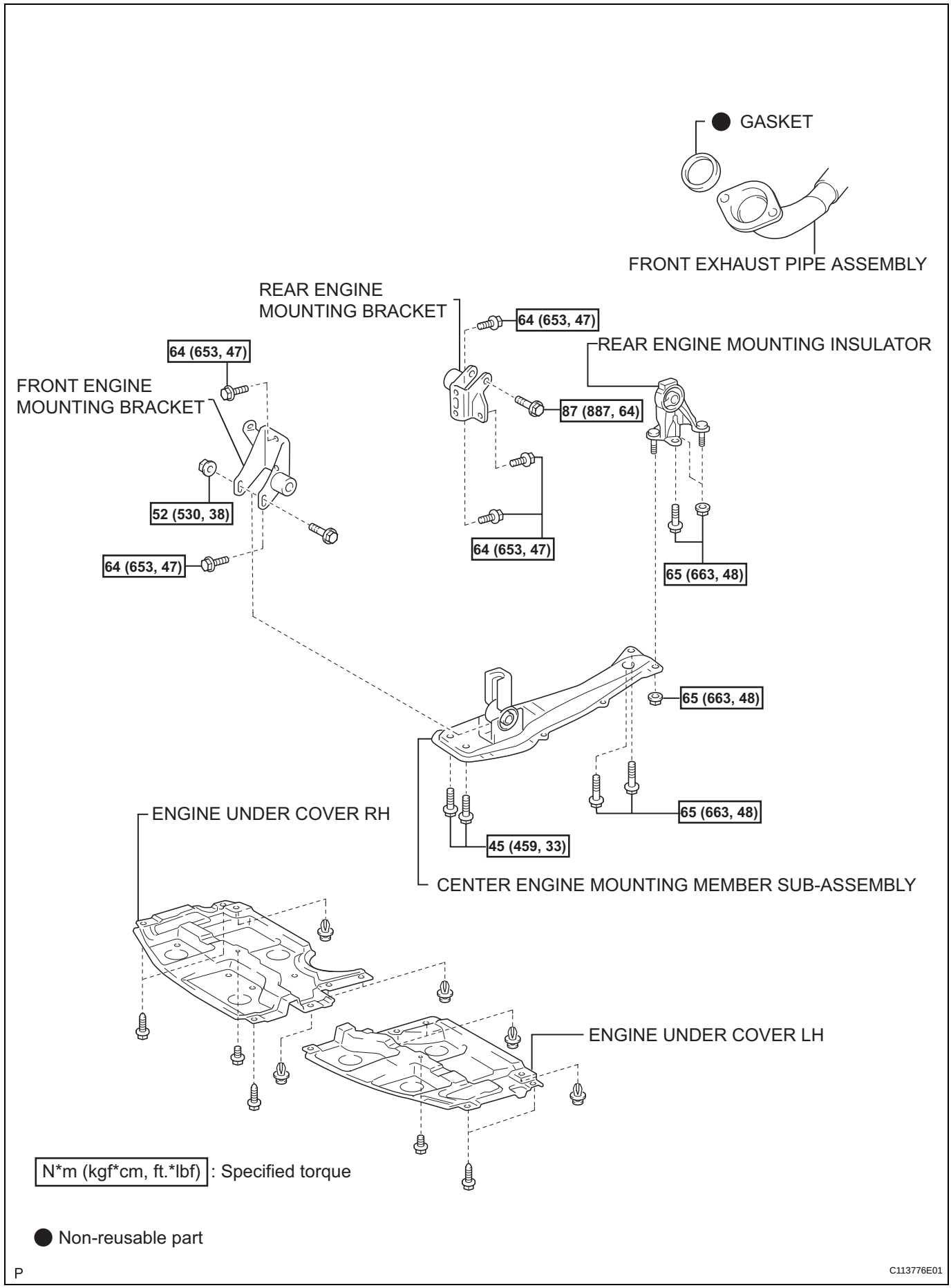


AX


8.4 (86, 74 in.*lbf)
TRANSMISSION CONTROL CABBLE SUPPORT
12 (122,9)
5.0 (51, 44 in.*lbf)
NO. 1 OIL COOLER OUTLET TUBE
NO. 1 OIL COOLER INLET TUBE
12 (122,9)
CLAMP
34 (347,25)
5.5 (56, 49 in.*lbf)
BREATHER HOSE
STARTER ASSEMBLY
9.8 (100, 87) in.*lbf)
O-RING
ATF LEVEL GAUGE
NO. 1 TRANSMISSION CONTROL CABLE BRACKET
TRANSMISSION OIL FILLER TUBE SUB-ASSEMBLY
64 (653,47)
CLIP
TRANSMISSION CONTROL CABLE ASSEMBLY
12 (122,9)
N*m (kgf*cm, ft.*lbf) : Specified torque
12 (122,9)
Non-reusable part
ATF
C113774E01


FRONT DRIVE SHAFT ASSEMBLY RH
64 (653, 47)
64 (650, 47)
87 (887, 64)
ENGINE MOUNTING BRACKET LH
52 (530, 38)
HOLE SNAP RING
64 (650, 47)
52 (530, 38)
ENGINE MOUNTING INSULATOR LH
TORQUE CONVERTER CLUTCH ASSEMBLY
64 (653, 47)
44 (449, 32)
46 (469, 34)
46 (469, 34)
HOLE SNAP RING
44 (449, 32)
FLYWHEEL HOUSING UNDER COVER
FRONT DRIVE SHAFT ASSEMBLY LH
GASKET
49 (500, 36)
DRAIN PLUG
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
P
C113775E03

AX


GASKET
FRONT EXHAUST PIPE ASSEMBLY
REAR ENGINE MOUNTING BRACKET
64 (653, 47)
REAR ENGINE MOUNTING INSULATOR
64 (653, 47)
FRONT ENGINE MOUNTING BRACKET
87 (887, 64)
52 (530, 38)
64 (653, 47)
64 (653, 47)
65 (663, 48)
65 (663, 48)
65 (663, 48)
ENGINE UNDER COVER RH
45 (459, 33)
CENTER ENGINE MOUNTING MEMBER SUB-ASSEMBLY
ENGINE UNDER COVER LH
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
C113776E01

AX

P

REMOVAL

1. REMOVE HOOD SUB-ASSEMBLY

(a) Remove the hood (see page ED-1).

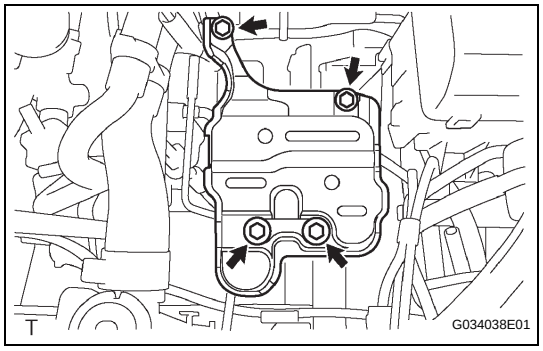
2. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY

(a) Remove the 2 nuts and engine cover.

3. REMOVE BATTERY

CAUTION:

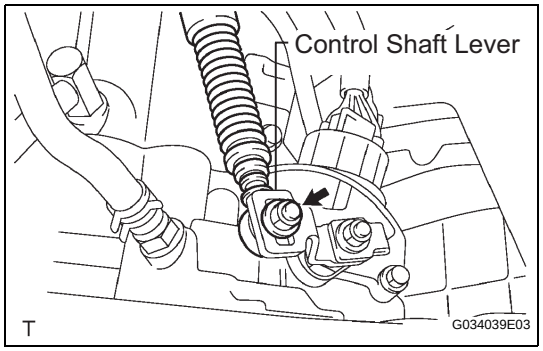
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



4. REMOVE BATTERY CARRIER

(a) Remove the 4 bolts and battery carrier.

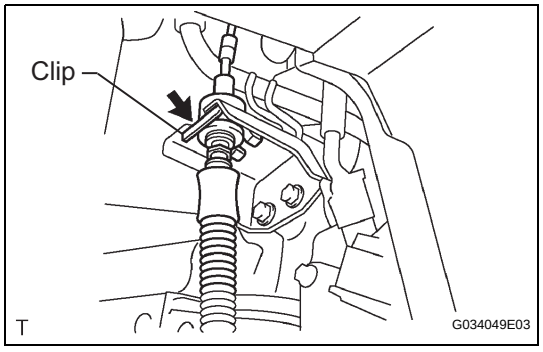
5. REMOVE AIR CLEANER ASSEMBLY



6. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

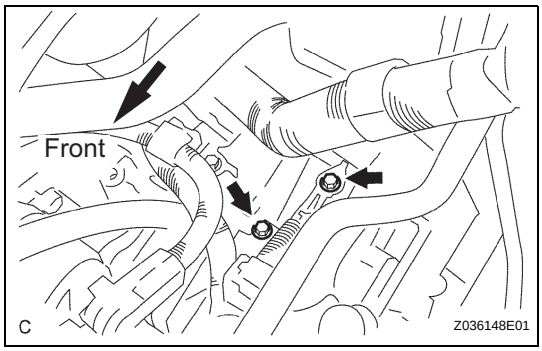
(a) Remove the nut from the control shaft lever.

(b) Disconnect the control cable from the control shaft lever.



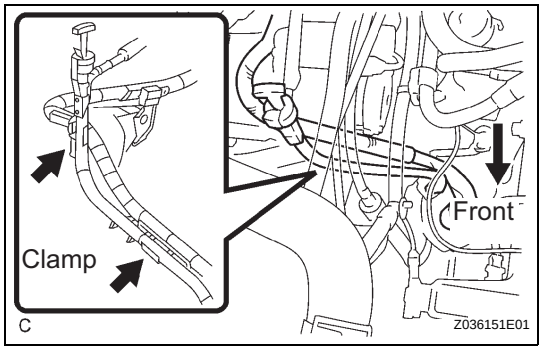
(c) Remove the clip and disconnect the cable from the control cable bracket.

AX



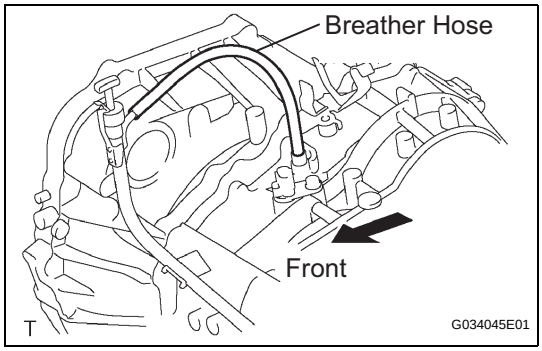
7. DISCONNECT WIRE HARNESS

(a) Remove the 2 bolts.
(b) Disconnect the harness and wire harness bracket.



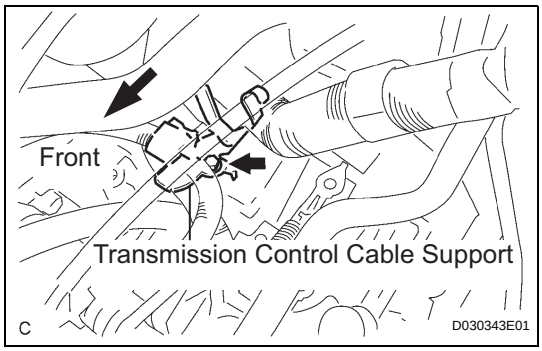
8. DISCONNECT CONNECTOR

(a) Disconnect the 2 wire harness clamps from the oil filler tube.
(b) Disconnect the transmission wire connector.
(c) Disconnect the park/neutral position switch connector.
(d) Disconnect the 2 speed sensor connectors.



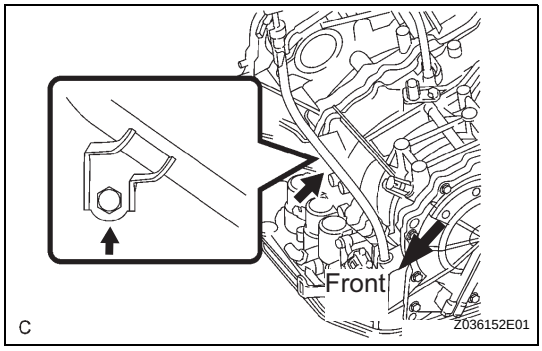
9. REMOVE BREATHER PLUG HOSE

(a) Remove the hose from the transmission oil filler tube and automatic transaxle.



10. REMOVE TRANSMISSION CONTROL CABLE SUPPORT

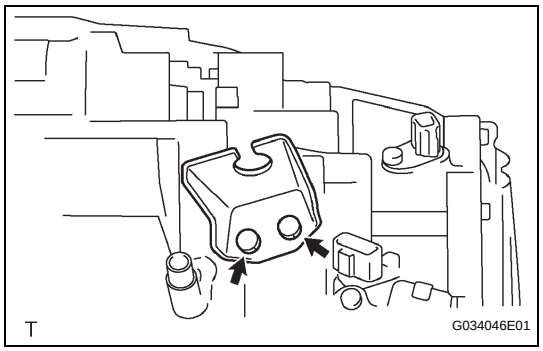
(a) Remove the bolt and transmission control cable support from the automatic transaxle.



11. REMOVE TRANSMISSION OIL FILLER TUBE SUB-ASSEMBLY

(a) Remove the ATF level gauge.
(b) Remove the bolt and oil filler tube.
(c) Remove the O-ring from the oil filler tube.

AX



12. REMOVE NO. 1 TRANSMISSION CONTROL CABLE BRACKET

(a) Remove the 2 bolts and bracket.

13. REMOVE WHEEL

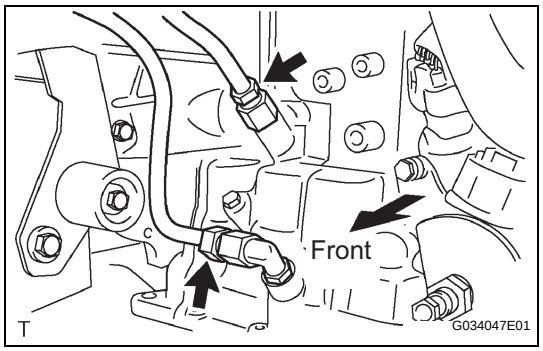
14. REMOVE ENGINE UNDER COVER RH

15. REMOVE ENGINE UNDER COVER LH

16. DRAIN AUTOMATIC TRANSAXLE FLUID

(a) Remove the drain plug and gasket, and drain the ATF.

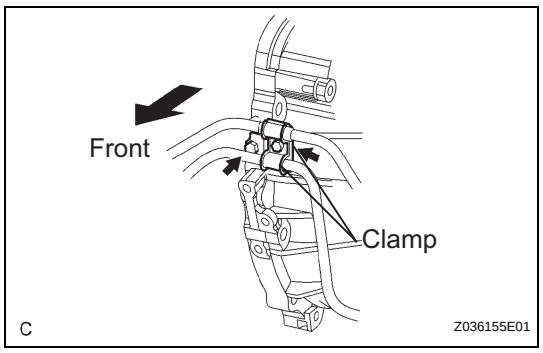
(b) Install a new gasket and the drain plug.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)



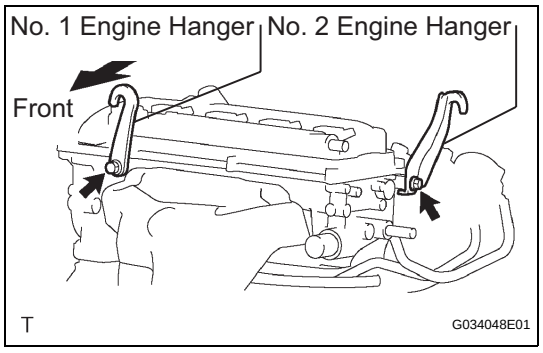
17. DISCONNECT NO. 1 OIL COOLER INLET TUBE

18. DISCONNECT NO. 1 OIL COOLER OUTLET TUBE

(a) Disconnect the tube.



(b) Remove the 2 bolts and separate the 2 clamps.



19. SUSPEND ENGINE ASSEMBLY

(a) Install the No. 1 and No. 2 engine hangers in the correct direction.
Part No. :
No. 1 engine hanger:
12281-28010
No. 2 engine hanger:
12282-28010
Bolts:
91512-61020
Torque: 38 N*m (387 kgf*cm, 28 ft.*lbf)

(b) Attach the engine chain hoist to the engine hanger.
CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.

20. REMOVE EXHAUST PIPE ASSEMBLY FRONT

(a) Remove the exhaust pipe (see page EX-2).

21. REMOVE FRONT DRIVE SHAFT ASSEMBLY RH

(a) Remove the drive shaft (see page DS-5).

22. REMOVE FRONT DRIVE SHAFT ASSEMBLY LH

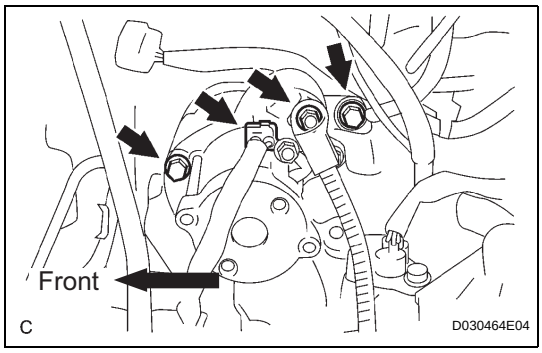
(a) Remove the drive shaft (see page DS-5).

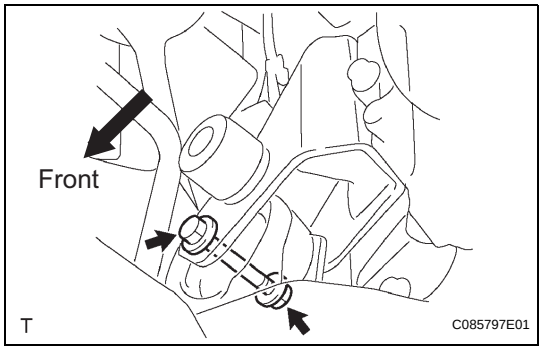
23. REMOVE STARTER ASSEMBLY

(a) Remove the nut and disconnect the starter wire.
(b) Disconnect the connector.
(c) Remove the 2 bolts and starter.

24. SUPPORT AUTOMATIC TRANSAXLE ASSEMBLY

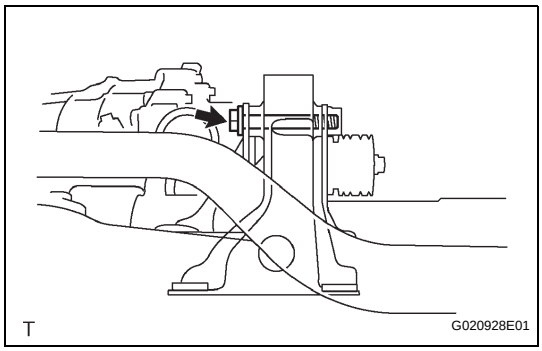
(a) Support the transaxle with a transmission jack.





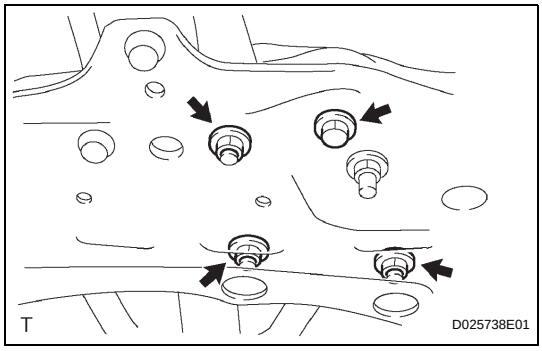
25. DISCONNECT FRONT ENGINE MOUNTING INSULATOR

(a) Remove the bolt and nut from the bracket.
(b) Disconnect the insulator from the bracket.



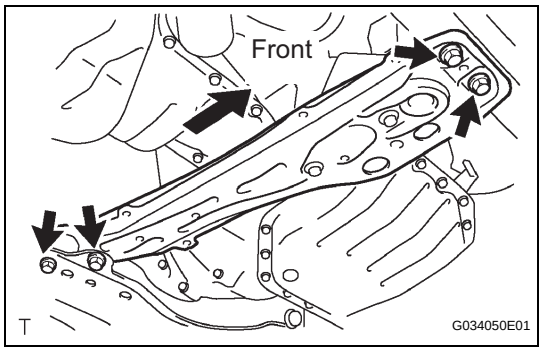
26. REMOVE REAR ENGINE MOUNTING INSULATOR

(a) Disconnect the hose clamp from the insulator.
(b) Remove the bolt from the rear engine mounting bracket.



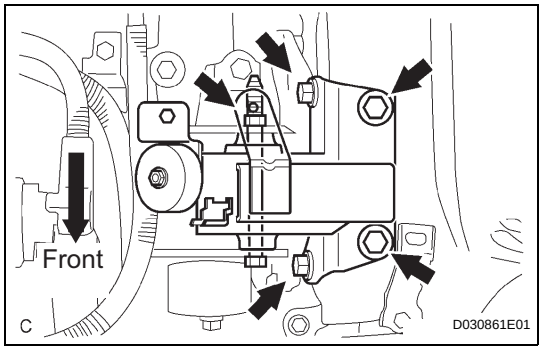
(c) Remove the 3 nuts, bolt and insulator from the suspension member.

AX



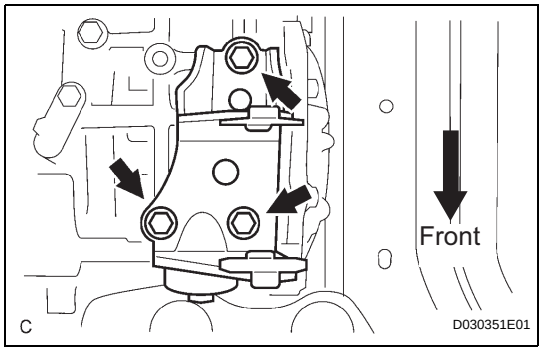
27. REMOVE CENTER ENGINE MOUNTING MEMBER SUB-ASSEMBLY

(a) Remove the 4 bolts and member with the front engine mounting insulator.



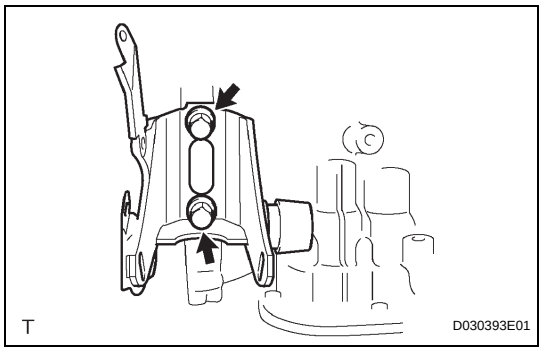
28. REMOVE ENGINE MOUNTING INSULATOR LH

(a) Remove the 5 bolts, nut and insulator.



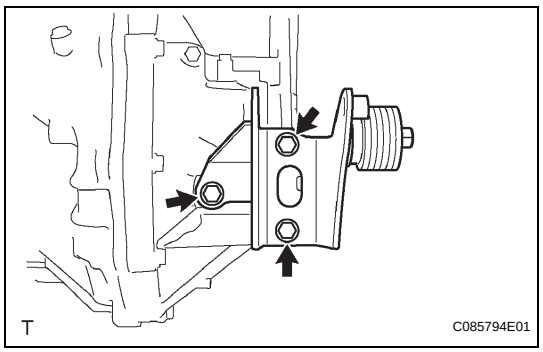
29. REMOVE ENGINE MOUNTING BRACKET LH

(a) Remove the 3 bolts and bracket from the automatic transaxle.



30. REMOVE FRONT ENGINE MOUNTING BRACKET

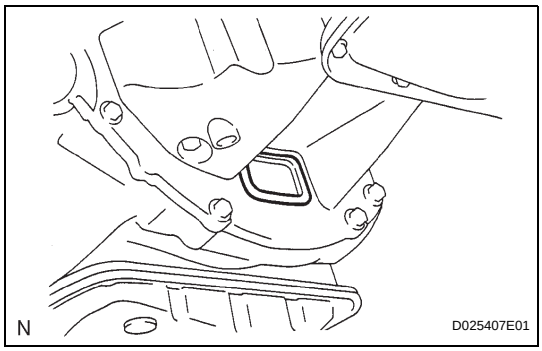
(a) Remove the 2 bolts and bracket from the automatic transaxle.



31. REMOVE REAR ENGINE MOUNTING BRACKET

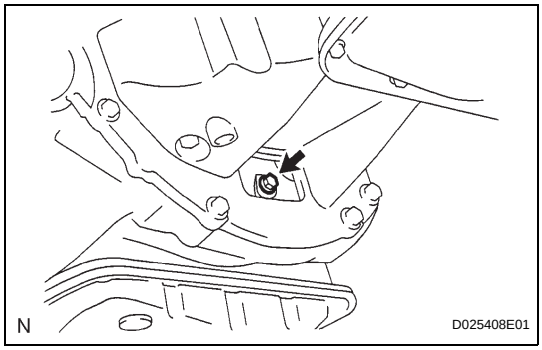
(a) Remove the 3 bolts and bracket from the automatic transaxle.

AX



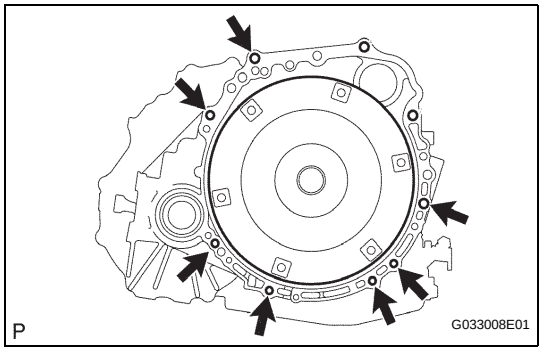
32. REMOVE FLYWHEEL HOUSING UNDER COVER

(a) Remove the cover from the automatic transaxle.



33. REMOVE AUTOMATIC TRANSAXLE ASSEMBLY

(a) Turn the crankshaft to remove the 6 bolts while holding the crankshaft pulley bolt with a wrench.



(b) Remove the 7 bolts.

(c) Remove the transaxle.

34. REMOVE TORQUE CONVERTER CLUTCH ASSEMBLY

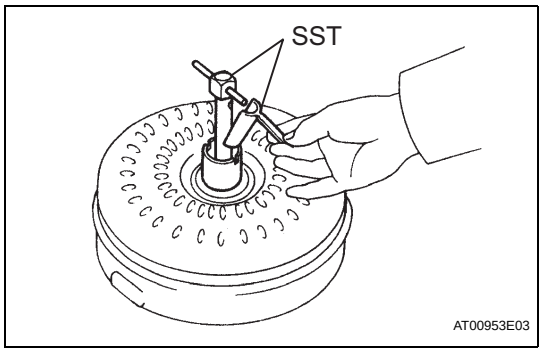
INSPECTION

1. INSPECT TORQUE CONVERTER CLUTCH ASSEMBLY

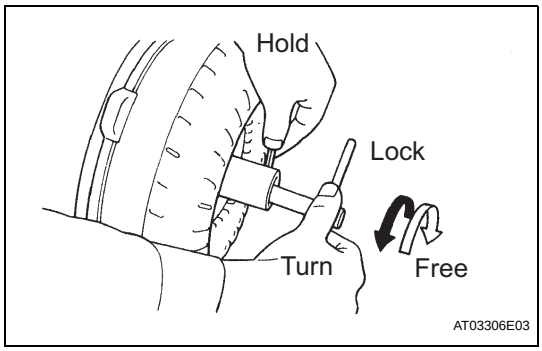
(a) Inspect the one-way clutch.

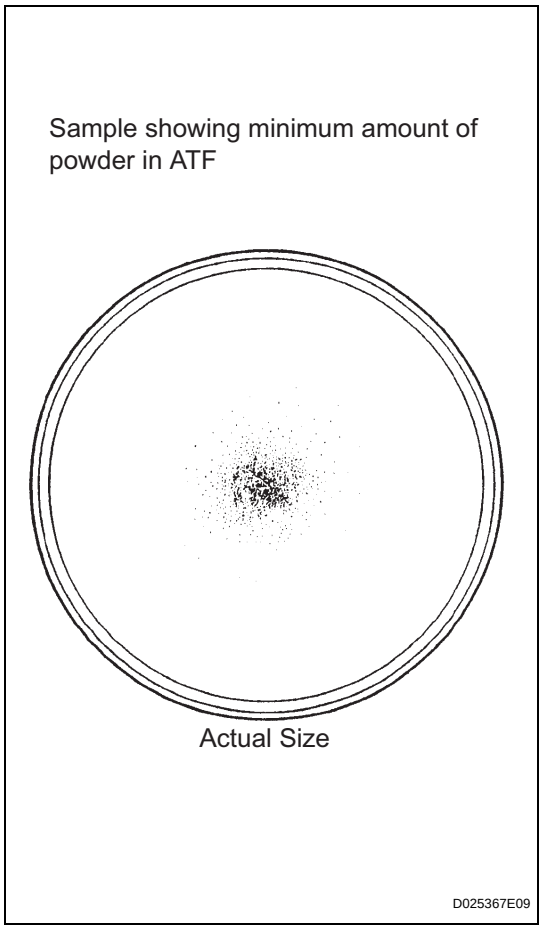
(1) Install SST into the inner race of the one-way clutch.
SST 09350-32014 (09351-32010)

(2) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.
SST 09350-32014 (09351-32020)



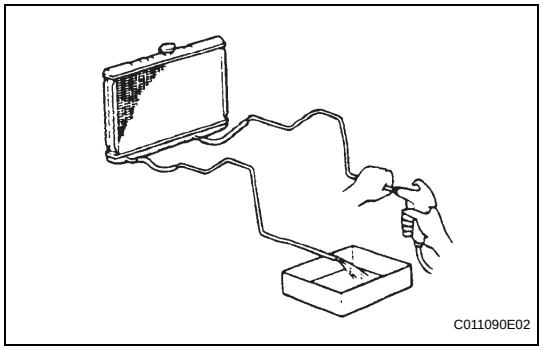
(3) With the torque converter clutch standing on its side, check that the one-way clutch locks when it is turned counterclockwise, and rotates smoothly when turned clockwise.
If necessary, clean the converter and retest the one-way clutch.
Replace the converter if the one-way clutch still fails the test.



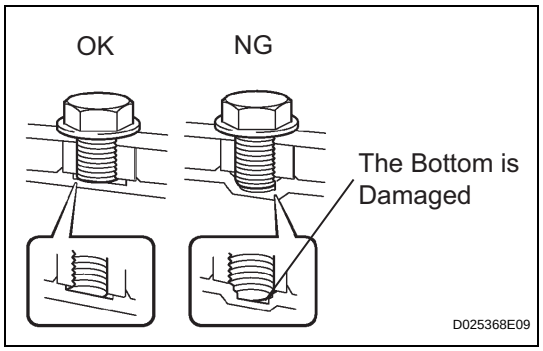


(b) Determine the condition of the torque converter clutch.
  (1) If the inspection result of the torque converter clutch assembly meets the following criteria, replace the torque converter clutch.
  Malfunction:
  Any metallic sound is heard from the torque converter clutch during the stall test or when the shift lever is in the neutral position. The one-way clutch is free or locked in both directions.
  Fine powder exceeding the sample limit is identified in the ATF. (See the sample.)
  HINT:
  The sample shows ATF of approximately. 0.25 liters (0.26 US qts, 0.22 Imp. qts) that has been taken out from the removed torque converter clutch.

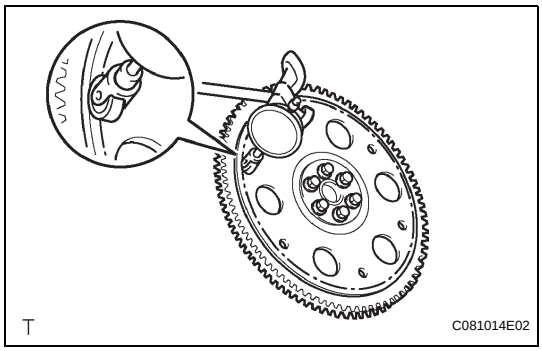
(c) Replace the ATF in the torque converter clutch.
  (1) If the ATF is discolored and/or has a foul odor, completely stir the ATF in the torque converter clutch and drain it with the face for installation facing up.



(d) Clean and check the oil cooler and oil pipe line.
  (1) If the torque converter clutch is inspected or the ATF is changed, clean the oil cooler and oil pipe line.
  NOTICE:
  - **Spray compressed air of 196 kPa (2 kgf/cm^2, 28 psi) from the inlet hose.**
  - **If plenty of fine powder is identified in the ATF, add new ATF using a bucket pump and clean it again.**
  (2) If the ATF is cloudy, inspect the oil cooler (radiator).



(e) Prevent deformation of the torque converter clutch and damage to the oil pump gear.
  (1) When there is any damage on the end of the bolt for the torque converter clutch and on the bottom of the bolt hole, replace the bolt and the torque converter clutch.
  (2) All of the bolts should be the same length.
  (3) Do not lose the spring washer.



2. REMOVE DRIVE PLATE & RING GEAR SUB-ASSEMBLY

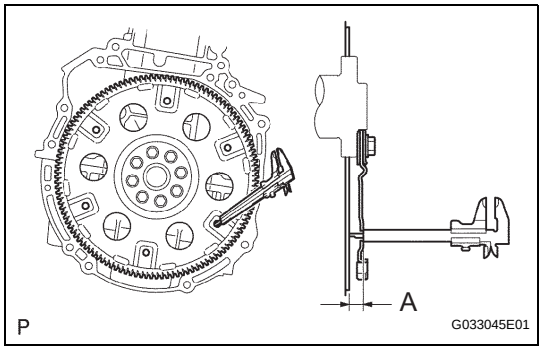
(a) Set up a dial indicator and measure the drive plate runout.
Maximum runout:
0.20 mm

(b) Check for damage of the ring gear.
If the runout is greater than the maximum or the ring gear is damaged, replace the drive plate.

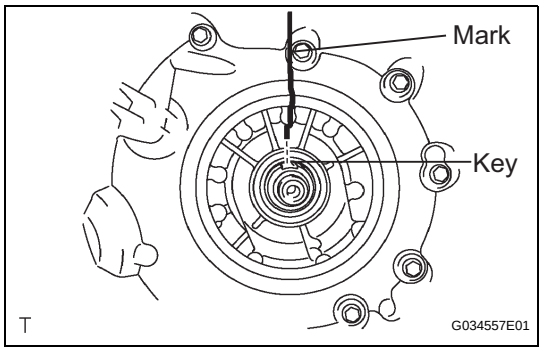
INSTALLATION

1. INSTALL TORQUE CONVERTER CLUTCH ASSEMBLY

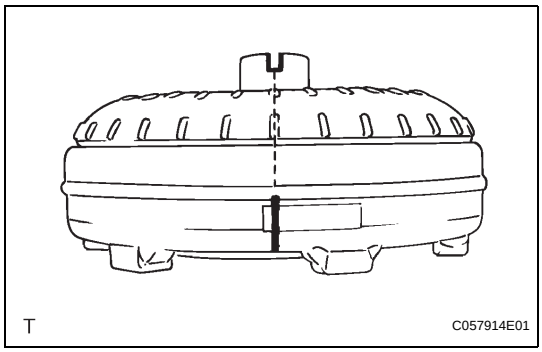
(a) Using a vernier caliper, measure dimension "A" between the transaxle fitting part of the engine and the converter fitting part of the drive plate.



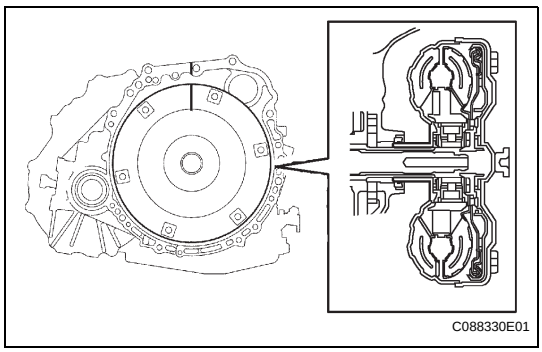
(b) Set the key of the front oil pump drive gear to the top and put a mark on the housing.



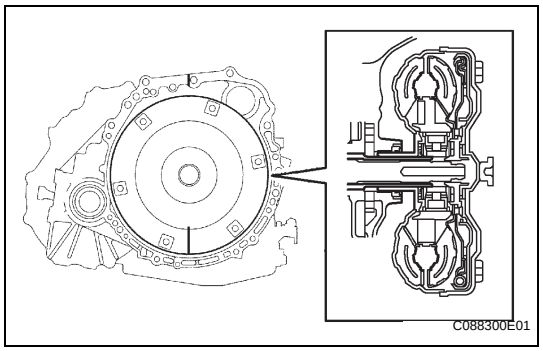
(c) Put a mark on the torque converter clutch so that its groove can be clearly indicated.



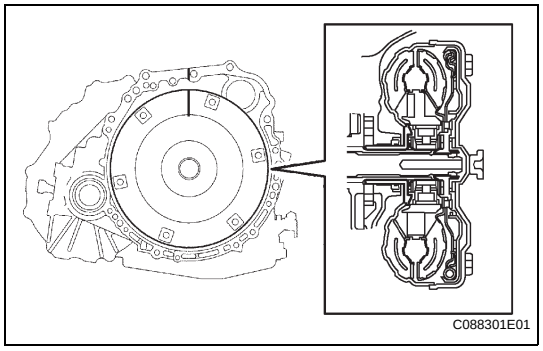
(d) Match the 2 marks on the transaxle case and the torque converter clutch and fit the spline part of the input shaft to the spline part of the turbine runner.



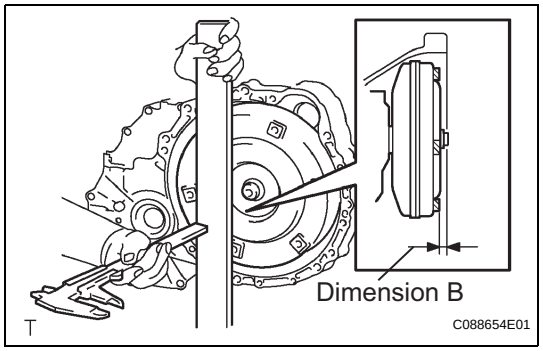
AX



(e) Rotating the torque converter clutch, fit the spline part of the stator shaft with the spline part of the stator.
HINT:
Rotate it about 180°.



(f) Rotating the torque converter clutch, match the 2 marks on the case and the torque converter clutch again and fit the key of the oil pump drive gear into the key way of the torque converter clutch.
NOTICE:
When rotating the torque converter clutch, do not push it with excessive force.

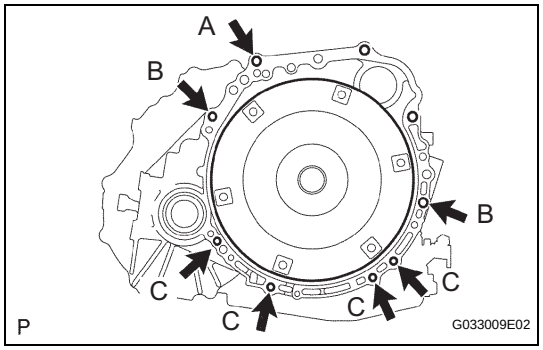


(g) Using a vernier caliper and straightedge, measure dimension B shown in the illustration and check that B is greater than A.
Standard dimension:
B = A + 1.0 mm (0.039 in.) or more

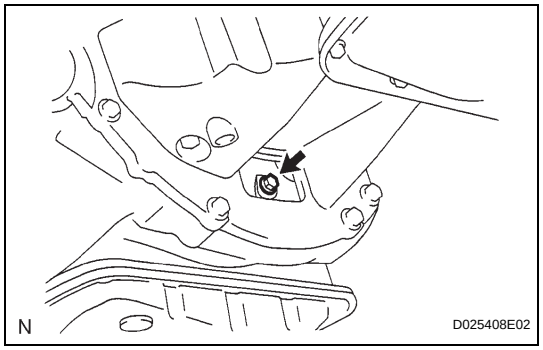
AX

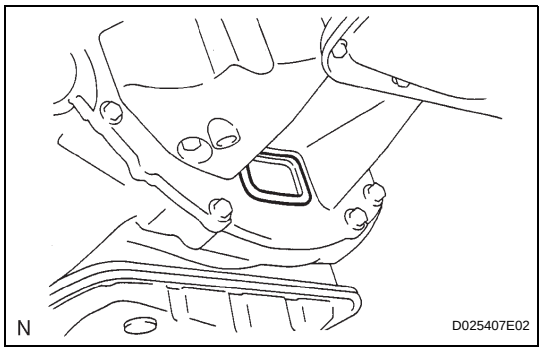
2. INSTALL AUTOMATIC TRANSAXLE ASSEMBLY

(a) Install the transaxle to the engine with the 7 bolts.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf) for bolt A
46 N*m (469 kgf*cm, 34 ft.*lbf) for bolt B
44 N*m (449 kgf*cm, 32 ft.*lbf) for bolt C



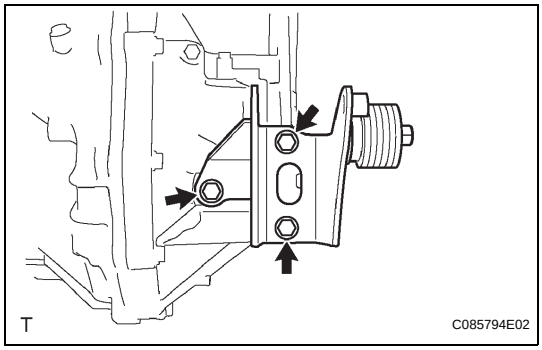
(b) Install the 6 torque converter clutch mounting bolts.
Torque: 41 N*m (418 kgf*cm, 30 ft.*lbf)
HINT:
First install the black colored bolt, and then the remaining 5 bolts.





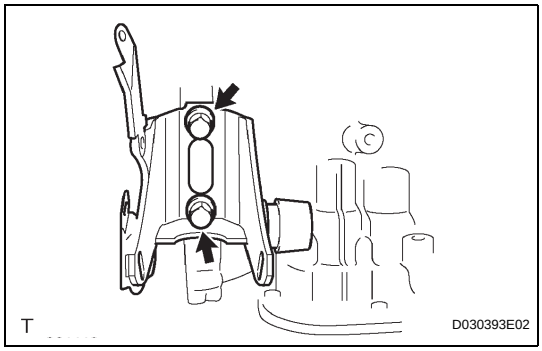
3. INSTALL FLYWHEEL HOUSING UNDER COVER

(a) Install the cover to the automatic transaxle.



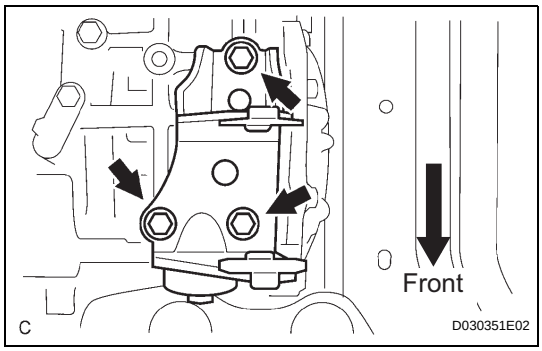
4. INSTALL REAR ENGINE MOUNTING BRACKET

(a) Install the bracket to the automatic transaxle with the 3 bolts.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)



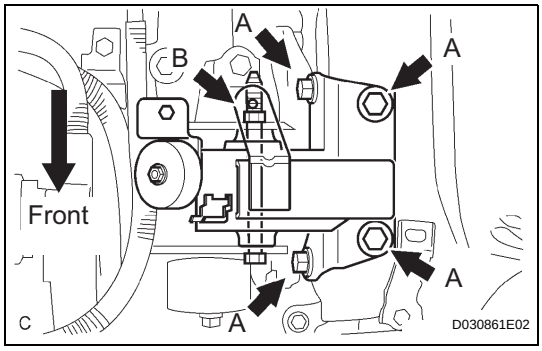
5. INSTALL FRONT ENGINE MOUNTING BRACKET

(a) Install the bracket to the automatic transaxle with the 2 bolts.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)



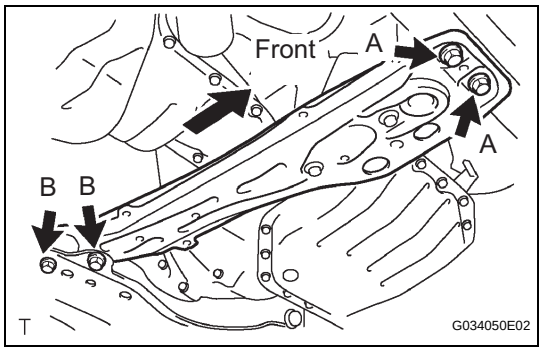
6. INSTALL ENGINE MOUNTING BRACKET LH

(a) Install the bracket to the automatic transaxle with the 3 bolts.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)



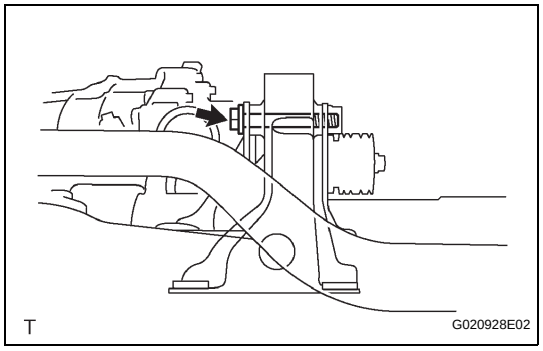
7. INSTALL ENGINE MOUNTING INSULATOR LH

(a) Install the engine mounting insulator LH with the 5 bolts and nut.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf) for bolt A
87 N*m (887 kgf*cm, 64 ft.*lbf) for nut B



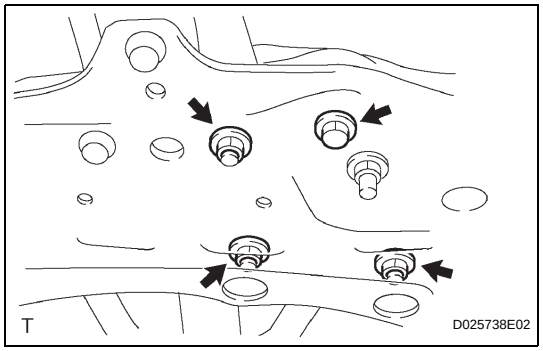
8. INSTALL CENTER ENGINE MOUNTING MEMBER SUB-ASSEMBLY

(a) Install the engine mounting member with the 4 bolts.
Torque: 45 N*m (459 kgf*cm, 33 ft.*lbf) for bolt A
65 N*m (663 kgf*cm, 48 ft.*lbf) for bolt B

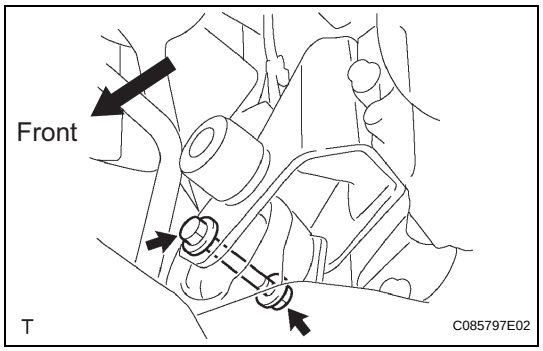


9. INSTALL REAR ENGINE MOUNTING INSULATOR

(a) Install the insulator to the rear engine mounting bracket with the bolt.
Torque: 87 N*m (887 kgf*cm, 64 ft.*lbf)

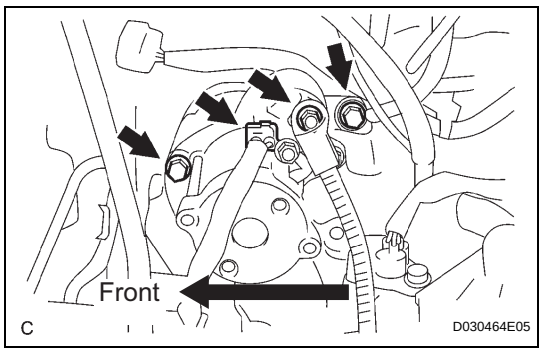


(b) Tighten the 3 nuts and bolt.
Torque: 65 N*m (663 kgf*cm, 48 ft.*lbf)



10. INSTALL FRONT ENGINE MOUNTING INSULATOR

(a) Install the insulator to the front engine mounting bracket with the bolt and nut.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)



11. INSTALL STARTER ASSEMBLY

(a) Install the starter with the 2 bolts.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)
(b) Connect the connector.
(c) Install the starter wire with the nut.
Torque: 9.8 N*m (100 kgf*cm, 87 in.*lbf)

12. INSTALL FRONT DRIVE SHAFT ASSEMBLY LH

(a) Install the drive shaft (see page DS-16).

13. INSTALL FRONT DRIVE SHAFT ASSEMBLY RH

(a) Install the drive shaft (see page DS-16).

14. INSTALL FRONT EXHAUST PIPE ASSEMBLY

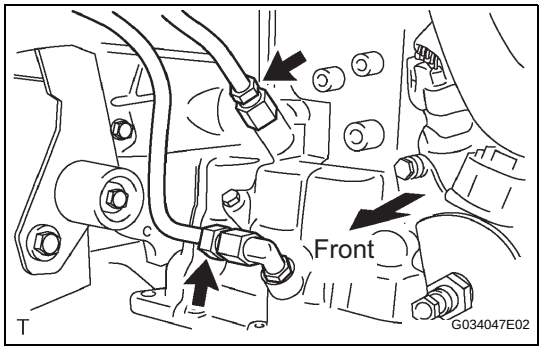
(a) Install the exhaust pipe (see page EX-3).

15. INSTALL ENGINE UNDER COVER LH

16. INSTALL ENGINE UNDER COVER RH

17. INSTALL FRONT WHEEL

Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)



18. INSTALL NO. 1 OIL COOLER OUTLET TUBE

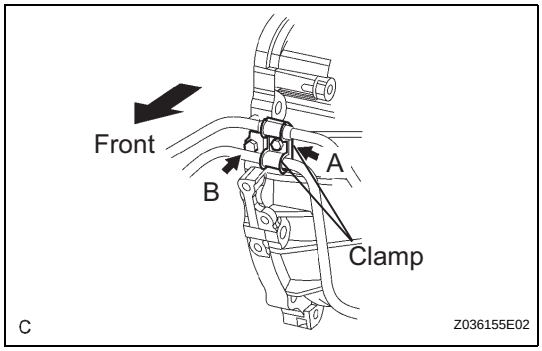
(a) Tighten the tube.

Torque: 34 N*m (347 kgf*cm, 25 ft.*lbf)

19. INSTALL NO. 1 OIL COOLER INLET TUBE

(a) Tighten the tube.

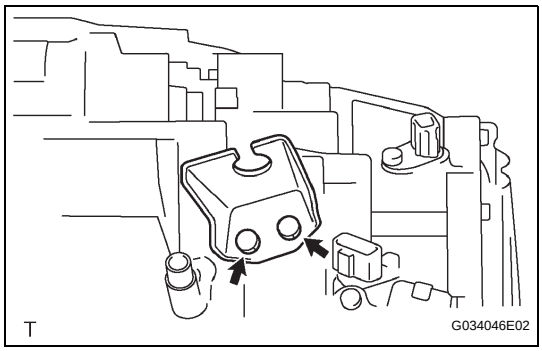
Torque: 34 N*m (347 kgf*cm, 25 ft.*lbf)



(b) Install the 2 oil cooler tube clamps with the 2 bolts.

Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf) for bolt A
12 N*m (122 kgf*cm, 9 ft.*lbf) for bolt B

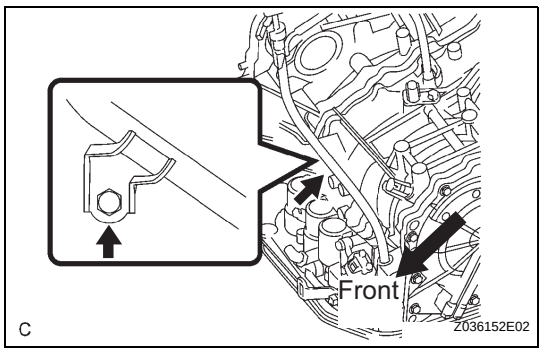
AX



20. INSTALL NO. 1 TRANSMISSION CONTROL CABLE BRACKET

(a) Install the cable bracket to the automatic transaxle with the 2 bolts.

Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)



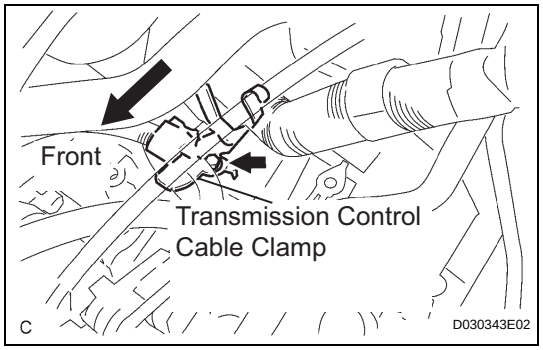
21. INSTALL TRANSMISSION OIL FILLER TUBE SUB-ASSEMBLY

(a) Coat a new O-ring with ATF, and install it to the oil filler tube.

(b) Install the oil filler tube to the automatic transaxle with the bolt.

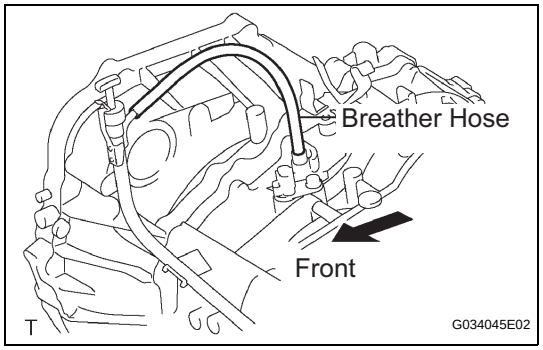
Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)

(c) Install the ATF level gauge.



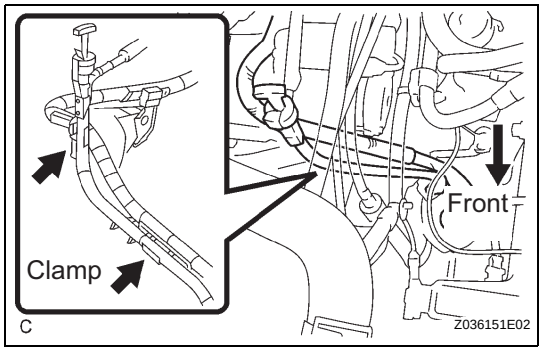
22. INSTALL TRANSMISSION CONTROL CABLE CLAMP

(a) Install the transmission control cable support to the automatic transaxle with the bolt.
Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)



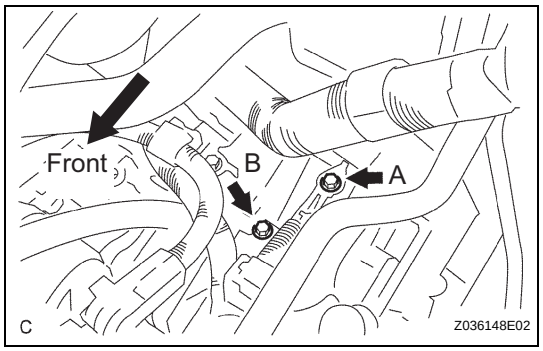
23. INSTALL BREATHER PLUG HOSE

(a) Install the hose to the oil filler tube sub-assembly and automatic transaxle.



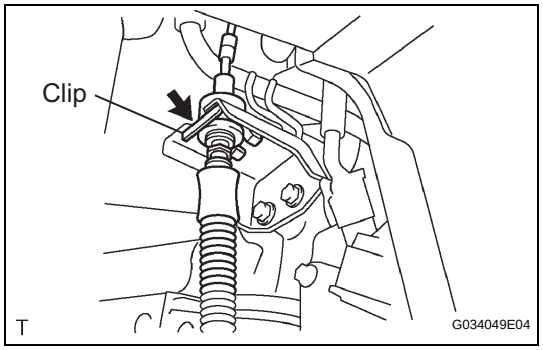
24. CONNECT CONNECTOR

(a) Connect the 2 clamps to the oil filler tube.
(b) Connect the transmission wire connector.
(c) Connect the park/neutral position switch connector.
(d) Connect the 2 speed sensor connectors.



25. INSTALL WIRE HARNESS

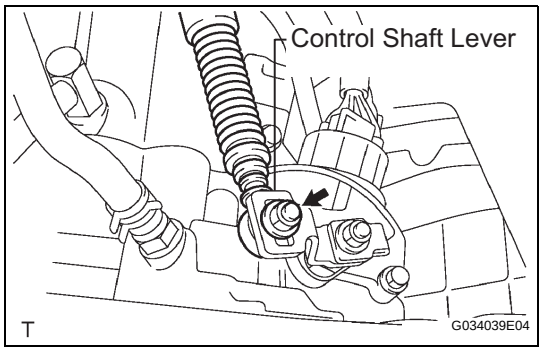
(a) Install the harness and wire harness bracket with the 2 bolts.
Torque: 5.0 N*m (51 kgf*cm, 44 ft.*lbf) for bolt A
Torque: 8.4 N*m (86 kgf*cm, 74 in.*lbf) for bolt B



26. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY

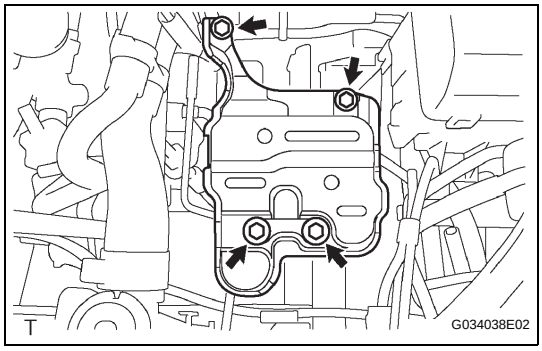
(a) Install the cable and clip to the bracket.

AX



(b) Temporarily install the cable to the control shaft lever with the nut.

27. INSTALL AIR CLEANER ASSEMBLY
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



28. INSTALL BATTERY CARRIER
(a) Install the carrier to the body with the 4 bolts.
Torque: 13 N*m (132 kgf*cm, 10 ft.*lbf)

29. INSTALL BATTERY

30. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)

31. INSTALL HOOD SUB-ASSEMBLY
Torque: 13 N*m (132 kgf*cm, 10 ft.*lbf)

32. INSPECT HOOD SUB-ASSEMBLY
(a) Inspect the food (see page ED-1).

33. ADJUST HOOD SUB-ASSEMBLY
(a) Adjust the food (see page ED-1).

34. ADD AUTOMATIC TRANSAXLE FLUID
Fluid type:
Toyota Genuine ATF WS
Standard capacity:
3.5 liters (3.7 US qts, 3.1 Imp.qts)

35. ADJUST SHIFT LEVER POSITION
(a) Adjust the lever position (see page AX-133).

36. INSPECT SHIFT LEVER POSITION
(a) Inspect the lever position (see page AX-133).

37. INSPECT AUTOMATIC TRANSAXLE FLUID
(a) Inspect the fluid (see page AX-104).

38. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT
(a) Inspect and adjust the wheel alignment (see page SP-2).

39. CHECK ABS SPEED SENSOR SIGNAL
(a) Check the sensor signal (see page BC-20).

40. RESET MEMORY
(a) Reset memory (AT initialization) (see page AX-15).

41. PERFORM INITIALIZATION
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

AX

AXLE SYSTEM

PROBLEM SYMPTOMS TABLE

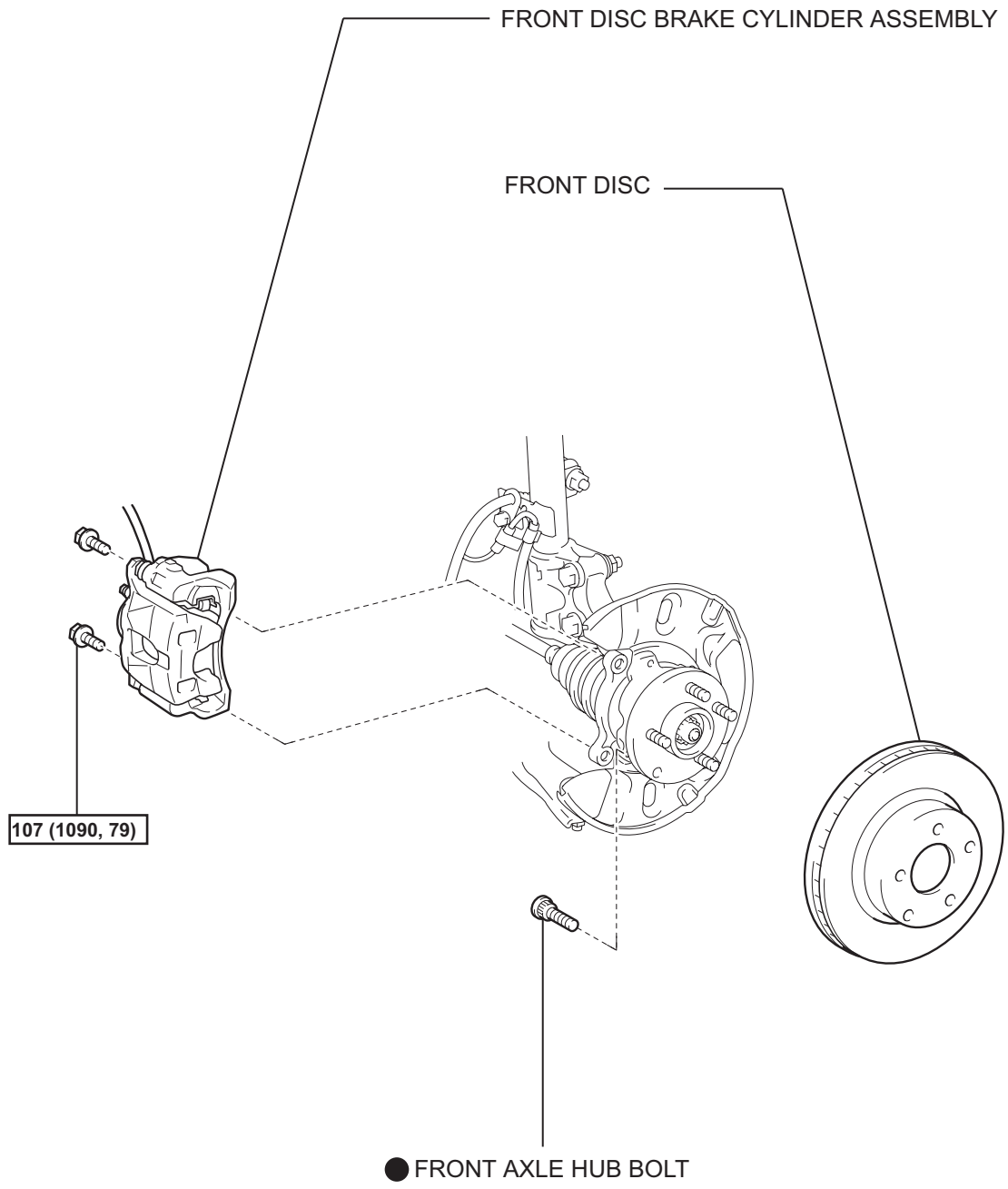
Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Axle system

Symptom	Suspected Area	See page
Wander or pulls	Tires (worn or improperly inflated)	TW-1
	Wheel alignment (incorrect)	SP-2
	Hub bearings (loose or worn)	AH-6
	Steering gear (adjustment required or broken)	PS-28
	Suspension parts (worn out)	SP-26
Front wheel shimmy	Tires (worn or improperly inflated)	TW-1
	Wheels (out of balance)	TW-1
	Shock absorber (worn out)	SP-17
	Wheel alignment (incorrect)	SP-2
	Ball joint (worn)	SP-26
	Hub bearings (loose or worn)	AH-6
	Steering gear	PS-28
Rear wheel shimmy	Tires (worn or improperly inflated)	TW-3
	Wheels (out of balance)	TW-3
	Shock absorber (worn out)	SP-36
	Wheel alignment (incorrect)	SP-9
	Axle bearings (loose or worn)	AH-17

FRONT AXLE HUB BOLT

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

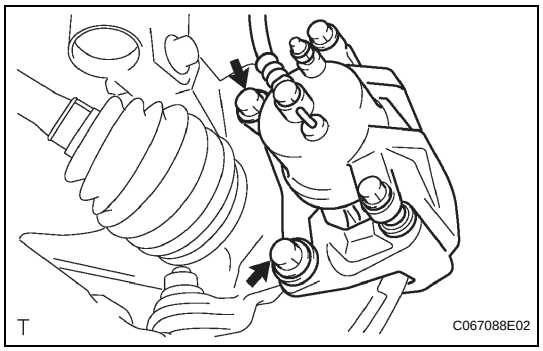
C117472E02

REPLACEMENT

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

1. REMOVE FRONT WHEEL



2. REMOVE FRONT DISC BRAKE CYLINDER ASSEMBLY

(a) Remove the 2 bolts and disconnect the disc brake caliper assembly LH from the steering knuckle.

NOTICE:

- **Use a string or equivalent to keep the brake caliper from hanging down by the flexible hose.**
- **The friction surface of the pad and disc must be free from oil, grease and paint.**

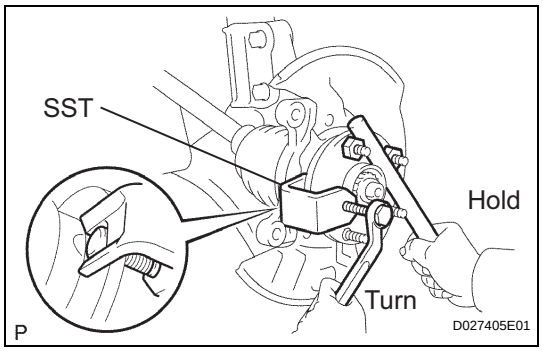
3. REMOVE FRONT DISC

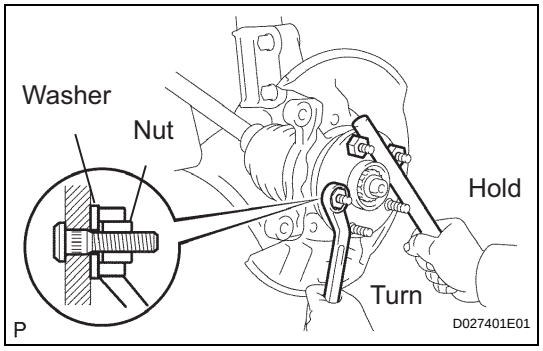
4. REMOVE FRONT AXLE HUB BOLT

(a) Temporarily install the 2 hub nuts.

(b) Using SST and a hammer handle or an equivalent to hold the axle hub LH, remove the LH hub bolt.

SST 09628-10011





5. INSTALL FRONT AXLE HUB BOLT

(a) Install a washer and nut to a new LH hub bolt as shown in the illustration.

(b) Using a hammer handle or an equivalent to hold the axle hub LH, install the LH hub bolt by tightening the nut.

6. INSTALL FRONT DISC

7. INSTALL FRONT DISC BRAKE CYLINDER ASSEMBLY

(a) Install the disc brake caliper with the 2 bolts to the steering knuckle LH.

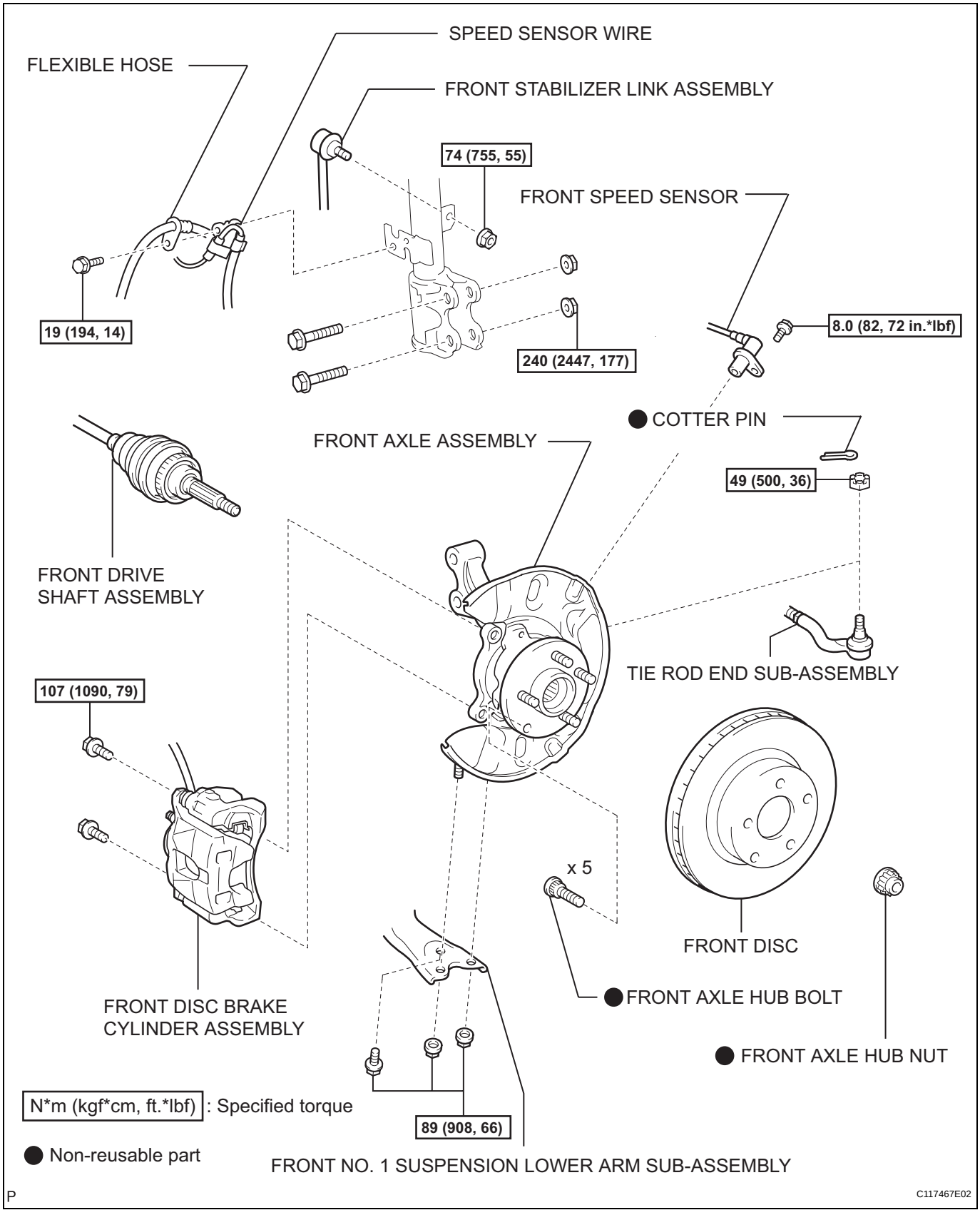
Torque: 107 N*m (1090 kgf*cm, 79 in.*lbf)

8. INSTALL FRONT WHEEL

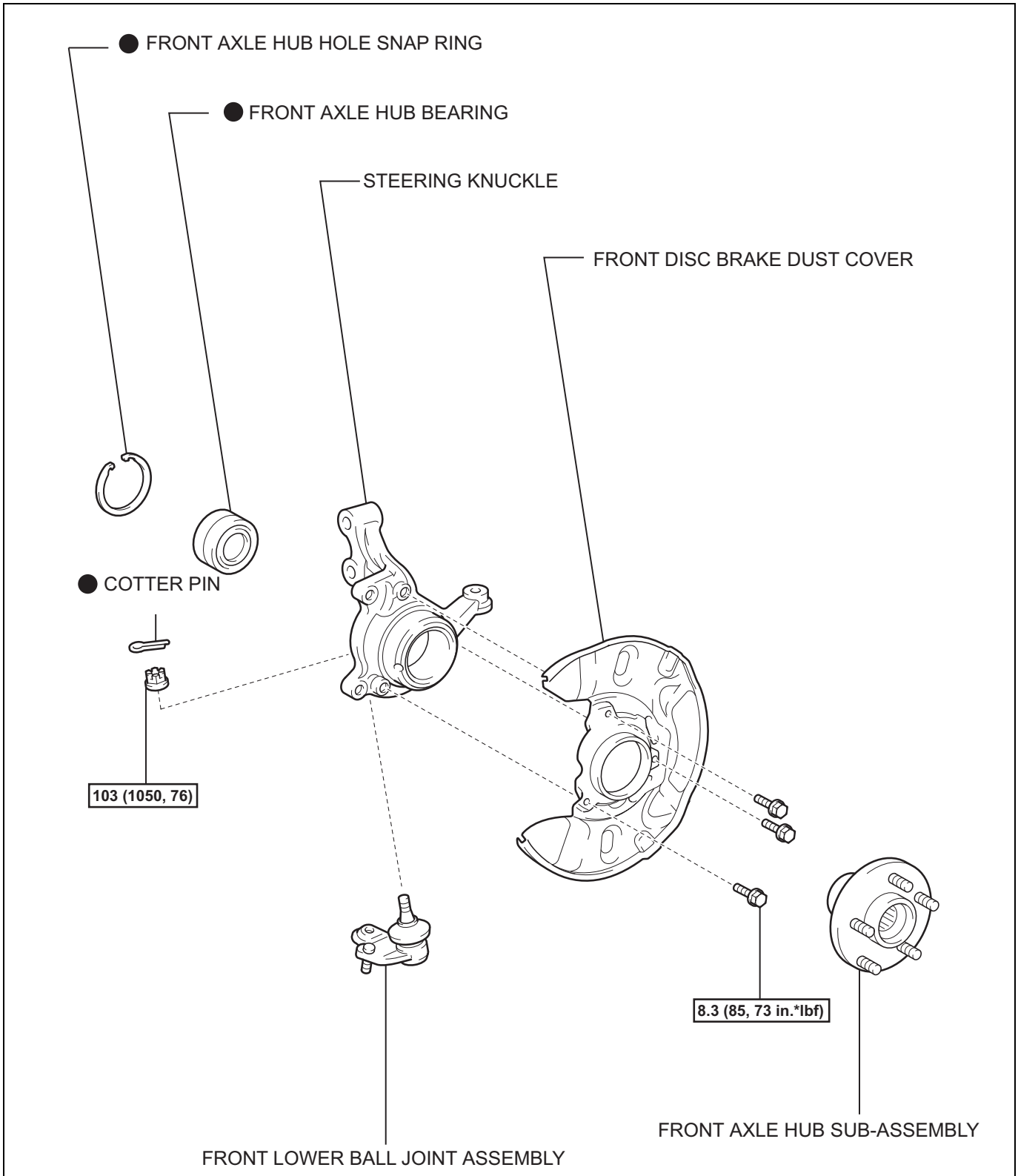
Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)

FRONT AXLE HUB

COMPONENTS



AH



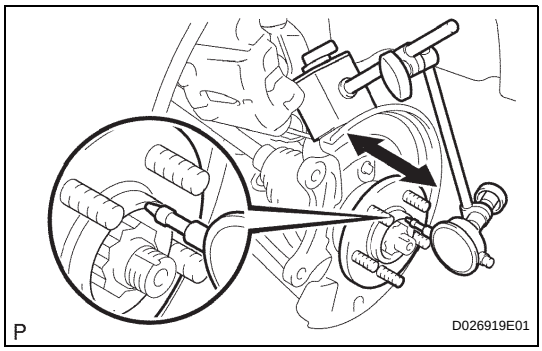
N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

C117469E02

AH



ON-VEHICLE INSPECTION

1. CHECK FRONT AXLE HUB BEARING

(a) Remove the front wheel.

(b) Disconnect the front disc brake caliper (see page BR-24).

(c) Remove the front disc.

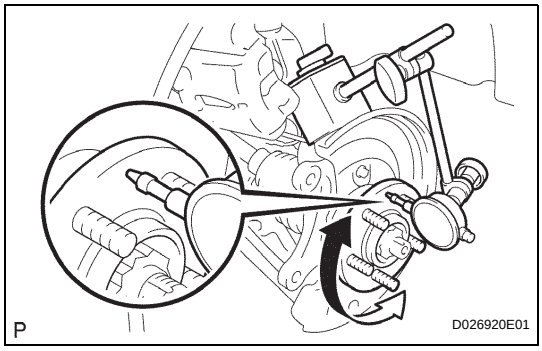
(d) Inspect the axle hub backlash.

(1) Using a dial indicator, check the backlash near the center of the axle hub.

Maximum backlash:

0.05 mm (0.0020 in.)

If the backlash is greater than the maximum, replace the bearing.



(e) Inspect the axle hub deviation.

(1) Using a dial indicator, check the deviation on the surface of the axle hub.

Maximum deviation:

0.05 mm (0.0020 in.)

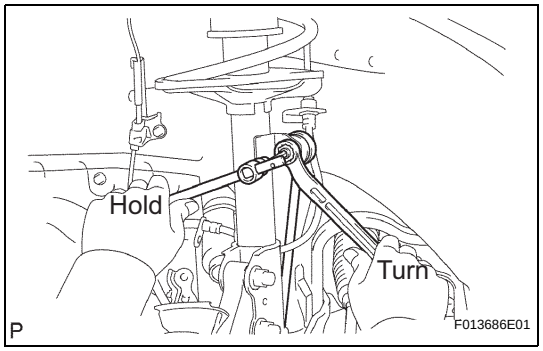
If the deviation is greater than the maximum, replace the bearing.

REMOVAL

HINT:
- Use the same procedures for the RH and LH side.
- The procedures listed below are for the LH side.

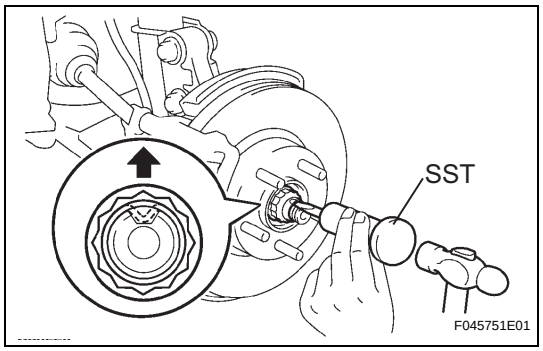
1. REMOVE FRONT WHEEL

2. DISCONNECT FRONT STABILIZER LINK ASSEMBLY



(a) Remove the nut, and disconnect the stabilizer link assembly.
HINT:
If the ball joint turns together with the nut, use a 6 mm hexagon wrench to hold the stud in place.

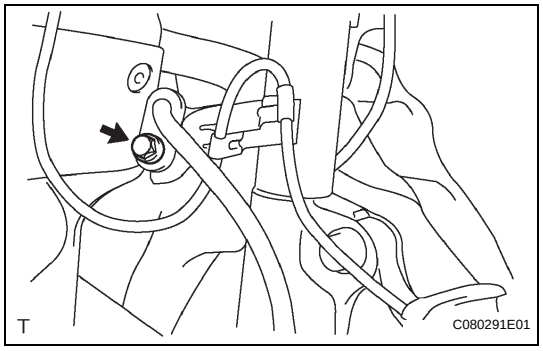
3. REMOVE FRONT AXLE HUB NUT



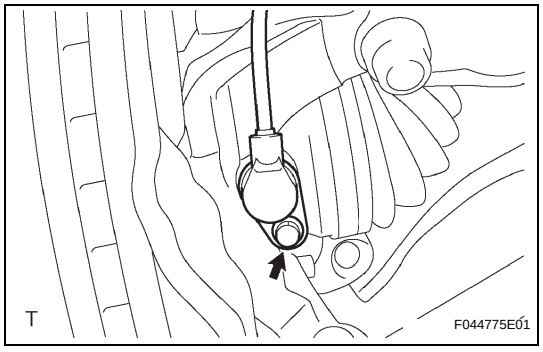
(a) Using SST and a hammer, unstake the staked part of the nut.
SST 09930-00010
NOTICE:
Loosen the staked part of the nut completely, otherwise the screw of the drive shaft may be damaged.

(b) While applying the brakes, remove the lock axle hub nut.

4. DISCONNECT FRONT SPEED SENSOR

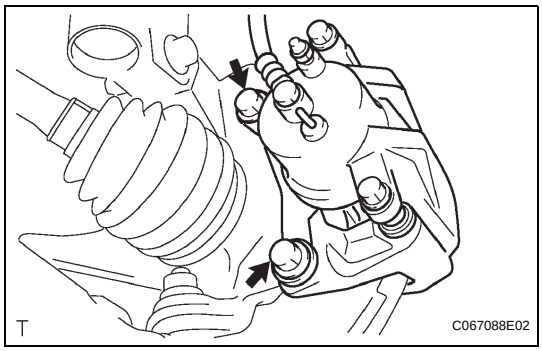


(a) Remove the bolt, and disconnect the speed sensor wire and flexible hose from the shock absorber.
HINT:
Be careful not to damage the speed sensor.



(b) Remove the bolt, and separate the speed sensor front from the steering knuckle.
NOTICE:
- **Be careful not to damage the speed sensor.**
- **Prevent foreign matter from attaching to the speed sensor.**

AH



5. DISCONNECT FRONT DISC BRAKE CYLINDER ASSEMBLY

(a) Remove the 2 bolts and disconnect the disc brake caliper from the steering knuckle.

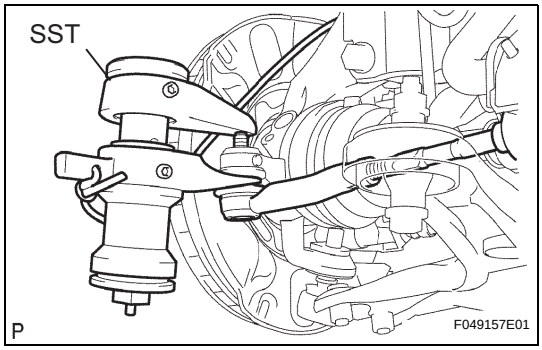
NOTICE:

- **Use a string or equivalent to keep the brake caliper from hanging down by the flexible hose.**
- **The friction surface of the pad and disc must be free from oil, grease and paint.**

6. REMOVE FRONT DISC

NOTICE:

There should be no oil or grease on the friction surface of the pad and disc.

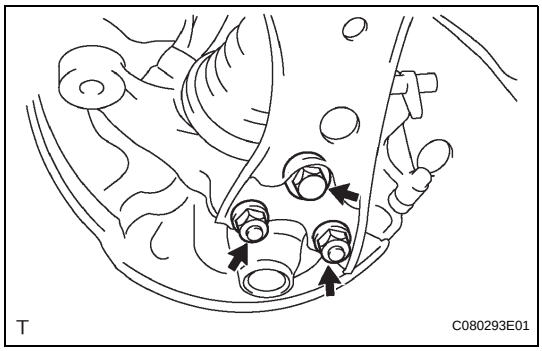


7. DISCONNECT TIE ROD END SUB-ASSEMBLY

(a) Remove the cotter pin and nut.

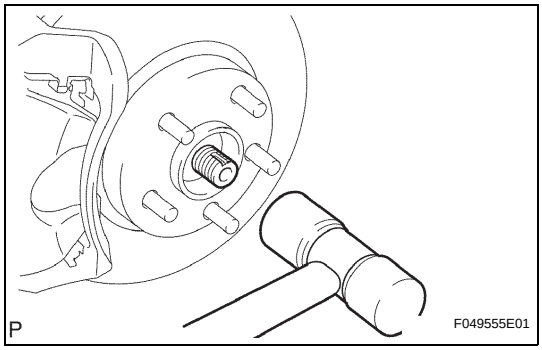
(b) Using SST, disconnect the tie rod end from the steering knuckle.

SST 09628-00011



8. DISCONNECT FRONT NO. 1 SUSPENSION LOWER ARM SUB-ASSEMBLY

(a) Remove the bolt and 2 nuts, and disconnect the suspension lower arm from the lower ball joint.

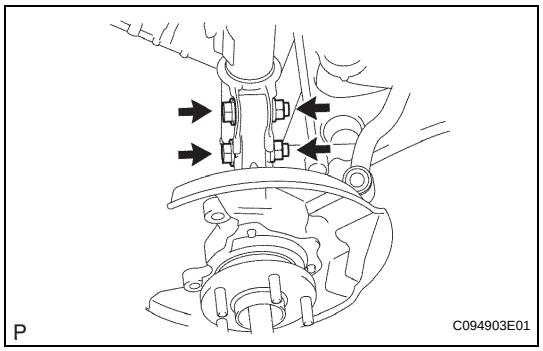


9. REMOVE FRONT AXLE ASSEMBLY

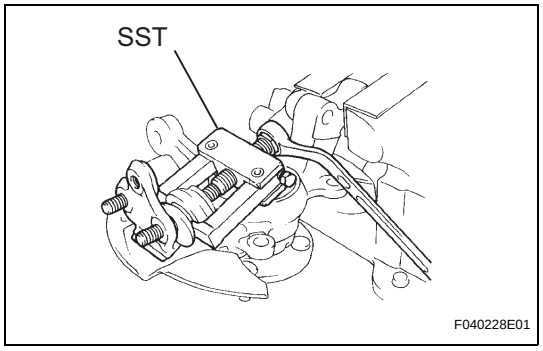
(a) Using a plastic-faced hammer, disconnect the drive shaft from the axle hub.

NOTICE:

Be careful not to damage the boot and speed sensor rotor.



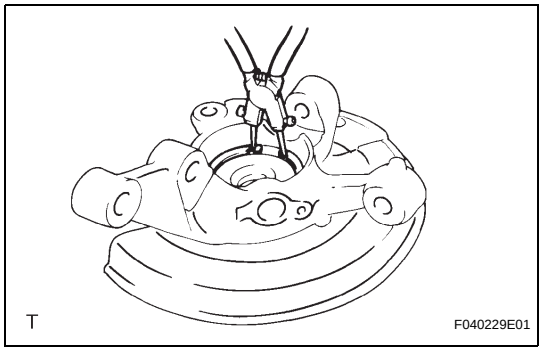
(b) Remove the 2 bolts, 2 nuts and steering knuckle from the shock absorber.



10. REMOVE FRONT LOWER BALL JOINT ASSEMBLY

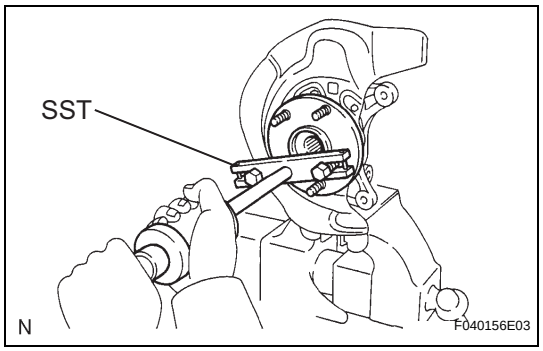
(a) Remove the cotter pin and nut.

(b) Using SST, remove the ball joint.
SST 09628-62011



11. REMOVE FRONT AXLE HUB HOLE SNAP RING

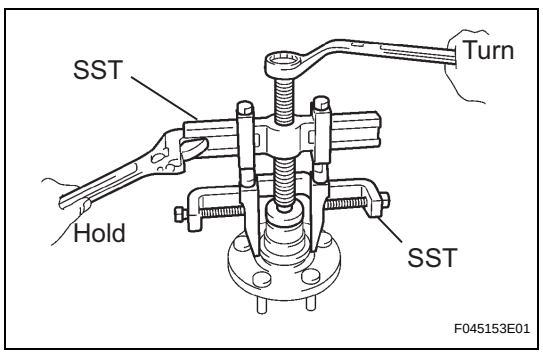
(a) Using snap ring pliers, remove the hole snap ring.



12. REMOVE FRONT AXLE HUB SUB-ASSEMBLY

(a) Hold the steering knuckle lightly in a soft vise.
NOTICE:
Do not overtighten the vise.

(b) Using SST, remove the axle hub.
SST 09520-00031

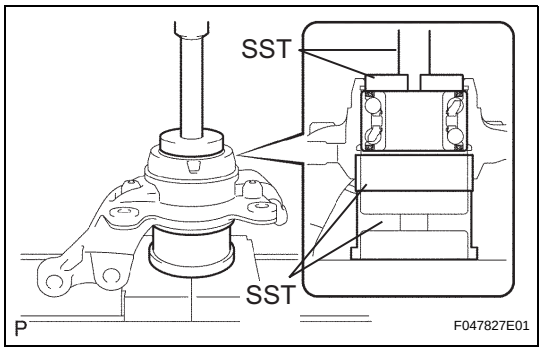


(c) Using SST, remove the bearing inner race (outside) from the axle hub.
SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010, 09958-04010), 09950-60010 (09951-00370)

13. REMOVE FRONT DISC BRAKE DUST COVER

(a) Remove the 3 bolts and front disc brake dust cover from the steering knuckle.

AH



14. REMOVE FRONT AXLE HUB BEARING

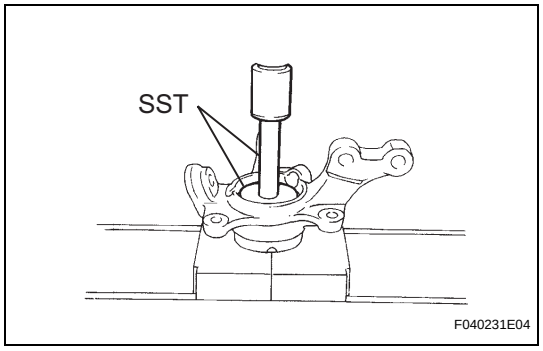
(a) Place the bearing inner race (outside) on the axle hub bearing.

(b) Using SST and a press, press out the axle hub bearing from the steering knuckle.

SST 09223-15020, 09950-60020 (09951-00720), 09950-70010 (09951-07100, 09387-02010)

INSTALLATION

HINT:
- Use the same procedures for the RH and LH side.
- The procedures listed below are for the LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).



1. INSTALL FRONT AXLE HUB BEARING

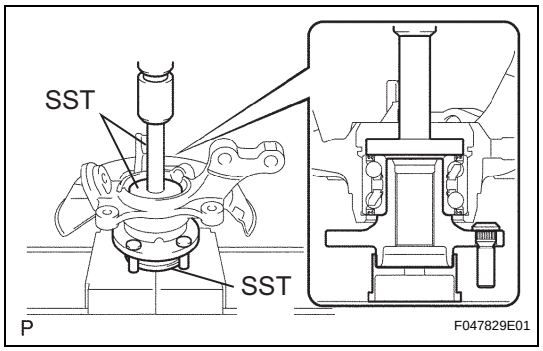
(a) Using SST and a press, press a new axle hub bearing into the steering knuckle.

SST 09950-60020 (09951-00720), 09950-70010 (09951-07100)

2. INSTALL FRONT DISC BRAKE DUST COVER

(a) Install the front disc brake dust cover to the steering knuckle with the 3 bolts.

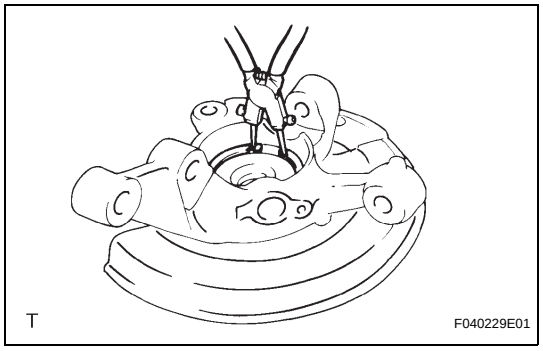
Torque: 8.3 N*m (85 kgf*cm, 73 in.*lbf)



3. INSTALL FRONT AXLE HUB SUB-ASSEMBLY

(a) Using SST and a press, press in the axle hub sub-assembly.

SST 09608-32010, 09950-60010 (09951-00600), 09950-70010 (09951-07100)



4. INSTALL FRONT AXLE HUB HOLE SNAP RING

(a) Using snap ring pliers, install the hole snap ring.

5. INSTALL FRONT LOWER BALL JOINT ASSEMBLY

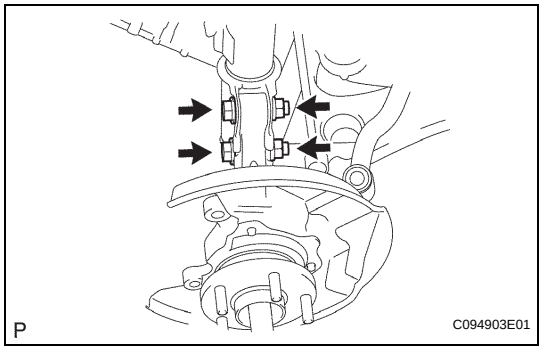
(a) Install the lower ball joint and torque the nut.

Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)

(b) Install a new cotter pin.

NOTICE:

If the holes for the cotter pin are not aligned, tighten the nut an additional 60°.



6. INSTALL FRONT AXLE ASSEMBLY

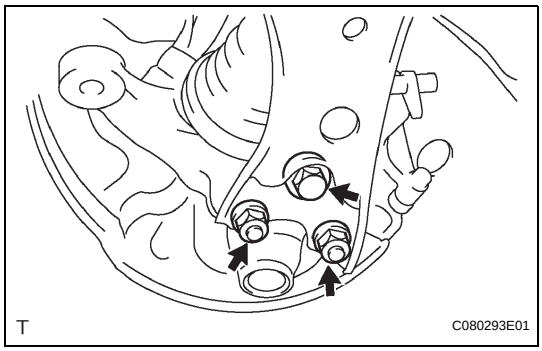
(a) Install the drive shaft to the front axle.

(b) Install the steering knuckle with the 2 bolts and 2 nuts.

Torque: 240 N*m (2447 kgf*cm, 177 ft.*lbf)

NOTICE:
- **Only when reusing the bolts and nuts, apply the small amount of engine oil to the screw parts of the nuts.**
- **Be careful not to damage the outboard joint boot and speed sensor rotor.**

AH

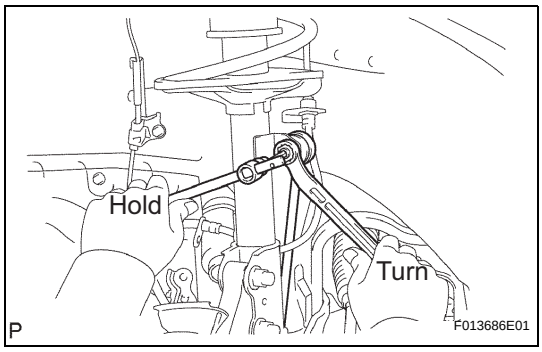


7. INSTALL FRONT NO. 1 SUSPENSION LOWER ARM SUB-ASSEMBLY

(a) Install the lower ball joint to the No. 1 front suspension lower arm with the bolt and 2 nuts.
Torque: 89 N*m (908 kgf*cm, 66 ft.*lbf)

8. INSTALL TIE ROD END SUB-ASSEMBLY

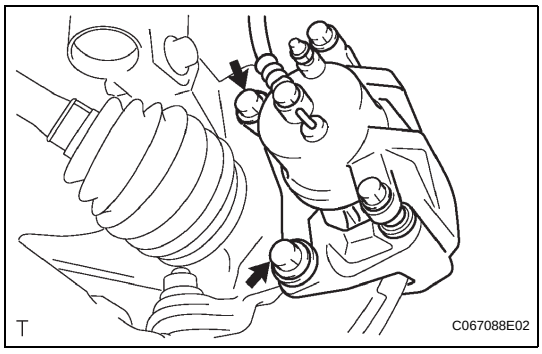
(a) Install the tie rod end to the steering knuckle with the nut.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)
NOTICE:
If the holes for the cotter pin are not aligned, tighten the nut an additional 60°.



9. INSTALL FRONT STABILIZER LINK ASSEMBLY

(a) Install the front stabilizer link assembly with the nut.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
HINT:
If the ball joint turns together with the nut, use a 6 mm hexagon wrench to hold the stud in place.

10. INSTALL FRONT DISC



11. INSTALL FRONT DISC BRAKE CYLINDER ASSEMBLY

(a) Install the front disc brake caliper assembly to the steering knuckle with the 2 bolts.
Torque: 107 N*m (1090 kgf*cm, 79 ft.*lbf)
NOTICE:
There should be no oil or grease on the friction surface of the pad and disc.

12. INSTALL FRONT AXLE HUB NUT

(a) Using a 30 mm socket wrench, install a new axle hub nut.
Torque: 216 N*m (2200 kgf*cm, 159 ft.*lbf)

13. REMOVE FRONT DISC BRAKE CYLINDER ASSEMBLY

(a) Remove the 2 bolts and separate the disc brake caliper assembly from the steering knuckle.
NOTICE:
- **Use a string or equivalent to keep the brake caliper from hanging down by the flexible hose.**
- **There should be no oil or grease on the friction surface of the pad and disc.**

14. REMOVE FRONT DISC

15. INSPECT FRONT AXLE HUB BEARING BACKLASH.

(a) Inspect the front axle hub bearing backlash. (see page AH-6).

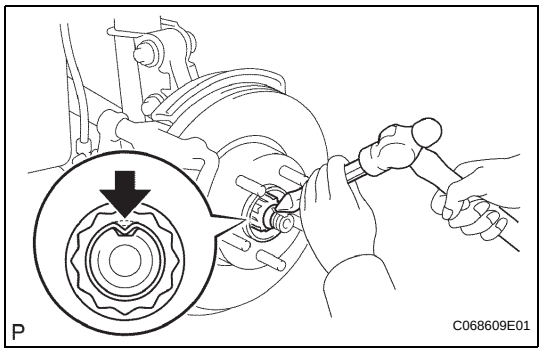
AH

16. INSPECT FRONT AXLE HUB BEARING DEVIATION
(a) Inspect the front axle hub bearing deviation. (see page AH-6).

17. INSTALL FRONT DISC

18. INSTALL DISC BRAKE CYLINDER ASSEMBLY
(a) Install the disc brake caliper assembly to the steering knuckle with the 2 bolts.
Torque: 107 N*m (1090 kgf*cm, 79 ft.*lbf)

19. INSTALL FRONT SPEED SENSOR
(a) Install the front speed sensor (see page BC-77).



20. STAKE FRONT AXLE HUB NUT
(a) Using a chisel and hammer, stake the axle hub nut.

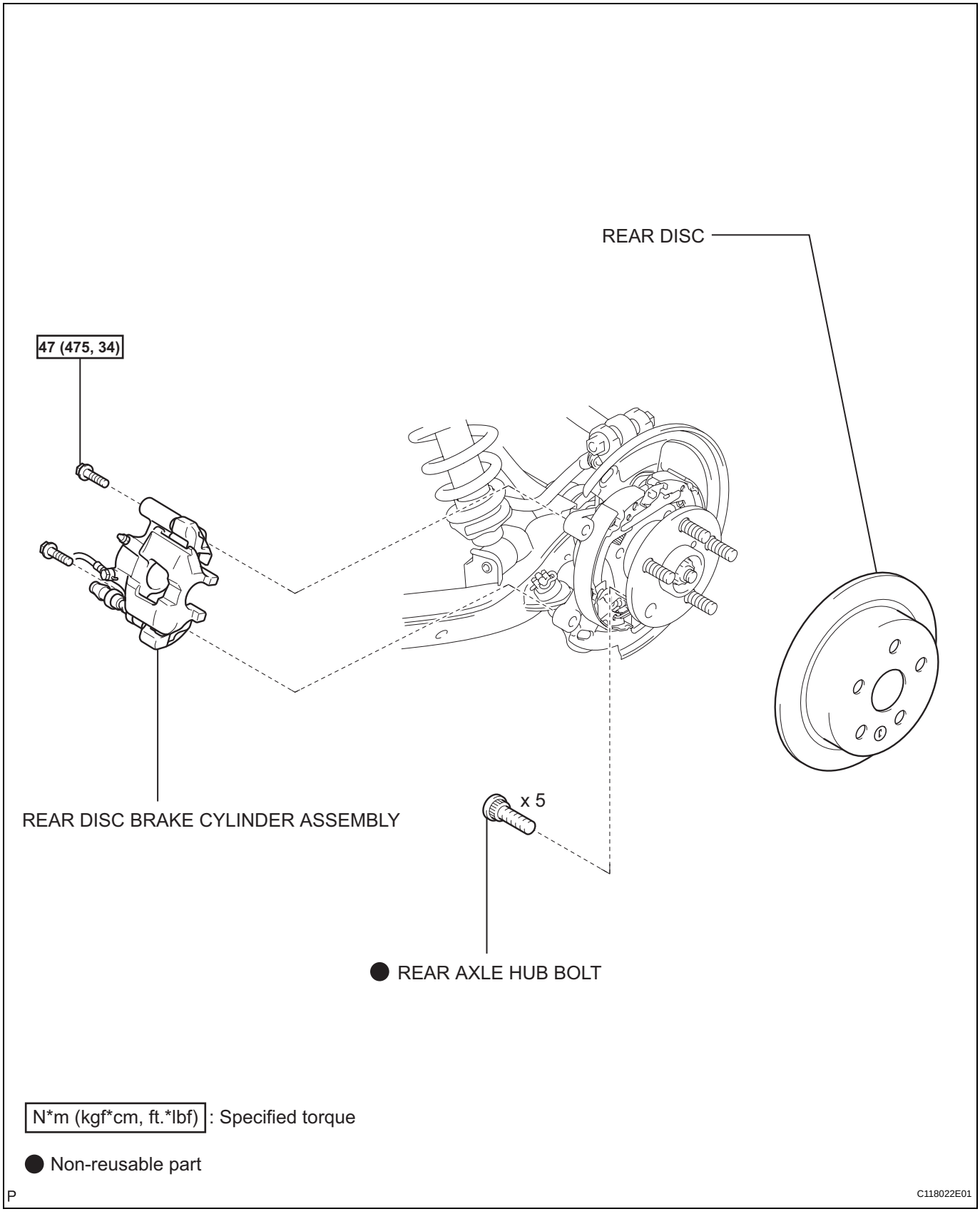
21. INSTALL FRONT WHEEL
Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)

22. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT
(a) Inspect and adjust the front wheel alignment (see page SP-2).

23. CHECK ABS SPEED SENSOR SIGNAL
(a) Check the ABS speed sensor signal (see page BC-12).

REAR AXLE HUB BOLT

COMPONENTS



REPLACEMENT

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

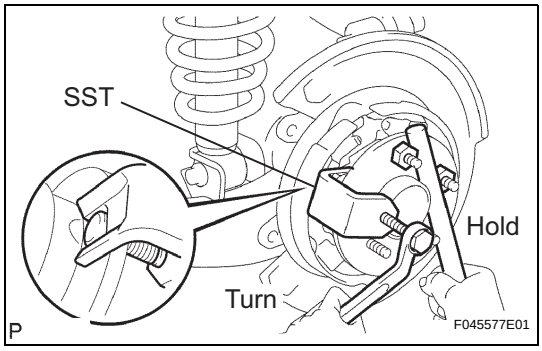
1. DISCONNECT REAR WHEEL

2. REMOVE REAR DISC BRAKE CYLINDER ASSEMBLY

(a) Disconnect the rear disc brake cylinder assembly (see page BR-31).

3. REMOVE REAR DISC

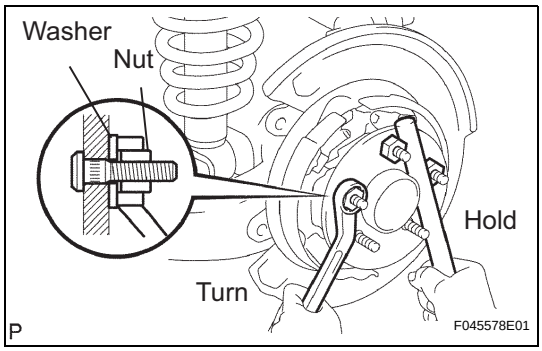
4. REMOVE REAR AXLE HUB BOLT



(a) Temporarily install the 2 nuts to the hub bolts as shown in the illustration.

(b) Using SST and a brass bar or equivalent to hold the axle shaft, and remove the hub bolt.

SST 09628-10011



5. INSTALL REAR AXLE HUB BOLT

(a) Install a plate washer and nut to a new hub bolt, as shown in the illustration.

(b) Using a brass bar or equivalent to hold the axle shaft, and install the hub bolt by torquing the nut.

(c) Remove the 2 nuts from the hub bolts.

6. INSTALL REAR DISC

7. INSTALL REAR DISC BRAKE CYLINDER ASSEMBLY

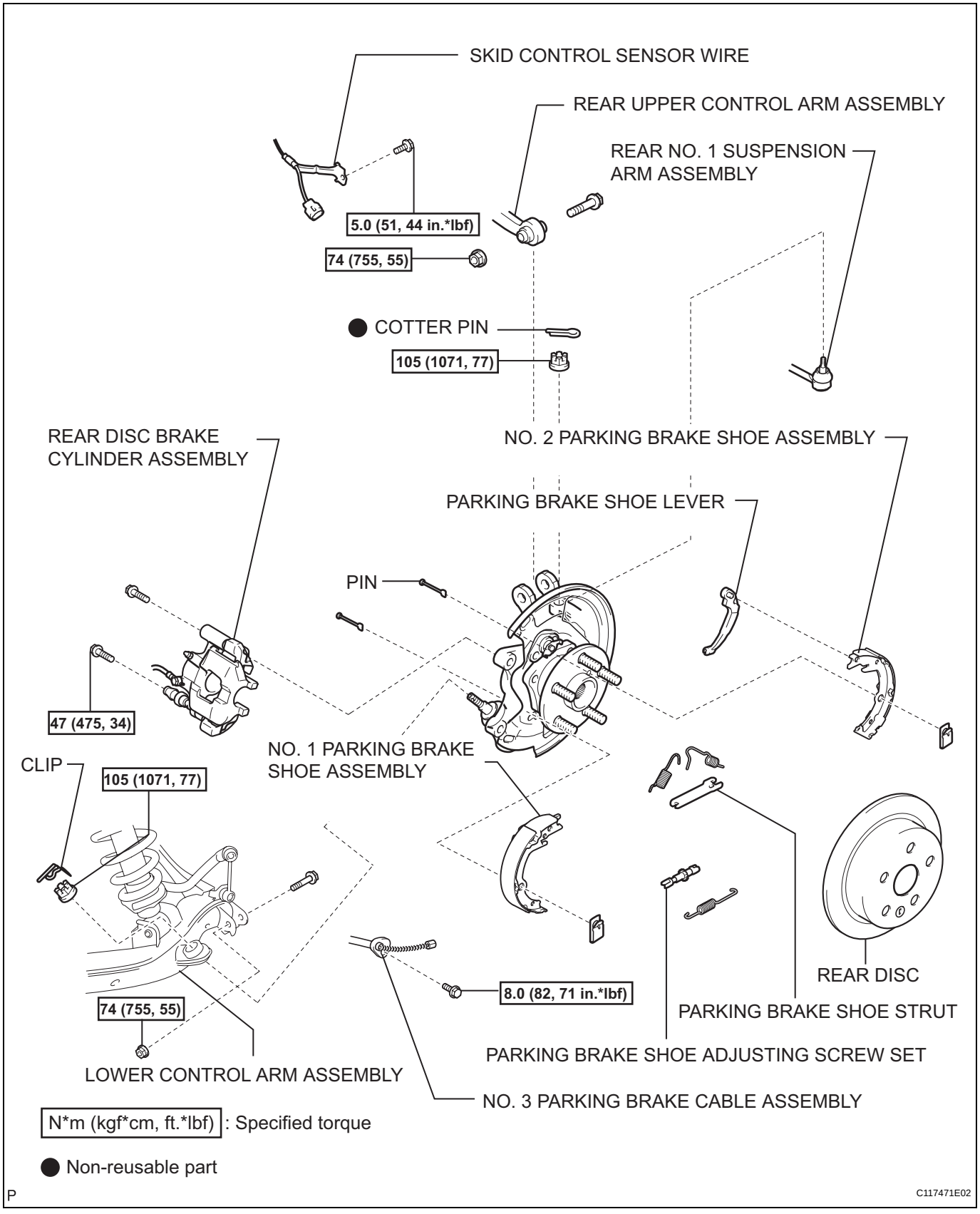
(a) Install the rear disc brake cylinder assembly (see page BR-34).

8. INSTALL REAR WHEEL

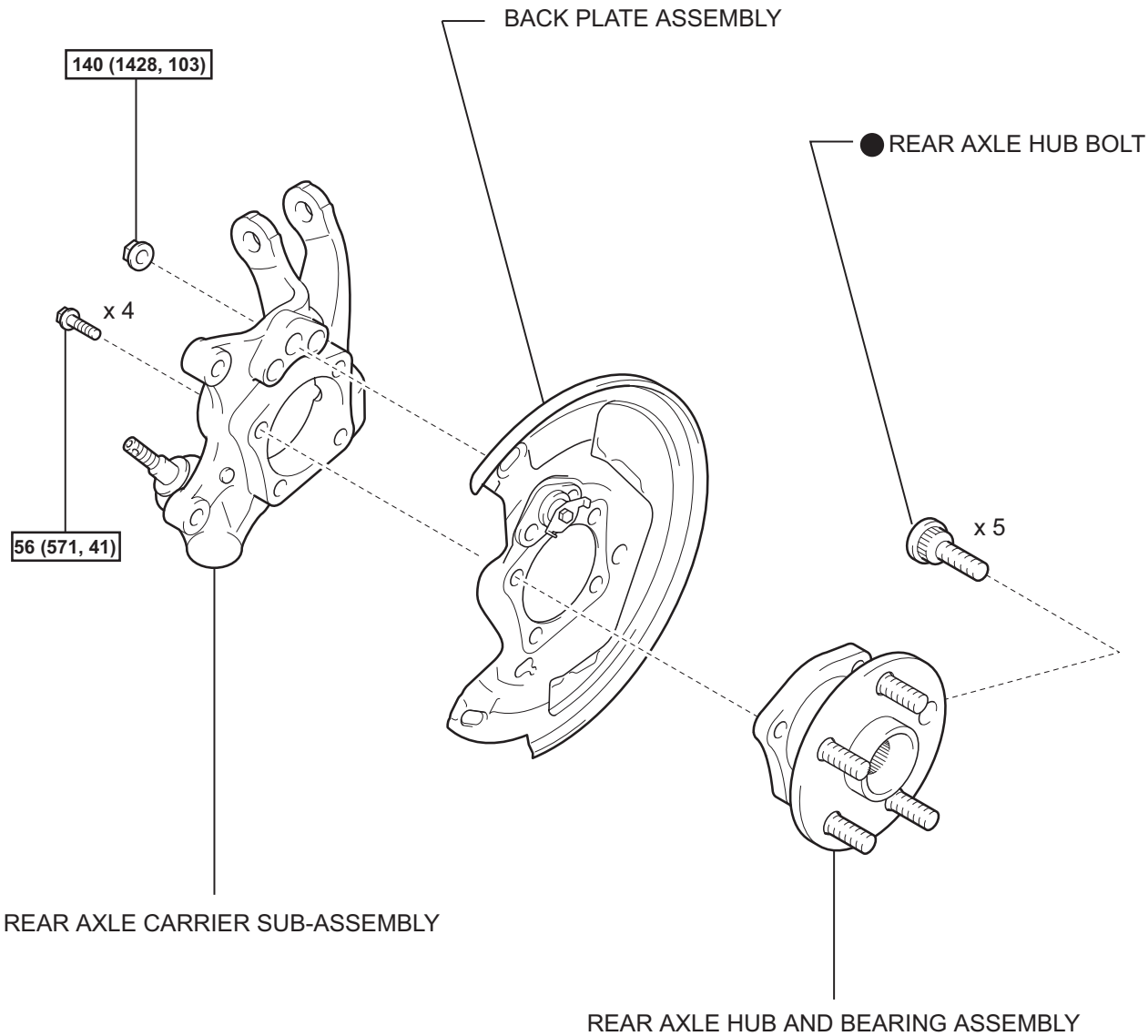
Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)

REAR AXLE CARRIER

COMPONENTS



AH



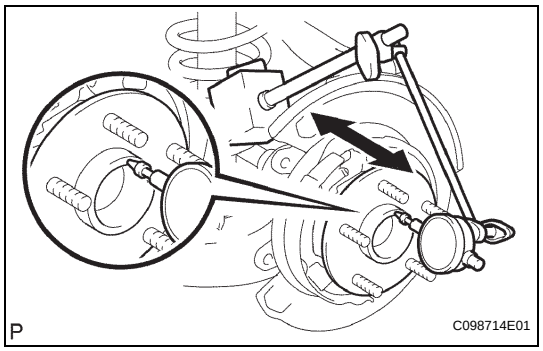
AH

N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

C117466E02



ON-VEHICLE INSPECTION

1. CHECK REAR AXLE SHAFT BEARING

(a) Remove the rear wheel.

(b) Disconnect the rear brake cylinder (see page BR-24).

(c) Remove the rear disc.

(d) Inspect the axle shaft backlash.

(1) Using a dial indicator, check the backlash near the center of the axle shaft.

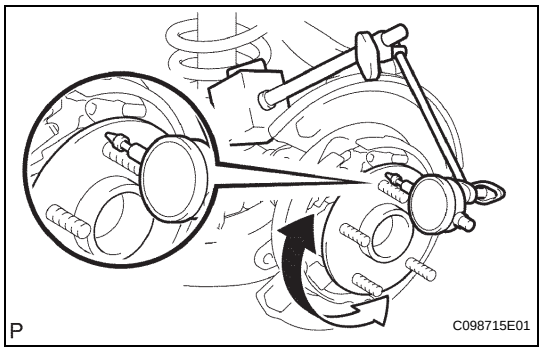
Maximum backlash:

0.05 mm (0.0020 in.)

If the backlash is greater than the maximum, replace the bearing.

NOTICE:

Ensure that the dial indicator is set at right angles to the measurement surface.



(e) Inspect the axle shaft deviation.

(1) Using a dial indicator, check the deviation at the surface of the axle shaft.

Maximum deviation:

0.07 mm (0.0028 in.)

If the deviation is greater than the maximum, replace the bearing.

REMOVAL

HINT:

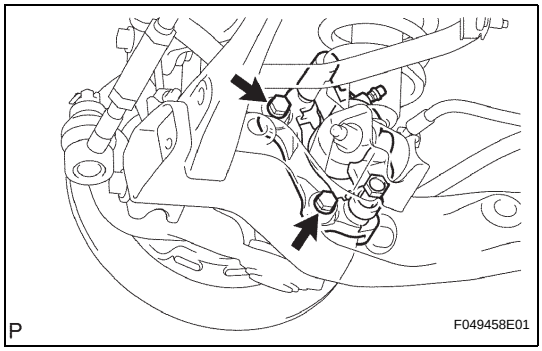
- Use the same procedures for the RH and LH side.
- The procedures listed below are for the LH side.

1. REMOVE REAR WHEEL

2. DISCONNECT REAR DISC BRAKE CYLINDER ASSEMBLY

(a) Remove the 2 bolts and disconnect the rear disc brake cylinder assembly.

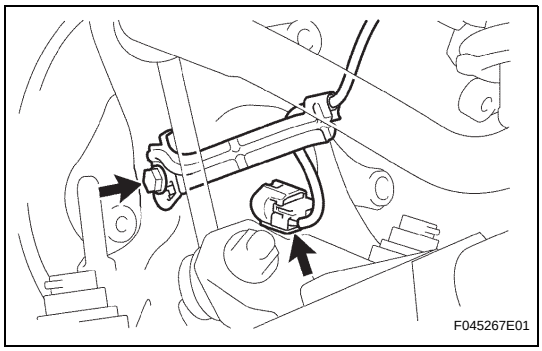
NOTICE:
Use a string or equivalent to keep the brake caliper from hanging down by the flexible hose.



3. DISCONNECT SKID CONTROL SENSOR WIRE

(a) Remove the bolt and disconnect the skid control sensor wire.

(b) Disconnect the connector.



4. REMOVE REAR DISC

5. REMOVE PARKING BRAKE SHOE ADJUSTING SCREW SET

(a) Remove the parking brake shoe adjusting screw set (see page PB-14).

6. REMOVE NO. 1 PARKING BRAKE SHOE ASSEMBLY

(a) Using SST, remove the No. 1 parking brake shoe assembly (see page PB-14).

SST 09718-00010

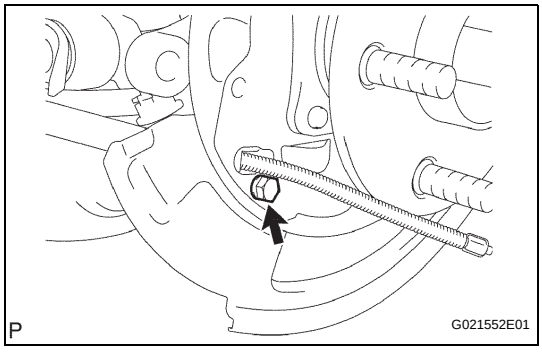
7. DISCONNECT NO. 2 PARKING BRAKE SHOE ASSEMBLY

(a) Using SST, remove the No. 2 parking brake shoe assembly (see page PB-14).

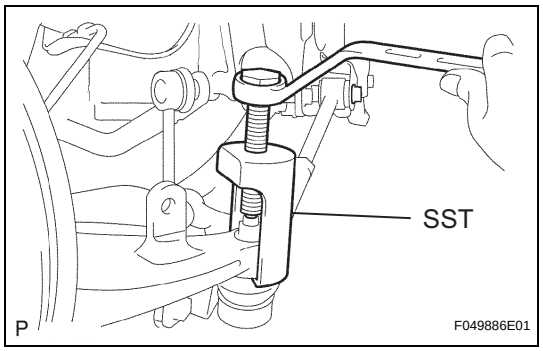
SST 09718-00010

8. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

(a) Using needle-nose pliers, disconnect the No.3 parking brake cable assembly from the backing plate.



AH

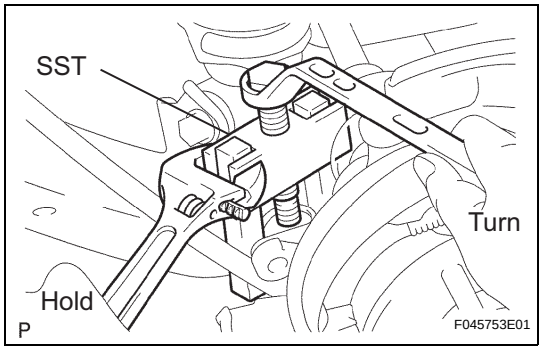


9. DISCONNECT LOWER CONTROL ARM ASSEMBLY

(a) Loosen the lower control arm assembly bolt (member side).

(b) Remove the cotter pin and nut.

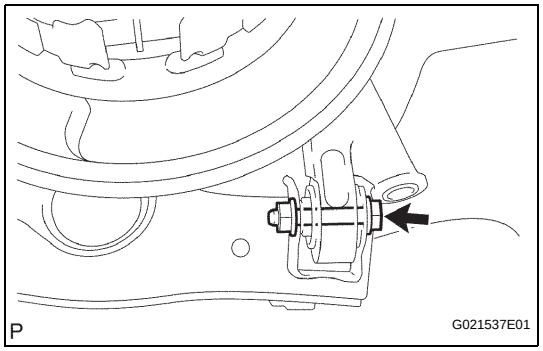
(c) Using SST, disconnect the lower control arm assembly from the axle carrier.
SST 09610-20012



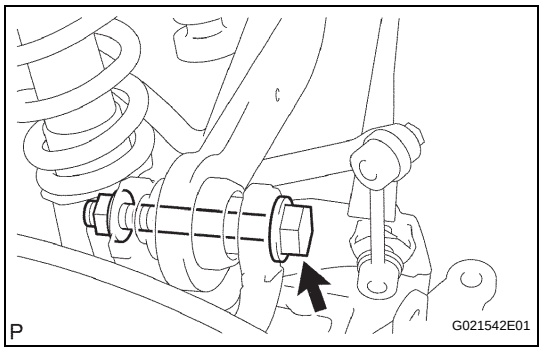
10. DISCONNECT REAR NO. 1 SUSPENSION ARM ASSEMBLY

(a) Remove the clip and nut.

(b) Using SST, disconnect the suspension arm (ball joint side).
SST 09628-62011

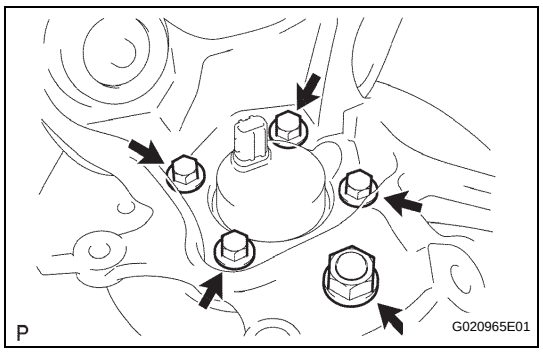


(c) Remove the bolt and nut, and then separate the rear suspension arm.
NOTICE:
When removing the bolt, hold the nut in place.



11. DISCONNECT REAR UPPER CONTROL ARM ASSEMBLY

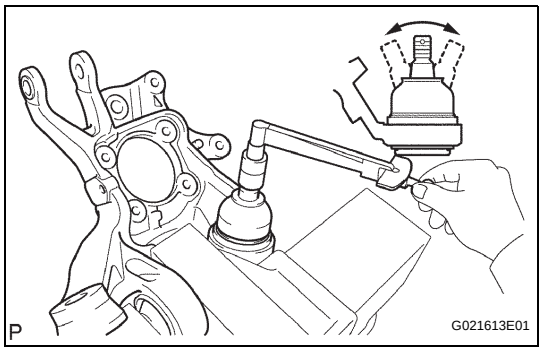
(a) Remove the bolt and nut, and then disconnect the upper control arm from the axle carrier.
NOTICE:
When removing the bolt, hold the nut not in place.



12. REMOVE REAR AXLE CARRIER SUB-ASSEMBLY

(a) Remove the 4 bolts, nut, hub and bearing assembly and back plate assembly from the rear axle carrier.

AH



13. INSPECT REAR AXLE CARRIER SUB-ASSEMBLY

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times before installing the nut.

(b) Using a torque wrench, turn the nut continuously at a rate of 3 to 5 seconds per turn and take the torque reading on the 5th turn.

Torque: Maximum turning torque
3.0 N*m (30 kgf*cm, 27 in.*lbf)

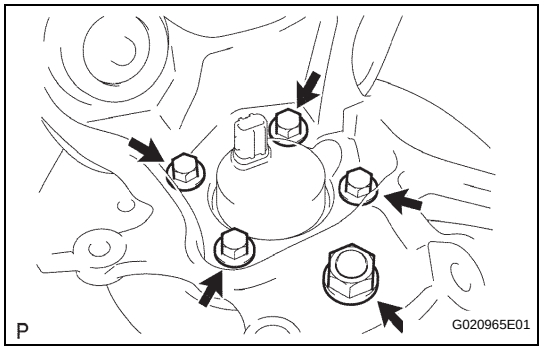
NOTICE:

- **Neither abnormal drag nor rattle exists during the rotation.**
- **There should be no cracks, grease leakage or deformation on the dust cover.**

INSTALLATION

HINT:

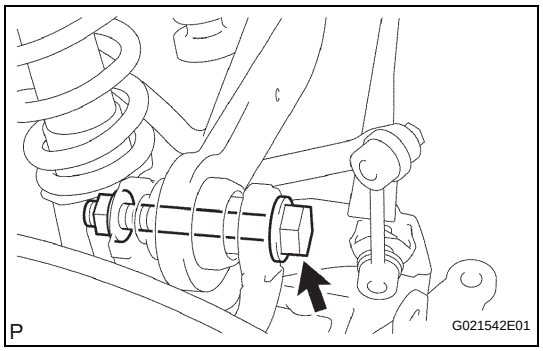
- Use the same procedures for the RH and LH side.
- The procedures listed below are for the LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).



1. INSTALL REAR AXLE CARRIER SUB-ASSEMBLY

(a) Install the hub and bearing assembly and back plate assembly to the rear axle carrier with the 4 bolts and nut.

Torque: 56 N*m (571 kgf*cm, 41 ft.*lbf) for bolt
140 N*m (1428 kgf*cm, 103 ft.*lbf) for nut

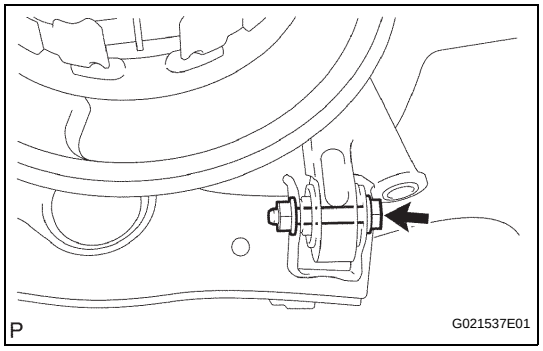


2. TEMPORARILY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY

(a) Temporarily tighten the upper control arm with the bolt and nut.

HINT:

Insert the bolt from the rear side of the vehicle and temporarily install the bolt.

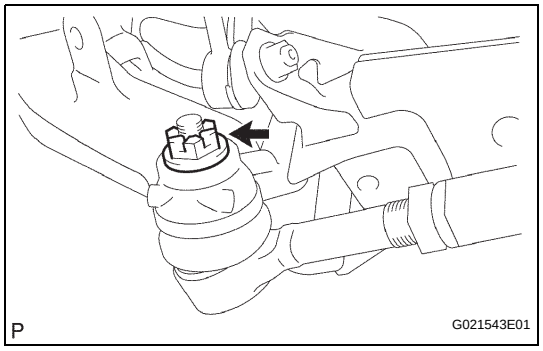


3. TEMPORARILY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY

(a) Temporarily tighten the rear suspension arm (ball joint side) with the bolt and nut.

HINT:

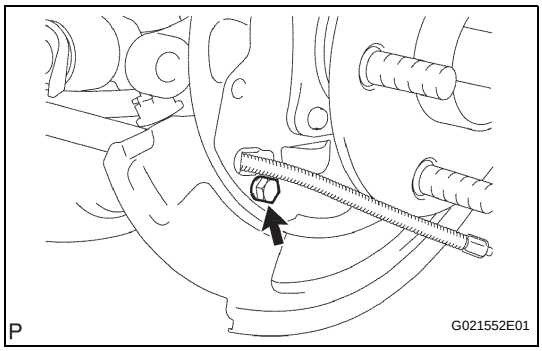
Insert the bolt from the rear side of the vehicle and temporarily install the bolt.



4. TEMPORARILY TIGHTEN LOWER CONTROL ARM ASSEMBLY

(a) Temporarily tighten the lower control arm with the nut.

AH



5. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY

(a) Install the No. 3 parking brake cable to the backing plate with the bolt.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

6. APPLY HIGH TEMPERATURE GREASE

(a) Apply high temperature grease (see page PB-16).

7. INSTALL PARKING BRAKE SHOE LEVER

(a) Install the parking brake shoe lever (see page PB-16).

8. INSTALL NO. 1 PARKING BRAKE SHOE ASSEMBLY

(a) Install the No. 1 parking brake shoe assembly (see page PB-16).

9. INSTALL PARKING BRAKE SHOE ADJUSTING SCREW SET

(a) Install the parking braking brake shoe adjusting screw set (see page PB-16).

10. INSTALL PARKING BRAKE SHOE STRUT

(a) Install the parking brake shoe strut (see page PB-16).

11. CHECK PARKING BRAKE INSTALLATION

(a) Check the parking brake installation (see page PB-16).

12. INSPECT AXLE HUB BEARING BACKLASH

(a) Inspect the axle hub bearing backlash (see page AH-17).

13. INSPECT AXLE HUB BEARING DEVIATION

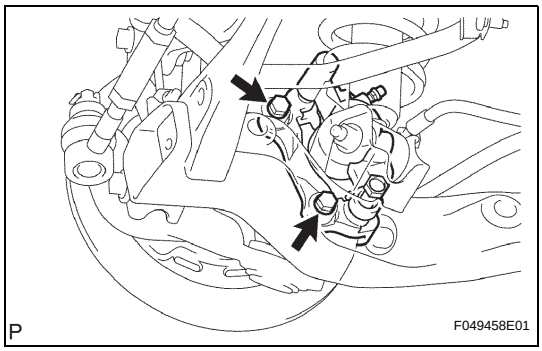
(a) Inspect the axle hub bearing deviation (see page AH-17).

14. INSTALL REAR DISC

15. ADJUST PARKING BRAKE SHOE CLEARANCE

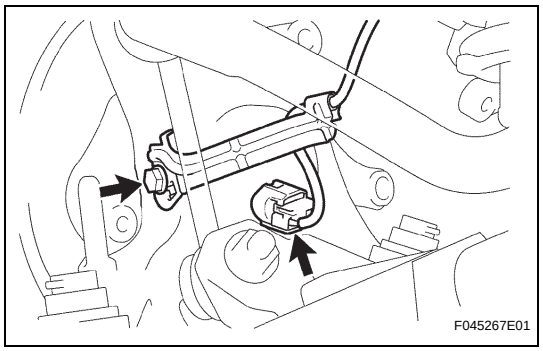
(a) Adjust the parking brake shoe clearance (see page PB-18).

AH



16. INSTALL REAR DISC BRAKE CYLINDER ASSEMBLY

(a) Install the rear disc brake caliper with the 2 bolts.
Torque: 47 N*m (475 kgf*cm, 34 ft.*lbf)



17. **CONNECT SKID CONTROL SENSOR WIRE**
    (a) Connect the skid control sensor wire with the bolt.
    Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
    (b) Connect the connector.
    HINT:
    Do not twist the sensor wire when installing the sensor.

18. **INSTALL REAR WHEEL**
    Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)

19. **STABILIZE SUSPENSION**
    (a) Stabilize the suspension (see page SP-38).

20. **FULLY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY**
    (a) Fully tighten the bolt and nut.
    Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
    NOTICE:
    When installing the bolt, hold the nut in place.

21. **FULLY TIGHTEN REAR NO. 1 SUSPENSION ARM ASSEMBLY**
    (a) Fully tighten the nut (ball joint side).
    Torque: 105 N*m (1071 kgf*cm, 77 ft.*lbf)
    (b) Install a new clip.
    NOTICE:
    If the holes for the clip are not aligned, tighten the nut an addifional 60°.
    (c) Fully tighten the bolt and nut.
    Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
    NOTICE:
    When installing the bolt, hold the nut in place.

22. **FULLY TIGHTEN LOWER CONTROL ARM ASSEMBLY**
    (a) Fully tighten the nut.
    Torque: 105 N*m (1071 kgf*cm, 77 ft.*lbf)
    (b) Install a new cotter pin.
    NOTICE:
    If the holes for the clip are not aligned, tighten the nut an additional 60°.
    (c) Fully tighten the bolt (member side).
    Torque: 115 N*m (1173 kgf*cm, 85 ft.*lbf)
    NOTICE:
    When installing the bolt, hold the nut in place.

23. **INSPECT AND ADJUST PARKING BRAKE LEVER TRAVEL**
    (a) Inspect and adjust the parking brake lever travel (see page PB-1).

24. **INSPECT AND ADJUST REAR WHEEL ALIGNMENT**
    (a) Inspect and adjust the rear wheel alignment (see page SP-9).

25. **CHECK ABS SPEED SENSOR SIGNAL**
    (a) Check the ABS speed sensor signal (see page BC-12).

BRAKE SYSTEM

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 replacing the brake system.**
- **If the vehicle is equipped with a mobile communication system, refer to the Precautions in the INTRODUCTION section.**

PROBLEM SYMPTOMS TABLE

Use the table below to help determine the cause of the problem symptom. 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

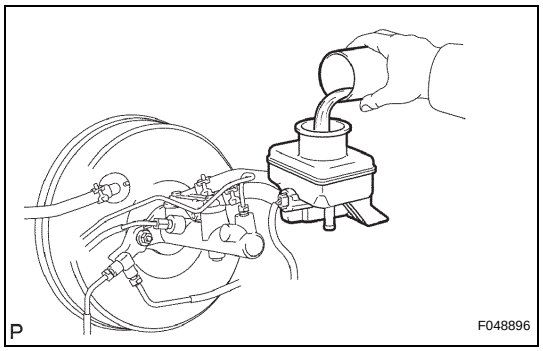
Symptom	Suspected Area	See page
Low pedal or spongy pedal	1. Fluid leaks in brake system	-
	2. Air in brake system	BR-3
	3. Piston seals (worn or damaged), for front	BR-25
	4. Piston seals (worn or damaged), for rear	BR-32
	5. Brake master cylinder (faulty)	BR-13
	6. Booster push rod (adjustment necessary)	BR-15
Brake drag	1. Brake pedal free play (minimal)	BR-7
	2. Parking brake lever travel (adjustment necessary)	PB-1
	3. Parking brake wire (sticking)	PB-7
	4. Parking brake shoe clearance (adjustment necessary)	PB-1
	5. Pad (cracked or distorted), for front	BR-26
	6. Pad (cracked or distorted), for rear	BR-33
	7. Piston (stuck or frozen), for front	BR-25
	8. Piston (stuck or frozen), for rear	BR-32
	9. Booster push rod (adjustment necessary)	BR-15
	10. Vacuum leaks in brake system	BR-19
	11. Brake master cylinder (faulty)	BR-13
Brake pull	1. Piston (stuck or frozen), for front	BR-25
	2. Piston (stuck or frozen), for rear	BR-32
	3. Pad (oily, cracked or distorted), for front	BR-26
	4. Pad (oily, cracked or distorted), for rear	BR-33
	5. Front disc (scored)	BR-26
	6. Rear disc (scored)	BR-33
Brake pedal is depressed firmly but brake is insufficient	1. Fluid leaks in brake system	-
	2. Air in brake system	BR-3
	3. Pad (worn, cracked, distorted, oily or glazed), for front	BR-26
	4. Pad (worn, cracked, distorted, oily or glazed), for rear	BR-33
	5. Front disc (scored)	BR-26
	6. Rear disc (scored)	BR-33
	7. Booster push rod (adjustment necessary)	BR-15
	8. Vacuum leaks in brake system	BR-19

Symptom	Suspected Area	See page
Noise from brakes	1. Pad (worn, cracked, distorted, oily or glazed), for front	BR-26
	2. Pad (worn, cracked, distorted, oily or glazed), for rear	BR-33
	3. Installation bolt (loose), for front	BR-24
	4. Installation bolt (loose), for rear	BR-31
	5. Front disc (scored)	BR-26
	6. Rear disc (scored)	BR-33
	7. Pad support plate (loose), for front	BR-26
	8. Pad support plate (loose), for rear	BR-33
	9. Sliding pin (worn), for front	BR-25
	10. Sliding pin (worn), for rear	BR-32
	11. Anti squeal shim (damaged), for front	BR-24
	12. Anti squeal shim (damaged), for rear	BR-31

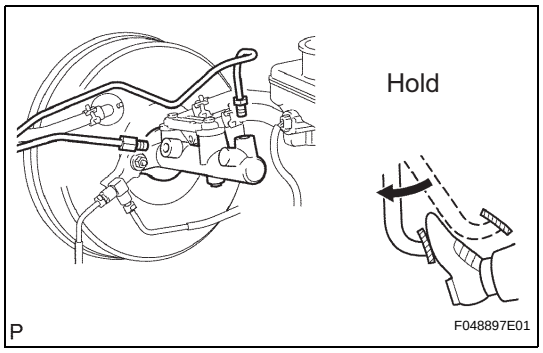
BRAKE FLUID

BLEEDING

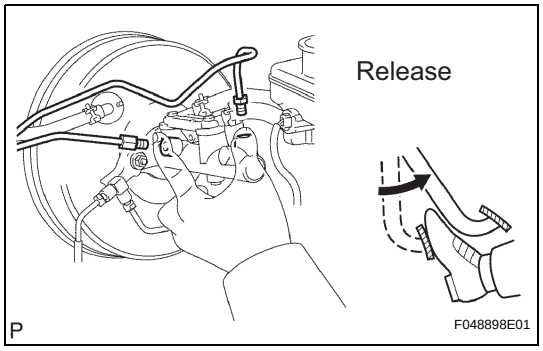
HINT:
If any work is performed on the brake system or if air in brake lines is suspected, bleed air from the brake system.
NOTICE:
Wash off brake fluid immediately if it comes in contact with any painted surface.



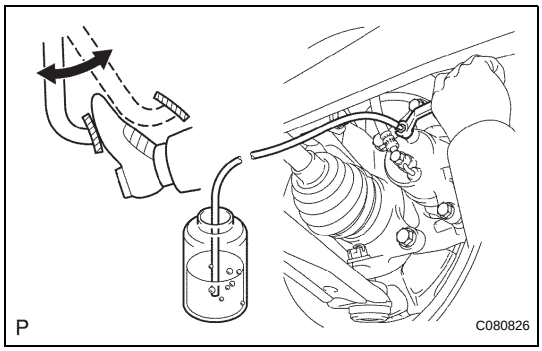
1. FILL RESERVOIR WITH BRAKE FLUID
Fluid:
SAE J1703 or FMVSS No. 116 DOT3



2. BLEED AIR FROM BRAKE MASTER CYLINDER
HINT:
If the master cylinder has been disassembled or if the reservoir becomes empty, bleed air from the master cylinder.
(a) Using SST, disconnect the 2 brake lines from the master cylinder.
SST 09023-00101
(b) Slowly depress and hold the brake pedal.

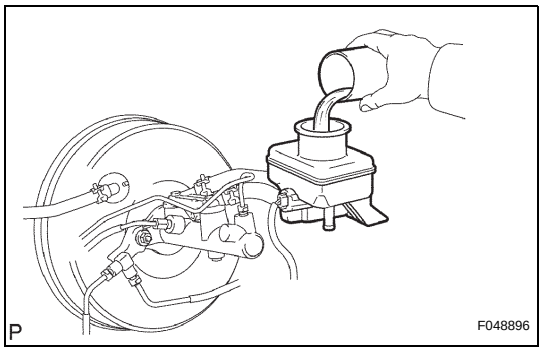


(c) Cover the outer holes with your finger, and release the pedal.
(d) Repeat the 2 previous steps 3 or 4 times.
(e) Using SST, connect the 2 brake lines to the master cylinder.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
14 N*m (143 kgf*cm, 10 ft.*lbf) with SST
HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).



3. BLEED AIR FROM BRAKE LINE

(a) Remove the bleeder plug cap.
(b) Connect the vinyl tube to the bleeder plug.
(c) Depress the pedal several times, and then loosen the bleeder plug with the pedal depressed.
(d) When fluid stops coming out, immediately tighten the bleeder plug. Then release the pedal.
(e) Repeat the 2 previous steps until all the air in the brake fluid is gone.
(f) Tighten the bleeder plug.
Torque: 8.3 N*m (85 kgf*cm, 74 in.*lbf)
(g) Install the cap.
(h) Bleed air from the brake line for each wheel by repeating the above procedures.

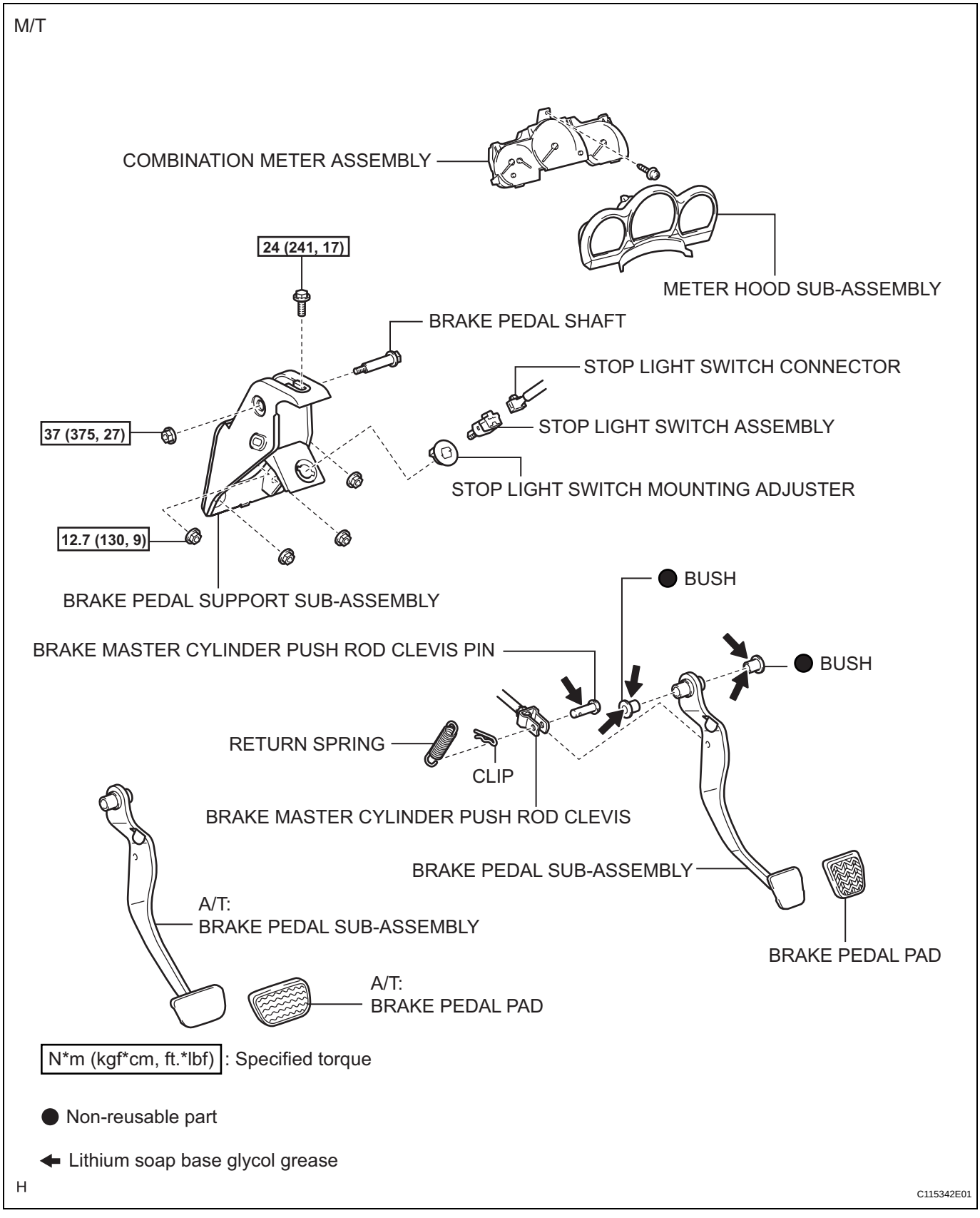


4. CHECK BRAKE FLUID LEVEL IN RESERVOIR

(a) Check the fluid level and add fluid if necessary.
Fluid:
SAE J1703 or FMVSS No 116 DOT3

BRAKE PEDAL

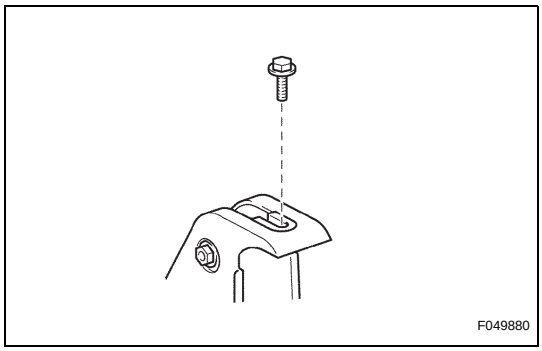
COMPONENTS

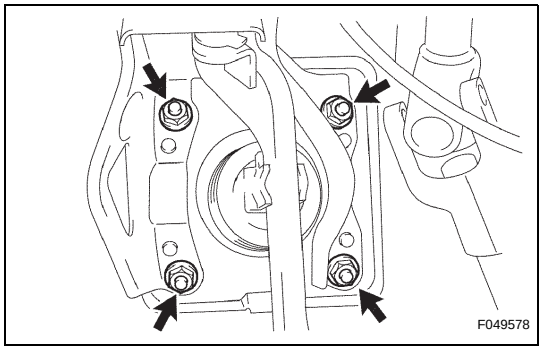


BR

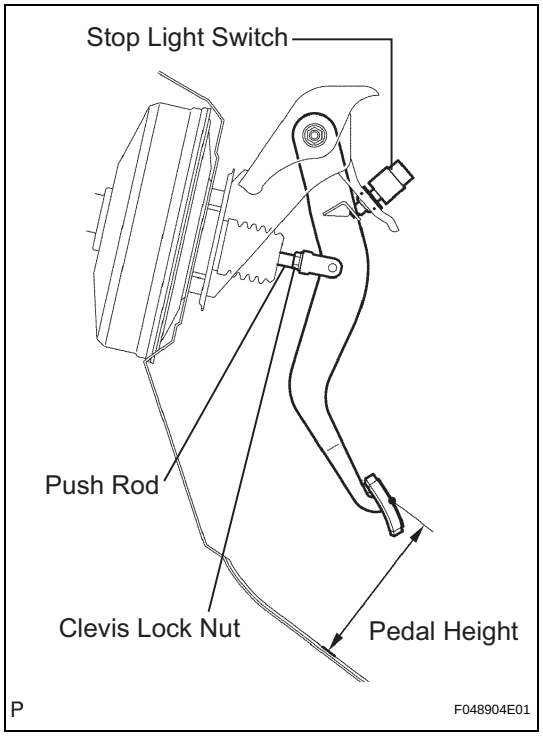
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE METER HOOD SUB-ASSEMBLY (See page ME-45)**
3. **REMOVE COMBINATION METER ASSEMBLY (See page ME-45)**
4. **DISCONNECT BRAKE MASTER CYLINDER PUSH ROD CLEVIS**
   (a) Remove the return spring.
   (b) Remove the clip and clevis pin.
   (c) Disconnect the push rod clevis from the brake pedal.
5. **REMOVE BRAKE PEDAL SUPPORT SUB-ASSEMBLY**
   (a) Disconnect the stop light switch connector.
   (b) Disconnect the wire harness clamp from the pedal support.
   (c) Remove the bolt from the pedal support.





   (d) Remove the 4 nuts and pedal support.
6. **REMOVE BRAKE PEDAL SUB-ASSEMBLY**
   (a) Remove the nut, brake pedal shaft and brake pedal.
   (b) Remove the 2 bushes from the brake pedal.
7. **REMOVE STOP LIGHT SWITCH ASSEMBLY**
   (a) Turn the switch counterclockwise and remove it.
   (b) Remove the mounting adjuster from the pedal support.
8. **REMOVE BRAKE PEDAL PAD**



ADJUSTMENT

1. CHECK AND ADJUST BRAKE PEDAL HEIGHT

(a) Check the pedal height.

Standard brake pedal height from asphalt sheet

Model	Specified Condition
M/T	146.1 to 156.1 mm (5.752 to 6.146 in.)
A/T	146.9 to 156.9 mm (5.784 to 6.177 in.)

(b) Adjust the pedal height.

(1) Disconnect the connector from the stop light switch.

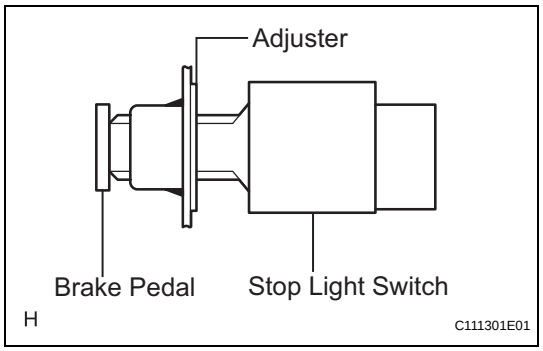
(2) Remove the switch.

(3) Loosen the push rod clevis lock nut.

(4) Adjust the pedal height by turning the push rod.

(5) Tighten the clevis lock nut.

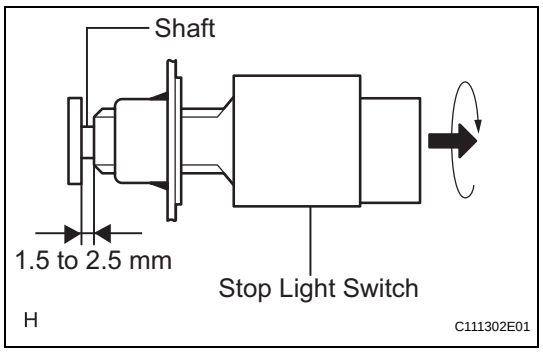
Torque: 26 N*m (265 kgf*cm, 19 ft.*lbf)



(6) Insert the switch into the adjuster until it slightly touches the pedal.

NOTICE:

Do not depress the pedal.



(7) Turn the switch a quarter turn clockwise.

Torque: 1.5 N*m (15 kgf*cm, 13 in.*lbf) or less

NOTICE:

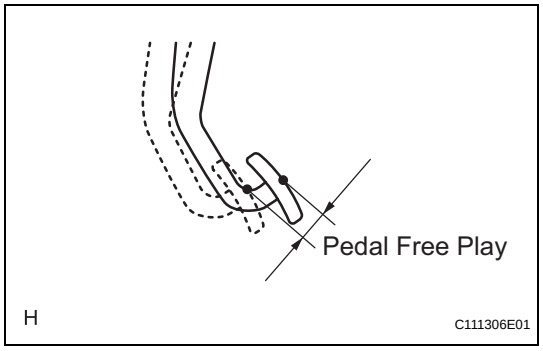
Do not depress the pedal.

(8) Connect the connector to the switch.

(9) Check the switch clearance.

Standard stop light switch clearance:

1.5 to 2.5 mm (0.059 to 0.098 in.)



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.

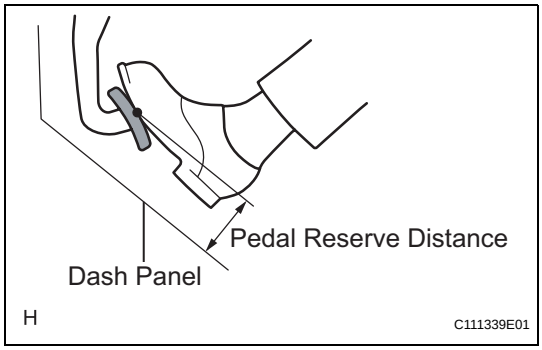
(c) Check the pedal's free play by measuring the distance between the position in the previous step and the pedal's released position.

Standard pedal free play:

1.0 to 6.0 mm (0.039 to 0.236 in.)

If the free play is not as specified, check the switch clearance in the next step.
If the free play is as specified, proceed to the "check brake pedal reserve distance" procedure.

(d) Check the switch clearance.
Standard stop light switch clearance:
1.5 to 2.5 mm (0.059 to 0.098 in.)
If the clearance is not as specified, adjust the clearance and recheck the pedal's free play.
If the clearance is as specified, troubleshoot the brake system and proceed to the "check brake pedal reserve distance" procedure.



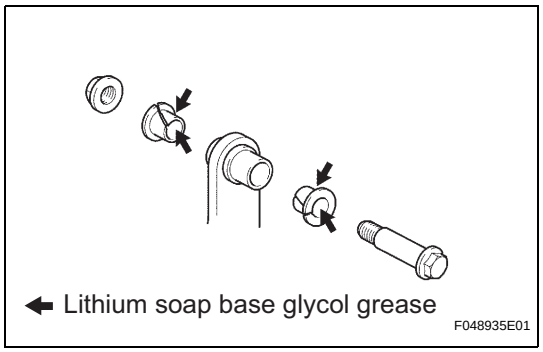
3. CHECK BRAKE PEDAL RESERVE DISTANCE

(a) Release the parking brake lever. Start the engine.
(b) Depress the pedal and check the pedal reserve distance.
(1) Depress the pedal with a force of 490 N (50 kgf, 110 lbf).
(2) Measure the distance between the pedal and dash panel shown in the illustration.
Standard pedal reserve distance:
More than 90 mm (3.54 in.)
If the distance is not as specified, troubleshoot the brake system.

INSTALLATION

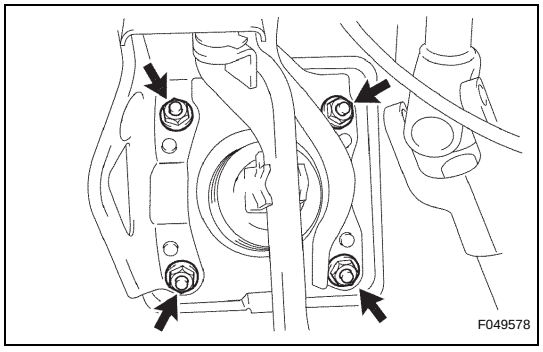
1. INSTALL BRAKE PEDAL PAD

2. INSTALL BRAKE PEDAL SUB-ASSEMBLY



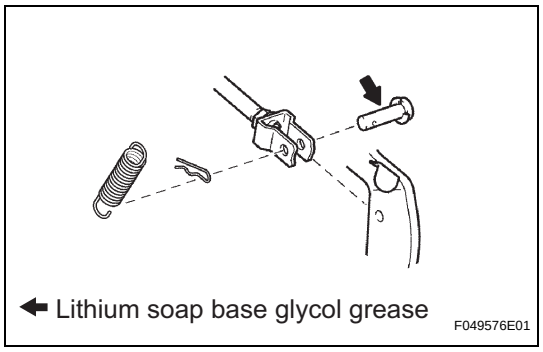
(a) Apply lithium soap base glycol grease to 2 new bushes.
(b) Install them to the brake pedal.
(c) Install the brake pedal to the pedal shaft with the nut and brake pedal shaft.
Torque: 37 N*m (375 kgf*cm, 27 ft.*lbf)

3. INSTALL BRAKE PEDAL SUPPORT SUB-ASSEMBLY



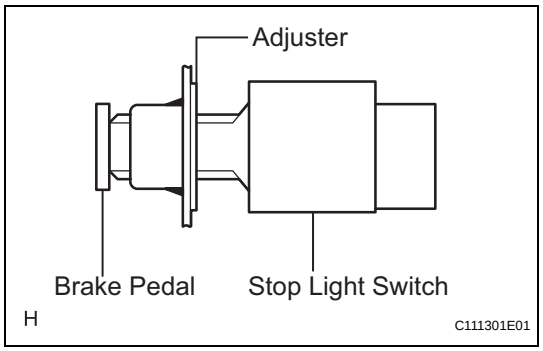
(a) Install the pedal support with the 4 nuts.
Torque: 12.7 N*m (130 kgf*cm, 9 ft.*lbf)
(b) Install the bolt to the support.
Torque: 24 N*m (241 kgf*cm, 17 ft.*lbf)

4. CONNECT BRAKE MASTER CYLINDER PUSH ROD CLEVIS

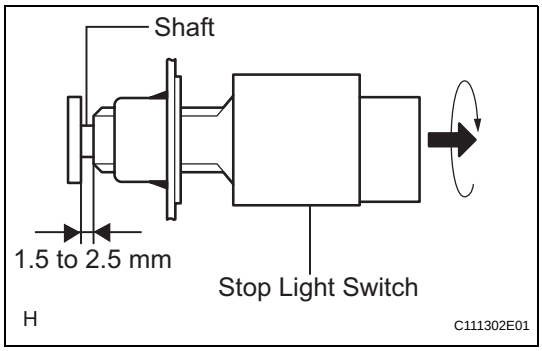


(a) Apply lithium soap base glycol grease to the clevis pin.
(b) Install the push rod clevis with the clevis pin and clip.
(c) Install the return spring.

5. INSTALL STOP LIGHT SWITCH ASSEMBLY



(a) Install the mounting adjuster to the pedal support.
(b) Insert the switch into the mounting adjuster until it slightly touches the pedal.
NOTICE:
Do not depress the pedal.

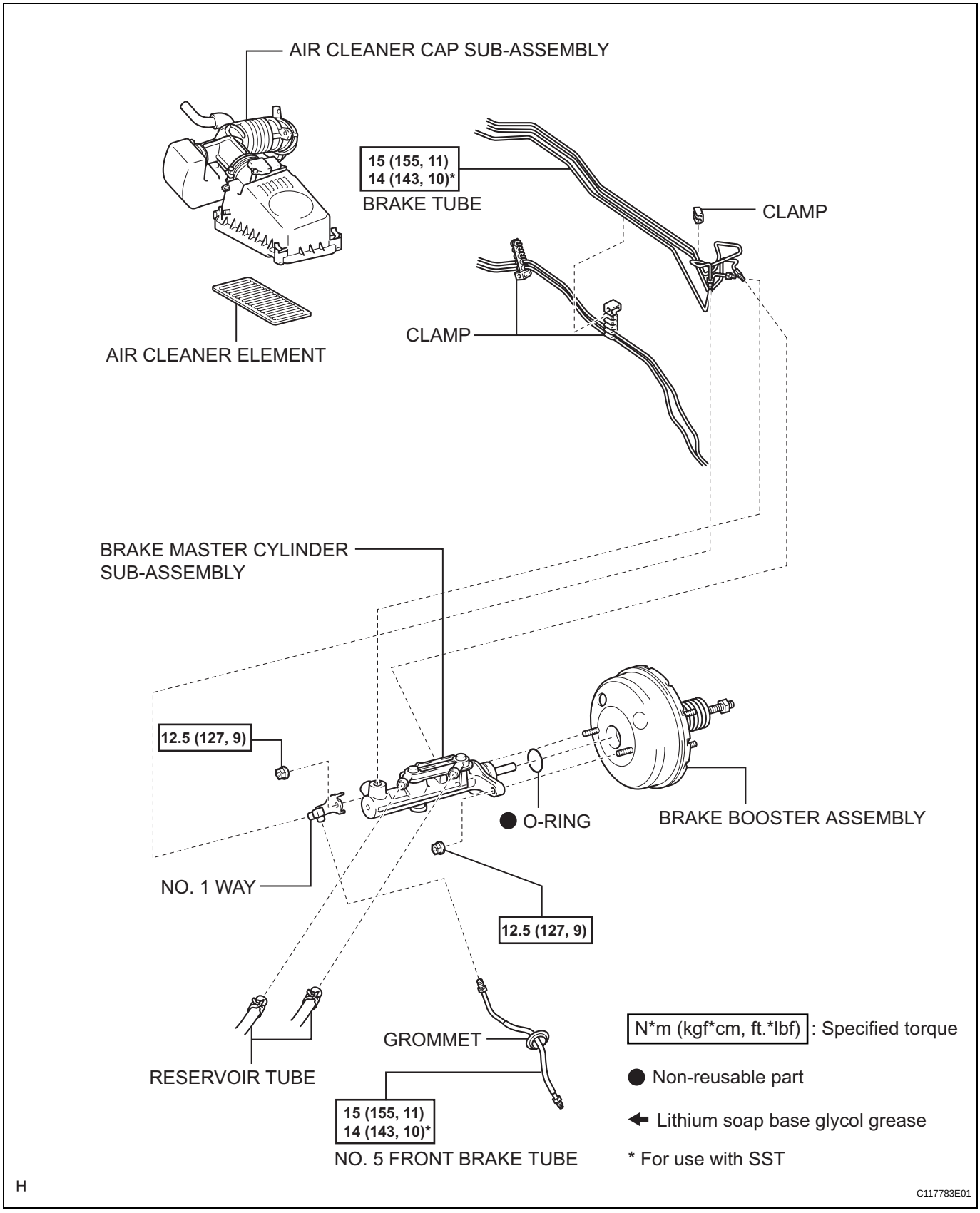


(c) Turn the switch a quarter turn clockwise.
Torque: 1.5 N*m (15 kgf*cm, 13 in.*lbf)
NOTICE:
Do not depress the pedal.
(d) Connect the wire harness clamp to the pedal support.
(e) Connect the switch connector to the switch.
(f) Check the switch clearance.
Standard stop light switch clearance:
1.5 to 2.5 mm (0.059 to 0.098 in.)

6. **CHECK AND ADJUST BRAKE PEDAL HEIGHT (See page BR-7)**
7. **CHECK BRAKE PEDAL FREE PLAY (See page BR-7)**
8. **CHECK BRAKE PEDAL RESERVE DISTANCE (See page BR-8)**
9. **INSTALL COMBINATION METER ASSEMBLY (See page ME-45)**
10. **INSTALL METER HOOD SUB-ASSEMBLY (See page ME-46)**
11. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
12. **PERFORM INITIALIZATION**
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

BRAKE MASTER CYLINDER

COMPONENTS



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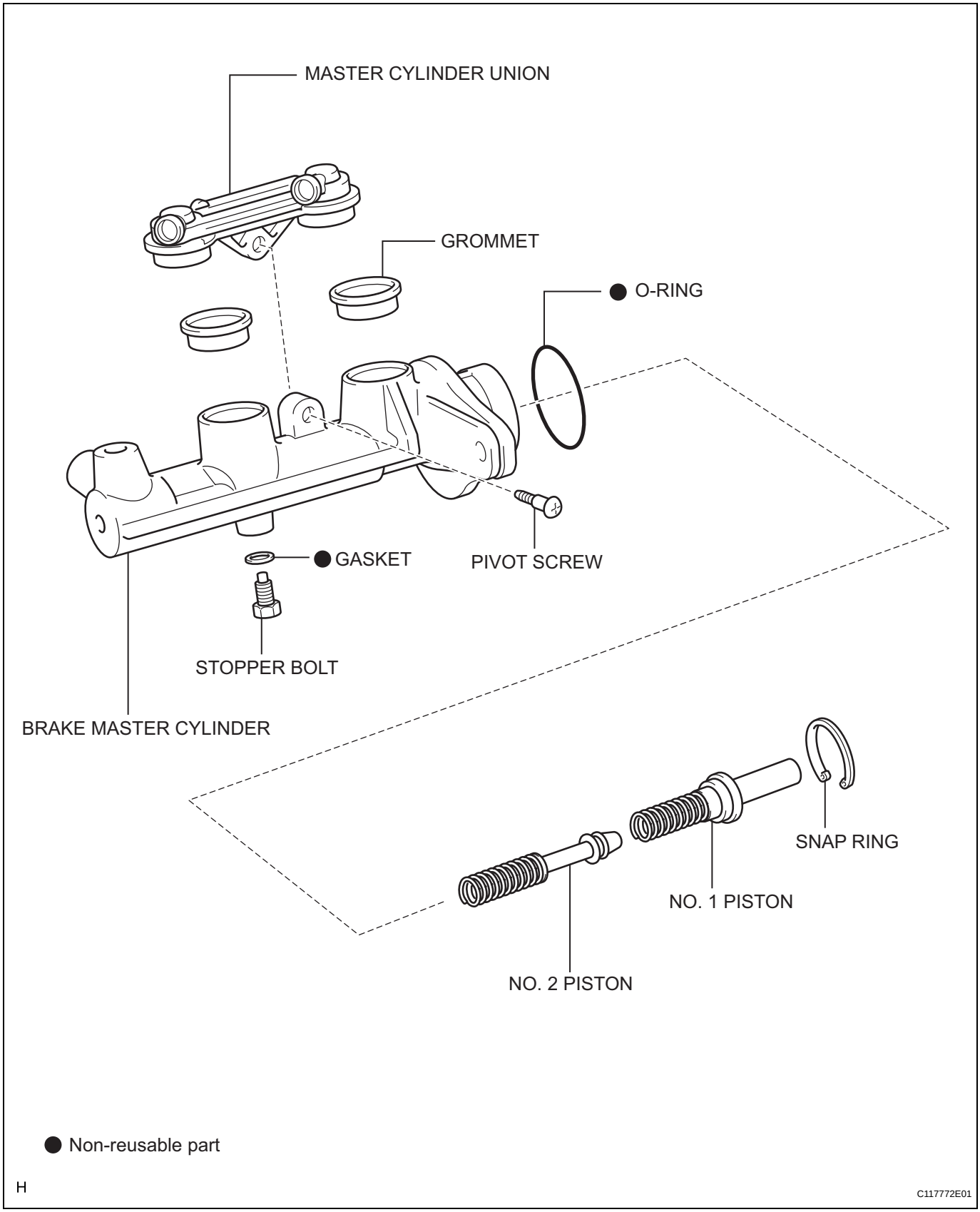
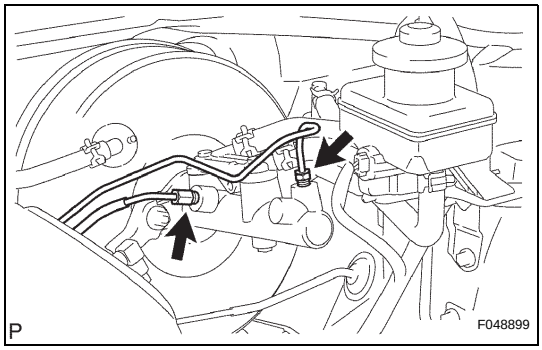
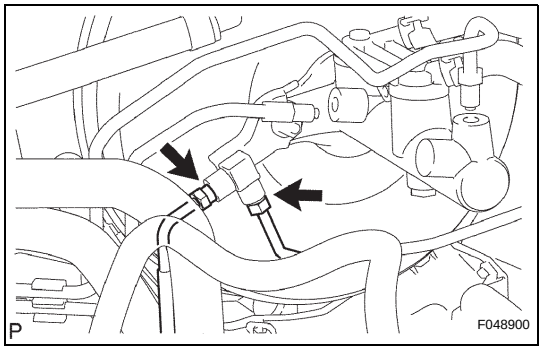

MASTER CYLINDER UNION
GROMMET
● O-RING
● GASKET
PIVOT SCREW
STOPPER BOLT
BRAKE MASTER CYLINDER
SNAP RING
NO. 1 PISTON
NO. 2 PISTON
● Non-reusable part
H
C117772E01

REMOVAL

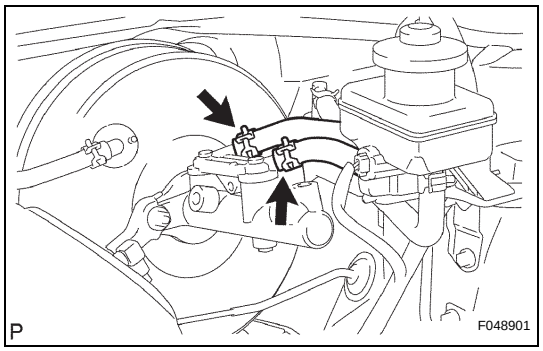
1. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.
2. **REMOVE FRONT WIPER ARM HEAD CAP (See page WW-4)**
3. **REMOVE WINDSHIELD WIPER ARM AND BLADE ASSEMBLY LH (See page WW-4)**
4. **REMOVE WINDSHIELD WIPER ARM AND BLADE ASSEMBLY RH (See page WW-4)**
5. **REMOVE HOOD TO COWL TOP SEAL (See page WW-4)**
6. **REMOVE COWL TOP VENTILATOR LOUVER LH (See page WW-4)**
7. **REMOVE WINDSHIELD WIPER MOTOR AND LINK (See page WW-5)**
8. **REMOVE OUTER COWL TOP PANEL SUB-ASSEMBLY**
   (a) Remove the 7 bolts and outer cowl top panel.
9. **REMOVE NO. 1 COWL WATER EXTRACT HOSE**
   (a) Remove the clip and No. 1 cowl water extract hose.
10. **REMOVE LOWER COWL BODY MOUNTING BRACKET LH**
    (a) Remove a bolt and lower cowl body mounting bracket LH.
11. **REMOVE AIR CLEANER CAP SUB-ASSEMBLY**
12. **REMOVE BRAKE MASTER CYLINDER SUB-ASSEMBLY**
    (a) Using SST, disconnect the 2 brake tubes from the master cylinder.
    SST 09023-00101



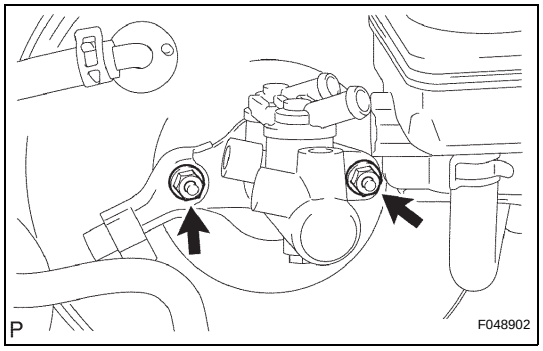


(b) Using SST, disconnect the 2 brake tubes from the No. 1 way.
SST 09023-00101

BR



(c) Remove the clips and disconnect the 2 reservoir tubes from the master cylinder.



(d) Remove the 2 nuts, and pull out the master cylinder and No. 1 way.

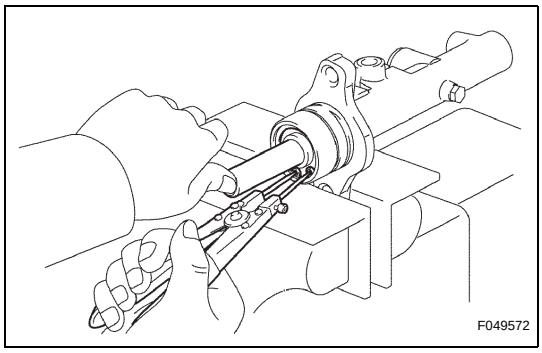
DISASSEMBLY

1. REMOVE UNION

(a) Remove the stopper screw and master cylinder union.

(b) Remove the 2 grommets from the master cylinder.

2. REMOVE BRAKE MASTER CYLINDER KIT



(a) Hold the master cylinder in a vise with the 2 aluminum plates in between.

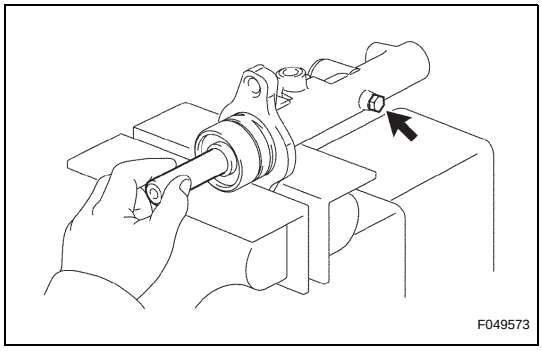
(b) Remove the O-ring from the master cylinder.

(c) Push in the piston.

(d) Using snap ring pliers, remove the snap ring.

NOTICE:

When pushing the piston, the fluid left in the cylinder may spatter.

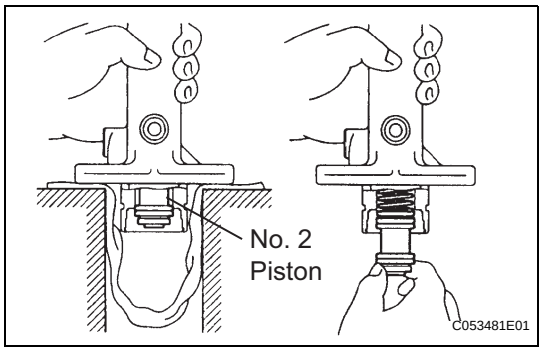


(e) Push in the piston and remove the piston stopper bolt and gasket.

(f) Remove the No. 1 piston from the master cylinder body by pulling it straight out.

NOTICE:

Do not scratch the inside of the cylinder body.



(g) Tap the flanged part against wooden blocks until the end of the No. 2 piston comes out. When the end of the No. 2 piston comes out, pull out the No. 2 piston straight from the master cylinder body.

NOTICE:

Do not scratch the inside of the cylinder body.

REASSEMBLY

1. CHECK BRAKE MASTER CYLINDER SUB-ASSEMBLY

(a) Check the inside of the master cylinder for scratch. If necessary, replace the master cylinder.

2. INSTALL BRAKE MASTER CYLINDER KIT

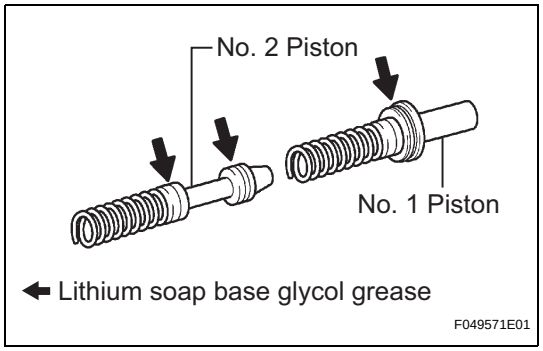
(a) Place aluminum plates between the vise and master cylinder. Place the master cylinder in a vise.

(b) Apply lithium soap base glycol grease to the rubber part as shown in the illustration.

(c) Install the No. 1 and No. 2 pistons to the master cylinder body.

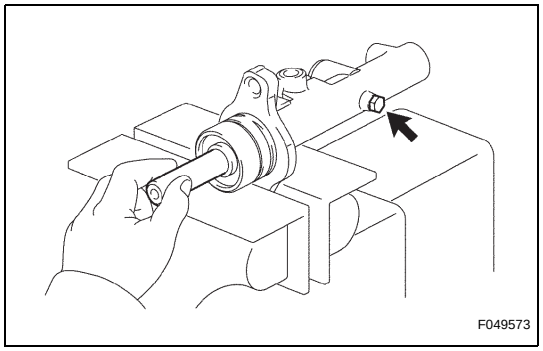
NOTICE:

- **Install the pistons straight carefully not to give any damage to the inside of the cylinder.**
- **Do not damage the lip of the cylinder cup.**



(d) Push in the piston and install a new gasket and a new piston stopper bolt.

Torque: 10 N*m (102 kgf*cm, 7 ft.*lbf)



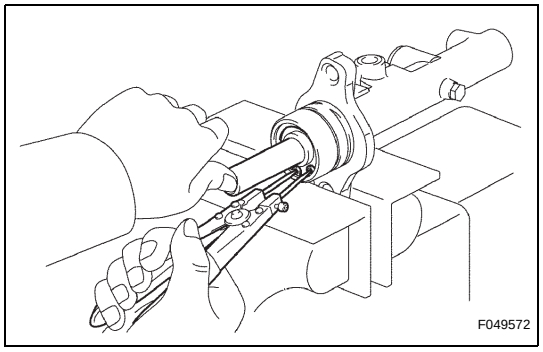
(e) Using snap ring pliers, install the hole snap ring with the piston pushed in.

NOTICE:

Do not scratch the inside of the cylinder body.

(f) Apply lithium soap base glycol grease to a new O-ring.

(g) Install the O-ring to the master cylinder body.

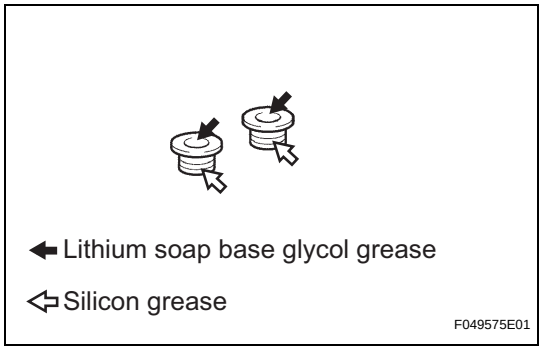


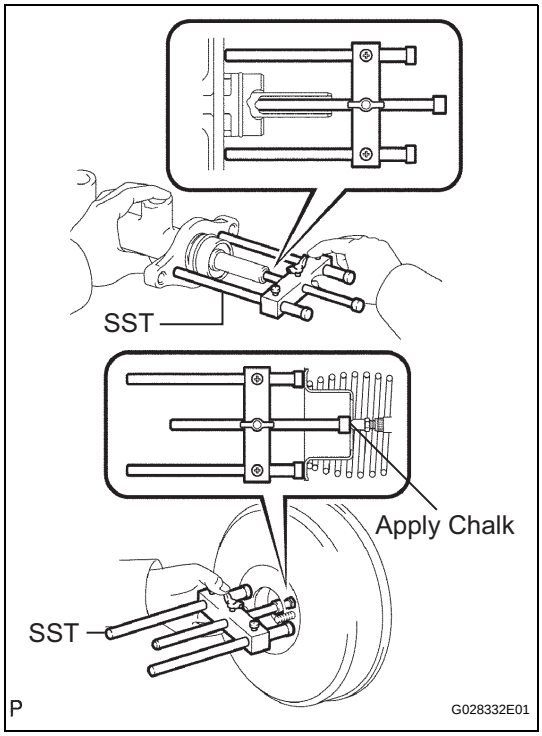
3. INSTALL UNION

(a) Apply lithium soap base glycol grease and silicon grease to the 2 grommets as shown in the illustration.

(b) Install the 2 grommets to the master cylinder body.

(c) Install the master cylinder union with the stopper screw.

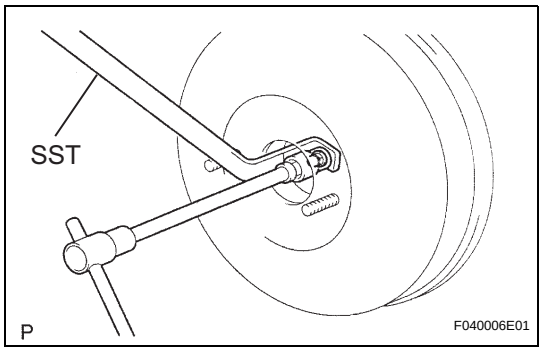




4. CHECK AND ADJUST BRAKE BOOSTER PUSH ROD

(a) Set SST on the master cylinder and lower the rod of the SST until it slightly touches the piston.
SST 09737-00013

(b) Apply chalk to the flat tip of the SST rod. Turn the SST upside down and measure the clearance between the brake booster push rod and the SST.
Clearance:
0 mm (0 in.)
If there is a clearance between the SST main body and the shell of the brake booster, the push rod is protruding too far.
If the chalk does not stick on the tip of the brake booster push rod, the push rod protrusion is insufficient.

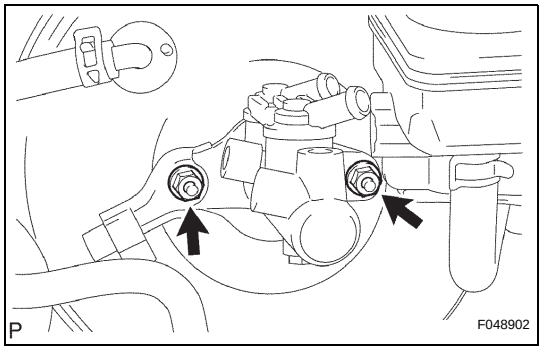


(c) If the clearance is not within the standard, adjust the length by holding the rod using SST and turning the tip of the rod using a 7 mm socket driver.
SST 09737-00020
HINT:
Check the push rod clearance again after adjustment.

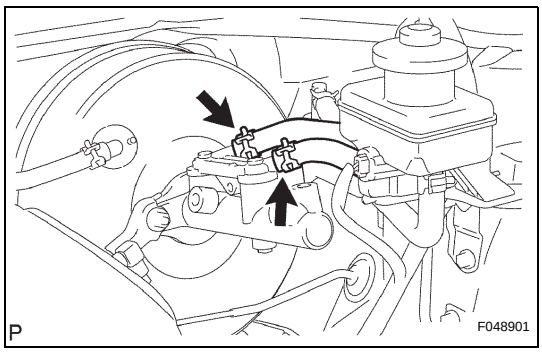
INSTALLATION

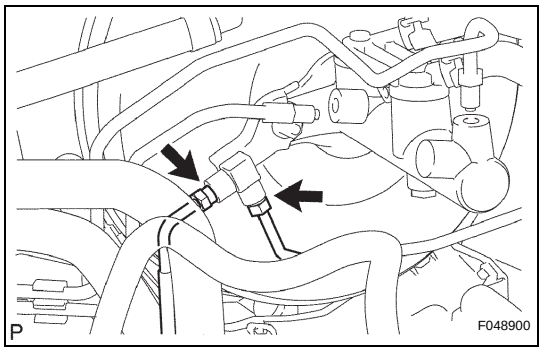
1. INSTALL BRAKE MASTER CYLINDER SUB-ASSEMBLY

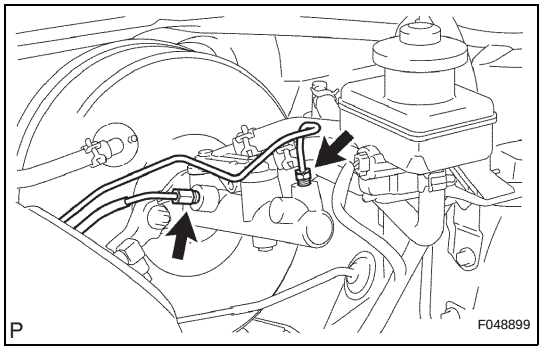
(a) Install the master cylinder and No. 1 way with the 2 nuts.
Torque: 12.5 N*m (127 kgf*cm, 9 ft.*lbf)



(b) Connect the 2 reservoir tubes to the master cylinder with the clips.







(c) Using SST, connect the 2 brake tubes to the No. 1 way.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
14 N*m (143 kgf*cm, 10 ft.*lbf) with SST
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

(d) Using SST, connect the 2 brake tubes to the master cylinder.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
14 N*m (143 kgf*cm, 10 ft.*lbf) with SST
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

2. **INSTALL AIR CLEANER CAP SUB-ASSEMBLY**

3. **INSTALL LOWER COWL BODY MOUNTING BRACKET LH**
   (a) Install the lower cowl top mounting bracket LH with a bolt.
   Torque: 13 N*m (133 kgf*cm, 10 ft.*lbf)

4. **INSTALL NO. 1 COWL WATER EXTRACT HOSE**
   (a) Install the No. 1 cowl water extract hose with the clip.

5. **INSTALL OUTER COWL TOP PANEL SUB-ASSEMBLY**
   (a) Install the outer cowl top panel with the 7 bolts.
   Torque: 13 N*m (133 kgf*cm, 10 ft.*lbf)

6. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**

7. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**

8. **BLEED AIR FROM BRAKE LINE (See page BR-4)**

9. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-4)**

10. **CHECK FOR BRAKE FLUID LEAKAGE**

11. **INSTALL WINDSHIELD WIPER MOTOR AND LINK (See page WW-7)**

12. **INSTALL COWL TOP VENTILATOR LOUVER LH**

13. **INSTALL HOOD TO COWL TOP SEAL**

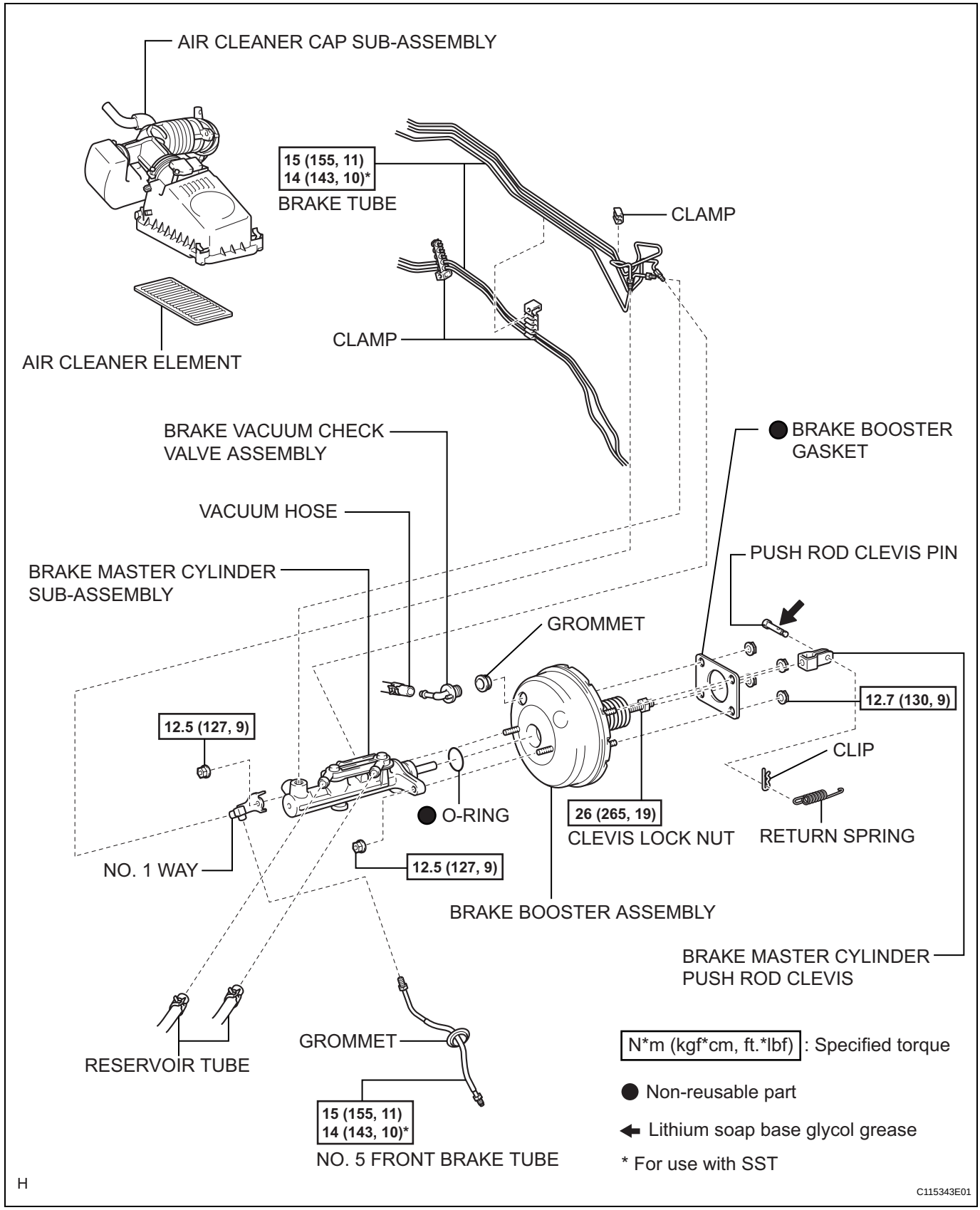
14. **INSTALL WINDSHIELD WIPER ARM AND BLADE ASSEMBLY LH (See page WW-7)**

15. **INSTALL WINDSHIELD WIPER ARM AND BLADE ASSEMBLY RH (See page WW-8)**

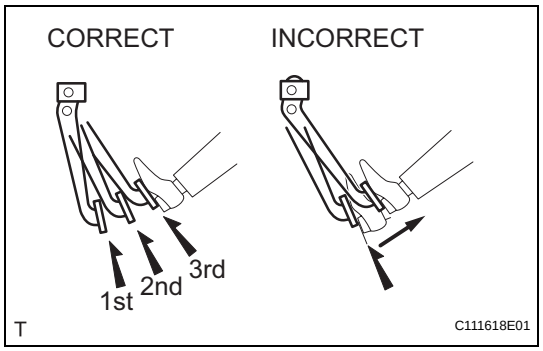
16. INSTALL FRONT WIPER ARM HEAD CAP

BRAKE BOOSTER

COMPONENTS



BR



ON-VEHICLE INSPECTION

1. CHECK BRAKE BOOSTER ASSEMBLY

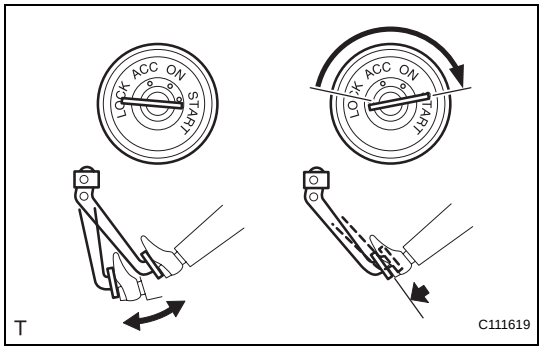
(a) Airtightness check.

(1) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times.

(2) Make sure the booster is airtight. Check that the distance the pedal can be depressed decreases gradually in correlation with each subsequent press of the pedal.
If the pedal is not as specified, check the check valve.
If the check valve is normal, replace the booster.

(3) Start the engine. Depress and hold down the pedal, and stop the engine.

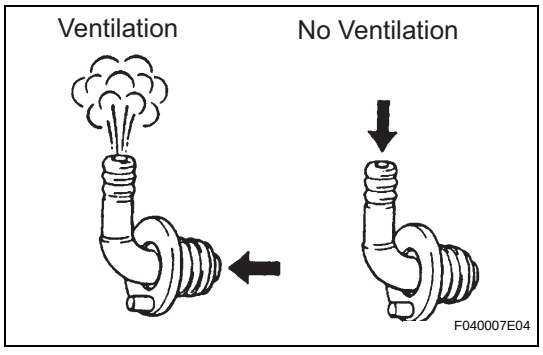
(4) Make sure the booster is airtight. Hold the pedal for 30 seconds and check that there is no change in the pedal reserve distance.
If the pedal is not as specified, check the check valve.
If the check valve is normal, replace the booster.



(b) Operation check.

(1) Depress the pedal several times with the ignition switch OFF and check that there is no change in the pedal reserve distance.

(2) Depress and hold down the pedal, and start the engine. Check that the pedal can only be depressed slightly.
If the pedal is not as specified, check the check valve.
If the check valve is normal, replace the booster.



2. CHECK BRAKE VACUUM CHECK VALVE ASSEMBLY

(a) Check the check valve.

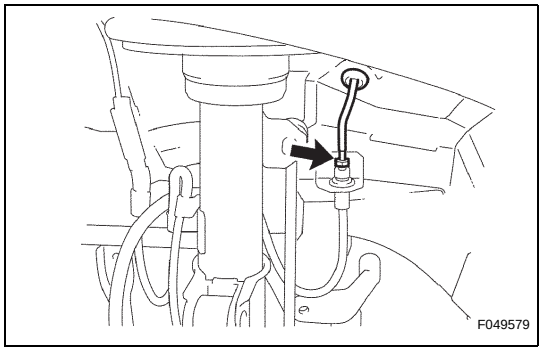
(1) Slide the clip and disconnect the vacuum hose.

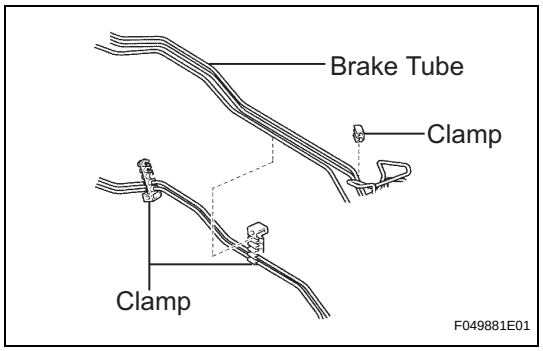
(2) Remove the check valve from the booster.

(3) Check that there is ventilation from the booster to the engine, and no ventilation from the engine to the booster.
If the results are not as specified, replace the check valve.

REMOVAL

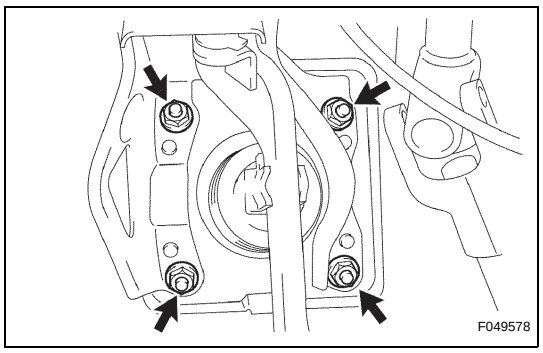
1. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.
2. **REMOVE FRONT WIPER ARM HEAD CAP (See page WW-4)**
3. **REMOVE WINDSHIELD WIPER ARM AND BLADE ASSEMBLY LH (See page WW-4)**
4. **REMOVE WINDSHIELD WIPER ARM AND BLADE ASSEMBLY RH (See page WW-4)**
5. **REMOVE HOOD TO COWL TOP SEAL (See page WW-4)**
6. **REMOVE COWL TOP VENTILATOR LOUVER LH (See page WW-4)**
7. **REMOVE WINDSHIELD WIPER MOTOR AND LINK (See page WW-5)**
8. **REMOVE OUTER COW TOP PANEL SUB-ASSEMBLY (See page BR-12)**
9. **REMOVE NO. 1 COWL WATER EXTRACT HOSE (See page BR-12)**
10. **REMOVE LOWER COWL BODY MOUNTING BRACKET LH (See page BR-12)**
11. **REMOVE AIR CLEANER CAP SUB-ASSEMBLY**
12. **REMOVE BRAKE MASTER CYLINDER SUB-ASSEMBLY (See page BR-12)**
13. **DISCONNECT BRAKE MASTER CYLINDER PUSH ROD CLEVIS (See page BR-6)**
14. **REMOVE FRONT WHEEL LH**
15. **REMOVE NO. 5 FRONT BRAKE TUBE**
    (a) Using SST, disconnect the No. 5 front brake tube and remove it.
    SST 09023-00101





16. REMOVE BRAKE TUBE

(a) Remove the 3 brake tubes from the clamps as shown in the illustration.
(b) Remove the clamp from the brake tubes.



17. REMOVE BRAKE BOOSTER ASSEMBLY

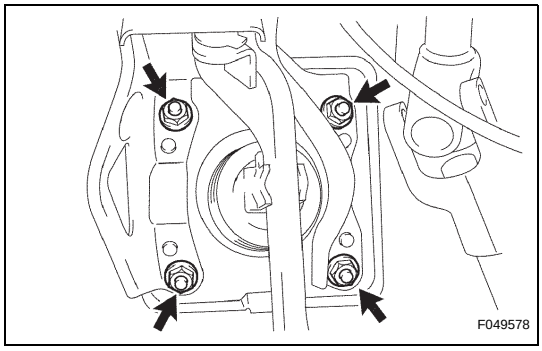
(a) Loosen the clevis lock nut and remove the clevis from the brake booster.
(b) Slide the clip and disconnect the vacuum hose from the brake booster.
(c) Remove the 4 nuts and brake booster.
(d) Remove the check valve and grommet from the brake booster.

18. REMOVE BRAKE BOOSTER GASKET

INSTALLATION

1. INSTALL BRAKE BOOSTER GASKET

(a) Install a new gasket to the brake booster.



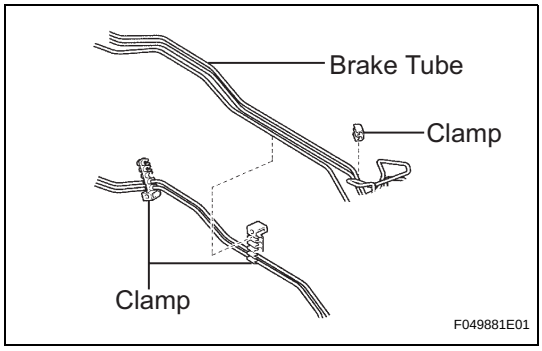
2. INSTALL BRAKE BOOSTER ASSEMBLY

(a) Install the grommet and check valve to the brake booster.

(b) Install the brake booster with the 4 nuts.
Torque: 12.7 N*m (130 kgf*cm, 9 ft.*lbf)

(c) Connect the vacuum hose to the brake booster with the clamp.

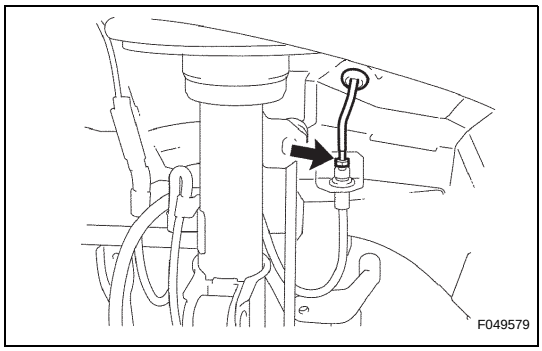
(d) Install the push rod clevis and lock nut to the brake booster.
HINT:
After adjusting the brake pedal height, torque the clevis lock nut.



3. INSTALL BRAKE TUBE

(a) Install the 3 brake tubes to the clamps as shown in the illustration.

(b) Install the clamp to the brake tubes.



4. CONNECT NO. 5 FRONT BRAKE TUBE

(a) Using SST, connect the No. 5 front brake tube.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
14 N*m (143 kgf*cm, 10 ft.*lbf) with SST
HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).
NOTICE:
Make sure that the grommet is installed correctly.

5. INSTALL FRONT WHEEL LH
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

6. INSTALL BRAKE MASTER CYLINDER SUB-ASSEMBLY (See page BR-15)

7. INSTALL AIR CLEANER CAP SUB-ASSEMBLY

8. INSTALL LOWER COWL BODY MOUNTING BRACKET LH (See page BR-16)

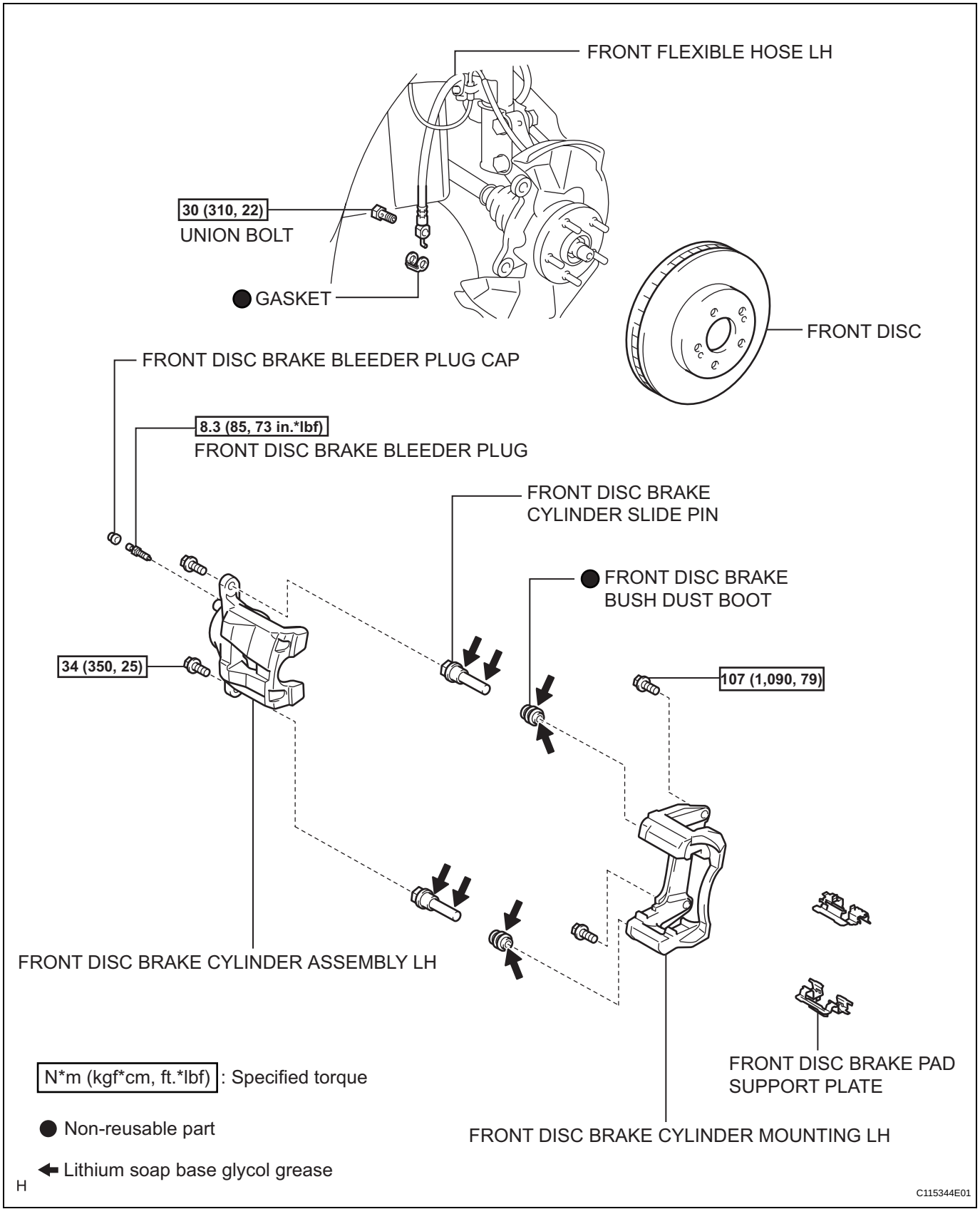
9. INSTALL NO. 1 COWL WATER EXTRACT HOSE (See page BR-16)

10. INSTALL OUTER COWL TOP PANEL SUB-ASSEMBLY (See page BR-16)

11. CONNECT BRAKE MASTER CYLINDER PUSH ROD CLEVIS (See page BR-9)
12. FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)
13. BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)
14. BLEED AIR FROM BRAKE LINE (See page BR-4)
15. CHECK AND ADJUST BRAKE PEDAL HEIGHT (See page BR-7)
16. CHECK BRAKE PEDAL FREE PLAY (See page BR-7)
17. CHECK BRAKE PEDAL RESERVE DISTANCE (See page BR-8)
18. CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-4)
19. CHECK FOR BRAKE FLUID LEAKAGE
20. INSTALL WINDSHIELD WIPER MOTOR AND LINK (See page WW-7)
21. INSTALL COWL TOP VENTILATOR LOUVER LH
22. INSTALL HOOD TO COWL TOP SEAL
23. INSTALL WINDSHIELD WIPER ARM AND BLADE ASSEMBLY LH (See page WW-7)
24. INSTALL WINDSHIELD WIPER ARM AND BLADE ASSEMBLY RH (See page WW-8)
25. INSTALL FRONT WIPER ARM HEAD CAP
26. CHECK BRAKE BOOSTER ASSEMBLY (See page BR-19)

FRONT BRAKE

COMPONENTS



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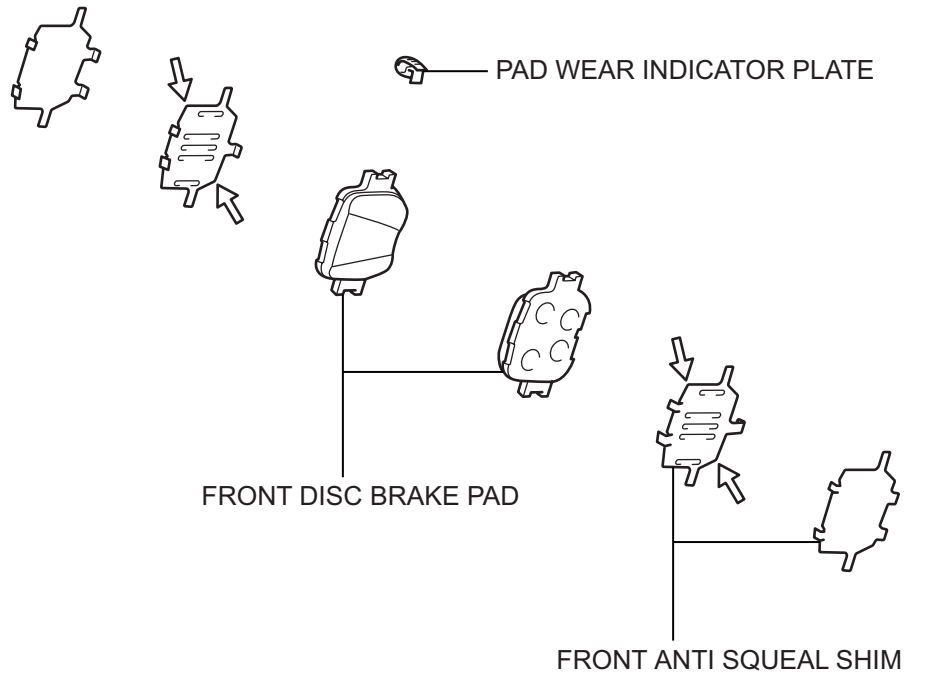
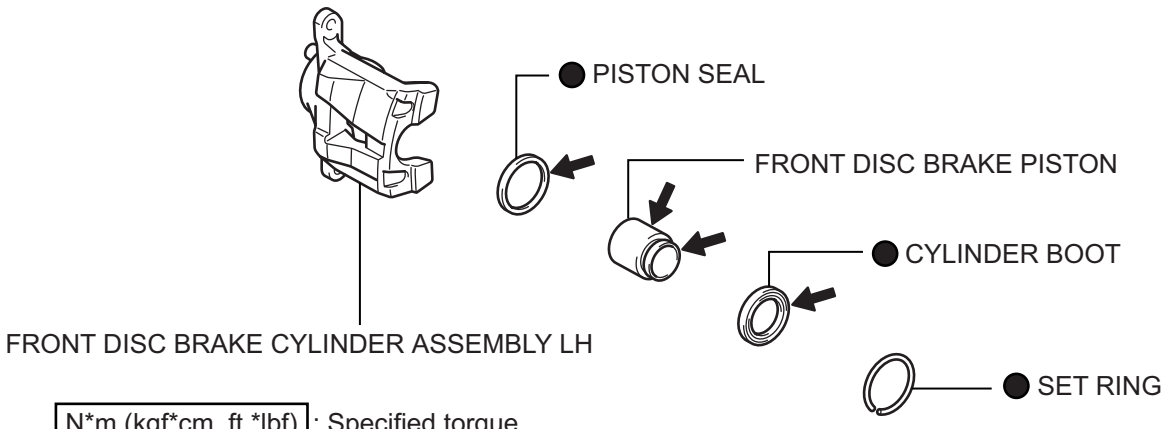




N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

⬅ Lithium soap base glycol grease

⇦ Disc brake grease

H

C115345E01

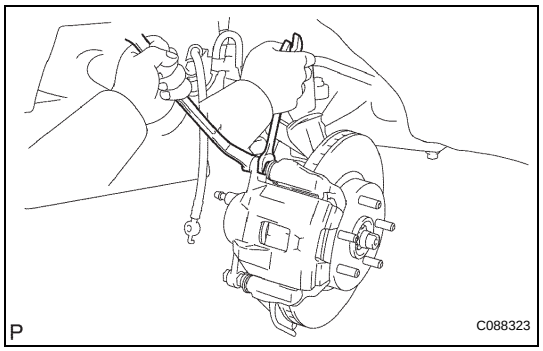
BR

REMOVAL

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. REMOVE FRONT WHEEL LH

2. DRAIN BRAKE FLUID
NOTICE:
Wash off brake fluid immediately if it comes in contact with any painted surface.



3. REMOVE FRONT DISC BRAKE CYLINDER ASSEMBLY LH
(a) Remove the union bolt and gasket.
(b) Disconnect the flexible hose from the brake cylinder.
(c) Remove the 2 bolt and brake cylinder.

4. REMOVE FRONT DISC BRAKE PAD
(a) Remove the 2 pads with anti squeal shims from the cylinder mounting.

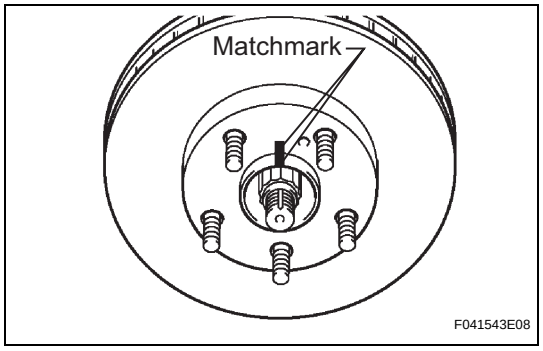
5. REMOVE FRONT ANTI SQUEAL SHIM
(a) Remove the 4 anti squeal shims from each pad.
(b) Remove the pad wear indicator plate from the pad (inner).

6. REMOVE FRONT DISC BRAKE PAD SUPPORT PLATE
(a) Remove the support plates (No. 1 and No. 2) from the cylinder mounting.

7. REMOVE FRONT DISC BRAKE CYLINDER SLIDE PIN
(a) Remove the 2 slide pins from the cylinder mounting.

8. REMOVE FRONT DISC BRAKE BUSH DUST BOOT
(a) Remove the 2 dust boots from the cylinder mounting.

9. REMOVE FRONT DISC BRAKE CYLINDER MOUNTING LH
(a) Remove the 2 bolts and cylinder mounting.

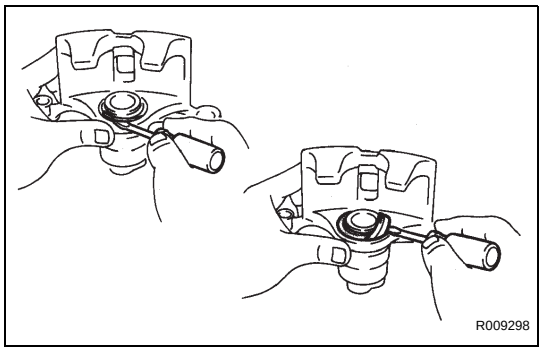


10. REMOVE FRONT DISC
(a) Put matchmarks on the disc and axle hub.
(b) Remove the front disc.

DISASSEMBLY

HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

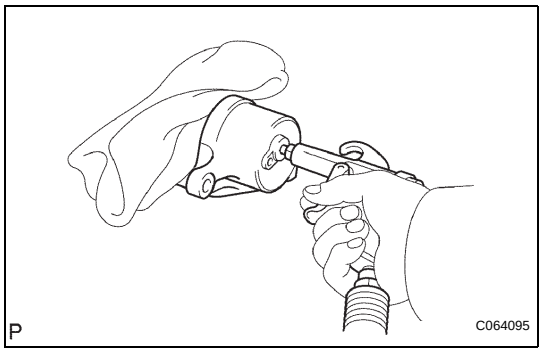


1. REMOVE CYLINDER BOOT

(a) Using a screwdriver, pry out the set ring and cylinder boot.

NOTICE:

Be careful not to damage the brake piston and cylinder.



2. REMOVE FRONT DISC BRAKE PISTON

(a) Place a piece of cloth or equivalent between the piston and brake cylinder.

(b) Use compressed air to remove the piston from the brake cylinder.

CAUTION:

Do not place your finger in front of the piston when using compressed air.

NOTICE:

Be careful not to spatter the brake fluid.

3. REMOVE PISTON SEAL

(a) Using a screwdriver, pry out the seal from the brake cylinder.

NOTICE:

Be careful not to damage the inner cylinder and cylinder groove.

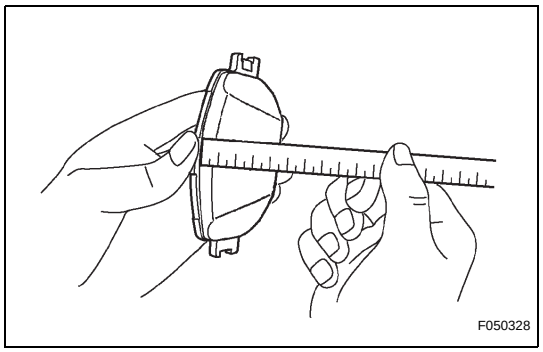
4. REMOVE FRONT DISC BRAKE BLEEDER PLUG

INSPECTION

1. CHECK BRAKE CYLINDER AND PISTON

(a) Check the brake cylinder bore and piston for rust or scoring.

If necessary, replace the brake cylinder and piston.



2. CHECK PAD LINING THICKNESS

(a) Using a ruler, measure the pad lining thickness.

Standard thickness:
11.5 mm(0.453 in.)
Minimum thickness:
1.0 mm (0.039 in.)

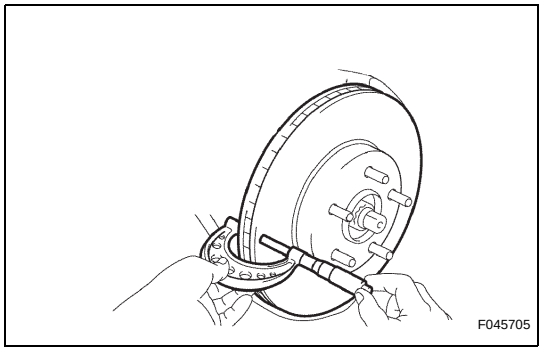
If the pad lining thickness is equal to or less than the minimum, replace the brake pad.

3. CHECK FRONT DISC BRAKE PAD SUPPORT PLATE

(a) Check the 4 support plates.

Make sure that the plates have sufficient rebound and are free from deformation, cracks, wear, rust and dirt.

If necessary, replace the support plates.



4. CHECK DISC THICKNESS

(a) Using a micrometer, measure the disc thickness.

Standard thickness:
25.0 mm (0.984 in.)
Minimum thickness:
23.0 mm (0.906 in.)

If the disc thickness is less than the minimum, replace the disc.

REASSEMBLY

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. TEMPORARILY TIGHTEN FRONT DISC BRAKE BLEEDER PLUG

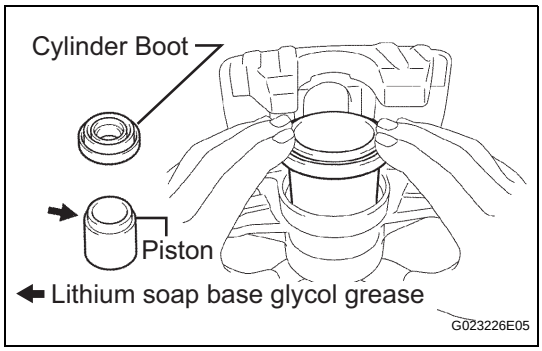
(a) Install the bleeder plug to the brake cylinder.
HINT:
The bleeder plug will be tightened to a torque specification in the "bleed air from brake line" procedures.

(b) Install the cap.

2. INSTALL PISTON SEAL

(a) Apply lithium soap base glycol grease to a new piston seal.

(b) Install the piston seal to the brake cylinder.

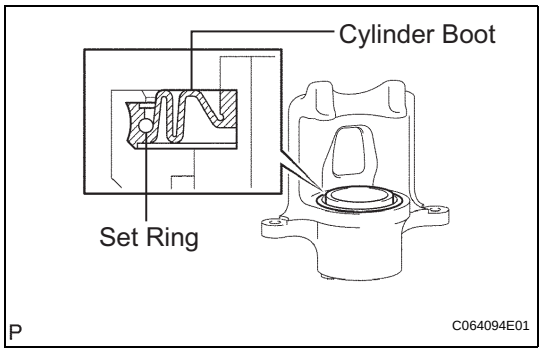


3. INSTALL FRONT DISC BRAKE PISTON

(a) Apply lithium soap base glycol grease to the piston and a new cylinder boot.

(b) Install the cylinder boot to the piston.

(c) Install the piston (with cylinder boot) to the brake cylinder.
NOTICE:
Do not forcibly install the piston to the brake cylinder.



4. INSTALL CYLINDER BOOT

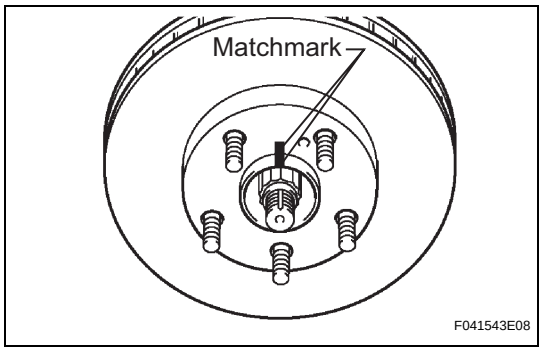
(a) Install the cylinder boot to the brake cylinder.
NOTICE:
Install the cylinder boot securely to the grooves of the brake cylinder and piston.

(b) Using a screwdriver, install the set ring.
NOTICE:
Be careful not to damage the cylinder boot.

INSTALLATION

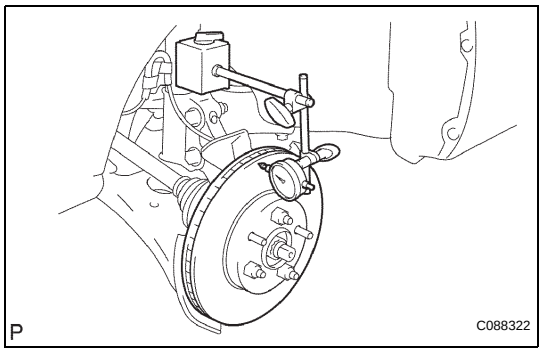
HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



1. INSTALL FRONT DISC

(a) Align the matchmarks and install the disc.
HINT:
When replacing the disc with a new one, select the installation position where the disc has the minimum runout.

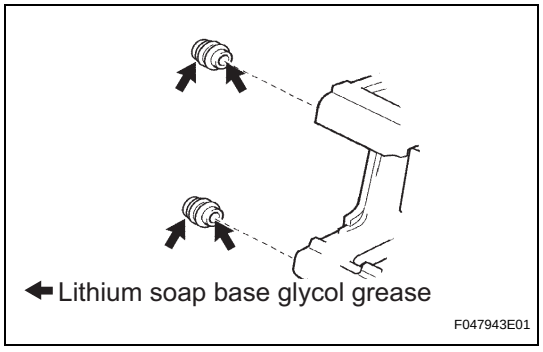


2. CHECK DISC RUNOUT

(a) Check the bearing play in the axle direction and check the axle hub runout (see page AH-6).
(b) Temporarily install the disc to the hub with the 2 hub nuts.
(c) Using a dial indicator, measure the disc runout 10 mm (0.3 in.) away from the outer edge of the disc.
Minimum disc runout:
0.05 mm (0.0020 in.)
If the runout is greater than the maximum, change the installation position of the disc and axle so that the runout will become minimal.
If the runout is greater than the maximum even when the installation positions are changed, grind the disc.
If the disc thickness is less than the minimum, replace the disc.
(d) Remove the 2 hub nuts.

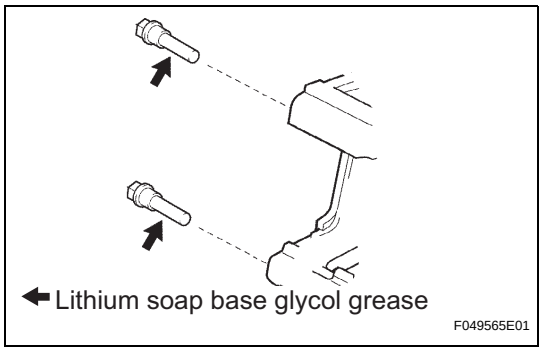
3. INSTALL FRONT DISC BRAKE CYLINDER MOUNTING LH

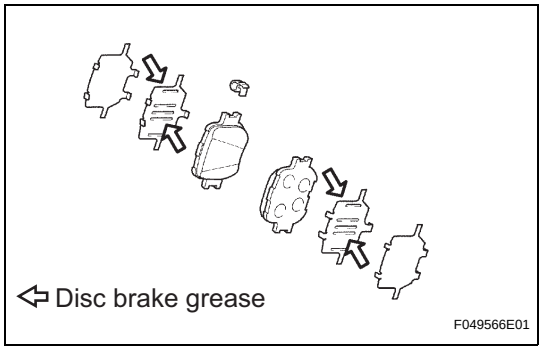
(a) Install the cylinder mounting with the 2 bolts.
Torque: 107 N*m (1,090 kgf*cm, 79 ft.*lbf)



4. INSTALL FRONT DISC BRAKE BUSH DUST BOOT

(a) Apply lithium soap base glycol grease to the seal surface of 2 new dust boots.
(b) Install the dust boots to the cylinder mounting.





5. **INSTALL FRONT DISC BRAKE CYLINDER SLIDE PIN**
   (a) Apply lithium soap base glycol grease to the sliding part and the seal surface of the 2 cylinder slide pins.
   (b) Install the 2 cylinder slide pins to the cylinder mounting.

6. **INSTALL FRONT DISC BRAKE PAD SUPPORT PLATE**
   (a) Install the support plate (No. 1 and No. 2) to the cylinder mounting.

7. **INSTALL FRONT ANTI SQUEAL SHIM**
   (a) Apply disc brake grease to the both side of the shims (inner).
   (b) Install the shims (inner and outer) to each pad.
   NOTICE:
   - **When replacing worn pads, the shims must be replaced together with the pads.**
   - **Install the shims in the correct positions and direction.**
   (c) Install the pad wear indicator plate to the pad (inner).
   NOTICE:
   Install the pad wear indicator plate in the correct position and direction.

8. **INSTALL FRONT DISC BRAKE PAD**
   (a) Install the 2 pads to the cylinder mounting.
   NOTICE:
   There should be no oil or grease on the friction surface of the pads and disc.

9. **INSTALL FRONT DISC BRAE CYLINDER ASSEMBLY LH**
   (a) Install the brake cylinder with the 2 bolts.
   Torque: 34 N*m (350 kgf*cm, 25 ft.*lbf)
   (b) Connect the flexible hose with the union bolt and a new gasket.
   Torque: 30 N*m (310 kgf*cm, 22 ft.*lbf)
   NOTICE:
   Connect the flexible hose lock securely in the lock hole in the brake cylinder.

10. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**

11. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**

12. **BLEED AIR FROM BRAKE LINE (See page BR-4)**

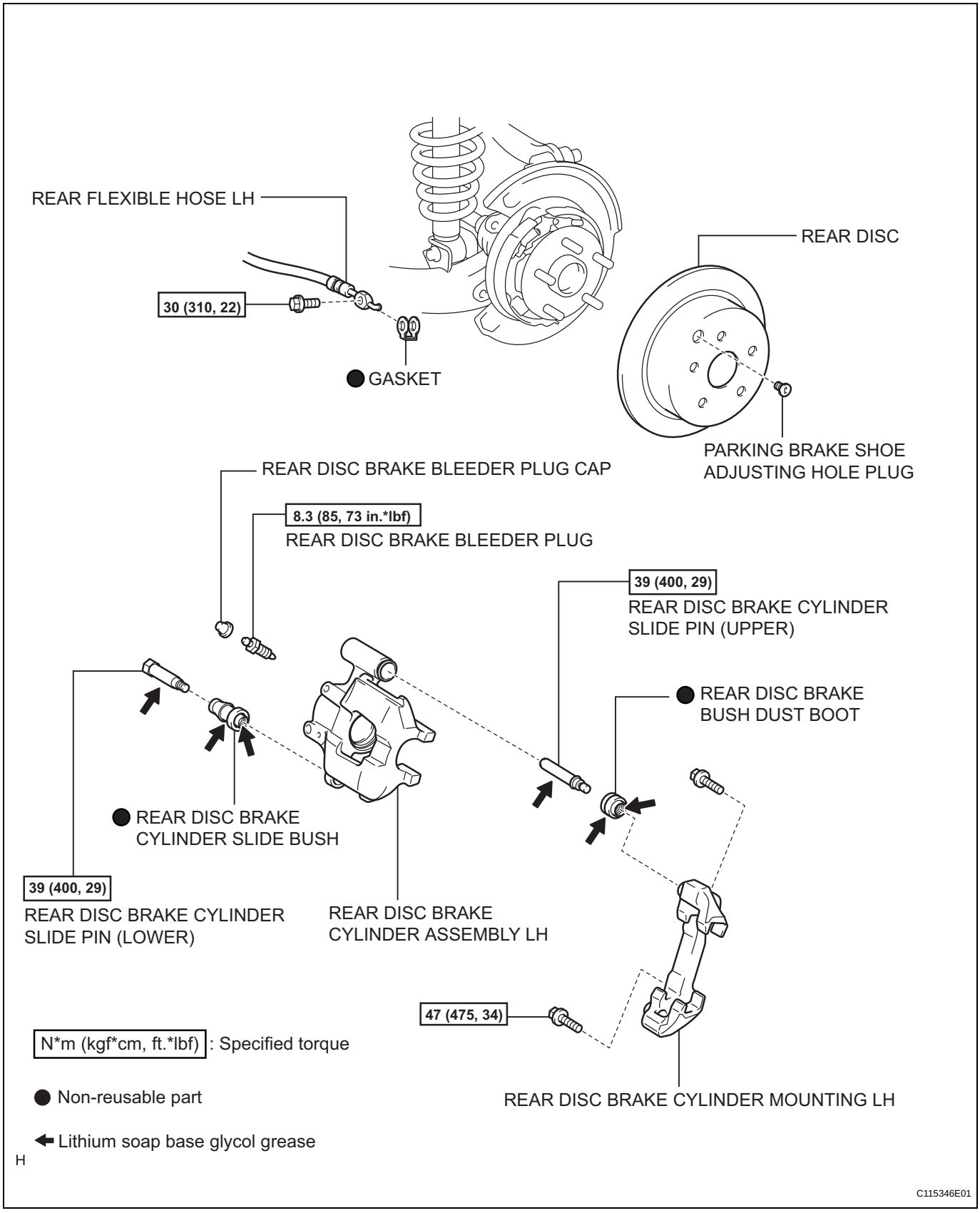
13. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-4)**

14. **CHECK FOR BRAKE FLUID LEAKAGE**

15. **INSTALL FRONT WHEEL LH**
    Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

REAR BRAKE

COMPONENTS



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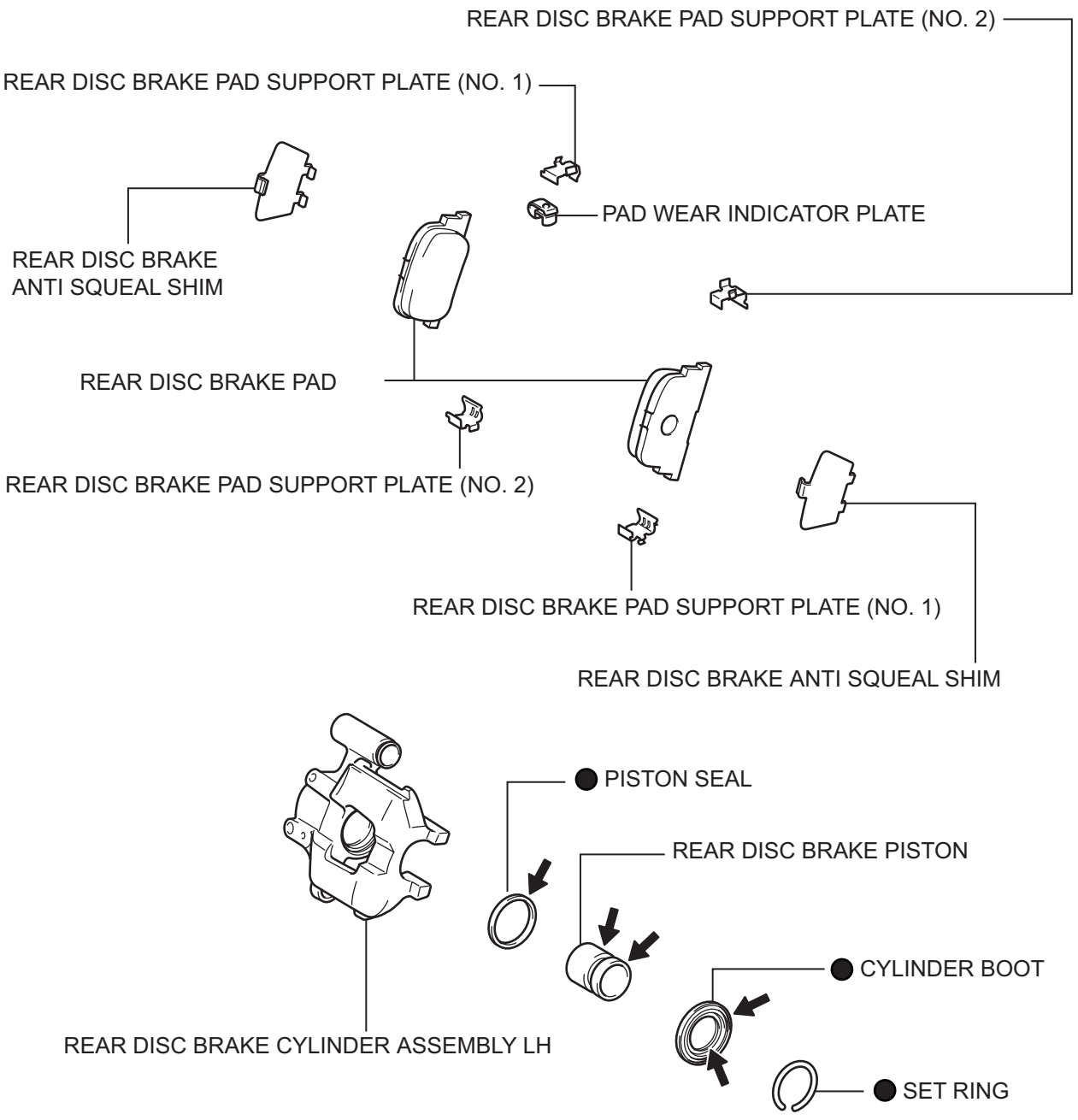

N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

← Lithium soap base glycol grease

H

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BR

REMOVAL

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. REMOVE REAR WHEEL

2. DRAIN BRAKE FLUID
NOTICE:
Wash off brake fluid immediately if it comes in contact with any painted surface.

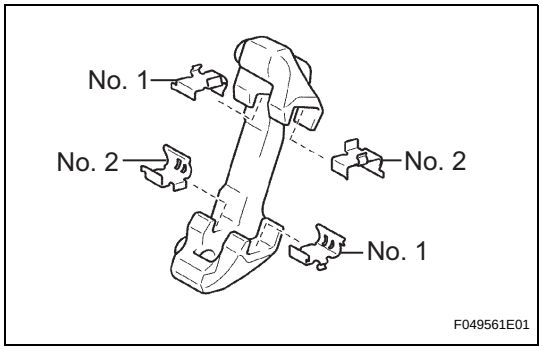
3. DISCONNECT REAR FLEXIBLE HOSE LH
(a) Remove the union bolt and gasket.
(b) Disconnect the flexible hose from the brake cylinder.

4. REMOVE REAR DISC BRAKE CYLINDER SLIDE PIN
(a) Remove the cylinder slide pin (lower).

5. REMOVE REAR DISC BRAKE CYLINDER ASSEMBLY LH

6. REMOVE REAR DISC BRAKE PAD
(a) Remove the 2 brake pads with anti squeal shims.

7. REMOVE REAR DISC BRAKE ANTI SQUEAL SHIM
(a) Remove the 2 shims from each pad.
(b) Using a screwdriver, remove the pad wear indicator plate from pad (inner).



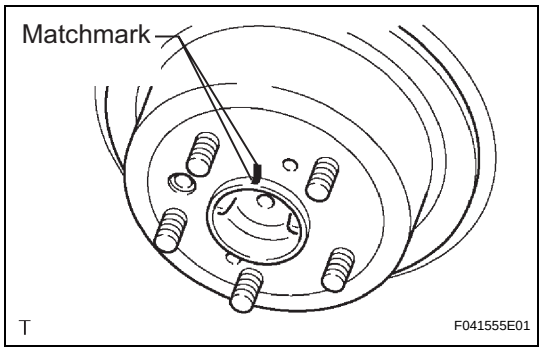
8. REMOVE REAR DISC BRAKE PAD SUPPORT PLATE
(a) Remove the 4 support plates (No. 1 and No. 2) from the cylinder mounting.

9. REMOVE REAR DISC BRAKE BUSH DUST BOOT
(a) Remove the dust boot from the cylinder slide pin (upper).

10. REMOVE REAR DISC BRAKE CYLINDER SLIDE BUSH
(a) Remove the cylinder slide bush from the brake cylinder.

11. REMOVE REAR DISC BRAKE CYLINDER SLIDE PIN
(a) Using a 8 mm socket hexagon wrench, remove the cylinder slide pin (upper).

12. REMOVE REAR DISC BRAKE CYLINDER MOUNTING LH
(a) Remove the 2 bolts and cylinder mounting.



13. REMOVE REAR DISC

(a) Put matchmarks on the disc and axle hub.

(b) Remove the rear disc.

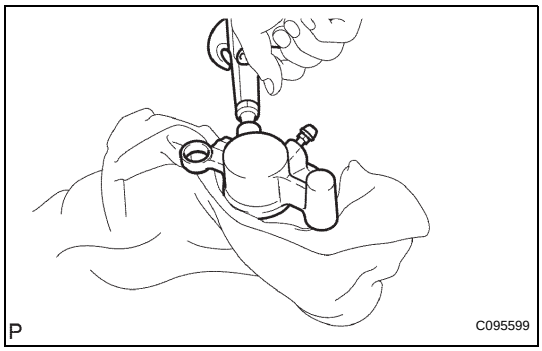
14. REMOVE PARKING BRAKE SHOE ADJUSTING HOLE PLUG

DISASSEMBLY

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. REMOVE CYLINDER BOOT

(a) Using a screwdriver, pry out the set ring and cylinder boot.

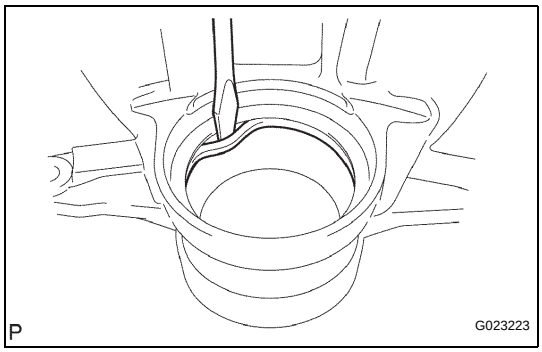


2. REMOVE REAR DISC BRAKE PISTON

(a) Place a cloth or equivalent between the piston and brake cylinder.

(b) Use compressed air to remove the piston from the brake cylinder.

CAUTION:
Do not place your fingers in font of the piston when using compressed air.
NOTICE:
Be careful not to spatter the brake fluid.



3. REMOVE PISTON SEAL

(a) Using a screwdriver, pry out the piston seal from the brake cylinder.

NOTICE:
Be careful not to damage the inner cylinder and cylinder groove.

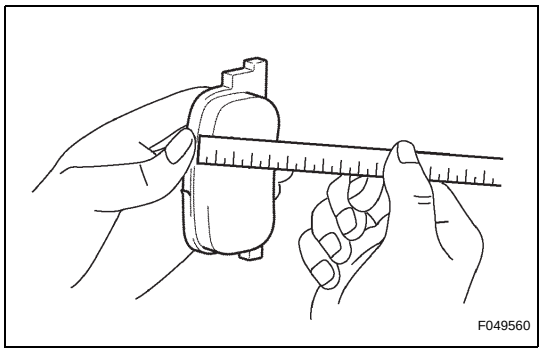
4. REMOVE REAR DISC BRAKE BLEEDER PLUG

INSPECTION

1. CHECK BRAKE CYLINDER AND PISTON

(a) Check the brake cylinder bore and piston for rust or scoring.

If necessary, replace the brake cylinder and piston.



2. CHECK PAD LINING THICKNESS

(a) Using a ruler, measure the pad lining thickness.

Standard thickness:
10.0 mm (0.394 in.)
Minimum thickness:
1.0 mm (0.039 in.)

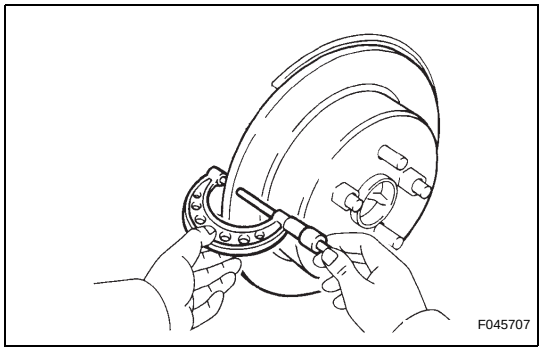
If the pad lining thickness is equal to or less than the minimum, replace the pad.

3. CHECK REAR DISC BRAKE PAD SUPPORT PLATE

(a) Check the 4 support plates.

Make sure that the plates have sufficient rebound and are free from deformation, cracks, wear, rust and dirt.

If necessary, replace the support plates.



4. CHECK DISC THICKNESS

(a) Using a micrometer, measure the disc thickness.

Standard thickness:
9.0 mm (0.354 in.)
Minimum thickness:
7.5 mm (0.295 in.)

If the disc thickness is less than the minimum, replace the disc.

REASSEMBLY

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. TEMPORARILY TIGHTEN REAR DISC BRAKE BLEEDER PLUG

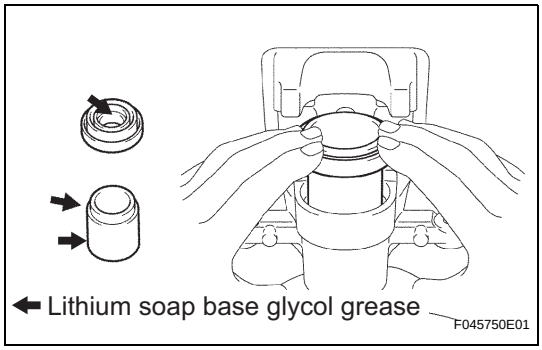
(a) Install the bleeder plug to the brake cylinder.
HINT:
The bleeder plug will be tightened to a torque specification in the "bleed air from brake line" procedures.

(b) Install the cap.

2. INSTALL PISTON SEAL

(a) Apply lithium soap base glycol grease to a new piston seal.

(b) Install the piston seal to the brake cylinder.

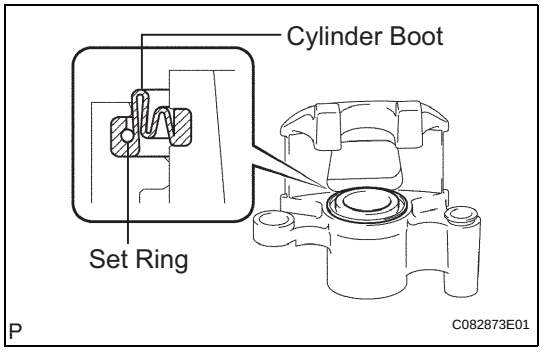


3. INSTALL REAR DISC BRAKE PISTON

(a) Apply lithium soap base glycol grease to the piston and a new cylinder boot.

(b) Install the cylinder boot to the piston.

(c) Install the piton (with cylinder boot) to the brake cylinder.
NOTICE:
Do not forcibly install the piston to the brake cylinder.



4. INSTALL CYLINDER BOOT

(a) Install the cylinder boot to the brake cylinder.
NOTICE:
Install the boot securely to the grooves of the brake cylinder and piston.

(b) Using a screwdriver, install the set ring.
NOTICE:
Be careful not to damage the cylinder boot.

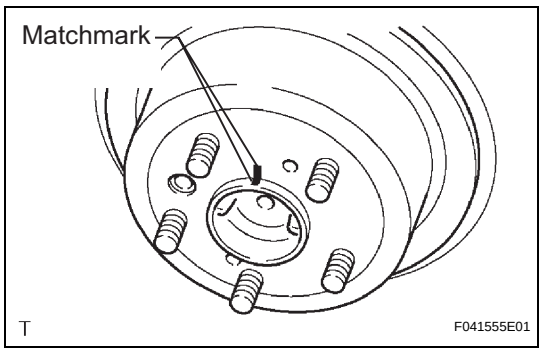
INSTALLATION

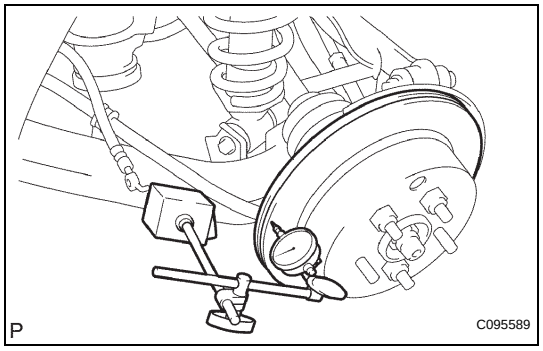
HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. INSTALL PARKING BRAKE SHOE ADJUSTING HOLE PLUG

2. INSTALL REAR DISC

(a) Align matchmarks and install the disc.
HINT:
When replacing the disc with a new one, select the installation position where the disc has the minimum runout.





3. CHECK DISC RUNOUT

(a) Check the bearing play in the axle direction and check the axle hub runout (see page AH-17).
(b) Temporarily install the disc to the hub with the hub nuts.
(c) Using a dial indicator, measure the disc runout 10 mm (0.39 in.) away from the outer edge of the disc.
Maximum disc runout:
0.15 mm (0.0059 in.)
If the runout is greater than the maximum, change the installation positions of the disc and axle so that the runout will become minimal.
If the runout is greater than the maximum when the installation positions are changed, grind the disc.
If the disc thickness is less than the minimum, replace the disc.
(d) Remove the hub nuts.

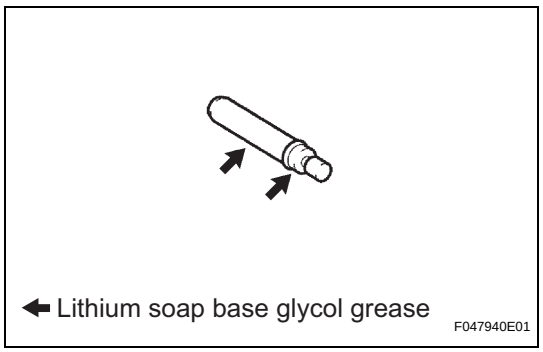
4. ADJUST PARKING BRAKE SHOE CLEARANCE (See page PB-19)

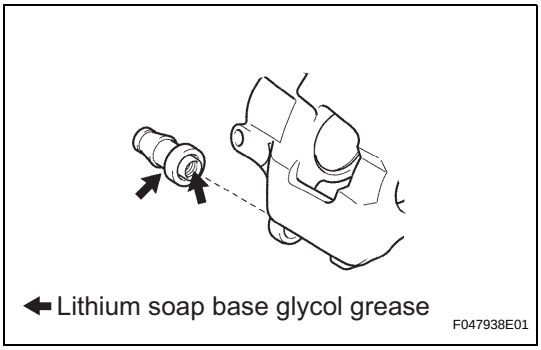
5. INSTALL REAR DISC BRAKE CYLINDER MOUNTING LH

(a) Install the cylinder mounting with the 2 bolts.
Torque: 47 N*m (475 kgf*cm, 34 ft.*lbf)

6. INSTALL REAR DISC BRAKE CYLINDER SLIDE PIN

(a) Apply lithium soap base glycol grease to the sliding part of the cylinder slide pin (upper).
(b) Using a socket hexagon wrench (8 mm), install the cylinder slide pin (upper) to the cylinder mounting.
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)

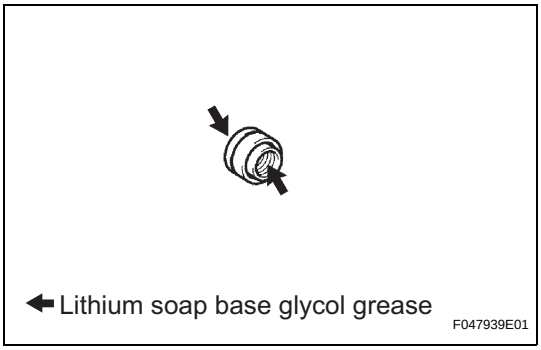




7. INSTALL REAR DISC BRAKE CYLINDER SLIDE BUSH

(a) Apply lithium soap base glycol grease to the sliding part of a new cylinder slide bush.

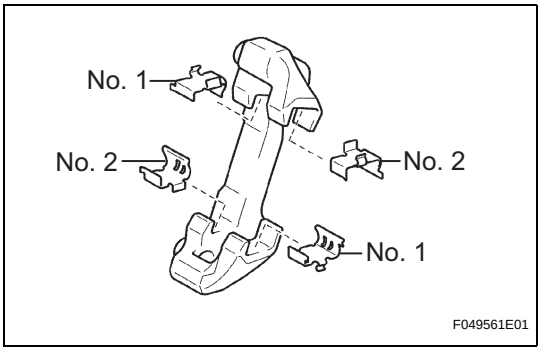
(b) Install the cylinder slide bush to the brake cylinder.



8. INSTALL REAR DISC BRAKE BUSH DUST BOOT

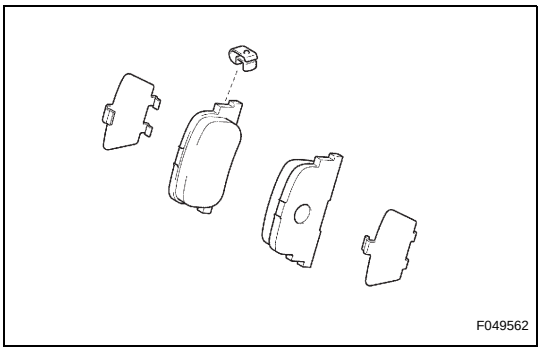
(a) Apply lithium soap base glycol grease to a new dust boot.

(b) Install the dust boot to the cylinder slide pin (upper).



9. INSTALL REAR DISC BRAKE PAD SUPPORT PLATE

(a) Install the 4 support plates (No. 1 and No. 2) to the cylinder mounting.



10. INSTALL REAR DISC BRAKE ANTI SQUEAL SHIM

(a) Install the 2 anti squeal shims to each pads.

NOTICE:

- **When replacing worn pad, the shims must be replaced together with the pads.**
- **Install the shims in the correct positions and direction.**

(b) Install the pad wear indicator plate to the pad (inner).

NOTICE:

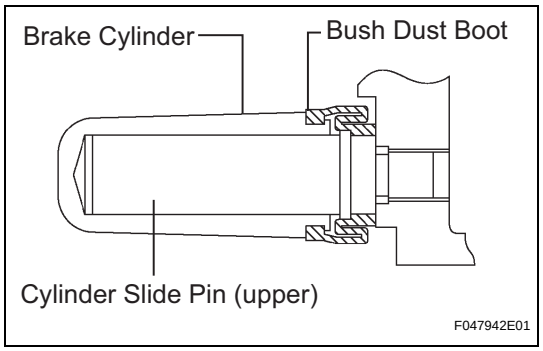
Install the pad wear indicator plate in the correct position and direction.

11. INSTALL REAR DISC BRAKE PAD

(a) Install the 2 pads (with anti squeal shims) to the cylinder mounting.

NOTICE:

There should be no oil or grease on the friction surface of the pads and disc.



12. **INSTALL REAR DISC BRAKE CYLINDER ASSEMBLY LH**
NOTICE:
Make sure that the dust boot is installed correctly as shown in the illustration.

13. **INSTALL REAR DISC BRAKE CYLINDER SLIDE PIN**
(a) Install the cylinder slide pin (lower).
Torque: 34 N*m (350 kgf*cm, 25 ft.*lbf)

14. **CONNECT REAR LH FLEXIBLE HOSE**
(a) Connect the flexible hose with the union bolt and a new gasket.
Torque: 30 N*m (310 kgf*cm, 22 ft.*lbf)
HINT:
Install the flexible hose lock securely in the lock hole in the brake cylinder.

15. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**

16. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**

17. **BLEED AIR FROM BRAKE LINE (See page BR-4)**

18. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-4)**

19. **CHECK FOR BRAKE FLUID LEAKAGE**

20. **INSTALL REAR WHEEL**
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

ANTI-LOCK BRAKE SYSTEM

PRECAUTION

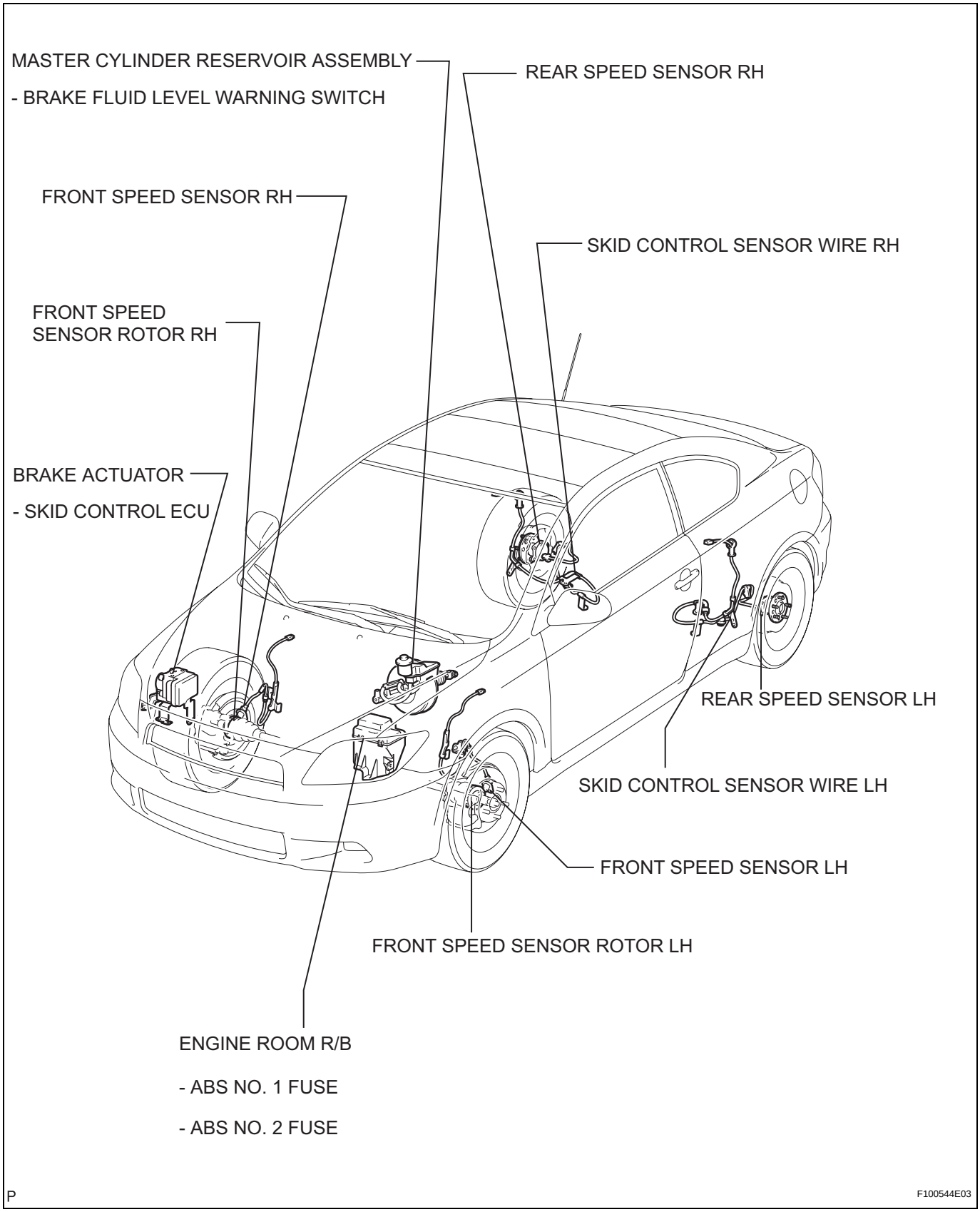
NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

System	See procedure
Power window control system (with Jam protection function)	IN-23
Sliding roof system	

CAUTION:

- **When there is a malfunction in the contact point of the terminals or installation problems with parts, removing and installing of the suspected problem parts may return the system to the normal condition either completely or temporarily.**
- **In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as by DTC output and the freeze frame data output, and record it before disconnecting each connector or removing and installing parts.**
- **Since the ABS with EBD system may be influenced by a malfunction in the other systems, be sure to check for DTCs in the other systems.**
- **Be sure to remove and install the brake actuator and each sensor with the ignition switch OFF unless specified in the inspection procedure.**
- **When removing and installing the brake actuator and each sensor, be sure to check that the normal display is output in the test mode inspection and the DTC output inspection after installing all the parts.**

PARTS LOCATION



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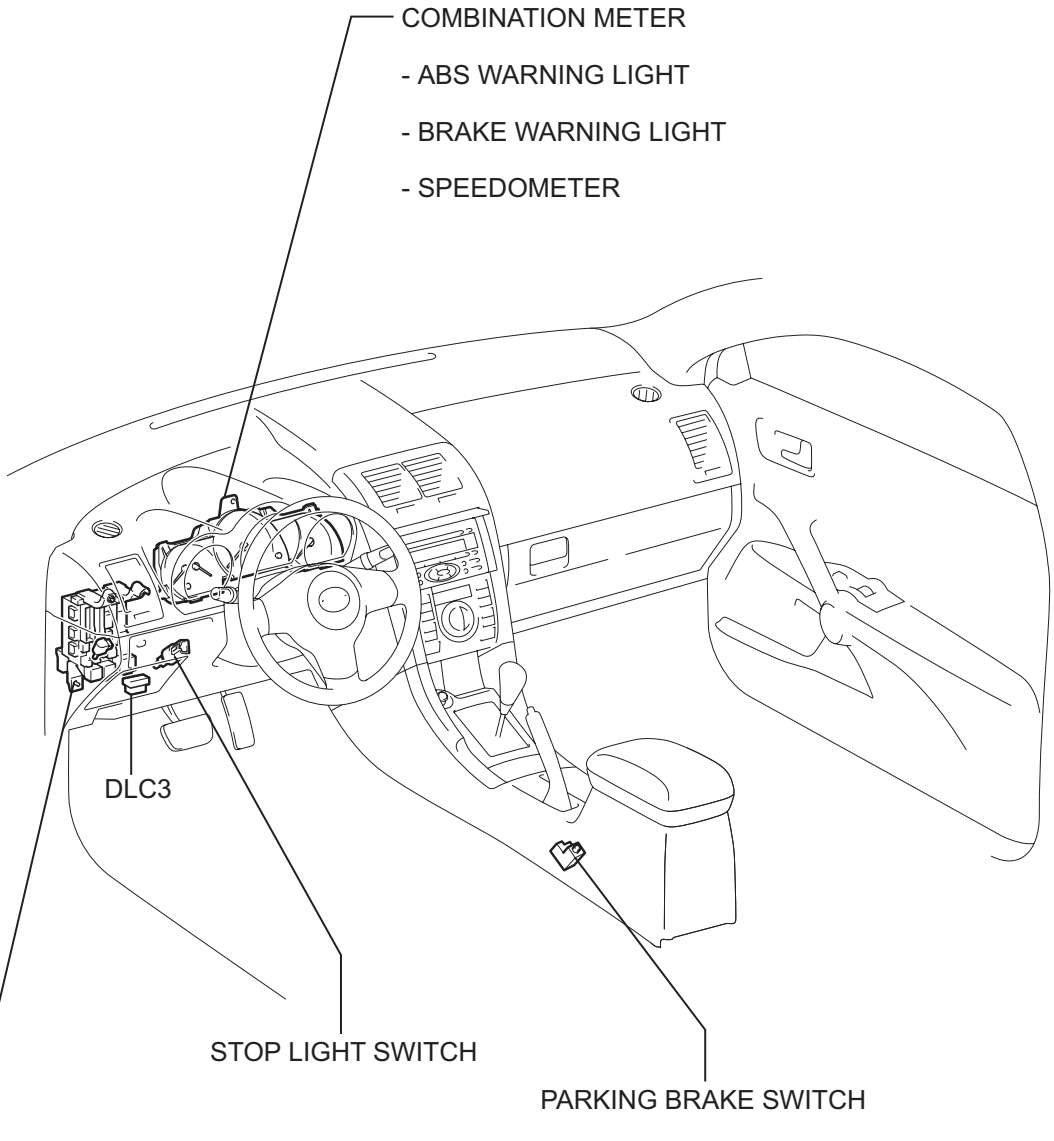

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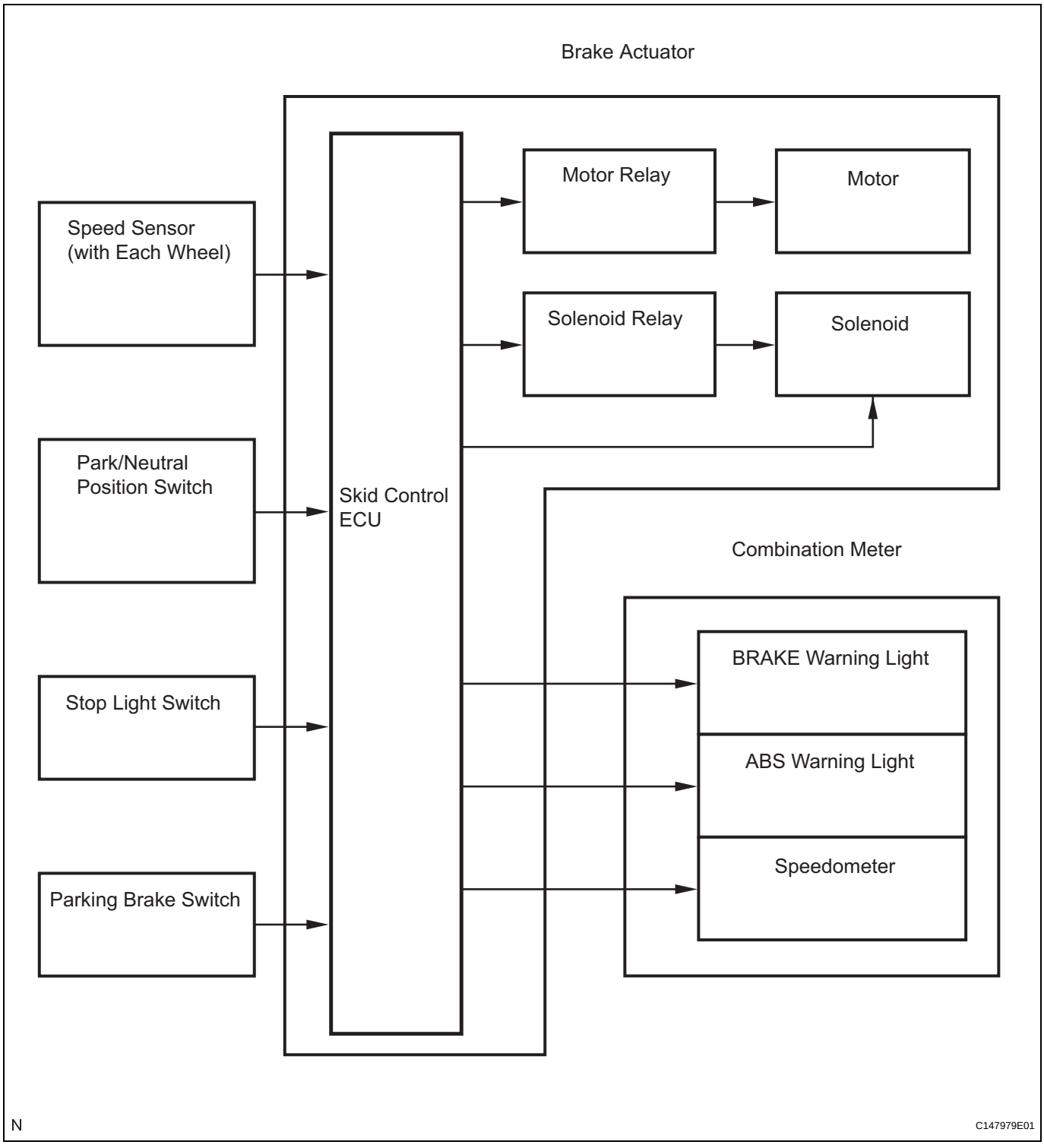
SYSTEM DIAGRAM



SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

HINT:

The skid control ECU is a single unit with brake actuator.

(a) ABS

(Anti-lock Brake System)

The ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.

(b) EBD

(Electronic Brake Force Distribution)

The EBD control utilizes ABS, realizing proper brake force distribution between front and rear wheels in accordance with driving conditions.

In addition, when braking while cornering, it also controls the brake forces of right and left wheels, helping to maintain vehicle behavior.

2. ABS WITH EBD OPERATION

(a) Based on the signals received from the 4 wheel speed sensors, the skid control ECU calculates each wheel speed and deceleration, and checks wheel slipping condition. And according to the slipping condition, the ECU controls the pressure holding valve and pressure reduction valve in order to adjust the fluid pressure of each wheel cylinder.

3. FAIL SAFE FUNCTION

(a) When a failure occurs in the ABS system, the ABS warning light comes on and operation is prohibited. In addition to this, when a failure which disables the EBD operation occurs, the BRAKE warning light comes on as well and operation is prohibited.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
*: Use the intelligent tester.

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 AND CLEAR DTC***

NEXT

4	**PROBLEM SYMPTOM CONFIRMATION**

Result

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B → **Go to step 6**

A

5	**SYMPTOM SIMULATION**

NEXT

6	**CHECK FOR DTC***

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B → **Go to step 9**

A

7	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 9

A

8	OVERALL ANALYSIS AND TROUBLESHOOTING

(a) Terminals of ECU (See page BC-11)
(b) DATA LIST / ACTIVE TEST (See page BC-16)

NEXT

Go to step 11

9	CHECK FOR FLUID LEAKAGE

NEXT

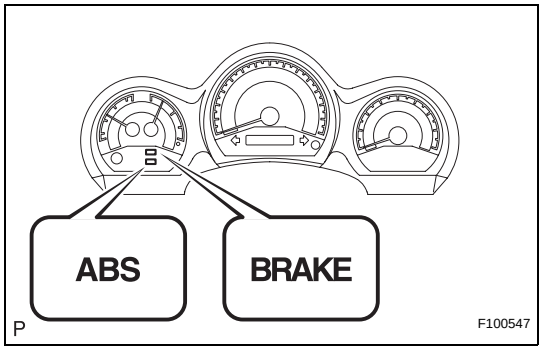
10	REPAIR OR REPLACE

NEXT

11	CONFIRMATION TEST

NEXT

END



TEST MODE PROCEDURE

1. ABS WARNING LIGHT

(a) The ABS warning light operates as listed below.
1. It comes ON when the ignition switch is ON.
2. After that, it goes OFF in 3 seconds.

2. BRAKE WARNING LIGHT

(a) The BRAKE warning light operates as listed below.
1. It comes ON when the ignition switch is ON and the parking brake is set.

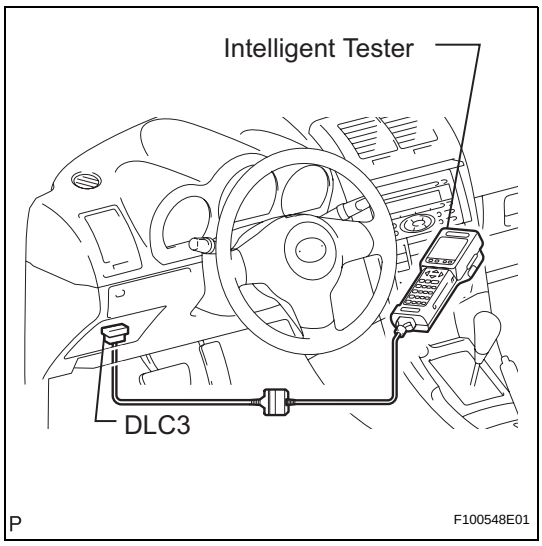
BC

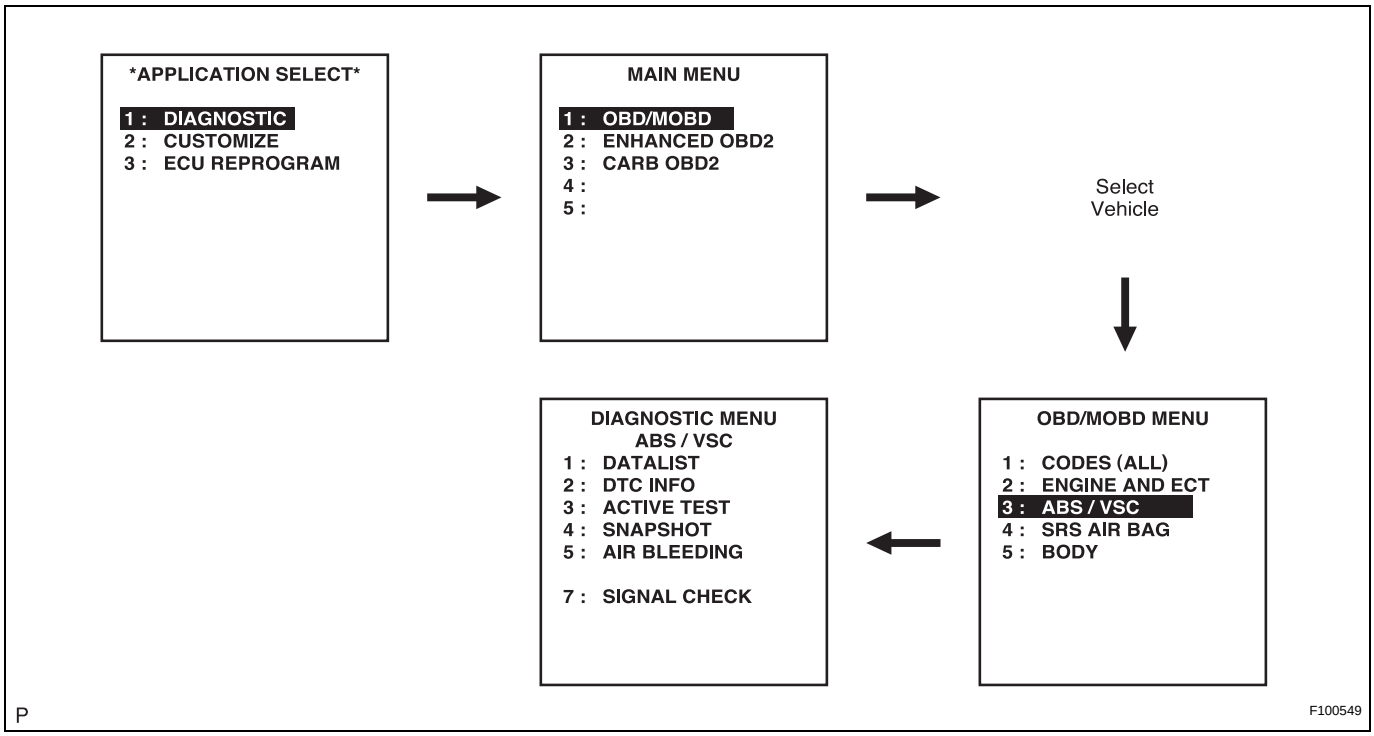
2. It comes ON when the ignition switch is ON and the brake fluid level of the reservoir tank is lower than the low level.
3. It goes OFF when the parking brake is not set.

3. TEST MODE FOR VEHICLE SPEED SENSOR SIGNAL (WITH INTELLIGENT TESTER)

HINT:
The manufacturer uses the test mode to check the vehicle speed sensor operation.

(a) Connect the intelligent tester to the DLC3.
(b) Allow the engine to idle.
(c) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and SIGNAL CHECK. The ABS warning light will blink.





(d) Drive the vehicle straightforward at 55 km/h (34 mph) or higher for several seconds. Then, do not turn the steering wheel and do not spin the wheels. The ABS warning light will go OFF when the signal check is complete.
(e) Stop the vehicle and do not turn the ignition switch OFF.

(f) Check the DTCs.

If DTCs are set, perform the inspection procedure depends on DTCs.

DTC of speed sensor check function

DTC*	Problem	Related DTC	See procedures
C1271	Low output voltage of right front speed sensor	C0200	BC-20
C1272	Low output voltage of left front speed sensor	C0205	BC-20
C1273	Low output voltage of right rear speed sensor	C0210	BC-27
C1274	Low output voltage of left rear speed sensor	C0215	BC-27
C1275	Abnormal change in output voltage of right front speed sensor	C1235	BC-20
C1276	Abnormal change in output voltage of left front speed sensor	C1236	BC-20
C1277	Abnormal change in output voltage of right rear speed sensor	C1238	BC-27
C1278	Abnormal change in output voltage of left rear speed sensor	C1239	BC-27

HINT:

*: These DTCs are set while the signal check mode only.

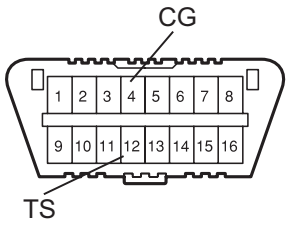
4. TEST MODE FOR VEHICLE SPEED SENSOR SIGNAL (WITHOUT INTELLIGENT TESTER)

HINT:

The manufacturer uses the test mode to check the vehicle speed sensor operation.

(a) Allow the engine to idle.

DLC3:



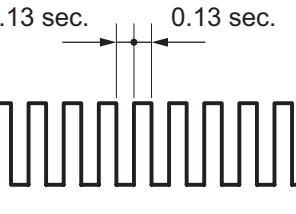
P C108847E43

(b) Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.The ABS warning light will blink.
SST 09843-18040

(c) Drive the vehicle straightforward at 55 km/h (34 mph) or higher for several seconds. Then, do not turn the steering wheel and do not spin the wheels. The ABS warning light will go OFF when the signal check is complete.

(d) Stop the vehicle and do not turn the ignition switch OFF.

ABS warning light blinking when no DTC is set:



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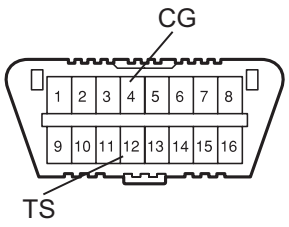
BC

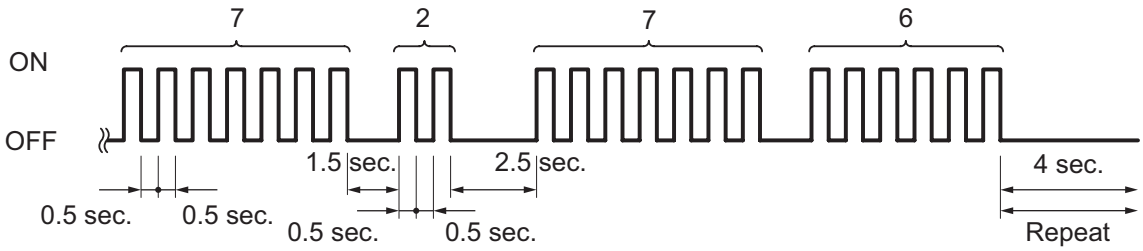
DLC3:



(e) Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.
SST 09843-18040

(f) Count the number of the ABS warning light blinks to check DTCs.

ABS warning light blinking when DTCs are set:



If DTCs are set, perform the inspection procedure depending on DTCs.

DTC of speed sensor check function

DTC*	Problem	Related DTC	See procedures
71	Low output voltage of right front speed sensor	31	BC-20
72	Low output voltage of left front speed sensor	32	BC-20
73	Low output voltage of right rear speed sensor	33	BC-27
74	Low output voltage of left rear speed sensor	34	BC-27
75	Abnormal change in output voltage of right front speed sensor	35	BC-20
76	Abnormal change in output voltage of left front speed sensor	36	BC-20
77	Abnormal change in output voltage of right rear speed sensor	38	BC-27
78	Abnormal change in output voltage of left rear speed sensor	39	BC-27

HINT:
*: These DTCs are set while the signal check mode only.

BC

PROBLEM SYMPTOMS TABLE

If the ABS has a problem even when DTCs are not output, use the table below to identify the potential causes of the symptoms.

NOTICE:

When replacing the brake actuator assembly or sensor, turn the ignition switch OFF.

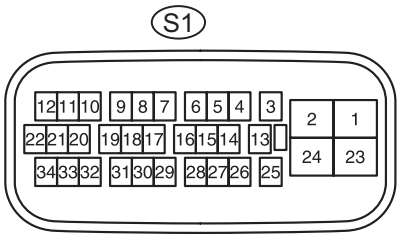
Anti-lock Brake System

Symptom	Suspected Area	See page
ABS does not operate	1. Check brake fluid leakage	-
	2. Check power source circuit	BC-44
	3. Check brake actuator assembly	BC-72
	4. When above areas (1 to 3) are all normal but problem still occurs, replace brake actuator assembly	BC-73
ABS does not operate efficiently	1. Check brake fluid leakage	-
	2. Check brake actuator assembly	BC-72
	3. When above areas (1 and 2) are all normal but problem still occurs, replace brake actuator assembly	BC-73
ABS warning light remains ON	1. Check ABS warning light circuit	BC-53
ABS warning light does not come ON	1. Check ABS warning light circuit	BC-57
BRAKE warning light malfunction	1. Check BRAKE warning light circuit	BC-60
DTC check cannot be done	1. Check TC and CG terminal circuit	BC-65
Test mode cannot be done	1. Check TS and CG terminal circuit	BC-68

TERMINALS OF ECU

1. TERMINALS OF ECU

Skid Control ECU:



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C108855E04

Symbols (Terminal No.)	Terminal Description
+BS (S1-1)	Solenoid valve power supply
GND1 (S1-24)	Skid control ECU ground
PN (S1-6)	NEUTRAL switch signal circuit
FL- (S1-8)	Front LH wheel speed signal input (-)
FL+ (S1-9)	Front LH wheel speed signal input (+)
STP (S1-10)	Stop light switch input
RL+ (S1-11)	Rear LH wheel speed signal input (+)
RL- (S1-12)	Rear LH wheel speed signal input (-)
WA (S1-13)	ABS warning light output
D/G (S1-14)	Diagnosis tester communication line
TS (S1-15)	Sensor diagnosis check input
TC (S1-16)	Diagnosis tester communication line
PKB (S1-18)	Parking brake switch input
+BM (S1-23)	Motor relay power supply
GND2 (S1-2)	Actuator pump motor ground
IG1 (S1-25)	ECU power supply
SP1 (S1-26)	Speed signal output for meter
FR- (S1-30)	Front RH wheel speed signal input (-)
FR+ (S1-31)	Front RH wheel speed signal input (+)
BRL (S1-32)	BRAKE warning light output
RR+ (S1-33)	Rear RH wheel speed signal input (+)
RR- (S1-34)	Rear RH wheel speed signal input (-)

2. TERMINALS INSPECTION

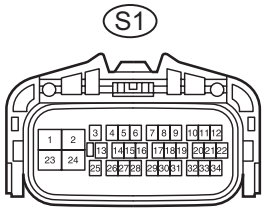
Disconnect the connector and measure the voltage on the wire harness side.

HINT:

Voltage cannot be measured with the connector connected to the skid control ECU as the connector is water resistant.

Skid Control ECU:

(harness side connector)



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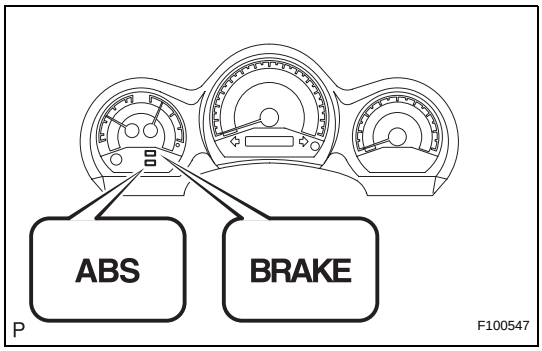
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
+BS (S1-1) - GND1, 2 (S1-24, 2)	B - W-B	Solenoid valve power supply	Always	11 to 14 V
STP (S1-10) - GND1, 2 (S1-24, 2)	L - W-B	Stop light switch input	Stop light switch ON	11 to 14 V
WA (S1-13) - GND1, 2 (S1-24, 2)	SB - W-B	ABS warning light output	Ignition switch ON, ABS warning light ON	11 to 14 V
PKB (S1-18) - GND1, 2 (S1-24, 2)	LG - W-B	Parking brake switch input	Ignition switch ON, parking brake switch ON	Below 2.0 V
PKB (S1-18) - GND1, 2 (S1-24, 2)	LG - W-B	Parking brake switch input	Ignition switch ON, parking brake switch OFF	11 to 14 V
+BM (S1-23) - GND1, 2 (S1-24, 2)	W - W-B	Motor relay power supply	Always	11 to 14 V
BRL (S1-32) - GND1, 2 (S1-24, 2)	V - W-B	BRAKE warning light output	Ignition switch ON, BRAKE warning light ON	7 to 10 V
IG1 (S1-25) - GND1, 2 (S1-24, 2)	Y - W-B	ECU power supply	Ignition switch ON	11 to 14 V

DIAGNOSIS SYSTEM

1. DIAGNOSIS

CAUTION:
When releasing the parking brake lever, set the chocks to hold the vehicle for safety.



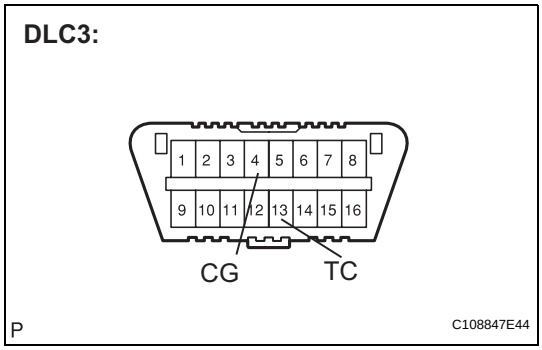
(a) Release the parking brake lever.

(b) If the skid control ECU detects a malfunction, the ABS and BRAKE warning lights will come on to warn the driver. The table below indicates which lights come on when there is a malfunction in a particular function.

Item/Trouble Area	ABS System	EBD System	Skid Control ECU
ABS Warning light	○	○	○
BRAKE Warning light	-	○	○

○: Light ON
-: Light OFF

(c) The DTCs are simultaneously stored in memory. The DTCs can be read by connecting the SST between terminals TC and CG of the DLC3 and observing the blinking of the ABS warning light, or by connecting the intelligent tester.
SST 09843-18040



DTC CHECK / CLEAR

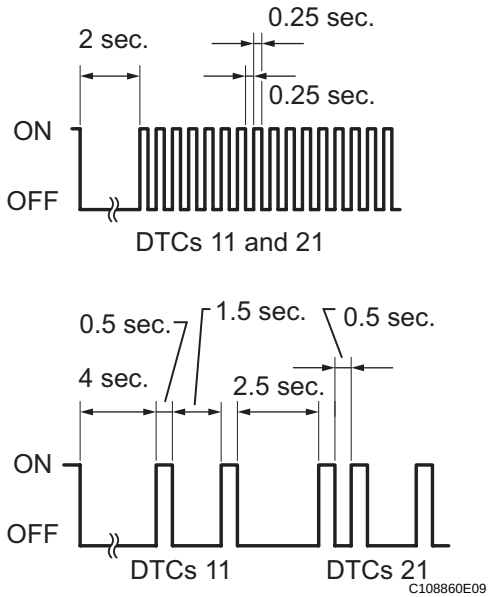
1. CHECK DTC (USING SST CHECK WIRE)

(a) Check DTCs.

(1) Using SST, connect terminals 13 (TC) and the 4 (CG) of the DLC3.
SST 09843-18040

(2) Turn the ignition switch to the ON position.

Normal System Code:

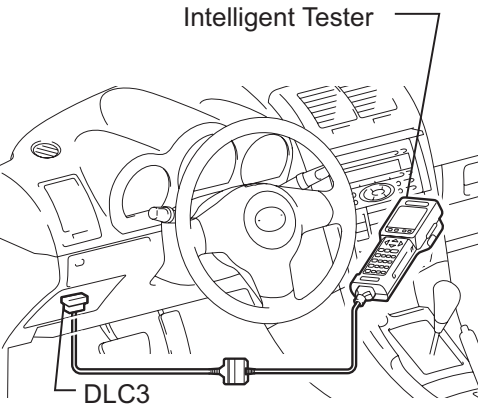


(3) Read the DTC from the ABS warning light on the combination meter assembly.
HINT:
- If no code appears, inspect the TC and CG terminal circuit or ABS warning light circuit.

Trouble Area	See procedure
TC and CG terminal circuit	BC-65
ABS warning light circuit	BC-53 BC-57

- As examples, the blinking patterns for a normal system code and DTCs 11 and 21 are shown.

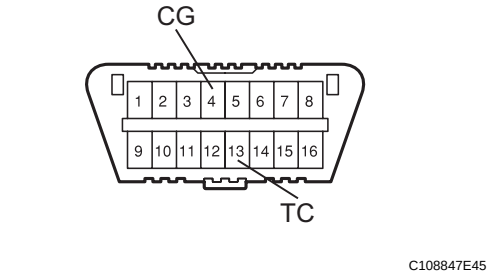
(4) Codes are explained in the code table.
(5) After completing the check, disconnect terminals TC and CG of the DLC3, and turn off the display. If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed first.



2. CHECK DTC (USING INTELLIGENT TESTER)

(a) Check DTCs.
(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Read the DTCs by following the prompts on the tester screen.
HINT:
Refer to the intelligent tester operator's manual for further details.

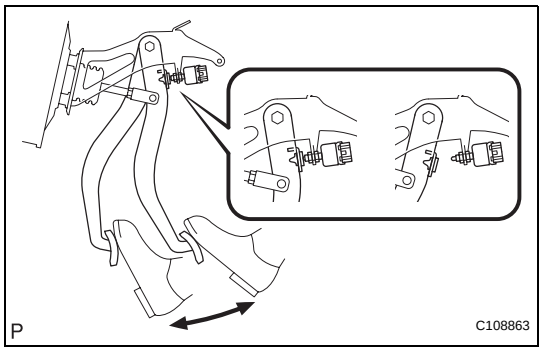
DLC3:



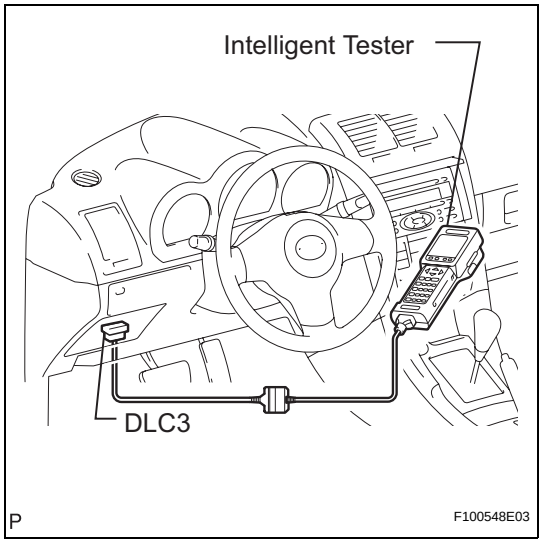
3. CLEAR DTC (USING SST CHECK WIRE)

(a) Clear the DTCs.
(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040
(2) Turn the ignition switch to the ON position.

BC



(3) Clear the DTCs stored in ECU by depressing the brake pedal 8 times or more within 5 seconds.
(4) Check that the warning light indicates the normal system code.
(5) Remove the SST from the terminals of the DLC3.
HINT:
Clearing the DTCs cannot be performed by removing the battery cable or ECU-IG fuse.



4. CLEAR DTC (USING INTELLIGENT TESTER)

(a) Clear DTCs.
(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Operate the intelligent tester to erase the codes.
HINT:
Refer to the intelligent tester operator's manual for further details.

5. END OF DTC CHECK / CLEAR

(a) Turn the ignition switch to the ON position.
(b) Check that the ABS warning light goes off in about 3 seconds.

FREEZE FRAME DATA

1. FREEZE FRAME DATA

HINT:

- Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
- The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from OFF to the ON position since the last time the ABS was activated. However, if the vehicle was stopped or at a low speed (7 km/h (4.3 mph) or less), or if a DTC is detected, the skid control ECU will not count the number since then.
- Freeze frame data at the time the ABS operated: 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 when the ABS operated is erased.
- 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.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) From the display on the tester, select the "FREEZE FRAME DATA".

Tester Display	Measurement Item	Reference Value
VEHICLE SPD	Vehicle speed	Min.: 0, max.: 326.4 km/h
STOP LIGHT SW	Stop light switch signal	Stop light switch ON: ON; OFF: OFF
# IG ON	Numbers of operations of ignition switch ON after memorizing freeze frame data	0 to 31
SYSTEM	System status	ABS activated: ABS, NO SYS, FAIL SAFE
TROUBLE CODE	Freeze DTC	Min.: 0, max.: 255
SPD GRADE	Vehicle speed grade	Min.: -1.869, max.: 1.869
# CODES	Number of trouble code	Min.: 0, max.: 255

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 and prohibits ABS control.
The ABS control will be prohibited, but EBD control continues as much as possible. If EBD control is impossible, the BRAKE warning light comes on to warn the driver.

Malfunction	Symptom
ABS system	ABS control prohibited
EBD system	ABS and EBD control prohibited

HINT:
If the ABS system has a malfunction, the brake system will operate normally without ABS control.

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

According to the DATA LIST displayed on the intelligent tester, you can read the value and status of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as the first stop of trouble-shooting is one of the methods to shorten labor time.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) From the display on the tester, read the DATA LIST.

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
AIR BLD SUPPORT	Air bleed support / SUPPORT or NOT SUP	Support / Not support	-
PKB SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
STOP LIGHT SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
ABS MOT RELAY	ABS motor relay / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
SOL RELAY	Solenoid relay / ON or OFF	ON: Solenoid relay ON OFF: Solenoid relay OFF	-
TEST MODE	Test mode operation / NORMAL or TEST	NORMAL: Normal mode TEST: During test mode	-
ABS OPERT RL	ABS operation (RL) / BEFORE or OPERATE	BEFORE: No ABS operation (RL) OPERATE: During ABS operation (RL)	Similar speed as indicated on speedometer
ABS OPERT RR	ABS operation (RR) / BEFORE or OPERATE	BEFORE: No ABS operation (RR) OPERATE: During ABS operation (RR)	Similar speed as indicated on speedometer
ABS OPERT FL	ABS operation (FL) / BEFORE or OPERATE	BEFORE: No ABS operation (FL) OPERATE: During ABS operation (FL)	-
ABS OPERT FR	ABS operation (FR) / BEFORE or OPERATE	BEFORE: No ABS operation (FR) OPERATE: During ABS operation (FR)	-
SRLR	ABS solenoid (SRLR) ON / OFF	ON: Operated OFF: Not operated	-
SRLH	ABS solenoid (SRLH) ON / OFF	ON: Operated OFF: Not operated	-
SRRR (SRR)	ABS solenoid (SRRR (SRR)) ON / OFF	ON: Operated OFF: Not operated	-
SRRH (SRH)	ABS solenoid (SRRH (SRH)) ON / OFF	ON: Operated OFF: Not operated	-
SFLR	ABS solenoid (SFLR) ON / OFF	ON: Operated OFF: Not operated	-
SFLH	ABS solenoid (SFLH) ON / OFF	ON: Operated OFF: Not operated	-
SFRR	ABS solenoid (SFRR) ON / OFF	ON: Operated OFF: Not operated	-
SFRH	ABS solenoid (SFRH) ON / OFF	ON: Operated OFF: Not operated	-
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer
VEHICLE SPD	Vehicle speed / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed	Similar speed as indicated on speedometer
IG VOLTAGE	ECU power supply voltage / TOO HIGH / NORMAL / TOO LOW	TOO HIGH: 14 V or more NORMAL: 9.8 V to 14 V TOO LOW: Below 9.8 V	-
SPD SEN FR	FR speed sensor open detection / OPEN or NORMAL	OPEN: Momentary interruption	-
SPD SEN FL	FL speed sensor open detection / OPEN or NORMAL	OPEN: Momentary interruption	-
SPD SEN RR	RR speed sensor open detection / OPEN or NORMAL	OPEN: Momentary interruption	-
SPD SEN RL	RL speed sensor open detection / OPEN or NORMAL	OPEN: Momentary interruption	-

2. PERFORM ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the intelligent tester allows the relay, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one of the methods to shorten labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch to the ON position.

(c) According to the display on the tester, perform the ACTIVE TEST.

HINT:

Ignition switch must be turned to the ON position to proceed to the ACTIVE TEST using the intelligent tester.

Tester Display	Test Part	Control Range	Diagnostic Note
ABS MOT RELAY	Turns ABS motor relay	Relay ON / OFF	Operation of solenoid (clicking sound) can be heard
SOL RELAY	Turns solenoid relay	Relay ON / OFF	Operation of solenoid (clicking sound) can be heard
BRAKE WRN LIGHT	Turns BRAKE warning light	Warning light ON / OFF	Observe combination meter
ABS WARN LIGHT	Turns ABS warning light	Warning light ON / OFF	Observe combination meter
SRLR	Turns ABS solenoid (SRLR)	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SRLH)	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRR	Turns ABS solenoid (SRRR)	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH)	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard

Tester Display	Test Part	Control Range	Diagnostic Note
SFLR	Turns ABS solenoid (SFLR)	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH)	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRR	Turns ABS solenoid (SFRR)	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH)	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRR & SFRH	Turns ABS solenoid SFRR and SFRH	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SFLR & SFLH	Turns ABS solenoid SFLR and SFLH	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SRH & SRR	Turns ABS solenoid SRRR and SRRH	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SRLR & SRLH	Turns ABS solenoid SRLR and SRLH	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard
SFRH & SFLH	Turns ABS solenoid SFRH and SFLH	Solenoid ON / OFF	Operation of solenoid (clicking sound) can be heard

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:
When removing parts, turn the ignition switch OFF.
HINT:

- Using SST 09843-18040, connect terminals TC and CG of the DLC3.
- If any abnormality is not found when inspecting parts, inspect the ECU and ground points for poor contact.
- If a trouble code is displayed during the DTC check, check the circuit listed for that code. For details of each code, turn to the page referred to under the "See page" for respective "DTC Code" in the DTC chart.
- When two or more DTCs are recorded and the problem is not identified, perform circuit inspection of the other DTCs.

DTC chart of ABS:

DTC Code	Detection Item	Trouble Area	See page
C0200/31	Right Front Wheel Speed Sensor Signal Malfunction	1. Front speed sensor RH 2. Front speed sensor circuit 3. Front speed sensor rotor 4. Sensor installation	BC-20
C0205/32	Left Front Wheel Speed Sensor Signal Malfunction	1. Front speed sensor LH 2. Front speed sensor circuit 3. Front speed sensor rotor 4. Sensor installation	BC-20
C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction	1. Rear speed sensor RH 2. Rear speed sensor circuit 3. Rear speed sensor rotor 4. Sensor installation	BC-27
C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction	1. Rear speed sensor LH 2. Rear speed sensor circuit 3. Rear speed sensor rotor 4. Sensor installation	BC-27
C0226/21	SFR Solenoid Circuit	1. Brake actuator assembly 2. SFRR or SFRH circuit	BC-33
C0236/22	SFL Solenoid Circuit	1. Brake actuator assembly 2. SFLR or SFLH circuit	BC-33
C0246/23	SRR Solenoid Circuit	1. Brake actuator assembly 2. SRRR or SRRH circuit	BC-33
C0256/24	SRL Solenoid Circuit	1. Brake actuator assembly 2. SFLR or SRLH circuit	BC-33
C0273/13	Open or Short Circuit in ABS Motor Relay Circuit	1. ABS motor relay 2. ABS motor relay circuit 3. Brake actuator assembly	BC-36
C0274/14	Short to B+ in ABS Motor Relay Circuit	1. ABS motor relay 2. ABS motor relay circuit 3. Brake actuator assembly	BC-36
C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit	1. ABS motor relay 2. ABS motor relay circuit 3. Brake actuator assembly	BC-40
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	1. ABS motor relay 2. ABS motor relay circuit 3. Brake actuator assembly	BC-40
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	1. Front speed sensor RH 2. Front speed sensor rotor RH	BC-20
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	1. Front speed sensor LH 2. Front speed sensor rotor LH	BC-20
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	1. Rear speed sensor RH 2. Rear speed sensor rotor RH	BC-27

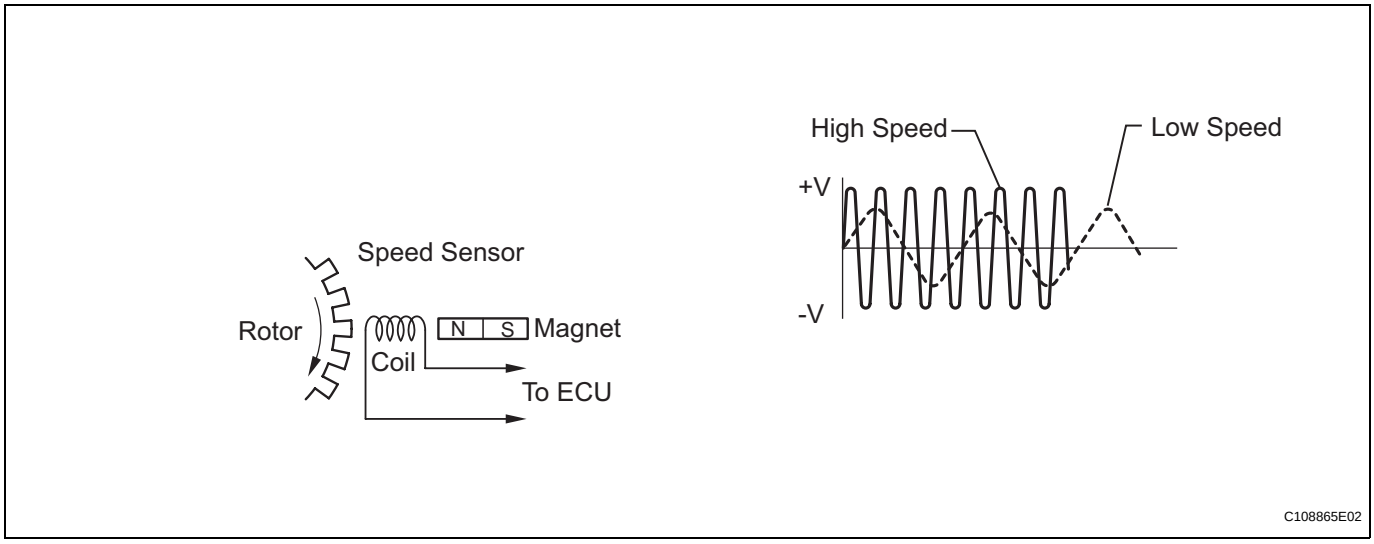
DTC Code	Detection Item	Trouble Area	See page
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	1. Rear speed sensor LH 2. Rear speed sensor rotor LH	BC-27
C1241/41	Low Battery Positive Voltage	1. Battery 2. Charging system 3. Power source circuit	BC-44
C1249/49	Open in Stop Light Switch Circuit	1. Stop light switch 2. Stop light switch circuit	BC-47
C1251/51	Open in Pump Motor Circuit	1. ABS pump motor 2. Brake actuator assembly	BC-50

Test Mode DTC of ABS:

DTC Code	Detection Item	Trouble Area	See page
C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	1. Front speed sensor RH 2. Sensor installation 3. Speed sensor rotor	BC-20
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	1. Front speed sensor LH 2. Sensor installation 3. Speed sensor rotor	BC-20
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	1. Rear speed sensor RH 2. Sensor installation 3. Speed sensor rotor	BC-27
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	1. Rear speed sensor LH 2. Sensor installation 3. Speed sensor rotor	BC-27
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	Speed sensor rotor	BC-20
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	Speed sensor rotor	BC-20
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	Speed sensor rotor	BC-27
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	Speed sensor rotor	BC-27

DTC	C0200/31	Right Front Wheel Speed Sensor Signal Malfunction
DTC	C0205/32	Left Front Wheel Speed Sensor Signal Malfunction
DTC	C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH
DTC	C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH
DTC	C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)
DTC	C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

DESCRIPTION



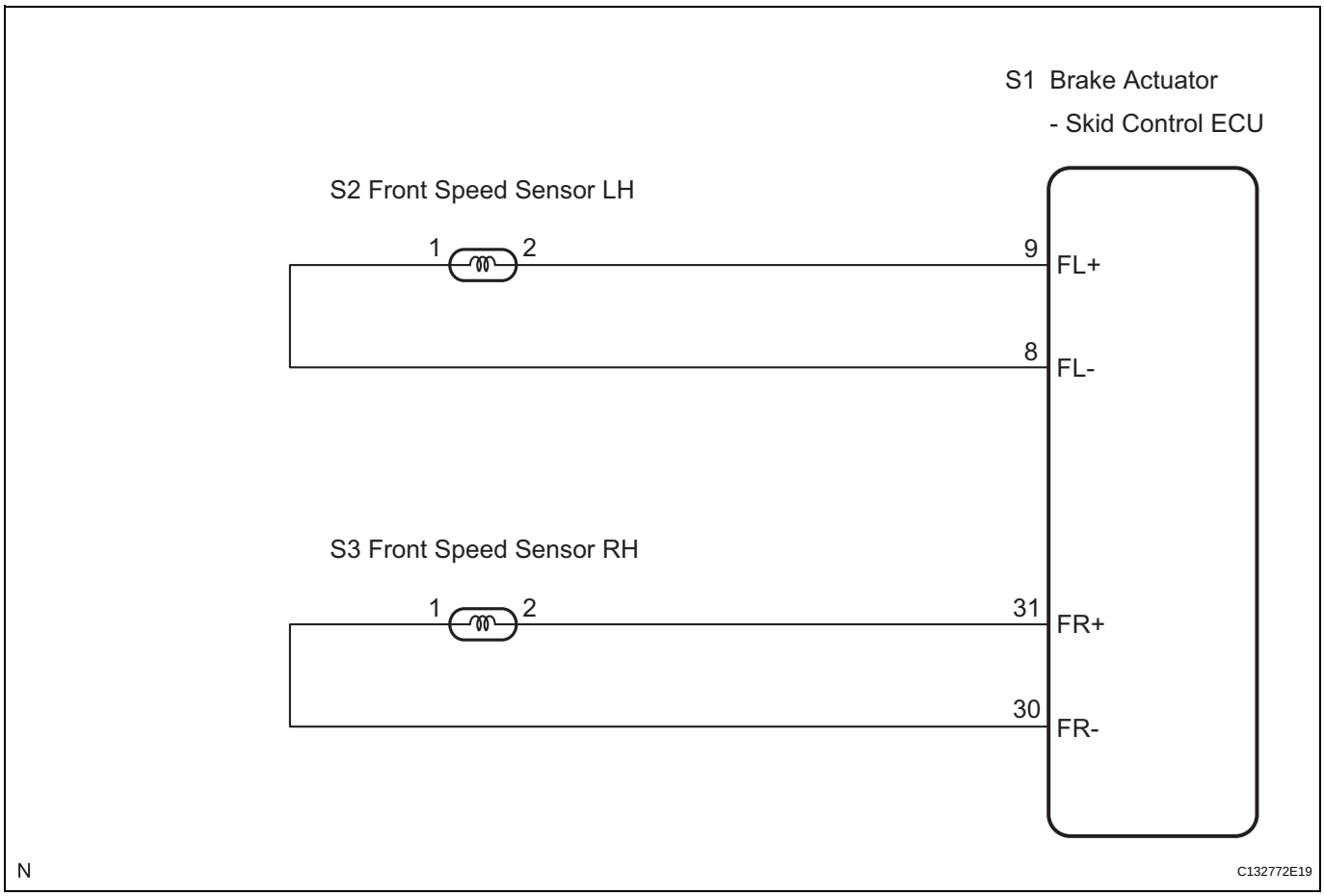
The speed sensor detects wheel speed and transmits the appropriate signals to the ECU. These signals are used for control of the ABS control system. Each of the front and rear rotors has 48 serrations. When the rotors rotate, the magnetic field generated by the permanent magnet in the speed sensor induces AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

BC

DTCs C1271/71, C1272/72, C1275/75 and C1276/76 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1271/71, C1272/72, C1275/75 and C1276/76 are out put only in the test mode.

DTC Code	DTC Detection Condition	Trouble Area
C0200/31	Any of the following conditions is detected: • At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more at vehicle speed of 35 km/h (20 mph) or more. • Sensor signal circuit is open for 0.5 sec. or more.	• Front speed sensor RH • Front speed sensor RH circuit • Speed sensor rotor • Sensor installation
C0205/32	Any of the following conditions is detected: • At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more at vehicle speed of 35 km/h (20 mph) or more. • Sensor signal circuit is open for 0.5 sec. or more.	• Front speed sensor LH • Front speed sensor LH circuit • Speed sensor rotor • Sensor installation
C1235/35	At the vehicle speed of 20 km/h (12 mph) or more, the condition that noise is included in the speed sensor signal continues for 5 sec. or more.	• Front speed sensor RH • Speed sensor rotor
C1236/36	At the vehicle speed of 20 km/h (12 mph) or more, the condition that noise is included in the speed sensor signal continues for 5 sec. or more.	• Front speed sensor LH • Speed sensor rotor

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method:

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → **Go to step 4**

BC

A

2	READ VALUE OF INTELLIGENT TESTER (FRONT SPEED SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and DATA LIST.

(d) Read the WHEEL SPD FR and WHEEL SPD FL status.

Tester Display	Measurement Item/Range	Normal Condition
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed

OK:

There is almost no difference from the displayed speed value.

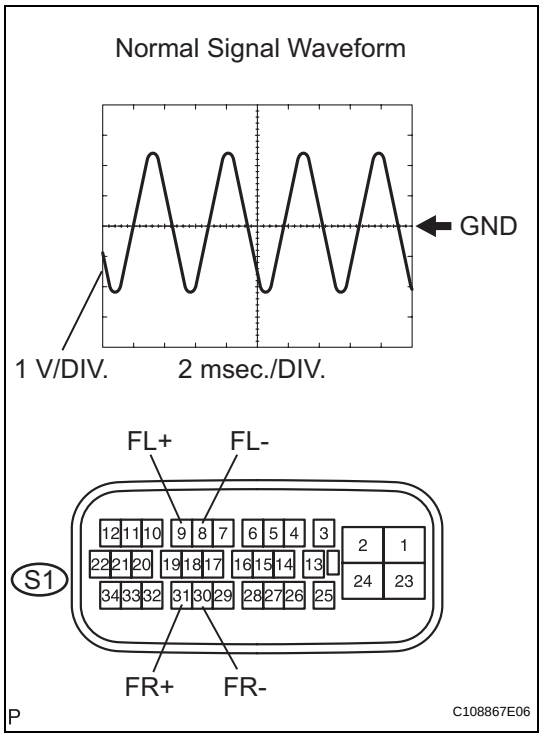
HINT:

There is tolerance of +- 10% in the speedometer indication.

NG → **Go to step 4**

OK

3 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



(a) INSPECTION USING OSCILLOSCOPE:

(1) Connect the oscilloscope between terminals FR+ and FR-, or FL+ and FL- of the skid control ECU connector.

(2) Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.

OK:

A waveform as shown in the figure should be output.

HINT:

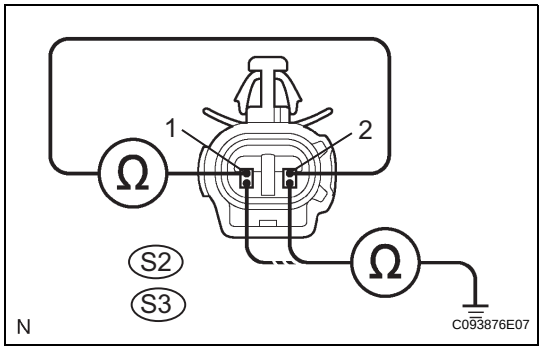
- As vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter attached to it.

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

BC

4 INSPECT FRONT SPEED SENSOR



(a) Make sure that there is no looseness at the locking part and connecting part of connectors.
(b) Disconnect the S2 and S3 speed sensor connectors.
(c) Measure the resistance of the speed sensors.
Standard resistance:
LH

Tester Connection	Specified Condition
S2-2 (FL+) - S2-1 (FL-)	1.4 to 1.8 kΩ at 20°C (68°F)
S2-2 (FL+) - Body ground	10 kΩ or higher
S2-1 (FL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
S3-2 (FR+) - S3-1 (FR-)	1.4 to 1.8 kΩ at 20°C (68°F)
S3-2 (FR+) - Body ground	10 kΩ or higher
S3-1 (FR-) - Body ground	10 kΩ or higher

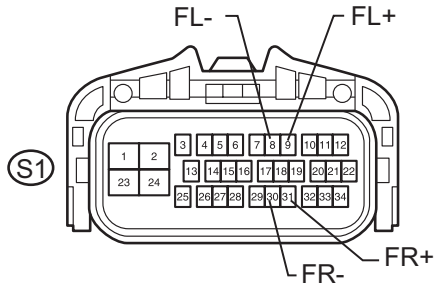
HINT:
Check the speed sensor signal after replacement.

NG → **REPLACE FRONT SPEED SENSOR**

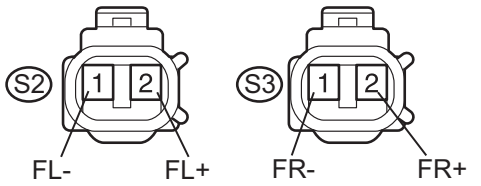
OK

5 CHECK WIRE HARNESS (SKID CONTROL ECU - FRONT SPEED SENSOR)

Skid Control ECU Wire Harness Side:



Front Speed Sensor:



(a) Disconnect the S1 skid control ECU connector.
(b) Disconnect the S2 and S3 front speed sensor connectors.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance:
LH

Tester Connection	Specified Condition
S1-9 (FL+) - S2-2 (FL+)	Below 1 Ω
S1-8 (FL-) - S2-1 (FL-)	Below 1 Ω
S1-9 (FL+) - Body ground	10 kΩ or higher
S1-8 (FL-) - Body ground	10 kΩ or higher

RH

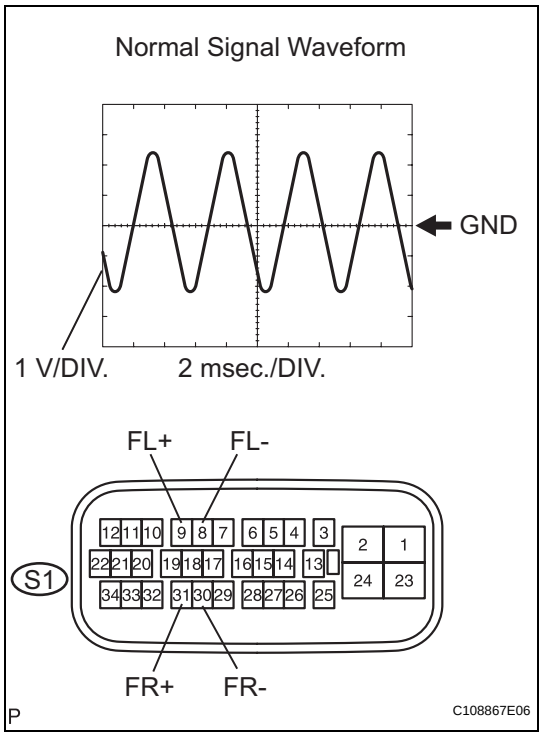
Tester Connection	Specified Condition
S1-31 (FR+) - S3-2 (FR+)	Below 1 Ω
S1-30 (FR-) - S3-1 (FR-)	Below 1 Ω
S1-31 (FR+) - Body ground	10 kΩ or higher
S1-30 (FR-) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

BC

OK

6 INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS

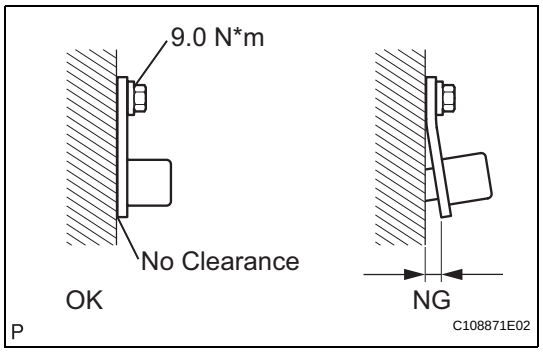


(a) INSPECTION USING OSCILLOSCOPE:
(1) Connect the oscilloscope to terminal FR+ and FR-, or FL+ and FL- of the skid control ECU connector.
(2) Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.
OK:
A waveform as shown in the figure should be output.
HINT:
- As vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter attached to it.

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

7 INSPECT FRONT SPEED SENSOR INSTALLATION



(a) Check the speed sensor installation.
OK:
There is no clearance between the sensor and the front steering knuckle.
The installation bolt is tightened properly.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
HINT:
Check the speed sensor signal after replacement (See page BC-7).

NG → **REPLACE FRONT SPEED SENSOR**

OK

8 INSPECT SPEED SENSOR TIP

(a) Remove the front speed sensor.
(b) Check the sensor tip.
OK:
No scratches or foreign matter on the sensor tip.

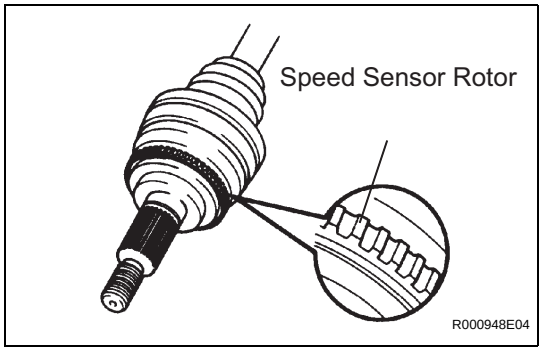
BC

HINT:
Check the speed sensor signal after cleaning / replacement (See page BC-7).

NG → **CLEAN OR REPLACE SPEED SENSOR**

OK

9	**INSPECT SPEED SENSOR ROTOR**



(a) Remove the front drive outboard joint shaft assembly.
(b) Check the sensor rotor serrations.
OK:
No scratches, missing teeth or foreign matter on the rotors.
HINT:
- If there is foreign matter in the rotor, remove it and check the output waveform after reassembly.
- Check the speed sensor signal after cleaning / replacement (See page BC-7).

NG → **CLEAN OR REPLACE SENSOR ROTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

DTC	C0210/33	Right Rear Wheel Speed Sensor Signal Malfunction
DTC	C0215/34	Left Rear Wheel Speed Sensor Signal Malfunction
DTC	C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH
DTC	C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH
DTC	C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)
DTC	C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)
DTC	C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)
DTC	C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DESCRIPTION

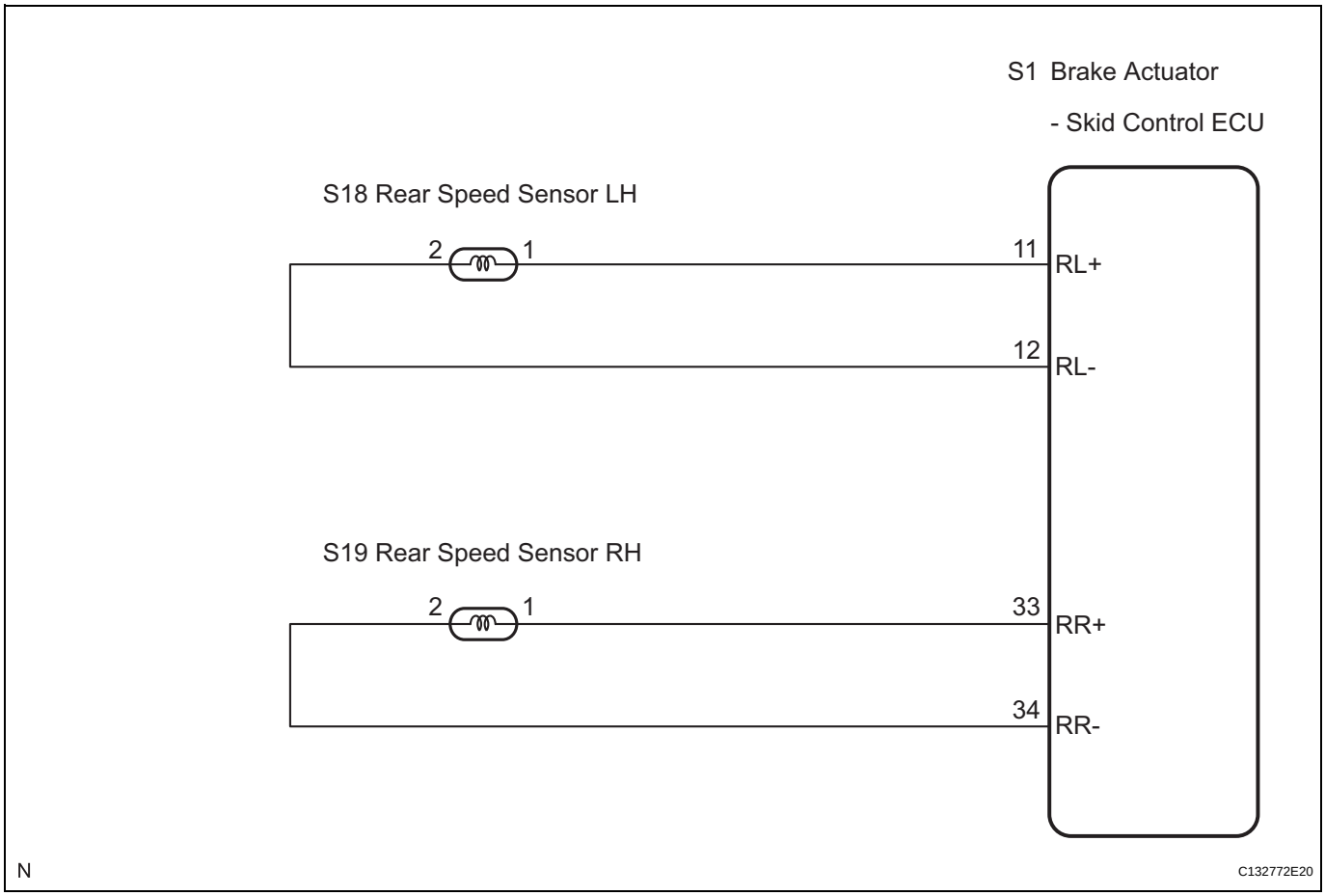
Refer to DTC C0200/31, C0205/32, C1235/35, C1236/36 (See page BC-20).

DTCs C1273/73, C1274/74, C1277/77 and C1278/78 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1273/73, C1274/74, C1277/77 and C1278/78 are out put only in the test mode.

DTC Code	DTC Detection Condition	Trouble Area
C0210/33	Any of the following conditions is detected: • At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more at vehicle speed of 35 km/h (20 mph) or over. • Sensor signal circuit is open for 0.5 sec. or more.	• Rear speed sensor RH • Rear speed sensor RH circuit • Speed sensor rotor • Sensor installation
C0215/34	Any of the following conditions is detected: • At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. • Momentary interruption of sensor signal of faulty wheel has occurred 7 times or more at vehicle speed of 35 km/h (20 mph) or over. • Sensor signal circuit is open for 0.5 sec. or more.	• Rear speed sensor LH • Rear speed sensor LH circuit • Speed sensor rotor • Sensor installation

DTC Code	DTC Detection Condition	Trouble Area
C1238/38	At the vehicle speed of 20 km/h (12 mph) or more, the condition that noise is included in the speed sensor signal continues for 5 sec. or more.	• Rear speed sensor RH • Speed sensor rotor
C1239/39	At the vehicle speed of 20 km/h (12 mph) or more, the condition that noise is included in the speed sensor signal continues for 5 sec. or more.	• Rear speed sensor LH • Speed sensor rotor

WIRING DIAGRAM



INSPECTION PROCEDURE

BC

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method:

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → **Go to step 4**

A

2 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and DATA LIST.
(d) Read the WHEEL SPD RL and WHEEL SPD RR status.

Tester Display	Measurement Item/Range	Normal Condition
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Actual wheel speed

OK:

There is almost no difference from the displayed speed value.

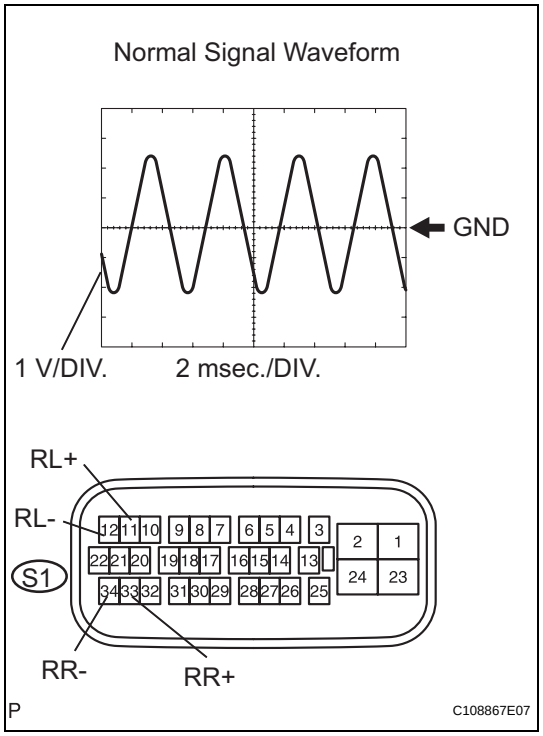
HINT:

There is tolerance of +- 10% in the speedometer indication.

NG → **Go to step 4**

OK

3 INSPECT SENSOR AND SENSOR ROTOR SERRATIONS



(a) INSPECTION USING OSCILLOSCOPE:
(1) Connect the oscilloscope to terminal RR+ and RR-, or RL+ and RL- of the skid control ECU connector.
(2) Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.

OK:

A waveform as shown in the figure should be output.

HINT:

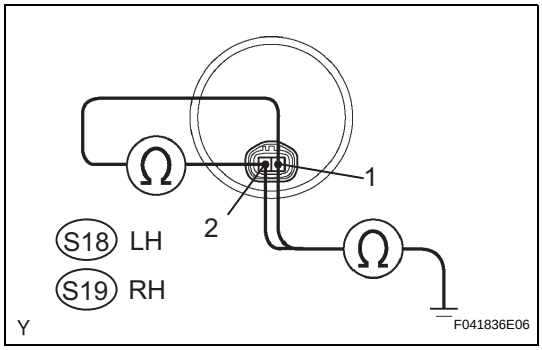
- As vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter attached to it.

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

BC

4 INSPECT REAR SPEED SENSOR



(a) Disconnect the S18 and S19 rear speed sensor connectors.

(b) Measure the resistance of the speed sensors.

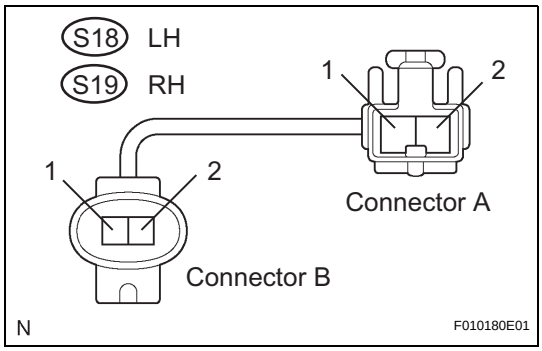
Standard resistance:

LH

Tester Connection	Specified Condition
S18-1 (RL+) - S18-2 (RL-)	Less than 2.2 kΩ
S18-1 (RL+) - Body ground	10 kΩ or higher
S18-2 (RL-) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
S19-1 (RR+) - S19-2 (RR-)	Less than 2.2 kΩ
S19-1 (RR+) - Body ground	10 kΩ or higher
S19-2 (RR-) - Body ground	10 kΩ or higher



(c) Skid control sensor wire:

(1) Remove the seat cushion and seatback.

(2) Make sure that there is no looseness at the connector's locking part and connecting part.

(3) Measure the resistance of the sensor wires.

Standard resistance:

LH

Tester Connection	Specified Condition
S18 (A-1) - S18 (A-2)	10 kΩ or higher
S18 (A-1) - S18 (B-1)	Below 1 Ω
S18 (A-2) - S18 (B-2)	Below 1 Ω
S18 (A-1) - Body ground	10 kΩ or higher
S18 (A-2) - Body ground	10 kΩ or higher

RH

Tester Connection	Specified Condition
S19 (A-1) - S19 (A-2)	10 kΩ or higher
S19 (A-1) - S19 (B-1)	Below 1 Ω
S19 (A-2) - S19 (B-2)	Below 1 Ω
S19 (A-1) - Body ground	10 kΩ or higher
S19 (A-2) - Body ground	10 kΩ or higher

HINT:

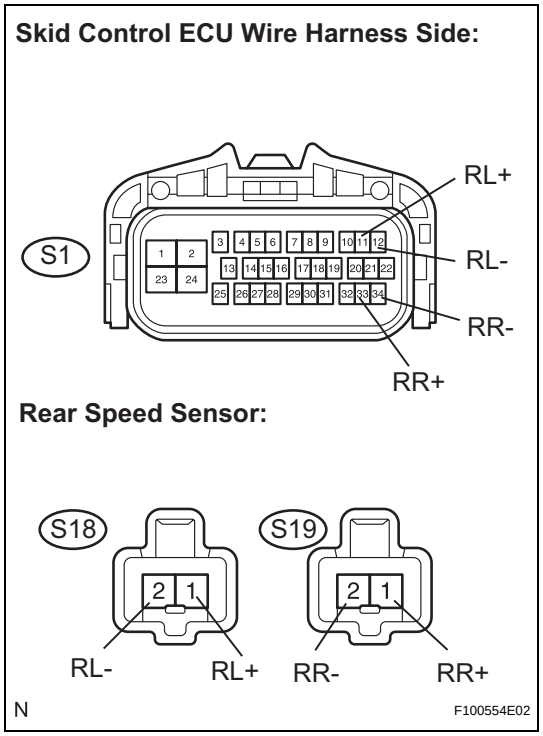
Check the speed sensor signal after replacement (See page BC-7).

NG → **REPLACE REAR SPEED SENSOR OR SKID CONTROL SENSOR WIRE**

OK

BC

5 CHECK WIRE HARNESS (SKID CONTROL ECU - REAR SPEED SENSOR)



(a) Disconnect the S1 skid control ECU connector.
(b) Disconnect the S18 and S19 rear speed sensor connectors.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance:

LH

Tester Connection	Specified Condition
S1-11 (RL+) - S18-1 (RL+)	Below 1 Ω
S1-12 (RL-) - S18-2 (RL-)	Below 1 Ω
S1-11 (RL+) - Body ground	10 kΩ or higher
S1-12 (RL-) - Body ground	10 kΩ or higher

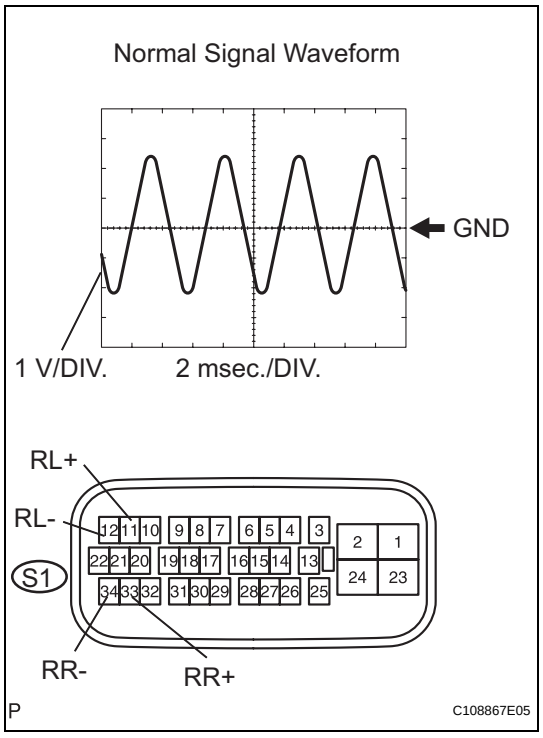
RH

Tester Connection	Specified Condition
S1-33 (RR+) - S19-1 (RR+)	Below 1 Ω
S1-34 (RR-) - S19-2 (RR-)	Below 1 Ω
S1-33 (RR+) - Body ground	10 kΩ or higher
S1-34 (RR-) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

6 INSPECT SENSOR AND SENSOR ROTOR SERRATIONS



(a) INSPECTION USING OSCILLOSCOPE:
(1) Connect the oscilloscope to terminal RR+ and RR-, or RL+ and RL- of the skid control ECU.
(2) Drive the vehicle at about 30 km/h (19 mph), and check the signal waveform.

OK:

A waveform as shown in the figure should be output.

HINT:

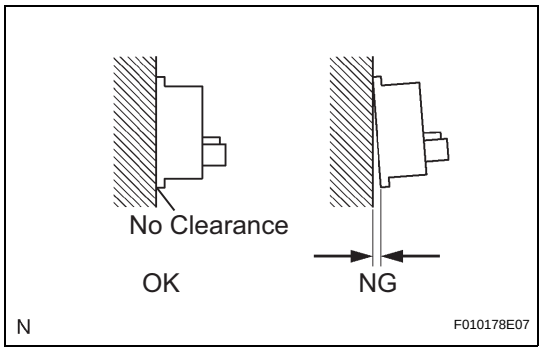
- As vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter attached to it.

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

BC

NG

7 INSPECT SENSOR INSTALLATION



(a) Check the sensor installation.
OK:
There is no clearance between the sensor and rear axle carrier.
The installation bolt is tightened properly.
HINT:
Check the speed sensor signal after replacement (See page BC-7).

NG → **REPLACE REAR SPEED SENSOR**

OK

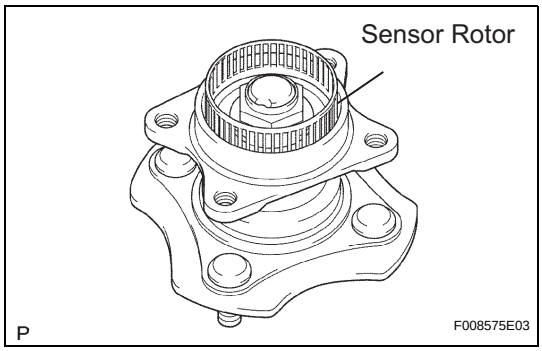
8 INSPECT REAR SPEED SENSOR TIP

(a) Remove the rear speed sensor.
(b) Check the sensor tip.
OK:
No scratches or foreign matter on the sensor tip.
HINT:
Check the speed sensor signal after cleaning/ replacement (See page BC-7).

NG → **CLEAN OR REPLACE SPEED SENSOR**

OK

9 INSPECT SENSOR ROTOR



(a) Check the sensor rotor serrations.
OK:
No scratches, missing teeth or foreign matter on the rotor.
HINT:
Check the speed sensor signal after replacement (See page BC-7).

NG → **REPLACE AXLE HUB AND BEARING ASSEMBLY**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BC

DTC	C0226/21	SFR Solenoid Circuit

DTC	C0236/22	SFL Solenoid Circuit

DTC	C0246/23	SRR Solenoid Circuit

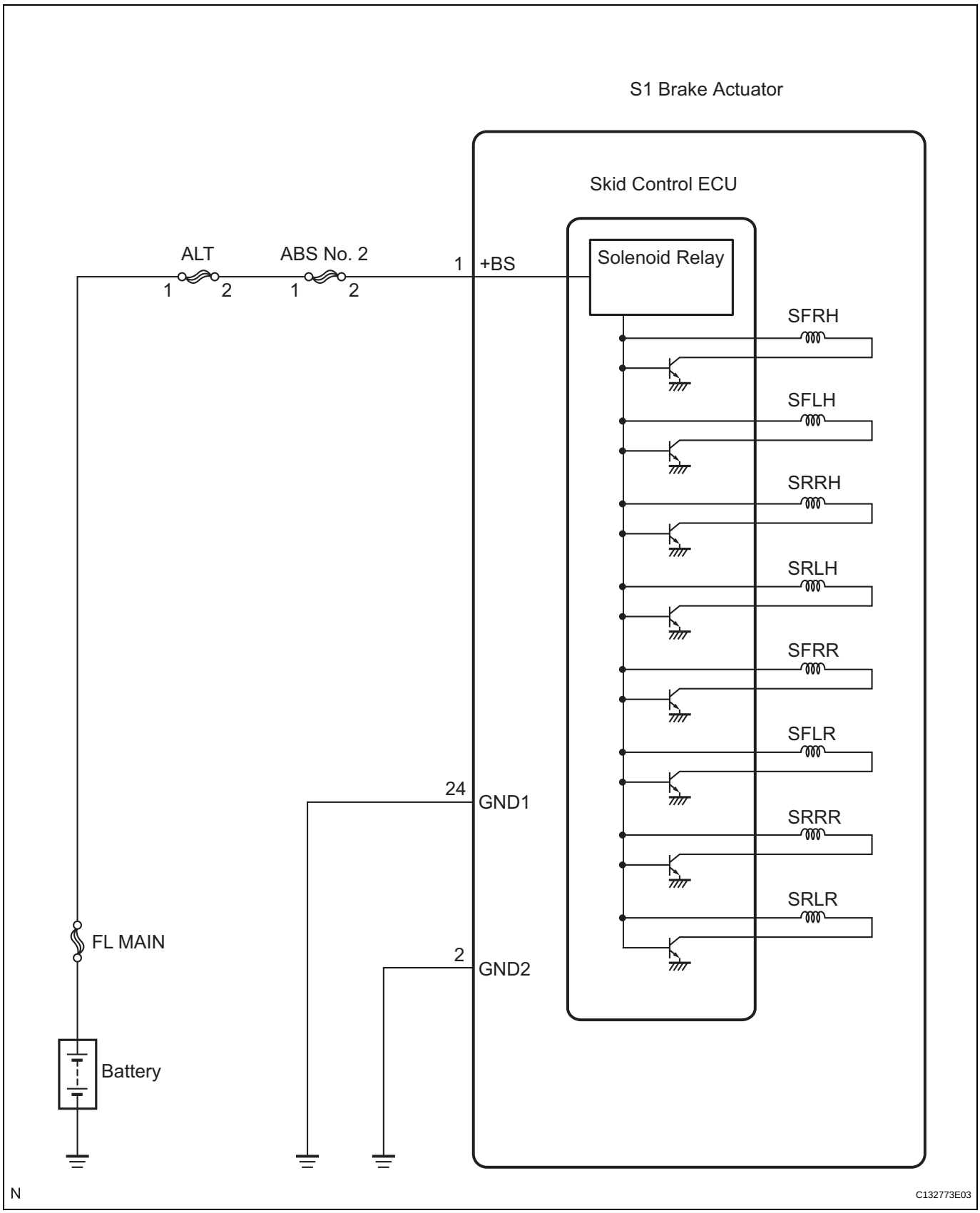
DTC	C0256/24	SRL Solenoid Circuit

DESCRIPTION

These solenoid go on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226/21	Solenoid circuit is open / short for 0.05 seconds or more when ignition switch is ON (IG terminal voltage is 11 to 14 V)	• SFR solenoid circuit • Brake actuator assembly
C0236/22	Solenoid circuit is open / short for 0.05 seconds or more when ignition switch is ON (IG terminal voltage is 11 to 14 V)	• SFL solenoid circuit • Brake actuator assembly
C0246/23	Solenoid circuit is open / short for 0.05 seconds or more when ignition switch is ON (IG terminal voltage is 11 to 14 V)	• SRR solenoid circuit • Brake actuator assembly
C0256/24	Solenoid circuit is open / short for 0.05 seconds or more when ignition switch is ON (IG terminal voltage is 11 to 14 V)	• SRL solenoid circuit • Brake actuator assembly

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	RECONFIRM DTC

These codes are detected when a problem is determined in the brake actuator assembly. The solenoid circuit is 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 before replacing the brake actuator assembly.

(a) Clear the DTCs (See page BC-13).
(b) Turn the ignition switch to the ON position.
(c) Are the same DTCs recorded (See page BC-13)?

HINT:

- The skid control ECU inspects the solenoid relay circuit when the stop light switch is turned off and the vehicle is running at a speed of 4 mph (6 km/h) or more.
- These DTCs may be recorded due to a malfunction in the connector terminal connection, etc.

NO → **END**

YES

REPLACE BRAKE ACTUATOR ASSEMBLY

DTC	C0273/13	Open or Short Circuit in ABS Motor Relay Circuit

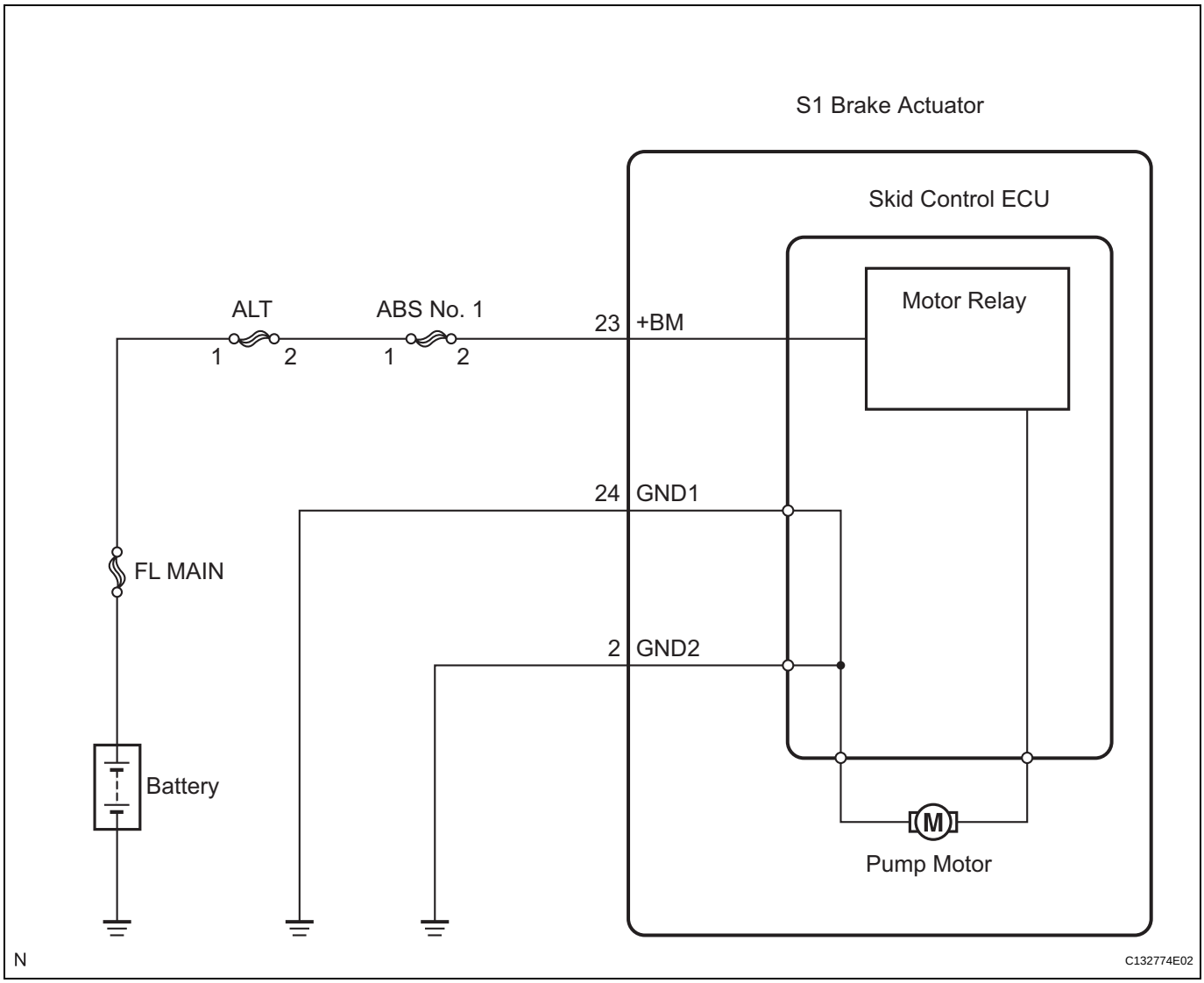
DTC	C0274/14	Short to B+ in ABS Motor Relay Circuit

DESCRIPTION

The ABS motor relay supplies power to the ABS pump motor. While the ABS is activated, the ECU switches the motor relay on and operates the ABS pump motor.
If the voltage supplied to the motor relay (+BM) is below the DTCs detection threshold due to battery / generator shortage, the DTCs may be stored.

DTC Code	DTC Detection Condition	Trouble Area
C0273/13	The motor relay contact is OFF for 0.2 sec. or more immediately after the motor relay is turned ON.	• ABS motor relay • ABS motor relay circuit • Brake actuator assembly
C0274/14	The motor relay contact is ON for 2.5 sec. or more when the IG terminal voltage is 10 to 14 V and the motor relay is OFF.	• ABS motor relay • ABS motor relay circuit • Brake actuator assembly

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method:

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → **Go to step 3**

A

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS MOTOR RELAY)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and ACTIVE TEST.
(d) Read the ABS MOT RELAY status.

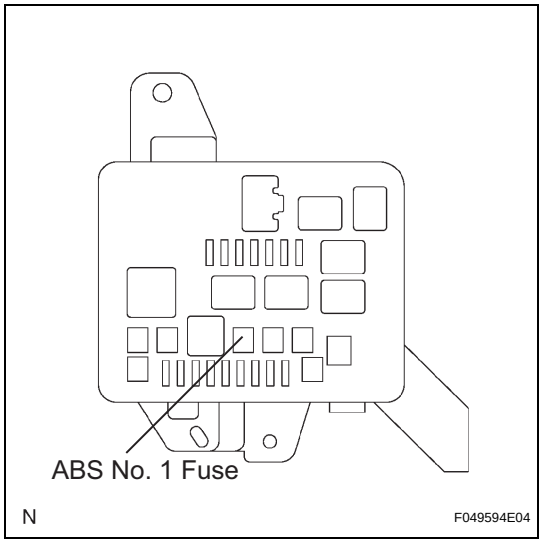
Tester Display	Vehicle Condition/Test Details	Diagnostic Note
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operation sound of motor can be heard

OK:
The operation sound of the ABS motor should be heard.

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

3 INSPECT FUSE (ABS NO. 1)



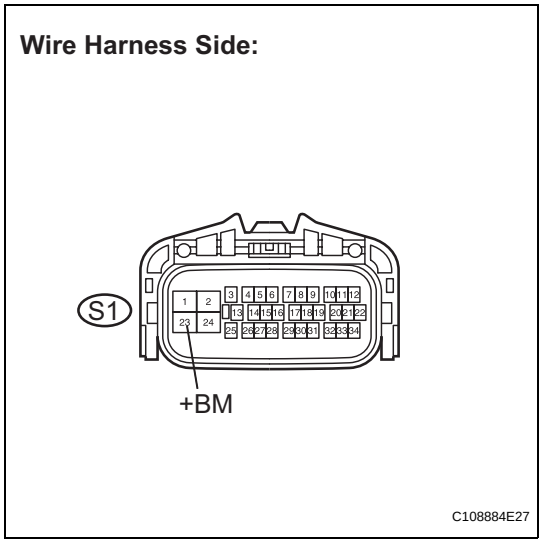
(a) Remove the ABS No. 1 fuse from the engine room relay block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

BC

OK

4 CHECK SKID CONTROL ECU CONNECTOR (+BM VOLTAGE)



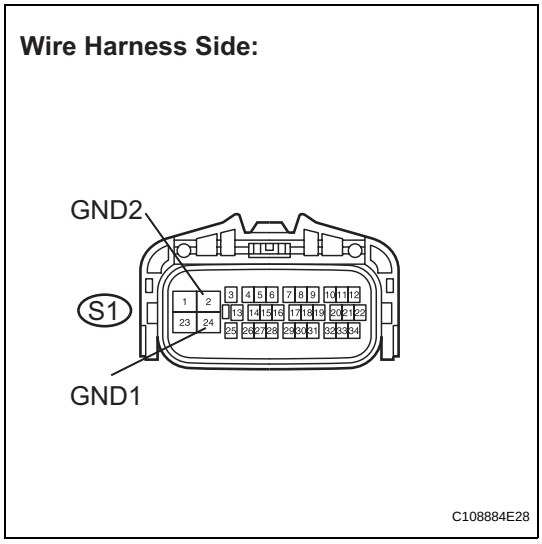
(a) Disconnect the S1 skid control ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-23 (+BM) - Body ground	Always	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

5 CHECK SKID CONTROL ECU CONNECTOR (GROUND)



(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S1-24 (GND1) - Body ground	Below 1 Ω
S1-2 (GND2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

BC

OK

6 RECONFIRM DTC

(a) Clear the DTCs (See page BC-13).
(b) Drive the vehicle at a speed of 6 km/h (4 mph) or more.
(c) Are the same DTCs recorded? (See page BC-13)
HINT:
- The skid control ECU inspects the motor relay circuit when the stop light switch is turned off and the vehicle is running at a speed of 6 km/h (4 mph) or more.

- These DTCs may be recorded due to a malfunction in the connector terminal connection, etc.

NO → **END**

YES

REPLACE BRAKE ACTUATOR ASSEMBLY

DTC	C0278/11	Open or Short Circuit in ABS Solenoid Relay Circuit

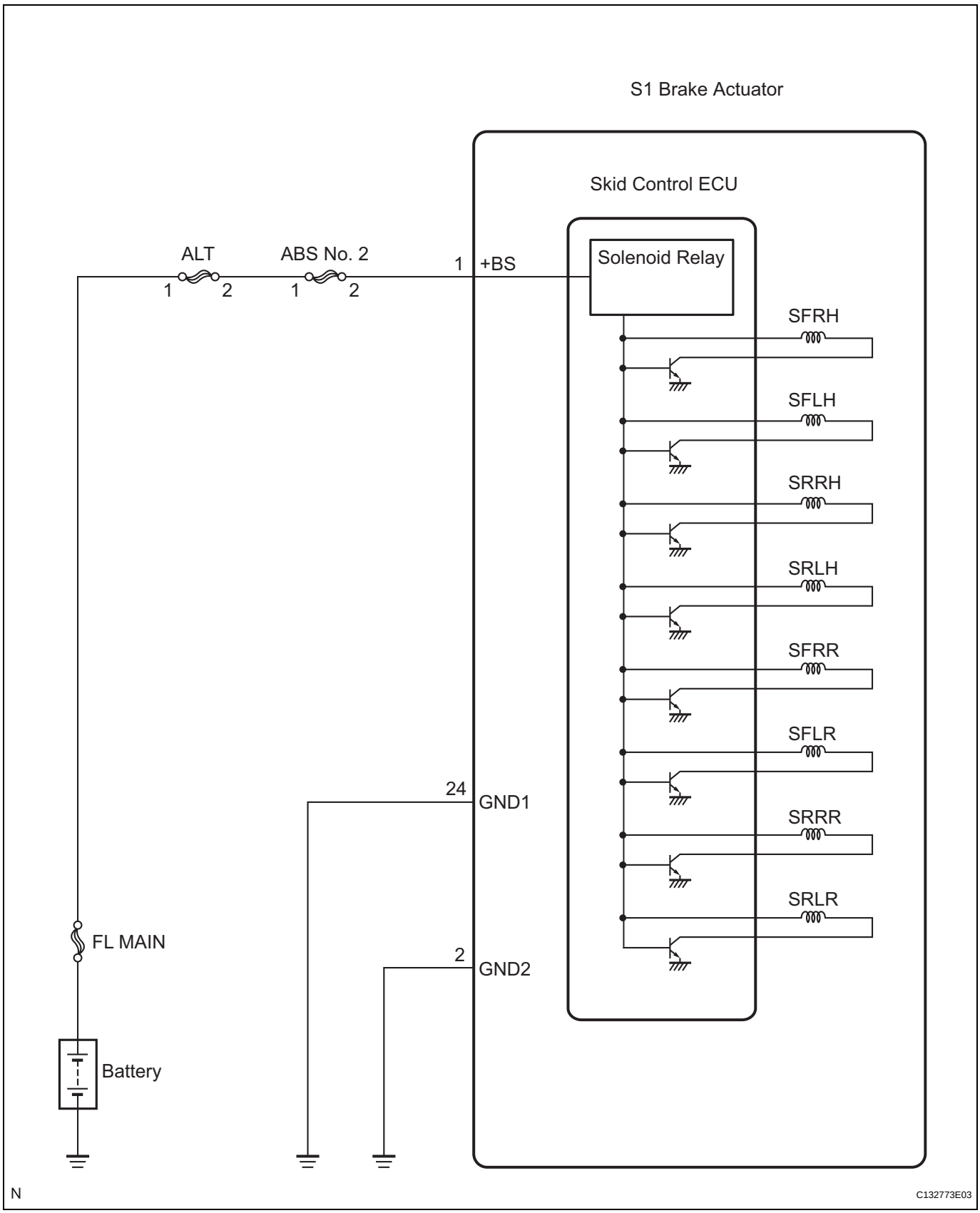
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

DESCRIPTION

This relay supplies power to each ABS solenoid.
Immediately after the ignition switch is turned to the ON position, the relay turns on if the solenoid is determined to be normal as a result of self-diagnosis during initial check.
The relay turns off if an open / short is detected.
If the voltage supplied to the motor relay (+BS) is below the DTC detection threshold due to battery / generator shortage, the DTCs may be stored.

DTC Code	DTC Detection Condition	Trouble Area
C0278/11	When solenoid relay is turned on, relay contact is OFF for 0.2 sec. or longer.	• ABS solenoid relay • ABS solenoid relay circuit • Brake actuator assembly
C0279/12	IG voltage is 10 to 14 V, and when solenoid relay is turned off, relay contact is ON for 0.2 sec. or longer.	• ABS solenoid relay • ABS solenoid relay circuit • Brake actuator assembly

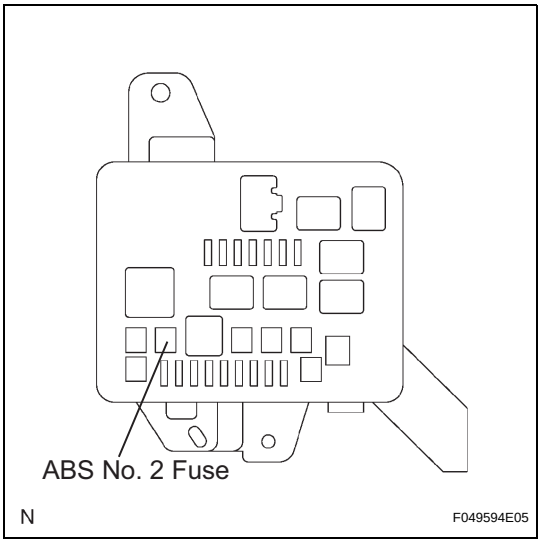
WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	INSPECT FUSE (ABS NO. 2)



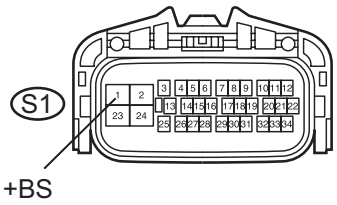
(a) Remove the ABS No. 2 fuse from the engine room relay block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

OK

2	CHECK SKID CONTROL ECU CONNECTOR (+BS VOLTAGE)

Wire Harness Side:



C108884E29

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
S1-1 (+BS) - Body ground	Always	11 to 14 V

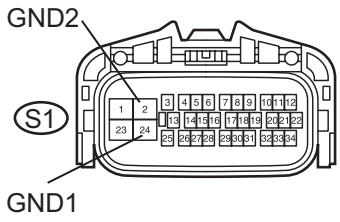
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

BC

3	CHECK SKID CONTROL ECU CONNECTOR (GROUND)

Wire Harness Side:



C108884E28

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
S1-24 (GND1) - Body ground	Below 1 Ω
S1-2 (GND2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4	RECONFIRM DTC

(a) Clear the DTCs (See page BC-13).
(b) Drive the vehicle at a speed of 6 km/h (4 mph) or more.
(c) Are the same DTCs recorded (See page BC-13)?
HINT:
- The skid control ECU inspects the solenoid relay circuit when the stop light switch is turned off and the vehicle is running at a speed of 6 km/h (4 mph) or more.
- These DTCs may be recorded due to a malfunction in the connector terminal connection, etc.

NO → **END**

YES

REPLACE BRAKE ACTUATOR ASSEMBLY

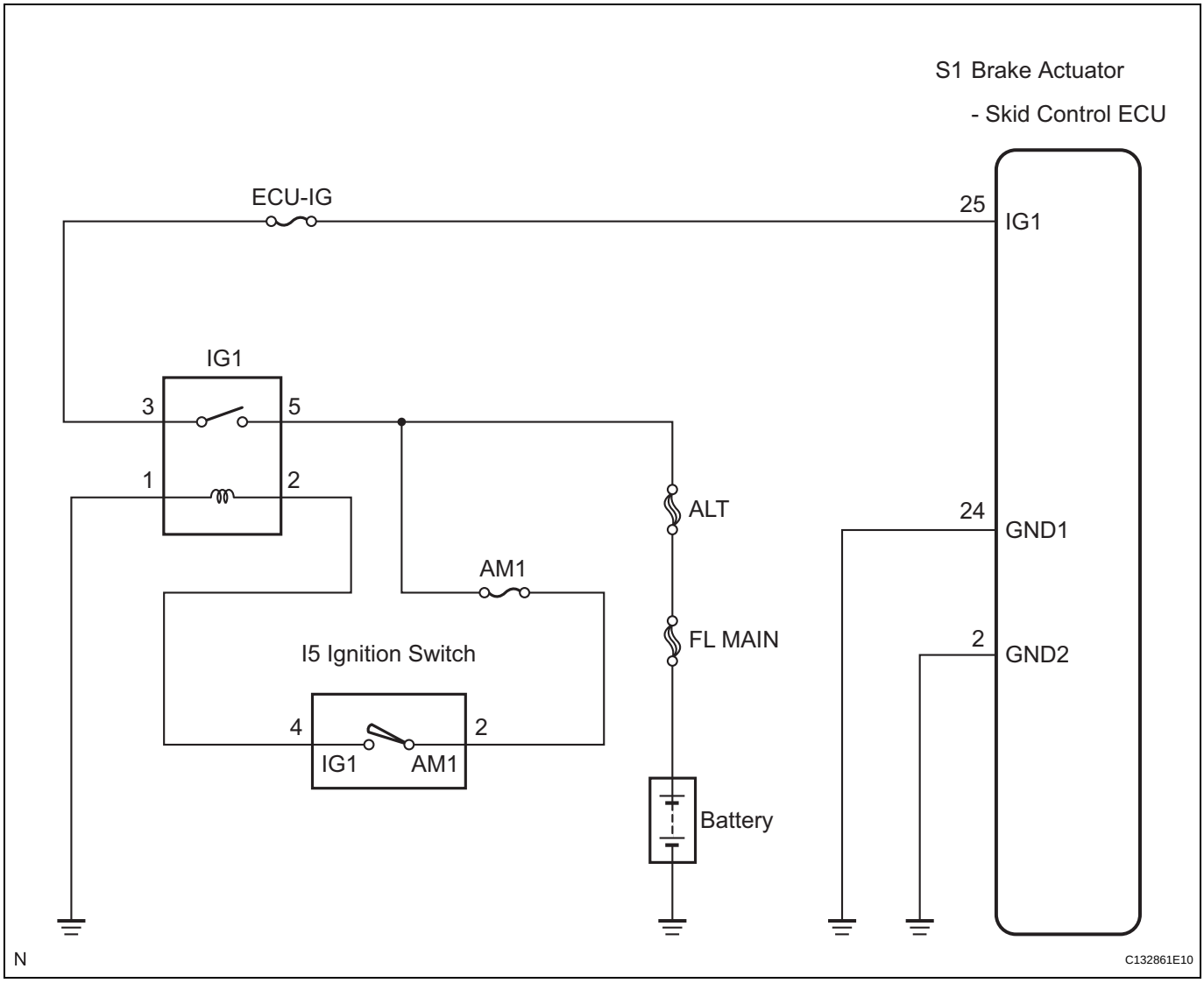
DTC	C1241/41	Low Battery Positive Voltage

DESCRIPTION

If there is a problem with the brake actuator assembly (skid control ECU) power supply circuit, the skid control ECU outputs the DTC and prohibits operation under the fail safe function.
If the voltage supplied to the IG1 terminal is not within the DTC detection threshold due to malfunctions, such as the battery and alternator circuit, this DTC is stored.

DTC Code	DTC Detection Condition	Trouble Area
C1241/41	Vehicle speed is 3 km/h (2 mph) or more and IG1 terminal voltage is 9.5 V or less for at least 10 sec.	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT BATTERY

(a) Check battery voltage.

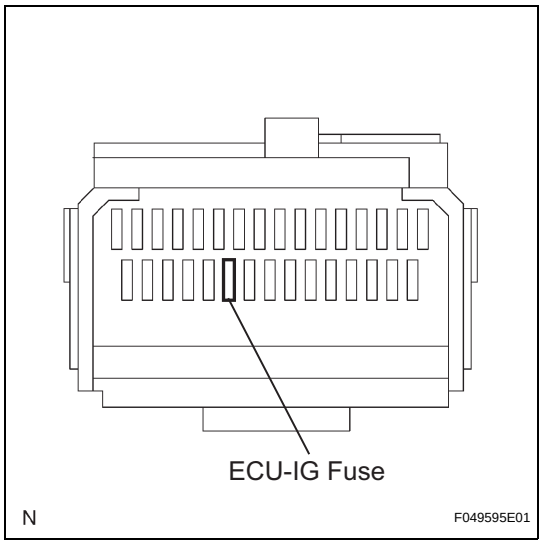
BC

Standard voltage:
11 to 14 V

NG → **INSPECT CHARGING SYSTEM**

OK

2 INSPECT FUSE (ECU-IG)



(a) Remove the ECU-IG fuse from the instrument panel junction block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

OK

3 CHECK SKID CONTROL ECU CONNECTOR (IG1 VOLTAGE)

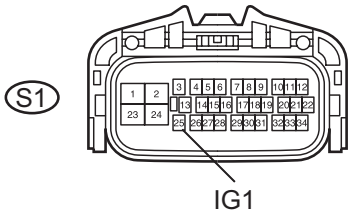
(a) WHEN USING INTELLIGENT TESTER:
(1) Connect the intelligent tester to the DLC3.
(2) Start the engine.
(3) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and DATA LIST.
(4) Read the IG VOLTAGE status.

Tester Display	Measurement Item/Range	Normal Condition
IG VOLTAGE	ECU power supply voltage / TOO HIGH / NORMAL / TOO LOW	TOO HIGH: 14 V or more NORMAL: 9.8 to 14 V TOO LOW: Below 9.8 V

OK:
The tester displays Normal (IG VOLTAGE of the ABS ECU is 9.8 to 14 V).

BC

Wire Harness Side:



C108884E30

(b) WHEN NOT USING INTELLIGENT TESTER:
(1) Disconnect the S1 skid control ECU connector.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage of the wire harness side connector.

Standard voltage

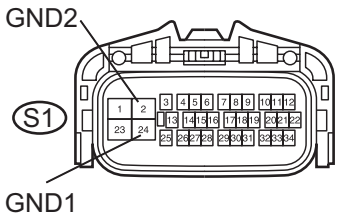
Tester Connection	Condition	Specified Condition
S1-25 (IG1) - Body ground	Ignition switch ON	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4 CHECK SKID CONTROL ECU CONNECTOR (GROUND)

Wire Harness Side:



C108884E28

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
S1-24 (GND1) - Body ground	Below 1 Ω
S1-2 (GND2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

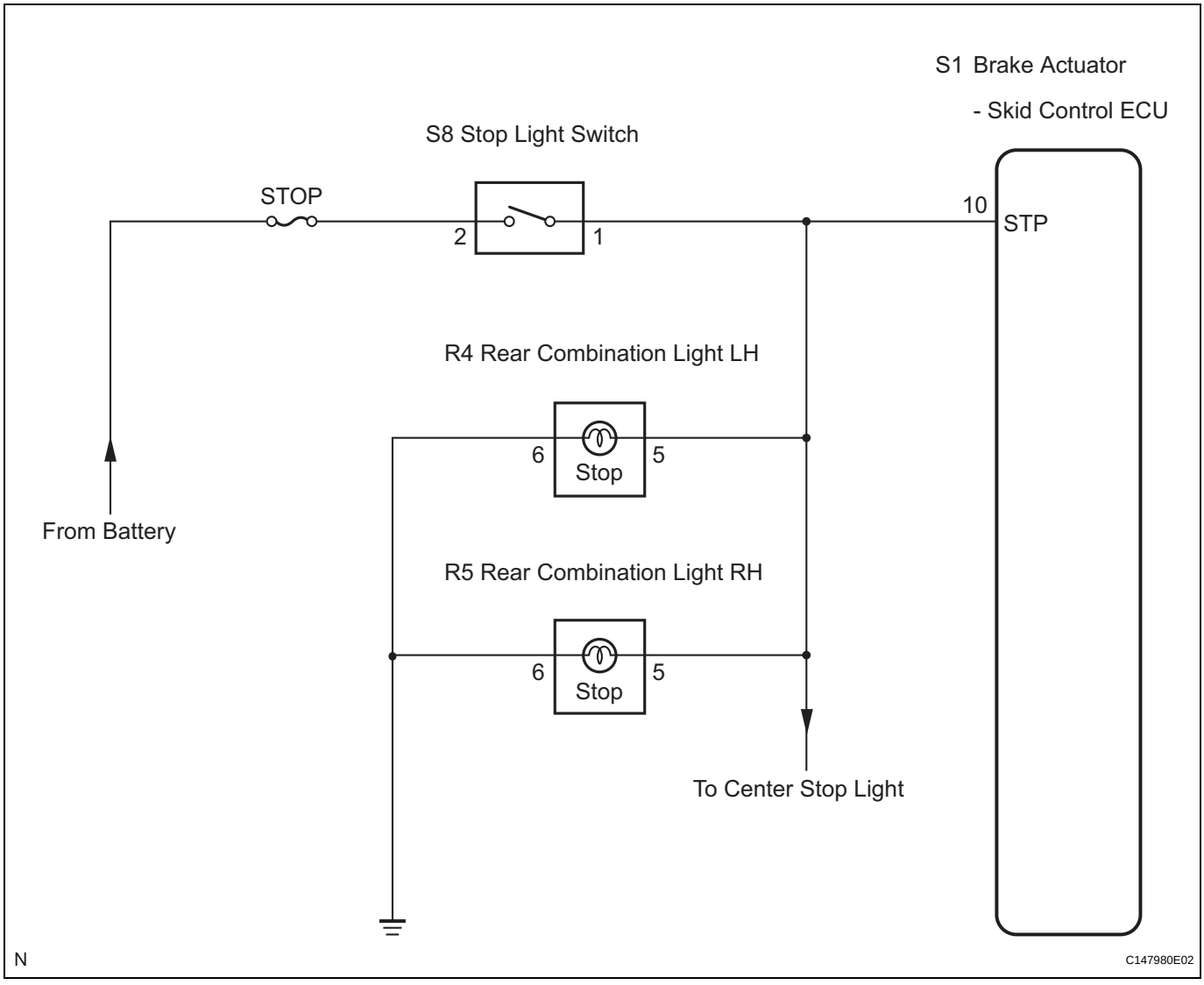
DTC	C1249/49	Open in Stop Light Switch Circuit

DESCRIPTION

The skid control ECU inputs the stop light switch signal and detects the status of the brake operation. The skid control ECU has an open detection circuit. If an open in the stop light switch input line or GND side stop light circuit is detected when the stop light switch is off, this DTC is output.

DTC Code	DTC Detection Condition	Trouble Area
C1249/49	An open in the stop light switch circuit continues for at least 0.3 sec. when the IG1 terminal voltage is between 9.5 to 17.2 V and the brake pedal is released (STP OFF)	• Stop light switch • Stop light switch circuit

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 **CHECK STOP LIGHT SWITCH OPERATION**

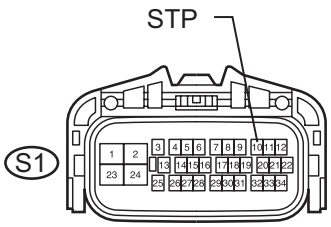
(a) Check that the stop light comes on when the brake pedal is depressed and goes off when the brake pedal is released.
HINT:
Check the stop light bulb because it may be burnt out.
OK:
Stop light switch function is normal.

NG → **Go to step 3**

OK

2 **CHECK SKID CONTROL ECU CONNECTOR (STP VOLTAGE)**

Wire Harness Side:



C108884E31

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

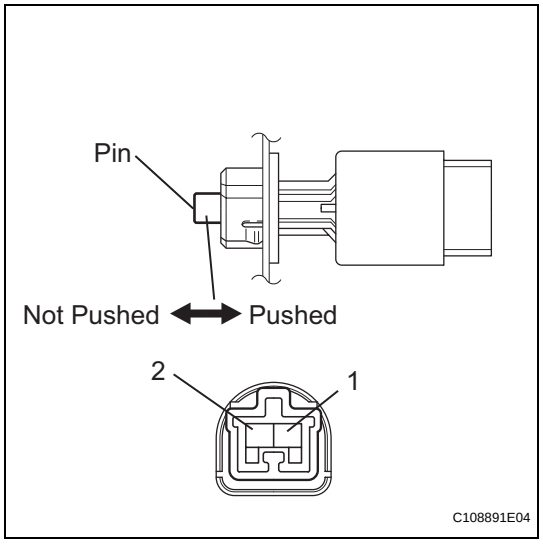
Tester Connection	Condition	Specified Condition
S1-10 (STP) - Body ground	Brake pedal is depressed	11 to 14 V
S1-10 (STP) - Body ground	Brake pedal is released	Below 1 V

NG → **Go to step 4**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

3 INSPECT STOP LIGHT SWITCH ASSEMBLY



(a) Remove the stop light switch assembly.
(b) Measure the resistance of the stop light switch.
Standard resistance

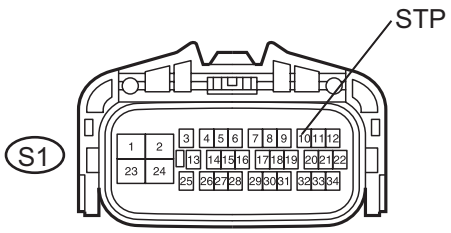
Tester Connection	Switch Condition	Specified Condition
1 - 2	Switch pin not pushed	Below 1 Ω
1 - 2	Switch pin pushed	10 kΩ or higher

NG → **REPLACE STOP LIGHT SWITCH ASSEMBLY**

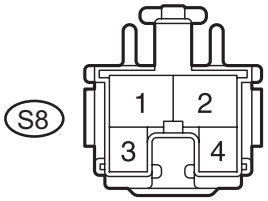
OK

4 CHECK WIRE HARNESS (STOP LIGHT SWITCH ASSEMBLY - SKID CONTROL ECU)

Skid Control ECU Wire Harness Side:



Stop Light Switch Assembly:



(a) Disconnect the S1 skid control ECU connector.
(b) Disconnect the stop light switch assembly connector.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
S1-10 (STP) - S8-1	Below 1 Ω
S1-10 (STP) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

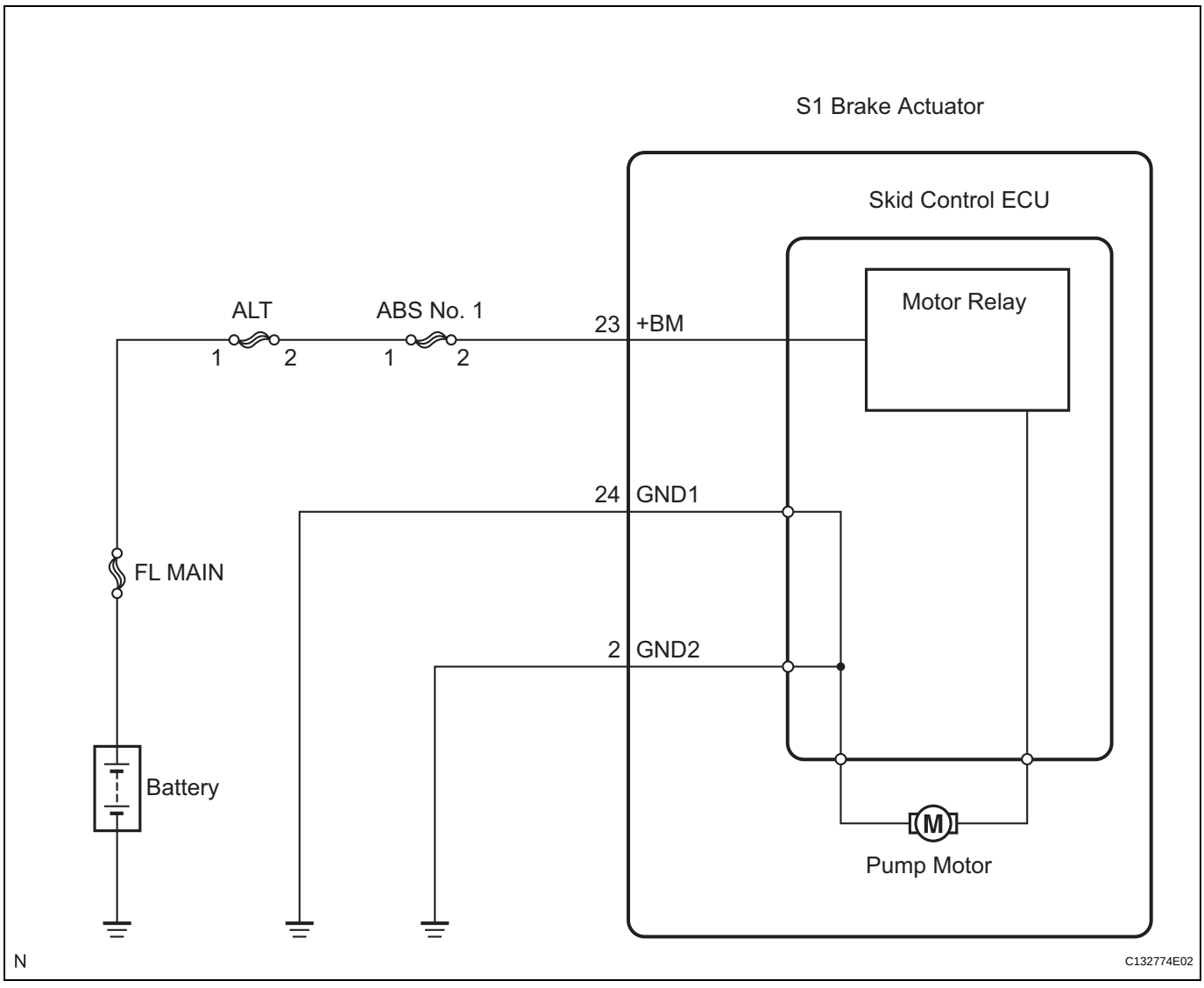
BC

DTC	C1251/51	Open in Pump Motor Circuit

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1251/51	When one of following conditions is met: • Actuator pump motor does not operate properly. • Open in actuator pump motor circuit continues for at least 2 sec.	• ABS pump motor • Brake actuator assembly

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.
Method:

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → **Go to step 3**

A

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and ACTIVE TEST.
(d) Read the ABS MOT RELAY status.

Tester Display	Vehicle Condition/Test Details	Diagnostic Note
ABS MOT RELAY	Turns ABS motor relay ON / OFF	Operation sound of motor can be heard

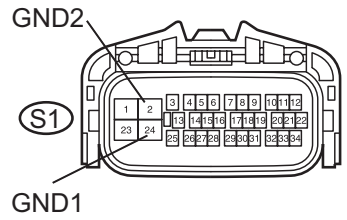
OK:
The operation sound of the ABS motor should be heard.

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

3 CHECK SKID CONTROL ECU CONNECTOR (GROUND)

Wire Harness Side:



C108884E28

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
S1-24 (GND1) - Body ground	Below 1 Ω
S1-2 (GND2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

BC

4	RECONFIRM DTC

(a) Clear the DTCs (See page BC-13).
(b) Drive the vehicle at a speed of 6 km/h (4 mph) or more.
(c) Are the same DTCs recorded? (See page BC-13)
HINT:
- The skid control ECU inspects the motor relay circuit when the stop light switch is turned off and the vehicle is running at a speed of 6 km/h (4 mph) or more.
- This DTC may be recorded due to a malfunction in the connector terminal connection, etc.

NO → END

YES

REPLACE BRAKE ACTUATOR ASSEMBLY

ABS Warning Light Remains ON

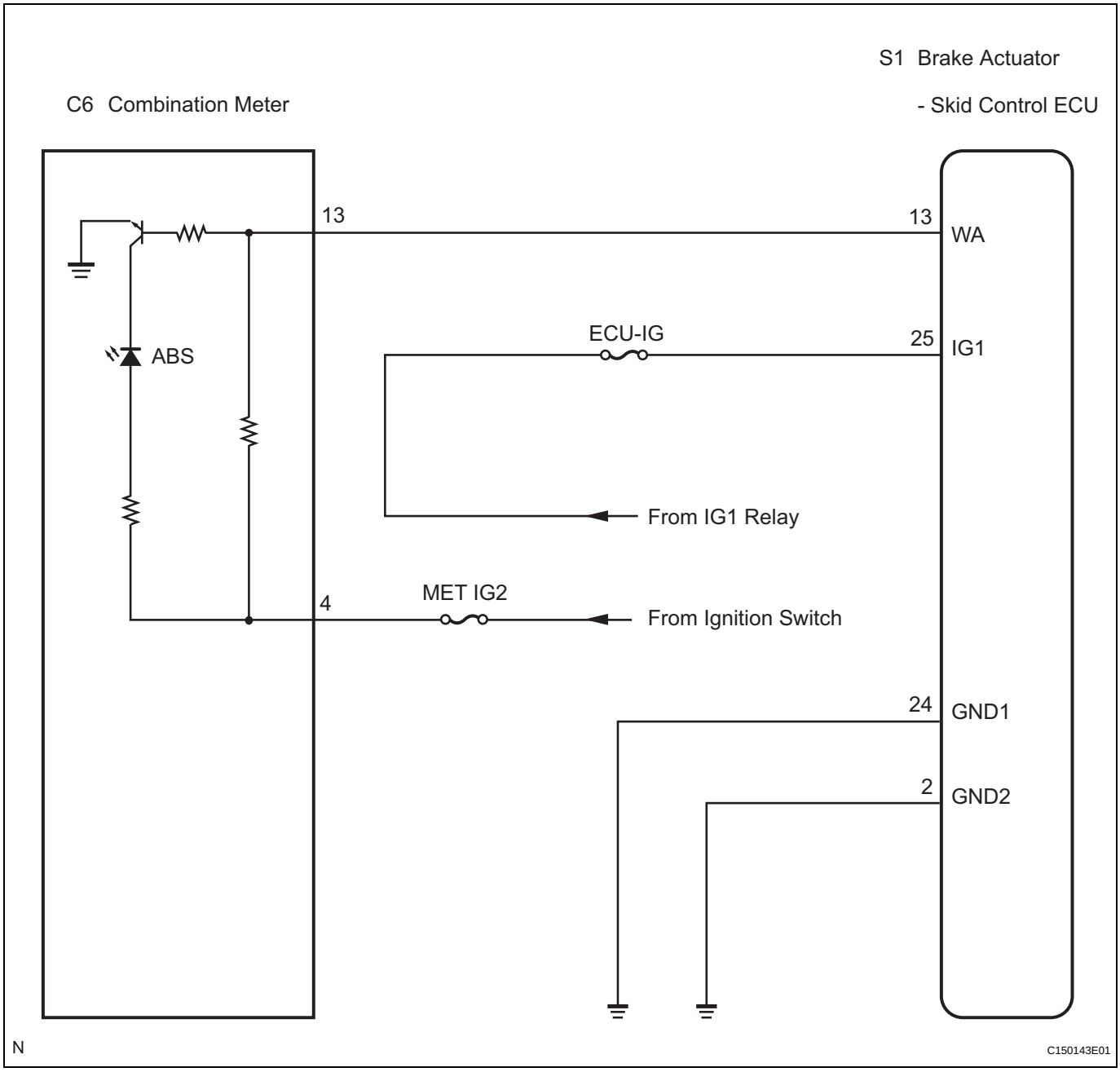
When reading DTCs by SST (check wire), if the ABS warning light remains on, troubleshoot by following the inspection procedure.

DESCRIPTION

If any of the following is detected, the ABS warning light remains on:
1. The skid control ECU connectors are disconnected from the skid control ECU.
2. There is a malfunction in the skid control ECU internal circuit.
3. There is an open or short in the wire harness between the combination meter and skid control ECU.

HINT:
The intelligent tester may not be usable when there is a malfunction in the skid control ECU.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHECK DTC

(a) Is DTC output for ABS?

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B → **REPAIR CIRCUIT INDICATED BY OUTPUT CODE**

A

2	INSPECT SKID CONTROL ECU CONNECTOR

(a) Check the ECU connector's connecting condition.
OK:
The connector should be securely connected.

NG → **CONNECT CONNECTOR TO ECU**

OK

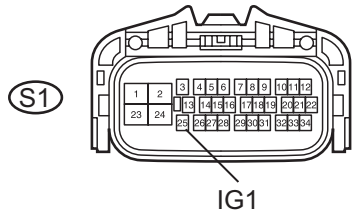
3	CHECK SKID CONTROL ECU (IG1 VOLTAGE)

(a) WHEN USING INTELLIGENT TESTER:
(1) Connect the intelligent tester to the DTC3.
(2) Start the engine.
(3) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and DATA LIST.
(4) Read the IG VOLTAGE status.

Tester Display	Measurement Item/Range	Normal Condition
IG VOLTAGE	ECU power supply voltage / TOO LOW / NORMAL / TOO HIGH	TOO LOW: Below 9.8 V NORMAL: 9.8 to 14.0 V TOO HIGH: 14.0 V or more

OK:
The tester displays Normal (IG VOLTAGE of the ABS ECU is 9.8 to 14 V).

Wire Harness Side:



C108884E32

(b) WHEN NOT USING INTELLIGENT TESTER:
(1) Disconnect the S1 skid control ECU connector.
(2) Turn the ignition switch to the ON position.
(3) Measure the voltage of the wire harness side connector.

Standard voltage

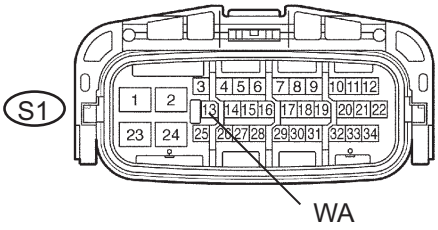
Tester Connection	Condition	Specified Condition
S1-25 (IG1) - Body ground	Ignition switch ON	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

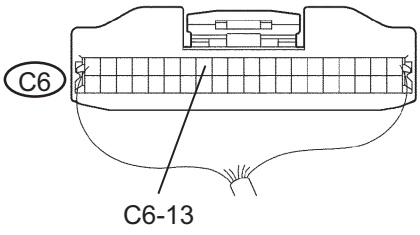
OK

4 CHECK WIRE HARNESS (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU Wire Harness Side:



Combination Meter:



F048385E02

(a) Disconnect the S1 skid control ECU connector.
(b) Disconnect the C6 combination meter connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S1-13 (WA) - C6-13	Below 1 Ω
S1-13 (WA) - Body ground	10 kΩ or higher

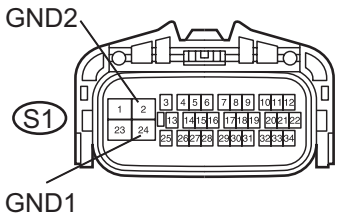
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

BC

5	CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)

Wire Harness Side:



C108884E28

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
S1-24 (GND1) - Body ground	Below 1 Ω
S1-2 (GND2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

6	INSPECT COMBINATION METER ASSEMBLY

(a) Check combination meter assembly (See page ME-6).

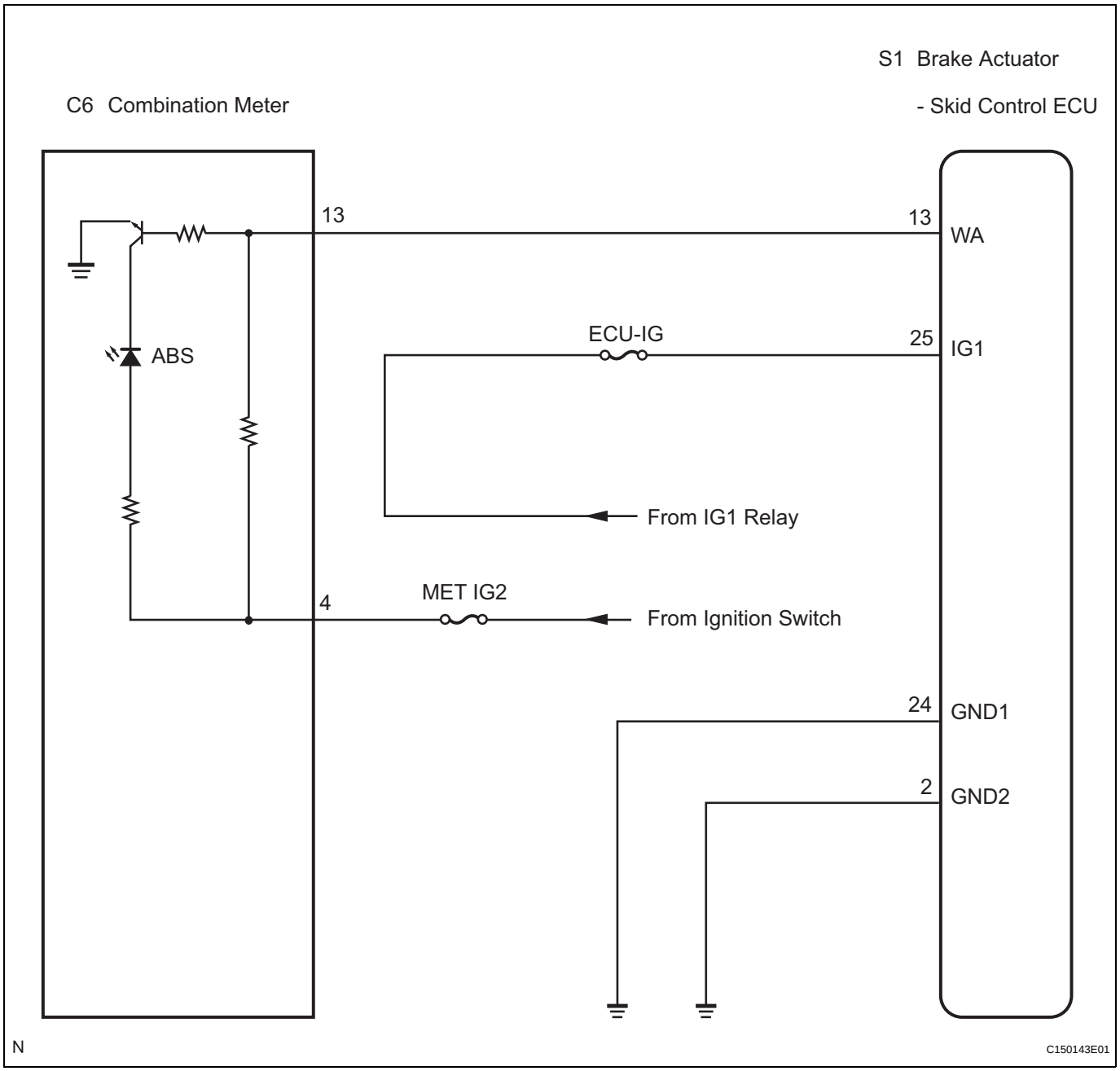
NG → **CHECK COMBINATION METER ASSEMBLY**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

ABS Warning Light does not Come ON

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1	CHECK ABS WARNING LIGHT CIRCUIT

(a) WHEN USING INTELLIGENT TESTER:
  (1) Connect the intelligent tester to the DLC3.
  (2) Start the engine.
  (3) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and ACTIVE TEST.

(4) Read the ABS WARN LIGHT status.

Tester Display	Vehicle Condition/Test Details	Diagnostic Note
ABS WARN LIGHT	Turns ABS warning light ON / OFF	Observe combination meter

OK:

The ABS warning light turns on or off in accordance with the intelligent tester.

(b) WHEN NOT USING INTELLIGENT TESTER:

(1) Turn the ignition switch OFF and disconnect the S1 skid control ECU connector.

(2) Ground terminal WA of the skid control ECU.

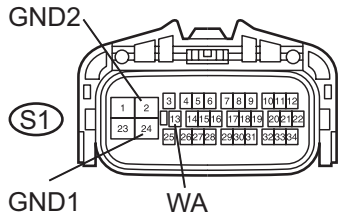
(3) Turn the ignition switch to the ON position.

(4) Check the ABS warning light.

OK

WA - GND Condition	Illumination Condition
Connected	OFF
Disconnected	ON

Wire Harness Side:



C108884E33

OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG

2 CHECK WIRE HARNESS (SKID CONTROL ECU - COMBINATION METER)

(a) Disconnect the S1 skid control ECU connector.

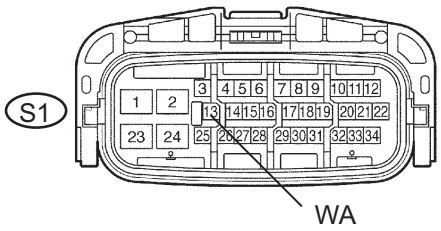
(b) Disconnect the C6 combination meter connector.

(c) Measure the resistance of the wire harness side connectors.

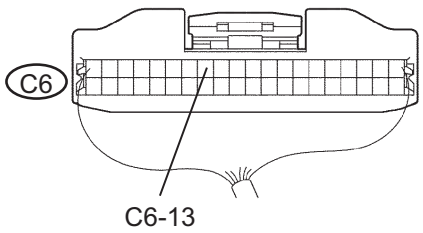
Standard resistance

Tester Connection	Specified Condition
S1-13 (WA) - C6-13	Below 1 Ω
S1-13 (WA) - Body ground	10 kΩ or higher

Skid Control ECU Wire Harness Side:



Combination Meter:



F048385E02

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

BC

3	INSPECT COMBINATION METER ASSEMBLY

(a) Check combination meter assembly (See page ME-6).

NG → CHECK COMBINATION METER ASSEMBLY

OK

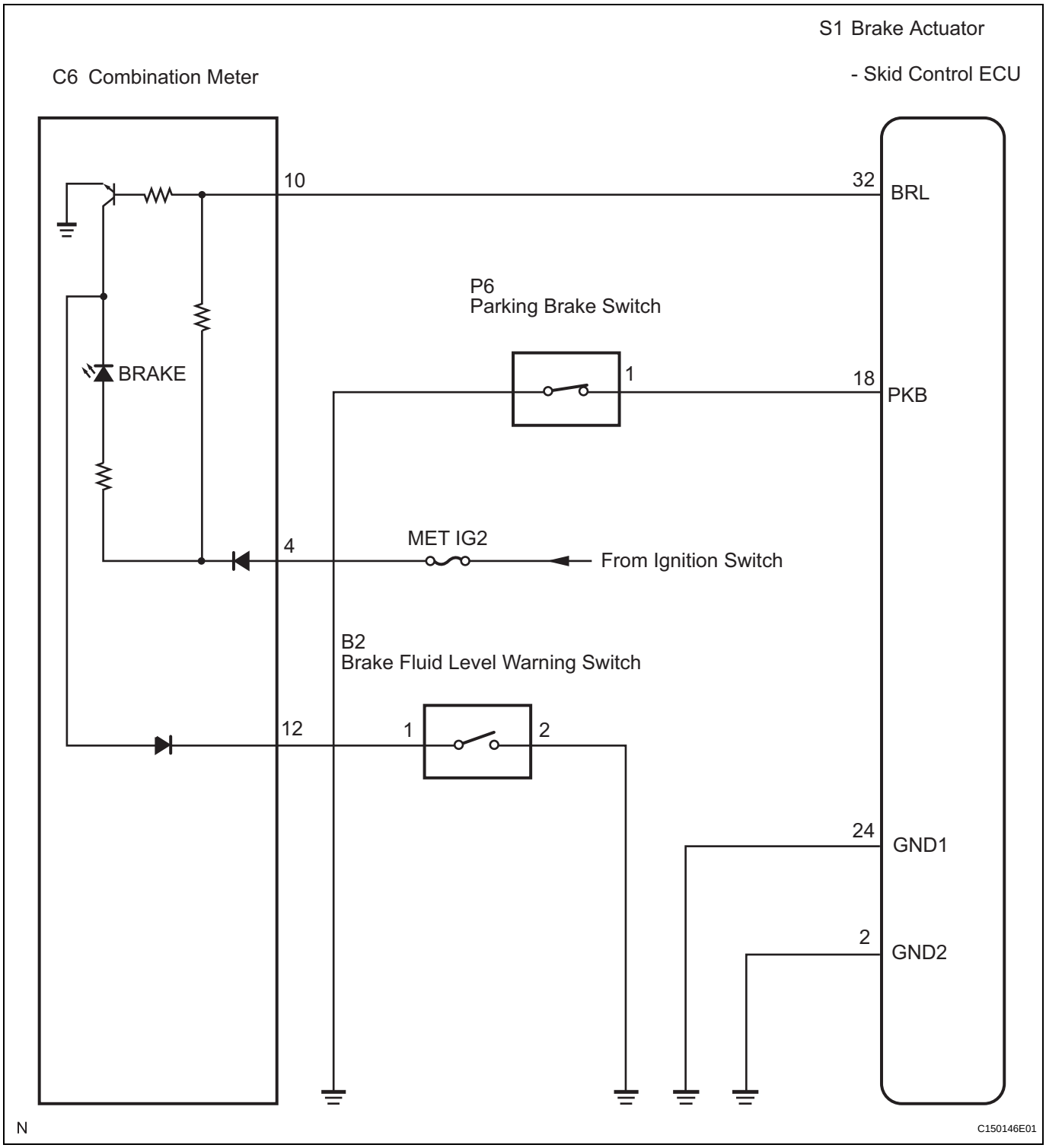
REPLACE BRAKE ACTUATOR ASSEMBLY

Brake Warning Light Circuit

DESCRIPTION

The BRAKE warning light turns on when the brake fluid is insufficient, the parking brake is applied or the EBD is defective.

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:
When releasing the parking brake, set the chocks to hold the vehicle for safety.

1	CHECK BRAKE FLUID

(a) Check that the brake fluid level is proper.

NG → **ADD BRAKE FLUID**

OK ↓

2	CHECK DTC FOR ABS

(a) Are the DTC recorded (See page BC-13)?

YES → **REPAIR CIRCUIT INDICATED BY OUTPUT CODE**

NO ↓

3	CHECK BRAKE WARNING LIGHT

(a) WHEN USING INTELLIGENT TESTER:
(1) Connect the intelligent tester to the DLC3.
(2) Start the engine.
(3) Select the tester menus: DIAGNOSTIC, OBD/MOBD, ABS/VSC and ACTIVE TEST.
(4) Read the BRAKE WARN LIGHT status.

Tester Display	Vehicle Condition/Test Details	Diagnostic Note
BRAKE WARN LIGHT	Turns BRAKE warning light ON / OFF	Observe combination meter

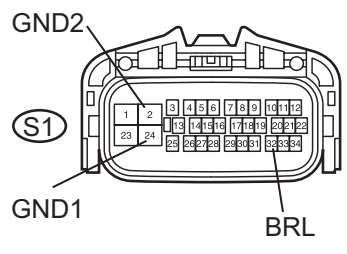
OK:
The BRAKE warning light turns on or off in accordance with the intelligent tester.

(b) WHEN NOT USING INTELLIGENT TESTER:
(1) Turn the ignition switch OFF and disconnect the S1 skid control ECU connector.
(2) Ground terminal BRL of the skid control ECU.
(3) Turn the ignition switch to the ON position.
(4) Check the BRAKE warning light.

OK

BRL - GND Condition	Illumination Condition
Connected	OFF
Disconnected	ON

Wire Harness Side:

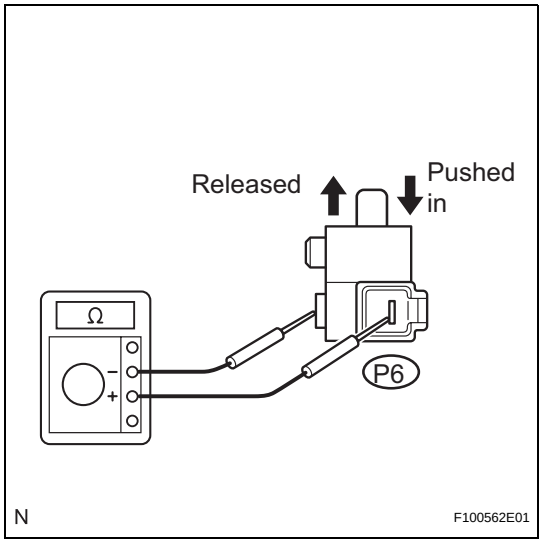


OK → **REPLACE BRAKE ACTUATOR ASSEMBLY**

NG ↓

BC

4 INSPECT PARKING BRAKE SWITCH ASSEMBLY



(a) Remove the parking brake switch assembly.
(b) Measure the resistance of the parking brake switch.
Standard resistance

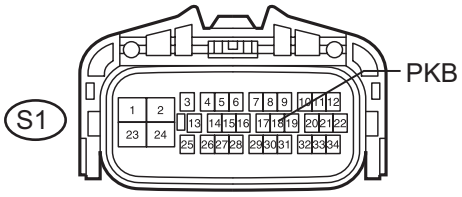
Tester Connection	Switch Condition	Specified Condition
P6-1 - Ground part	Released	Below 1 Ω
P6-1 - Ground part	Pushed in	10 kΩ or higher

NG → **REPLACE PARKING BRAKE SWITCH ASSEMBLY**

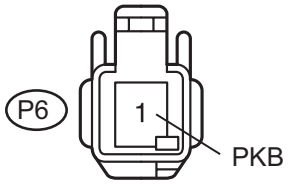
OK

5 CHECK WIRE HARNESS (PARKING BRAKE SWITCH ASSEMBLY - SKID CONTROL ECU)

Skid Control ECU Wire Harness Side:



Parking Brake Switch:



P F100563E02

(a) Disconnect the S1 skid control ECU connector.
(b) Disconnect the P6 parking brake switch assembly connector.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

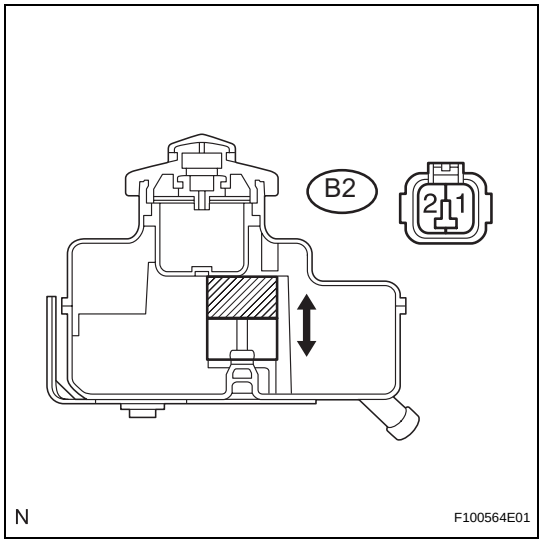
Tester Connection	Specified Condition
S1-18 (PKB) - P6-1 (PKB)	Below 1 Ω
S1-18 (PKB) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

BC

6	INSPECT BRAKE FLUID LEVEL WARNING SWITCH



(a) Remove the reservoir tank cap and strainer.
(b) Disconnect the brake fluid level warning switch connector.
(c) Measure the resistance of the brake fluid level warning switch.

Standard resistance

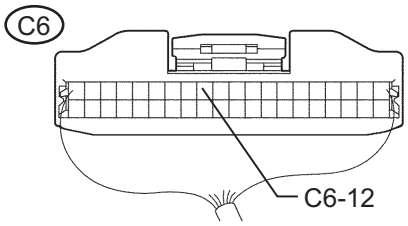
Tester Connection	Switch Condition	Specified Condition
B2-1 - B2-2	Float UP	10 kΩ or higher
B2-1 - B2-2	Float DOWN	Below 1 Ω

NG → **REPLACE BRAKE MASTER CYLINDER RESERVOIR SUB-ASSEMBLY**

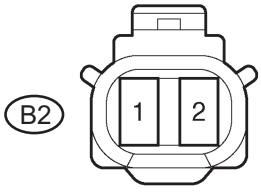
OK

7	CHECK WIRE HARNESS (BRAKE FLUID LEVEL WARNING SWITCH - COMBINATION METER)

Combination Meter Wire Harness Side:



Brake Fluid Level Warning Switch:



N
F049384E06

(a) Disconnect the C6 combination meter connector.
(b) Disconnect the B2 brake fluid level warning switch connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C6-12 - B2-1	Below 1 Ω
C6-12 - Body ground	10 kΩ or higher

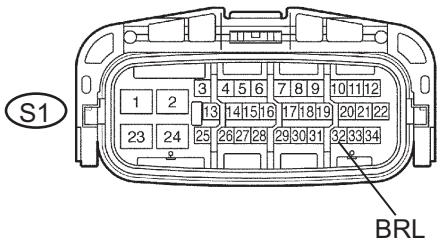
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

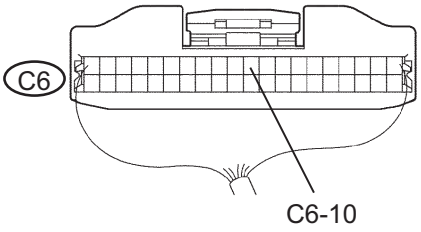
BC

8	CHECK WIRE HARNESS (SKID CONTROL ECU - COMBINATION METER)

Skid Control ECU Wire Harness Side:



Combination Meter:



F048385E04

(a) Disconnect the S1 skid control ECU connector.
(b) Disconnect the C6 combination meter connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S1-32 (BRL) - C6-10	Below 1 Ω
S1-32 (BRL) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

9	INSPECT COMBINATION METER ASSEMBLY

(a) Check combination meter assembly (See page ME-6).

NG → **CHECK COMBINATION METER ASSEMBLY**

OK

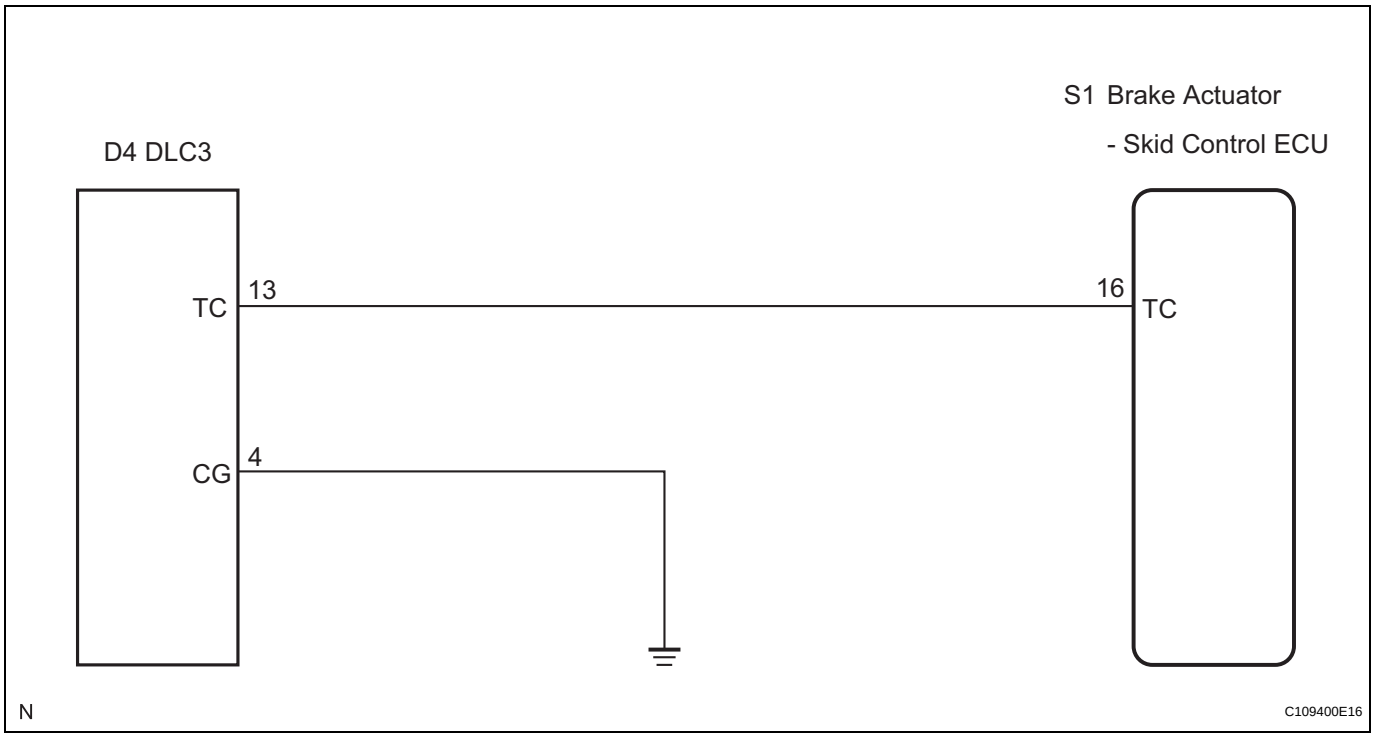
REPLACE BRAKE ACTUATOR ASSEMBLY

TC and CG Terminal Circuit

DESCRIPTION

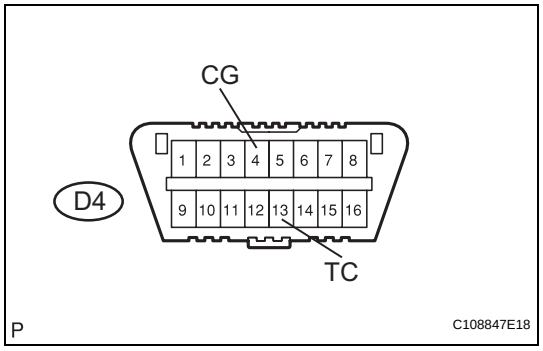
Connecting terminals TC and CG of the DLC3 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK DLC3 (TC VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
D4-13 (TC) - D4-4 (CG)	Ignition switch ON	11 to 14 V

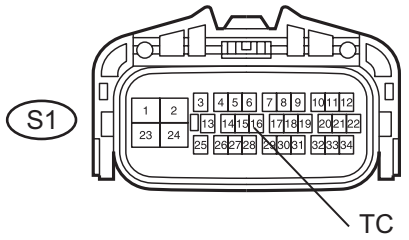
NG → **Go to step 3**

OK

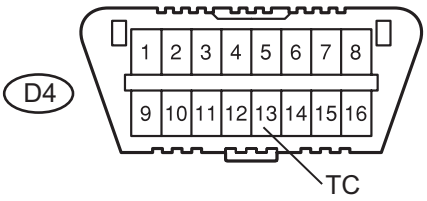
BC

2 CHECK WIRE HARNESS (SKID CONTROL ECU - DLC3)

Skid Control ECU Wire Harness Side:



DLC3:



P F100567E04

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of the wire harness side connectors.

Standard resistance

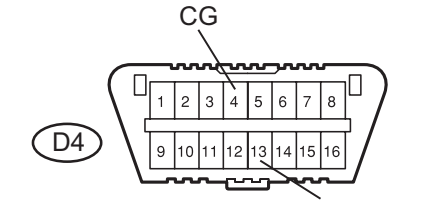
Tester Connection	Specified Condition
S1-16 (TC) - D4-13 (TC)	Below 1 Ω
S1-16 (TC) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

3 CHECK WIRE HARNESS (DLC3 - BODY GROUND)



P C108847E18

(a) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
D4-4 (CG) - Body ground	Below 1 Ω

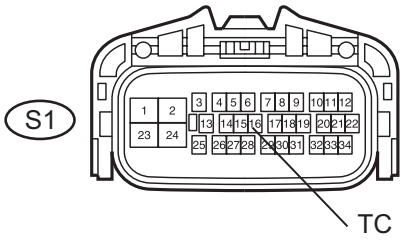
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

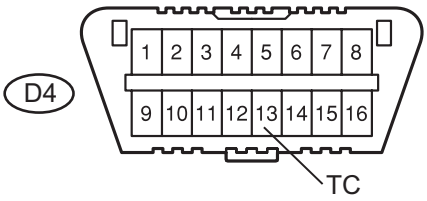
BC

4	CHECK WIRE HARNESS (SKID CONTROL ECU - DLC3)

Skid Control ECU Wire Harness Side:



DLC3:



P F100567E04

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S1-16 (TC) - D4-13 (TC)	Below 1 Ω
S1-16 (TC) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

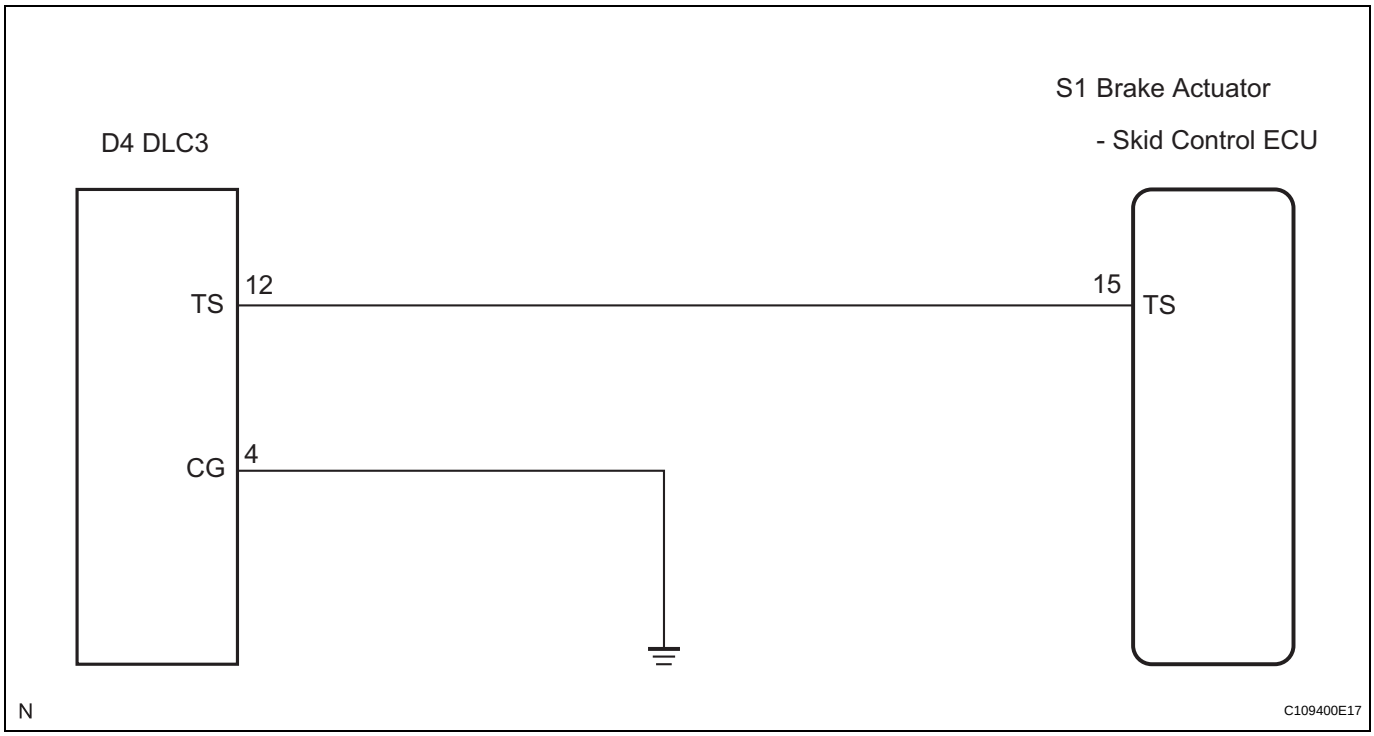
REPLACE BRAKE ACTUATOR ASSEMBLY

TS and CG Terminal Circuit

DESCRIPTION

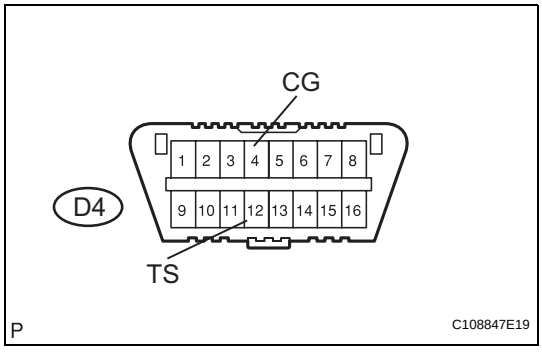
In the sensor check mode, a malfunction in the speed sensor that cannot be detected when the vehicle is stopped is detected while driving.
Transition to the sensor check mode can be performed by connecting terminals TS and CG of the DLC3 and turning the ignition switch from OFF to the ON position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK DLC3 (TS VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
D4-12 (TS) - D4-4 (CG)	Ignition switch ON	11 to 14 V

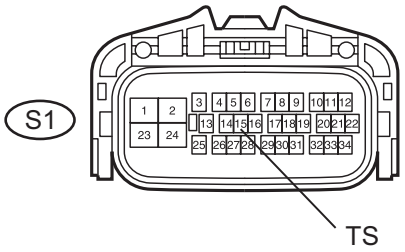
NG → **Go to step 3**

OK

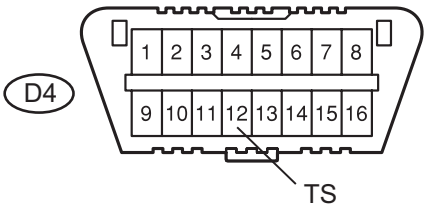
BC

2 CHECK WIRE HARNESS (SKID CONTROL ECU - DLC3)

Skid Control ECU Wire Harness Side:



DLC3:



P F100567E06

(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of the wire harness side connectors.

Standard resistance

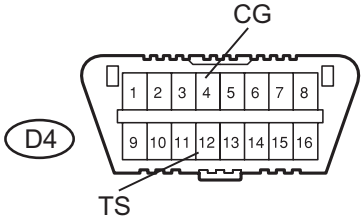
Tester Connection	Specified Condition
S1-15 (TS) - D4-12 (TS)	Below 1 Ω
S1-15 (TS) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

3 CHECK WIRE HARNESS (DLC3 - BODY GROUND)



P C108847E19

(a) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
D4-4 (CG) - Body ground	Below 1 Ω

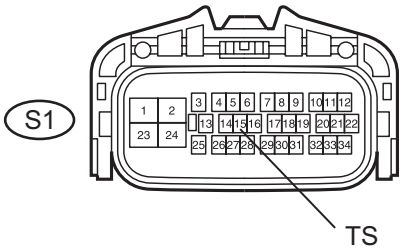
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

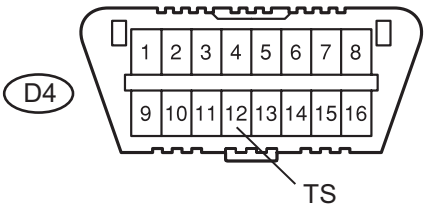
BC

4	CHECK WIRE HARNESS (SKID CONTROL ECU - DLC3)

Skid Control ECU Wire Harness Side:



DLC3:



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(a) Disconnect the S1 skid control ECU connector.
(b) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
S1-15 (TS) - D4-12 (TS)	Below 1 Ω
S1-15 (TS) - Body ground	10 kΩ or higher

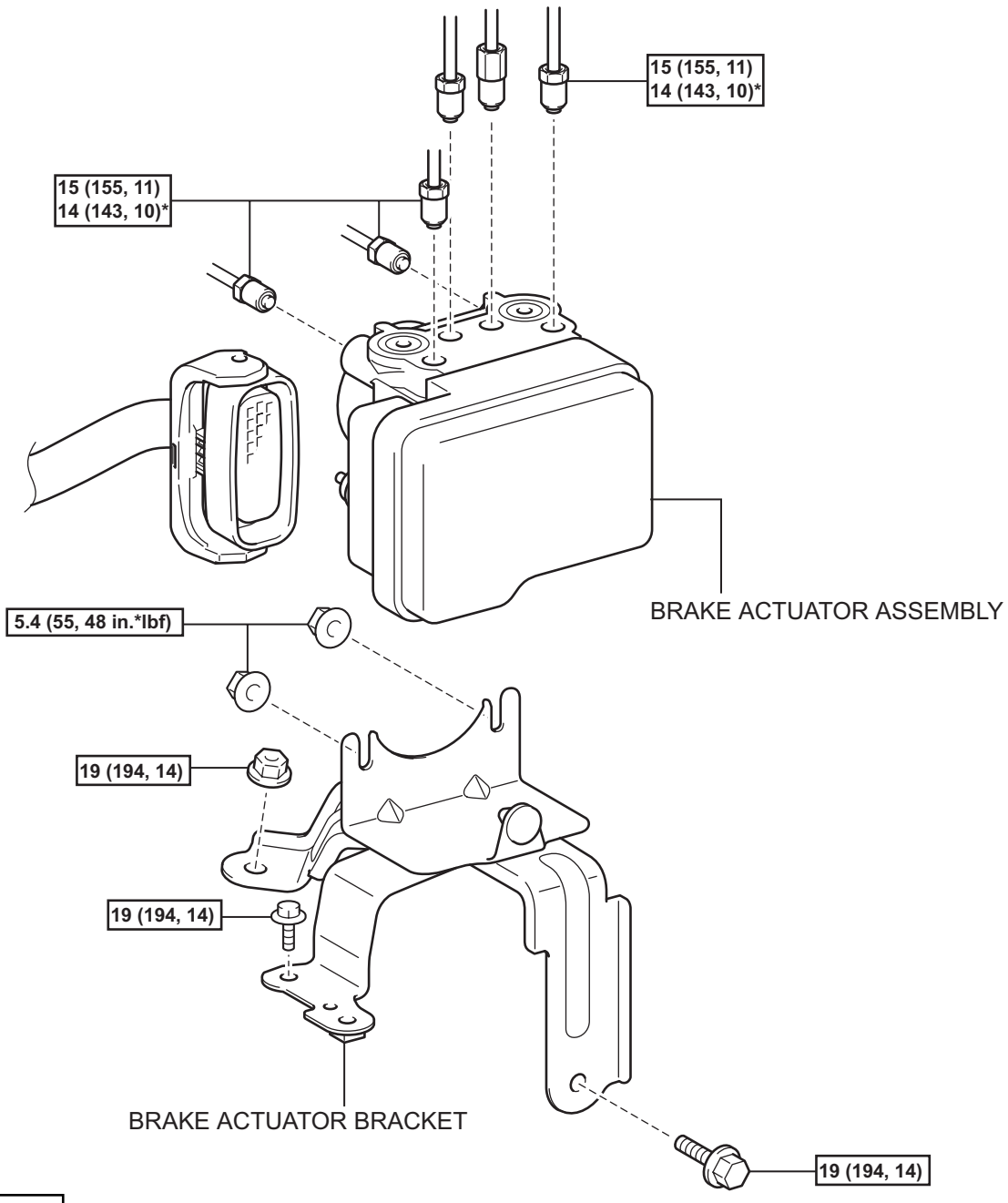
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

BRAKE ACTUATOR

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

* For use with SST

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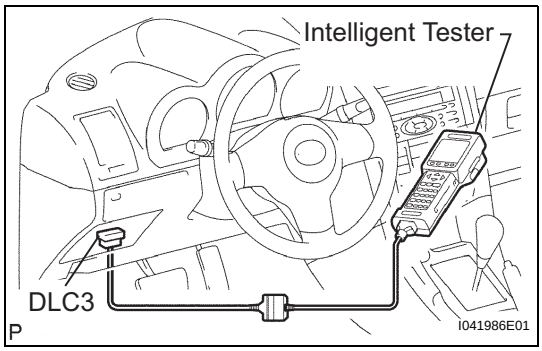
BC



ON-VEHICLE INSPECTION

1. CONNECT INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC 3.
(b) Start the engine and run it idle.
(c) Select the ACTIVE TEST mode on the intelligent tester.
HINT:
Please refer to the intelligent tester operator's manual further details.

2. CHECK ACTUATOR MOTOR OPERATION

NOTICE:
Do not keep a motor relay ON for more than 5 seconds. When operating it consecutively, wait 20 seconds between each operation.

(a) Turn the motor relay ON and check the actuator motor operation noise.
(b) Turn the motor relay OFF.
(c) Fully depress the brake pedal and hold it for approximately 15 seconds. Check that the pedal's initial depth is maintained for the entire 15 seconds.
(d) Turn the motor relay ON and check that the pedal does not pulsate.
(e) Turn the motor relay OFF and release the pedal.

3. CHECK RIGHT FRONT WHEEL OPERATION

NOTICE:
- **Be sure to follow the procedures below when turning ON a solenoid.**
- **Do not keep a solenoid ON for more 5 seconds. When operating it consecutively, wait 20 seconds between each operation.**
- **The pedal must not be depressed if only the reduction solenoid SFRR, SFLR, SRRR or SRLR is turned ON.**

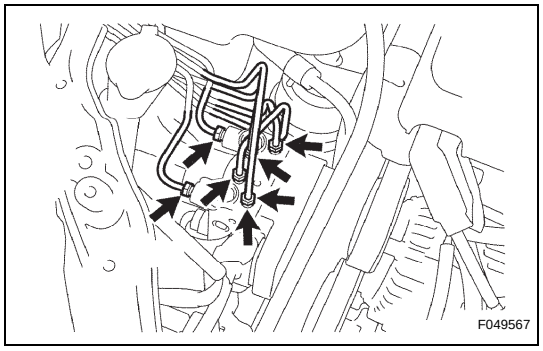
(a) With the pedal fully depressed, perform the following operations.
(b) Turn the SFRH and SFRR solenoids ON simultaneously, and check that the pedal cannot be depressed further.
(c) Turn the SFRH and SFRR solenoids OFF simultaneously, and check that the pedal can be depressed.
(d) Turn the motor relay ON and check that the pedal returns.
(e) Turn the motor relay OFF and release the pedal.

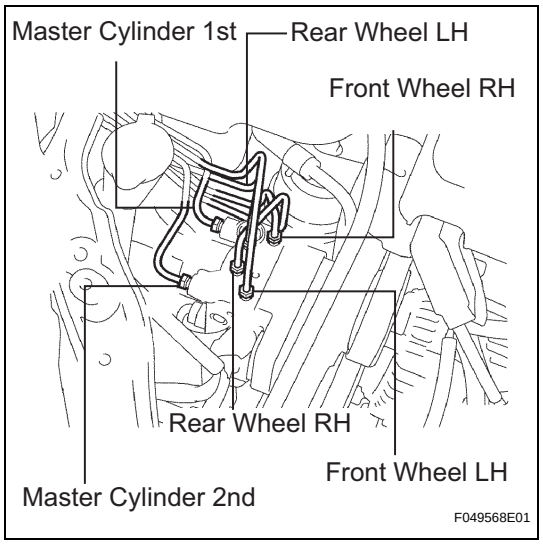
4. CHECK OTHER WHEEL OPERATION

(a) Using the same procedures, check the solenoids of the other wheels.
HINT:
Left front wheel: SFLH, SFLR
Right front wheel: SFRH, SFRR
Left rear wheel: SRLH, SRLR
Right rear wheel: SRLH, SRLR

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash off brake fluid immediately if it comes in contact with any painted surface.
3. **REMOVE FRONT WHEEL RH**
4. **REMOVE HOOD TO FRONT END PANEL SEAL (See page ET-4)**
5. **REMOVE FRONT FENDER LINER LH (See page ET-2)**
6. **REMOVE FRONT FENDER LINER RH (See page ET-2)**
7. **REMOVE FRONT BUMPER COVER (See page ET-3)**
8. **REMOVE HEADLIGHT UNIT RH (See page LI-9)**
9. **REMOVE BRAKE ACTUATOR ASSEMBLY WITH BRACKET**
   (a) Disconnect the actuator connector.
   (b) Using SST, disconnect 6 brake tubes from the actuator.
   SST 09023-00101



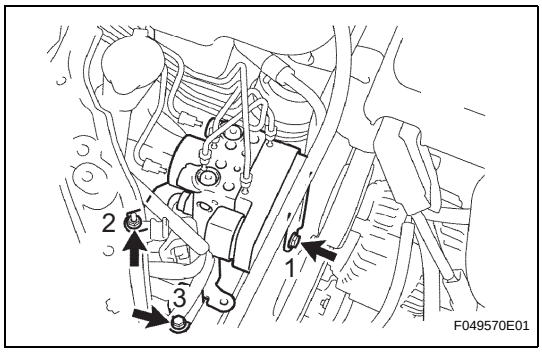


   (c) Place tags or marks to identify the installation locations of each brake tube.
   (d) Remove the 2 bolts, nut and actuator with bracket.
   NOTICE:
   Be careful not to damage the brake tubes and wire harness.
10. **REMOVE BRAKE ACTUATOR ASSEMBLY**
    (a) Remove the 2 nuts and brake actuator from the bracket.

BC

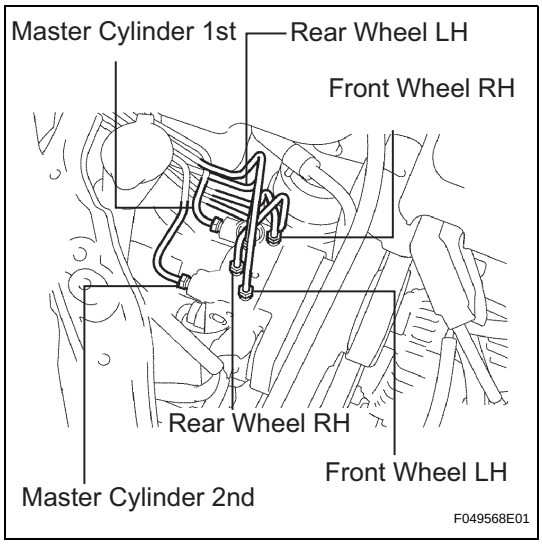
INSTALLATION

1. **INSTALL BRAKE ACTUATOR ASSEMBLY**
   (a) Install the brake actuator to the bracket with the 2 nuts.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



2. **INSTALL BRAKE ACTUATOR ASSEMBLY WITH BRACKET**
   (a) Install the brake actuator with bracket with the 2 bolts and nut.
   Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
   NOTICE:
   - **Be careful not to damage the brake tubes and wire harness.**
   - **Install the bolts and nut in order shown n the illustration.**

   (b) Connect the brake actuator connector.
   NOTICE:
   Make sure that the lever is locked securely.



   (c) Using SST, connect the 6 brake tubes to the correct locations on the actuator, as shown in the illustration.
   SST 09023-00101
   Torque: 14 N*m (145 kgf*cm, 10 ft.*lbf) with SST
   Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf) without SST
   HINT:
   Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

3. **INSTALL HEADLIGHT UNIT RH (See page LI-15)**
4. **INSTALL FRONT BUMPER COVER (See page ET-5)**
5. **INSTALL FRONT FENDER LINER LH (See page ET-4)**
6. **INSTALL FRONT FENDER LINER RH (See page ET-5)**
7. **INSTALL HOOD TO FRONT END PANEL SEAL (See page ET-4)**
8. **INSTALL FRONT WHEEL RH**
   Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
10. **FILL RESERVOIR WITH BRAKE FLUID (See page BR-3)**
11. **BLEED AIR FROM BRAKE MASTER CYLINDER (See page BR-3)**
12. **BLEED AIR FROM BRAKE LINE (See page BR-4)**
13. **CHECK BRAKE FLUID LEVEL IN RESERVOIR (See page BR-4)**
14. **CHECK FOR BRAKE FLUID LEAKAGE**

15. **CHECK BRAKE ACTUATOR WITH INTELLIGENT TESTER**
    (a) Check the brake actuator with the intelligent tester (see page BC-72).

16. **ADJUST VEHICLE PREPARATION FOR HEADLIGHT AIM (See page LI-10)**

17. **PREPARATION FOR HEADLIGHT AIMING (Using Headlight Tester) (See page LI-11)**

18. **PREPARATION FOR HEADLIGHT AIMING (Using Screen) (See page LI-11)**

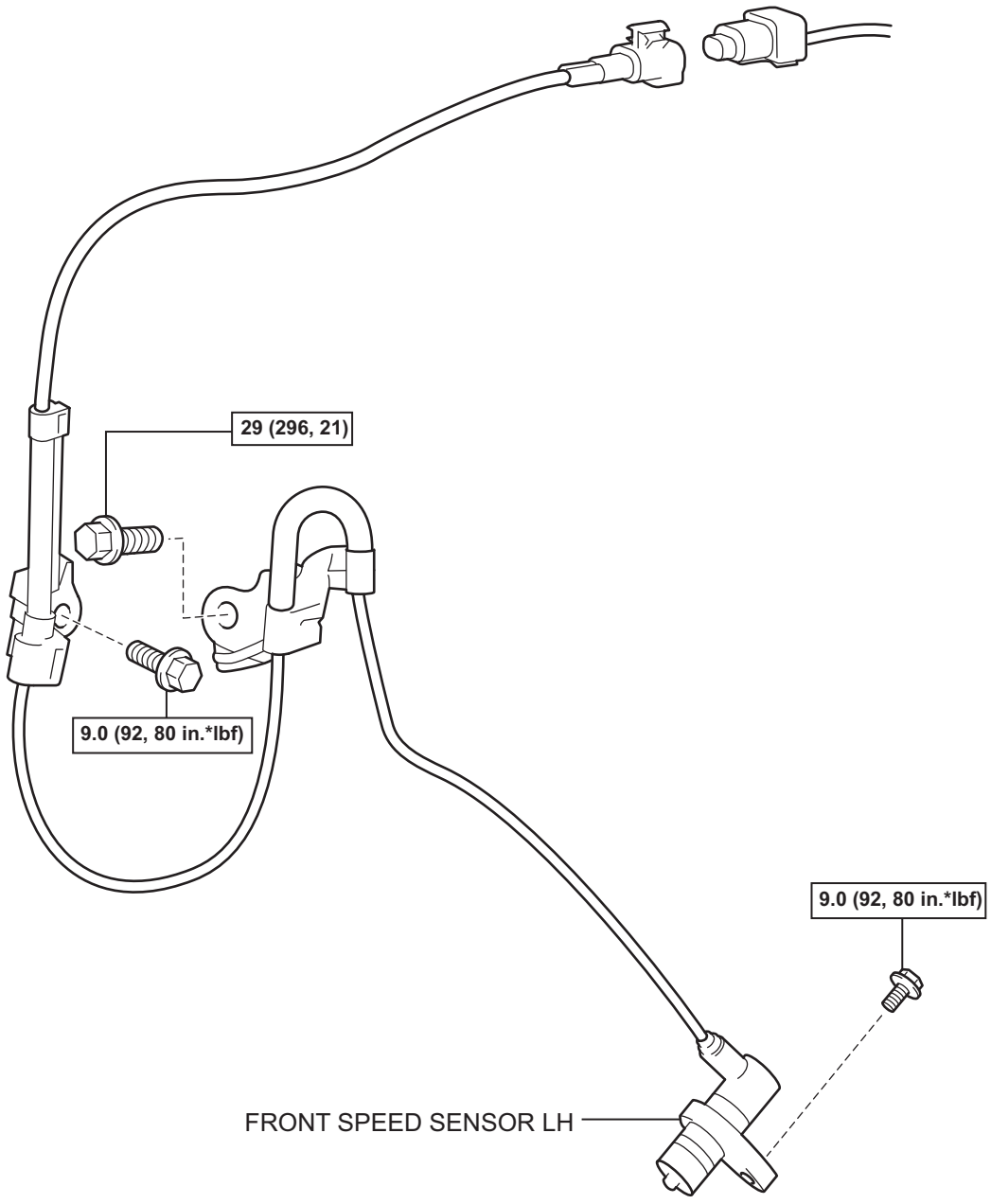
19. **INSPECT HEADLIGHT AIMING (See page LI-13)**

20. **ADJUST HEADLIGHT AIMING (See page LI-14)**

21. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

FRONT SPEED SENSOR

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

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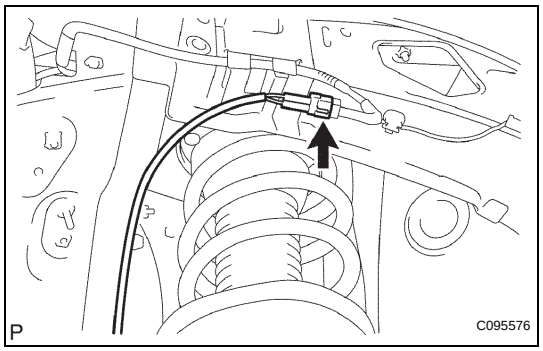
BC

REMOVAL

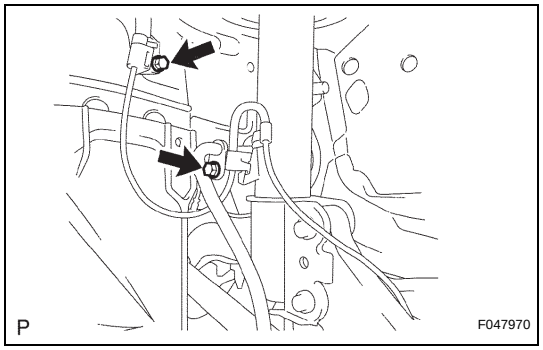
HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

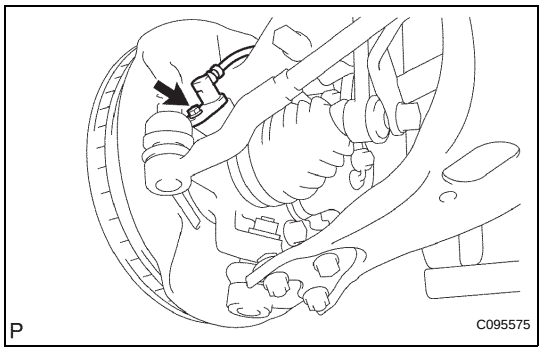
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT WHEEL**
3. **REMOVE FRONT FENDER LINER LH (See page ET-2)**
4. **REMOVE FRONT SPEED SENSOR LH**
   (a) Detach the clamp and disconnect the connector.



(b) Remove the bolts and separate the speed sensor from the body.



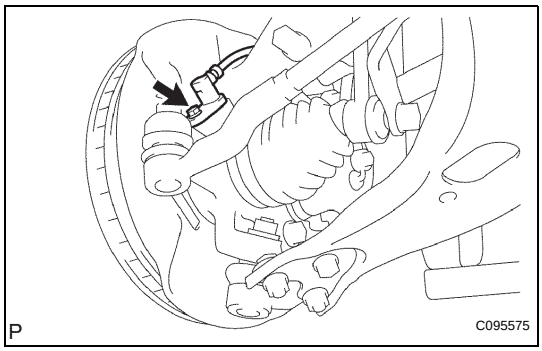
(c) Remove the bolt and speed sensor.
NOTICE:
Keep the sensor tip and sensor installation hole free from foreign matter.



INSTALLATION

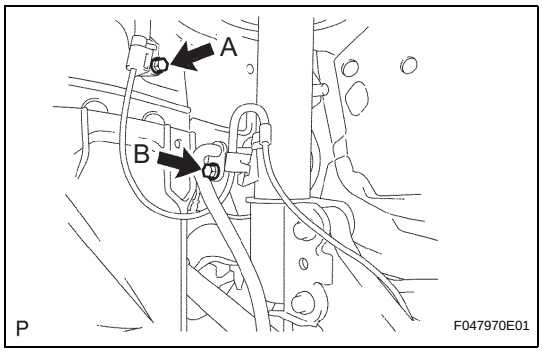
HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

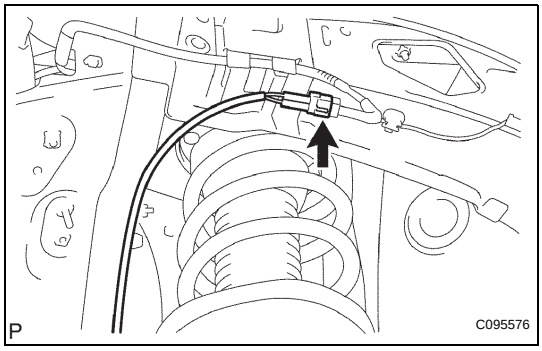


1. INSTALL FRONT SPEED SENSOR LH

(a) Install the speed sensor with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
NOTICE:
Keep the sensor tip and sensor installation hole free from foreign matter.



(b) Install the speed sensor to the body with the 2 bolts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf) for bolt A
29 N*m (296 kgf*cm, 21 ft.*lbf) for bolt B



(c) Connect the connector and attach the clamp.

2. INSTALL FRONT FENDER LINER LH (See page ET-5)

3. INSTALL FRONT WHEEL
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

5. PERFORM INITIALIZATION

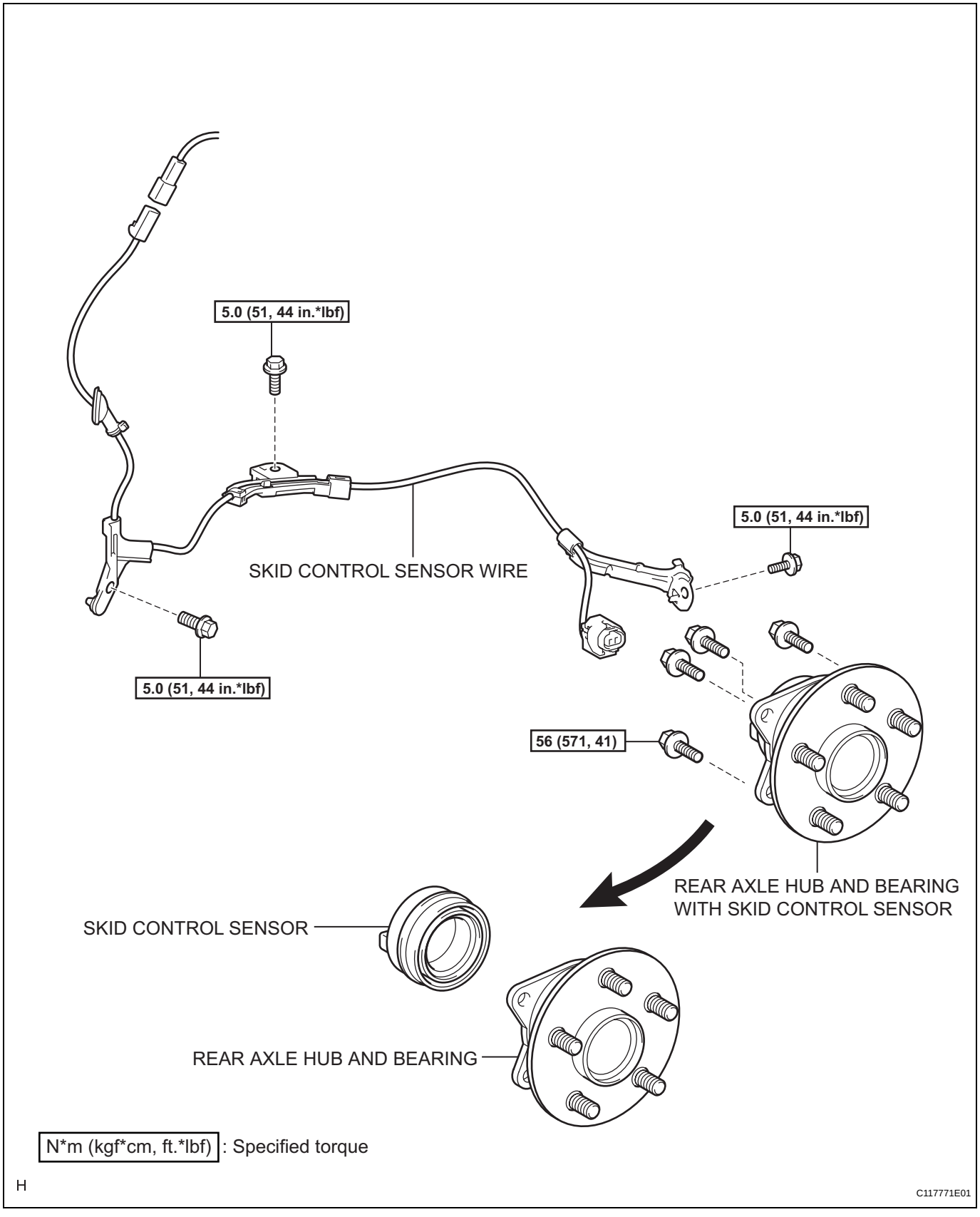
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

6. CHECK ABS SPEED SENSOR SIGNAL

(a) Check the ABS speed sensor signal (see page BC-12).

SKID CONTROL SENSOR

COMPONENTS

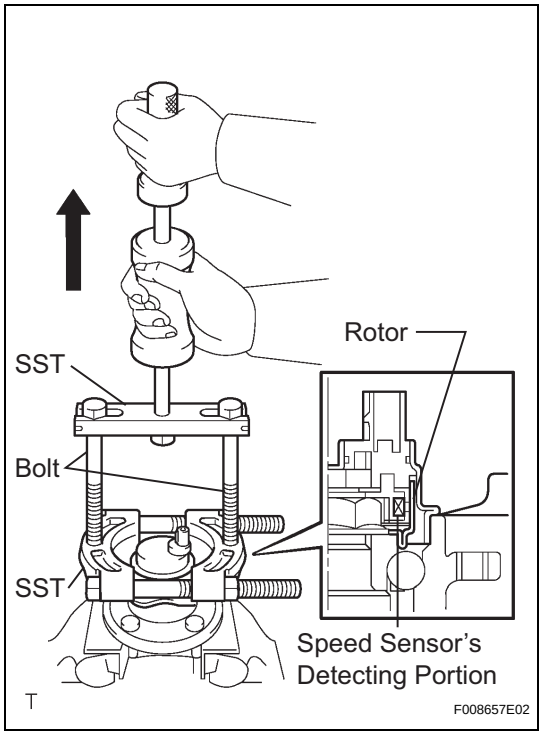


BC

REMOVAL

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

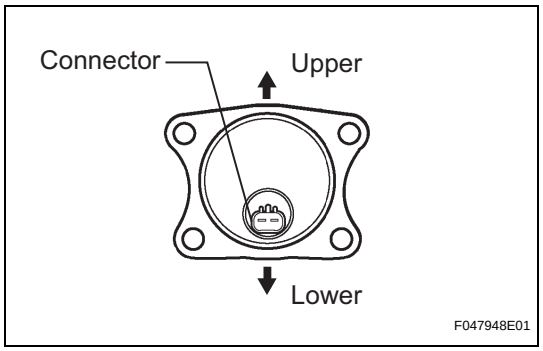
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE REAR WHEEL**
3. **DISCONNECT SKID CONTROL SENSOR WIRE (See page AH-17)**
4. **REMOVE REAR DISC BRAKE CYLINDER MOUNTING WITH REAR DISC BRAKE CYLINDER ASSEMBLY (See page AH-17)**
5. **REMOVE REAR DISC (See page BR-32)**
6. **REMOVE REAR AXLE HUB AND BEARING (See page AH-19)**
7. **REMOVE SKID CONTROL SENSOR**
   (a) Install the 4 hub nuts to the 4 rear axle hub bolts.
   (b) Placing an aluminum plate below the rear axle hub and bearing assembly, place them into a vise.
   NOTICE:
   Replace the rear axle hub and bearing assembly if it is dropped or receives a strong shock.
   (c) Using a 3 mm pin punch and hammer, remove the 2 pins from the SST (09520-00031) and disconnect the attachment (09521-00010).
   (d) Using SST and 2 bolts, remove the skid control sensor from the rear axle hub and bearing assembly.
   SST 09520-00031 (09520-00040), 09521-00020, 09950-00020
   NOTICE:
   - **Pull the skid control sensor off straight, be careful not to make contact with the skid control sensor rotor.**
   - **If the sensor rotor is damaged or deformed, replace the rear axle hub and bearing assembly.**
   - **Do not scratch the area where the skid control sensor contacts the rear axle hub and bearing assembly.**
   - **Do not attach the foreign matter to the sensor rotor.**

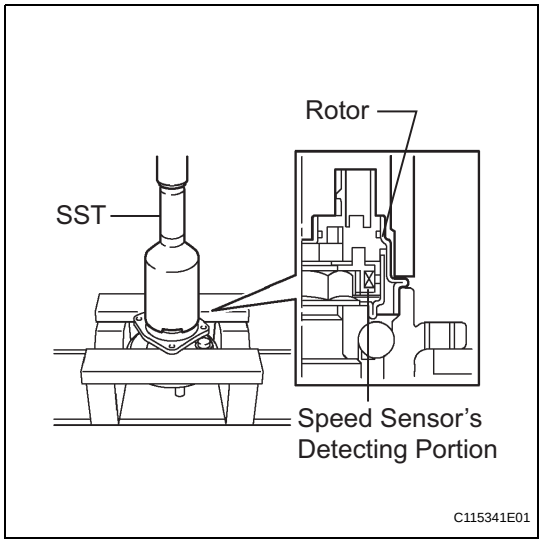


BC

INSTALLATION

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.





1. **INSTALL SKID CONTROL SENSOR**
   (a) Wipe off sealant attached to the skid control sensor's fitting surface with white gasoline.
   NOTICE:
   Prevent foreign matter from attaching to the sensor rotor.
   (b) Install a new skid control sensor to the rear axle hub and bearing assembly. The skid control sensor connector should be placed in the lowest position.
   HINT:
   The rear axle hub and bearing assembly should be placed with the narrow side facing the lower side.
   (c) Using SST and a press, press the skid control sensor so that it becomes flat with the rear axle hub and bearing assembly.
   SST 09214-76011
   NOTICE:
   - **Do not use a hammer on the skid control sensor.**
   - **Check that there is no foreign matter such as iron chips on the sensor's detection portion.**
   - **Slowly press the skid control sensor in straight.**
2. **INSTALL REAR AXLE HUB AND BEARING (See page AH-19)**
3. **INSTALL REAR DISC (See page BR-35)**
4. **INSTALL REAR DISC BRAKE CYLINDER MOUNTING WITH REAR DISC BRAKE CYLINDER ASSEMBLY (See page AH-21)**
5. **CONNECT SKID CONTROL SENSOR WIRE (See page AH-21)**
6. **INSTALL REAR WHEEL**
   Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
7. **CHECK AND ADJUST REAR WHEEL ALIGNMENT**
   (a) Check and adjust the rear wheel alignment (see page SP-9).
8. **CABLE TO NEGATIVE BATTERY TERMINAL BATTERY**
9. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

10. CHECK ABS SPEED SENSOR SIGNAL

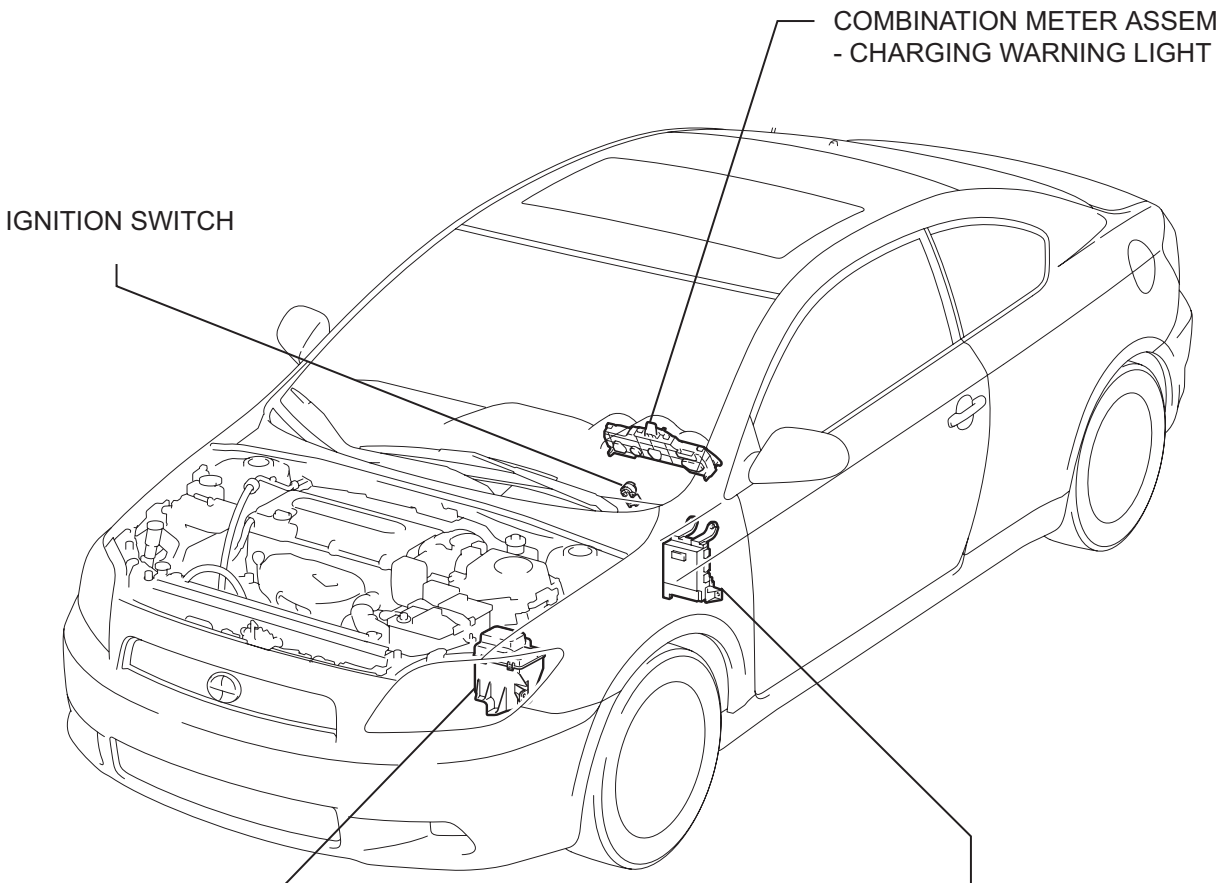
(a) Check the ABS speed sensor signal (see page BC-12).

CHARGING SYSTEM

PRECAUTION

1. **Check that the battery cables are connected to the correct terminals.**
2. **Disconnect the battery cables if a quick charge is given to the battery.**
3. **Do not perform tests with a high voltage insulation resistance tester.**
4. **Never disconnect the battery while the engine is running.**
5. **Check that the charging cable is tightly connected onto terminal B of the generator and the fuse box.**
6. **Do not check whether the generator generates current or not while terminal F is connected to the other terminals.**

PARTS LOCATION



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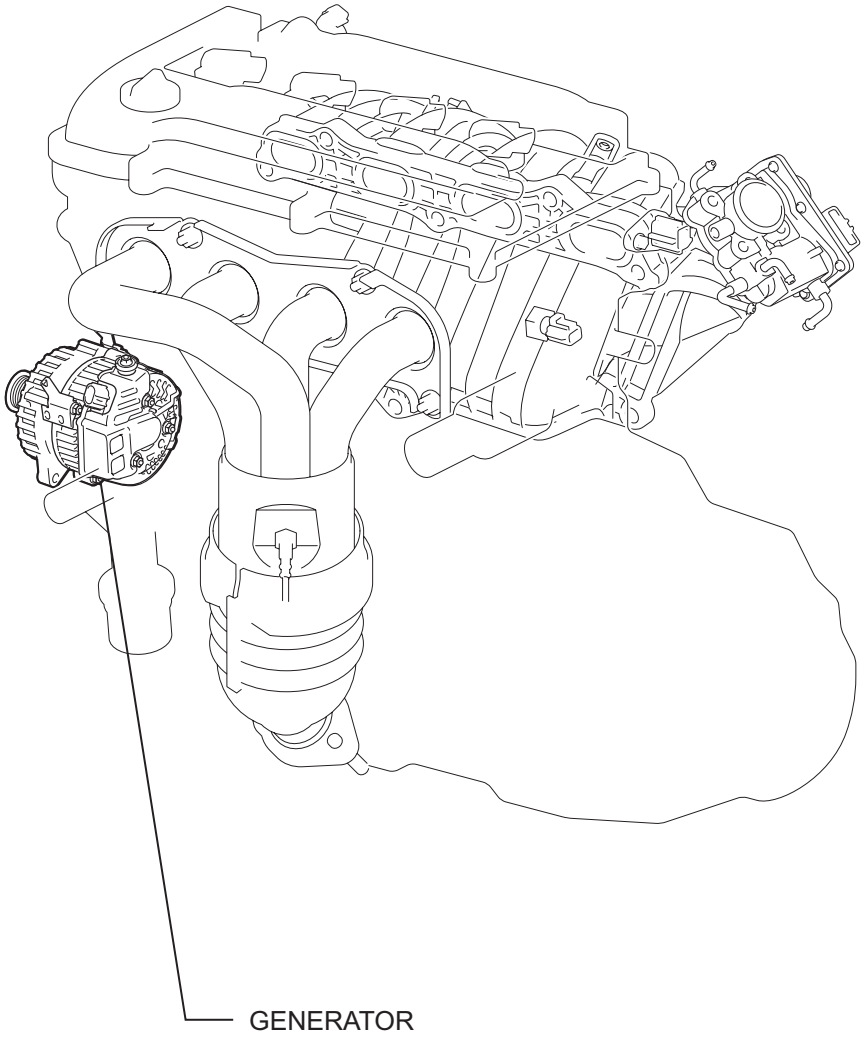

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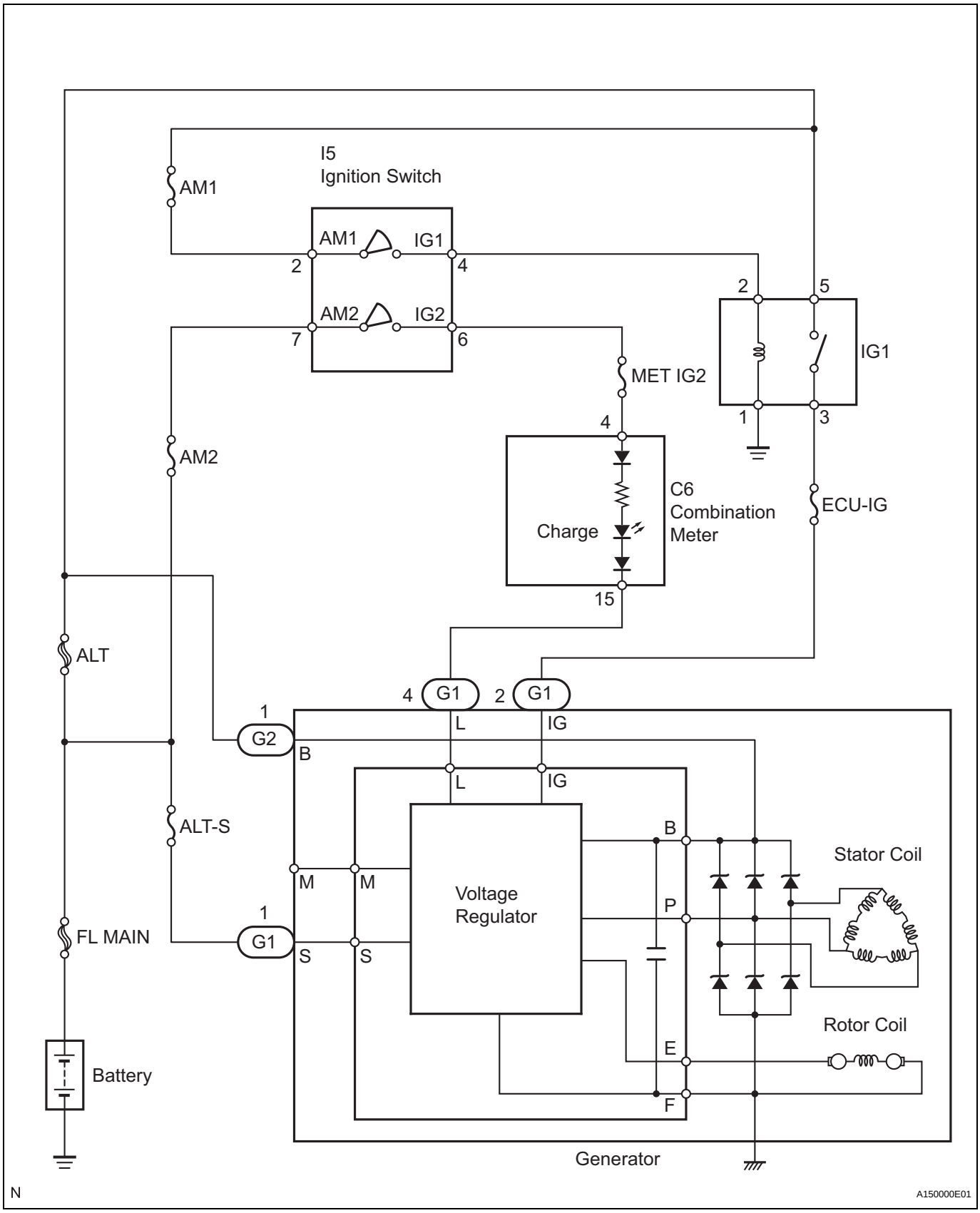
SYSTEM DIAGRAM



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 electrolyte quantity of each cell.

(1) For maintenance-free batteries:

- If the electrolyte quantity is below the lower line, replace the battery.
- If the electrolyte quantity is above the lower line, check the battery voltage when cranking the engine. If the 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) For non-maintenance-free batteries:

- If the electrolyte quantity is below the lower line, add distilled water to each cell. Then, recharge the battery and check the electrolyte's specific gravity.
  Standard specific gravity:
  1.25 to 1.29 at 20°C (68°F)
  If the electrolyte quantity is above the lower line, check the battery voltage when cranking the engine. If the 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.).

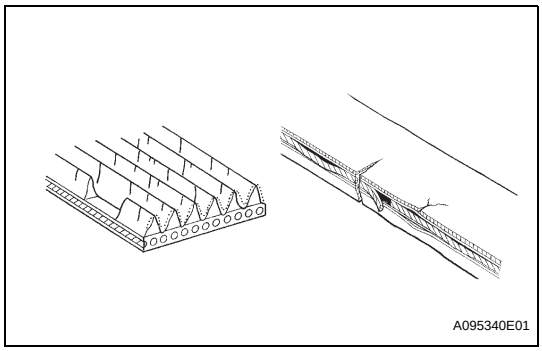
2. INSPECT BATTERY TERMINAL AND FUSE

(a) Visually check the battery terminals.

(1) Check that the battery terminals are not loose or corroded.

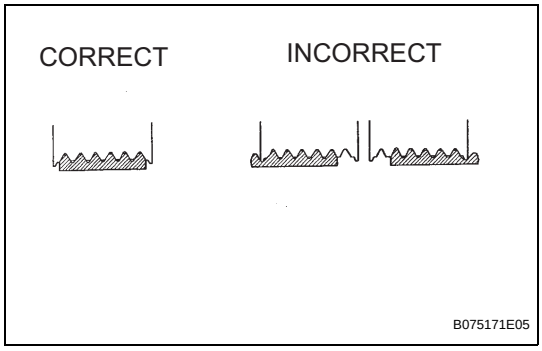
(b) Visually check the fusible link and fuses.

(1) Check that there is continuity between the fusible links, high current fuses and regular fuses.



3. INSPECT V-RIBBED BELT

(a) Visually check the belt for excessive wear, frayed cords, etc.
If any defects are found, replace the V-ribbed belt.
HINT:
Cracks on the rib side of the belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.



(b) Check that the belt fits properly in the ribbed grooves.
HINT:
Confirm by hand that the belt has not slipped out of the grooves on the bottom of the pulley.

4. INSPECT GENERATOR WIRING

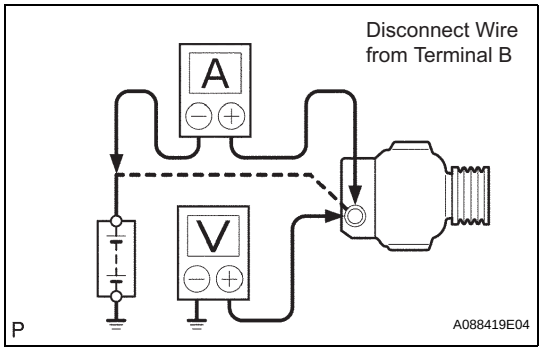
(a) Visually check the generator wiring.
(1) Check that the wiring is in good condition.

5. INSPECT 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 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) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows.
(1) Disconnect the wire from terminal B of the generator, then connect it to the negative (-) lead of the ammeter.
(2) Connect the positive (+) lead of the ammeter to terminal B of the generator.
(3) Connect the positive (+) lead of the voltmeter to terminal B of the generator.
(4) Ground the negative (-) lead of the voltmeter.
(b) Check the charging circuit.
(1) Keep the engine speed at 2,000 rpm and check the reading on the ammeter and voltmeter.
Standard amperage:
10 A or less
Standard voltage:
13.2 to 14.8 V

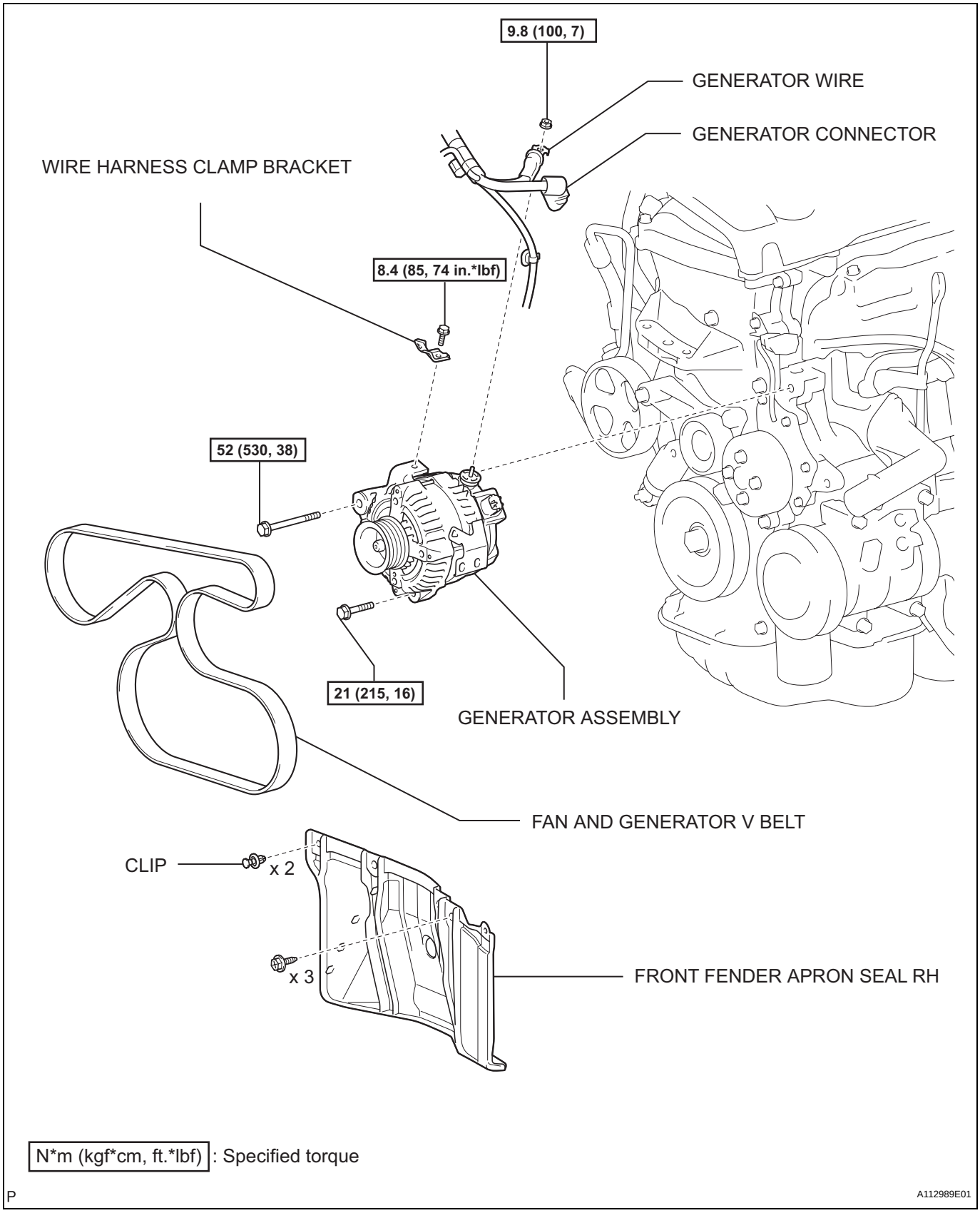
8. INSPECT CHARGING CIRCUIT WITH LOAD

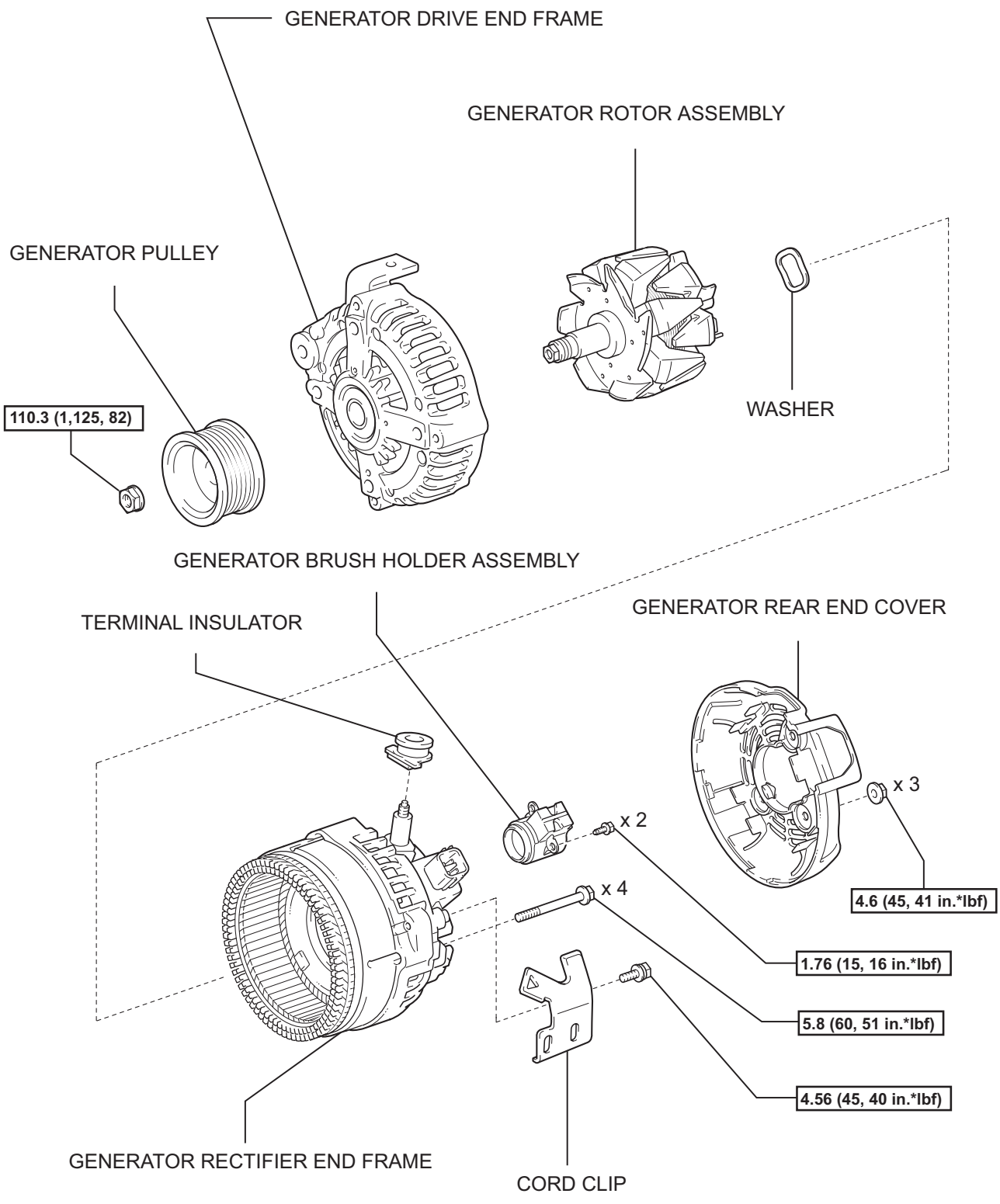
(a) With the engine running at 2,000 rpm, turn the high beam headlights ON and turn the heater blower switch to the "HI" position.

(b) Check the reading on the ammeter.
Standard amperage:
30 A or more
If the ammeter reading is less than the standard amperage, repair the generator.
HINT:
If the battery is fully charged, the indication will sometimes be less than the standard amperage.

GENERATOR

COMPONENTS





N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

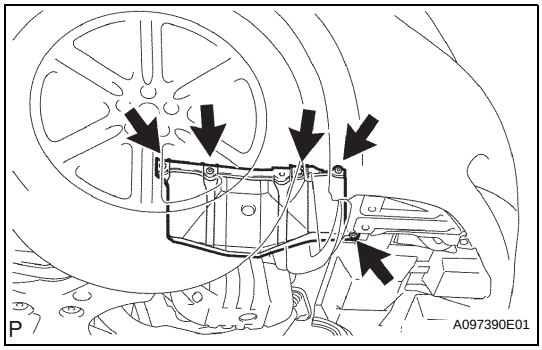
A112990E01

CH

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

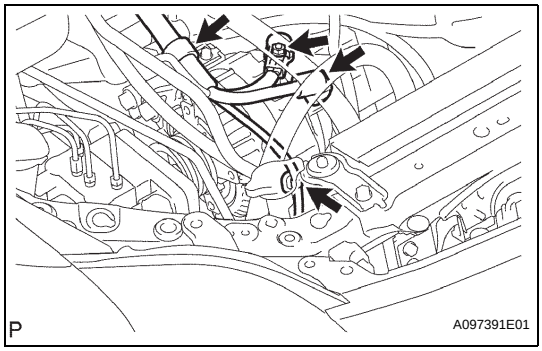
CAUTION:
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



2. REMOVE FRONT FENDER APRON SEAL RH

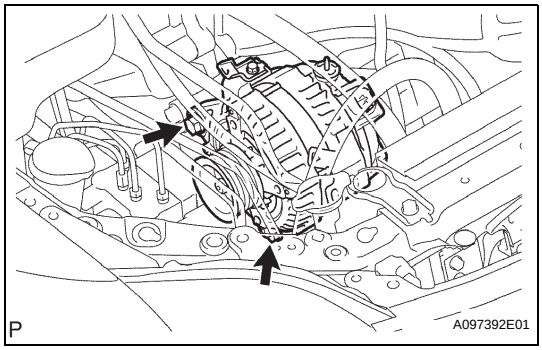
(a) Remove the 2 screws, 3 clips and apron seal.

3. REMOVE FAN AND GENERATOR V BELT (See page EM-6)

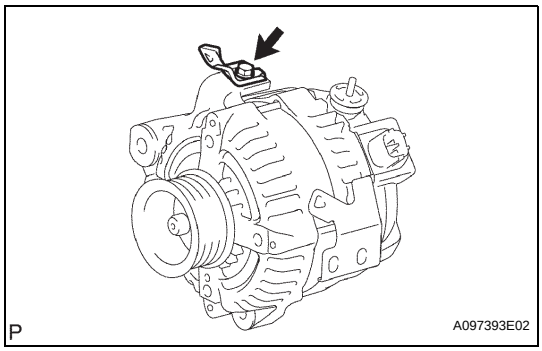


4. REMOVE GENERATOR ASSEMBLY

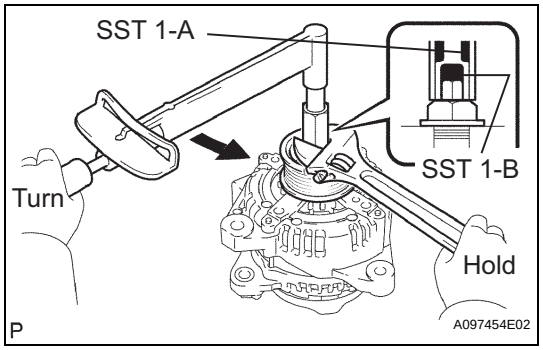
(a) Disconnect the generator connector.
(b) Remove the terminal cap.
(c) Remove the nut and disconnect the generator wire.
(d) Remove the 2 wire harness clamps.



(e) Remove the 2 bolts and generator.



(f) Remove the bolt and wire harness clamp bracket.



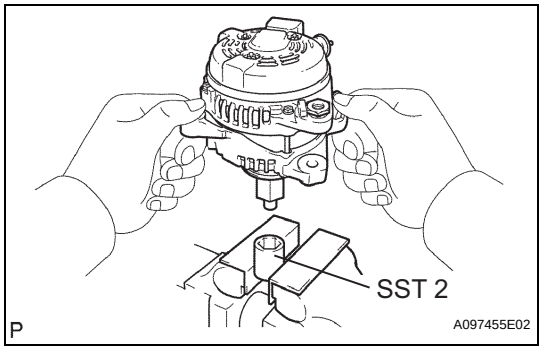
DISASSEMBLY

1. REMOVE GENERATOR PULLEY
SST 09820-63011 (09820-06010), 09820-06021

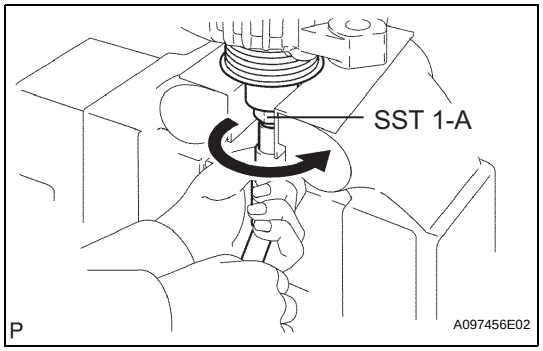
(a) Tighten SST 1-B to the specified torque, and then fix SST 1-A on the generator rotor shaft.

Item	Part No.
SST 1-A and B	09820-06010
SST 2	09820-06021

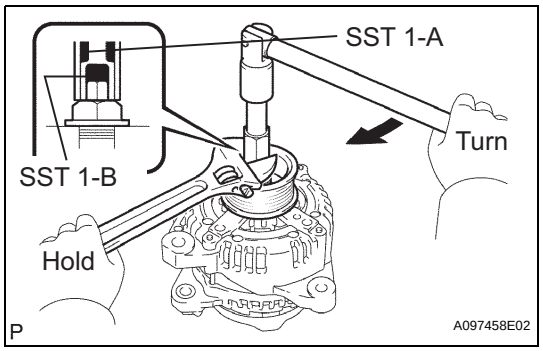
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)
NOTICE:
Securely fix SST on the generator rotor shaft.



(b) Clamp SST 2 in a vise.
(c) Insert SST 1-A and B into SST 2, and then fix the generator pulley nut into SST 2.

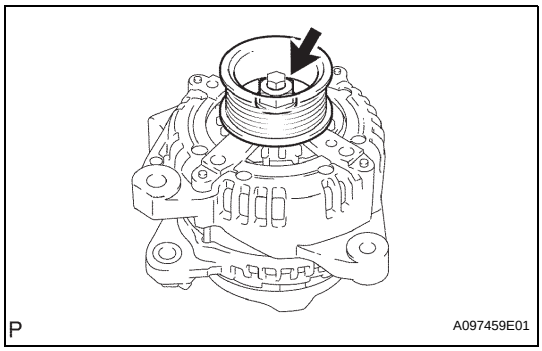


(d) Turn SST 1-A in the direction shown, and then loosen the generator pulley nut.
NOTICE:
If the generator pulley nut is turned by more than a half turn, the generator rotor shaft may be damaged.
(e) Remove the generator from SST 2.

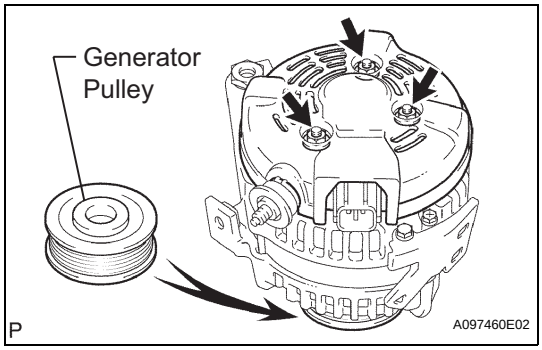


(f) Fix SST 1-B, and then loosen SST 1-A in the direction shown. Remove SST 1-A and B from the generator.

CH



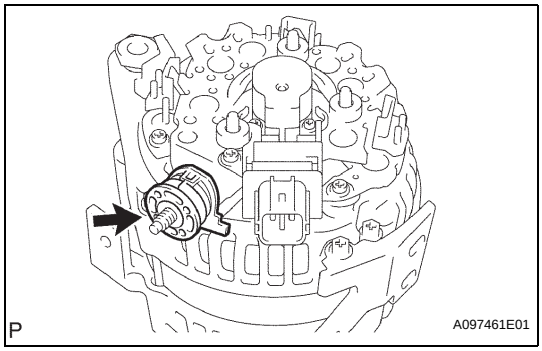
(g) Remove the generator pulley nut and generator pulley.



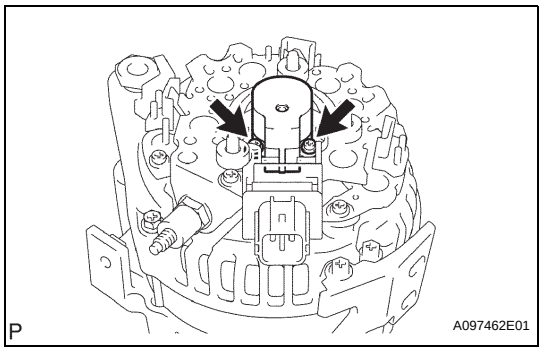
2. REMOVE GENERATOR BRUSH HOLDER ASSEMBLY

(a) Place the generator on the generator pulley.

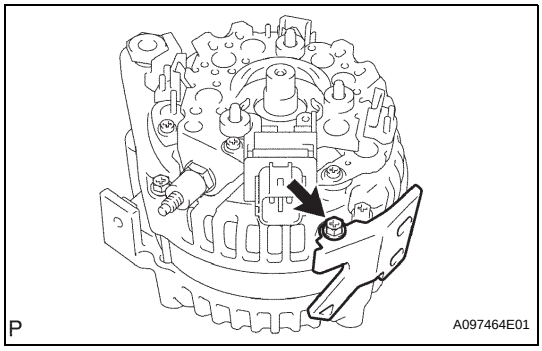
(b) Remove the 3 nuts and generator rear end cover.



(c) Remove the terminal insulator.



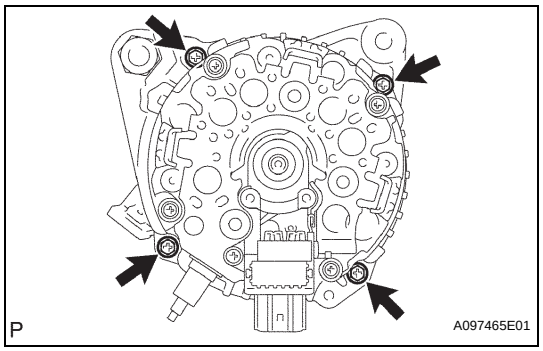
(d) Remove the 2 screws and generator brush holder.



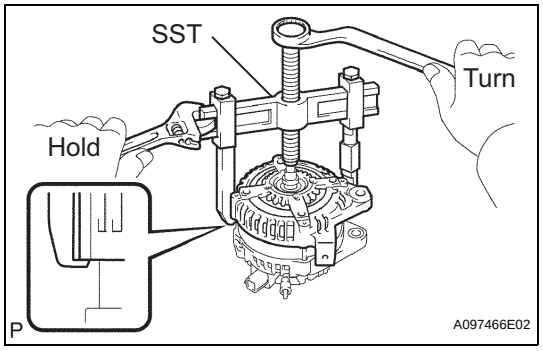
3. REMOVE GENERATOR ROTOR ASSEMBLY

(a) Remove the bolt and cord clip.

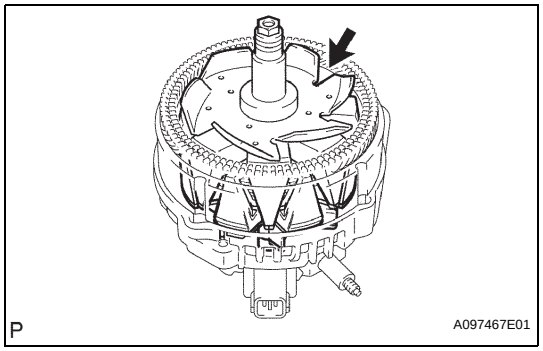
CH



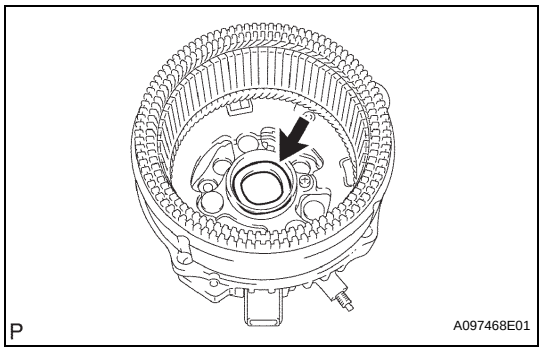
(b) Remove the 4 bolts.



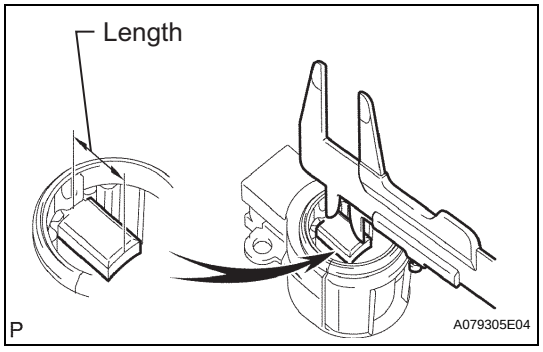
(c) Using SST, remove the generator drive end frame.
SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04071, 09957-04010)



(d) Remove the generator rotor from the generator rectifier end frame.



(e) Remove the washer from the generator rectifier end frame.

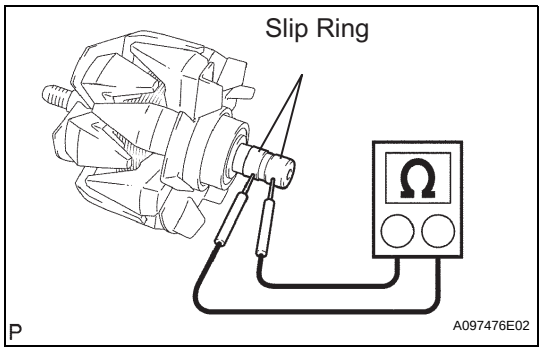


INSPECTION

1. INSPECT GENERATOR BRUSH HOLDER ASSEMBLY

(a) Using a vernier caliper, measure the brush length.
Standard length:
9.5 to 11.5 mm (0.374 to 0.453 in.)
Minimum length:
4.5 mm (0.177 in.)
If the brush length is less than the minimum, replace the generator brush holder assembly.

CH



2. INSPECT GENERATOR ROTOR ASSEMBLY

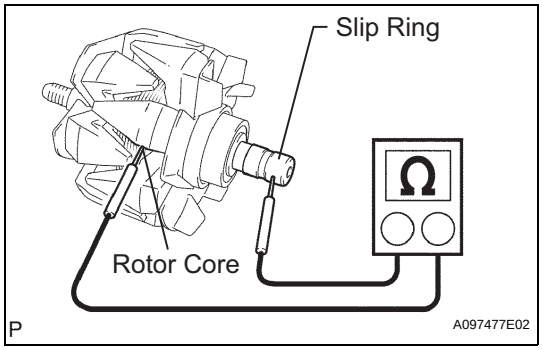
(a) Check the resistance.

(1) Measure the resistance between the slip rings.

Standard resistance:

2.3 to 2.7 Ω at 20°C (68°F)

If the result is not as specified, replace the generator rotor assembly.

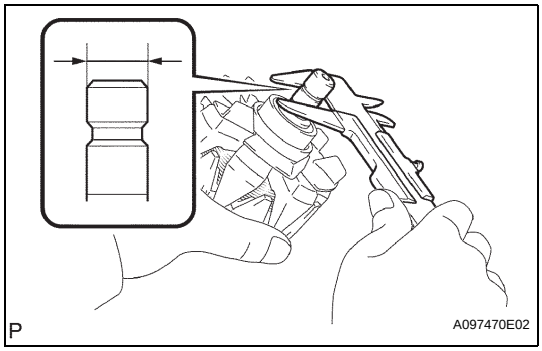


(2) Measure the resistance between the slip ring and rotor core.

Standard resistance:

1 MΩ or higher

If the result is not as specified, replace the generator rotor assembly.



(b) Check the slip ring diameter.

(1) Using a vernier caliper, measure the slip ring diameter.

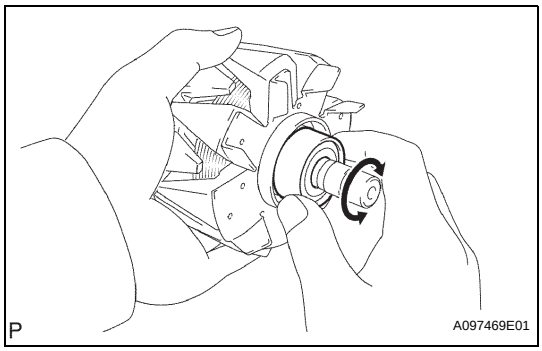
Standard diameter:

14.2 to 14.4 mm (0.559 to 0.567 in.)

Minimum diameter:

14 mm (0.551 in.)

If the diameter is less than the minimum, replace the generator rotor assembly.



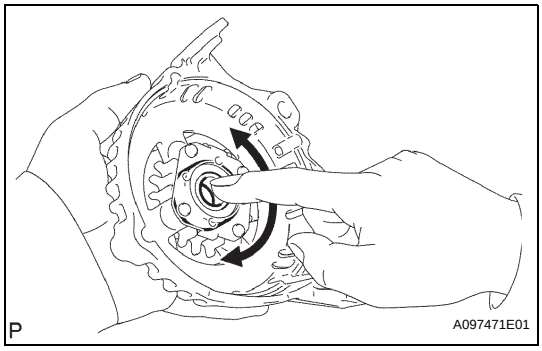
(c) Check the appearance.

(1) Check that the bearing is not rough or worn.

OK:

The bearing rotates smoothly.

If the result is not as specified, replace the generator rotor assembly.



3. INSPECT GENERATOR DRIVE END FRAME BEARING

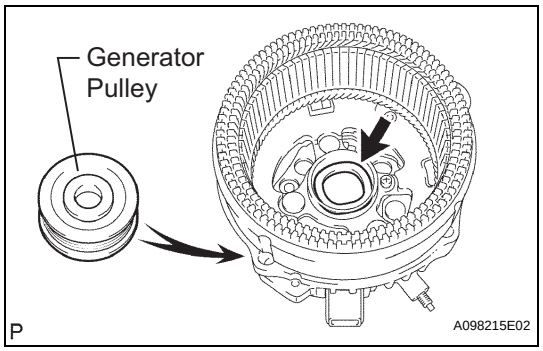
(a) Check that the bearing is not rough or worn.

Standard:

The bearing rotates smoothly.

If the bearing does not rotate smoothly, replace the generator assembly.

CH

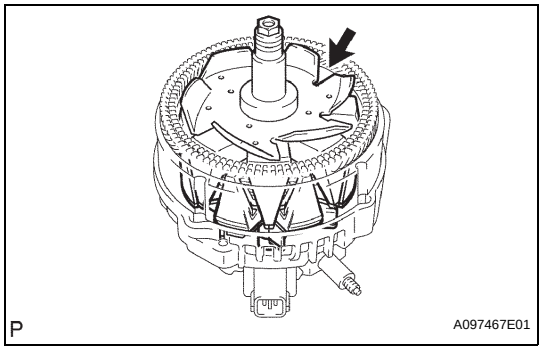


REASSEMBLY

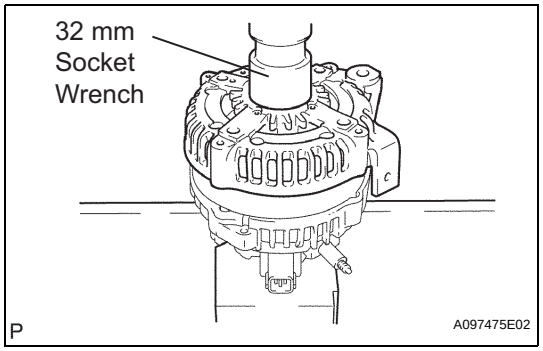
1. INSTALL GENERATOR ROTOR ASSEMBLY

(a) Place the generator drive end frame on the generator pulley.

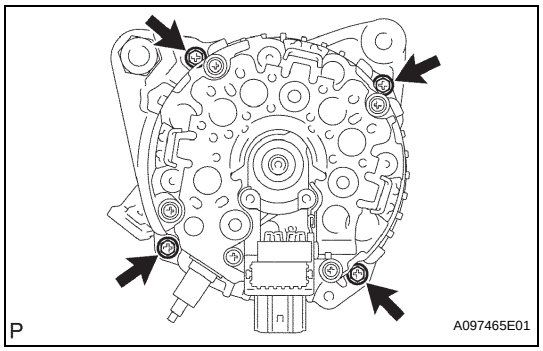
(b) Install the washer onto the generator rectifier end frame.



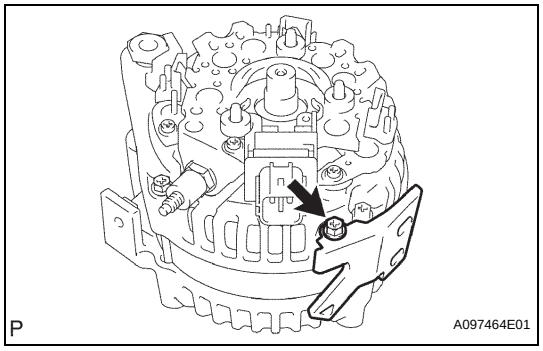
(c) Install the generator rotor onto the generator rectifier end frame.



(d) Using a 32 mm socket wrench and press, slowly push the generator drive end frame onto the generator rectifier end frame.

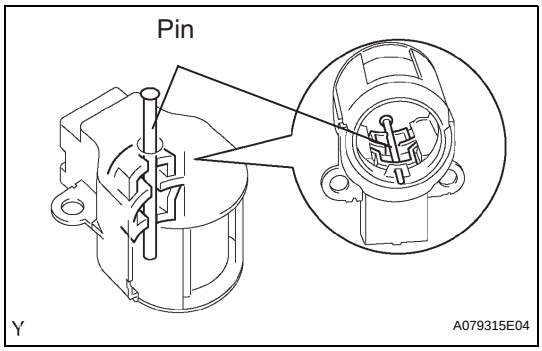


(e) Tighten the 4 bolts.
Torque: 5.8 N*m (60 kgf*cm, 51 in.*lbf)



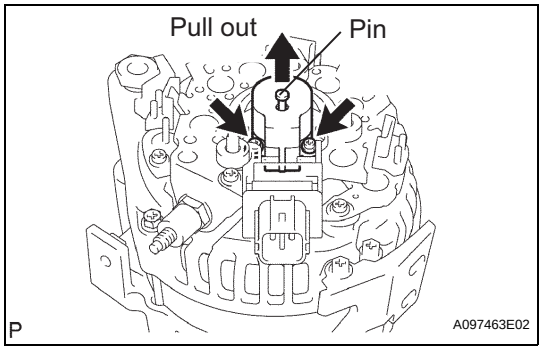
(f) Install the cord clip with the bolt.
Torque: 4.56 N*m (45 kgf*cm, 40 in.*lbf)

CH



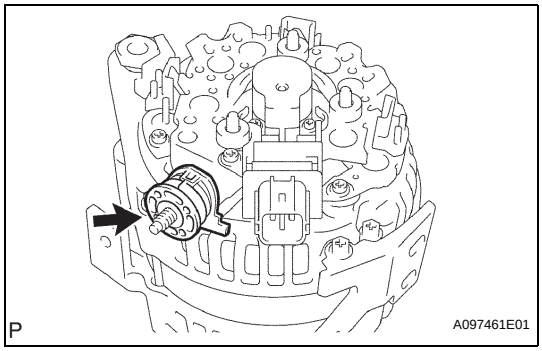
2. REMOVE GENERATOR BRUSH HOLDER ASSEMBLY

(a) While pushing the 2 brushes into the generator brush holder, insert a 1.0 mm (0.039 in.) pin into the generator brush holder.

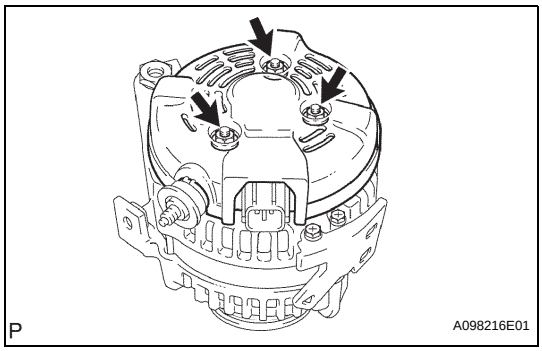


(b) Install the generator brush holder with the 2 screws.
Torque: 1.76 N*m (15 kgf*cm, 16 in.*lbf)

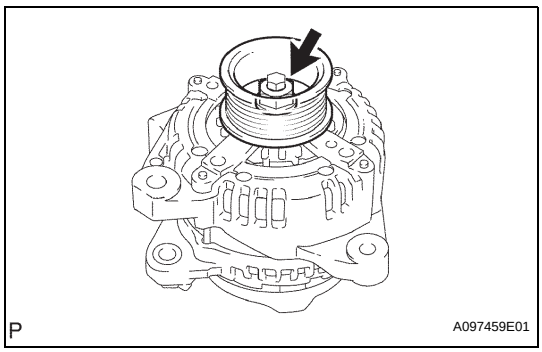
(c) Pull the 1.0 mm (0.039 in.) pin out of the generator brush holder.



(d) Install the terminal insulator onto the generator rectifier end frame.

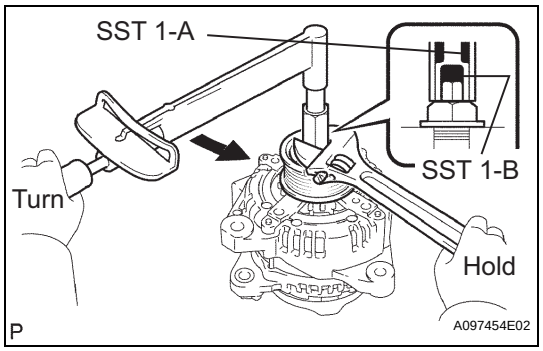


(e) Install the generator rear end cover with the 3 nuts.
Torque: 4.6 N*m (45 kgf*cm, 41 in.*lbf)



3. REMOVE GENERATOR PULLEY
SST 09820-63011 (09820-06010), 09820-06021

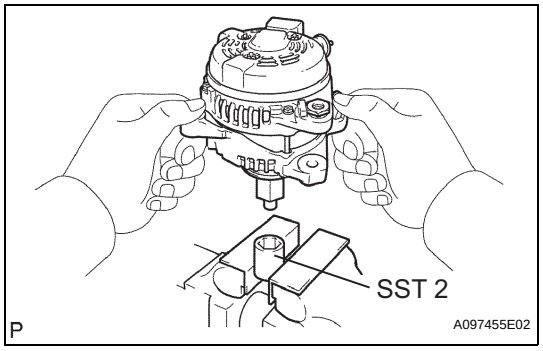
(a) Install the generator pulley onto the generator rotor shaft, and then temporarily tighten the generator pulley nut by hand.



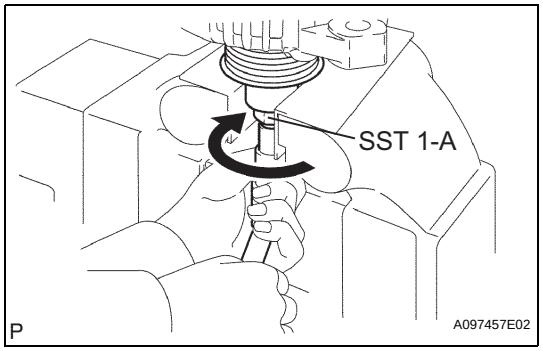
(b) Tighten SST 1-B to the specified torque, and then fix SST 1-A on the generator rotor shaft.

Item	Part No.
SST 1-A and B	09820-06010
SST 2	09820-06021

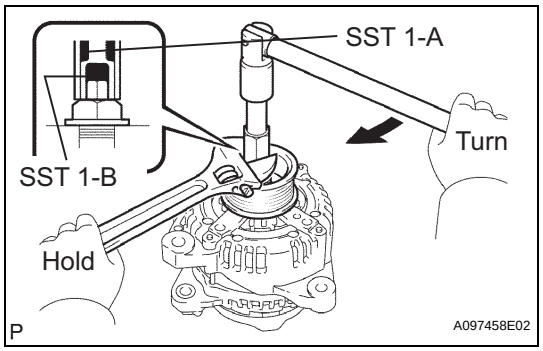
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)
NOTICE:
Securety fix SST on the generator rotor shaft.



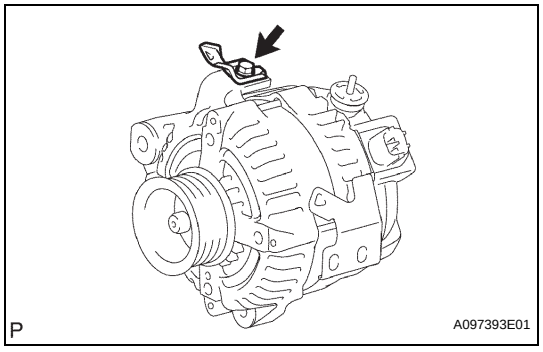
(c) Clamp SST 2 in a vise.
(d) Insert SST 1-A and B into SST 2, and then fix the generator pulley nut into SST 2.



(e) Turn SST 1-A in the direction shown, and then loosen the generator pulley nut.
Torque: 110.3 N*m (1,125 kgf*cm, 82 ft.*lbf)
(f) Remove the generator from SST 2.



(g) Fix SST 1-B, then loosen SST 1-A in the direction shown. Remove SST 1-A and B from the generator.
(h) Turn the generator pulley, and then check that the generator pulley moves smoothly.

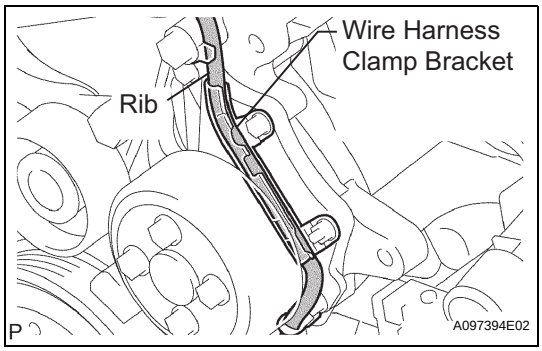


INSTALLATION

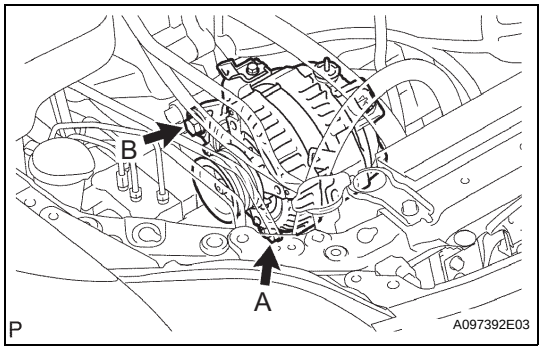
1. INSTALL GENERATOR ASSEMBLY

(a) Install the wire harness clamp bracket with the bolt.
Torque: 8.4 N*m (85 kgf*cm, 74 in.*lbf)

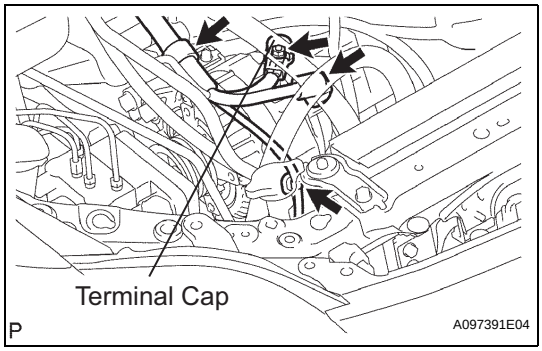
CH



(b) Confirm that the wire harness of the crankshaft position sensor is secured to the wire harness clamp bracket through the back of the rib of the timing chain cover.

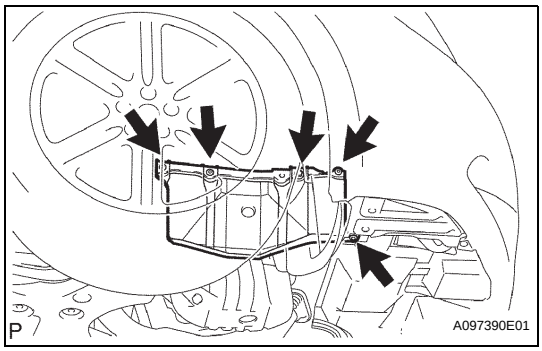


(c) Install the generator with the 2 bolts.
Torque: 21 N*m (215 kgf*cm, 16 ft.*lbf) for bolt A
52 N*m (530 kgf*cm, 38 ft.*lbf) for bolt B



(d) Install the 2 wire harness clamps.
(e) Connect the generator wire with the nut.
Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)
(f) Install the terminal cap.
(g) Connect the generator connector.

2. INSTALL FAN AND GENERATOR V BELT (See page EM-6)



3. INSTALL FRONT FENDER APRON SEAL RH
(a) Install the apron seal with the 3 clips and 2 screws.

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

5. PERFORM INITIALIZATION
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

CH

CLUTCH SYSTEM

PROBLEM SYMPTOMS TABLE

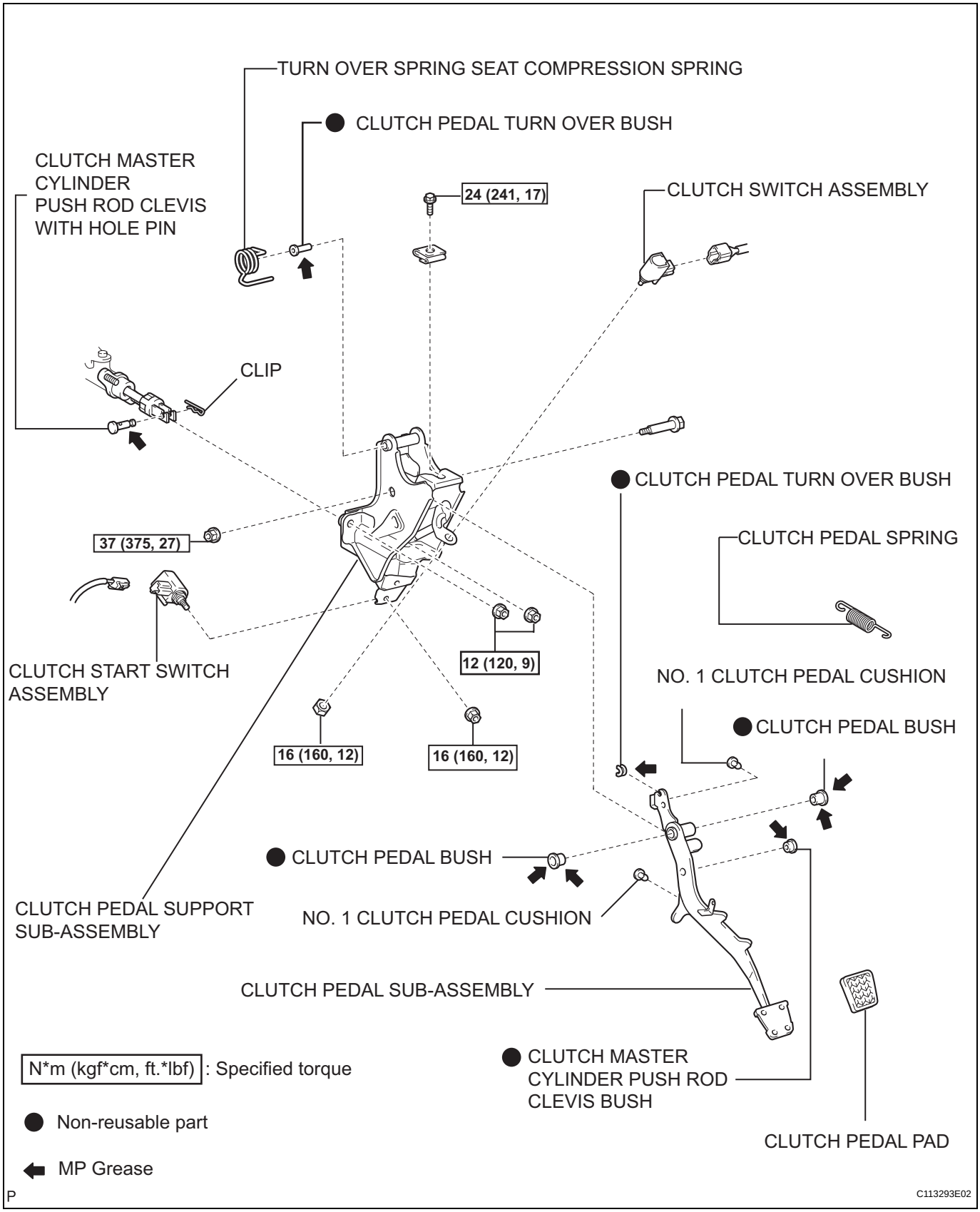
HINT:
Use the table below to help determine the cause of the problem. The numbers indicate the priority of the likely causes of the problem. Check each part in the order. If necessary, replace these parts.

Clutch system

Symptom	Suspected Area	See page
Clutch grabs/chatters	Engine mounting (Loose)	-
	Clutch disc assembly (Runout is excessive)	CL-19
	Clutch disc assembly (Oily)	CL-19
	Clutch disc assembly (Worn out)	MX-32
	Clutch disc torsion rubber (Damaged)	CL-19
	Clutch disc assembly (Glazed)	CL-19
	Diaphragm spring (Out of tip alignment)	CL-19
Clutch pedal is spongy	Clutch line (Air in line)	-
	Master cylinder cup (Damaged)	CL-12
	Release cylinder rubber (Damaged)	CL-16
Clutch is noisy	Clutch release bearing assembly (Worn, dirty, or damaged)	CL-19
	Clutch disk torsion rubber (Damaged)	CL-19
Clutch slips	Clutch pedal (Free play is out of adjustment)	CL-5
	Clutch disc assembly (Oily)	CL-19
	Clutch disc assembly (Worn out)	CL-19
	Diaphragm spring (Damaged)	CL-19
	Pressure plate (Distortion)	CL-19
	Flywheel sub-assembly (Distortion)	-
Clutch does not disengage	Clutch pedal (Free play is out of adjustment)	CL-5
	Clutch line (Air in line)	-
	Master cylinder cup (Damaged)	CL-12
	Release cylinder cup (Damaged)	CL-16
	Clutch disc assembly (Out of true)	CL-19
	Clutch disc assembly (Runout is excessive)	CL-19
	Clutch disc assembly (Lining is broken)	CL-19
	Clutch disc assembly (Dirty or burned)	CL-19
	Clutch disc assembly (Lack of spline grease)	CL-19

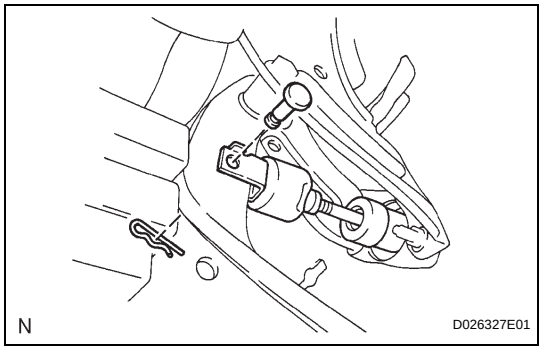
CLUTCH PEDAL

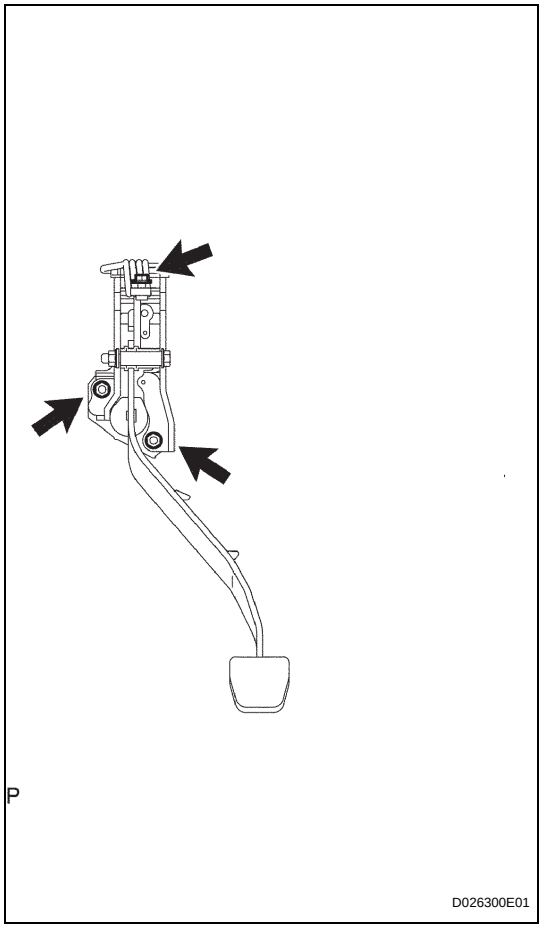
COMPONENTS



REMOVAL

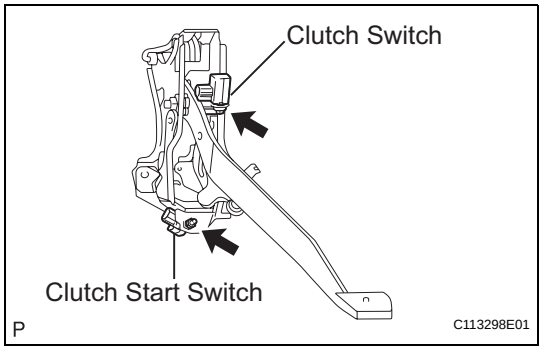
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE NO. 1 INSTRUMENT PANEL AIRBAG ASSEMBLY LOWER (See page IP-19)**
3. **REMOVE INSTRUMENT PANEL SUB-ASSEMBLY UPPER (See page IP-6)**
4. **DISCONNECT CONNECTOR**
   (a) Disconnect the clutch start switch connector.
   (b) Disconnect the clutch switch connector.
5. **REMOVE CLUTCH PEDAL SPRING**
6. **REMOVE CLUTCH MASTER CYLINDER PUSH ROD CLEVIS HOLE PIN**
   (a) Remove the clip and hole pin.





7. REMOVE CLUTCH PEDAL SUPPORT SUB-ASSEMBLY

(a) Remove the 2 nuts, bolt and clutch pedal support.



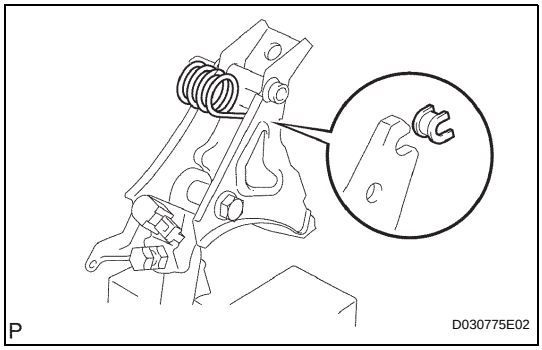
DISASSEMBLY

1. REMOVE CLUTCH START SWITCH ASSEMBLY

(a) Remove the nut and clutch start switch.

2. REMOVE CLUTCH SWITCH ASSEMBLY

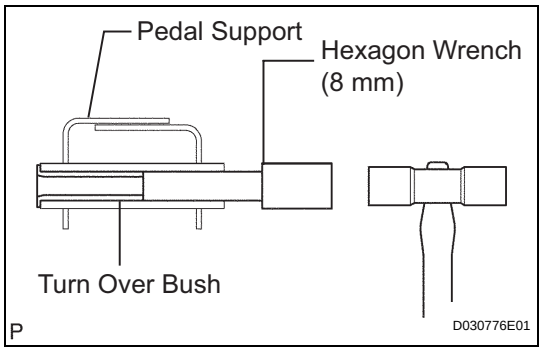
(a) Remove the nut and clutch switch.



3. REMOVE TURN OVER SPRING SEAT COMPRESSION SPRING

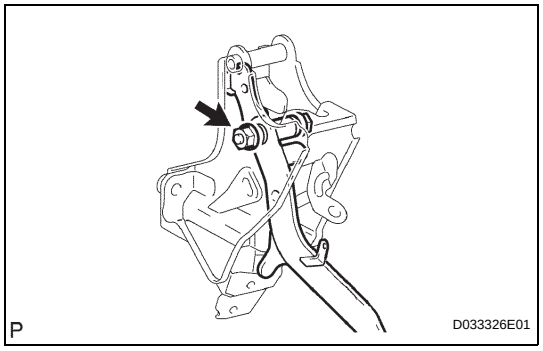
(a) Mount the clutch pedal in a soft jaw vise.
(b) Using a screwdriver, remove the spring.
(c) Remove the turn over bush from the clutch pedal.

CL



4. REMOVE CLUTCH PEDAL TURN OVER BUSH

(a) Using an 8 mm hexagon wrench and hammer, tap out the turn over bush.

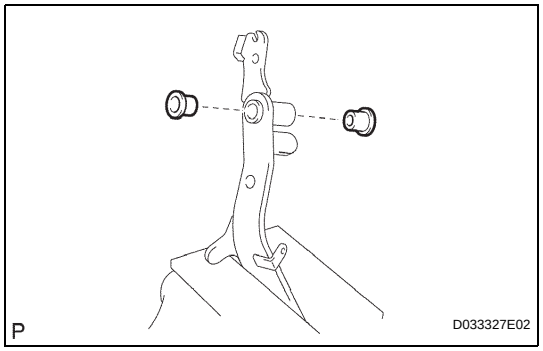


5. REMOVE CLUTCH PEDAL SUB-ASSEMBLY

(a) Remove the bolt and nut.

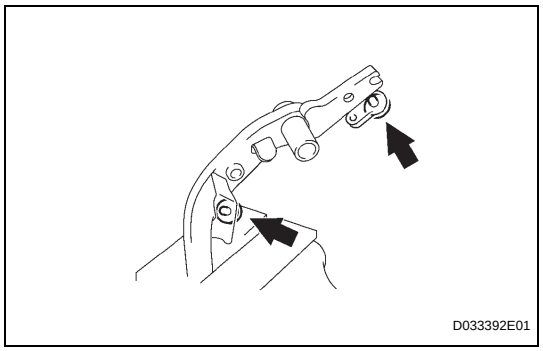
(b) Remove the clutch pedal from the clutch pedal support.

6. REMOVE CLUTCH PEDAL PAD



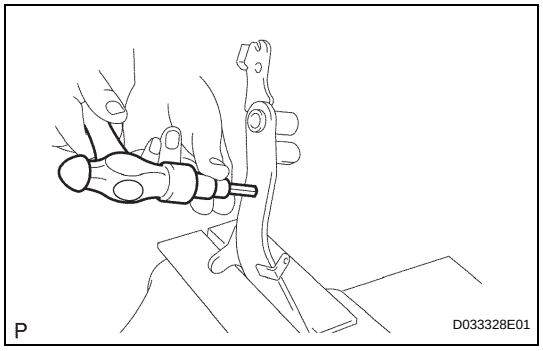
7. REMOVE CLUTCH PEDAL BUSH

(a) Remove the 2 bushes from the clutch pedal.



8. REMOVE NO. 1 CLUTCH PEDAL CUSHION

(a) Using needle-nose pliers, remove the 2 cushions from the clutch pedal.



9. REMOVE CLUTCH MASTER CYLINDER PUSH ROD CLEVIS BUSH

(a) Using an 8 mm hexagon wrench and hammer, remove the clevis bush from the clutch pedal.

CL

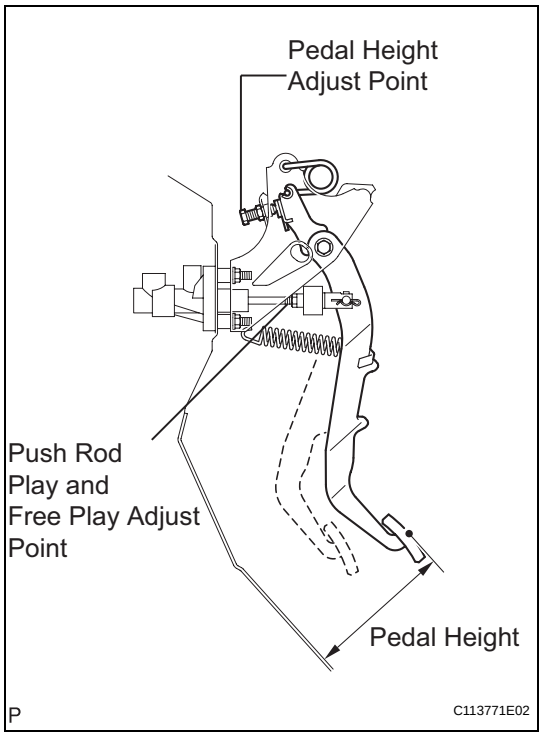
ADJUSTMENT

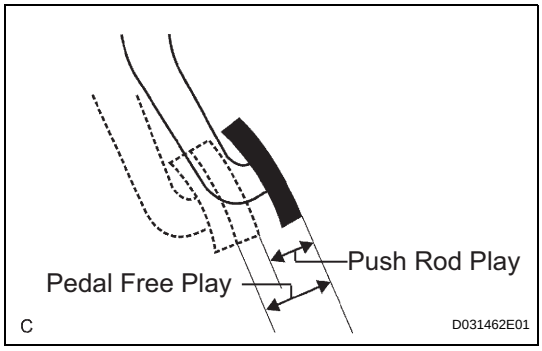
1. INSPECT AND ADJUST CLUTCH PEDAL HEIGHT

(a) Turn back the floor carpet to expose the asphalt sheet under the pedal.

(b) Check that the pedal height is correct.
Standard pedal height from asphalt sheet:
137.6 to 147.6 mm (5.417 to 5.811 in.)

(c) Adjust the pedal height.
(1) Loosen the lock nut and turn the stopper bolt until the correct height is obtained.
(2) Tighten the lock nut.
Torque: 25 N*m (250 kgf*cm, 18 ft.*lbf)



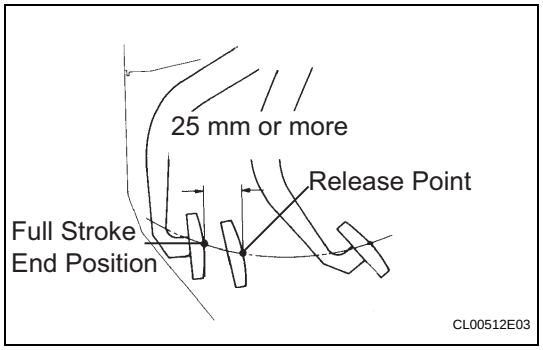


2. INSPECT PEDAL FREE PLAY AND PUSH ROD PLAY

(a) Check that pedal free play and push rod play are correct.
(1) Depress the pedal until clutch resistance begins to be felt.
Standard pedal free play:
5.0 to 15.0 mm (0.197 to 0.591 in.)
(2) Gently depress the pedal until the resistance begins to increase a little.
Standard push rod play at pedal top:
1.0 to 5.0 mm (0.039 to 0.197 in.)

(b) Adjust the pedal free play and push rod play.
(1) Remove the No. 1 instrument panel airbag lower (see page IP-18).
(2) Loosen the lock nut and turn the push rod until correct free play and push rod play are obtained.
(3) Tighten the lock nut.
Torque: 12 N*m (120 kgf*cm, 9 ft.*lbf)
(4) After adjusting the pedal free play, check the pedal height.
(5) Install the No. 1 instrument panel airbag lower (see page IP-22).

CL



3. INSPECT CLUTCH RELEASE POINT

(a) Check the clutch release point.

(1) Pull the parking brake lever and use wheel chocks to secure the vehicle.

(2) Start the engine and run it at idle.

(3) Without depressing the clutch pedal, slowly move the shift lever into reverse until the gears contact.

(4) Gradually depress the clutch pedal and measure the stroke distance from the point that the gear noise stops (release point) up to the full stroke end position.

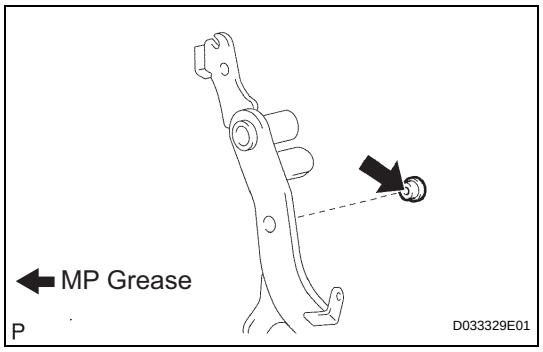
Standard distance:

25 mm or more (From pedal stroke end position to release point)

If the distance is not as specified, perform the following the operations.

- Check the pedal height.
- Check the push rod play and pedal free play.
- Bleed air from the clutch line.
- Check the clutch cover and disc.

REASSEMBLY



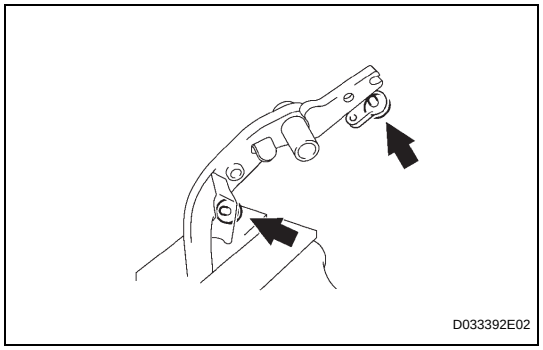
1. INSTALL CLUTCH MASTER CYLINDER PUSH ROD CLEVIS BUSH

(a) Apply MP grease to the inside of a new clevis bush.

(b) Install the clevis bush to the clutch pedal.

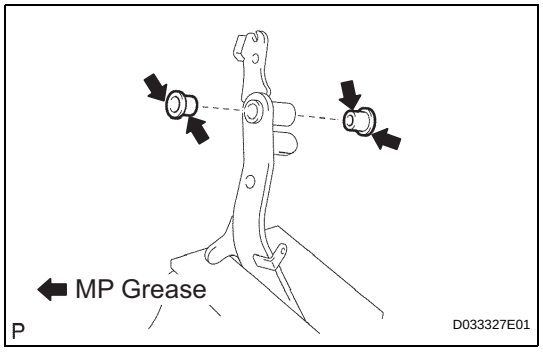
HINT:

Install the clevis bush from the right side of the vehicle.



2. INSTALL NO. 1 CLUTCH PEDAL CUSHION

(a) Using needle-nose pliers, install the 2 cushions to the clutch pedal.

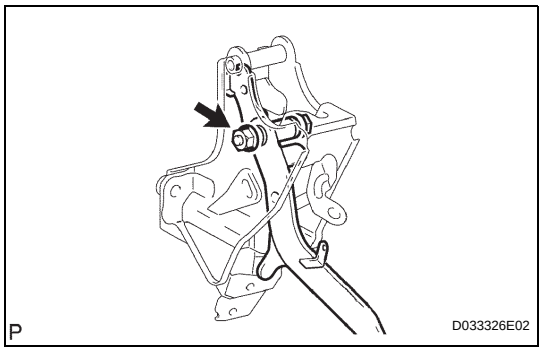


3. INSTALL CLUTCH PEDAL BUSH

(a) Apply MP grease to the inner, outer and end surfaces of 2 new bushes.

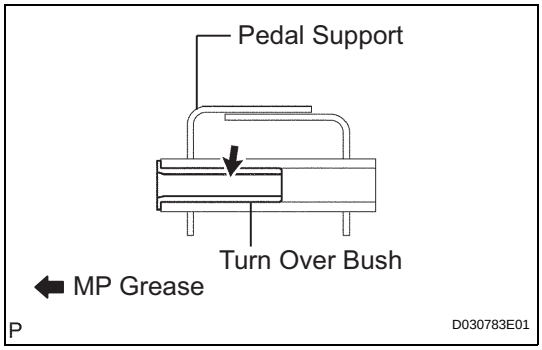
(b) Install the 2 bushes to the clutch pedal.

4. INSTALL CLUTCH PEDAL PAD



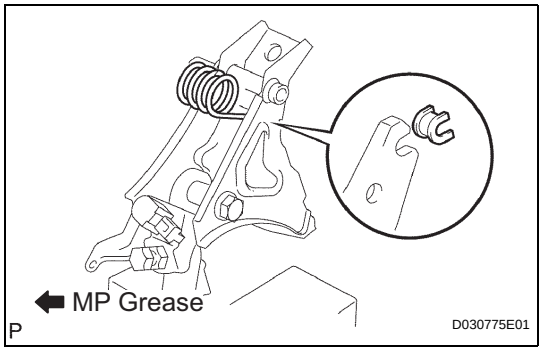
5. INSTALL CLUTCH PEDAL SUB-ASSEMBLY

(a) Install the clutch pedal to the clutch pedal support with the bolt and nut.
Torque: 37 N*m (375 kgf*cm, 27 ft.*lbf)
HINT:
Install the bolt from the right side of the vehicle.



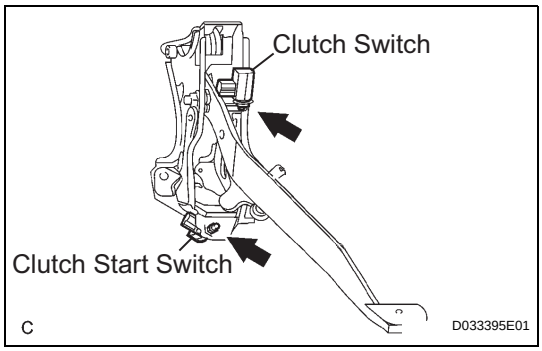
6. INSTALL CLUTCH PEDAL TURN OVER BUSH

(a) Apply MP grease to the inside of a new turn over bush.
(b) Install the turn over bush to the clutch pedal support.



7. INSTALL TURN OVER SPRING SEAT COMPRESSION SPRING

(a) Apply MP grease to the inside of the turn over bush.
(b) Install the turn over bush to the clutch pedal.
(c) Install the spring to the clutch pedal and clutch pedal support.

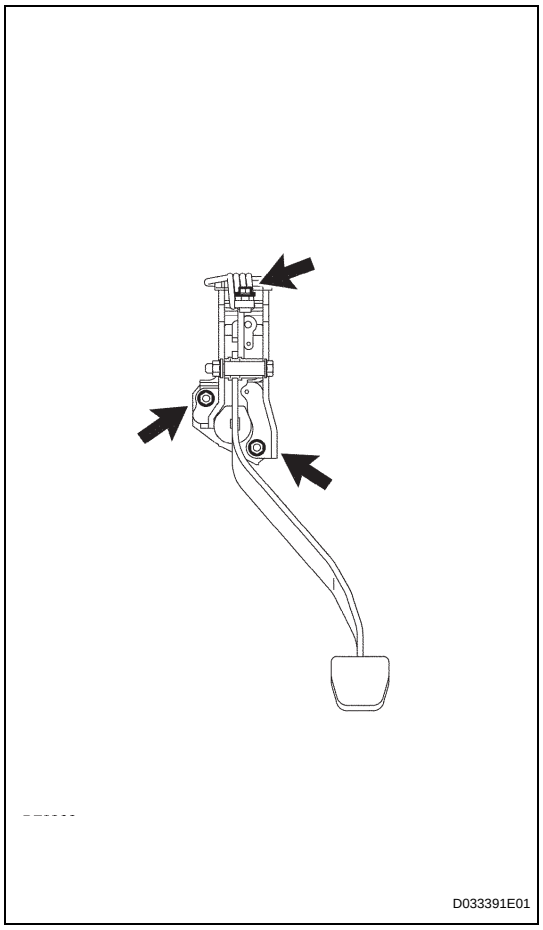


8. INSTALL CLUTCH SWITCH ASSEMBLY

(a) Install the clutch switch to the clutch pedal with the nut.
Torque: 16 N*m (160 kgf*cm, 12 ft.*lbf)

9. INSTALL CLUTCH START SWITCH ASSEMBLY

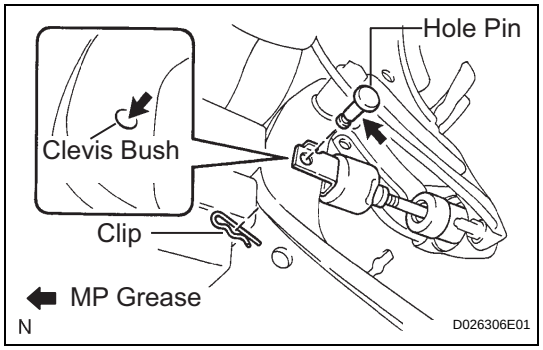
(a) Install the clutch start switch to the clutch pedal support with the nut.
Torque: 16 N*m (160 kgf*cm, 12 ft.*lbf)



INSTALLATION

1. INSTALL CLUTCH PEDAL SUB-ASSEMBLY

(a) Install the clutch pedal support to the vehicle with the 2 nuts and bolt.
Torque: 24 N*m (241 kgf*cm, 17 ft.*lbf) for bolt
Torque: 12 N*m (120 kgf*cm, 9 ft.*lbf) for nut



2. INSTALL CLUTCH MASTER CYLINDER PUSH ROD CLEVIS HOLE PIN

(a) Apply MP grease to the contact surface of the hole pin and clevis bush.
(b) Connect the clevis to the clutch pedal with the hole pin.
HINT:
Install the hole pin from the right side of the vehicle.
(c) Install the clip to the hole pin.

3. INSTALL CLUTCH PEDAL SPRING

4. CONNECT CONNECTOR

(a) Connect the clutch start switch connector.
(b) Connect the clutch switch connector.

5. INSTALL INSTRUMENT PANEL SUB-ASSEMBLY UPPER (See page IP-9)

6. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSEMBLY

(a) Inspect and adjust the clutch pedal (see page CL-1).

7. INSTALL NO. 1 INSTRUMENT PANEL AIRBAG ASSEMBLY LOWER (See page IP-22)

8. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

9. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

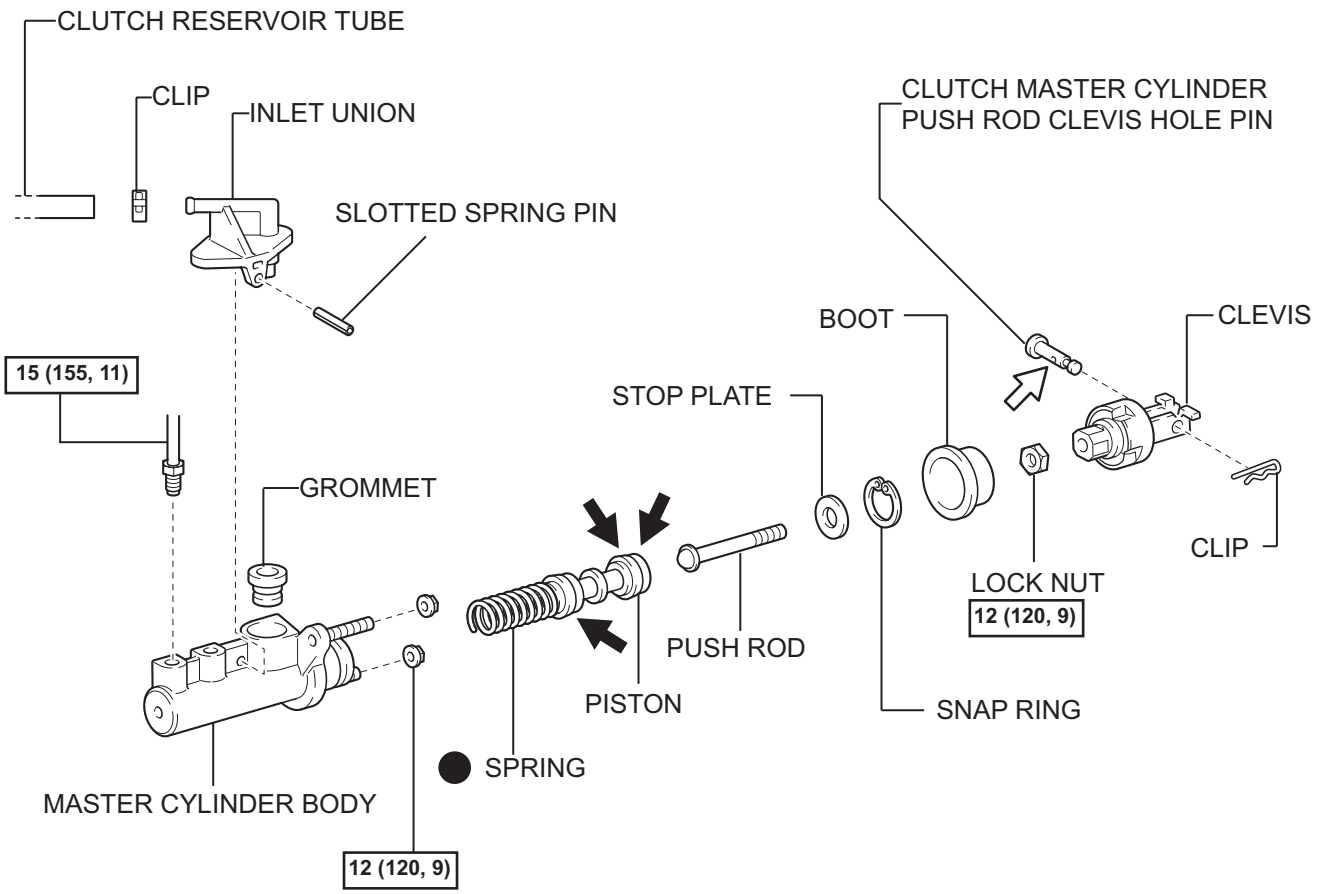
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

10. CHECK SRS WARNING LIGHT

(a) Check SRS warning light (see page RS-11).

CLUTCH MASTER CYLINDER

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

⬅ Lithium soap base glycol grease

⇦ MP grease

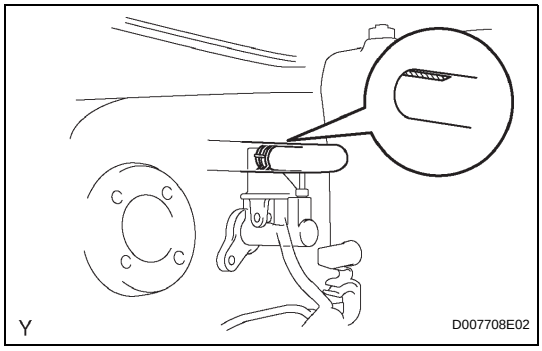
P

C113294E02

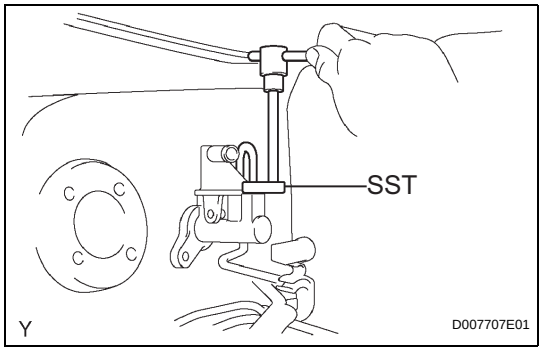
CL

REMOVAL

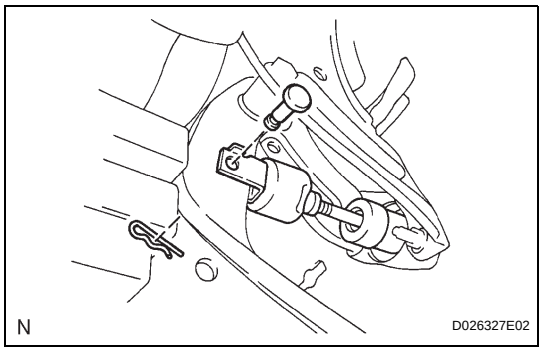
1. **DRAIN BRAKE FLUID**
   NOTICE:
   Wash brake fluid off immediately if it adheres to any painted surface.
2. **REMOVE BRAKE MASTER CYLINDER SUB-ASSEMBLY**
   (a) Remove the master cylinder (see page BR-12).
3. **REMOVE BRAKE BOOSTER ASSEMBLY**
   (a) Remove the booster (see page BR-19).
4. **DISCONNECT CLUTCH RESERVOIR TUBE**
   (a) Loosen the clip and disconnect the clutch reservoir tube from the clutch master cylinder.
   HINT:
   Use a container to catch the fluid.



5. **DISCONNECT CLUTCH MASTER CYLINDER TO FLEXIBLE HOSE TUBE**
   (a) Using SST, disconnect the flexible hose tube.
   SST 09023-00101
   HINT:
   Use a container to catch the fluid.

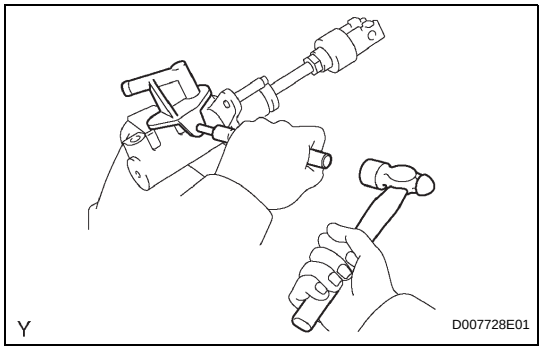


6. **REMOVE CLUTCH MASTER CYLINDER PUSH ROD CLEVIS HOLE PIN**
   (a) Remove the clip and hole pin.
7. **REMOVE CLUTCH MASTER CYLINDER ASSEMBLY**
   (a) Remove the 2 nuts and clutch master cylinder.



DISASSEMBLY

1. **REMOVE CLUTCH MASTER CYLINDER KIT**
   (a) Using a pin punch and hammer, tap out the slotted spring pin.
   (b) Remove the inlet union and grommet.
   (c) Loosen the lock nut, and remove the clevis.
   (d) Remove the lock nut from the push rod.
   (e) Remove the boot from the cylinder body.



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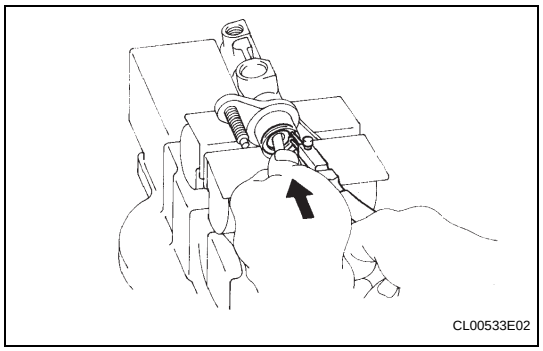
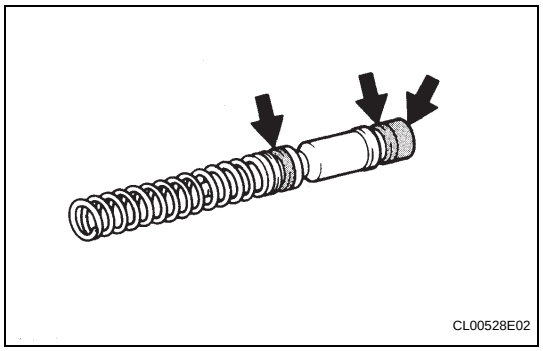

CL00533E02

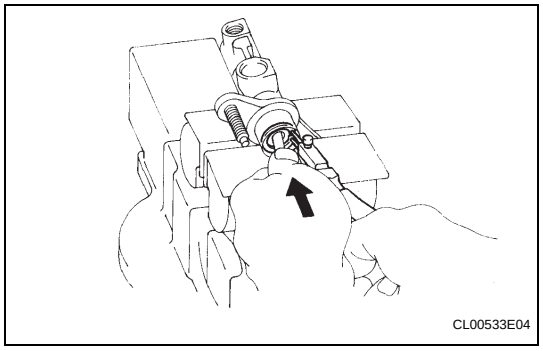
(f) Using snap ring pliers, remove the snap ring while pushing on the piston rod.
(g) Remove the push rod from the cylinder body.
NOTICE:
The piston may pop up out of the cylinder body. Therefore, slowly remove the push rod from the cylinder body.
(h) Remove the stop plate and push rod.
(i) Remove the piston with the spring from the cylinder.
NOTICE:
Be careful not to damage the inside of the cylinder body.


CL00528E02

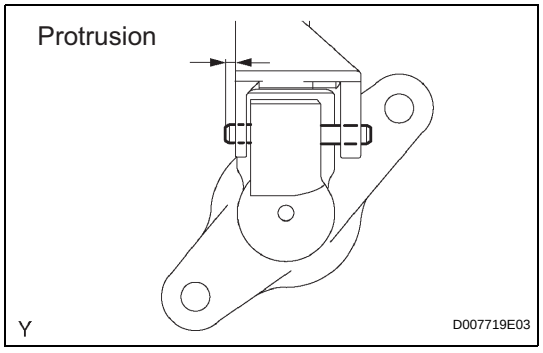
REASSEMBLY

1. INSTALL CLUTCH MASTER CYLINDER KIT

(a) Coat the parts indicated by arrows with lithium soap base glycol grease.
(b) Install the piston with the spring into the cylinder.
NOTICE:
Be careful not to damage the inside of the cylinder body.
(c) Install the stop plate to the push rod.
(d) Install the push rod to the cylinder body.


CL00533E04

(e) Using snap ring pliers, install the snap ring while pushing on the piston rod.
(f) Install the boot to the cylinder body.
(g) Install the lock nut to the push rod.
(h) Temporarily install the clevis with the lock nut to the push rod.
(i) Install the inlet union and a new grommet.



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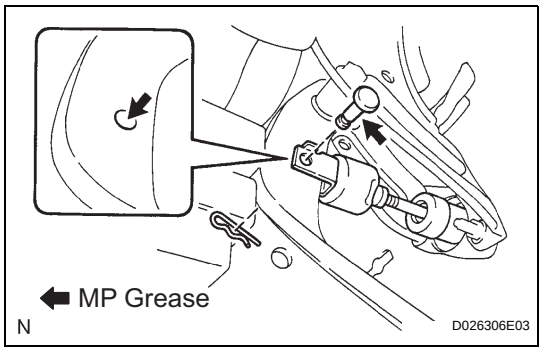
(j) Using a pin punch and hammer, tap in the slotted spring pin.
Standard protrusion:
1.5 to 3.5 mm (0.059 to 0.138 in.)

CL

INSTALLATION

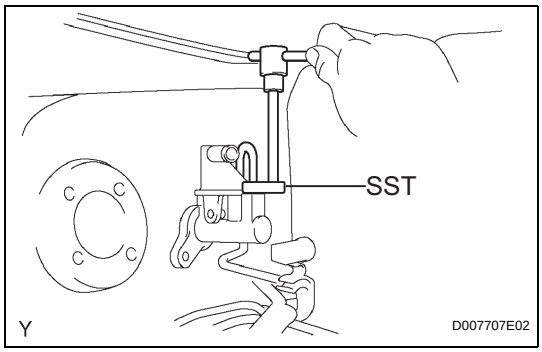
1. INSTALL CLUTCH MASTER CYLINDER ASSEMBLY

(a) Install the clutch master cylinder with the 2 nuts.
Torque: 12 N*m (120 kgf*cm, 9 ft.*lbf)



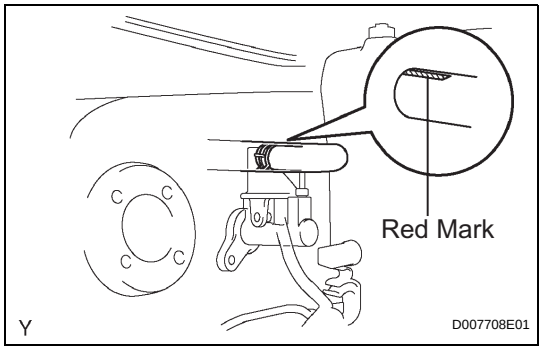
2. INSTALL CLUTCH MASTER CYLINDER PUSH ROD CLEVIS HOLE PIN

(a) Apply MP grease to the contact surface of the hole pin and clevis bush.
(b) Connect the clevis to the clutch pedal with the hole pin.
HINT:
Install the hole pin from the right side of the vehicle.
(c) Install the clip to the hole pin.



3. CONNECT CLUTCH MASTER CYLINDER TO FLEXIBLE HOSE TUBE

(a) Using SST, connect the flexible hose tube.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)



4. CONNECT CLUTCH RESERVOIR TUBE

(a) Connect the clutch reservoir tube to the clutch master cylinder with the clip.
NOTICE:
Face the red mark upward.

5. INSTALL BRAKE BOOSTER ASSEMBLY

(a) Install the booster (see page BR-21).

6. INSTALL BRAKE MASTER CYLINDER SUB-ASSEMBLY

(a) Install the master cylinder (see page BR-15).

7. BLEED AIR FROM BRAKE LINE

(a) Bleed the air from brake line (see page BR-3).

8. BLEED AIR FROM CLUTCH PIPE LINE

(a) Fill the brake reservoir with brake fluid and bleed air from the clutch system.
Torque: 8.4 N*m (85 kgf*cm, 74 in.*lbf)

9. CHECK AND ADJUST BRAKE PEDAL HEIGHT (See page BR-7)

10. INSPECT AND ADJUST CLUTCH PEDAL SUB-ASSEMBLY (See page CL-5)

11. BLEED AIR FROM BRAKE LINE

12. INSPECT FOR BRAKE FLUID LEAK

HINT:
- Inspect for leak in the brake system.

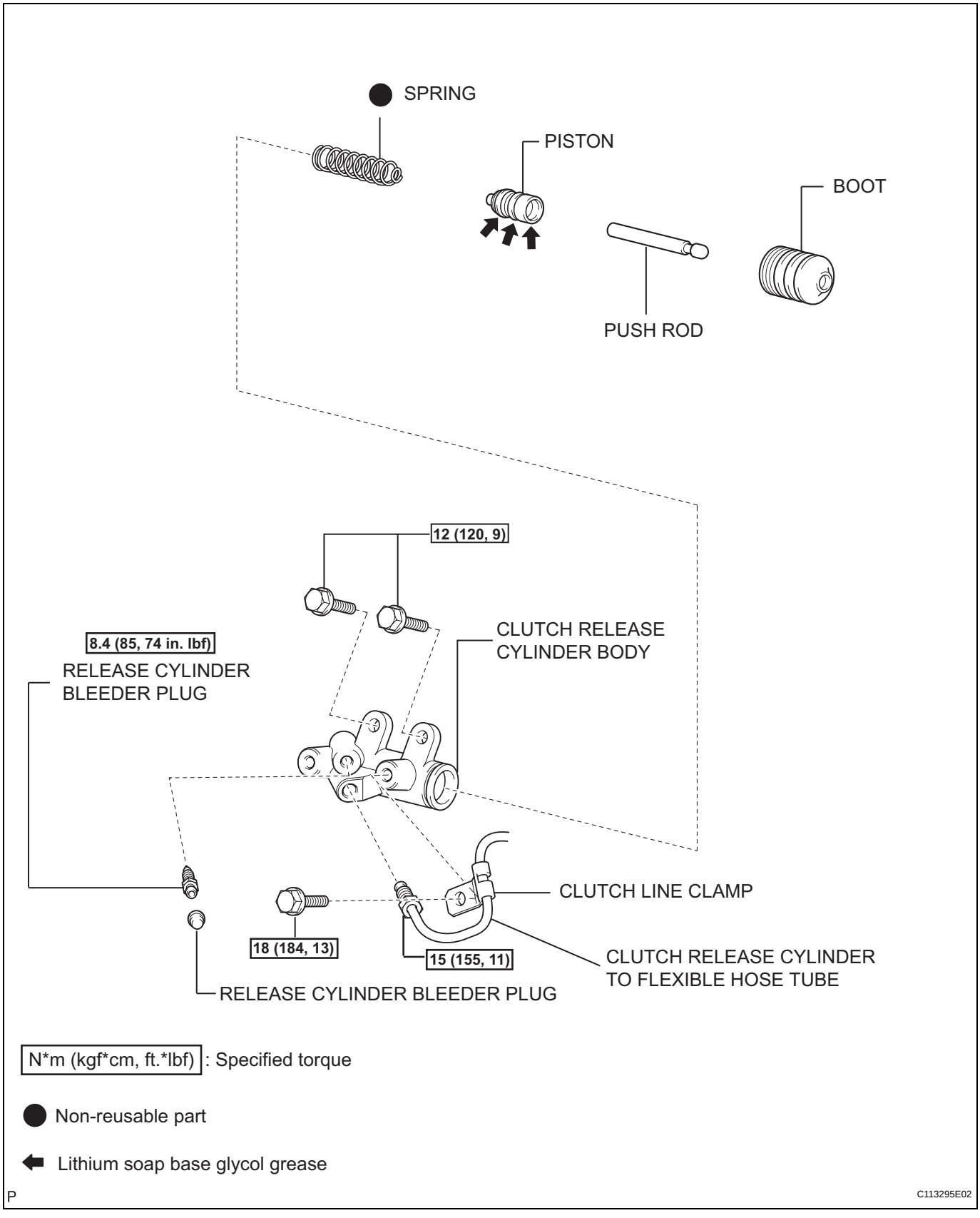
CL

- Inspect for leak in the clutch system.

13. CHECK FLUID LEVEL IN RESERVOIR

CLUTCH RELEASE CYLINDER

COMPONENTS



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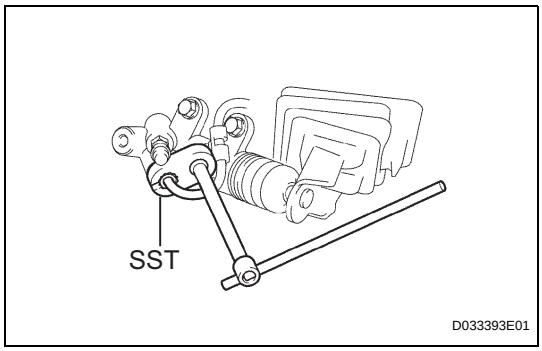
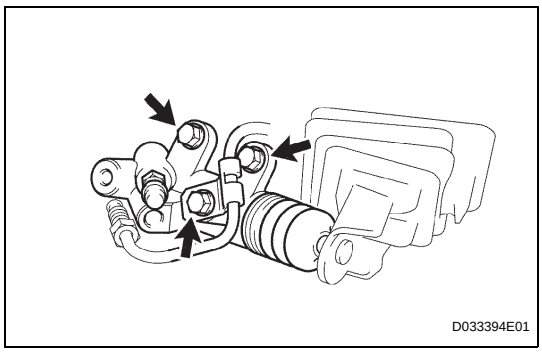


REMOVAL

1. DISCONNECT CLUTCH RELEASE CYLINDER TO FLEXIBLE HOSE TUBE

(a) Using SST, disconnect the flexible hose tube.
SST 09023-00101
NOTICE:
Use a container to catch the fluid.



2. REMOVE CLUTCH RELEASE CYLINDER ASSEMBLY

(a) Remove the 3 bolts and clutch release cylinder.

DISASSEMBLY

1. REMOVE CLUTCH RELEASE CYLINDER KIT

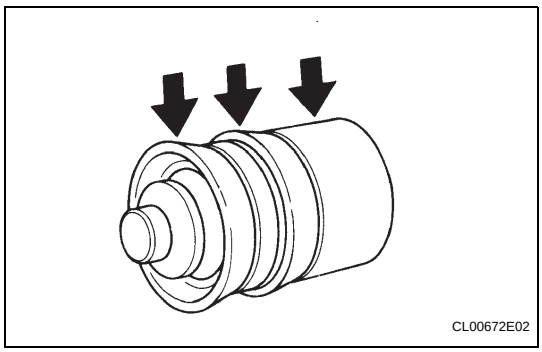
(a) Remove the boot from the cylinder body.
(b) Remove the push rod from the cylinder body.
(c) Remove the piston from the cylinder body.
NOTICE:
Be careful not to damage the inside of the cylinder body.
(d) Remove the spring from the cylinder body.
(e) Remove the bleeder plug cap from the bleeder plug.

2. REMOVE RELEASE CYLINDER BLEEDER PLUG

REASSEMBLY

1. INSTALL RELEASE CYLINDER BLEEDER PLUG
Torque: 8.4 N*m (85 kgf*cm, 74 in.*lbf)

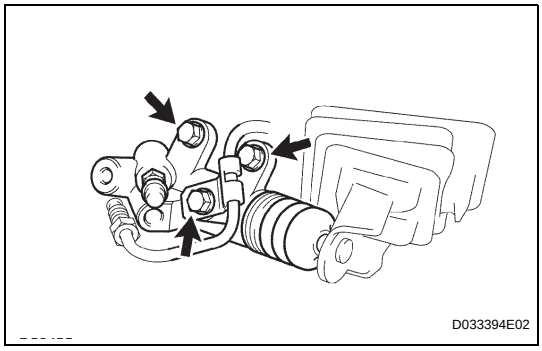
2. INSTALL CLUTCH RELEASE CYLINDER KIT
(a) Install the bleeder plug cap to the bleeder plug.
(b) Install a new spring to the cylinder body.



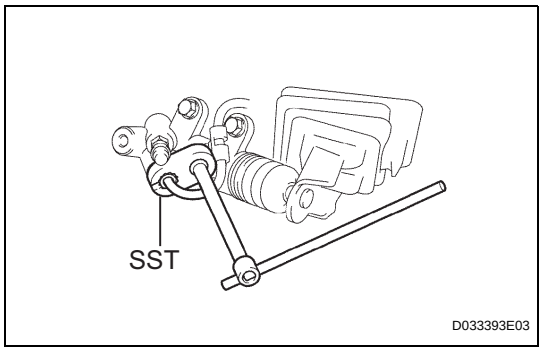
(c) Coat the piston with lithium soap base glycol grease, as shown in the illustration.
(d) Install the piston to the cylinder body.
NOTICE:
Be careful not to damage the inside of the cylinder body.
(e) Install the push rod to the cylinder body.
(f) Install the boot to the cylinder body.

INSTALLATION

1. INSTALL CLUTCH RELEASE CYLINDER ASSEMBLY
(a) Install the clutch release cylinder with the 2 bolts.
Torque: 12 N*m (120 kgf*cm, 9 ft.*lbf)
(b) Install the flexible hose tube with the bolt.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)



2. CONNECT CLUTCH RELEASE CYLINDER TO FLEXIBLE HOSE TUBE
(a) Using SST, connect the flexible hose tube.
SST 09023-00101
Torque: 15 N*m (155 kgf*cm, 11 ft.*lbf)



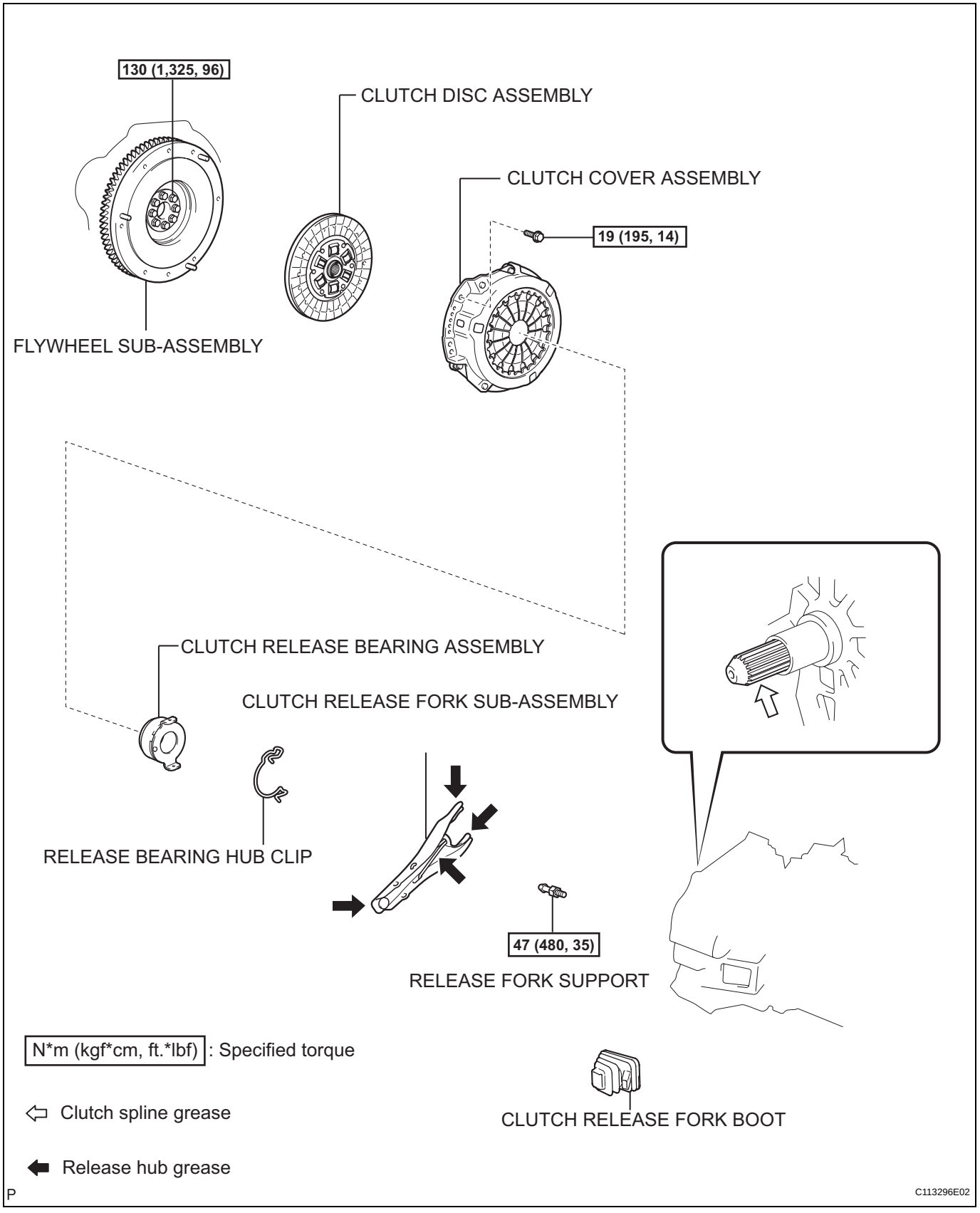
3. BLEED AIR FROM CLUTCH PIPE LINE
(a) Fill the brake reservoir with brake fluid and bleed air from the clutch system.
Torque: 8.4 N*m (85 kgf*cm, 74 in.*lbf)

4. INSPECT FOR CLUTCH FLUID LEAK

CL

CLUTCH UNIT

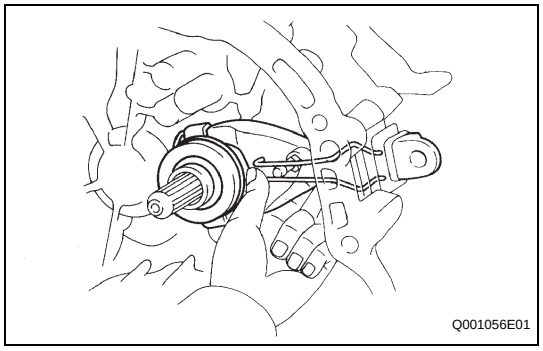
COMPONENTS



CL

REMOVAL

1. REMOVE MANUAL TRANSAXLE ASSEMBLY
(a) Remove the transaxle (see page MX-18).



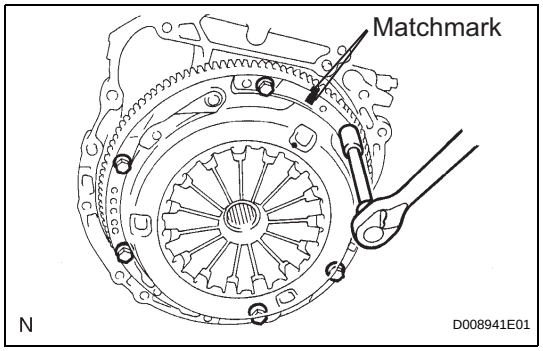
2. REMOVE CLUTCH RELEASE FORK SUB-ASSEMBLY
(a) Remove the clutch release fork with the clutch release bearing from the transaxle.

3. REMOVE CLUTCH RELEASE BEARING ASSEMBLY
(a) Remove the clutch release bearing from the clutch release fork.

4. REMOVE RELEASE BEARING HUB CLIP

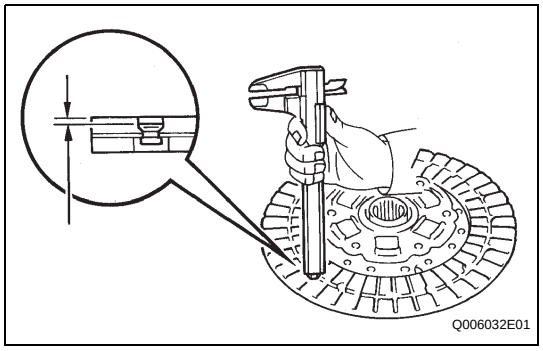
5. REMOVE CLUTCH RELEASE FORK BOOT

6. REMOVE RELEASE FORK SUPPORT
(a) Remove the release fork support from the transaxle.

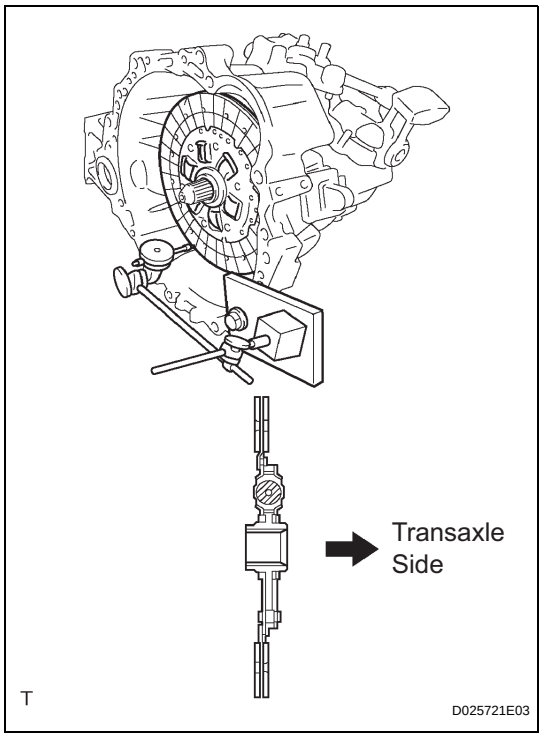


7. REMOVE CLUTCH COVER ASSEMBLY
(a) Put matchmark on the clutch cover and flywheel.
(b) Loosen each set bolt one turn at a time until spring tension is released.
(c) Remove the set bolts, and pull off the clutch cover.
NOTICE:
Do not drop the clutch disc.

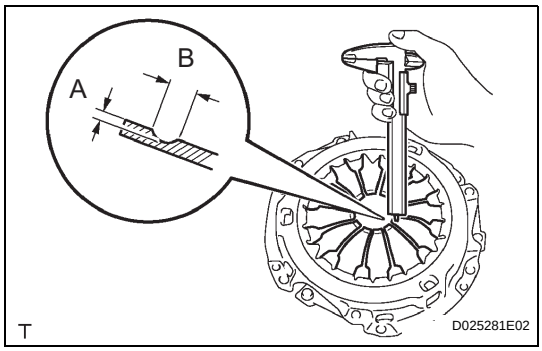
8. REMOVE CLUTCH DISC ASSEMBLY
NOTICE:
Keep the lining part of the clutch disc, the pressure plate and surface of the flywheel away from oil and foreign matter.



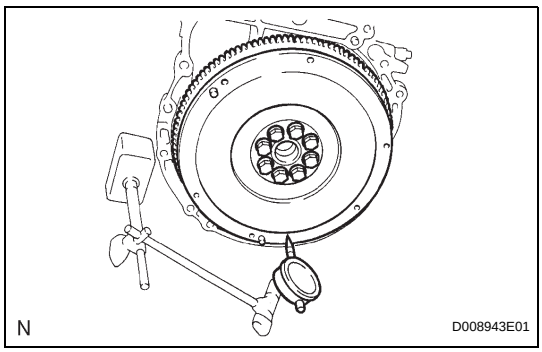
9. INSPECT CLUTCH DISC ASSEMBLY
(a) Using a vernier caliper, measure the rivet head depth.
Minimum rivet depth:
0.3 mm (0.012 in.)
If the depth is less than the minimum, replace the clutch disc assembly.
(b) Install the clutch disc to the transaxle.
NOTICE:
Take care not to insert the clutch disc assembly in the wrong direction.



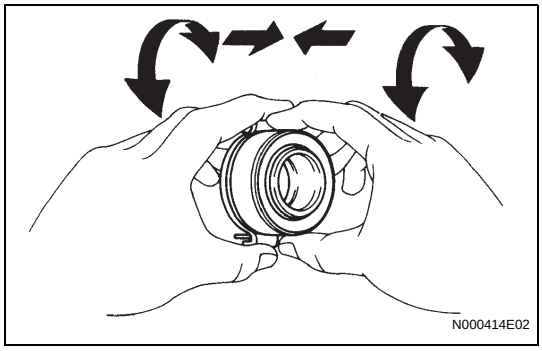
(c) Using a dial indicator, measure the clutch disc runout.
Maximum runout:
0.8 mm (0.031 in.)
If the runout is greater than the maximum, replace the clutch disc assembly.



10. INSPECT CLUTCH COVER ASSEMBLY
(a) Using a vernier caliper, measure the diaphragm spring for the depth and width of wear.
Maximum wear:
A (Depth):
0.5 mm (0.020 in.)
B (Width):
6.0 mm (0.236 in.)
If the wear is greater than the maximum, replace the clutch cover assembly.

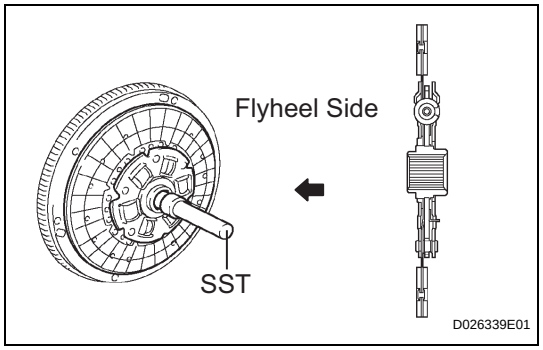


11. INSPECT FLYWHEEL SUB-ASSEMBLY
(a) Using a dial indicator, measure the flywheel runout.
Maximum runout:
0.1 mm (0.004 in.)
If the runout is greater than the maximum, replace the flywheel sub-assembly.



12. 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 (contact surfaces with the clutch cover) while applying force in the axial direction.
(b) Inspect the clutch release bearing for damage or wear.
HINT:
If necessary, replace the release bearing assembly.

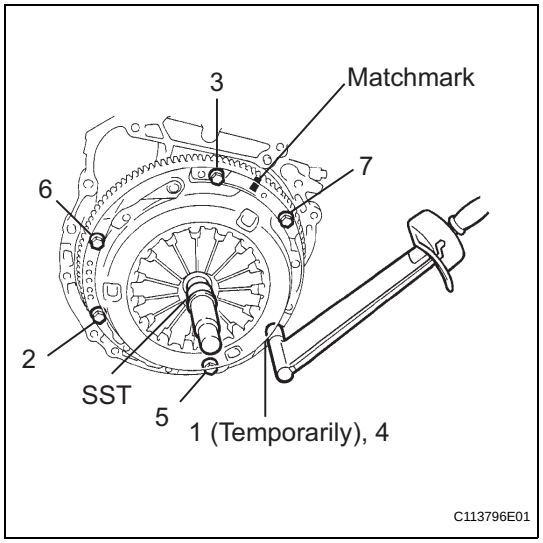
CL



INSTALLATION

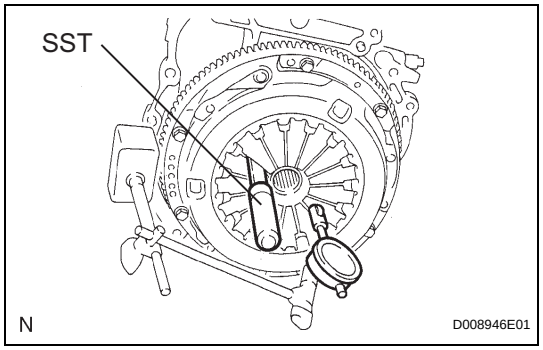
1. INSTALL CLUTCH DISC ASSEMBLY

(a) Insert SST in the clutch, and then insert them in the flywheel.
SST 09301-00220
NOTICE:
Take care not to insert the clutch disc in the wrong direction.



2. INSTALL CLUTCH COVER ASSEMBLY

(a) Align the matchmarks on the clutch cover and flywheel.
(b) Install and tighten the 6 bolts as described below.
(1) Determine the first bolt to be tightened by choosing the bolt closest to the knock pin.
(2) Uniformly tighten the 6 bolts relative to the position of the first bolt to be tightened. Use the illustration as a reference.
Torque: 19 N*m (195 kgf*cm, 14 ft.*lbf)
HINT:
- Evenly tighten the bolts by following the order shown in the illustration.
- Tighten the bolts after checking that the disc is in the center by lightly moving the SST up and down, left and right.

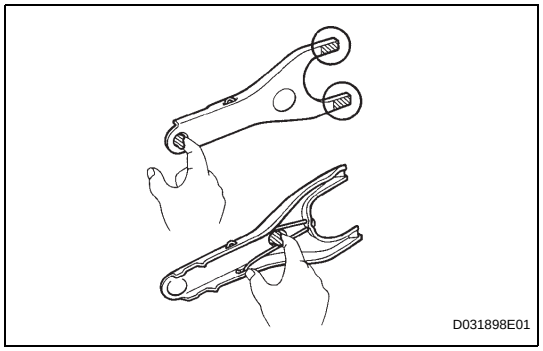


3. INSPECT AND ADJUST CLUTCH COVER ASSEMBLY

(a) Using a dial indicator with a roller instrument, measure the diaphragm spring tip alignment.
Maximum non-alignment:
0.5 mm (0.020 in.)
If the alignment is greater than the maximum, adjust the diaphragm spring tip alignment using SST.
SST 09333-00013

4. INSTALL RELEASE FORK SUPPORT

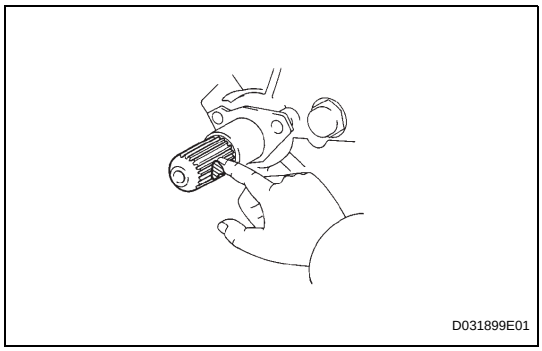
(a) Install the release fork support to the transaxle.
Torque: 47 N*m (480 kgf*cm, 35 ft.*lbf)



5. INSTALL CLUTCH RELEASE FORK SUB-ASSEMBLY

(a) Apply release hub grease to the contact surfaces of, the release fork and release bearing assembly, release fork and push rod, and release fork and support.
Sealant:
Toyota Genuine Release Hub Grease, or equivalent
(b) Install the release fork to the release bearing.
(c) Install the release bearing hub clip.

CL



6. INSTALL CLUTCH RELEASE BEARING ASSEMBLY

(a) Apply clutch spline grease to the input shaft spline as shown in the illustration.

Sealant:

Toyota Genuine Clutch Spline Grease, or equivalent

(b) Install the release fork with the release bearing assembly to the manual transaxle.

NOTICE:

After installation, move the fork back and forth to check that the release bearing slides smoothly.

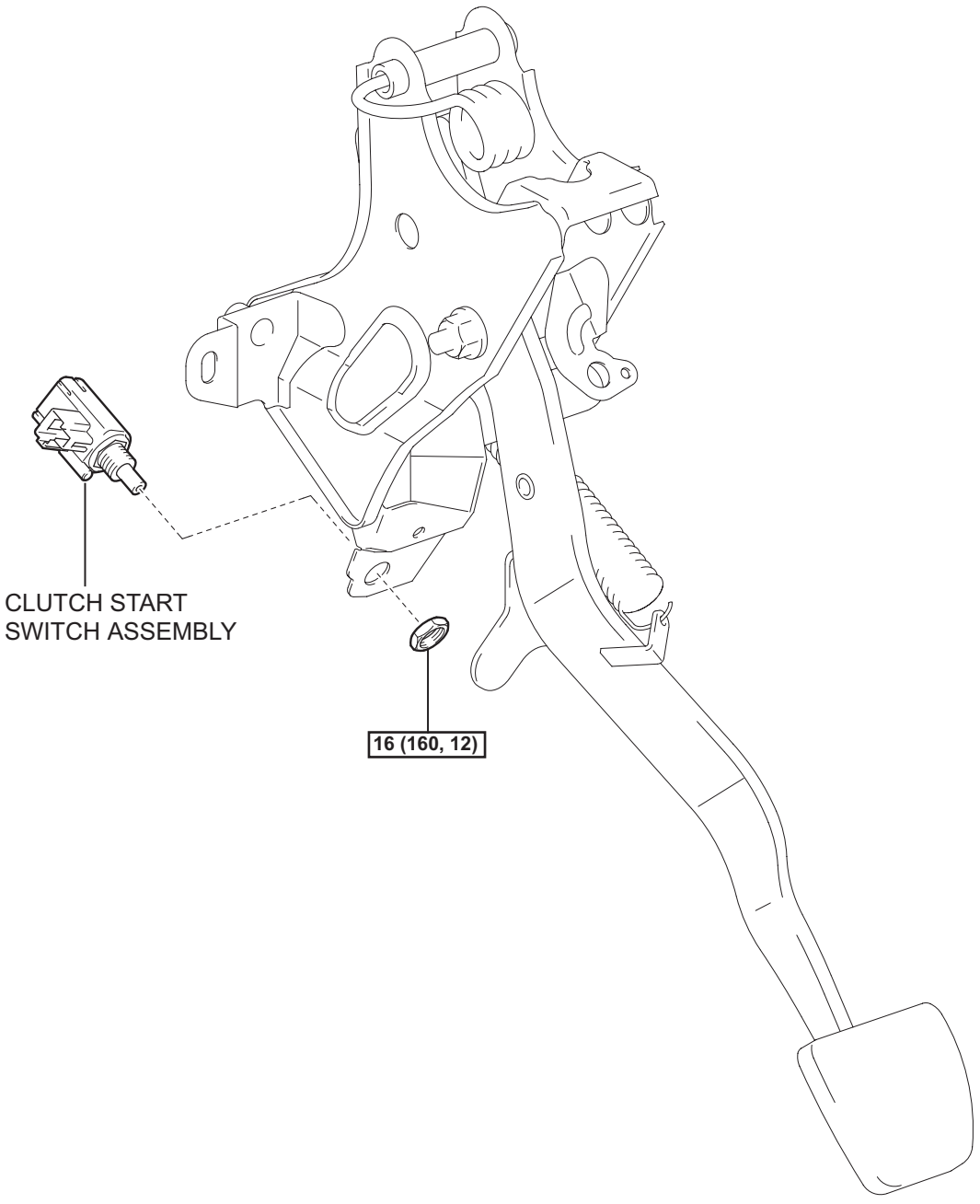
7. INSTALL CLUTCH RELEASE FORK BOOT

8. INSTALL MANUAL TRANSAXLE ASSEMBLY

(a) Install the transaxle (see page MX-21).

CLUTCH START SWITCH

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

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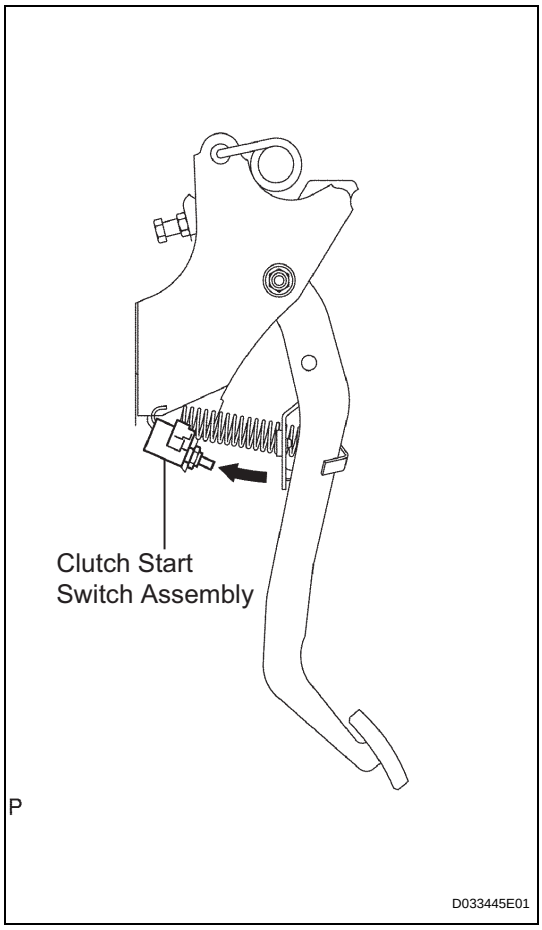


ON-VEHICLE INSPECTION

1. CHECK 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, inspect and replace the clutch start switch assembly.

REMOVAL

1. REMOVE CLUTCH START SWITCH ASSEMBLY

(a) Disconnect the clutch start switch connector.

(b) Remove the nut and clutch start switch from the clutch pedal support.

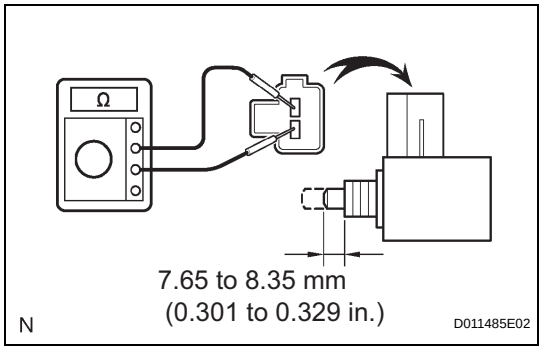
INSPECTION

1. INSPECT CLUTCH START SWITCH ASSEMBLY

(a) Check the continuity between the terminals when the switch is ON and OFF.

OK

Switch Position	Specified Condition
ON (pushed)	10 Ω or less
OFF (not pushed)	10 kΩ or more



INSTALLATION

1. INSTALL CLUTCH START SWITCH ASSEMBLY

(a) Install the clutch start switch with the nut.
Torque: 16 N*m (160 kgf*cm, 12 ft.*lbf)

(b) Connect the clutch start switch connector.

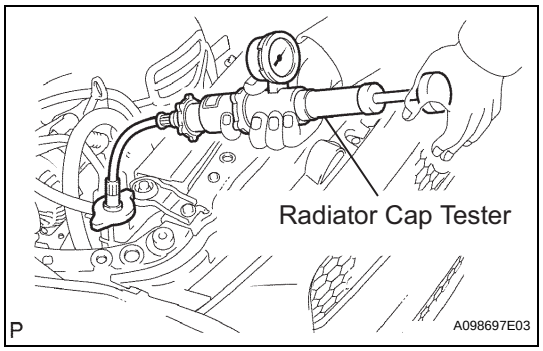
COOLING SYSTEM

ON-VEHICLE INSPECTION

1. CHECK COOLING SYSTEM FOR LEAKAGE

(a) Remove the radiator cap.

CAUTION:
To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.



(b) Fill the radiator with coolant, and then attach a radiator cap tester.

(c) Warm up the engine.

(d) Pump the radiator cap tester to 118 kPa (1.2 kgf/cm^2, 17.1 psi), and then check that the pressure does not drop.
If the pressure drops, check the hoses, radiator and water pump for leakage. If there are no signs of external coolant leaks, check the heater core, cylinder block and head.

(e) Reinstall the radiator cap.

2. CHECK ENGINE COOLANT LEVEL OF RESERVOIR

(a) The engine coolant should be between the LOW and FULL lines when the engine is cold.
If low, check for leakage and add Toyota Super Long Life Coolant or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology up to the FULL line.

3. CHECK ENGINE COOLANT QUALITY

(a) Remove the radiator cap.

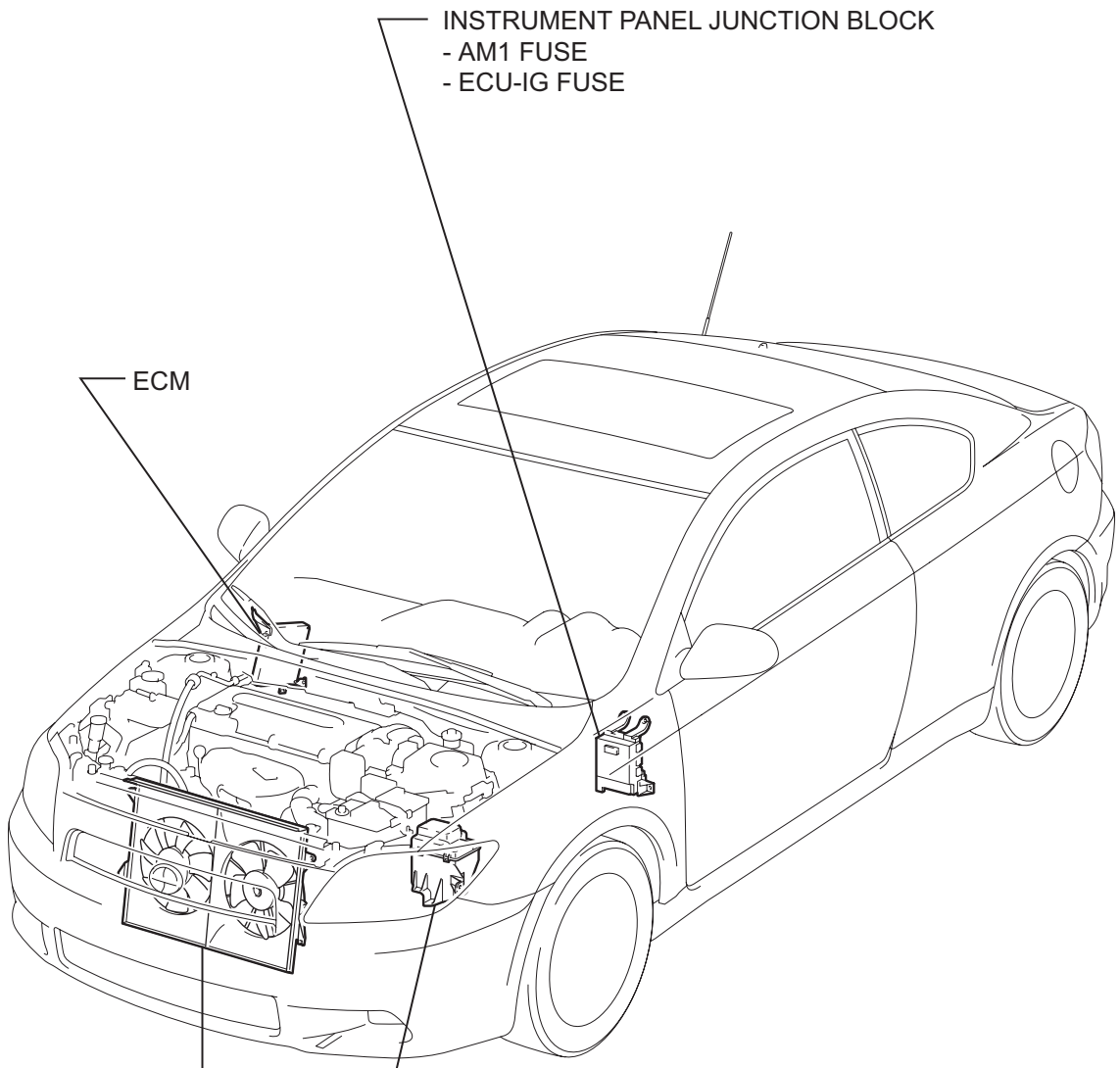
CAUTION:
To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

(b) Check for any excessive deposits of rust or scale around the radiator cap and radiator filler hole; the coolant should be free of oil.
If excessively dirty, replace the coolant.

(c) Reinstall the radiator cap.

COOLING FAN SYSTEM

PARTS LOCATION



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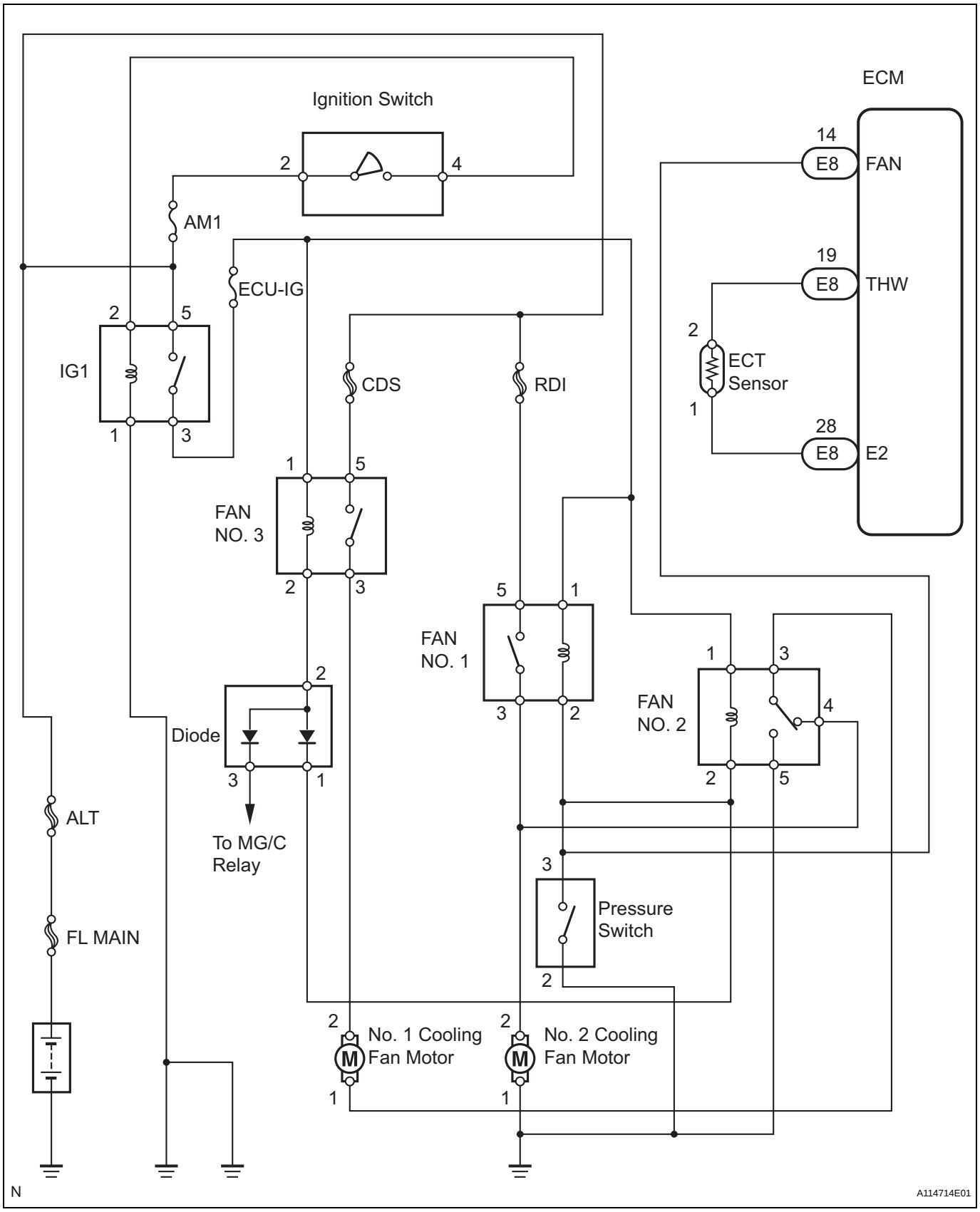
SYSTEM DIAGRAM



CO

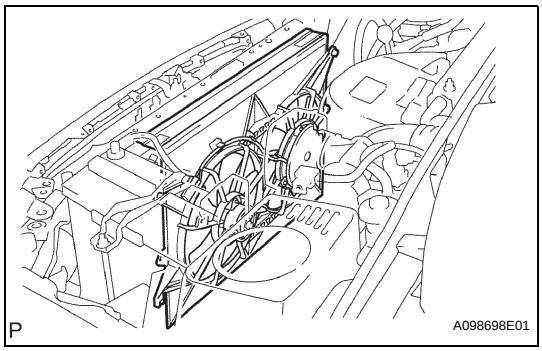
ON-VEHICLE INSPECTION

HINT:
It is normal for the cooling fan to sometimes rotate when the ignition switch is turned from ACC to ON.

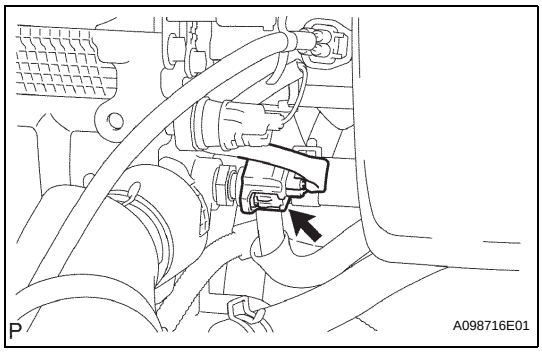
1. CHECK COOLING FAN OPERATION AT LOW TEMPERATURES (Below 94°C (201°F))

(a) Turn the ignition switch ON with the A/C switch OFF.

(b) Check that the cooling fan stops.
If not, check the cooling fan relays and engine coolant temperature sensor, and then check for disconnection of the connector or wire break between the cooling fan relay and engine coolant temperature sensor.

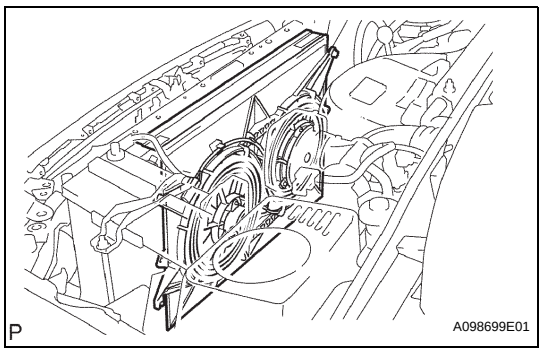


(c) Disconnect the engine coolant temperature sensor connector.



(d) Check that the cooling fan rotates.
If not, check the fuses, cooling fan relays, ECM and cooling fan, and then check for a short circuit between the cooling fan relay and engine coolant temperature sensor.

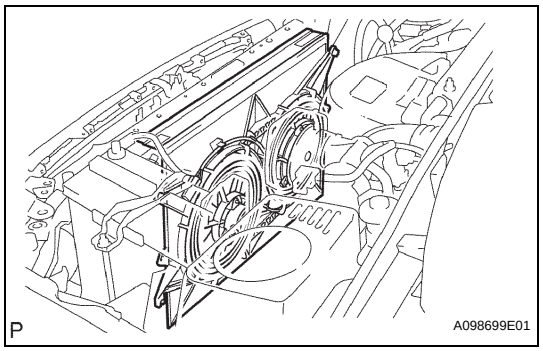
(e) Reconnect the engine coolant temperature sensor connector.



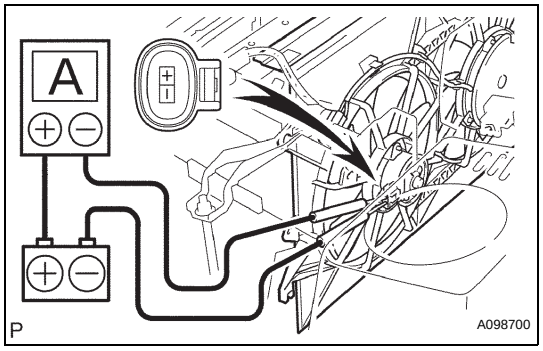
2. CHECK COOLING FAN OPERATION AT HIGH TEMPERATURES (Above 96°C (205°F))

(a) Start the engine, and then raise the coolant temperature to above 96°C (205°F).
HINT:
Coolant temperature is the value detected by the engine coolant temperature sensor on the cylinder head.

(b) Check that the A/C switch is OFF.

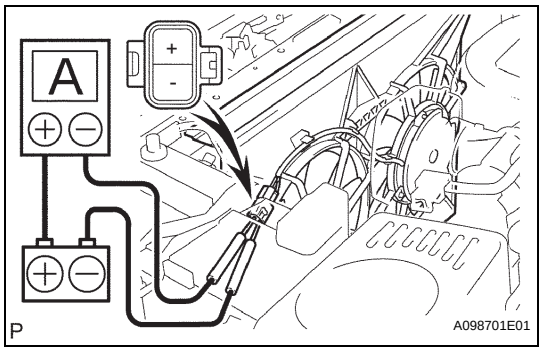


(c) Check that the cooling fan rotates.
If not, replace the engine coolant temperature sensor.



3. INSPECT NO. 1 COOLING FAN

(a) Disconnect the No. 1 fan connector.
(b) Connect the battery and ammeter to the No. 1 fan connector.
(c) Check that the No. 1 fan rotates smoothly, and then check the reading on the ammeter.
Standard amperage:
5.2 to 8.2 A at 20°C (68°F)
If the result is not as specified, replace the cooling fan motor.
(d) Reconnect the No. 1 fan connector.



4. INSPECT NO. 2 COOLING FAN

(a) Disconnect the No. 2 fan connector.
(b) Connect the battery and ammeter to the No. 2 fan connector.
(c) Check that the No. 2 fan rotates smoothly, and then check the reading on the ammeter.
Standard amperage:
5.2 to 8.2 A at 20°C (68°F)
If the result is not as specified, replace the cooling fan motor.
(d) Reconnect the No. 2 fan connector.

CO

COOLANT

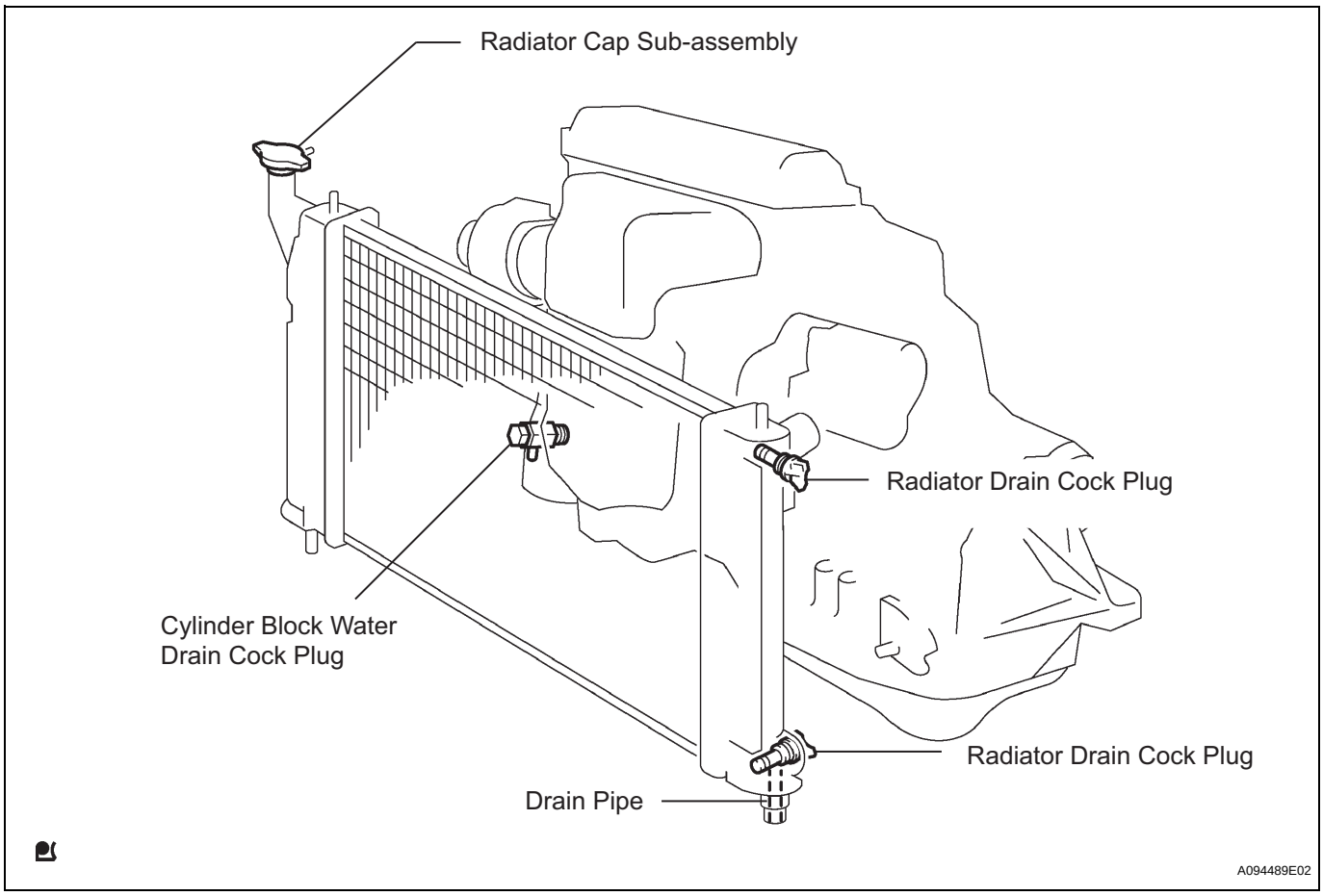
ON-VEHICLE INSPECTION

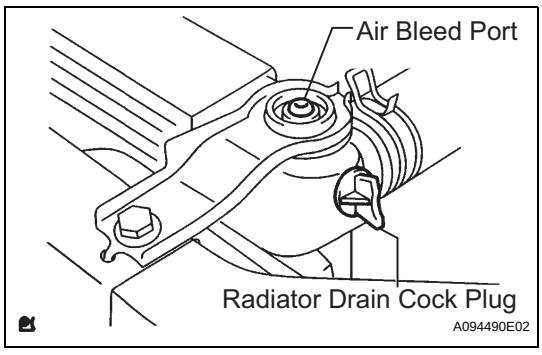
1. DRAIN ENGINE COOLANT

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

(a) Loosen the radiator drain cock plug (lower side) and water drain cock plug, and then drain the coolant.
(b) Remove the radiator cap.
(c) Close the radiator drain cock plug (lower side).
(d) Tighten the water drain cock plug.
Torque: 12.7 N*m (129 kgf*cm, 9 ft.*lbf)





2. ADD ENGINE COOLANT

(a) Loosen the radiator drain cock plug (upper side) by 3 turns.
(b) Connect a vinyl tube to the air bleed port.
(c) Fill the radiator with coolant from the fill port. Add coolant until it overflows from the air bleed port and it remains inside the vinyl tube, and then tighten the radiator drain cock plug (upper side).
Standard capacity:
Manual transaxle:
6.8 liters (7.2 US qts, 6.0 Imp. qts)

Automatic transaxle:
6.7 liters (7.1 US qts, 5.9 Imp. qts)
Engine Coolant:
Toyota Super Long Life Coolant or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology (coolant with long-life hybrid organic acid technology consists of a combination of low phosphates and organic acids).
NOTICE:
Do not substitute water for engine coolant.
HINT:
- Use of improper coolants may damage the engine cooling system.
- Use only Toyota Super Long Life Coolant or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology (coolant with long-life hybrid organic acid technology consists of a combination of low phosphates and organic acids).
- Toyota Super Long Life Coolant is premixed with 50% coolant and 50% deionized water. This coolant provides protection down to about -35°C (-31°F).

(d) Check the coolant level inside the radiator by pressing the inlet and outlet radiator hoses several times by hand. If the coolant level goes down, add coolant.
(e) Install the radiator cap securely.
(f) Slowly pour coolant into the radiator reservoir until it reaches the FULL line.
(g) Warm up the engine until the cooling fan operates.
(1) Set the air conditioning as follows while warming up the engine.

Item	Condition
Blower speed	Any setting except "OFF"
Set temperature	MAX HOT
Air conditioning switch	"OFF"

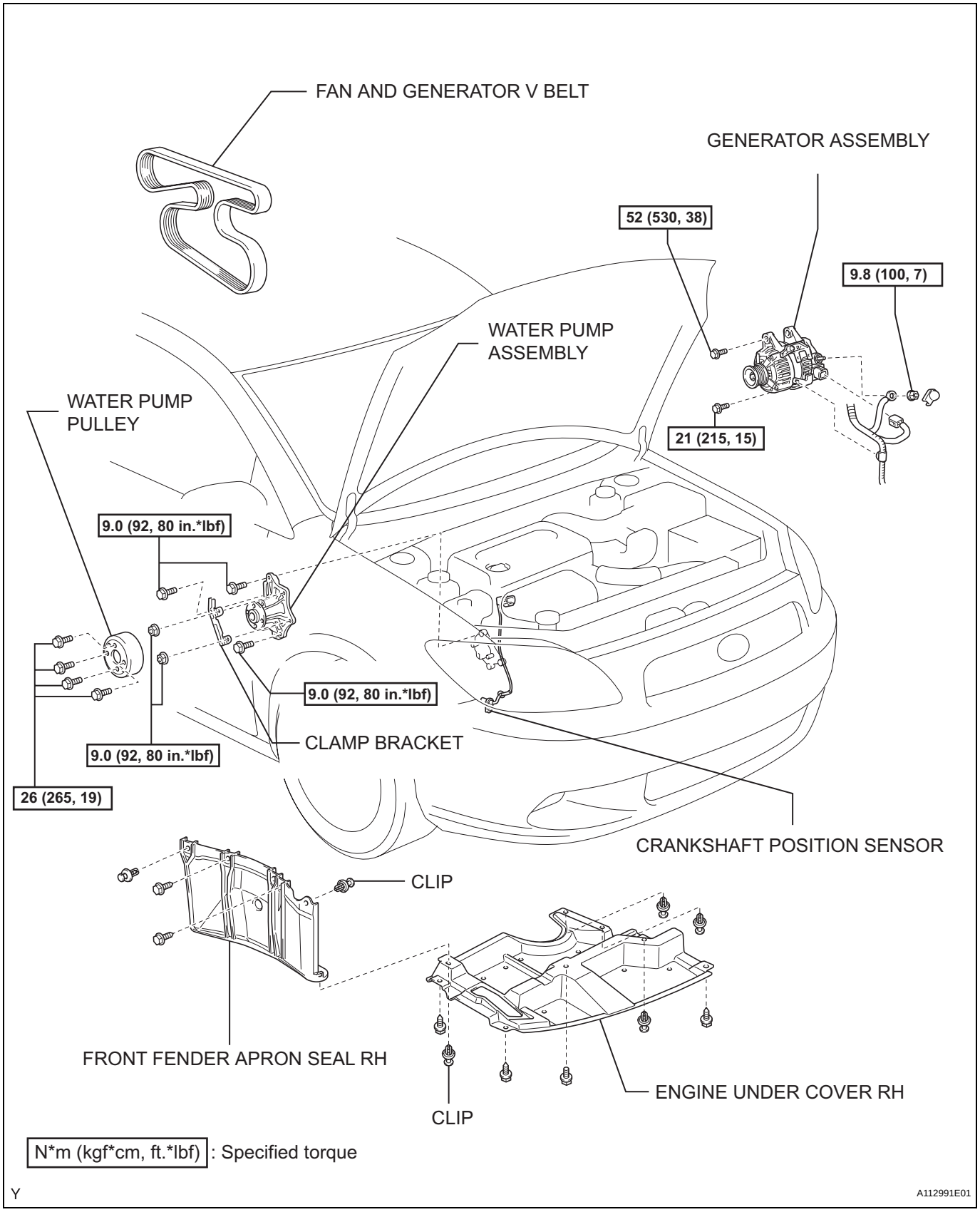
(2) Maintain the engine speed at 2,000 to 2,500 rpm and warm up the engine until the cooling fan operates.
(h) Press the inlet and outlet radiator hoses several times by hand while warming up the engine.
(i) Stop the engine and wait until the coolant cools down.
(j) Remove the radiator cap and check the coolant level inside the radiator.
(k) If the coolant level is below the full level, perform all of the "ADD ENGINE COOLANT" steps above and repeat the operation until the coolant level stays the full level.

(l) Recheck the coolant level inside the radiator reservoir tank. If it is below the full level, add coolant.

3. **CHECK FOR ENGINE COOLANT LEAKAGE (See page CO-1)**

WATER PUMP

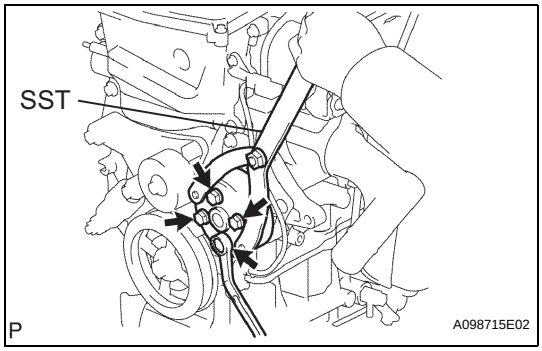
COMPONENTS



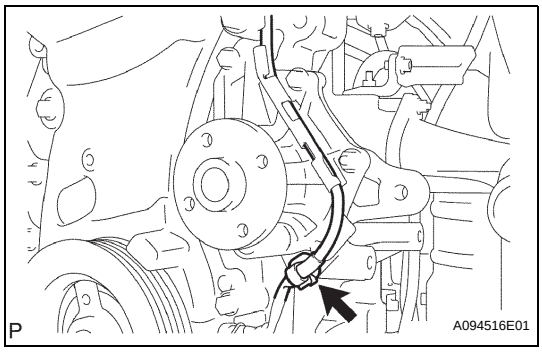
CO

REMOVAL

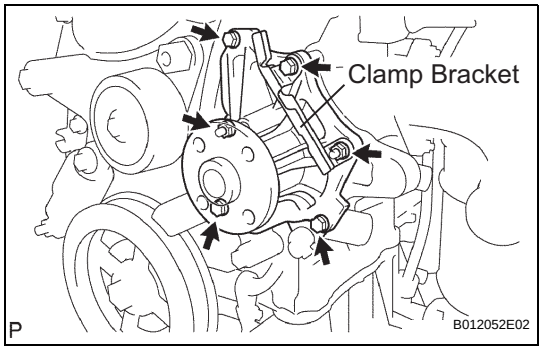
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **DRAIN ENGINE COOLANT (See page CO-6)**
3. **REMOVE FRONT FENDER APRON SEAL RH (See page CH-10)**
4. **REMOVE ENGINE UNDER COVER RH**
5. **REMOVE FAN AND GENERATOR V BELT (See page EM-6)**
6. **REMOVE GENERATOR ASSEMBLY (See page CH-10)**
7. **REMOVE WATER PUMP PULLEY**
   (a) Using SST, remove the 4 bolts and water pump pulley.
   SST 09960-10010 (09962-01000, 09963-00700)

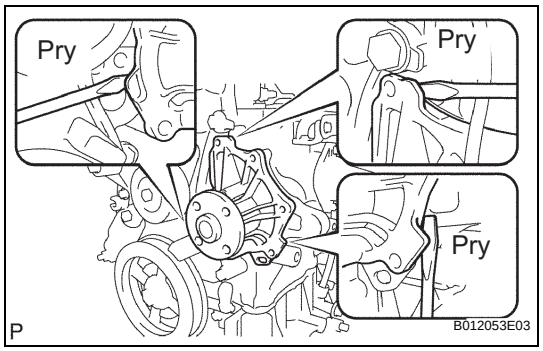


8. **REMOVE WATER PUMP ASSEMBLY**
   (a) Remove the clamp of the crankshaft position sensor from the water pump.
   (b) Disconnect the wire of the crankshaft position sensor from the clamp bracket.



   (c) Remove the 4 bolts, 2 nuts and clamp bracket.

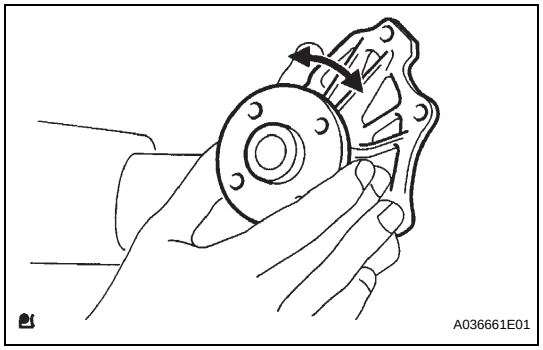




(d) Using a screwdriver, pry between the water pump and cylinder block, and then remove the water pump.

NOTICE:

Be careful not to damage the contact surface of the water pump and cylinder block.



INSPECTION

1. INSPECT WATER PUMP ASSEMBLY

(a) Visually check the drain hole coolant leakage.
If leakage is found, replace the water pump.

(b) Turn the pulley, and then check that the water pump bearing moves smoothly without making a click noise.
If it does not move smoothly, replace the water pump.

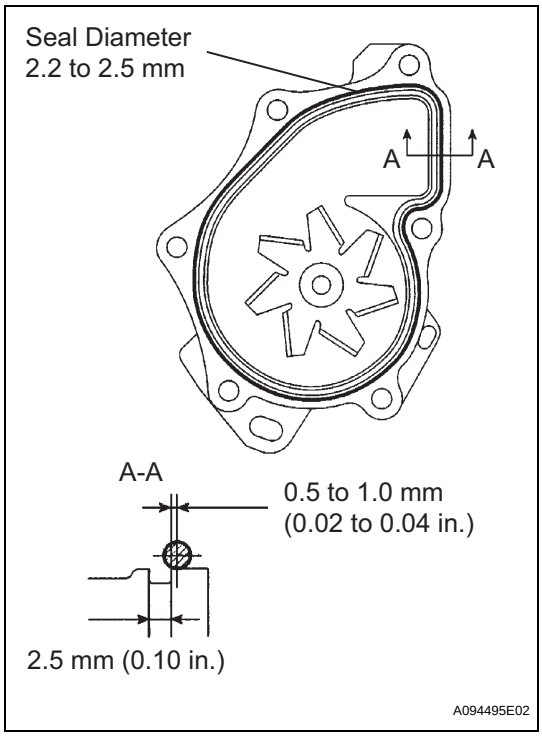
INSTALLATION

1. INSTALL WATER PUMP ASSEMBLY

(a) Remove any old seal packing material from the contact surface.

(b) Apply a continuous line of seal packing as shown in the illustration.

Seal packing:
Part No. 08826-00080 or equivalent
Standard seal diameter:
2.2 to 2.5 mm (0.09 to 0.10 in.)
NOTICE:
- **Remove any oil from the contact surface.**
- **The parts must be set within 3 minutes after applying seal packing. Otherwise, the material must be removed and reapplied.**

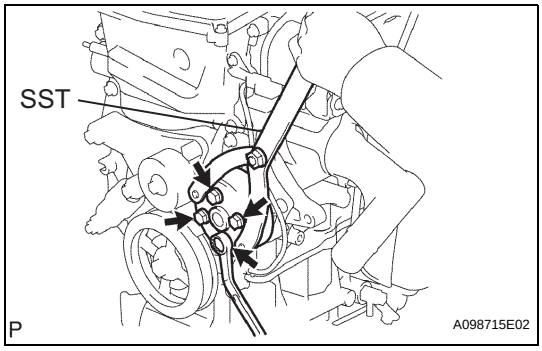


(c) Install the water pump and clamp bracket with the 4 bolts and 2 nuts.

Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

(d) Install the wire of the crankshaft position sensor onto the clamp bracket.

(e) Install the clamp of the crankshaft position sensor onto the water pump.



2. INSTALL WATER PUMP PULLEY

(a) Using SST, install the water pump pulley with the 4 bolts.

SST 09960-10010 (09962-01000, 09963-00700)
Torque: 26 N*m (265 kgf*cm, 19 ft.*lbf)

3. INSTALL GENERATOR ASSEMBLY (See page CH-17)

4. INSTALL FAN AND GENERATOR V BELT (See page EM-6)

5. ADD ENGINE COOLANT (See page CO-6)

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

7. CHECK FOR ENGINE COOLANT LEAKAGE (See page CO-1)

8. INSTALL ENGINE UNDER COVER RH

9. INSTALL FRONT FENDER APRON SEAL RH (See page CH-18)

10. PERFORM INITIALIZATION

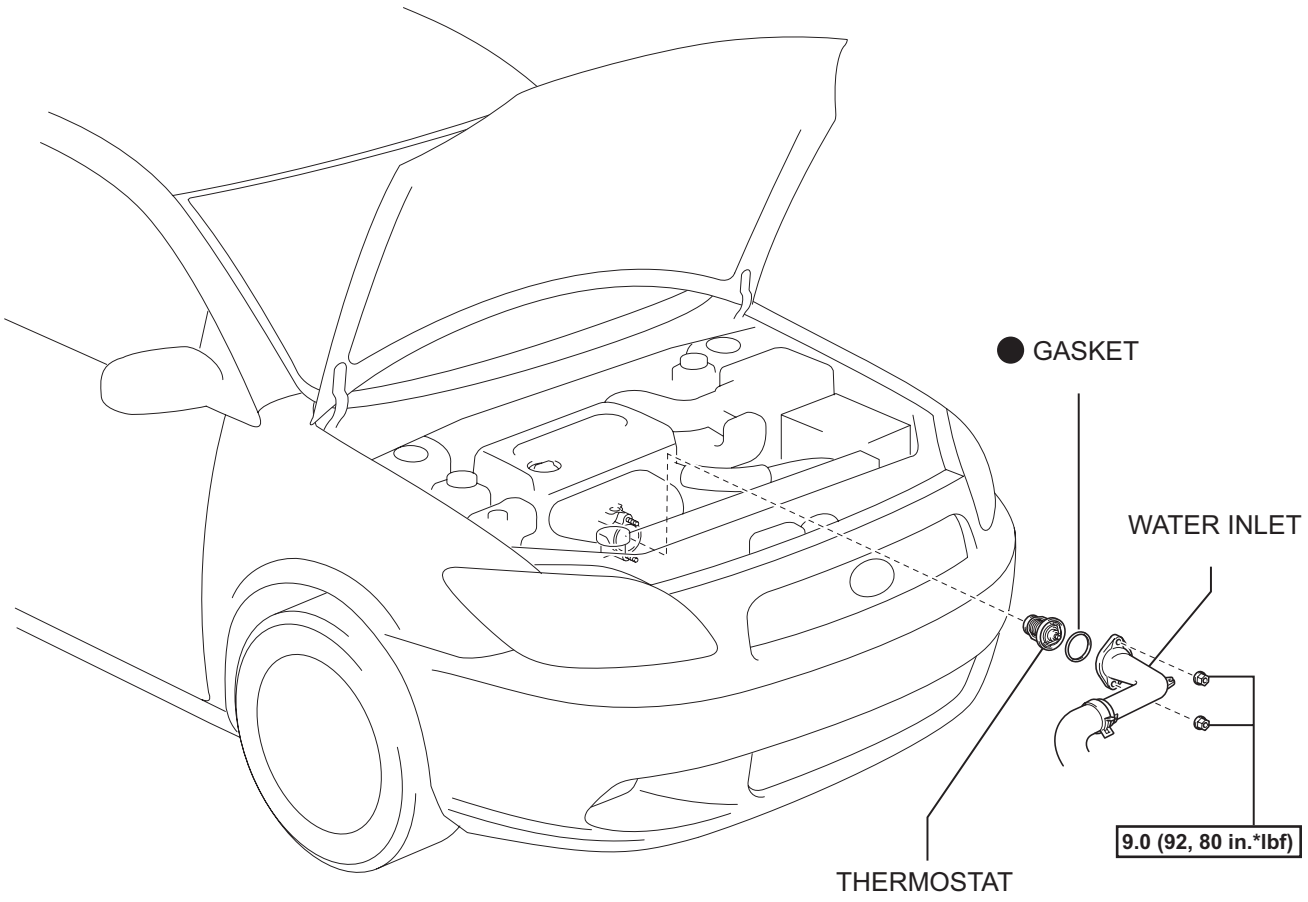
(a) Perform initialization (see page IN-23).

NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

CO

THERMOSTAT

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

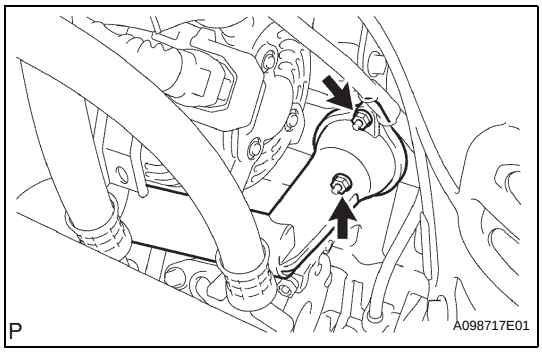
● Non-reusable part

Y

A112992E01

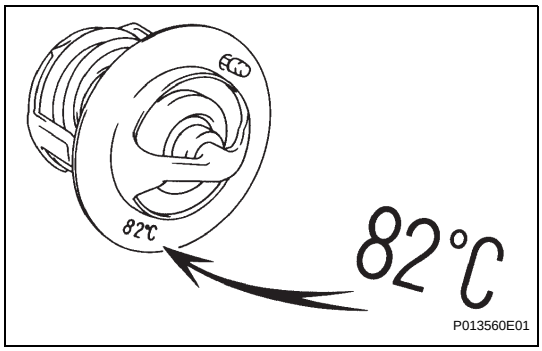
REMOVAL

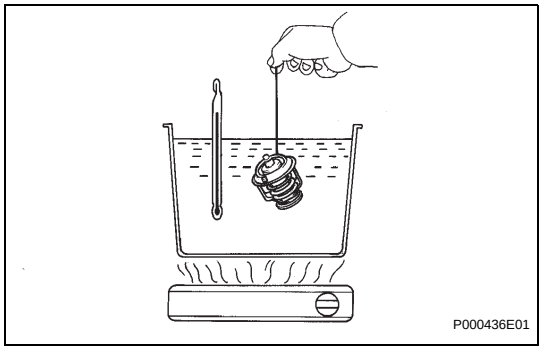
1. **DRAIN ENGINE COOLANT (See page CO-6)**
2. **REMOVE WATER INLET**
   (a) Remove the 2 nuts and disconnect the water inlet from the cylinder block.
3. **REMOVE THERMOSTAT**



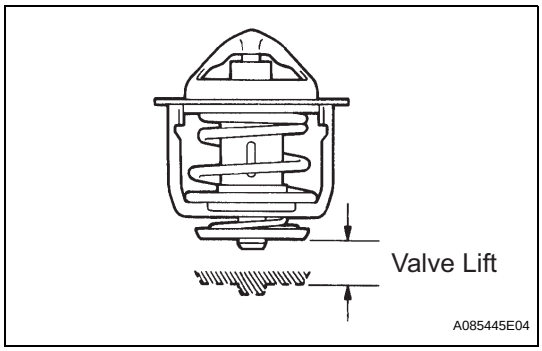
INSPECTION

1. **INSPECT THERMOSTAT**
   HINT:
   The valve opening temperature is inscribed on the thermostat.





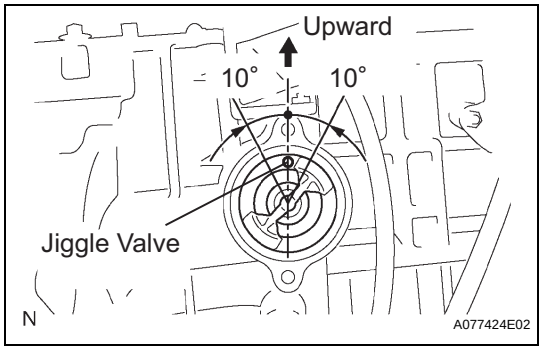
(a) Immerse the thermostat in water, and then gradually heat the water.
(b) Check the valve opening temperature of the thermostat.
Valve opening temperature:
80 to 84°C (176 to 183°F)
If the valve opening temperature is not as specified, replace the thermostat.



(c) Check the valve lift.
Valve lift:
10 mm (0.39 in.) or more at 95°C (203°F)
If the valve lift is not as specified, replace the thermostat.
(d) Check that the valve is fully closed when the thermostat is at low temperatures (below 77°C (171°F).
If not fully closed, replace the thermostat.

CO

INSTALLATION



1. INSTALL THERMOSTAT

(a) Install a new gasket onto the thermostat.

(b) Install the thermostat with the jiggle valve upward.
HINT:
The jiggle valve may be set to within 10° on either side of the prescribed position.

2. INSTALL WATER INLET

(a) Install the water inlet with the 2 nuts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

3. ADD ENGINE COOLANT (See page CO-6)

4. CHECK FOR ENGINE COOLANT LEAKAGE (See page CO-1)

COOLING FAN RELAY

ON-VEHICLE INSPECTION

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

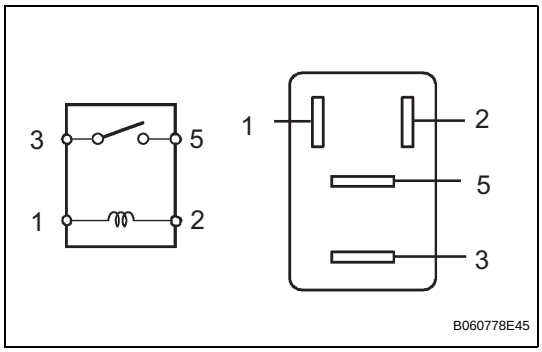
2. REMOVE ENGINE ROOM RELAY BLOCK COVER

3. INSPECT NO. 1 FAN RELAY (Marking: FAN NO. 1)

(a) Remove the relay from the engine room relay block.

(b) Measure the resistance of the relay.

Standard resistance



Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

If the result is not as specified, replace the relay.

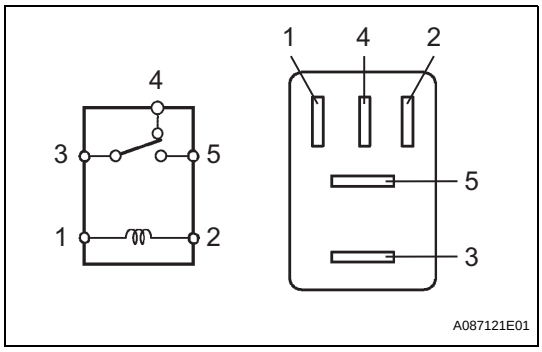
(c) Install the relay.

4. INSPECT NO. 2 FAN RELAY (Marking: FAN NO. 2)

(a) Remove the relay from the engine room relay block.

(b) Measure the resistance of the relay.

Standard resistance



Tester Connection	Specified Condition
3 - 4	Below 1 Ω
3 - 5	10 kΩ or higher
3 - 4	10 kΩ or higher (when battery voltage is applied to terminals 1 and 2)
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

If the result is not as specified, replace the relay.

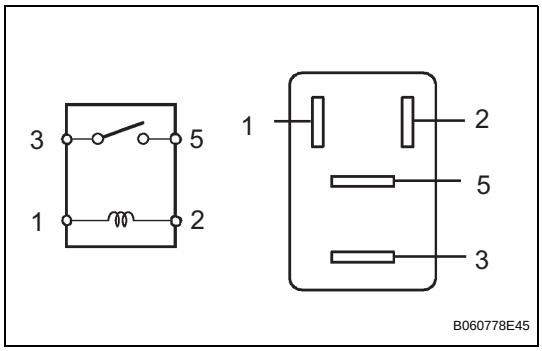
(c) Install the relay.

5. REMOVE NO. 3 FAN RELAY (Marking: FAN NO. 3)

(a) Remove the relay from the engine room relay block.

(b) Measure the resistance of the relay.

Standard resistance



Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

If the result is not as specified, replace the relay.

(c) Install the relay.

6. INSTALL ENGINE ROOM RELAY BLOCK COVER

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

CO

8. PERFORM INITIALIZATION

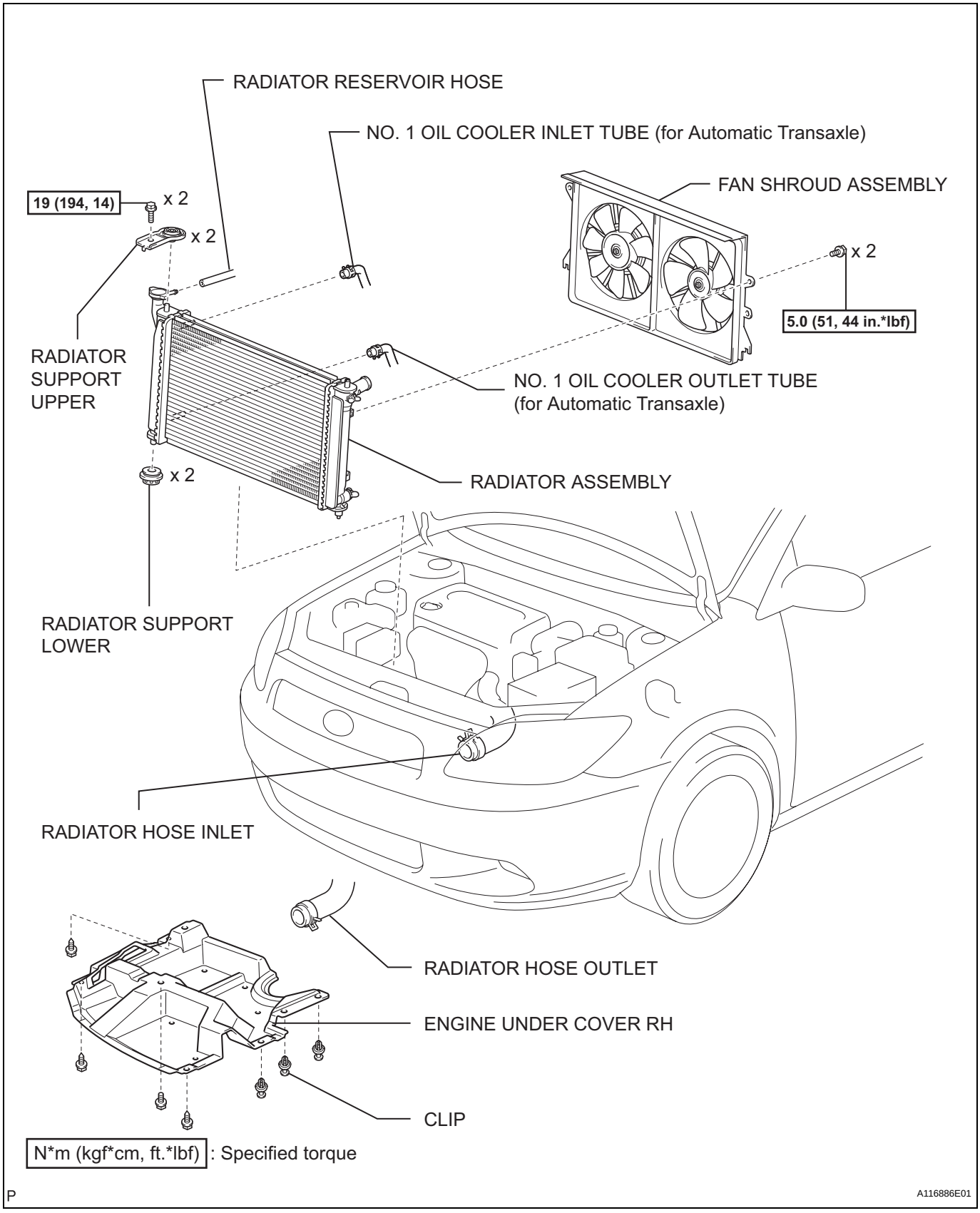
(a) Perform initialization (see page IN-23).

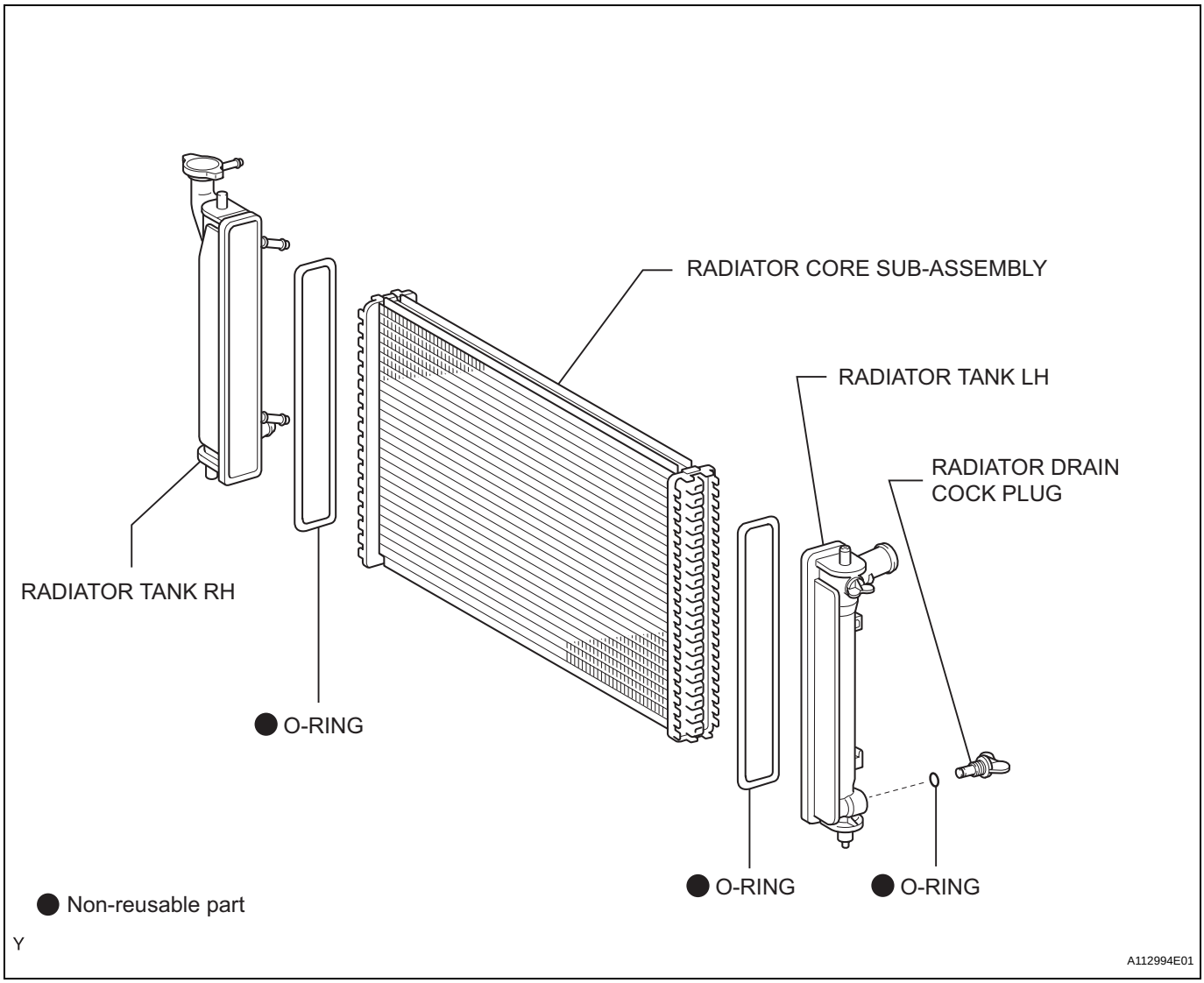
NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

RADIATOR

COMPONENTS




RADIATOR CORE SUB-ASSEMBLY
RADIATOR TANK LH
RADIATOR DRAIN COCK PLUG
RADIATOR TANK RH
O-RING
O-RING
O-RING
Non-reusable part
Y
A112994E01

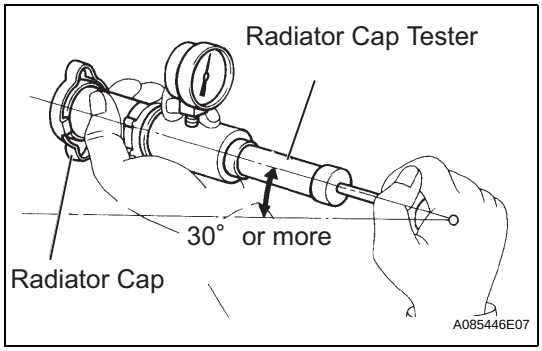
CO

ON-VEHICLE INSPECTION

1. INSPECT RADIATOR CAP SUB-ASSEMBLY

NOTICE:

- **If the radiator cap is contaminated, rinse it with water.**
- **Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.**
- **When performing the following 2 steps, keep the tester at an angle of 30° or more above the horizontal.**



(a) Using a radiator cap tester, slowly pump and check that air is coming from the vacuum valve.

Pumping speed:

1 push every 3 seconds or more

NOTICE:

Push the pump at a constant speed.

If air does not come from the vacuum valve, replace the radiator cap.

(b) Pump the tester, and then measure the relief valve opening pressure.

Pumping speed:

1 push within 1 second

NOTICE:

The above pumping speed is for the first pumping only (in order to close the vacuum valve). After the first pumping, the pumping speed can be reduced.

Standard opening pressure:

74 to 103 kPa (0.75 to 1.05 kgf/cm^2, 10.7 to 14.9 psi)

Minimum opening pressure:

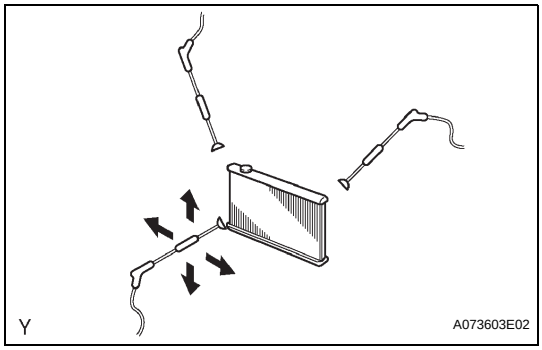
59 kPa (0.6 kgf/cm^2, 8.6 psi)

If the opening pressure is less than the minimum, replace the radiator cap.

HINT:

Use the tester's maximum reading as the opening pressure.

ON-VEHICLE CLEANING



1. CHECK FIN FOR BLOCKAGE

(a) If the fins are clogged, wash them with water or a steam cleaner, and then dry them with compressed air.

NOTICE:

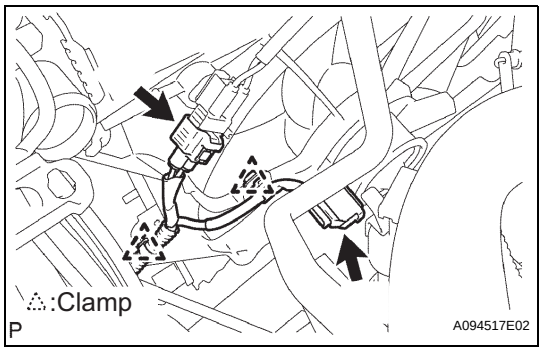
- **If the fins are bent, straighten them with a screwdriver or pliers.**
- **Be careful not to expose electronic components to water.**

- **If the distance between the steam cleaner and core is too small, there is a possibility of damaging the fins, so keep the following injection distances.**
  Standard pressure

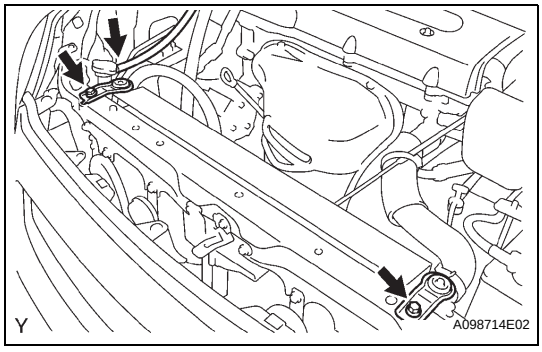
Injection Distance	Injection Pressure
300 mm (11.811 in.)	2,942 to 4,903 kPa (30 to 50 kgf/cm^2, 427 to 711 psi)
500 mm (19.685 in.)	4,903 to 7,845 kPa (50 to 80 kgf/cm^2, 711 to 1,138 psi)

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **DRAIN ENGINE COOLANT (See page CO-6)**
3. **REMOVE ENGINE UNDER COVER RH**
4. **DISCONNECT RADIATOR HOSE INLET**
5. **DISCONNECT RADIATOR HOSE OUTLET**
6. **DISCONNECT NO. 1 OIL COOLER INLET TUBE (for Automatic Transaxle)**
7. **DISCONNECT NO. 1 OIL COOLER OUTLET TUBE (for Automatic Transaxle)**
8. **REMOVE RADIATOR ASSEMBLY**
   (a) Disconnect the 2 cooling fan motor connectors.
   (b) Disconnect the 2 clamps of the engine room main wire.

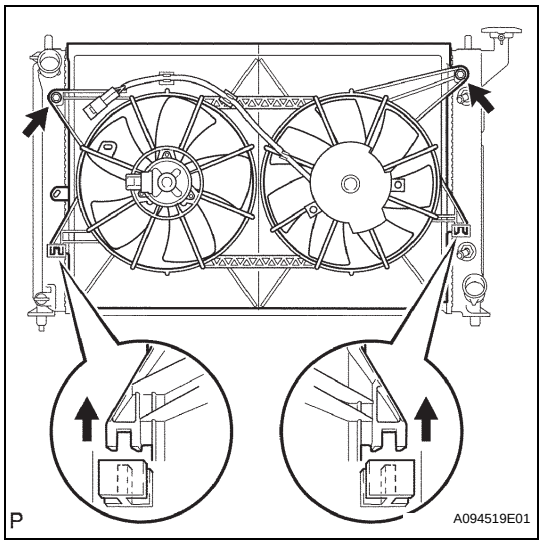


   (c) Disconnect the radiator reservoir hose.
   (d) Remove the 2 bolts and 2 radiator support uppers, and then remove the radiator assembly.



9. **REMOVE RADIATOR SUPPORT LOWER**

CO



10. REMOVE FAN SHROUD ASSEMBLY

(a) Remove the 2 bolts.

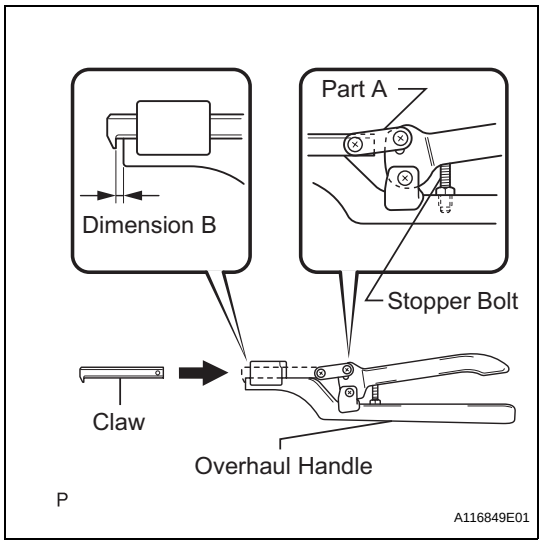
(b) Disconnect the 2 pawl fittings, and remove the fan assembly.

DISASSEMBLY

1. REMOVE RADIATOR DRAIN COCK PLUG

(a) Remove the drain cock plug.

(b) Remove the O-ring from the drain cock plug.



2. ASSEMBLE SST

SST 09230-01010 (09231-01010, 09231-01030)

(a) Install the claw onto the overhaul handle by inserting it in the hole at part A as shown in the illustration.

(b) While gripping the handle, adjust dimension B to between 0.2 and 0.3 mm using the stopper bolt.

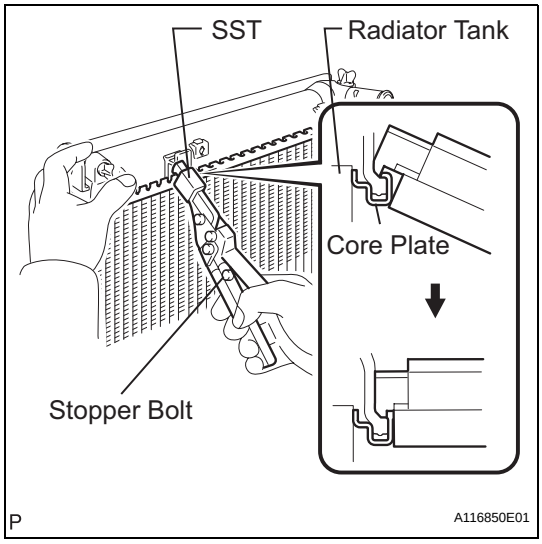
Standard dimension B:

0.2 to 0.3 mm (0.008 to 0.012 in.)

NOTICE:

If the stopper bolt is not adjusted, the claw may be damaged.

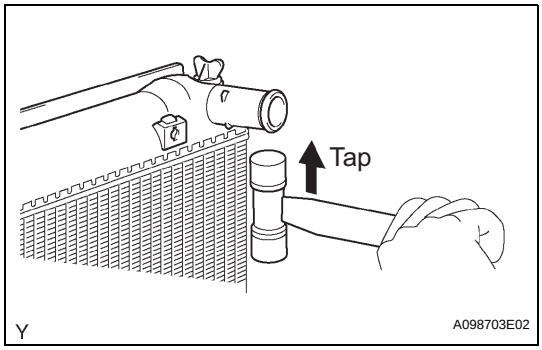
CO



3. UNCAULK CORE PLATE

(a) Straighten the core plate by gripping it with SST until stopped by the stopper bolt.

SST 09230-01010 (09231-01010, 09231-01030)



4. REMOVE RADIATOR TANK LH

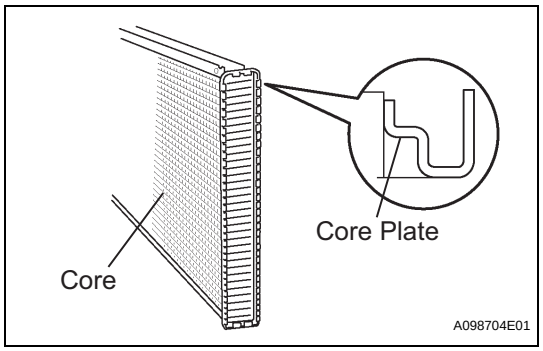
(a) Lightly tap the bracket of the radiator tank (or radiator tank pipe) with a soft-faced hammer to remove the radiator tank.

(b) Remove the O-ring.

5. REMOVE RADIATOR TANK RH

HINT:

Perform the same procedures as the radiator tank.



6. INSPECT RADIATOR CORE SUB-ASSEMBLY

Check the core plate for damage.

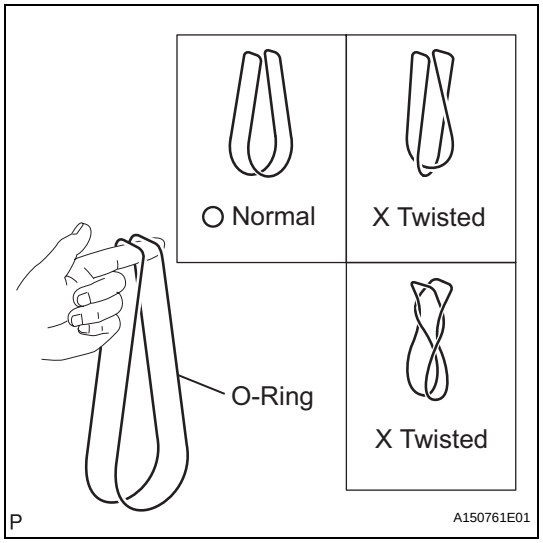
HINT:

- If the sides of the core plate groove are deformed, it is impossible to reassembly the radiator tank. Therefore, first correct any deformation using pliers or a similar tool.
- Water leakage will occur if the bottom of the core plate groove is damaged or dented. Repair or replace it if necessary.

NOTICE:

The radiator can only be recaulked 2 times. After being recaulked 2 times, the radiator assembly must be replaced.

REASSEMBLY

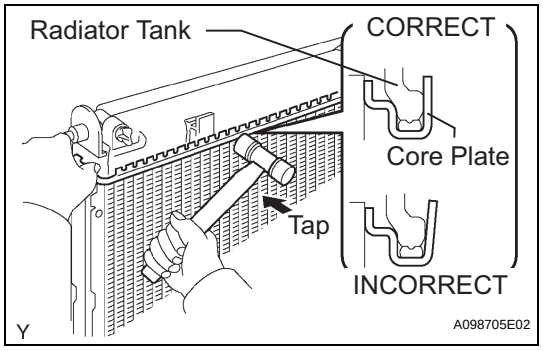


1. INSTALL RADIATOR TANK LH

(a) Check that there are no foreign objects in the core plate groove, and then install a new O-ring without twisting it.

HINT:

To clean the core plate groove, lightly rub it with sandpaper without scratching it.



(b) Install the radiator tank without damaging the O-ring.

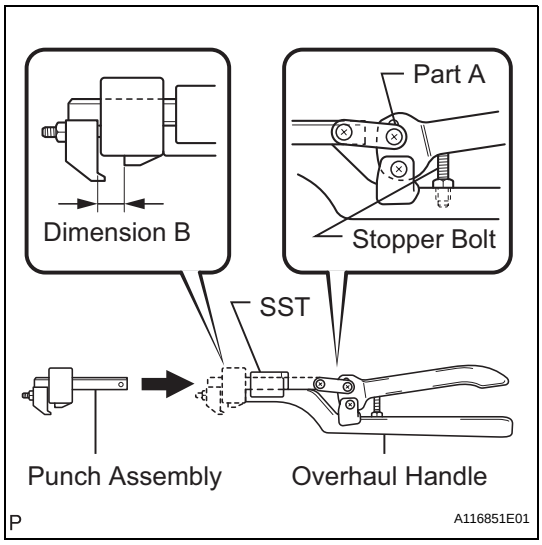
(c) Tap the core plate with a soft-faced hammer so that there is not gap between the core plate and radiator tank.

2. INSTALL RADIATOR TANK RH

HINT:

Perform the same procedures as the radiator tank LH.

CO



3. ASSEMBLE SST

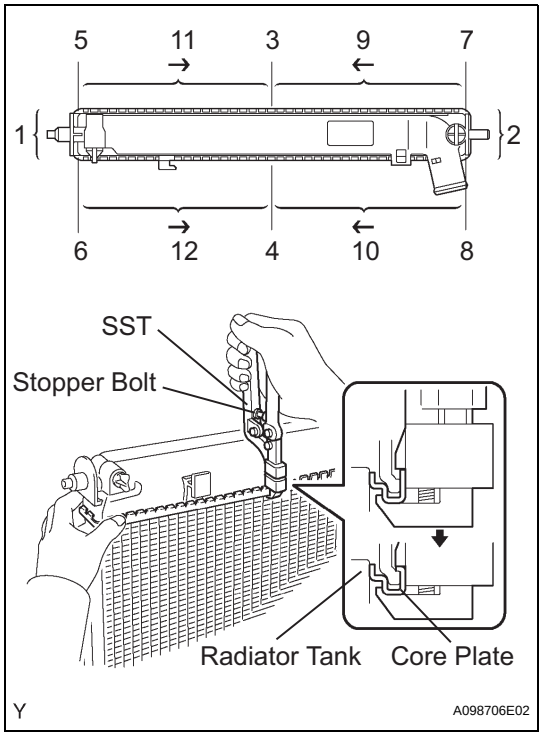
SST 09230-01010 (09231-01010, 09231-01020)

(a) Install the punch assembly into the overhaul handle by inserting it in the hole at part A as shown in the illustration.

(b) While gripping the handle, adjust the stopper bolt so that dimension B is as shown in the illustration.

Standard dimension B:

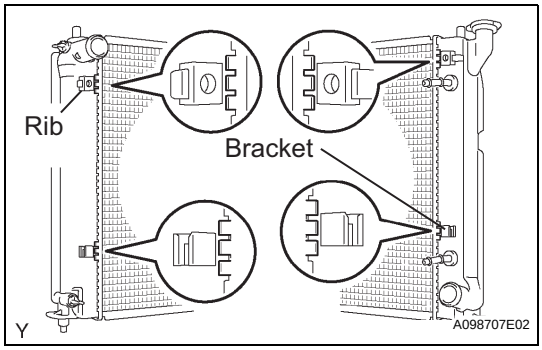
8.4 mm (0.331 in.)



4. CAULK CORE PLATE

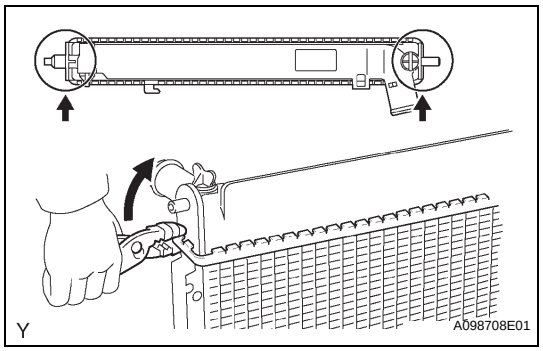
(a) Lightly press SST against the core plate in the order shown in the illustration. After repeating this a few times, fully caulk the core plate by gripping the handle until stopped by the stopper bolt.

SST 09230-01010 (09231-01010, 09231-01020)

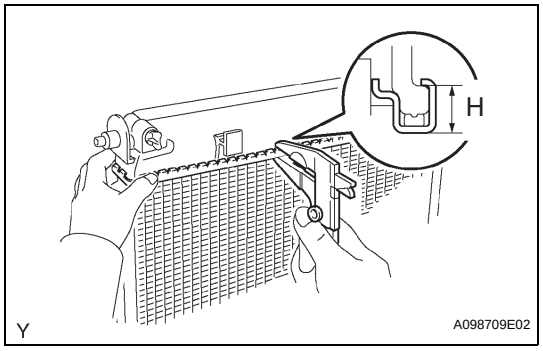


HINT:

- Do not tap the areas protruding around the pipes, brackets or tank ribs.



- Do not tap the sections shown in the illustration or the oil cooler using SST. Use pliers or a similar tool. Be careful not to damage the core plate.



(b) Check the core plate height (H) after completing the caulking.
Standard plate height (H):
8.7 to 9.1 mm (0.343 to 0.358 in.)
If the height is not as specified, readjust the stopper bolt of the handle, and then caulk again.

5. INSTALL RADIATOR DRAIN COCK PLUG

(a) Install a new O-ring onto the drain cock plug.
(b) Install the drain cock plug.

INSTALLATION

1. **INSTALL FAN SHROUD ASSEMBLY**
   (a) Attach the 2 pawl fittings of the shroud.
   (b) Install the fan assembly with the 2 bolts.
   Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
2. **INSTALL RADIATOR SUPPORT LOWER**
3. **INSTALL RADIATOR ASSEMBLY**
   (a) Install the radiator assembly with the 2 radiator support uppers and 2 bolts.
   Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
   (b) Connect the radiator reservoir hose.
   (c) Connect the 2 clamps of the engine room main wire.
   (d) Connect the 2 cooling fan motor connectors.
4. **CONNECT NO. 1 OIL COOLER OUTLET TUBE (for Automatic Transaxle)**
5. **CONNECT NO. 1 OIL COOLER INLET TUBE (for Automatic Transaxle)**
6. **CONNECT RADIATOR HOSE OUTLET**
7. **CONNECT RADIATOR HOSE INLET**
8. **ADD ENGINE COOLANT (See page CO-6)**
9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
10. **CHECK FOR ENGINE COOLANT LEAKAGE (See page CO-1)**
11. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
12. **INSTALL ENGINE UNDER COVER RH**

CRUISE CONTROL SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

System	See procedure
Power window control system (with Jam protection function)	IN-23
Sliding roof system	

1. Pay attention to the following points when inspecting the cruise control system.

(a) Push the cruise control main switch ON-OFF button off when not using the cruise control.

(b) Be careful of vehicle speed increase when driving downhill with the cruise control on.

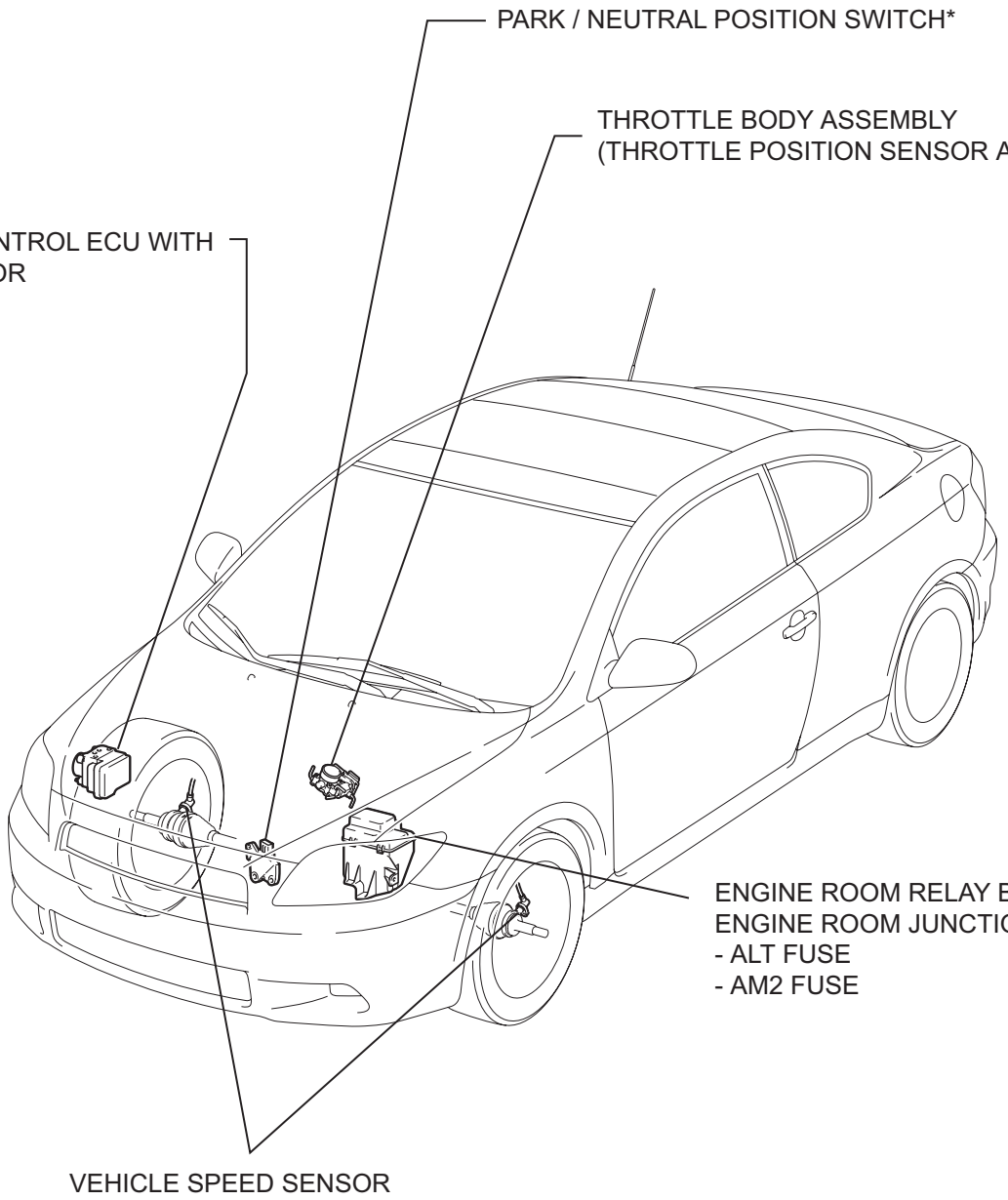
(c) "RES/+" operation, after canceling the cruise control, works as RESUME, and works as "+" (ACCEL) while the cruise control system is operating.

(d) Push the cruise control main switch ON-OFF button off and reset the cruise control if the CRUISE main indicator light blinks while the cruise control system is operating. When the cruise control can not be set by this procedure or canceled immediately after setting, there may be a malfunction in the system.

(e) Do not use the cruise control system where the road conditions are as follows:

- Heavy traffic
- Steep downhill
- Sharp turns
- Icy or snowy roads
- Slippery roads

PARTS LOCATION



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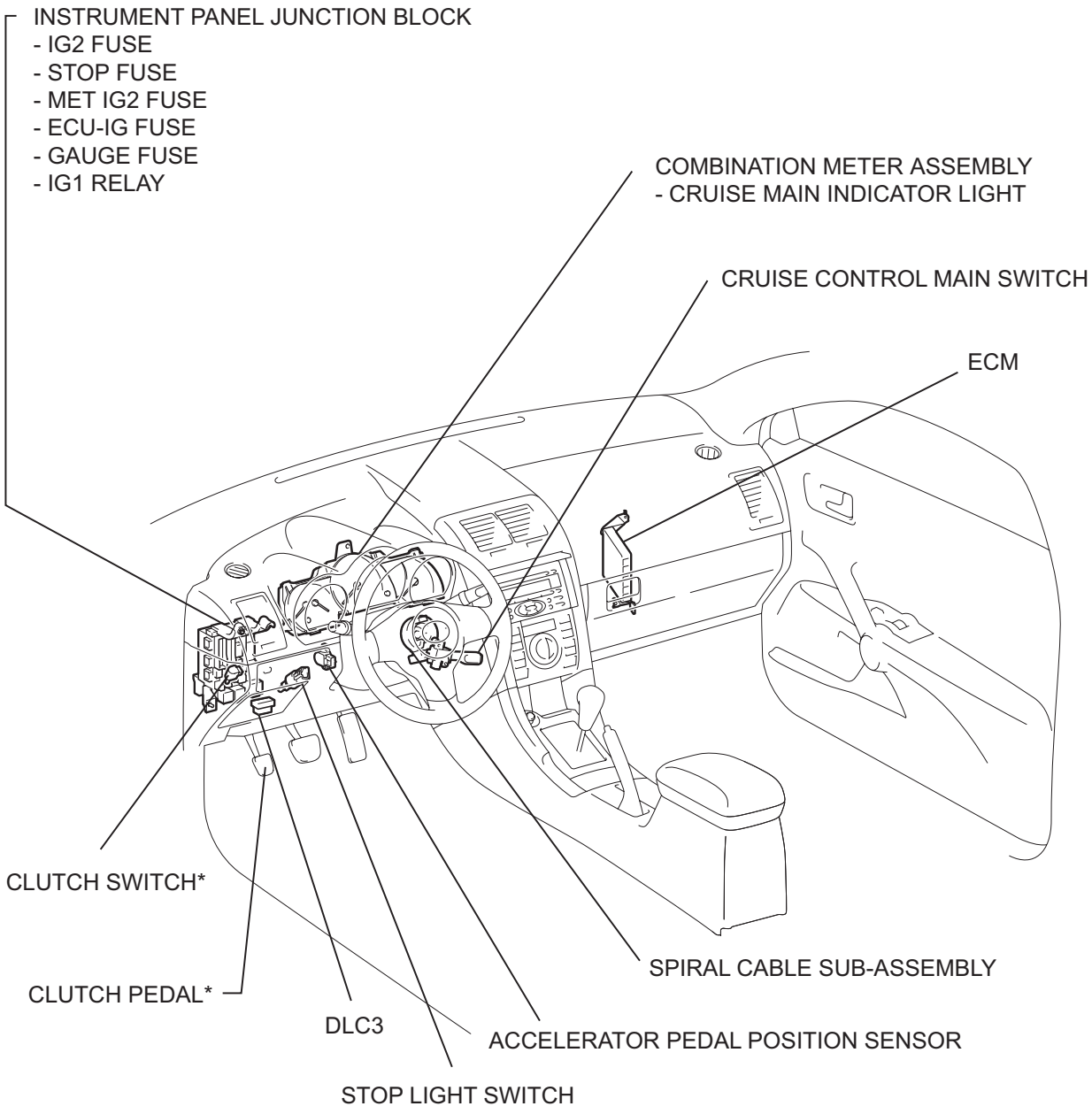

*: M/T

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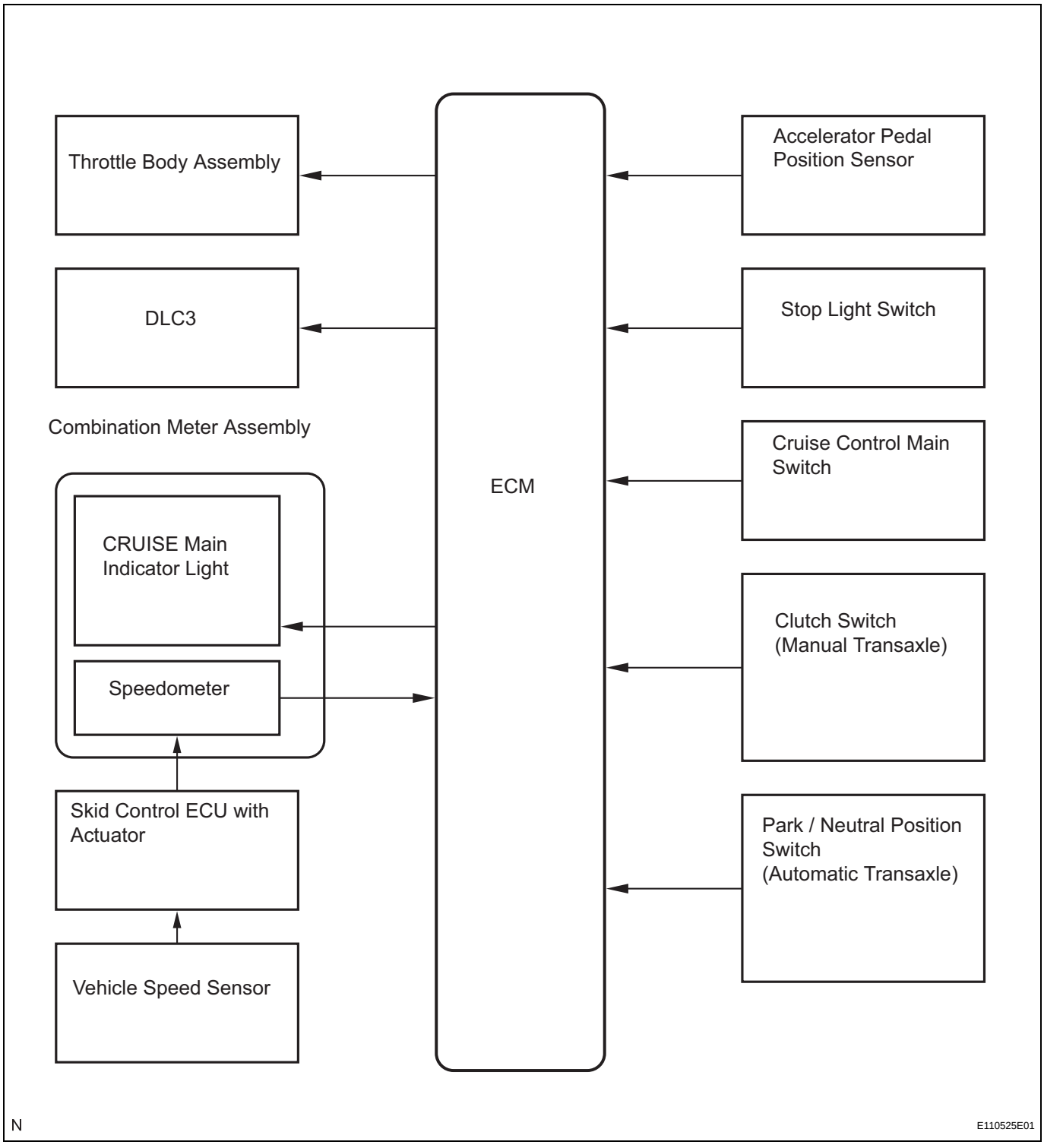
E110524E01

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

1. CRUISE CONTROL SYSTEM

The cruise control system makes it possible to drive at a desired speed without using the accelerator pedal. The ECM controls the throttle opening angle based on signals from switches and sensors.

A microcomputer which controls the cruise control system is built into the ECM, and the actuator is the throttle body assembly.

Constant speed control is possible when the cruise control main switch ON-OFF button is pushed (the CRUISE main indicator light comes on).

Operating the cruise control main switch, the driver can control the following functions.

2. LIMIT CONTROL

(a) Low speed limit

The lowest possible limit of the speed setting range is set at approximately 40 km/h (25 mph). The cruise control system cannot be set when the driving vehicle speed is below the low speed limit. Cruise control operation will be automatically canceled when the vehicle speed goes below the low speed limit while the cruise control is operating.

(b) High speed limit

The highest possible limit of the speed setting range is set at approximately 200 km/h (125 mph). The cruise control system cannot be set when the driving vehicle speed is over the high speed limit. When accelerating using "RES/+" with the cruise control main switch assembly, the speed cannot be set beyond the high speed limit.

3. OPERATION OF CRUISE CONTROL

The cruise control main switch operates seven functions: SET, '-' (COAST), TAP-DOWN, '+' (ACCEL), TAP-UP, RESUME and CANCEL. The SET, TAP-DOWN and '-' (COAST) functions, and the RESUME, TAP-UP and '+' (ACCEL) function are operated wit the same switch. The cruise control main switch assembly is an automatic return type switch which turns on only while operating it in each arrow direction and turns off after releasing it.

(a) SET CONTROL

When pushing down the cruise control main switch to "SET / -", the ECM stores the set speed and compares it to actual vehicle speed. If the actual driving speed is greater than the set speed, the ECM sends a signal to the throttle body assembly to close the throttle valve. If lower, it opens the throttle valve. The cruise control operative speed range is between the low and high speed limits.

(b) '-' (COAST) CONTROL
A cruise set speed decreases while pushing down on the cruise control main switch to "SET / -". The vehicle cruises at the newly set speed when releasing the cruise control main switch.

(c) TAP-DOWN CONTROL
When tapping down on the cruise control main switch to "SET / -" (approximately 0.6 seconds), the ECM decreases the stored set speed by 1.6 km/h (1 mph) at a time. However, when the difference between the driving and the stored vehicle speed is more than 5 km/h (approximately 3.1 mph), if the cruise control main switch is released from "SET / -", vehicle speed will be stored and constant speed control is maintained.

(d) '+' (ACCEL) CONTROL
The cruise set speed increases while pushing up on the cruise control main switch to "RES / +". The vehicle cruises at the newly set speed when releasing the cruise control main switch.

(e) TAP-UP CONTROL
When tapping up on the cruise control main switch to "RES / +" (approximately 0.6 seconds), the ECM increases the stored set speed by 1.6 km/h (1 mph) at a time. However, when the difference between the driving and the stored vehicle speed is more than 5 km/h (approximately 3.1 mph), the stored vehicle speed will not be changed.

(f) RESUME CONTROL
If cruise control operation was canceled under the manual cancel conditions (other than pushing the cruise control main switch ON-OFF button off) and if driving speed is within the limit range, pushing up the cruise control main switch "RES / +" restores vehicle speed memorized at the time of cancellation, and maintains constant speed control.

(g) MANUAL CANCEL CONTROL
The ECM cancels the cruise control under the following conditions while driving:
- The cruise control main switch is pulled to CANCEL.
- The brake pedal is depressed.
- The clutch pedal is depressed (Manual Transaxle).
- Moving the shift lever the D position to the N, 2 or L position.
- The cruise control main switch ON-OFF button is pushed off.

(h) AUTO CANCEL CONTROL
If any of the following malfunctions occur in the system, the ECM stops the cruise control until the cruise control main switch ON-OFF button is pushed off.
- Stop light switch assembly malfunction

- Vehicle speed signal circuit malfunction
- Throttle position sensor and motor malfunction
  If any of the following malfunctions occur in the system, the ECM stops the cruise control until the ignition switch is turned off.
- Stop light switch input circuit malfunction
- CANCEL function circuit malfunction
  Under these conditions, the cruise main indicator light blinks until the cruise control main switch ON-OFF button is pushed off.
  AUTO CANCEL also works when actual vehicle speed either drops below 40 km/h (25 mph) or is 16 km/h (10 mph) lower than the set speed.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the cruise control system.
- *: Use the intelligent tester.

1	VEHICLE BROUGHT TO WORKSHOP

CC

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 INDICATOR LIGHT

NEXT

4	CHECK DTC*

(a) Check for DTCs and note any codes that are output.
(b) Delete the DTC.
(c) Recheck for DTCs, and try to prompt the DTC by simulating the original activity that the DTC suggests.

Result

Result	Proceed to
DTC does not reoccur	A
DTC reoccurs	B

B → **Go to step 7**

A

5	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 7**

A

6	**OVERALL ANALYSIS AND TROUBLESHOOTING**

(a) Terminals of ECM (see page CC-11)
(b) Data List/Active Test (see page CC-15)

NEXT

7	**ADJUST, REPAIR OR REPLACE**

NEXT

8	**CONFIRMATION TEST**

NEXT

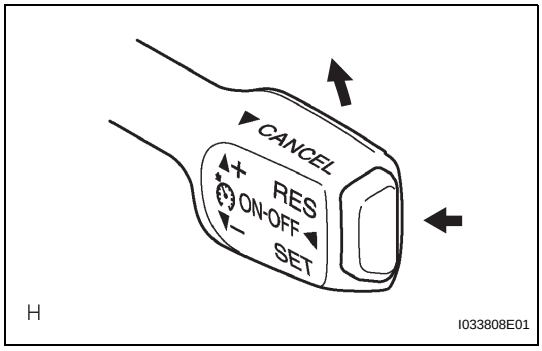
END

ROAD TEST

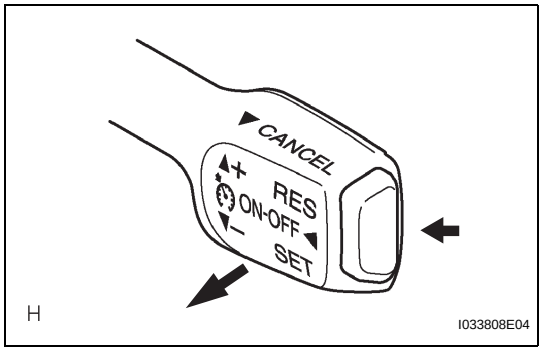
HINT:
SET and '-', RES and '+', ON-OFF functions share the same switch. Operate the cruise control main switch according to the directions (↓, ↑, ←) indicated on the switch.

1. PROBLEM SYMPTOM CONFIRMATION

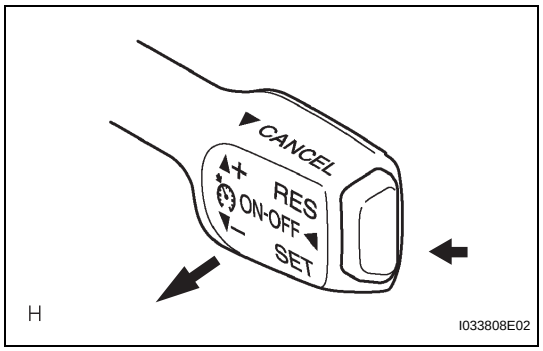
(a) Inspect the SET function.
(1) Push the ON-OFF button.
(2) Drive at the required speed (40 km/h (25 mph) or higher).
(3) Push down the cruise control main switch to "SET / -".
(4) After releasing the switch, check that the vehicle cruises at the set speed.



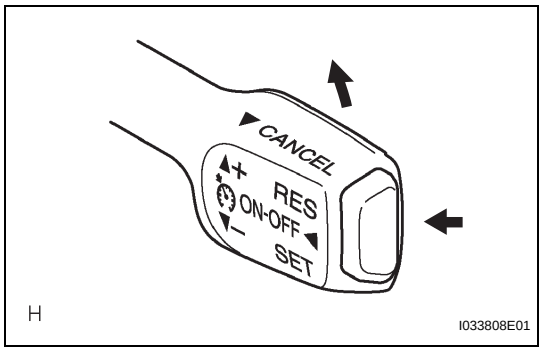
(b) Inspect the '+' (ACCEL) function.
(1) Push the ON-OFF button on.
(2) Drive at the required speed (40 km/h (25 mph) or higher).
(3) Push down the cruise control main switch to "SET / -".
(4) Check that vehicle speed increases while the cruise control main switch is pushed up to "RES / +" , and that the vehicle cruises at the newly set speed when the switch is released.
(5) Momentarily (approximately 0.6 seconds) push up the cruise control main switch to "RES / +" and then immediately release it. Check that vehicle speed increases by approximately 1.6 km/h (1.0 mph) (Tap-up function).



(c) Inspect the '-' (COAST) function.
(1) Push the ON-OFF button on.
(2) Drive at the required speed (40 km/h (25 mph) or higher).
(3) Push down the cruise control main switch to "SET / -".
(4) Check that vehicle speed decreases while the cruise control main switch is pushed down to "SET / -", and the vehicle cruises at the newly set speed when the switch is released.
(5) Momentarily (approximately 0.6 seconds) push down the cruise control main switch to " SET / -", and then immediately release it. Check that the vehicle speed decreases by approximately 1.6 km/h (1.0 mph) (Tap-down function).



(d) Inspect the CANCEL function.
(1) Push the ON-OFF button on.
(2) Drive at the required speed (40 km/h (25 mph) or higher).
(3) Push down the cruise control main switch to "SET / -".
(4) When doing one of the following, check that the cruise control system is canceled and that the normal driving mode is reset.
- Depressing the brake pedal
- Depressing the clutch pedal (Manual Transaxle)
- Moving the shift lever from the D position to the N, 2 or L position.
- Pushing the ON-OFF button off
- Pulling the cruise control main switch to CANCEL



(e) Inspect the RES (RESUME) function.
(1) Push the ON-OFF button on.
(2) Drive at the required speed (40 km/h (25 mph) or higher).
(3) Push down the cruise control main switch to "SET / -".
(4) When doing one of the following, check that the cruise control system is canceled and that the normal driving mode is reset.
- Depressing the brake pedal
- Depressing the clutch pedal (manual Transaxle)
- Moving the shift lever from the D position to the N, 2 or L position.
- Pulling the cruise control main switch to CANCEL

(5) After pushing the cruise control main switch to "RES / +" at a driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed prior to the cancellation.

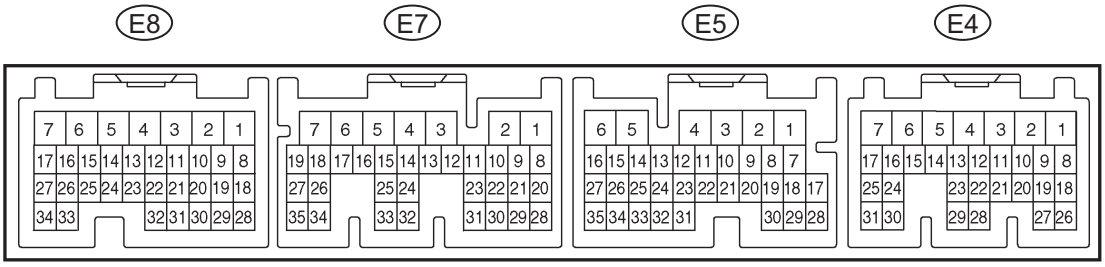
PROBLEM SYMPTOMS TABLE

If a normal system code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.
HINT:
Inspect the fuses and relays before confirming the suspected areas as shown in the table below.
Inspect each malfunction circuit in numerical order for the corresponding symptom.

Symptom	Suspected Area	See page
Main switch cannot be turned ON. (Cruise indicator light in combination meter does not come on.)	1. Cruise control switch circuit	CC-30
	2. Combination meter system (CRUISE main indicator light circuit)	CC-35
	3. Combination meter assembly	ME-4
	4. ECM	CC-11
Vehicle speed setting cannot be done. (Although indicator light in combination meter comes on when the main switch is turned ON, it goes off when vehicle speed is set.)	1. Cruise control switch circuit	CC-30
	2. ECM	CC-11
Setting cannot be done. (Indicator light in combination meter comes on when the main switch is turned ON and it remains ON while setting.)	1. Cruse control switch circuit	CC-30
	2. Vehicle speed sensor circuit	CC-17
	3. Stop light switch circuit	CC-18
	4. Combination meter system (CRUISE main indicator light circuit)	CC-35
	5. Clutch switch circuit (Manual Transaxle)	CC-23
	6. Park/Neutral position switch circuit (Automatic Transaxle)	CC-26
	7. Combination meter assembly	ME-4
	8. ECM	CC-11
While the vehicle is driven with cruise control, the set control is canceled. (Indicator light and CRUISE remain ON.)	1. Cruise control switch circuit	CC-30
	2. Vehicle speed sensor circuit	CC-17
	3. Stop light switch circuit	CC-18
	4. Combination meter system (CRUISE main indicator light circuit)	CC-35
	5. Clutch switch circuit (Manual Transaxle)	CC-23
	6. Park / Neutral position switch circuit (Automatic Transaxle)	CC-26
	7. Combination meter assembly	ME-4
	8. ECM	CC-11
Hunting (Speed is not constant.)	1. Vehicle speed sensor circuit	CC-17
	2. ECM	CC-11
Setting cannot be canceled (when functions such as - (coast), + (acceleration), resume, set speed change are operated using control switch).	1. Diagnosis circuit	CC-39
DTC is not output or is output when it should not be.	1. Diagnosis circuit	CC-39
CRUISE main indicator light does not come on.	1. Cruise control switch circuit	CC-30
	2. Combination meter system (CRUISE main indicator light circuit)	CC-35
	3. Combination meter assembly	ME-4
	4. ECM	CC-11

TERMINALS OF ECM

1. CHECK ECM



Y

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Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
TC (E5-17) - E1 (E8-3)	R - L	DTC output signal	Ignition switch ON → Connect terminals TC and CG of DLC3	10 to 14 V → Below 2 V
D (E5-21) - E1 (E8-3) *1	R - L	Clutch switch input signal	Ignition switch ON, depress clutch pedal → release clutch pedal	Below 1 V → 10 to 14 V
D (E5-21) - E1 (E8-3) *2	W - L	Shift position input signal	Ignition switch ON, shift D position → any shift position except D	10 to 14 V → Below 1 V
ST1- (E4-16) - E1 (E8-3)	L - L	Cruise cancel input signal	Ignition switch ON, depress brake pedal → release brake pedal	Below 1 V → 10 to 14 V
PI (E5-18) - E1 (E8-3)	B - L	Cruise main indicator light input signal	Ignition switch ON, cruise control main switch ON	Below 1 V → 10 to 14 V
STP (E5-4) - E1 (E8-3)	L - L	Stop light switch input signal	Ignition switch ON, depress brake pedal → release brake pedal	10 to 14 V → Below 1 V
CCS (E5-31) - E1 (E8-3)	Y - L	Cruise control main switch input signal	Ignition switch ON	10 to 14 V
CCS (E5-31) - E1 (E8-3)	Y - L	Cruise control main switch input signal	CANCEL switch held ON	6.6 to 10.1 V
CCS (E5-31) - E1 (E8-3)	Y - L	Cruise control main switch input signal	SET / - switch held ON	4.5 to 7.1 V
CCS (E5-31) - E1 (E8-3)	Y - L	Cruise control main switch input signal	RES / + switch held ON	2.3 to 4 V
CCS (E5-31) - E1 (E8-3)	Y - L	Cruise control main switch input signal	MAIN switch held ON	Below 1 V

HINT:
*1: Manual Transaxle
*2: Automatic Transaxle

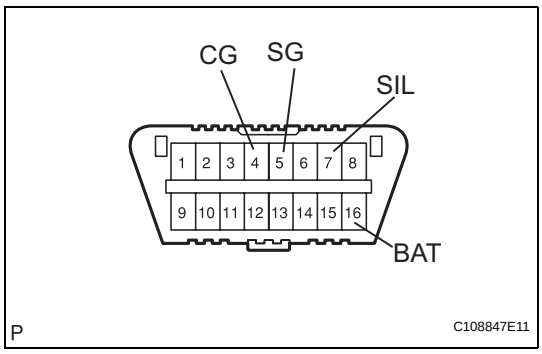
DIAGNOSIS SYSTEM

1. DESCRIPTION

The CRUISE indicator light on the combination meter blinks when the cruise control is malfunctioning. And then, the ECM (PCM) stores diagnosis trouble codes (DTCs). DTCs can be read from the data link connector (DLC3) with a intelligent tester or an OBDII scan tool. If the CRUISE indicator light blinks, read DTCs to isolate the problem.

CC

2. CHECK DLC3



(a) The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

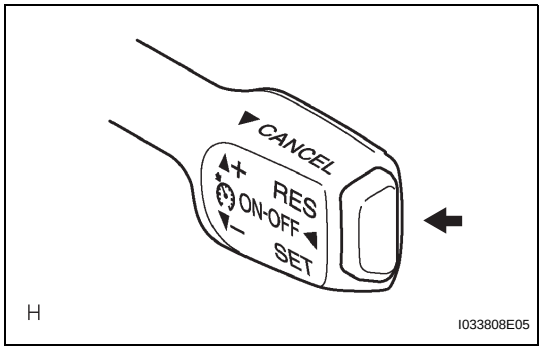
Symbols (Terminal NO.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	11 to 10 V

HINT:

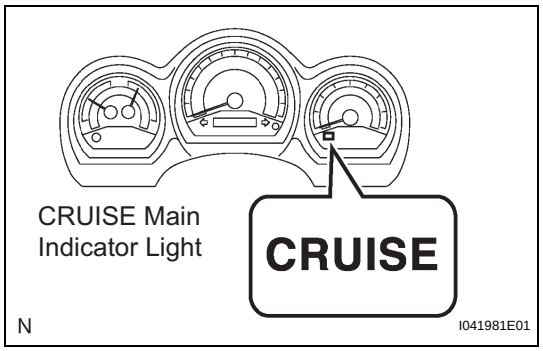
If the display shows "UNABLE TO CONNECT TO VEHICLE" after connecting the intelligent tester to the DLC3 and turning the ignition switch to the ON position, there is a problem with either the vehicle or the tester. (Intelligent tester only)

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself, so consult the Service Department listed in the tester's instruction manual.

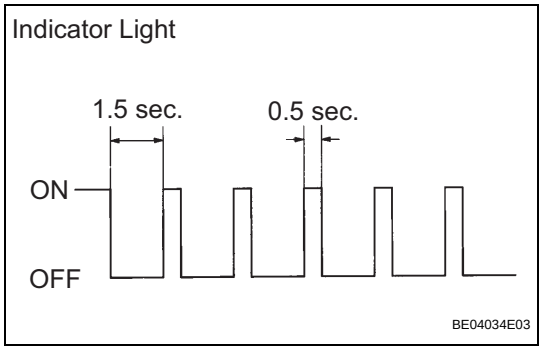
3. CHECK CRUISE MAIN INDICATOR LIGHT



(a) Turn the ignition switch to the ON position.



(b) Check that the CRUISE main indicator light comes on when the cruise control main switch ON-OFF button is pushed on, and that the indicator light goes off when the ON-OFF button is pushed off.
HINT:
If there is a problem with the indicator light, inspect the CRUISE main indicator light circuit (see page CC-35).



HINT:
If a malfunction occurs in the vehicle speed sensors, stop light switch assembly or other related parts during cruise control driving, the ECM actuates AUTO CANCEL of the cruise control. Then the CRUISE main indicator light starts to blink, informing the driver of the malfunction. At the same time, data of the malfunction is stored as a diagnostic trouble code (DTC).

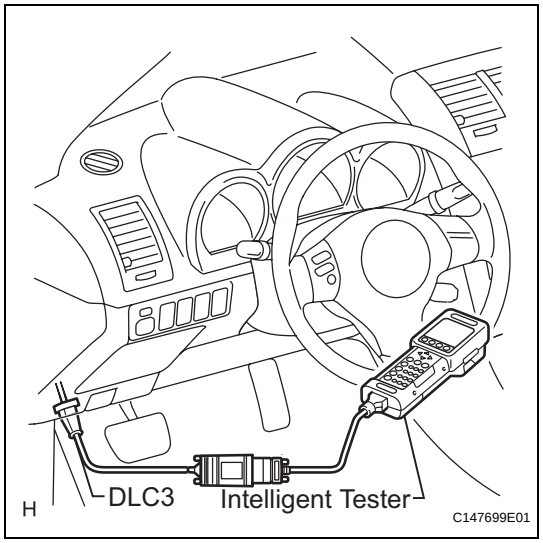
CC

DTC CHECK / CLEAR

1. DTC CHECK / CLEAR (USING INTELLIGENT TESTER)

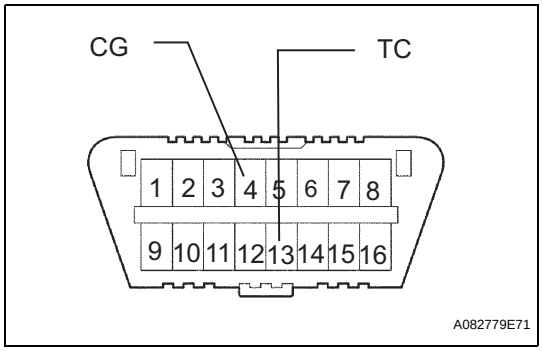
(a) DTC CHECK
(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Read DTCs on the tester screen.

(b) DTC CLEAR
(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Clear the DTCs following the prompts on the tester screen.
(4) Recheck DTCs.
HINT:
Intelligent tester has a "Snapshot" function which records the monitored data.
Refer to the intelligent tester operator's manual for further details.

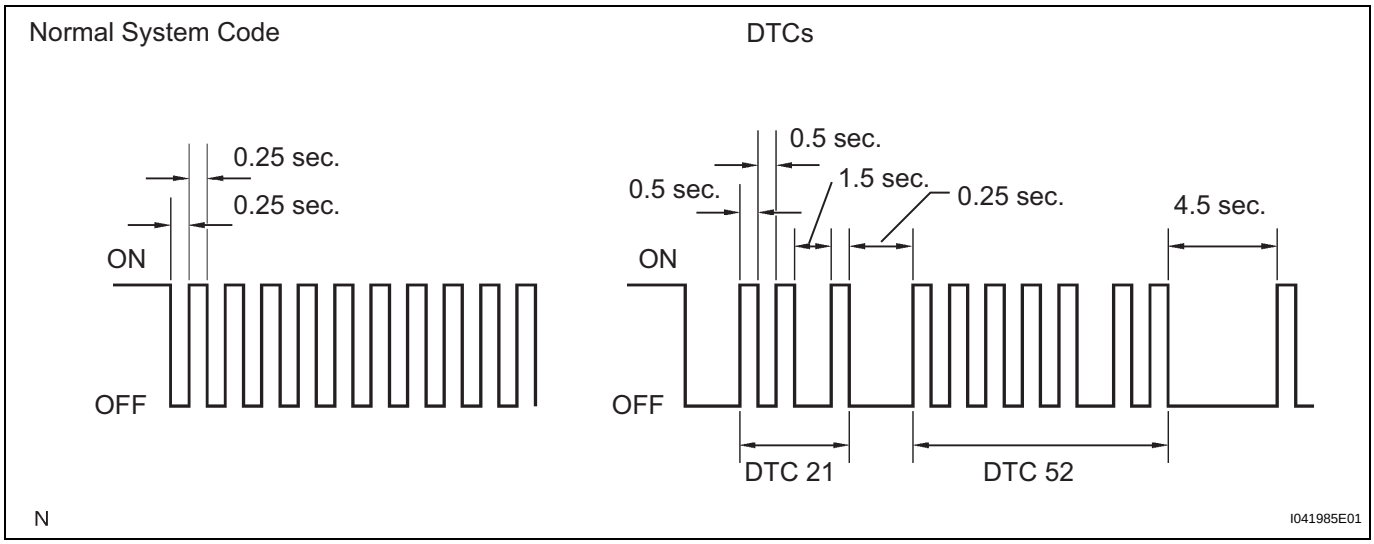


2. DTC CHECK / CLEAR (USING SST CHECK WIRE)

(a) DTC CHECK
(1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040
(2) Turn the ignition switch to the ON position.



(3) Read and record DTCs from the CRUISE main indicator light on the combination meter. As examples, refer to the chart below for the blinking patterns of the normal system code and DTCs 21 and 52.



HINT:
If the CRUISE main indicator light does not blink DTC blinking patterns, or the normal system code blinking pattern, inspect the following circuits.

Relevant Circuit	See Procedure
TC and CG terminal circuit	CC-35
CRUISE main indicator light circuit	CC-39

(b) DTC CLEAR
(1) Turn the ignition switch OFF.
(2) If DTCs are indicated, repair the relevant circuits referring to the Diagnostic Trouble Code Chart (see page CC-16).
(3) Clear the DTCs according to either one of the following procedures.
- Disconnect the negative (-) battery cable for 60 seconds.
- Remove the EFI fuse for 60 seconds.

(4) Recheck DTCs.

DATA LIST / ACTIVE TEST

1. DATA LIST

(a) While the intelligent tester is connected to the DLC3 with the ignition switch in the ON position, the cruise control DATA LIST can be displayed. Follow the prompts on the tester screen to access the DATA LIST.

ECM (Cruise Control):

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
VEHICLE SPD	Vehicle speed / min.: 0 km/h (0 mph), max.: 255 km/h (158 mph)	Actual vehicle speed	-
MEMORY SPD	Cruise control memorized speed / min.: 0°, max.: 125°	Actual stored vehicle speed	-
THROTTLE	Required throttle opening angle / min.: 36km/h (22.5 mph), max.: 200 km/h (125 mph)	Actual required throttle opening angle	-
CRUISE CTRL	Cruise control system active condition / ON or OFF	ON: Cruise control activated OFF: Cruise control inactivated	-
MAIN SW (MAIN)	Main switch signal (Main CPU) / ON or OFF	ON: Main switch ON (Pushed on) OFF: Main switch OFF (Pushed off)	-
MAIN SW (SUB)	Main switch signal (Sub CPU) / ON or OFF	ON: Main switch ON (Pushed on) OFF: Main switch OFF (Pushed off)	-
CCS READY M	Cruise control system standby condition (Main CPU) / ON or OFF	ON - OFF: ON / OFF changes each time main switch is pushed in.	-
CCS INDICATOR M	Cruise indicator signal (Main CPU) / ON or OFF	ON: "CRUISE" ON OFF: "CRUISE" OFF	-
CANCEL SW	CANCEL switch signal / ON or OFF	ON: CANCEL switch ON OFF: CANCEL switch OFF	-
SET / COAST SW	SET / - switch signal ON or OFF	ON: SET / - switch ON OFF: SET / - switch OFF	-
RES / ACC SW	RES / + switch signal ON or OFF	ON: RES / + switch ON OFF: RES / + switch OFF	-
STP LIGHT SW2 M	Stop light switch signal (Main CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW1 S	Stop light switch signal (Sub CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW2 S	Stop light switch signal (Sub CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
SHIFT D POS	PNP switch signal (D position) / ON or OFF	ON: Shift position D OFF: Any shift position except D	For automatic transaxle

DIAGNOSTIC TROUBLE CODE CHART

DTC Code	Detection Item	Trouble Area	See page
P0500/21	Vehicle Speed Sensor Circuit	- Vehicle speed sensor - Vehicle speed sensor circuit - ECM	CC-17
P0503/23	Vehicle Speed Sensor Circuit	- Vehicle speed sensor - Vehicle speed sensor circuit - ECM	CC-17
P0571/52	Stop Light Switch Circuit	- Stop light switch assembly - Stop light switch assembly circuit - ECM	CC-18
P0607/54	Input Signal Circuit Abnormal	- ECM	CC-22

DTC	P0500/21	Vehicle Speed Sensor Circuit

DTC	P0503/23	Vehicle Speed Sensor Circuit

DESCRIPTION

(see page ES-212)

DTC No.	DTC Detection Condition	Trouble Area
P0500/21	This trouble code is output when the vehicle speed signal from the vehicle speed sensor is cut for 0.14 sec. or more while the cruise control is operating.	• Vehicle speed sensor • Vehicle speed sensor signal circuit • ECM
P0503/23	Momentary interruption and noise are detected when a rapid change of vehicle speed occurs while the cruise control is operating.	• Vehicle speed sensor • Vehicle speed sensor signal circuit • ECM

CC

WIRING DIAGRAM

(see page ES-212)

INSPECTION PROCEDURE

(see page ES-212)

DTC	P0571/52	Stop Light Switch Circuit

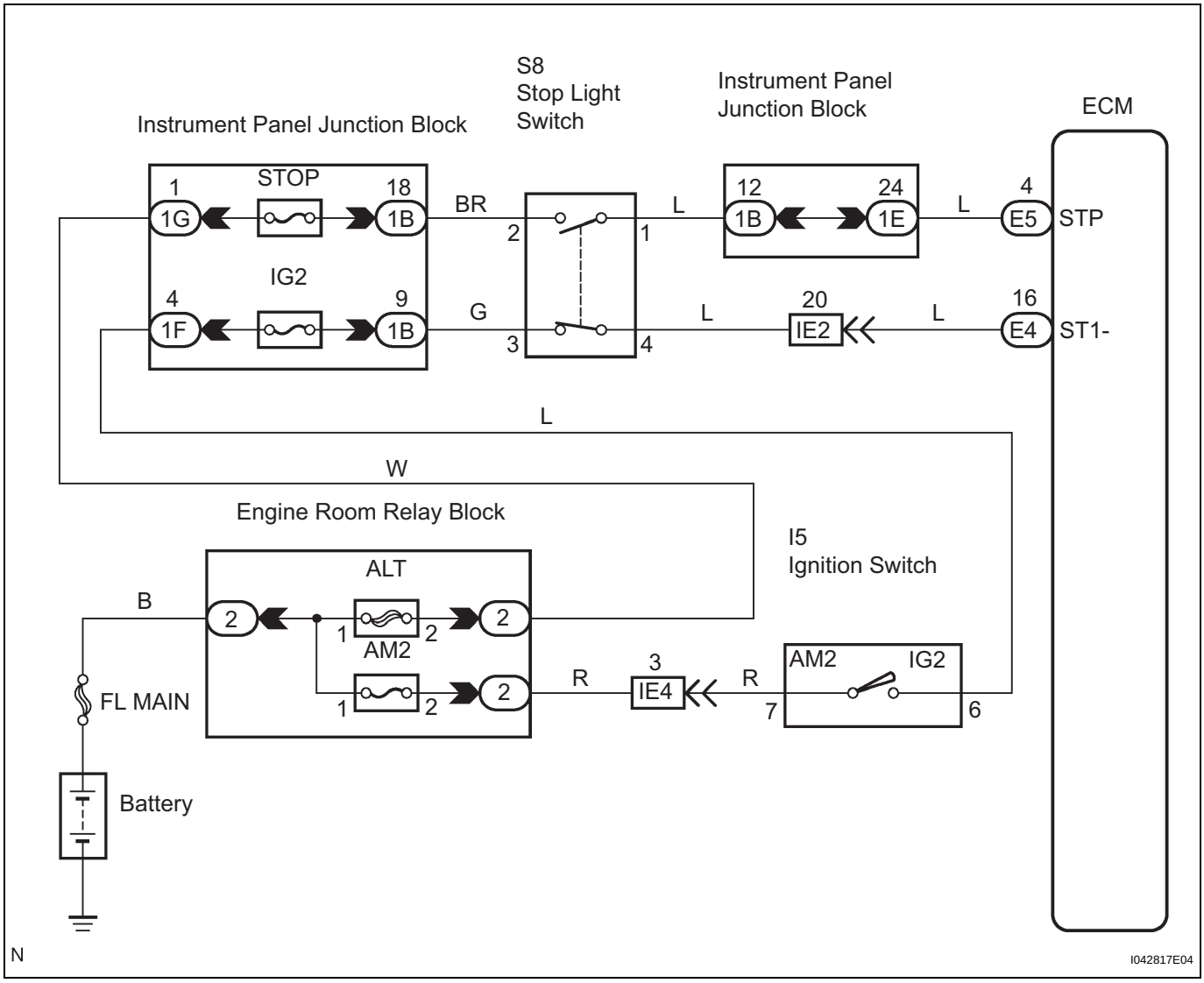
DESCRIPTION

When the brake pedal is depressed, the stop light switch assembly sends a signal to the ECM. When the ECM receives this signal, it cancels the cruise control.
The fail-safe function operates to enable normal driving even if there is a malfunction in the stop light signal circuit.
The cancel condition occurs when positive battery voltage is applied to terminal STP.
When the brake is applied, positive battery voltage is normally applied to terminal STP of the ECM through the STOP fuse and the stop light switch assembly and the ECM turns the cruise control off.

CC

DTC No.	DTC Detection Condition	Trouble Area
P0571/52	This trouble code is output when the voltage of the STP terminal and that of the ST1- terminal on the ECM are below 1 V for 0.5 sec. or more.	• Stop light switch assembly • Stop light switch assembly circuit • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE, be sure to follow the table before replacing the ECM.

1 CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

CC

B → **Go to step 3**

A

2 READ VALUE ON INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position, and turn the intelligent tester main switch on.
(c) Select the item "STP LIGHT SW M", "STP LIGHT SW S1" or "STP LIGHT SW D2" in the DATA LIST, and read its value display on the intelligent tester.
(d) Check that the stop light come on when the brake pedal is depressed, and goes off when the brake pedal is released.

ECM (Cruise Control)

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
STP LIGHT SW2 M	Stop light SW signal (Main CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW1 M	Stop light SW signal (Sub CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
STP LIGHT SW2 S	Stop light SW signal (Sub CPU) / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

OK:
When the brake pedal is operated, the display changes as shown above.

Result

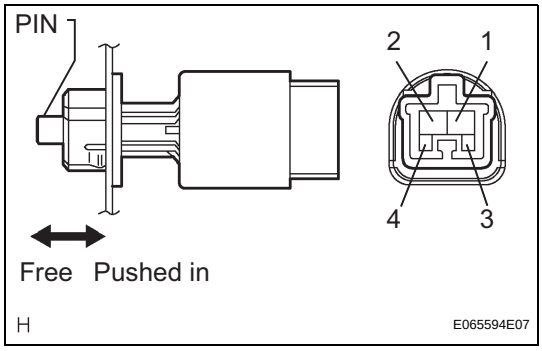
Result	Proceed to
OK (When troubleshooting in accordance with the DTC CHART.)	A
OK (When troubleshooting in accordance with the PROBLEM SYMPTOMS TABLE.)	B
NG	C

A → **REPLACE ECM**

B → PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

C

3 INSPECT STOP LIGHT SWITCH ASSEMBLY



(a) Disconnect the S8 stop light switch connector.
(b) Measure the resistance according to the value(s) in the table below.

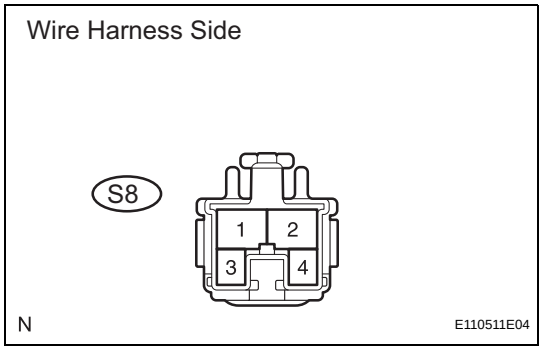
Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Switch pin free	Below 1 Ω
3 - 4	Switch pin free	10 kΩor higher
1 - 2	Switch pin pushed in	10 kΩor higher
3 - 4	Switch pin pushed in	Below 1 Ω

NG → REPLACE STOP LIGHT SWITCH ASSEMBLY

OK

4 CHECK WIRE HARNESS (STOP LIGHT SWITCH - BATTERY)



(a) Measure the voltage according to the value(s) in the table below.

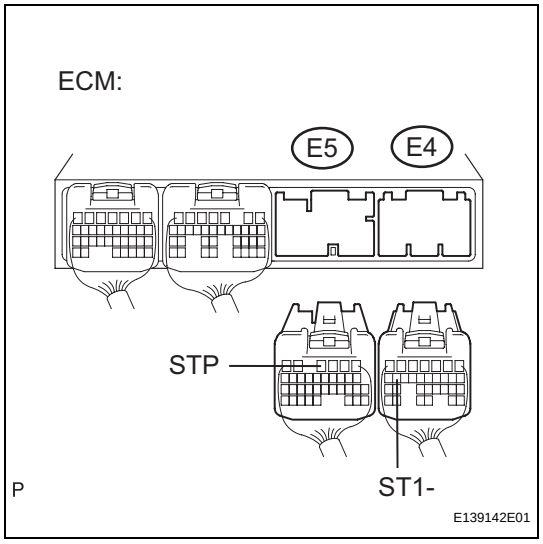
Standard voltage

Tester Connection	Condition	Specified Condition
2 - Body ground	Always	10 to 14 V
3 - Body ground	Ignition switch ON	10 to 14 V

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5	CHECK WIRE HARNESS (ECM - STOP LIGHT SWITCH)



(a) Reconnect the S8 stop light switch connector.
(b) Disconnect the E4 and E5 connectors from the ECM.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E4-16 (ST1-) - Body ground	Brake pedal depressed	Below 1 V
E4-16 (ST1-) - Body ground	Brake pedal released	10 to 14 V
E5-4 (STP) - Body ground	Brake pedal depressed	10 to 14 V
E5-4 (STP) - Body ground	Brake pedal released	Below 1 V

CC

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE ECM

DTC	P0607/54	Input Signal Circuit Abnormal

DESCRIPTION

This DTC indicates the internal abnormalities of the ECM.

DTC No.	Detection Condition	Trouble Area
P0607/54	The ECM has a supervisory CPU and a control ECU inside. This trouble code is output when each input STP signal is different for 0.15 sec. or more. This trouble code is output after 0.4 sec. has passed from the time the cruise cancel input signal (STP input) is input into the ECM.	ECM

HINT:
The ECM receives signals from each sensor to control all the functions of the cruise control with the microcomputer.
When a trouble code is detected, the fail-safe remains on until the ignition switch is turned off.

INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Delete the DTC.
(b) Check for DTCs.

OK:
No DTC is output.

NG → **REPLACE ECM**

OK

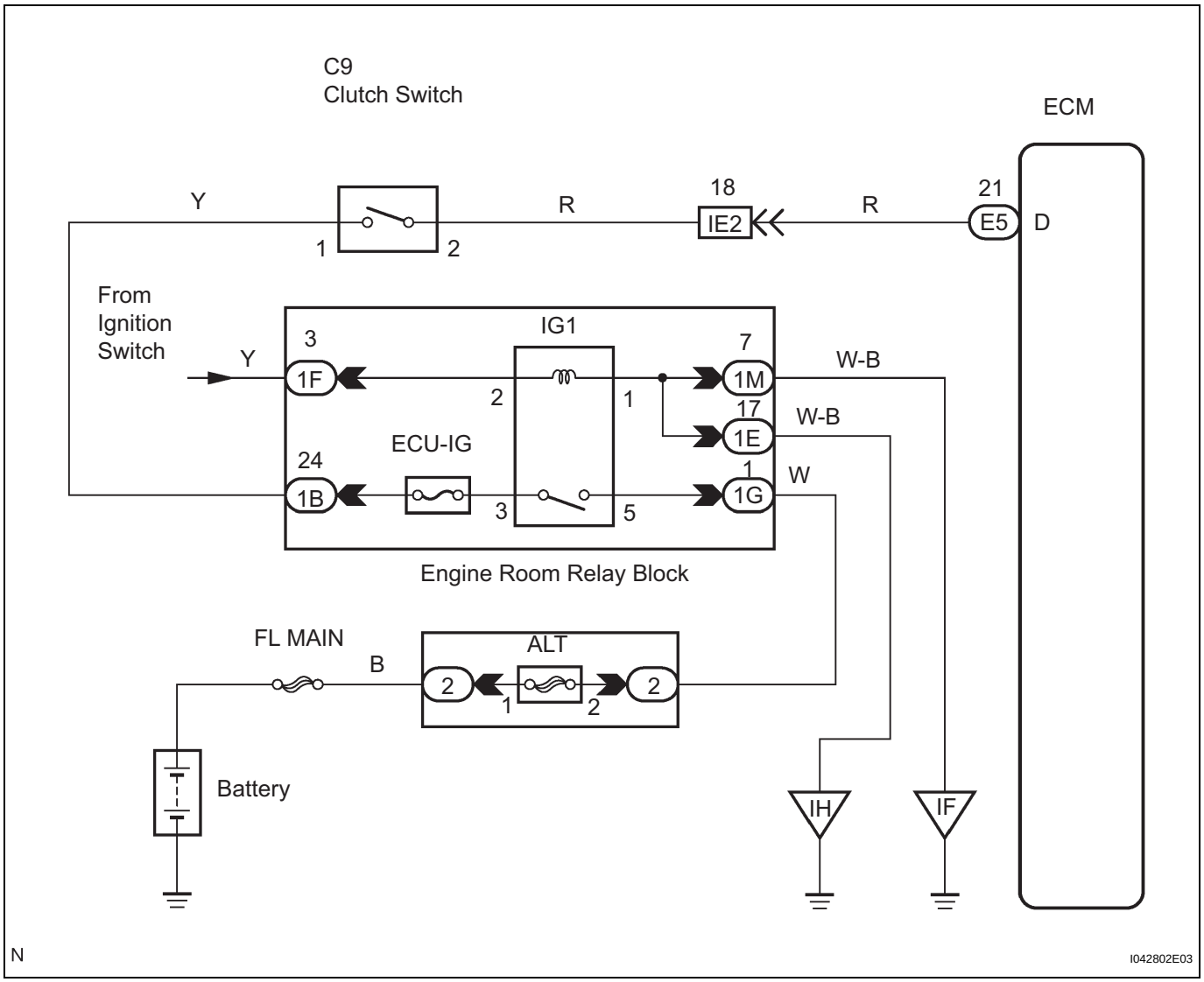
END

Clutch Switch Circuit

DESCRIPTION

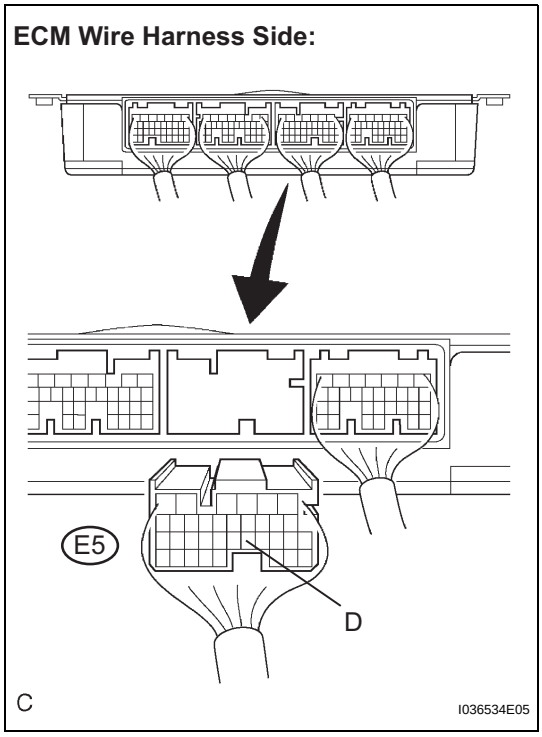
Clutch switch circuit inspection is necessary for manual transaxle vehicles.
When the clutch pedal is released, the ECM receives positive (+) battery voltage through the IG1 relay and ECU-IG fuse. While depressing the clutch pedal, the clutch switch assembly sends a signal to terminal D of the ECM. The ECM cancels cruise control driving when terminal D receives the signal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (ECM - BATTERY)



(a) Disconnect the E5 connector from the ECM
(b) Turn the ignition switch on the ON position.
(c) Measure the voltage according to the value(s) in the table below.

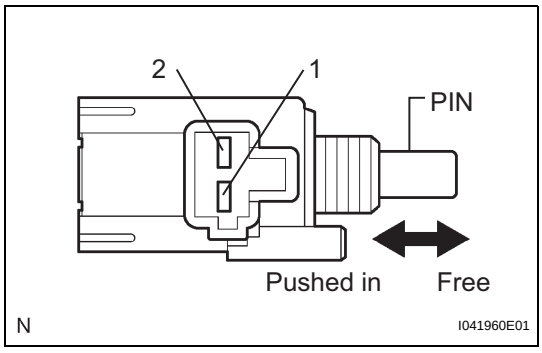
Standard voltage

Tester Connection	Condition	Specified Condition
E5-21 (D) - Body ground	Clutch pedal depressed	Below 1 V
E5-21 (D) - Body ground	Clutch pedal released	10 to 14 V

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

NG

2	INSPECT CLUTCH SWITCH ASSEMBLY



(a) Disconnect the C9 clutch switch connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

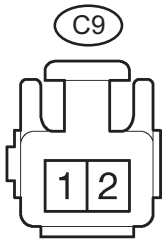
Tester Connection	Condition	Specified Condition
1 - 2	Switch pin free (Clutch pedal depressed)	10 kΩor higher
1 - 2	Switch pin pushed in (Clutch pedal depressed)	Below 1 Ω

NG → **REPLACE CLUTCH SWITCH ASSEMBLY**

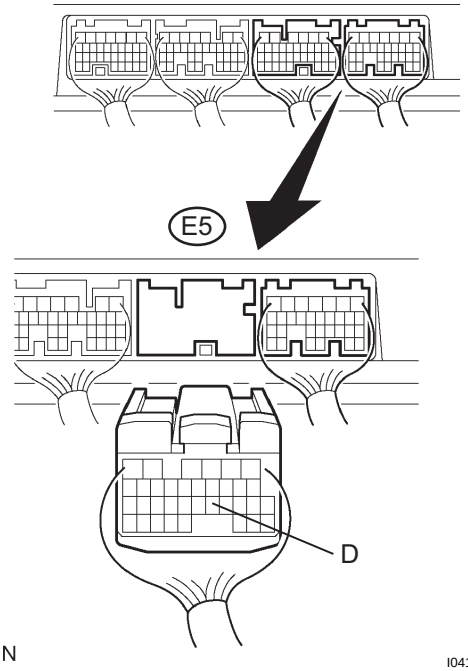
OK

3	CHECK WIRE HARNESS (CLUTCH SWITCH - ECM)

Clutch Switch Connector Front View:



ECM Wire Harness View:



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
C9-2 (D) - E5-21 (D)	Always	Below 1 Ω
E5-21 (D) - Body ground	Always	10 kΩor higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

CC

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR (CLUTCH SWITCH - BATTERY)

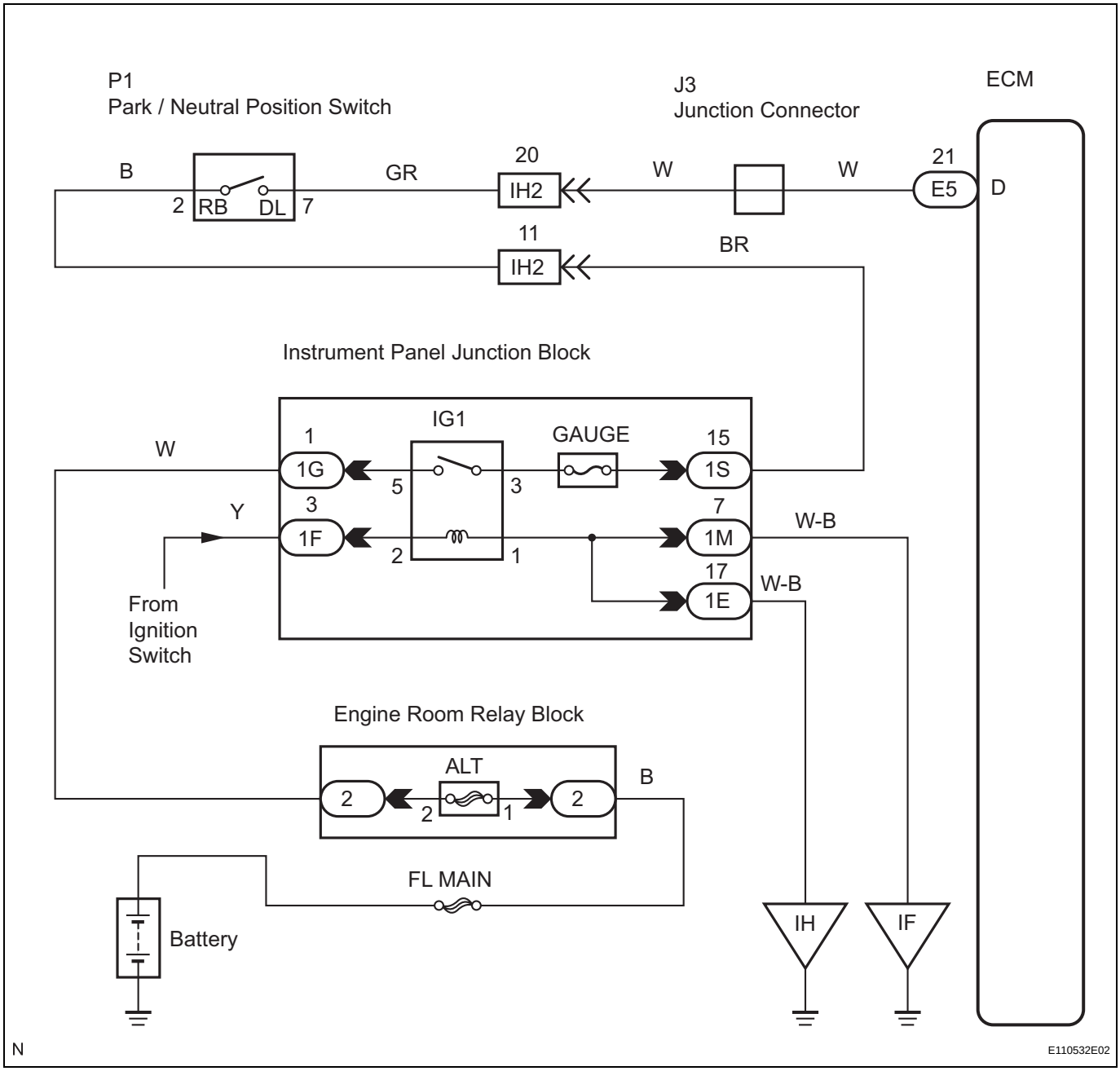
Park / Neutral Position Switch Circuit

DESCRIPTION

The park / neutral position switch circuit inspection is necessary for automatic transaxle equipped vehicle. When the shift lever is in any position except D, a signal is sent from the park / neutral position switch to the ECM. When this signal is input during cruise control driving, the ECM cancels the cruise control.

WIRING DIAGRAM

CC



INSPECTION PROCEDURE

1 **CHOOSE DIAGNOSIS METHOD**

(a) Choose the diagnosis method.

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → **Go to step 3**

A

2 **READ VALUE ON INTELLIGENT TESTER**

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the intelligent tester main switch on.
(c) Select the item below in the "DATA LIST", and read the display on the intelligent tester.

ECM (Cruise Control)

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
SHIFT D POS	PNP SW signal (D position) ON or OFF	ON: Shift position D OFF: Any shift position except D	-

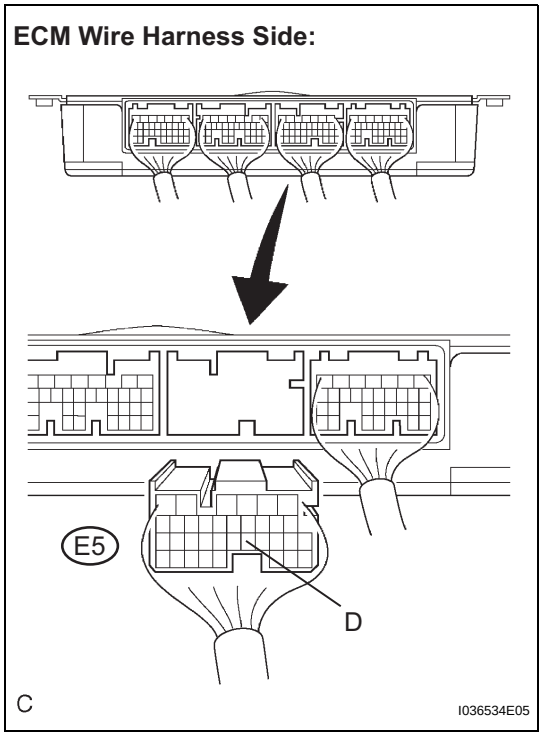
OK:

When the shift lever is operated, the display changes as shown above.

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

NG

3 CHECK WIRE HARNESS (ECM - BATTERY)



(a) Disconnect the E5 connector from the ECM.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

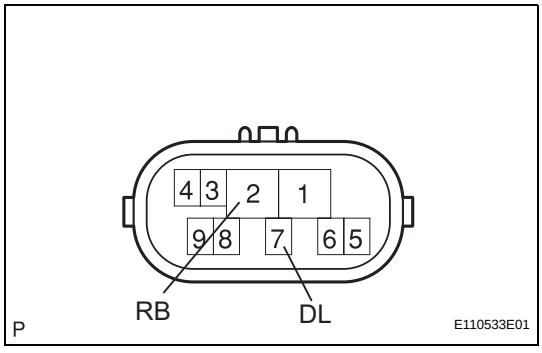
Standard voltage

Tester Connection	Condition	Specified Condition
E5-21 (D) - Body ground	Shift position D	10 to 14 V
E5-21 (D) - Body ground	Any shift position except D	Below 1 V

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

NG

4 INSPECT PARK / NEUTRAL POSITION SWITCH ASSEMBLY



(a) Disconnect the P1 park / neutral position switch connector.
(b) Measure the resistance according to the value(s) in the table below.

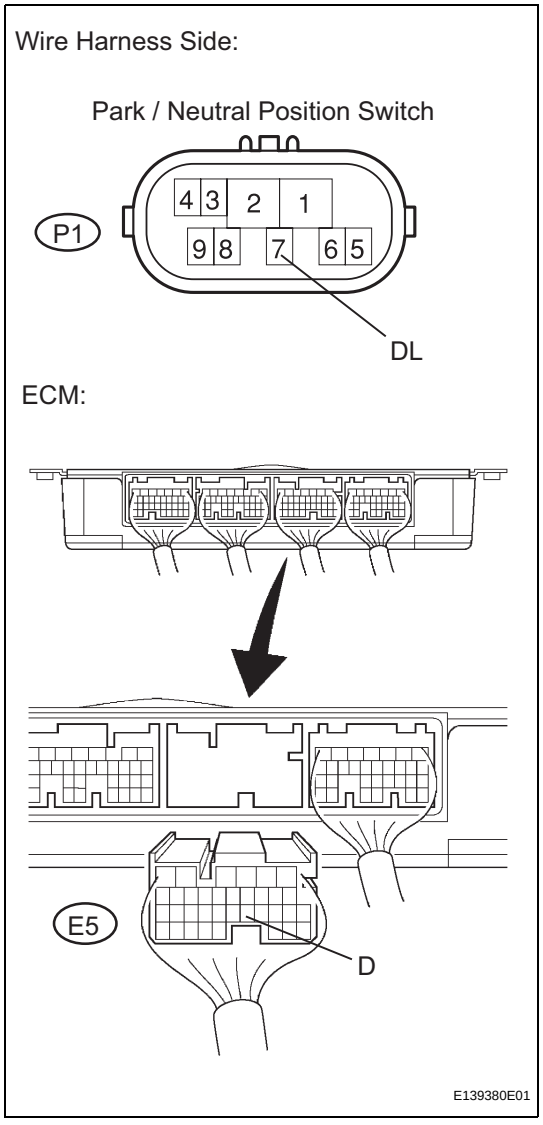
Standard resistance

Tester Connection	Condition	Specified Condition
2 (RB) - 7 (DL)	Shift position D	Below 1 Ω
2 (RB) - 7 (DL)	Any shift position except D	10 kΩor higher

NG → **REPLACE PARK / NEUTRAL POSITION SWITCH ASSEMBLY**

OK

5	CHECK WIRE HARNESS (PARK / NEUTRAL POSITION SWITCH - ECM)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
P1-7 (DL) - E5-21 (D)	Always	Below 1 Ω
E5-21 (D) - Body ground	Always	10 kΩor higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

CC

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR (PARK / NEUTRAL POSITION SWITCH - BATTERY)

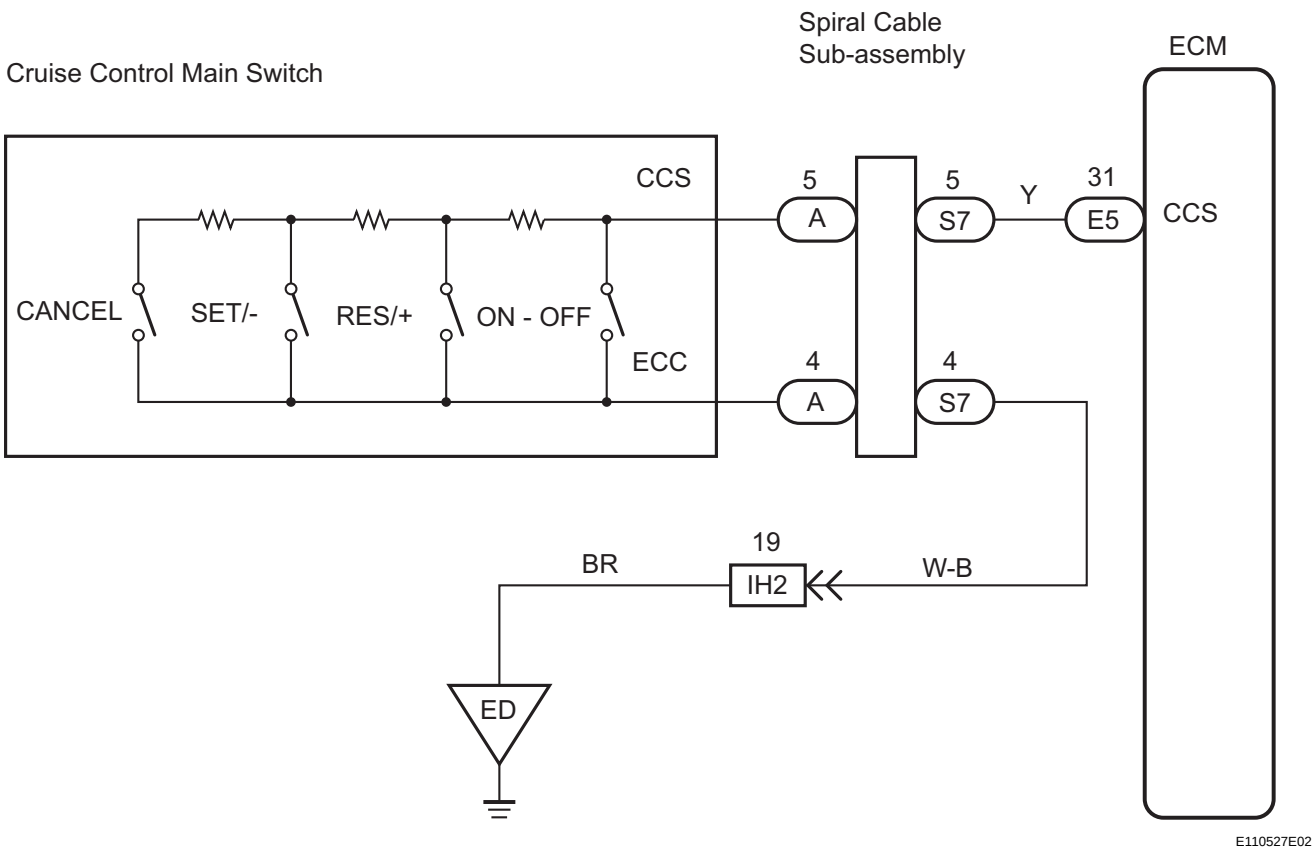
Cruise Control Switch Circuit

DESCRIPTION

The cruise control main switch operates seven functions: SET, '-' (COAST), TAP-DOWN, RESUME, '+' (ACCEL), TAP-UP, and CANCEL. The SET, TAP-DOWN and COAST functions, and the 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 each arrow direction and turns off after releasing it. The internal contact point of the cruise control main switch is turned on with the switch operation. Then the ECM reads the voltage that has been changed by the switch operation to control SET, '-' (COAST), RESUME, '-' (ACCEL) and CANCEL.

CC

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

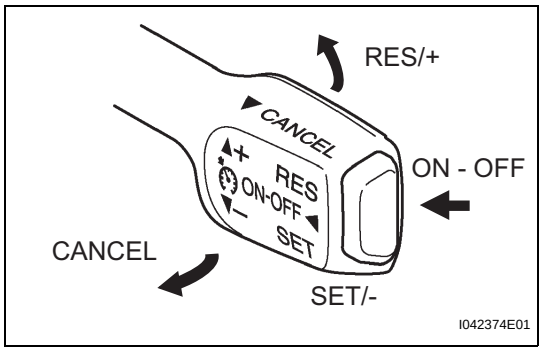
(a) Choose the diagnosis method.

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → **Go to step 3**

A

2	READ VALUE ON INTELLIGENT TESTER



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) According to the display on the tester, read the "DATA LIST".

CC

ECM (Cruise Control)

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
MAIN SW (MAIN)	Main SW signal (Main CPU) ON or OFF	ON: Main SW ON (Pushed on) OFF: Main SW OFF (Pushed off)	-
MAIN SW (SUB)	Main SW signal (Sub CPU) ON or OFF	ON: Main SW ON (Pushed on) OFF: Main SW OFF (Pushed off)	-
CANCEL SW	CANCEL SW signal ON or OFF	ON: CANCEL SW ON OFF: CANCEL SW OFF	-
SET / COAST SW	SET/- SW signal ON or OFF	ON: SET/- SW ON OFF: SET/- SW OFF	-
RES / ACC SW	RES/+ SW signal ON or OFF	ON: RES/+ SW ON OFF: RES/+ SW OFF	-

OK:
When the cruise control main switch is operated, the display changes as shown above.

Result

Result	Proceed to
OK	A
NG (All items are detective.)	B
NG (One to four items are defective.)	C

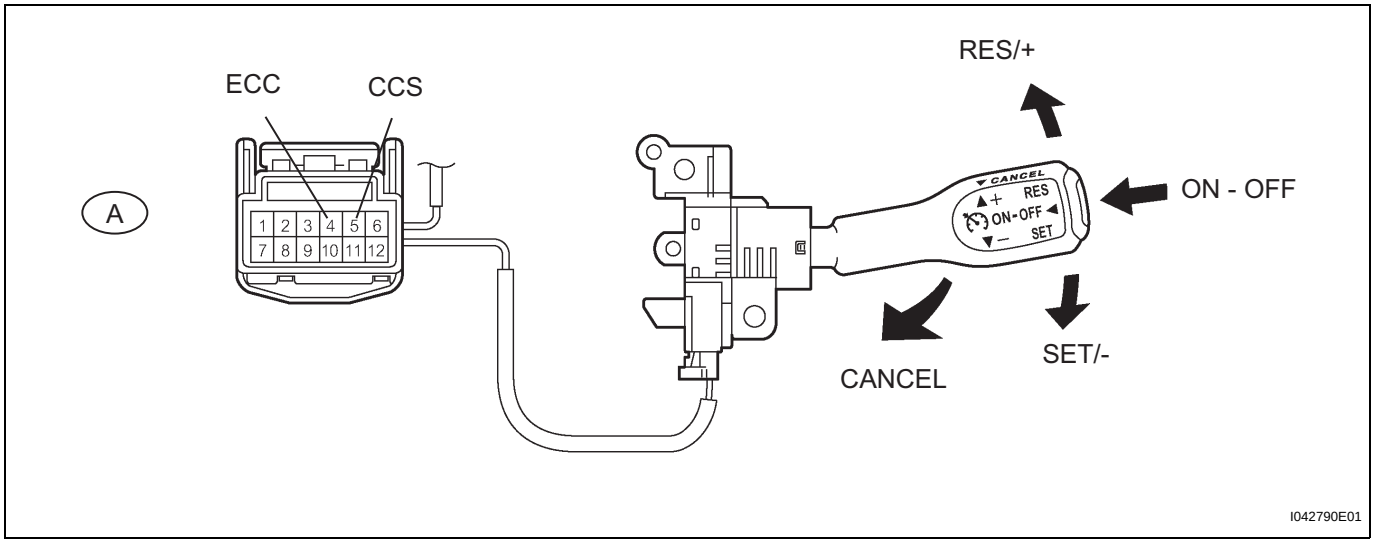
A → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

C → **REPLACE CRUISE CONTROL MAIN SWITCH ASSEMBLY**

B

3	INSPECT CRUISE CONTROL MAIN SWITCH ASSEMBLY

(a) Disconnect the cruise control main switch connector.



(b) Measure the resistance according to the value(s) in the table below.

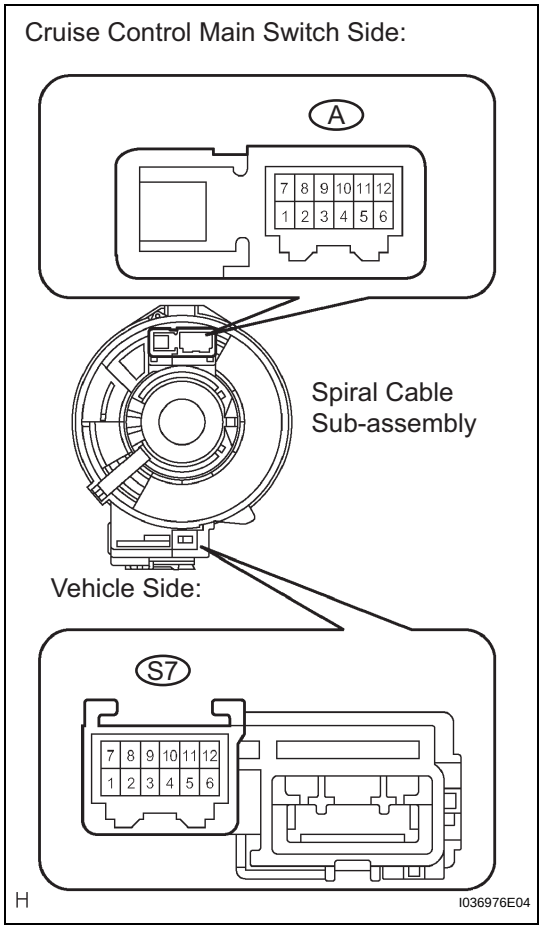
Standard resistance

Tester Connection	Condition	Specified Condition
4 - 5	Neutral	10 kΩor higher
4 - 5	RES/+	210 to 270 Ω
4 - 5	SET/-	560 to 700 Ω
4 - 5	CANCEL	1,380 to 1,700 Ω
4 - 5	Main switch OFF	10 kΩor higher
4 - 5	Main switch ON	Below 1 Ω

NG → **REPLACE CRUISE CONTROL MAIN SWITCH ASSEMBLY**

OK

4	INSPECT SPIRAL CABLE SUB-ASSEMBLY



(a) Disconnect the S7 spiral cable connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

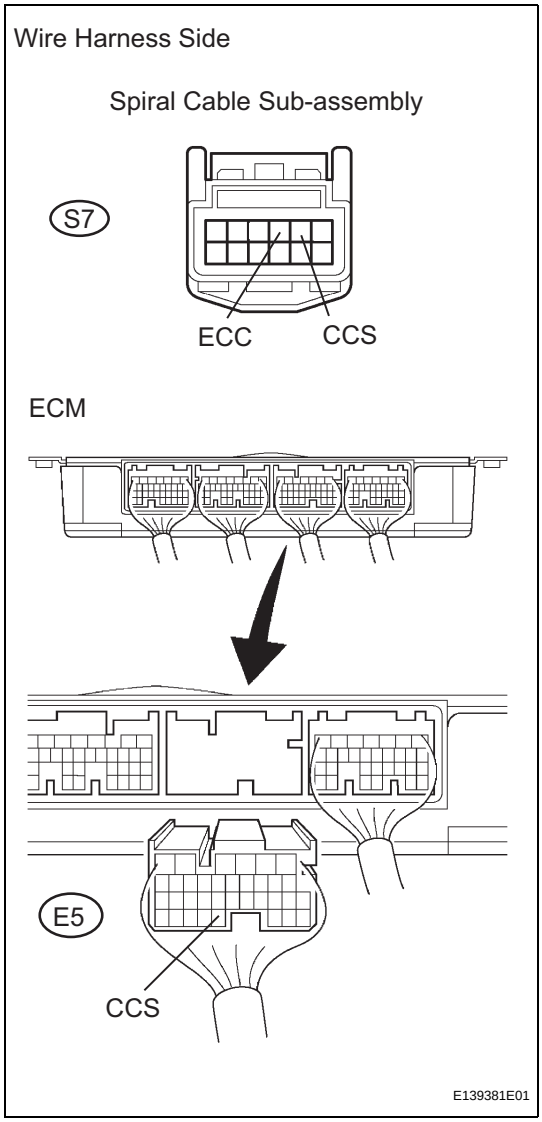
Tester Connection	Condition	Specified Condition
A-4 - S7-4	Always	Below 1 Ω
A-5 - S7-5	Always	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

CC

5	CHECK WIRE HARNESS (SPIRAL CABLE - ECM AND BODY GROUND)



(a) Disconnect the E5 connector from the ECM.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Connection	Specified Condition
S7-5 - E5-31 (CCS)	Always	Below 1 Ω
E5-31 (CCS) - Body ground	Always	10 kΩor higher
S7-4 - Body ground	Always	Below 1 Ω

NG → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

OK

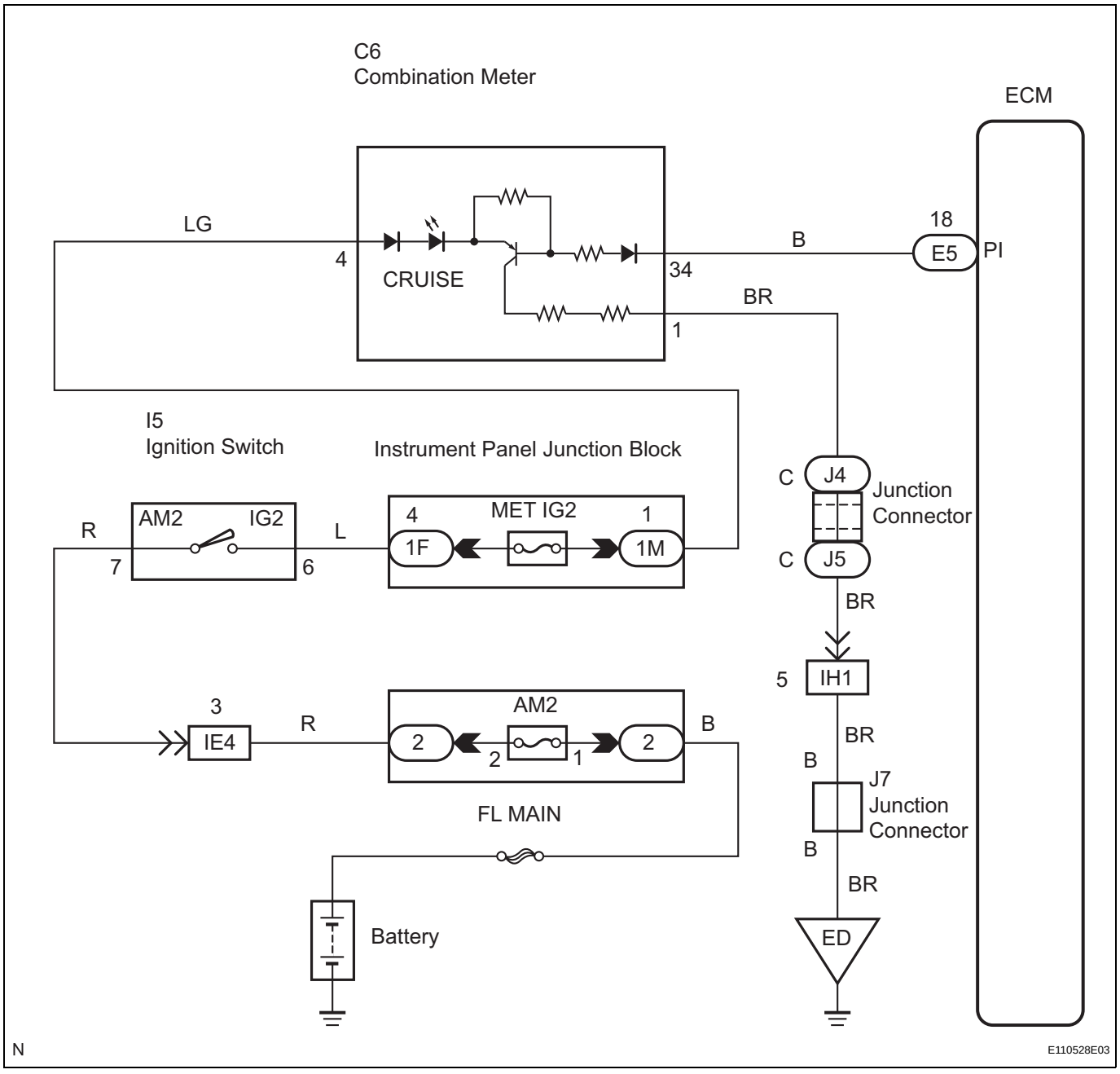
REPAIR OR REPLACE HARNESS AND CONNECTOR

Cruise Main Indicator Light Circuit

DESCRIPTION

When the cruise control main switch is turned off, the cruise control does not operate.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHOOSE DIAGNOSIS METHOD

(a) Choose the diagnosis method.

Method	Proceed to
Using intelligent tester	A
Not using intelligent tester	B

B → Go to step 3

CC

A

2	READ VALUE ON INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the intelligent tester main switch on.
(c) Select the item below in the "DATA LIST", and read the display on the intelligent tester.

ECM (Cruise Control)

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
CCS INDICATOR M	Cruise indicator signal (Main CPU) ON or OFF	ON: "CRUISE" ON OFF: "CRUISE" OFF	-

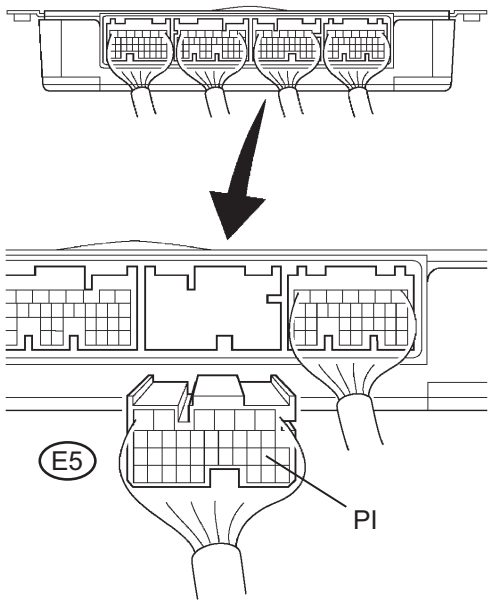
OK:
When the cruise control main switch is operated, the display changes as shown above.

OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

NG

3 CHECK WIRE HARNESS (ECM - BATTERY)

ECM Wire Harness Side:



(a) Disconnect the E5 connector from the ECM.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E5-18 (P1) - Body ground	Cruise main indicator light ON →OFF (Cruise control main switch ON → OFF)	Below 1 V→ 10 to 14 V

CC

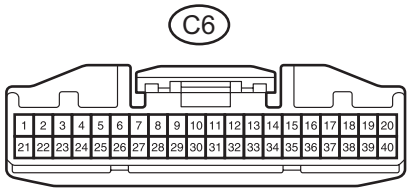
OK → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE**

NG

4 INSPECT COMBINATION METER ASSEMBLY

Wire Harness Side

Combination Meter Assembly



(a) Disconnect the C6 combination meter connector.
(b) Measure the voltage according to the value(s) in the table below.

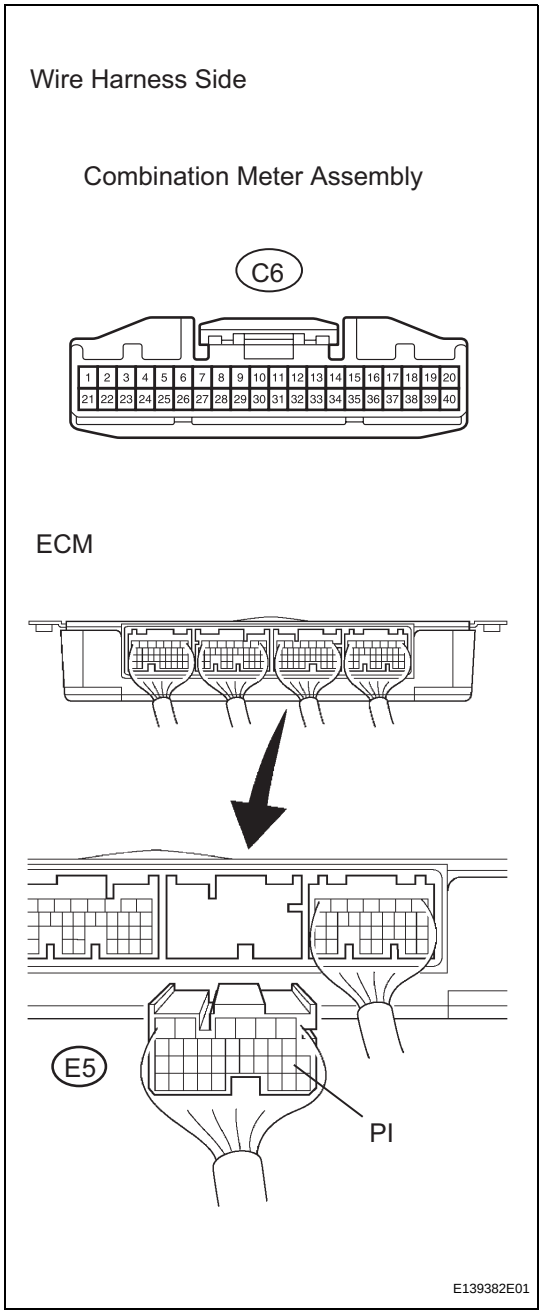
Standard voltage

Tester Connection	Condition	Specified Condition
C6-4 - Body ground	Ignition switch OFF	Below 1 V
C6-4 - Body ground	Ignition switch ON	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR (COMBINATION METER-BATTERY)**

OK

5	CHECK WIRE HARNESS (COMBINATION METER - ECM AND BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
C6-34 - E5-18 (PI)	Always	Below 1 Ω
E5-18 (PI) - Body ground	Always	10 kΩor higher
C6-1 - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

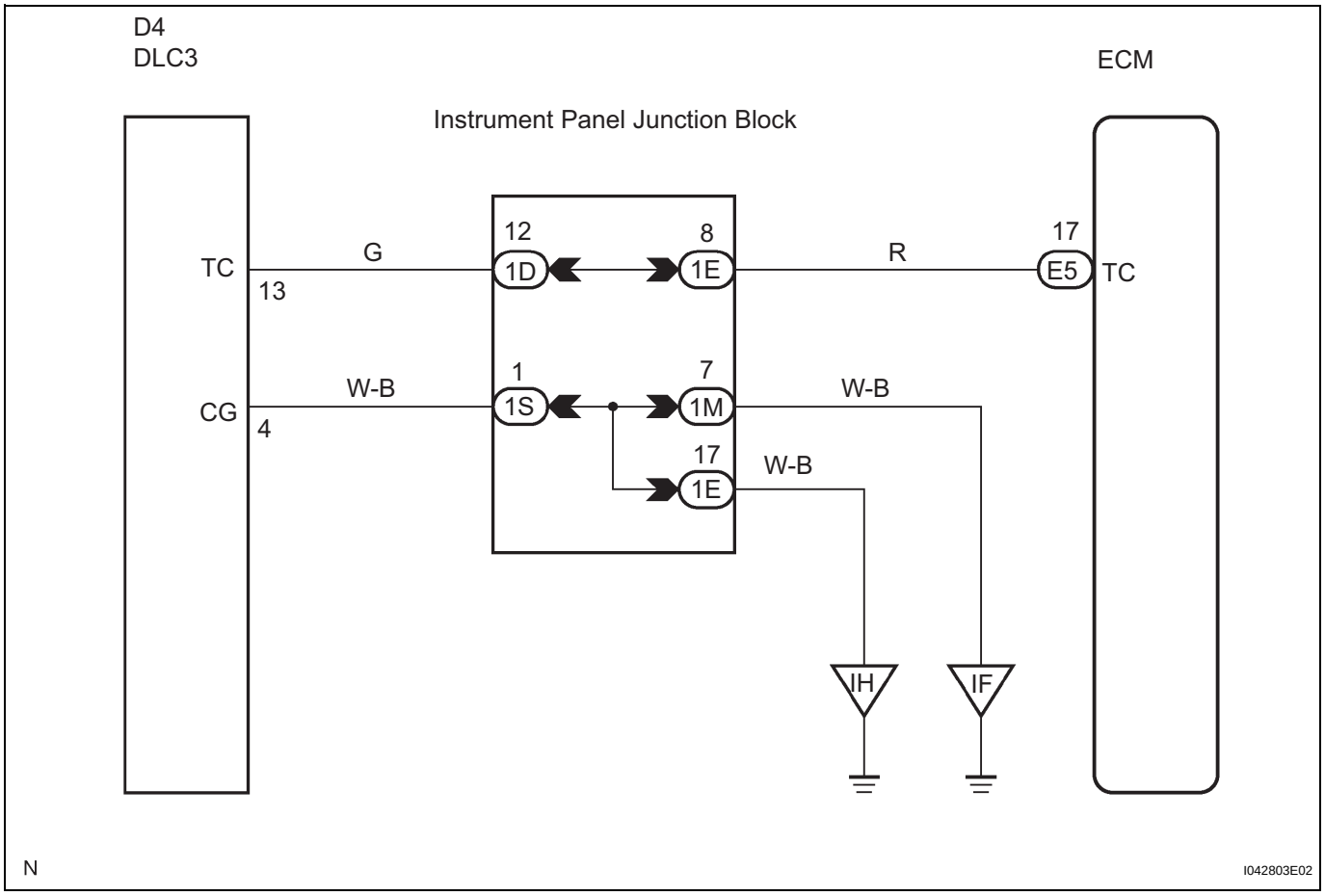
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

Diagnosis Circuit

DESCRIPTION

Making a short circuit between terminals TC and CG of the DLC3 will output DTCs from the DLC3.

WIRING DIAGRAM

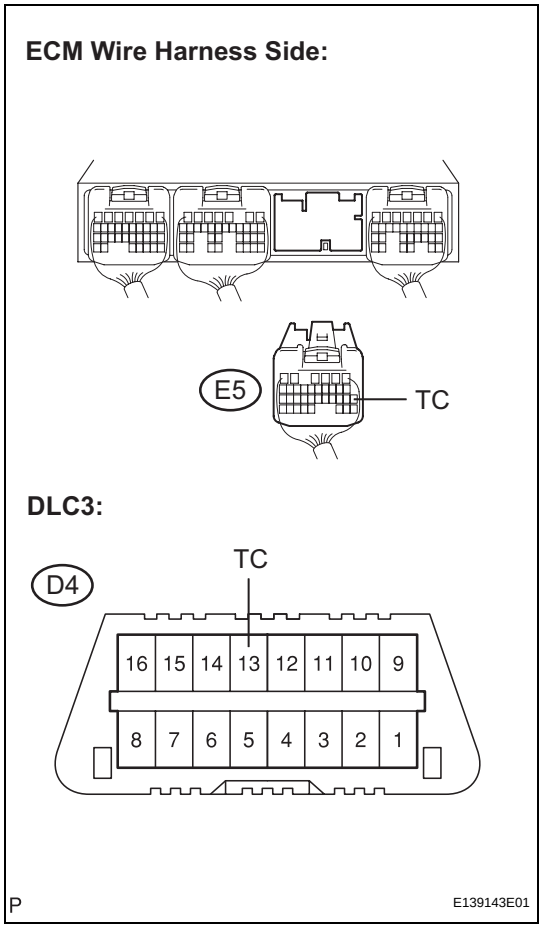


HINT:

When a particular warning light stays blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in the relevant ECU is suspected.

INSPECTION PROCEDURE

1 CHECK WIRE HARNESS (DLC3 - ECM AND BODY GROUND)



(a) Disconnect the E4 connector from the ECM.
(b) Measure the resistance according to the value(s) in the table below.

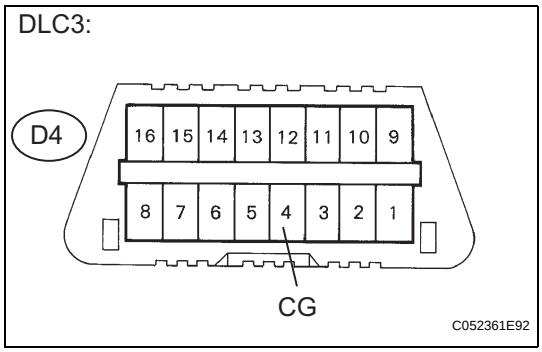
Standard resistance

Tester Connection	Condition	Specified Condition
D4-13 (TC) - E4-20 (TC)	Always	Below 1 Ω
D4-13 (TC) - Body ground	Always	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 CHECK WIRE HARNESS (DLC3 - BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
D4-4 (CG) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ECM

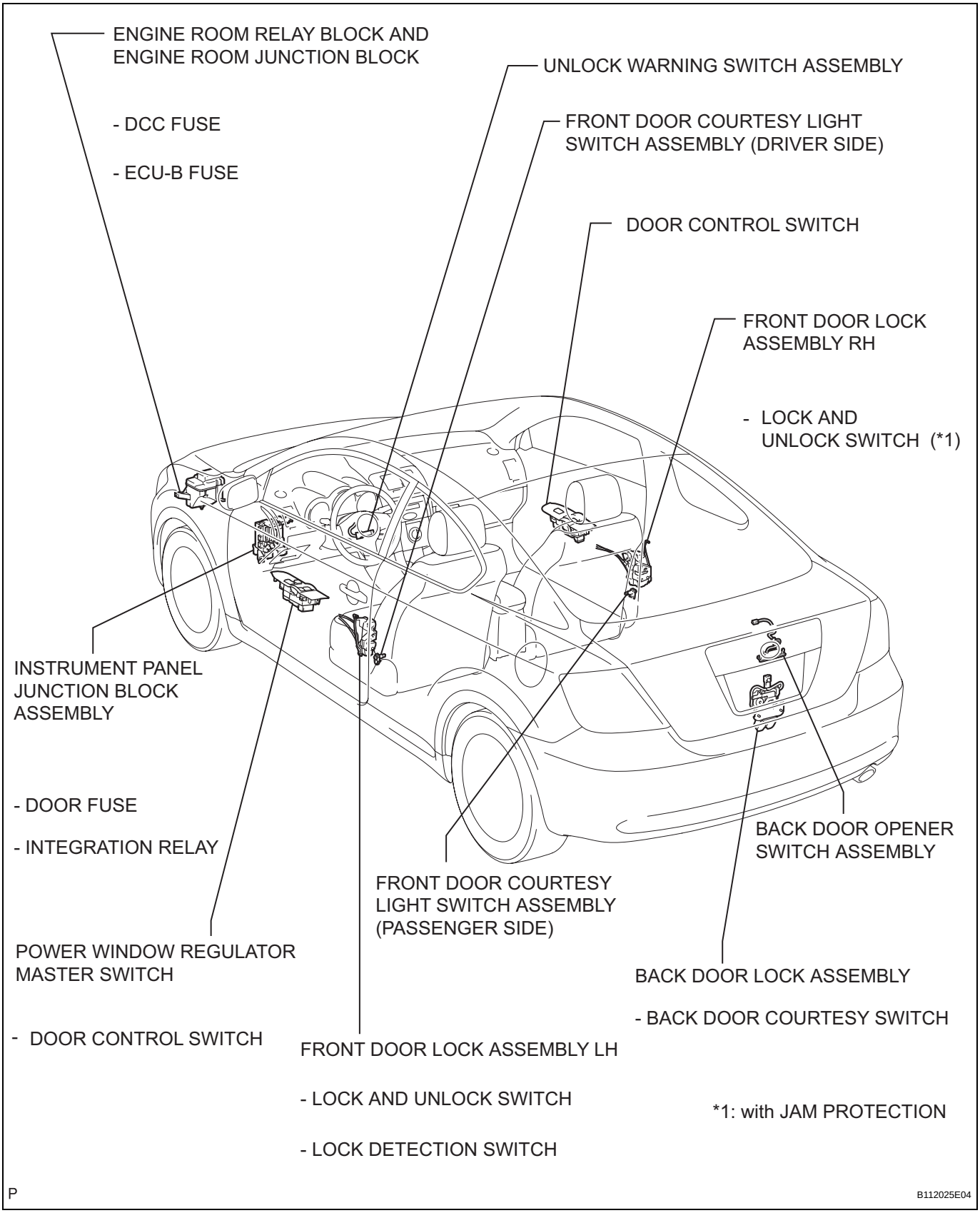
POWER DOOR LOCK CONTROL SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

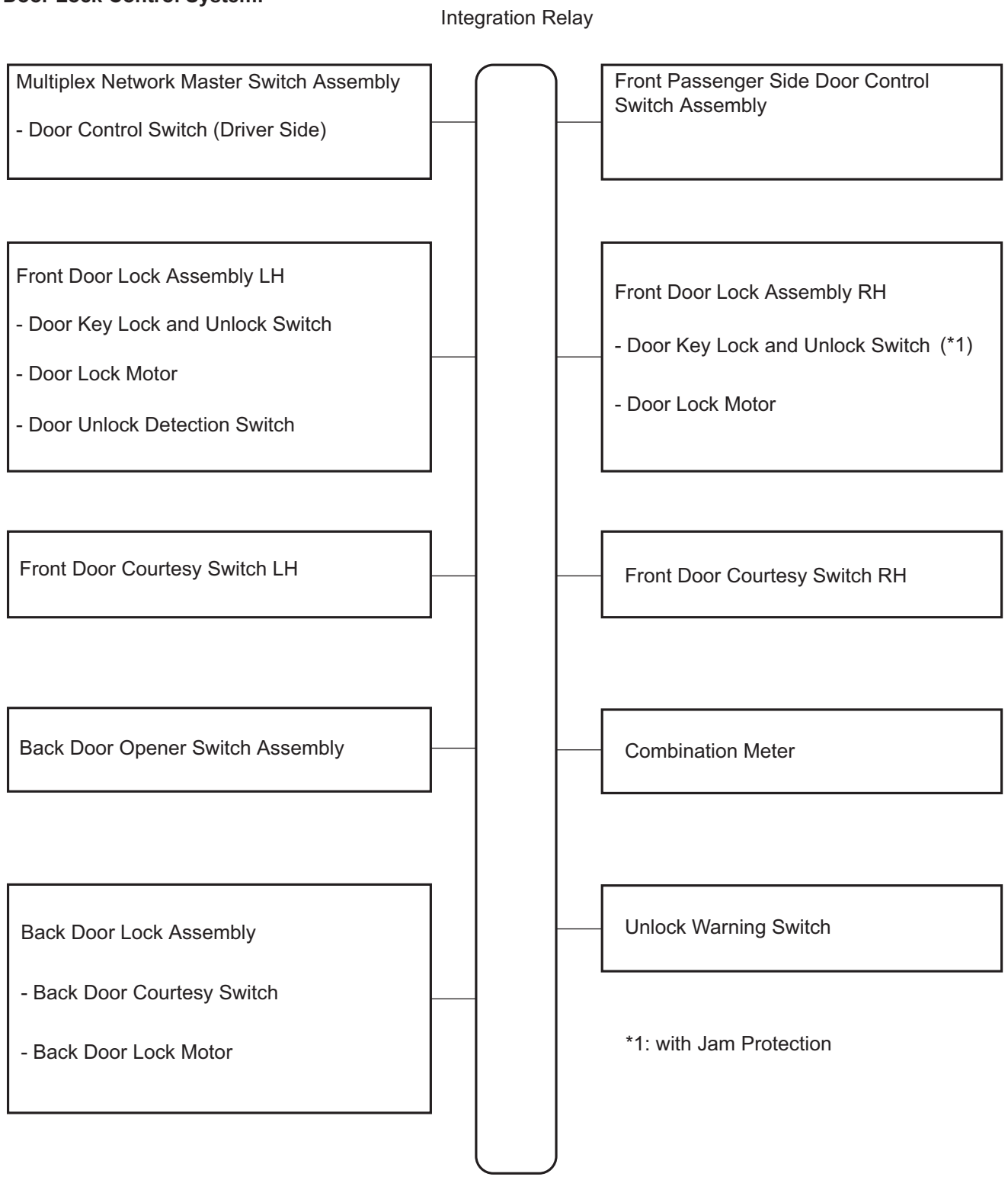
System Name	See Page
Power Window Control System	WS-5
Sliding Roof System	RF-3

PARTS LOCATION



SYSTEM DIAGRAM

Door Lock Control System:



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DL

SYSTEM DESCRIPTION

All doors are locked and unlocked simultaneously by the door lock motor. The motors are operated by the integration relay (instrument panel junction block). The integration relay receives lock/unlock signals from the driver and passenger door key cylinders, and the driver and passenger side door control switches. The signals are sent when: 1) the driver/passenger door key cylinder is turned with the key, and 2) the driver/passenger side door control switch is pressed.
The power door lock system has the following functions:

Function	Description
All doors unlock with transmitter (2-step unlock)	Pressing UNLOCK twice unlocks all doors.
All doors unlock with driver door key cylinder (2-step unlock)	Turning key cylinder twice with key unlock all doors.
All doors unlock with passenger door key cylinder (*1)	Turning key cylinder with key unlocks all doors.
All doors unlock with driver side door control switch	Operating switch unlocks all doors.
All doors unlock with passenger door control switch	Operating switch unlocks all doors.
All doors lock with transmitter	Pressing LOCK locks all doors.
All doors lock with driver door key cylinder	Turning key cylinder with key locks all doors.
All doors lock with passenger door key cylinder (*1)	Turning key cylinder with key locks all doors.
All doors lock with driver side door control switch	Operating switch locks all doors.
All doors lock with passenger door control switch	Operating switch locks all doors.
Key reminder function	All door lock is cancelled when: • Key is in ignition key cylinder • Driver side door is open
Unlock prohibition for security purposes	All doors cannot be unlocked with driver side door control switch and passenger side door control switch when they have been locked with key or transmitter.

*1: with Jam Protection

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
Use this procedure to troubleshoot the power door lock control 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**

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 4**

A

4 **OVERALL ANALYSIS AND TROUBLESHOOTING**

(a) Terminal of ECU (See page DL-6)

NEXT

5 **ADJUST, REPAIR OR REPLACE**

NEXT

6 **CONFIRMATION TEST**

NEXT

END

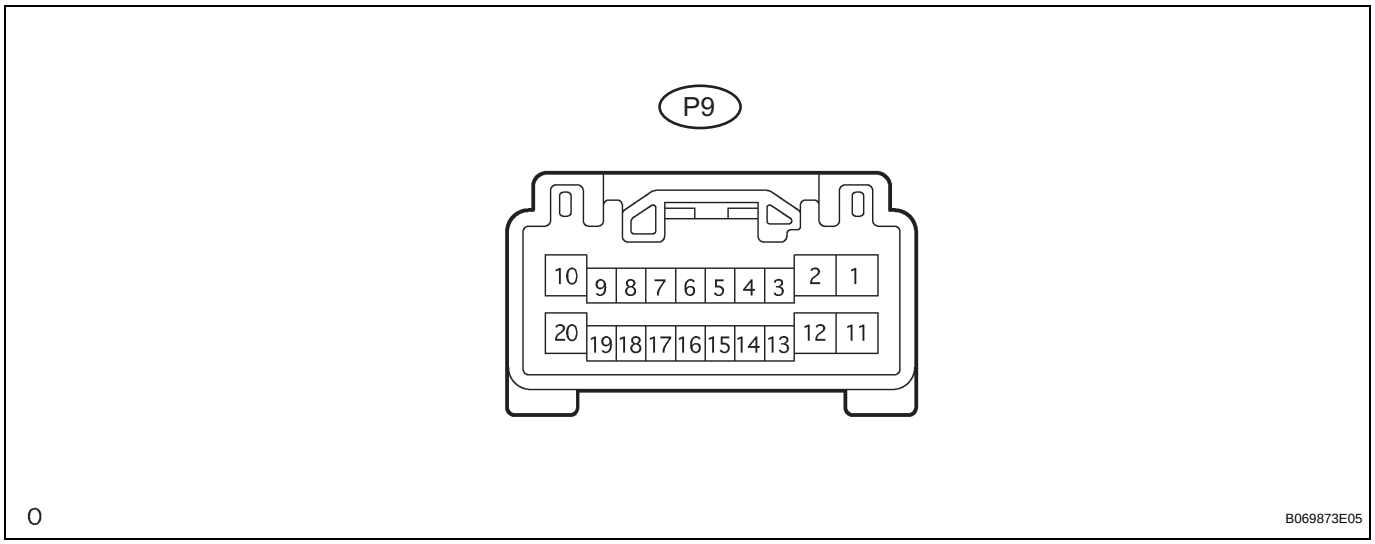
PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cause of the problem symptom. 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
All doors cannot be locked/unlocked simultaneously	1. DCC fuse	DL-14
	2. ECU-B fuse	DL-14
	3. DOOR fuse	DL-14
	4. IG1 relay	DL-14
	5. Power window regulator master switch assembly	DL-14
	6. Door control switch assembly (passenger side)	DL-14
	7. Front door lock assembly RH	DL-14
	8. Front door lock assembly LH	DL-14
	9. Wire harness	DL-14
	10. Instrument panel junction block assembly (integration relay)	DL-14
Key lock-in prevention function does not work properly (manual operation and key-linked lock are active)	1. Front door courtesy light switch assembly	DL-30
	2. Unlock warning switch assembly	DL-30
	3. Wire harness	DL-30
	4. Instrument panel junction block assembly (integration relay)	DL-30
Only back door cannot be opened (unlocked)	1. Back door lock assembly	DL-36
	2. Back door opener witch assembly	DL-36
	3. Wire harness	DL-36
	4. Instrument panel junction block assembly (integration relay)	DL-36

TERMINALS OF ECU

1. CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY (with Jam Protection)

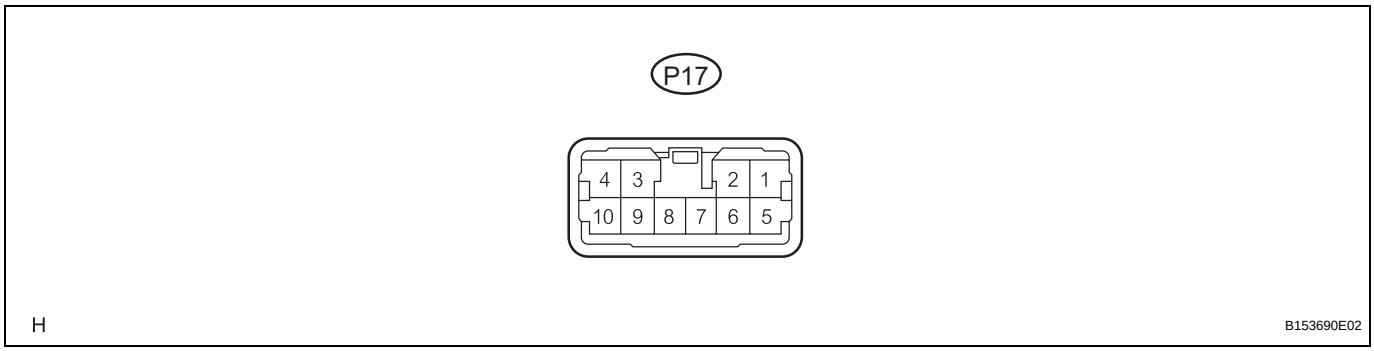


(a) Disconnect the P9 switch connector.
(b) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
B (P9-10) - Body ground	B - Body ground	+B power supply	Always	10 to 14 V
IG (P9-20) - Body ground	R - Body ground	Ignition power supply	Ignition switch OFF	Below 1 V
IG (P9-20) - Body ground	R - Body ground	Ignition power supply	Ignition switch ON	10 to 14 V
GND (P9-2) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
L (P9-4) - Body ground	R - Body ground	Door control switch door lock input	Door control switch OFF	10 kΩ or higher
L (P9-4) - Body ground	R - Body ground	Door control switch door lock input	Door control switch LOCK	Below 1 Ω
U (P9-14) - Body ground	P - Body ground	Door control switch door unlock input	Door control switch OFF	10 kΩ or higher
U (P9-14) - Body ground	P - Body ground	Door control switch door unlock input	Door control switch UNLOCK	Below 1 Ω

If the result is not as specified, there may be a malfunction on the wire harness side.
HINT:
After disconnecting the P9 switch connector, be sure to reconnect it and then reset the power window motor (See page WS-5).

2. CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY (without Jam Protection)



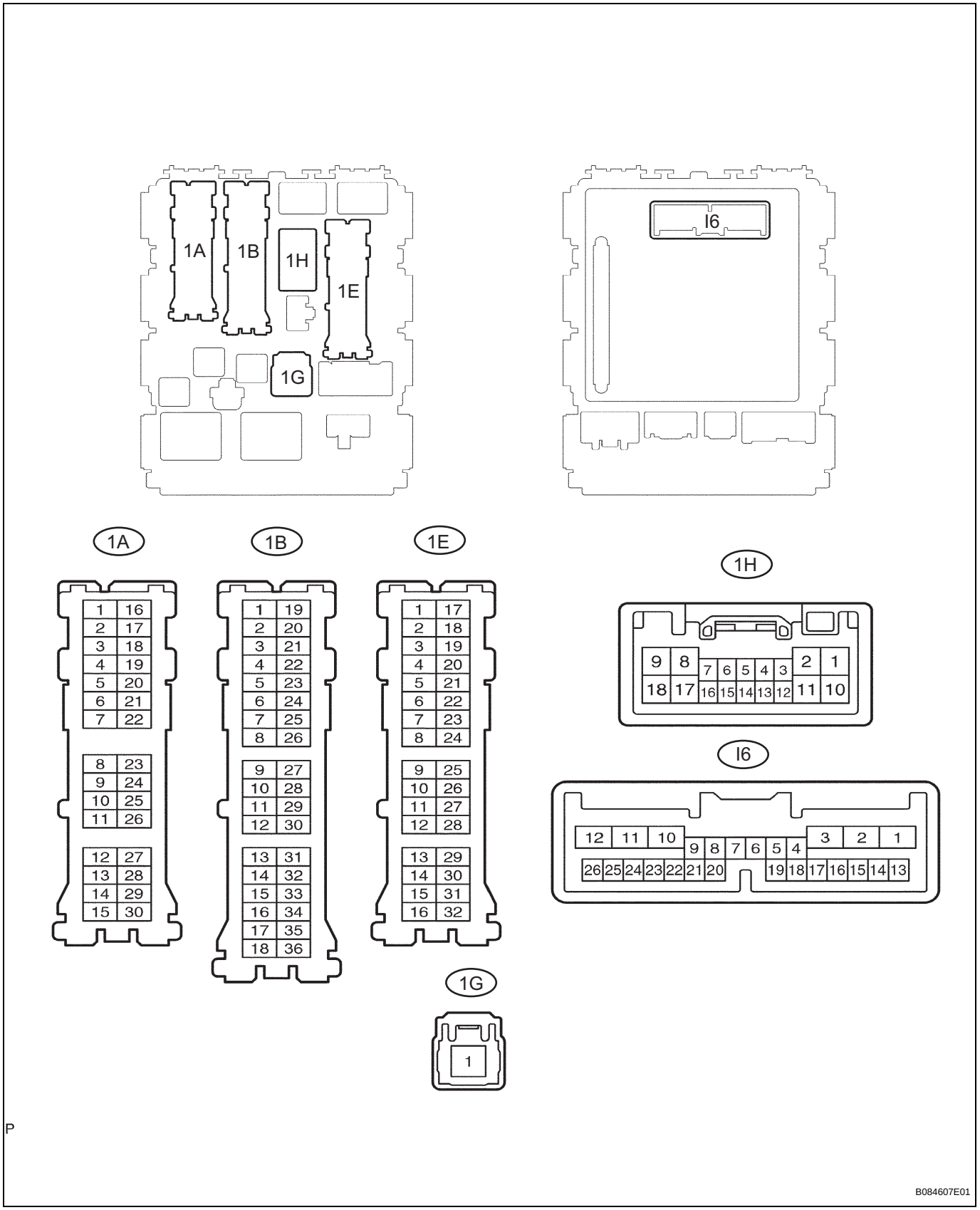
(a) Disconnect the P17 switch connector.
(b) Measure the voltage and resistance of the wire harness side connector.

DL

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
B (P17-3) - Body ground	G - Body ground	IG power supply	IG switch ON	10 to 14 V
E (P17-1) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
L (P17-2) - Body ground	R - Body ground	Door control switch door lock input	Door control switch OFF	10 kΩ or higher
L (P17-2) - Body ground	R - Body ground	Door control switch door lock input	Door control switch LOCK	Below 1 Ω
U (P17-7) - Body ground	P - Body ground	Door control switch door unlock input	Door control switch OFF	10 kΩ or higher
U (P17-7) - Body ground	P - Body ground	Door control switch door unlock input	Door control switch UNLOCK	Below 1 Ω

If the result is not as a specified, there may be a malfunction on the wire harness side.

3. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY)



(a) Disconnect the 1A, 1B, 1E, 1G and 1H junction block connectors.
(b) Disconnect the I6 relay connector.

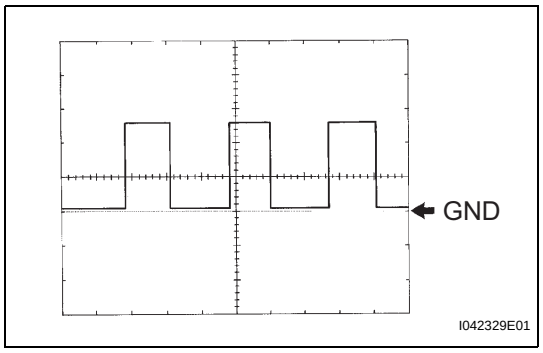
(c) Measure the voltage and resistance of the wire harness side connectors.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
ALTB (1G-1) - Body ground	W - Body ground	+B (power system, generator system) power supply	Always	10 to 14 V
ECUB (1B-30) - Body ground	V - Body ground	+B (ECUB) power supply	Always	10 to 14 V
GND (1E-17) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
KSW (1E-26) - Body ground	B - Body ground	Key unlock warning switch input	No key in ignition key cylinder	10 kΩ or higher
KSW (1E-26) - Body ground	B - Body ground	Key unlock warning switch input	Key inserted	Below 1 Ω
L1 (1H-13) - Body ground	GR - Body ground	Driver side door control switch lock input	Driver side door control switch OFF	10 kΩ or higher
L1 (1H-13) - Body ground	GR - Body ground	Driver side door control switch lock input	Driver side door control switch LOCK	Below 1 Ω
UL1 (1H-14) - Body ground	V - Body ground	Driver side door control switch unlock input	Driver side door control switch OFF	10 kΩ or higher
UL1 (1H-14) - Body ground	V - Body ground	Driver side door control switch unlock input	Driver side door control switch UNLOCK	Below 1 Ω
L1 (1H-4) - Body ground	L - Body ground	Passenger side door control switch lock input	Passenger side door control switch OFF	10 kΩ or higher
L1 (1H-4) - Body ground	L - Body ground	Passenger side door control switch lock input	Passenger side door control switch LOCK	Below 1 Ω
UL1 (1H-5) - Body ground	B - Body ground	Passenger side door control switch unlock input	Passenger side door control switch OFF	10 kΩ or higher
UL1 (1H-5) - Body ground	B - Body ground	Passenger side door control switch unlock input	Passenger side door control switch UNLOCK	Below 1 Ω
L2 (1H-16) - Body ground	L - Body ground	Driver side door key-linked door lock input	Driver side door key cylinder OFF	10 kΩ or higher
L2 (1H-16) - Body ground	L - Body ground	Driver side door key-linked door lock input	Driver side door key cylinder LOCK	Below 1 Ω
UL3 (I6-18) - Body ground	P - Body ground	Driver side door key-linked door unlock input	Driver side door key cylinder OFF	10 kΩ or higher
UL3 (I6-18) - Body ground	P - Body ground	Driver side door key-linked door unlock input	Driver side door key cylinder UNLOCK	Below 1 Ω
LSWD (I6-20) - Body ground	W - Body ground	Driver side door lock position switch input	Driver side door UNLOCK	10 kΩ or higher
LSWD (I6-20) - Body ground	W - Body ground	Driver side door lock position switch input	Driver side door LOCK	Below 1 Ω
L2 (1H-7) - Body ground (*1)	O - Body ground	Passenger side door key-linked door lock input	Passenger side door key cylinder OFF	10 kΩ or higher
L2 (1H-7) - Body ground (*1)	O - Body ground	Passenger side door key-linked door lock input	Passenger side door key cylinder LOCK	Below 1 Ω
UL2 (1H-6) - Body ground (*1)	LG - Body ground	Passenger side door key-linked door unlock input	Passenger side door key cylinder OFF	10 kΩ or higher
UL2 (1H-6) - Body ground (*1)	LG - Body ground	Passenger side door key-linked door unlock input	Passenger side door key cylinder UNLOCK	Below 1 Ω
DCTY (1A-21) - Body ground	O - Body ground	Driver side courtesy switch input	Driver side door closed	10 kΩ or higher
DCTY (1A-21) - Body ground	O - Body ground	Driver side courtesy switch input	Driver side door open	Below 1 Ω
BCTY (1A-7) - Body ground	V - Body ground	Back door courtesy switch input	Back door closed	10 kΩ or higher
BCTY (1A-7) - Body ground	V - Body ground	Back door courtesy switch input	Back door open	Below 1 Ω

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BDSU (I6-19) - Body ground	O - Body ground	Back door opener switch input	Back door opener switch OFF	10 kΩ or higher
BDSU (I6-19) - Body ground	O - Body ground	Back door opener switch input	Back door opener switch ON	Below 1 Ω
SPD (I6-11) - Body ground	V - Body ground	Vehicle speed signal	Ignition switch on, rotate front wheel slowly	Pulse generation (See waveform 1)

*1: with Jam Protection

If the result is not as specified, there may be a malfunction on the wire harness side.



(d) Using an oscilloscope, check the signal waveform of the ECU.

(1) Waveform 1

Waveform 1 (Reference):

Terminal No.	SPD (I6-11) - Body ground
Tool Setting	5 V/DIV., 10 ms./DIV.
Vehicle Condition	Driving at approx. 20 km/h (12 mph)

HINT:

As the vehicle speed increases, the wavelength shortens.

(e) Reconnect the 1A, 1B, 1E, 1G and 1H junction block connectors.

(f) Reconnect the I6 relay connector.

(g) Measure the voltage of the connectors.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
ACT+ (1H-8) - Body ground	BR - Body ground	Door lock motor LOCK drive output (driver and passenger doors)	Drivers' door control switch OFF	Below 1 V
			Drivers' door control switch LOCK	10 to 14 V
			Drivers' door key cylinder OFF	Below 1 V
			Drivers' door key cylinder LOCK	10 to 14 V
			Passengers' door control switch OFF	Below 1 V
			Passengers' door control switch LOCK	10 to 14 V
			Passengers' door key cylinder OFF	Below 1 V
			Passengers' door key cylinder LOCK	10 to 14 V

DL

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
ACT+ (1H-17) - Body ground	R - Body ground	Door lock motor LOCK drive output (driver and passenger doors)	Drivers' door control switch OFF	Below 1 V
			Drivers' door control switch LOCK	10 to 14 V
			Drivers' door key cylinder OFF	Below 1 V
			Drivers' door key cylinder LOCK	10 to 14 V
			Passengers' door control switch OFF	Below 1 V
			Passengers' door control switch LOCK	10 to 14 V
			Passengers' door key cylinder OFF	Below 1 V
			Passengers' door key cylinder LOCK	10 to 14 V
ACTD (I6-2) - Body ground	L - Body ground	Door lock motor UNLOCK drive output (driver door)	Drivers' door control switch OFF	Below 1 V
			Drivers' door control switch UNLOCK	10 to 14 V
			Drivers' door key cylinder OFF	Below 1 V
			Drivers' door key cylinder UNLOCK	10 to 14 V
			Passengers' door control switch OFF	Below 1 V
			Passengers' door control switch UNLOCK	10 to 14 V
			Passengers' door key cylinder OFF	Below 1 V
			Passengers' door key cylinder UNLOCK	10 to 14 V
ACT- (1H-9) - Body ground	W - Body ground	Door lock motor UNLOCK drive output (passenger door)	Drivers' door control switch OFF	Below 1 V
			Drivers' door control switch UNLOCK	10 to 14 V
			Drivers' door key cylinder OFF	Below 1 V
			Drivers' door key cylinder UNLOCK	10 to 14 V
			Passengers' door control switch OFF	Below 1 V
			Passengers' door control switch UNLOCK	10 to 14 V
			Passengers' door key cylinder OFF	Below 1 V
			Passengers' door key cylinder UNLOCK	10 to 14 V
BACT (I6-1) - Body ground	LG - Body ground	Back door lock motor OPEN drive output	Door control switch UNLOCK, back door opener switch OFF	Below 1 V
			Door control switch UNLOCK, back door opener switch ON	10 to 14 V

DL

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BACT (I6-1) - Body ground	LG - Body ground	Back door lock motor OPEN drive output	Door control switch LOCK, back door opener switch OFF	Below 1 V
			Door control switch LOCK, back door opener switch ON	Below 1 V

If the result is not as specified, the junction block (integration relay) may have a malfunction.

ON-VEHICLE INSPECTION

1. CHECK POWER DOOR LOCK OPERATION

(a) Check the basic function.

(1) For the door control switch (manual operation): 1) pushing LOCK causes all the doors to lock and 2) pushing UNLOCK causes all the doors to unlock.

(2) For the door key cylinder lock function: turning the driver or passenger side door lock key cylinder to LOCK causes all the doors to lock.

(3) For the passenger side door key cylinder unlock function: turning the passenger side door lock key cylinder to UNLOCK causes all the doors to unlock.

(4) For the driver side door key cylinder unlock function: 1) turning the driver side door key cylinder to UNLOCK once causes the driver side door to unlock, and 2) turning it again to UNLOCK within 3 seconds causes all the doors to unlock (2-step unlock function).

(b) Check the key lock-in prevention function.

NOTICE:

To prevent the key from being locked in the vehicle, the following inspection should be made with the driver side door window open.

(1) Have the key inserted into the ignition key cylinder.

(2) With the driver side door open, turn the driver side door control knob to LOCK and check that all the doors unlock immediately.

(3) With the driver side door open, push LOCK on the door control switch (manual operation) and check that all the doors unlock immediately.

(4) With the driver side door open, turn the driver side door control knob to LOCK, hold it for 2 seconds or more and then close the driver side door. Check that all the doors unlock.

(c) Check the security function.

(1) Open the driver side door window so that the door control switch can be operated from outside of the vehicle. Then, close all the doors.

(2) Pull out the key, open the driver side door and then close and lock the door without using the key. Check that pushing UNLOCK on the door control switch (manual operation) from outside of the vehicle does not unlock the doors.

(3) Pull out the key, close and lock the driver side door using the key operation. Check that pushing UNLOCK on the door control switch (manual operation) from outside of the vehicle does not unlock the doors.

(4) Pull out the key, close the driver side door and lock the door by wireless door lock operation. Check that pushing UNLOCK on the door control switch (manual operation) from outside of the vehicle does not unlock the doors.
HINT:
Check that the security function is canceled when any of the following conditions is met:
- The ignition switch is turned ON.
- The driver side door is unlocked using the key.
- UNLOCK on the door control switch (for manual operation) is pushed after the door control knob is turned to UNLOCK manually.
- The doors are unlocked with the wireless operation.

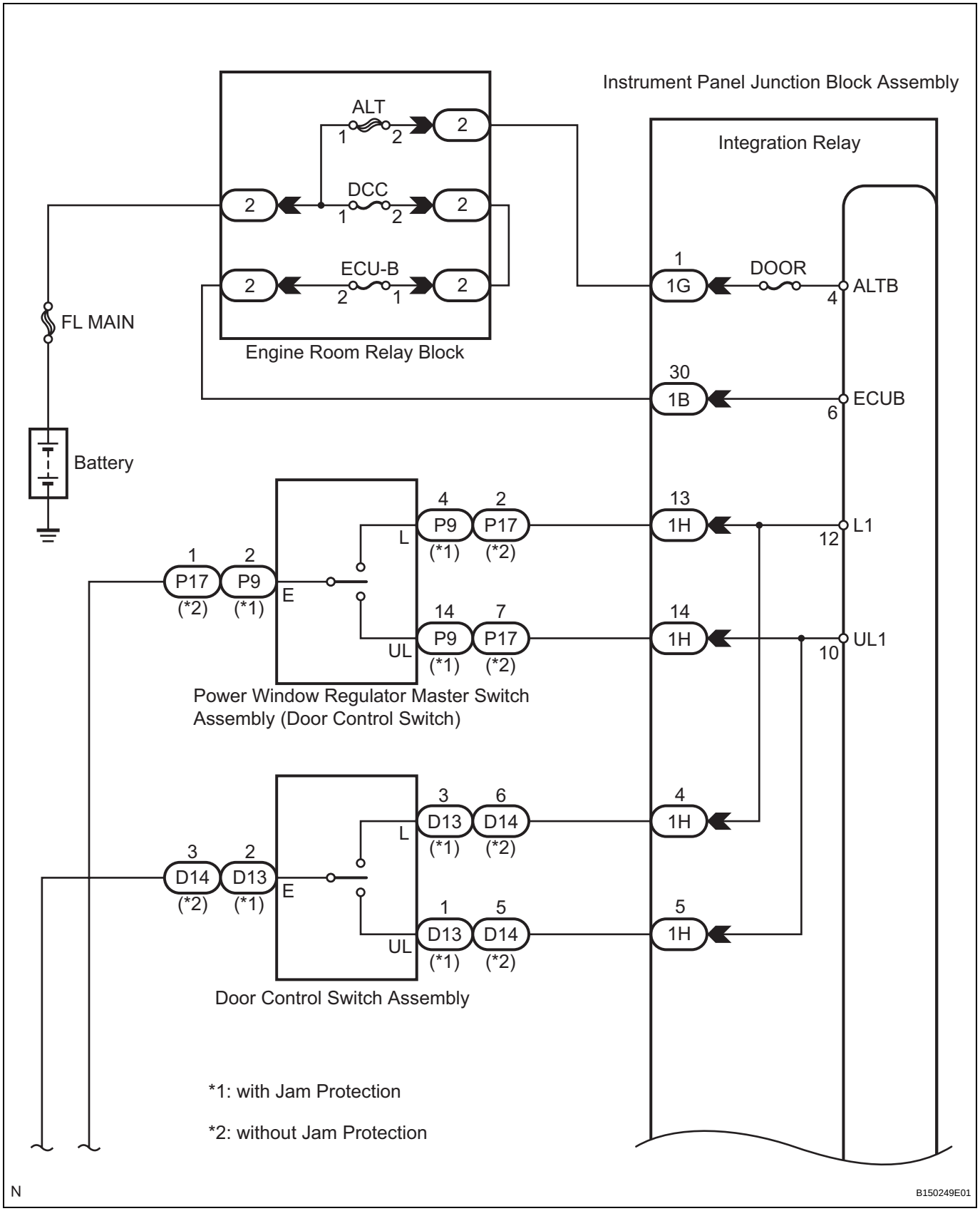
(d) Check the illumination function.
(1) Set the room light switch to the DOOR position.
(2) With all doors locked, check that all doors unlock when the driver side door lock key cylinder is turned to UNLOCK using the key. At the same time, the room light should illuminate.
(3) Check that the room light turns off in approximately 15 seconds if the doors have not been opened.

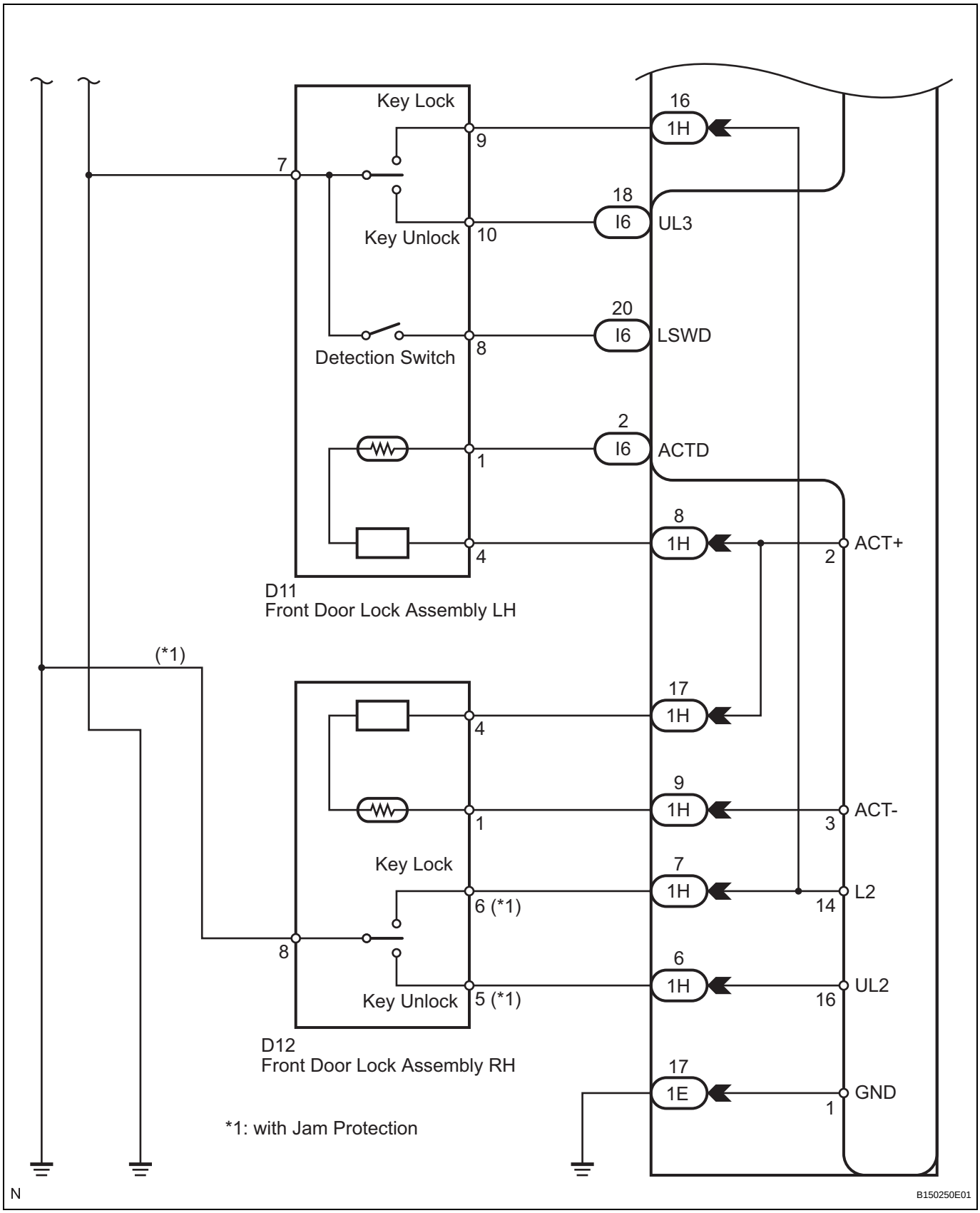
All Doors cannot be Locked / Unlocked Simultaneously

DESCRIPTION

The integration relay drives the door lock motors with driver/passenger side door control switch signals, or driver/passenger side door key cylinder signals.

WIRING DIAGRAM




Key Lock
Key Unlock
Detection Switch
7
9
10
8
1
4
16
1H
18
I6
UL3
20
I6
LSWD
2
I6
ACTD
8
1H
ACT+
2
D11
Front Door Lock Assembly LH
(*1)
4
1
Key Lock
6 (*1)
8
Key Unlock
5 (*1)
17
1H
9
1H
ACT-
3
7
1H
L2
14
6
1H
UL2
16
D12
Front Door Lock Assembly RH
17
1E
GND
1
*1: with Jam Protection
N
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INSPECTION PROCEDURE

1	CHECK ALL DOOR LOCK/UNLOCK OPERATION

(a) All doors can be simultaneously locked/unlocked using one of the following:
- Pressing the driver side door control switch
- Pressing the passenger side door control switch
- Turning the driver door key cylinder with the key
- Turning the passenger door key cylinder with the key

(b) Proceed to the next step according to the symptom if all the doors cannot be locked/unlocked at once.

Malfunctioning Part	Proceed to
Cannot lock/unlock using driver side door control switch	A
Cannot lock/unlock using passenger side door control switch	B
Cannot lock/2-step unlock using driver door key cylinder (*1)	C
Cannot lock/unlock using passenger door key cylinder	D
All functions do not operate	E

*1: with Jam Protection

B → **Go to step 5**

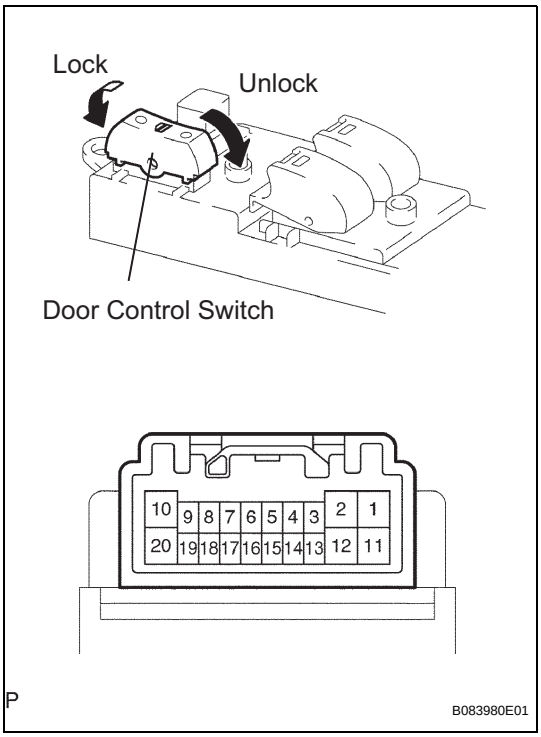
C → **Go to step 8**

D → **Go to step 12**

E → **Go to step 16**

A

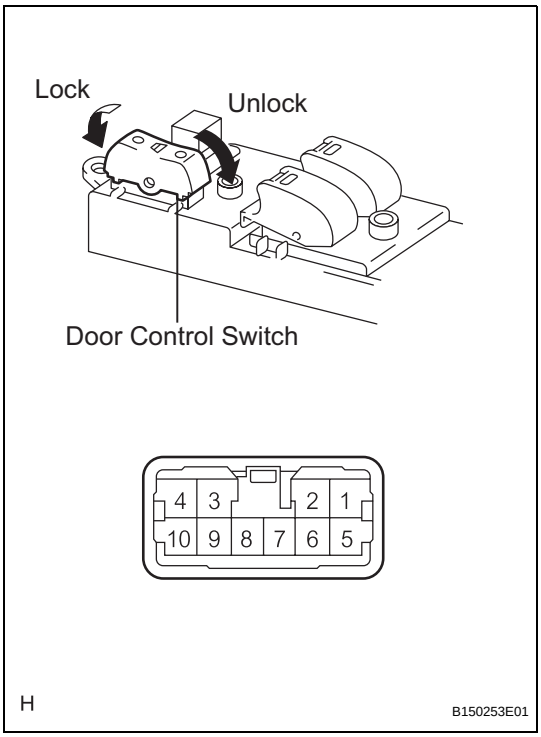
2	INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY (DOOR CONTROL SWITCH)



(a) Measure the resistance of the door control switch (with Jam Protection).

Standard resistance

Tester Connection	Switch Condition	Specified Condition
2 - 4	Lock	Below 1 Ω
2 - 4	OFF	10 kΩ or higher
2 - 14	OFF	10 kΩ or higher
2 - 14	Unlock	Below 1 Ω



(b) Measure the resistance of the door control switch (without Jam Protection).

Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Lock	Below 1 Ω
1 - 2	OFF	10 kΩ or higher
1 - 7	OFF	10 kΩ or higher
1 - 7	Unlock	Below 1 Ω

NG → **REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**

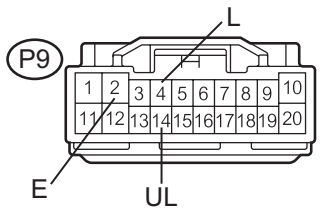
OK

3	**CHECK WIRE HARNESS (POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND BODY GROUND)**

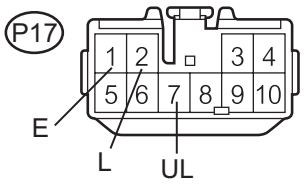
(a) Disconnect the P9 (*1) or P17 (*2) switch connector.

Wire Harness Side:

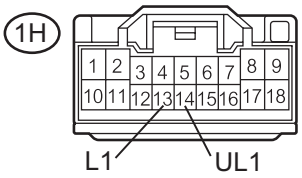
Power Window Regulator Master Switch Assembly (*1)



Power Window Regulator Master Switch Assembly (*2)



Instrument Panel Junction Block Assembly



*1: with Jam Protection *2: without Jam Protection

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(b) Disconnect the 1H junction block connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
P9-4 (L) - 1H-13 (L1) (*1)	Below 1 Ω
P9-14 (UL) - 1H-14 (UL1) (*1)	Below 1 Ω
P9-2 (E) - Body ground (*1)	Below 1 Ω
P9-4 (L) or 1H-13 (L1) - Body ground (*1)	10 kΩ or higher
P9-14 (UL) or 1H-14 (UL1) - Body ground (*1)	10 kΩ or higher
P17-2 (L) - 1H-13 (L1) (*2)	Below 1 Ω
P17-7 (UL) - 1H-14 (UL1) (*2)	Below 1 Ω
P17-1 (E) - Body ground (*2)	Below 1 Ω
P17-2 (L) or 1H-13 (L1) - Body ground (*2)	10 kΩ or higher
P17-7 (UL) or 1H-14 (UL1) - Body ground (*2)	10 kΩ or higher

*1: with Jam Protection
*2: without Jam Protection

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4	**CHECK OPERATION OF INTEGRATION RELAY**

(a) After replacing the integration relay with a normally functioning relay, check that the power door lock operates normally.

OK:

Power door lock operates normally.

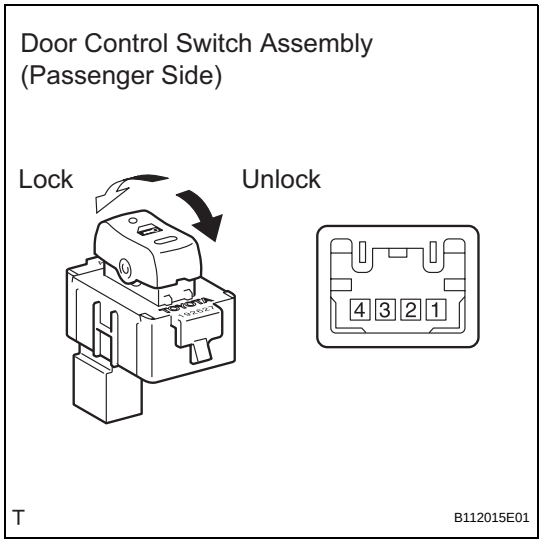
DL

NG → REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK

NORMAL (INTEGRATION RELAY DEFECTIVE)

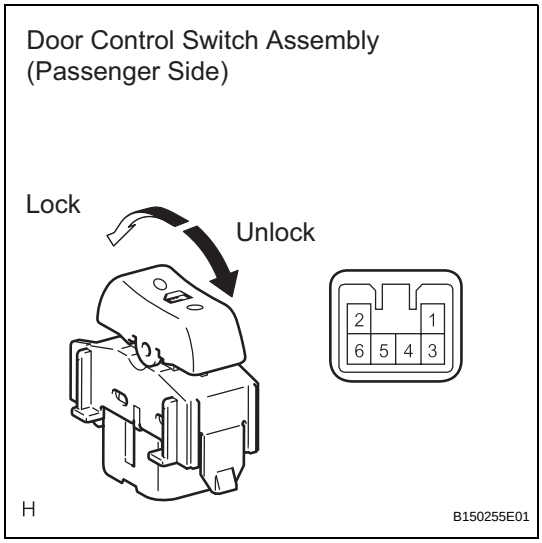
5 INSPECT DOOR CONTROL SWITCH ASSEMBLY (PASSENGER SIDE)



(a) Measure the resistance of the switch (with Jam Protection).

Standard resistance

Tester Connection	Switch Condition	Specified Condition
2 - 3	Lock	Below 1 Ω
1 - 2	Unlock	Below 1 Ω



(b) Measure the resistance of the switch (without Jam Protection).

Standard resistance

Tester Connection	Switch Condition	Specified Condition
3 - 6	Lock	Below 1 Ω
3 - 5	Unlock	Below 1 Ω

NG → REPLACE DOOR CONTROL SWITCH ASSEMBLY

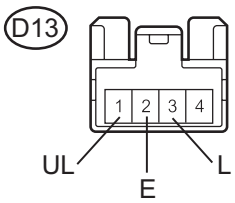
OK

6 CHECK WIRE HARNESS (DOOR CONTROL SWITCH ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY) AND BODY GROUND)

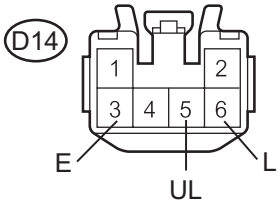
(a) Disconnect the D13 (*1) or D14 (*2) switch connector.

Wire Harness Side:

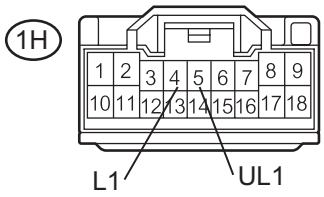
Door Control Switch Assembly (Passenger Side) (*1)



Door Control Switch Assembly (Passenger Side) (*2)



Instrument Panel Junction Block Assembly



*1: with Jam Protection *2: without Jam Protection

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(b) Disconnect the 1H junction block connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
D13-3 (L) - 1H-4 (L1) (*1)	Below 1 Ω
D13-1 (UL) - 1H-5 (UL1) (*1)	Below 1 Ω
D13-2 (E) - Body ground (*1)	Below 1 Ω
D13-3 (L) or 1H-4 (L1) - Body ground (*1)	10 kΩ or higher
D13-1 (UL) or 1H-5 (UL1) - Body ground (*1)	10 kΩ or higher
D14-6 (L) - 1H-4 (L1) (*2)	Below 1 Ω
D14-5 (UL) - 1H-5 (UL1) (*2)	Below 1 Ω
D14-3 (E) - Body ground (*2)	Below 1 Ω
D14-6 (L) - 1H-4 (L1) - Body ground (*2)	10 kΩ or higher
D14-5 (UL) or 1H-5 (UL1) - Body ground (*2)	10 kΩ or higher

*1: with Jam Protection
*2: without Jam Protection

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

7	CHECK OPERATION OF INTEGRATION RELAY

(a) After replacing the integration relay with a normally functioning relay, check that the power door lock operates normally.

OK:

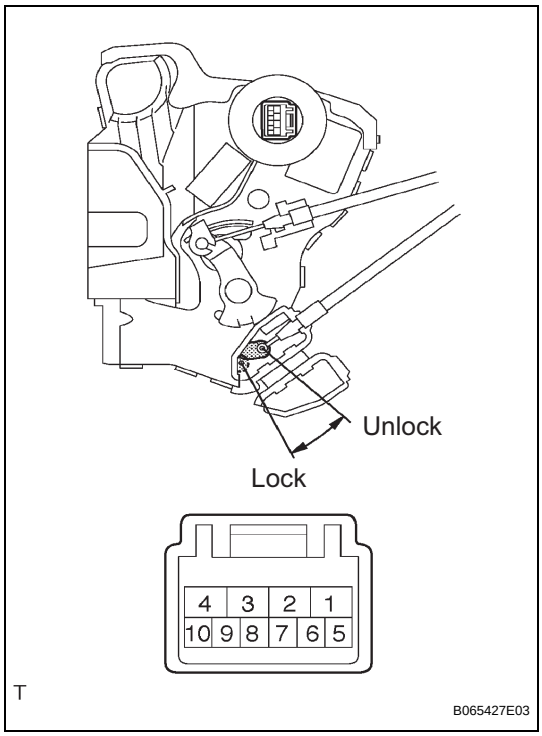
Power door lock operates normally.

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

NORMAL (INTEGRATION RELAY DEFECTIVE)

8	INSPECT FRONT DOOR LOCK ASSEMBLY LH (DOOR LOCK MOTOR)



(a) Apply battery voltage to the door lock and check operation of the door lock motor.
OK

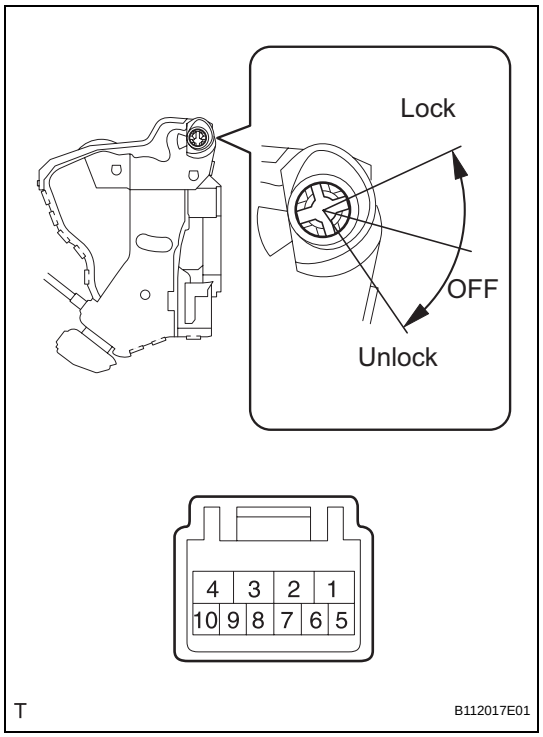
Measurement Condition	Specified Condition
Battery positive (+) → Terminal 4 Battery negative (-) → Terminal 1	Lock
Battery positive (+) → Terminal 1 Battery negative (-) → Terminal 4	Unlock

NG → **REPLACE FRONT DOOR LOCK ASSEMBLY LH**

OK

DL

9	**INSPECT FRONT DOOR LOCK ASSEMBLY LH (DOOR LOCK AND UNLOCK SWITCH AND LOCK DETECTION SWITCH)**



(a) Measure the resistance of the door lock and unlock switch and lock detection switch.

Standard resistance:

Door lock and unlock switch

Tester Connection	Door lock Condition	Specified Condition
7 - 9	Lock	Below 1 Ω
7 - 9	OFF	10 kΩ or higher
7 - 10	OFF	10 kΩ or higher
7 - 10	Unlock	Below 1 Ω

Detection switch

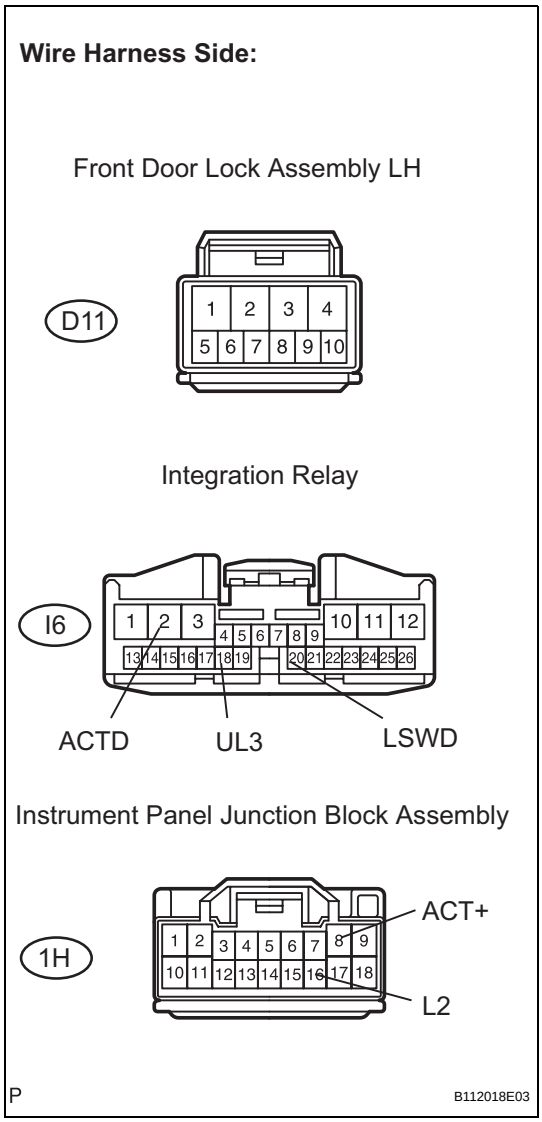
Tester Connection	Door Lock Condition	Specified Condition
7 - 8	Lock	10 kΩ or higher
7 - 8	Unlock	Below 1 Ω

NG → **REPLACE FRONT DOOR LOCK ASSEMBLY**

OK

DL

10	CHECK WIRE HARNESS (FRONT DOOR LOCK ASSEMBLY LH - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY) AND BODY GROUND)



(a) Disconnect the D11 lock connector.
(b) Disconnect the I6 relay connector.
(c) Disconnect the 1H junction block connector.
(d) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
D11-4 - 1H-8 (ACT+)	Below 1 Ω
D11-1 - I6-2 (ACTD)	Below 1 Ω
D11-9 - 1H-16 (L2)	Below 1 Ω
D11-10 - I6-18 (UL3)	Below 1 Ω
D11-8 - I6-20 (LSWD)	Below 1 Ω
D11-7 - Body ground	Below 1 Ω
D11-4 or 1H-8 (ACT+) - Body ground	10 kΩ or higher
D11-1 or I6-2 (ACTD) - Body ground	10 kΩ or higher
D11-9 or 1H-16 (L2) - Body ground	10 kΩ or higher
D11-10 or I6-18 (UL3) - Body ground	10 kΩ or higher
D11-8 or I6-20 (LSWD) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

11	CHECK OPERATION INTEGRATION RELAY

(a) After replacing the integration relay with a normally functioning relay, check that the power door lock operates normally.

OK:

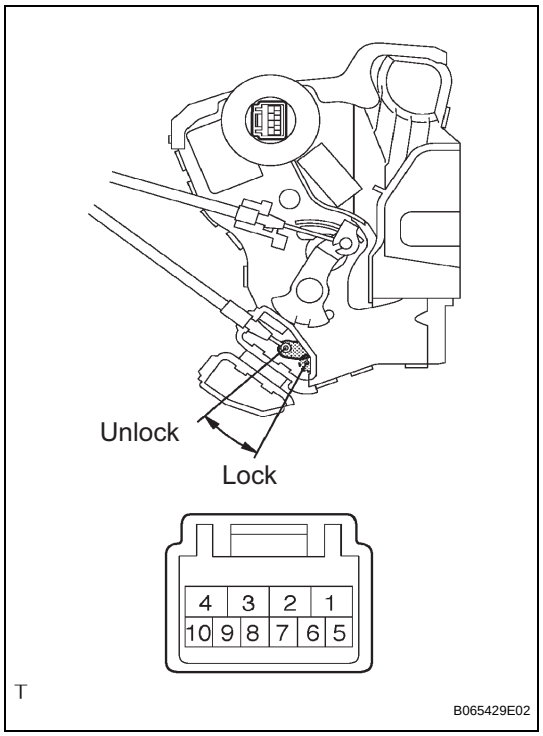
Power door lock operates normally.

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

NORMAL (INTEGRATION RELAY DEFECTIVE)

12 **INSPECT FRONT DOOR LOCK ASSEMBLY RH (DOOR LOCK MOTOR)**



(a) Apply battery voltage to the door lock and check operation of the door lock motor.
OK

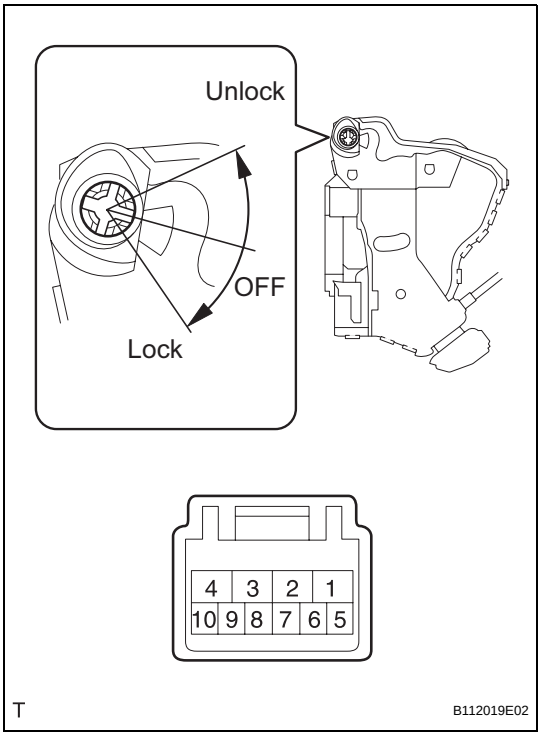
Measurement Condition	Specified Condition
Battery positive (+) → Terminal 4 Battery negative (-) → Terminal 1	Lock
Battery positive (+) → Terminal 1 Battery negative (-) → Terminal 4	Unlock

NG → **REPLACE FRONT DOOR LOCK ASSEMBLY RH**

OK

DL

13 INSPECT FRONT DOOR LOCK ASSEMBLY RH (DOOR LOCK AND UNLOCK SWITCH)



(a) Measure the resistance of the door lock and unlock switch.

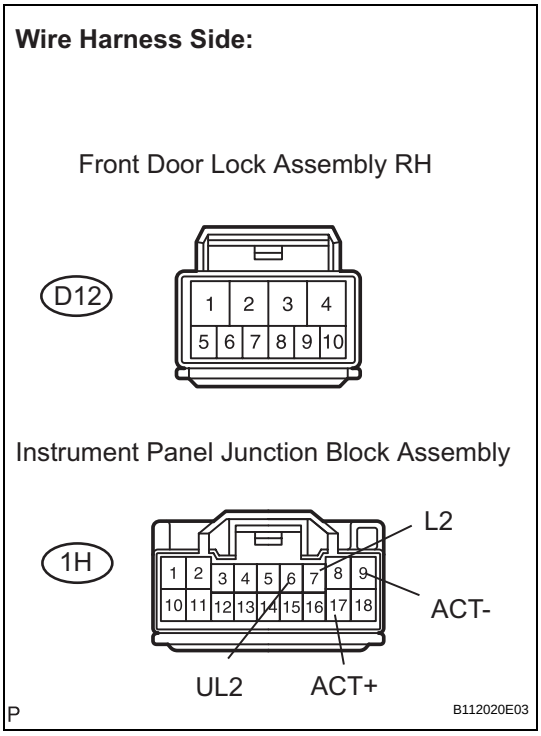
Standard resistance

Tester Connection	Switch Condition	Specified Condition
8 - 6	Lock	Below 1 Ω
8 - 6	OFF	10 kΩ or higher
8 - 5	OFF	10 kΩ or higher
8 - 5	Unlock	Below 1 Ω

NG → **REPLACE FRONT DOOR LOCK ASSEMBLY RH**

OK

14 CHECK WIRE HARNESS (FRONT DOOR LOCK ASSEMBLY RH - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY) AND BODY GROUND)



(a) Disconnect the D12 lock connector.
(b) Disconnect the 1H junction block connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
D12-4 - 1H-17 (ACT+)	Below 1 Ω
D12-1 - 1H-9 (ACT-)	Below 1 Ω
D12-6 - 1H-7 (L2)	Below 1 Ω
D12-5 - 1H-6 (UL2)	Below 1 Ω
D12-8 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

15	CHECK OPERATION OF INTEGRATION RELAY

(a) After replacing the integration relay with a normally functioning relay, check that the power door lock operates normally.
OK:
Power door lock operates normally.

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

NORMAL (INTEGRATION RELAY DEFECTIVE)

16	INSPECT FUSE (ECU-B, DOOR, DCC)

(a) Remove the DOOR fuse from the instrument panel junction block.
(b) Remove the ECU-B and DCC fuses from the engine room relay block.
(c) Measure the resistance of the fuses.
Standard resistance:
Below 1 Ω

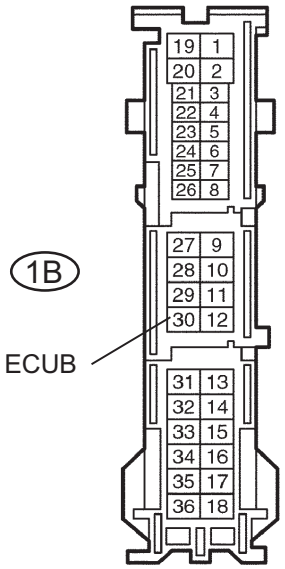
NG → **REPLACE FUSE**

OK

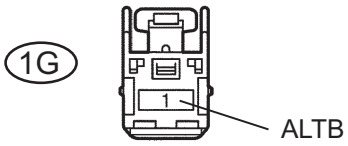
17	CHECK WIRE HARNESS (INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY) - BATTERY AND BODY GROUND)

Wire Harness Side:

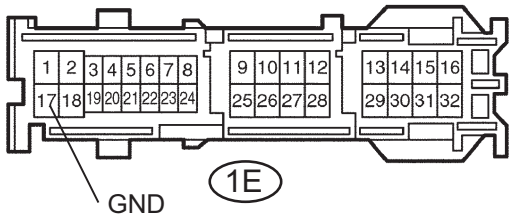
Instrument Panel Junction Block Assembly



Instrument Panel Junction Block Assembly



Instrument Panel Junction Block Assembly



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(a) Disconnect the 1B, 1G and 1E junction block connectors.
(b) Measure the voltage and resistance of the wire harness side connectors.

Standard voltage

Tester Connection	Specified Condition
1B-30 (ECUB) - Body ground	10 to 14 V
1G-1 (ALTB) - Body ground	10 to 14 V

Standard resistance

Tester Connection	Specified Condition
1E-17 (GND) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

18	CHECK OPERATION OF INTEGRATION RELAY

(a) After replacing the integration relay with a normally functioning relay, check that the power door lock operates normally.
OK:
Power door lock operates normally.

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

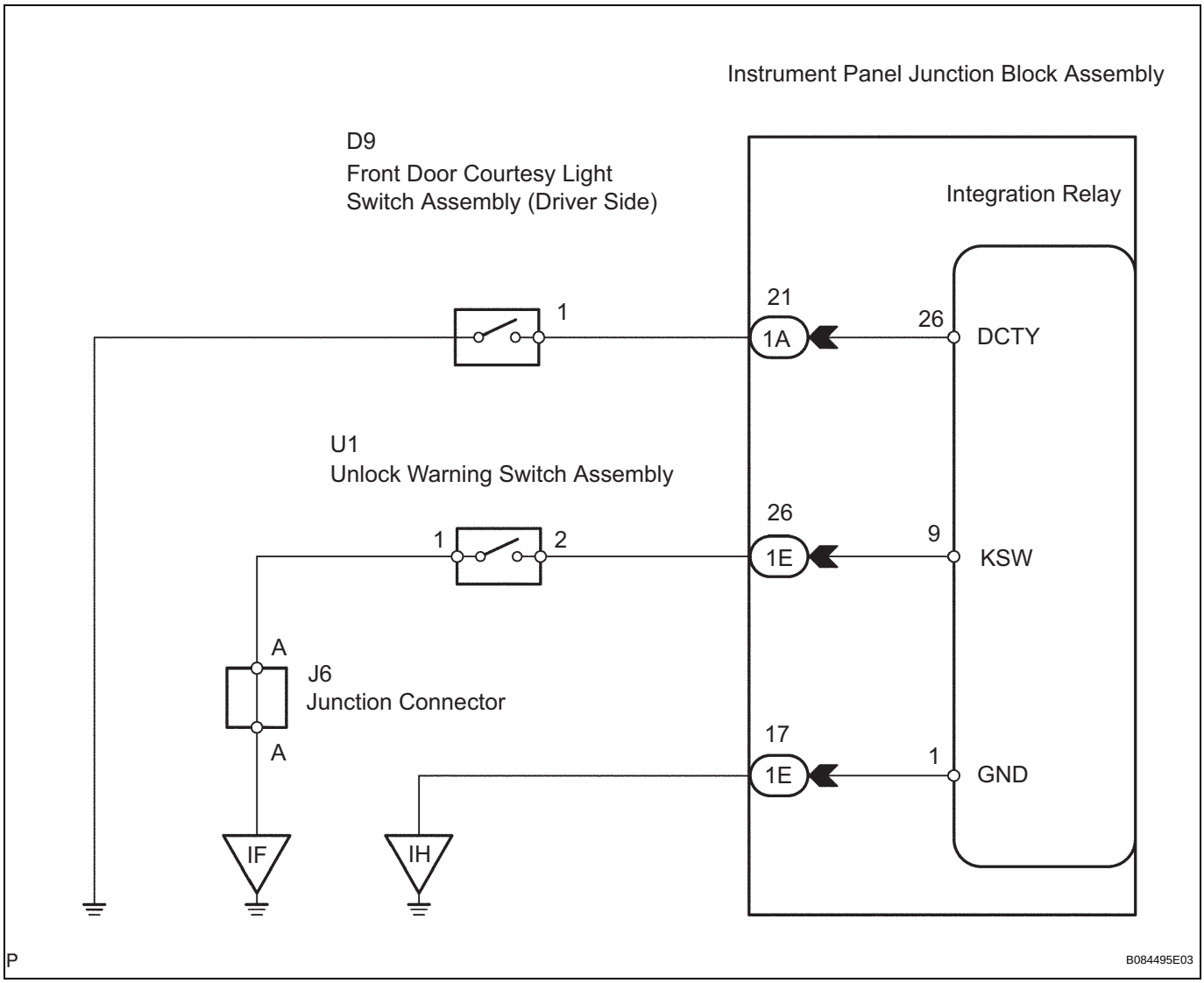
NORMAL (INTEGRATION RELAY DEFECTIVE)

Key Lock-in Prevention Function does not Work Properly

DESCRIPTION

To prevent the key from being locked in the vehicle, the integration relay prevents the door from being locked by monitoring 2 switches: 1) the unlock warning switch, which turns ON when the key is inserted into the ignition key cylinder; and 2) the driver side courtesy light switch, which turns ON when the driver side door is opened.

WIRING DIAGRAM



INSPECTION PROCEDURE

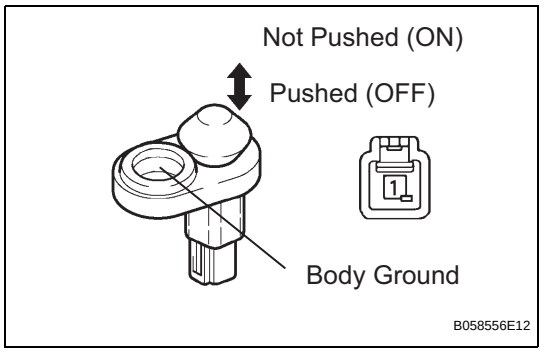
1	CHECK NO. 1 ROOM LIGHT ASSEMBLY

(a) Move the room light switch to the DOOR position and open the driver side door. Then check that the room light illuminates.
OK:
Room light illuminates.

OK → **Go to step 4**

NG

2	**INSPECT FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY (DRIVER SIDE)**



(a) Remove the courtesy light switch.
(b) Measure the resistance of the switch.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - Body ground	Not pushed (ON)	Below 1 Ω
1 - Body ground	Pushed (OFF)	10 kΩ or higher

NG → **REPLACE FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY (DRIVER SIDE)**

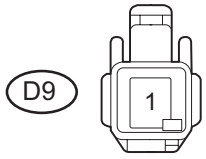
OK

DL

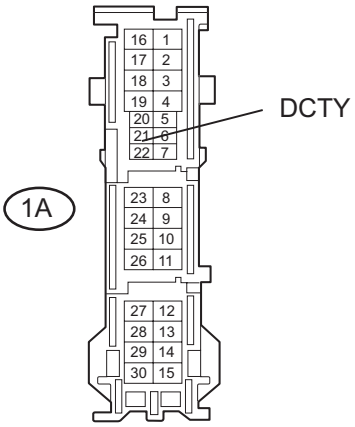
3	**CHECK WIRE HARNESS (FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY)**

Wire Harness Side:

Front Door Courtesy Light Switch Assembly (Driver Side)



Instrument Panel Junction Block Assembly



Y

B112021E20

(a) Disconnect the D9 switch connector.
(b) Disconnect the 1A junction block connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

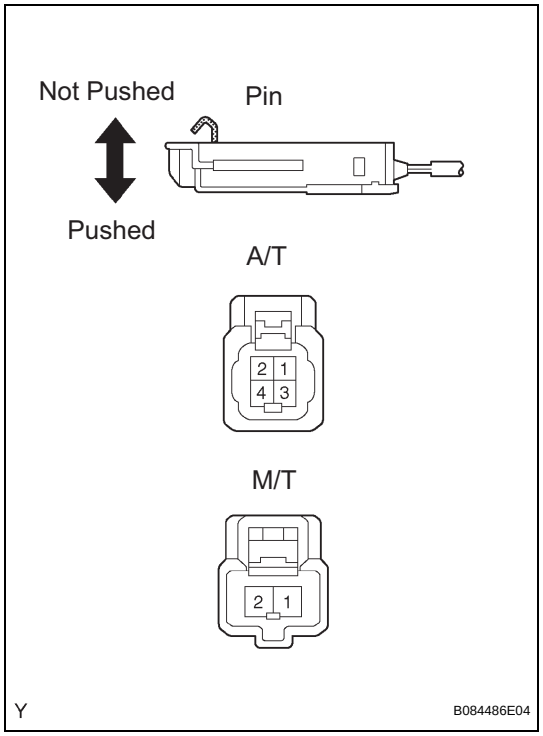
Tester Connection	Specified Condition
D9-1 - 1A-21 (DCTY)	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

DL

4	**INSPECT UNLOCK WARNING SWITCH ASSEMBLY**



(a) Remove the unlock warning switch.
(b) Measure the resistance of the switch.
Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Not pushed	10 kΩ or higher
1 - 2	Pushed	Below 1 Ω

NG → **REPLACE UNLOCK WARNING SWITCH ASSEMBLY**

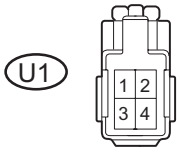
OK

DL

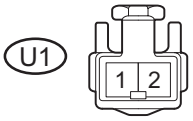
5	CHECK WIRE HARNESS (UNLOCK WARNING SWITCH ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY) AND BODY GROUND)

Wire Harness Side:

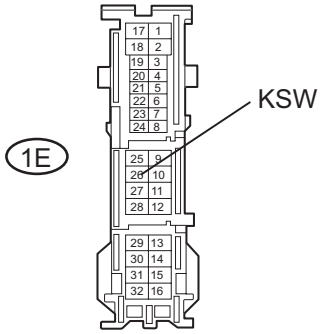
Unlock Warning Switch Assembly (A/T)



Unlock Warning Switch Assembly (M/T)



Instrument Panel Junction Block Assembly



Y

B112022E02

(a) Disconnect the U1 switch connector.
(b) Disconnect the 1E junction block connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
U1-2 - 1E-26 (KSW)	Below 1 Ω
U1-1 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

6	CHECK OPERATION OF INTEGRATION RELAY

(a) After replacing the integration relay with a normally functioning relay, check that the power door lock operates normally.

OK:

Power door lock operates normally.

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

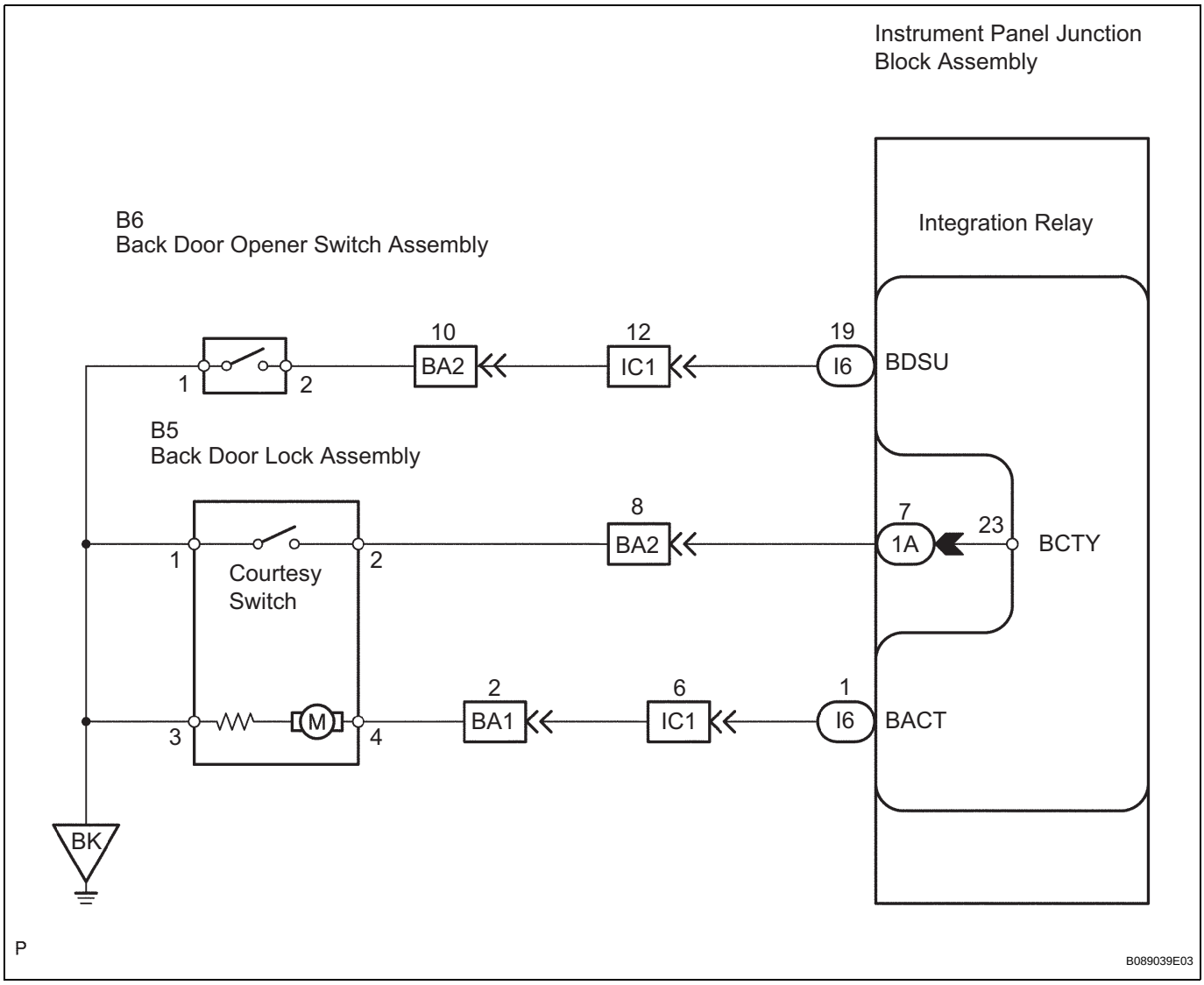
NORMAL (INTEGRATION RELAY DEFECTIVE)

Only Back Door cannot be Opened

DESCRIPTION

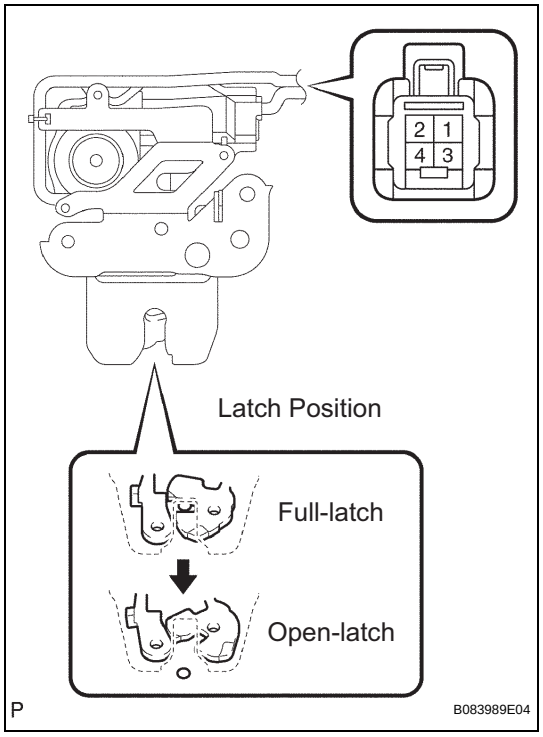
The instrument panel junction block (integration relay) receives switch signals from the driver/passenger side door control switch and activates the back door lock motor according to the signals.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**INSPECT BACK DOOR LOCK ASSEMBLY**



(a) Check the operation of the back door lock.
  (1) Using a screwdriver, move the latch to the full-latch position.
  (2) Apply battery voltage to the door lock terminals and check the operation of the latch.
  OK

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 3 Battery negative (-) → Terminal 4	Latch turns to open-latch position

(b) Measure the resistance of the courtesy switch connector.
Standard resistance

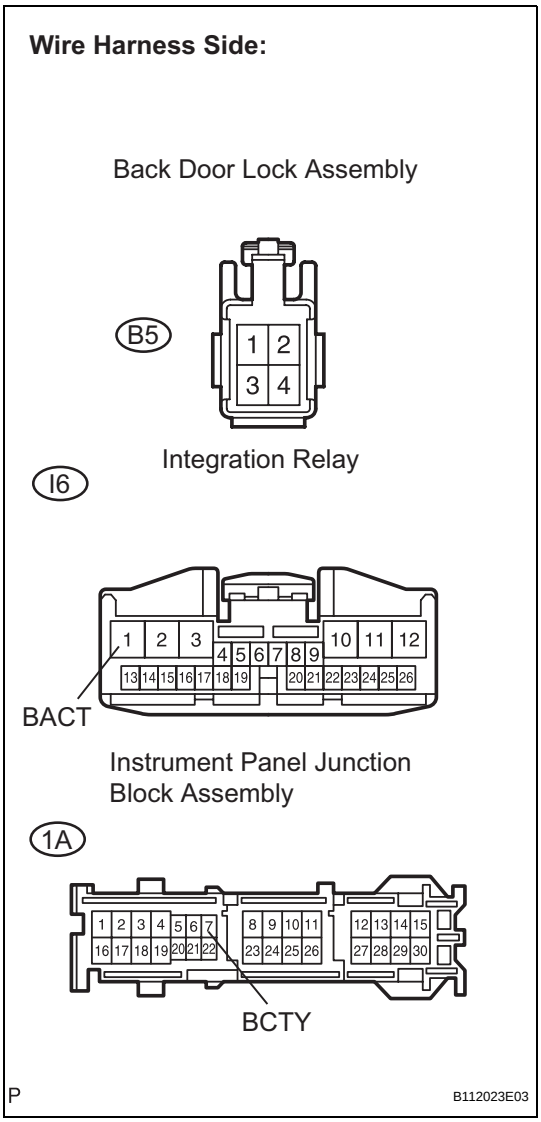
Tester Connection	Door Lock Latch Condition	Specified Condition
1 - 2	Open-latch	Below 1 Ω
1 - 2	Full-latch	10 kΩ or higher

NG → **REPLACE BACK DOOR LOCK ASSEMBLY**

OK

DL

2	CHECK WIRE HARNESS BACK DOOR LOCK ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY) AND BODY GROUND)



(a) Disconnect the B5 lock connector.
(b) Disconnect the I6 relay connector.
(c) Disconnect the 1A junction block connector.
(d) Measure the resistance of the wire harness side connectors.

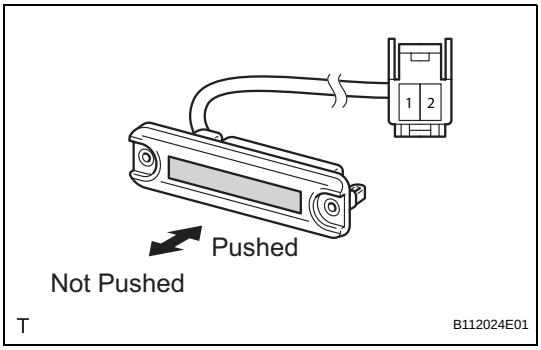
Standard resistance

Tester Connection	Specified Condition
B5-2 - 1A-7 (BCTY)	Below 1 Ω
B5-4 - I6-1 (BACT)	Below 1 Ω
B5-1 - Body ground	Below 1 Ω
B5-3 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

3	INSPECT BACK DOOR OPENER SWITCH ASSEMBLY



(a) Remove the back door opener switch.
(b) Measure the resistance of the switch.

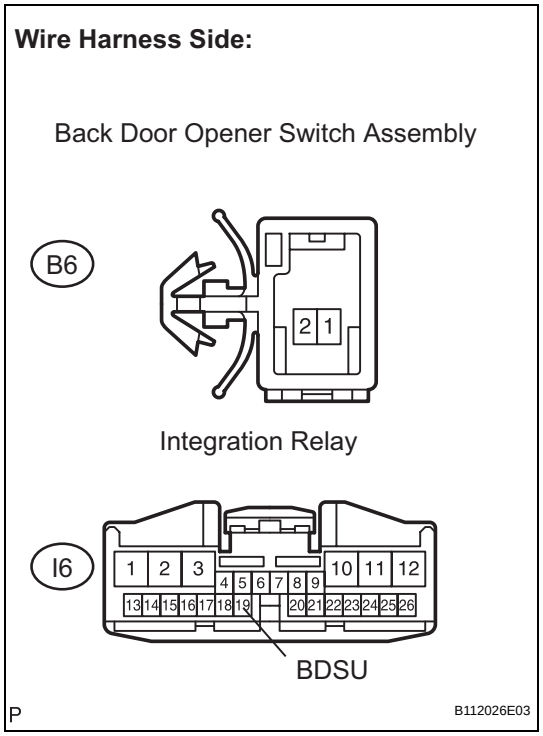
Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Not pushed	10 kΩ or higher
1 - 2	Pushed	Below 1 Ω

NG → **REPLACE BACK DOOR OPENER SWITCH ASSEMBLY**

OK

4	CHECK WIRE HARNESS (BACK DOOR OPENER SWITCH ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY) AND BODY GROUND)



(a) Disconnect the B6 switch connector.
(b) Disconnect the I6 relay connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
B6-2 - I6-19 (BDSU)	Below 1 Ω
B6-1 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

DL

OK

5	CHECK OPERATION OF INTEGRATION RELAY

(a) After replacing the integration relay with a normally functioning relay, check that the back door lock operates normally.

OK:

Back door look operates normally.

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

NORMAL (INTEGRATION RELAY)

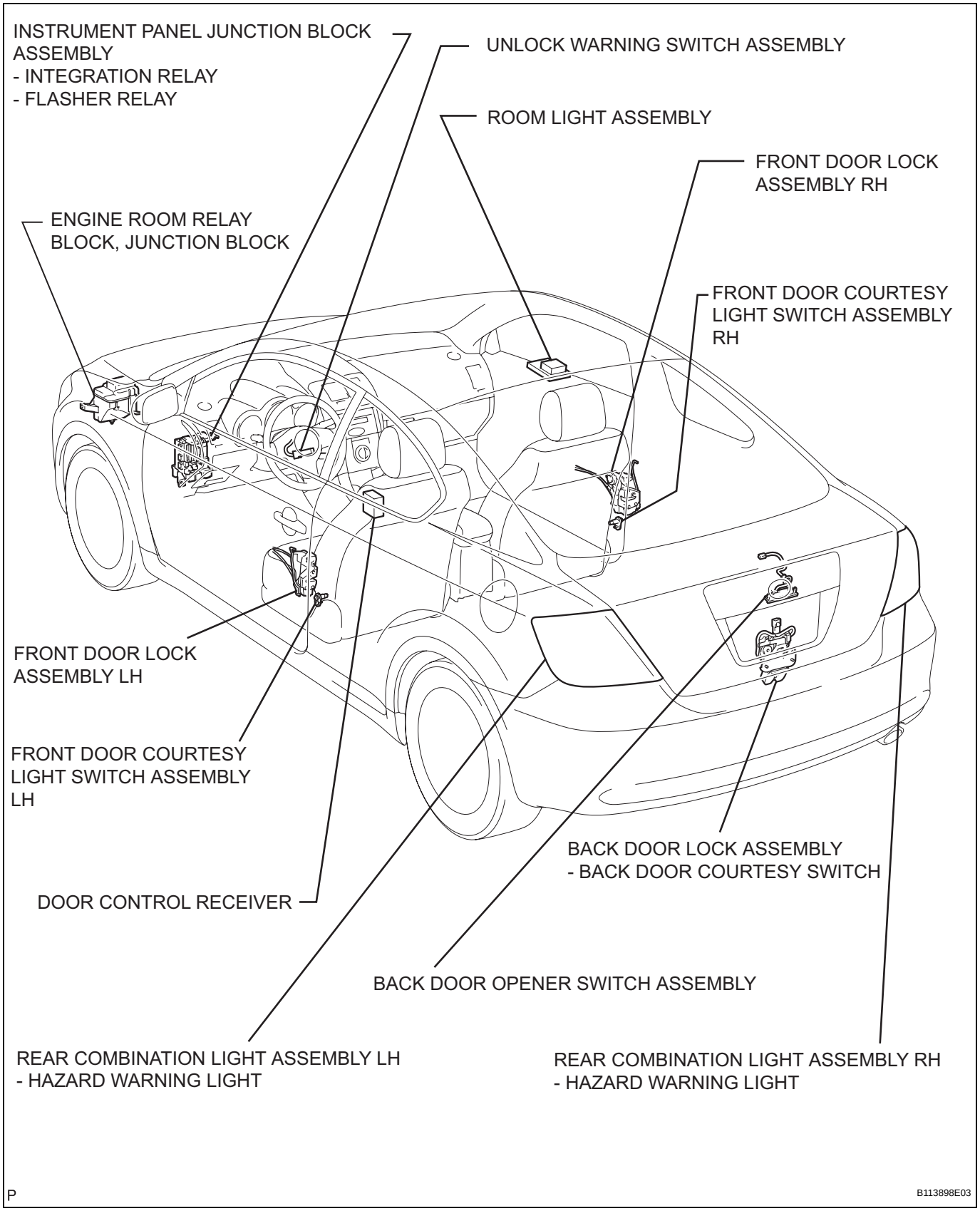
WIRELESS DOOR LOCK CONTROL SYSTEM

PRECAUTION

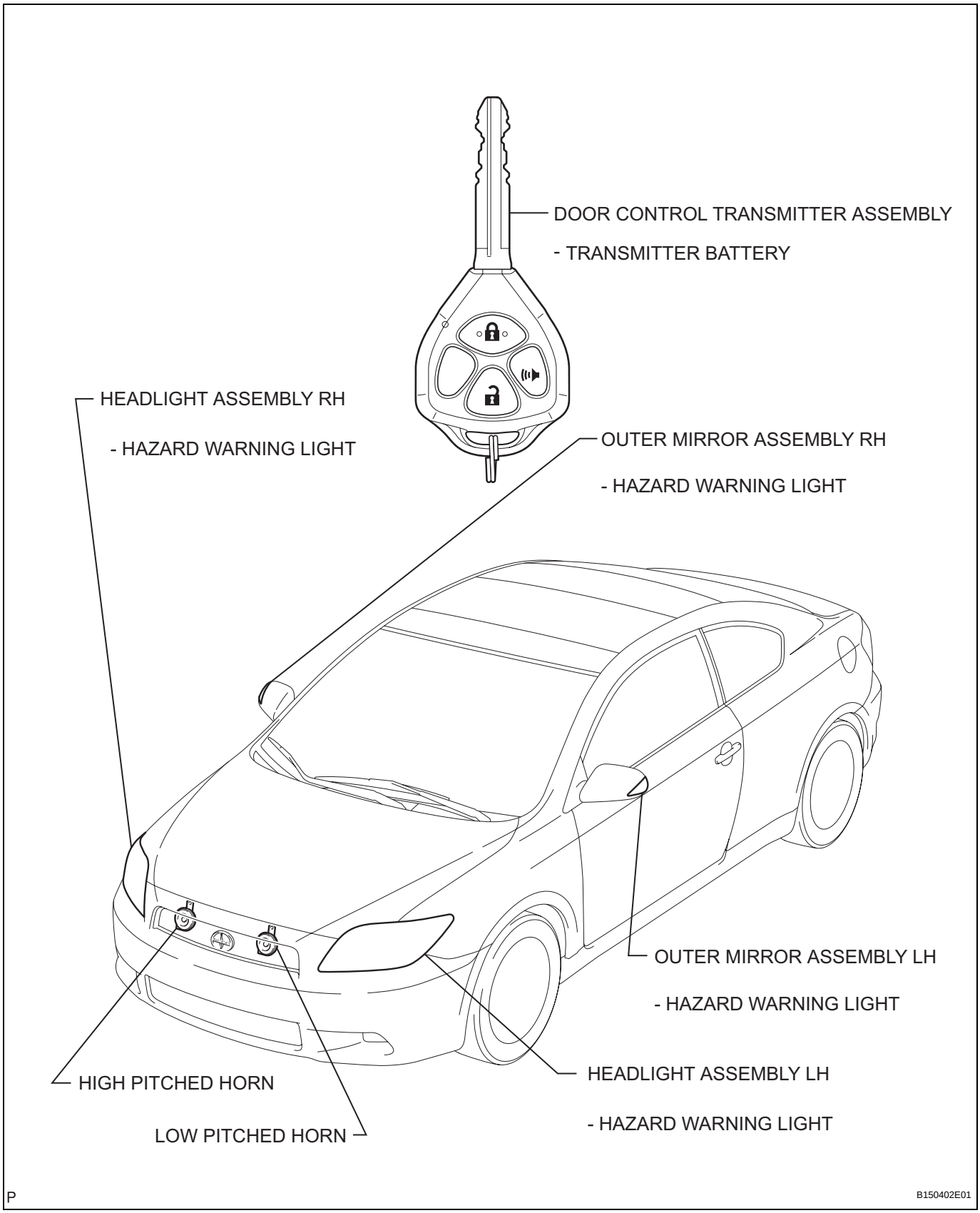
NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

System Name	See procedure
Power Window Control System (w/ Jam Protection Function)	IN-23
Sliding Roof System	

PARTS LOCATION



DL


DOOR CONTROL TRANSMITTER ASSEMBLY
- TRANSMITTER BATTERY
HEADLIGHT ASSEMBLY RH
- HAZARD WARNING LIGHT
OUTER MIRROR ASSEMBLY RH
- HAZARD WARNING LIGHT
OUTER MIRROR ASSEMBLY LH
- HAZARD WARNING LIGHT
HEADLIGHT ASSEMBLY LH
- HAZARD WARNING LIGHT
HIGH PITCHED HORN
LOW PITCHED HORN
P
B150402E01

SYSTEM DESCRIPTION

1. WIRELESS DOOR LOCK CONTROL SYSTEM

This system locks and unlocks the vehicle's doors remotely. The wireless control system has the following features:

- The door control receiver performs the code identification process and the instrument panel junction block (integration relay) operates the door lock control.
  A serial data link is provided for communication between the receiver and integration relay.
- A key-integrated type transmitter is used and it has a door lock switch, door unlock switch and panic switch.

2. FUNCTION OF MAIN COMPONENTS

Component	Function
Door control transmitter	• Has LOCK, UNLOCK, and PANIC switches. • Transmits weak radio waves (recognition codes and function codes) to the door control receiver. • Illuminates the indicator light (LED) during transmission.
Door control receiver	Receives weak radio waves (recognition codes and function codes) and outputs them as code data to the integration relay.
• Front door courtesy light switch • Rear door courtesy light switch • Back door courtesy light switch	Turns on when a door is opened and turns off when it is closed. Outputs door status codes (open or closed) to the integration relay.
Unlock warning switch	Detects if the key is inserted in the ignition key cylinder or not.
Door lock position switch	Transmits the door lock positions of each door to the integration relay.
Integration relay	Sends wireless door lock control signals in response to the code data from the door control receiver and signals from each switch.

3. SYSTEM FUNCTION

The door control transmitter has the LOCK, UNLOCK and PANIC switches. Operating these switches activates each function.

The wireless door lock control system has the following functions:

Function	Operation
All door lock function	Pressing LOCK switch locks all doors when all doors are closed.
All door unlock function (2-step unlock function)	Pressing UNLOCK switch once will unlock driver side door. Pressing UNLOCK switch again within 3 seconds will unlock passenger side door and back door.
Answer-back function	Hazard warning lights flash once when doors are locked, and flash twice when doors are unlocked to indicate that operation has been completed.
Panic alarm function	Holding down PANIC switch sets off theft deterrent alarm, which consists of sounding horn intermittently, illuminating room light and flashing headlights, taillights and hazard warning lights.
Automatic lock function	If no doors are opened within 30 seconds after they are unlocked by wireless operation, all doors will lock again automatically.
Illuminated entry function	With all doors locked, pressing UNLOCK switch causes room lights to illuminate simultaneously with unlocking operation.

4. TRANSMITTER RECOGNITION CODE REGISTRATION FUNCTION

The table below shows the 4 ID registration function modes by which up to 6 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 4, the oldest registered code is erased first.
Rewrite mode	Erases 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 exist.
Prohibition mode	Deletes 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 operation is not available when:
- Any of the doors is open.
- The key is inserted in the ignition key cylinder.

(b) Unlock operation is not available when:
- The key is inserted in the ignition key cylinder.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
Use this procedure to troubleshoot the wireless door lock control 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 CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK

NEXT

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 5**

A

5 OVERALL ANALYSIS AND TROUBLESHOOTING

(a) Terminals of ECU (See page DL-53)
(b) Operation check (See page DL-45)

NEXT

6 ADJUST, REPAIR OR REPLACE

NEXT

7	**CONFIRMATION TEST**

NEXT

END

OPERATION CHECK

1. FUNCTIONS AND OPERATING CONDITIONS

(a) The wireless door LOCK/UNLOCK function:
This function operates only when the following 3 conditions are met:
(1) There is no key in the ignition key cylinder.
(2) All the doors are closed.
(3) The power door lock system is functioning normally.
HINT:
The UNLOCK function operates even when any of the doors are open.

(b) Remote panic function:
This function operates only when the following condition is met:
(1) The ignition switch is OFF.
HINT:
The key can be inserted.
However the ignition switch must be OFF.

(c) The wireless transmitter operational range differs depending on the situation.
(1) The operational range differs depending on the user, the way the transmitter is held and the location.
(2) In certain areas, the operational range will be reduced due to the vehicle body shape and the influence of the surrounding environment.
(3) Since the transmitter uses weak radio waves, the operational range may be reduced or the transmitter may not function if interference or stronger radio waves occur in the area where the transmitter is used.
(4) When the battery is low, the operational range is reduced and/or the transmitter may not function.
HINT:
If the transmitter has been left in a place that is exposed to direct sunlight, such as on the instrument panel, the battery may be weakened or other problems may occur.

2. CHECK WIRELESS DOOR LOCK CONTROL FUNCTIONS

HINT:
- The switches built into the door control transmitter send radio waves to the door lock control receiver.
- The operational range must be taken into account during checks.

(a) Establish conditions that allow the wireless control function to be operated successfully.

(b) Check the following basic functions.
(1) Check that the transmitter's LED lights up 3 times when each switch is pressed 3 times and that the LED blinks when each switch is pressed and held down.
HINT:
If the LED does not illuminate when the switch has been pressed 3 times or more, the battery may be depleted.
(2) Check that all the doors lock when the LOCK switch is pressed.
(3) Check that the driver's door unlocks when the UNLOCK switch is pressed once, and all the doors unlock when pressed twice within 3 seconds.

(c) Check the automatic lock function.
(1) Check that if the driver's door or all doors are unlocked with the UNLOCK switch and none of the doors are opened or locked within approximately 30 seconds, the doors automatically re-lock.
(2) Check that if the driver's door or all doors are unlocked with the UNLOCK switch and a door is opened or locked within approximately 30 seconds, the automatic lock function does not operate.

(d) Check the illuminated entry function.
HINT:
Turn the interior light switch to the DOOR position before the check.
(1) Check that the interior light comes on simultaneously with the unlocking operation when the UNLOCK switch is pressed.
(2) Check that the interior light goes off in approximately 15 seconds if none of the doors is opened after the unlocking operation.

(e) Check the answer back function.
(1) When the doors are locked by wireless operation, the hazard warning lights flash once.
(2) When the doors are unlocked by wireless operation, the hazard warning lights flash twice.

(f) Check the switch operation fail-safe function.
(1) Check that the doors cannot be locked by operating a switch while the key is in the ignition key cylinder.
HINT:
This check cannot be made when the system is in recognition code registration mode.

(g) Check the chattering prevention function.
  (1) Check that the corresponding operation occurs only once, and does not repeat itself while the switch is kept pressed. Check that the corresponding operation is carried out when the switch is operated repeatedly at 1-second intervals.

(h) Check the door ajar warning function.
  (1) Check that the buzzer sounds when the LOCK switch is pressed when any of the doors are ajar. When all the doors are closed or when the UNLOCK switch is pressed, the buzzer will stop after it sounds for 10 seconds continuously.

(i) Check the panic alarm function.
  (1) Check that the following alarms operate for 60 sec. when the PANIC switch is pressed longer than about 0.8 seconds or more:
    - The vehicle horns sound.
    - The hazard warning lights, headlights and taillights flash.
  (2) Check that during the panic alarm is operating, pressing any switch of transmitter cancels the alarm operation.

REGISTRATION

HINT:

- If replacing the door control transmitter or the door control receiver, register its recognition code to the integration relay.
- Add mode is used to register new recognition codes while still retaining codes already registered. This mode is used when a new transmitter is added. If the number of registered codes exceeds 4, the previously registered codes will be erased in order, starting from the code that was registered first.
- Rewrite mode is used to erase all the previously registered recognition codes in order to register all new recognition codes. This mode is used when the transmitter or the door control receiver is replaced.
- Confirmation mode is used to confirm how many recognition codes have already been registered before another recognition code is registered.
- Prohibition mode is used to erase all the registered codes and disable the wireless door lock function. This mode is used when the transmitter is lost.
- All of the following registration procedures must be performed in order.

1. REGISTER RECOGNITION CODE (SWITCH OPERATION)

(a) The following conditions should be met:
- No key in ignition key cylinder.
- Only driver side door is opened.

(b) Insert the key into the ignition key cylinder and pull it out (Procedure "A").

(c) Insert the key into the ignition key cylinder, and then pull it out within 5 seconds after Procedure "A" (Procedure "B").

(d) Close and open the driver side door twice.

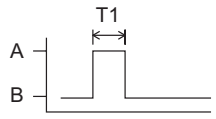
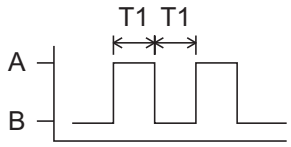
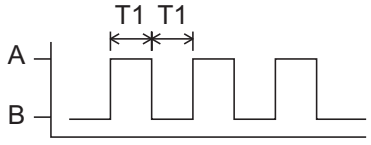
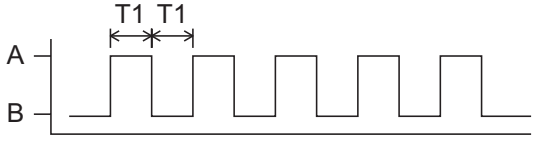
(e) Insert the key into the ignition key cylinder, and then pull it out within 40 seconds after Procedure "B" (Procedure "C").

(f) Close and open the driver side door twice.

(g) Insert the key into the ignition key cylinder and close all doors within 40 seconds after Procedure "C" (Procedure "D").

(h) Turn the ignition switch from LOCK to ON and back to LOCK at approximately 1 second intervals according to the number of times shown in the table below.

Number of ON-LOCK operations of ignition switch:

Mode Selection	Ignition Switch ON-LOCK Operation	Ignition Key Status
Add mode	Once	A: Ignition switch status "ON" B: Ignition switch status "LOCK" T1: Approximately 1 second 
Rewrite Mode	Twice	A: Ignition switch status "ON" B: Ignition switch status "LOCK" T1: Approximately 1 second 
Confirmation Mode	3 times	A: Ignition switch status "ON" B: Ignition switch status "LOCK" T1: Approximately 1 second 
Prohibition Mode	5 times	A: Ignition switch status "ON" B: Ignition switch status "LOCK" T1: Approximately 1 second 

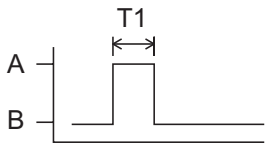
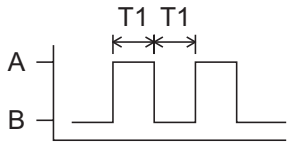
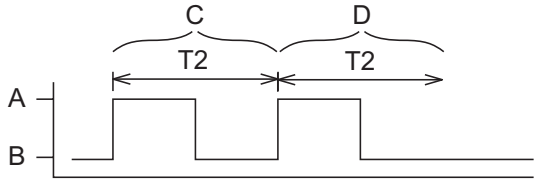
DL

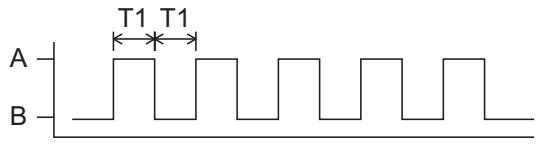
HINT:
If the number of the ON-LOCK operations of the ignition switch is 0, 4 or 6 or more, there will be no response (power door LOCK-UNLOCK operation) to show which mode has been selected.

(i) Remove the key from the ignition key cylinder within 40 seconds after Procedure "D" (Procedure "E").

(j) The integration relay automatically performs power door LOCK-UNLOCK operations to indicate which mode has been selected.

Response to selected mode (Power door lock operation):

Mode Selection	Power Door Lock LOCK-UNLOCK	Door Lock Status
Add mode	Once	A: Door lock motor status "LOCK" B: Door lock motor status "UNLOCK" T1: Approximately 1 second 
Rewrite Mode	Twice	A: Door lock motor status "LOCK" B: Door lock motor status "UNLOCK" T1: Approximately 1 second 
Confirmation Mode	The number of registered codes (1 to 5 times)	A: Door lock motor status "LOCK" B: Door lock motor status "UNLOCK" C: 1st time D: 2nd time T1: Approximately 1 second T2: Approximately 2 seconds 

Mode Selection	Power Door Lock LOCK-UNLOCK	Door Lock Status
Prohibition Mode	5 times	A: Door lock motor status "LOCK" B: Door lock motor status "UNLOCK" T1: Approximately 1 second 

HINT:

- In confirmation mode, the LOCK-UNLOCK operation will occur once for each recognition code that has been registered. For example, if 2 recognition codes have been registered, the LOCK-UNLOCK operation will occur twice.
- In confirmation mode, if no recognition codes have been registered, the LOCK-UNLOCK operation will occur 5 times.

DL

Next step

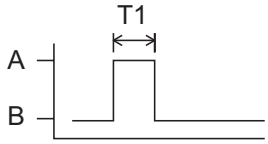
Mode Selection	Procedure
Add Mode	Continued in next step.
Rewrite Mode	
Confirmation Mode	Registration procedures are completed.
Prohibition Mode	

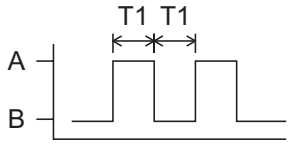
(k) Press both the LOCK and UNLOCK switches on the transmitter simultaneously (Procedure "F").

(l) Press a single switch (LOCK or UNLOCK) within 45 seconds after Procedure "E".

(m) The integration relay automatically performs power door LOCK-UNLOCK operations to show whether registration has been completed correct or not.

Response to registration completion:

Power Door Lock LOCK-UNLOCK Opearation	Result	Door Lock Status
Once	Registration of recognition code has been completed.	A: Door lock motor status "LOCK" B: Door lock motor status "UNLOCK" T1: Approximately 1 second 

Power Door Lock LOCK-UNLOCK Opearation	Result	Door Lock Status
Twice	Registration of recognition code has failed.	A: Door lock motor status "LOCK" B: Door lock motor status "UNLOCK" T1: Approximately 1 second 

HINT:
If registration of a recognition code has failed, perform registration procedures again from the beginning.

DL

Next step

Next Operation	Procedure
When another transmitter needs to registered.	Return to procedure "F" within 40 seconds *.
When registration procedures are completed.	Continued in next step.

HINT:
*: All 4 recognition codes can be registered consecutively.

(n) Perform either of the following:
- Open a door.
- Insert key into ignition key cylinder.

(o) Registration of recognition codes (add mode and rewrite mode) is completed.

PROBLEM SYMPTOMS TABLE

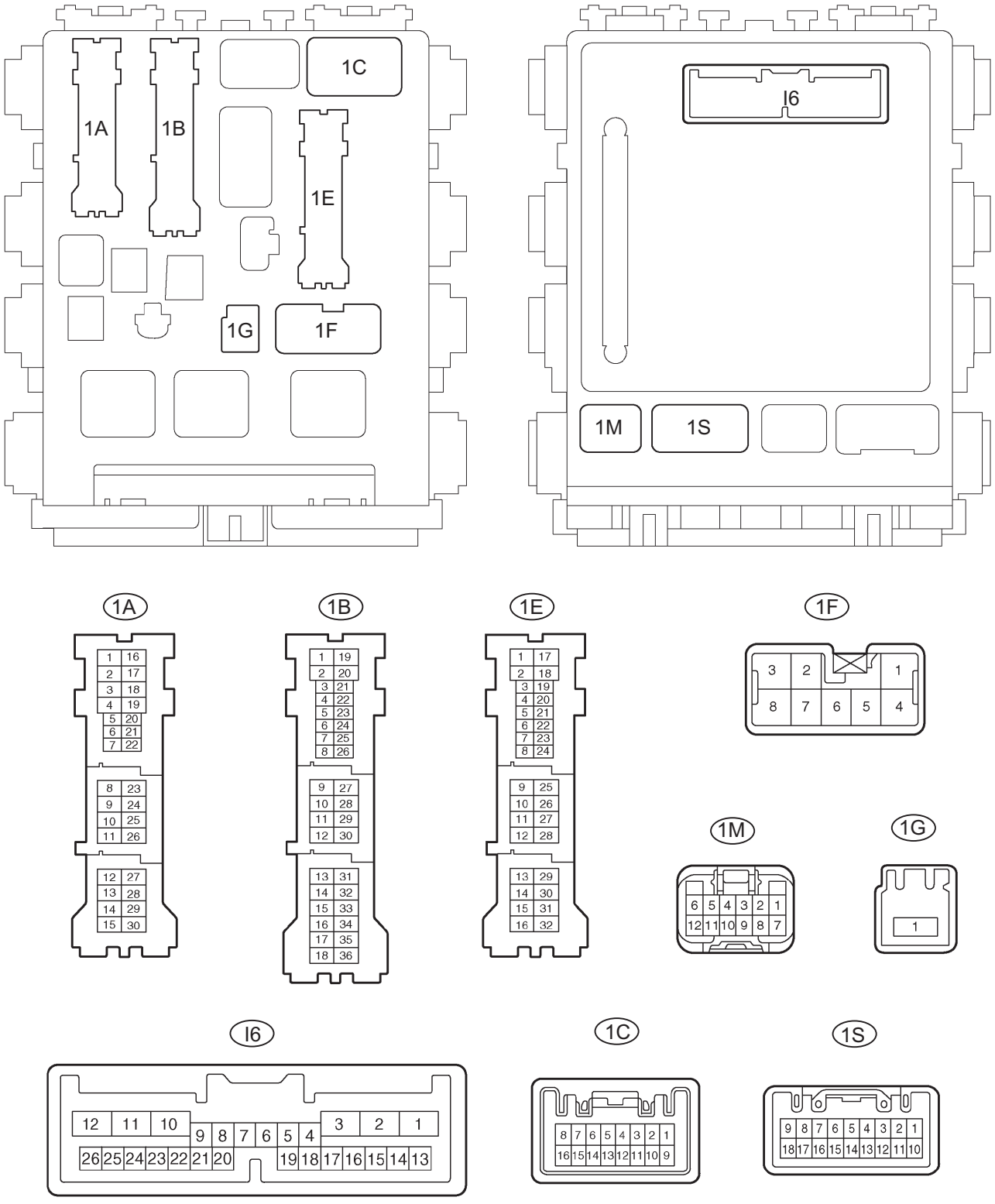
HINT:
Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Wireless door lock control system:

Symptom	Suspected Area	See page
Only wireless control function is inoperative	1. Transmitter battery	DL-78
	2. Door control transmitter assembly	DL-80
	3. Door control receiver	DL-92
	4. Unlock warning switch assembly	EI-42
	5. Instrument panel junction block assembly (integration relay)	-
	6. Lighting system	LI-1
	7. Wire harness	-
No answer-back (hazard warning light)	1. Lighting system	LI-1
	2. Instrument panel junction block assembly (integration relay)	-
	3. Wire harness	-

TERMINALS OF ECU

1. CHECK INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (INTEGRATION RELAY)



Y

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(a) Disconnect the 1A, 1B, 1C, 1E, 1F, 1G and 1M junction block connectors.
(b) Measure the resistance and voltage of the wire harness side connectors.

Standard resistance

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
KSW (1E-26) - Body ground	B - Body ground	Key unlock warning switch input	No key in ignition key cylinder	10 kΩ or higher
KSW (1E-26) - Body ground	B - Body ground	Key unlock warning switch input	Key inserted	Below 1 Ω
DCTY (1A-21) - Body ground	O - Body ground	Driver side courtesy switch input	Driver side door closed	10 kΩ or higher
DCTY (1A-21) - Body ground	O - Body ground	Driver side courtesy switch input	Driver side door open	Below 1 Ω
PCTY (1C-14) - Body ground	L - Body ground	Passenger side courtesy switch input	Passenger side door closed	10 kΩ or higher
PCTY (1C-14) - Body ground	L - Body ground	Passenger side courtesy switch input	Passenger side door open	Below 1 Ω
BCTY (1A-7) - Body ground	V - Body ground	Back door courtesy switch input	Back door closed	10 kΩ or higher
BCTY (1A-7) - Body ground	V - Body ground	Back door courtesy switch input	Back door open	Below 1 Ω
GND (1M-7) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
GND (1E-17) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω

Standard voltage

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
SIG (1G-1) - Body ground	W - Body ground	Ignition power supply	Ignition switch OFF	Below 1 V
SIG (1G-1) - Body ground	W - Body ground	Ignition power supply	Ignition switch ON	10 to 14 V
ALTB (1F-1) - Body ground	W - Body ground	+B (ALTB) power supply	Always	10 to 14 V
ECUB (1B-30) - Body ground	V - Body ground	+B (ECUB) power supply	Always	10 to 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.

(c) Reconnect the 1A, 1B, 1C, 1E, 1F, 1G and 1M junction block connectors.
(d) Measure the voltage of the connectors.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
HAZ (1S-17) - Body ground	O - Body ground	Hazard warning light drive	Answer-back OFF	10 to 14 V
HAZ (1S-17) - Body ground	O - Body ground	Hazard warning light drive	Answer-back ON	Pulse generation
RDA (I6-7) - Body ground	GR - Body ground	Door control receiver input	No key in ignition key cylinder, all doors closed and each transmitter switch OFF to ON	Below 1 V → 10 to 14 V → Below 1 V

If the result is not as specified, the junction block assembly (integration relay) may have a malfunction.

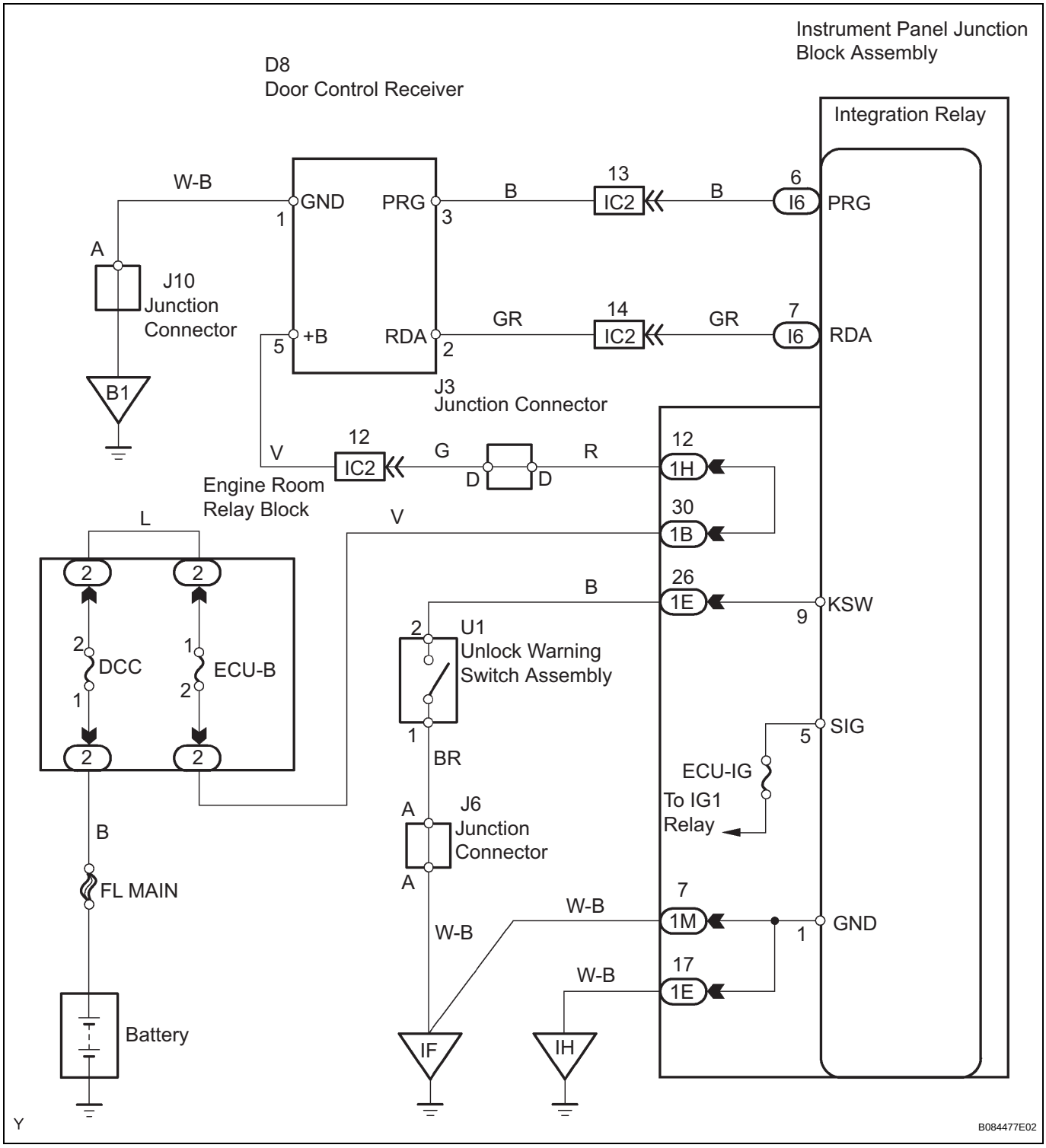
DL

Only Wireless Control Function is Inoperative

SYSTEM DESCRIPTION

The door control receiver receives signals from the transmitter and sends these signals to the integration relay. The integration relay then controls all the doors by sending LOCK / UNLOCK signals to each door lock actuator.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WIRELESS DOOR LOCK CONTROL FUNCTIONS

(a) Check that the wireless door lock control (See page DL-45).

OK → NORMAL

NG

2	CHECK THAT TRANSMITTER LED ILLUMINATES

(a) Check that the transmitter LED illuminates 3 times when the switch is pressed 3 times.

OK:

Transmitter LED illuminates 3 times when the switch is pressed 3 times.

NG → Go to step 4

OK

3	CHECK WIRELESS DOOR LOCK FUNCTIONS (STANDARD OPERATION)

(a) Check standard LOCK / UNLOCK switch operation.

NOTICE:

Standardized test procedure: press the transmitter switch for 1 second, directing the transmitter to the driver side door outside handle from a distance of 1 m (3.28 ft.). The transmitter should be pointed directly at the door handle, i.e. at a 90°angle to the vehicle body.

NG → Go to step 5

OK

REPLACE DOOR CONTROL TRANSMITTER

4	REPLACE TRANSMITTER BATTERY

(a) After replacing the transmitter battery, check that the doors can be locked and unlocked by using the transmitter LOCK / UNLOCK switch.

OK:

Doors can be locked and unlocked with transmitter.

NG → REPLACE DOOR CONTROL TRANSMITTER

DL

OK

NORMAL

5	CHECK ROOM LIGHT

(a) Check that the room light illuminates.
HINT:
When the room light does not illuminate, proceed to self-diagnostic mode after repairing the room light.

NEXT

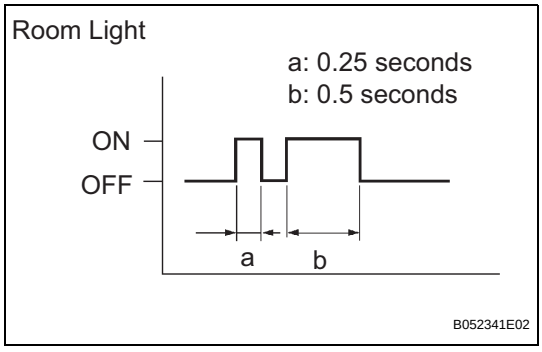
DL

6	SWITCH TO SELF-DIAGNOSTIC MODE

(a) Switch to self-diagnostic mode by operating the ignition switch.
(1) Make sure the vehicle is in a condition where wireless control functions can be operated, and then insert the key into the ignition key cylinder and remove it.
(2) Within 5 seconds of removing the key, insert the key into the ignition key cylinder. Then turn the ignition switch ON and OFF.
(3) Within 30 seconds of turning the ignition switch ON and OFF, perform the following 9 times: turn the ignition switch ON and OFF.
HINT:
- Turning the ignition switch ON after performing all of the steps above will end self-diagnostic mode.
- Do not lock or unlock doors during self-diagnostic mode.

NOTICE:
If the change to the self-diagnostic mode has failed, the system will return to normal mode.

(b) Check that the system has switched to self-diagnostic mode by comparing the flash patterns of the room light to the timing chart.
OK:
The flash patterns of the room light should be the same as the patterns shown in the timing chart.

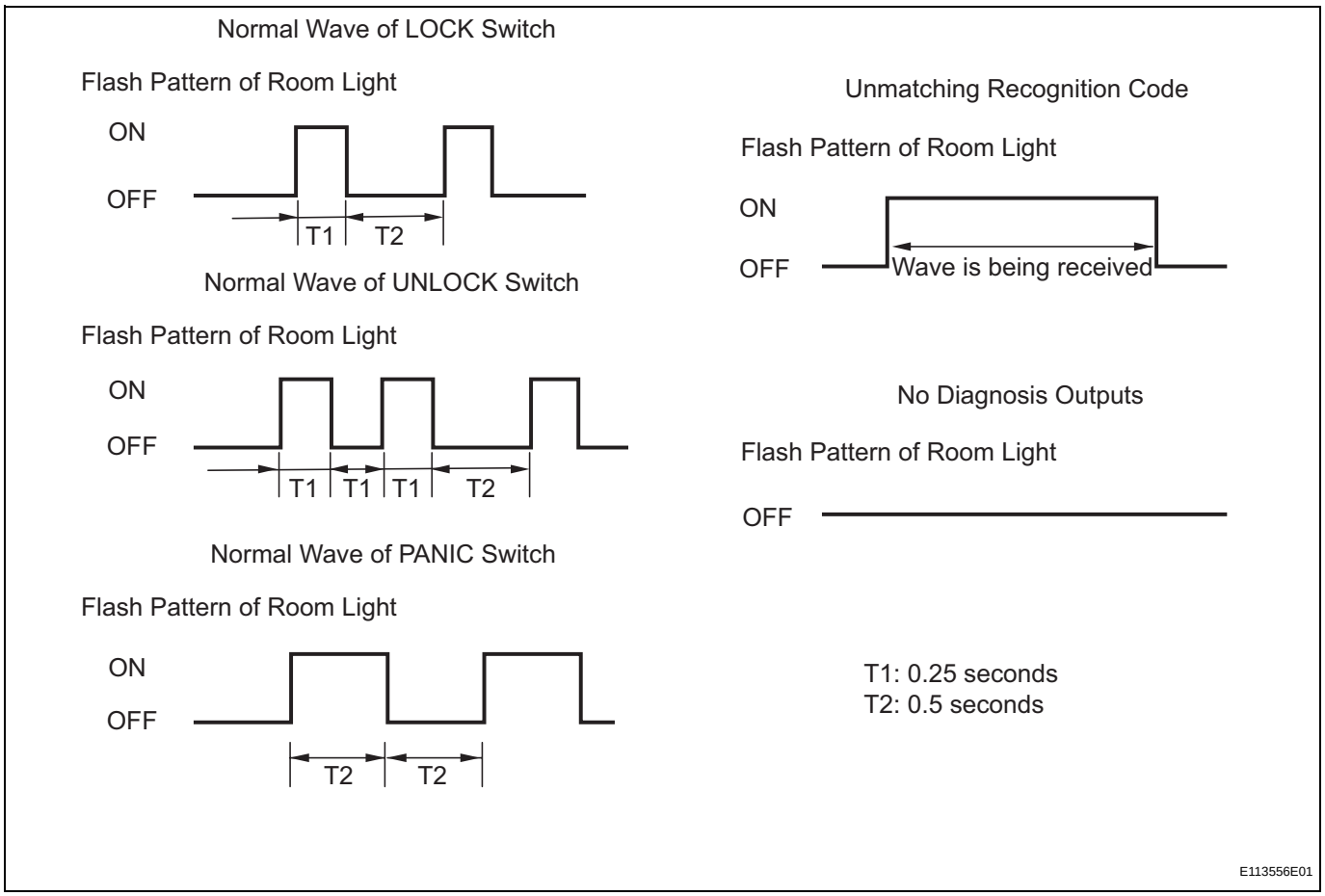


NG → Go to step 11

OK

7	CHECK SELF-DIAGNOSTIC MODE

(a) Check the diagnosis outputs when the door control transmitter switch is held down. The diagnosis outputs can be checked by observing the flash patterns of the room light.



Result

Result	Proceed to
Unmatching recognition code is output	A
Normal waves of LOCK, UNLOCK and PANIC switches are output	B
There are no diagnosis outputs (room light is OFF)	C

B → **Go to step 17**

C → **Go to step 9**

A

8	RESISTER RECOGNITION CODE

(a) Check that the system can switch to rewrite mode or add mode, and that a recognition code can be registered.

OK:

System can switch to rewrite mode or add mode, and recognition code can be registered.

NG → **Go to step 10**

OK ↓

NORMAL (CARRY OUT INSPECTION OF FUNCTION)

9	CHECK RESPONSE OF DOOR CONTROL RECEIVER

(a) When a new or functioning door control transmitter switch for the same vehicle type is held down, check that an unmatching recognition code is output.

OK:

Unmatching recognition code is output.

NG → **Go to step 14**

OK ↓

REPLACE DOOR CONTROL TRANSMITTER

10	REPLACE DOOR CONTROL RECEIVER

(a) After replacing the door control receiver, check that the doors can be locked and unlocked by using the transmitter LOCK / UNLOCK switch.

OK:

Doors can be locked and unlocked with transmitter.

NG → **Go to step 17**

OK ↓

END

11	CONFIRM INPUT METHOD OF SELF-DIAGNOSTIC MODE

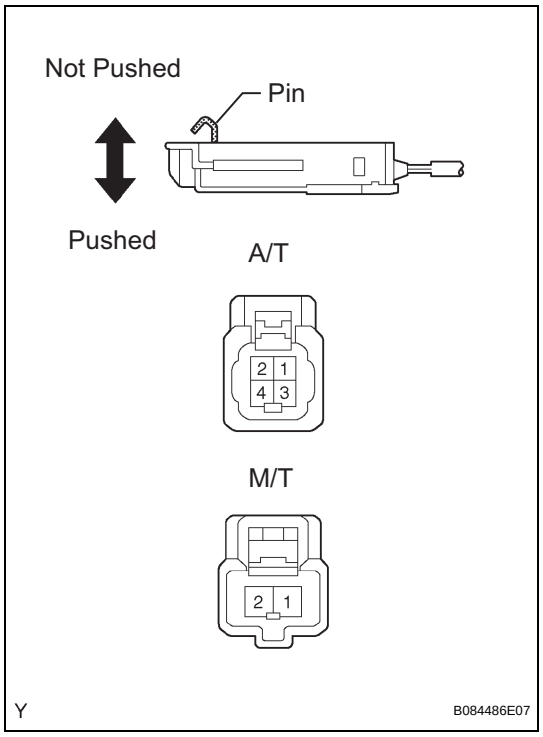
Result

Result	Proceed to
Method for changing system to self-diagnostic mode works	A
Method for changing system to self-diagnostic mode does not work	B

B → **Go to step 6**

A

12	INSPECT UNLOCK WARNING SWITCH ASSEMBLY



(a) Measure the resistance of the switch.
Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Not pushed	10 kΩ or higher
1 - 2	Pushed	Below 1 Ω

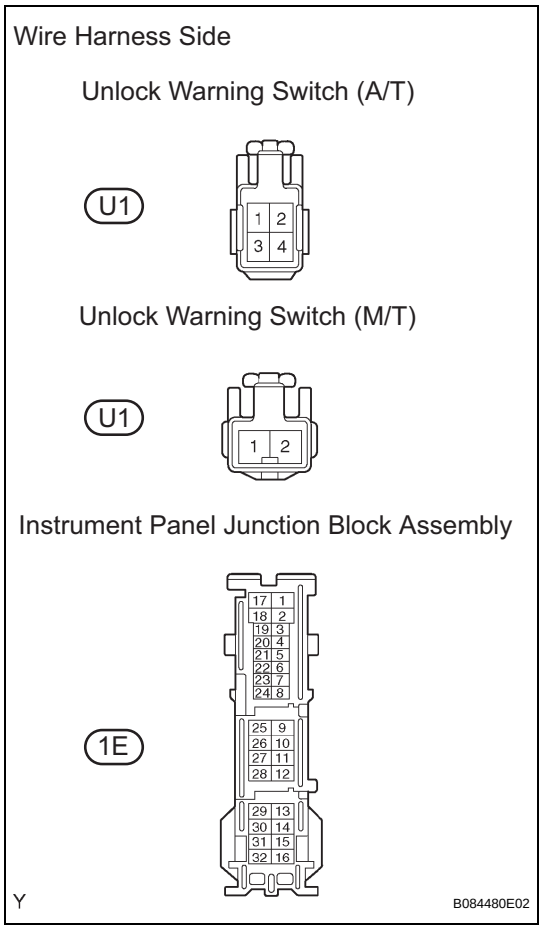
NG → **REPLACE UNLOCK WARNING SWITCH ASSEMBLY**

DL

OK

13	CHECK WIRE HARNESS (UNLOCK WARNING SWITCH ASSEMBLY - INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY AND BODY GROUND)

(a) Disconnect the U1 switch connector.
(b) Disconnect the 1E junction block connector.



(c) Measure the resistance of the wire harness side connectors.

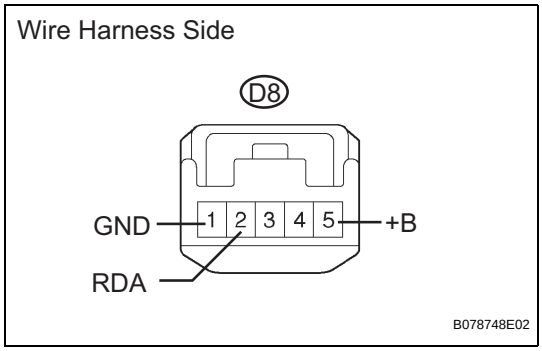
Standard resistance

Tester Connection	Specified Condition
U1-2 - 1E-26	Below 1 Ω
U1-1 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

14 CHECK WIRE HARNESS (DOOR CONTROL RECEIVER - BATTERY AND BODY GROUND)



(a) Disconnect the D8 receiver connector.

(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
D8-1 (GND) - Body ground	Below 1 Ω

(c) Measure the voltage of the wire harness side connector.

Standard voltage

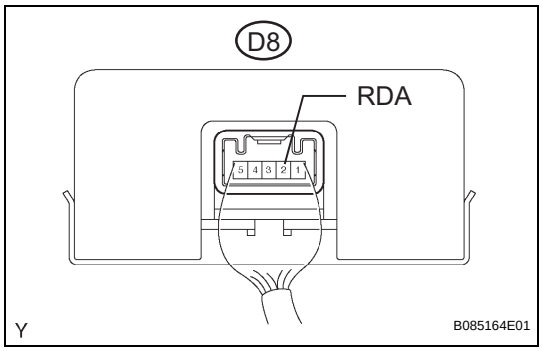
Tester Connection	Specified Condition
D8-5 (+B) - Body ground	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

15 CHECK DOOR CONTROL RECEIVER (OUTPUT)

(a) Reconnect the D8 receiver connector.



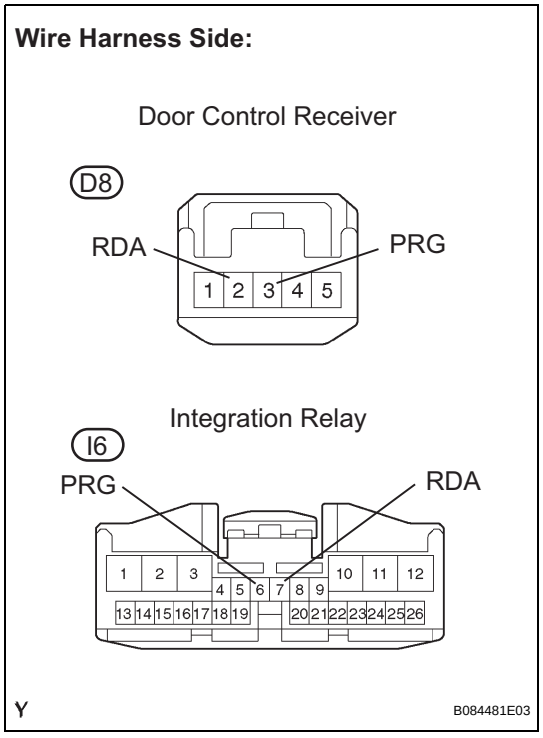
(b) Measure the voltage of the connector.
Standard voltage

Tester Connection	Condition	Specified Condition
D8-2 (RDA) - Body ground	No key in ignition key cylinder, all doors closed and each transmitter switch OFF to ON	Below 12 V → Approx. 6 to 7 V → Below 12 V

NG → **Go to step 10**

OK

16 CHECK WIRE HARNESS (DOOR CONTROL RECEIVER - INTEGRATION RELAY)



(a) Disconnect the D8 receiver connector.
(b) Disconnect the I6 relay connector.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
D8-2 (RDA) - I6-7 (RDA)	Below 1 Ω
D8-3 (PRG) - I6-6 (PRG)	Below 1 Ω
D8-2 (RDA) or I6-7 (RDA) - Body ground	10 kΩ or higher
D8-3 (PRG) or I6-6 (PRG) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

17 REPLACE INTEGRATION RELAY

(a) After replacing the integration relay, check that the doors can be locked and unlocked by using the transmitter LOCK / UNLOCK switch.
OK:
The wireless door control system operates.

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

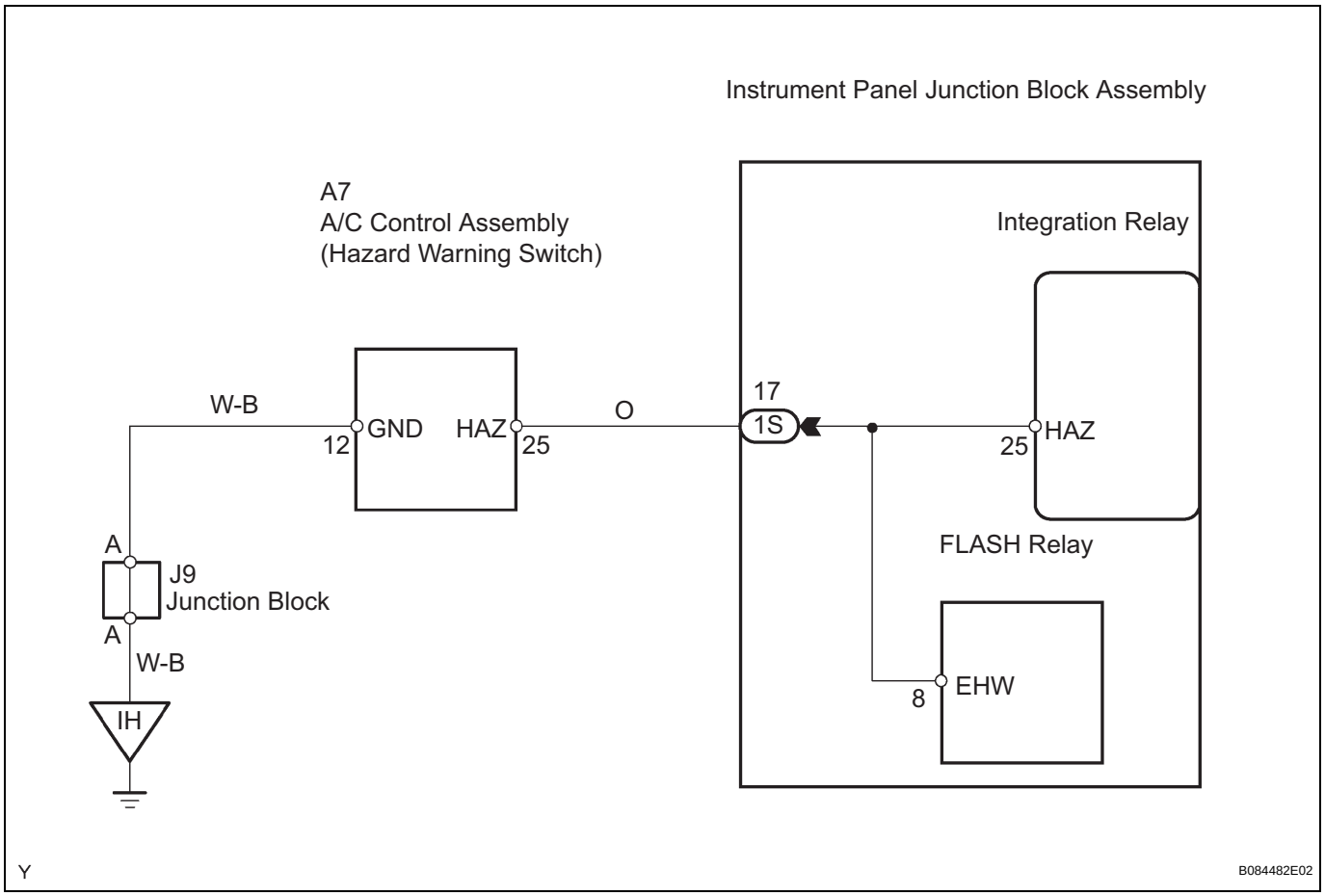
END

No Answer-Back

SYSTEM DESCRIPTION

In some cases, wireless control functions are normal but the hazard warning light is not. A malfunction may be present in the integration relay hazard warning light signal outputs from the integration relay.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WIRELESS DOOR LOCK FUNCTIONS

(a) Check the wireless door lock functions by operating the transmitter switch.

Result

Result	Proceed to
Wireless door lock functions operate normally but hazard warning light answer-back does not occur	A
Wireless door lock functions do not operate	B

B → GO TO PROBLEM SYMPTOMS TABLE

A

2	CHECK HAZARD WARNING LIGHT

(a) Check that the hazard warning lights flash continuously when the hazard warning light switch is pressed.
OK:
Hazard warning light flash continuously.

NG → **GO TO LIGHTING SYSTEM**

OK

3	REPLACE INTEGRATION RELAY

(a) After replacing the integration relay, check that the answer-back occurs.
OK:
Answer-back occurs.

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

END

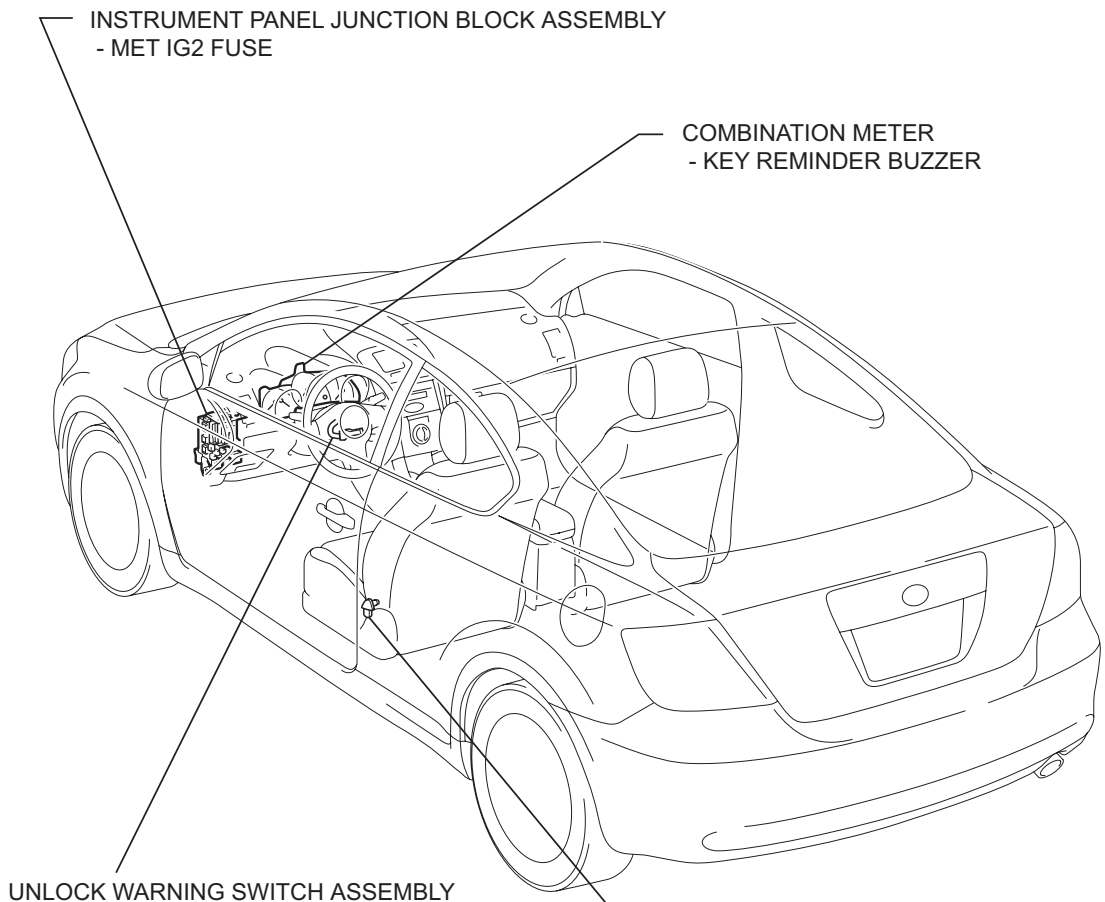
KEY REMINDER WARNING SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

System Name	See Procedure
Power Window Control System (w/ Jam Protection Function)	IN-23
Sliding Roof System	

PARTS LOCATION



T

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DL

SYSTEM DESCRIPTION

1. SYSTEM DESCRIPTION

(a) The key reminder system is a precautionary function that reminds the driver that the key is still in the ignition key cylinder. The system activates a built-in buzzer when the ignition switch is OFF, the key is in the ignition key cylinder and the driver door is opened.

2. SYSTEM FUNCTION

(a) The combination meter commands the driver circuit to sound a built-in buzzer when the following 3 conditions are met: 1) the ignition switch is turned OFF: 2) the combination meter receives an unlock warning switch signal from the ignition key cylinder indicating that the key is inserted, and: 3) the combination meter receives a driver side door open signal from the front door courtesy light switch.

3. FUNCTION OF MAIN COMPONENTS

Components	Function
Front door courtesy light switch assembly	Detects if driver side door is open or closed and outputs data to combination meter.
Unlock warning switch assembly	Detects if key is/is not in ignition key cylinder and outputs data to combination meter.
Combination meter assembly	Receives unlock warning switch signal from ignition key cylinder and driver side door open signal from front door courtesy light switch. Then combination meter actuates driver circuit to sound built-in buzzer intermittently.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
Use these procedure to troubleshoot the key reminder warning 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

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 4**

A

4 OVERALL ANALYSIS AND TROUBLESHOOTING

(a) Terminals of ECU (see page DL-70).
(b) On-vehicle inspection (see page DL-70).
(c) Inspection
  (1) Front door courtesy light switch (see page DL-76).
  (2) Unlock warning switch (see page DL-77).

NEXT

5 REPAIR OR REPLACE

NEXT

DL

6	**CONFIRMATION TEST**

NEXT

END

PROBLEM SYMPTOMS TABLE

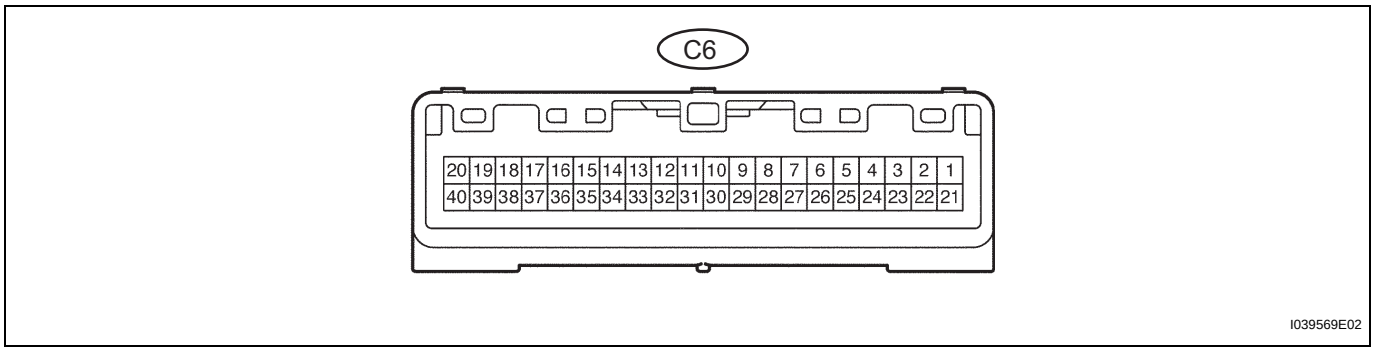
HINT:
Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

KEY REMINDER WARNING SYSTEM

Symptom	Suspected Area	See page
Key reminder dose not sound	1. Front door courtesy light switch assembly (driver side)	DL-71
	2. Unlock warning switch assembly	DL-71
	3. Wire harness	DL-71
	4. Combination meter assembly	DL-71

TERMINALS OF ECU

1. CHECK COMBINATION METER ASSEMBLY



(a) Disconnect the C6 meter connector.
(b) Measure the voltage and resistance of the wire harness side connector.

DL

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
C6-4 - Body ground	LG - Body ground	IG power supply	Ignition switch OFF	Below 1 V
C6-4 - Body ground	LG - Body ground	IG power supply	Ignition switch ON	10 to 14 V
C6-3 - Body ground	V - Body ground	+B power supply	Always	10 to 14 V
C6-1 - Body ground	BR - Body ground	Ground	Always	Below 1 Ω
C6-8 - Body ground	BR - Body ground	Driver side courtesy switch input	Driver side door closed	10 kΩor higher
C6-8 - Body ground	BR - Body ground	Driver side courtesy switch input	Driver side door open	Below 1 Ω
C6-7 - Body ground	Y - Body ground	Unlock warning switch input	No key in ignition key cylinder	10 kΩor higher
C6-7 - Body ground	Y - Body ground	Unlock warning switch input	Key in ignition key cylinder	Below 1 Ω

If the result is not as specified, there may be a malfunction on the wire harness side.

ON-VEHICLE INSPECTION

1. CHECK KEY REMINDER WARNING SYSTEM

(a) Check that the key reminder warning buzzer functions.

(1) Close the driver side door and insert the key into the ignition key cylinder.
HINT:
The ignition switch must be OFF.

(2) Open the driver side door.

(3) Check that the key reminder warning buzzer sounds intermittently.

(4) While the buzzer is sounding, perform one of the following operations:
- Close the driver side door (front door courtesy light switch is off).
- Turn the ignition switch ON.
- Pull out the key from the ignition key cylinder.

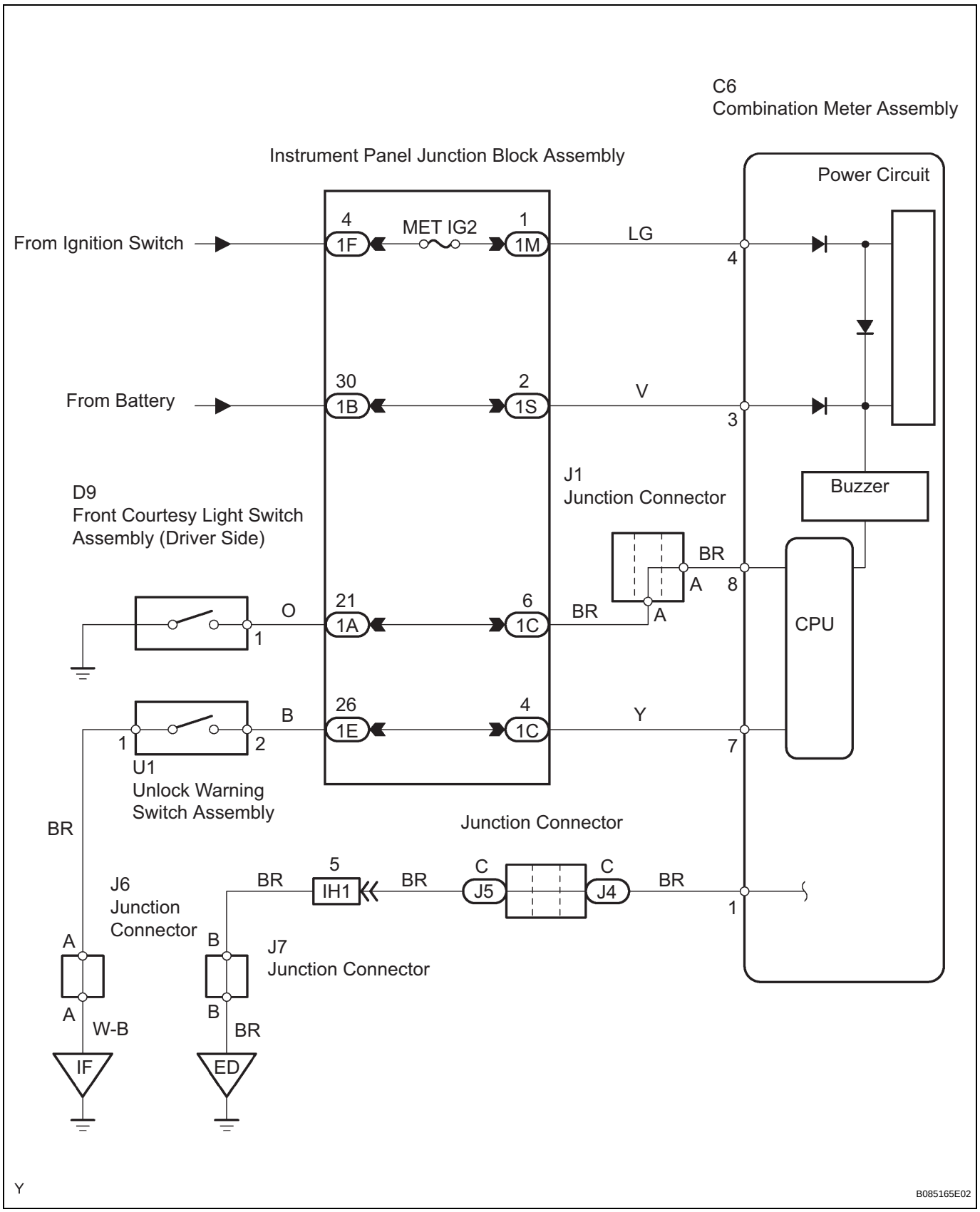
(5) Check that the key reminder warning buzzer stops sounding.

Key Reminder Buzzer does not Sound

DESCRIPTION

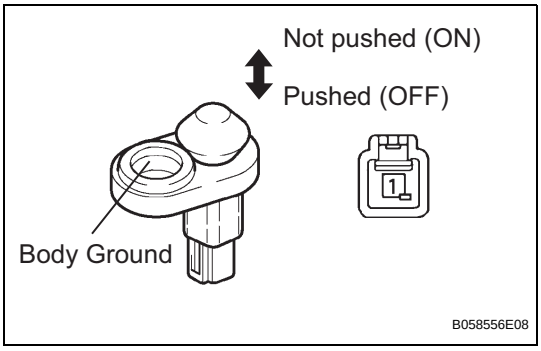
The key reminder warning buzzer sounds when the following 3 conditions are met: 1) the ignition switch is turned OFF: 2) the combination meter receives an unlock warning switch signal from the ignition key cylinder, and: 3) the combination meter receives a driver side door open signal from the front door courtesy light switch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**INSPECT FRONT DOOR COURTESY LIGHT SWITCH (DRIVER SIDE)**



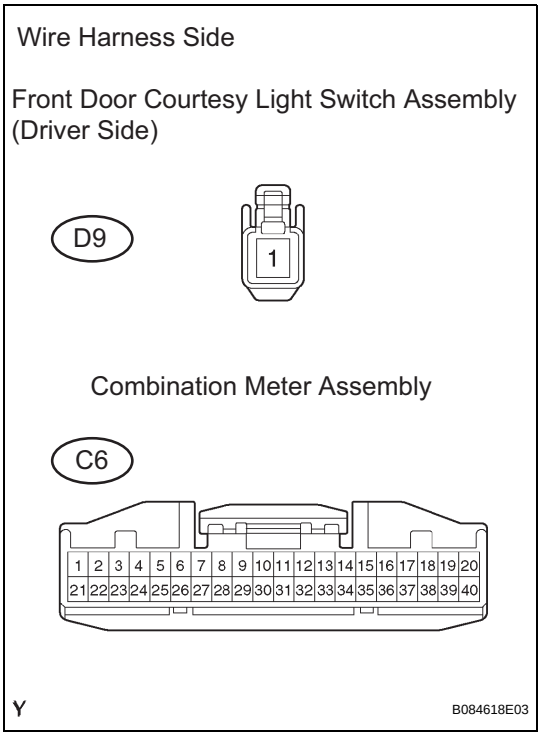
(a) Remove the courtesy light switch.
(b) Measure the resistance of the switch.
Standard resistance

Tester Connection	Condition	Specified Condition
1 - Body ground	Nor pushed (ON)	Below 1 Ω
1 - Body ground	Pushed (OFF)	10 kΩor higher

NG → **REPLACE FRONT DOOR COURTESY LIGHT SWITCH**

OK

2	**CHECK WIRE HARNESS (FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY (DRIVER SIDE) - COMBINATION METER ASSEMBLY)**



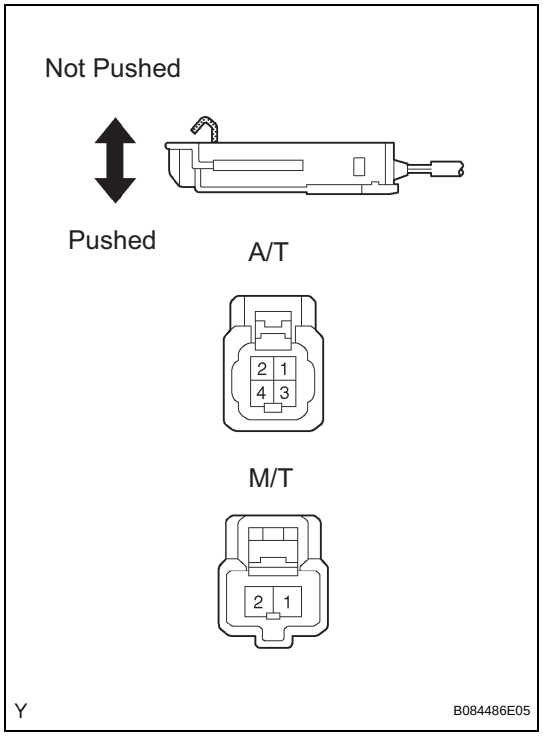
(a) Disconnect the D9 switch connector.
(b) Disconnect the C6 meter connector.
(c) Measure the resistance of the wire harness side connectors.
Standard resistance

Tester Connection	Specified Condition
D9-1 - C6-8	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

3	**INSPECT UNLOCK WARNING SWITCH ASSEMBLY**



(a) Remove the unlock warning switch.
(b) Measure the resistance of the switch.
Standard resistance

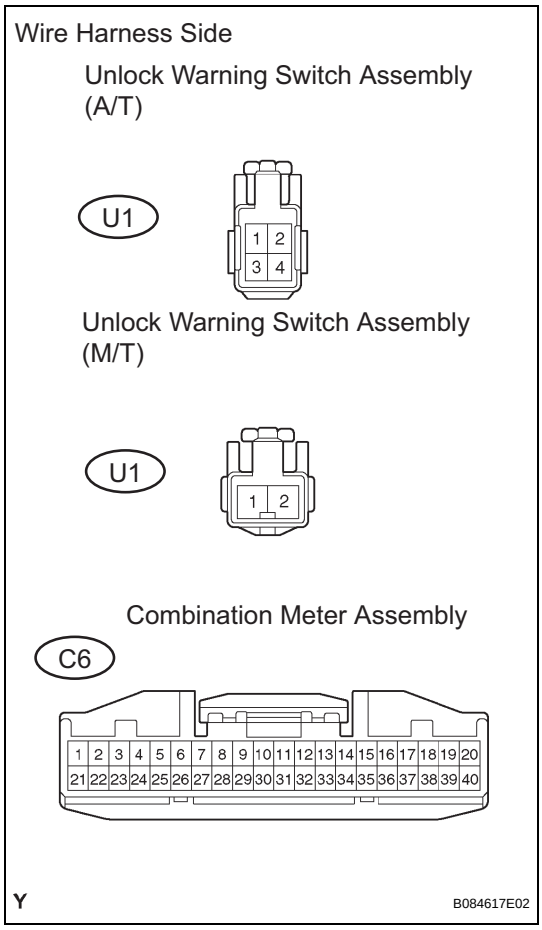
Tester Connection	Condition	Specified Condition
1 - 2	Not pushed	10 kΩor higher
1 - 2	Pushed	Below 1 Ω

NG → **REPLACE UNLOCK WARNING SWITCH ASSEMBLY**

OK

DL

4	**CHECK WIRE HARNESS (UNLOCK WARNING SWITCH ASSEMBLY - COMBINATION METER ASSEMBLY AND BODY GROUND)**



(a) Disconnect the U1 switch connector.
(b) Disconnect the C6 meter connector.
(c) Measurer the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
U1-2 - C6-7	Below 1 Ω
U1-1 - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

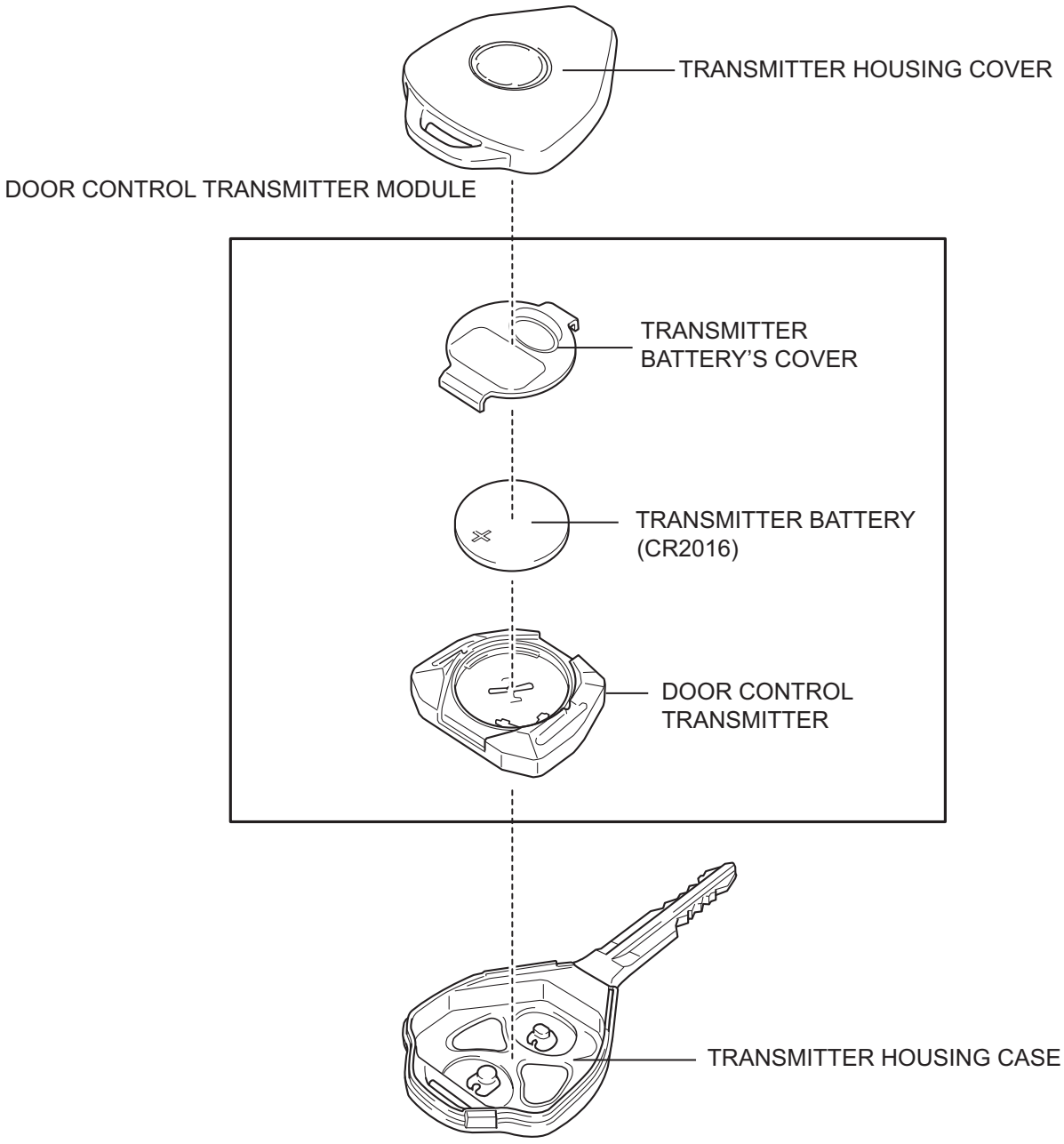
OK

REPLACE COMBINATION METER ASSEMBLY

DL

TRANSMITTER BATTERY

COMPONENTS



REMOVAL

1. REMOVE TRANSMITTER HOUSING COVER

NOTICE:

Take extra care when handling these precision electronic components.

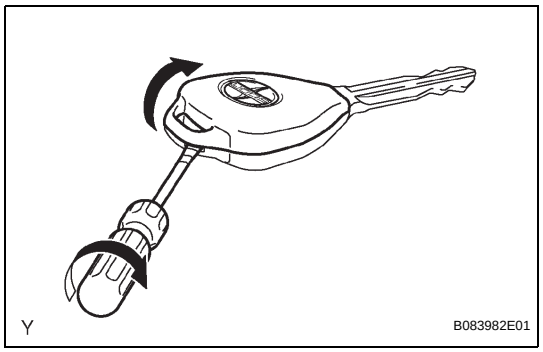
(a) Using a screwdriver, pry apart the transmitter cover.

NOTICE:

Do not forcibly pry apart the cover.

HINT:

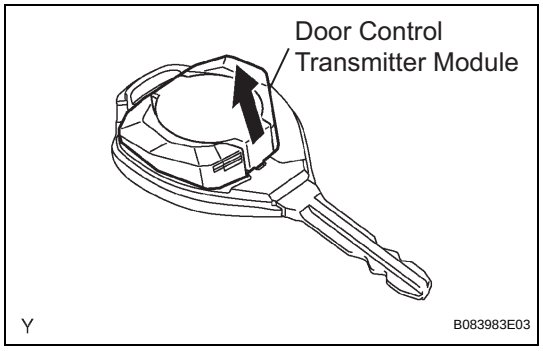
Tape the screwdriver tip before use.



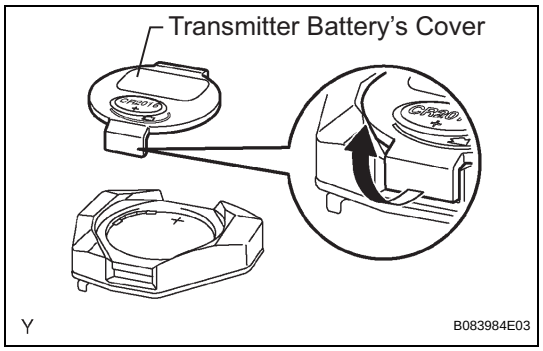
DL

2. REMOVE DOOR CONTROL TRANSMITTER MODULE

(a) Remove the door control transmitter module from the case.



(b) Disengage the hook of the transmitter battery's cover and remove the cover.

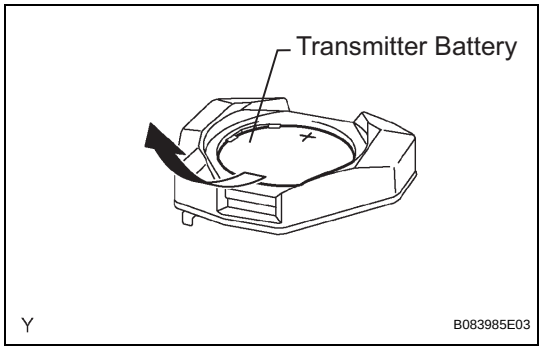


3. REMOVE BATTERY

(a) Remove the battery (lithium battery).

NOTICE:

- **Do not push the terminals with your finger.**
- **Do not forcibly pry up the battery (lithium battery). The terminals may become damaged.**
- **Do not touch the battery with wet hands. Water may cause rust.**
- **Do not touch or move any components inside the transmitter, as it may cease to work.**



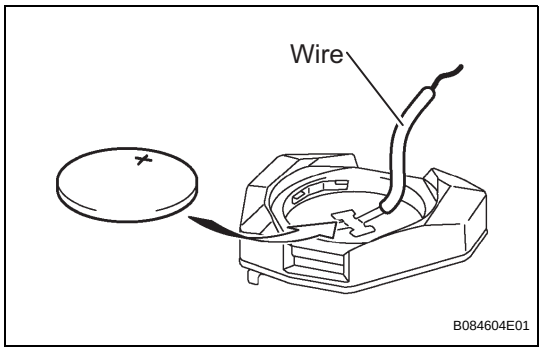
INSPECTION

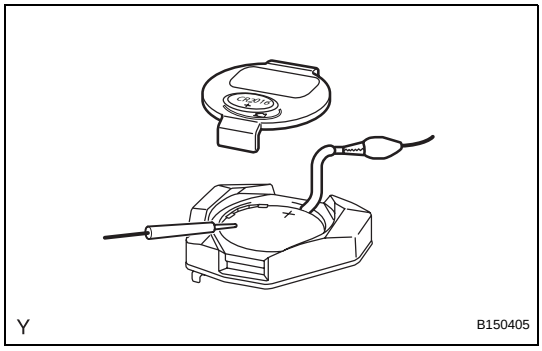
1. INSPECT BATTERY CAPACITY

HINT:

- When checking the amount of energy left in the battery (lithium battery), the battery must be checked while it is installed in the transmitter (1.2 kW is applied to the battery). When the battery is checked while it is uninstalled, the voltage reading will be more than 2.5 V until the energy is depleted.
- If the transmitter is malfunctioning, the voltage reading of the energy left in the battery may be inaccurate.

(a) Connect a wire to the negative (-) terminal of the transmitter and install the battery.





(b) Connect the tester's positive (+) lead to the positive (+) side of the battery (lithium battery) and the negative (-) lead to the wire.

(c) Press one of the transmitter switches for approximately 1 second.

(d) Press the transmitter switch again to check the voltage.

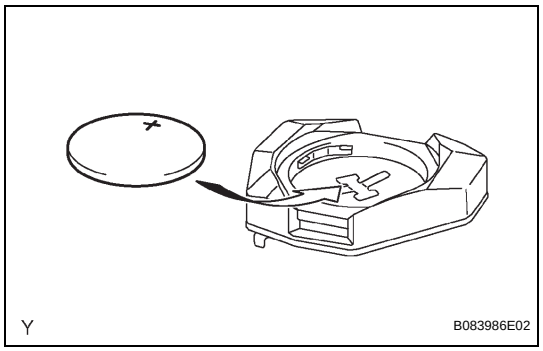
Standard voltage:

2.2 V or higher

HINT:

- When the temperature of the battery is low, the inspection results may be inaccurate. When the outcome of the test is less than 2.2 V, conduct the test again after leaving the battery in a place where the temperature is 18°C (64°F) for more than 30 minutes.
- Read the voltage immediately after the switch is pressed. 0.8 seconds after the switch has been pressed, the automatic power-off function starts and resistance applied to the battery will cease. The voltage of the battery will be 2.5 V or more.
- Press the switch at least 3 times before reading the voltage. If the battery has just been returned to 18°C (64°F), the voltage may be unusually high for the first or second voltage reading.

(e) Disconnect the lead.



INSTALLATION

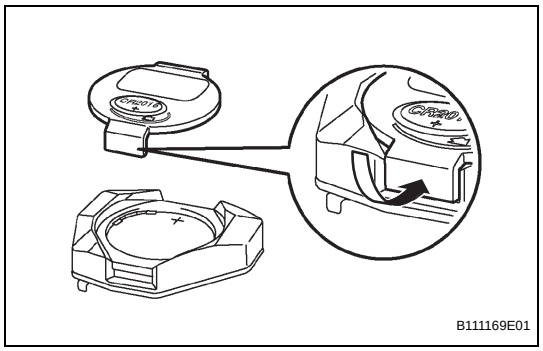
1. INSTALL TRANSMITTER BATTERY

(a) Install a new battery (lithium battery) with the positive (+) side up, as shown in the illustration.

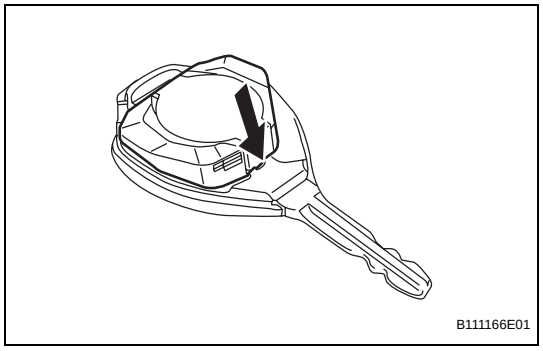
NOTICE:

- **Be sure that the positive (+) side and the negative (-) side of the transmitter battery are matched up correctly.**
- **Be careful not to bend the transmitter battery electrode during insertion.**
- **Keep the transmitter cover interior free of dust and oil.**

(b) Attach the hook of the transmitter battery's cover and install the cover.

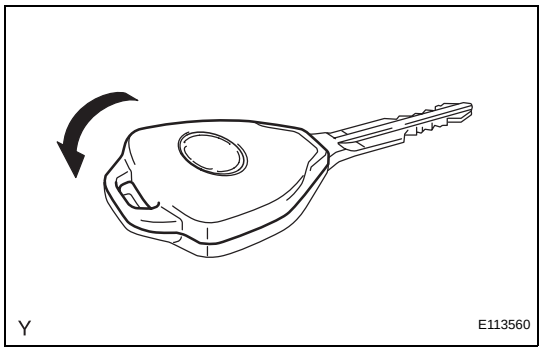


DL



2. INSTALL DOOR CONTROL TRANSMITTER MODULE

(a) Install the door control transmitter module to the case.



3. INSTALL TRANSMITTER HOUSING COVER

(a) Install the transmitter housing cover.

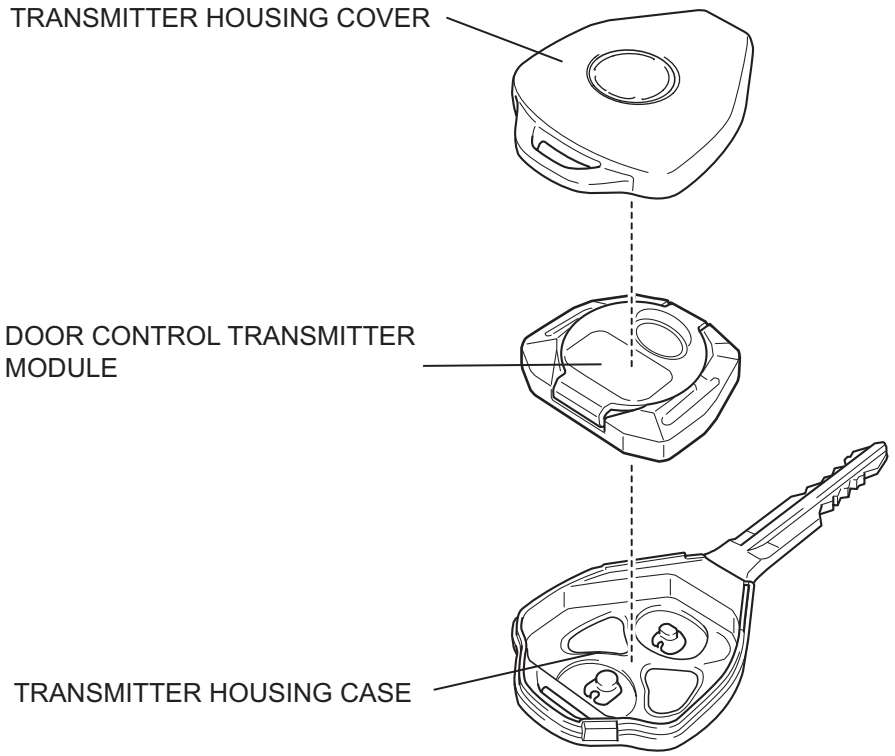
(b) Check that the transmitter's LED illuminates 3 times when the switch is pressed 3 times.

OK:

Transmitter's LED illuminates 3 times when switch is pressed 3 times.

DOOR CONTROL TRANSMITTER MODULE

COMPONENTS



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DL

REMOVAL

1. **REMOVE TRANSMITTER HOUSING COVER (See page DL-77)**
2. **REMOVE DOOR CONTROL TRANSMITTER MODULE (See page DL-77)**

INSPECTION

1. INSPECT DOOR CONTROL TRANSMITTER

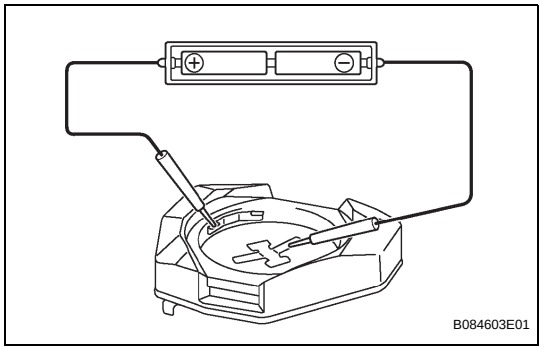
(a) Inspect operation of the transmitter.

(1) Remove the battery (lithium battery) from the transmitter.

(2) Install a new or non-depleted battery (lithium battery).

HINT:

When a new or non-depleted transmitter battery is not available, connect 2 new 1.5 V batteries in series. Then connect leads to the batteries and use the leads to apply 3 V to the transmitter, as shown in the illustration.



(3) From outside the vehicle, approximately 1 m (3.28 ft.) from the driver side door outside handle, test the transmitter by pointing its key plate at the vehicle and pressing a transmitter switch.

OK:

Door lock can be operated via the transmitter.

HINT:

- The operating range differs depending on the user, the way the transmitter is held and the location.
- The transmitter's faint electric waves may be affected if the area has strong electric waves or noise. The transmitter operational area may be shortened or the transmitter may not function.

DL

INSTALLATION

1. **INSTALL DOOR CONTROL TRANSMITTER MODULE (See page DL-79)**
2. **INSTALL TRANSMITTER HOUSING COVER (See page DL-79)**

DOOR CONTROL SWITCH

INSPECTION

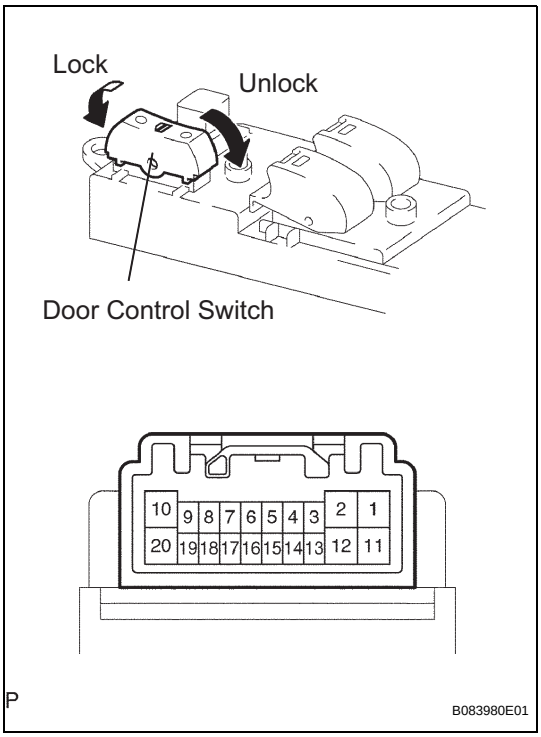
1. INSPECT POWER WINDOW REGULATOR MASTER SWITCH (w/ Jam Protection Function)

(a) Inspect door control switch.

(1) Measure the resistance of the door control switch.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
2 - 4	Lock	Below 1 Ω
2 - 4	OFF (Free)	10 kΩ or higher
2 - 14	Unlock	Below 1 Ω
2 - 14	OFF (Free)	10 kΩ or higher



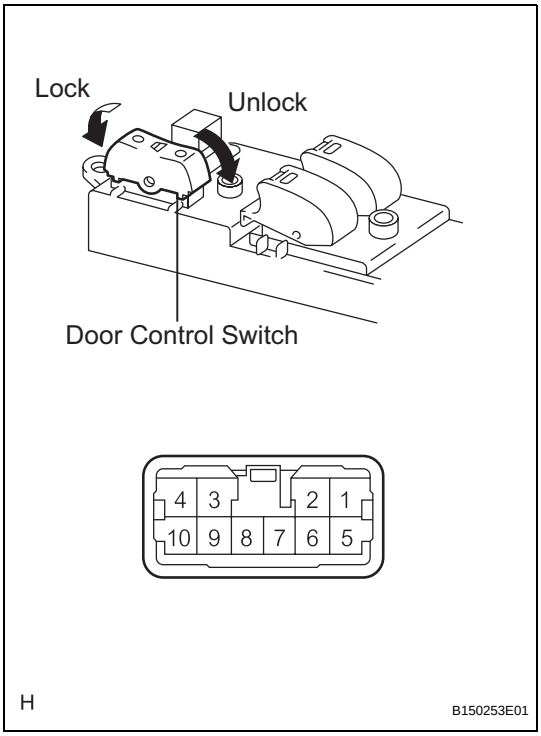
2. INSPECT POWER WINDOW REGULATOR MASTER SWITCH (w/o Jam Protection Function)

(a) Inspect door control switch.

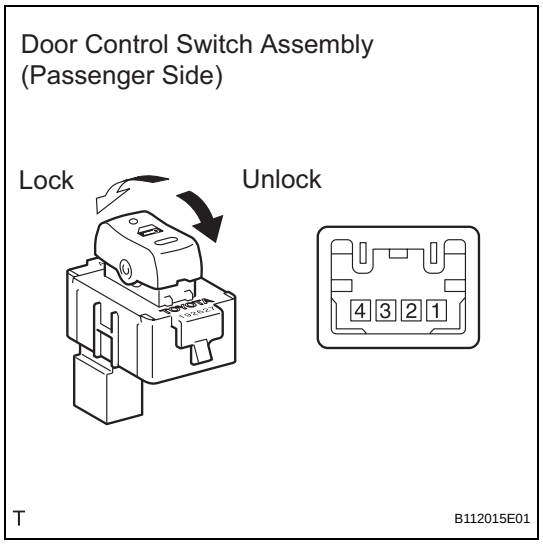
(1) Measure the resistance of the door control switch.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Lock	Below 1 Ω
1 - 2	OFF (Free)	10 kΩ or higher
1 - 7	Unlock	Below 1 Ω
1 - 7	OFF (Free)	10 kΩ or higher



DL



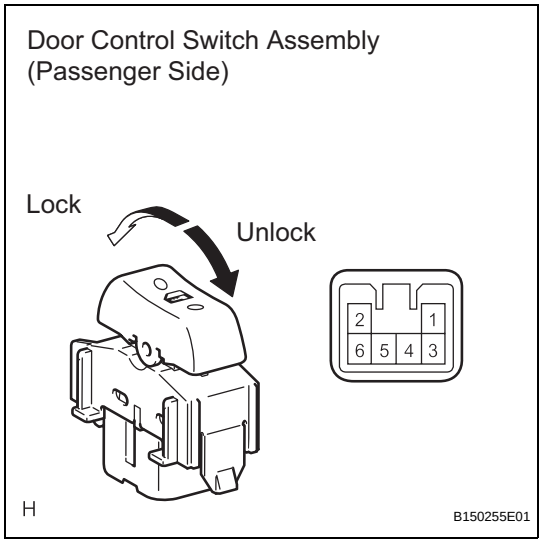
3. INSPECT DOOR CONTROL SWITCH (w/ Jam Protection Function)

(a) Inspect door control switch.

(1) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
2 - 3	Lock	Below 1 Ω
1 - 2	Unlock	Below 1 Ω



4. INSPECT DOOR CONTROL SWITCH (w/o Jam Protection Function)

(a) Inspect door control switch.

(1) Measure the resistance according to the value(s) in the table below.

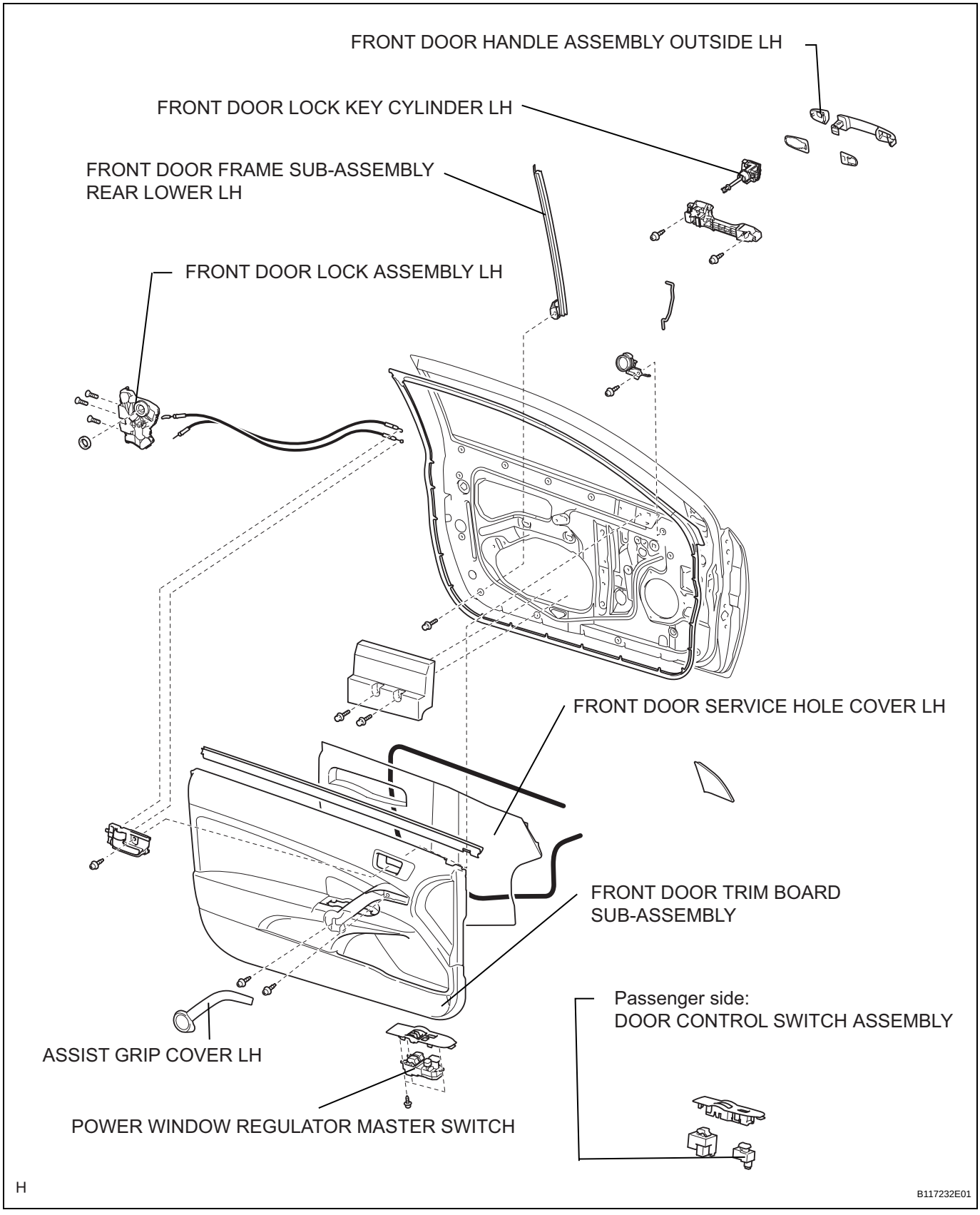
Standard resistance

Tester Connection	Switch Condition	Specified Condition
3 - 6	Lock	Below 1 Ω
3 - 5	Unlock	Below 1 Ω

DL

FRONT DOOR LOCK

COMPONENTS



REMOVAL

HINT:

- Before adjusting the door position for vehicles equipped with side airbag and curtain shield airbag, be sure to disconnect the cable from the negative (-) battery terminal. After the adjustment, inspect the SRS warning light, the side airbag system and curtain shield airbag system for normal operation (see page RS-11).
- The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the RH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE ASSIST GRIP COVER LH**
   (a) Remove the assist grip cover LH (see page ED-7).
3. **REMOVE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**
   (a) Driver side:
   Remove the power window regulator master switch assembly (see page ED-7).
4. **REMOVE DOOR CONTROL SWITCH ASSEMBLY**
   (a) Passenger side:
   Remove the door control switch assembly (see page ED-7).
5. **REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY**
   (a) Remove the front door trim board sub-assembly (see page ED-7).
6. **REMOVE FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY**
   (a) Remove the front door inside handle sub-assembly (see page ED-7).
7. **REMOVE FRONT DOOR SERVICE HOLE COVER**
   (a) Remove the front door service hole cover (see page ED-7).
8. **REMOVE FRONT DOOR FRAME SUB-ASSEMBLY REAR LOWER**
   (a) Remove the front door frame sub-assembly rear lower (see page ED-7).
9. **REMOVE FRONT DOOR OUTSIDE HANDLE COVER**
   (a) Remove the front door outside handle cover (see page ED-7).

10. REMOVE FRONT DOOR LOCK ASSEMBLY

(a) Remove the front door lock assembly (see page ED-7).

INSPECTION

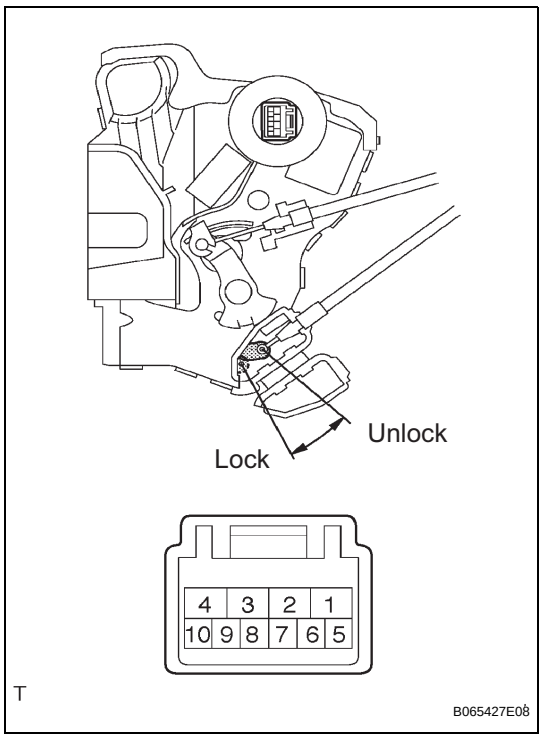
1. INSPECT FRONT DOOR LOCK ASSEMBLY LH

(a) Apply battery voltage to the door lock and check operation of the door lock motor.

OK

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 4 Battery positive (-) → Terminal 1	Lock
Battery positive (+) → Terminal 1 Battery positive (-) → Terminal 4	Unlock

If the result is not as specified, replace the door lock assembly.



(b) Measure the resistance of the lock detection switch.

Standard resistance

Tester Connection	Door Lock Condition	Specified Condition
7 - 8	Lock	10 kΩ or higher
7 - 8	Unlock	Below 1 Ω

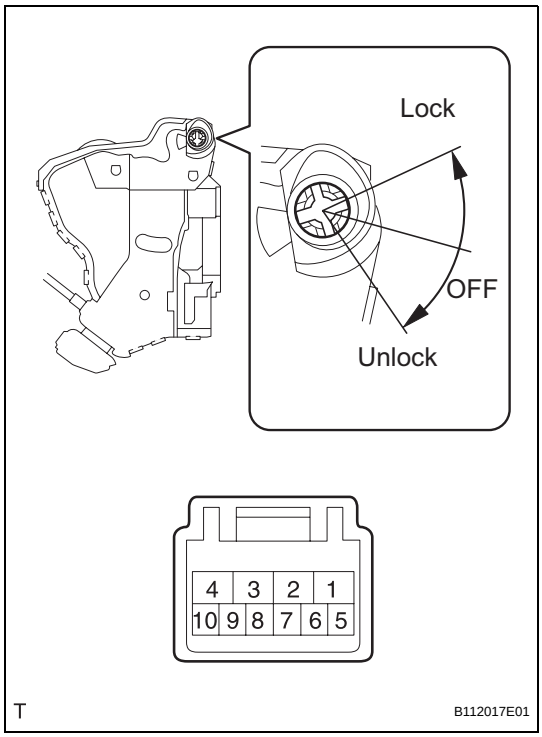
If the result is not as specified, replace the door lock assembly.

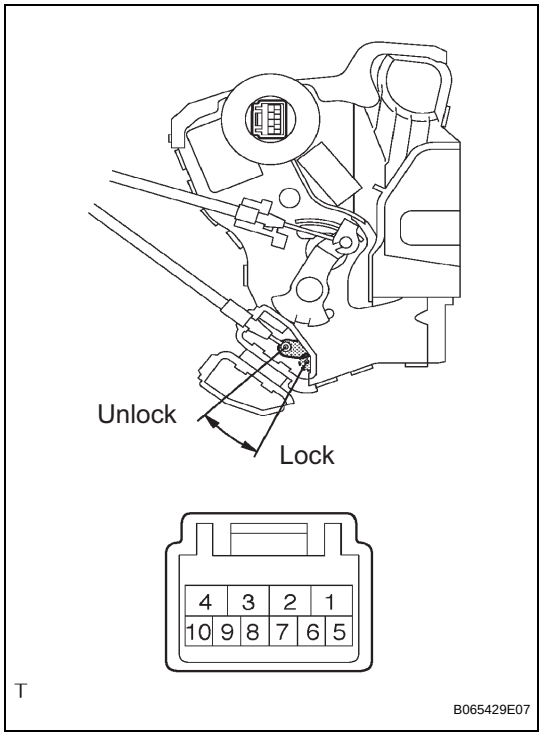
(c) Measure the resistance of the door lock and unlock switch.

Standard resistance

Tester Connection	Door Lock Condition	Specified Condition
7 - 9	Lock	Below 1 Ω
7 - 9	OFF	10 kΩ or higher
7 - 10	OFF	10 k Ω or higher
7 - 10	Unlock	Below 1 Ω

If the result is not as specified, replace the door lock assembly.





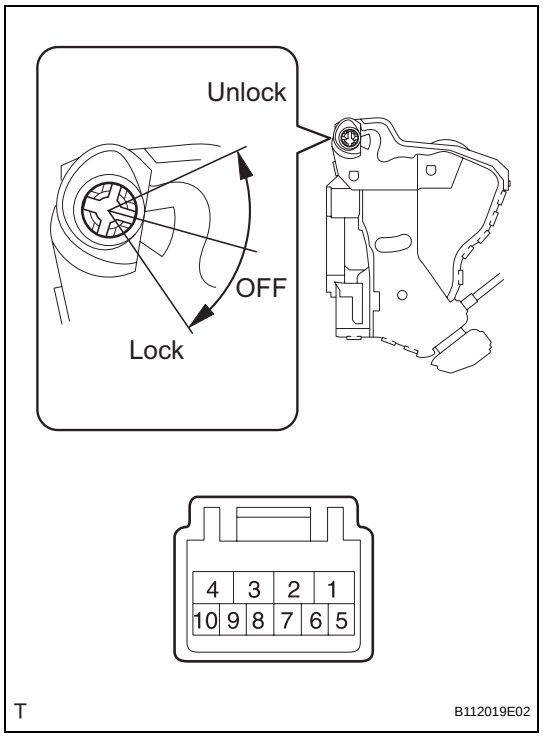
2. INSPECT FRONT DOOR LOCK ASSEMBLY RH

(a) Apply battery voltage to the door lock and check operation of the door lock motor.

OK

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 4 Battery positive (-) → Terminal 1	Lock
Battery positive (+) → Terminal 1 Battery positive (-) → Terminal 4	Unlock

If the result is not as specified, replace the door lock assembly.



(b) Measure the resistance of the door lock and unlock switch.

Standard resistance

Tester Connection	Door Lock Condition	Specified Condition
8 - 6	Lock	Below 1 Ω
8 - 6	OFF	10 kΩ or higher
8 - 5	OFF	10 kΩ or higher
8 - 5	Unlock	Below 1 Ω

If the result is not as specified, replace the door lock assembly.

DL

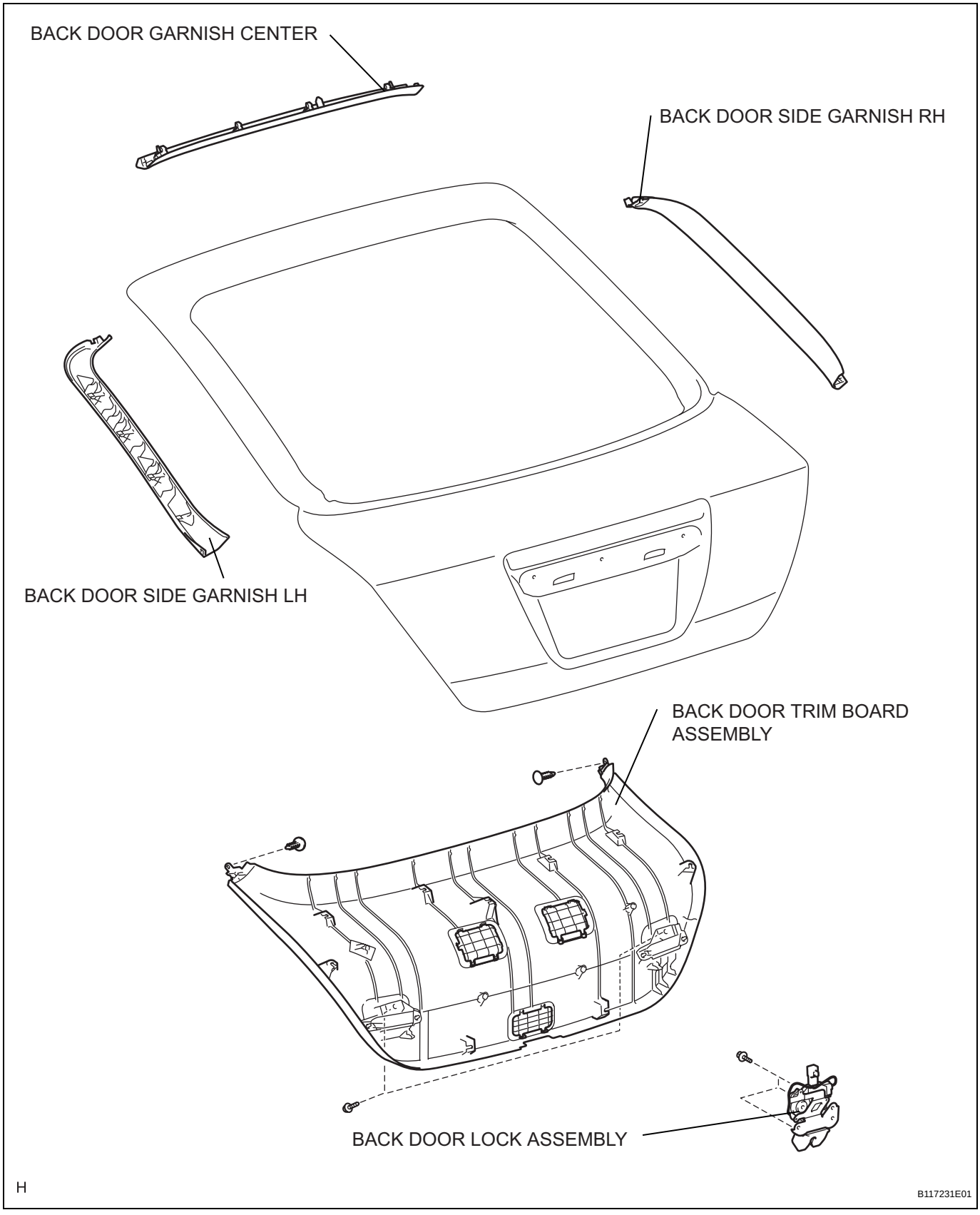
INSTALLATION

HINT:
The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.

1. **INSTALL FRONT DOOR LOCK ASSEMBLY**
   (a) Install the front door lock assembly (see page ED-15).
2. **INSTALL FRONT DOOR OUTSIDE HANDLE COVER**
   (a) Install the front door outside handle cover (see page ED-15).
3. **INSTALL FRONT DOOR FRAME SUB-ASSEMBLY REAR LOWER**
   (a) Install the front door frame sub-assembly rear lower (see page ED-15).
4. **INSTALL FRONT DOOR SERVICE HOLE COVER**
   (a) Install the front door service hole cover (see page ED-15).
5. **INSTALL FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY**
   (a) Install the front door inside handle sub-assembly (see page ED-15).
6. **INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY**
   (a) Install the front door trim board sub-assembly (see page ED-15).
7. **INSTALL DOOR CONTROL SWITCH ASSEMBLY**
   (a) Passenger side:
   Install the door control switch assembly (see page ED-15).
8. **INSTALL POWER WINDOW REGULATOR MASTER SWITCH**
   (a) Driver side:
   Install the power window regulator master switch (see page ED-15).
9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
10. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).

BACK DOOR LOCK

COMPONENTS



REMOVAL

HINT:

- The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

1. REMOVE BACK DOOR GARNISH CENTER

(a) Remove the back door garnish center (see page ED-24).

2. REMOVE BACK DOOR SIDE GARNISH LH

(a) Remove the back door side garnish LH (see page ED-24).

3. REMOVE BACK DOOR SIDE GARNISH RH

(a) Remove the back door side garnish RH (see page ED-24).

4. REMOVE BACK DOOR TRIM BOARD ASSEMBLY

(a) Remove the back door trim board assembly (see page ED-24).

5. REMOVE BACK DOOR LOCK ASSEMBLY

(a) Remove the back door lock assembly (see page ED-24).

INSPECTION

1. INSPECT BACK DOOR LOCK ASSEMBLY

(a) Check the operation of the door lock.

(1) Using a screwdriver, move the latch to the full-latch position.

(2) Apply battery voltage to the door lock and check the operation of the latch.

OK

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 4 Battery positive (+) → Terminal 3	Latch turns to open-latch position

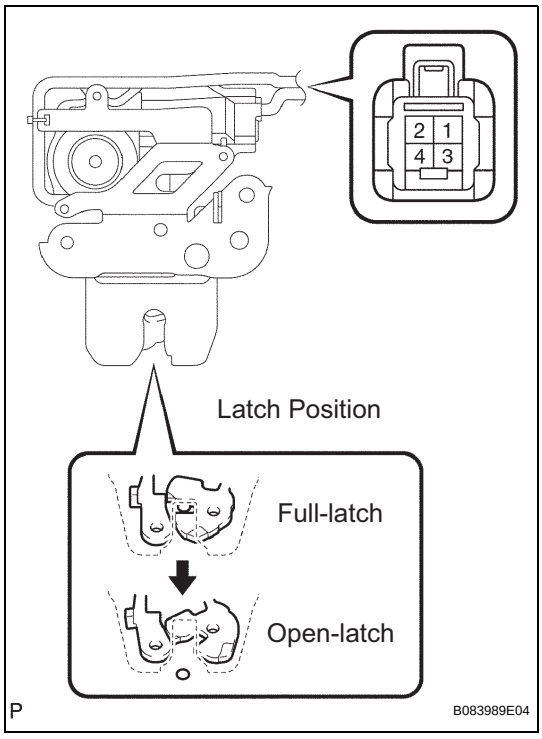
If the result is not as specified, replace the back door lock assembly.

(b) Measure the resistance of the back door lock connector.

Standard resistance

Tester Connection	Door Lock Latch Condition	Specified Condition
2 - 1	Open (ON)	Below 1 Ω
2 - 1	Full (OFF)	10 kΩ or higher

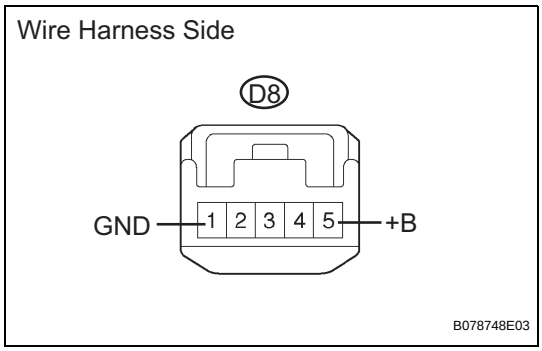
If the result is not as specified, replace the back door lock assembly.



INSTALLATION

HINT:
The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.

1. **INSTALL BACK DOOR LOCK ASSEMBLY**
   (a) Install the back door lock assembly (see page ED-26).
2. **INSTALL BACK DOOR TRIM BOARD ASSEMBLY**
   (a) Install the back door trim board assembly (see page ED-26).
3. **INSTALL BACK DOOR SIDE GARNISH RH**
   (a) Install the back door side garnish RH (see page ED-26).
4. **INSTALL BACK DOOR SIDE GARNISH LH**
   (a) Install the back door side garnish LH (see page ED-26).
5. **INSTALL BACK DOOR GARNISH CENTER**
   (a) Install the back door garnish center (see page ED-26).



DOOR CONTROL RECEIVER

ON-VEHICLE INSPECTION

1. CHECK DOOR CONTROL RECEIVER

(a) Disconnect the D8 receiver connector.

(b) Measure the voltage and resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
D8-1 (GND) - Body ground	Below 1 Ω

Standard voltage

Tester Connection	Specified Condition
D8-5 (+B) - Body ground	10 to 14 V

If the result is not as specified, the receiver may have a malfunction.

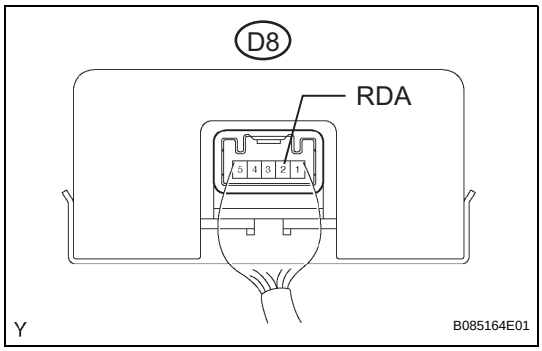
(c) Reconnect the D8 receiver connector.

(d) Measure the voltage of the connector.

Standard voltage

Tester Connection	Condition	Specified Condition
D8-2 (RDA) - Body ground	No key in ignition key cylinder, all doors closed and each transmitter switch OFF to ON	Below 12 V → Approx. 6 to 7 V → Below 12 V

If the result is not as specified, the receiver may have a malfunction.



DRIVE SHAFT SYSTEM

PROBLEM SYMPTOMS TABLE

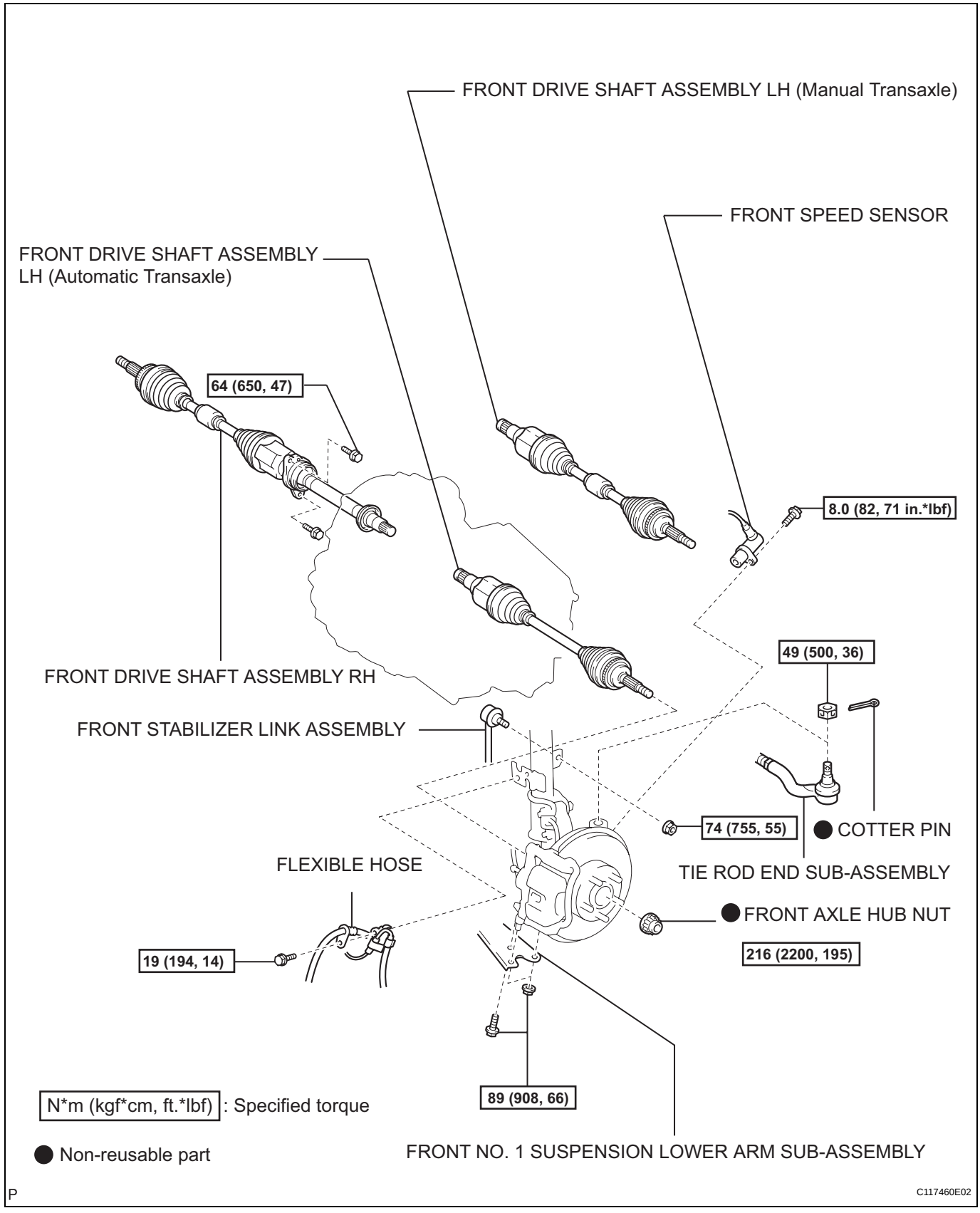
Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.

Drive shaft system

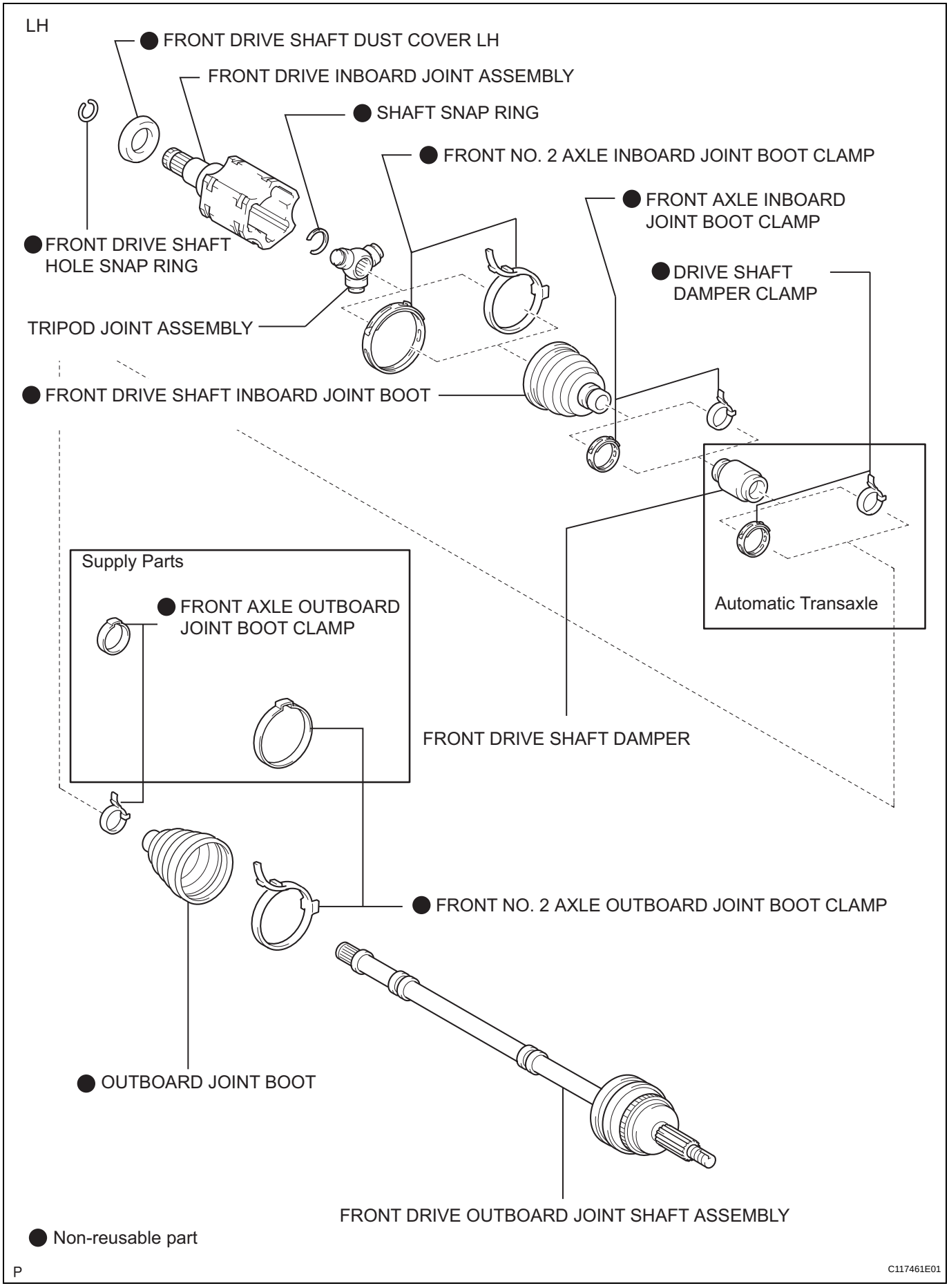
Symptom	Suspected Area	See page
Front wheel shimmy	Front drive shaft (worn)	DS-11

FRONT DRIVE SHAFT

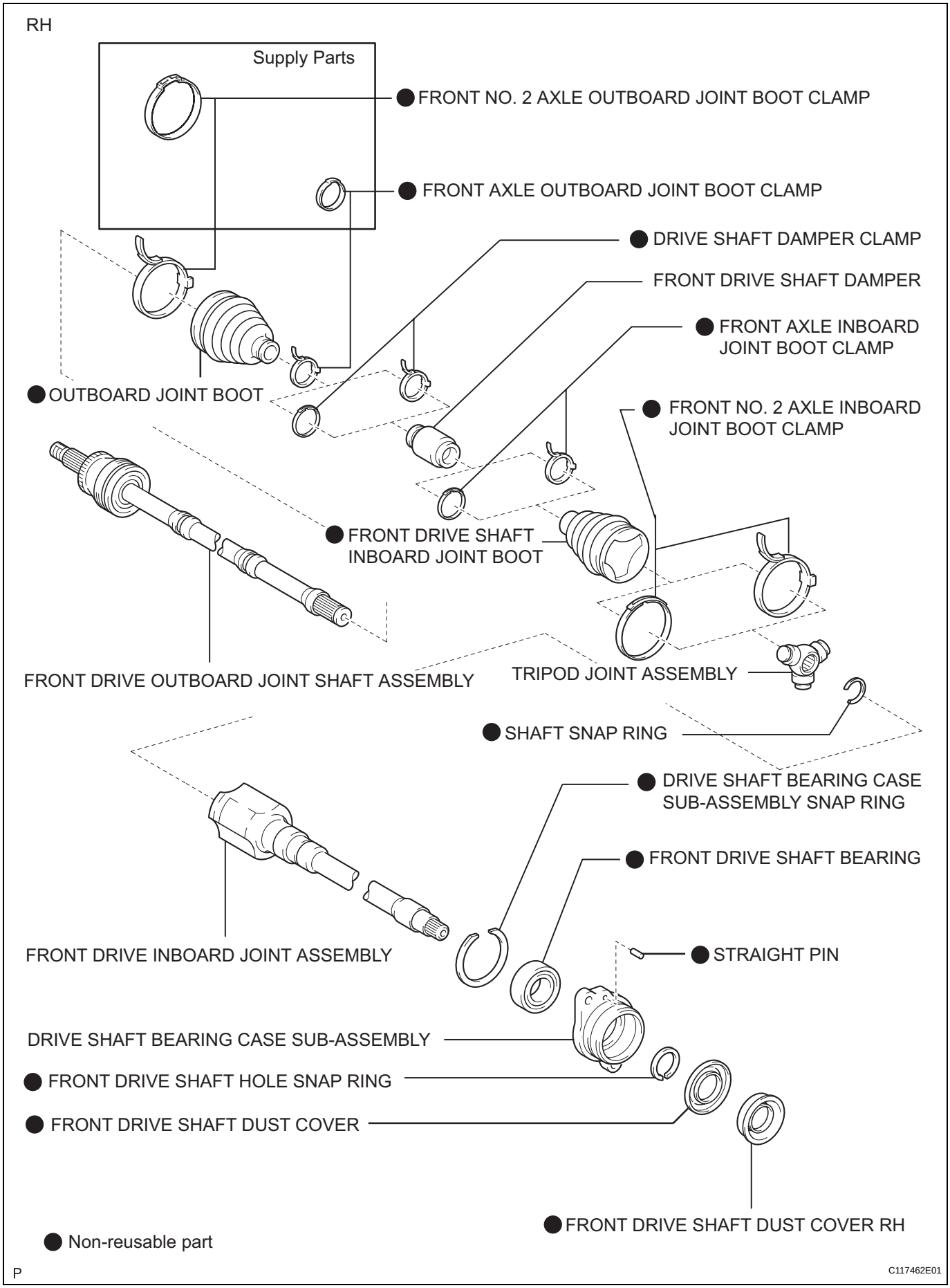
COMPONENTS



DS


LH
● FRONT DRIVE SHAFT DUST COVER LH
FRONT DRIVE INBOARD JOINT ASSEMBLY
● SHAFT SNAP RING
● FRONT NO. 2 AXLE INBOARD JOINT BOOT CLAMP
● FRONT AXLE INBOARD JOINT BOOT CLAMP
● FRONT DRIVE SHAFT HOLE SNAP RING
● DRIVE SHAFT DAMPER CLAMP
TRIPOD JOINT ASSEMBLY
● FRONT DRIVE SHAFT INBOARD JOINT BOOT
Supply Parts
● FRONT AXLE OUTBOARD JOINT BOOT CLAMP
Automatic Transaxle
FRONT DRIVE SHAFT DAMPER
● FRONT NO. 2 AXLE OUTBOARD JOINT BOOT CLAMP
● OUTBOARD JOINT BOOT
FRONT DRIVE OUTBOARD JOINT SHAFT ASSEMBLY
● Non-reusable part
P
C117461E01

DS


RH
Supply Parts
FRONT NO. 2 AXLE OUTBOARD JOINT BOOT CLAMP
FRONT AXLE OUTBOARD JOINT BOOT CLAMP
DRIVE SHAFT DAMPER CLAMP
FRONT DRIVE SHAFT DAMPER
FRONT AXLE INBOARD JOINT BOOT CLAMP
OUTBOARD JOINT BOOT
FRONT NO. 2 AXLE INBOARD JOINT BOOT CLAMP
FRONT DRIVE SHAFT INBOARD JOINT BOOT
FRONT DRIVE OUTBOARD JOINT SHAFT ASSEMBLY
TRIPOD JOINT ASSEMBLY
SHAFT SNAP RING
DRIVE SHAFT BEARING CASE SUB-ASSEMBLY SNAP RING
FRONT DRIVE SHAFT BEARING
FRONT DRIVE INBOARD JOINT ASSEMBLY
STRAIGHT PIN
DRIVE SHAFT BEARING CASE SUB-ASSEMBLY
FRONT DRIVE SHAFT HOLE SNAP RING
FRONT DRIVE SHAFT DUST COVER
FRONT DRIVE SHAFT DUST COVER RH
Non-reusable part
P
C117462E01

DS

REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. DRAIN AUTOMATIC TRANSAXLE FLUID (for Automatic Transaxle)

(a) Drain automatic transaxle fluid (see page AX-104).

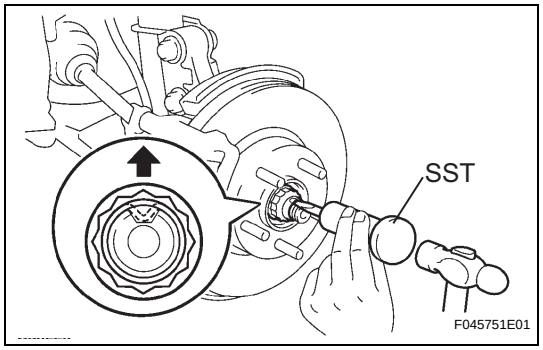
2. DRAIN MANUAL TRANSAXLE OIL (for Manual Transaxle)

(a) Drain manual transaxle oil (see page MX-2).

3. REMOVE FRONT WHEEL

4. REMOVE ENGINE UNDER COVER

5. REMOVE FRONT AXLE HUB NUT



(a) Using SST and a hammer, unstake the staked part of the nut.

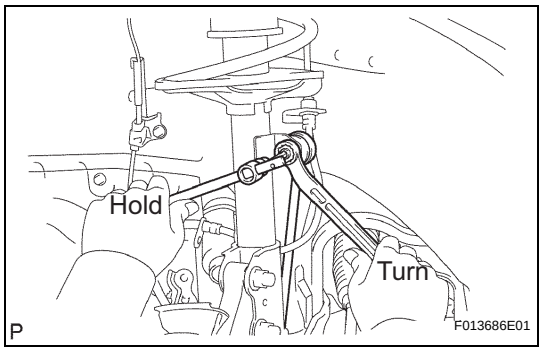
SST 09930-00010

NOTICE:

Loosen the staked part of the nut completely, otherwise the screw of the drive shaft may be damaged.

(b) While applying the brakes, remove the lock axle hub nut.

6. DISCONNECT FRONT STABILIZER LINK ASSEMBLY

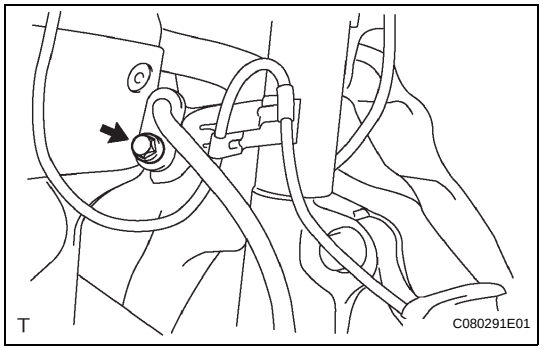


(a) Remove the nut and disconnect the stabilizer link assembly.

HINT:

If the ball joint turns together with the nut, use a 6 mm hexagon wrench to hold the stud in place.

7. DISCONNECT FRONT SPEED SENSOR

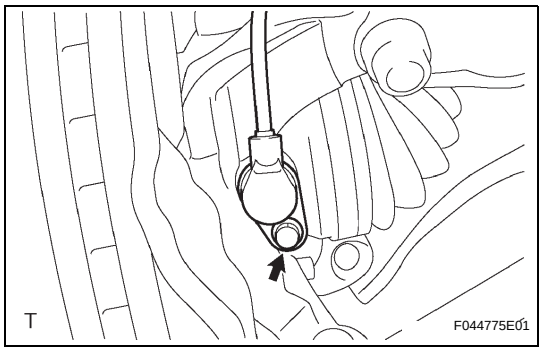


(a) Remove the bolt, and disconnect the speed sensor wire and flexible hose from the shock absorber.

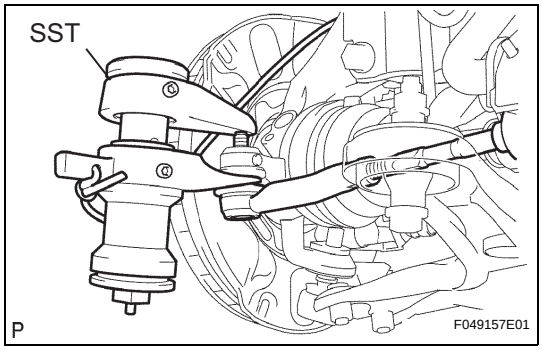
NOTICE:

Be careful not to damage the speed sensor.

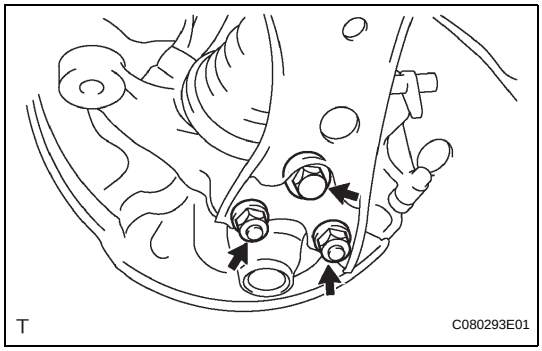
DS



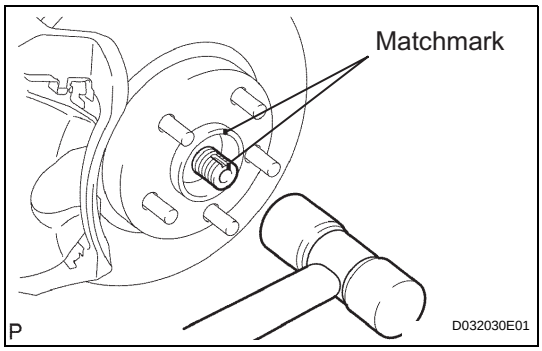
(b) Remove the bolt, and disconnect the front speed sensor from the steering knuckle.
NOTICE:
- **Be careful not to damage the speed sensor.**
- **Prevent foreign matter from attaching to the speed sensor.**



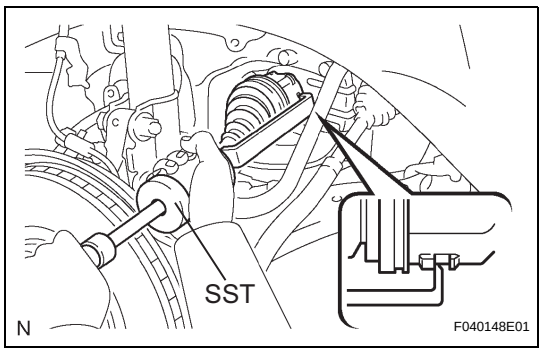
8. DISCONNECT TIE ROD END SUB-ASSEMBLY
(a) Remove the cotter pin and nut.
(b) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09628-00011



9. DISCONNECT FRONT NO. 1 SUSPENSION LOWER ARM SUB-ASSEMBLY
(a) Remove the bolt and 2 nuts, and separate the front suspension lower arm from the lower ball joint.

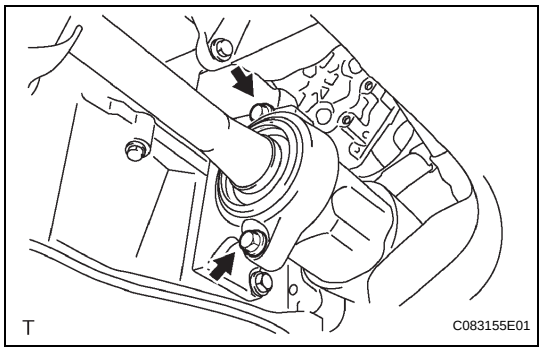


10. REMOVE FRONT AXLE ASSEMBLY
(a) Put matchmarks on the drive shaft and the axle hub.
(b) Using a plastic-faced hammer, separate the drive shaft from the axle hub.
NOTICE:
Be careful not to damage the boot and speed sensor rotor.
Do not excessively push out the drive shaft from the axle assembly.



11. REMOVE FRONT DRIVE SHAFT ASSEMBLY LH
(a) Using SST, remove the front drive shaft.
SST 09520-01010, 09520-24010 (09520-32040)
NOTICE:
- **Be careful not to damage the transaxle case oil seal, inboard joint boot and drive shaft dust cover.**
- **Be careful not to drop the drive shaft assembly.**

DS



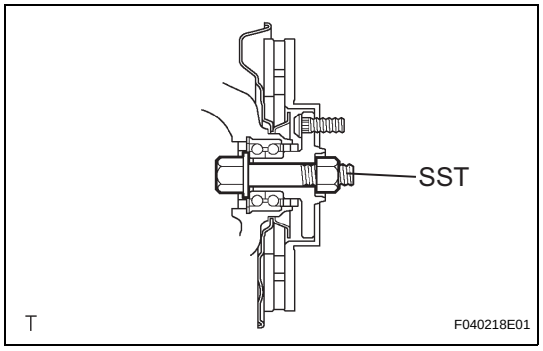
12. REMOVE FRONT DRIVE SHAFT ASSEMBLY RH

(a) Remove the 2 bolts and pull out the drive shaft together with the drive shaft bearing case.

(b) Remove the drive shaft from the transaxle.

NOTICE:

- **Be careful not to damage the inboard joint boot and drive shaft dust cover.**
- **Be careful not to drop the drive shaft assembly.**



13. FIX FRONT AXLE ASSEMBLY

NOTICE:

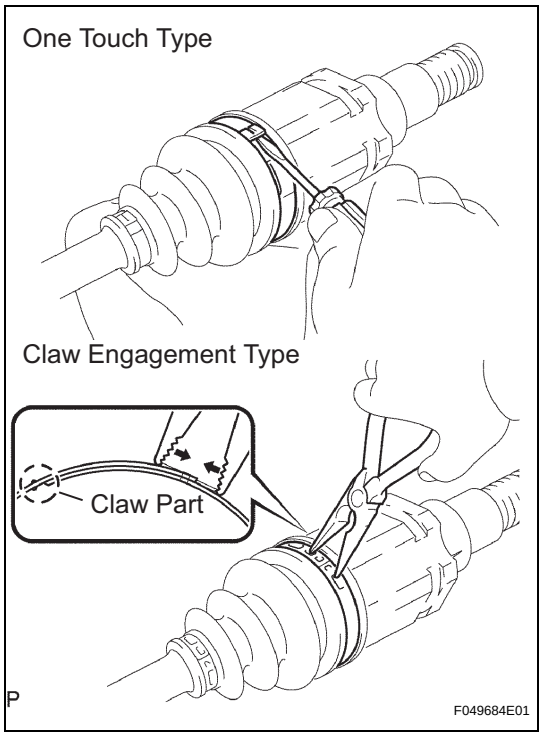
The hub bearing could be damaged if it is subjected to the vehicle weight, such as when moving the vehicle with the drive shaft removed.

Therefore, if it is absolutely necessary to place the vehicle weight on the hub bearing, first support it with SST.

SST 09608-16042 (09608-02021, 09608-02041)

DISASSEMBLY

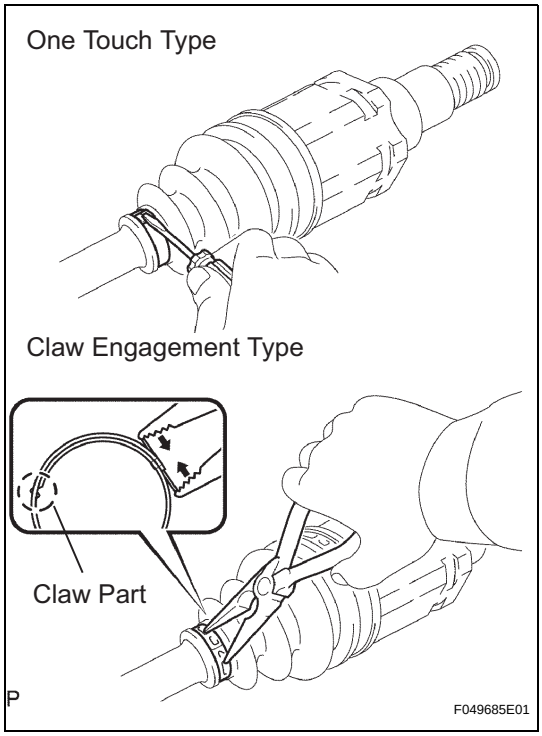
HINT:
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. REMOVE FRONT NO. 2 AXLE INBOARD JOINT BOOT CLAMP

(a) One touch type:
Using a screwdriver, remove the No. 2 inboard joint boot clamp, as shown in the illustration.

(b) Claw engagement type:
Using needle-nose pliers, remove the No. 2 inboard joint boot clamp, as shown in the illustration.



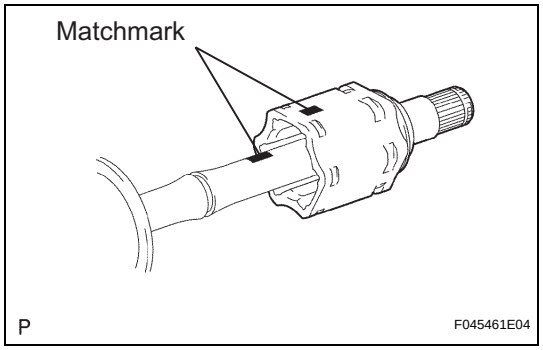
2. REMOVE FRONT AXLE INBOARD JOINT BOOT CLAMP

(a) One touch type:
Using a screwdriver, remove the inboard joint boot clamp, as shown in the illustration.

(b) Claw engagement type:
Using needle-nose pliers, remove the inboard joint boot clamp, as shown in the illustration.

3. REMOVE FRONT DRIVE SHAFT INBOARD JOINT BOOT

(a) Remove the inboard joint boot from the inboard joint assembly.

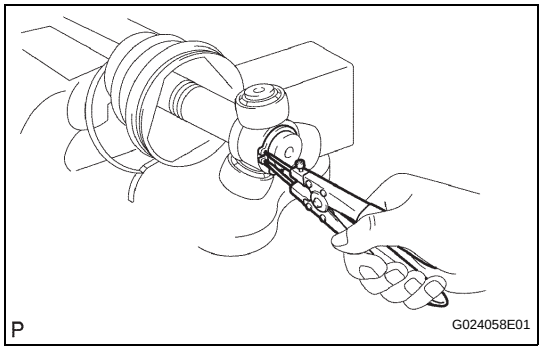


4. REMOVE FRONT DRIVE INBOARD JOINT ASSEMBLY

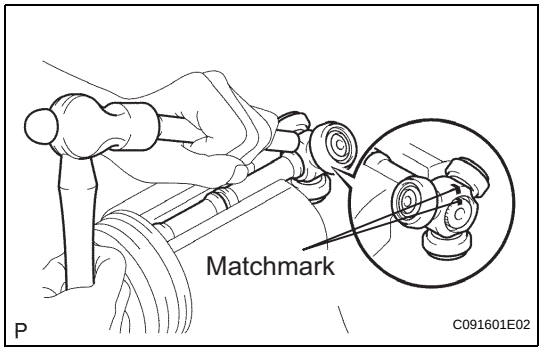
(a) Remove the old grease from the inboard joint.

(b) Put matchmarks on the inboard joint and outboard joint shaft assembly.
NOTICE:
Do not punch the marks.

(c) Remove the inboard joint from the outboard joint shaft.



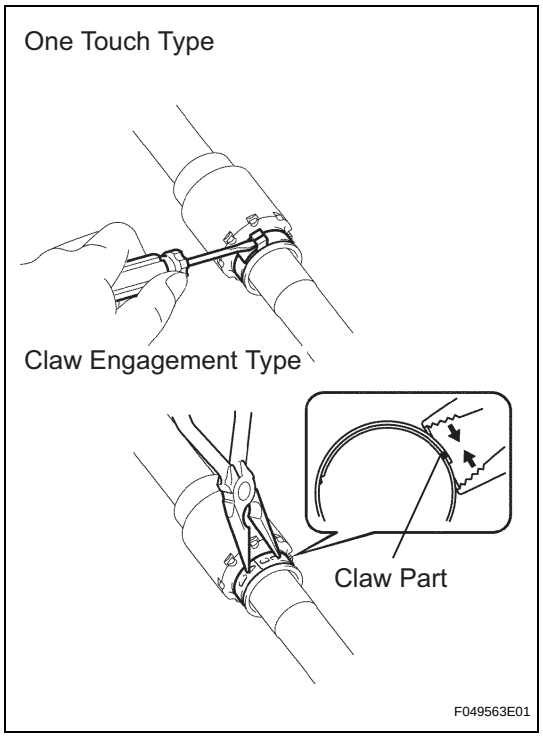
(d) Using a snap ring expander, remove the shaft snap ring.



(e) Put matchmarks on the outboard joint shaft and tripod joint.
NOTICE:
Do not punch the marks.

(f) Using a brass bar and hammer, tap out the tripod joint from the outboard joint shaft.
NOTICE:
Do not tap the rollers.

(g) Remove the inboard joint boot.



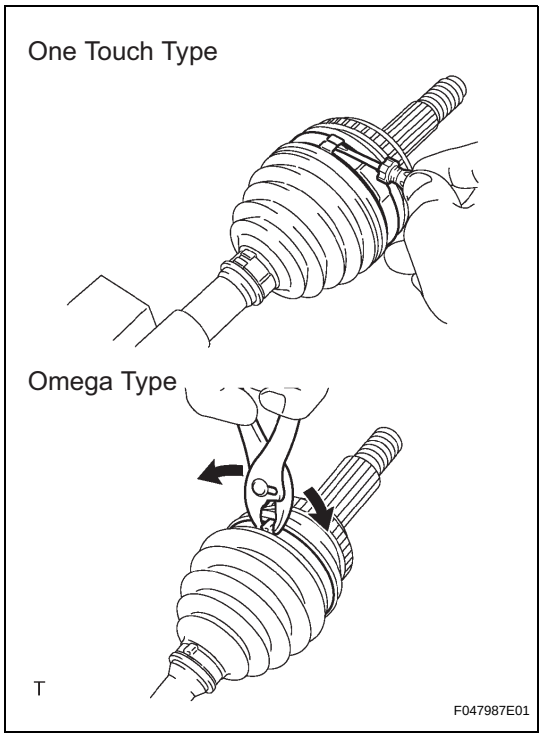
5. REMOVE FRONT DRIVE SHAFT DAMPER (for Automatic Transaxle)

(a) One touch type:
Using a screwdriver, remove the drive shaft damper clamp, as shown in the illustration.

(b) Claw engagement type:
Using needle-nose pliers, remove the drive shaft damper clamp, as shown in the illustration.

(c) Remove the front drive shaft damper.

DS



6. REMOVE FRONT NO. 2 AXLE OUTBOARD JOINT BOOT CLAMP

(a) One touch type:
Using a screwdriver, remove the No. 2 outboard joint boot clamp, as shown in the illustration.

(b) Omega type:
Using pliers, remove the No. 2 outboard joint boot clamp, as shown in the illustration.

7. REMOVE FRONT AXLE OUTBOARD JOINT BOOT CLAMP

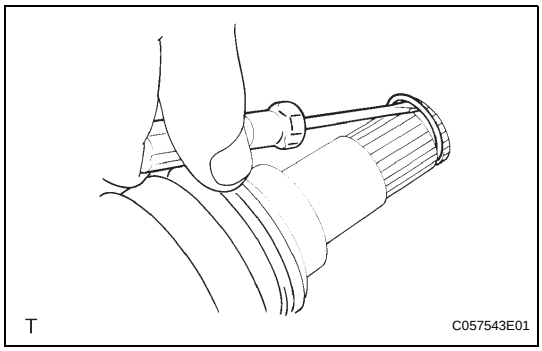
(a) One touch type:
Using a screwdriver, remove the outboard joint boot clamp, as shown in the illustration.

(b) Omega type:
Using pliers, remove the outboard joint boot clamp, as shown in the illustration.

8. REMOVE OUTBOARD JOINT BOOT

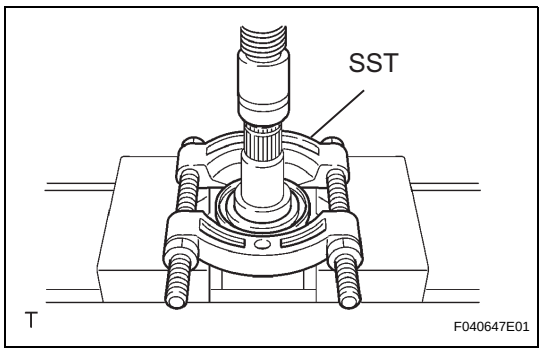
(a) Remove the outboard joint boot from the outboard joint shaft.

(b) Remove the old grease from the outboard joint.



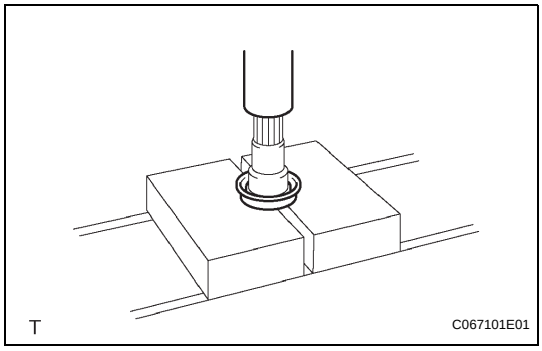
9. REMOVE FRONT DRIVE SHAFT HOLE SNAP RING

(a) Using a screwdriver, remove the hole snap ring.



10. REMOVE FRONT DRIVE SHAFT DUST COVER LH

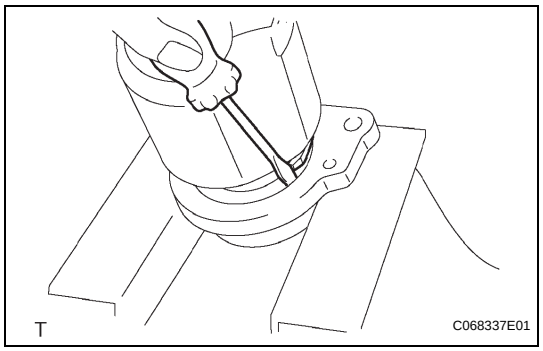
(a) Using SST and a press, press out the front drive shaft dust cover.
SST 09950-00020
NOTICE:
Be careful not to drop the inboard joint assembly.



11. REMOVE FRONT DRIVE SHAFT DUST COVER RH

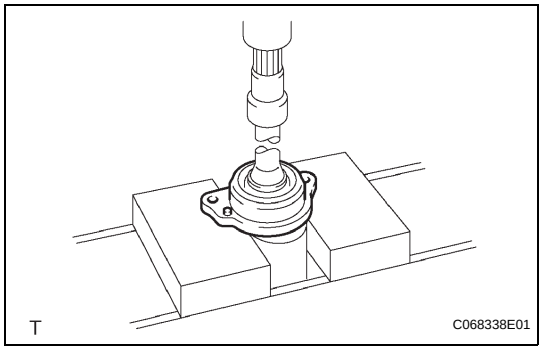
(a) Using a press, press out the drive shaft dust cover.

DS



12. REMOVE DRIVE SHAFT BEARING CASE SUB-ASSEMBLY SNAP RING

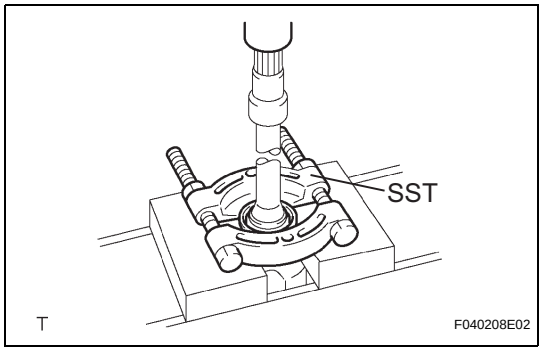
(a) Using a screwdriver, remove the bearing case snap ring.



13. REMOVE DRIVE SHAFT BEARING CASE SUB-ASSEMBLY

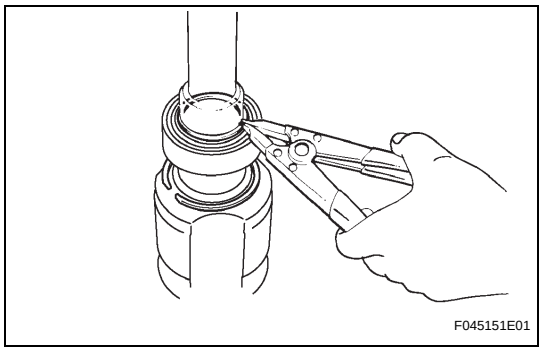
(a) Using a press, press out the drive shaft bearing case.
NOTICE:
Be careful not to drop the inboard joint assembly.

(b) Remove the straight pin.



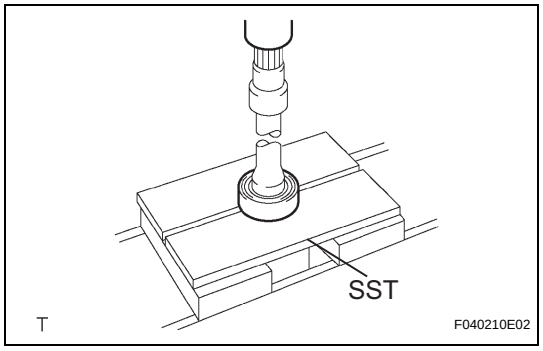
14. REMOVE FRONT DRIVE SHAFT DUST COVER

(a) Using SST and a press, press out the drive shaft dust cover.
SST 09950-00020
NOTICE:
Be careful not to drop the inboard joint assembly.



15. REMOVE FRONT DRIVE SHAFT BEARING

(a) Using a snap ring expander, remove the drive shaft hole snap ring.



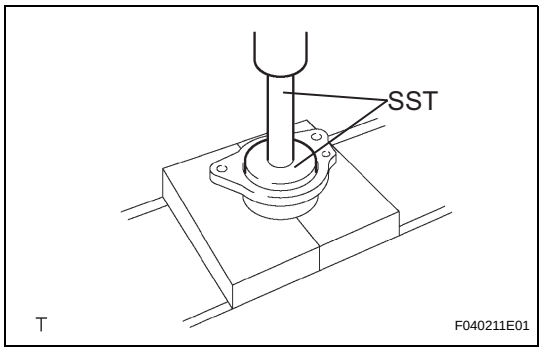
(b) Using SST and a press, press out the drive shaft bearing.
SST 09527-10011

(c) Remove the snap ring.

DS

REASSEMBLY

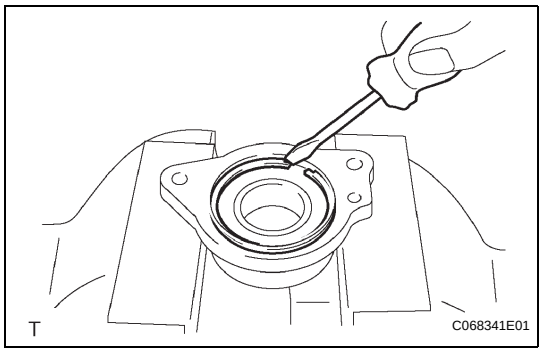
HINT:
- Use the same procedures for the RH and LH side.
- The procedures listed below are for the LH side.



1. INSTALL FRONT DRIVE SHAFT BEARING

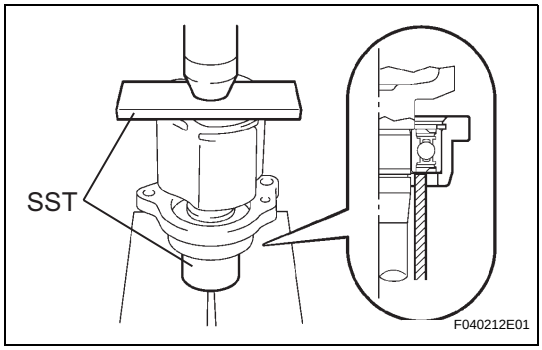
(a) Using SST and a press, press in a new drive shaft bearing.

SST 09950-60020 (09951-00710), 09950-70010 (09951-07100)



2. INSTALL DRIVE SHAFT BEARING CASE SUB-ASSEMBLY SNAP RING

(a) Using a screwdriver, install a new bearing case snap ring.



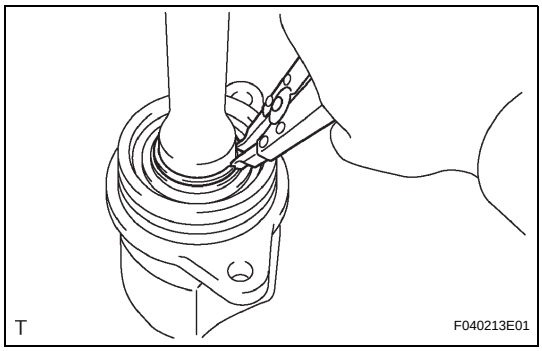
3. INSTALL DRIVE SHAFT BEARING CASE SUB-ASSEMBLY

(a) Using SST and a press, press in the drive shaft bearing case to the inboard joint RH.

SST 09527-10011, 09710-04081

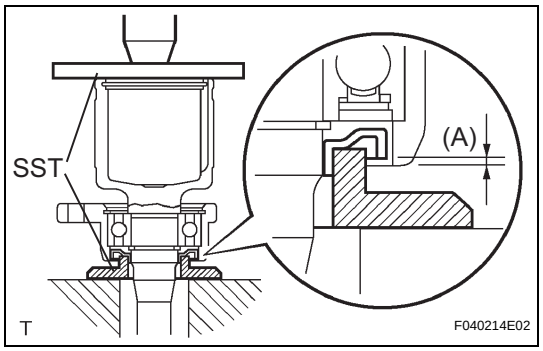
NOTICE:

Bearing should be installed completely.



(b) Using a snap ring expander, install a new drive shaft hole snap ring.

DS



4. INSTALL FRONT DRIVE SHAFT DUST COVER

(a) Using SST and a press, press in a new drive shaft dust cover.

SST 09726-40010, 09527-10011

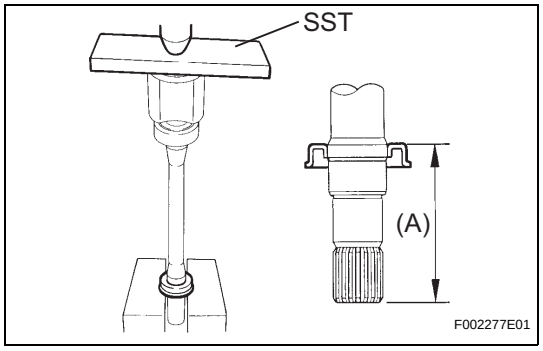
Standard distance (A):

0 to 1.0 mm (0 to 0.039 in.)

NOTICE:

Be careful not to damage the dust cover.

(b) Install the straight pin.



5. INSTALL FRONT DRIVE SHAFT DUST COVER RH

(a) Using SST and a press, press in a new drive shaft dust cover until the distance from the tip of the center drive shaft to the drive shaft dust cover reaches the specification, as shown in the illustration.

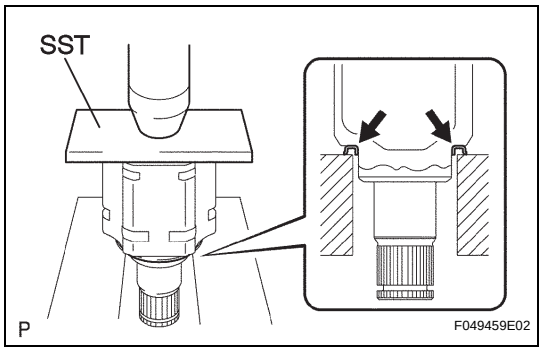
SST 09527-10011

Standard distance (A):

91.0 to 92.0 mm (3.582 to 3.622 in.)

NOTICE:

- **The dust cover should be installed completely.**
- **Be careful not to damage the dust cover.**



6. INSTALL FRONT DRIVE SHAFT DUST COVER LH

(a) Using SST and a press, press in a new drive shaft dust cover.

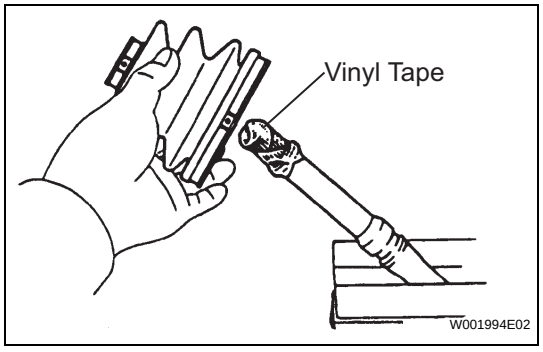
SST 09527-10011

NOTICE:

- **The dust cover should be installed completely.**
- **Be careful not to damage the dust cover.**

7. INSTALL FRONT DRIVE SHAFT HOLE SNAP RING

(a) Install a new hole snap ring.



8. INSTALL OUTBOARD JOINT BOOT

HINT:

Before installing the boots, wrap the spline of the drive shaft with vinyl tape to prevent the boots from being damaged.

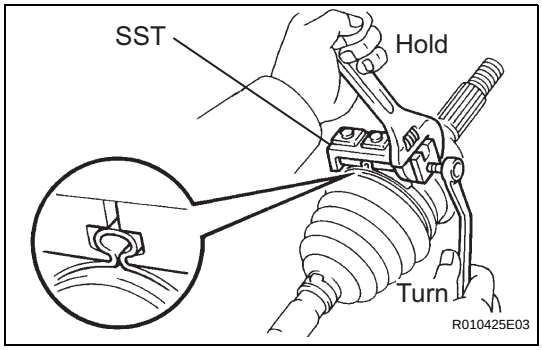
(a) Install new parts to the outboard joint shaft assembly in the following order.
  (1) No. 2 outboard joint boot clamp
  (2) Outboard joint boot
  (3) Outboard joint boot clamp

(b) Pack the outboard joint shaft and boot with grease from the boot kit.

Standard grease capacity:

190 to 200 g (6.7 to 7.1 oz.)

DS

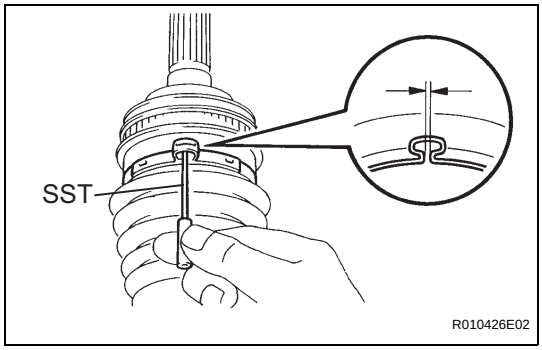


9. INSTALL FRONT NO. 2 AXLE OUTBOARD JOINT BOOT CLAMP

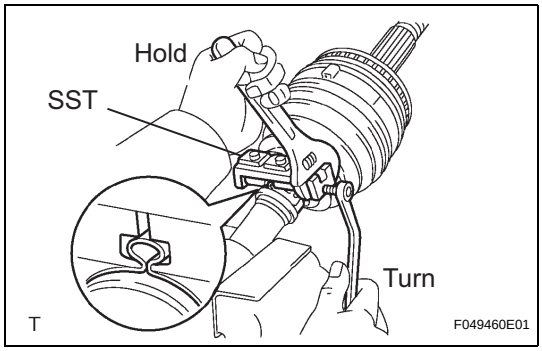
(a) Secure the No. 2 outboard joint boot clamp onto the boot.

(b) Place SST onto the No. 2 outboard joint boot clamp.
SST 09521-24010

(c) Tighten SST so that the No. 2 outboard joint boot clamp is pinched.
NOTICE:
Do not overtighten SST.



(d) Using SST, measure the clearance of the outboard joint boot clamp.
SST 09240-00020
Standard clearance:
0.8 mm (0.031 in.) or less
NOTICE:
When the measured value is greater than the specified value, retighten the clamp.

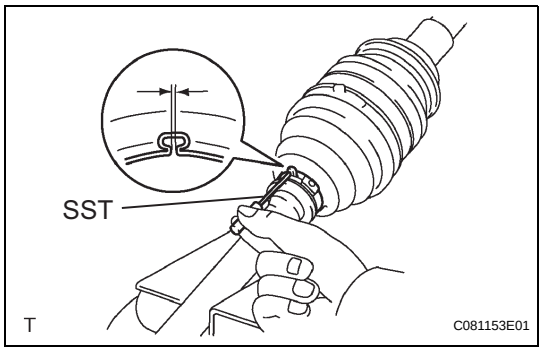


10. INSTALL FRONT AXLE OUTBOARD JOINT BOOT CLAMP

(a) Secure the outboard joint boot clamp onto the boot.

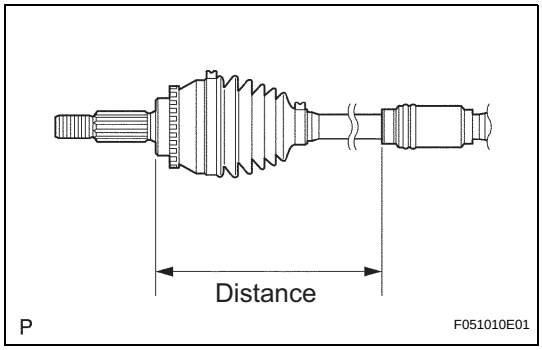
(b) Place SST onto the outboard joint boot clamp.
SST 09521-24010

(c) Tighten SST so that the outboard joint boot clamp is pinched.
NOTICE:
Do not overtighten SST.



(d) Using SST, measure the clearance of the outboard joint boot clamp.
SST 09240-00020
Standard clearance:
0.8 mm (0.031 in.) or less
NOTICE:
When the measured value is greater than the specified value, retighten the clamp.

DS



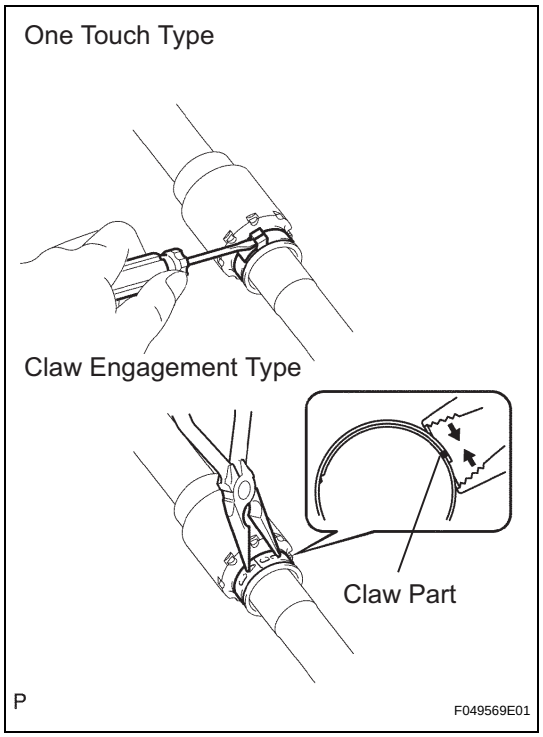
11. INSTALL FRONT DRIVE SHAFT DAMPER

HINT:
Install the damper clamp to outboard joint side.

(a) Install a new drive shaft damper clamp and the drive shaft damper to the drive shaft.

(b) Make sure that the damper is on the shaft groove.

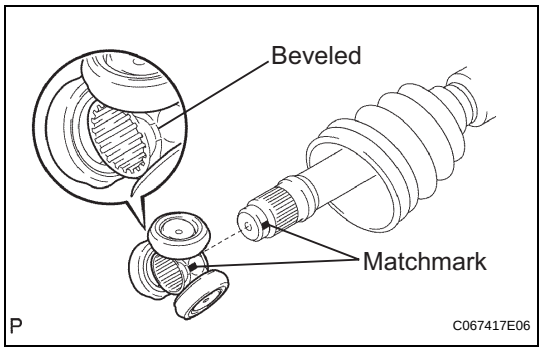
(c) Set the distance, as described below.
Distance:
202.4 to 206.4 mm (7.969 to 8.126 in.)



(d) Hold the front drive shaft lightly in a soft vise.
(e) Install the drive shaft damper clamp to the damper.
NOTICE:
Be sure to install the clamp in the correct position.
(f) One touch type:
Using a screwdriver, install the drive shaft damper clamp, as shown in the illustration.
(g) Claw engagement type:
Using needle-nose pliers, install the drive shaft damper clamp, as shown in the illustration.

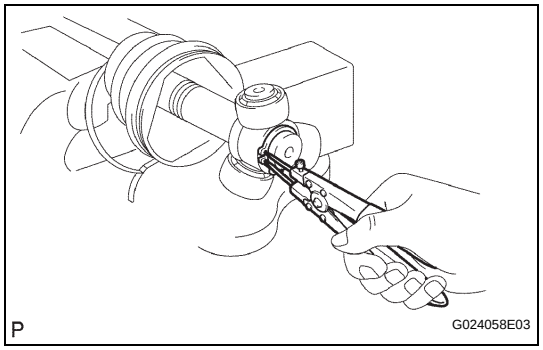
12. INSTALL FRONT DRIVE INBOARD JOINT ASSEMBLY

(a) Wrap the spline of the outboard joint shaft with vinyl tape to prevent the boots from being damaged.
(b) Install new parts to the outboard joint shaft in the following order.
(1) Inboard joint boot clamp
(2) No. 2 inboard joint boot clamp
(3) Inboard joint boot

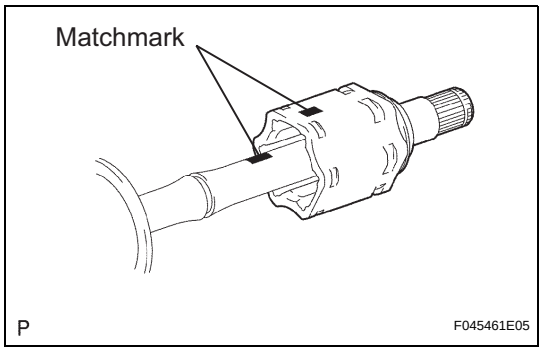


(c) Place the beveled side of the tripod axial spline toward the outboard joint.
(d) Align the matchmarks placed before removal.
(e) Using a brass bar and hammer, tap the tripod joint onto the drive shaft.
NOTICE:
- **Do not tap the rollers.**
- **Be sure to install the tripod joint in the correct direction.**

(f) Pack the inboard joint shaft and boot with grease from the boot kit.
Standard grease capacity:
175 to 185 g (6.2 to 6.5 oz.)



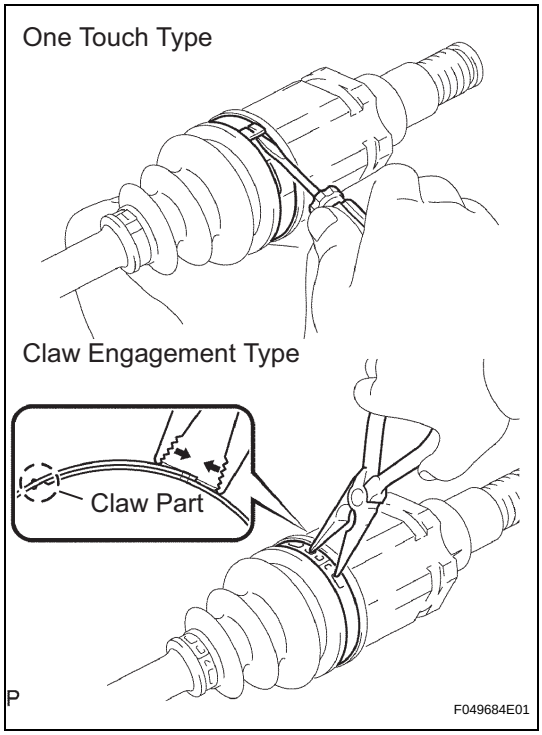
(g) Using a snap ring expander, install a new shaft snap ring.



(h) Aligning the matchmarks, and install the inboard joint to the outboard joint shaft.

13. INSTALL FRONT DRIVE SHAFT INBOARD JOINT BOOT

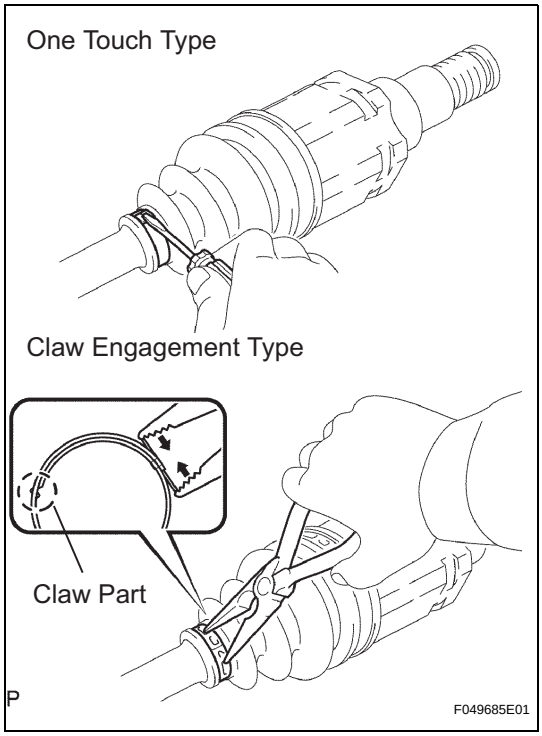
(a) Install the inboard joint boot to the inboard joint and outboard joint shaft.



14. INSTALL FRONT NO. 2 AXLE INBOARD JOINT BOOT CLAMP

(a) One touch type:
Using a screwdriver, install the No. 2 inboard joint boot clamp, as shown in the illustration.
NOTICE:
Be careful not to damage the boot.

(b) Claw engagement type:
Using needle-nose pliers, install the No. 2 inboard joint boot clamp, as shown in the illustration.
NOTICE:
Be careful not to damage the boot.

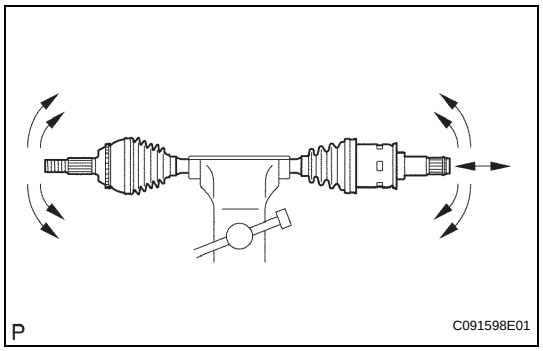


15. INSTALL FRONT AXLE INBOARD JOINT BOOT CLAMP

(a) One touch type:
Using a screwdriver, install the inboard joint boot clamp, as shown in the illustration.
NOTICE:
Be careful not to damage the boot.

(b) Claw engagement type:
Using needle-nose pliers, install the inboard joint boot clamp, as shown in the illustration.
NOTICE:
Be careful not to damage the boot.

DS

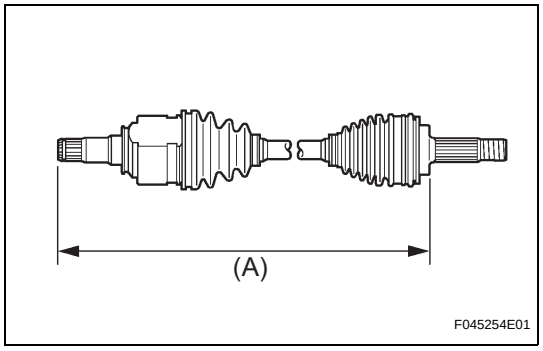


16. INSPECT FRONT DRIVE SHAFT

(a) Check that there is no severe play in the radial direction of the outboard joint.

(b) Check that the inboard joint slides smoothly in the thrust direction.

(c) Check that there is no severe play in the radial direction of the inboard joint.



(d) Check the boots for damage.

NOTICE:

Keep the drive shaft assembly level during inspection.

HINT:

For dimension (A), refer to the following values.

Reference value:

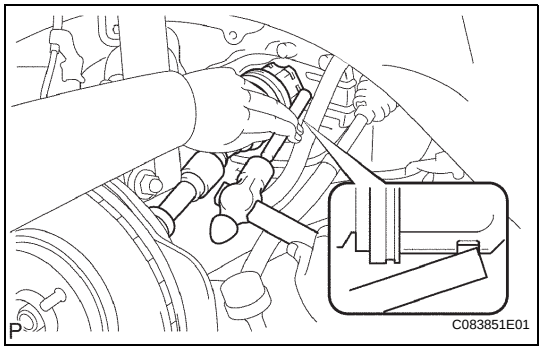
873.0 to 883.0 mm (34.370 to 34.764 in.) for RH side

556.2 to 566.2 mm (21.898 to 22.291 in.) for LH side

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).



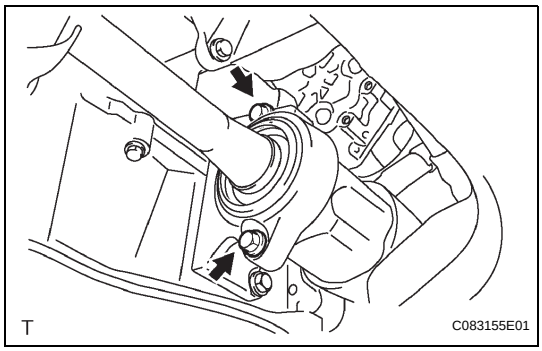
1. INSTALL FRONT DRIVE SHAFT ASSEMBLY LH

(a) Coat the spline of the inboard joint shaft with gear oil.

(b) Align the shaft splines drive in the drive shaft. Using a brass bar and hammer.

NOTICE:

- **Set the snap ring with the opening side facing downwards.**
- **Be careful not to damage the oil seal, boot and dust cover.**



2. INSTALL FRONT DRIVE SHAFT ASSEMBLY RH

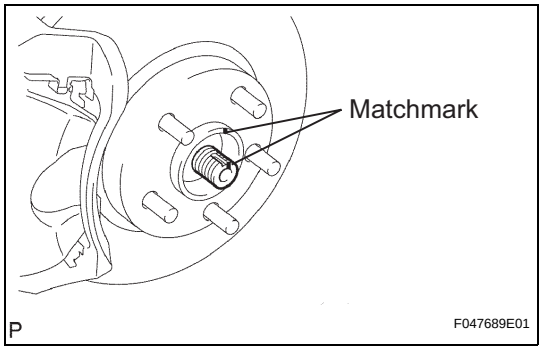
(a) Coat the spline of the inboard joint shaft with gear oil.

(b) Align the shaft splines and install the drive shaft with the 2 bolts.

Torque: 64 N*m (650 kgf*cm, 47 ft.*lbf)

NOTICE:

Do not damage the oil seal, boot and dust cover.

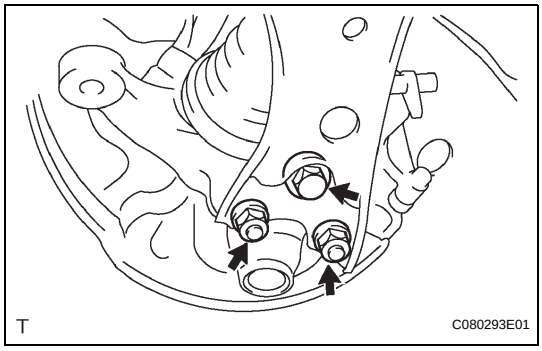


3. INSTALL FRONT AXLE ASSEMBLY

(a) Align the matchmarks and install the drive shaft to the front axle.

NOTICE:

Be careful not to damage the outboard joint boot and speed sensor rotor.



4. CONNECT FRONT NO. 1 SUSPENSION LOWER ARM SUB-ASSEMBLY

(a) Install the lower ball joint to the suspension lower arm with the bolt and 2 nuts.

Torque: 89 N*m (908 kgf*cm, 66 ft.*lbf)

5. CONNECT TIE ROD END SUB-ASSEMBLY

(a) Install the tie rod end to the steering knuckle with the nut.

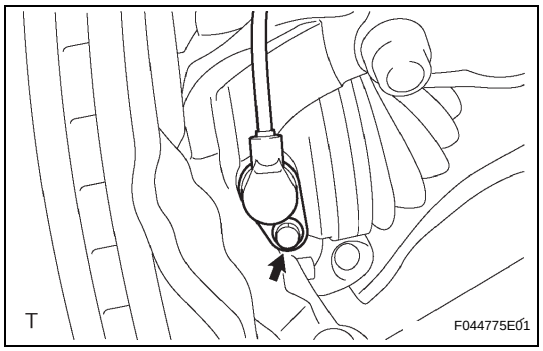
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)

(b) Install a new cotter pin.

NOTICE:

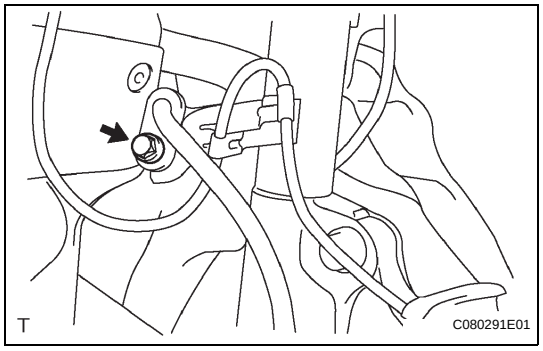
If the holes for the cotter pin are not aligned, tighten the nut an additional 60°.

DS

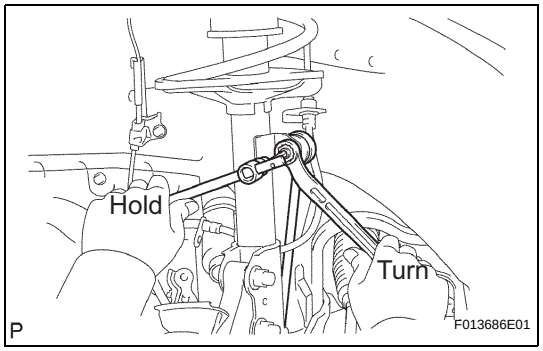


6. INSTALL SPEED SENSOR FRONT

(a) Install the speed sensor front to the steering knuckle with the bolt.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

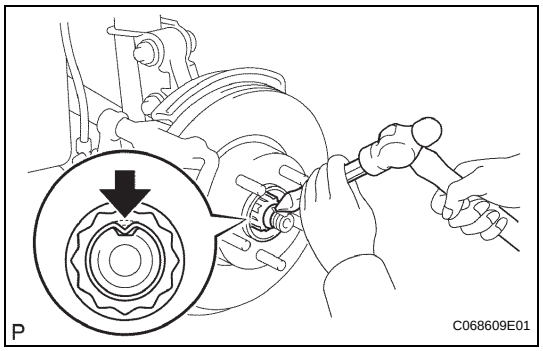


(b) Connect the speed sensor wire and flexible hose to the shock absorber with the bolt.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
NOTICE:
- **Be careful not to damage the speed sensor.**
- **Prevent foreign matter from adhering to the speed sensor.**
- **Do not twist the sensor wire when installing the speed sensor.**



7. INSTALL FRONT STABILIZER LINK ASSEMBLY

(a) Install the front stabilizer link with the nut.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
HINT:
If the ball joint turns together with the nut, use a 6 mm hexagon wrench to hold the stud in place.



8. INSTALL FRONT AXLE HUB NUT

(a) Install a new axle hub nut.
Torque: 216 N*m (2200 kgf*cm, 159 ft.*lbf)

(b) Using a chisel and hammer, stake the axle hub nut.

9. INSTALL ENGINE UNDER COVER

10. INSTALL FRONT WHEEL
Torque: 103 N*m (1050 kgf*cm, 76 ft.*lbf)

11. ADD AUTOMATIC TRANSAXLE FLUID (for Automatic Transaxle)

12. INSPECT AND ADJUST AUTOMATIC TRANSAXLE FLUID (for Automatic Transaxle)

(a) Inspect and adjust the automatic transaxle fluid (see page AX-104).

13. ADD MANUAL TRANSAXLE OIL (for Manual Transaxle)

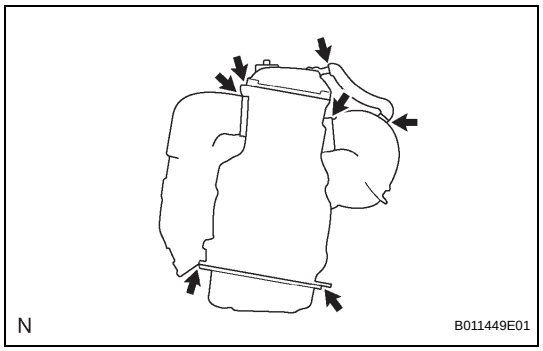
14. INSPECT MANUAL TRANSAXLE OIL (for Manual Transaxle)

(a) Inspect the manual transaxle oil (see page MX-2).

DS

15. **INSPECT AND ADJUST FRONT WHEEL ALIGNMENT**
    (a) Inspect and adjust the front wheel alignment (see page SP-2).

16. **CHECK ABS SPEED SENSOR SIGNAL**
    (a) Check the ABS speed sensor signal (see page BC-12).



EMISSION CONTROL SYSTEM

ON-VEHICLE INSPECTION

1. VISUALLY CHECK HOSES, CONNECTORS AND GASKETS

(a) Check that there are no cracks, leaks or damage.

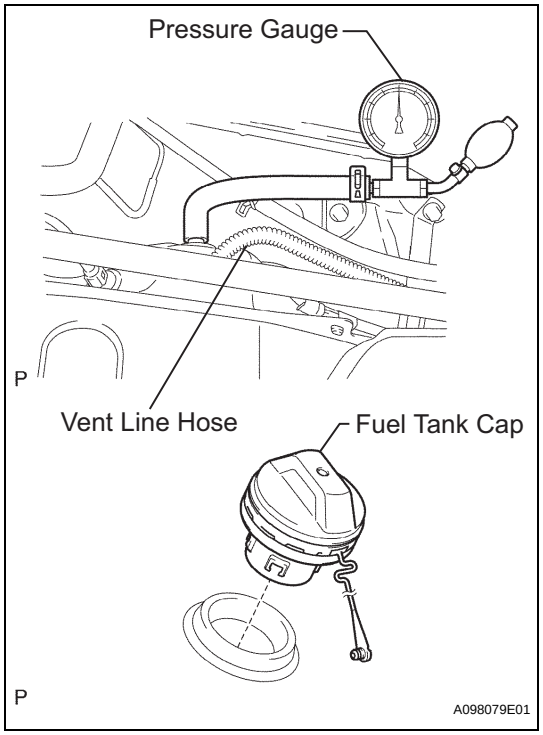
NOTICE:

- **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 body and cylinder head will cause engine failure or engine malfunctions.**

If the result is not as specified, replace parts as necessary.

2. CHECK HOSES AND CONNECTORS

(a) Visually check for loose connections, sharp bends or damage.



3. INSPECT FUEL CUT OFF VALVE AND FILL CHECK VALVE

(a) Disconnect the vent line hose from the fuel tank (see page FU-29).

(b) Connect the pressure gauge to the fuel tank.

(c) Fill the fuel tank with fuel.

(d) Apply pressure of 4 kPa (41kgf/cm^2, 0.58 psi) to the vent port of the fuel tank.

HINT:

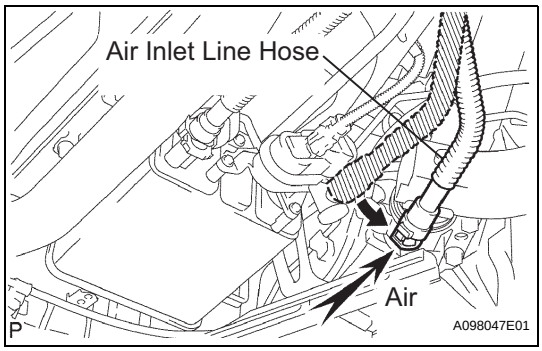
It is necessary to check the amount of fuel tank. When the fuel tank is full, the float valve of the fill check valve is closed and no air can pass through.

(e) Remove the fuel tank cap, and check that pressure drops.

If the pressure does not drop, replace the fuel tank assembly.

(f) Reconnect the vent line hose to the fuel tank (see page FU-35).

EC

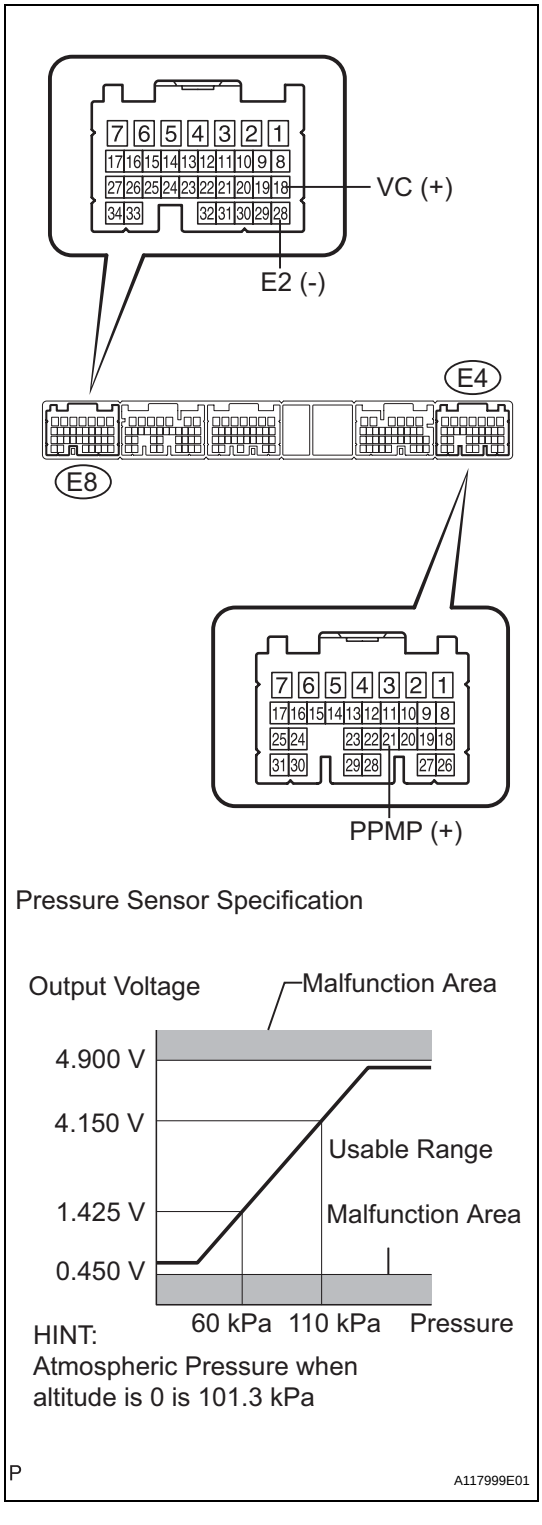


4. CHECK AIR INLET LINE

(a) Disconnect the air inlet line hose from the charcoal canister.

(b) Check that air can flow freely into the air inlet line. If air cannot flow freely into the air inlet line, repair or replace it.

(c) Reconnect the air inlet line hose to the charcoal canister.



5. INSPECT LEAK DETECTION PUMP (PRESSURE SENSOR)

(a) Measure the power source voltage of the ECM connectors.

Standard voltage

Tester Connection	Condition	Specified Condition
E8-18 (VC) -E8-28 (E2)	Ignition switch ON	4.5 to 5.5 V

If the voltage is not as specified, check the ECM, leak detection pump and wire harness.

(b) Measure the power output of the ECM connectors.

(1) Remove the fuel tank cap.

Standard voltage

Tester Connection	Condition	Specified Condition
E4-21 (PPMP) - E8-28 (E2)	Ignition switch ON	1.425 to 4.150 V

If the voltage is not as specified, check the ECM, leak detection pump and wire harness.

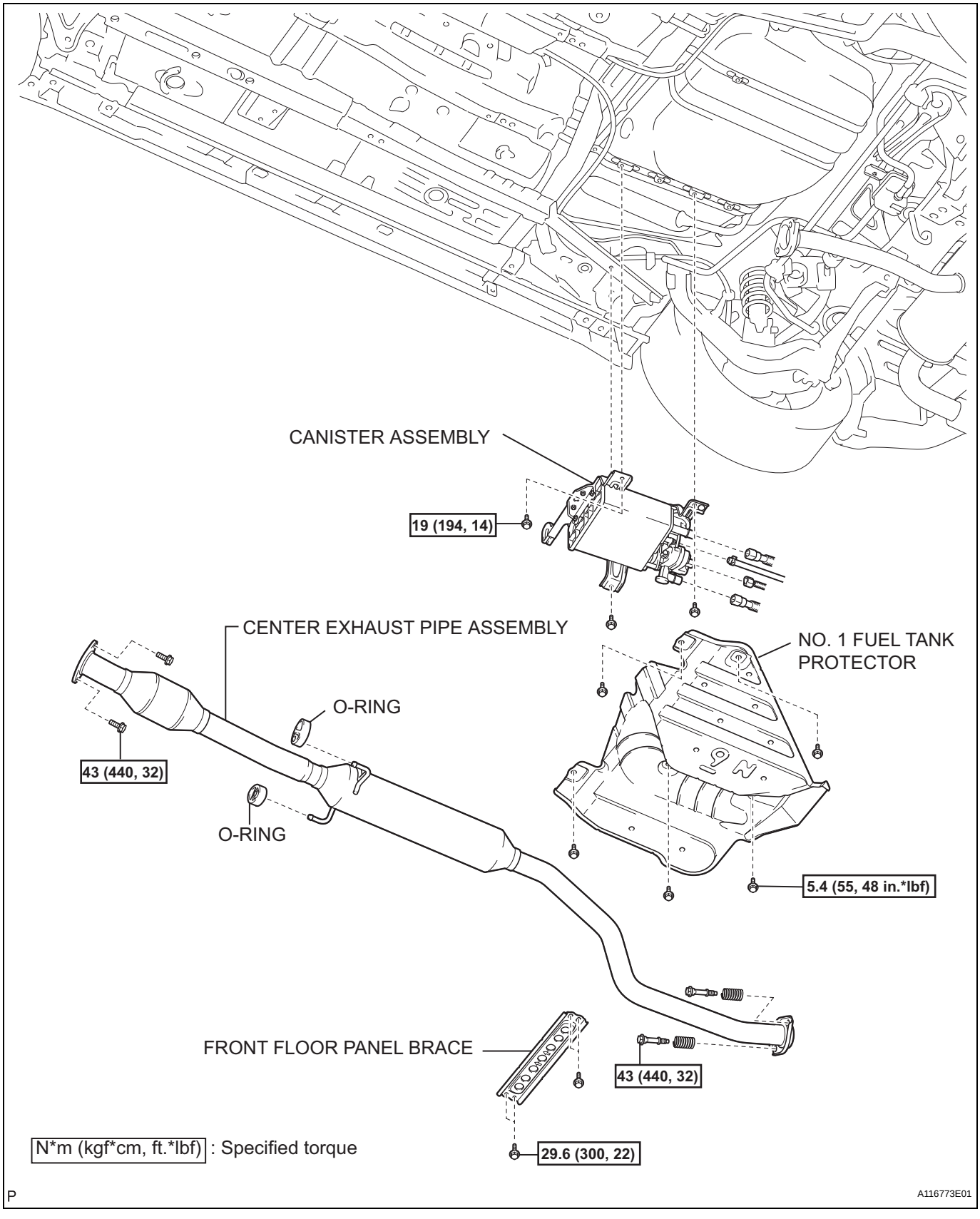
(2) Install the fuel tank cap.

6. CHECK FUEL TANK ASSEMBLY

(a) Visually check for deformation, cracks or fuel leakage.

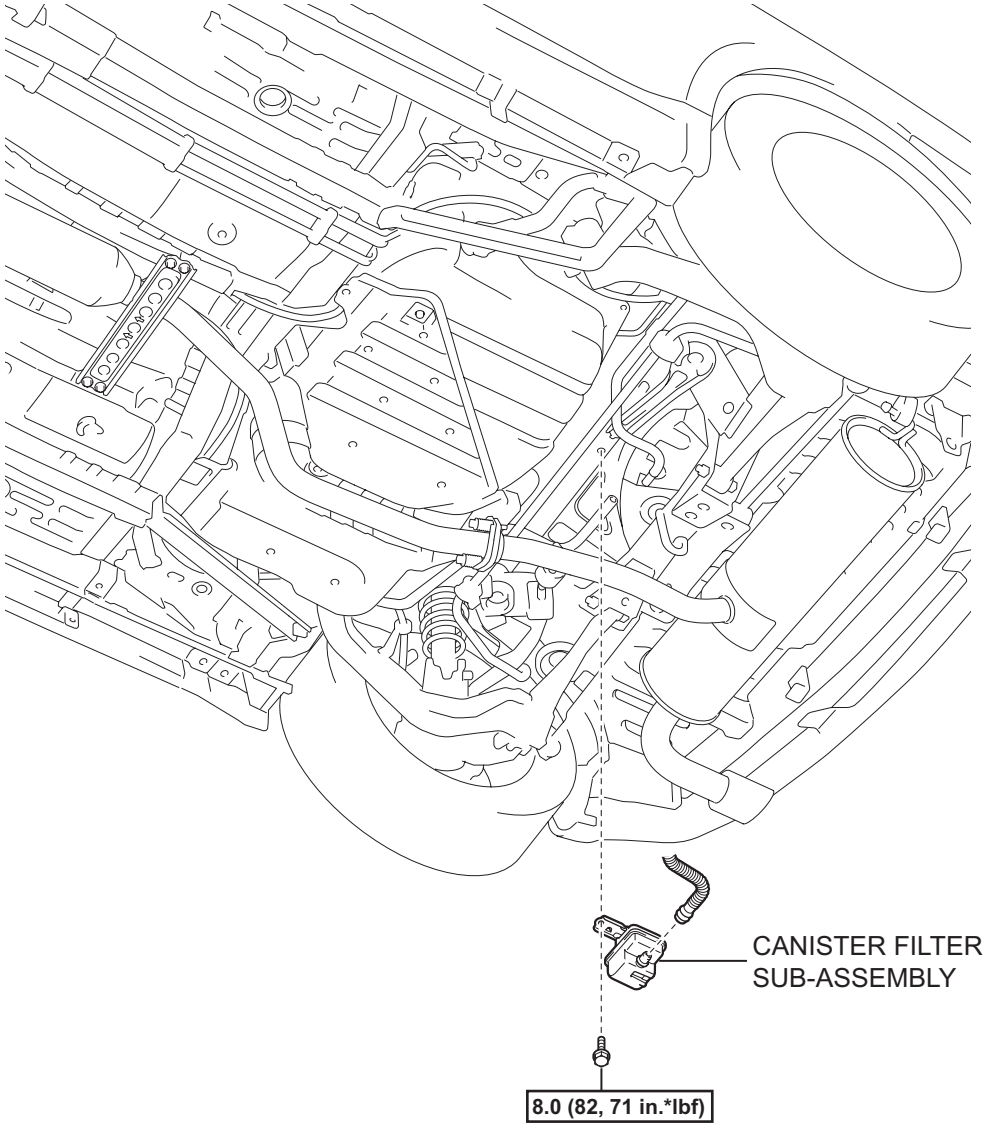
CANISTER

COMPONENTS



EC

EC



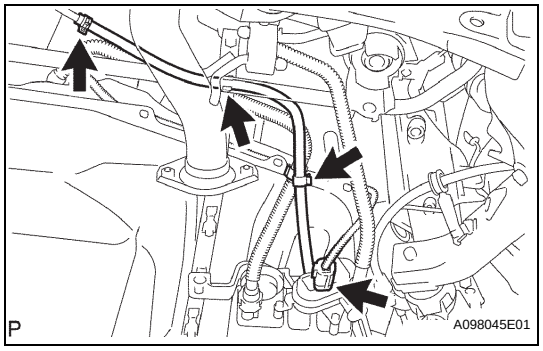
N*m (kgf*cm, ft.*lbf) : Specified torque

P

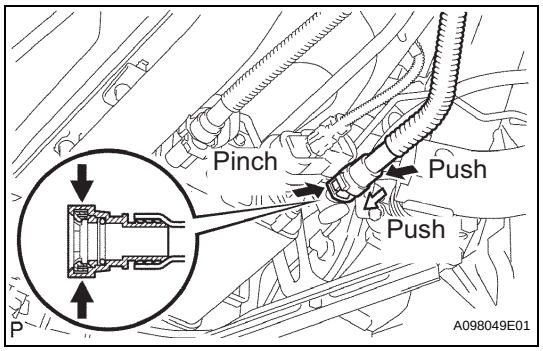
A116775E01

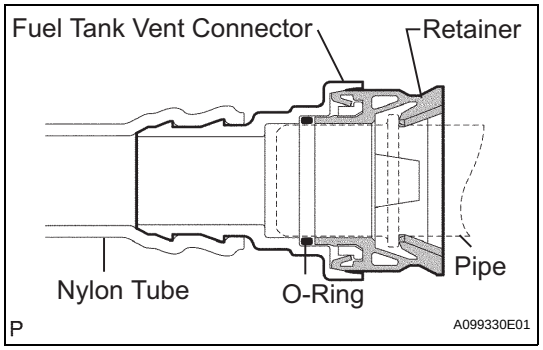
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT FLOOR PANEL BRACE (See page EX-2)**
3. **REMOVE CENTER EXHAUST PIPE ASSEMBLY (See page EX-2)**
4. **REMOVE NO. 1 FUEL TANK PROTECTOR (See page FU-29)**
5. **REMOVE REAR SUSPENSION BRACE LOWER RH (See page FU-29)**
6. **REMOVE CANISTER ASSEMBLY**
   (a) Disconnect the leak detection pump connector.
   (b) Disconnect the fuel emission hose and 2 clamps.



   (c) Disconnect the fuel tank vent hose.

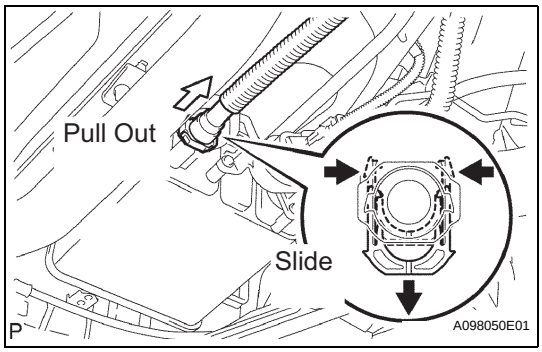




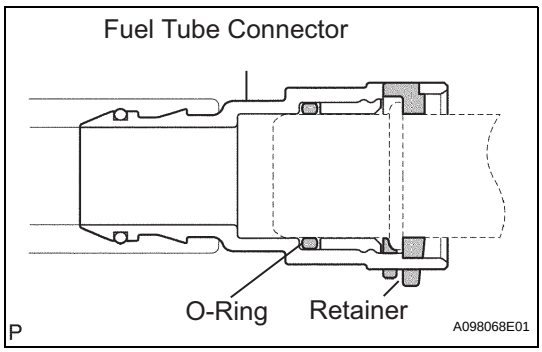
   (1) Pinch the retainer and pull out the fuel tank vent connector with the fuel tank vent connector pushed to the pipe side to disconnect the fuel tank vent hose from the charcoal canister.
   NOTICE:
   - **Remove dirt or foreign objects on the fuel tank vent connector before this work.**
   - **Do not allow any scratches or foreign objects on the parts when disconnecting as the fuel tank vent connector has the O-ring that seals the pipe.**
   - **Perform this work by hand. Do not use any tools.**

EC

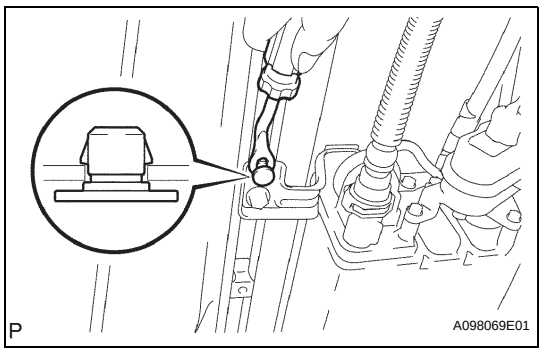
- **Do not forcibly bend, twist or turn the nylon tube.**
- **Protect the connected part by covering it with a plastic bag after disconnecting the fuel tank vent hose.**
- **If the fuel tank vent connector and pipe are stuck, push and pull them to release.**



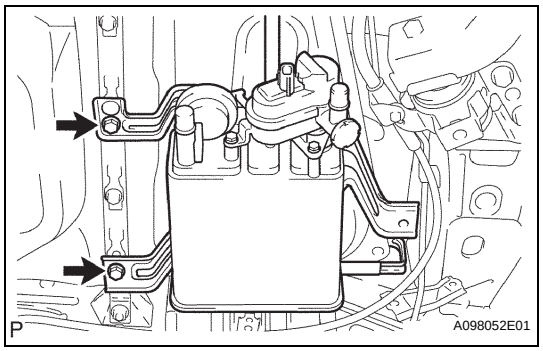
(d) Disconnect the fuel tank vent hose.
(1) Pinch the tab of the retainer of the fuel tube connector to remove the lock claws and slide it as shown in the illustration.



(2) Pull the fuel tank vent hose out of the charcoal canister.
NOTICE:
- **Remove any dirt or foreign objects on the fuel tube connector before performing this work.**
- **Do not allow any scratches or foreign objects on the parts when disconnecting as the fuel tube connector has the O-ring that seals the pipe.**
- **Perform this work by hand. Do not use any tools.**
- **Do not forcibly bend, twist or turn the nylon tube.**
- **Protect the disconnected part by covering it with a plastic bag after disconnecting the fuel tank vent hose.**
- **If the fuel tube connector and pipe are stuck, push and pull to release them.**



(e) Using a clip remover, remove the clip.
HINT:
The clip is for placing the part temporarily when working at a workshop. There is no need to install the clip when reassembling.

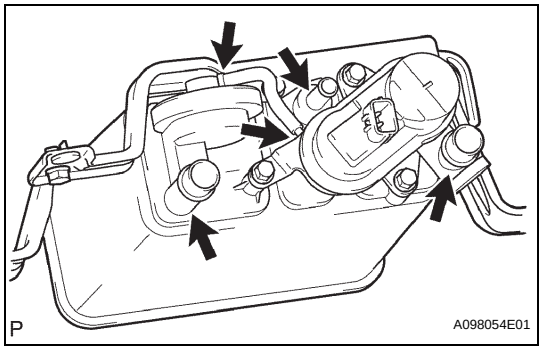


(f) Remove the 2 bolts and charcoal canister.

7. REMOVE CANISTER FILTER SUB-ASSEMBLY

(a) Disconnect the 2 hoses.

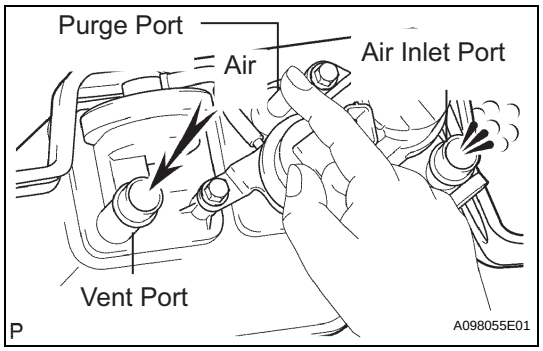
(b) Remove the bolt and filter.



INSPECTION

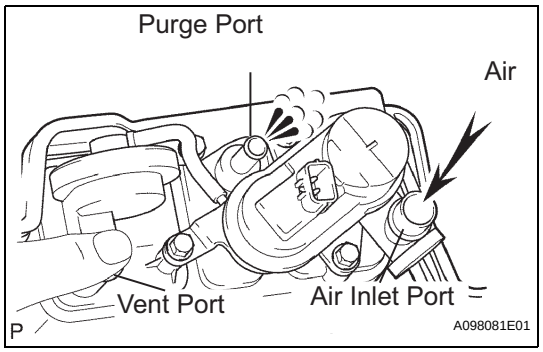
1. INSPECT CANISTER ASSEMBLY

(a) Visually check the canister for cracks or damage.
If cracks or damage are found, replace the canister assembly.

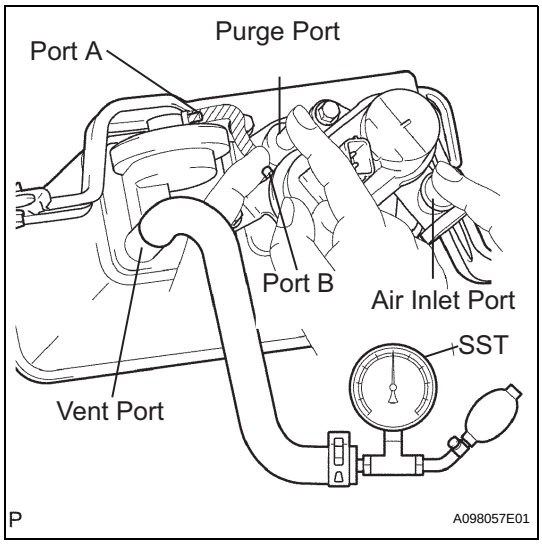


(b) Check canister operation.

(1) While holding the purge port closed, blow 1.67 kPa (17.0 gf/cm^2, 0.24 psi) to the vent port, and check that the air flows from the air inlet port.
If the result is not as specified, replace the canister assembly.



(2) While holding the vent port closed, blow 1.10 kPa (11.2 gf/cm^2, 0.16 psi) to the air inlet port, and check that the air flows from the purge port.
If the result is not as specified, replace the canister assembly.



(c) Check the air leakage.
  (1) Remove the air hose between ports A and B.
  (2) Connect SST (pressure gauge) to the vent port of the canister.
    SST 09992-00242
  (3) While holding port B, the purge port and the air inlet port closed, apply 19.6 kPa (0.2 kgf/cm^2, 2.81 psi) to the vent port, and then confirm that the pressure is retained.
    If the result is not as specified, replace the canister assembly.

INSTALLATION

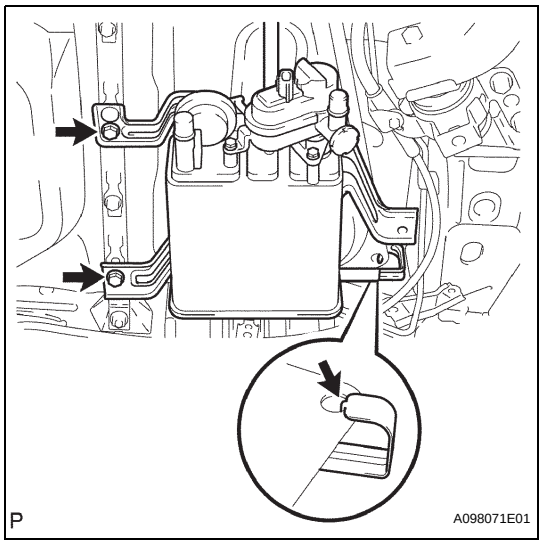
1. INSTALL CANISTER FILTER SUB-ASSEMBLY

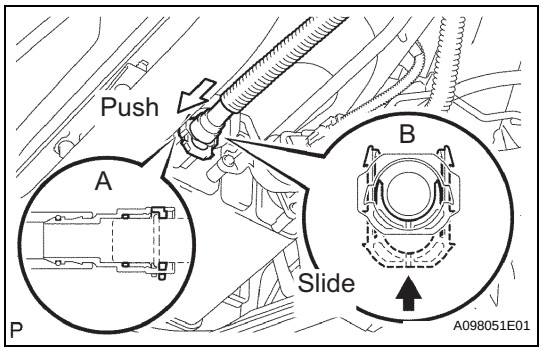
(a) Install the filter with the bolt.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

(b) Connect the 2 hoses.

2. INSTALL CANISTER ASSEMBLY

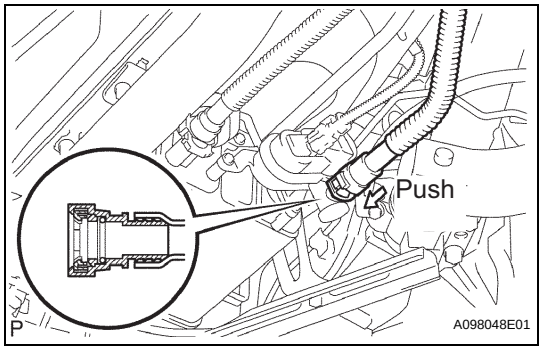
(a) Temporarily hook the claw of the canister bracket around the fuel tank hoses, and install the canister with the 2 bolts.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)





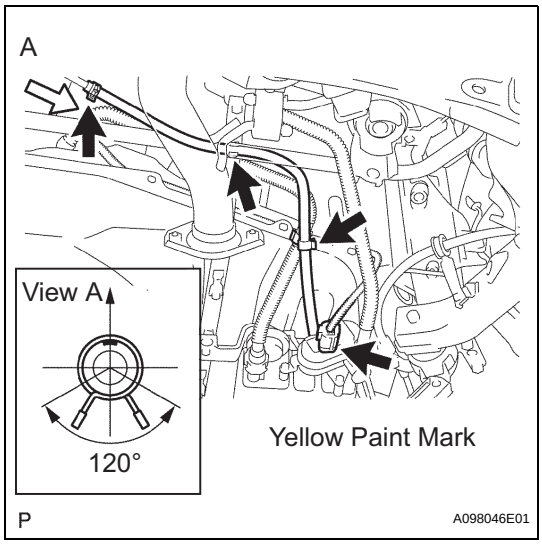
(b) Install the fuel vent hose.

(1) Connect the pipe to the fuel tube connector, as shown in A in the illustration. Then push up the retainer to lock the claws, as shown in B in the illustration.
NOTICE:
- **Check that there are no scratches or foreign objects around the connected part of the fuel tube connector and pipe before performing this work.**
- **After connecting the fuel tank vent hose, check that the fuel tank vent hose is securely connected by pulling the fuel tube connector and pipe.**



(c) Connect the fuel tank vent hose.

(1) Align the fuel tank vent connector with the pipe, and then push in the fuel tank vent connector until the retainer makes a "click" sound to connect the fuel tank vent hose to the canister.
NOTICE:
- **Check that there are no scratches or foreign objects around the connected part of the fuel tank vent connector and pipe before this work.**
- **After connecting the fuel tank vent hose, check that the fuel tank vent hose is securely connected by pulling the quick connector.**



(d) Install the fuel emission hose and 2 clamps.
(e) Install the leak detection pump connector.

3. **INSTALL REAR SUSPENSION BRACE LOWER RH (See page FU-36)**

4. **INSTALL NO. 1 FUEL TANK PROTECTOR (See page FU-37)**

5. **INSTALL CENTER EXHAUST PIPE ASSEMBLY (See page EX-4)**

6. **INSTALL FRONT FLOOR PANEL BRACE (See page EX-5)**

7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

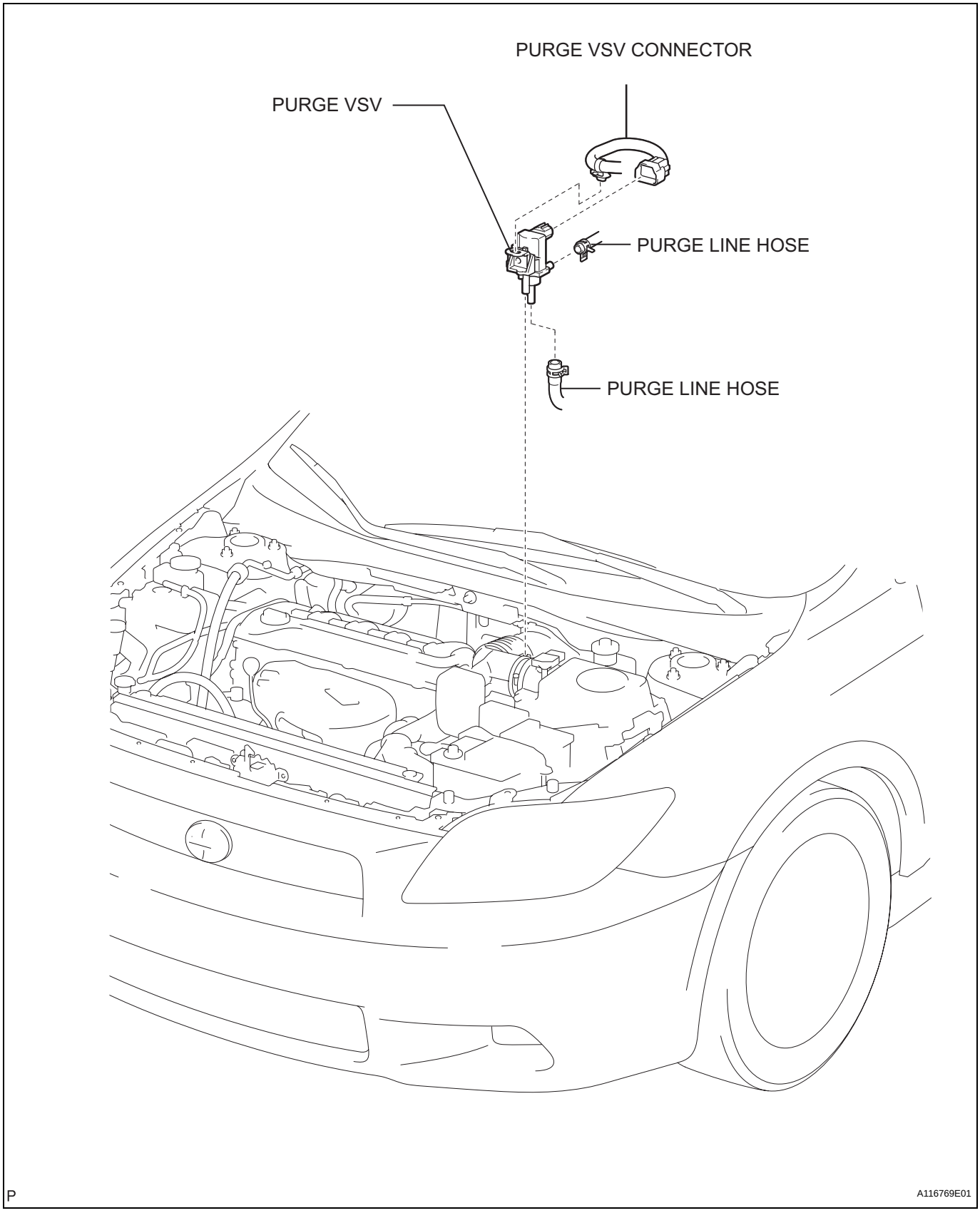
8. **PERFORM INITIALIZATION**
   (a) Perform the initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

9. **CHECK FOR EXHAUST GAS LEAKS**

EC

VACUUM SWITCHING VALVE

COMPONENTS



REMOVAL

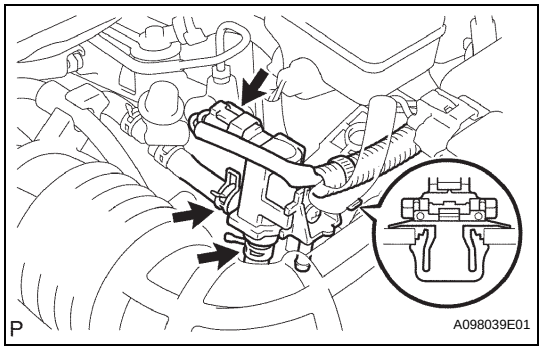
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE PURGE VSV

(a) Disconnect the purge VSV connector.
(b) Remove the wire harness clamp.
(c) Disconnect the 2 purge line hoses from the vacuum switching valve.
(d) Remove the purge VSV from the air cleaner hose.



INSPECTION

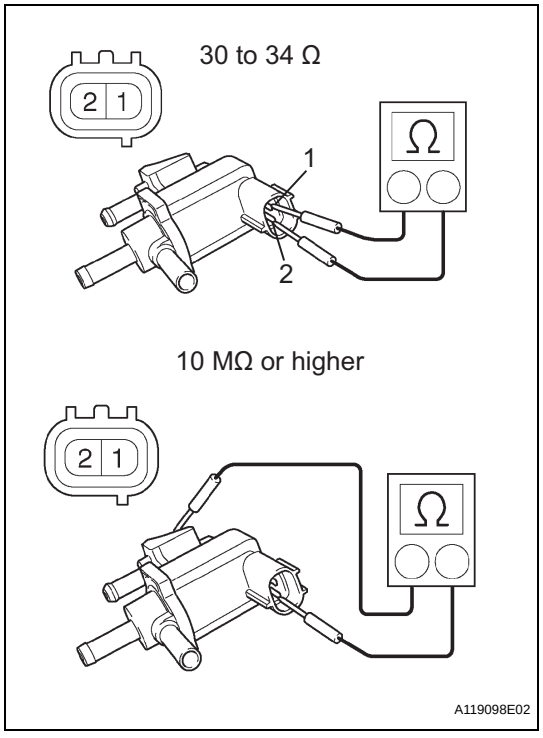
1. INSPECT VACUUM SWITCHING VALVE ASSEMBLY (for EVAP)

(a) Measure the resistance of the purge VSV.

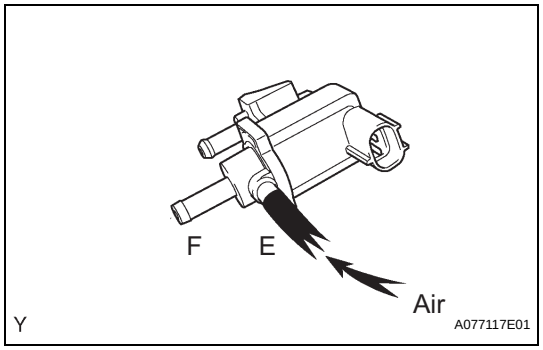
Standard resistance

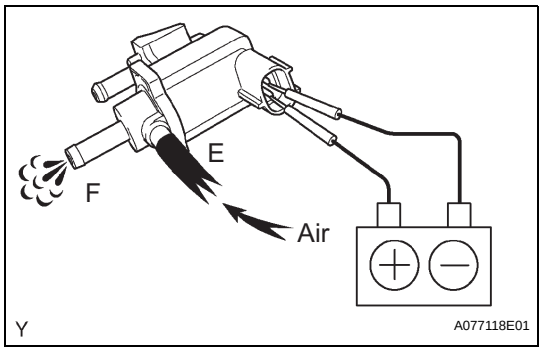
Tester Connection	Specified Condition
1 - 2	30 to 34 Ω at 20°C (68°F)
1 - Body ground 2 - Body ground	10 MΩ or higher

If the result is not as specified, replace the purge VSV.

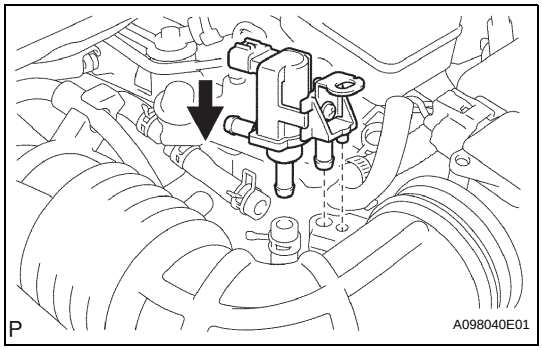


(b) Check the operation of the purge VSV.
(1) Check that air does not flow from port E to port F.





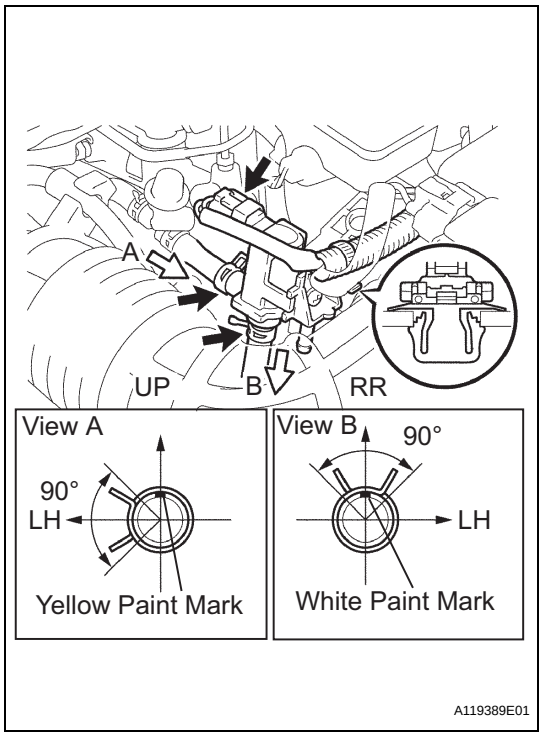
(2) Apply battery voltage across terminals.
(3) Check that air flows from port E to port F.
If the result is not as specified, replace the purge VSV.



INSTALLATION

1. INSTALL PURGE VSV

(a) Install the purge VSV onto the air cleaner hose.



(b) Connect the 2 purge line hoses to the purge VSV.
NOTICE:
Make sure that the hose clip and mark are at the correct angle when installing.
(c) Install the wire harness clamp.
(d) Connect the purge VSV connector.

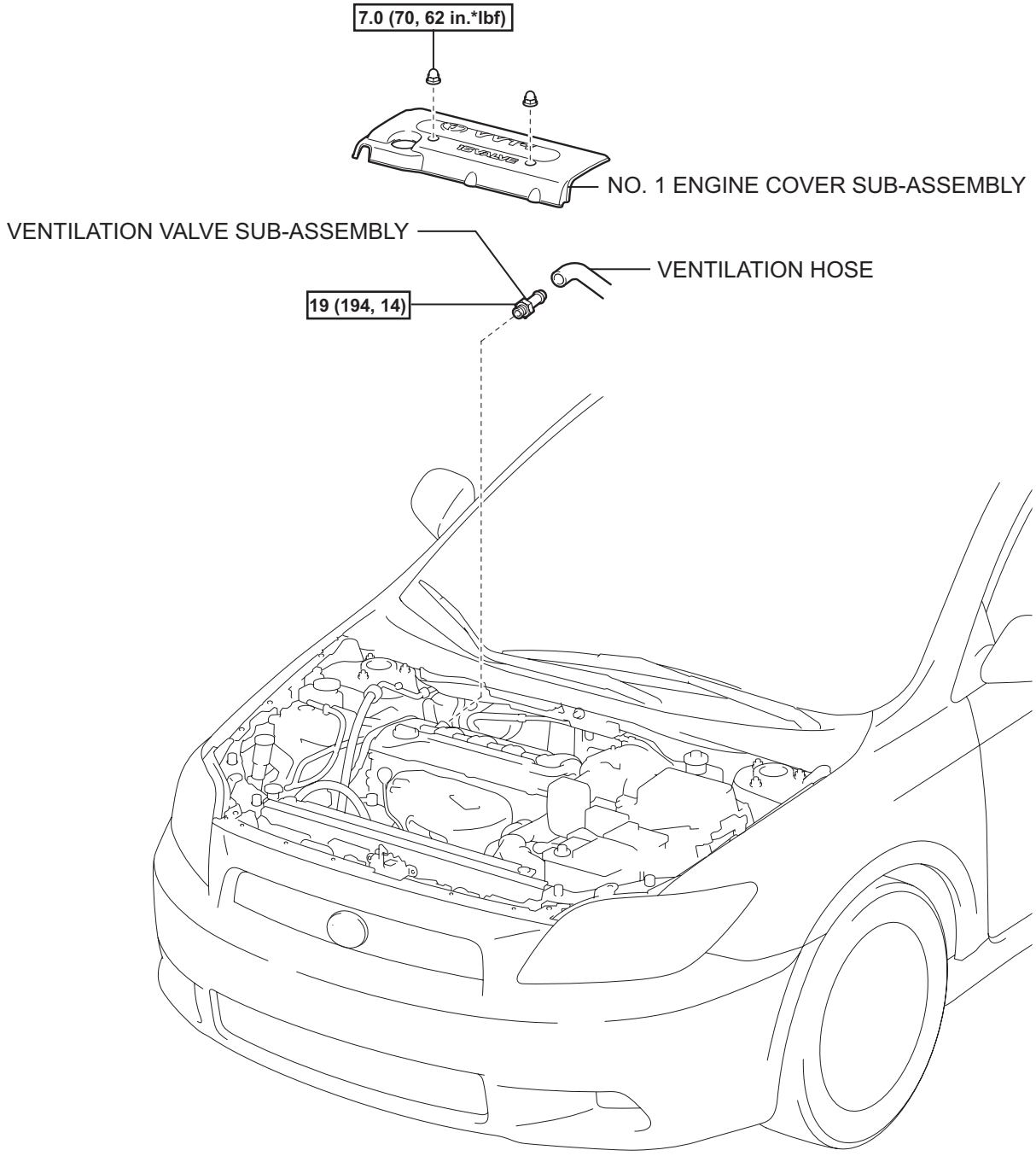
2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. PERFORM INITIALIZATION

(a) Perform the initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

VENTILATION VALVE

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

P

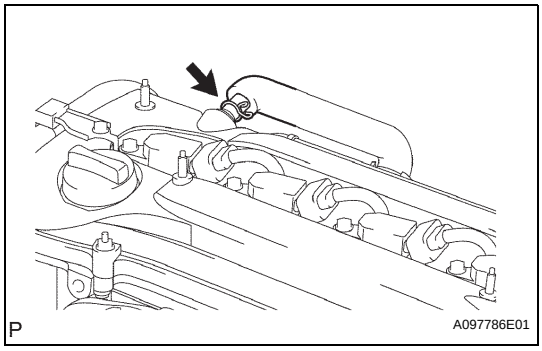
A116771E01

EC

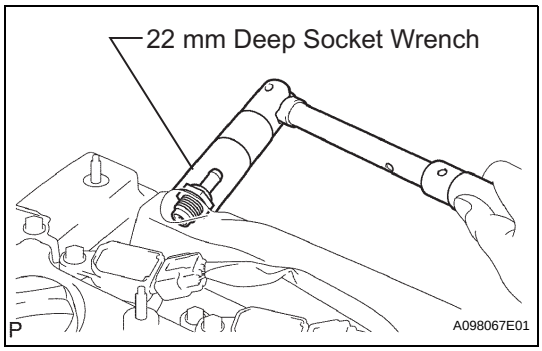
REMOVAL

1. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-22)**

2. **REMOVE VENTILATION VALVE SUB-ASSEMBLY**
   (a) Disconnect the No. 2 ventilation hose from the ventilation valve.



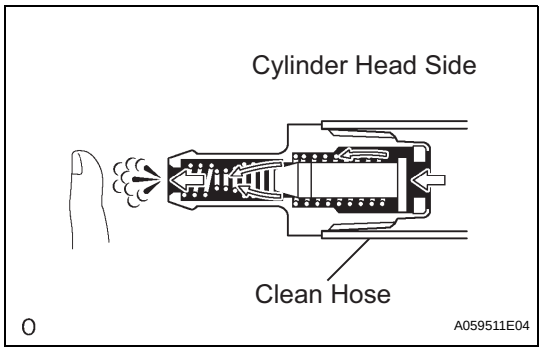
   (b) Using a 22 mm deep socket wrench, remove the ventilation valve.

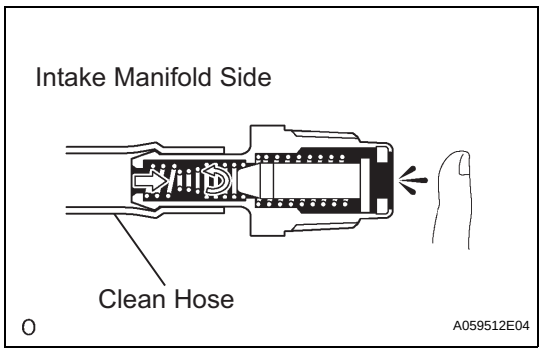


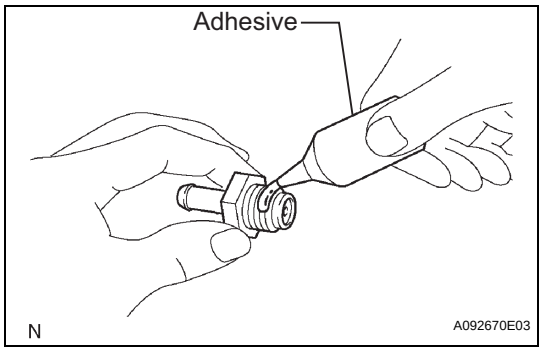
INSPECTION

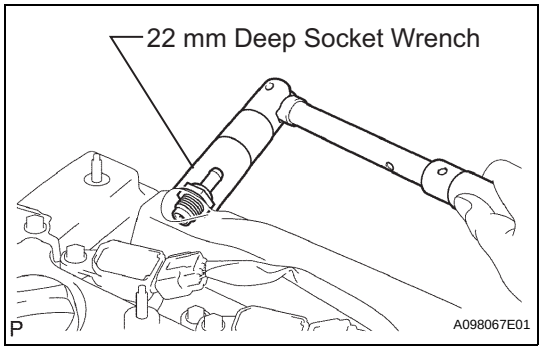
1. **INSPECT VENTILATION VALVE SUB-ASSEMBLY**
   (a) Install a clean hose to the ventilation valve.
   (b) Check the ventilation valve operation.
      (1) Blow air into the cylinder head side, and check that air passes through easily.
      CAUTION:
      Do not suck air through the valve.
      Petroleum 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.
      If the result is not as specified, replace the ventilation valve sub-assembly.
   (c) Remove the clean hose from the ventilation valve.









INSTALLATION

1. INSTALL VENTILATION VALVE SUB-ASSEMBLY

(a) Apply adhesive to 2 or 3 threads of the ventilation valve.

Adhesive:
Part No. 08833-00070, THREE BOND 1342 or equivalent

(b) Using a 22 mm deep socket wrench, install the ventilation valve.

Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

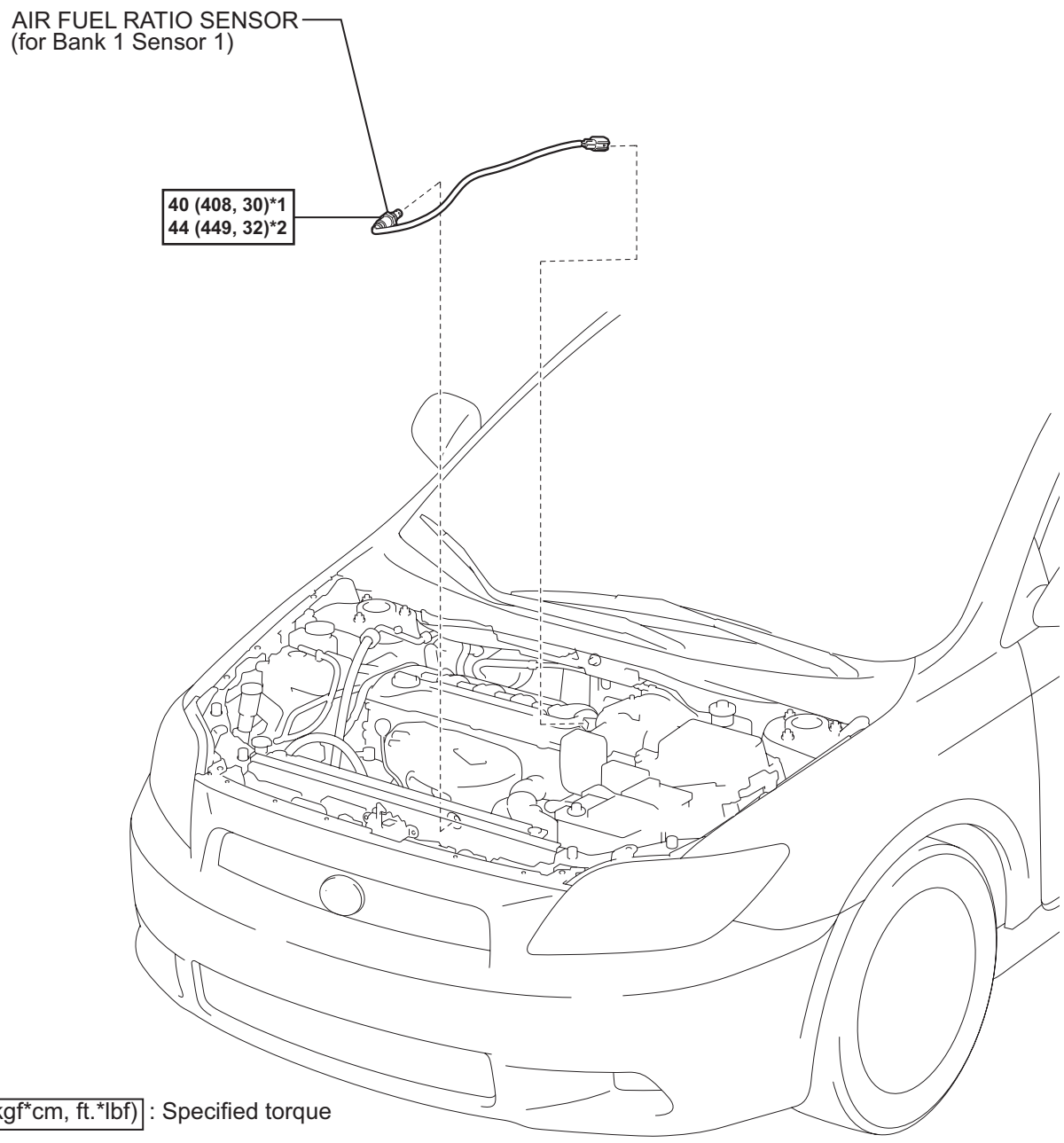
2. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-42)

3. CHECK FOR ENGINE OIL LEAKS

EC

AIR FUEL RATIO SENSOR

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

*1: For use with SST

*2: For use without SST

P

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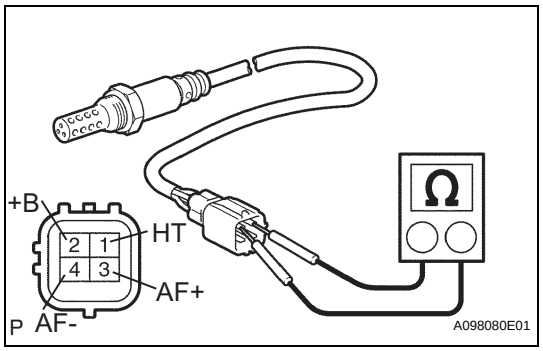


ON-VEHICLE INSPECTION

1. INSPECT AIR FUEL RATIO SENSOR (for Bank 1 Sensor 1)

(a) Measure the resistance of the sensor.
Standard resistance

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	1.8 to 3.4 Ω at 20°C (68°F)
1 (HT) - 4 (AF-)	10 kΩ or higher

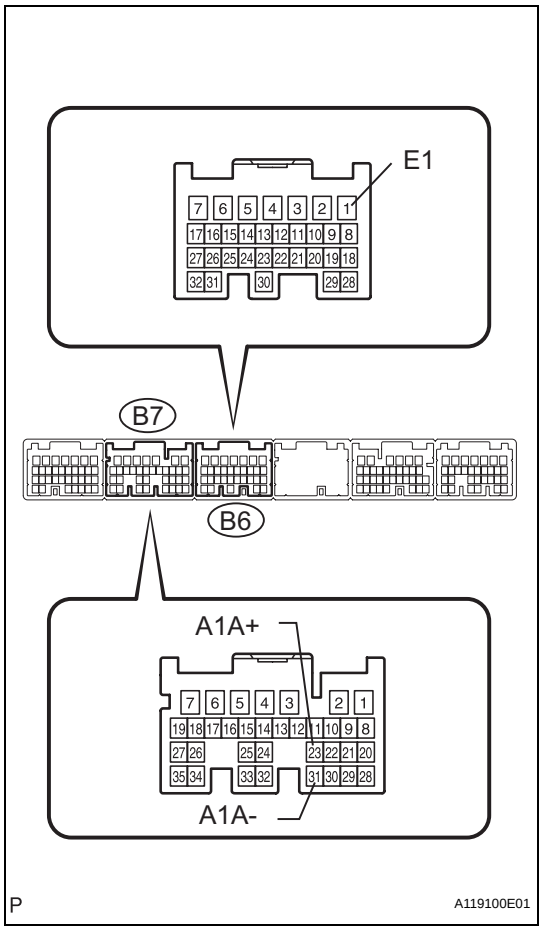
If the resistance is not as specified, replace the sensor.

2. INSPECT AIR FUEL RATIO COMPENSATION SYSTEM

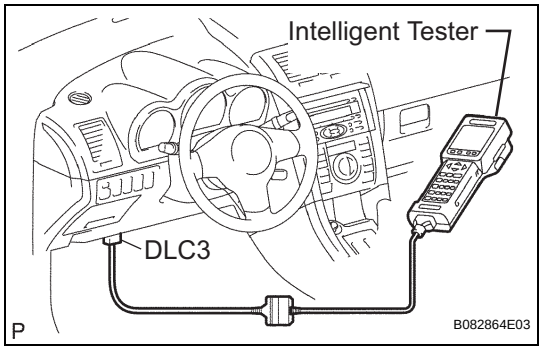
(a) Measure the voltage of the ECM connectors.
Standard voltage

Tester Connection	Condition	Specified Condition
B7-23 (A1A+) - B6-1 (E1)	Ignition switch ON	3.3 V
B7-31 (A1A-) - B6-1 (E1)	Ignition switch ON	2.9 V

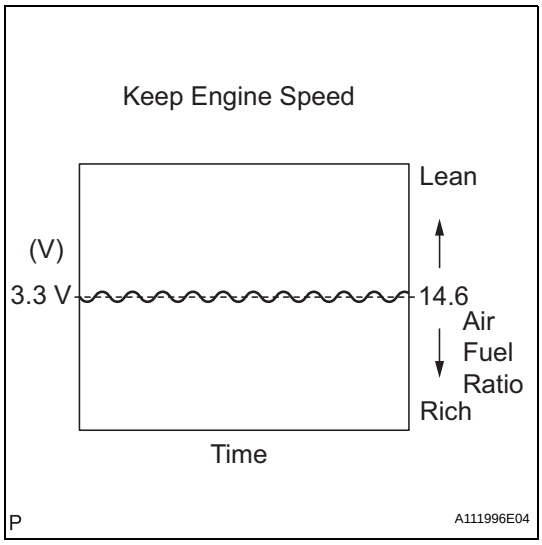
EC



NOTICE:
Connect test leads from the back side of the connector. The connectors should not be disconnected from the ECM.
HINT:
The voltage between the terminals of the ECM is kept constant regardless of the voltage of the A/F sensor.



(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to ON.
(d) Select the following menu items: Data List / A/FS B1 S1 and O2S B1 S2.
(e) Warm up the A/F sensor with the engine speed at 2,500 rpm for approximately 2 minutes.



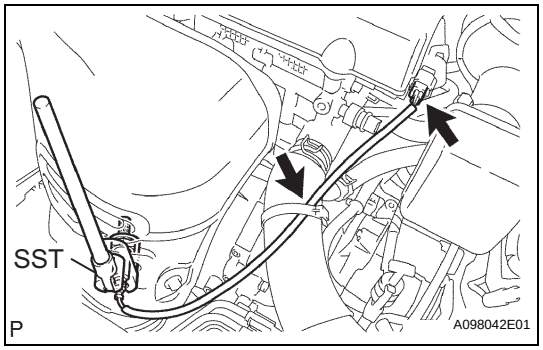
(f) Keep the engine speed at 2,500 rpm and confirm that the display of "A/FS B1 S1" is as shown in the illustration.
HINT:
- The illustration may slightly differ from the display on the intelligent tester.
- Only the intelligent tester displays the waveform of the A/F sensor.

(g) Confirm that the display of "O2S B1 S2" changes between 0 to 1 V with the engine speed at 2,500 rpm.
OK:
The voltage output oscillates more than 8 times in 10 seconds.
CAUTION:
- **Perform the check immediately after warming the engine up.**
- **If the voltage variation could not be verified, warm up the heated oxygen sensor again. If it could not be verified even after warming up the sensor again, check for DTCs (see page ES-47).**

EC

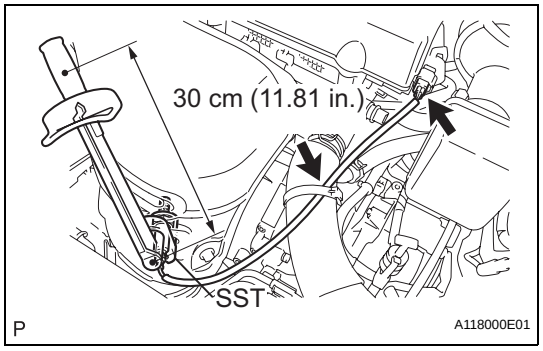
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



2. **REMOVE AIR FUEL RATIO SENSOR (for Bank 1 Sensor 1)**
   (a) Disconnect the sensor connector.
   (b) Using SST, remove the sensor from the exhaust manifold.
   SST 09224-00010

INSTALLATION



1. **INSTALL AIR FUEL RATIO SENSOR (for Bank 1 Sensor 1)**
   (a) Using SST, install the sensor to the exhaust manifold.
   SST 09224-00010
   Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf) for use with SST
   44 N*m (449 kgf*cm, 32 ft.*lbf) for use without SST
   HINT:
   Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).
   (b) Connect the sensor connector.

2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

3. **PERFORM INITIALIZATION**
   (a) Perform the initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

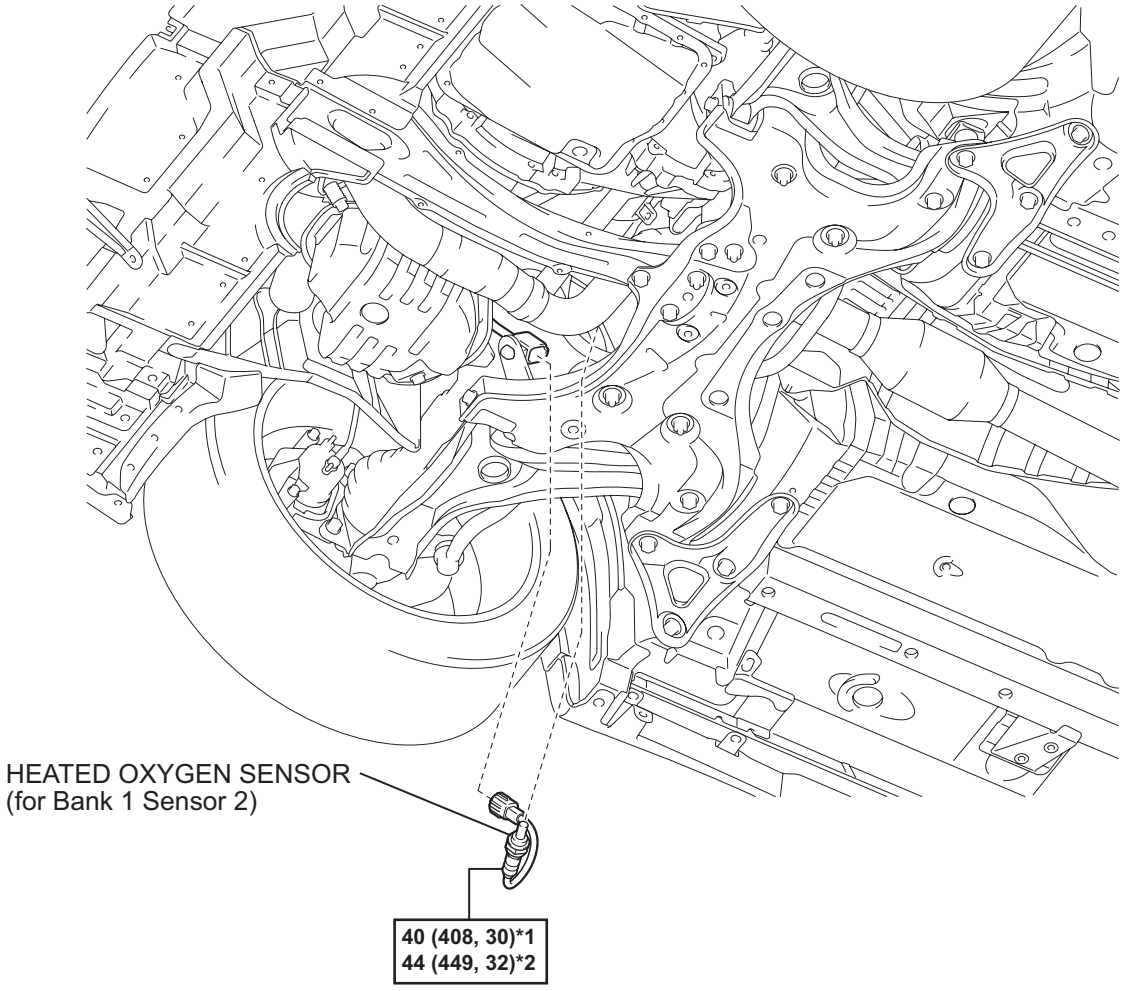
4. **CHECK FOR EXHAUST GAS LEAKS**

EC

HEATED OXYGEN SENSOR

COMPONENTS

EC



N*m (kgf*cm, ft.*lbf) : Specified torque

*1: For use with SST

*2: For use without SST

P

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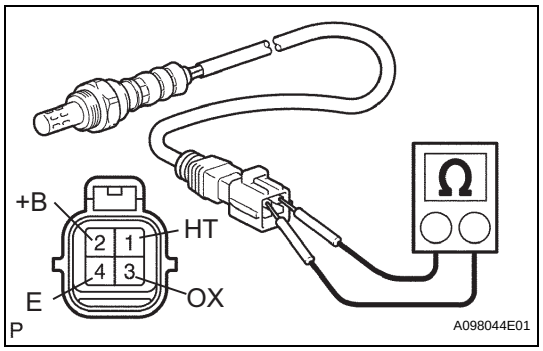


ON-VEHICLE INSPECTION

1. INSPECT HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)

(a) Measure the resistance of the sensor.

Standard resistance

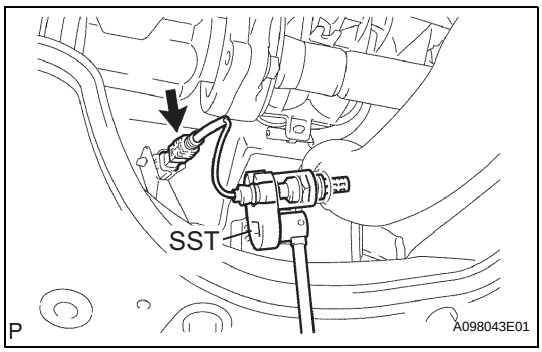
Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
1 (HT) - 4 (E)	10 kΩ or higher

If the resistance is not as specified, replace the sensor.

EC

REMOVAL

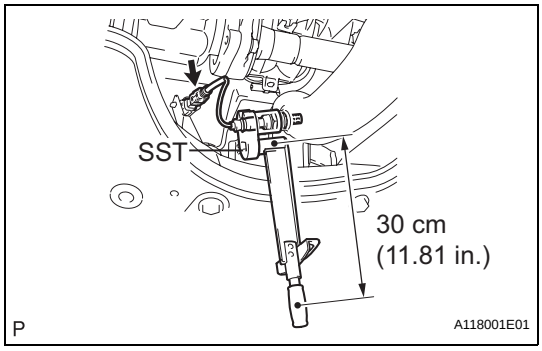
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



2. **REMOVE HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)**
   (a) Disconnect the sensor connector.
   (b) Using SST, remove the sensor from the front exhaust pipe.
   SST 09224-00010

EC

INSTALLATION

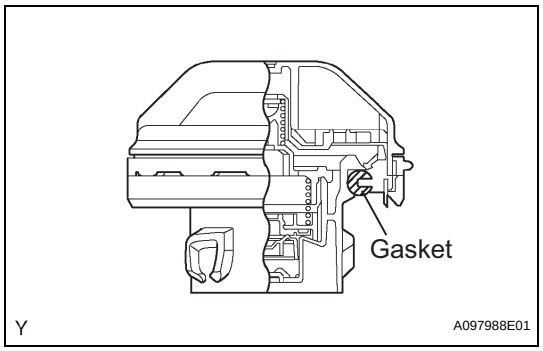


1. **INSTALL HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)**
   (a) Using SST, install the sensor to the front exhaust pipe.
   SST 09224-00010
   Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf) for use with SST
   44 N*m (449 kgf*cm, 32 ft.*lbf) for use without SST
   HINT:
   Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).
   (b) Connect the sensor connector.

2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

3. **PERFORM INITIALIZATION**
   (a) Perform the initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

4. **CHECK FOR EXHAUST GAS LEAKS**



FUEL TANK CAP

INSPECTION

1. INSPECT FUEL TANK CAP ASSEMBLY

(a) Visually check that the cap and gasket are not deformed or damaged.
If the result is not as specified, replace the cap assembly or gasket.

SFI SYSTEM

PRECAUTION

NOTICE:

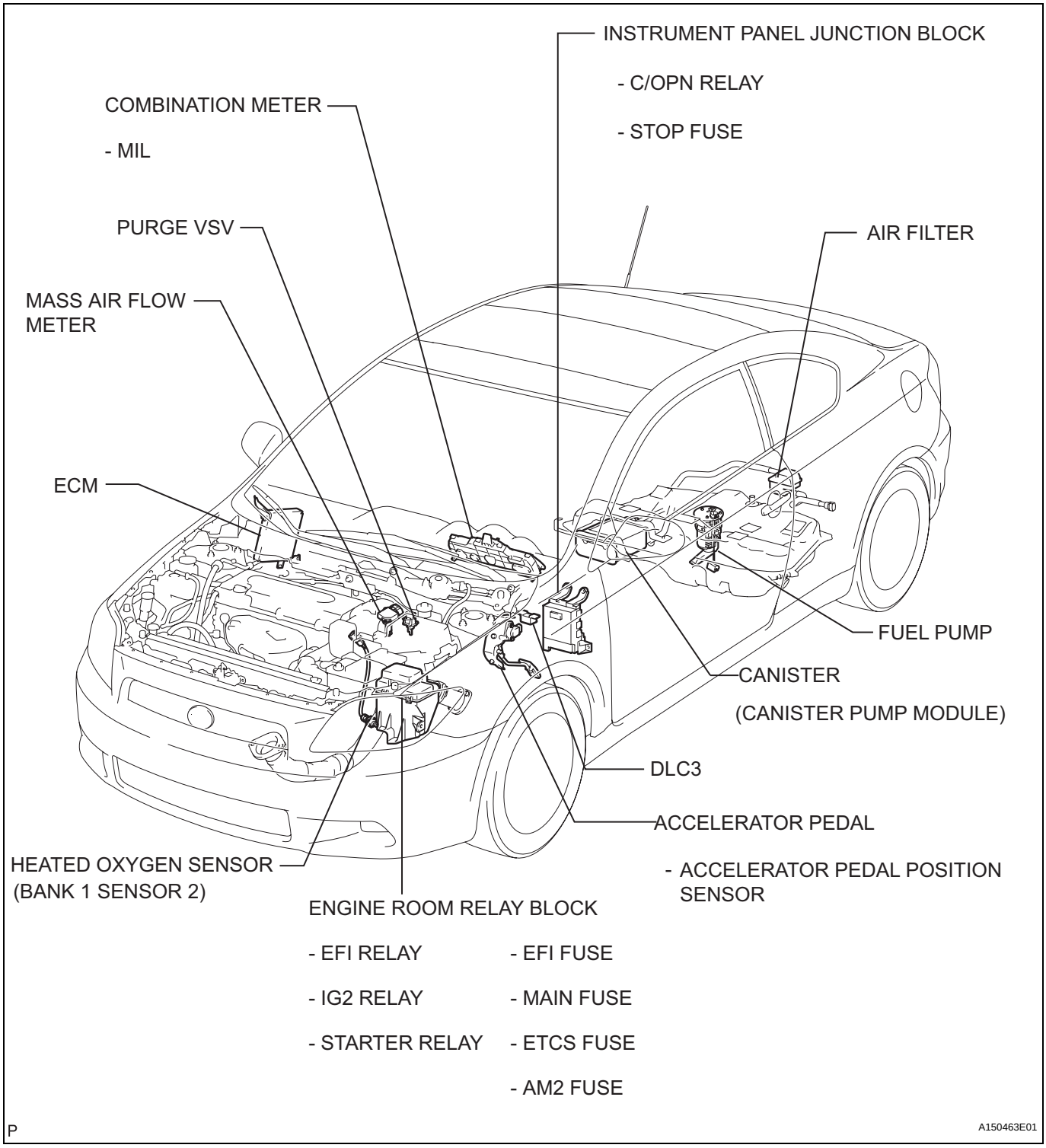
- **Perform the RESET MEMORY (A/T initialization) operation after replacing the automatic transmission assembly, engine assembly or ECM.**
- **Initialize the following systems after disconnecting and reconnecting the cable to the negative (-) battery terminal.**

System Name	See procedure
Power Window Control System (with Jam Protection Function)	IN-23
Sliding Roof System	IN-23

DEFINITION OF TERMS

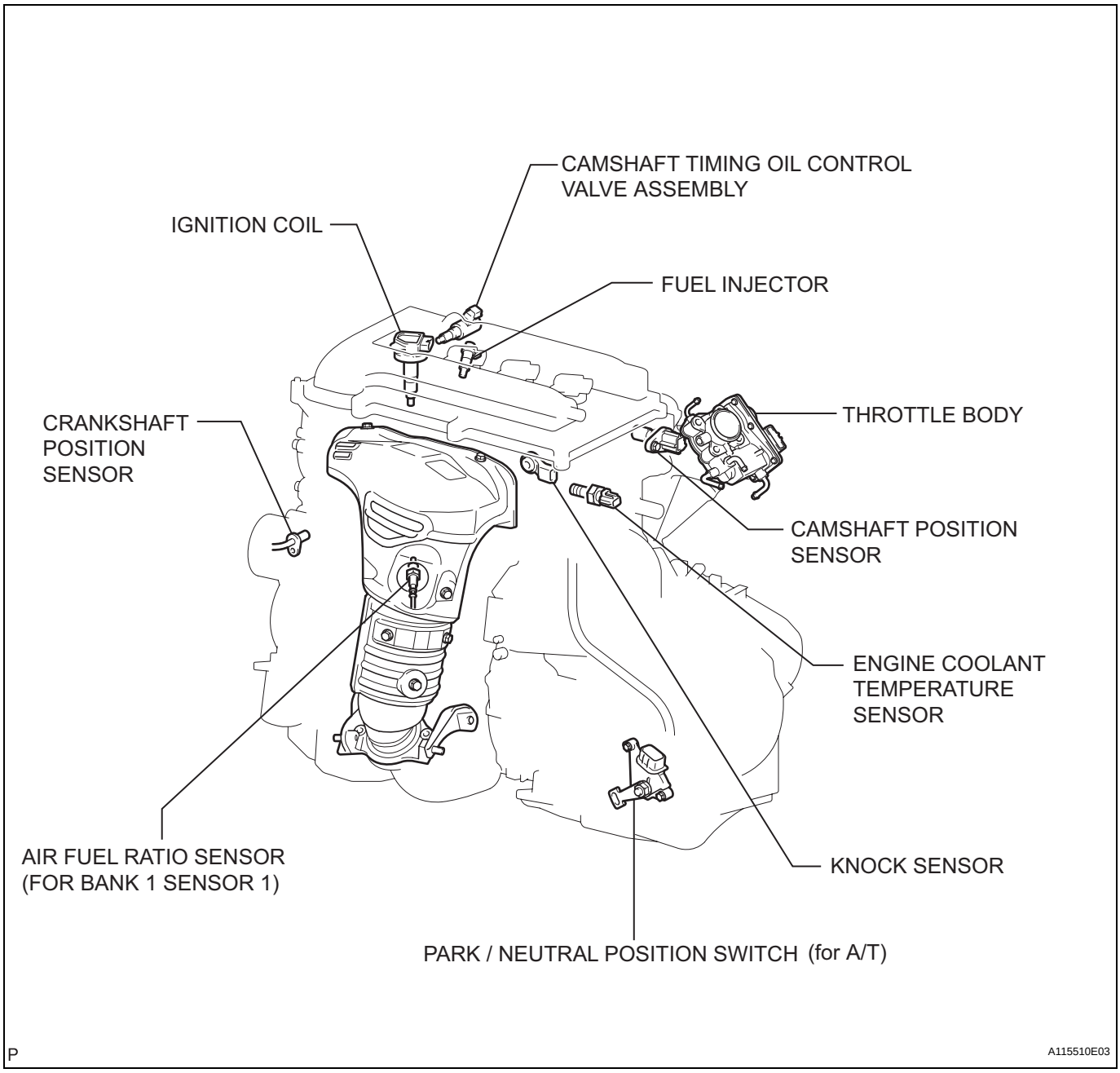
Terms	Definitions
Monitor description	Description of what the ECM monitors and how it detects malfunctions (monitoring purpose and its details).
Related DTCs	A group of diagnostic trouble codes that are output by ECM based on same malfunction detection logic.
Typical enabling condition	Preconditions that allow ECM to detect malfunctions. With all preconditions satisfied, ECM sets 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 monitored in turn and not monitored until previous detection operation 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 set DTC. Timing begins when Typical Enabling Conditions are met.
Malfunction thresholds	Value beyond which ECM determines malfunctions exist and sets DTCs.
MIL operation	Timing of MIL illumination after malfunction detected. "Immediate" means ECM illuminates MIL as soon as malfunction detected. "2 driving cycle" means ECM illuminates MIL if same malfunction detected second time during next sequential driving cycle.

PARTS LOCATION

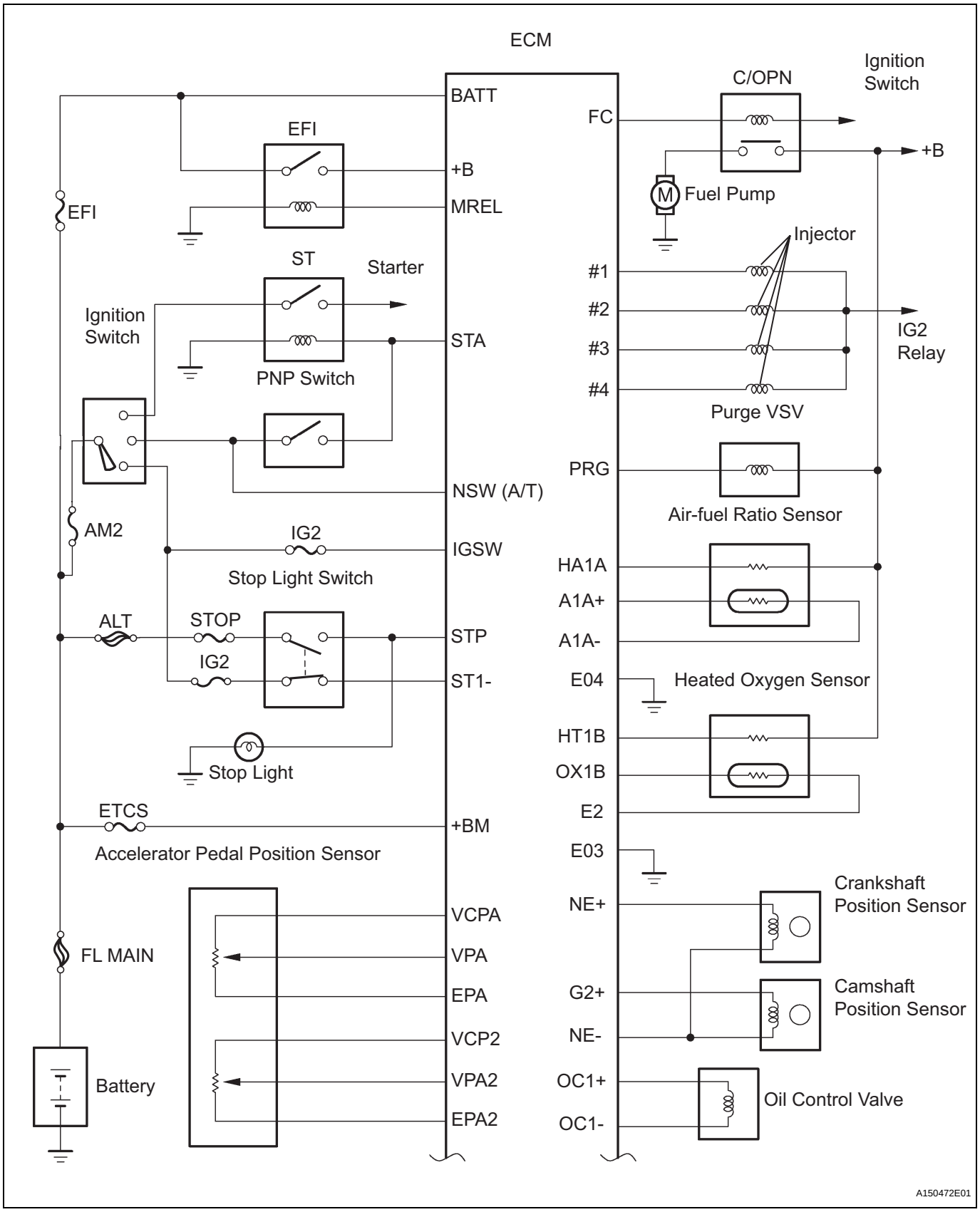


ES

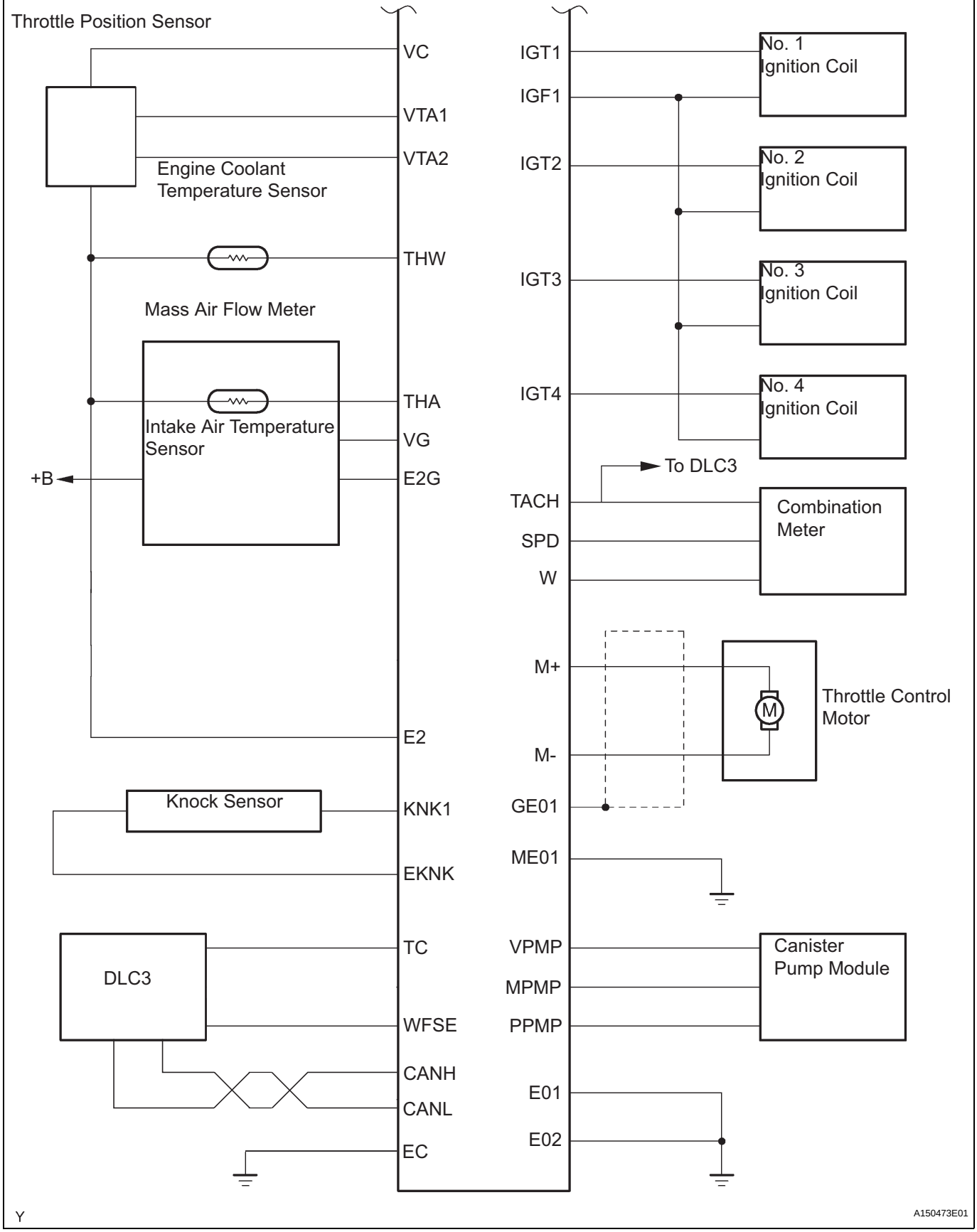
ES


CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY
IGNITION COIL
FUEL INJECTOR
CRANKSHAFT POSITION SENSOR
THROTTLE BODY
CAMSHAFT POSITION SENSOR
ENGINE COOLANT TEMPERATURE SENSOR
AIR FUEL RATIO SENSOR (FOR BANK 1 SENSOR 1)
KNOCK SENSOR
PARK / NEUTRAL POSITION SWITCH (for A/T)
P
A115510E03

SYSTEM DIAGRAM



ES


Throttle Position Sensor
VC
VTA1
VTA2
Engine Coolant Temperature Sensor
THW
Mass Air Flow Meter
THA
Intake Air Temperature Sensor
VG
+B
E2G
E2
Knock Sensor
KNK1
EKNK
DLC3
TC
WFSE
CANH
CANL
EC
IGT1
IGF1
IGT2
IGT3
IGT4
No. 1 Ignition Coil
No. 2 Ignition Coil
No. 3 Ignition Coil
No. 4 Ignition Coil
To DLC3
TACH
SPD
W
Combination Meter
M+
M-
M
Throttle Control Motor
GE01
ME01
VPMP
MPMP
PPMP
Canister Pump Module
E01
E02
Y
A150473E01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
*: Use the intelligent tester.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	CUSTOMER PROBLEM ANALYSIS

NEXT

3	CONNECT INTELLIGENT TESTER TO DLC3*

HINT:
If the display indicates a communication fault in the tester, inspect the DLC3.

NEXT

4	CHECK DTC AND FREEZE FRAME DATA*

HINT:
Record or print DTCs and freeze frame data, if necessary.

NEXT

5	CLEAR DTC AND FREEZE FRAME DATA*

NEXT

6	CONDUCT VISUAL INSPECTION

NEXT

7	SET CHECK MODE DIAGNOSIS*

NEXT

8	CONFIRM PROBLEM SYMPTOMS

HINT:
If the engine does not start, first perform "CHECK DTC" procedures and "CONDUCT BASIC INSPECTION" procedures below.

Result	Proceed to
Malfunction does not occur	A
Malfunction occurs	B

B → GO TO STEP 10

ES

A

9	SIMULATE SYMPTOMS

NEXT

10	CHECK FOR DTC*

Result	Proceed to
Trouble code	A
No code	B

B → GO TO STEP 12

A

11	REFER TO DTC CHART

NEXT

GO TO STEP 14

12	CONDUCT BASIC INSPECTION

Result	Proceed to
Malfunctioning parts not confirmed	A
Malfunctioning parts confirmed	B

B → GO TO STEP 17

A

13	REFER TO PROBLEM SYMPTOMS TABLE

Result	Proceed to
Malfunctioning circuit confirmed	A
Malfunctioning parts confirmed	B

B → GO TO STEP 17

A

14	CHECK ECM POWER SOURCE CIRCUIT

ES

NEXT

15	CONDUCT CIRCUIT INSPECTION

Result	Proceed to
Malfunction not confirmed	A
Malfunction confirmed	B

B → GO TO STEP 18

A

16	CHECK FOR INTERMITTENT PROBLEMS

NEXT

GO TO STEP 18

17	CONDUCT PARTS INSPECTION

NEXT

18	IDENTIFY PROBLEM

NEXT

19	ADJUST AND/OR REPAIR

NEXT

20	CONDUCT CONFIRMATION TEST

NEXT

END

CHECK FOR INTERMITTENT PROBLEMS

HINT:
Intelligent tester only:
Inspect the vehicle's ECM using check mode. Intermittent problems are easier to detect with an intelligent tester 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 the DTCs (See page ES-32).**
2. **Switch the ECM from normal mode to check mode using an intelligent tester (See page ES-35).**
3. **Perform a simulation test (See page IN-26).**
4. **Check and wiggle the harnesses, connectors and terminals (See page IN-34).**

BASIC INSPECTION

When a malfunction is not confirmed by the DTC check, troubleshooting should be carried out in all circuits considered to be possible causes of the problem. In many cases, by carrying out the basic engine check shown in the following flowchart, the location of the problem can be found quickly and efficiently. Therefore, using this check is essential when engine troubleshooting.

ES

1 CHECK BATTERY VOLTAGE

NOTICE:
Carry out this check with the engine stopped and ignition switch off.

Result	Proceed to
11 V or more	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 FILTER

(a) Visually check that the air filter is not excessively contaminated with dirt or oil.

NG → **REPLACE AIR FILTER**

OK

5 CHECK IDLING SPEED

NG → **PROCEED TO PROBLEM SYMPTOMS TABLE**

OK

6	CHECK FUEL PRESSURE

NG → TROUBLESHOOT FUEL SYSTEM AND PROCEED TO NEXT STEP

OK

7	CHECK FOR SPARK

NG → TROUBLESHOOT IGNITION SYSTEM AND PROCEED TO NEXT STEP

OK

PROCEED TO PROBLEM SYMPTOMS TABLE

REGISTRATION

NOTICE:
The Vehicle Identification Number (VIN) must be input into the replacement ECM.
HINT:
The VIN is in the form of a 17-digit alphanumeric vehicle identification number. An intelligent tester is required to register the VIN.

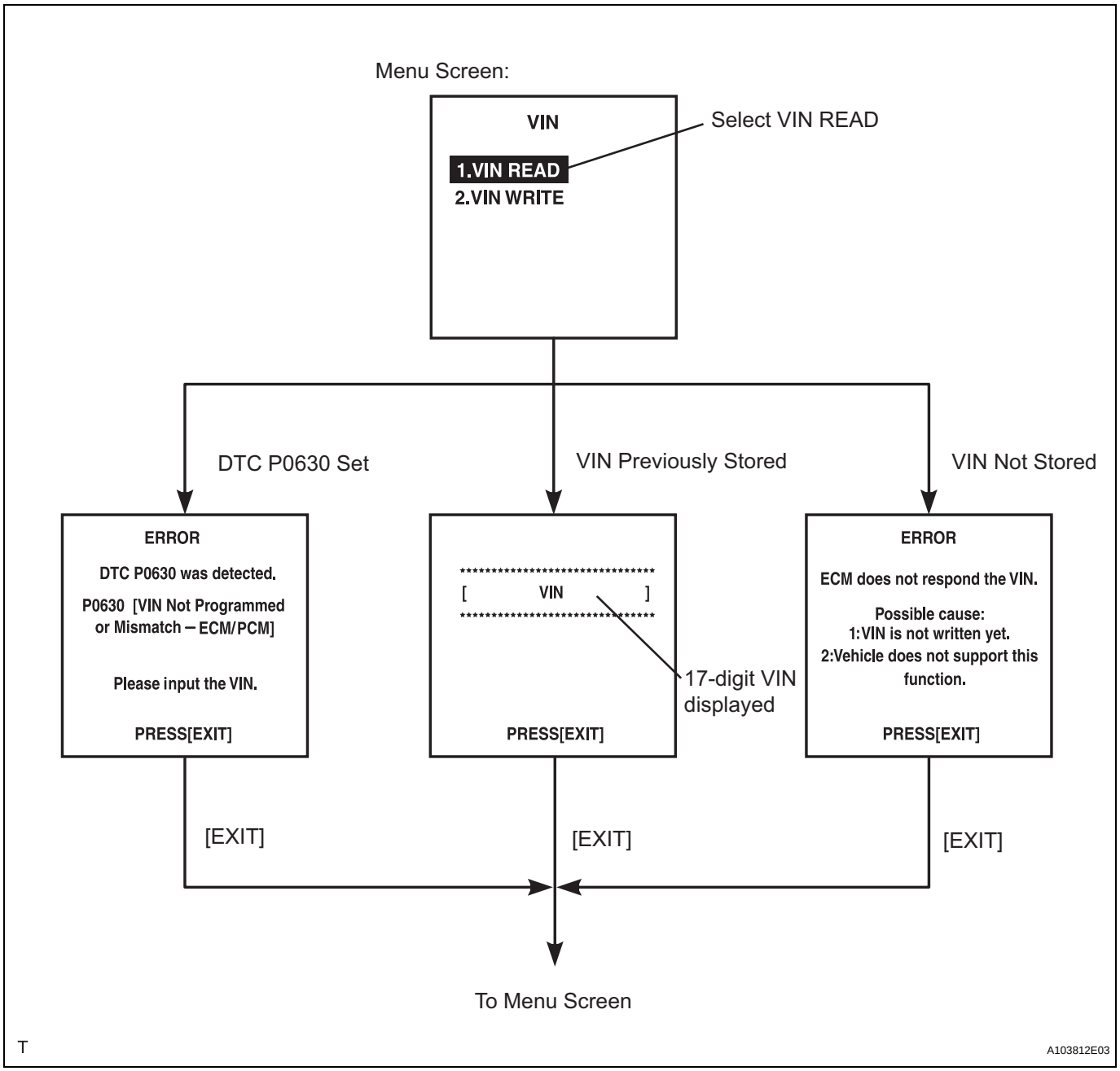
1. INPUT INSTRUCTIONS

(a) The general VIN input instructions using an intelligent tester are explained below.
(b) The arrow buttons (UP, DOWN, RIGHT and LEFT) and numerical buttons (0 to 9) are used, in order to input the VIN.
(c) Cursor Operation
To move the cursor around the tester screen, press the RIGHT and LEFT buttons.
(d) Alphabetical Character Input
(1) Press the UP and DOWN buttons to select the desired alphabetical character.
(2) After selection, the cursor should move.
(e) Numeric Character Input
(1) Press the numerical button corresponding to the number that you want to input.
(2) Select or input the correct character using the UP/DOWN buttons, or the numerical buttons.
HINT:
Numerical characters can also be selected and input using the UP and DOWN buttons.
(f) Correction
(1) After input, the cursor should move.
(2) When correcting the input character(s), put the cursor onto the character using the RIGHT or LEFT buttons.
(g) Finishing Input Operation
(1) Make sure that the input VIN matches the vehicle VIN after input.
(2) Press the ENTER button on the tester.

2. READ VIN (Vehicle Identification Number)

(a) The VIN reading process is explained in a flowchart. 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's ECM, are the same.
(b) Read the VIN using an intelligent tester.
(c) Check the vehicle's VIN.
(d) Connect the intelligent tester to the DLC3.
(e) Turn the ignition switch to the ON position.
(f) Turn the tester on.

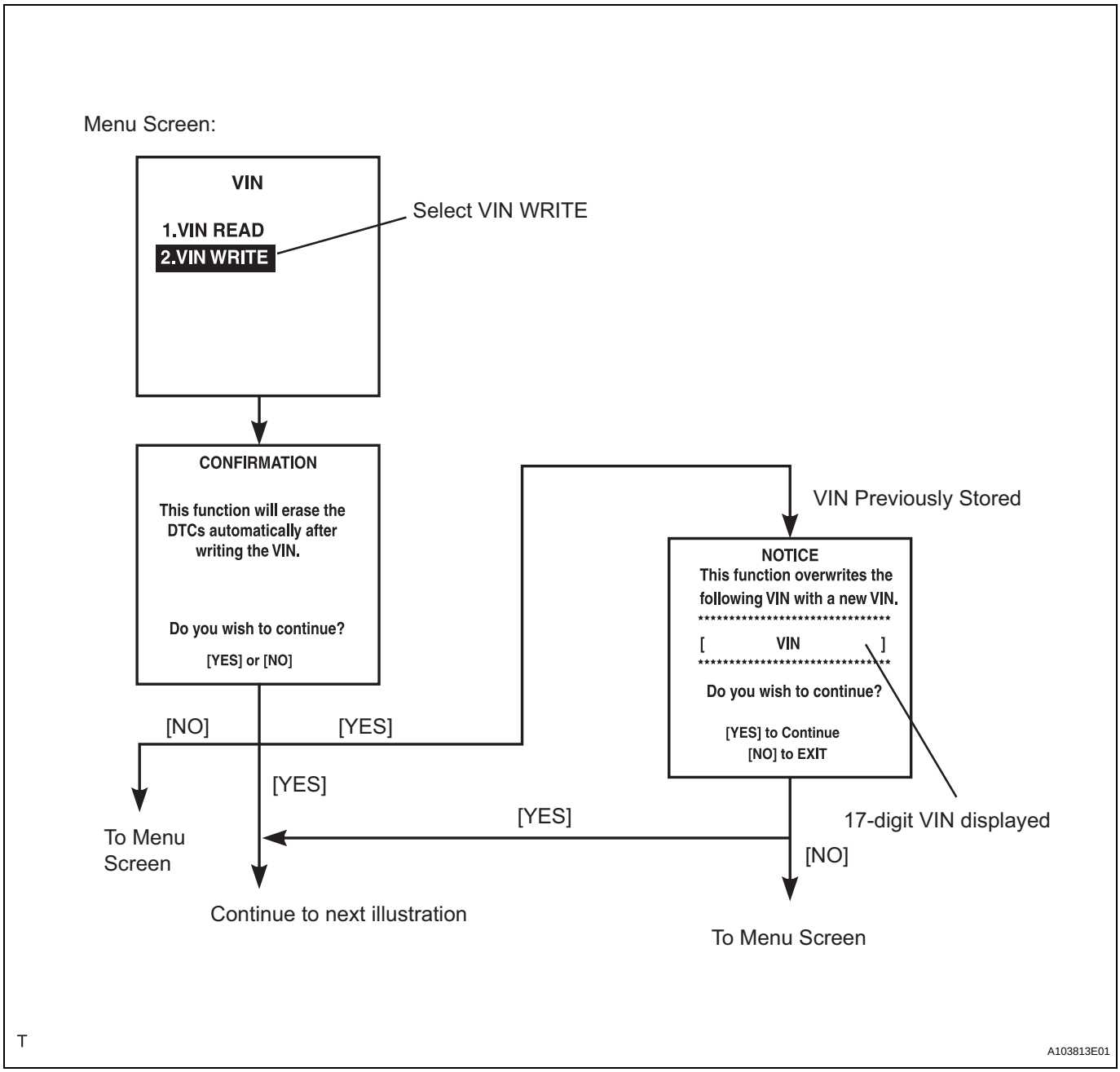
(g) Enter the following menus: DIAGNOSIS / ENHANCED OBD II/ VIN.

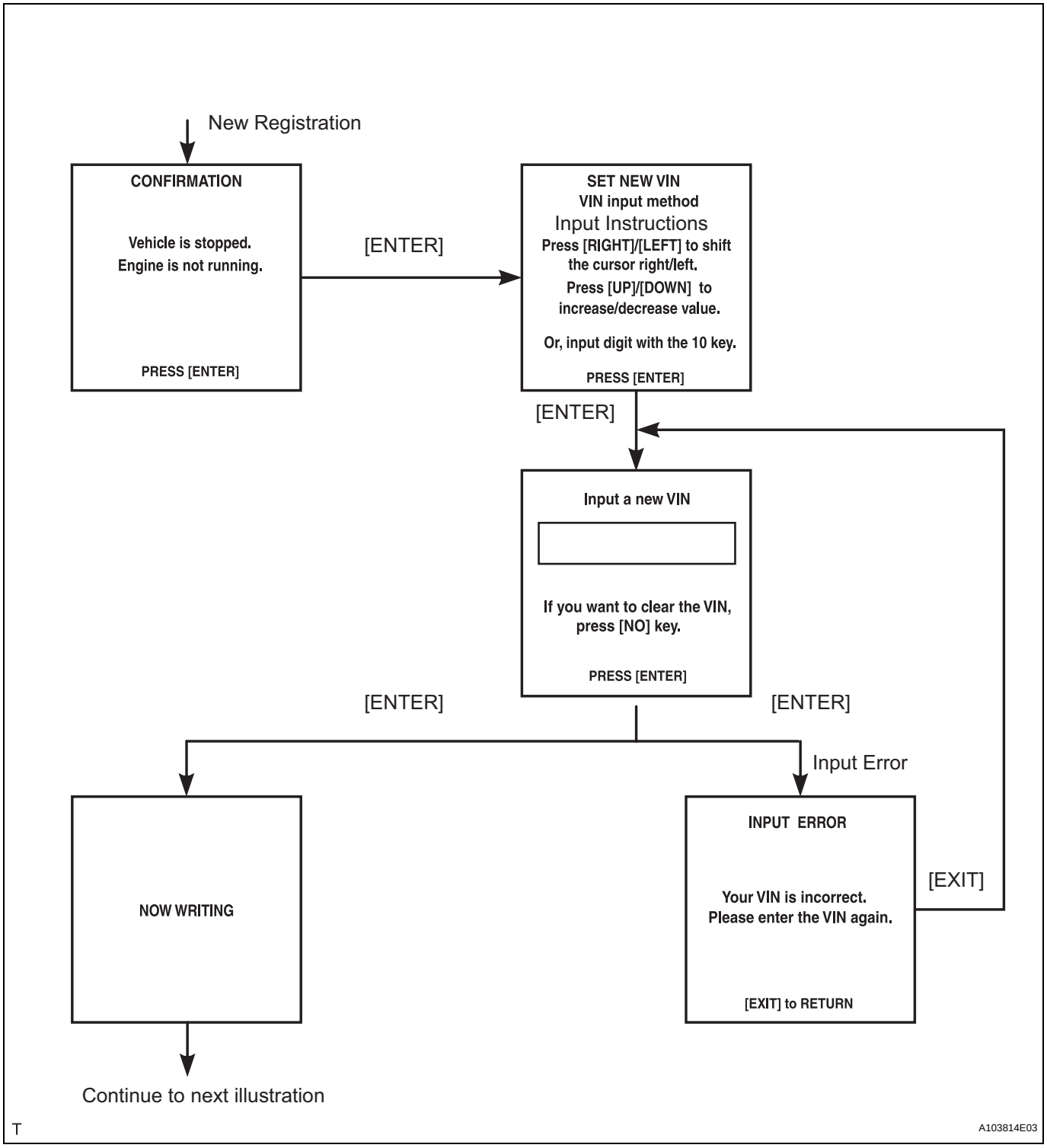


3. WRITE VIN

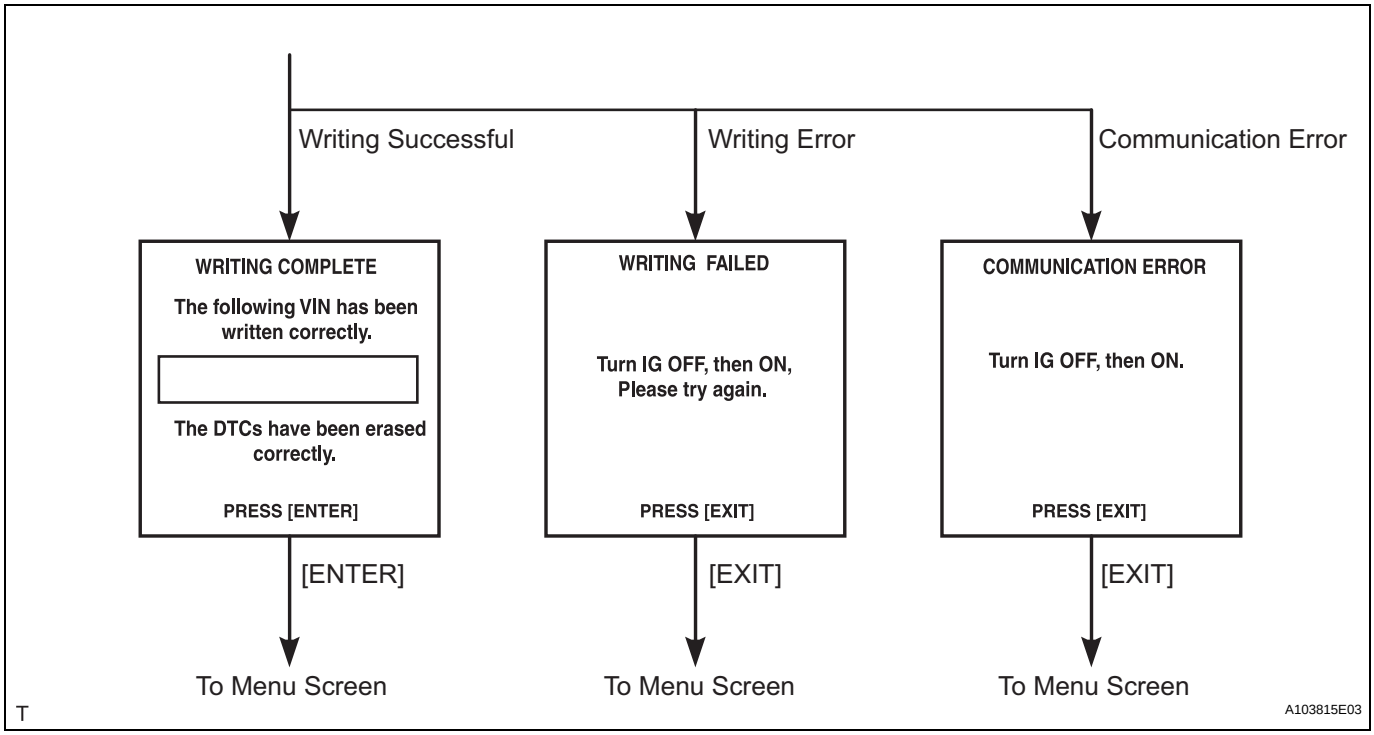
(a) The VIN writing process is explained in a flowchart. This process allows the VIN to be input into the ECM. If the ECM is changed, or the 2 VINs do not match, the VIN can be registered, or overwritten in the ECM by following this procedure.
(b) Write the VIN using the intelligent tester.
(c) Check the vehicle's VIN.
(d) Connect the intelligent tester to the DLC3.
(e) Turn the ignition switch to the ON position.
(f) Turn the tester on.

(g) Enter the following menus: DIAGNOSIS / ENHANCED OBD II/ VIN.




New Registration
CONFIRMATION
Vehicle is stopped.
Engine is not running.
PRESS [ENTER]
[ENTER]
SET NEW VIN
VIN input method
Input Instructions
Press [RIGHT]/[LEFT] to shift the cursor right/left.
Press [UP]/[DOWN] to increase/decrease value.
Or, input digit with the 10 key.
PRESS [ENTER]
[ENTER]
Input a new VIN
If you want to clear the VIN, press [NO] key.
PRESS [ENTER]
[ENTER]
[ENTER]
Input Error
NOW WRITING
INPUT ERROR
Your VIN is incorrect.
Please enter the VIN again.
[EXIT] to RETURN
[EXIT]
Continue to next illustration
T
A103814E03

ES


Writing Successful
Writing Error
Communication Error
WRITING COMPLETE
The following VIN has been written correctly.
The DTCs have been erased correctly.
PRESS [ENTER]
WRITING FAILED
Turn IG OFF, then ON, Please try again.
PRESS [EXIT]
COMMUNICATION ERROR
Turn IG OFF, then ON.
PRESS [EXIT]
[ENTER]
[EXIT]
[EXIT]
To Menu Screen
To Menu Screen
To Menu Screen
T
A103815E03

ES

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, evaporative emissions (EVAP) and thermostats.

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 instruction to view the monitor status. Although this instruction refers to the Lexus/Toyota diagnostic tester, it 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 intelligent tester to the DLC3.

(b) Turn the ignition switch to the ON position and the tester on.

(c) Clear the DTCs (See page ES-32).

(d) Run the vehicle in accordance with the applicable drive pattern described in READINESS MONITOR DRIVE PATTERN (See page ES-18). 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) Select the following items from the intelligent tester menus: DIAGNOSIS, ENHANCED OBD II, MONITOR INFO and MONITOR RESULT. The monitor status appears after the component name.

- INCMP: The component has not been monitored yet.
- PASS: The component is functioning normally.
- FAIL: The component is malfunctioning.

(b) Confirm that the component is either PASS or FAIL.

(c) Select the component and press ENTER. The accuracy test value appears if the monitor status is either PASS or FAIL.

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 near 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

If you use a generic scan tool, multiply the test value by the scaling value listed below.

A/F Sensor (Sensor 1)

Monitor ID	Test ID	Scaling	Unit	Description
$01	$8E	Multiply by 0.001	V	A/F sensor deterioration level
$01	$91	Multiply by 0.004	mA	A/F sensor current

HO2 Sensor (Sensor 2)

Monitor ID	Test ID	Scaling	Unit	Description
$02	$07	Multiply by 0.001	V	Minimum sensor voltage
$02	$08	Multiply by 0.001	V	Maximum sensor voltage
$02	$8F	Multiply by 0.0003	g	Maximum oxygen storage capacity

Catalyst

Monitor ID	Test ID	Scaling	Unit	Description
$21	$A9	Multiply by 0.0003	No dimension	Oxygen storage capacity of catalyst

EVAP

Monitor ID	Test ID	Scaling	Unit	Description
$3D	$C9	Multiply by 0.001	kPa	Test value for small leak (P0456)
$3D	$CA	Multiply by 0.001	kPa	Test value for gross leak (P0455)
$3D	$CB	Multiply by 0.001	kPa	Test value for leak detection pump stuck OFF (P2401)
$3D	$CD	Multiply by 0.001	kPa	Test value for leak detection pump stuck ON (P2402)
$3D	$CE	Multiply by 0.001	kPa	Test value for vent valve stuck OFF (P2420)
$3D	$CF	Multiply by 0.001	kPa	Test value for vent valve stuck ON (P2419)
$3D	$D0	Multiply by 0.001	kPa	Test value for reference orifice low flow (P043E)
$3D	$D1	Multiply by 0.001	kPa	Test value for reference orifice high flow (P043F)
$3D	$D4	Multiply by 0.001	kPa	Test value for purge VSV stuck closed (P0441)
$3D	$D5	Multiply by 0.001	kPa	Test value for purge VSV stuck open (P0441)
$3D	$D7	Multiply by 0.001	kPa	Test value for purge flow insufficient (P0441)

Misfire

Monitor ID	Test ID	Scaling	Unit	Description
$A1	$0B	Multiply by 1	Time	Exponential Weighted Moving Average (EWMA) misfire for all cylinders: EWMA = Total misfire counts for last driving cycle * 0.1 + Last EWMA * 0.9 Misfire counts for last 10 driving cycles - Total
$A1	$0C	Multiply by 1	Time	Ignition switch on: Total misfire counts for last driving cycle Engine running: Total misfire counts for current driving cycle Misfire counts for last or current driving cycle - all cylinders

Monitor ID	Test ID	Scaling	Unit	Description
$A2	$0B	Multiply by 1	Time	Exponential Weighted Moving Average (EWMA) misfire for cylinder 1: EWMA = Total misfire counts for last driving cycle * 0.1 + Last EWMA * 0.9 Misfire counts for last 10 driving cycles - Total
$A2	$0C	Multiply by 1	Time	Ignition switch on: Total misfire counts for last driving cycle Engine running: Total misfire counts for current driving cycle Misfire counts for last or current driving cycle - cylinder 1
$A3	$0B	Multiply by 1	Time	Exponential Weighted Moving Average (EWMA) misfire for cylinder 2: EWMA = Total misfire counts for last driving cycle * 0.1 + Last EWMA * 0.9 Misfire counts for last 10 driving cycles - Total
$A3	$0C	Multiply by 1	Time	Ignition switch on: Total misfire counts for last driving cycle Engine running: Total misfire counts for current driving cycle Misfire counts for last or current driving cycle - cylinder 2
$A4	$0B	Multiply by 1	Time	Exponential Weighted Moving Average (EWMA) misfire for cylinder 3: EWMA = Total misfire counts for last driving cycle * 0.1 + Last EWMA * 0.9 Misfire counts for last 10 driving cycles - Total
$A4	$0C	Multiply by 1	Time	Ignition switch on: Total misfire counts for last driving cycle Engine running: Total misfire counts for current driving cycle Misfire counts for last or current driving cycle - cylinder 3
$A5	$0B	Multiply by 1	Time	Exponential Weighted Moving Average (EWMA) misfire for cylinder 4: EWMA = Total misfire counts for last driving cycle * 0.1 + Last EWMA * 0.9 Misfire counts for last 10 driving cycles - Total
$A5	$0C	Multiply by 1	Time	Ignition switch on: Total misfire counts for last driving cycle Engine running: Total misfire counts for current driving cycle Misfire counts for last or current driving cycle - cylinder 4

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 with 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.
- The intelligent tester's software must be version 9.0 or newer to view the Readiness Monitor Status. To view the status, enter the following menus: DIAGNOSIS / ENHANCED OBD II / MONITOR INFO / MONITOR STATUS.
- When the Readiness Monitor status reads COMPL (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 a vehicle's Readiness Monitor status to show COMPL before beginning emissions tests.

  The Readiness Monitor will be reset to INCMPL (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 INCMPL, follow the appropriate Readiness Monitor Drive Pattern to change the status to COMPL.

  CAUTION:

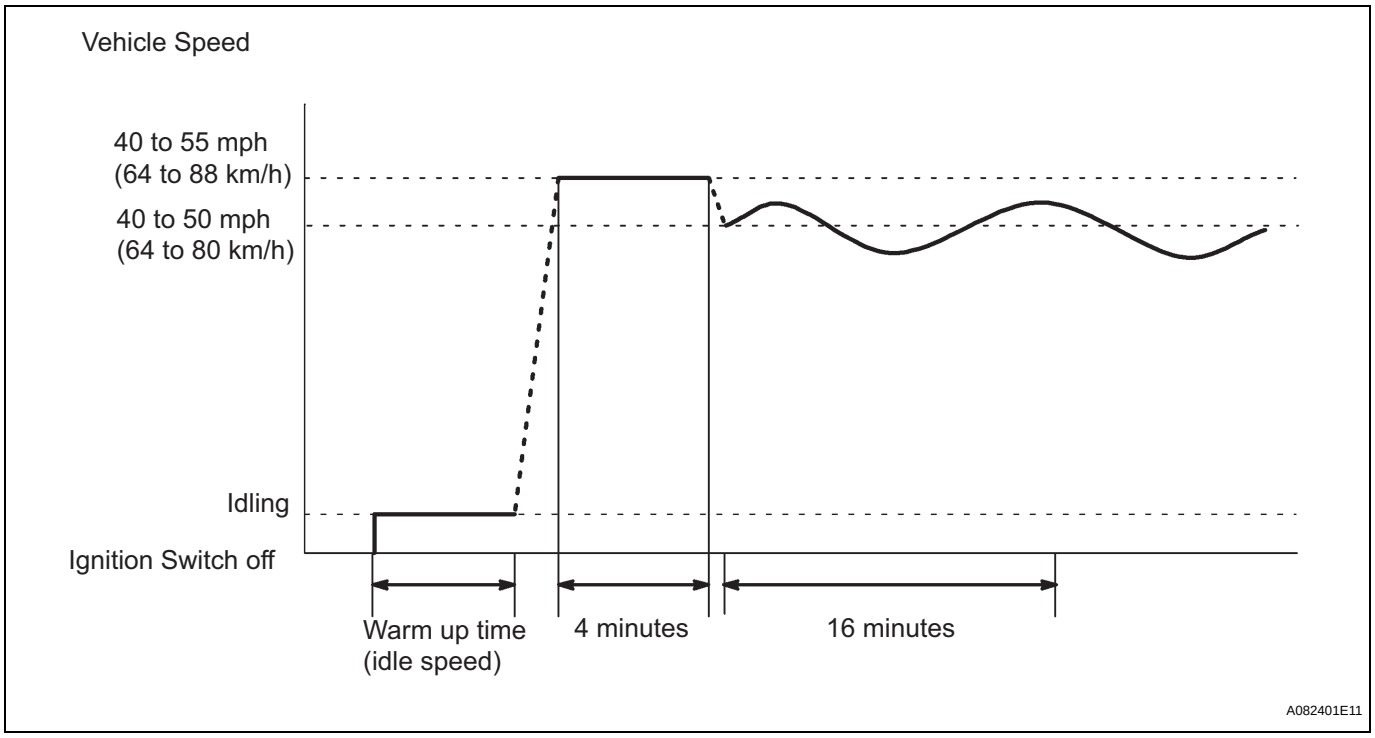
  Strictly observe posted speed limits, traffic laws, and road conditions when performing these drive patterns.

  NOTICE:

  The drive patterns represent the fastest method of satisfying all conditions necessary to achieve complete status for each specific Readiness Monitor. If a drive pattern is 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. CATALYST MONITOR (AIR-FUEL RATIO (A/F) SENSOR TYPE)



(a) Preconditions

The monitor will not run unless:

– The MIL is OFF
– Engine Coolant Temperature (ECT) is 75°C (167°F) or higher.
– Intake Air Temperature (IAT) is -10°C (14°F) or higher.

(b) Drive Pattern

Step 1

Connect the intelligent tester to the DLC3 to check Readiness Monitor status and preconditions (refer to step (a)).

Step 2

Drive the vehicle at 40 to 55 mph (64 to 88 km/h) for approximately 4 minutes.

NOTICE:

Drive with smooth throttle operation and avoid sudden acceleration. If IAT was less than 10°C (50°F) when the engine was started, drive the vehicle at 40 to 55 mph (64 to 88 km/h) for an additional 4 minutes.

Step 3

Drive the vehicle allowing speed to fluctuate between 40 to 50 mph (64 to 80 km/h) for approximately 7 minutes.

NOTICE:

Drive with smooth throttle operation and avoid sudden closure of the throttle.

Step 4

Check the status of the readiness monitor on the scan tool display. If the readiness monitor status did not switch to complete, ensure that preconditions are met, turn the ignition switch off, and then repeat steps 2 and 3.

3. EVAP SYSTEM MONITOR (KEY OFF TYPE)

(a) Preconditions

The monitor will not run unless:

- The fuel tank is less than 90 % full.
- The altitude is less than 8,000 ft. (2,450 m).
- The vehicle is stationary.
- The engine coolant temperature is between 4.4°C and 35°C (40°F and 95°F).
- The intake air temperature is between 4.4°C and 35°C (40°F and 95°F).
- Vehicle was driven in the city area (or on free-way) for 10 minutes or more.

(b) Monitor Conditions

(1) Turn the ignition switch off and wait for 9.5 hours.

HINT:

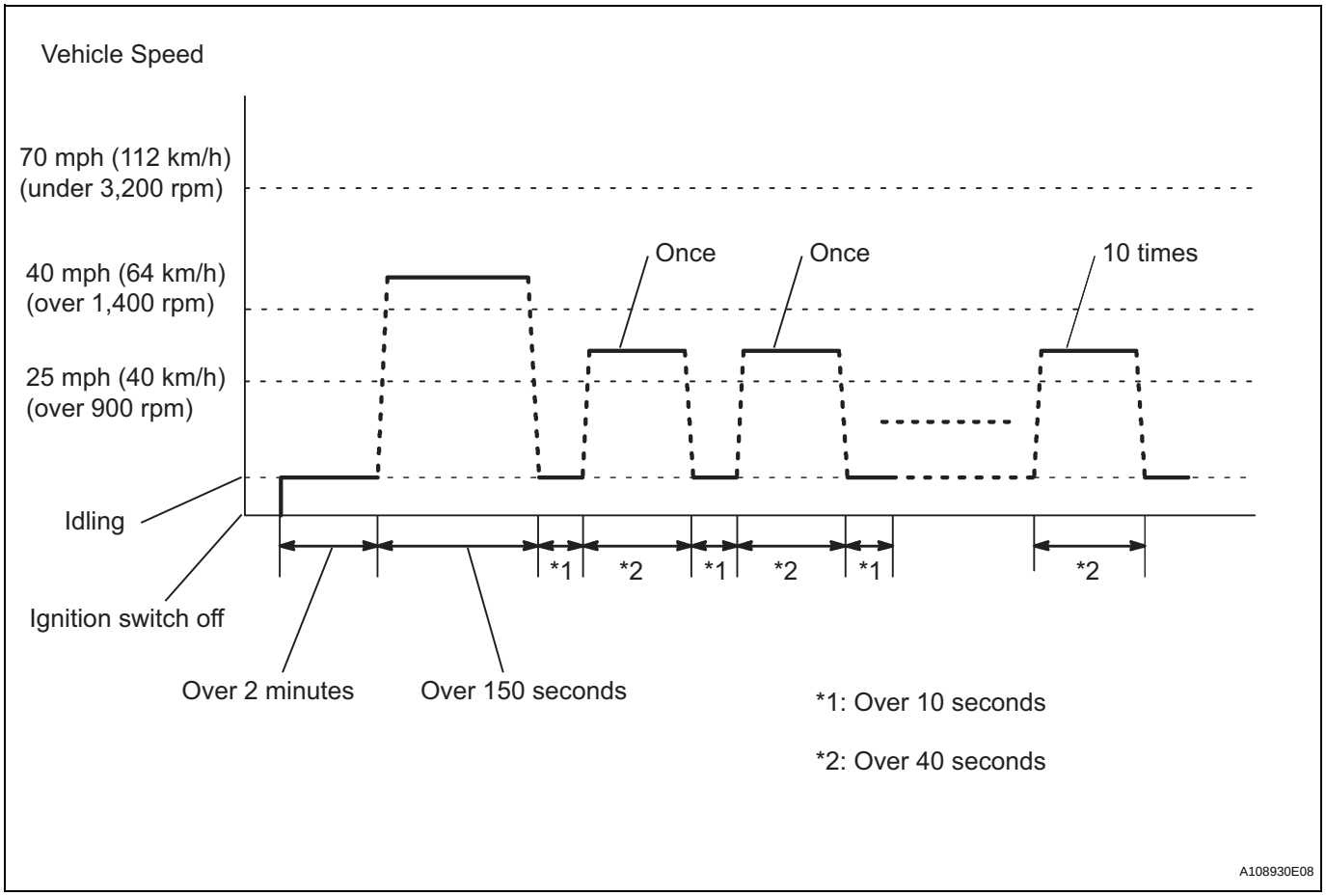
Do not start the engine until checking Readiness Monitor status. If the engine is started, the step described above must be repeated.

(c) Monitor Status

(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Turn the tester on.
(4) Check the Readiness Monitor status displayed on the tester.

If the status does not switch to COMPL (complete), restart the engine, make sure that the preconditions have been met, and then perform the Monitor Conditions again.

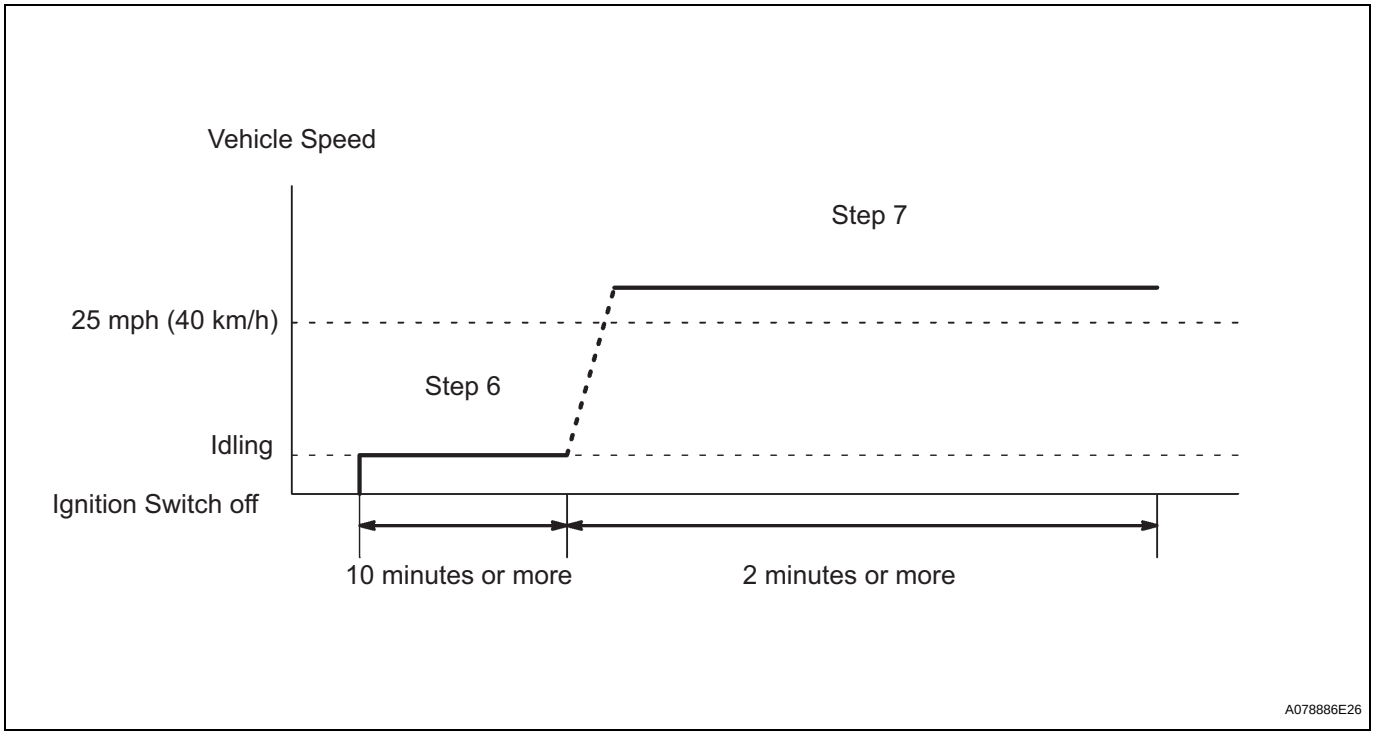
4. AIR-FUEL RATIO (A/F) AND HEATED OXYGEN (HO2) SENSOR MONITORS (FRONT A/F AND REAR HO2 SENSOR TYPE)



(a) Preconditions
The monitor will not run unless:
The MIL is OFF.
(b) Drive Pattern
Step 1
Connect the intelligent tester to the DLC3 to check monitor status and preconditions (refer to step (a)).
Step 2
Start the engine and allow it to idle for 2 minutes or more.
Step 3
Drive the vehicle at 40 to 70 mph (64 to 112 km/h) for at least 150 seconds.
Step 4
Stop the vehicle and allow the engine to idle for 10 seconds or more.
Step 5
Drive the vehicle at 25 to 40 mph (40 to 64 km/h) for at least 40 seconds.
Step 6
Stop the vehicle and allow the engine to idle for 10 seconds or more.
Step 7
Perform steps 5 and 6 ten times.
Step 8

Check the readiness monitor status. If the readiness monitor status did not change to COMPL (complete), check the preconditions, turn the ignition switch off, and repeat steps 1 to 6.

5. AIR-FUEL RATIO (A/F) AND HEATED OXYGEN (HO2) SENSOR HEATER MONITORS (FRONT A/F AND REAR HO2 SENSOR TYPE)



(a) Preconditions
The monitor will not run unless:
The MIL is OFF.
(b) Drive Pattern
Step 1
Connect the intelligent tester to the DLC3.
Step 2
Turn the ignition switch to the ON position.
Step 3
Turn the tester on.
Step 4
Clear the DTCs (where set).
Step 5
Start the engine.
Step 6
Allow the engine to idle for 10 minutes or more.
Step 7
Drive the vehicle at 25 mph (40 km/h) or more for at least 2 minutes.
(c) Monitor Status
(1) Check the Readiness Monitor status displayed on the tester.
If the status does not switch to COMPL (complete), make sure that the preconditions have been met, and repeat steps 5 to 7 described in the Drive Pattern above.

PROBLEM SYMPTOMS TABLE

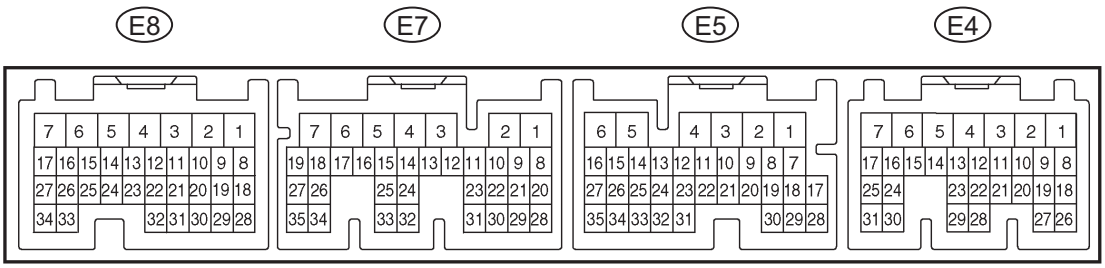
HINT:
When a malfunction is not confirmed by a DTC (Diagnostic Trouble Code) check and the cause of problem cannot be identified through a basic inspection, troubleshoot according to the priority order indicated in the table below.

SFI system

Symptom	Suspected Area	See page
Engine does not crank (Does not start)	1. Immobiliser system	EI-3
	2. Starter	ST-8
	3. STARTER relay	ST-15
No initial combustion (Does not start)	1. ECM power source circuit	ES-346
	2. ECM VC output circuit	ES-351
	3. Fuel pump control circuit	ES-354
	4. ECM	ES-407
Engine cranks normally but difficult to start	1. Fuel pump control circuit	ES-354
	2. Compression	EM-3
Difficult to start with cold engine	1. Start signal circuit	ST-3
	2. Fuel pump control circuit	ES-354
	3. Spark plug	IG-4
	4. Ignition system	IG-4
	5. Injector	FU-9
Difficult to start with warm engine	1. Start signal circuit	ST-3
	2. Fuel pump control circuit	ES-354
	3. Spark plug	IG-4
	4. Ignition system	IG-4
	5. Injector	FU-9
High engine idling speed (Poor idling)	1. A/C signal circuit (compressor circuit)	-
	2. ECM power source circuit	ES-346
	3. Electronic throttle control system	ES-252
	4. Air induction system	-
	5. PCV hose	-
Low engine idling speed (Poor idling)	1. A/C signal circuit (compressor circuit)	-
	2. Fuel pump control circuit	ES-354
	3. Electronic throttle control system	ES-252
	4. Air induction system	-
	5. PCV hose	-
Rough Idling (Poor idling)	1. Compression	EM-3
	2. Fuel pump control circuit	ES-354
	3. Electronic throttle control system	ES-252
	4. Air induction system	-
	5. PCV hose	-
Hunting (Poor idling)	1. ECM power source circuit	ES-346
	2. Fuel pump control circuit	ES-354
	3. Spark plug	IG-4
	4. Ignition system	IG-4
	5. Injector	FU-9
	6. Electronic throttle control system	ES-252
	7. Air induction system	-
	8. PCV hose	-

Symptom	Suspected Area	See page
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit	ES-354
	2. A/T faulty*	AX-7
	3. Spark plug	IG-4
	4. Ignition system	IG-4
	5. Injector	FU-7
Surging (Poor driveability)	1. Fuel pump control circuit	ES-354
	3. Spark plug	IG-4
	4. Ignition system	IG-4
	5. Injector	FU-9
Engine stalls soon after starting	1. Fuel pump control circuit	ES-354
	2. Spark plug	IG-4
	3. Ignition system	IG-4
	4. Injector	FU-9
Engine stalls during A/C operation	1. A/C signal circuit (compressor circuit)	-
	2. ECM	ES-407
Unable/difficult to refuel	Refueling valve (canister)	-

TERMINALS OF ECM



Y

A066714E10

HINT:
The standard normal 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 normal voltage for that pair of the terminals, and displayed in the "Specified Conditions" column. The illustration above can be used as a reference to identify the ECM terminal locations.

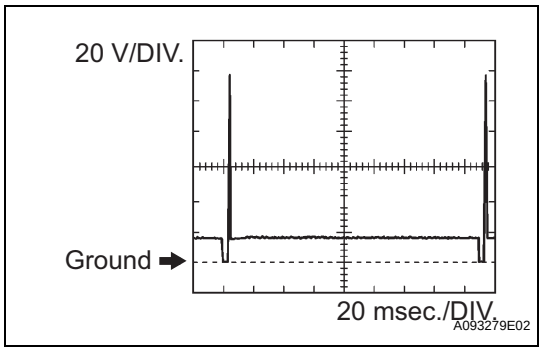
Terminal No. (Symbols)	Wiring Color	Terminal Description	Condition	Specified Condition
E4-3 (BATT) - E8-3 (E1)	V - L	Battery (for measuring battery voltage and for ECM memory)	Always	9 to 14 V
E4-7 (+BM) - E8-3 (E1)	BR - L	Power source of throttle motor	Always	9 to 14 V
E4-9 (IGSW) - E8-3 (E1)	G - L	Ignition switch	Ignition switch ON	9 to 14 V
E4-1 (+B) - E8-3 (E1)	GR - L	Power source of ECM	Ignition switch ON	9 to 14 V
E4-2 (+B2) - E8-3 (E1)	O - L	Power source of ECM	Ignition switch ON	9 to 14 V
E8-13 (OC1+) - E8-12 (OC1-)	Y - W	Camshaft timing oil control valve (OCV)	Ignition switch ON	Pulse generation (See waveform 8)
E4-8 (MREL) - E8-7 (E01)	O - B	EFI relay	Ignition switch ON	9 to 14 V
E8-18 (VC) - E8-28 (E2)	V - R	Power source of sensor (specific voltage)	Ignition switch ON	4.5 to 5.5 V
E7-28 (VG) - E7-30 (E2G)	R - W	Mass air flow meter	Idling, shift lever position P or N position, A/C switch OFF	0.5 to 3.0 V
E7-29 (THA) - E8-28 (E2)	L - R	Intake air temperature sensor	Idling, intake air temp. 20°C (68°F)	0.5 to 3.4 V
E8-32 (THW) - E8-28 (E2)	G - R	Engine coolant temperature sensor	Idling, engine coolant temp. 80°C (176°F)	0.2 to 1.0 V
E8-20 (VTA1) - E8-28 (E2)	LG - R	Throttle position sensor (for engine control)	Ignition switch ON, accelerator pedal released	0.3 to 1.0 V
			Ignition switch ON, accelerator pedal depressed	3.2 to 4.9 V
E8-19 (VTA2) - E8-28 (E2)	BR - R	Throttle position sensor (for sensor malfunction detection)	Ignition switch ON, accelerator pedal released	2.1 to 3.1 V
			Ignition switch ON, accelerator pedal depressed	4.5 to 5.5 V

Terminal No. (Symbols)	Wiring Color	Terminal Description	Condition	Specified Condition
E4-18 (VPA) - E4-20 (EPA)	W - BR	Accelerator pedal position sensor (for engine control)	Ignition switch ON, accelerator pedal released	0.5 to 1.1 V
			Ignition switch ON, accelerator pedal depressed	2.6 to 4.5 V
E4-19 (VPA2) - E4-21 (EPA2)	V - R	Accelerator pedal position sensor (for sensor malfunction detection)	Ignition switch ON, accelerator pedal released	1.2 to 2.0 V
			Ignition switch ON, accelerator pedal depressed	3.4 to 5.3 V
E4-26 (VCPA) - E4-20 (EPA)	L - BR	Power source of accelerator pedal position sensor (for VPA)	Ignition switch ON	4.5 to 5.5 V
E4-27 (VCP2) - E4-21 (EPA2)	P - R	Power source of accelerator pedal position sensor (for VPA2)	Ignition switch ON	4.5 to 5.5 V
E8-1 (HA1A) - E7-7 (E04)	O - W-B	A/F sensor heater	Idling	Below 3.0 V
			Ignition switch ON	9 to 14 V
E8-21 (A1A+) - E8-3 (E1)	O - L	A/F sensor	Ignition switch ON	3.0 to 3.6 V
E8-31 (A1A-) - E8-3 (E1)	W - L	A/F sensor	Ignition switch ON	2.7 to 3.3 V
E8-2 (HT1B) - E7-4 (E03)	L - BR	Heated oxygen sensor heater	Idling	Below 3.0 V
			Ignition switch ON	9 to 14 V
E8-25 (OX1B) - E8-28 (E2)	B - R	Heated oxygen sensor	Maintain engine speed at 2500 rpm for 2 minutes after warming up	Pulse generation (See waveform 6)
E7-6 (#1) - E8-7 (E01) E7-5 (#2) - E8-7 (E01) E7-2 (#3) - E8-7 (E01) E7-1 (#4) - E8-7 (E01)	L - B R - B Y - B W - B	Injector	Ignition switch ON	9 to 14 V
			Idling	Pulse generation (See waveform 1)
E8-29 (KNK1) - E8-30 (EKNK)	R - G	Knock sensor	Maintain engine speed at 4000 rpm after warming up engine	Pulse generation (See waveform 7)
E8-26 (G2+) - E8-34 (NE-)	P - G	Camshaft position sensor	Idling	Pulse generation (See waveform 3)
E8-27 (NE+) - E8-34 (NE-)	R - G	Crankshaft position sensor	Idling	Pulse generation (See waveform 3)
E8-17 (IGT1) - E8-3 (E1) E8-16 (IGT2) - E8-3 (E1) E8-15 (IGT3) - E8-3 (E1) E8-14 (IGT4) - E8-3 (E1)	G - L P - L B - L LG - L	Ignition coil with igniter (ignition signal)	Idling	Pulse generation (See waveform 2)
E8-23 (IGF1) - E8-3 (E1)	V - L	Ignition coil with igniter (ignition confirmation signal)	Ignition switch ON	4.5 to 5.5 V
			Idling	Pulse generation (See waveform 2)
E7-23 (PRG) - E8-7 (E01)	R - B	Purge VSV	Ignition switch ON	9 to 14 V
			Idling	Pulse generation (See waveform 9)
E5-8 (SPD) - E8-3 (E1)	V - L	Speed signal from combination meter	Ignition switch ON, rotate driving wheel slowly	Pulse generation (See waveform 11)
E4-12 (STA) - E8-3 (E1)	B - L	Starter signal	Shift lever position P or N, ignition switch START	9 to 14 V
E5-4 (STP) - E8-3 (E1)	L - L	Stop light switch	Brake pedal is depressed	7.5 to 14 V
			Brake pedal is released	Below 1.5 V
E4-16 (ST1-) - E8-3 (E1)	L - L	Stop light switch (opposite to STP terminal)	Ignition switch ON, Brake pedal is depressed	Below 1.5 V
			Ignition switch ON, Brake pedal is released	7.5 to 14 V
E4-30 (NSW)*1 - E8-3 (E1)	Y - L	Park/neutral position switch	Ignition switch ON, shift position at P or N	0 to 3.0 V
			Ignition switch ON, shift position is not P or N	9 to 14 V

Terminal No. (Symbols)	Wiring Color	Terminal Description	Condition	Specified Condition
E8-5 (M+) - E7-3 (ME01)	B - W-B	Throttle actuator	Idling	Pulse generation (See waveform 4)
E8-4 (M-) - E7-3 (ME01)	W - W-B	Throttle actuator	Idling	Pulse generation (See waveform 5)
E4-25 (FC) - E8-7 (E01)	L - B	Fuel pump control	Ignition switch ON	9 to 14 V
E5-30 (W) - E8-3 (E1)	G - L	MIL	Ignition switch ON	Below 3.0 V
			Idling	9 to 14 V
E4-15 (ELS1) - E8-3 (E1)	B - L	Electric load	Light control switch OFF	0 to 1.5 V
			Light control switch is in TAIL position	9 to 14 V
E5-3 (ELS3) - E8-3 (E1)	O - L	Electric load	Rear defogger switch OFF (Rear defogger system is not operating)	0 to 1.5 V
			Rear defogger switch ON (Rear defogger system is operating)	9 to 14 V
E5-17 (TC) - E8-3 (E1)	R - L	Terminal TC of DLC 3	Ignition switch ON	9 to 14 V
E5-1 (TACH) - E8-3 (E1)	B - L	Engine speed	Idling	Pulse generation (See waveform 10)
E7-32 (PSW) - E8-3 (E1)	R - L	P/S pressure switch	Ignition switch ON	9 to 14 V
E4-5 (VPMP) - E8-7 (E01)	G - B	Vent valve (built into canister pump module)	Ignition switch ON	9 to 14 V
E4-6 (MPMP) - E8-7 (E01)	L - B	Leak detection pump (built into canister pump module)	Leak detection pump OFF	Below 3 V
			Leak detection pump ON	9 to 14 V
E4-31 (PPMP) - E8-28 (E2)	LG - BR	Canister pressure sensor (built into canister pump module)	Ignition switch ON	3 to 3.6 V
E4-14 (FANH) - E8-7 (E01)	GR - B	Fan No. 2, 3 relay	Idling with high engine coolant temperature	Below 1.5 V
E8-10 (ALT) - E8-3 (E1)	Y - L	Generator	Ignition switch ON	9 to 14 V
E5-33 (CANH) - E8-3 (E1)	B - L	CAN communication line	Ignition switch ON	Pulse generation (See waveform 12)
E5-34 (CANL) - E8-3 (E1)	W - L	CAN communication line	Ignition switch ON	Pulse generation (See waveform 13)

HINT:

*1: A/T only

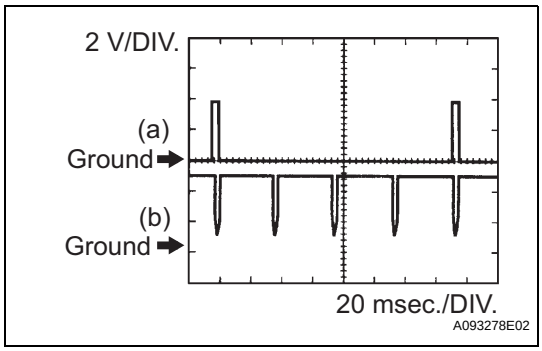


1. WAVEFORM 1
Fuel injector

Item	Content
ECM Terminal Names	Between #1 (to 4) and E01
Tester Ranges	20 V/DIV., 20 msec./DIV.
Conditions	Idling

HINT:

The wavelength becomes shorter as the engine rpm increases.



2. WAVEFORM 2

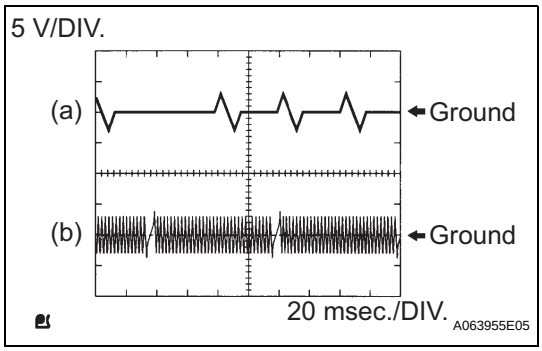
(a) Igniter IGT signal (from ECM to igniter)

Item	Content
ECM Terminal Names	Between IGT (1 to 4) and E1
Tester Ranges	2 V/DIV., 20 msec./DIV.
Conditions	Idling

(b) Igniter IGF signal (from igniter to ECM)

Item	Content
ECM Terminal Names	Between IGF1 and E1
Tester Ranges	2 V/DIV., 20 msec./DIV.
Conditions	Idling

HINT:
The wavelength becomes shorter as the engine rpm increases.



3. WAVEFORM 3

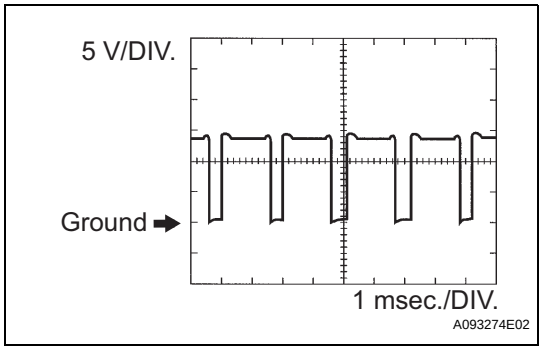
(a) Camshaft position sensor

Item	Content
ECM Terminal Names	Between G2+ and NE-
Tester Ranges	5 V/DIV., 20 msec./DIV.
Conditions	Idling

(b) Crankshaft position sensor

Item	Content
ECM Terminal Names	Between NE+ and NE-
Tester Ranges	5 V/DIV., 20 msec./DIV.
Conditions	Idling

HINT:
The wavelength becomes shorter as the engine rpm increases.

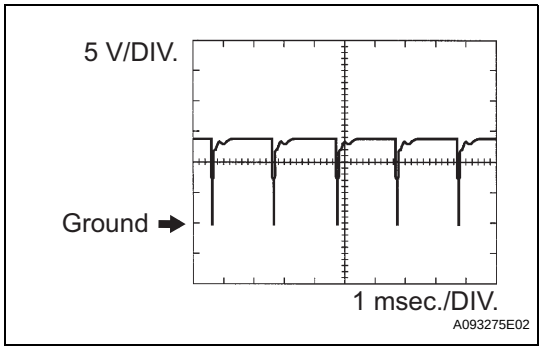


4. WAVEFORM 4

Throttle actuator positive terminal

Item	Content
ECM Terminal Names	Between M+ and ME01
Tester Ranges	5 V/DIV., 1 msec./DIV.
Conditions	Idling with warm engine

HINT:
The duty ratio varies depending on the throttle actuator operation.

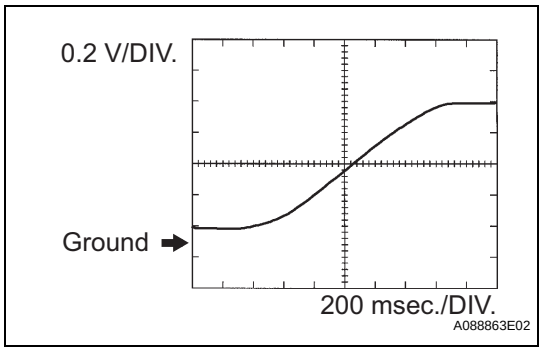


5. WAVEFORM 5

Throttle actuator negative terminal

Item	Content
ECM Terminal Names	Between M- and ME01
Tester Ranges	5 V/DIV., 1 msec./DIV.
Conditions	Idling with warm engine

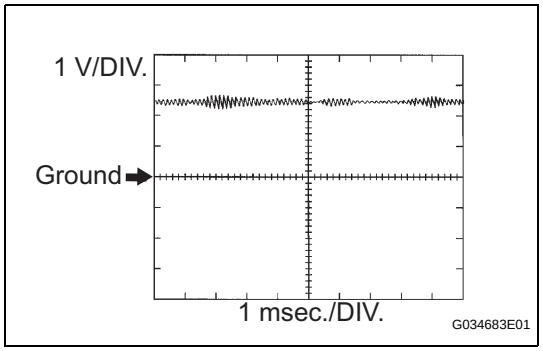
HINT:
The duty ratio varies depending on the throttle actuator operation.



6. WAVEFORM 6
Heated oxygen sensor

Item	Content
ECM Terminal Names	Between OX1B and O1B
Tester Ranges	0.2 V/DIV., 200 msec./DIV.
Conditions	Engine speed maintained at 2,500 rpm for 2 minutes after warming up sensor

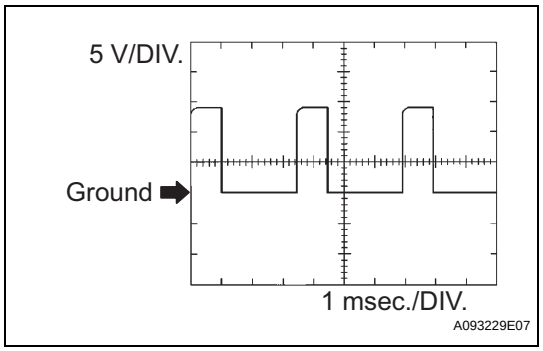
HINT:
In the DATA LIST, item O2S B1S2 shows the ECM input values from the heated oxygen sensor.



7. WAVEFORM 7
Knock sensor

Item	Content
ECM Terminal Names	Between KNK1 and EKNK
Tester Ranges	0.01 to 10 V/DIV., 0.01 to 10 msec./DIV.
Conditions	Engine speed at 4,000 rpm after warming up engine

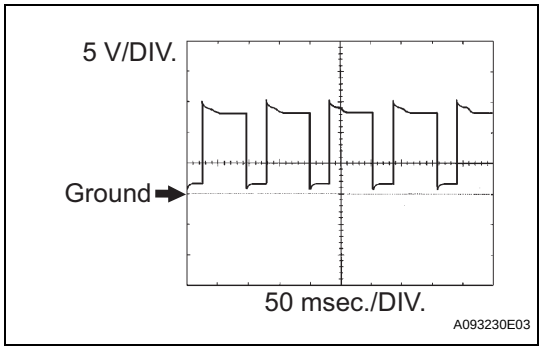
HINT:
- The wavelength becomes shorter as the engine rpm increases.
- The waveforms and amplitudes displayed differ slightly depending on the vehicle.



8. WAVEFORM 8
Camshaft timing oil control valve (OCV)

Item	Content
ECM Terminal Names	Between OC1+ and OC1-
Tester Ranges	5 V/DIV., 1 msec./DIV.
Conditions	Idling

HINT:
The wavelength becomes shorter as the engine rpm increases.

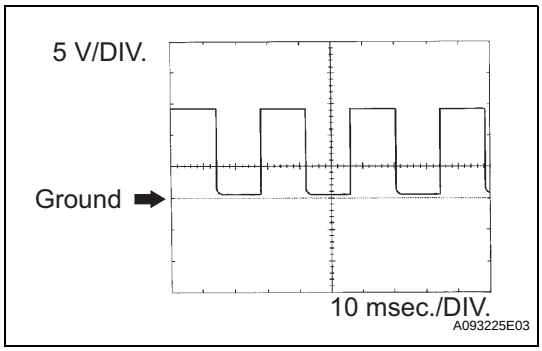


9. WAVEFORM 9
Purge VSV

Item	Content
ECM Terminal Names	Between PRG and E1
Tester Ranges	5 V/DIV., 50 msec./DIV.
Conditions	Idling

HINT:
If the waveform is not similar to the illustration, check the waveform again after idling for 10 minutes or more.

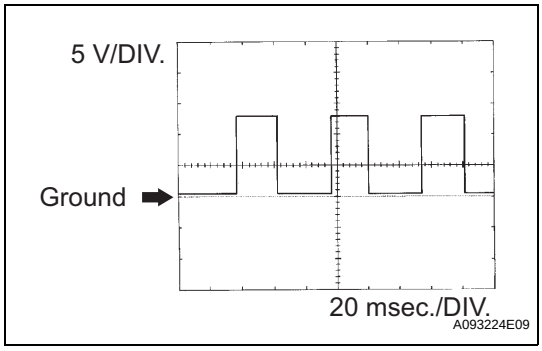
ES



10. WAVEFORM 10
Engine speed signal

Item	Content
ECM Terminal Names	Between TACH and E1
Tester Ranges	5 V/DIV., 10 msec./DIV.
Conditions	Idling

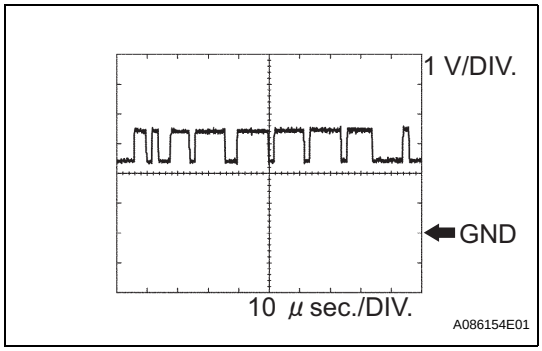
HINT:
The wavelength becomes shorter as the engine rpm increases.



11. WAVEFORM 11
Vehicle speed signal

Item	Content
ECM Terminal Names	Between SPD and E1
Tester Ranges	5 V/DIV., 20 msec./DIV.
Conditions	Driving at 12 mph (20 km/h)

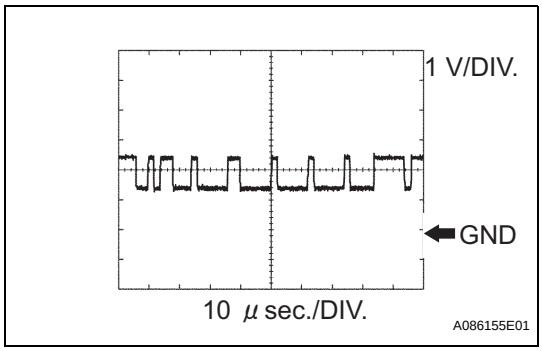
HINT:
The wavelength becomes shorter as the vehicle speed increases.



12. WAVEFORM 12
CAN communication signal:

ECM Terminal Names	Between CANH and E1
Tester Ranges	1 V/DIV., 10 μsec./DIV.
Conditions	Engine stops and ignition switch to the ON position

HINT:
The waveform varies depending on the CAN communication signal.



13. WAVEFORM 13
CAN communication signal:

ECM Terminal Names	Between CANL and E1
Tester Ranges	1 V/DIV., 10 μsec./DIV.
Conditions	Engine stops and ignition switch to the ON position

HINT:
The waveform varies depending on the CAN communication signal.

DIAGNOSIS SYSTEM

1. DESCRIPTION

When troubleshooting OBD II (On-Board Diagnostics) vehicles, the intelligent tester (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 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)

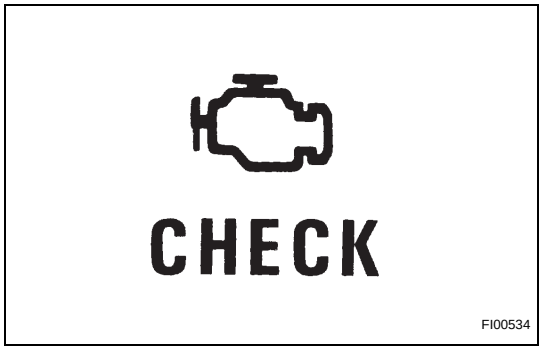
(c) The computer itself

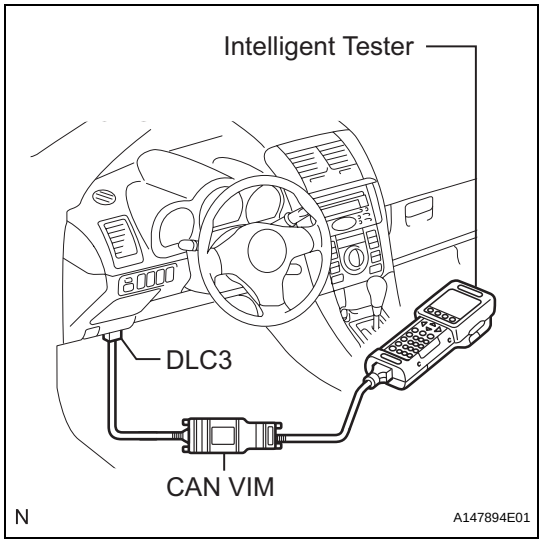
In addition, if the applicable DTCs (Diagnostic Trouble Codes) prescribed by SAE J2012 are not recorded on 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.

To check DTCs, connect the intelligent tester to the DLC3. The tester displays DTCs, freeze frame data, and a variety of the engine data. The DTCs and freeze frame data can be erased with the tester (See page ES-32).

In order to enhance OBD function on vehicles and develop the Off-Board diagnosis system, CAN (Controller Area Network) communication is introduced in this system. It minimizes the gap between technician skills and vehicle technology. CAN is a network, which uses a pair of data transmission lines, spanning multiple computers and sensors. It allows high speed communication between the systems and simplifies the wire harness connection.

Since this system is equipped with the CAN communication, connecting the CAN VIM (Vehicle Interface Module) to the intelligent tester is necessary to display any information from the ECM. (Also the communication between the intelligent tester and the ECM uses CAN communication signals.) When confirming the DTCs and any data of the ECM, connect the CAN VIM between the DLC3 and the intelligent tester.





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 simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (intelligent tester only) (See page ES-35).

ES

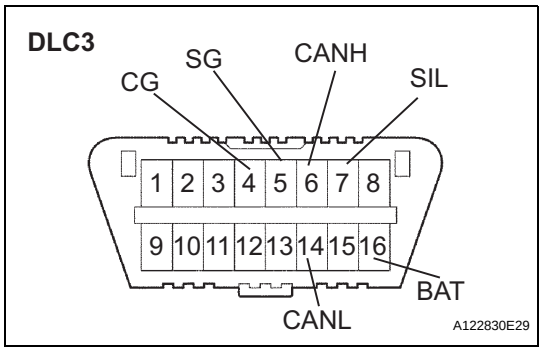
3. 2 TRIP DETECTION LOGIC

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. 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.

ES



5. DLC3 (Data link Connector 3)

The vehicle's ECM uses ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

Symbols (Terminal No.)	Terminal Description	Condition	Result
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	11 to 14 V
CANH (6) - CANL (14)	CAN bus line	Ignition switch off	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Ignition switch off	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Ignition switch off	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Ignition switch off	6 kΩ or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Ignition switch off	6 kΩ or higher

HINT:

The DLC3 is the interface prepared for reading various data from the vehicle's ECM. After connecting the cable of an intelligent tester, turn the ignition switch to the ON position and turn the tester on. If a communication failure message is displayed on the tester screen (on the tester: UNABLE TO CONNECT TO VEHICLE), a problem exists in either the vehicle or tester. In order to identify the location of the problem, connect the tester to another vehicle.

If communication is normal: Inspect the DLC3 on the original vehicle.

If communication is still not possible: The problem is probably in the tester itself. Consult the Service Department listed in the instruction manual.

6. BATTERY VOLTAGE

Battery voltage:

11 to 14 V

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

7. Malfunction Indicator Lamp (MIL)

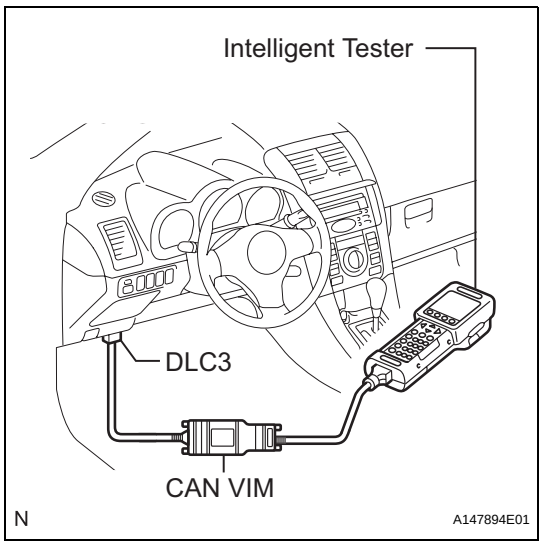
(a) The MIL is illuminated when the ignition switch is first turned to the ON position (the engine is not running).

(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 is not illuminated when the ignition switch is first turned to the ON position, check the MIL circuit (See page ES-361).

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 erased. 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 intelligent tester. The intelligent tester can display current and pending DTCs.
- Some DTCs are not set 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.



1. CHECK DTC
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Check the DTC(s) and freeze frame data, and then write them down.
(f) Check the details of the DTC(s) (See page ES-47).

2. CLEAR DTC
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CLEAR CODES.
(e) Press the YES button.

3. CLEAR DTC (Without using the intelligent tester)
(a) Perform either one of the following operations:
(1) Disconnect the negative (-) battery cable for more than 1 minute.
(2) Remove the EFI and ETCS fuses from the relay block located inside the engine compartment for more than 1 minute.
NOTICE:
When disconnecting the battery cable, perform the INITIALIZE procedure (See page IN-23).

FREEZE FRAME DATA

1. DESCRIPTION

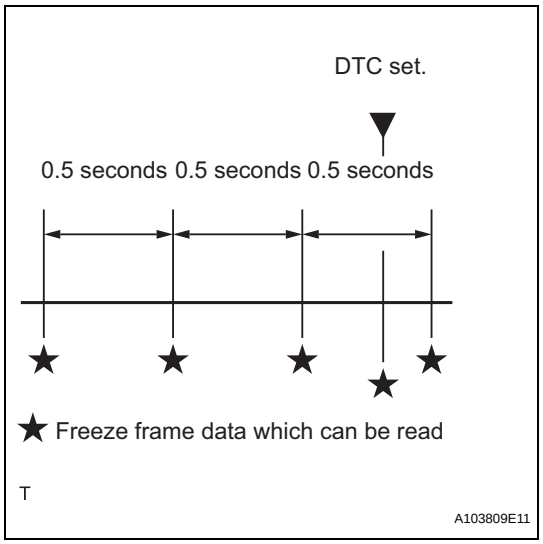
Freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when a malfunction is detected. When troubleshooting, it can help determine if the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was Lean or Rich, and other data from the time the malfunction occurred.

HINT:

If it is impossible to duplicate the problem even though a DTC is detected, confirm the freeze frame data.

The ECM records engine conditions in the form of freeze frame data every 0.5 seconds. Using the intelligent tester, 5 separate sets of freeze frame data can be checked.

– 3 data sets before the DTC was set.
– 1 data set when the DTC was set.
– 1 data set after the DTC was set.
These data sets can be used to simulate the condition of the vehicle 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

Tester Display	Measurement Item	Diagnostic Note
INJECTOR	Injection period of No. 1 cylinder	-
IGN ADVANCE	Ignition advance	-
CALC LOAD	Calculated load	Calculated load by ECM
VEHICLE LOAD	Vehicle load	-
MAF	Mass air flow volume	If approximately 0.0 g/sec.: • Mass air flow meter power source circuit open or short • VG circuit open or short If 160.0 g/sec. or more: • E2G circuit open
ENGINE SPD	Engine speed	-
VEHICLE SPD	Vehicle speed	Speed indicated on speedometer
COOLANT TEMP	Engine coolant temperature	If -40°C (-40°F), sensor circuit open If 140°C (284°F) or more, sensor circuit shorted
INTAKE AIR	Intake air temperature	If -40°C (-40°F), sensor circuit open If 140°C (284°F) or more, sensor circuit shorted
AIR-FUEL RATIO	Ratio compared to stoichiometric level	-
PURGE DENSITY	Learning value of purge density	-
EVAP PURGE FLOW	Ratio of evaporative purge flow to intake air volume	-
EVAP PURGE VSV	EVAP purge VSV duty ratio	-
KNOCK CRRT VAL	Correction learning value of knocking	-
KNOCK FB VAL	Feedback value of knocking	-
ACCEL POS #1	Absolute Accelerator Pedal Position (APP) No. 1	-
ACCEL POS #2	Absolute APP No. 2	-

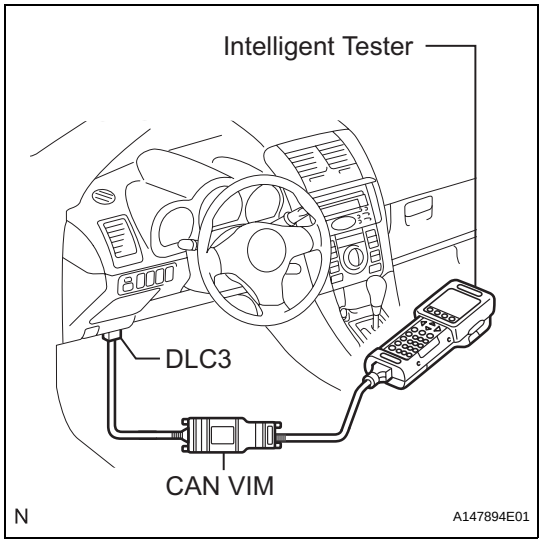
Tester Display	Measurement Item	Diagnostic Note
THROTTLE POS	Throttle sensor positioning	-
THROTTLE POS	Throttle position	-
THROTTLE POS #2	Throttle sensor positioning #2	-
THROTTLE MOT	Throttle motor	-
O2S B1 S2	Heated oxygen sensor output	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check output voltage of sensor
AFS B1 S1	A/F sensor output	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check output voltage of sensor
TOTAL FT #1	Total fuel trim	-
SHORT FT #1	Short-term fuel trim	Short-term fuel compensation used to maintain air-fuel ratio at stoichiometric air-fuel ratio
LONG FT #1	Long-term fuel trim	Overall fuel compensation carried out in long-term to compensate a continual deviation of short-term fuel trim from central valve
FUEL SYS #1	Fuel system status	• OL (Open Loop): Has not yet satisfied conditions to go closed loop • CL (Closed Loop): Using A/F sensor as feedback for fuel control • OL DRIVE: Open loop due to driving conditions (fuel enrichment) • OL FAULT: Open loop due to detected system fault • CL FAULT: Closed loop but A/F sensor, which used for fuel control malfunctioning
O2FT B1 S2	Fuel trim at heated oxygen sensor	-
AF FT B1 S1	Fuel trim at A/F sensor	-
AFS B1 S1	A/F sensor current	-
CAT TEMP B1S1	Estimated catalyst temperature (sensor 1)	-
CAT TEMP B1S2	Estimated catalyst temperature (sensor 2)	-
S O2S B1S2	Sub heated oxygen sensor impedance (sensor 2)	-
INI COOL TEMP	Engine coolant temperature at engine start	-
INI INTAKE TEMP	Intake air temperature at engine start	-
INJ VOL	Injection volume	-
STARTER SIG	Starter switch (STSW) signal	-
PS SW	Power steering signal	-
PS SIGNAL	Power steering signal (history)	Signal status usually ON until ignition switch turned off
CTP SW	Closed throttle position switch	-
A/C SIGNAL	A/C signal	-
PNP SW (NSW)	Park/Neutral Position (PNP) switch signal	-
ELECT LOAD SIG	Electrical load signal	-
STOP LIGHT SW	Stop light switch	-
BATTERY VOLTAGE	Battery voltage	-
ATM PRESSURE	Atmosphere pressure	-
EVAP (Purge) VSV	EVAP Purge VSV	-
FUEL PUMP/SPD	Fuel pump/speed status	-
VVT CTRL B1	VVT control status	-
VACUUM PUMP	Key-off EVAP system leak detection pump status	-
EVAP VENT VAL	Key-off EVAP system vent valve status	-
FAN MOTOR	Electric fan motor	-
TC/TE1	TC and CG (TE1) terminals of DLC3	-
ENG SPEED #1	Engine rpm during No. 1 cylinder fuel cut	Output only when FUEL CUT #1 is performed using ACTIVE TEST

Tester Display	Measurement Item	Diagnostic Note
ENG SPEED #2	Engine rpm during No. 2 cylinder fuel cut	Output only when FUEL CUT #2 is performed using ACTIVE TEST
ENG SPEED #3	Engine rpm during No. 3 cylinder fuel cut	Output only when FUEL CUT #3 is performed using ACTIVE TEST
ENG SPEED #4	Engine rpm during No. 4 cylinder fuel cut	Output only when FUEL CUT #4 is performed using ACTIVE TEST
ENG SPEED ALL	Average of engine rpm values during fuel cut of No. 1 to No. 4 cylinders	Output only when ACTIVE TEST is performed
VVT CHNG ANGL#1	VVT angle	-
VVT OCV DUTY B1	VVT OCV operation duty	-
FC IDL	Fuel cut idle	ON: when throttle valve fully closed and engine speed over 3,500 rpm
FC TAU	Fuel cut during very light load	Fuel cut being performed under very light load to prevent engine combustion from becoming incomplete
IGNITION	Ignition counter	-
CYL #1	Cylinder #1 misfire	Only displayed during idling
CYL #2	Cylinder #2 misfire	Only displayed during idling
CYL #3	Cylinder #3 misfire	Only displayed during idling
CYL #4	Cylinder #4 misfire	Only displayed during idling
CYL ALL	All cylinders misfire	Only displayed during idling
MISFIRE RPM	Engine speed when misfire occurred	-
MISFIRE LOAD	Engine load when misfire occurred	-
MISFIRE MARGIN	Margin to detect engine misfire	-
ENG RUN TIME	Accumulated engine running time	-
TIME DTC CLEAR	Cumulative time after DTC cleared	-
DIST DTC CLEAR	Accumulated distance from DTC cleared	-
WU CYC DTC CLEAR	Warm-up cycle after DTC cleared	-

CHECK MODE PROCEDURE

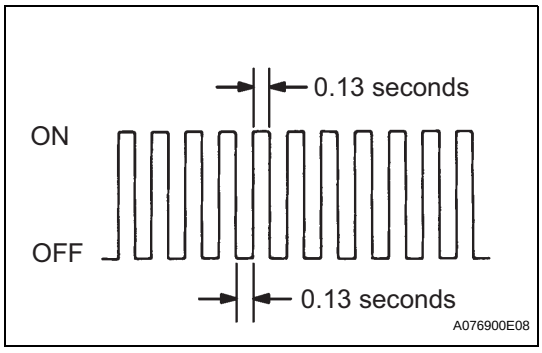
HINT:
Intelligent tester only:
Compared to the normal mode, check mode is more sensitive to malfunctions. Therefore, check mode can detect the malfunctions that cannot be detected by normal mode.
NOTICE:
All the stored DTCs and freeze frame data are erased if: 1) the ECM is changed from normal mode to check mode or vice versa; or 2) the ignition switch is turned from ON position to ACC position or off while in check mode. Before changing modes, always check and make a note of any DTCs and freeze frame data.

ES



1. CHECK MODE PROCEDURE

(a) Check and ensure the following conditions:
  (1) Battery voltage 11 V or more
  (2) Throttle valve fully closed
  (3) Transmission in the P or N position
  (4) A/C switch off
(b) Turn the ignition switch off.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch to the ACC position.
(e) Turn the tester on.
(f) Record the current DTCs and freeze frame data.
(g) Enter the following menus: DIAGNOSIS / ENHANCED OBD II/ CHECK MODE.
(h) Switch the ECM from normal mode to check mode.



(i) Make sure the MIL flashes as shown in the illustration.
(j) Start the engine.
(k) Make sure the MIL turns OFF.
(l) Simulate the conditions of the malfunction described by the customer.
(m) Check for DTCs and freeze frame data using the tester.

FAIL-SAFE CHART

If any of the following DTCs are set, the ECM enters fail-safe mode to allow the vehicle to be driven temporarily.

DTC	Component	Fail-Safe Operation	Fail-Safe Deactivation Condition
P0031 and P0032	Air-Fuel Ratio (A/F) Sensor Heater	ECM turns off A/F sensor heater.	Ignition switch off
P0037 and P0038	Heated Oxygen (HO2) Sensor Heater	ECM turns off HO2 sensor heater.	Ignition switch off
P0100, P0102 and P0103	Mass Air Flow (MAF) Meter	ECM calculates ignition timing according to engine speed and throttle valve position.	Pass condition detected
P0110, P0112 and P0113	Intake Air Temperature (IAT) Sensor	ECM estimates IAT to be 20°C (68°F).	Pass condition detected
P0115, P0117 and P0118	Engine Coolant Temperature (ECT) Sensor	ECM estimates ECT to be 80°C (176°F).	Pass condition detected
P0120, P0121, P0122, P0123, P0220, P0222, P0223, P0604, P0606, P0607, P0657, P2102, P2103, P2111, P2112, P2118, P2119 and P2135	Electronic Throttle Control System (ETCS)	ECM cuts off throttle actuator current and throttle valve returned to 6.5° throttle position by return spring. ECM then adjusts engine output by controlling fuel injection (intermittent fuel-cut) and ignition timing in accordance with accelerator pedal opening angle, to allow vehicle to continue at minimal speed.*	Pass condition detected and then ignition switch turned off
P0325, P0327 and P0328	Knock Sensor	ECM sets ignition timing to maximum retard.	Ignition switch off
P0351 to P0354	Igniter	ECM cuts fuel.	Pass condition detected
P2120, P2121, P2122, P2123, P2125, P2127, P2128 and P2138	Accelerator Pedal Position (APP) Sensor	APP sensor has 2 sensor circuits: Main and Sub. If either of circuits malfunctions, ECM controls engine using other circuit. If both of circuits malfunction, ECM regards accelerator pedal as being released. As a result, throttle valve is closed and engine idles.	Pass condition detected and then ignition switch turned off

HINT:

*: The vehicle can be driven slowly when the accelerator pedal is depressed firmly and slowly. If the accelerator pedal is depressed quickly, the vehicle may speed up and slow down erratically.

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

By reading the DATA LIST displayed on the intelligent tester, you can check values, including those of the switches, sensors, and actuators, without removing any parts. Reading the DATA LIST as the first step in troubleshooting is one method of shortening diagnostic time.

NOTICE:

In the table below, the values listed under Normal Conditions are for reference only. Do not depend solely on these values when determining whether or not a part is faulty.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn the tester on.
(f) If using the intelligent tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST.
(g) Check the values by referring to the table below.

ECM:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
INJECTOR	Injection period of No. 1 cylinder: Min.: 0 ms, Max.: 32.64 ms	1.0 to 3.0 ms: Idling	-
IGN ADVANCE	Ignition timing advance for No. 1 cylinder: Min.: -64 deg, Max.: 63.5 deg	BTDC 8 to 12 deg: Idling	-
CALC LOAD	Calculated load by ECM: Min.: 0%, Max.: 100%	• 10 to 30%: Idling • 10 to 30%: Running without load at 2,500 rpm	Load value
VEHICLE LOAD	Vehicle load: Min.: 0%, Max.: 25,700%	Actual vehicle load	Load percentage in terms of maximum intake air flow amount
MAF	Air flow rate from Mass Air Flow (MAF) meter: Min.: 0 g/sec., Max.: 655.35 g/sec.	1 to 3 g/sec.: Idling 2 to 6 g/sec.: Running without load at 2,500 rpm	If value is approximately 0.0 g/sec.: • MAF meter power source circuit open • VG circuit open or shorted If value is 160.0 g/sec. or more: • E2G circuit open
ENGINE SPD	Engine speed: Min.: 0 rpm, Max.: 16,383.75 rpm	650 to 750 rpm: Idling (Manual transaxle) 610 to 710 rpm: Idling (Automatic transaxle)	-
VEHICLE SPD	Vehicle speed: Min.: 0 km/h, Max.: 255 km/h	Actual vehicle speed	Speed indicated on speedometer
COOLANT TEMP	Engine coolant temperature: Min.: -40°C, Max.: 140°C	80 to 100°C (176 to 212°F): After warming up	• If -40°C (-40°F): sensor circuit open • If 140°C (284°F) or more: sensor circuit shorted
INTAKE AIR	Intake air temperature: Min.: -40°C, Max.: 140°C	Equivalent to ambient air temperature	• If -40°C (-40°F): sensor circuit open • If 140°C (284°F) or more: sensor circuit shorted

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
AIR-FUEL RATIO	Ratio compared to stoichiometric level: Min.: 0, Max.: 1.999	0.8 to 1.2: Idling	• Less than 1 (0 to 0.999) = Lean • Stoichiometric air-fuel ratio = 1 • Greater than 1 (1.001 to 1.999) = Rich
PURGE DENSITY	Learning value of purge density: Min.: -50, Max.: 350	-40 to 10: Idling	-
EVAP PURGE FLOW	Ratio of evaporative purge flow to intake air volume: Min.: 0%, Max.: 102.4%	0 to 10%: Idling	-
EVAP PURGE VSV	EVAP (PURGE) VSV control duty: Min.: 0%, Max.: 100%	10 to 50%: Idling	Order signal from ECM
VAPOR PRES PUMP	Vapor pressure: Min.: 33.853 kPa, Max.: 125.596 kPa	Approximately 100 kPa: Ignition switch to the ON position	EVAP system pressure monitored by canister pressure sensor
VAPOR PRES CALC	Vapor pressure (calculated): Min.: -5.632 kPa, Max.: 715.264 kPa	Approximately 100 kPa: Ignition switch to the ON position	EVAP system pressure monitored by canister pressure sensor
KNOCK CRRT VAL	Knock correction learning value: Min: -64°CA, Max.: 1,984°CA	0 to 20°CA: Driving at 44 mph (70 km/h)	Service data
KNOCK FB VAL	Knock feedback value: Min: -64°CA, Max.: 1,984°CA	-20 to 0°CA: Driving at 44 mph (70 km/h)	Service data
CLUTCH	Clutch current: Min: 0 A, Max.: 2.49 A	-	Indicated when ETCS malfunction
ACCEL POS #1	Absolute Accelerator Pedal Position (APP) sensor No. 1: Min.: 0%, Max.: 100%	10 to 22%: Accelerator pedal released 52 to 90%: Accelerator pedal fully depressed	Read value with ignition switch to the ON position (Do not start engine)
ACCEL POS #2	Absolute APP sensor No. 2: Min.: 0%, Max.: 100%	24 to 40%: Accelerator pedal released 68 to 100%: Accelerator pedal fully depressed	Read value with ignition switch to the ON position (Do not start engine)
ACCEL POS #1	APP sensor No. 1 voltage: Min.: 0 V, Max.: 4.98 V	-	Indicated when ETCS malfunction
ACCEL POS #2	APP sensor No. 2 voltage: Min.: 0 V, Max.: 4.98 V	-	Indicated when ETCS malfunction
ACCEL POS #1	APP sensor No. 1 voltage: Min.: 0 V, Max.: 5 V	0.5 to 1.1 V: Accelerator pedal released 2.6 to 4.5 V: Accelerator pedal fully depressed	Read value with ignition switch to the ON position (Do not start engine)
ACCEL POS #2	APP sensor No. 2 voltage: Min.: 0 V, Max.: 5 V	1.2 to 2.0 V: Accelerator pedal released 3.4 to 5.0 V: Accelerator pedal fully depressed	Read value with ignition switch to the ON position (Do not start engine)
ACCEL IDL POS	Whether or not accelerator pedal position sensor detecting idle: ON or OFF	ON: Idling	-
THRTL LEARN VAL	Throttle valve fully closed (learned value): Min.: 0 V, Max.: 5 V	0.4 to 0.8 V	-
ACCEL SSR #1 AD	APP sensor No. 1 voltage (AD): Min.: 0 V, Max.: 4.9804 V	-	ETCS service data
ACCEL LRN VAL#1	Accelerator fully closed learning value No. 1: Min.: 0 deg, Max.: 124.512 deg	-	ETCS service data
ACCEL LRN VAL#2	Accelerator fully closed learning value No. 2: Min.: 0 deg, Max.: 124.512 deg	-	ETCS service data
FAIL #1	Whether or not fail safe function executed: ON or OFF	ON: ETCS has failed	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FAIL #2	Whether or not fail safe function executed: ON or OFF	ON: ETCS has failed	-
ST1	Brake pedal signal: ON or OFF	ON: Brake pedal depressed	-
SYS GUARD JUDGE	System guard: ON or OFF	-	ETCS service data
OPN MALFUNCTION	Open side malfunction: ON or OFF	-	ETCS service data
THROTTLE POS	Throttle position sensor: Min.: 0%, Max.: 100%	• 10 to 22%: Throttle fully closed • 66 to 98%: Throttle fully open	• Calculated value based on VTA1 • Read value with ignition switch to the ON position (Do not start engine)
THROTTL IDL POS	Whether or not throttle position sensor detecting idle: ON or OFF	ON: Idling	-
THRTL REQ POS	Throttle requirement position: Min.: 0 V, Max.: 5 V	0.5 to 1.0 V: Idling	-
THROTTLE POS	Throttle position: Min.: 0%, Max.: 100%	• 0%: Throttle fully closed • 50 to 80%: Throttle fully open	• Recognition value for throttle opening angle on ECM • Read value with ignition switch to the ON position (Do not start engine)
THROTTLE POS #2	Throttle position No. 2 sensor: Min.: 0%, Max.: 100%	• 42 to 62%: Throttle fully closed • 92 to 100%: Throttle fully open	• Calculated value based on VTA2 • Read value with ignition switch to the ON position (Do not start engine)
THROTTLE POS #1	Throttle position sensor No. 1 voltage: Min.: 0 V, Max.: 4.98 V	-	Indicated when ETCS malfunction
THROTTLE POS #2	Throttle position sensor No. 2 voltage: Min.: 0 V, Max.: 4.98 V	-	Indicated when ETCS malfunction
THROTTLE POS #1	Throttle position sensor No. 1 output voltage: Min.: 0 V, Max.: 5 V	• 0.5 to 1.1 V: Throttle fully closed • 3.3 to 4.9 V: Throttle fully open	Read value with ignition switch to the ON position (Do not start engine)
THROTTLE POS #2	Throttle position sensor No. 2 output voltage: Min.: 0 V, Max.: 5 V	• 2.1 to 3.1 V: Throttle fully closed • 4.6 to 5.0 V: Throttle fully open	Read value with ignition switch to the ON position (Do not start engine)
THRTL COMND VAL	Throttle position command value: Min.: 0 V, Max.: 4.9804 V	0.5 to 4.9 V	Read value with ignition switch to the ON position (Do not start engine)
THROTTLE SSR #1	Throttle sensor opener position No. 1: Min.: 0 V, Max.: 4.9804 V	-	ETCS service data
THROTTLE SSR #2	Throttle sensor opener position No. 2: Min.: 0 V, Max.: 4.9804 V	-	ETCS service data
THRTL SSR #1 AD	Throttle position sensor No. 1 output voltage (AD): Min.: 0 V, Max.: 4.9804 V	0.5 to 4.9 V	Read value with ignition switch to the ON position (Do not start engine)
THROTTLE MOT	Whether or not throttle actuator control permitted: ON or OFF	ON: Idling	Read value with ignition switch to the ON position (Do not start engine)
THROTTLE MOT	Throttle actuator current: Min.: 0 A, Max.: 80 A	0 to 3.0 A: Idling	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
THROTTLE MOT	Throttle actuator: Min.: 0%, Max.: 100%	0.5 to 40%: Idling	-
THROTTLE MOT	Throttle motor current: Min.: 0 A, Max.: 19.92 A	-	Indicated when ETCS malfunction
THROTTLE OPN DUTY	Throttle motor opening duty ratio: Min.: 0%, Max.: 100%	-	Indicated when ETCS malfunction
THROTTLE CLS DUTY	Throttle motor closing duty ratio: Min.: 0%, Max.: 100%	-	Indicated when ETCS malfunction
THRTL MOT (OPN)	Throttle actuator duty ratio (open): Min.: 0%, Max.: 100%	0 to 40%: Idling	ETCS service data
THRTL MOT (CLS)	Throttle actuator duty ratio (closed): Min.: 0%, Max.: 100%	0 to 40%: Idling	ETCS service data
O2S B1 S2	Heated oxygen sensor output voltage for sensor 2: Min.: 0 V Max.: 1.275 V	0.1 to 0.9 V: Driving at 44 mph (70 km/h)	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check output voltage of sensor
AFS B1 S1	A/F sensor output voltage for sensor 1: Min.: 0 V Max.: 7.999 V	2.8 to 3.8 V: Idling	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check output voltage of sensor
TOTAL FT #1	Total fuel trim value for fuel system: Min.: -0.5, Max.: 0.496	-0.2 to 0.2	-
SHORT FT #1	Short-term fuel trim: Min.: -100%, Max.: 99.2%	-20 to 20%	Short-term fuel compensation used to maintain air-fuel ratio at stoichiometric air-fuel ratio
LONG FT #1	Long-term fuel trim: Min.: -100%, Max.: 99.2%	-20 to 20%	Overall fuel compensation carried out in long-term to compensate for a continual deviation of short-term fuel trim from central value
FUEL SYS #1	Fuel system status: OL or CL or OL DRIVE or OL FAULT or CL FAULT	CL: Idling after warming up	• OL (Open Loop): Has not yet satisfied conditions to go closed loop • CL (Closed Loop): Using A/F sensor as feedback for fuel control • OL DRIVE: Open loop due to driving conditions (fuel enrichment) • OL FAULT: Open loop due to detected system fault • CL FAULT: Closed loop but A/F sensor, which used for fuel control malfunctioning
FUEL SYS #2	Fuel system status: OL or CL or OL DRIVE or OL FAULT or CL FAULT	-	Not available
O2FT B1 S2	Short-term fuel trim associated with sensor 2: Min.: -100%, Max.: 99.2%	-	-
AF FT B1 S1	Short-term fuel trim associated with sensor 1: Min.: 0, Max.: 1.999	• Value less than 1 (0.000 to 0.999) =Lean • Stoichiometric air-fuel ratio=1 • Value greater than 1 (1.001 to 1.999) = Rich	-
AFS B1 S1	A/F sensor current: Min.: -128 mA, Max.: 127.99 mA	-	-
CAT TEMP B1S1	Estimated catalyst temperature (sensor 1): Min.: -40°C, Max.: 6,513.5°C	-	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
CAT TEMP B1S2	Estimated catalyst temperature (sensor 2): Min.: -40°C, Max.: 6,513.5°C	-	-
S O2S B1S2	Sub heated oxygen sensor impedance (sensor 2): Min.: 0 Ω, Max.: 21247.68 Ω	-	-
INI COOL TEMP	Engine coolant temperature at engine start: Min.: -40°C, Max.: 120°C	Close to ambient air temperature	-
INI INTAKE TEMP	Intake air temperature at engine start: Min.: -40°C, Max.: 120°C	Close to ambient air temperature	-
INJ VOL	Injection volume (Cylinder 1): Min.: 0 ml, Max.: 2.048 ml	0 to 0.15 ml: Idling	Quantity of fuel injection volume for 10 times
STARTER SIG	Starter switch (STSW) signal: ON or OFF	ON: Cranking	-
PS SW	Power steering signal: ON or OFF	ON: Power steering operation	-
PS SIGNAL	Power steering signal (history): ON or OFF	ON: When steering wheel first turned after battery terminals connected	Signal status usually ON until battery terminals disconnected
CTP SW	Closed throttle position switch: ON or OFF	• ON: Throttle fully closed • OFF: Throttle open	-
A/C SIGNAL	A/C signal: ON or OFF	ON: A/C ON	-
PNP SW [NSW] *1	PNP switch status: ON or OFF	ON: P or N position	-
ELECT LOAD SIG	Electrical load signal: ON or OFF	ON: Headlights or defogger turned ON	-
STOP LIGHT SW	Stop light switch: ON or OFF	ON: Brake pedal depressed	-
+BM	Whether or not electric throttle control system power inputted: ON or OFF	ON: Ignition switch to the ON position and system normal	-
+BM VOLTAGE	+BM voltage: Min.: 0, Max.: 19.2182	9 to 14 (V): Ignition switch to the ON position and system normal	ETCS service data
BATTERY VOLTAGE	Battery voltage: Min.: 0 V, Max.: 65.535 V	9 to 14 V: Ignition switch to the ON position	-
ACTUATOR POWER	Actuator power supply: ON or OFF	ON: Idling	ETCS service data
ATM PRESSURE	Atmospheric pressure: Min.: 0 kPa, Max.: 255 kPa	Approximately 100 kPa: Ignition switch to the ON position	-
EVAP (Purge) VSV	Purge VSV status: ON or OFF	-	-
FUEL PUMP / SPD	Fuel pump status: ON or OFF	ON: Engine running	Active Test support data
VVT CTRL B1	VVT control (bank 1) status: ON or OFF	-	-
VACUUM PUMP	Key-off EVAP system leak detection pump status: ON or OFF	-	Active Test support data
EVAP VENT VAL	Key-off EVAP system vent valve status: ON or OFF	-	Active Test support data
FAN MOTOR	Electric fan motor: ON or OFF	ON: Electric fan motor operating	-
TC/TE1	TC and CG (TE1) terminals of DLC3: ON or OFF	-	Active Test support data

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
ENG SPEED #1	Engine rpm during No. 1 cylinder fuel cut: Min.: 0 rpm, Max.: 25,600 rpm	-	Output only when FUEL CUT #1 is performed using ACTIVE TEST
ENG SPEED #2	Engine rpm during No. 2 cylinder fuel cut: Min.: 0 rpm, Max.: 25,600 rpm	-	Output only when FUEL CUT #2 is performed using ACTIVE TEST
ENG SPEED #3	Engine rpm during No. 3 cylinder fuel cut: Min.: 0 rpm, Max.: 25,600 rpm	-	Output only when FUEL CUT #3 is performed using ACTIVE TEST
ENG SPEED #4	Engine rpm during No. 4 cylinder fuel cut: Min.: 0 rpm, Max.: 25,600 rpm	-	Output only when FUEL CUT #4 is performed using ACTIVE TEST
ENG SPEED ALL	Average of engine rpm values during fuel cut of No. 1 to No. 4 cylinders: Min.: 0 rpm, Max.: 25,600 rpm	-	Output only when ACTIVE TEST is performed
VVTL AIM ANGL#1 *2	VVT aim angle: Min.: 0%, Max.: 100%	0 to 100%	VVT duty signal value during intrusive operation
VVT CHNG ANGL#1 *2	VVT angle: Min.: 0°FR, Max.: 60°FR	0 to 56°FR	Displacement angle during intrusive operation
VVT OCV DUTY B1 *2	VVT OCV operation duty: Min.: 0%, Max.: 100 %	0 to 100%	Requested duty value for intrusive operation
FC IDL	Fuel cut idle: ON or OFF	ON: Fuel cut operation	FC IDL = "ON" when throttle valve fully closed and engine speed over 3,500 rpm
FC TAU	Fuel cut TAU (Fuel cut with a very light load): ON or OFF	ON: Fuel cut operating	Fuel cut being performed with a very light load to prevent incomplete engine combustion
IGNITION	Ignition counter: Min.: 0, Max.: 400	0 to 400	-
CYL #1, #2, #3, #4	Misfire of cylinder 1 to 4: Min.: 0, Max.: 255	0	-
CYL ALL	All cylinders misfire: Min.: 0, Max.: 255	0	-
MISFIRE RPM	Engine speed when misfire occurs: Min.: 0 rpm, Max.: 6,375 rpm	-	-
MISFIRE LOAD	Engine load when misfire occurs: Min.: 0 g/rev, Max.: 3.98 g/rev	-	-
MISFIRE MARGIN	Margin to detect engine misfire: Min.: -100%, Max.: 99.22%	-100 to 99.22%	Misfire detecting margin
#CODES	Number of codes: Min.: 0, Max.: 255	-	Number of detected DTCs
CHECK MODE	Check mode: ON or OFF	ON: Check mode ON	(See page ES-35)
SPD TEST	Check mode result for vehicle speed sensor: COMPL or INCMPL	-	-
MISFIRE TEST	Check mode result for misfire monitor: COMPL or INCMPL	-	-
OXS1 TEST	Check mode result for HO2 sensor: COMPL or INCMPL	-	-
A/F SSR TEST B1	Check mode result for air-fuel ratio sensor: COMPL or INCMPL	-	-
MIL	MIL status: ON or OFF	ON: MIL ON	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
MIL ON RUN DIST	MIL ON run distance: Min.: 0 km, Max.: 65,535 km	Distance after DTC detected	-
MIL ON RUN TIME	Running time from MIL ON: Min.: 0 minutes, Max.: 65,535 minutes	Equivalent to running time after MIL ON	-
ENG RUN TIME	Engine run time: Min.: 0 seconds, Max.: 65,535 seconds	Time after engine start	-
TIME DTC CLEAR	Time after DTC cleared: Min.: 0 minutes, Max.: 65,535 minutes	Equivalent to time after DTCs erased	-
DIST DTC CLEAR	Distance after DTC cleared: Min.: 0 km, Max.: 65,535 km	Equivalent to drive distance after DTCs erased	-
WU CYC DTC CLEAR	Warm-up cycle after DTC cleared: Min.: 0, Max.: 255	-	Number of warm-up cycles after DTC cleared
OBD CERT	OBD requirement	OBD2	-
#CARB CODES	Number of emission related DTCs	-	-
COMP MON	Comprehensive component monitor: NOT AVL or AVAIL	-	-
FUEL MON	Fuel system monitor: NOT AVL or AVAIL	-	-
MISFIRE MON	Misfire monitor: NOT AVL or AVAIL	-	-
EGR MON	EGR monitor: NOT AVL or AVAIL	-	Not available
EGR MON	EGR monitor: COMPL or INCMPL	-	Not available
O2S (A/FS) HTR	O2S (A/FS) heater monitor: NOT AVL or AVAIL	-	-
O2S (A/FS) HTR	O2S (A/FS) heater monitor: COMPL or INCMPL	-	-
O2S (A/FS) MON	O2S (A/FS) monitor: NOT AVL or AVAIL	-	-
O2S (A/FS) MON	O2S (A/FS) monitor: COMPL or INCMPL	-	-
A/C MON	A/C monitor: NOT AVL or AVAIL	-	Not available
A/C MON	A/C monitor: COMPL or INCMPL	-	Not available
2nd AIR MON	Secondary air injection monitor: NOT AVL or AVAIL	-	Not available
2nd AIR MON	Secondary air injection monitor: COMPL or INCMPL	-	Not available
EVAP MON	EVAP monitor: NOT AVL or AVAIL	-	-
EVAP MON	EVAP monitor: COMPL or INCMPL	-	-
HTD CAT MON	Heated catalyst monitor: NOT AVL or AVAIL	-	-
HTD CAT MON	Heated catalyst monitor: COMPL or INCMPL	-	-
CAT MON	Catalyst monitor: NOT AVL or AVAIL	-	-
CAT MON	Catalyst monitor: COMPL or INCMPL	-	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
CCM ENA	Comprehensive component monitor: UNABLE or ENABLE	-	-
CCM CMPL	Comprehensive component monitor: COMPL or INCMPL	-	-
FUEL ENA	Fuel system monitor: UNABLE or ENABLE	-	-
FUEL CMPL	Fuel system monitor: COMPL or INCMPL	-	-
MISFIRE ENA	Misfire monitor: UNABLE or ENABLE	-	-
MISFIRE CMPL	Misfire monitor: COMPL or INCMPL	-	-
EGR ENA	EGR monitor: UNABLE or ENABLE	-	Not available
EGR CMPL	EGR monitor: COMPL or INCMPL	-	Not available
HTR ENA	O2S (A/FS) heater monitor: UNABLE or ENABLE	-	-
HTR CMPL	O2S (A/FS) heater monitor: COMPL or INCMPL	-	-
O2S (A/FS) ENA	O2S (A/FS) monitor: UNABLE or ENABLE	-	-
O2S (A/FS) CMPL	O2S (A/FS) monitor: COMPL or INCMPL	-	-
ACRF ENA	A/C monitor: UNABLE or ENABLE	-	Not available
ACRF CMPL	A/C monitor: COMPL or INCMPL	-	Not available
AIR ENA	Secondary air injection system monitor: UNABLE or ENABLE	-	Not available
AIR CMPL	Secondary air injection system monitor: COMPL or INCMPL	-	Not available
EVAP ENA	EVAP monitor: UNABLE or ENABLE	-	-
EVAP CMPL	EVAP monitor: COMPL or INCMPL	-	-
HCAT ENA	Heated catalyst monitor: UNABLE or ENABLE	-	-
HCAT CMPL	Heated catalyst monitor: COMPL or INCMPL	-	-
CAT ENA	Catalyst monitor: UNABLE or ENABLE	-	-
CAT CMPL	Catalyst monitor: COMPL or INCMPL	-	-
MODEL CODE	Identifying model code	ACV40	-
ENGINE TYPE	Identifying engine type	2AZFE	-
CYLINDER NUMBER	Identifying cylinder number: Min.: 0, Max.: 255	4	-
TRANSMISSION	Identifying transmission type	5AT or M/T	-
DESTINATION	Identifying destination	A (America)	-
MODEL YEAR	Identifying model year: Min.: 1,900, Max.: 2,155	2007	-
SYSTEM	Identifying engine system	GASLIN (gasoline engine)	-

HINT:
Normal Condition: If no idling conditions are specified, the transmission gear selector lever should be in the N or P position, and the A/C switch and all accessory switches should be off.
*1: A/T only

2. ACTIVE TEST

HINT:
Performing an ACTIVE TEST enables components including the relays, VSV (Vacuum Switching Valve), and actuators, to be operated without removing any parts. The ACTIVE TEST can be performed with the intelligent tester. Performing an ACTIVE TEST as the first step in troubleshooting is one method of shortening diagnostic time.
DATA LIST can be displayed during ACTIVE TEST.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST.
(e) Perform the ACTIVE TEST by referring to the table below.

ECM:

Tester Display	Test Part	Control Range	Diagnostic Notes
INJ VOL	Change injection volume	Between -12.5 and 24.8%	• All injectors tested at same time • Perform test at less than 3,000 rpm • Injection volume can be changed in 0.1% graduations within control range
A/F CONTROL	Change injection volume	Between -12.5 and 24.8%	• Perform test at less than 3,000 rpm • A/F CONTROL enables checking and graphing of A/F (Air-Fuel Ratio) sensor and Heated Oxygen (HO2) sensor voltage outputs • To conduct test, select following menu items: ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2; then press YES and ENTER followed by F4.
EVAP VSV (ALONE)	Activate purge VSV control	ON/OFF	-
VVT CTRL B1	Control VVT (bank 1)	-128 to 127%	Test is possible while vehicle stopped and engine idling
FUEL PUMP / SPD	Activate fuel pump (C/OPN Relay)	ON/OFF	Test is possible when engine stopped
TC/TE1	Turn on and off TC and TE1 connection	ON/OFF	• ON: TC and TE1 connected • OFF: TC and TE1 disconnected
FC IDL PROHBT	Prohibit idling fuel cut control	ON/OFF	-
COOLING FAN	Control electric cooling fan	ON/OFF	-

Tester Display	Test Part	Control Range	Diagnostic Notes
ETCS OPEN SLOW	Throttle actuator	ON: Throttle valve opens slowly	Test is possible when following conditions met: • Engine stopped • Shift position in P • Fully depressing accelerator pedal (APP: 59° or more)
ETCS CLOSE SLOW	Throttle actuator	ON: Throttle valve closes slowly	
ETCS OPEN FAST	Throttle actuator	ON: Throttle valve opens fast	
ETCS CLOSE FAST	Throttle actuator	ON: Throttle valve closes fast	
VVT B1	Control VVT (bank 1)	-128 to 127% This value added to present OCV control duty 100%: Maximum advance -100%: Maximum retard	• Engine stall or rough idle when VVT actuator operated by 100%. • Test is possible while vehicle stopped and engine idling
FUEL CUT #1	Cylinder #1 injector fuel cut	ON/OFF	• Test is possible while vehicle stopped and engine idling • ON: All cylinder injector fuel cut and ignition stop
FUEL CUT #2	Cylinder #2 injector fuel cut	ON/OFF	
FUEL CUT #3	Cylinder #3 injector fuel cut	ON/OFF	
FUEL CUT #4	Cylinder #4 injector fuel cut	ON/OFF	
VACUUM PUMP	Leak detection pump	ON/OFF	-
VENT VALVE	Vent valve	ON/OFF	-
VVT LINEAR B1	Control VVT (bank 1)	-128 to 127% This value added to present OCV control duty 100%: Maximum advance -100%: Maximum retard	Engine stalls or idles roughly when VVT actuator is operated by 100%. Test is possible with vehicle stopped and engine idling.
COMPRESS CHECK	All cylinder injector fuel cut and ignition stop	ON/OFF	*

ES

3. 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 set, and can detect potential malfunctions in the system. The SYSTEM CHECK can be performed with the intelligent tester.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK.
(e) Perform the SYSTEM CHECK by referring to the table below.

Tester Display	Test Part	Control Range	Diagnostic Note
EVAP SYS CHECK (AUTO OPERATION)	Perform 4 steps in order to operate EVAP key-off monitor automatically	-	• If no DTCs in PENDING CODE after performing this test, system functioning normally • Refer to EVAP system (See page ES-314) • Recommended fuel temperature is 35°C (95°F) or less
EVAP SYS CHECK (MANUAL OPERATION)	Perform 4 steps in order to operate EVAP key-off monitor manually	-	• Used to detect malfunctioning parts • Refer to EVAP system (See page ES-314) • Recommended fuel temperature is 35°C (95°F) or less

DIAGNOSTIC TROUBLE CODE CHART

HINT:
Parameters listed in the chart may not be exactly the same as your readings due to the type of instrument or other factors. If a DTC is displayed, check the trouble area for the DTC listed in the table below. For details of each DTC.

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P0010	Camshaft Position "A" Actuator Circuit (Bank 1)	1. Open or short in Oil Control Valve circuit 2. Oil control valve 3. ECM	Comes on	DTC stored	ES-58
P0011	Camshaft Position "A" - Timing Over-Advanced or System Performance (Bank 1)	1. Valve timing 2. Oil control valve (OCV) 3. OCV filter 4. Camshaft timing gear assembly 5. ECM	Comes on	DTC stored	ES-63
P0012	Camshaft Position "A" - Timing Over-Retarded (Bank 1)	Same as DTC P0011	Comes on	DTC stored	ES-63
P0016	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A)	1. Mechanical system (Timing chain has jumped tooth or chain stretched) 2. ECM	Comes on	DTC stored	ES-68
P0031	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 1)	1. Open in Air-Fuel Ratio (A/F) sensor heater circuit 2. A/F sensor heater 3. EFI relay 4. ECM	Comes on	DTC stored	ES-70
P0032	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 1)	1. Short in A/F sensor heater circuit 2. A/F sensor heater 3. EFI relay 4. ECM	Comes on	DTC stored	ES-70
P0037	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2)	1. Open in Heated Oxygen (HO2) sensor heater circuit 2. HO2 sensor heater 3. EFI relay 4. ECM	Comes on	DTC stored	ES-74
P0038	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 2)	1. Short in HO2 sensor heater circuit 2. HO2 sensor heater 3. EFI relay 4. ECM	Comes on	DTC stored	ES-74
P0100	Mass or Volume Air Flow Circuit	1. Open or short in Mass Air Flow (MAF) meter circuit 2. MAF meter 3. ECM	Comes on	DTC stored	ES-79
P0101	Mass or Volume Air Flow Circuit Range / Performance Problem	MAF meter	Comes on	DTC stored	ES-86
P0102	Mass or Volume Air Flow Circuit Low Input	1. Open in MAF meter circuit 2. MAF meter 3. ECM	Comes on	DTC stored	ES-79

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P0103	Mass or Volume Air Flow Circuit High Input	1. Short in MAF meter circuit 2. MAF meter 3. ECM	Comes on	DTC stored	ES-79
P0110	Intake Air Temperature Circuit	1. Open or short in Intake Air Temperature (IAT) sensor circuit 2. IAT sensor (built into MAF meter) 3. ECM	Comes on	DTC stored	ES-88
P0111	Intake Air Temperature Sensor Gradient Too High	Mass air flow meter	Comes on	DTC stored	ES-94
P0112	Intake Air Temperature Circuit Low Input	1. Short in IAT sensor circuit 2. IAT sensor (built into MAF meter) 3. ECM	Comes on	DTC stored	ES-88
P0113	Intake Air Temperature Circuit High Input	1. Open in IAT sensor circuit 2. IAT sensor (built into MAF meter) 3. ECM	Comes on	DTC stored	ES-88
P0115	Engine Coolant Temperature Circuit	1. Open or short in Engine Coolant Temperature (ECT) sensor circuit 2. ECT sensor 3. ECM	Comes on	DTC stored	ES-97
P0116	Engine Coolant Temperature Circuit Range / Performance Problem	ECT sensor	Comes on	DTC stored	ES-102
P0117	Engine Coolant Temperature Circuit Low Input	1. Short in ECT sensor circuit 2. ECT sensor 3. ECM	Comes on	DTC stored	ES-97
P0118	Engine Coolant Temperature Circuit High Input	1. Open in ECT sensor circuit 2. ECT sensor 3. ECM	Comes on	DTC stored	ES-97
P0120	Throttle / Pedal Position Sensor / Switch "A" Circuit	1. Throttle Position (TP) sensor (built into throttle body) 2. ECM	Comes on	DTC stored	ES-105
P0121	Throttle / Pedal Position Sensor / Switch "A" Circuit Range / Performance Problem	TP sensor (built into throttle body)	Comes on	DTC stored	ES-113
P0122	Throttle / Pedal Position Sensor / Switch "A" Circuit Low Input	1. TP sensor (built into throttle body) 2. Short in VTA1 circuit 3. Open in VC circuit 4. ECM	Comes on	DTC stored	ES-105

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P0123	Throttle / Pedal Position Sensor / Switch "A" Circuit High Input	1. TP sensor (built into throttle body) 2. Open in VTA1 circuit 3. Open in E2 circuit 4. Short between VC and VTA1 circuit 5. ECM	Comes on	DTC stored	ES-105
P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control	1. Cooling system 2. ECT sensor 3. Thermostat	Comes on	DTC stored	ES-115
P0128	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)	1. Thermostat 2. Cooling system 3. ECT sensor 4. ECM	Comes on	DTC stored	ES-118
P0136	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	1. Open or short in heated oxygen (HO2) sensor (sensor 2) circuit 2. Heated oxygen sensor (sensor 2) 3. Heated oxygen sensor heater (sensor 2) 4. A/F sensor (sensor 1) 5. EFI relay 6. Gas leakage from exhaust system	Comes on	DTC stored	ES-121
P0137	Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 2)	1. Open in HO2 sensor (sensor 2) circuit 2. Heated oxygen sensor (sensor 2) 3. Heated oxygen sensor heater (sensor 2) 4. EFI relay 5. Gas leakage from exhaust system	Comes on	DTC stored	ES-121
P0138	Oxygen Sensor Circuit High Voltage (Bank 1 Sensor 2)	1. Short in heated oxygen sensor (sensor 2) circuit 2. Short in heated oxygen sensor 3. ECM internal circuit malfunction	Comes on	DTC stored	ES-121
P0141	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	1. Open or short in HO2 sensor heater circuit 2. HO2 sensor heater (sensor 2) 3. EFI relay 4. ECM	Comes on	DTC stored	ES-74

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P0171	System Too Lean (Bank 1)	1. Air induction system 2. Injector blockage 3. MAF meter 4. ECT sensor 5. Fuel pressure 6. Gas leakage from exhaust system 7. Open or short in A/F sensor (sensor 1) circuit 8. A/F sensor (sensor 1) 9. A/F sensor heater (sensor 1) 10. EFI relay 11. A/F sensor heater and EFI relay circuits 12. PCV hose connections 13. PCV valve and hose 14. ECM	Comes on	DTC stored	ES-135
P0172	System Too Rich (Bank 1)	1. Injector leakage or blockage 2. MAF meter 3. ECT sensor 4. Ignition system 5. Fuel pressure 6. Gas leakage from exhaust system 7. Open or short in A/F sensor (sensor 1) circuit 8. A/F sensor (sensor 1) 9. A/F sensor heater (sensor 1) 10. EFI relay 11. A/F sensor heater and EFI relay circuits 12. ECM	Comes on	DTC stored	ES-135
P0220	Throttle / Pedal Position Sensor / Switch "B" Circuit	1. TP sensor (built into throttle body) 2. ECM	Comes on	DTC stored	ES-105
P0222	Throttle / Pedal Position Sensor / Switch "B" Circuit Low Input	1. TP sensor (built into throttle body) 2. Short in VTA2 circuit 3. Open in VC circuit 4. ECM	Comes on	DTC stored	ES-105
P0223	Throttle / Pedal Position Sensor / Switch "B" Circuit High Input	1. TP sensor (built into throttle body) 2. Open in VTA2 circuit 3. Open in E2 circuit 4. Short between VC and VTA2 circuit 5. ECM	Comes on	DTC stored	ES-105

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P0300	Random / Multiple Cylinder Misfire Detected	1. Open or short in engine wire harness 2. Connector connections 3. Vacuum hose connections 4. Ignition system 5. Injector 6. Fuel pressure 7. MAF meter 8. ECT sensor 9. Compression pressure 10. Valve clearance 11. Valve timing 12. PCV hose connections 13. PCV valve and hose 14. ECM	Comes on	DTC stored	ES-146
P0301	Cylinder 1 Misfire Detected	Same as DTC P0300	Blinks	DTC stored	ES-146
P0302	Cylinder 2 Misfire Detected	Same as DTC P0300	Blinks	DTC stored	ES-146
P0303	Cylinder 3 Misfire Detected	Same as DTC P0300	Blinks	DTC stored	ES-146
P0304	Cylinder 4 Misfire Detected	Same as DTC P0300	Blinks	DTC stored	ES-146
P0327	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)	1. Short in knock sensor circuit 2. Knock sensor 3. ECM	Comes on	DTC stored	ES-158
P0328	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)	1. Open in knock sensor circuit 2. Knock sensor 3. ECM	Comes on	DTC stored	ES-158
P0335	Crankshaft Position Sensor "A" Circuit	1. Open or short in Crankshaft Position (CKP) sensor circuit 2. CKP sensor 3. Sensor plate (CKP sensor plate) 4. ECM	Comes on	DTC stored	ES-162
P0339	Crankshaft Position Sensor "A" Circuit Intermittent	Same as DTC P0335	-	DTC stored	ES-162
P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)	1. Open or short in Camshaft Position (CMP) sensor circuit 2. CMP sensor 3. Camshaft 4. Timing chain has jumped tooth 5. ECM	Comes on	DTC stored	ES-167
P0351	Ignition Coil "A" Primary / Secondary Circuit	1. Ignition system 2. Open or short in IGF1 or IGT circuit (1 to 4) between ignition coil and ECM 3. No. 1 to No. 4 ignition coil with igniters 4. ECM	Comes on	DTC stored	ES-171

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P0352	Ignition Coil "B" Primary / Secondary Circuit	Same as DTC P0351	Comes on	DTC stored	ES-171
P0353	Ignition Coil "C" Primary / Secondary Circuit	Same as DTC P0351	Comes on	DTC stored	ES-171
P0354	Ignition Coil "D" Primary / Secondary Circuit	Same as DTC P0351	Comes on	DTC stored	ES-171
P0420	Catalyst System Efficiency Below Threshold (Bank 1)	1. Gas leakage from exhaust system 2. A/F sensor (sensor 1) 3. Heated oxygen sensor (sensor 2) 4. Front exhaust pipe (TWC)	Comes on	DTC stored	ES-179
P043E	Evaporative Emission System Reference Orifice Clog Up	1. Canister pump module 2. Connector/Wire harness (Canister pump module - ECM) 3. ECM	Comes on	DTC stored	ES-186
P043F	Evaporative Emission System Reference Orifice High Flow	1. Canister pump module 2. Connector/Wire harness (Canister pump module - ECM) 3. ECM	Comes on	DTC stored	ES-186
P0441	Evaporative Emission Control System Incorrect Purge Flow	1. Purge VSV 2. Connector/Wire harness (purge VSV-ECM) 3. ECM 4. Canister pump module 5. Leakage from EVAP system	Comes on	DTC stored	ES-191
P0450	Evaporative Emission Control System Pressure Sensor / Switch	1. Canister pump module 2. ECM	Comes on	DTC stored	ES-199
P0451	Evaporative Emission Control System Pressure Sensor Range / Performance	1. Canister pump module 2. Connector/Wire harness (between canister pump module and ECM) 3. ECM	Comes on	DTC stored	ES-199
P0452	Evaporative Emission Control System Pressure Sensor / Switch Low Input	1. Canister pump module 2. Connector/Wire harness (between canister pump module and ECM) 3. ECM	Comes on	DTC stored	ES-199
P0453	Evaporative Emission Control System Pressure Sensor / Switch High Input	1. Canister pump module 2. Connector/Wire harness (between canister pump module and ECM) 3. ECM	Comes on	DTC stored	ES-199

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P0455	Evaporative Emission Control System Leak Detected (Gross Leak)	1. Fuel tank cap (loose) 2. Leakage from EVAP line (between canister and fuel tank) 3. Leakage from EVAP line (between purge VSV and canister) 4. Canister pump module 5. Leakage from fuel tank 6. Leakage from canister	Comes on	DTC stored	ES-207
P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)	Same as DTC P0455	Comes on	DTC stored	ES-207
P0500	Vehicle Speed Sensor "A"	1. Open or short in vehicle speed sensor circuit 2. Vehicle speed sensor 3. Combination meter 4. ECM 5. Skid control ECU	Comes on	DTC stored	ES-212
P0504	Brake Switch "A" / "B" Correlation	1. Short in stop light switch signal circuit 2. STOP fuse 3. Stop light switch 4. ECM	-	DTC stored	ES-215
P0505	Idle Control System Malfunction	1. ETCS (Electronic Throttle Control System) 2. Air induction system 3. PCV hose connections 4. ECM	Comes on	DTC stored	ES-220
P050A	Cold Start Idle Air Control System Performance	1. Throttle body assembly 2. MAF meter 3. Air induction system 4. PCV hose connections 5. VVT system 6. Air cleaner filter element 7. ECM	Comes on	DTC stored	ES-223
P050B	Cold Start Ignition Timing Performance	Same as DTC P050A	Comes on	DTC stored	ES-223
P0560	System Voltage	1. Open in backup power source circuit 2. EFI fuse 3. ECM	Comes on	DTC stored	ES-229
P0604	Internal Control Module Random Access Memory (RAM) Error	ECM	Comes on	DTC stored	ES-233
P0606	ECM / PCM Processor	ECM	Comes on	DTC stored	ES-235

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P0607	Control Module Performance	ECM	Comes on	DTC stored	ES-238
P0617	Starter Relay Circuit High	1. PNP switch (A/T) 2. Clutch start switch (M/T) 3. Starter relay circuit 4. Ignition switch 5. ECM	Comes on	DTC stored	ES-240
P0630	VIN not Programmed or Mismatch - ECM / PCM	ECM	Comes on	DTC stored	ES-245
P0657	Actuator Supply Voltage Circuit / Open	ECM	Comes on	DTC stored	ES-247
P0724	Brake Switch "B" Circuit High	1. Short in stop light switch signal circuit 2. Stop light switch 2. ECM	Comes on	DTC stored	ES-249
P2102	Throttle Actuator Control Motor Circuit Low	1. Open in throttle actuator circuit 2. Throttle actuator 3. ECM	Comes on	DTC stored	ES-252
P2103	Throttle Actuator Control Motor Circuit High	1. Short in throttle actuator circuit 2. Throttle actuator 3. Throttle valve 4. Throttle body assembly 5. ECM	Comes on	DTC stored	ES-252
P2111	Throttle Actuator Control System - Stuck Open	1. Throttle actuator 2. Throttle body assembly 3. Throttle valve	Comes on	DTC stored	ES-256
P2112	Throttle Actuator Control System - Stuck Closed	Same as DTC P2111	Comes on	DTC stored	ES-256
P2118	Throttle Actuator Control Motor Current Range / Performance	1. Open in ETCS power source circuit 2. ETCS fuse 3. ECM	Comes on	DTC stored	ES-259
P2119	Throttle Actuator Control Throttle Body Range / Performance	1. ETCS 2. ECM	Comes on	DTC stored	ES-264
P2120	Throttle / Pedal Position Sensor / Switch "D" Circuit	1. Accelerator Pedal Position (APP) sensor 2. ECM	Comes on	DTC stored	ES-267
P2121	Throttle / Pedal Position Sensor / Switch "D" Circuit Range / Performance	1. APP sensor 2. ECM	Comes on	DTC stored	ES-275
P2122	Throttle / Pedal Position Sensor / Switch "D" Circuit Low Input	1. APP sensor 2. Open in VCP1 circuit 3. Open or ground short VPA1 circuit 4. ECM	Comes on	DTC stored	ES-267
P2123	Throttle / Pedal Position Sensor / Switch "D" Circuit High Input	1. APP sensor 2. Open in EPA circuit 3. ECM	Comes on	DTC stored	ES-267

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P2125	Throttle / Pedal Position Sensor / Switch "E" Circuit	1. APP sensor 2. ECM	Comes on	DTC stored	ES-267
P2127	Throttle / Pedal Position Sensor / Switch "E" Circuit Low Input	1. APP sensor 2. Open in VCP2 circuit 3. Open or ground short VPA2 circuit 4. ECM	Comes on	DTC stored	ES-267
P2128	Throttle / Pedal Position Sensor / Switch "E" Circuit High Input	1. APP sensor 2. Open in EPA2 circuit 3. ECM	Comes on	DTC stored	ES-267
P2135	Throttle / Pedal Position Sensor / Switch "A" / "B" Voltage Correlation	1. Short between VTA1 and VTA2 circuits 2. TP sensor (built into throttle body) 3. ECM	Comes on	DTC stored	ES-105
P2138	Throttle / Pedal Position Sensor / Switch "D" / "E" Voltage Correlation	1. Short between VPA1 and VPA2 circuits 2. APP sensor 3. ECM	Comes on	DTC stored	ES-267
P2195	Oxygen (A/F) Sensor Signal Stuck Lean (Bank 1 Sensor 1)	1. Open or short in A/F sensor (sensor 1) circuit 2. A/F sensor (sensor 1) 3. A/F sensor heater (sensor 1) 4. EFI relay 5. A/F sensor heater and relay circuits 6. Air induction system 7. Fuel pressure 8. Injector 9. ECM	Comes on	DTC stored	ES-278
P2196	Oxygen (A/F) Sensor Signal Stuck Rich (Bank 1 Sensor 1)	Same as DTC P2195	Comes on	DTC stored	ES-278
P2237	Oxygen (A/F) Sensor Pumping Current Circuit / Open (Bank 1 Sensor 1)	1. Open or short in A/F sensor (sensor 1) circuit 2. A/F sensor (sensor 1) 3. ECM	Comes on	DTC stored	ES-291
P2238	Oxygen (A/F) Sensor Pumping Current Circuit Low (Bank 1 Sensor 1)	Same as DTC P2237	Comes on	DTC stored	ES-291
P2239	Oxygen (A/F) Sensor Pumping Current Circuit High (Bank 1 Sensor 1)	Same as DTC P2237	Comes on	DTC stored	ES-291
P2252	Oxygen (A/F) Sensor Reference Ground Circuit Low (Bank 1 Sensor 1)	Same as DTC P2237	Comes on	DTC stored	ES-291
P2253	Oxygen (A/F) Sensor Reference Ground Circuit High (Bank 1 Sensor 1)	Same as DTC P2237	Comes on	DTC stored	ES-291

DTC Code	Detection Item	Trouble Area	MIL	Memory	See page
P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low	1. Canister pump module 2. Connector/Wire harness (between canister pump module and ECM) 3. ECM	Comes on	DTC stored	ES-186
P2402	Evaporative Emission System Leak Detection Pump Control Circuit High	1. Canister pump module 2. Connector/Wire harness (between canister pump module and ECM) 3. ECM	Comes on	DTC stored	ES-186
P2419	Evaporative Emission System Switching Valve Control Circuit Low	1. Canister pump module 2. Connector/Wire harness (between canister pump module and ECM) 3. ECM	Comes on	DTC stored	ES-186
P2420	Evaporative Emission System Switching Valve Control Circuit High	1. Canister pump module 2. Connector/Wire harness (between canister pump module and ECM) 3. ECM	Comes on	DTC stored	ES-298
P2610	ECM / PCM Internal Engine Off Timer Performance	ECM	Comes on	DTC stored	ES-302
P2A00	A/F Sensor Circuit Slow Response (Bank 1 Sensor 1)	1. Open or short in A/F sensor (sensor 1) circuit 2. A/F sensor (sensor 1) 3. A/F sensor heater 4. EFI relay 5. A/F sensor heater and EFI relay circuits 6. Air induction system 7. Fuel pressure 8. Injector 9. PCV valve and hose 10. PCV hose connections 11. ECM	Comes on	DTC stored	ES-304

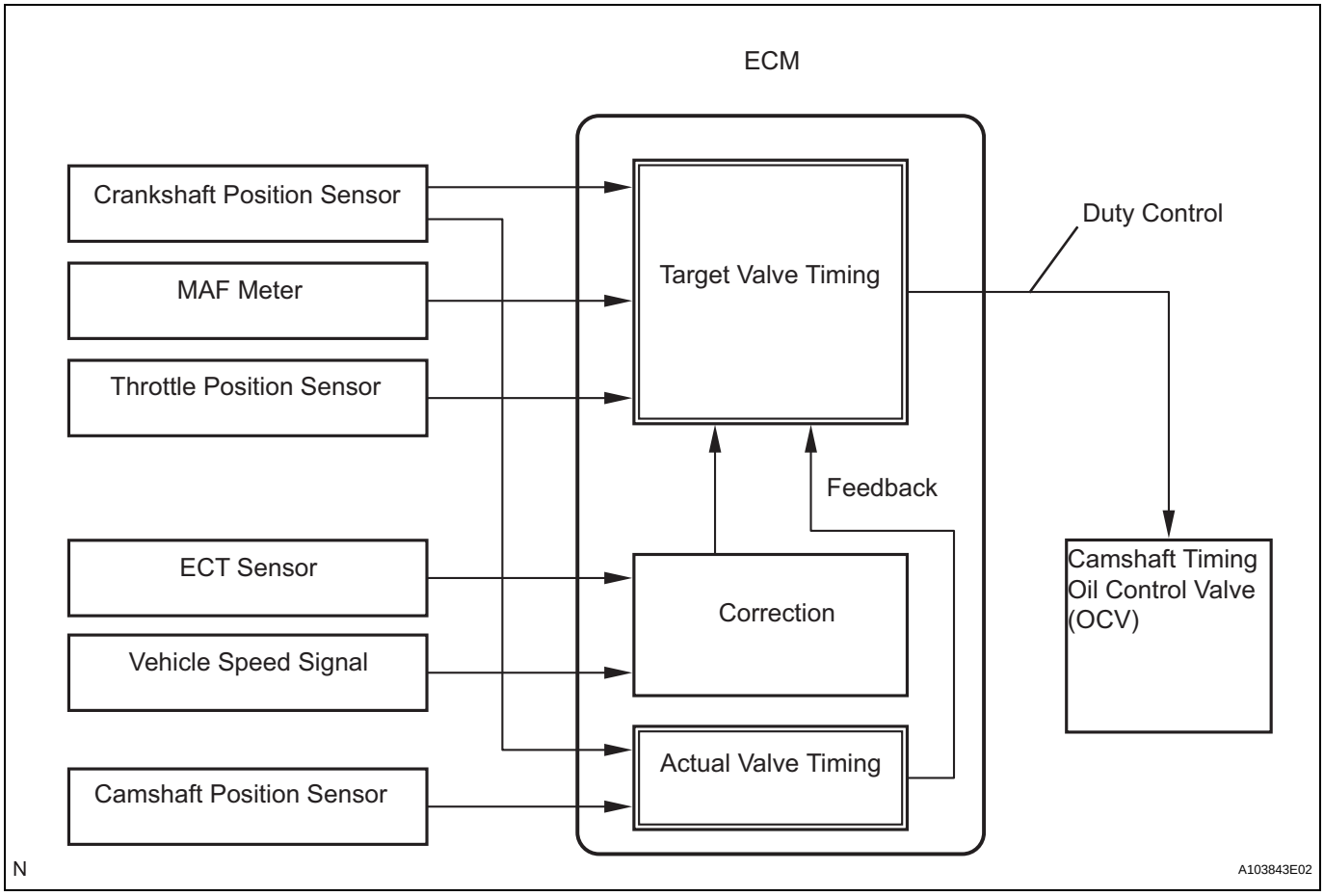
DTC	P0010	Camshaft Position "A" Actuator Circuit (Bank 1)

DESCRIPTION

The Variable Valve Timing (VVT) system includes the ECM, OCV and VVT controller. The ECM sends a target duty-cycle control signal to the OCV. This control signal regulates the oil pressure supplied to the VVT controller. Camshaft timing control is performed according to engine operating conditions such as the intake air volume, throttle valve position and engine coolant temperature.

The ECM controls the OCV, based on the signals transmitted by several sensors. The VVT controller regulates the intake camshaft angle using oil pressure through the OCV. As a result, the relative positions of the camshaft and crankshaft are optimized, the engine torque and fuel economy improve, and the exhaust emissions decrease under overall driving conditions. The ECM detects the actual intake valve timing using signals from the camshaft and crankshaft position sensors, and performs feedback control. This is how the target intake valve timing is verified by the ECM.

ES



DTC No.	DTC Detection Condition	Trouble Area
P0010	Open or short in OCV circuit (1 trip detection logic)	• Open or short in OCV circuit • OCV • ECM

MONITOR DESCRIPTION

The ECM optimizes the valve timing using the VVT system to control the intake camshaft. The VVT system includes the ECM, the OCV and the VVT controller. The ECM sends a target duty-cycle control signal to the OCV. This control signal regulates the oil pressure supplied to the VVT controller. The VVT controller can advance or retard the intake camshaft.

After the ECM sends the target duty-cycle signal to the OCV, the ECM monitors the OCV current to establish an actual duty-cycle. The ECM determines the existence of a malfunction and sets the DTC when the actual duty-cycle ratio varies from the target duty-cycle ratio.

MONITOR STRATEGY

Related DTCs	P0010: VVT OCV range check
Required Sensors/Components (Main)	VVT OCV (Variable Valve Timing Oil Control Valve)
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
When all conditions below are met:	-
Starter	OFF
Ignition switch	ON
Time after ignition switch OFF to ON	0.5 seconds or more

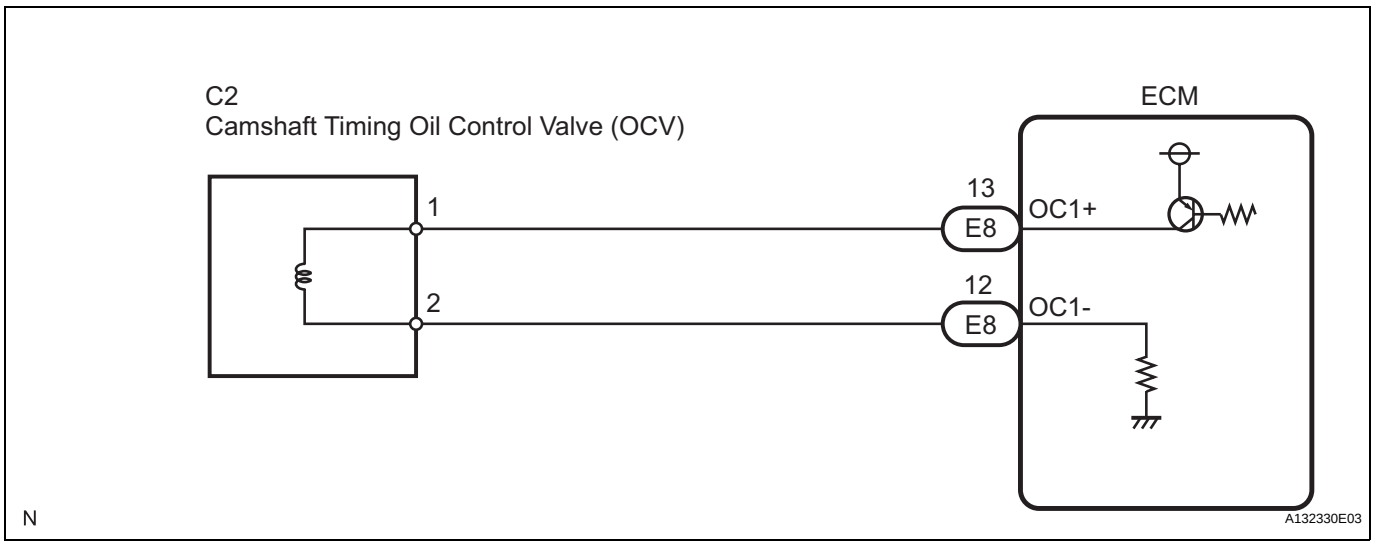
TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met:	a, b or c
a. All conditions below are met:	-
Battery voltage	11 V to 13 V
Target duty ratio	Less than 70 %
Output signal duty ratio	100 %
b. All conditions below are met:	-
Battery voltage	13 V or more
Target duty ratio	Less than 80 %
Output signal duty ratio	100 % (always ON)
c. Both conditions below are met:	-
Current cut status	Not cut
Output signal duty ratio	3 % or less

COMPONENT OPERATING RANGE

VVT OCV duty ratio	3 to 100 %

WIRING DIAGRAM



ES

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

1	PERFORM ACTIVE TEST (OCV OPERATION)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and turn the tester on.
(c) Warm up the engine.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VVT B1.
(e) Check the engine speed while operating the Oil Control Valve (OCV) using the tester.

OK

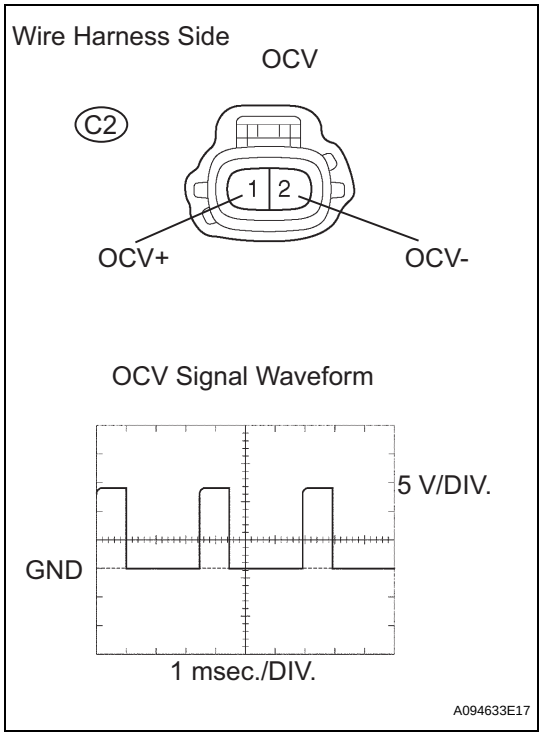
Tester Operation	Specified Condition
-128 % (OCV OFF)	Normal engine speed
127 % (OCV ON)	Engine idles roughly or stalls (soon after OCV switched from OFF to ON)

NG → **Go to step 2**

OK

CHECK FOR INTERMITTENT PROBLEMS

2	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (OCV SIGNAL)



(a) Disconnect the C2 OCV connector.
(b) While idling, check the waveform of the wire harness side connector using an oscilloscope.
OK

Tester Connection	Specified Condition
OCV+ (C2-1) - OCV- (C2-2)	Correct waveform appears as shown

NG → **Go to step 3**

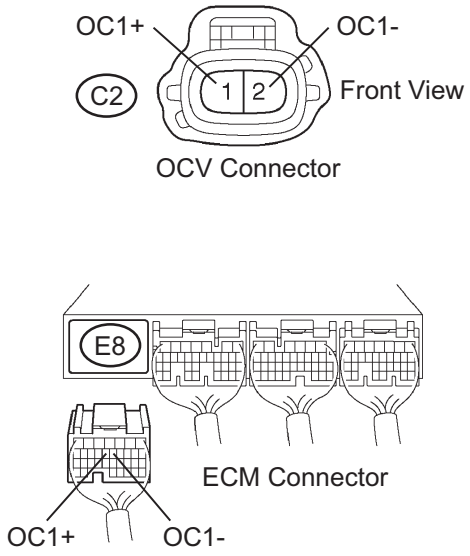
ES

OK

REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY

3	CHECK HARNESS AND CONNECTOR (ECM - CAMSHAFT TIMING OIL CONTROL VALVE)

Wire Harness Side:



(a) Disconnect the OCV 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	Specified Condition
C2-1 (OC1+) - E8-13 (OC1+)	Below 1 Ω
C2-2 (OC1-) - E8-12 (OC1-)	Below 1 Ω

Standard resistance (Check for short)

Tester Connection	Specified Condition
C2-1 (OC1+) or E8-13 (OC1+) - Body ground	10 kΩ or higher
C2-2 (OC1-) or E8-12 (OC1-) - Body ground	10 kΩ or higher

(d) Reconnect the OCV connector.
(e) Reconnect the ECM connector.

NG → **REPLACE ECM**

OK →

REPAIR OR REPLACE HARNESS OR CONNECTOR

DTC	P0011	Camshaft Position "A" - Timing Over-Advanced or System Performance (Bank 1)

DTC	P0012	Camshaft Position "A" - Timing Over-Retarded (Bank 1)

DESCRIPTION

Refer to DTC P0010 (See page ES-58).
HINT:
If DTC P0011 or P0012 is present, check the VVT (Variable Valve Timing) system.

DTC No.	DTC Detection Condition	Trouble Area
P0011	Advanced camshaft timing: With warm engine and engine speed of between 550 rpm and 4,000 rpm, all conditions (1), (2) and (3) met (1 trip detection logic): (1) Difference between target and actual intake valve timings more than 5°CA (Crankshaft Angle) for 4.5 seconds (2) Current intake valve timing fixed (timing changes less than 5°CA in 5 seconds) (3) Variations in VVT controller timing more than 19°CA of maximum delayed timing (malfunction in advance timing)	• Valve timing • Oil control valve (OCV) • OCV filter • Camshaft timing gear assembly • ECM
P0012	Retarded camshaft timing: With warm engine and engine speed of between 550 rpm and 4,000 rpm, all conditions (1), (2) and (3) met (2 trip detection logic): (1) Difference between target and actual intake valve timings more than 5°CA (Crankshaft Angle) for 4.5 seconds (2) Current intake valve timing fixed (timing changes less than 5°CA in 5 seconds) (3) Variations in VVT controller timing 19°CA or less of maximum delayed timing (malfunction in retarded timing)	• Valve timing • OCV • OCV filter • Camshaft timing gear assembly • ECM

MONITOR DESCRIPTION

The ECM optimizes the valve timing using the VVT (Variable Valve Timing) system to control the intake camshaft. The VVT system includes the ECM, the Oil Control Valve (OCV) and the VVT controller. The ECM sends a target duty-cycle control signal to the OCV. 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 actual intake valve timing are small, the ECM interprets this as the VVT controller stuck malfunction and sets a DTC.
Example:
A DTC will be set if 1) the difference between the target and actual valve timings is more than 5° of the camshaft angle (CA) and the condition continues for more than 4.5 seconds; or 2) the OCV is forcibly activated 12 times or more.
Advanced cam DTC is subject to "1 trip" detection logic.
Retarded cam DTC is subject to "2 trip" detection logic.

MONITOR STRATEGY

Related DTCs	P0011: Advanced Camshaft Timing P0012: Retarded Camshaft Timing
Required Sensors/Components (Main)	VVT OCV and VVT Actuator
Required Sensors/Components (Related)	Crankshaft position sensor, Camshaft position sensor and Engine coolant temperature sensor

Frequency of Operation	Once per driving cycle
Duration	Within 10 seconds
MIL Operation	Advanced camshaft timing: Immediate Retarded camshaft timing: 2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0100 - P0103 (MAF sensor) P0115 - P0118 (ECT sensor) P0125 (Insufficient ECT for closed loop) P0335 (CKP sensor) P0340 (CMP sensor) P0351 - P0354 (igniter)
Battery voltage	11 V or more
Engine RPM	550 to 4,000 rpm
Engine coolant temperature	75 to 100°C (167 to 212°F)

TYPICAL MALFUNCTION THRESHOLDS

Advanced camshaft timing:

All of the following conditions are met:	-
Crank angle between reference position and actual intake camshaft angle	67°CA or more
Valve timing	No change at advanced valve timing

Retarded camshaft timing:

All of the following conditions are met:	-
Crank angle between reference position and actual intake camshaft angle	Less than 67°CA
Valve timing	No change at retarded valve timing

If the difference between the target and actual camshaft timings is greater than the specified value, the ECM operates the VVT actuator.
Then, the ECM monitors the camshaft timing change for 5 seconds.

WIRING DIAGRAM

Refer to DTC P0010 (See page ES-60).

INSPECTION PROCEDURE

NOTICE:

DTC P0011 or P0012 may be set when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain set even if the system returns to normal after a short time. Foreign objects are filtered out by the oil filter.

HINT:

Read freeze frame data using the intelligent tester. 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.

1	**CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0011 OR P0012)**

(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(d) Read the DTCs.
Result

Display (DTC Output)	Proceed to
P0011 or P0012	A
P0011 or P0012 and other DTCs	B

HINT:
If any DTCs other than P0011 or P0012 are output, troubleshoot those DTCs first.

B → **GO TO DTC CHART**

A

2 PERFORM ACTIVE TEST (OPERATE OCV)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and turn the tester on.
(c) Warm up the engine.
(d) On the tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VVT B1.
(e) Check the engine speed while operating the Oil Control Valve (OCV) using the tester.

OK

Tester Operation	Specified Condition
-128 % (OCV OFF)	Normal engine speed
127 % (OCV ON)	Engine idles roughly or stalls (soon after OCV switched from OFF to ON)

NG → **Go to step 4**

OK

3 CHECK WHETHER DTC OUTPUT RECURS (DTC P0011 OR P0012)

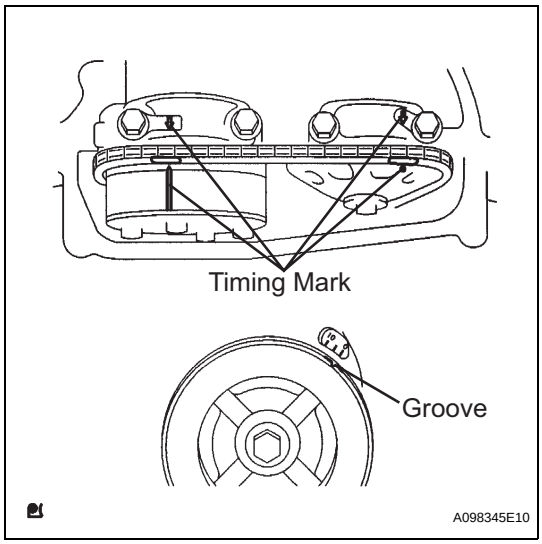
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Clear the DTCs (See page ES-32).
(d) Start the engine and warm it up.
(e) Switch the ECM from normal mode to check mode using the tester (See page ES-35).
(f) Drive the vehicle for more than 10 minutes.
(g) Read the DTCs using the tester.
OK:
No DTC output.

NG → **Go to step 4**

OK

END

4 CHECK VALVE TIMING (CHECK FOR LOOSE AND JUMPED TEETH ON TIMING CHAIN)

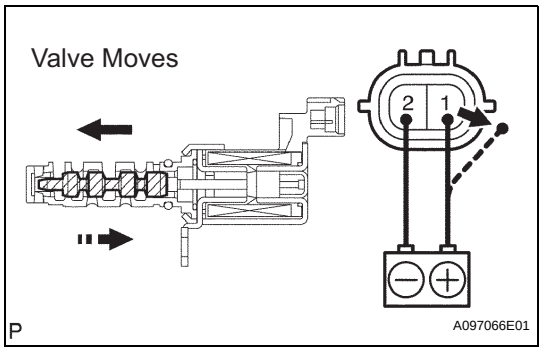


(a) Remove the cylinder head cover (See page EM-115).
(b) Turn the crankshaft pulley until its groove and the timing mark "0" of the timing chain cover are aligned.
(c) Check that each timing mark of the camshaft timing gears is aligned with its corresponding timing mark located on the No. 1 and No. 2 bearing caps as shown in the illustration.
If not, turn the crankshaft by 1 revolution (360°) to align the timing marks as above.
OK:
The timing marks of the camshaft timing gears are aligned with the timing marks located on the No. 1 and No. 2 bearing caps.

NG → **ADJUST VALVE TIMING**

OK

5 INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (OCV)

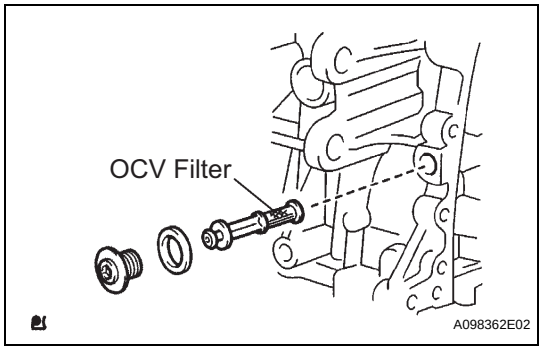


(a) Remove the OCV.
(b) Measure the resistance between the terminals of the OCV.
Standard resistance:
6.9 to 7.9 Ω at 20°C (68°F)
(c) Apply the positive battery voltage to terminal 1 and negative battery voltage to terminal 2. Check the valve operation.
OK:
The valve moves quickly.

NG → **REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY**

OK

6	INSPECT OIL CONTROL VALVE FILTER



(a) Remove the generator (See page CH-10).
(b) Remove the OCV filter.
(c) Check that the filter is not clogged.
OK:
The filter is not clogged.

NG → **CLEAN OIL CONTROL VALVE FILTER**

ES

OK

7	REPLACE CAMSHAFT TIMING GEAR ASSEMBLY

After replacing the camshaft timing gear, confirm that the DTC output does not recur.
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Clear the DTCs (See page ES-32).
(d) Start the engine and warm it up.
(e) Switch the ECM from normal mode to check mode using the tester (See page ES-35).
(f) Drive the vehicle for more than 10 minutes.
(g) Confirm that no DTC is set using the tester.

NEXT

END

DTC	P0016	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A)

DESCRIPTION

Refer to DTC P0335 (See page ES-162).

DTC No.	DTC Detection Condition	Trouble Area
P0016	Deviations in crankshaft and camshaft position sensor signals (2 trip detection logic)	• Mechanical system (Timing chain has jumped tooth or chain stretched) • ECM

MONITOR DESCRIPTION

The ECM optimizes the valve timing by using the VVT (Variable Valve Timing) system to control the intake camshaft. The VVT system includes the ECM, the Oil Control Valve (OCV) and the VVT controller.
The ECM sends a target duty-cycle control signal to the OCV. This control signal regulates the oil pressure supplied to the VVT controller. The VVT controller can advance or retard the intake camshaft.
The ECM calibrates the intake valve timing by setting the intake camshaft to the most retarded angle while the engine is idling. The ECM closes the OCV to retard the cam. The ECM stores this value as the VVT learning value. When the difference between the target and actual intake valve timings is 5°CA (Crankshaft Angle) or less, the ECM stores it.
If the VVT learning value matches the following conditions, the ECM determines the existence of a malfunction in the VVT system, and sets the DTC.

- VVT learning value: Less than 27°CA, or more than 49°CA.
- Above condition continues for 18 seconds or more.

This DTC indicates that the intake camshaft has been installed toward the crankshaft at an incorrect angle, caused by factors such as the timing chain having a jumped tooth.
This monitor begins to run after the engine has idled for 5 minutes.

MONITOR STRATEGY

Related DTCs	P0016: Camshaft Timing Misalignment at Idling
Required Sensors/Components (Main)	VVT actuator
Required Sensors/Components (Related)	Camshaft position sensor, Crankshaft position sensor
Frequency of Operation	Once per driving cycle
Duration	Within 1 minute
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0011 (VVT system 1 - advanced) P0012 (VVT system 1 - retarded) P0115 - P0118 (ECT sensor)
Engine RPM	550 to 1,400 rpm

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met:	-
VVT learning value at maximum retarded valve timing	Less than 27.8°CA (crankshaft angle)
VVT learning value at maximum retarded valve timing	More than 48°CA (crankshaft angle)

WIRING DIAGRAM

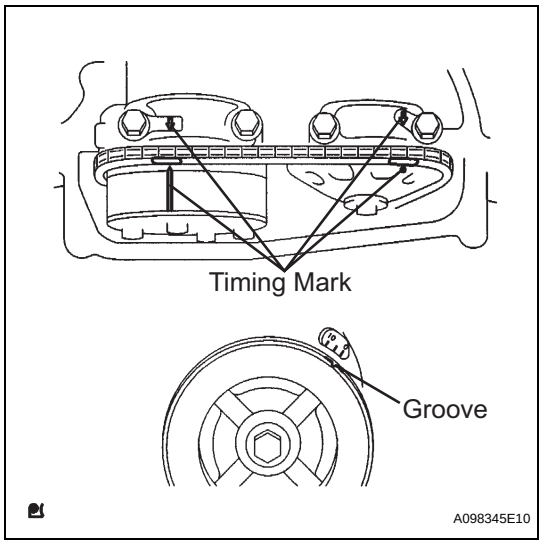
Refer to DTC P0335 (See page ES-164).

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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.

1	CHECK VALVE TIMING (CHECK FOR LOOSE AND JUMPED TEETH ON TIMING CHAIN)



(a) Remove the cylinder head cover (See page EM-115).
(b) Turn the crankshaft pulley until its groove and the timing mark "0" of the timing chain cover are aligned.
(c) Check that each timing mark of the camshaft timing gears is aligned with its corresponding timing mark located on the No. 1 and No. 2 bearing caps as shown in the illustration.
If not, turn the crankshaft by 1 revolution (360°) to align the timing marks as above.

OK:

The timing marks of the camshaft timing gears are aligned with the timing marks located on the No. 1 and No. 2 bearing caps.

NG → **ADJUST VALVE TIMING**

OK

2	REPLACE ECM

After replacing the ECM or adjusting intake valve timing, confirm that the DTC output does not recur.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTCs (See page ES-32).
(e) If using the intelligent tester, switch the ECM from normal mode to check mode (See page ES-35).
(f) Start the engine and warm it up.
(g) Allow the engine to idle for 1 minute or more, and then drive the vehicle for 1 minute or more.
(h) Confirm that no DTC is set using the tester.

NEXT

END

DTC	P0031	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 1)

DTC	P0032	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 1)

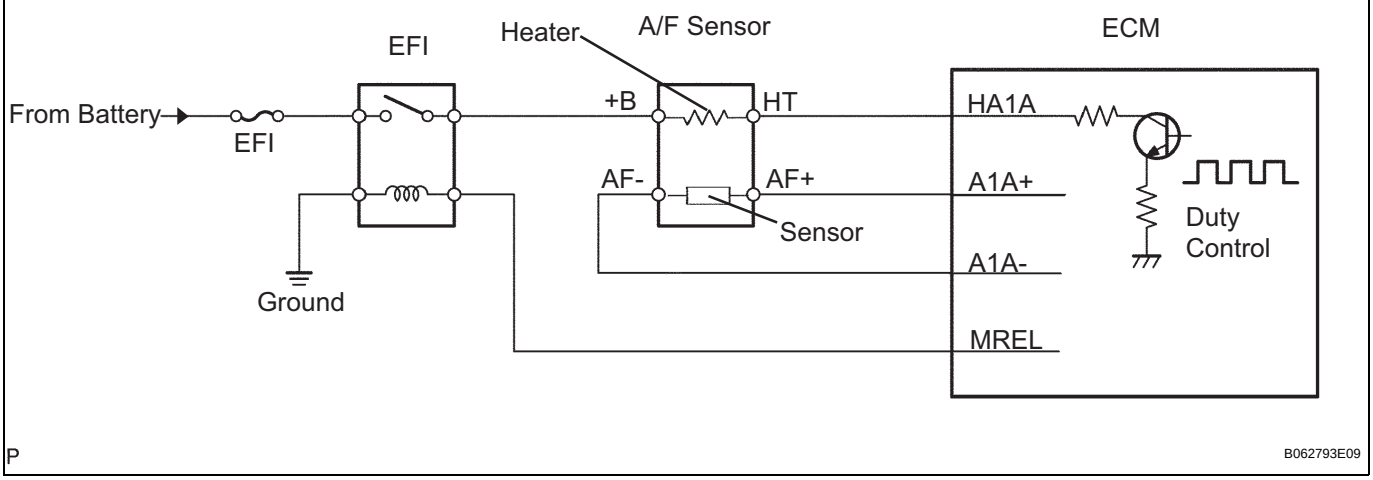
DESCRIPTION

Refer to DTC P2195 (See page ES-278).

HINT:

- Although the DTC titles say oxygen sensor, these DTCs relate to the Air-Fuel Ratio (A/F) sensor.
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.
- When any of these DTCs are set, the ECM enters fail-safe mode. The ECM turns off the A/F sensor heater in fail-safe mode. Fail-safe mode continues until the ignition switch is turned off.
- The ECM provides a pulse width modulated control circuit to adjust the current through the heater. The A/F sensor heater circuit uses a relay on the +B side of the circuit.

Reference (System Diagram of Sensor 1)



DTC No.	DTC Detection Condition	Trouble Area
P0031	A/F sensor heater current less than 0.8 A (1 trip detection logic)	• Open in A/F sensor heater circuit • A/F sensor heater • EFI relay • ECM
P0032	A/F sensor heater current more than 10 A (1 trip detection logic)	• Short in A/F sensor heater circuit • A/F sensor heater • EFI relay • ECM

MONITOR DESCRIPTION

The ECM uses information from the Air-Fuel Ratio (A/F) 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 (TWC) to purify the exhaust gases.

The A/F 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 A/F 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 A/F sensor will be inaccurate, as a result, the ECM will be unable to regulate air-fuel ratio properly.
When the current in the A/F sensor heater is outside the normal operating range, the ECM interprets this as a malfunction in the sensor heater and sets a DTC.
Example:
The ECM sets DTC P0032 when the current in the A/F sensor heater is more than 10 A. Conversely, when the heater current is less than 0.8 A, DTC P0031 is set.

MONITOR STRATEGY

Related DTCs	P0031: A/F sensor heater open/short (Low electrical current) P0032: A/F sensor heater open/short (High electrical current)
Required Sensors/Components (Main)	A/F sensor heater
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	10 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P0031:

Monitor runs whenever the following DTCs are not present	None
Battery voltage	10.5 V or more
A/F sensor heater duty-cycle ratio	50 % or more
Time after engine start	10 seconds or more

P0032:

Monitor runs whenever the following DTCs are not present	None
Time after engine start	10 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

P0031:

A/F sensor heater current	Less than 0.8 A

P0032:

A/F sensor heater current	More than 10 A

COMPONENT OPERATING RANGE

A/F sensor heater current	0.9 to 9.9 A

WIRING DIAGRAM

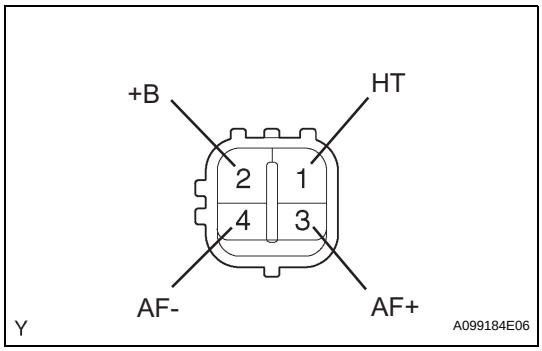
Refer to DTC P2195 (See page ES-281).

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

ES

1 INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)



(a) Disconnect the A3 Air-Fuel Ratio (A/F) sensor connector.
(b) Measure the resistance according to the value(s) in the table below.

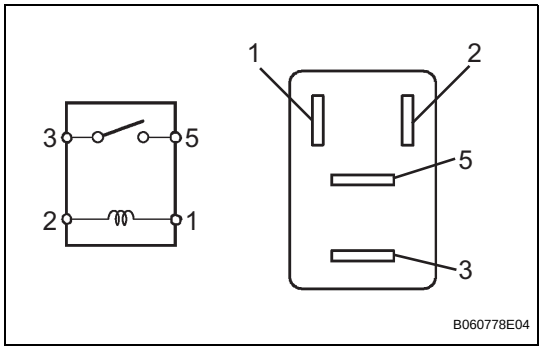
Standard resistance

Tester Connection	Specified Condition
HT (1) - +B (2)	1.8 to 3.4 Ω at 20°C (68°F)
HT (1) - AF- (4)	10 kΩ or higher

NG → **REPLACE AIR FUEL RATIO SENSOR**

OK

2 INSPECT EFI RELAY (Marking: EFI)



(a) Remove the EFI relay from the engine room relay block.
(b) Measure the EFI relay resistance according to the value(s) in the table below.

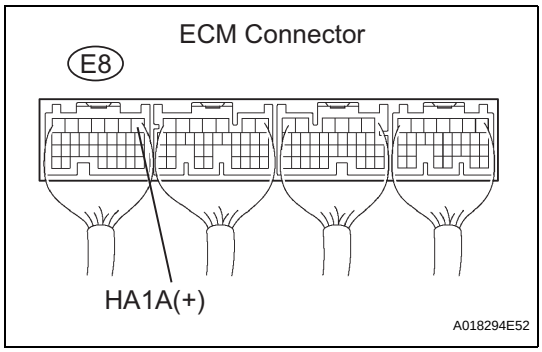
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG → **REPLACE EFI RELAY**

OK

3 INSPECT ECM (HT1A VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
HA1A (E8-1) - Body ground	9 to 14 V

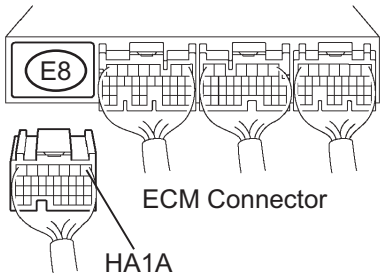
NG → **Go to step 4**

OK

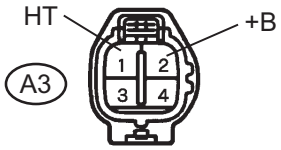
REPLACE ECM

4	CHECK WIRE HARNESS (AIR FUEL RATIO SENSOR - ECM, AIR FUEL RATIO SENSOR - EFI RELAY)

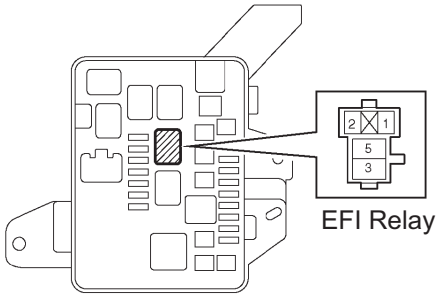
Wire Harness Side:



Air Fuel Ratio Sensor



Engine Room Relay Block



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(a) Check the wire harness between the ECM and A/F sensor.
  (1) Disconnect the A3 A/F sensor connector.
  (2) Disconnect the E8 ECM connector.
  (3) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
HT (A3-1) - HA1A (E8-1)	Below 1 Ω
HT (A3-1) or HA1A (E8-1) - Body ground	10 kΩ or higher

(b) Check the wire harness between the A/F sensor and EFI relay.
  (1) Disconnect the A3 A/F sensor connector.
  (2) Remove the EFI relay from the engine room relay block.
  (3) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
+B (A3-2) - EFI relay (3)	Below 1 Ω
+B (A3-2) or EFI relay (3) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

DTC	P0037	Oxygen Sensor Heater Control Circuit Low (Bank 1 Sensor 2)

DTC	P0038	Oxygen Sensor Heater Control Circuit High (Bank 1 Sensor 2)

DTC	P0141	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)

ES

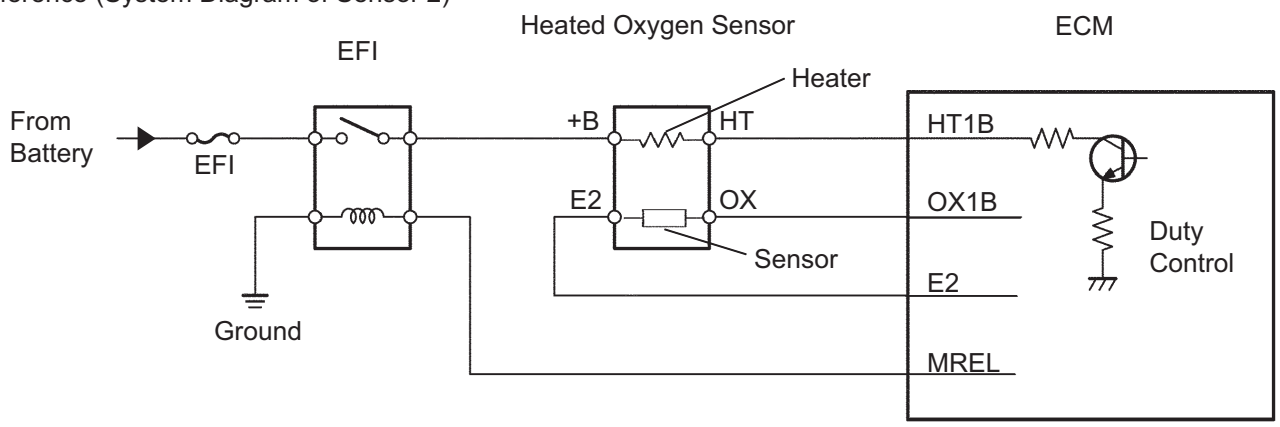
DESCRIPTION

Refer to DTC P0136 (See page ES-121).

HINT:

- Sensor 2 refers to the sensor mounted behind the Three-Way Catalytic Converter (TWC) and located far from the engine assembly.
- When any of these DTCs are set, the ECM enters fail-safe mode. The ECM turns off the HO2 sensor heater in fail-safe mode. Fail-safe mode continues until the ignition switch is turned off.
- The Heated Oxygen (HO2) sensor heater circuit uses a relay on the +B side of the circuit.

Reference (System Diagram of Sensor 2)



DTC No.	DTC Detection Condition	Trouble Area
P0037	HO2 sensor heater current less than 0.3 A (1 trip detection logic)	• Open in HO2 sensor heater circuit • HO2 sensor heater • EFI relay • ECM
P0038	HO2 sensor heater current more than 2 A (1 trip detection logic)	• Short in HO2 sensor heater circuit • HO2 sensor heater • EFI relay • ECM
P0141	Cumulative heater resistance correction value exceeds threshold (2 trip detection logic)	• Open or short in HO2 sensor heater circuit • HO2 sensor heater (sensor 2) • EFI relay • ECM

MONITOR DESCRIPTION

The sensing portion of the Heated Oxygen (HO2) 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. When the current in the sensor heater is outside the standard operating range, the ECM interprets this as a malfunction in the sensor heater and sets a DTC.
Example:
The ECM sets DTC P0038 when the current in the HO2 sensor heater is more than 2 A. Conversely, when the heater current is less than 0.3 A, DTC P0037 is set.

MONITOR STRATEGY

Related DTCs	P0037: Heated oxygen sensor heater range check (Low current) P0038: Heated oxygen sensor heater range check (High current) P0141: Heated oxygen sensor heater performance
Required Sensors/Components (Main)	Heated oxygen sensor heater
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous: P0037 and P0038 Once per driving cycle: P0141
Duration	1 second: P0037 and P0038 10 seconds: P0141
MIL Operation	Immediate: P0037 and P0038 2 driving cycles: P0141
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever the following DTCs are not present	None

P0037:

Battery voltage	10.5 to 20 V

P0038:

Battery voltage	10.5 to 20 V

P0041:

All of the following conditions are met:	-
Battery voltage	10.5 V or more
Fuel cut	OFF
Time after fuel cut ON to OFF	30 seconds or more
Accumulated heater ON time	100 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

P0037:

Heater current	Less than 0.3 A

P0038:

Heater current	More than 2 A

P0141 (Heater performance monitor check):

Accumulated heater resistance	Varies with sensor element temperature (Example: More than 23 Ω)

COMPONENT OPERATING RANGE

Heated Oxygen (HO2) sensor heater current	0.4 to 1 A (when engine idles, HO2 sensor warmed up and battery voltage 11 to 14 V)

MONITOR RESULT

Refer to detailed information on "CHECKING MONITOR STATUS" (See page ES-15).

WIRING DIAGRAM

Refer to DTC P0136 (See page ES-125).

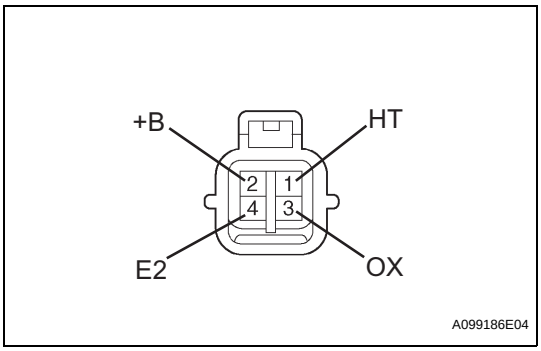
INSPECTION PROCEDURE

ES

HINT:

Read freeze frame data using the intelligent tester. 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.

1 INSPECT HEATED OXYGEN SENSOR (HEATER RESISTANCE)



(a) Disconnect the H5 Heated Oxygen (HO2) sensor connector.

(b) Measure the resistance between the terminals of the HO2 sensor connector.

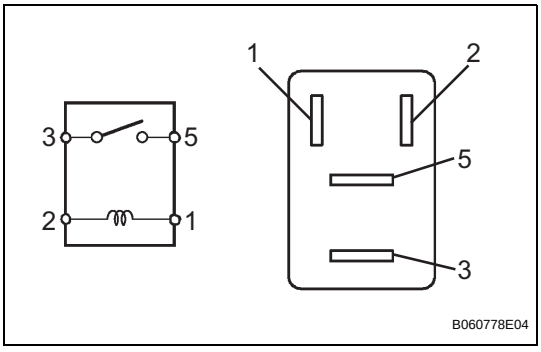
Standard resistance

Tester Connection	Specified Condition
HT (1) - +B (2)	11 to 16 Ω at 20°C (68°F)
HT (1) - E2 (4)	10 kΩ or higher

NG → REPLACE HEATED OXYGEN SENSOR

OK

2 INSPECT EFI RELAY (Marking: EFI)



(a) Remove the EFI relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below..

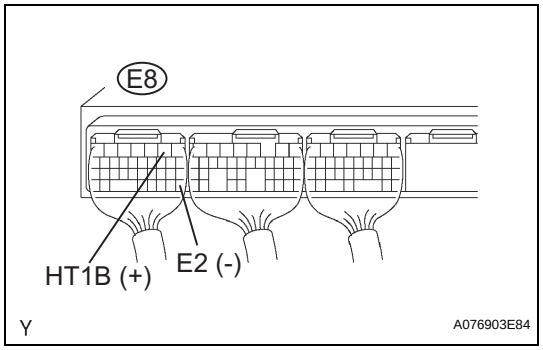
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

NG → REPLACE EFI RELAY

OK

3	INSPECT ECM (HT1B VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage between the terminals of the E8 ECM connector.

Standard voltage

Tester Connection	Specified Condition
HT1B (E8-2) - E2 (E8-28)	9 to 14 V

NG → **Go to step 4**

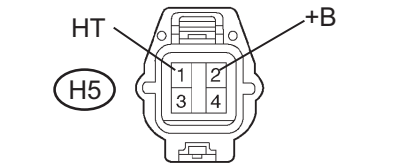
OK

REPLACE ECM

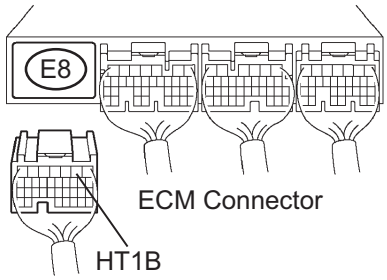
ES

4	CHECK WIRE HARNESS (HEATED OXYGEN SENSOR - ECM, EFI RELAY [Marking: EFI])

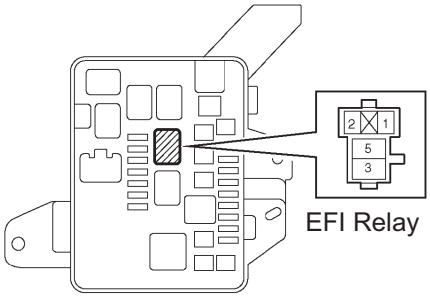
Wire Harness Side:



Heated Oxygen Sensor Connector



Engine Room Relay Block



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(a) Check the wire harness between the ECM and HO2 sensor.
  (1) Disconnect the H5 HO2 sensor connector.
  (2) Disconnect the E8 ECM connector.
  (3) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
HT (H5-1) - HT1B (E8-2)	Below 1 Ω
HT (H5-1) or HT1B (E8-2) - Body ground	10 kΩ or higher

(b) Check the wire harness between the HO2 sensor and EFI relay.
  (1) Disconnect the H5 HO2 sensor connector.
  (2) Remove the EFI relay from the engine room relay block.
  (3) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
+B (H5-2) - EFI relay (3)	Below 1 Ω
+B (H5-2) or EFI relay (3) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

DTC	P0100	Mass or Volume Air Flow Circuit

DTC	P0102	Mass or Volume Air Flow Circuit Low Input

DTC	P0103	Mass or Volume Air Flow Circuit High Input

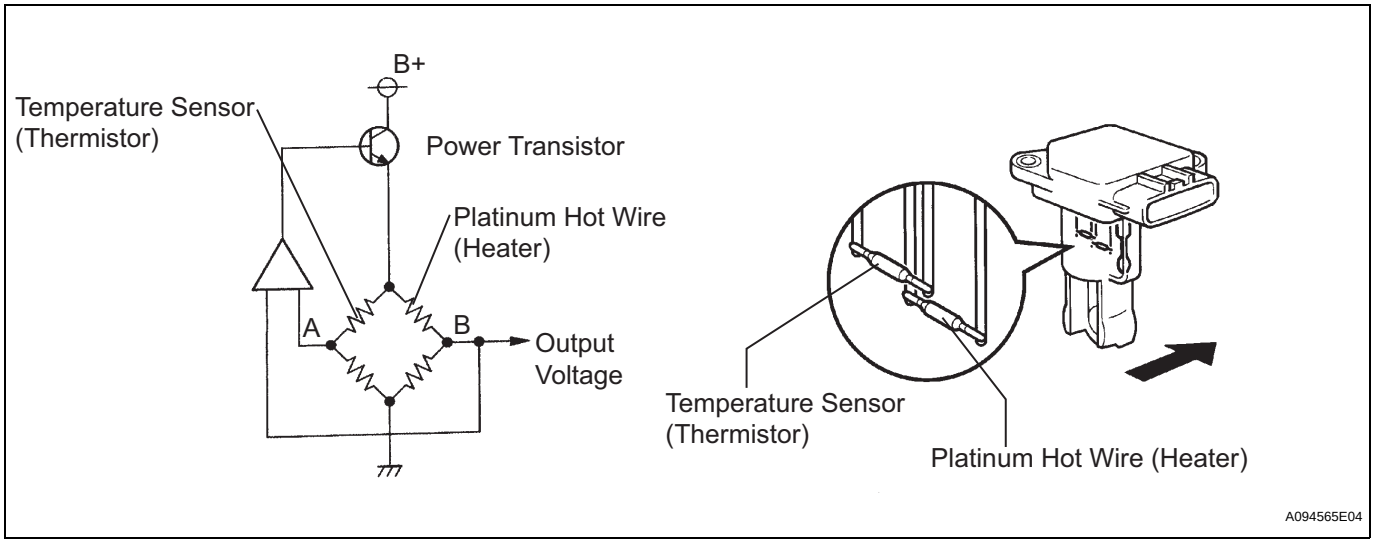
DESCRIPTION

The Mass Air Flow (MAF) 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 appropriate air-fuel ratio. Inside the MAF 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 these components in the MAF meter. 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 provide 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 are set, the ECM enters fail-safe mode. During fail-safe mode, the ignition timing is calculated by the ECM, according to the engine RPM and throttle valve position. Fail-safe mode continues until a pass condition is detected.



DTC No.	DTC Detection Condition	Trouble Area
P0100	MAF meter voltage less than 0.2 V, or more than 4.9 V for 3 seconds (1 trip detection logic)	• Open or short in MAF meter circuit • MAF meter • ECM
P0102	MAF meter voltage less than 0.2 V for 3 seconds (1 trip detection logic)	• Open in MAF meter circuit • MAF meter • ECM
P0103	MAF meter voltage more than 4.9 V for 3 seconds (1 trip detection logic)	• Short in MAF meter circuit • MAF meter • ECM

HINT:
When any of these DTCs are set, check the air-flow rate by selecting the following menu items on the intelligent tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF.

Mass Air Flow Rate (gm/s)	Malfunction
Approximately 0.0	• Open in Mass Air Flow (MAF) meter power source circuit • Open or short in VG circuit
271.0 or more	Open in EVG circuit

MONITOR DESCRIPTION

If there is a defect in the MAF 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 MAF meter and sets a DTC.
Example:
When the sensor voltage output remains less than 0.2 V or more than 4.9 V for more than 3 seconds, the ECM sets a DTC.
If the malfunction is not repaired successfully, a DTC is set 3 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0100: Mass air flow meter range check (Fluctuating) P0102: Mass air flow meter range check (Low voltage) P0103: Mass air flow meter range check (High voltage)
Required Sensors/Components (Main)	MAF meter
Required Sensors/Components (Related)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	3 seconds
MIL Operation	Immediate: Engine RPM less than 4,000 rpm 2 driving cycles: Engine RPM 4,000 rpm or more
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None

TYPICAL MALFUNCTION THRESHOLDS

P0100:

MAF meter voltage	Less than 0.2 V, or more than 4.9 V

P0102:

MAF meter voltage	Less than 0.2 V

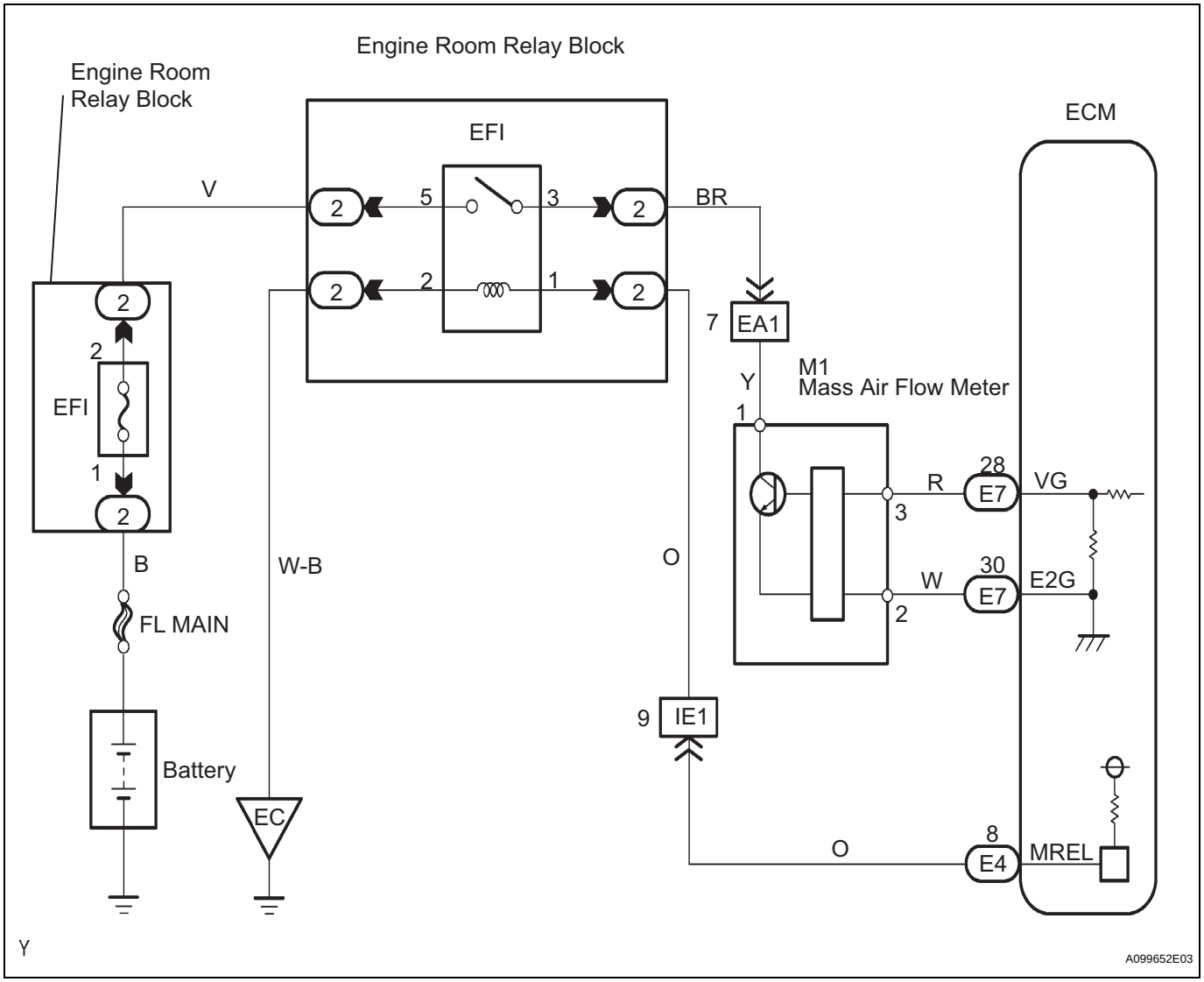
P0103:

MAF meter voltage	More than 4.9 V

COMPONENT OPERATING RANGE

MAF meter voltage	Between 0.4 and 2.2 V

WIRING DIAGRAM



ES

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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.

1	READ VALUE USING INTELLIGENT TESTER (MASS AIR FLOW RATE)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Turn the tester on.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF.
(e) Read the values displayed on the tester.

Result

Mass Air Flow Rate (gm/s)	Proceed to
0.0	A
271.0 or more	B
Between 1.0 and 270.0 (*)	C

HINT:
*: The value must change when the throttle valve is open or closed.

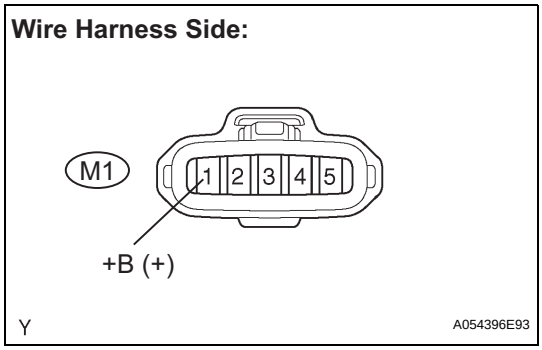
B → **Go to step 6**

C → **CHECK FOR INTERMITTENT PROBLEMS**

ES

A

2 INSPECT MASS AIR FLOW METER (POWER SOURCE VOLTAGE)



(a) Disconnect the M1 MAF meter connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

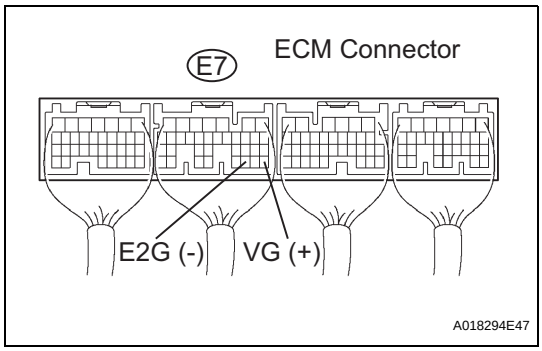
Standard voltage

Tester Connection	Specified Condition
+B (M1-1) - Body ground	9 to 14 V

NG → **Go to step 5**

OK

3 INSPECT ECM (VG VOLTAGE)



(a) Start the engine.
(b) Measure the voltage according to the value(s) in the table below.
HINT:
The transmission gear selector lever should be in the P or N position and the A/C switch should be turned off.

Standard voltage

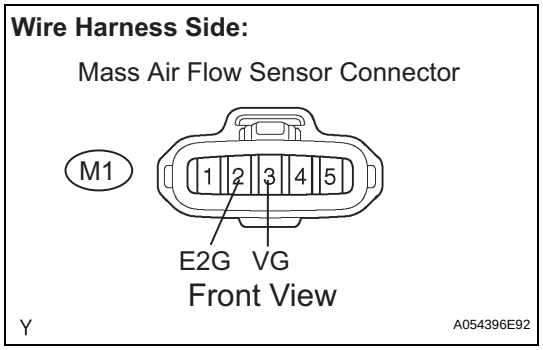
Tester Connection	Condition	Specified Condition
VG (E7-28) - E2G (E7-30)	Engine idling	0.5 to 3.0 V

NG → **Go to step 4**

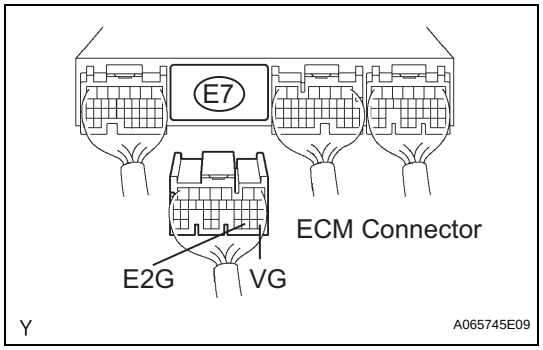
OK

REPLACE ECM

4	CHECK WIRE HARNESS (MASS AIR FLOW METER - ECM)



(a) Disconnect the M1 MAF meter connector.



(b) Disconnect the E7 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
VG (M1-3) - VG (E7-28)	Below 1 Ω
E2G (M1-2) - E2G (E7-30)	Below 1 Ω
VG (M1-3) or VG (E7-28) - Body ground	10 kΩ or higher

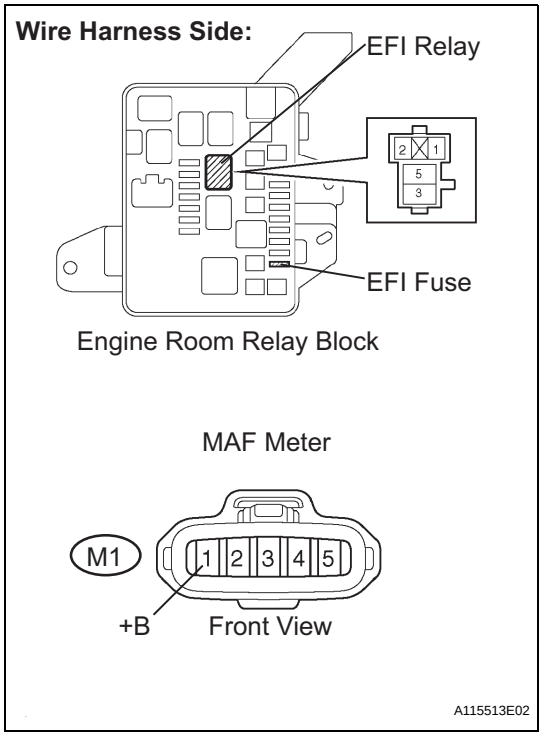
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

ES

5	CHECK WIRE HARNESS (MASS AIR FLOW METER - EFI RELAY [Marking: EFI])



(a) Inspect the EFI fuse.
  (1) Remove the EFI fuse from the engine room relay block.
  (2) Measure the EFI fuse resistance.
    Standard resistance:
      Below 1 Ω
  (3) Reinstall the EFI fuse.
(b) Remove the EFI relay from the engine room relay block.
(c) Disconnect the M1 MAF meter connector.
(d) Measure the resistance according to the value(s) in the table below.
  Standard resistance

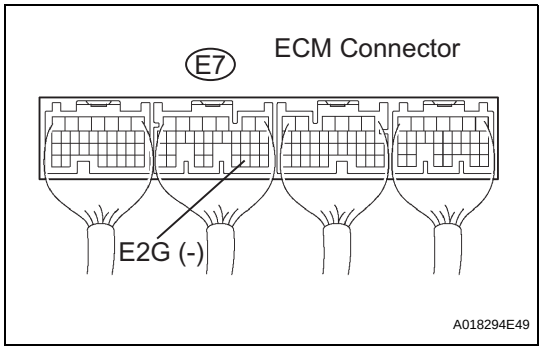
Tester Connection	Specified Condition
+B (M1-1) - EFI relay (3)	Below 1 Ω
+B (M1-1) or EFI relay (3) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

INSPECT ECM POWER SOURCE CIRCUIT

6	INSPECT ECM (SENSOR GROUND)



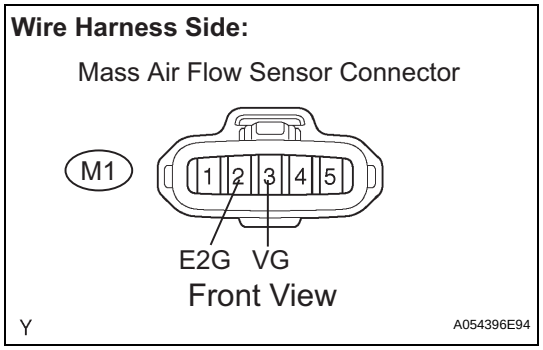
(a) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
E2G (E7-30) - Body ground	Below 1 Ω

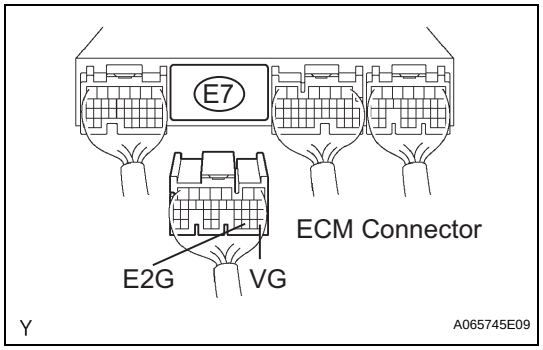
NG → **REPLACE ECM**

OK

7	CHECK WIRE HARNESS (MASS AIR FLOW METER - ECM)



(a) Disconnect the M1 MAF meter connector.



(b) Disconnect the E7 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
VG (M1-3) - VG (E7-28)	Below 1 Ω
E2G (M1-2) - E2G (E7-30)	Below 1 Ω
VG (M1-3) or VG (E7-28) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

ES

DTC	P0101	Mass or Volume Air Flow Circuit Range / Performance Problem

DESCRIPTION

Refer to DTC P0100 (See page ES-79).

DTC No.	DTC Detection Condition	Trouble Area
P0101	Conditions (a), (b), (c) (d) and (e) continue for more than 10 seconds (2 trip detection logic): (a) Engine running (b) Engine coolant temperature 70°C (158°F) or higher (c) Throttle Position (TP) sensor voltage 0.24 V or more (d) Average engine load value ratio less than 0.85, or more than 1.15 (varies with estimated engine load) Average engine load value ratio = Average engine load based on MAF meter output / Average engine load estimated from driving conditions (e) Average air-fuel ratio less than -20 %, or more than 20 %	• MAF meter • Air induction system • PCV hose connections

ES

MONITOR DESCRIPTION

The MAF 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 MAF 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 these components of the MAF meter. The voltage level is proportional to the airflow through the sensor, and the ECM uses it to calculate the intake air volume.

If there is a defect in the sensor, or an open or short in the circuit, the voltage level deviates from the normal operating range. The ECM interprets this deviation as a malfunction in the MAF meter and sets the DTC.

Example:

If the voltage is more than 2.2 V or less than 0.65 V while idling, the ECM determines that there is a malfunction in the MAF meter and sets the DTC.

MONITOR STRATEGY

Related DTCs	P0101: Mass air flow meter rationality
Required Sensors/Components (Main)	Mass air flow meter
Required Sensors/Components (Related)	Crankshaft position sensor, engine coolant temperature sensor and throttle position sensor
Frequency of Operation	Continuous
Duration	10 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for closed loop) P0335 (CKP sensor) P0340 (CMP sensor)
Throttle position (TP sensor voltage)	0.24 V or more

Engine	Running
Battery voltage	10.5 V or more
Engine coolant temperature	70°C (158°F) or more
IAT sensor circuit	OK
ECT sensor circuit	OK
CKP sensor circuit	OK
TP sensor circuit	OK
Canister pressure sensor circuit	OK
EVAP leak detection pump	OK
EVAP vent valve	OK

TYPICAL MALFUNCTION THRESHOLDS

Averaged engine load	Less than 0.845 % or more than 1.23 %

WIRING DIAGRAM

Refer to DTC P0100 (See page ES-81).

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

1 **CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0101)**

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0101 and other DTCs	A
P0101	B

HINT:
If any DTCs other than P0101 are output, troubleshoot those DTCs first.

B → **REPLACE MASS AIR FLOW METER**

A

GO TO DTC CHART

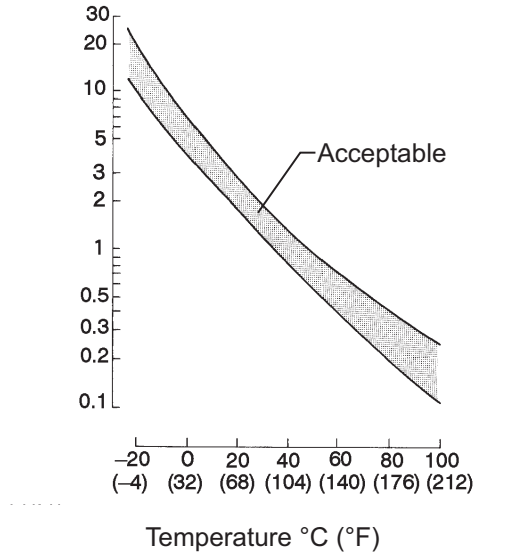
DTC	P0110	Intake Air Temperature Circuit

DTC	P0112	Intake Air Temperature Circuit Low Input

DTC	P0113	Intake Air Temperature Circuit High Input

DESCRIPTION

(Figure 1)



The Intake Air Temperature (IAT) sensor, mounted on the Mass Air Flow (MAF) meter, monitors the IAT. The IAT sensor has a built-in thermistor with a resistance that varies according to the temperature of the intake air. When the IAT 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 (see Fig. 1).

The IAT sensor is powered by a 5 V supply from the THA terminal of the ECM, via resistor R.

Resistor R and the IAT sensor are connected in series. When the resistance value of the IAT sensor changes, according to changes in the IAT, 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 any of DTCs P0110, P0112 and P0113 are set, the ECM enters fail-safe mode. During fail-safe mode, the IAT 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
P0110	Open or short in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM
P0112	Short in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	• Short in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM
P0113	Open in IAT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM

HINT:
When any of these DTCs are set, check the IAT by entering the following menus on the intelligent tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
140°C (284°F) or higher	Short circuit

MONITOR DESCRIPTION

The ECM monitors the sensor voltage and uses this value to calculate the Intake Air Temperature (IAT). When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a malfunction in the IAT sensor and sets a DTC.
Example:
If the sensor output indicates -40°C (-40°F) for 0.5 seconds or more, the ECM determines that there is an open in the IAT sensor circuit, and sets DTC P0113. Conversely, if the sensor output indicates more than 140°C (284°F) for 0.5 seconds or more, the ECM determines that there is a short in the sensor circuit, and sets DTC P0112.
If the malfunction is not repaired successfully, a DTC is set 0.5 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0110: Intake air temperature sensor range check (Fluctuating) P0112: Intake air temperature sensor range check (Low Resistance) P0113: Intake air temperature sensor range check (High Resistance)
Required Sensors/Components (Main)	Intake Air Temperature (IAT) 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 the following DTCs are not present	None

TYPICAL MALFUNCTION THRESHOLDS

P0110:

IAT sensor voltage	Less than 0.18 V, or more than 4.91 V

P0112:

IAT sensor voltage	Less than 0.18 V

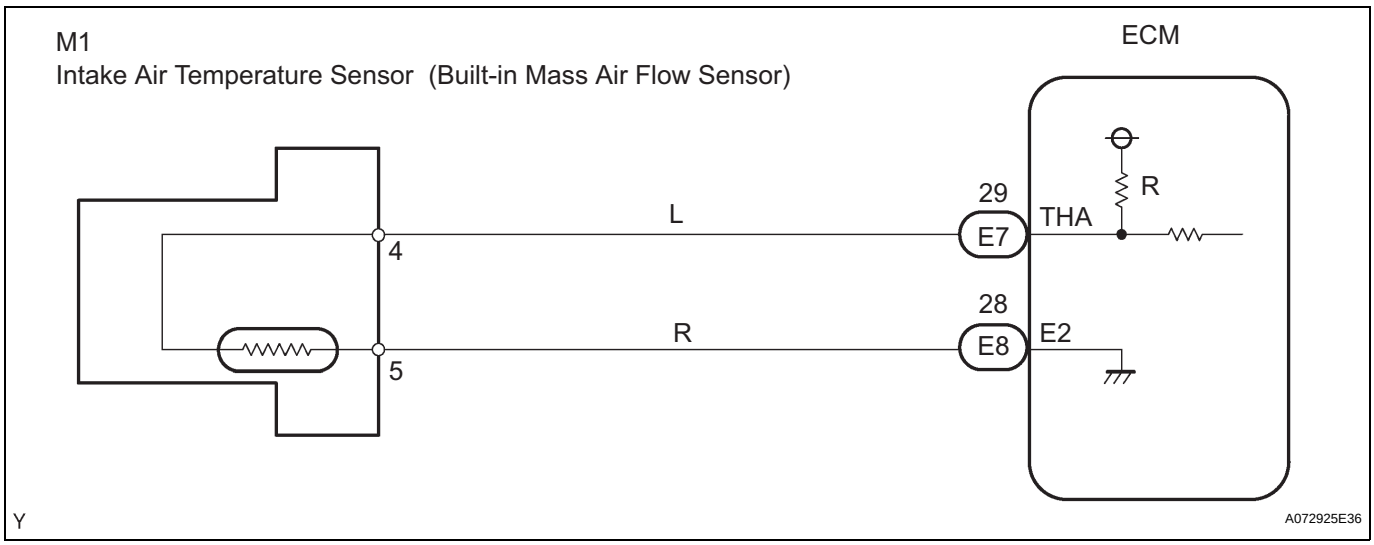
P0113:

IAT sensor voltage	More than 4.91 V

COMPONENT OPERATING RANGE

IAT sensor resistance [Intake air temperature]	98.5 Ω to 156 kΩ [-40 to 140°C (-40 to 284°F)]

WIRING DIAGRAM



ES

INSPECTION PROCEDURE

HINT:

- If other DTCs relating to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester. 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.

1	READ OUTPUT DTC

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(d) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0110	A
P0112	B
P0113	C

B → **Go to step 5**

C → **Go to step 4**

A

2	READ VALUE USING INTELLIGENT TESTER (INTAKE AIR TEMPERATURE)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.

(c) Turn the tester on.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
(e) Read the value displayed on the tester.
Standard:
Same as the actual Intake Air Temperature (IAT).
Result

Temperature Displayed	Proceed to
-40°C (-40°F)	A
140°C (284°F) or higher	B
Same as actual IAT	C

ES

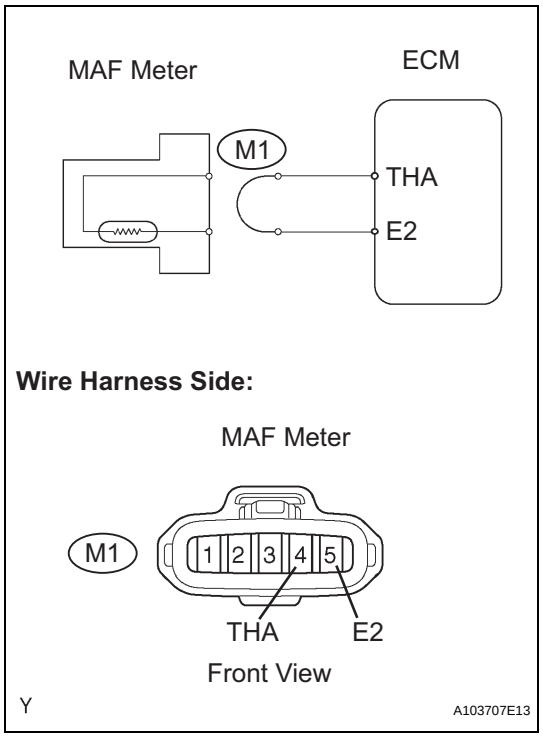
HINT:
- If there is an open circuit, the intelligent tester indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester indicates 140°C (284°F) or higher.

B → **Go to step 5**

C → **CHECK FOR INTERMITTENT PROBLEMS**

A

3 READ VALUE USING INTELLIGENT TESTER (CHECK FOR OPEN IN WIRE HARNESS)

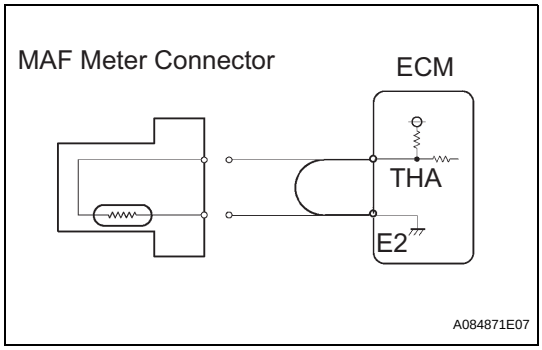


(a) Disconnect the M1 MAF meter connector.
(b) Connect terminals THA of the MAF meter wire harness side connector.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch to the ON position and turn the intelligent tester on.
(e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
(f) Read the value.
Standard temperature:
140°C (284°F) or more

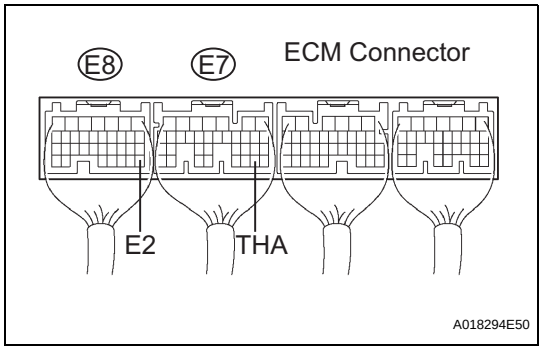
OK → **CONFIRM GOOD CONNECTION TO SENSOR. IF OK, REPLACE MASS AIR FLOW METER**

NG

4	READ VALUE USING INTELLIGENT TESTER (CHECK FOR OPEN IN ECM)



(a) Disconnect the M1 MAF meter connector.



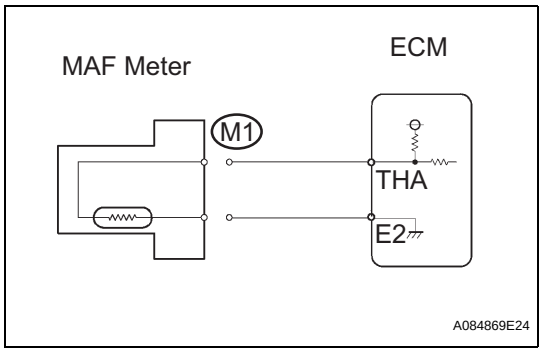
(b) Connect terminals THA and E2 of the E7 and E8 ECM connectors.
HINT:
Before checking, perform visual and contact pressure checks on the ECM connector.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn the tester on.
(f) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
(g) Read the value displayed on the tester.
Standard temperature:
140°C (284°F) or higher

NG → **CONFIRM GOOD CONNECTION TO ECM. IF OK, REPLACE ECM**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

5	READ VALUE USING INTELLIGENT TESTER (CHECK FOR SHORT IN WIRE HARNESS)

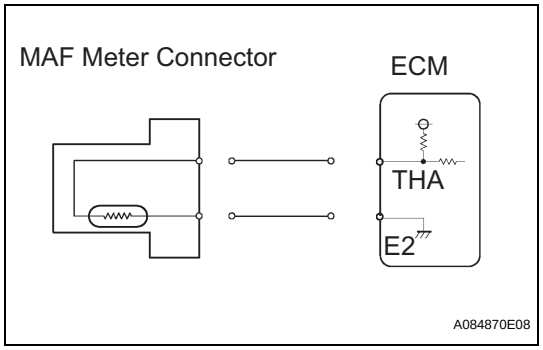


(a) Disconnect the M1 MAF meter connector.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Turn the tester on.
(e) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
(f) Read the value displayed on the tester.
Standard temperature:
-40°C (-40°F)

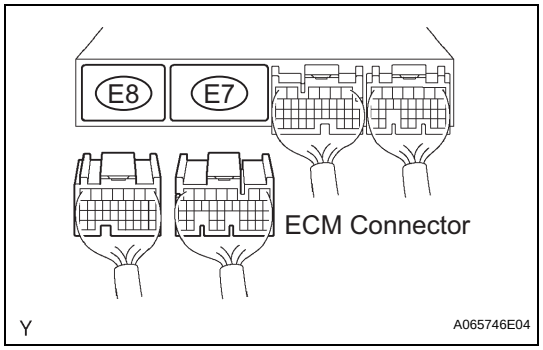
OK → **REPLACE MASS AIR FLOW METER**

NG

6	READ VALUE USING INTELLIGENT TESTER (CHECK FOR SHORT IN ECM)



(a) Disconnect the E7 and E8 ECM connectors.



(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Turn the tester on.
(e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / INTAKE AIR.
(f) Read the value displayed on the tester.
Standard temperature:
-40°C (-40°F)

NG → **REPLACE ECM**

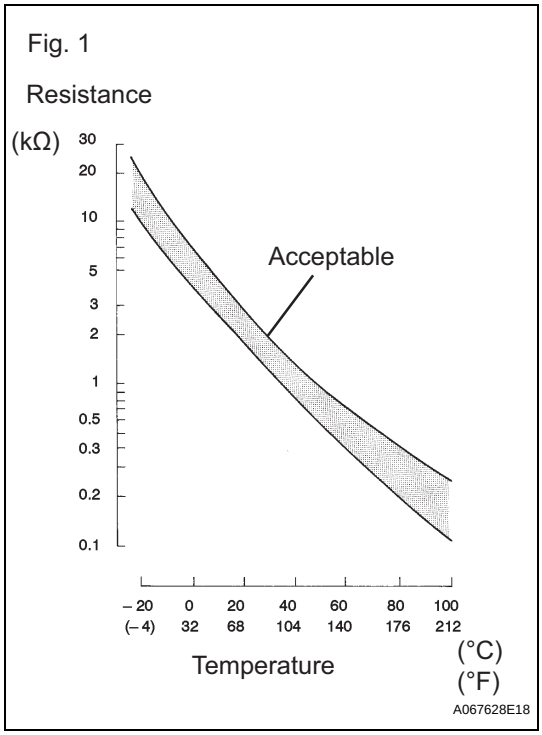
OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

ES

DTC	P0111	Intake Air Temperature Sensor Gradient Too High

DESCRIPTION



The Intake Air Temperature (IAT) sensor, mounted on the Mass Air Flow (MAF) meter, monitors the IAT. The IAT sensor has a built-in thermistor with a resistance that varies according to the temperature of the intake air. When the IAT 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 (See Fig. 1).
The IAT sensor is powered by a 5 V supply from the THA terminal of the ECM, via resistor R.
Resistor R and the IAT sensor are connected in series. When the resistance value of the IAT sensor changes, according to changes in the IAT, 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	When either condition below is met: 1. The intake air temperature rise is large, from the previous trip warm-up to the following trip (2 trip detection logic). 2. When the change in the intake air temperature after engine start is less than the threshold value.	Mass air flow meter assembly

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 the stuck intake air temperature sensor value 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 (After engine stop) P0111: Intake air temperature sensor rationality (After cold engine start)
Required Sensors/Components (Main)	Intake Air Temperature (IAT) sensor
Required Sensors/Components (Sub)	-
Frequency of Operation	Once per driving cycle
Duration	5 hours or more
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever the following DTCs are not present	None

After engine stop:

Time after engine start	10 seconds or more
Battery voltage	10.5 V or more
ECT sensor circuit	OK
ECT change since engine	Less than 180°C (356°F)
ECT before engine stop	70°C (158°F) or more
Time that MAF is low before engine stop	70 minutes
Accumulated MAF amount before engine stop	3,131 g or more
Key-off duration	30 minutes

After cold engine start:

Key-off duration	5 hours
Time after engine start	10 seconds or more
ECT sensor circuit	OK
ECT	70°C (158°F) or more
Accumulated MAF amount	3,451 g or more
One of the following conditions 1 or 2 is met:	-
1. Duration while engine load is low	120 seconds or more
2. Duration while engine load is high	10 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

After engine stop:

IAT change	Less than 1°C (2°F)

After cold engine start:

IAT change	Less than 1°C (2°F)

WIRING DIAGRAM

Refer to DTC P0110 (See page ES-88).

INSPECTION PROCEDURE

1	**CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0111)**

(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0111 and other DTCs	A
P0111	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**

DTC	P0115	Engine Coolant Temperature Circuit

DTC	P0117	Engine Coolant Temperature Circuit Low Input

DTC	P0118	Engine Coolant Temperature Circuit High Input

DESCRIPTION

A thermistor is built into the Engine Coolant Temperature (ECT) sensor, of which the resistance value varies according to the ECT.

The structure of the sensor and its connection to the ECM are the same as those of the Intake Air Temperature (IAT) sensor.

HINT:

When any of DTCs P0115, P0117 and P0118 are set, the ECM enters fail-safe mode. During fail-safe mode, the ECT is estimated to be 80°C (176°F) by the ECM. Fail-safe mode continues until a pass condition is detected.

DTC No.	DTC Detection Condition	Trouble Area
P0115	Open or short in ECT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open or short in ECT sensor circuit • ECT sensor • ECM
P0117	Short in ECT sensor circuit for 0.5 seconds (1 trip detection logic)	• Short in ECT sensor circuit • ECT sensor • ECM
P0118	Open in ECT sensor circuit for 0.5 seconds (1 trip detection logic)	• Open in ECT sensor circuit • ECT sensor • ECM

HINT:

When any of these DTCs are set, check the ECT by selecting the following menu items on the intelligent tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

Temperature Displayed	Malfunction
-40°C (-40°F)	Open circuit
140°C (284°F) or higher	Short circuit

MONITOR DESCRIPTION

The Engine Coolant Temperature (ECT) sensor is used to monitor the ECT. The ECT 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 voltage output from the sensor. The ECM monitors the sensor voltage and uses this value to calculate the ECT. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the ECT sensor and sets a DTC.

Example:

If the sensor voltage output is -40°C (-40°F) for 0.5 seconds or more, the ECM determines that there is an open in the ECT sensor circuit, and sets DTC P0118. Conversely, if the voltage output is more than 140°C (284°F) for 0.5 seconds or more, the ECM determines that there is a short in the sensor circuit, and sets DTC P0117.

If the malfunction is not repaired successfully, a DTC is set 0.5 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0115: Engine coolant temperature sensor range check (Fluctuating) P0117: Engine coolant temperature sensor range check (Low resistance) P0118: Engine coolant temperature sensor range check (High resistance)

Required Sensors/Components (Main)	Engine Coolant Temperature (ECT) 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 the following DTCs are not present	None

TYPICAL MALFUNCTION THRESHOLDS

P0115:

ECT sensor voltage	Less than 0.14 V, or more than 4.91 V

P0117:

ECT sensor voltage	Less than 0.14 V

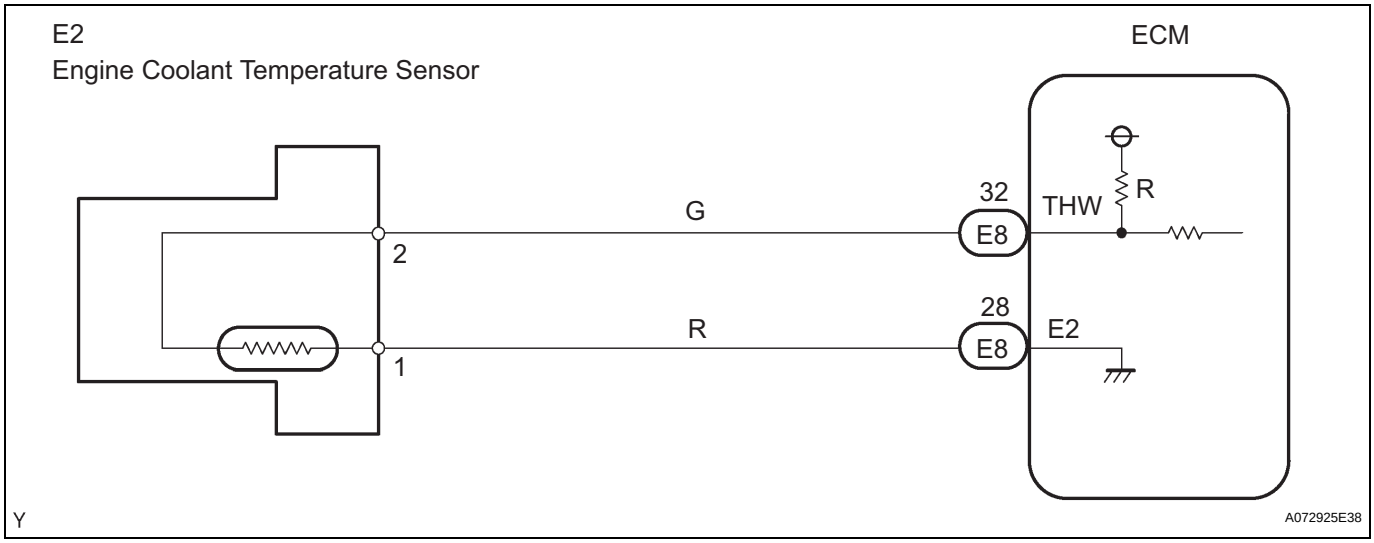
P0118:

ECT sensor voltage	More than 4.91 V

COMPONENT OPERATING RANGE

ECT sensor voltage [Engine coolant temperature]	0.14 to 4.91 V [-40 to 140°C (-40 to 284°F)]

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If other DTCs relating to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester. 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.

1	READ OUTPUT DTC

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0115	A
P0117	B
P0118	C

ES

B → **Go to step 5**

C → **Go to step 3**

A

2	READ VALUE USING INTELLIGENT TESTER (ENGINE COOLANT TEMPERATURE)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
(e) Read the value displayed on the tester.

Standard temperature:

Between 80°C and 97°C (176°F and 207°F) with warm engine.

Result

Temperature Displayed	Proceed to
-40°C (-40°F)	A
140°C (284°F) or higher	B
Between 80°C and 97°C (176°F and 207°F)	C

HINT:

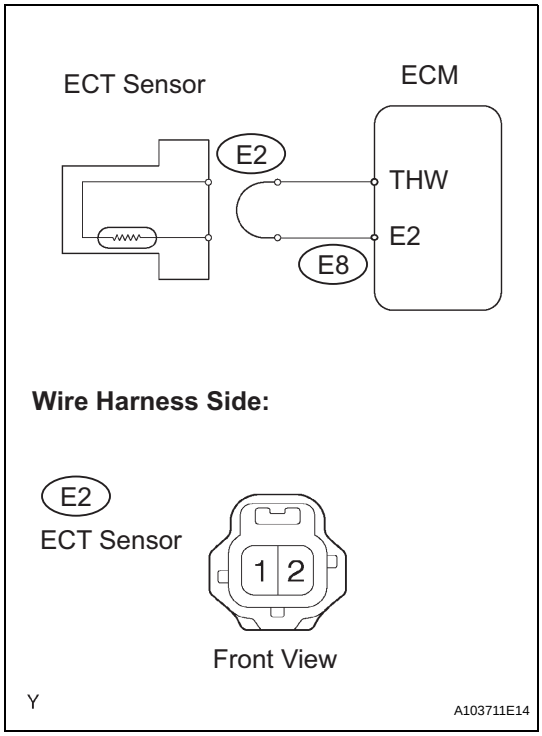
- If there is an open circuit, the intelligent tester indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester indicates 140°C (284°F) or higher.

B → **Go to step 5**

C → **CHECK FOR INTERMITTENT PROBLEMS**

A

3	READ VALUE USING INTELLIGENT TESTER (CHECK FOR OPEN IN WIRE HARNESS)

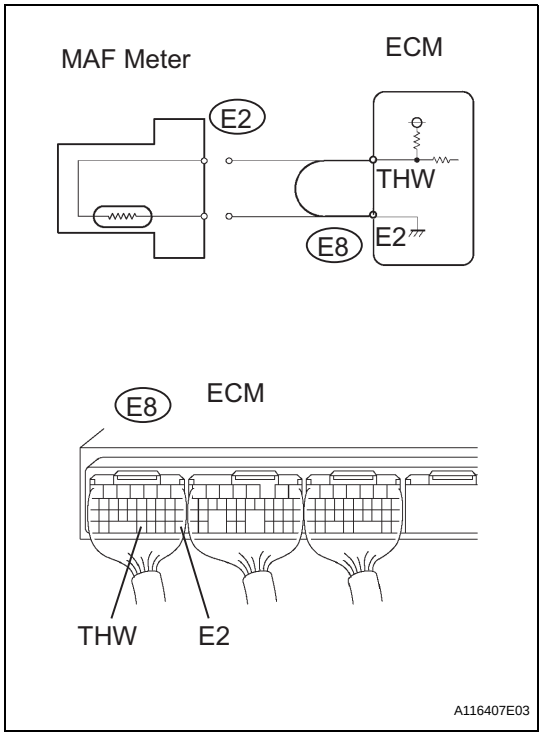


(a) Disconnect the E2 Engine Coolant Temperature (ECT) sensor connector.
(b) Connect terminals 1 and 2 of the ECT sensor connector on the wire harness side.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn the tester on.
(f) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
(g) Read the value displayed on the tester.
Standard temperature:
140°C (284°F) or higher

OK	CONFIRM GOOD CONNECTION TO SENSOR. IF OK, REPLACE ENGINE COOLANT TEMPERATURE SENSOR

NG

4	READ VALUE USING INTELLIGENT TESTER (CHECK FOR OPEN IN ECM)



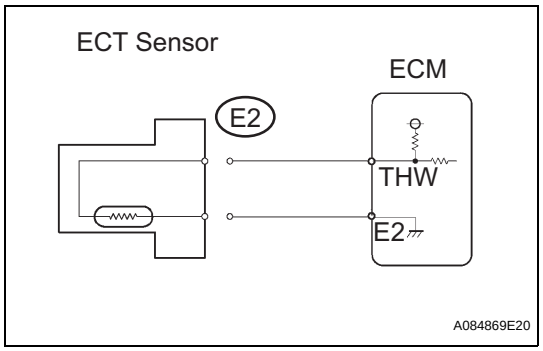
(a) Disconnect the E2 ECT sensor connector.
(b) Connect terminals THW and E2 of the E8 ECM connector.
HINT:
Before checking, perform visual and contact pressure checks on the ECM connector.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Turn the tester on.
(f) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
(g) Read the value displayed on the tester.
Standard temperature:
140°C (284°F) or higher

OK	REPAIR OR REPLACE HARNESS OR CONNECTOR

NG

CONFIRM GOOD CONNECTION TO ECM. IF OK, REPLACE ECM

5	READ VALUE USING INTELLIGENT TESTER (CHECK FOR SHORT IN WIRE HARNESS)



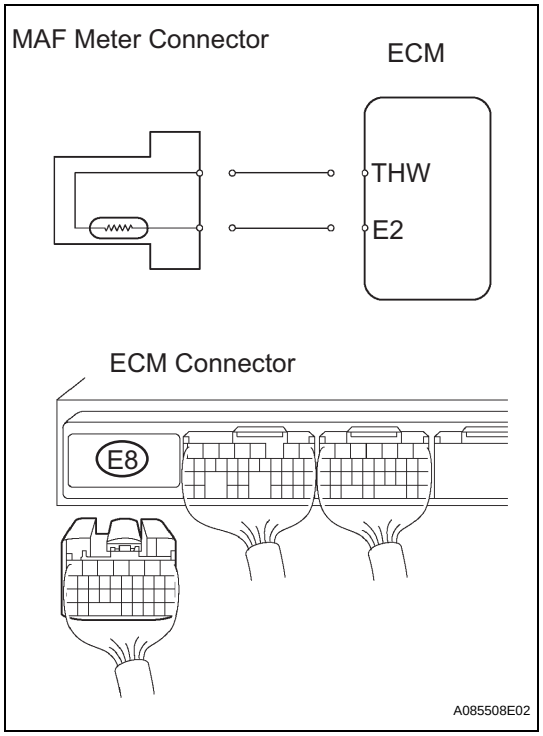
(a) Disconnect the E2 ECT sensor connector.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Turn the tester on.
(e) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
(f) Read the value displayed on the tester.
Standard temperature:
-40°C (-40°F)

ES

OK → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

NG

6	READ VALUE USING INTELLIGENT TESTER (CHECK FOR SHORT IN ECM)



(a) Disconnect the E8 ECM connector.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Turn the tester on.
(e) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
(f) Read the value displayed on the tester.
Standard temperature:
-40°C (-40°F)
(g) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

DTC	P0116	Engine Coolant Temperature Circuit Range / Performance Problem

DESCRIPTION

Refer to DTC P0115 (See page ES-97).

DTC No.	DTC Detection Condition	Trouble Area
P0116	When either of the following conditions is met (2 trip detection logic): • When cold engine started and engine warmed up, Engine Coolant Temperature (ECT) sensor value does not change. • After warmed up engine started, ECT sensor value does not change when engine stopped and then next cold engine start performed.	ECT sensor

MONITOR DESCRIPTION

The ECT sensor is used to monitor the ECT. The ECT sensor has a built-in thermistor with a resistance that varies according to the temperature of the engine coolant. When the ECT is low, the resistance of the thermistor increases. When the temperature is high, the resistance drops. These variations in the resistance are reflected in the voltage output from the ECT sensor.
The ECM monitors the sensor voltage and uses this value to calculate the ECT. If the sensor voltage output deviates from the normal operating range, the ECM interprets this deviation as a malfunction in the ECT sensor and sets the DTC.
Examples:

- Upon starting the engine, the ECT is between 35°C and 60°C (95°F and 140°F). If the ECT remains within 3°C (5.4°F) of the starting temperature after driving for 250 seconds, the DTC is set (2 trip detection logic).
- Upon starting the engine, the ECT is over 60°C (140°F). If the ECT remains within 1°C (1.8°F) of the starting temperature after driving for 250 seconds, the DTC is set (6 trip detection logic).

MONITOR STRATEGY

Related DTCs	P0116: Engine coolant temperature (ECT) sensor cold start monitor P0116: ECT sensor soak timer
Required Sensors/Components (Main)	Engine Coolant Temperature (ECT) sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Once per driving cycle
Duration	5 hours or more
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

ECT sensor cold start monitor:

Monitor runs whenever the following DTCs are not present	P0100 to P0103: Mass Air Flow (MAF) meter P0110 to P0113: Intake Air Temperature (IAT) sensor
Battery voltage	10.5 V or more
Time after engine start	1 second or more
ECT at engine start	Less than 60°C (140°F)
IAT sensor circuit	OK
Soak time	5 hours or more
Accumulated MAF	814 g or more
Engine	Running

Fuel cut	OFF
Difference between ECT at engine start and IAT	Less than 40°C (72°F)

ECT sensor soak monitor:

Monitor runs whenever the following DTCs are not present	P0100 to P0103: MAF meter P0110 to P0113: IAT sensor
Battery voltage	10.5 V or more
Engine	Running
Soak time	5 hours or more
Either condition (a) or (b) is met:	-
(a) ECT	60°C (140°F) or more
(b) Accumulated MAF	1359 g or more

TYPICAL MALFUNCTION THRESHOLDS

ECT Sensor cold start monitor:

ECT sensor value change	Less than 5°C (9°F)

ECT Sensor soak monitor:

Difference between current ECT sensor value and previous ECT sensor value when engine stopped	Less than 5°C (9°F)

COMPONENT OPERATING RANGE

Engine coolant temperature	ECT sensor value changes in accordance with actual ECT

INSPECTION PROCEDURE

HINT:

- If DTC P0115, P0116, P0117, P0118 and P0125 are output simultaneously, The ECT sensor circuit may be open or shorted. Perform the troubleshooting of DTC P0115, P0117 or P0118 first.
- Read freeze frame data using the intelligent tester. 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.

1	CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0116)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(d) Read the DTCs.

Result

Display (DTC output)	Proceed to
P0116	**A**
P0116 and other DTCs	**B**

B → **GO TO DTC CHART**

A

2	INSPECT THERMOSTAT

(a) Remove the thermostat (See page CO-14).
(b) Check the valve opening temperature of the thermostat.
Standard temperature:
80 to 84°C (176 to 183°F)
HINT:
In addition to the above check, confirm that the valve is completely closed when the temperature is below the standard.
(c) Reinstall the thermostat (See page CO-14).

NG → **REPLACE THERMOSTAT**

OK

REPLACE ENGINE COOLANT TEMPERATURE SENSOR

DTC	P0120	Throttle / Pedal Position Sensor / Switch "A" Circuit
DTC	P0122	Throttle / Pedal Position Sensor / Switch "A" Circuit Low Input
DTC	P0123	Throttle / Pedal Position Sensor / Switch "A" Circuit High Input
DTC	P0220	Throttle / Pedal Position Sensor / Switch "B" Circuit
DTC	P0222	Throttle / Pedal Position Sensor / Switch "B" Circuit Low Input
DTC	P0223	Throttle / Pedal Position Sensor / Switch "B" Circuit High Input
DTC	P2135	Throttle / Pedal Position Sensor / Switch "A" / "B" Voltage Correlation

DESCRIPTION

HINT:

These DTCs relate to the Throttle Position (TP) sensor.

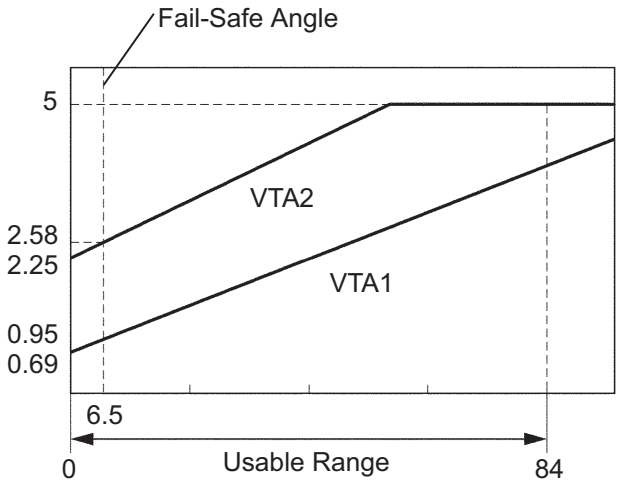
The Throttle Position (TP) sensor is mounted on the throttle body, and detects the opening angle of the throttle valve. This sensor is a non-contact type, and uses Hall-effect elements, in order to yield accurate signals, even in extreme driving conditions, such as at high speeds as well as very low speeds.

The TP sensor has 2 sensor circuits. One circuit sends the VTA1 signal. The other circuit sends the VTA2 signal. VTA1 is used to detect the throttle valve angle and VTA2 is used to detect malfunctions in VTA1. The sensor signal voltages vary between 0 V and 5 V in proportion to the throttle valve opening angle, and are transmitted to the VTA 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.

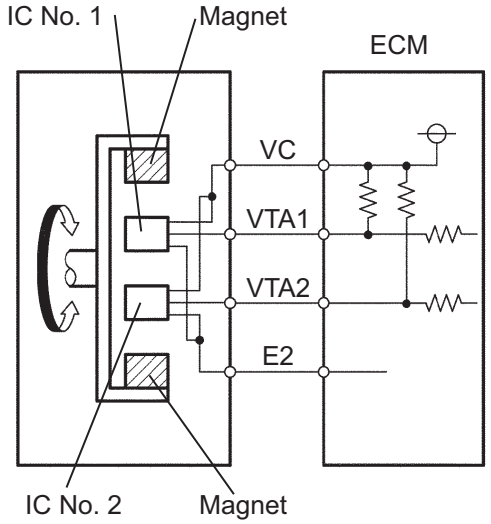
ES

Throttle Position Sensor Output Voltage (V)



Throttle Valve Opening Angle (°)

Throttle Position Sensor



Note:
The throttle valve opening angle detected by the sensor terminal VTA1 is expressed as percentages.

Between 6% and 16%: Throttle valve fully closed

Between 64% and 98%: Throttle valve fully open

Approximately 19%: Fail-safe angle (6.5°)

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DTC No.	DTC Detection Condition	Trouble Area
P0120	Output voltage of VTA1 quickly fluctuates beyond lower and upper malfunction thresholds for 2 seconds when accelerator pedal depressed (1 trip detection logic)	• Throttle Position (TP) sensor (built into throttle body) • ECM
P0122	Output voltage of VTA1 0.2 V or less for 2 seconds when accelerator pedal depressed (1 trip detection logic)	• TP sensor (built into throttle body) • Short in VTA1 circuit • Open in VC circuit • ECM
P0123	Output voltage of VTA1 4.535 V or more for 2 seconds when accelerator pedal depressed (1 trip detection logic)	• TP sensor (built into throttle body) • Open in VTA1 circuit • Open in E2 circuit • Short between VC and VTA1 circuits • ECM
P0220	Output voltage of VTA2 quickly fluctuates beyond lower and upper malfunction thresholds for 2 seconds when accelerator pedal depressed (1 trip detection logic)	• TP sensor (built into throttle body) • ECM

DTC No.	DTC Detection Condition	Trouble Area
P0222	Output voltage of VTA2 1.75 V or less for 2 seconds when accelerator pedal depressed (1 trip detection logic)	• TP sensor (built into throttle body) • Short in VTA2 circuit • Open in VC circuit • ECM
P0223	Output voltage of VTA2 4.8 V or more, and VTA1 between 0.2 V and 2.02 V, for 2 seconds when accelerator pedal depressed (1 trip detection logic)	• TP sensor (built into throttle body) • Open in VTA2 circuit • Open in E2 circuit • Short between VC and VTA2 circuits • ECM
P2135	Either condition (a) or (b) is met (1 trip detection logic): (a) Difference between output voltages of VTA1 and VTA2 0.02 V or less for 0.5 seconds or more (b) Output voltage of VTA1 0.2 V or less, and VTA2 1.75 V or less, for 0.4 seconds or more	• Short between VTA1 and VTA2 circuits • TP sensor (built into throttle body) • ECM

ES

HINT:

- When any of these DTCs are set, check the throttle valve opening angle by selecting the following menu items on the intelligent tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / THROTTLE POS AND THROTTLE POS #2.
- THROTTLE POS denotes the VTA1 signal (expressed in percentages), and THROTTLE POS #2 denotes the VTA2 signal (expressed in voltages).

Reference (Normal Condition)

Tester Display	Accelerator Pedal Fully Released	Accelerator Pedal Fully Depressed
THROTTLE POS	Between 6 % and 16 %	Between 64 % and 98 %
THROTTLE POS #2	Between 2.1 V and 3.1 V	Between 4.5 V and 5.0 V

MONITOR DESCRIPTION

The ECM uses the Throttle Position (TP) sensor to monitor the throttle valve opening angle. There are several checks that the ECM performs to confirm the proper operation of the TP 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, and sets a DTC.
- VTA1 and VTA2 each has a specific voltage range. If VTA1 or VTA2 is outside the normal operating range, the ECM interprets this as a malfunction in the sensor, and sets 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, and sets a DTC.

If the malfunction is not repaired successfully, a DTC is set 2 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0120: Throttle position sensor 1 range check (Fluctuating) P0122: Throttle position sensor 1 range check (Low voltage) P0123: Throttle position sensor 1 range check (High voltage) P0220: Throttle position sensor 2 range check (Fluctuating) P0222: Throttle position sensor 2 range check (Low voltage) P0223: Throttle position sensor 2 range check (High voltage) P2135: Throttle position sensor range check (Correlation)
Required Sensors/Components (Main)	Throttle position sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	2 seconds: P0120, P0122, P0123, P0220, P0222 and P0223 (Accelerator pedal ON) 10 seconds: P0120, P0122, P0123, P0220, P0222 and P0223 (Accelerator pedal OFF) 0.5 seconds: P2135 Case 1 0.4 seconds: P2135 Case 2
MIL Operation	Immediate

Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Either of the following conditions A or B is met:	-
A. Ignition switch ON	0.012 seconds or more
B. Electronic throttle actuator power	ON

TYPICAL MALFUNCTION THRESHOLDS

P0120:

VTA1 voltage	0.2 V or less, or 4.535 V or more

P0122:

VTA1 voltage	0.2 V or less

P0123:

VTA1 voltage	4.535 V or more

P0220:

VTA2 voltage	1.75 V or less, or 4.8 V or more

P0222:

VTA2 voltage	1.75 V or less

P0223:

VTA2 voltage when VTA1 0.2 V or more, and 2.02 V or less	4.8 V or more

P2135 Case 1:

Difference between VTA1 and VTA2 voltages	0.02 V or less

P2135 Case 2:

VTA1 voltage	0.2 V or less
VTA2 voltage	1.75 V or less

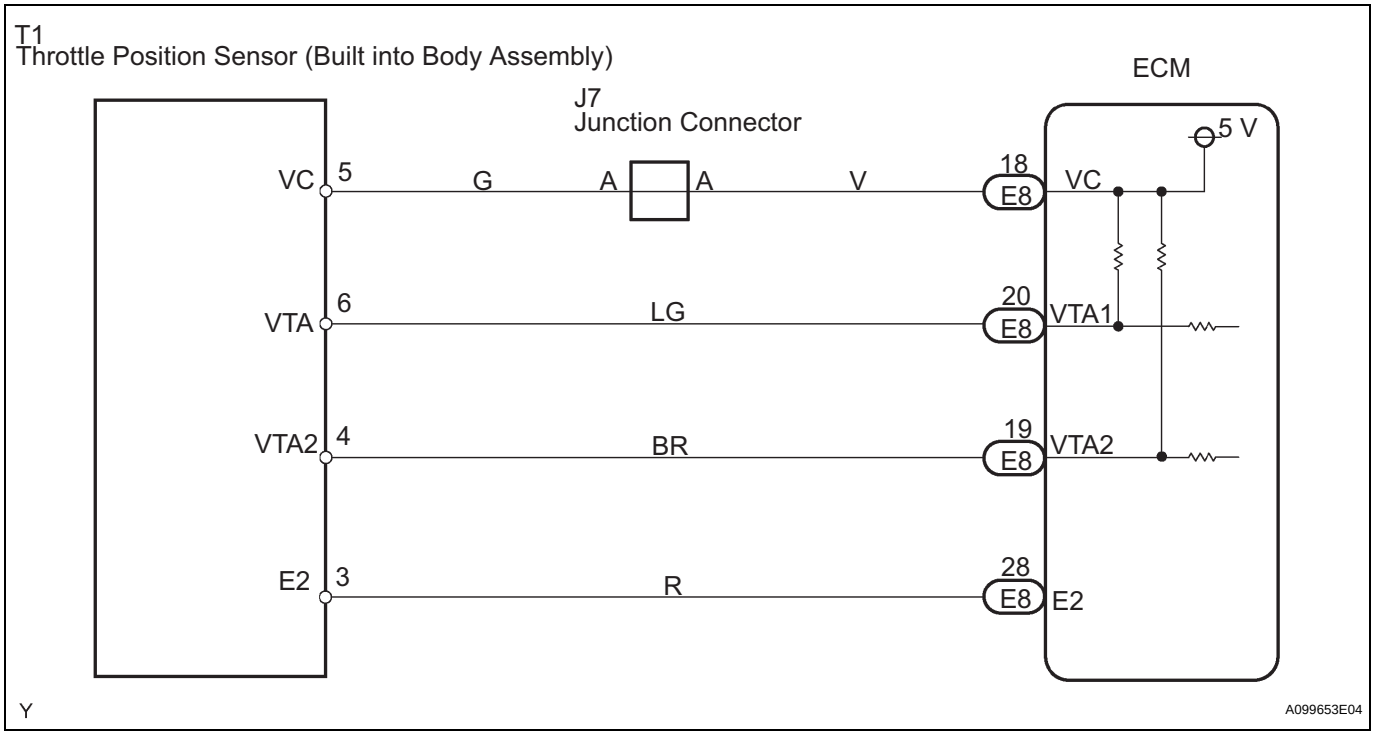
COMPONENT OPERATING RANGE

VTA1 voltage	0.69 to 4.05 V
VTA2 voltage	2.25 to 4.8 V

FAIL-SAFE

When any of these DTCs, as well as other DTCs relating to ETCS (Electronic Throttle Control System) malfunctions, are set, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator off, and the throttle valve is returned to a 6.5° 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 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:

- If other DTCs relating to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester. 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.

1	READ VALUE USING INTELLIGENT TESTER (THROTTLE POS #1, THROTTLE POS #2)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ETCS / THROTTLE POS and THROTTLE POS #2.
(d) Check the values displayed on the tester.

Result

TP#1 (VTA1) When AP Released	TP#2 (VTA2) When AP Released	TP#1 (VTA1) When AP Depressed	TP#2 (VTA2) When AP Depressed	Trouble Area	Proceed to
0 %	Between 0 V and 0.2 V	0 %	Between 0 V and 0.2 V	VC circuit open	A
100 %	Between 4.5 V and 5.0 V	100 %	Between 4.5 V and 5.0 V	E2 circuit open	A
0 % or 100 %	Between 2.1 V and 3.1 V (Fail-safe)	0 % or 100 %	Between 2.1 V and 3.1 V (Fail-safe)	VTA1 circuit open or ground short	A

TP#1 (VTA1) When AP Released	TP#2 (VTA2) When AP Released	TP#1 (VTA1) When AP Depressed	TP#2 (VTA2) When AP Depressed	Trouble Area	Proceed to
Approximately 19 % (Fail-safe)	Between 0 V and 0.2 V, or 4.5 V and 5.0 V	Approximately 19 % (Fail-safe)	Between 0 V and 0.2 V, or 4.5 V and 5.0 V	VTA2 circuit open or ground short	A
Between 6 % and 16 %	Between 2.1 V and 3.1 V	Between 64 % and 98 % (Not fail-safe)	Between 4.5 V and 5.0 V (Not fail-safe)	TP sensor circuit normal	B

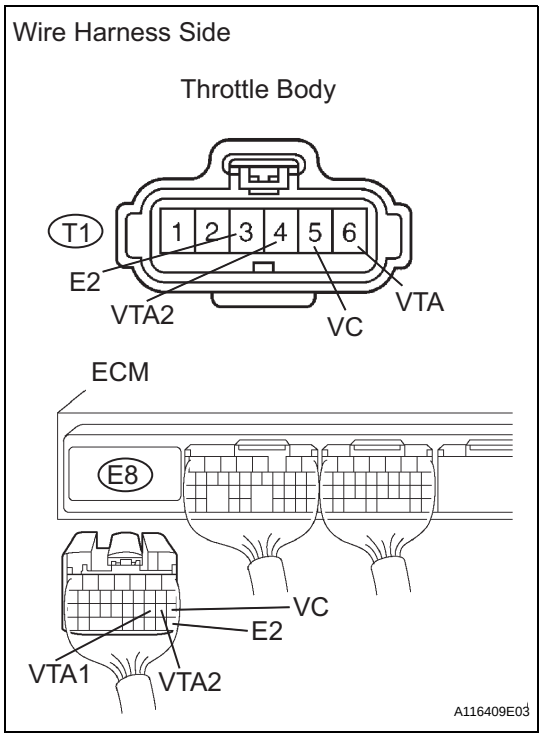
HINT:
- TP#1 denotes THROTTLE POS, and TP#2 denotes THROTTLE POS#2.
- AP denotes Accelerator Pedal.
- VTA1 is expressed as percentages, and VTA2 is expressed as voltages.

ES

B → Go to step 5

A

2 CHECK WIRE HARNESS (THROTTLE POSITION SENSOR - ECM)



(a) Disconnect the T1 throttle body connector.
(b) Disconnect the E8 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

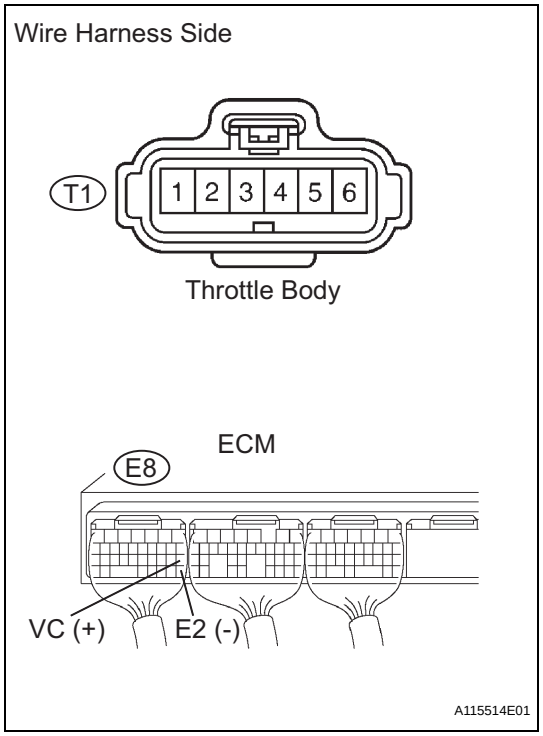
Standard resistance

Tester Connection	Specified Condition
VC (T1-5) - VC (E8-18)	Below 1 Ω
VTA (T1-6) - VTA1 (E8-20)	Below 1 Ω
VTA2 (T1-4) - VTA2 (E8-19)	Below 1 Ω
E2 (T1-3) - E2 (E8-28)	Below 1 Ω
VC (T1-5) or VC (E8-18) - Body ground	10 kΩ or higher
VTA (T1-6) or VTA1 (E8-20) - Body ground	10 kΩ or higher
VTA2 (T1-4) or VTA2 (E8-19) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3 **INSPECT ECM (VC VOLTAGE)**



(a) Disconnect the T1 throttle body connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
VC (E8-18) - E2 (E8-28)	Between 4.5 and 5.5 V

NG → **REPLACE ECM**

OK

4 **REPLACE THROTTLE BODY**

(a) Replace the throttle body (See page ES-382).

NEXT

5 **READ OUTPUT DTC (THROTTLE POSITION SENSOR DTCS ARE OUTPUT AGAIN)**

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Clear the DTCs (See page ES-32).
(d) Start the engine.
(e) Allow the engine to idle for 15 seconds or more.
(f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(g) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0120, P0122, P0123, P0220, P0222, P0223 and/or P2135	A
No output	B

B → **SYSTEM OK**

ES

A

REPLACE ECM

DTC	P0121	Throttle / Pedal Position Sensor / Switch "A" Circuit Range / Performance Problem

DESCRIPTION

HINT:
This DTC relates to the Throttle Position (TP) sensor.
Refer to DTC P0120 (See page ES-105).

DTC No.	DTC Detection Condition	Trouble Area
P0121	Difference between VTA1 and VTA2 voltages less than 0.8 V, or more than 1.6 V for 2 seconds (1 trip detection logic)	TP sensor (built into throttle body)

MONITOR DESCRIPTION

The ECM uses the TP sensor to monitor the throttle valve opening angle.
This sensor transmits 2 signals: VTA1 and VTA2. VTA1 is used to detect the throttle opening angle and VTA2 is used to detect malfunctions in VTA1. The ECM performs several checks to confirm the proper operation of the TP sensor and VTA1.
For each throttle opening angle, a specific voltage difference is expected between the outputs of VTA1 and VTA2. If the voltage output difference between the 2 signals deviates from the normal operating range, the ECM interprets this as a malfunction of the TP sensor. The ECM illuminates the MIL and sets the DTC.
If the malfunction is not repaired successfully, the DTC is set 2 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0121: TP sensor rationality
Required Sensors/Components (Main)	TP sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	Within 2 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0120 - P0223, P2135 (TP sensor)
Either of the following conditions A or B is met:	-
A. Ignition Switch	ON
B. ETCS power	ON

TYPICAL MALFUNCTION THRESHOLDS

Difference in voltage between VAT1 and VTA2 TP sensor 1 - [TP sensor 2 x 0.8 (corrected by learning value)]	Less than 0.8 V, or more than 1.6 V

FAIL-SAFE

When any of these DTCs, as well as other DTCs relating to ETCS (Electronic Throttle Control System) malfunctions, are set, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator off, and the throttle valve is returned to a 6.5° 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 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 P0120 (See page ES-109).

ES

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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.

1	READ OTHER DTC OUTPUT (IN ADDITION TO DTC P0121)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(d) Read the DTCs.

Result

Display (DTC output)	Proceed to
P0121	A
P0121 and other DTCs	B

HINT:

If any other codes besides P0121 are output, perform the troubleshooting for those codes first.

B → GO TO DTC CHART

A

REPLACE THROTTLE BODY

DTC	P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control

DESCRIPTION

Refer to DTC P0115 (See page ES-97).

DTC No.	DTC Detection Condition	Trouble Area
P0125	Engine Coolant Temperature (ECT) does not reach closed-loop enabling temperature for 20 minutes (this period varies with engine start ECT) (2 trip detection logic)	• Cooling system • ECT sensor • Thermostat

MONITOR DESCRIPTION

The resistance of the ECT sensor varies in proportion to the actual ECT. The ECM supplies a constant voltage to the sensor and monitors the signal output voltage of the sensor. The signal voltage output varies according to the changing resistance of the sensor. After the engine is started, the ECT is monitored through this signal. If the ECT sensor indicates that the engine is not yet warm enough for closed-loop fuel control, despite a specified period of time having elapsed since the engine was started, the ECM interprets this as a malfunction in the sensor or cooling system and sets the DTC.
Example:
The ECT is 0°C (32°F) at engine start. After 5 minutes running time, the ECT sensor still indicates that the engine is not warm enough to begin closed-loop fuel (air-fuel ratio feedback) control. The ECM interprets this as a malfunction in the sensor or cooling system and sets the DTC.

MONITOR STRATEGY

Related DTCs	P0125: Insufficient engine coolant temperature for closed-loop fuel control
Required Sensors/Components (Main)	Thermostat, cooling system
Required Sensors/Components (Related)	Engine coolant temperature sensor and mass air flow meter
Frequency of Operation	Once per driving cycle
Duration	72.38 seconds: Engine start ECT is -8.34°C (17°F) or more 122.73 seconds: Engine start ECT is -19.45 to -8.34°C (-3 to 17°F) 20 minutes: Engine start ECT is less than -19.45°C (-3°F)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0100 - P0103 (MAF sensor) P0110 - P0113 (IAT sensor) P0115 - P0118 (ECT sensor)
Thermostat failure	Not detected

TYPICAL MALFUNCTION THRESHOLDS

Time until actual engine coolant temperature reaches closed-loop engine coolant temperature	72.38 seconds: Engine start ECT is -8.34°C (17°F) or more 122.73 seconds: Engine start ECT is -19.45 to -8.34°C (-3 to 17°F) 20 minutes: Engine start ECT is less than -19.45°C (-3°F)

WIRING DIAGRAM

Refer to DTC P0115 (See page ES-98).

INSPECTION PROCEDURE

HINT:

- If any of DTCs P0115, P0116, P0117 or P0118 are output simultaneously with DTC P0125, the Engine Coolant Temperature (ECT) sensor may have an open or a short circuit. Troubleshoot those DTCs first.
- Read freeze frame data using the intelligent tester. 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.

1 CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0125)

ES

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0125	A
P0125 and other DTCs	B

HINT:
If any DTCs other than P0125 are output, troubleshoot those DTCs first.

B → **GO TO DTC CHART**

A

2 INSPECT THERMOSTAT

(a) Remove the thermostat (See page CO-14).
(b) Check the valve opening temperature of the thermostat.
Standard temperature:
80 to 84°C (176 to 183°F)
HINT:
In addition to the above check, confirm that the valve is completely closed when the temperature is below the standard.
(c) Reinstall the thermostat (See page CO-14).

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

DTC	P0128	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)

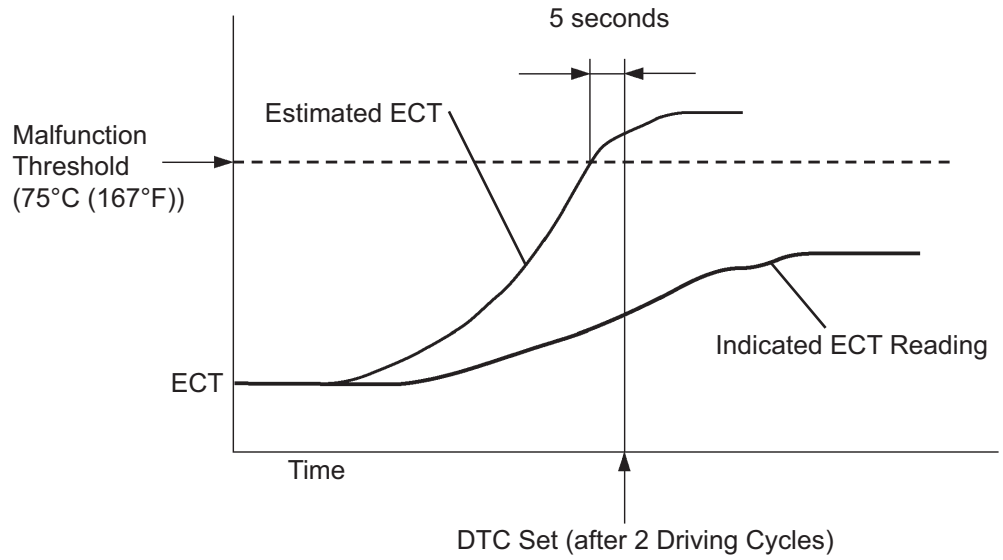
DESCRIPTION

HINT:
This DTC relates to the thermostat.
This DTC is set when the Engine Coolant Temperature (ECT) does not reach 75°C (167°F) despite sufficient engine warm-up time.

DTC No.	DTC Detection Condition	Trouble Area
P0128	Conditions (a), (b) and (c) are met for 5 seconds (2 trip detection logic): (a) Cold start (b) Engine warmed up (c) ECT less than 75°C (167°F)	• Thermostat • Cooling system • ECT sensor • ECM

ES

MONITOR DESCRIPTION



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The ECM estimates the coolant temperature based on starting temperature, engine loads, and engine speeds. The ECM then compares the estimated temperature with the actual ECT. When the estimated coolant temperature reaches 75°C (167°F), the ECM checks the actual ECT. If the actual ECT is less than 75°C (167°F), the ECM interprets this as a malfunction in the thermostat or the engine cooling system and sets the DTC.

MONITOR STRATEGY

Related DTCs	P0128: Coolant Thermostat
Required Sensors/Components (Main)	Thermostat

Required Sensors/Components (Related)	Engine Coolant Temperature (ECT) sensor, Intake Air Temperature (IAT) sensor, Vehicle speed sensor
Frequency of Operation	Once per driving cycle
Duration	900 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0010 (VVT OCV Bank 1) P0011 (VVT System 1 - Advance) P0012 (VVT System 1 - Retard) P0031, P0032, P0051, P0052 (A/F sensor heater - Sensor 1) P0100 - P0103 (MAF meter) P0110 - P0113 (IAT sensor) P0115 - P0118 (ECT sensor) P0125 (Insufficient ECT for Closed Loop) P0171, P0172 (Fuel system) P0300 - P0304 (Misfire) P0335 (CKP sensor) P0340 (CMP sensor) P0351 - P0354 (Igniter) P0500 (VSS) P2196 (A/F sensor - rationality) P2A00 (A/F sensor - slow response)
Battery voltage	11 V or more
Either of the following conditions is met:	1 or 2 is met
1. All of the following conditions are met:	(a), (b) and (c) are met
(a) ECT at engine start - IAT at engine start	-15 to 7°C (-27 to 12.6°F)
(b) ECT at engine start	-10 to 56°C (14 to 132.8°F)
(c) IAT at engine start	-10 to 56°C (14 to 132.8°F)
2. All of the following conditions are met:	(d), (e) and (f) are met
(d) ECT at engine start - IAT at engine start	Higher than 7°C (12.6°F)
(e) ECT at engine start	56°C (132.8°F) or lower
(f) IAT at engine start	-10°C (14°F)
Accumulated time that vehicle speed is 80 mph (128 km/h) or more	Less than 20 seconds

TYPICAL MALFUNCTION THRESHOLDS

Duration that both of the following conditions are met:	Conditions A and B are met
A. Estimated ECT	75°C (167°F) or higher
B. ECT sensor output	Lower than 75°C (167°F)

MONITOR RESULT

Refer to detailed information on "CHECKING MONITOR STATUS" (See page ES-15).

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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.

1	CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0128)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0128	A
P0128 and other DTCs	B

HINT:
If any DTCs other than P0128 are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

A

2	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

3	INSPECT THERMOSTAT

(a) Remove the thermostat (See page CO-14).
(b) Check the valve opening temperature of the thermostat.
Standard temperature:
80 to 84°C (176 to 183°F)
HINT:
In addition to the above check, confirm that the valve is completely closed when the temperature is below the standard.
(c) Reinstall the thermostat (See page CO-14).

NG → REPLACE THERMOSTAT

OK

REPLACE ECM

DTC	P0136	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)

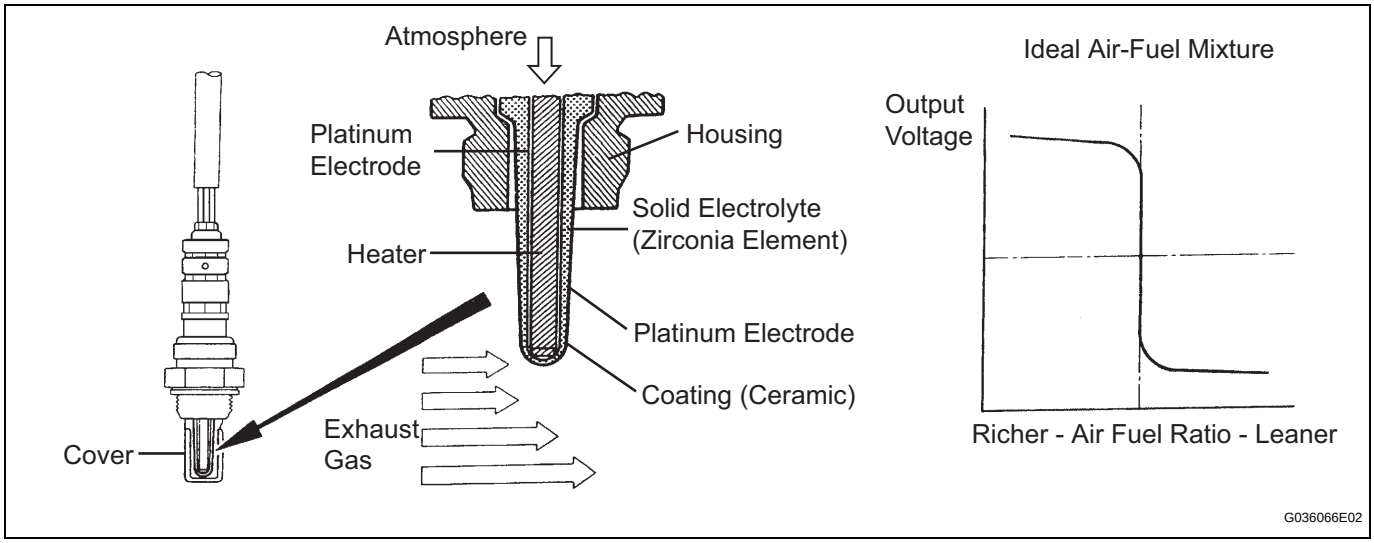
DTC	P0137	Oxygen Sensor Circuit Low Voltage (Bank 1 Sensor 2)

DTC	P0138	Oxygen Sensor Circuit High Voltage (Bank 1 Sensor 2)

DESCRIPTION

ES

A three-way catalytic converter (TWC) is used in order to convert the carbon monoxide (CO), hydrocarbon (HC), and nitrogen oxide (NOx) into less harmful substances. To allow the TWC to function effectively, it is necessary to keep the air-fuel of the engine near the stoichiometric air-fuel ratio. For the purpose of helping the ECM to deliver accurate air-fuel ratio control, the 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.
HINT:
Sensor 2 refers to the sensor mounted behind the Three-Way Catalytic Converter (TWC) and located far from the engine assembly.



DTC No.	DTC Detection Condition	Trouble Area
P0136	• Abnormal voltage output: During active air-fuel ratio control, following conditions (a) and (b) met for certain period of time (2 trip detection logic): (a) Heated Oxygen (HO2) sensor voltage does not decrease to less than 0.59 V (b) HO2 sensor voltage does not increase to more than 0.21 V • Low impedance: Sensor impedance less than 5 Ω for more than 30 seconds when ECM presumes sensor to be warmed up and operating normally (2 trip detection logic):	• Open or short in HO2 sensor (sensor 2) circuit • HO2 sensor (sensor 2) • HO2 sensor heater (sensor 2) • Air-Fuel Ratio (A/F) sensor (sensor 1) • EFI relay • Gas leakage from exhaust system
P0137	• Low voltage (open): During active air-fuel ratio control, following conditions (a) and (b) met for certain period of time (2 trip detection logic): (a) HO2 sensor voltage output less than 0.21 V (b) Target air-fuel ratio rich • High impedance: Sensor impedance 15 kΩ or more for more than 90 seconds when ECM presumes sensor to be warmed up and operating normally (2 trip detection logic):	• Open in HO2 sensor (sensor 2) circuit • HO2 sensor (sensor 2) • HO2 sensor heater (sensor 2) • EFI relay • Gas leakage from exhaust system
P0138	• High voltage (short): During active air-fuel ratio control, following conditions (a) and (b) met for certain period of time (2 trip detection logic): (a) HO2 sensor voltage output more than 0.59 V (b) Target air-fuel ratio lean • Extremely high voltage (short): HO2 sensor voltage output exceeds 1.2 V for more than 10 seconds (2 trip detection logic):	• Short in HO2 sensor (sensor 2) circuit • HO2 sensor (sensor 2) • ECM internal circuit malfunction

ES

MONITOR DESCRIPTION

The ECM monitors the rear Heated Oxygen (HO2) sensor to check for the following malfunctions. If any of the malfunctions are detected, the ECM illuminates the MIL and sets a DTC:

- The HO2 sensor output voltage remains above 0.45 V (rich) or below 0.45 V (lean) while the vehicle is accelerated and decelerated for 8 minutes.
- The HO2 sensor output voltage remains below 0.05 V for a long period of time while the vehicle is driven.
- The HO2 sensor output voltage does not decrease below 0.2 V (extremely lean condition) within 7 seconds after fuel-cut is performed while the vehicle is decelerated. The ECM interprets this as the sensor response having deteriorated.

MONITOR STRATEGY

Related DTCs	P0136: Heated oxygen sensor output voltage (Abnormal voltage output) P0136: Heated oxygen sensor impedance (Low) P0137: Heated oxygen sensor output voltage (Low voltage) P0137: Heated oxygen sensor impedance (High) P0138: Heated oxygen sensor output voltage (High voltage) P0138: Heated oxygen sensor output voltage (Extremely high)
Required Sensors/Components (Main)	Heated oxygen sensor
Required Sensors/Components (Related)	Crankshaft position sensor, engine coolant temperature sensor, mass air flow meter and throttle position sensor
Frequency of Operation	Once per driving cycle: Active air-fuel ratio control detection Continuous: Other

Duration	20 seconds: Active air-fuel ratio control detection 90 seconds: Heated oxygen sensor impedance (High) 30 seconds: Heated oxygen sensor impedance (Low) 10 seconds: Output voltage (Stuck high)
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0031, P0032 (A/F sensor heater - Sensor 1) P0037, P0038 (O2 Sensor Heater - Sensor 2) P0100 - P0103 (MAF meter) P0110 - P0113 (IAT sensor) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for Closed Loop) P0171, P0172 (Fuel system) P0300 - P0304 (Misfire) P0335 (CKP sensor) P0340 (CMP sensor) P0500 (VSS) P2196 (A/F sensor - rationality) P2A00 (A/F sensor - slow response)

ES

Heated Oxygen Sensor Output Voltage (Abnormal Voltage Output, High Voltage and Low Voltage):

Active air-fuel ratio control	Executing
Active air-fuel ratio control begins when all of the following conditions are met:	-
Battery voltage	11 V or more
Engine coolant temperature	75°C (167°F) or more
Idling	OFF
Engine RPM	Less than 4,000 rpm
A/F sensor status	Activated
Fuel system status	Closed loop
Fuel cut	OFF
Engine load	10 to 80 %
Shift position	4th

Heated Oxygen Sensor Impedance (Low):

Battery voltage	11 V or more
Estimated rear HO2 sensor temperature	Less than 700°C (1,292°F)
ECM monitor	Completed
DTC P0606	Not set

Heated Oxygen Sensor Impedance (High):

Battery voltage	11 V or more
Estimated rear HO2 sensor temperature	450°C (842°F) or more
ECM monitor	Completed
DTC P0606	Not set

Heated Oxygen Sensor Output Voltage (Extremely High):

Battery voltage	11 V or more
Time after engine start	2 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

Heated Oxygen Sensor Output Voltage (Abnormal Voltage Output):

Either of the following conditions is met:	1 or 2

1. All of the following conditions (a), (b) and (c) are met:	-
(a) Commanded air-fuel ratio	14.3 or less
(b) Rear HO2 sensor voltage	0.21 to 0.59 V
(c) OSC (Oxygen Storage Capacity of Catalyst)	2 g or more
2. All of the following conditions (d), (e) and (f) are met:	-
(d) Commanded air-fuel ratio	14.9 or more
(e) Rear HO2 sensor voltage	0.21 to 0.59 V
(f) OSC	2 g or more

Heated Oxygen Sensor Output Voltage (Low):

All of the following conditions (a), (b) and (c) are met:	-
(a) Commanded air-fuel ratio	14.3 or less
(b) Rear HO2 sensor voltage	Less than 0.21 V
(c) OSC	2 g or more

Heated Oxygen Sensor Output Voltage (High):

All of the following conditions (a), (b) and (c) are met:	-
(a) Commanded air-fuel ratio	14.9 or more
(b) Rear HO2 sensor voltage	More than 0.59 V
(c) OSC	2 g or more

Heated Oxygen Sensor Impedance (Low):

Duration that the following condition is met	30 seconds or more
Heated oxygen sensor impedance	Less than 5 Ω

Heated Oxygen Sensor Impedance (High):

Duration that the following condition is met	90 seconds or more
Heated oxygen sensor impedance	15 kΩ or more

Heated Oxygen Sensor Output Voltage (Extremely High):

Duration that the following condition is met	10 seconds or more
Heated oxygen sensor voltage	1.2 V or more

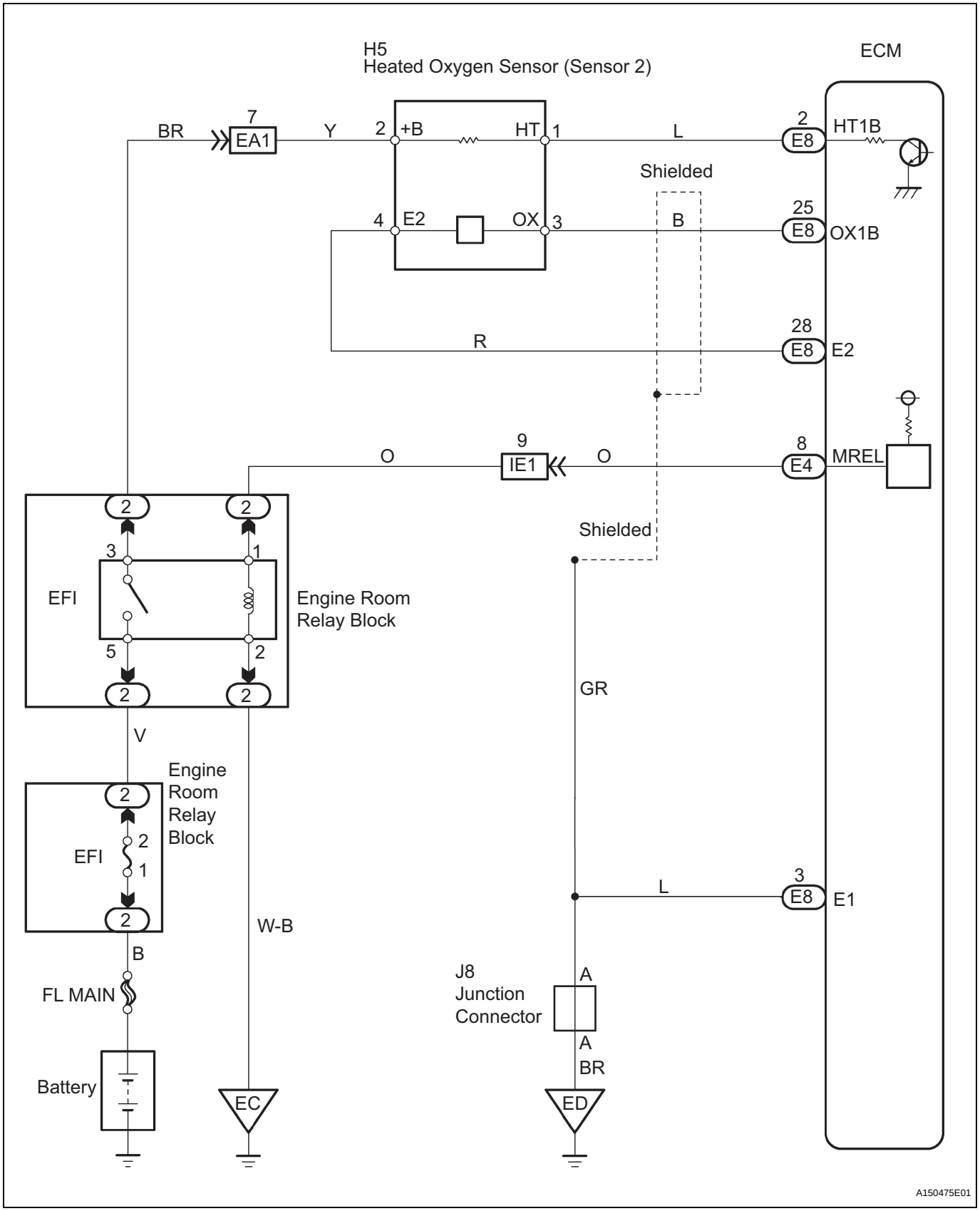
COMPONENT OPERATING RANGE

Duration that the following condition is met	30 seconds or more
Heated oxygen sensor voltage	Varies between 0.1 V and 0.9 V

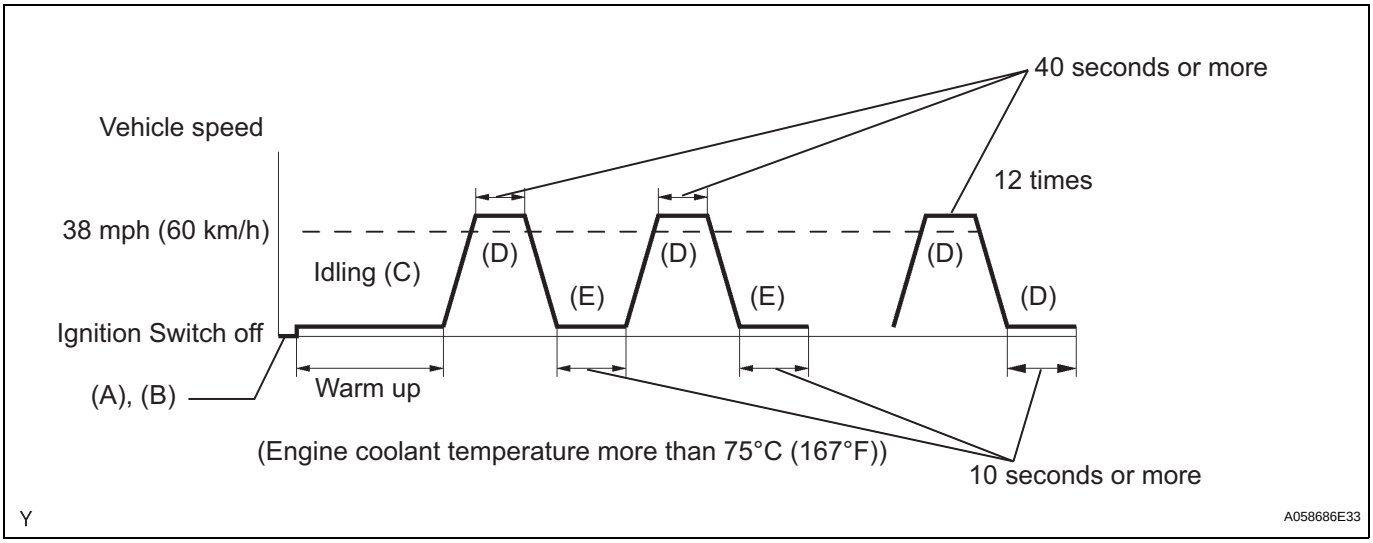
MONITOR RESULT

Refer to CHECKING MONITOR STATUS (See page ES-15).

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN



(a) Connect the intelligent tester to the DLC3 (Procedure "A").
(b) Switch the ECM from normal mode to check mode using the tester (See page ES-35) (Procedure "B").
(c) Start the engine and warm it up until the engine coolant temperature reaches more than 75°C (167°F) (Procedure "C").
(d) Drive the vehicle at 38 mph (60 km/h) or more for 40 seconds or more (Procedure "D").
(e) Allow the engine to idle for 10 seconds or more (Procedure "E").
(f) Perform Procedure "D" and "E" 12 times (Procedure "F").
HINT:
If a malfunction exists, the MIL illuminates during Procedure "F".
NOTICE:
If the conditions in this test are not strictly followed, malfunctions may not be detected. If you do not have the intelligent tester, turn the ignition switch off after performing Procedure "C" to "F", then perform Procedure "C" to "F" again.

INSPECTION PROCEDURE

HINT:
Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.
The following instructions describe how to conduct the A/F CONTROL operation using the intelligent tester.
1. Connect the intelligent tester to the DLC3.
2. Start the engine and turn the tester on.
3. Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
4. On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
5. Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
6. Monitor the voltage outputs of the A/F and HO2 sensors (AFS B1S1 and OS2 B1S2) displayed on the tester.

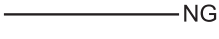
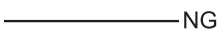
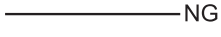
HINT:
- The A/F CONTROL operation lowers the fuel injection volume by 12.5 % or increases the injection volume by 25 %.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard:

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 (A/F)	+25 %	Rich	Less than 3.0

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 (A/F)	-12.5 %	Lean	More than 3.35
O2S B1S2 (HO2)	+25 %	Rich	More than 0.55
O2S B1S2 (HO2)	-12.5 %	Lean	Less than 0.4

NOTICE:
The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage		HO2 Sensor (Sensor 2) Output Voltage		Main Suspected Trouble Area
1	Injection Volume +25 % -12.5 %		Injection Volume +25 % -12.5 %		-
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage More than 0.55 V Less than 0.4 V		
2	Injection Volume +25 % -12.5 %		Injection Volume +25 % -12.5 %		• A/F sensor • A/F sensor heater • A/F sensor circuit
	Output Voltage Almost no reaction		Output Voltage More than 0.55 V Less than 0.4 V		
3	Injection Volume +25 % -12.5 %		Injection Volume +25 % -12.5 %		• Heated oxygen sensor • Heated oxygen sensor heater • Heated oxygen sensor circuit
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage Almost no reaction		
4	Injection Volume +25 % -12.5 %		Injection Volume +25 % -12.5 %		• Injector • Fuel pressure • Gas leakage from exhaust system (Air-furl ratio extremely lean or rich)
	Output Voltage Almost no reaction		Output Voltage Almost no reaction		

- Following the A/F CONTROL procedure enables technicians to check and graph the voltage outputs of both the A/F and HO2 sensors.
- To display the graph, select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2, and press the YES button and then the ENTER button followed by the F4 button.

HINT:

- If other DTCs relating to different systems that have terminal E2 as the ground terminal are output simultaneously, terminal E2 may have an open circuit.
- Read freeze frame data using the intelligent tester. 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.
- If the OX1B wire from the ECM connector is short-circuited to the +B wire, DTC P0136 will be set.

1	READ OUTPUT DTC

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(d) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0138, P0139	A
P0137	B
P0136	C

B → Go to step 14

C → Go to step 7

A

2	READ VALUE USING INTELLIGENT TESTER (OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B1S2.
(d) Allow the engine to idle.
(e) Read the Heated Oxygen (HO2) sensor output voltage while idling.

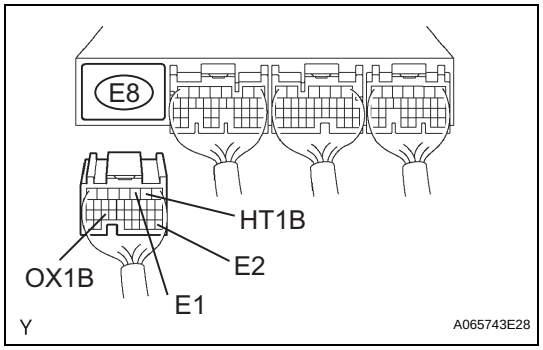
Result

HO2 Sensor Output Voltage	Proceed to
More than 1.2 V	A
Less than 1.0 V	B

B → Go to step 5

A

3 CHECK WIRE HARNESS (FOR SHORT)



(a) Turn the ignition switch off and wait for 5 minutes.
(b) Disconnect the E8 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

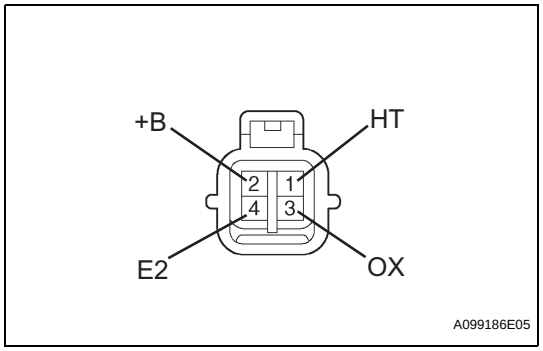
Tester Connection	Specified Condition
HT1B (E8-2) - OX1B (E8-25)	10 kΩ or higher

NG → **Go to step 4**

OK

REPLACE ECM

4 INSPECT HEATED OXYGEN SENSOR (CHECK FOR SHORT)



(a) Disconnect the H5 HO2 sensor connector.
(b) Measure the resistance of the sensor.

Standard resistance

Tester Connection	Specified Condition
+B (2) - E2 (4)	10 kΩ or higher
+B (2) - OX (3)	10 kΩ or higher

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

5 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

6 CHECK WHETHER DTC OUTPUT RECURS (DTC P0138, P0139)

(a) On the intelligent tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(b) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0138, P0139	A

ES

Display (DTC Output)	Proceed to
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

REPLACE HEATED OXYGEN SENSOR

ES

7 READ VALUE USING INTELLIGENT TESTER (OUTPUT VOLTAGE OF HEATED OXYGEN SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Start the engine.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / O2S B1S2.
(e) After warming up the engine, run the engine at an engine speed of 2,500 rpm for 3 minutes.
(f) Read the output voltage of the HO2 sensor when the engine rpm is suddenly increased.
HINT:
Quickly accelerate the engine to 4,000 rpm 3 times using the accelerator pedal.
Standard:
Fluctuates between 0.4 V or less and 0.5 V or more.

NG → Go to step 14

OK

8 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

9 CHECK WHETHER DTC OUTPUT RECURS (DTC P0136)

(a) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(b) Read the DTCs.
Result

Display (DTC Output)	Proceed to
P0136	A
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

10	REPLACE HEATED OXYGEN SENSOR

NEXT

11	PERFORM CONFIRMATION DRIVING PATTERN

HINT:
Clear all DTCs before performing the confirmation driving pattern.

NEXT

ES

12	CHECK WHETHER DTC OUTPUT RECURS (DTC P0136)

(a) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(b) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0136	A
No output	B

B → REPAIR COMPLETED

A

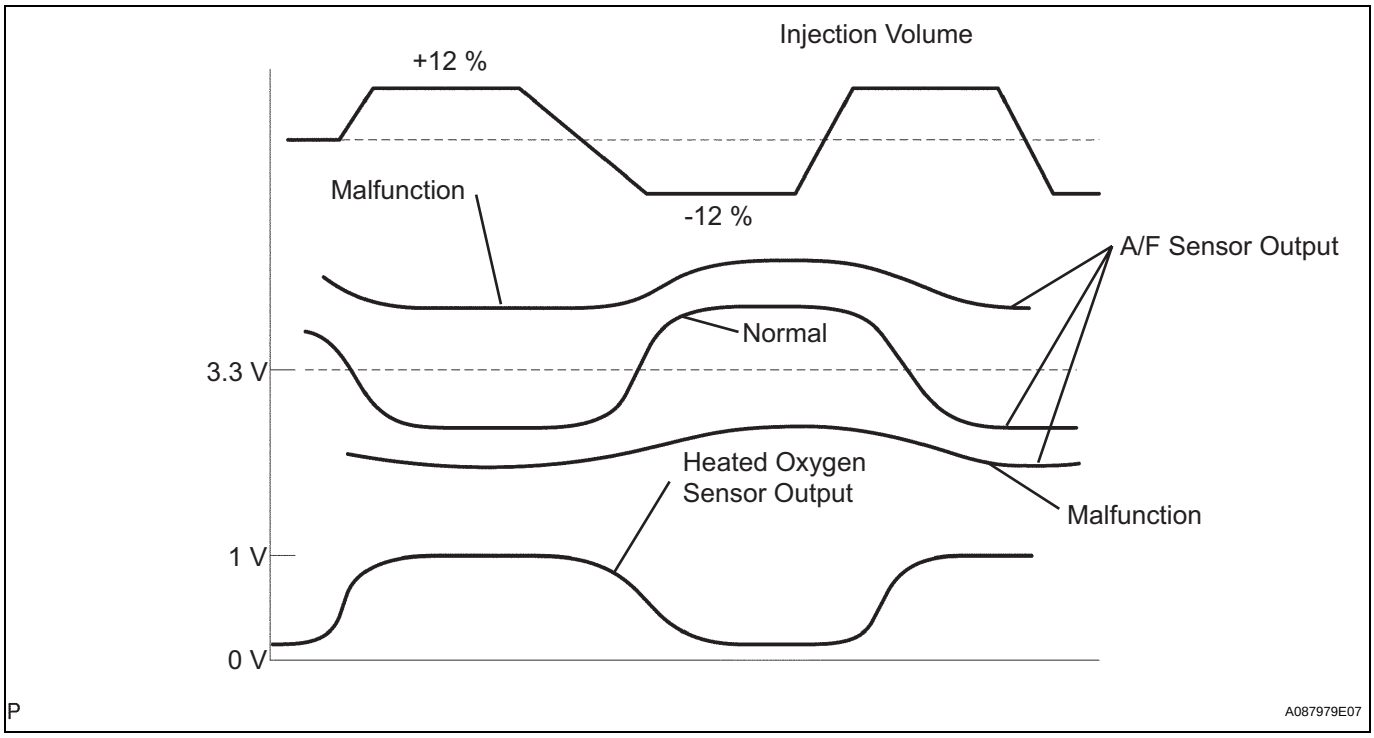
13	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (INJECTION VOLUME)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and turn the tester on.
(c) Warm up the engine.
(d) Enter the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / INJ VOL.
(e) Change the fuel injection volume using the tester, monitoring the voltage output of Air-Fuel Ratio (A/F) and HO2 sensors displayed on the tester.
HINT:
- Change the fuel injection volume within the range of -12 % and +12 %. The injection volume can be changed in 1 % graduations within the range.
- The A/F sensor is displayed as AFS B1S1, and the HO2 sensor is displayed as O2S B1S2, on the intelligent tester.

Result

Tester Display (Sensor)	Voltage Variation	Proceed to
AFS B1S1 (A/F)	Alternates between more and less than 3.3 V	OK
AFS B1S1 (A/F)	Remains at more than 3.3 V	NG
AFS B1S1 (A/F)	Remains at less than 3.3 V	NG

HINT:
A normal HO2 sensor voltage (O2S B1S2) reacts in accordance with increases and decreases in fuel injection volumes. When the A/F sensor voltage remains at either less or more than 3.3 V despite the HO2 sensor indicating a normal reaction, the A/F sensor is malfunctioning.



NG → **REPLACE AIR FUEL RATIO SENSOR**

OK

CHECK FUEL SYSTEM AND EXHAUST SYSTEM

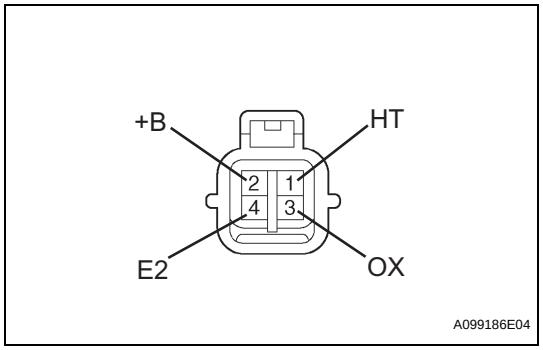
14	INSPECT FOR EXHAUST GAS LEAK

OK:
No gas leakage.

NG → **REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT**

OK

15 INSPECT HEATED OXYGEN SENSOR (HEATER RESISTANCE)



(a) Disconnect the H5 HO2 sensor connector.
(b) Measure the resistance according to the value(s) in the table below.

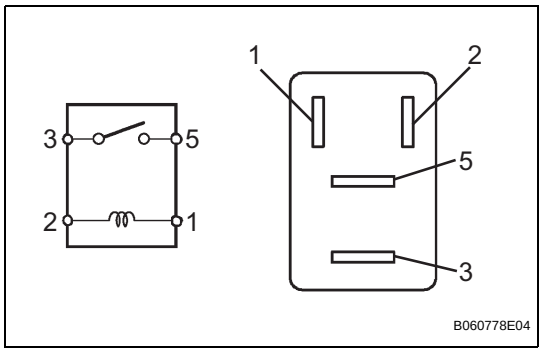
Standard resistance

Tester Connection	Specified Condition
HT (1) - +B (2)	11 to 16 Ω at 20°C (68°F)
HT (1) - E2 (4)	10 kΩ or higher

NG → **REPLACE HEATED OXYGEN SENSOR**

OK

16 INSPECT EFI RELAY (EFI)



(a) Remove the EFI relay from the engine room relay block.
(b) Measure the relay resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage applied to terminals 1 and 2)

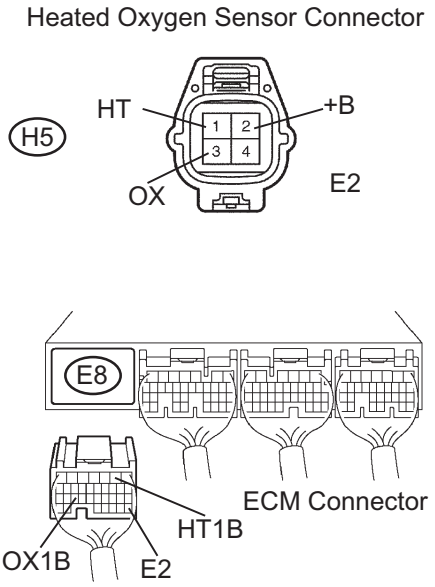
NG → **REPLACE EFI RELAY**

OK

ES

17	CHECK WIRE HARNESS (HEATED OXYGEN SENSOR - ECM) AND (SENSOR POWER SOURCE)

Wire Harness Side:



(a) Disconnect the H5 HO2 sensor connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

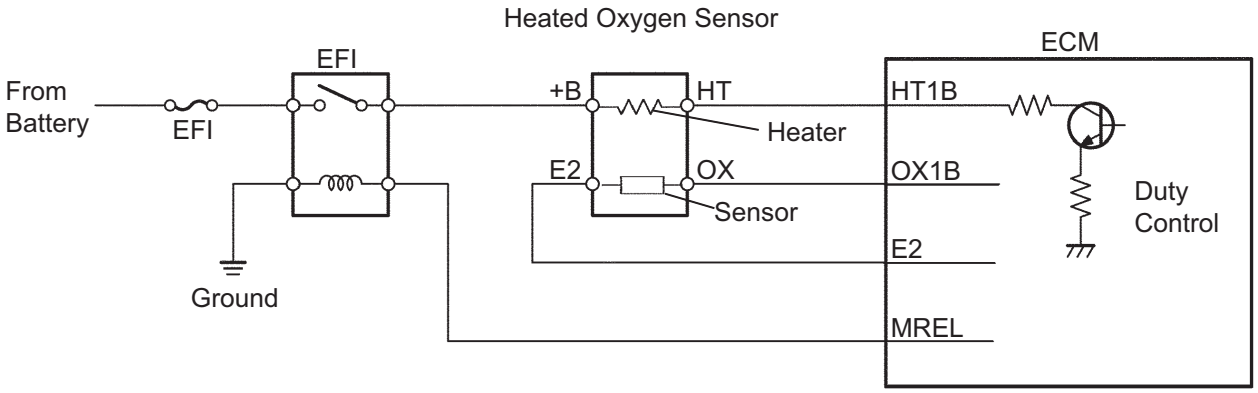
Tester Connection	Specified Condition
+B (H5-2) - Body ground	9 to 14 V

(d) Turn the ignition switch off.
(e) Disconnect the E8 ECM connector.
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
HT (H5-1) - HT1B (E8-2)	Below 1 Ω
OX (H5-3) - OX1B (E8-25)	Below 1 Ω
E2 (H5-4) - E2 (E8-28)	Below 1 Ω
HT (H5-1) or HT1B (E8-2) - Body ground	10 kΩ or higher
OX (H5-3) or OX1B (E8-25) - Body ground	10 kΩ or higher
E2 (H5-4) or E2 (E8-28) - Body ground	10 kΩ or higher

Reference (System Diagram of Sensor 2)



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK →

REPLACE HEATED OXYGEN SENSOR

DTC	P0171	System Too Lean (Bank 1)

DTC	P0172	System Too Rich (Bank 1)

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 long-term fuel trims.

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 (A/F) 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 central value. The long-term fuel trim, which controls overall fuel compensation, compensates for long-term deviations in the fuel trim from the central value caused by the short-term fuel trim compensation.

If both the short-term and long-term fuel trims are lean or rich beyond predetermined values, it is interpreted as a malfunction, and the ECM illuminates the MIL and sets a DTC.

ES

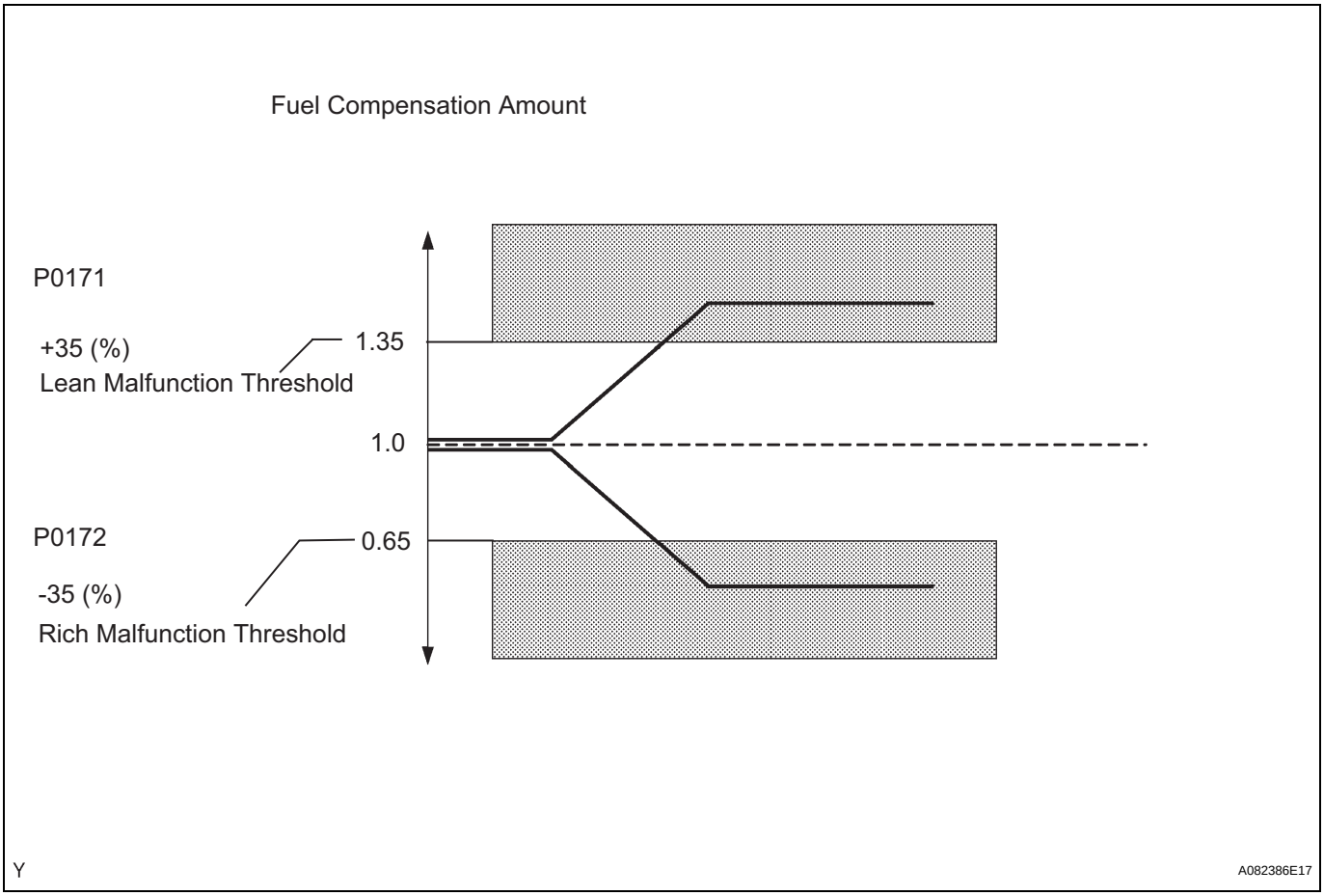
DTC No.	DTC Detection Condition	Trouble Area
P0171	With warm engine and stable air-fuel ratio feedback, fuel trim considerably in error to lean side (2 trip detection logic)	• Air induction system • Injector blockage • Mass Air Flow (MAF) meter • Engine Coolant Temperature (ECT) sensor • Fuel pressure • Gas leakage from exhaust system • Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • A/F sensor heater (sensor 1) • EFI relay • A/F sensor heater and EFI relay circuits • PCV valve and hose • PCV hose connections • ECM
P0172	With warm engine and stable air-fuel ratio feedback, fuel trim considerably in error to rich side (2 trip detection logic)	• Injector leakage or blockage • MAF meter • ECT sensor • Ignition system • Fuel pressure • Gas leakage from exhaust system • Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • A/F sensor heater (sensor 1) • EFI relay • A/F sensor heater and EFI relay circuits • 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 the total of the short-term and long-term fuel trim values is within the malfunction threshold (and the engine coolant temperature is more than 75°C [167°F]), the system is functioning normally.

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 thresholds, the ECM interprets this as a fault in the fuel system and sets a DTC.
Example:
The average fuel trim learning value is more than +35% or less than -35%, the ECM interprets this as a fuel system malfunction.



MONITOR STRATEGY

Related DTCs	P0171: Fuel trim lean P0172: Fuel trim rich
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	Within 10 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0010 (VVT OCV Bank 1) P0011 (VVT System 1 - Advance) P0012 (VVT System 1 - Retard) P0031, P0032 (A/F sensor heater - Sensor 1) P0100 - P0103 (MAF meter) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for Closed Loop) P0335 (CKP sensor) P0340 (CMP sensor) P0500 (VSS)
Fuel system status	Closed-loop
Battery voltage	11 V or more
Either of the following conditions A or B is met:	-
A. Engine RPM	Below 1,100 rpm
B. Intake air amount per revolution	0.22 g/rev or more
Catalyst monitor	Not executed

ES

TYPICAL MALFUNCTION THRESHOLDS

Purge-cut	Executing
Either of the following conditions is met:	-
Average between short-term fuel trim and long-term fuel trim	35% or more (varies with ECT)
Average between short-term fuel trim and long-term fuel trim	-35% or less (varies with ECT)

WIRING DIAGRAM

Refer to DTC P2195 (See page ES-281).

INSPECTION PROCEDURE

HINT:

Intelligent tester only:

Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the A/F CONTROL operation using the intelligent tester.

1. Connect the intelligent tester to the DLC3.
2. Start the engine and turn the tester on.
3. Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
4. On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
5. Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
6. Monitor the voltage outputs of the A/F and HO2 sensors (AFS B1S1 and OS2 B1S2) displayed on the tester.

HINT:

- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard:

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 (A/F)	+25%	Rich	Less than 3.0

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 (A/F)	-12.5%	Lean	More than 3.35
O2S B1S2 (HO2)	+25%	Rich	More than 0.55
O2S B1S2 (HO2)	-12.5%	Lean	Less than 0.4

NOTICE:
The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage		HO2S Voltage (Sensor 2) Output Voltage		Main Suspected Trouble Area
1	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		-
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage More than 0.55 V Less than 0.4 V		
2	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• A/F sensor • A/F sensor heater • A/F sensor circuit
	Output Voltage Almost no reaction		Output Voltage More than 0.55 V Less than 0.4 V		
3	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• Heated oxygen sensor • Heated oxygen sensor heater • Heated oxygen sensor circuit
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage Almost no reaction		
4	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)
	Output Voltage Almost no reaction		Output Voltage Almost no reaction		

- Following the A/F CONTROL procedure enables technicians to check and graph the voltage outputs of both the A/F and HO2 sensors.
- To display the graph, select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2, and press the YES button and then the ENTER button followed by the F4 button.

HINT:

- Read freeze frame data using the intelligent tester. Freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, 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 A/F sensor voltage could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A high A/F sensor voltage could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0171 OR P0172)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(d) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0171 or P0172	A
P0171 or P0172 and other DTCs	B

HINT:
If any DTCs other than P0171 or P0172 are output, troubleshoot those DTCs first.

B → **GO TO DTC CHART**

A

2	CHECK PCV HOSE CONNECTIONS

OK:
PCV hose is connected correctly, and is not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

OK

3	CHECK AIR INDUCTION SYSTEM

(a) Check the air induction system for vacuum leakage.
OK:
No leakage from air induction system.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

4	PERFORM ACTIVE TEST USING INTELLIGENT TESTER (A/F CONTROL)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and turn the tester on.
(c) Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.

(e) Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).

(f) Monitor the voltage outputs of A/F and HO2 sensors (AFS B1S1 and O2S B1S2) displayed on the tester.
HINT:
- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard

ES

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 (A/F)	+25%	Rich	Less than 3.0
AFS B1S1 (A/F)	-12.5%	Lean	More than 3.35
O2S B1S2 (HO2)	+25%	Rich	More than 0.55
O2S B1S2 (HO2)	-12.5%	Lean	Less than 0.4

Result

Status AFS B1S1	Status O2S B1S2	A/F Condition and A/F Sensor Condition	Misfire	Suspected Trouble Area	Proceed to
Lean/Rich	Lean/Rich	Normal	-	-	C
Lean	Lean	Actual air-fuel ratio lean	May occur	• PCV valve and hose • PCV hose connections • Injector blockage • 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	-	• Injector leakage or blockage • Gas leakage from exhaust system • Ignition system • Fuel pressure • MAF meter • ECT sensor	A
Lean	Lean/Rich	A/F sensor malfunction	-	A/F sensor	B
Rich	Lean/Rich	A/F sensor malfunction	-	A/F sensor	B

Lean: During A/F CONTROL, the A/F sensor output voltage (AFS) is consistently more than 3.35 V, and the HO2 sensor output voltage (O2S) is consistently less than 0.4 V.
Rich: During A/F CONTROL, the AFS is consistently less than 3.0 V, and the O2S is consistently more than 0.55 V.

B	Go to step 11
C	Go to step 15

A

5	READ VALUE USING INTELLIGENT TESTER (COOLANT TEMP)

(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.
(d) Read the COOLANT TEMP twice, when the engine is cold and also when warmed up.
Standard:
With cold engine:
Same as ambient air temperature
With warm engine:
Between 75°C and 95°C (167°F and 203°F)

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

ES

OK

6	READ VALUE USING INTELLIGENT TESTER (MAF)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF and COOLANT TEMP.
(d) Allow the engine to idle until the COOLANT TEMP reaches 75°C (167°F) or more.
(e) Read the MAF with the engine in an idling condition and at an engine speed of 2,500 rpm.
Standard:
MAF while engine idling:
Between 0.54 gm/s and 4.33 gm/s (shift position: N; A/C: OFF)
MAF at engine speed of 2,500 rpm:
Between 0.58 gm/s and 4.67 gm/s (shift position: N; A/C: OFF)

NG → **REPLACE MASS AIR FLOW METER**

OK

7	CHECK FUEL PRESSURE

(a) Check the fuel pressure (See page FU-2).

NG → **REPAIR OR REPLACE FUEL SYSTEM**

OK

8	INSPECT FOR EXHAUST GAS LEAK

OK:
No gas leakage.

NG → REPAIR OR REPLACE EXHAUST SYSTEM

OK

9	CHECK FOR SPARK AND IGNITION

HINT:
If the spark plugs or ignition system malfunctions, engine misfire may occur. The misfire count can be read using the intelligent tester. Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / CYL #1 (to CYL #4).

NG → REPAIR OR REPLACE IGNITION SYSTEM

OK

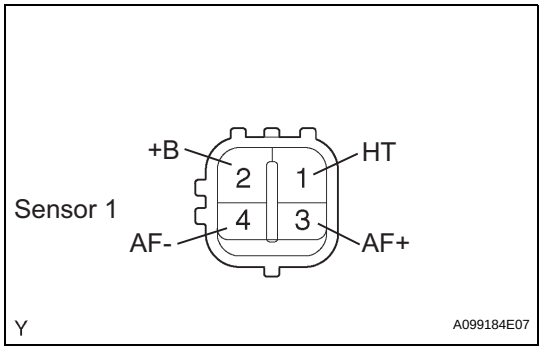
10	INSPECT FUEL INJECTOR (INJECTION AND VALVE)

HINT:
If the injectors malfunction, engine misfire may occur. The misfire count can be read using the intelligent tester. Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / CYL #1 (to CYL #4).

NG → REPLACE FUEL INJECTOR

OK

11	INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)



(a) Disconnect the A3 Air-Fuel Ratio (A/F) sensor connector.
(b) Measure the resistance according to the value(s) in the table below.

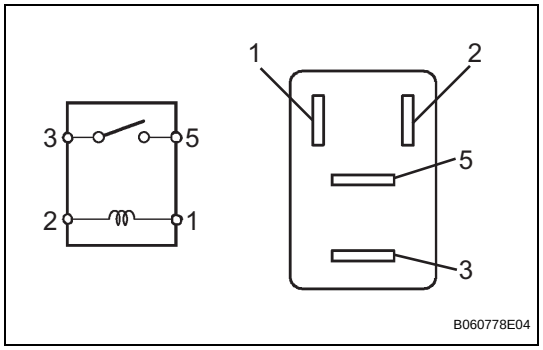
Standard resistance

Tester Connection	Specified Condition
HT (1) - +B (2)	1.8 to 3.4 Ω at 20°C (68°F)
HT (1) - AF- (4)	10 kΩ or higher

NG → REPLACE AIR FUEL RATIO SENSOR

OK

12 INSPECT EFI RELAY



(a) Remove the EFI relay from the engine room relay block.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

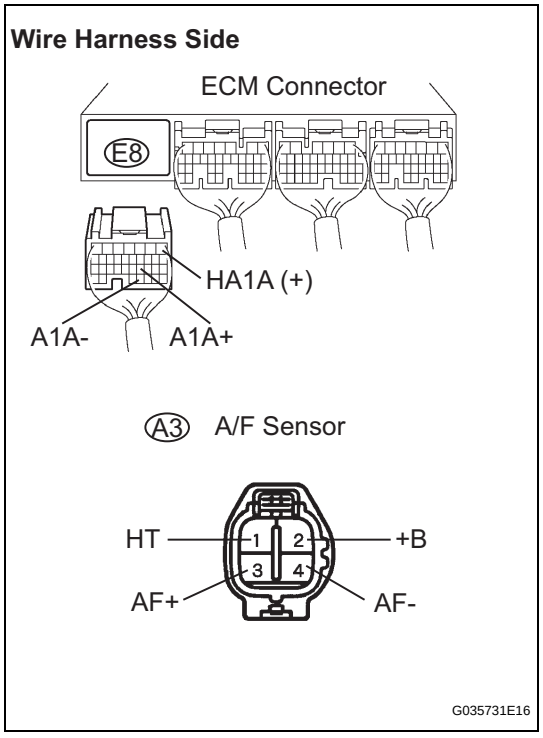
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

(c) Reinstall the EFI relay.

NG → REPLACE EFI RELAY

OK

13 CHECK WIRE HARNESS (A/F SENSOR - ECM) AND (SENSOR POWER SOURCE)



(a) Disconnect the A3 A/F sensor connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

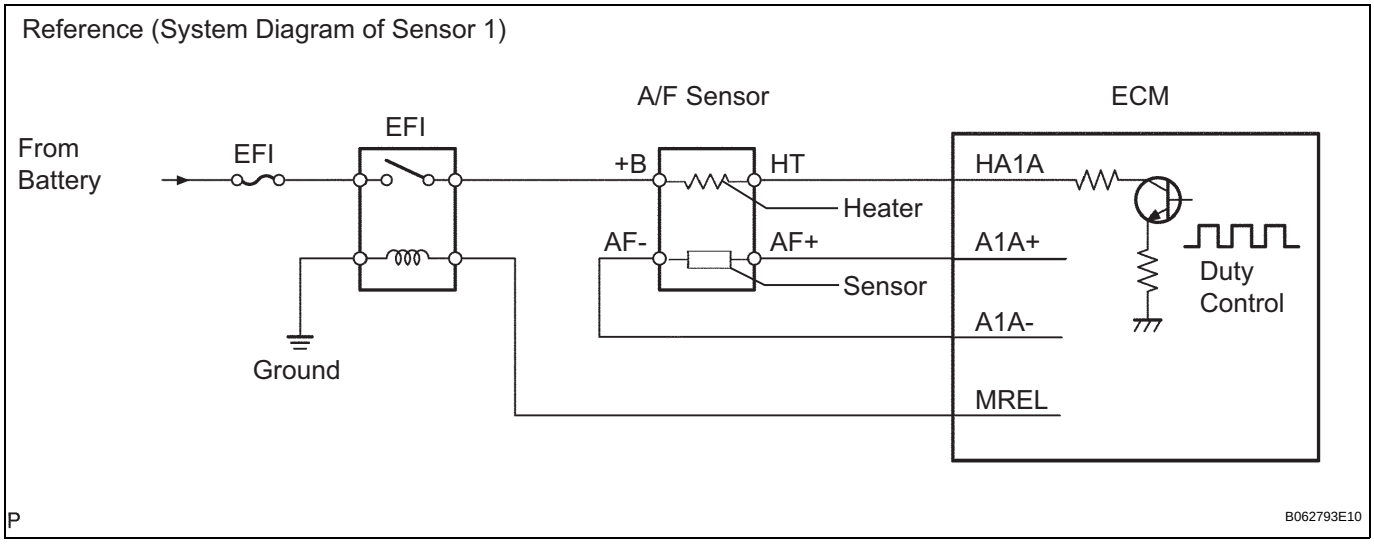
Tester Connection	Specified Condition
+B (A3-2) - Body ground	9 to 14 V

(d) Turn the ignition switch off.
(e) Disconnect the E8 ECM connector.
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
HT (A3-1) - HA1A (E8-1)	Below 1 Ω
AF+ (A3-3) - A1A+ (E8-21)	Below 1 Ω
AF- (A3-4) - A1A- (E8-31)	Below 1 Ω
HT (A3-1) or HA1A (E8-1) - Body ground	10 kΩ or higher
AF+ (A3-3) or A1A+ (E8-21) - Body ground	10 kΩ or higher
AF- (A3-4) or A1A- (E8-31) - Body ground	10 kΩ or higher

ES



ES

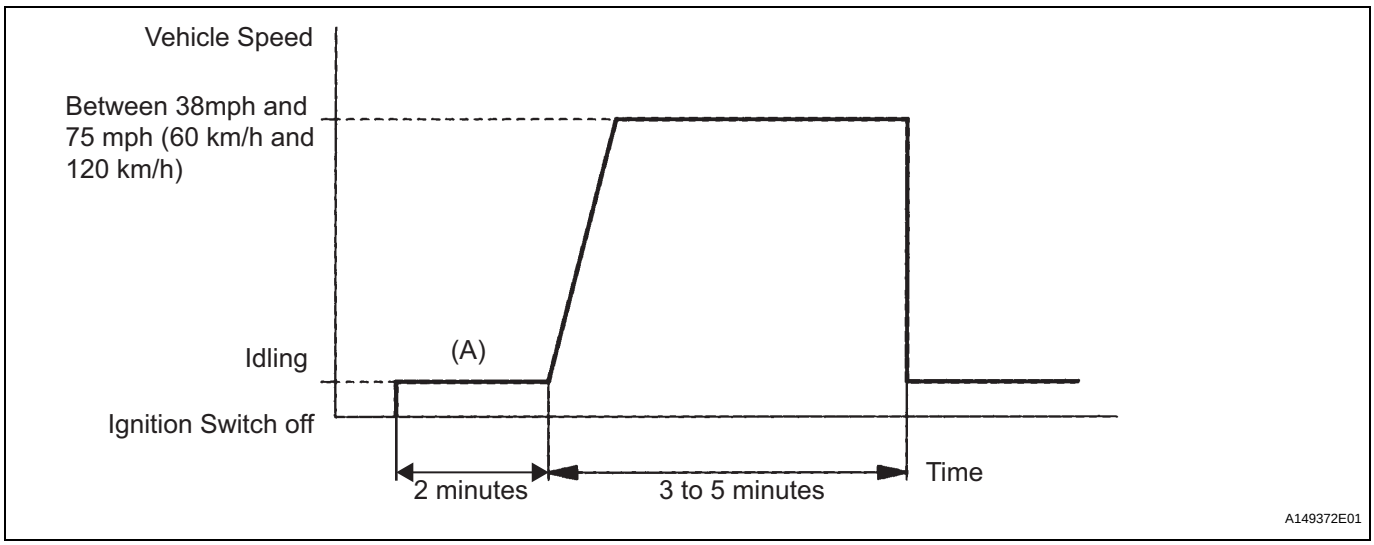
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

14	REPLACE AIR FUEL RATIO SENSOR

NEXT

15	PERFORM CONFIRMATION DRIVING PATTERN



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Clear the DTCs (See page ES-32).
(d) Switch the ECM from normal mode to check mode using the tester (See page ES-35).
(e) Start the engine and warm it up with all the accessories switched off (Procedure "A").

(f) Drive the vehicle at between 38 mph to 75 mph (60 km/h to 120 km/h) and at an engine speed of between 1,400 rpm and 3,200 rpm for 3 to 5 minutes (Procedure "B").
HINT:
If the system is still malfunctioning, the MIL will be illuminated during Procedure "A".
NOTICE:
If the conditions in this test are not strictly followed, no malfunction will be detected.

NEXT

16	CHECK WHETHER DTC OUTPUT RECURS (DTC P0171 OR P0172)

ES

(a) On the intelligent tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(b) Read the DTCs.
Result

Display (DTC Output)	Proceed to
No output	A
P0171 or P0172	B

B → Go to step 5

A

END

DTC	P0300	Random / Multiple Cylinder Misfire Detected

DTC	P0301	Cylinder 1 Misfire Detected

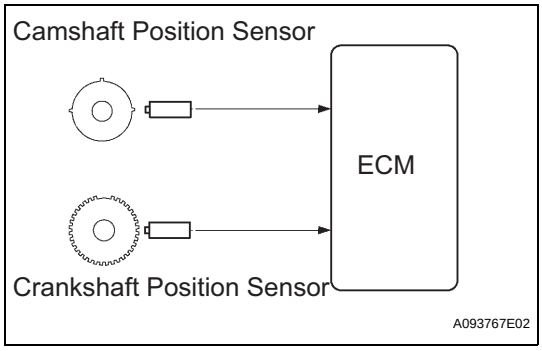
DTC	P0302	Cylinder 2 Misfire Detected

DTC	P0303	Cylinder 3 Misfire Detected

DTC	P0304	Cylinder 4 Misfire Detected

ES

DESCRIPTION



When the engine misfires, high concentrations of hydrocarbons (HC) enter the exhaust gas. Extremely high HC concentration levels can cause increases in exhaust emission levels. High concentrations of HC can also cause increases in the Three-Way Catalytic Converter (TWC) temperature, which may cause damage to the TWC. To prevent this increase in emissions and to limit the possibility of thermal damage, the ECM monitors the misfire rate. When the temperature of the TWC reaches the point of thermal degradation, the ECM blinks the MIL. To monitor misfires, the ECM uses both the Camshaft Position (CMP) sensor and the Crankshaft Position (CKP) sensor. The CMP sensor is used to identify any misfiring cylinders and the CKP 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 exceeds the threshold levels, and could cause emission deterioration, the ECM illuminates the MIL and sets a DTC.

DTC No.	DTC Detection Condition	Trouble Area
P0300	Simultaneous misfiring of several cylinders detected (2 trip detection logic)	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Mass Air Flow (MAF) meter • Engine Coolant Temperature (ECT) sensor • Compression pressure • Valve clearance • Valve timing • PCV valve and hose • PCV hose connection • ECM

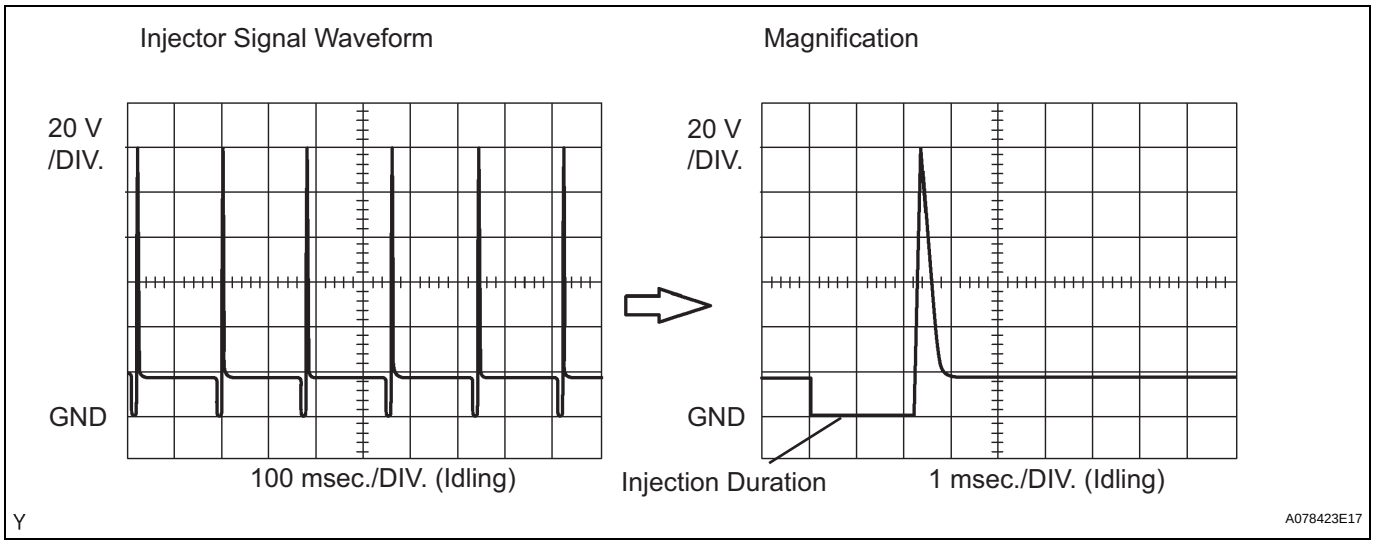
DTC No.	DTC Detection Condition	Trouble Area
P0301 P0302 P0303 P0304	Misfiring of specific cylinder detected (2 trip detection logic)	• Open or short in engine wire harness • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • MAF meter • ECT sensor • Compression pressure • Valve clearance • Valve timing • PCV valve and hose • PCV hose connection • ECM

ES

HINT:
When DTCs for misfiring cylinders are randomly set, but DTC P0300 is not set, it indicates that misfires have been detected in different cylinders at different times. DTC P0300 is only set when several misfiring cylinders are detected at the same time.
Reference: Inspection using an oscilloscope
With the engine idling, check the waveform between terminals #1 to #4 and E01 of the ECM connectors.

Item	Content
Terminals	#1 to #4 - E01
Equipment Settings	20 V/DIV., 100 or 1 ms./DIV.
Conditions	Idling

HINT:
The correct waveform is as shown.



MONITOR DESCRIPTION

The ECM illuminates the MIL and sets a DTC when either one of the following conditions, which could cause emission deterioration, is detected. (2 trip detection logic)

- Within the first 1,000 crankshaft revolutions of the engine starting, an excessive misfiring rate (approximately 20 to 50 misfires per 1,000 crankshaft revolutions) occurs once.
- After the first 1,000 crankshaft revolutions, an excessive misfiring rate (approximately 20 to 60 misfires per 1,000 crankshaft revolutions) occurs 4 times in sequential crankshaft revolutions.

The ECM flashes the MIL and sets a DTC when either one of the following conditions, which could cause Three-Way Catalytic Converter (TWC) damage, is detected. (2 trip detection logic)

- For every 200 crankshaft revolutions at a high engine rpm, the threshold misfiring percentage is recorded once.
- For every 200 crankshaft revolutions at a normal engine rpm, the threshold misfiring percentage is recorded 3 times.

MONITOR STRATEGY

Related DTCs	P0300: Multiple cylinder misfire P0301: Cylinder 1 misfire P0302: Cylinder 2 misfire P0303: Cylinder 3 misfire P0304: Cylinder 4 misfire
Required Sensors/Components (Main)	Crankshaft position sensor and Camshaft position sensor
Required Sensors/Components (Related)	Engine coolant temperature sensor, Intake air temperature sensor and Mass air flow meter
Frequency of Operation	Continuous
Duration	1, 000 to 4,000 crankshaft revolutions: Emission related misfire 600 crankshaft revolutions: Catalyst damage misfire
MIL Operation	2 driving cycles: Emission related misfire MIL flashes immediately: Catalyst damage misfire
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever the following DTCs are not present	P0100 - P0103 (MAF meter) P0110 - P0113 (IAT sensor) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for Closed Loop) P0327, P0328 (Knock sensor) P0335 (CKP sensor) P0340 (CMP sensor) P0500 (VSS)
Battery voltage	8 V or higher
VVT system	Not operated by scan tool
Engine RPM	400 to 6,400 rpm
All of the following conditions are met:	1, 2 and 3 are met
1. ECT	-10°C (14°F) or higher
2. Either of the following conditions is met:	(a) or (b) is met
(a) Engine start ECT	Higher than -7°C (19.4°F)
(b) ECT	Higher than 20°C (68°F)
3. Fuel-cut	OFF

Emission-related-misfire:

First 1,000 revolutions after engine start, or Check Mode	Crankshaft 1,000 revolutions
Except above	Crankshaft 1,000 revolutions x 4

Catalyst-damage-misfire:

All of the following conditions 1, 2 and 3 are met:	Crankshaft 200 revolutions
1. Driving cycles	1st
2. Check Mode	OFF
3. RPM	Less than 2,300 rpm
Except above	Crankshaft 200 revolutions x 3

TYPICAL MALFUNCTION THRESHOLDS

Emission-related-misfire:

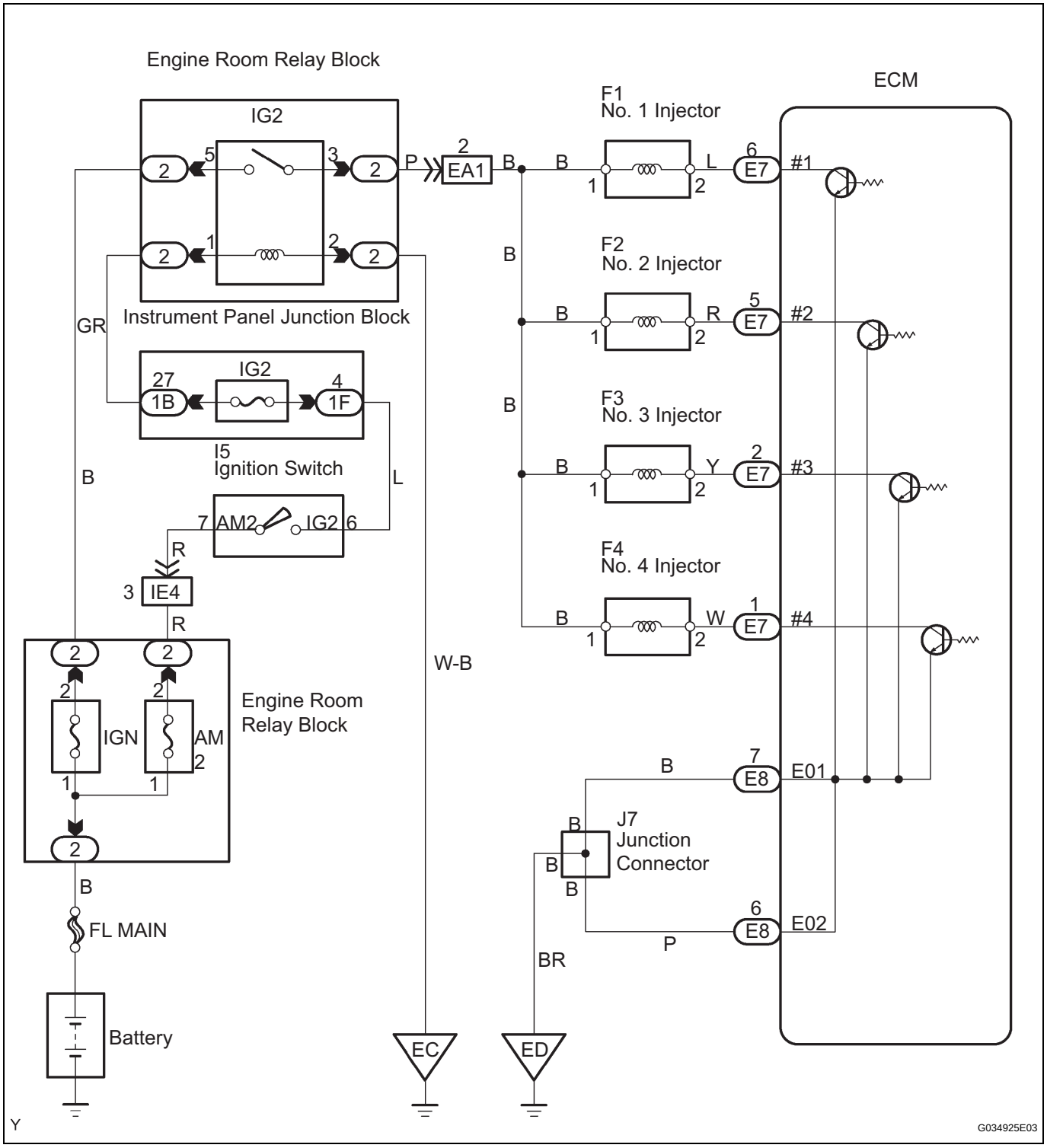
Misfire rate	1.3% or more

Catalyst-damage-misfire:

Number of misfire per 200 revolutions	118 or more (varies with intake air amount and RPM)

WIRING DIAGRAM

Refer to DTC P0351 (See page ES-175) for the wiring diagram of the ignition system.



CONFIRMATION DRIVING PATTERN

1. Connect the intelligent tester to the DLC3.
2. Turn the ignition switch to the ON position.
3. Turn the tester on.
4. Record the DTC(s) and freeze frame data.
5. Using the tester, switch the ECM from normal mode to check mode.
6. Read the misfire counts of each cylinder (CYL #1 to #4) with the engine in an idling condition. If any misfire count is displayed, skip the following confirmation driving pattern.
7. Drive the vehicle several times with the conditions, such as engine rpm and engine load, shown in MISFIRE RPM and MISFIRE LOAD in the DATA LIST.
   HINT:
   In order to store misfire DTCs, it is necessary to drive the vehicle for the period of time shown in the table below, with the MISFIRE RPM and MISFIRE LOAD in the DATA LIST.

Engine RPM	Duration
Idling	3.5 minutes or more
1,000	3 minutes or more
2,000	1.5 minutes or more
3,000	1 minute or more

8. If using the intelligent tester, follow the operations below in order for DTCs to be set by the ECM.
   (a) Drive the vehicle several times with the conditions, such as engine rpm and engine load, stored in the freeze frame data.
   (b) Turn the ignition switch off and then turn it to the ON position again.
   (c) Repeat step (a) described above.
9. Check whether misfires have occurred by checking DTCs and freeze frame data.
   HINT:
   Do not turn the ignition switch off until the stored 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 will be erased.
10. Record the DTC(s), freeze frame data and misfire counts.
11. Turn the ignition switch off and wait for at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If any DTCs other than the misfire DTCs are output, troubleshoot those DTCs first.
- Read freeze frame data using the intelligent tester. 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.
- If the misfire does not recur when the vehicle is brought to the workshop, reproduce the conditions stored in the freeze frame data.
- If the misfire still cannot be reproduced even though the conditions stored in the freeze frame data have been duplicated, one of the following factors is considered to be a possible cause of the problem:
  (1) The fuel tank is almost empty.
  (2) Improper fuel is used.
  (3) The spark plugs have been contaminated.
  (4) The problem is complex.
- After finishing repairs, check the misfire counts of the cylinders (CYL #1, #2, #3 and #4).
- Be sure to confirm that no misfiring cylinder DTCs are set again by conducting the confirmation driving pattern, after repairs.

- For 6 and 8 cylinder engines, the ECM intentionally does not set the specific misfiring cylinder DTCs at high engine RPM. If misfires occur only in high engine RPM areas, only DTC P0300 is set.
  In the event of DTC P0300 being present, perform the following operations:
  (1) Clear the DTC (See page ES-32).
  (2) Start the engine and conduct the confirmation driving pattern.
  (3) Read the misfiring rates of each cylinder or DTC(s) using the tester.
  (4) Repair the cylinder(s) that has a high misfiring rate or is indicated by the DTC.
  (5) After finishing repairs, conduct the confirmation driving pattern again, in order to verify that DTC P0300 is not set.
- When one of SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is outside the range of +-20%, the air-fuel ratio may be rich (-20% or less) or lean (+20% or more).
- When the COOLANT TEMP in the freeze frame data is less than 75°C (167°F), the misfires have occurred only while warming up the engine.

ES

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO MISFIRE DTCS)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0300, P0301, P0302, P0303 and/or P0304	A
"P0300, P0301, P0302, P0303 and/or P0304" and other DTCs	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	READ VALUE USING INTELLIGENT TESTER (MISFIRE RPM AND MISFIRE LOAD)

NOTICE:
If the intelligent tester is not available, proceed to the next step.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / MISFIRE / MISFIRE RPM and MISFIRE LOAD.
(d) Read and note the MISFIRE RPM and MISFIRE LOAD (engine load) values.
HINT:
The MISFIRE RPM and MISFIRE LOAD indicate the vehicle conditions under which the misfire occurred.

NEXT

3	CHECK CONNECTION OF PCV HOSE

OK:
PCV hose is connected correctly and is not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

OK ↓

4	CHECK MISFIRE COUNT (CYL #1, #2, #3 AND #4)

ES

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTCs (See page ES-32) (Procedure "A").
(e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / CYL #1, #2, #3 and #4 (Procedure "B").
(f) Allow the engine to idle (Procedure "C").
(g) Read each value of CYL #1 to #4 displayed on the tester (Procedure "D").
If no misfire counts occur in any cylinders, perform the following operations:
1. Shift the gear selector lever to the D position.
2. Repeat Procedure "A" and "B" above.
3. Check the CYL #1 to #4.
4. If misfire counts are still not displayed, repeat Procedure "D" and then check the misfire counts again.

(h) Drive the vehicle with the MISFIRE RPM and MISFIRE LOAD noted in step 2.
(i) Read the CYL #1 to #4 or DTCs displayed on the tester.

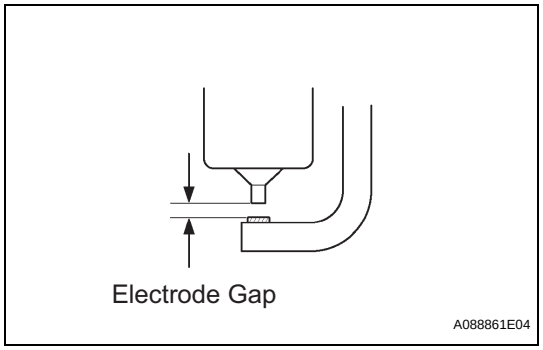
Result

Misfire Count	Proceed to
1 or 2 cylinders have misfire counts	A
3 cylinders or more have misfire counts	B

B → **Go to step 13**

A ↓

5 CHECK SPARK PLUG



(a) Remove the No. 2 cylinder head cover.
(b) Remove the ignition coil and the spark plug of the misfiring cylinder.
(c) Measure the spark plug electrode gap.
Standard gap:
1.0 to 1.3 mm (0.039 to 0.051 in.)
(d) Check the electrode for carbon deposits.
Recommended spark plug

Manufacturer	Product
DENSO	SK20R11
NGK	IFR6A11

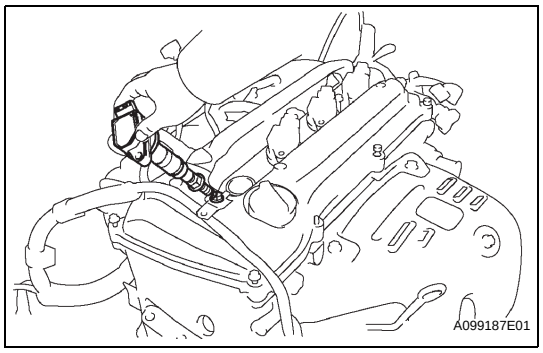
ES

NOTICE:
If the electrode gap is larger than standard, replace the spark plug. Do not adjust the electrode gap.

NG → **REPLACE SPARK PLUG**

OK

6 CHECK SPARK AND IGNITION



(a) Disconnect the injector connectors in order to prevent the engine from starting.
(b) Install the spark plug to the ignition coil.
(c) Attach the spark plug assembly to the cylinder head cover.
(d) Crank the engine for less than 2 seconds and check the spark.
OK:
Sparks jump across electrode gap

NG → **Go to step 8**

OK

7 CHECK CYLINDER COMPRESSION PRESSURE OF MISFIRING CYLINDER

(a) Measure the cylinder compression pressure of the misfiring cylinder.

OK → **Go to step 9**

NG

REPAIR OR REPLACE MALFUNCTION PARTS

8	CHANGE NORMAL SPARK PLUG AND CHECK SPARK OF MISFIRING CYLINDER

(a) Change the installed spark plug to a spark plug that functions normally.
(b) Perform a spark test.
CAUTION:
Always disconnect each injector connector.
NOTICE:
Do not crank the engine for more than 2 seconds.
(1) Install the spark plug to the ignition coil and connect the ignition coil connector.
(2) Disconnect the injector connectors.
(3) Ground the spark plug.
(4) Check if sparks occur while the engine is being cranked.
OK:
Sparks jump across electrode gap.

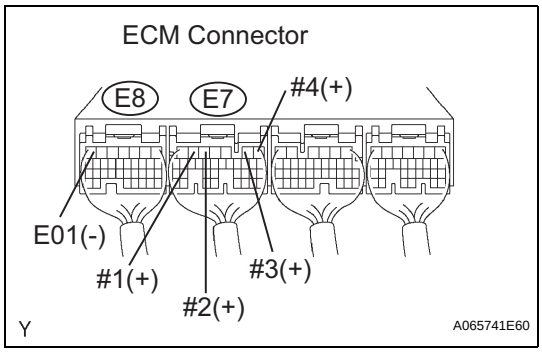
ES

NG → **REPLACE IGNITION COIL ASSEMBLY THEN CONFIRM THAT THERE IS NO MISFIRE**

OK

REPLACE SPARK PLUG

9	INSPECT ECM TERMINAL OF MISFIRING CYLINDER (#1, #2, #3 AND/OR #4 VOLTAGE)



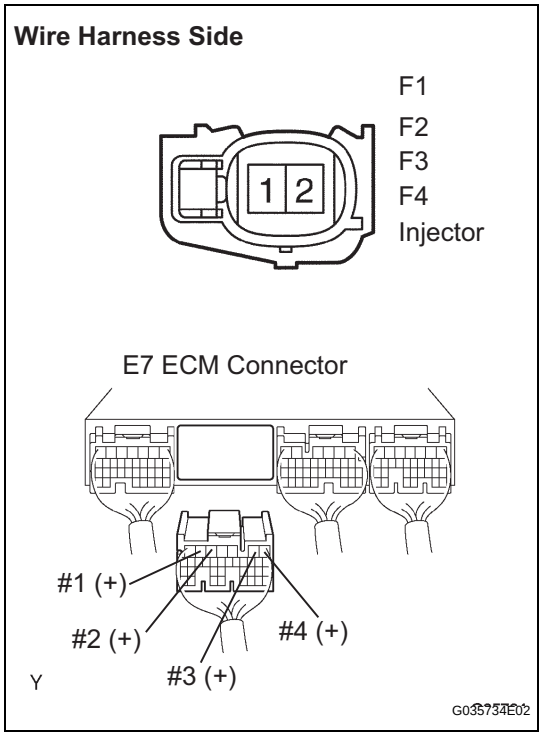
(a) Turn the ignition switch to the ON position.
(b) Measure the voltage according to the value(s) in the table below..
Standard voltage

Tester Connection	Specified Condition
#1 (E7-6) - E01 (E8-7)	9 to 14 V
#2 (E7-5) - E01 (E8-7)	9 to 14 V
#3 (E7-2) - E01 (E8-7)	9 to 14 V
#4 (E7-1) - E01 (E8-7)	9 to 14 V

OK → **Go to step 11**

NG

10	CHECK WIRE HARNESS (INJECTOR - ECM)



(a) Disconnect the injector connector (of the misfiring cylinder).
(b) Disconnect the E7 ECM connector.
(c) Turn the ignition switch to the ON position.
(d) Measure the resistance and voltage according to the value(s) in the table below.

Standard:

Cylinder No. 1

Tester Connection	Specified Condition
F1-1 - Ground	11 to 14 V
F1-2 - Ground	10 kΩ or higher
F1-2 - #1 (E7-6)	Below 1 Ω

Cylinder No. 2

Tester Connection	Specified Condition
F2-1 - Ground	11 to 14 V
F2-2 - Ground	10 kΩ or higher
F2-2 - #2 (E7-5)	Below 1 Ω

Cylinder No. 3

Tester Connection	Specified Condition
F3-1 - Ground	11 to 14 V
F3-2 - Ground	10 kΩ or higher
F3-2 - #3 (E7-2)	Below 1 Ω

Cylinder No. 4

Tester Connection	Specified Condition
F4-1 - Ground	11 to 14 V
F4-2 - Ground	10 kΩ or higher
F4-2 - #4 (E7-1)	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

11	CHECK FUEL INJECTOR OF MISFIRING CYLINDER

(a) Check the injector injection (whether fuel volume is high or low, and whether injection pattern is poor).

NG → **REPLACE FUEL INJECTOR ASSEMBLY**

OK

12	CHECK VALVE CLEARANCE OF MISFIRING CYLINDER

NG → **ADJUST VALVE CLEARANCE**

OK

13	CHECK AIR INDUCTION SYSTEM

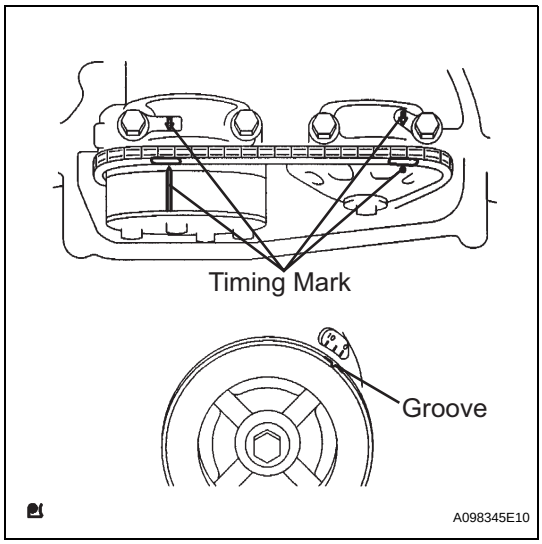
(a) Check the air induction system for vacuum leakage.
OK:
No leakage from air induction system.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

ES

14	CHECK VALVE TIMING



(a) Remove the cylinder head cover (See page EM-115).
(b) Turn the crankshaft pulley until its groove and the timing mark "0" of the timing chain cover are aligned.
(c) Check that each timing mark of the camshaft timing gears is aligned with its corresponding timing mark located on the No.1 and No.2 bearing caps as shown in the illustration.
If not, turn the crankshaft by 1 revolution (360°) to align the timing marks as above.
OK:
The timing marks of the camshaft timing gears are aligned with the timing marks located on the No. 1 and No. 2 bearing caps.
(d) Reinstall the cylinder head cover (See page EM-80).

NG → **ADJUST VALVE TIMING**

OK

15	CHECK FUEL PRESSURE

(a) Check the fuel pressure (See page FU-2).

NG → **CHECK AND REPLACE FUEL PUMP, PRESSURE REGULATOR, FUEL PIPE LINE AND FILTER**

OK

16	READ VALUE USING INTELLIGENT TESTER (COOLANT TEMP)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / COOLANT TEMP.

(e) Read the COOLANT TEMP twice, when the engine is both cold and warmed up.
Standard temperature:
With cold engine:
Same as ambient air temperature
With warm engine:
75 to 95°C (167 to 203°F)

NG → **REPLACE ENGINE COOLANT TEMPERATURE SENSOR**

OK

17	READ VALVE USING INTELLIGENT TESTER

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / MAF and COOLANT TEMP.
(e) Allow the engine to idle until the COOLANT TEMP reaches 75°C (167°F) or more.
(f) Read the MAF with the engine in an idling condition and at an engine speed of 2,500 rpm.
Standard:
MAF while engine idling:
Between 0.54 gm/s and 4.33 gm/s (shift position: N; A/C: OFF)
MAF at engine speed of 2,500 rpm:
Between 0.58 gm/s and 4.67 gm/s (shift position: N; A/C: OFF)

NG → **REPLACE MASS AIR FLOW METER**

OK

CHECK FOR INTERMITTENT PROBLEMS

DTC	P0327	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)

DTC	P0328	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)

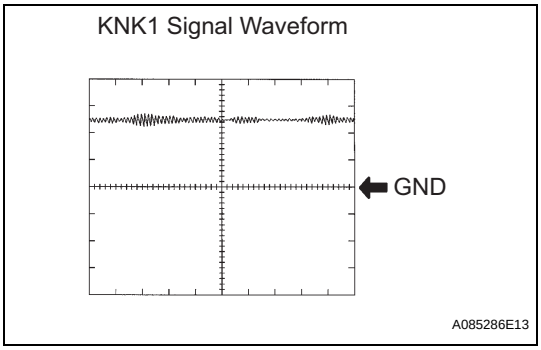
DESCRIPTION

A flat type knock sensor (non-resonant type) has a structure that can detect vibrations between approximately 6 kHz and 15 kHz.
Knock sensors are 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.

ES

DTC No.	DTC Detection Condition	Trouble Area
P0327	Output voltage of knock sensor less than 0.5 V (1 trip detection logic)	• Short in knock sensor circuit • Knock sensor • ECM
P0328	Output voltage of knock sensor more than 4.5 V (1 trip detection logic)	• Open in knock sensor circuit • Knock sensor • ECM

HINT:
When any of DTCs P0327 and P0328 are set, 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.



Reference: Inspection using an oscilloscope.
The correct waveform is as shown.

Item	Content
Terminals	KNK1 - EKNK
Equipment Settings	0.01 to 10 V/DIV., 0.01 to 10 msec./DIV.
Conditions	keep engine speed at 4,000 rpm with warm engine

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 sets a DTC.
The monitor for DTCs P0327 and P0328 begins to run when 5 seconds have elapsed since the engine was started.
If the malfunction is not repaired successfully, either DTC P0327 or P0328 is set 5 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0327: Knock sensor range check (low voltage) P0328: Knock sensor range check (high voltage)
Required Sensors/Components (Main)	Knock sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Battery voltage	10.5 V or more
Time after engine start	5 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

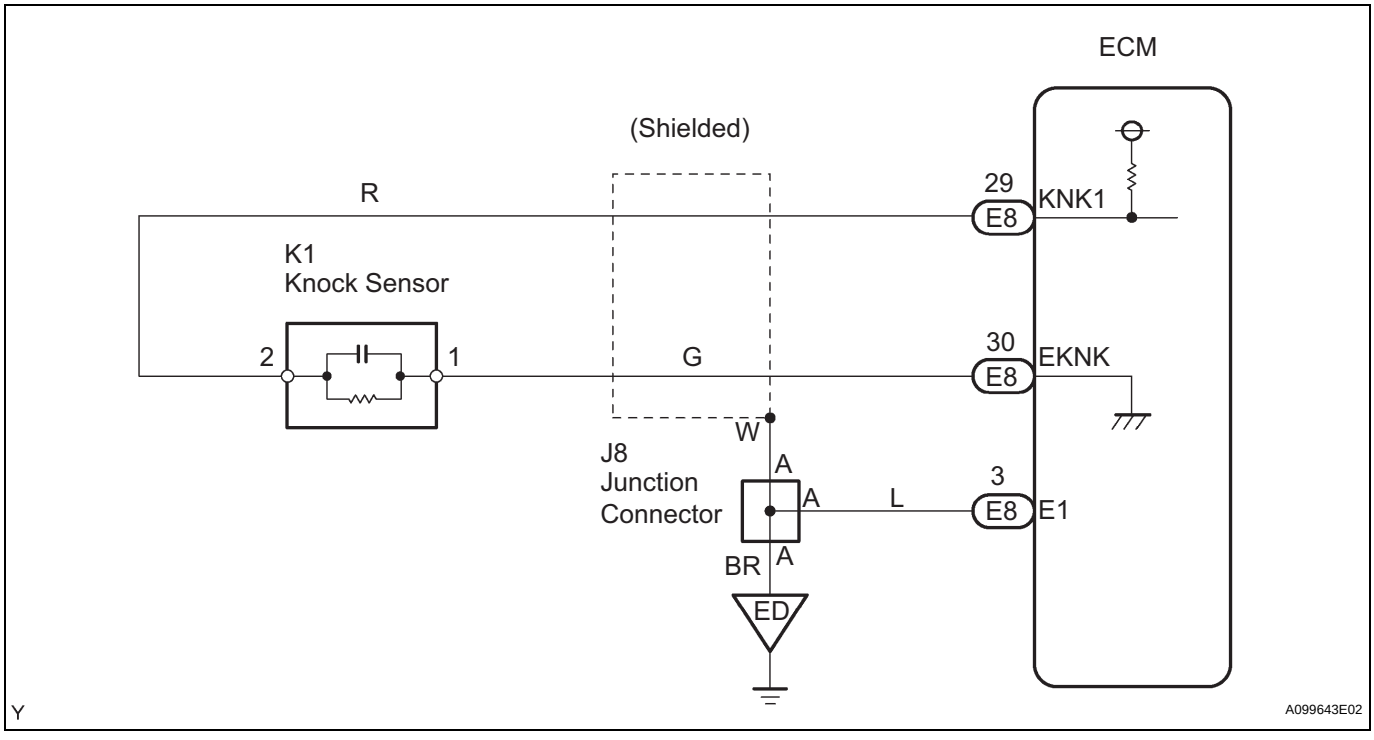
Knock Sensor Range Check (Low voltage) P0327:

Knock sensor voltage	Less than 0.5 V

Knock Sensor Range Check (High voltage) P0328:

Knock sensor voltage	More than 4.5 V

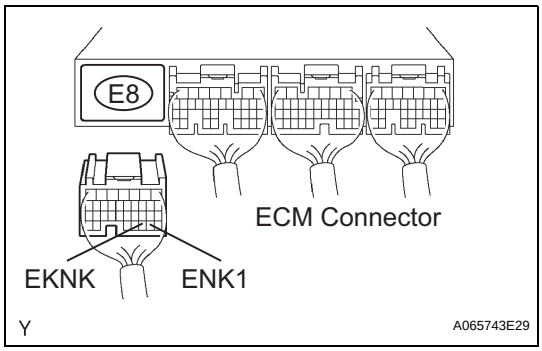
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

1 CHECK WIRE HARNESS (ECM - KNOCK SENSOR)



(a) Disconnect the E8 ECM connector.
(b) Measure the resistance according to the value(s) in the table below.

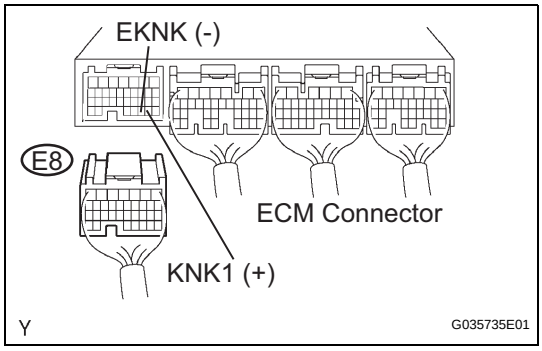
Standard resistance

Tester Connection	Specified Condition
KNK1 (E8-29) - EKNK (E8-30)	120 to 280 kΩ at 20°C (68°F)

NG → **Go to step 3**

OK

2 INSPECT ECM (KNK1 VOLTAGE)



(a) Disconnect the E8 ECM connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
KNK1 (E8-29) - EKNK (E8-30)	4.5 to 5.5 V

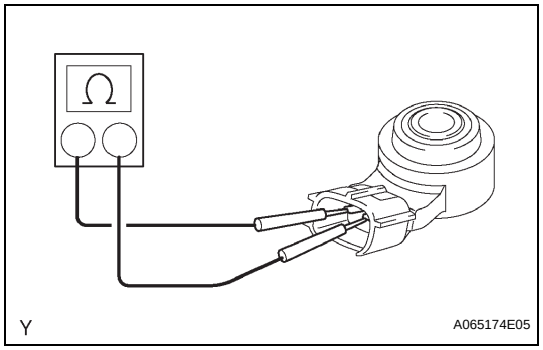
NOTICE:
Fault may be intermittent. Check the wire harness and connectors carefully.

NG → **REPLACE ECM**

OK

CHECK FOR INTERMITTENT PROBLEMS

3	INSPECT KNOCK SENSOR



(a) Remove the knock sensor.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
KNK1 (K1-2) - EKNK (K1-1)	120 to 280 kΩ at 20°C (68°F)

NG → **REPLACE KNOCK SENSOR**

OK

REPAIR OR REPLACE HARNESS OR CONNECTOR

ES

DTC	P0335	Crankshaft Position Sensor "A" Circuit

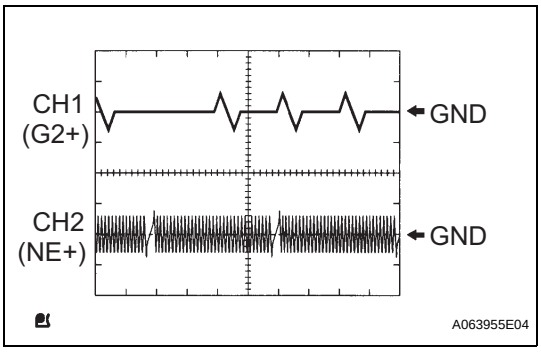
DTC	P0339	Crankshaft Position Sensor "A" Circuit Intermittent

DESCRIPTION

The Crankshaft Position (CKP) sensor system consists of a CKP sensor plate and a pickup coil. The sensor plate has 34 teeth and is installed on the crankshaft. The pickup coil is made of an iron core and a magnet. The sensor plate rotates and, as each tooth passes through the pickup coil, a pulse signal is created. The pickup coil generates 34 signals per engine revolution. Based on these signals, the ECM calculates the crankshaft position and engine RPM. Using these calculations, the fuel injection time and ignition timing are controlled.

ES

DTC No.	DTC Detection Condition	Trouble Area
P0335	When either condition below is met: • No CKP sensor signal to ECM while cranking (1 trip detection logic) • No CKP sensor signal to ECM at engine speed of 600 rpm or more (1 trip detection logic)	• Open or short in CKP sensor circuit • CKP sensor • Sensor plate (CKP sensor plate) • ECM
P0339	Under conditions (a), (b) and (c), no CKP sensor signal to ECM for 0.05 seconds or more (1 trip detection logic): (a) Engine speed 1,000 rpm or more (b) Starter signal OFF (c) 3 seconds or more have lapsed since starter signal switched from ON to OFF	• Open or short in CKP sensor circuit • CKP sensor • Sensor plate (CKP sensor plate) • ECM



Reference: Inspection using an oscilloscope.
HINT:
- The correct waveform is shown.
- G2+ stands for the Camshaft Position (CMP) sensor signal, and NE+ stands for the CKP sensor signal.

Item	Content
Terminals	CH1: G2+ - NE- CH2: NE+ - NE-
Equipment Settings	5 V/Division, 20 ms./Division
Conditions	Cranking or idling

MONITOR DESCRIPTION

If there is no signal from the CKP sensor although the engine is running, the ECM interprets this as a malfunction of the sensor.
If the malfunction is not repaired successfully, a DTC is set 10 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0335: CKP sensor range check or rationality
Required Sensors/Components (Main)	Crankshaft Position (CKP) sensor
Required Sensors/Components (Related)	Cam position sensor
Frequency of Operation	Continuous
Duration	3 times
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever the following DTCs are not present	None

Case 1:

Time after starter OFF to ON	0.3 seconds or more
Number of CMP sensor signal pulse	6 times
Battery voltage	7 V or more
CMP sensor circuit failure	Not detected
Ignition switch	ON

Case 2:

Starter	OFF
Engine speed	600 rpm or more
Time after starter from ON to OFF	3 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

Case 1:

Number of CKP sensor signal pulse	132 or less, and 174 or more

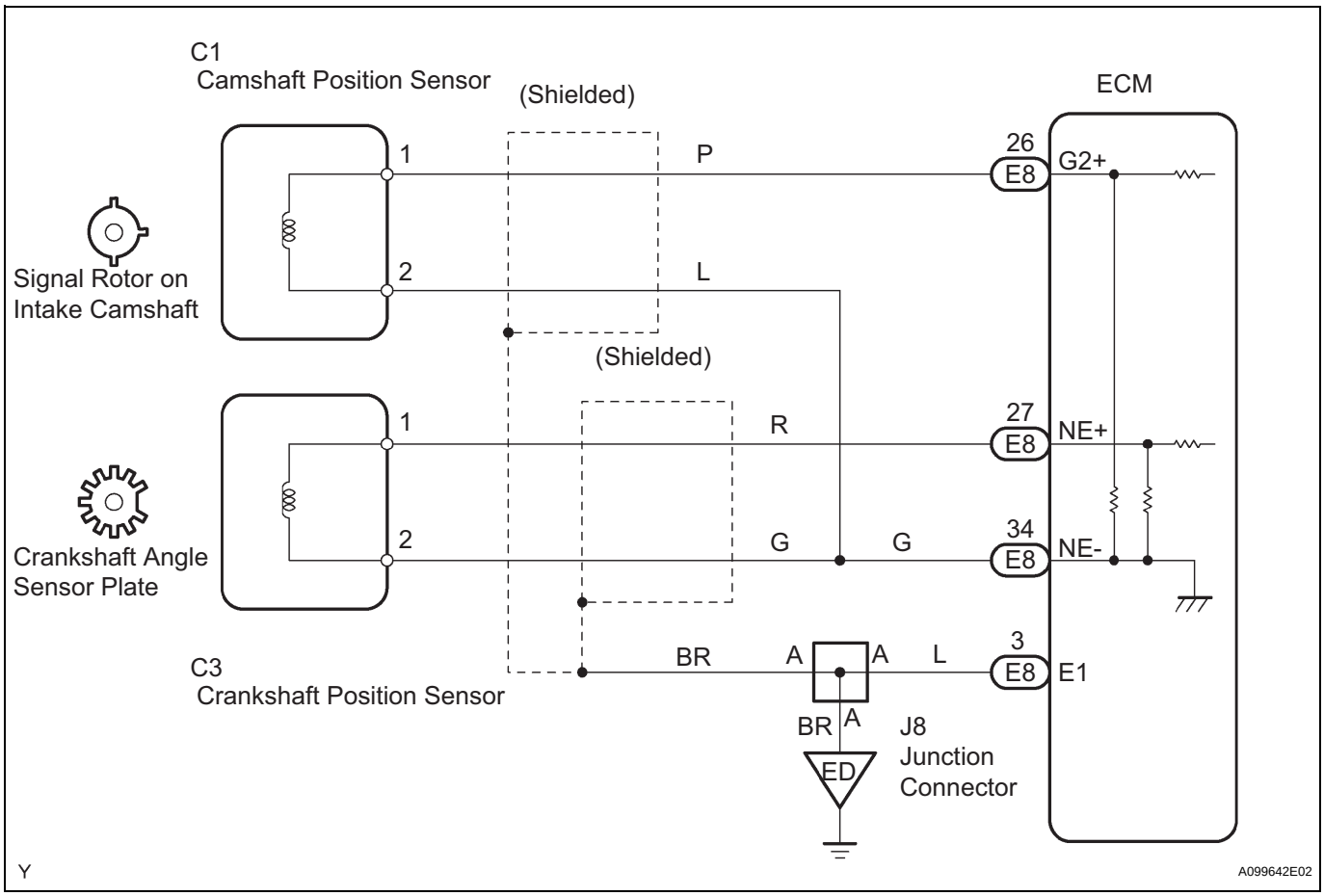
Case 2:

Engine speed signal	No signal

COMPONENT OPERATING RANGE

CKP sensor	• CKP sensor output voltage fluctuates while crankshaft is revolving • 34 CKP sensor signals per crankshaft revolution

WIRING DIAGRAM

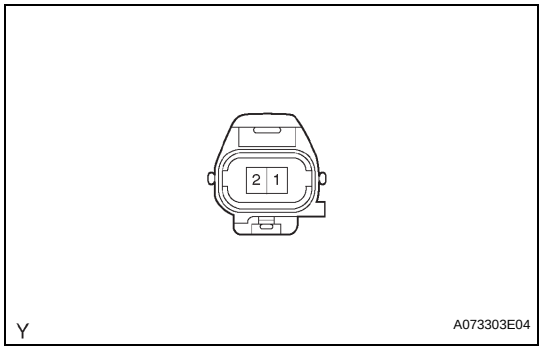


INSPECTION PROCEDURE

HINT:

- If no problem is found by this diagnostic troubleshooting procedure, troubleshoot the engine mechanical systems.
- Check the engine speed. The engine speed can be checked by using the intelligent tester. To check, perform the operations below:
  (a) Connect the intelligent tester to the DLC3.
  (b) Start the engine.
  (c) Turn the tester on.
  (d) If using the intelligent tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / ENGINE SPD.
  The engine speed may be indicated as zero despite the engine revolving normally. This is caused by a lack of NE signals from the Crankshaft Position (CKP) sensor. Alternatively, the engine speed may be indicated as lower than the actual engine speed, if the CKP sensor voltage output is insufficient.
- Read freeze frame data using the intelligent tester. 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.

1 INSPECT CRANKSHAFT POSITION SENSOR



(a) Disconnect the C3 sensor connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
1 - 2	985 to 1,600 Ω at cold
1 - 2	1,265 to 1,890 Ω at hot

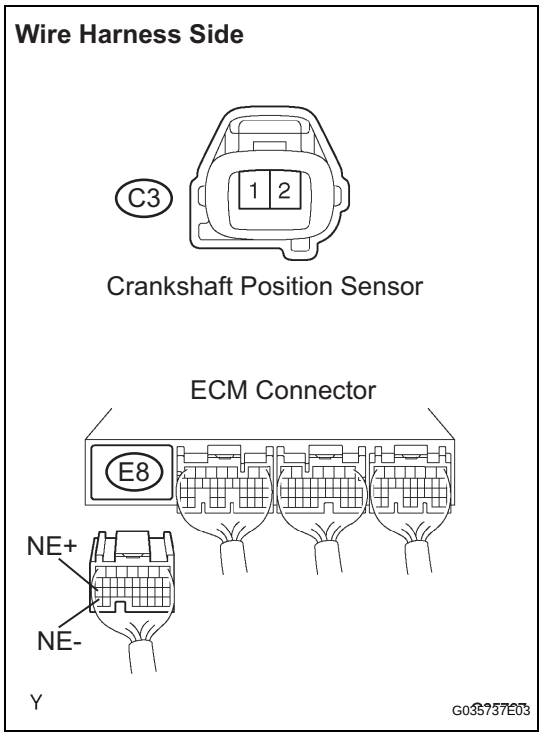
HINT:
Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10 to 50°C (14 to 122°F). "Hot" means approximately 50 to 100°C (122 to 212°F).

ES

NG → **REPLACE CRANKSHAFT POSITION SENSOR**

OK

2 CHECK WIRE HARNESS (CRANKSHAFT POSITION SENSOR - ECM)



(a) Disconnect the C3 sensor connector.
(b) Disconnect the E8 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

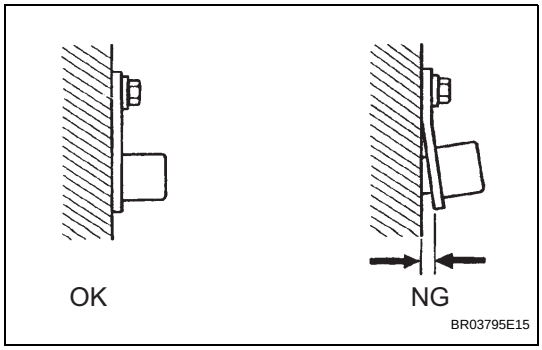
Standard resistance

Tester Connection	Specified Condition
NE+ (C3-1) - NE+ (E8-27)	Below 1 Ω
NE- (C3-2) - NE- (E8-34)	Below 1 Ω
NE+ (C3-1) or NE+ (E8-27) - Body ground	10 kΩ or higher
NE- (C3-2) or NE- (E8-34) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	CHECK SENSOR INSTALLATION (CRANKSHAFT POSITION SENSOR)



(a) Check the crankshaft position sensor installation.
OK:
Sensor is installed correctly.

NG → **TIGHTEN SENSOR**

OK

4	CHECK CRANKSHAFT TIMING PULLEY (TEETH OF PLATE)

(a) Check the teeth of the sensor plate.
OK:
Sensor plate does not have any cranks or deformation.

NG → **REPLACE CRANKSHAFT POSITION SENSOR PLATE**

OK

REPLACE ECM

DTC	P0340	Camshaft Position Sensor "A" Circuit (Bank 1 or Single Sensor)

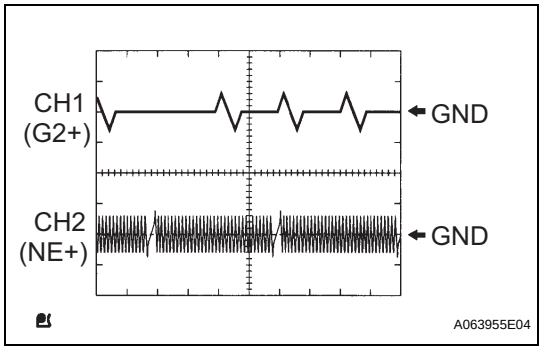
DESCRIPTION

The Camshaft Position (CMP) sensor consists of a magnet and an iron core which is wrapped with copper wire, and is installed onto the cylinder head. When the camshaft rotates, each of 3 teeth on the camshaft passes through the CMP sensor. This activates the internal magnet in the sensor, generating a voltage in the copper wire. The camshaft rotation is synchronized with the crankshaft rotation. When the crankshaft turns twice, the voltage is generated 3 times in the CMP sensor. The generated voltage in the sensor acts as a signal, allowing the ECM to locate the camshaft position. This signal is then used to control ignition timing, fuel injection timing, and the VVT system.

ES

DTC No.	DTC Detection Condition	Trouble Area
P0340	Case 1 • No CMP sensor signal to ECM while cranking (2 trip detection logic) Case 2 • Camshaft/Crankshaft misalignment detected at engine speed of 600 rpm or more (1 trip detection logic)	• Open or short in CMP sensor circuit • CMP sensor • Camshaft • Jumped tooth of timing chain • ECM

HINT:
DTC P0340 indicates a malfunction relating to the CMP sensor (+) circuit (the wire harness between the ECM and CMP sensor, and the CMP sensor itself).



Reference: Inspection using an oscilloscope.
HINT:
- The correct waveform is as shown.
- G2+ stands for the CMP sensor signal, and NE+ stands for the Crankshaft Position (CKP) sensor signal.

Item	Content
Terminals	CH1: G2+ - NE- CH2: NE+ - NE-
Equipment Settings	5 V/DIV., 20 ms./DIV.
Conditions	Cranking or idling

MONITOR DESCRIPTION

If no signal is transmitted by the CMP sensor although the engine is running, or the rotation of the camshaft and the crankshaft is not synchronized, the ECM interprets this as a malfunction of the sensor. If the malfunction is not repaired successfully, a DTC is set 10 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0340: Camshaft position sensor range check P0340: Camshaft position/crankshaft position misalignment

Required Sensors/Components (Main)	Camshaft Position (CMP) sensor
Required Sensors/Components (Related)	Crankshaft Position (CKP) sensor
Frequency of Operation	Continuous
Duration	4 seconds: CMP sensor range check 5 seconds: Camshaft position/crankshaft position misalignment
MIL Operation	2 driving cycles: CMP sensor range check Immediate: Camshaft position/crankshaft position misalignment
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None

ES

Camshaft Position Sensor Range Check:

Starter	ON
Minimal battery voltage while starter ON	Less than 11 V

Camshaft Position/Crankshaft Position Misalignment:

Engine speed	600 rpm or more
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

Camshaft Position Sensor Range Check:

CMP sensor signal	No signal

Camshaft Position/Crankshaft Position Misalignment:

Camshaft position and crankshaft position phase	Misaligned

COMPONENT OPERATING RANGE

CMP sensor	• CMP sensor output voltage fluctuates while camshaft is revolving • 3 CMP sensor signals per 2 crankshaft revolutions

WIRING DIAGRAM

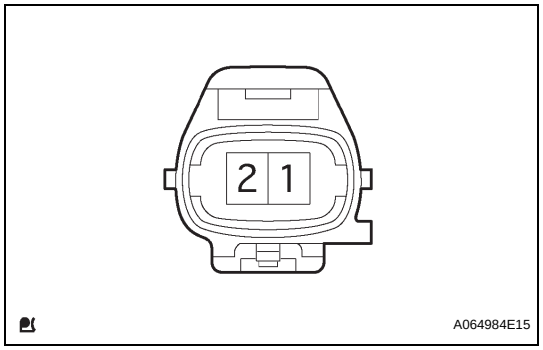
Refer to DTC P0335 (See page ES-164).

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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.

1 INSPECT CAMSHAFT POSITION SENSOR (RESISTANCE)



(a) Disconnect the C1 sensor connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
1 - 2	835 to 1,400 Ω at cold
1 - 2	1,060 to 1,645 Ω at hot

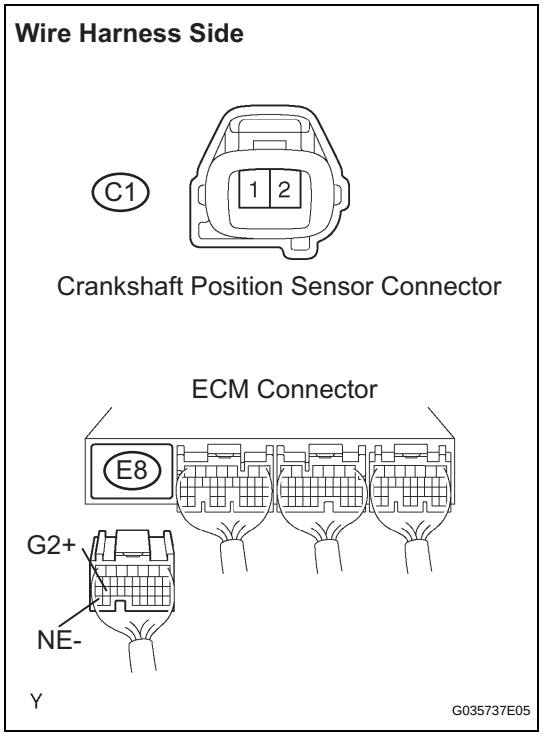
HINT:
Terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10 to 50°C (14 to 122°F). "Hot" means approximately 50 to 100°C (122 to 212°F).

ES

NG → **REPLACE CAMSHAFT POSITION SENSOR**

OK

2 CHECK WIRE HARNESS (CAMSHAFT POSITION SENSOR - ECM)



(a) Disconnect the C1 CMP sensor connector.
(b) Disconnect the E8 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

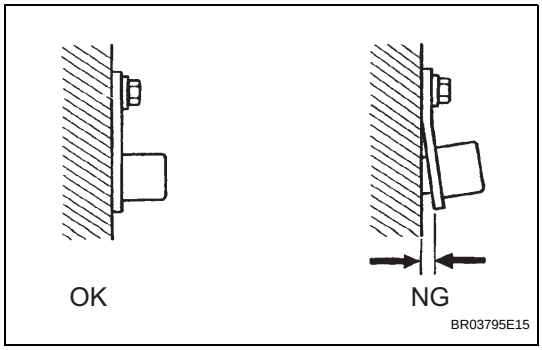
Standard resistance

Tester Connection	Specified Condition
G+ (C1-1) - G2+ (E8-26)	Below 1 Ω
G- (C1-2) - NE- (E8-34)	Below 1 Ω
G+ (C1-1) or G2+ (E8-26) - Body ground	10 kΩ or higher
G- (C1-2) or NE- (E8-34) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	CHECK SENSOR INSTALLATION (CAMSHAFT POSITION SENSOR)



(a) Check the CMP sensor installation.
OK:
Sensor is installed correctly.

NG → **TIGHTEN SENSOR**

OK

4	CHECK CAMSHAFT

(a) Check the teeth of the camshaft.
OK:
Camshaft teeth do not have any cracks or deformation.

NG → **REPLACE CAMSHAFT**

OK

REPLACE ECM

ES

DTC	P0351	Ignition Coil "A" Primary / Secondary Circuit

DTC	P0352	Ignition Coil "B" Primary / Secondary Circuit

DTC	P0353	Ignition Coil "C" Primary / Secondary Circuit

DTC	P0354	Ignition Coil "D" Primary / Secondary Circuit

DESCRIPTION

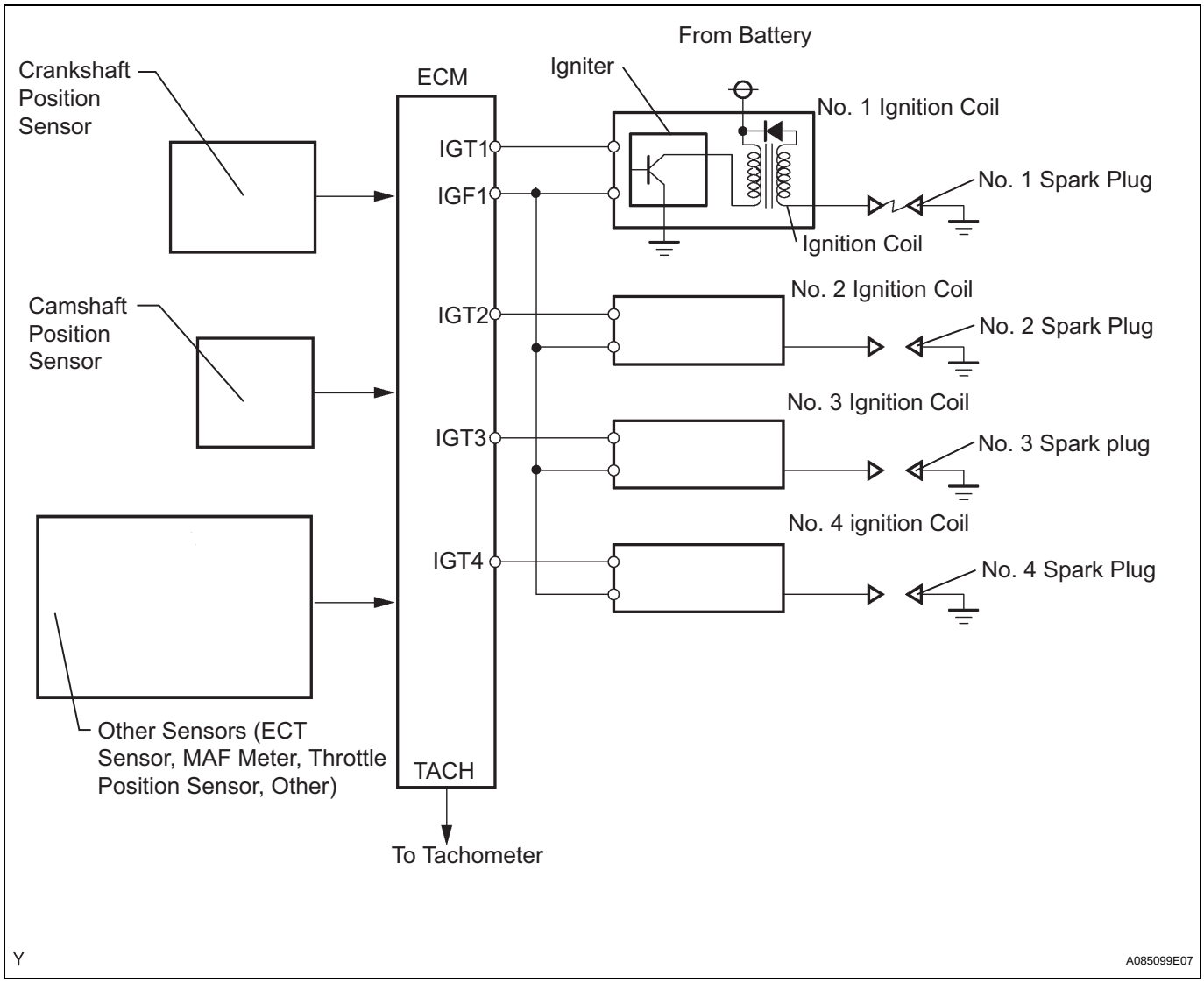
HINT:

- These DTCs indicate malfunctions relating to the primary circuit.
- If DTC P0351 is set, check the No. 1 ignition coil with igniter circuit.
- If DTC P0352 is set, check the No. 2 ignition coil with igniter circuit.
- If DTC P0353 is set, check the No. 3 ignition coil with igniter circuit.
- If DTC P0354 is set, check the No. 4 ignition coil with igniter circuit.

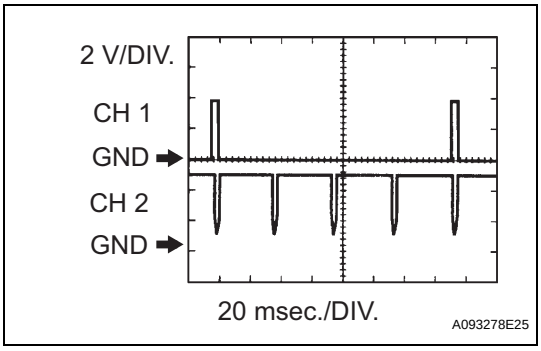
A Direct Ignition System (DIS) is used on this vehicle.

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 sparks of the spark plugs pass from the center electrodes to the ground electrodes.

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. As the ECM cuts the current to the primary coil, the igniter sends back an ignition confirmation (IGF) signal to the ECM for each cylinder ignition.



DTC No.	DTC Detection Condition	Trouble Area
P0351 P0352 P0353 P0354	No IGF signal to ECM while engine running (1 trip detection logic)	• Ignition system • Open or short in IGF1 or IGT circuit (1 to 4) between ignition coil with igniter and ECM • No. 1 to No. 4 ignition coils with igniters • ECM

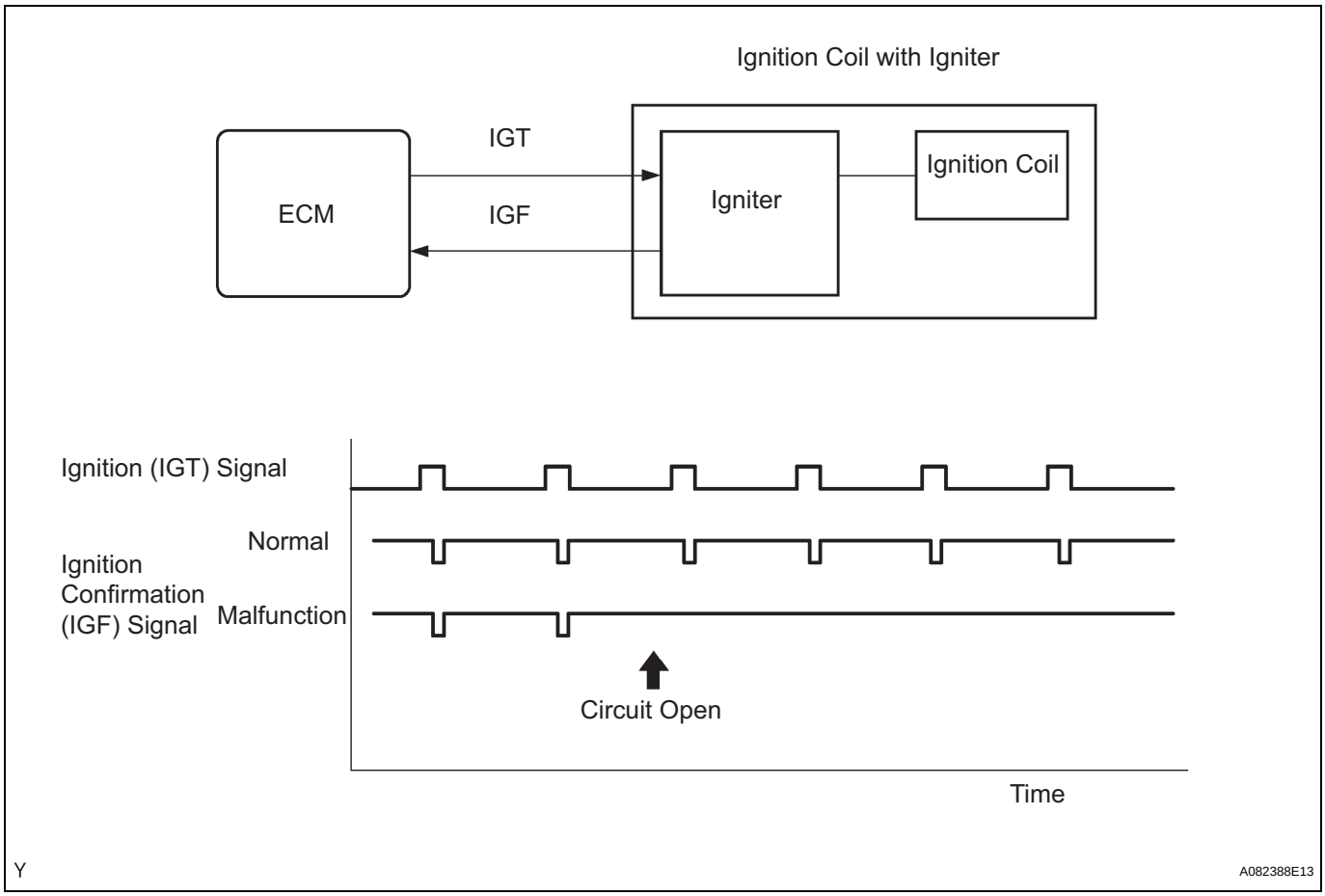


Reference: Inspection using an oscilloscope

While cranking or idling, check the waveform between terminals IGT (1 to 4) and E1, and IGF1 and E1 of the E8 ECM connector.

Item	Content
Terminals	CH1: IGT1, IGT2, IGT3, IGT4 - E1 CH2: IGF1 - E1
Equipment Settings	2 V/DIV., 20 ms./DIV.
Conditions	Cranking or idling

MONITOR DESCRIPTION



If the ECM does not receive any IGF signals although it transmits IGT signals, the ECM interprets this as a fault in the igniter and sets a DTC.
If the malfunction is not repaired successfully, a DTC is set 1 second after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0351: Igniter (Cylinder 1) malfunction P0352: Igniter (Cylinder 2) malfunction P0353: Igniter (Cylinder 3) malfunction P0354: Igniter (Cylinder 4) malfunction
Required Sensors/Components (Main)	Igniter
Required Sensors/Components (Related)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	0.256 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Either of the following conditions A or B is met:	-
A. Engine RPM	1,500 rpm or less
B. Starter	OFF
Either of the following conditions C or D is met:	-
C. Both of the following conditions (a) and (b) are met:	-
(a) Engine speed	500 rpm or less
(b) Battery voltage	6 V or more
D. All of the following conditions (a), (b) and (c) are met:	-
(a) Engine speed	More than 500 rpm
(b) Battery voltage	10 V or more
(c) Number of sparks after CPU reset	5 sparks or more

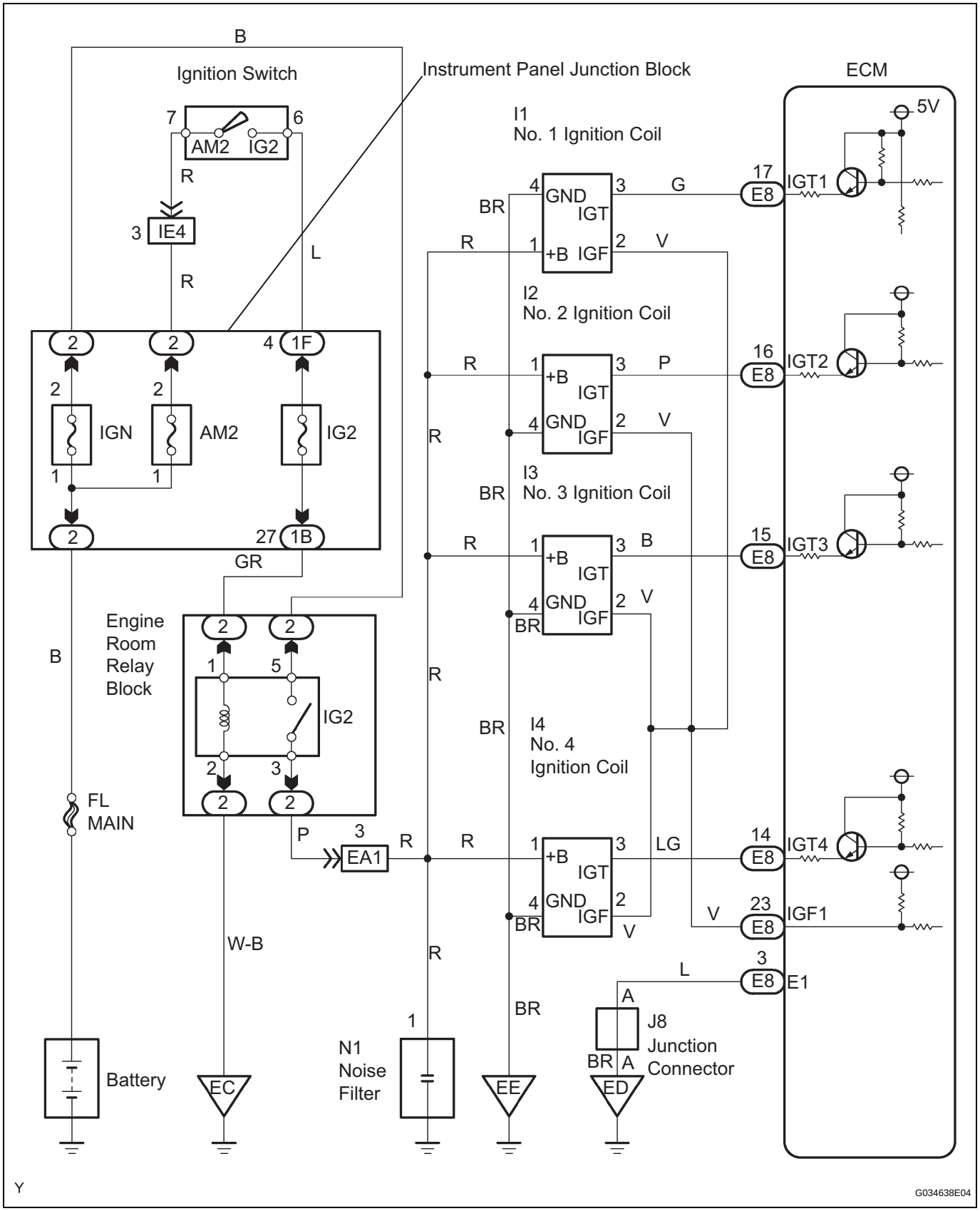
TYPICAL MALFUNCTION THRESHOLDS

IGF signal	ECM does not receive any IGF signal despite ECM sending IGT signal to igniter

COMPONENT OPERATING RANGE

IGF signal	Igniter transmits IGF signal when it receives IGT signal from ECM

WIRING DIAGRAM



ES

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

1 PERFORM SIMULATION TEST

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTCs (See page ES-32).
(e) Shuffle arrangement of the ignition coils with igniters (among No. 1 to No. 4 cylinders).
NOTICE:
Do not shuffle the connectors.
(f) Perform a simulation test.
(g) Check the DTCs displayed on the tester.

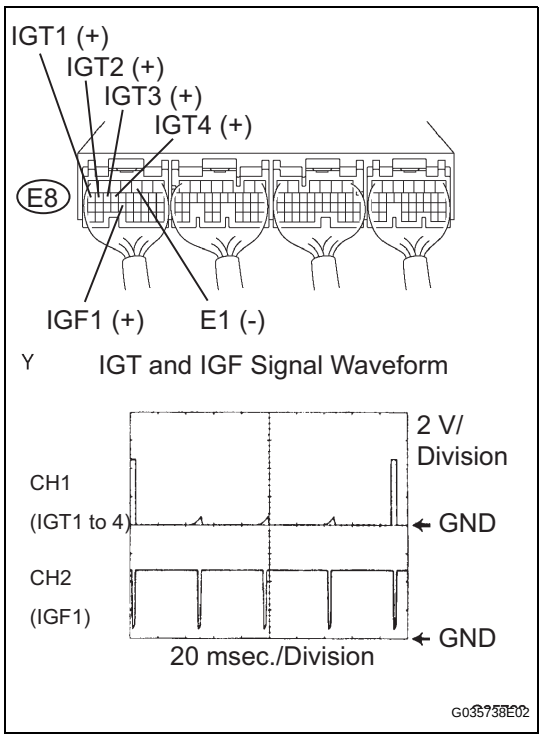
Result

Display (DTC Output)	Proceed to
Same DTCs (that have been erased)	A
Other DTCs	B

B → **REPLACE IGNITION COIL ASSEMBLY**

A

2 INSPECT ECM (IGT1, IGT2, IGT3, IGT4 AND IGF1 SIGNAL)



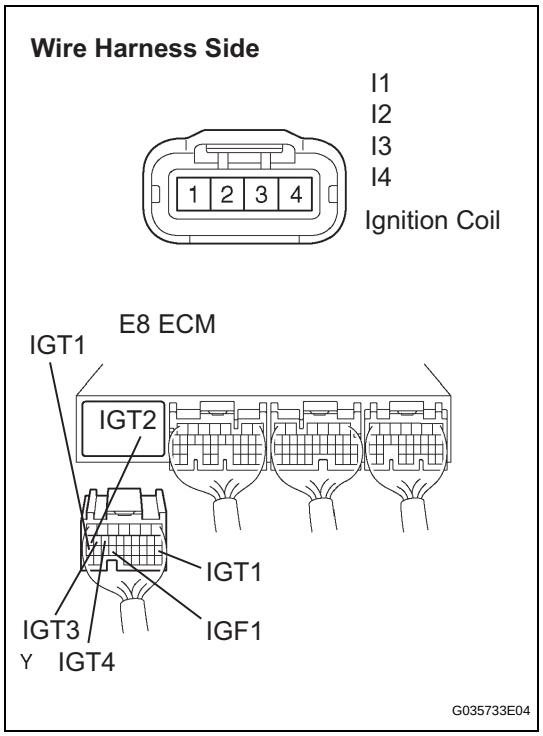
(a) While cranking or idling, check the waveform of the ECM connectors using an oscilloscope.
OK

Tester Connection	Specified Condition
IGT1 (E8-17) - E1 (E8-3)	Correct waveform appears as shown
IGT2 (E8-16) - E1 (E8-3)	Correct waveform appears as shown
IGT3 (E8-15) - E1 (E8-3)	Correct waveform appears as shown
IGT4 (E8-14) - E1 (E8-3)	Correct waveform appears as shown
IGF1 (E8-23) - E1 (E8-3)	Correct waveform appears as shown

NG → **REPLACE ECM**

OK

3 CHECK WIRE HARNESS (IGNITION COIL ASSEMBLY - ECM)



(a) Disconnect the I1, I2, I3 or I4 ignition coil with igniter connector.
(b) Disconnect the E8 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

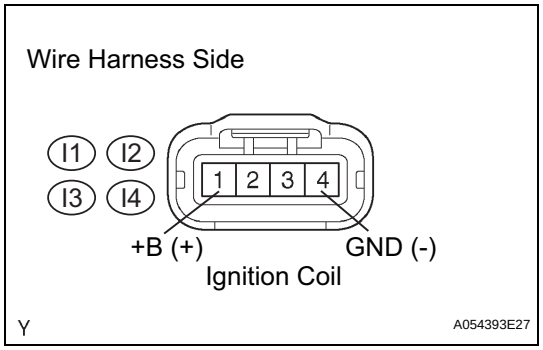
Standard resistance

Tester Connection	Specified Condition
IGF (I1-2) - IGF1 (E8-23)	Below 1 Ω
IGF (I2-2) - IGF1 (E8-23)	Below 1 Ω
IGF (I3-2) - IGF1 (E8-23)	Below 1 Ω
IGF (I4-2) - IGF1 (E8-23)	Below 1 Ω
IGT (I1-3) - IGT1 (E8-17)	Below 1 Ω
IGT (I2-3) - IGT2 (E8-16)	Below 1 Ω
IGT (I3-3) - IGT3 (E8-15)	Below 1 Ω
IGT (I4-3) - IGT4 (E8-14)	Below 1 Ω
IGF (I1-2) or IGF1 (E8-23) - Body ground	Below 1 Ω
IGF (I2-2) or IGF1 (E8-23) - Body ground	Below 1 Ω
IGF (I3-2) or IGF1 (E8-23) - Body ground	Below 1 Ω
IGF (I4-2) or IGF1 (E8-23) - Body ground	Below 1 Ω
IGT (I1-3) or IGT1 (E8-17) - Body ground	Below 1 Ω
IGT (I2-3) or IGT2 (E8-16) - Body ground	Below 1 Ω
IGT (I3-3) or IGT3 (E8-15) - Body ground	Below 1 Ω
IGT (I4-3) or IGT4 (E8-14) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 INSPECT IGNITION COIL ASSEMBLY (POWER SOURCE)



(a) Disconnect the I1, I2, I3 or I4 ignition coil connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
GND (I1-4) - Body ground	Below 1 Ω
GND (I2-4) - Body ground	Below 1 Ω
GND (I3-4) - Body ground	Below 1 Ω
GND (I4-4) - Body ground	Below 1 Ω

(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
+B (I1-1) - GND (I1-4)	Between 9 V and 14 V
+B (I2-1) - GND (I2-4)	Between 9 V and 14 V
+B (I3-1) - GND (I3-4)	Between 9 V and 14 V
+B (I4-1) - GND (I4-4)	Between 9 V and 14 V

(e) Reconnect the ignition coil connector.

NG → Go to step 5

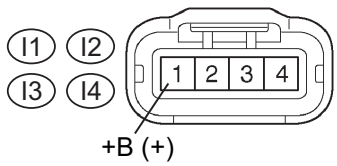
OK

ES

REPLACE IGNITION COIL ASSEMBLY

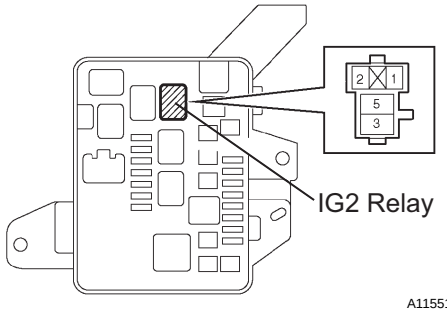
5 CHECK WIRE HARNESS (IGNITION COIL ASSEMBLY - IG2 RELAY)

Wire Harness Side



Ignition Coil and Igniter Connector

Engine Room Relay Block



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(a) Disconnect the I1, I2, I3 or I4 ignition coil with igniter connector.
(b) Remove the IG2 relay from the engine room relay block.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
+B (I1-1) - Engine room relay block (IG2 relay terminal 3)	Below 1 Ω
+B (I2-1) - Engine room relay block (IG2 relay terminal 3)	Below 1 Ω
+B (I3-1) - Engine room relay block (IG2 relay terminal 3)	Below 1 Ω
+B (I4-1) - Engine room relay block (IG2 relay terminal 3)	Below 1 Ω
+B (I1-1) or Engine room relay block (IG2 relay terminal 3) - Body ground	10 kΩ or higher
+B (I2-1) or Engine room relay block (IG2 relay terminal 3) - Body ground	10 kΩ or higher
+B (I3-1) or Engine room relay block (IG2 relay terminal 3) - Body ground	10 kΩ or higher
+B (I4-1) or Engine room relay block (IG2 relay terminal 3) - Body ground	10 kΩ or higher

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE IGNITION COIL ASSEMBLY

DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1)

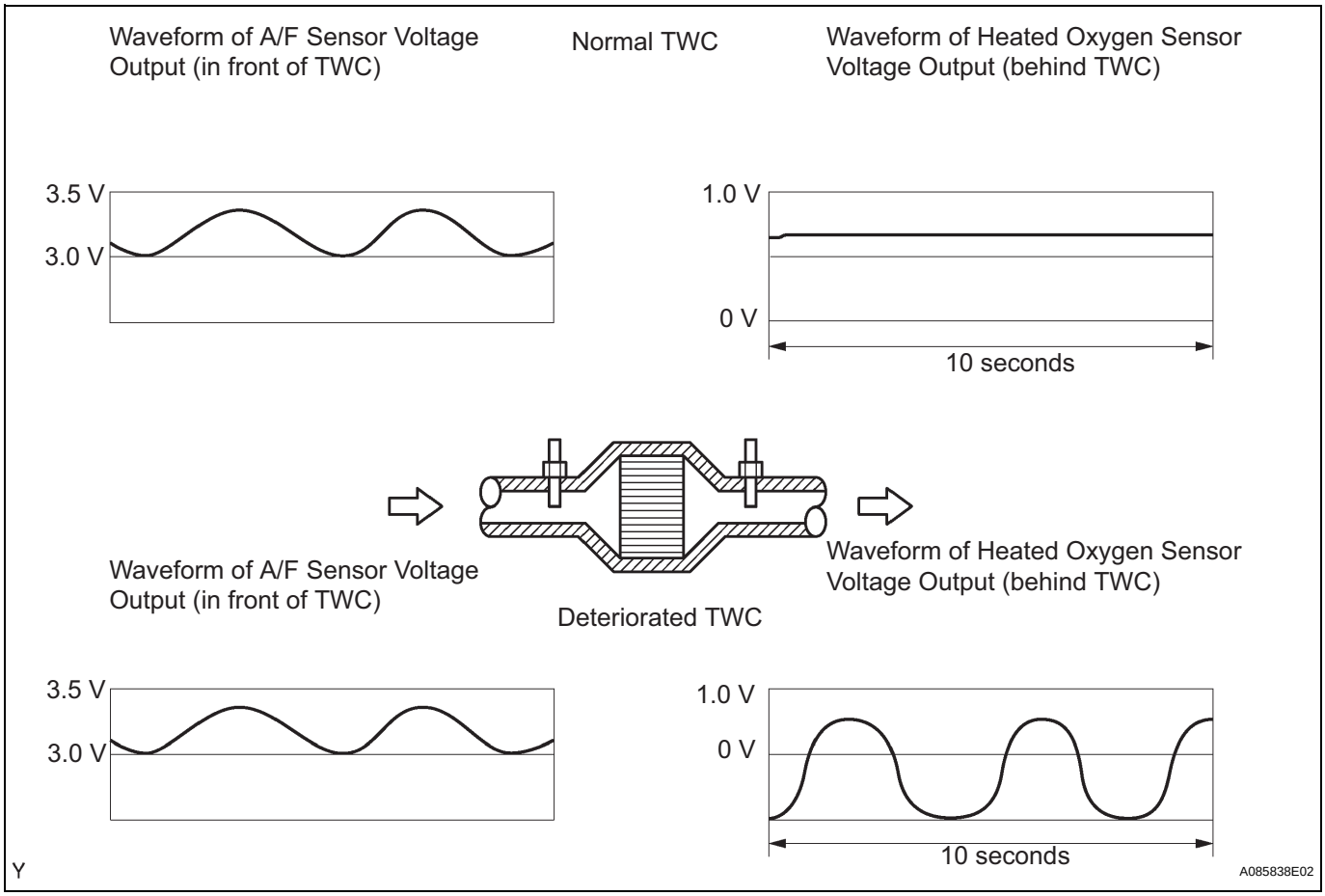
MONITOR DESCRIPTION

The ECM uses the 2 sensors, mounted in front of and behind the Three-way Catalytic Converter (TWC), to monitor its efficiency.

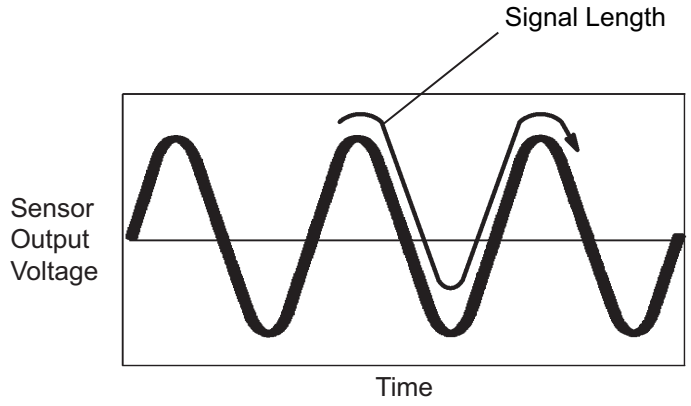
The first sensor, the Air-Fuel Ratio (A/F) sensor (sensor 1), sends pre-catalyst information to the ECM. The second sensor, the Heated Oxygen (HO2) sensor (sensor 2), sends post-catalyst information to the ECM. The ECM compares the information transmitted by these 2 sensors to determine the efficiency of the TWC performance and its ability to store oxygen.

When the TWC is functioning properly, the variation in the oxygen concentration in the exhaust gas after it has passed through the TWC is small. In this condition, the voltage output of sensor 2 slowly alternates between the rich and lean signal voltages (shown in the illustration below). As the TWC performance efficiency deteriorates, its oxygen storage capacity decreases, and the variation in the oxygen concentration in the exhaust gas increases. As a result, the sensor voltage output fluctuates frequently.

While the catalyst monitor is running, the ECM measures the signal lengths of both sensors 1 and 2, and calculates the ratio of the signal lengths to determine the extent of the TWC deterioration. If the deterioration level exceeds the preset threshold, the ECM interprets this as the TWC malfunction. The ECM then illuminates the MIL and sets the DTC.



Heated Oxygen Sensor Signal Length



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ES

DTC No.	DTC Detection Condition	Trouble Area
P0420	OSC value smaller than standard value under active air-fuel ratio control (2 trip detection logic)	• Gas leakage from exhaust system • A/F sensor (sensor 1) • HO2 sensor (sensor 2) • Three-Way Catalytic Converter (TWC) (Exhaust manifold)

HINT:
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.
- Sensor 2 refers to the sensor mounted behind the TWC and located far from the engine assembly.

MONITOR STRATEGY

Related DTCs	P0420: Catalyst Deterioration
Required Sensors/Components (Main)	TWC
Required Sensors/Components (Related)	A/F sensor, heated oxygen sensor, intake air temperature sensor, mass air flow meter, crankshaft position sensor and engine coolant temperature sensor
Frequency of Operation	Once per driving cycle
Duration	About 30 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0011 (VVT System 1 - Advance) P0012 (VVT System 1 - Retard) P0031, 32 (A/F Sensor heater - Sensor 1) P0037, 38 (O2 Sensor heater - Sensor 2) P0100 - P0103 (MAF meter) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for Closed Loop) P0136 (O2 Sensor - Sensor 2) P0171, P0172 (Fuel system) P0300 - P0304 (Misfire) P0335 (CKP sensor) P0340 (CMP sensor) P0351 - P0354 (Igniter) P0500 (VSS) P2196 (A/F Sensor - rationality) P2A00 (A/F Sensor - slow response)
Battery voltage	11 V or more

Intake air temperature	-10°C (14°F) or more
Engine coolant temperature	75°C (167°F) or more
Atmospheric pressure	76 kPa (570 mmHg) or more
Idling	OFF
Engine RPM	Less than 4,000 rpm
A/F sensor status	Activated
Fuel system status	Closed loop
Engine load	10 to 80%
All of the following conditions (a), (b) and (c) are met:	-
(a) Mass air flow rate	2.5 to 40 g/sec.
(b) Estimated front catalyst temperature	650 to 840°C (1,202 to 1,544°F)
(c) Estimated rear catalyst temperature	400 to 770°C (752 to 1,418°F)
Rear HO2 sensor heater monitor	Completed
Shift position	4th

ES

TYPICAL MALFUNCTION THRESHOLDS

Oxygen Storage Capacity (OSC) of Three-Way Catalytic Converter (TWC)	Less than 0.07 g

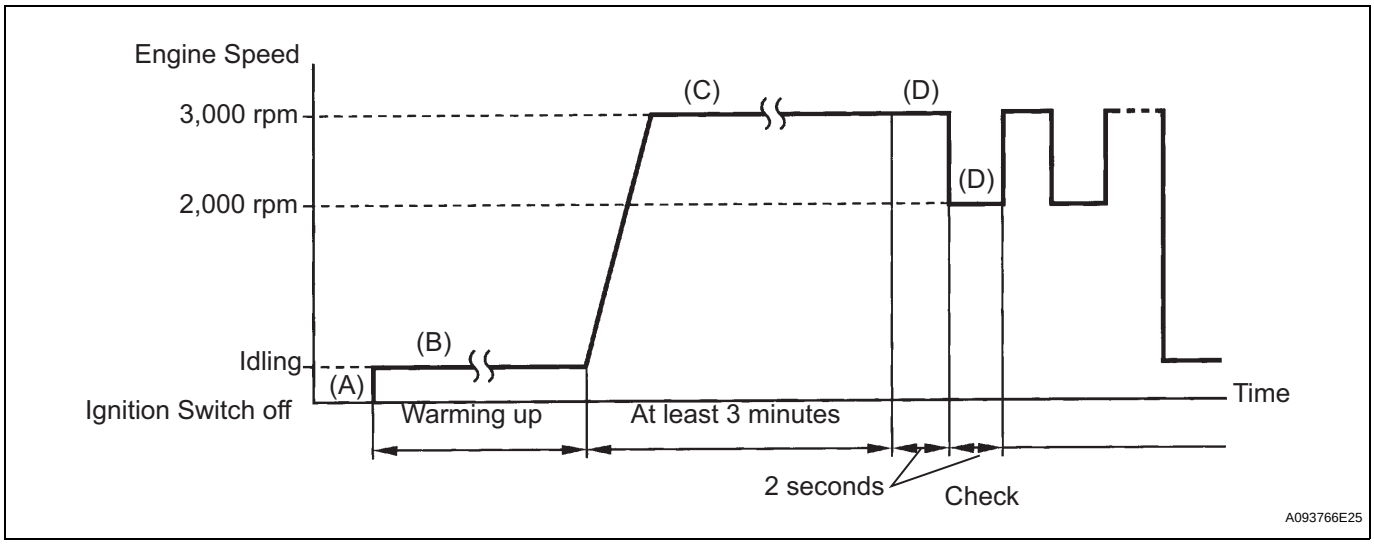
MONITOR RESULT

Refer to detailed information on "CHECKING MONITOR STATUS" (See page ES-15).

CONDITIONING FOR SENSOR TESTING

HINT:

Perform the operation with the engine speeds and time durations described below prior to checking the waveforms of the A/F and HO2 sensors. This is in order to activate the sensors sufficiently to obtain the appropriate inspection results.



(a) Connect the intelligent tester to the DLC3 (Procedure "A").

(b) Start the engine and warm it up with all the accessories switched OFF, until the engine coolant temperature stabilizes (Procedure "B").

(c) Run the engine at an engine speed of between 2,500 rpm and 3,000 rpm for at least 3 minutes (Procedure "C").

(d) While running the engine at 3,000 rpm for 2 seconds and 2,000 rpm for 2 seconds, check the waveforms of the A/F and HO2 sensors using the tester (Procedure "D").

HINT:
Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.
The following instructions describe how to conduct the A/F CONTROL operation using the intelligent tester.

1. Connect the intelligent tester to the DLC3.
2. Start the engine and turn the tester on.
3. Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
4. On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
5. Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
6. Monitor the voltage outputs of the A/F and HO2 sensors (AFS B1S1 and OS2 B1S2) displayed on the tester.

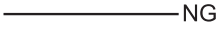
ES

HINT:
- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 (A/F)	+25%	Rich	Less than 3.0
AFS B1S1 (A/F)	-12.5%	Lean	More than 3.35
O2S B1S2 (HO2)	+25%	Rich	More than 0.55
O2S B1S2 (HO2)	-12.5%	Lean	Less than 0.4

NOTICE:
The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage		HO2S Voltage (Sensor 2) Output Voltage		Main Suspected Trouble Area
1	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		-
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage More than 0.55 V Less than 0.4 V		
2	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• A/F sensor • A/F sensor heater • A/F sensor circuit
	Output Voltage Almost no reaction		Output Voltage More than 0.55 V Less than 0.4 V		
3	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• Heated oxygen sensor • Heated oxygen sensor heater • Heated oxygen sensor circuit
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage Almost no reaction		

Case	A/F Sensor (Sensor 1) Output Voltage		HO2S Voltage (Sensor 2) Output Voltage		Main Suspected Trouble Area
4	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)
	Output Voltage Almost no reaction		Output Voltage Almost no reaction		

- Following the A/F CONTROL procedure enables technicians to check and graph the voltage outputs of both the A/F and HO2 sensors.
- To display the graph, select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2, and press the YES button and then the ENTER button followed by the F4 button.

ES

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0420)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(d) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0420	A
P0420 and other DTCs	B

HINT:
If any DTCs other than P0420 are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

A

2	PERFORM ACTIVE TEST BY INTELLIGENT TESTER (A/F CONTROL)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and turn the tester on.
(c) Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.

(e) Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).

(f) Monitor the voltage outputs of the A/F and HO2 sensors (AFS B1S1 and O2S B1S2) displayed on the tester.
HINT:
- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- Each sensor reacts in accordance with increases and decreases in the fuel injection volume.

Standard voltage

ES

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 (A/F)	+25%	Rich	Less than 3.0
AFS B1S1 (A/F)	-12.5%	Lean	More than 3.35
O2S B1S2 (HO2)	+25%	Rich	More than 0.55
O2S B1S2 (HO2)	-12.5%	Lean	Less than 0.4

Result

Status AFS B1S1	Status O2S B1S2	A/F Condition and A/F Sensor Condition	Misfire	Suspected Trouble Area	Proceed to
Lean/Rich	Lean/Rich	Normal	-	• Three-Way Catalytic Converter (TWC) • Gas leakage from exhaust system	A
Lean	Lean/Rich	A/F sensor malfunction	-	A/F sensor	B
Rich	Lean/Rich	A/F sensor malfunction	-	A/F sensor	B
Lean/Rich	Lean	HO2 sensor malfunction	-	• HO2 sensor • Gas leakage from exhaust system	C
Lean/Rich	Rich	HO2 sensor malfunction	-	• HO2 sensor • Gas leakage from exhaust system	C
Lean	Lean	Actual air-fuel ratio lean	May occur	• Extremely rich or lean actual air-fuel ratio • Gas leakage from exhaust system	A
Rich	Rich	Actual air-fuel ratio rich	-	• Extremely rich or lean actual air-fuel ratio • Gas leakage from exhaust system	A

Lean: During A/F CONTROL, the A/F sensor output voltage (AFS) is consistently more than 3.35 V, and the HO2 sensor output voltage (O2S) is consistently less than 0.4 V.
Rich: During A/F CONTROL, the AFS is consistently less than 3.0 V, and the O2S is consistently more than 0.55 V.

B → **CHECK AND REPLACE AIR FUEL RATIO SENSOR**

C → **CHECK AND REPLACE HEATED OXYGEN SENSOR, AND CHECK AND REPAIR EXHAUST GAS LEAKAGE**

A

3	INSPECT FOR EXHAUST GAS LEAK

OK:
No gas leakage.
NOTICE:
Replace both the front and rear catalysts (front exhaust pipe).

NG → **REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT**

ES

OK

REPLACE EXHAUST MANIFOLD CONVERTER

DTC	P043E	Evaporative Emission System Reference Orifice Clog Up

DTC	P043F	Evaporative Emission System Reference Orifice High Flow

DTC	P2401	Evaporative Emission System Leak Detection Pump Control Circuit Low

ES

DTC	P2402	Evaporative Emission System Leak Detection Pump Control Circuit High

DTC	P2419	Evaporative Emission System Switching Valve Control Circuit Low

DTC SUMMARY

DTCs	Monitoring Item	Malfunction Detection Condition	Trouble Area	Detection Timing	Detection Logic
P043E	0.02 inch orifice clogged	P043E, P043F, P2401, P2402, P2419 are present when one of the following conditions is met during key-off EVAP monitor • Reference orifice clogged • Reference orifice high-flow • Leak detection pump OFF malfunction • Leak detection pump ON malfunction • Vent valve ON (close) malfunction	• Pump module • Connector/wire harness (Pump module - ECM) • ECM	While engine switch off	2 trip
P043F	0.02 inch orifice high-flow				
P2401	Vacuum pump stuck OFF				
P2402	Vacuum pump stuck ON				
P2419	Vent valve stuck open (vent)				

HINT:
The 0.02 inch orifice is located inside the pump module.

DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) System (See page ES-314).

INSPECTION PROCEDURE

Refer to the EVAP System (See page ES-314).

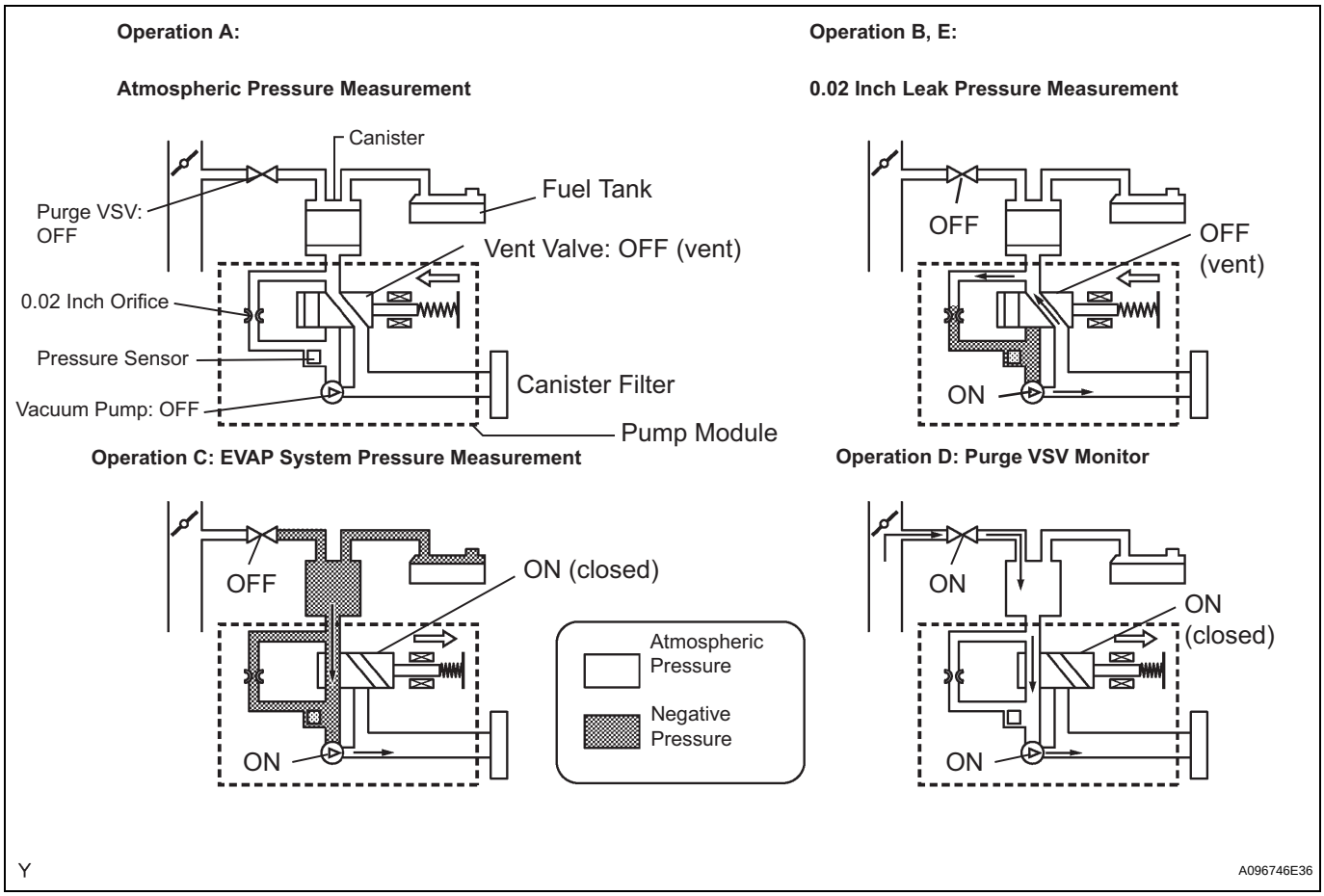
MONITOR DESCRIPTION

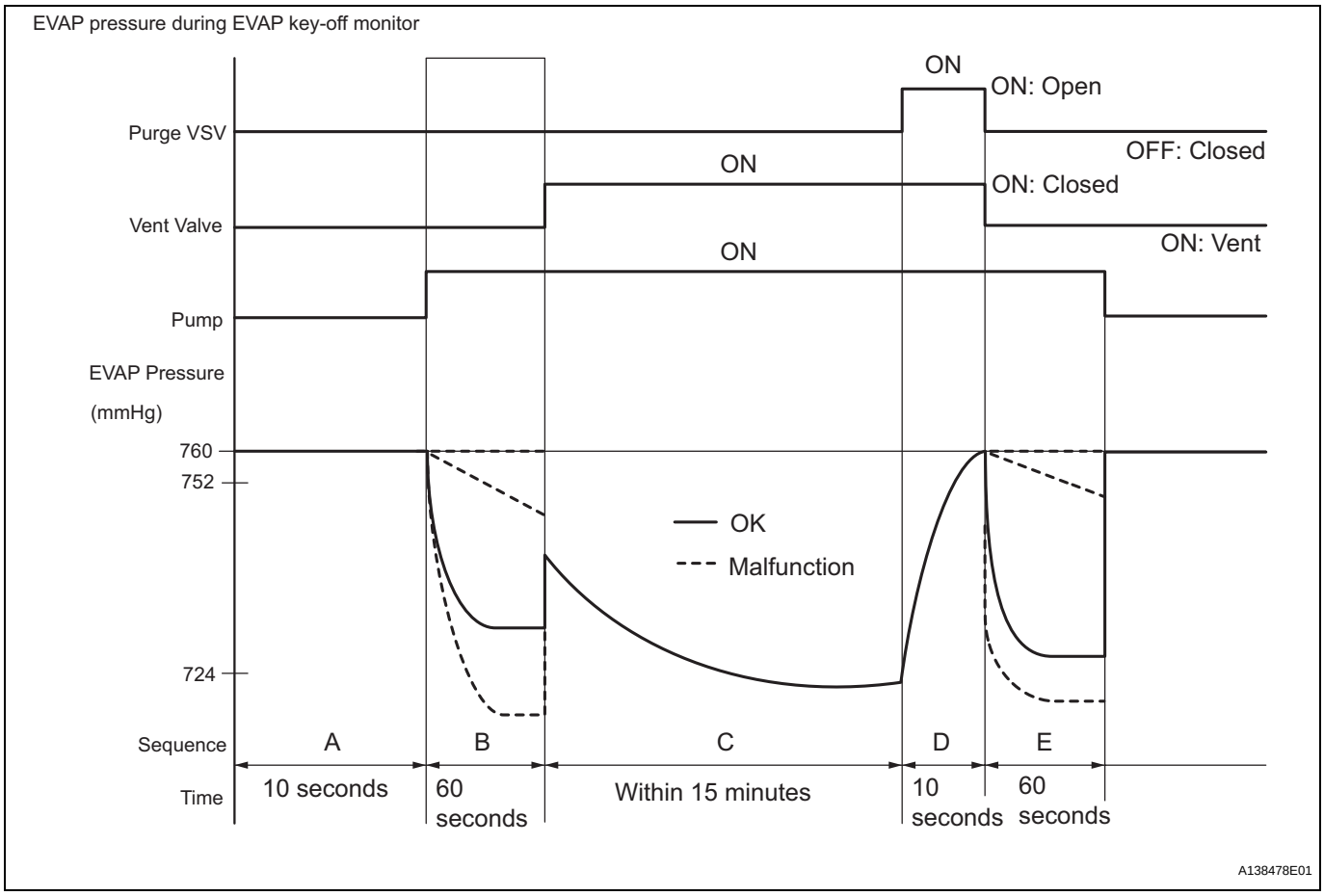
5 hours*1 after the ignition switch is turned off, the electric vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.
HINT:
*1: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operations	Descriptions	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch is turned off.	-

Sequence	Operations	Descriptions	Duration
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If pressure in EVAP system is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) is created in EVAP system, and EVAP system pressure is then measured. Write down measured value as it will be used in leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*2
D	Purge VSV monitor	Purge VSV is opened and then EVAP system pressure is measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	After second 0.02 inch leak pressure measurement, leak check is performed by comparing first and second 0.02 inch leak pressure standards. If stabilized system pressure is higher than second 0.02 inch leak pressure standard, ECM determines that EVAP system is leaking.	60 seconds
F	Final check	Atmospheric pressure is measured and then monitoring result is recorded by ECM.	-

*2: If there is only a small amount of fuel in the fuel tank, stabilizing the EVAP pressure takes longer than usual.





The leak detection pump creates negative pressure through the reference orifice. When the system is normal, the EVAP pressure is within 724 to 752 mmHg* and saturated within a minute.
If not, the ECM interprets this as a malfunction. The ECM will illuminate the MIL and set DTC if this malfunction is detected in a consecutive drive cycle.

*: Typical valve

MONITOR STRATEGY

Related DTCs	P043E: 0.02 inch orifice clog (built-in pump module) P043F: 0.02 inch orifice high-flow (built-in pump module) P2401: Vacuum pump stuck OFF P2402: Vacuum pump stuck ON P2419: Vent valve stuck open (vent)
Required Sensors/Components	Pump module
Frequency of Operation	Once per driving cycle
Duration	Within 2 minutes
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

The monitor runs whenever the following DTCs are not present	None
EVAP key-off monitor runs when all of the following conditions are met:	-
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)
Battery voltage	10.5 V or more
Vehicle speed	Below 2.5 mph (4 km/h)

Ignition switch	OFF
Time after key-off	5, 7 or 9.5 hours
EVAP pressure sensor malfunction (P0450, P0451, P0452, P0453)	Not detected
EVAP canister purge valve	Not operated by scan tool
EVAP canister vent valve	Not operated by scan tool
EVAP leak detection pump	Not operated by scan tool
Both of the following conditions 1 and 2 are met before key-off:	Conditions 1 and 2
1. Duration that vehicle is driven	5 minutes or more
2. EVAP purge operation	Performed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)

Key-off monitor sequence 1 to 8

1. Atmospheric pressure measurement

Next sequence runs if the following condition is met:	-
Atmospheric pressure measurement	Less than 0.3 kPa (2.25 mmHg) in 1 second

2. First reference pressure measurement

Next sequence runs if all of the following conditions are met:	Conditions 1, 2 and 3
1. EVAP pressure just after reference pressure measurement	-1 kPa (-7.5 mmHg) or less
2. Reference pressure	-4.85 to -1.057 kPa (-36.384 to -7.929 mmHg)
3. Reference pressure	Saturated within 1 minute

3. EVAP canister vent valve close stuck check

Next sequence runs if the following condition is met:	-
EVAP pressure change after vent valve is ON	0.3 kPa (2.25 mmHg) or more

4. Vacuum introduction

Next sequence runs if the following condition is met:	-
Vacuum introduction time	Saturated within 15 minutes

5. EVAP canister purge valve close stuck check

Next sequence runs if the following condition is met:	-
EVAP pressure change after purge valve is open	0.3 kPa (2.25 mmHg) or more

6. Second reference pressure measurement

Next sequence runs if all of the following conditions are met:	Conditions 1, 2, 3 and 4
1. EVAP pressure just after reference pressure	-1 kPa (-7.5 mmHg) or less
2. Reference pressure	-4.85 to -1.057 kPa (-36.384 to -7.929 mmHg)
3. Reference pressure	Saturated
4. Difference between first reference pressure and second reference pressure	Less than 0.7 kPa (5.25 mmHg)

7. Leak check

Next sequence runs if the following condition is met:	-
EVAP pressure when vacuum introduction was complete	Lower than second reference pressure

8. Atmospheric pressure measurement

EVAP monitor is complete if the following condition is met:	-
Atmospheric pressure difference between sequence 1 and 8	Within 0.3 kPa (2.25 mmHg)

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met:	-
EVAP pressure just after reference pressure measurement start	More than -1 kPa (-7.5 mmHg)

Reference pressure	Less than -4.85 kPa (-36.384 mmHg)
Reference pressure	-1.057 kPa (-7.929 mmHg) or more
Reference pressure	Not saturated
Difference between first reference pressure and second reference pressure	0.7 kPa (5.25 mmHg) or more

MONITOR RESULT

Refer to CHECKING MONITOR STATUS (See page ES-15).

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow

DTC SUMMARY

DTC No.	Monitoring Item	Malfunction Detection Condition	Trouble Area	Detection Timing	Detection Logic
P0441	Purge VSV (Vacuum Switching Valve) stuck open	Leak detection pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. Reference pressure measured at start and at end of leak check. If stabilized pressure higher than [second reference pressure x 0.2], ECM determines that purge VSV stuck open.	• Purge VSV • Connector/wire harness (Purge VSV - ECM) • ECM • Canister pump module • Leakage from EVAP system	Ignition switch off	2 trip
P0441	Purge VSV stuck closed	After EVAP leak check performed, purge VSV turned ON (open), and atmospheric air introduced into EVAP system. Reference pressure measured at start and at end of check. If pressure does not return to near atmospheric pressure, ECM determines that purge VSV stuck closed.	• Purge VSV • Connector/wire harness (Purge VSV - ECM) • ECM • Canister pump module • Leakage from EVAP system	Ignition switch off	2 trip
P0441	Purge flow	While engine running, following conditions are successively met: • Negative pressure not created in EVAP system when purge VSV turned ON (open) • EVAP system pressure change less than 0.5 kPa-g (3.75 mmHg-g) when vent valve turned ON (closed) • Atmospheric pressure change before and after purge flow monitor less than 0.1 kPa-g (0.75 mmHg-g)	• Purge VSV • Connector/wire harness (Purge VSV - ECM) • Leakage from EVAP line (Purge VSV - Intake manifold) • ECM	While engine running	2 trip

DESCRIPTION

Refer to the EVAP system (See page ES-314).

INSPECTION PROCEDURE

Refer to the EVAP system (See page ES-314).

MONITOR DESCRIPTION

The 2 monitors, key-off and purge flow, are used to detect malfunctions relating to DTC P0441. The key-off monitor is initiated by the ECM internal timer, known as the soak timer, 5 hours* after the ignition switch is turned off. The purge flow monitor runs while the engine is running.

1. **Key-off monitor**

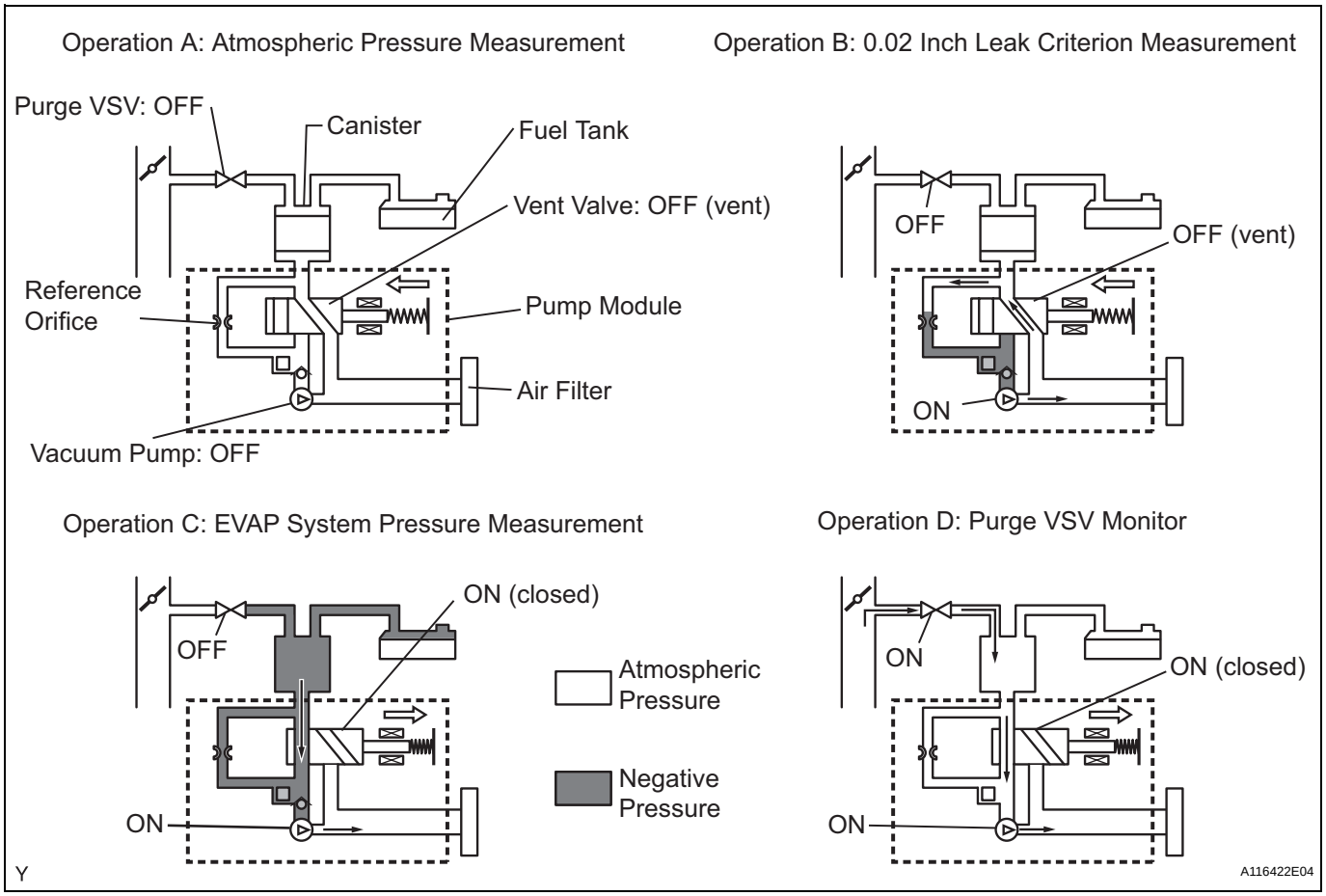
   5 hours* after the ignition switch is turned off, the leak detection pump creates negative pressure (vacuum) in the EVAP system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

   HINT:

   *: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operation	Description	Duration
-	ECM activation	Activated by soak timer 5, 7 or 9.5 hours after ignition switch off.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If pressure in EVAP system not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak criterion, leak detection pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if leak detection pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) created in EVAP system, and EVAP system pressure then measured. Write down measured value as it will be used in leak check. If EVAP pressure does not stabilize within 900 seconds, ECM cancels EVAP system monitor.	900 seconds*
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	After second 0.02 inch leak pressure measurement, leak check is performed by comparing first and second 0.02 inch leak pressure standards. If stabilized system pressure is higher than second 0.02 inch leak pressure standard, ECM determines that there is a leak in EVAP system.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

*: If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.



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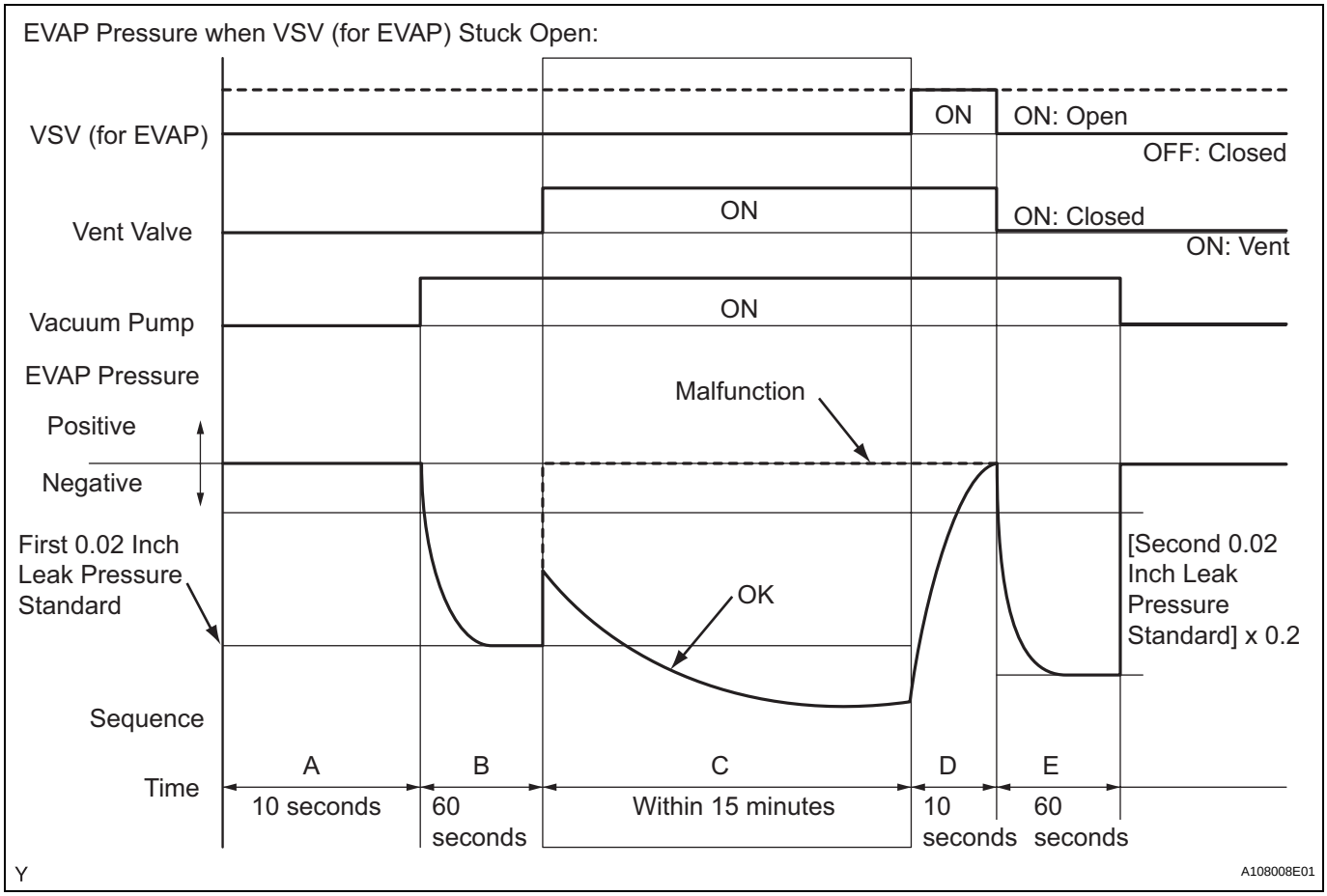
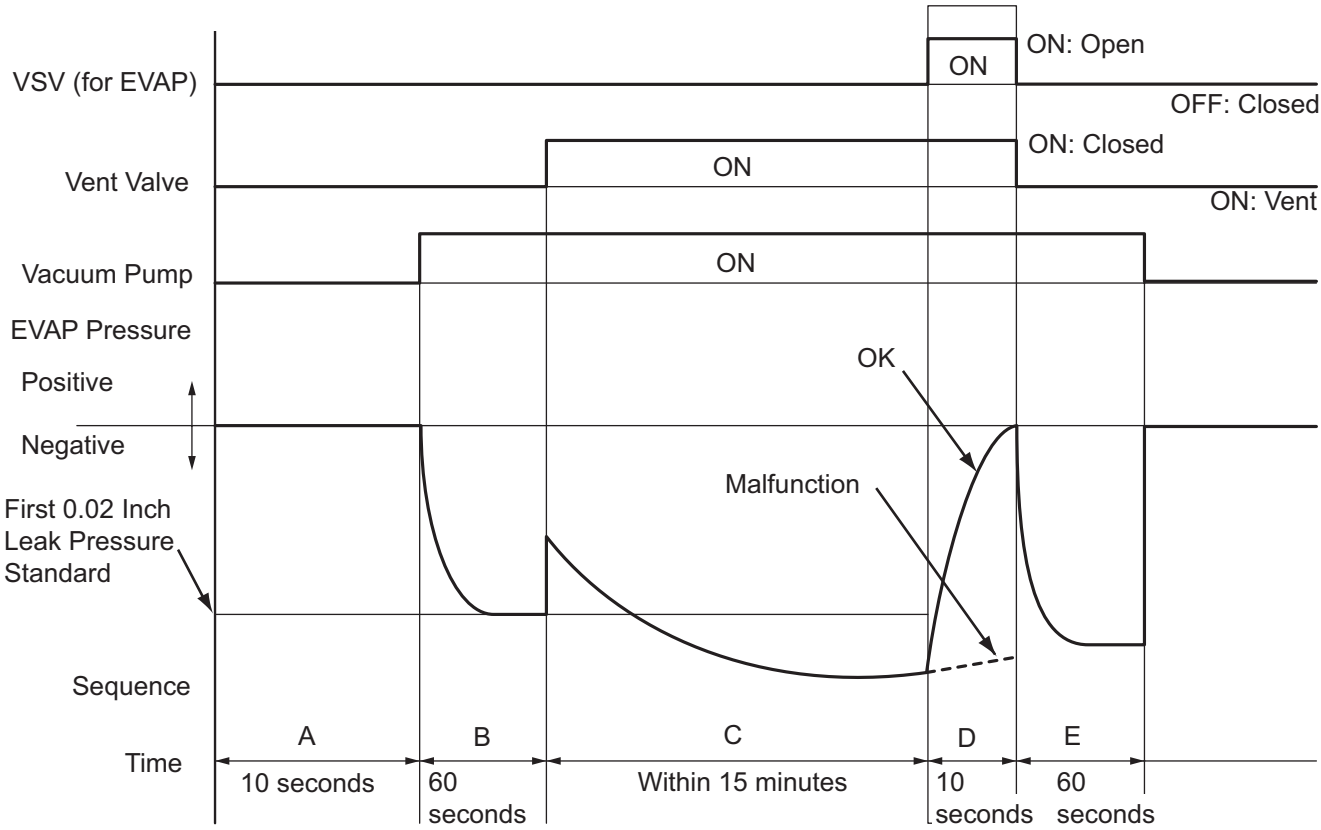
(a) Purge VSV stuck open
In operation C, the leak detection pump creates negative pressure (vacuum) in the EVAP system. The EVAP system pressure is then measured by the ECM using the canister pressure sensor. If the stabilized system pressure is higher than [second 0.02 inch leak criterion x 0.2], the ECM interprets this as the purge Vacuum Switching Valve (VSV) being stuck open. The ECM illuminates the MIL and sets the DTC (2 trip detection logic).

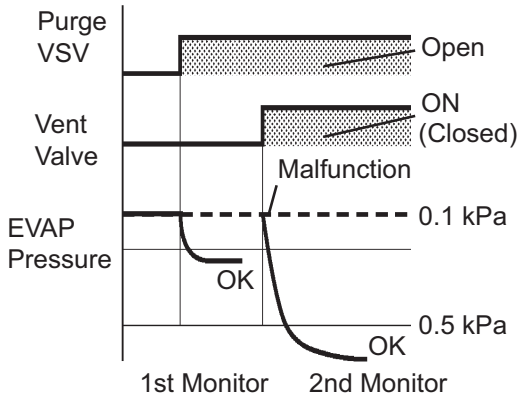


(b) Purge VSV stuck closed
In operation D, the pressure sensor measures the EVAP system pressure. The pressure measurement for the purge VSV monitor begins when the purge VSV is turned ON (open) after the EVAP leak check. When the measured pressure indicates an increase of 0.3 kPa (2.25 mmHg) or more, the purge VSV is functioning normally. If the pressure does not increase, the ECM interprets this as the purge VSV being stuck closed. The ECM illuminates the MIL and sets the DTC (2 trip detection logic).

EVAP Pressure when VSV (for EVAP) Stuck Closed:



EVAP Pressure During Purge Flow Monitor:



2. Purge flow monitor

The purge flow monitor consists of the 2 step 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 VSV is ON (open), the ECM monitors the purge flow by measuring the EVAP pressure change. If negative pressure is not created, 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 0.5 kPa (3.75 mmHg), the ECM interprets this as the Purge VSV being stuck closed, and illuminates the MIL and sets DTC P0441 (2 trip detection logic).

Atmospheric pressure check:
In order to ensure reliable malfunction detection, the variation between the atmospheric pressure, before and after conduction of the purge flow monitor, is measured by the ECM.

MONITOR STRATEGY

Key-off Monitor:

Related DTCs	P0441: Purge VSV stuck open P0441: Purge VSV stuck closed
Required Sensors/Components	Purge VSV and pump module
Frequency of Operation	Once per driving cycle
Duration	Within 15 minutes (varies with amount of fuel in tank)
MIL Operation	2 driving cycles
Sequence of Operation	None

Purge Flow Monitor:

Related DTC	P0441: Purge flow
Required Sensors/Components	Purge VSV and pump module
Frequency of Operation	Once per driving cycle
Duration	Within 10 minutes
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Key-off Monitor:

Monitor runs whenever these DTCs are not present	P0011, P0012: VVT system P0100 - P0103: MAF sensor P0110 - P0113: IAT sensor P0115 - P0118: ECT sensor P0120 - P0223, P2135: TP sensor P0171, P0172: Fuel trim P0300 - P0304: Misfire P0335: CKP sensor P0340: CMP sensor P0351 - P0354: Igniter P0450, P0452, P0453: Canister pressure sensor P0500: VSS sensor
Atmospheric pressure (absolute pressure)	70 kPa (525 mmHg) or more, and less than 110 kPa (825 mmHg)
Battery voltage	10.5 V or more
Vehicle speed	Below 2.5 mph (4 km/h)
Ignition switch	OFF
Soak time (ignition switch OFF time)	5, 7 or 9.5 hours
Canister pressure sensor malfunction (P0450, P0452, P0453)	Not detected
Purge VSV	Not operated by scan tool
Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool
When both conditions below are met:	Conditions 1 and 2 are met before key off
1. Duration that vehicle is driven	5 minutes or more
2. EVAP purge operation	Performed
Engine coolant temperature	4.4 to 35°C (40 to 95°F)
Intake air temperature	4.4 to 35°C (40 to 95°F)

Key-off monitor sequence 1 to 8

1. Atmospheric pressure measurement

Next sequence runs if the following condition is met:	-
Atmospheric pressure change	Within 0.3 kPa (2.25 mmHg) in 1 second

2. First reference pressure measurement

Next sequence runs if the following conditions are met:	Conditions 1, 2 and 3
1. EVAP pressure just after reference pressure measurement	-1 kPa (-7.5 mmHg) or lower
2. Reference pressure	-4.85 to -1.057 kPa (-36.384 to -7.929 mmHg)
3. Reference pressure	Saturated within 60 seconds

3. EVAP canister vent valve stuck closed check

Next sequence runs if the following condition is met:	-
EVAP pressure change after vent valve is ON	0.3 kPa (2.25 mmHg) or more

ES

4. Vacuum introduction

Next sequence runs if the following condition is met:	-
EVAP pressure	Saturated within 15 minutes

5. EVAP canister purge valve close stuck check

Next sequence runs if the following condition is met:	-
EVAP pressure change after purge valve is open	0.3 kPa (2.25 mmHg) or more

6. Second reference pressure measurement

Next sequence runs if all of the following conditions are met:	Conditions 1, 2, 3 and 4
1. EVAP pressure just after reference pressure	-1 kPa-g (-7.5 mmHg-g) or less
2. Reference pressure	-4.85 to -1.057 kPa-g (-36.4 to -7.93 mmHg-g)
3. Reference pressure	Saturated within 60 seconds
4. Reference pressure difference between first and second	Less than 0.7 kPa-g (5.25 mmHg-g)

7. Leak check

Next sequence runs if the following condition is met:	-
EVAP pressure when vacuum introduction is complete	Second reference pressure or less

8. Atmospheric pressure measurement

EVAP monitor is complete if the following condition is met:	-
Atmospheric pressure difference between sequence 1 and 8	Within 0.3 kPa-g (2.25 mmHg-g)

Purge Flow Monitor:

Monitor runs whenever the following DTCs are not present	P0011, P0012, P0021, P0022: VVT system P0100 - P0103: MAF sensor P0110 - P0113: IAT sensor P0115 - P0118: ECT sensor P0120 - P2135: TP sensor P0171 - P0175: Fuel trim P0300 - P0308: Misfire P0335: CKP sensor P0340: CMP sensor P0351 - P0358: Igniter P0450, P0452, P0453: Canister pressure sensor P0500: VSS sensor
Engine	Running
Engine coolant temperature	4.4°C (40°F) or more
Intake air temperature	4.4°C (40°F) or more
Canister pressure sensor malfunction	Not detected
Purge VSV	Not operated by scan tool
EVAP system check	Not operated by scan tool
Battery voltage	10 V or more

Duty ratio of purge VSV	8% or more

TYPICAL MALFUNCTION THRESHOLDS

Key-off Monitor: EVAP VSV stuck open

EVAP when vacuum introduction is complete	Higher than reference pressure x 0.2

Key-off Monitor: EVAP VSV stuck close

EVAP change after EVAP canister purge valve is open	Less than 0.3 kPa (2.25 mmHg)

Purge Flow Monitor:

Both of the following conditions are met:	-
EVAP pressure change when purge flow is started	Lower than 0.1 kPa (0.75 mmHg)
EVAP pressure change during purge flow when EVAP pressure switching valve is ON (closed)	Lower than 0.5 kPa (3.75 mmHg)

ES

MONITOR RESULT

Refer to detailed information on Monitor Result (See page ES-15).

DTC	P0450	Evaporative Emission Control System Pressure Sensor / Switch

DTC	P0451	Evaporative Emission Control System Pressure Sensor Range / Performance

DTC	P0452	Evaporative Emission Control System Pressure Sensor / Switch Low Input

DTC	P0453	Evaporative Emission Control System Pressure Sensor / Switch High Input

DTC SUMMARY

DTC No.	Monitoring Item	Malfunction Detection Condition	Trouble Area	Detection Timing	Detection Logic
P0450	Canister pressure sensor voltage abnormal fluctuation	Sensor output voltage rapidly fluctuates beyond upper and lower malfunction thresholds for 0.5 seconds.	• Canister pump module • ECM	• EVAP monitoring (ignition switch off) • Ignition switch on	1 trip
P0451	Canister pressure sensor noise	Sensor output voltage fluctuates frequently within certain time period.	• Canister pump module • Connector/wire harness (canister pump module - ECM) • ECM	• EVAP monitoring (ignition switch off) • Engine running	2 trip
P0451	Canister pressure sensor signal becomes fixed/flat	Sensor output voltage does not vary within certain time period.	• Canister pump module • Connector/wire harness (canister pump module - ECM) • ECM	• EVAP monitoring (ignition switch off)	2 trip
P0452	Canister pressure sensor low input	Sensor output voltage does not vary within certain time period.	• Canister pump module • Connector/wire harness (canister pump module - ECM) • ECM	• EVAP monitoring (ignition switch off) • Ignition switch on	1 trip
P0453	Canister pressure sensor high input	EVAP pressure more than 123.8 kPa for 0.5 seconds.	• Canister pump module • Connector/wire harness (canister pump module - ECM) • ECM	• EVAP monitoring (ignition switch off) • Ignition switch on	1 trip

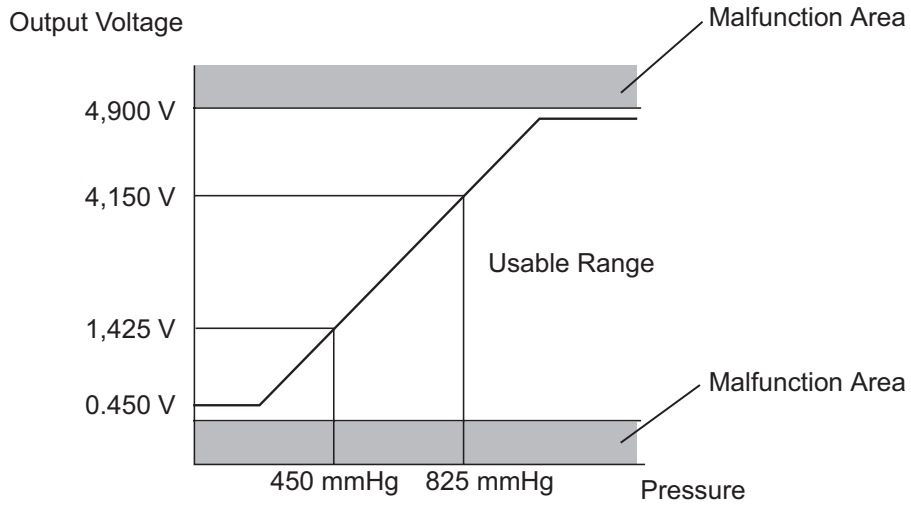
HINT:
The pressure sensor is built into the canister pump module.

DESCRIPTION

The circuit description can be found in the Evaporative Emission (EVAP) system (See page ES-314).

MONITOR DESCRIPTION

Canister Pressure Sensor Specification



HINT:

Standard atmospheric pressure is 759.9 mmHg

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1. DTC P0450: Canister pressure sensor voltage abnormal fluctuation
   If the canister pressure sensor voltage output rapidly fluctuates between less than 0.45 V (315.9 mmHg) and more than 4.9 V (928.4 mmHg), 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 sets the DTC (1 trip detection logic).
2. DTC P0451: Canister pressure sensor noisy or stuck
   If the canister pressure sensor voltage output fluctuates rapidly for 10 seconds, the ECM stops the EVAP system monitor. The ECM interprets this as noise from the canister pressure sensor, and stops the EVAP system monitor. The ECM then illuminates the MIL and sets the DTC.
   Alternatively, if the sensor voltage output does not change for 10 seconds, the ECM interprets this as the sensor being stuck, and stops the monitor. The ECM then illuminates the MIL and sets the DTC (both of the malfunctions are detected by 2 trip detection logic).
3. DTC P0452: Canister pressure sensor voltage low
   If the canister pressure sensor voltage output is below 0.45 V, 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 sets the DTC (1 trip detection logic).
4. DTC P0453: Canister pressure sensor voltage high
   If the canister pressure sensor voltage output is 4.9 V 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 sets the DTC (1 trip detection logic).

MONITOR STRATEGY

Related DTCs	P0450: Pressure sensor chattering P0451: Pressure sensor noise P0451: Pressure sensor stuck P0452: Pressure sensor low voltage P0453: Pressure sensor high voltage
Required Sensors/Components	Canister pump module
Frequency of Operation	Once per driving cycle: P0451 sensor fixed/flat Continuous: P0451 sensor noisy, P0450, P0452 and P0453
Duration	0.5 seconds: P0450, P0452 and P0453 2 minutes: P0451
MIL Operation	Immediate: P0450, P0452 and P0453 2 driving cycles: P0451
Sequence of Operation	None

ES

TYPICAL ENABLING CONDITIONS

P0451 (Noise Monitor):

Monitor runs whenever the following DTCs are not present	None
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)
Battery voltage	10.5 V or more
Intake air temperature	4.4 to 35°C (40 to 95°F)
Canister pressure sensor malfunction (P0450, P0452, P0453)	Not detected
Either of the following conditions is met:	A or B
A. Engine	Running
B. Time after key off	5, 7 or 9.5 hours

P0451 (Stuck Monitor):

Monitor runs whenever the following DTCs are not present	None
Battery voltage	10.5 V or more
Intake air temperature	4.4 to 35°C (40 to 95°F)
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)
Canister pressure sensor malfunction (P0450, P0452, P0453)	Not detected
Time after key off	5, 7 or 9.5 hours

P0450, P0452 and P0453:

Monitor runs whenever the following DTCs are not present	None
Either of the following conditions is met:	(a) or (b)
(a) Ignition switch	ON
(b) Soak timer	ON

TYPICAL MALFUNCTION THRESHOLDS

P0450: Canister pressure sensor chattering

EVAP pressure	Less than 42.1 kPa (315.9 mmHg) or more than 123.8 kPa (928.4 mmHg)

P0451: Canister pressure sensor noise

Frequency that EVAP pressure change is 0.3 kPa (2.25 mmHg) or more	10 times or more in 10 seconds

P0451: Canister pressure sensor stuck

EVAP pressure change during reference pressure	Less than 0.65 kPa (4.87 mmHg)

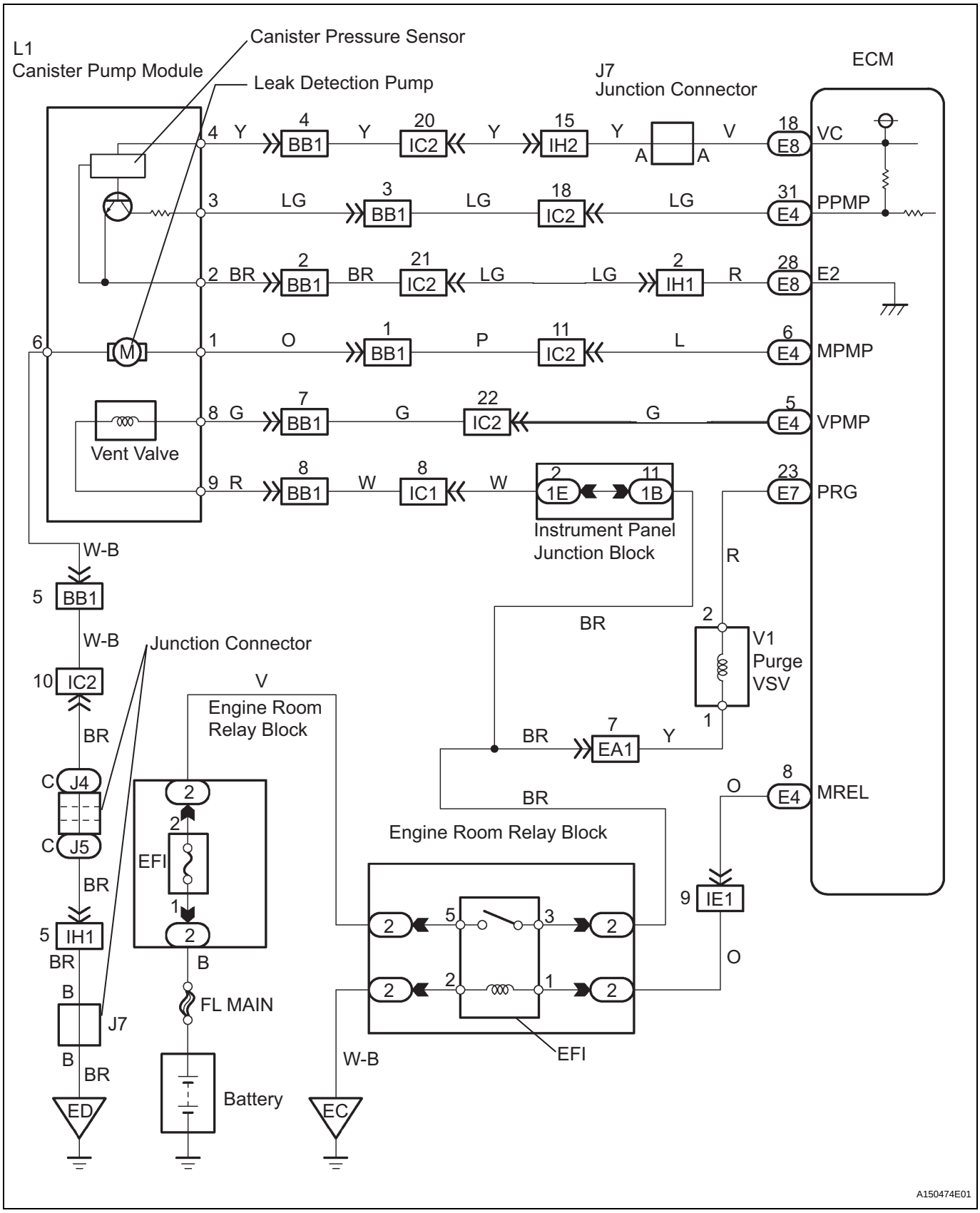
P0452: Canister pressure sensor low voltage

EVAP pressure	Less than 42.1 kPa (315.9 mmHg)

P0453: Canister pressure sensor high voltage

EVAP pressure	More than 123.8 kPa (928.4 mmHg)

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 tank cap.**
- **Do not disassemble the canister pump module.**
- **The intelligent tester is required to conduct the following diagnostic troubleshooting procedure.**

1	CONFIRM DTC AND EVAP PRESSURE

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position (do not start the engine).
(c) Turn the tester on.
(d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.
(f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / VAPOR PRESS.
(g) Read the EVAP (Evaporative Emission) pressure displayed on the tester.

ES

Result

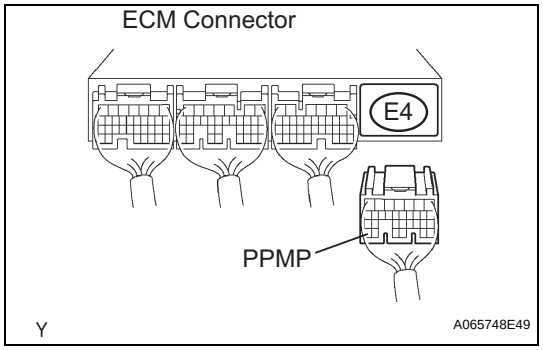
Display (DTC Output)	Test Result	Suspected Trouble Area	Proceed to
P0451	-	Canister pressure sensor	C
P0452	Less than 45 kPa (430 mmHg)	• Wire harness/connector (ECM - canister pressure sensor) • Canister pressure sensor • Short in ECM circuit	A
P0453	More than 120 kPa (900 mmHg)	• Wire harness/connector (ECM - canister pressure sensor) • Canister pressure sensor • Open in ECM circuit	B

B → Go to step 4

C → GO TO EVAP INSPECTION PROCEDURE

A

2	CHECK WIRE HARNESS (CANISTER PUMP MODULE - ECM)



(a) Turn the ignition switch off.
(b) Disconnect the E4 ECM connector.
(c) Measure the resistance between the PPMP terminal of the ECM connector and body ground.

Result

Test Result	Suspected Trouble Area	Proceed to
10 kΩ or less	• Wire harness/connector (ECM - canister pressure sensor) • Short in canister pressure sensor circuit	A
10 kΩ or more	• Wire harness/connector (ECM - canister pressure sensor) • Short in ECM circuit	B

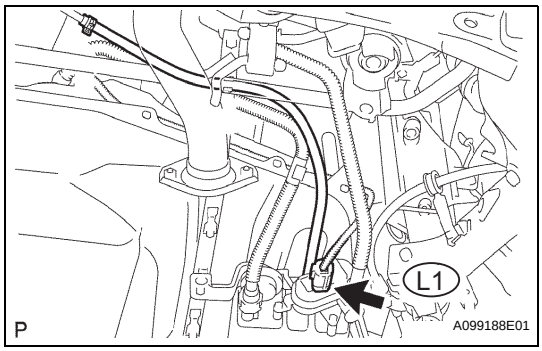
(d) Reconnect the ECM connector.

B → Go to step 7

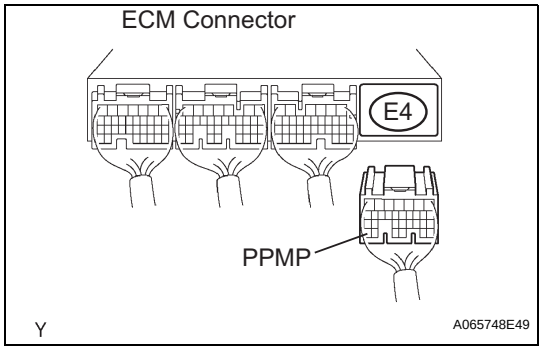
A

ES

3 CHECK WIRE HARNESS (CANISTER PUMP MODULE - ECM)



(a) Disconnect the L1 canister pump module connector.



(b) Disconnect the E4 ECM connector.
(c) Measure the resistance between the PPMP terminal of the ECM connector and body ground.

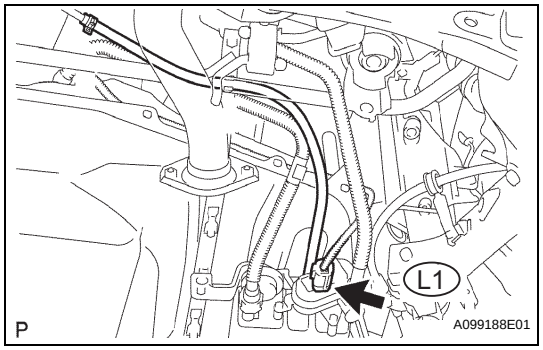
Result

Test Result	Suspected Trouble Area	Proceed to
10 kΩ or less	Short in canister pressure sensor circuit	A
10 kΩ or more	Short in wire harness/connector (ECM - canister pressure sensor)	B

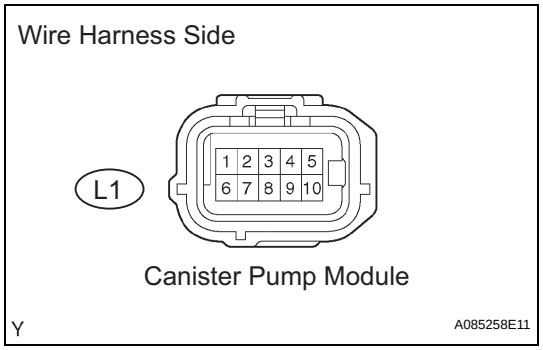
A → Go to step 5

B → Go to step 6

4 CHECK WIRE HARNESS (CANISTER PUMP MODULE - ECM)



(a) Disconnect the L1 canister pump module connector.



(b) Turn the ignition switch to the ON position.
(c) Measure the voltage and resistance according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
L1-4 - Body ground	4.5 to 5.5 V
L1-3 - Body ground	4.5 to 5.5 V

Standard resistance

Tester Connection	Specified Condition
L1-2 - Body ground	Below 1 Ω

Result

Test Result	Suspected Trouble Area	Proceed to
Voltage and resistance within standard ranges	Open in canister pressure sensor circuit	A
Voltage and resistance outside standard ranges	Open in wire harness/connector (ECM - canister pressure sensor)	B

B → Go to step 6

A

5 INSPECT CANISTER

NEXT → Go to step 8

6 REPAIR OR REPLACE WIRE HARNESS

HINT:
If the exhaust tail pipe has been removed, go to the next step before reinstalling it.

NEXT → Go to step 8

7	REPLACE ECM

NEXT → Go to step 8

8	CHECK WHETHER DTC OUTPUT RECURS (AFTER REPAIR)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Wait for at least 60 seconds.
(d) On the tester, select the following menu items: DIAGNOSIS/ENHANCED OBD II/DTC INFO/PENDING CODES.
HINT:
If no pending DTC is displayed on the tester, the repair has been successfully completed.

ES

NEXT

COMPLETED

DTC	P0455	Evaporative Emission Control System Leak Detected (Gross Leak)

DTC	P0456	Evaporative Emission Control System Leak Detected (Very Small Leak)

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 measured. Reference pressure measured at start and at end of leak check. If stabilized pressure higher than [second reference pressure x 0.2], ECM determines that EVAP system has large leak.	• Fuel tank cap (loose) • Leakage from EVAP line (canister - Fuel tank) • Leakage from EVAP line (purge VSV - canister) • Canister pump module • Leakage from fuel tank • Leakage from canister	While ignition switch off	2 trip
P0456	EVAP small leak	Leak detection pump creates negative pressure (vacuum) in EVAP system and EVAP system pressure measured. Reference pressure measured at start and at end of leak check. If stabilized pressure higher than second reference pressure, ECM determines that EVAP system has small leak.	Same above	While ignition switch off	2 trip

DESCRIPTION

The circuit description can be found in the Evaporative Emission (EVAP) system (See page ES-314).

INSPECTION PROCEDURE

Refer to the EVAP system (See page ES-314).

MONITOR DESCRIPTION

5 hours* after the ignition switch is turned off, the leak detection pump creates negative pressure (vacuum) in the EVAP system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.

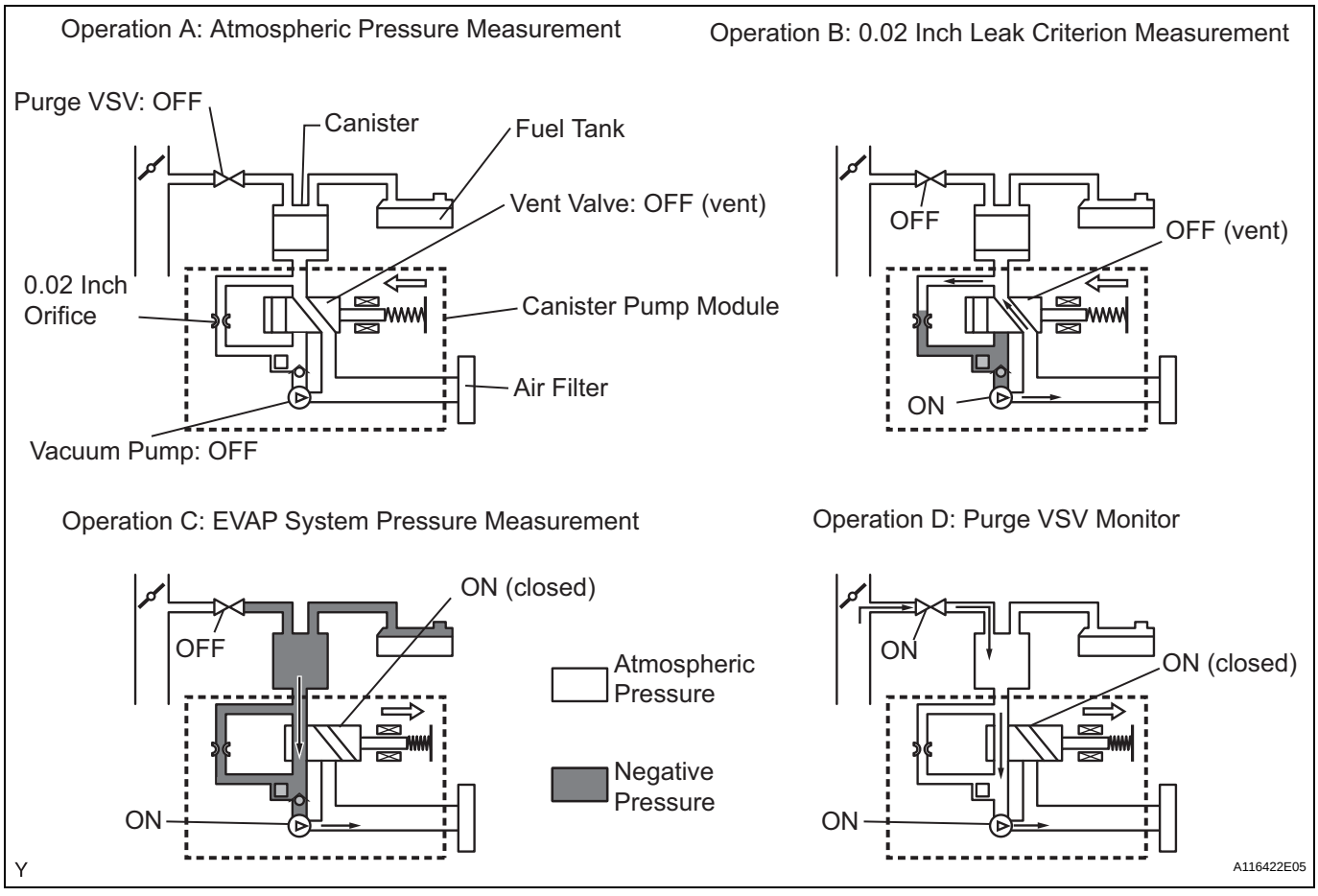
HINT:

*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operation	Description	Duration
-	ECM activation	Activated by soak timer 5, 7 or 9.5 hours after ignition switch off.	-
A	Atmospheric pressure measurement	Vent valve turned OFF (vent) and EVAP system pressure measured by ECM in order to register atmospheric pressure. If pressure in EVAP system is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds

Sequence	Operation	Description	Duration
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve turned ON (closed) to shut EVAP system. Negative pressure (vacuum) is created in EVAP system, and EVAP system pressure is then measured. Write down measured value as it will be used in leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*2
D	Purge VSV monitor	Purge VSV opened and then EVAP system pressure is measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	After second 0.02 inch leak pressure measurement, leak check is performed by comparing first and second 0.02 inch leak pressure standards. If stabilized system pressure is higher than second 0.02 inch leak pressure standard, ECM determines that there is a leak in EVAP system.	60 seconds
F	Final check	Atmospheric pressure measured and then monitoring result recorded by ECM.	-

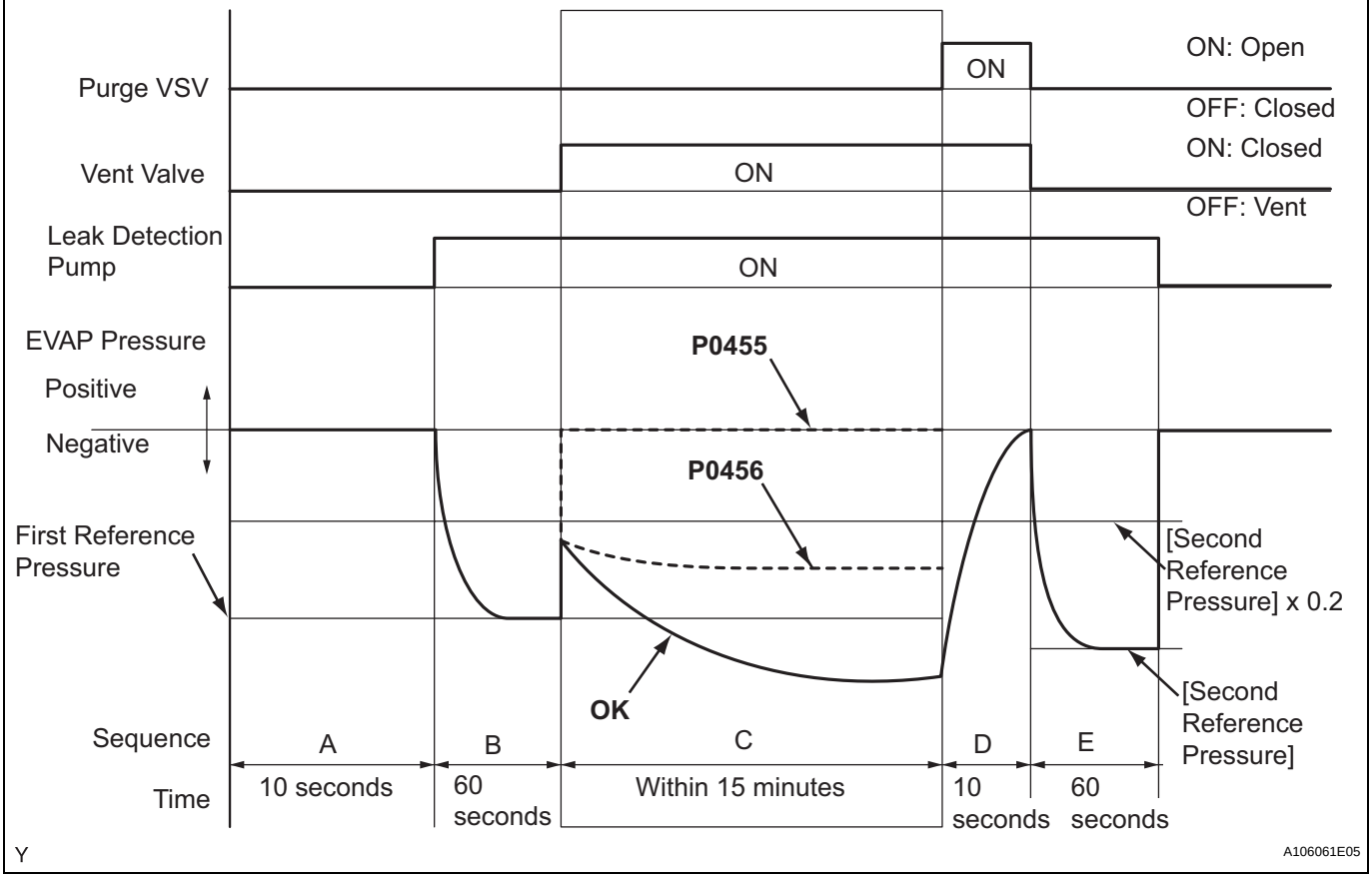
*2: If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.



1. P0455: EVAP 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 0.02 inch leak pressure standard x 0.2] (near atmospheric pressure), the ECM determines that the EVAP system has a large leak, illuminates the MIL and sets the DTC (2 trip detection logic).

2. 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 the second 0.02 inch leak pressure standard, the ECM determines that the EVAP system has a small leak, illuminates the MIL and sets the DTC (2 trip detection logic).

EVAP Pressure when EVAP System Leaks:



MONITOR STRATEGY

Related DTCs	P0455: Gross leak detected P0456: Very small leak (0.020 inch hole) detected
Required Sensors/Components	Purge VSV and pump module
Frequency of Operation	Once per driving cycle
Duration	Within 15 minutes
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)
Battery voltage	10.5 V or more
Vehicle speed	Below 4 km/h (2.5 mph)
Ignition switch	OFF
Time after key off	5, 7 or 9.5 hours
Canister pressure sensor malfunction (P0450, P0451, P0452 and P0453)	Not detected
Purge valve	Not operated by scan tool

Vent valve	Not operated by scan tool
Leak detection pump	Not operated by scan tool
Both of the following conditions are met:	Condition 1 and 2 are met before key off
1. Duration that vehicle is driven	5 minutes or more
2. EVAP purge operation	Performed
Engine coolant temperature	4.4 to 35°C (40 to 95°F)
Intake air temperature	4.4 to 35°C (40 to 95°F)

Key-off monitor sequence 1 to 8

1. Atmospheric pressure measurement

Next sequence runs if the following condition is met:	-
Atmospheric change	Less than 0.3 kPa (2.25 mmHg) in 1 second

2. First reference pressure measurement

Next sequence runs if the following conditions are met:	-
EVAP pressure just after reference pressure measurement start	-1 kPa (-7.5 mmHg) or lower
Reference pressure	-4.85 to -1.057 kPa (-36.4 to -7.93 mmHg)
Reference pressure	Saturated within 60 seconds

3. Vent valve stuck closed check

Next sequence runs if the following condition is met:	-
EVAP pressure change after vent valve is ON (closed)	0.3 kPa (2.25 mmHg) or more

4. Vacuum introduction

Next sequence runs if the following condition is met:	-
EVAP pressure	Saturated within 15 minutes

5. Purge valve stuck closed check

Next sequence runs if the following condition is met:	-
EVAP pressure change after purge VSV ON (open)	0.3 kPa (2.25 mmHg) or more

6. Second reference pressure measurement

Next sequence runs if all of the following conditions are met:	Conditions 1, 2, 3 and 4
1. EVAP pressure just after reference pressure	-1 kPa-g (-7.5 mmHg-g) or less
2. Reference pressure	-4.85 to -1.057 kPa-g (-36.4 to -7.93 mmHg-g)
3. Reference pressure	Saturated within 60 seconds
4. Reference pressure difference between first and second	Less than 0.7 kPa-g (5.25 mmHg-g)

7. Leak check

Next sequence runs if the following condition is met:	-
EVAP pressure when vacuum introduction is complete	Second reference pressure or less

8. Atmospheric pressure measurement

EVAP monitor is complete if the following condition is met:	-
Atmospheric pressure difference between sequence 1 and 8	Within 0.3 kPa-g (2.25 mmHg-g)

TYPICAL MALFUNCTION THRESHOLDS

P0455: EVAP gross leak

EVAP pressure when vacuum introduction is complete	Higher than reference pressure x 0.2

P0456: EVAP small leak

EVAP pressure when vacuum introduction is complete	Between reference pressure and reference pressure x 0.2

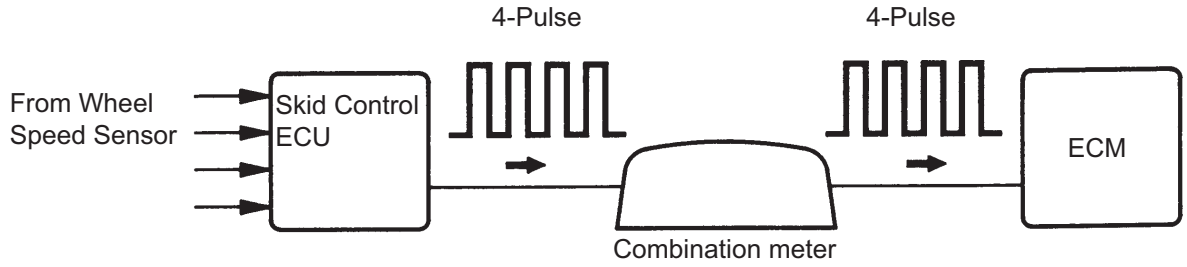
MONITOR RESULT

Refer to CHECKING MONITOR STATUS (See page ES-15).

DTC	P0500	Vehicle Speed Sensor "A"

DESCRIPTION

Vehicles, which are equipped with ABS (Anti-Lock Brake System), detect the vehicle speed using the skid control ECU 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 via the combination meter. The ECM determines the vehicle speed based on the frequency of the pulse signal.



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DTC No.	DTC Detection Condition	Trouble Area
P0500	While vehicle being driven, no vehicle speed sensor signal is transmitted to ECM (1 trip detection logic: Automatic transaxle) (2 trip detection logic: Manual transaxle)	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Combination meter • ECM • Skid control ECU

MONITOR DESCRIPTION

Automatic Transaxle Models:
The ECM assumes that the vehicle is being driven when the transmission counter gear indicates more than 300 rpm and over 30 seconds have passed since the Park/Neutral Position (PNP) switch was turned OFF. If there is no signal from the vehicle speed sensor, despite these conditions being met, the ECM interprets this as a malfunction in the sensor. The ECM then illuminates the MIL and sets the DTC.
Manual Transaxle Models:
The ECM assumes that the vehicle is being driven while the vehicle speed sensor signal is being transmitted by the combination meter. If there is no signal from the No. 1 vehicle speed sensor despite this condition being met, the ECM interprets this as a malfunction in the sensor. The ECM then illuminates the MIL and sets the DTC.

MONITOR STRATEGY

Related DTCs	P0500: Vehicle speed sensor "A" pulse input error
Required Sensors/Components (Main)	Vehicle Speed Sensor (VSS), Combination meter and skid control ECU
Required Sensors/Components (Related)	PNP switch, Engine Coolant Temperature (ECT) sensor, Crankshaft Position (CKP) sensor and Mass Air Flow (MAF) meter
Frequency of Operation	Continuous
Duration	2 seconds: Automatic transaxle 8 seconds: Manual transaxle
MIL Operation	Immediate: Automatic transaxle 2 driving cycles: Manual transaxle

Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0120 - P0223, P2135 (TP sensor)

M/T:

Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF
ECT	70°C (158°F) or more
Engine speed	2,000 to 4,500 rpm
Engine load	33.7 % or more
ECT sensor circuit fail	Not detected
MAF sensor circuit fail	Not detected

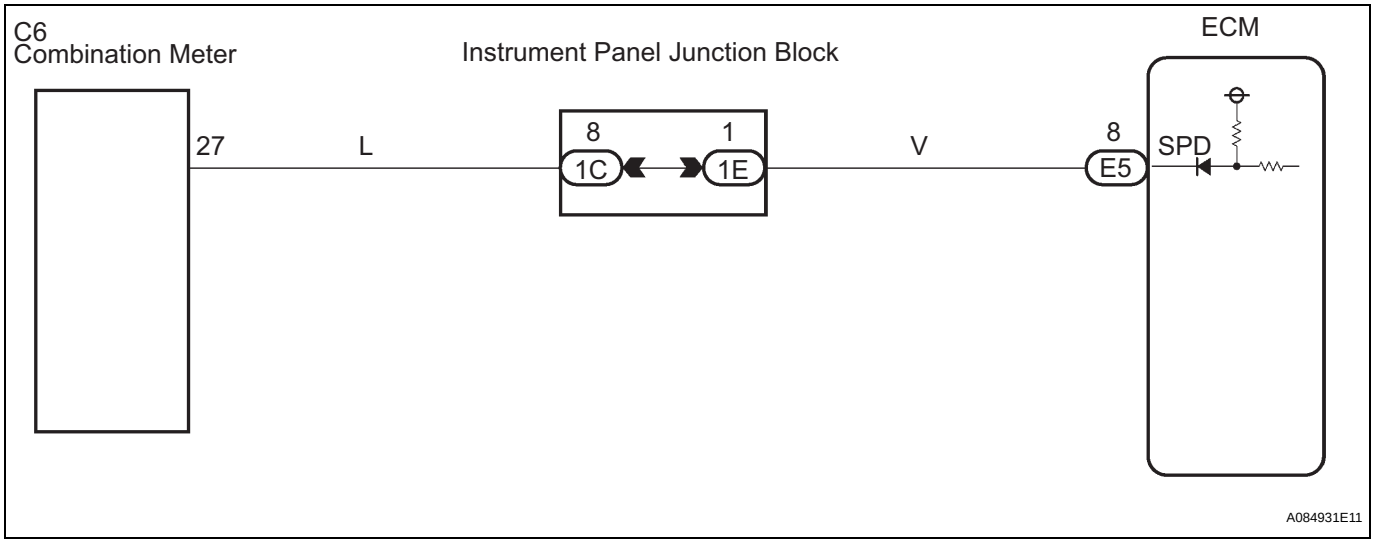
A/T:

Battery voltage	8 V or more
Time after ignition switch turned to the ON position	3 seconds or more
Transmission counter gear speed	300 rpm or more
Engine	Running
Either of the following conditions (a) or (b) is met:	-
(a) The following conditions 1 and 2 are met:	-
1. ECT and ECT sensor	20°C (68°F) or more, and sensor does not malfunction (P0115 or P0116)
2. Time after PNP switch turned off	10 seconds or more
(b) The following conditions 1 and 2 are met:	-
1. ECT and ECT sensor	Less than 20°C (68°F), and sensor malfunction (P0115 or P0116)
2. Time after PNP switch turned off	30 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

Vehicle speed sensor signal	No signal

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

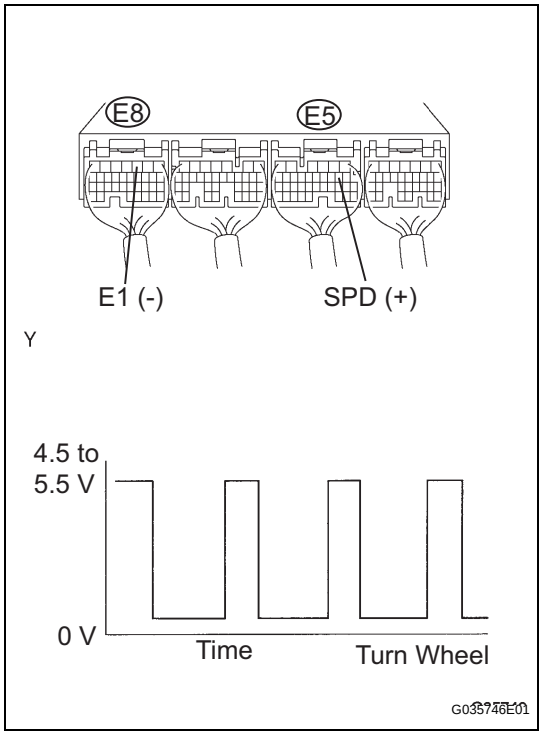
1	CHECK OPERATION OF SPEEDOMETER

(a) Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.
HINT:
The vehicle speed sensor is operating normally if the speedometer reading is normal.

NG → CHECK SPEEDOMETER CIRCUIT

OK

2	INSPECT ECM (SPD VOLTAGE)



(a) Shift the transmission gear selector lever to the neutral position.
(b) Jack up the vehicle.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below as the wheel is turned slowly.
Standard voltage

Tester Connection	Specified Condition
SPD (E5-8) - E1 (E8-3)	Voltage generated intermittently

HINT:
The output voltage should fluctuate up and down similarly to the diagram shown when the wheel is turned slowly.

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM

DTC	P0504	Brake Switch "A" / "B" Correlation

DESCRIPTION

The stop light switch is a duplex system that transmits 2 signals: STP and ST1-. These 2 signals are used by the ECM to monitor whether or not the brake system is working properly. If the signals, which indicate the brake pedal is being depressed and released, are detected simultaneously, the ECM interprets this as a malfunction in the stop light switch and sets the DTC.

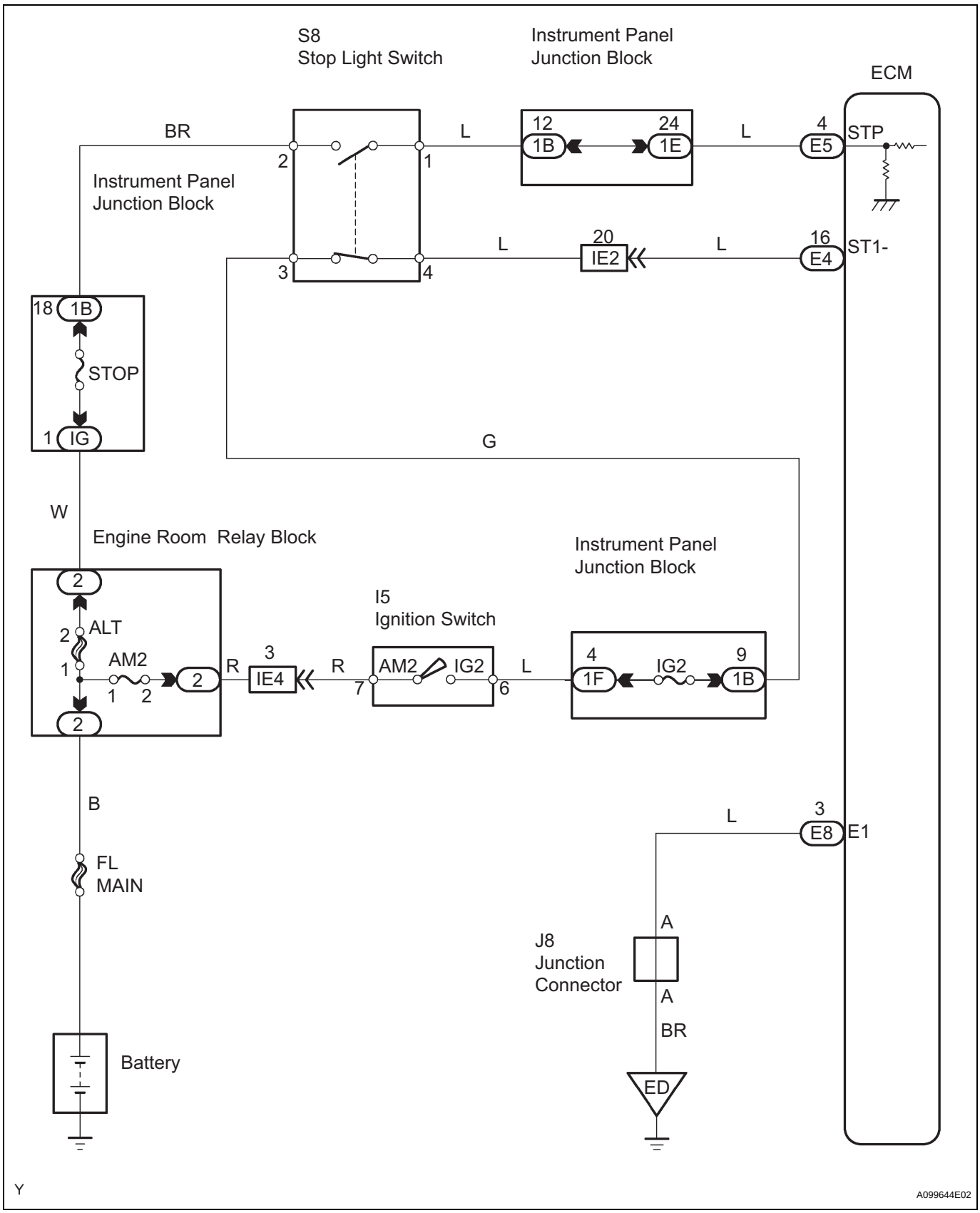
HINT:

The normal conditions are as shown in the table below. The signals can be read using the intelligent tester.

Signal	Brake Pedal Released	In Transition	Brake Pedal Depressed
STP	OFF	ON	ON
ST1-	ON	ON	OFF

DTC No.	DTC Detection Condition	Trouble Area
P0504	Conditions (a), (b) and (c) continue for 0.5 seconds or more (1 trip detection logic): (a) Ignition switch to the ON position (b) Brake pedal released (c) STP signal OFF when ST1- signal OFF	• Short in stop light switch signal circuit • STOP fuse • Stop light switch • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

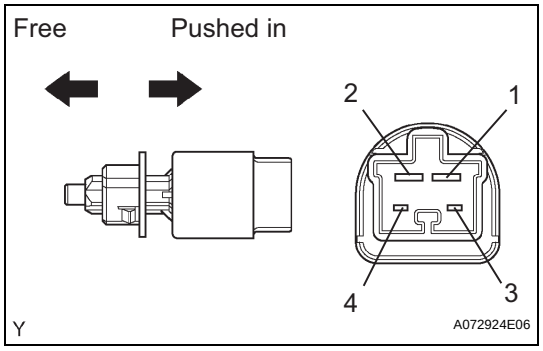
1	CHECK OPERATION OF STOP LIGHT

(a) Check whether the stop lights turn on and off normally when the brake pedal is depressed and released.
OK:
Stop lights turn ON when brake pedal is depressed.

NG → **REPAIR OR REPLACE STOP LIGHT SWITCH CIRCUIT**

OK

2	INSPECT STOP LIGHT SWITCH



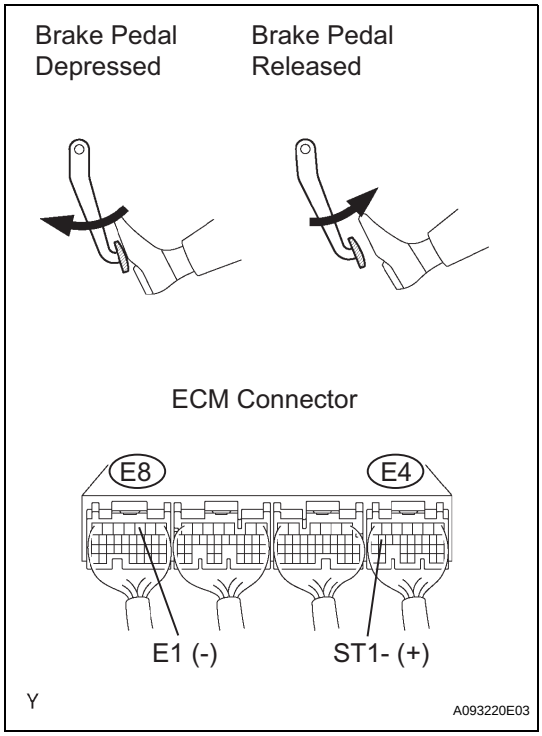
(a) Remove the stop light switch assembly.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Switch Position	Tester Connection	Specified Condition
Switch pin free	1 - 2	Below 1 Ω
Switch pin free	3 - 4	10 kΩ or higher
Switch pin pushed in	1 - 2	10 kΩ or higher
Switch pin pushed in	3 - 4	Below 1 Ω

NG → **REPLACE STOP LIGHT SWITCH**

OK

3	READ VALUE USING INTELLIGENT TESTER (STP SIGNAL AND ST1 - VOLTAGE)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STOP LIGHT SW.
(d) Check the STP signal when the brake pedal is depressed and released.

Standard operation

Brake Pedal Operation	Specified Condition
Depressed	STP signal ON
Released	STP signal OFF

(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

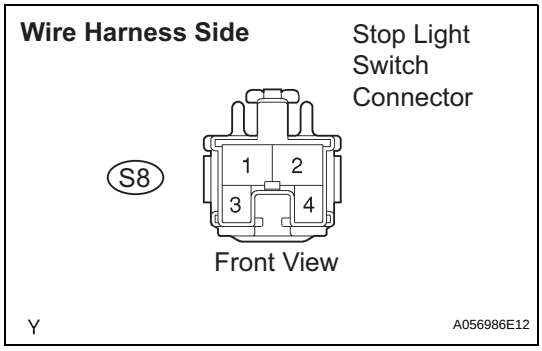
Tester Connection	Brake Pedal Operation	Specified Condition
ST1- (E4-16) - E1 (E8-3)	Depressed	Below 1.5 V
ST1- (E4-16) - E1 (E8-3)	Released	7.5 to 14 V

OK → **Go to step 4**

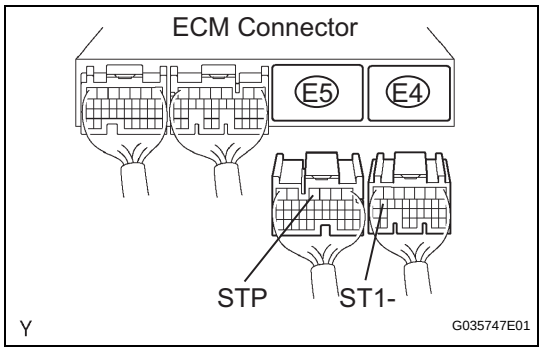
NG

CHECK FOR INTERMITTENT PROBLEMS

4	CHECK WIRE HARNESS (STOP LIGHT SWITCH - ECM)



(a) Disconnect the S8 stop light switch connector.



(b) Disconnect the E4 and E5 ECM connectors.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
Stop light switch (S8-1) - STP (E5-4)	Below 1 Ω
Stop light switch (S8-4) - ST1- (E4-16)	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

ES

DTC	P0505	Idle Control System Malfunction

DESCRIPTION

The idling speed is controlled by the ETCS (Electronic Throttle Control System). The one valve type throttle body ETCS is comprised of: 1) the throttle actuator, which operates the throttle valve; 2) the Throttle Position (TP) sensor, which detects the opening angle of the throttle valve; 3) the Accelerator Pedal Position (APP) sensor, which detects the accelerator pedal position; and 4) 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
P0505	Idling speed continues to vary greatly from target idling speed (2 trip detection logic)	• ETCS • Air induction system • PCV hose connections • ECM

ES

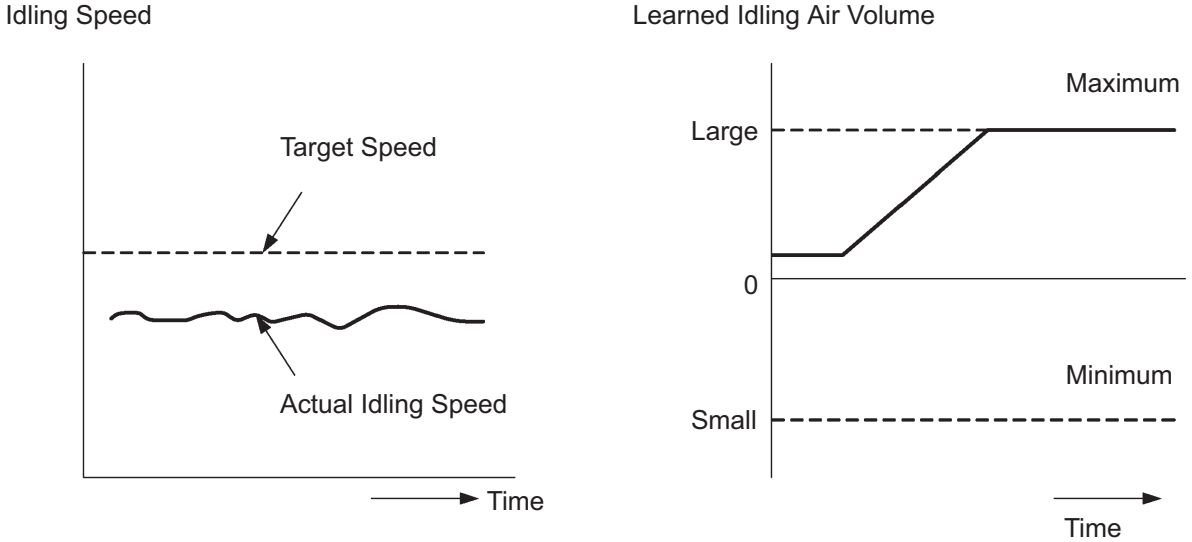
MONITOR DESCRIPTION

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 following conditions are met:

- The learned idling air flow volume remains at the maximum or minimum volumes 5 times or more during a drive cycle.
- While driving at 6 mph (10 km/h) or more, the actual engine idling speed varies from the target idling speed by between 100 rpm and 200 rpm 5 times or more during a drive cycle.

Example:
If the actual idling speed varies from the target idling speed by more than 200 rpm* 5 times during a drive cycle, the ECM illuminates the MIL and sets the DTC.
*: Threshold idling speed varies with engine load.

Example



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MONITOR STRATEGY

Related DTCs	P0505: ISC Function
Required Sensors/Components (Main)	ETCS
Required Sensors/Components (Related)	Crankshaft position sensor, Engine coolant temperature sensor, and Vehicle speed sensor
Frequency of Operation	Once per driving cycle: Functional check Continuous: Range check
Duration	10 minutes: Functional check 10 seconds: Range check
MIL Operation	2 driving cycles: Functional check Immediate: Range check
Sequence of Operation	None

ES

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions 1 or 2 is met:	-
1. Frequency that both of the following conditions (a) and (b) are met:	5 times or more
(a) Engine RPM - Target engine RPM	Less than -100 rpm, or more than 150 rpm
(b) Vehicle condition	Stop after vehicle was driven at 6.25 mph (10 km/h) or more
2. Frequency that both of the following conditions (c) and (d) are met:	Once
(c) Engine RPM - Target engine RPM	Below -100 rpm, or 150 rpm or more (A/C: OFF)
(d) IAC flow rate learning value	1.3 L/sec or less, or 6 L/sec or more

INSPECTION PROCEDURE

HINT:

- The following conditions may also cause DTC P0505 to be set:
  The throttle valve is not fully closed. (e.g. The accelerator pedal is slightly depressed by something such as a floor carpet overlapping the accelerator pedal.)
- Read freeze frame data using the intelligent tester. 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.

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P0505)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P0505	A
P0505 and other DTCs	B

HINT:
If any DTCs other than P0505 are output, troubleshoot those DTCs first.

B → **GO TO DTC CHART**

A

ES

2 CHECK PCV HOSE CONNECTIONS

OK:
PCV hose is connected correctly and is not damaged.

NG → **REPAIR OR REPLACE PCV HOSE**

OK

3 CHECK AIR INDUCTION SYSTEM

(a) Check the air induction system for vacuum leakage.
OK:
No leakage from air induction system.

NG → **REPAIR OR REPLACE AIR INDUCTION SYSTEM**

OK

4 CHECK THROTTLE VALVE

(a) Check the throttle valve condition.

NG → **REPLACE THROTTLE BODY**

OK

REPLACE ECM

DTC	P050A	Cold Start Idle Air Control System Performance

DTC	P050B	Cold Start Ignition Timing Performance

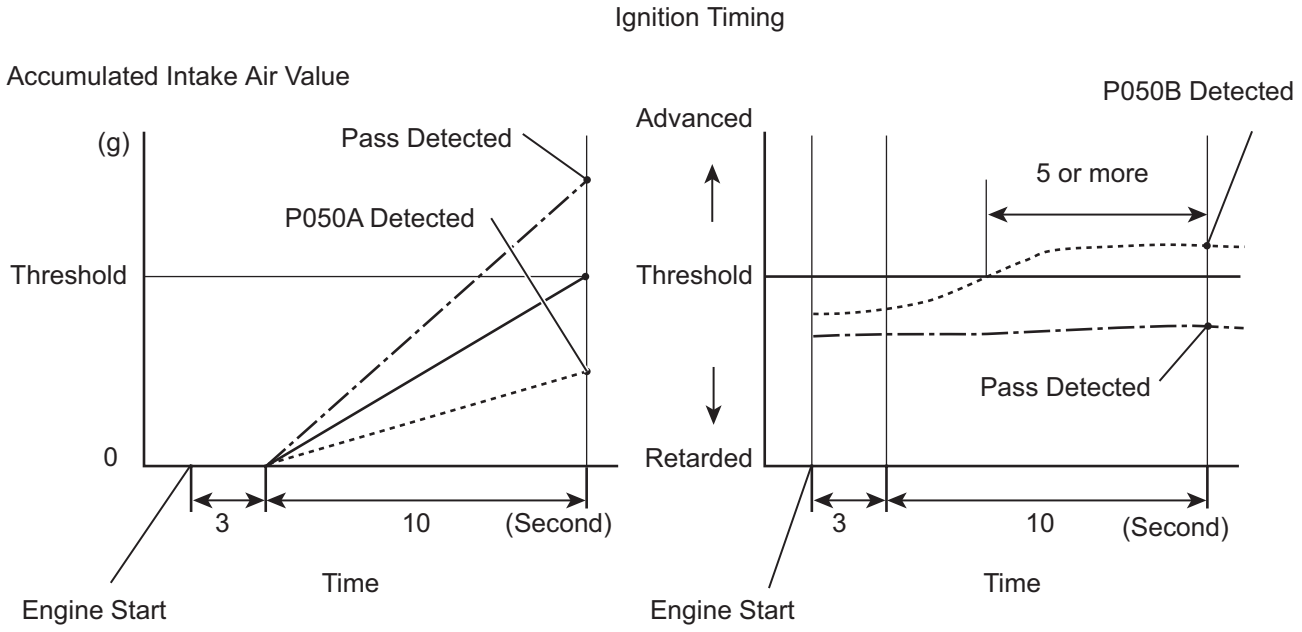
DESCRIPTION

The Electronic Throttle Control System (ETCS) controls the engine idling speed. The ETCS operates the throttle actuator to open and close the throttle valve, and adjusts the intake air amount to achieve the target idling speed.
In addition, the ECM retards the ignition timing and the ETCS increases the intake air amount to quickly increase the catalyst temperature at cold start to reduce emissions.

DTC No.	DTC Detection Condition	Trouble Area
P050A	Accumulated intake air amount during 10 seconds of idling after cold start is less than threshold (2 trip detection logic)	• Throttle body assembly • Mass air flow meter • Air induction system • PCV hose connections • VVT system • Air cleaner filter element • ECM
P050B	Ignition timing retard value insufficient for 5 seconds or more during 10 seconds of P050A monitoring duration at cold start (2 trip detection logic)	• Throttle body assembly • Mass air flow meter • Air induction system • PCV hose connections • VVT system • Air cleaner filter element • ECM

ES

MONITOR DESCRIPTION



The ECM monitors the intake air amount during idling and the ignition timing.
When the Engine Coolant Temperature (ECT) is between -10°C and 50°C (14°F and 122°F), the ECM calculates the idling intake air amount for 10 seconds, beginning 3 seconds after the engine starts.
When the accumulated value is below the threshold, the ECM interprets this as a malfunction in the Idle Speed Control (ISC) system at cold start.
The ECM also monitors the ignition timing at cold start, and judges it to be incorrect when it is advanced to the same value for a warm engine for 5 seconds or more of the 10 second monitoring period.
Example:
P050A is detected when all conditions below are met (2 trip detection logic).
1. The ECT is between -10°C and 50°C (14°F and 122°F) when the engine starts.
2. The engine idles for 13 seconds after engine start.
3. The accumulated intake air amount is below the threshold.

The ECM sets the DTC and illuminates the MIL 13 seconds after the engine is next started.

ES

NOTICE:
When the negative battery terminal is disconnected during inspection or repairs, the ISC learning values are cleared. The ISC learning must be performed by warming up the engine and idling for 5 minutes with the ECT at 75°C (167°F) or more because DTCs cannot be detected with the ISC learning values cleared.

MONITOR STRATEGY

Related DTCs	P050A: Idle speed control problem at cold P050B: Idle ignition timing problem at cold
Required Sensors/Components (Main)	Mass air flow meter
Required Sensors/Components (Related)	Engine Coolant Temperature (ECT) sensor, Throttle position sensor, Vehicle speed sensor
Frequency of Operation	Once per driving cycle
Duration	10 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

P050A:

Battery voltage	8 V or more
Time after engine start	3 seconds or more
Starter	OFF
ECT at engine start	-10°C (14°F) or more
ECT	-10°C to 50°C (14°F to 122°F)
Engine idling time	3 seconds or more
Fuel-cut	OFF
Vehicle speed	Less than 1.875 mph (3 km/h)
Time after shift position changed (A/T)	1 second or more
Atmospheric pressure	76 kPa (570 mmHg) or more

P050B:

Battery voltage	8 V or more
Time after engine start	3 seconds or more
Starter	OFF
ECT at engine start	-10°C (14°F) or more
ECT	-10°C to 50°C (14°F to 122°F)
Engine idling time	3 seconds or more
Fuel-cut	OFF
Vehicle speed	Less than 1.875 mph (3 km/h)

TYPICAL MALFUNCTION THRESHOLDS

P050A:

Accumulated air flow amount (A/T)	Varies with ECT (Example: Less than 1.44 g)

P050B:

Accumulated time when ignition timing retard value insufficient	5 seconds or more

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

ES

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P050A AND/OR P050B)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Select the following the menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P050A and/or P050B	A
P050A and/or P050B and other DTCs	B

HINT:
If any DTCs other than P050A and P050B are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

A

2	READ VALUE USING INTELLIGENT TESTER (FUEL TRIM)

HINT:
Calculate the total fuel trim values to check the characteristic deviation of the mass air flow meter.
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / PRIMARY / SHORT FT #1 and LONG FT #1.
(e) Read the values displayed on the tester.
(f) Add together the SHORT FT #1 and LONG FT #1 values to obtain the total FUEL TRIM.

OK:
Total of SHORT FT #1 and LONG FT #1 values is between -20% and 20%.

OK → **Go to step 12**

NG

3	PERFORM ACTIVE TEST USING INTELLIGENT TESTER (OPERATE OCV)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and turn the tester on.
(c) Warm up the engine.
(d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VVT CTRL B1.
(e) Check the engine speed while operating the Oil Control Valve (OCV) using the tester.

OK

Tester Operations	Specified Conditions
OCV OFF	Normal engine speed
OCV ON	Engine idles roughly or stalls (soon after OCV switched from OFF to ON)

NG → **Go to step 8**

OK

4	CHECK PCV HOSE CONNECTIONS

OK:
PCV hose is connected correctly and is not damaged.

NG → **Go to step 9**

OK

5	CHECK AIR INDUCTION SYSTEM

(a) Check the air induction system for vacuum leakage.
OK:
No leakage from air induction system.

NG → **Go to step 10**

OK

6	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:
Air cleaner filter element is not excessively contaminated with dirt or oil.

NG → Go to step 11

OK

7	REPLACE MASS AIR FLOW METER

NEXT → Go to step 15

8	CHECK AND REPAIR VVT SYSTEM

NEXT → Go to step 15

9	REPAIR OR REPLACE PCV HOSE

NEXT → Go to step 15

10	REPAIR OR REPLACE AIR INDUCTION SYSTEM

NEXT → Go to step 15

11	REPLACE AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY

NEXT → Go to step 15

12	CHECK THROTTLE VALVE

(a) Check for deposits around the throttle valve and throttle valve condition.

OK:

No deposits around the throttle valve and the throttle valve moves smoothly.

NG → Go to step 14

OK

13	REPLACE ECM

NEXT → Go to step 15

14	REPAIR OR REPLACE THROTTLE BODY ASSEMBLY

NEXT → Go to step 15

15	CHECK WHETHER DTC OUTPUT RECURS (DTC P050A AND/OR P050B)

NOTICE:
In this operation, the engine must be cold (the same level as the engine coolant temperature recorded in the freeze frame data).

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTCs (See page ES-32).
(e) Switch the ECM from normal mode to check mode using the tester (See page ES-35).
(f) Start the engine to idle for a minute.
OK:
Stable fast idling.
(g) Read DTCs.
OK:
No DTC output.

NEXT

END

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, these memories are 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 sets the DTC.

DTC No.	DTC Detection Condition	Trouble Area
P0560	Open in ECM backup power source circuit (1 trip detection logic)	• Open in back up power source circuit • EFI fuse • ECM

ES

HINT:
If DTC P0560 is set, the ECM does not store other DTCs.

MONITOR STRATEGY

Related DTCs	P0560: ECM system voltage
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	3 seconds
MIL Operation	Immediate (MIL illuminated after next engine start)
Sequence of Operation	None

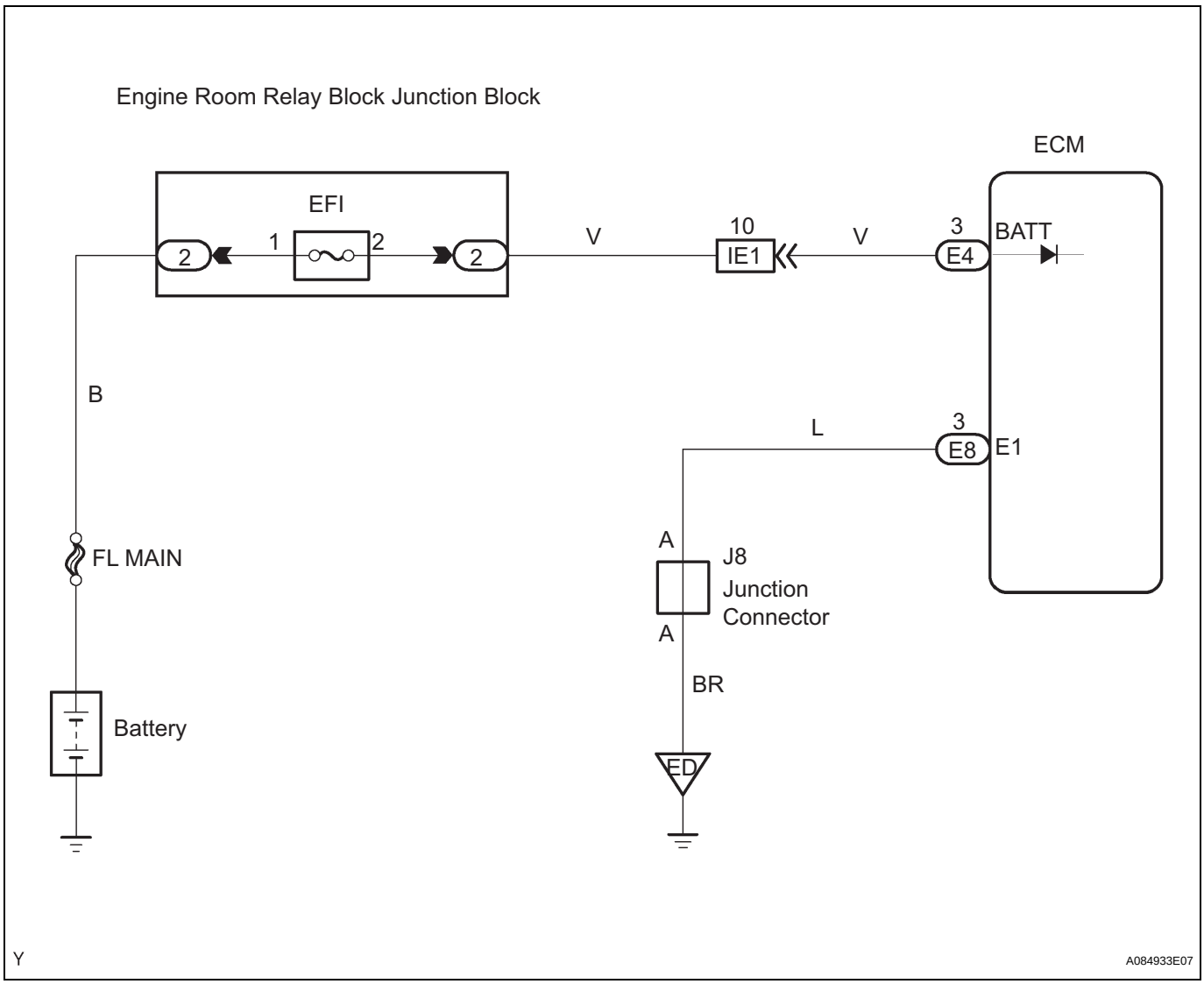
TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None

TYPICAL MALFUNCTION THRESHOLDS

ECM power source	Less than 3.5 V

WIRING DIAGRAM

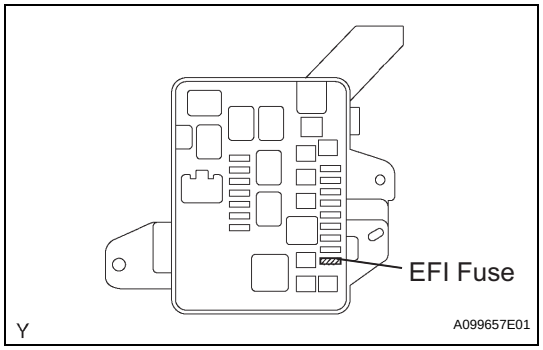


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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.

1	CHECK FUSE (EFI FUSE)

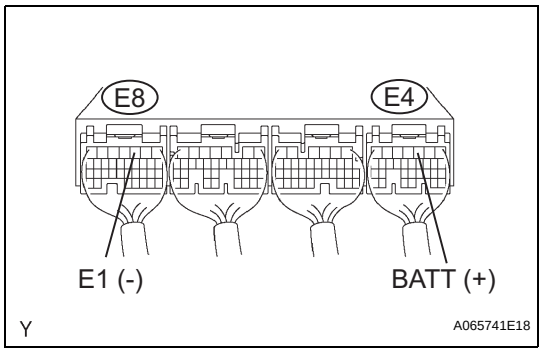


(a) Remove the EFI fuse from the engine room relay block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

2	INSPECT ECM (BATT VOLTAGE)



(a) Measure the voltage according to the value(s) in the table below.
Standard voltage

Tester Connection	Specified Condition
BATT (E4-3) - E1 (E8-3)	9 to 14 V

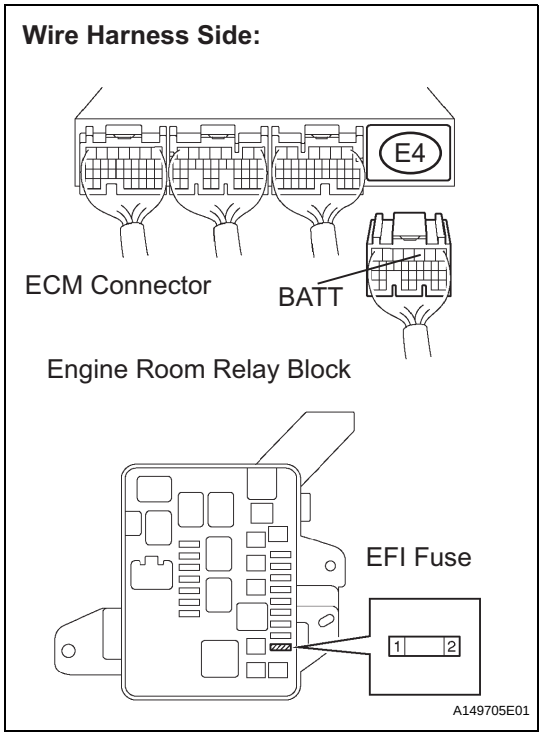
NG → **Go to step 3**

OK

REPLACE ECM

ES

3	CHECK WIRE HARNESS (ECM - EFI FUSE, EFI FUSE - BATTERY)



(a) Check the wire harness between the EFI fuse and ECM.
  (1) Remove the EFI fuse from the engine room relay block.
  (2) Disconnect the E4 ECM connector.
  (3) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
EFI fuse (2) - BATT (E4-3)	Below 1 Ω
EFI fuse (2) or BATT (E4-3) - Body ground	10 kΩ or higher

(b) Check the wire harness between the EFI fuse and battery.
  (1) Remove the EFI fuse from the engine room relay block.
  (2) Disconnect the cable from the positive (+) battery terminal.
  (3) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
Battery positive terminal - EFI fuse (1)	Below 1 Ω
Battery positive terminal or EFI fuse (1) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4	INSPECT BATTERY

(a) Check that the battery is not depleted.

NG → **REPLACE BATTERY**

OK

CHECK AND REPLACE ENGINE ROOM RELAY BLOCK

DTC	P0604	Internal Control Module Random Access Memory (RAM) Error

DESCRIPTION

The ECM continuously monitors its internal memory status. This self-check ensures that the ECM is 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 standards, the ECM will illuminate the MIL and set a DTC immediately.

DTC	DTC Setting Condition	Trouble Area
P0604	ECM RAM errors	ECM

MONITOR STRATEGY

Related DTC	P0604: ECM RAM error
Required sensors/Components	ECM
Frequency of Operation	Continuous
Duration	16 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None

TYPICAL MALFUNCTION THRESHOLDS

Main CPU and sub CPU mirroring	Fail

INSPECTION PROCEDURE

1	CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P0604)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTC.
(e) Turn the ignition switch off.
(f) Disconnect the battery negative terminal and wait for 1 minute.
(g) Connect the battery negative terminal.
(h) Turn the ignition switch to the ON position.
(i) Enter the following menus: DIAGNOSIS / ENHANCED II / DTC INFO / CURRENT CODES.
(j) Read the DTCs.

Result

Display (DTC output)	Proceed to
P0604	**A**
No output DTC	**B**

B → CHECK FOR INTERMITTENT PROBLEMS

A

REPLACE ECM (See page ES-407)

DTC	P0606	ECM / PCM Processor

DESCRIPTION

The ECM continuously monitors its internal processors (CPUs), A/F sensor transistors and heated oxygen sensor (HO2S) transistors. This self-check ensures that the ECM is functioning properly. These are diagnosed by internal "mirroring" of the main and sub CPUs to detect the processors error. If outputs from the processors deviate from the standards, the ECM will illuminate the MIL and set a DTC immediately.

DTC	DTC Setting Condition	Trouble Area
P0606	• ECM CPUs malfunction • A/F sensor transistors malfunction • HO2S transistors malfunction	• Exhaust gas leak • HO2 Sensor • ECM

MONITOR STRATEGY

Related DTC	P0606: ECM range check
Required sensors/Components (main)	ECM
Required sensors/Components (sub)	APP sensor, TP sensor, Brake switch, Cruise control, A/F sensor, HO2 sensor
Frequency of Operation	Continuous
Duration	60 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Engine	Running
Estimated A/F sensor temperature	450 to 800°C (842 to 1,472°F)
Estimated HO2S temperature	450 to 800°C (842 to 1,472°F)

TYPICAL MALFUNCTION THRESHOLDS

Difference of main APP and sub APP	0.3 V or more
Difference of main TP and sub TP	0.3 V or more
Difference of main brake switch signal and sub brake switch signal	Different
Cruise control	Fail
A/F sensor transistors	Fail
HO2S transistors	Fail

INSPECTION PROCEDURE

1	CHECK FOR EXHAUST GAS LEAK

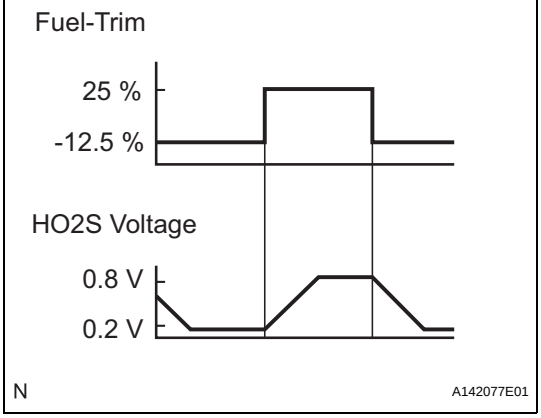
(a) Allow the engine to idle.
(b) Check for exhaust gas leak around the heated oxygen sensor.
OK:
No leak from the heated oxygen sensor.

NG → **REPAIR OR REPLACE EXHAUST GAS LEAKAGE POINT**

OK

2 CHECK HEATED OXYGEN SENSOR

Fuel-Trim and Rear HO2S Voltage Cross-reference



(a) Connect the intelligent tester to the DLC3.
(b) Start the engine and turn the tester on.
(c) Warm up the engine at an engine speed of 2,500rpm for approximately 90 seconds.
(d) Enter the following menus: DIAGNOSIS / ENHANCED II / ACTIVE TEST / A/F CONTROL.
(e) Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
(f) Monitor the voltage outputs of the HO2 sensors (O2S B1S2) displayed on the tester.
HINT:
- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- Each sensor reacts in accordance with increases in the fuel injection volume.

Standard voltage

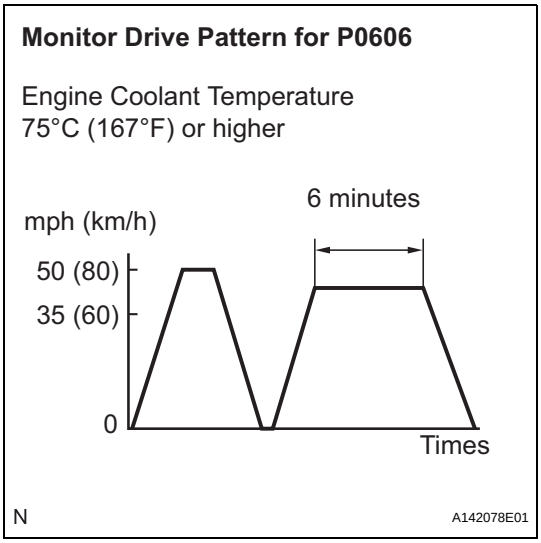
Tester Display (Sensor)	Injection Volume	Voltage
O2S B1S2	-12.5%	Less than 0.2 V
	+25%	More than 0.8 V

NG → **REPLACE HEATED OXYGEN SENSOR (See page EC-21)**

OK

3 CHECK WHETHER DTC OUTPUT RECURS (IN ADDITION TO DTC P0606)

Monitor Drive Pattern for P0606



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTC.
(e) Turn the ignition switch off.
(f) Disconnect the battery negative terminal and wait for 1 minute.
(g) Connect the battery negative terminal.
(h) Start the engine.
(i) Perform the drive pattern.
  (1) Warm up the engine.
  (2) Accelerate the vehicle to 50 mph (80 km/h) and stop the vehicle.
  (3) Drive the vehicle at 35 to 50 mph (60 to 80 km/h) for 5 minutes or more.
(j) Enter the following menus: DIAGNOSIS / ENHANCED II / DTC INFO / CURRENT CODES.
(k) Read the DTCs.

Result

Display (DTC output)	Proceed to
P0606	A
No output DTC	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

REPLACE ECM (See page ES-407)

DTC	P0607	Control Module Performance

DESCRIPTION

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 standards, the ECM will illuminate the MIL and set a DTC immediately.
The ECM also monitors the cruise control cancel circuit. If this circuit malfunctions, the ECM will set a DTC immediately (MIL is not illuminated).

DTC No.	DTC Detection Condition	Trouble Area
P0607	• ECM main CPU error • ECM sub CPU error • Cruise control cancel circuit malfunction	ECM

NOTICE:
First check for an exhaust gas leak around the HO2S if P0606 is present. An exhaust gas leak generates noise in the HO2S output. The ECM may interpret this as an HO2S transistor malfunction.

MONITOR STRATEGY

Related DTC	P0607: ECM CPU malfunction
Required sensors/Components	ECM
Frequency of Operation	Continuous
Duration	Within 1 second
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met:	Condition A or B
A. All of the following conditions are met:	Conditions (a), (b) and (c)
(a) CPU reset	1 time or more
(b) Learned TP - learned APP	0.4 V or more
(c) Throttle actuator	OFF
B. CPU reset	2 times or more

INSPECTION PROCEDURE

1	CHECK WHETHER DTC OUTPUT RECURS (IN ADDITION TO DTC P0607)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTC.
(e) Turn the ignition switch off.
(f) Disconnect the battery negative terminal and wait for 1 minute.
(g) Connect the battery negative terminal.

(h) Turn the ignition switch to the ON position.
(i) Enter the following menus: DIAGNOSIS / ENHANCED II / DTC INFO / CURRENT CODES.
(j) Read the DTCs.

Result

Display (DTC output)	Proceed to
P0607	A
No output DTC	B

B → **CHECK FOR INTERMITTENT PROBLEMS**

A

ES

REPLACE ECM

DTC	P0617	Starter Relay Circuit High

DESCRIPTION

While the engine is cranked, the positive battery voltage is applied to terminal STA of the ECM.
If the ECM detects the Starter Control (STA) signal while the vehicle is being driven, it determines that there is a malfunction in the STA circuit. The ECM then illuminates the MIL and sets the DTC.
This monitor runs when the vehicle is driven at 12.4 mph (20 km/h) for over 20 seconds.

DTC No.	DTC Detection Condition	Trouble Area
P0617	Conditions (a), (b) and (c) are met when positive (+B) battery voltage 10.5 V or more applied to ECM for 20 seconds (1 trip detection logic): (a) Vehicle speed 12.4 mph (20 km/h) or more (b) Engine speed 1,000 rpm or more (c) STA signal ON	• Park/Neutral Position (PNP) switch (A/T*) • Clutch start switch (M/T*) • Starter relay circuit • Ignition switch • ECM

*: A/T denotes Automatic Transaxle models and M/T denotes Manual Transaxle models.

MONITOR STRATEGY

Related DTCs	P0617: Starter signal
Required Sensors/Components (Main)	STARTER relay, PNP switch, Clutch start switch and Ignition switch
Required Sensors/Components (Related)	Vehicle Speed Sensor (VSS), Crankshaft Position (CKP) sensor
Frequency of Operation	Continuous
Duration	20 seconds
MIL Operation	Immediate
Sequence of Operation	None

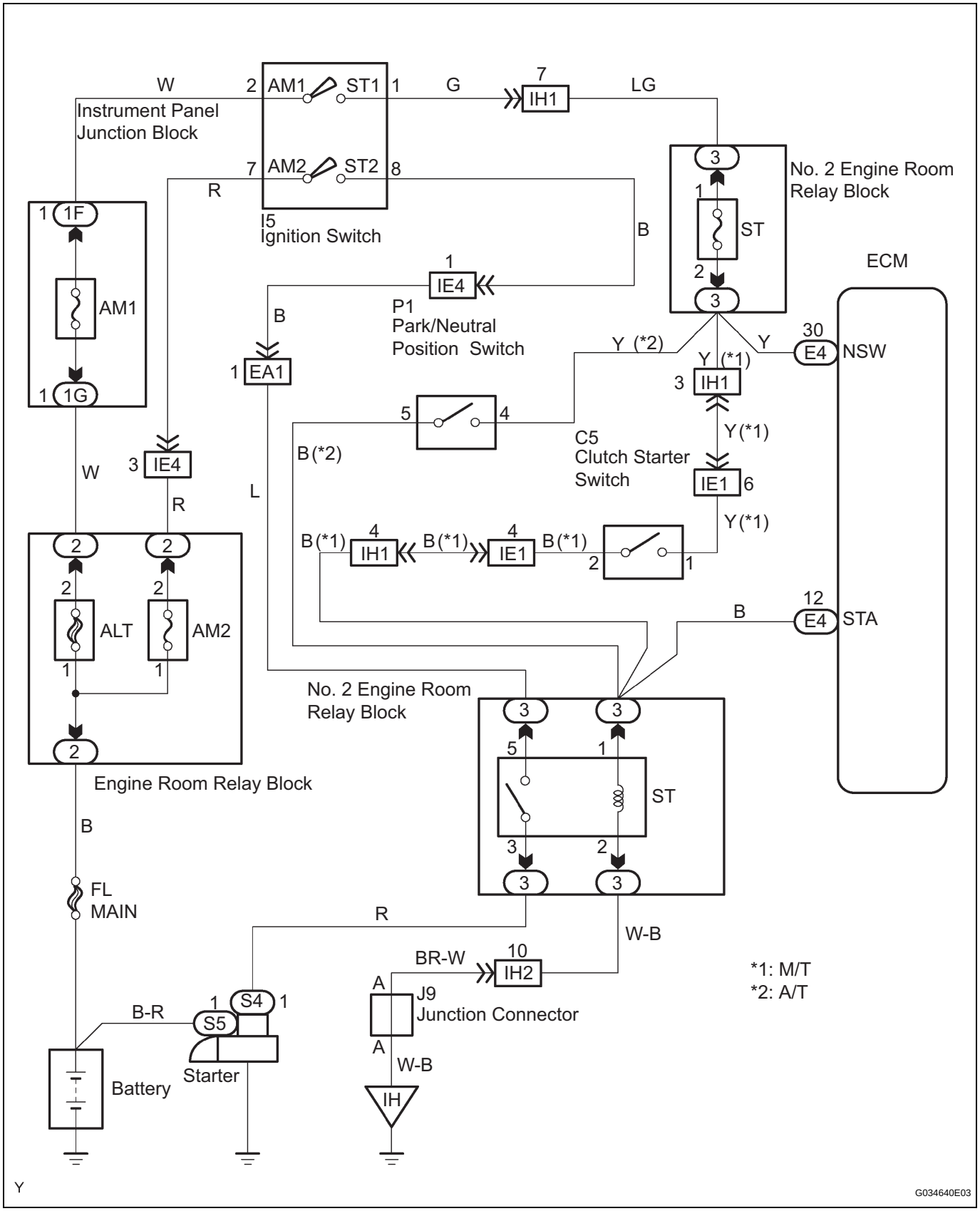
TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Battery voltage	10.5 V or more
Vehicle speed	12.4 mph (20 km/h) or more
Engine speed	1,000 rpm or more

TYPICAL MALFUNCTION THRESHOLDS

Starter signal	ON

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- The following troubleshooting flowchart is based on the premise that the engine is cranked normally. If the engine does not crank, proceed to the problem symptoms table (See page ES-23).
- Read freeze frame data using the intelligent tester. 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.

1	READ VALUE USING INTELLIGENT TESTER (STARTER SIGNAL)

ES

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.
(d) Check the value displayed on the tester when the ignition switch is turned to the ON and START positions.

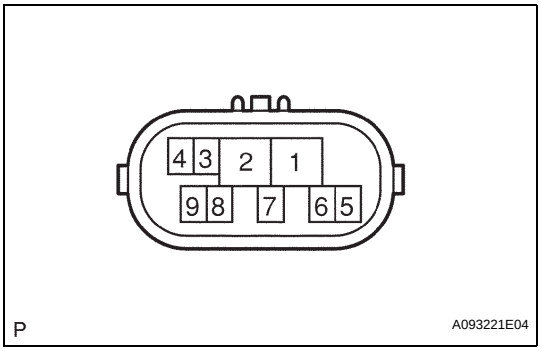
Result

Ignition Switch Position	STARTER SIG
ON	OFF
START	ON

OK → REPLACE ECM

NG

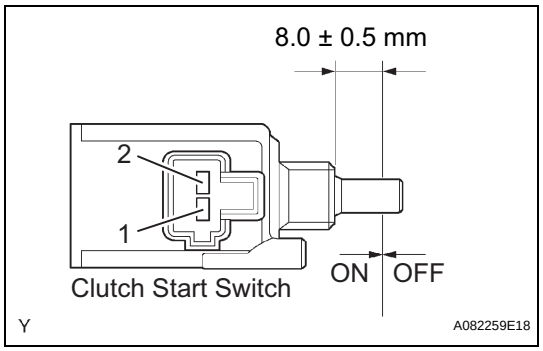
2	INSPECT PARK/NEUTRAL POSITION SWITCH OR CLUTCH START SWITCH



(a) Inspect the Park/Neutral Position (PNP) switch (for A/T models).
(1) Disconnect the P1 PNP switch connector.
(2) Measure the resistance when the transmission gear selector lever is moved to each position.

Standard resistance

Gear Selector Lever Position	Tester Connection	Specified Condition
P	2 - 6, 4 - 5	Below 1 Ω
R	1 - 2	Below 1 Ω
N	2 - 9, 4 - 5	Below 1 Ω
D	2 - 7	Below 1 Ω
2	2 - 3	Below 1 Ω
L	2 - 8	Below 1 Ω



(b) Inspect the clutch start switch (for M/T models).
(1) Disconnect the C5 clutch start switch connector.
(2) Measure the resistance when the clutch start switch is ON and OFF.
Standard resistance

Switch Position	Tester Connection	Specified Condition
ON (pushed)	1 - 2	Below 1 Ω
OFF (free)	1 - 2	10 kΩ or higher

NG → **REPLACE PARK/NEUTRAL POSITION SWITCH OR CLUTCH START SWITCH (GO TO NEXT STEP AFTER REPLACEMENT)**

ES

OK

3 READ VALUE USING INTELLIGENT TESTER (STARTER SIGNAL)

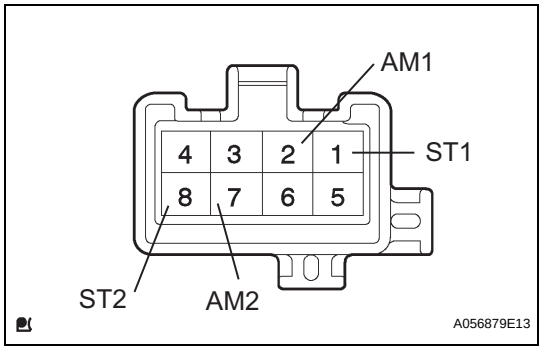
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.
(d) Check the value displayed on the tester when the ignition switch is turned to the ON and START positions.
Result

Ignition Switch Position	STARTER SIG
ON	OFF
START	ON

OK → **SYSTEM OK**

NG

4 INSPECT IGNITION OR STARTER SWITCH ASSEMBLY



(a) Disconnect the I5 ignition switch connector.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Switch Position	Tester Connection	Specified Condition
LOCK	All Terminals	10 kΩ or higher
START	ST1 (1) - AM1 (2) ST2 (8) - AM2 (7)	Below 1 Ω

NG → **REPLACE IGNITION OR STARTER SWITCH ASSEMBLY (GO TO NEXT STEP AFTER REPLACEMENT)**

OK

5	READ VALUE USING INTELLIGENT TESTER (STARTER SIGNAL)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / STARTER SIG.
(d) Check the value displayed on the tester when the ignition switch is turned to the ON and START positions.

Result

Ignition Switch Position	STARTER SIG
ON	OFF
START	ON

ES

OK → **SYSTEM OK**

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

DTC	P0630	VIN not Programmed or Mismatch - ECM / PCM

DESCRIPTION

DTC P0630 is set if the Vehicle Indication Number (VIN) is not stored in the ECM or the input VIN is not accurate. Input the VIN with the intelligent tester (See page ES-11).

DTC No.	DTC Detection Condition	Trouble Area
P0630	• VIN not stored in ECM • Input VIN incorrect (1 trip detection logic)	ECM

MONITOR STRATEGY

Related DTCs	P0630: VIN not programmed
Required Sensors/Components (Main)	ECM
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.325 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Battery voltage	8 V or more
Ignition switch	ON
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

VIN code	Not programmed

COMPONENT OPERATING RANGE

VIN code	Programmed

INSPECTION PROCEDURE

1	READ CURRENT DTC

NOTICE:
If P0630 is set, the VIN must be input to the ECM using the intelligent tester. However, all DTCs are cleared automatically by the tester when inputting the VIN. If DTCs other than P0630 are set, check them first.

NEXT

2	INPUT VIN WITH INTELLIGENT TESTER

NEXT

END

DTC	P0657	Actuator Supply Voltage Circuit / Open

DESCRIPTION

The ECM monitors the output voltage to the throttle actuator. This self-check ensures that the ECM is functioning properly. The output voltage is usually 0 V when the ignition switch is turned off. If the output voltage is higher than 7 volts when the ignition switch is turned off, the ECM will illuminate the MIL and set a DTC when the ignition switch is turned on.

DTC	DTC Detection Condition	Trouble Area
P0657	Throttle actuator power supply error	ECM

MONITOR STRATEGY

Related DTC	P0657: ETCS power supply
Required sensors/Components (main)	ECM
Required sensors/Components (sub)	Throttle actuator
Frequency of Operation	Once per driving cycle
Duration	Within 1 second
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor will run whenever this DTC is not present	None
Ignition switch	From ON to OFF

TYPICAL MALFUNCTION THRESHOLDS

Throttle actuator power supply	7 V or more

INSPECTION PROCEDURE

1	CHECK WHETHER DTC OUTPUT RECURS (IN ADDITION TO DTC P0657)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTC.
(e) Turn the ignition switch off.
(f) Disconnect the battery negative terminal and wait for 1 minute.
(g) Connect the battery negative terminal.
(h) Turn the ignition switch to the ON position for 10 seconds.
(i) Turn the ignition switch off.
(j) Turn the ignition switch to the ON position.
(k) Enter the following menus: DIAGNOSIS / ENHANCED II / DTC INFO / CURRENT CODES.
(l) Read the DTCs.

Result

Display (DTC output)	Proceed to
P0657	A
No output DTC	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

REPLACE ECM

DTC	P0724	Brake Switch "B" Circuit High

DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling while driving in the lock-up condition when the brakes are suddenly applied.
When the brake pedal is depressed, this switch sends a signal to the ECM. Then the ECM cancels the operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detection Condition	Trouble Area
P0724	Stop light switch remains ON even when vehicle is driven in GO (18.63 mph (30 km/h) or more) and STOP (less than 1.86 mph (3 km/h)) pattern 5 times (2 trip detection logic)	• Short in stop light switch signal circuit • Stop light switch • ECM

MONITOR DESCRIPTION

This DTC indicates that the stop light switch remains ON. When the stop light switch remains ON during GO and STOP driving, the ECM interprets this as a fault in the stop light switch. Then the MIL illuminates and the ECM stores the DTC. The vehicle must GO (18.63 mph (30 km/h) or more) and STOP (less than 1.86 mph (3 km/h)) 5 times for 2 driving cycles in order for the DTC to be output.

MONITOR STRATEGY

Related DTCs	P0724: Stop light switch/Range check/Rationality
Required sensors/Components	Stop light switch, Vehicle speed sensor
Frequency of operation	Continuous
Duration	GO and STOP 5 times
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present.	None
Battery voltage	8 V or more
Starter	OFF
Ignition switch	ON
GO (Vehicle speed is 18.63 mph (30 km/h) or more)	Once
STOP (Vehicle speed is less than 1.86 mph (3 km/h))	Once

TYPICAL MALFUNCTION THRESHOLDS

Brake switch	Stuck ON

WIRING DIAGRAM

Refer to DTC P0504 (See page ES-215).

INSPECTION PROCEDURE

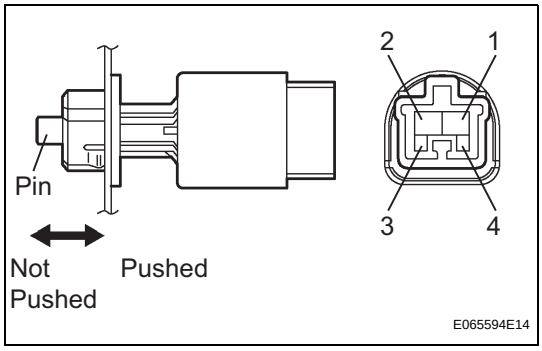
HINT:
Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.
NOTICE:
In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

1. Warm up the engine.
2. Turn the ignition switch off.
3. Connect the intelligent tester to the CAN VIM. Then connect the CAN VIM to the DLC3.
4. Turn the ignition switch to the ON position.
5. Turn the intelligent tester on.
6. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST.
7. Follow the instructions on the tester and read the DATA LIST.

Item	Measurement Item/Range	Normal Condition	Diagnostic Note
STOP LIGHT SW	Stop light switch status/ ON or OFF	• Brake pedal is depressed: ON • Brake pedal is released: OFF	-

ES

1 INSPECT STOP LIGHT SWITCH



(a) Remove the A3 stop light switch.
(b) Measure the resistance according to the value(s) in the table below.

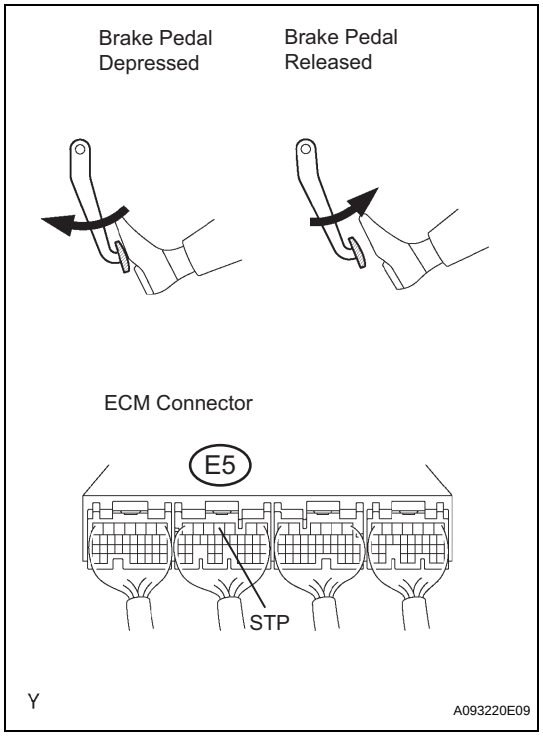
Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Pin pushed (pedal released)	Below 1 Ω
1 - 2	Pin not pushed (pedal depressed)	10 kΩ or higher
3 - 4	Pin pushed (pedal released)	10 kΩ or higher
3 - 4	Pin not pushed (pedal depressed)	Below 1 Ω

NG → **REPLACE STOP LIGHT SWITCH**

OK

2	CHECK WIRE HARNESS (ECM - BATTERY)



(a) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
E5-4 (STP) - Body ground	Brake pedal is depressed	10 to 14 V
E5-4 (STP) - Body ground	Brake pedal is released	Below 1 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

ES

OK

REPLACE ECM

DTC	P2102	Throttle Actuator Control Motor Circuit Low

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 (TP) sensor, which is mounted on the throttle body. The TP 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 ETCS (Electronic Throttle Control System) does not use a throttle cable.

ES

DTC No.	DTC Detection Condition	Trouble Area
P2102	Conditions (a) and (b) continue for 2.0 seconds (1 trip detection logic): (a) Throttle actuator duty ratio 80 % or more (b) Throttle actuator current 0.5 A or less	• Open in throttle actuator circuit • Throttle actuator • ECM
P2103	Either of the following conditions is met (1 trip detection logic): • Hybrid IC diagnosis failure • Hybrid IC current limiter port failure	• Short in throttle actuator circuit • Throttle actuator • Throttle valve • Throttle body assembly • 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 sets a DTC.
Example:
When the electrical current is more than 10 A, or less than 0.5 A and the throttle actuator duty ratio exceeds 80%, the ECM interprets this as the current being outside the standard range, and illuminates the MIL and sets a DTC.
If the malfunction is not repaired successfully, a DTC is set when the engine is quickly revved to a high rpm several times after the engine has idled for 5 seconds after engine start.

MONITOR STRATEGY

Related DTCs	P2102: Throttle actuator current (low current) P2103: Throttle actuator current (high current)
Required Sensors/Components (Main)	Throttle actuator (throttle body)
Required Sensors/Components (Related)	None
Frequency of Operation	Continuous
Duration	P2102: 2 seconds P2103: 0.1 second or 0.6 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None

P2102:

Throttle actuator	Activated

Duty ratio to open throttle actuator	80% or more
Throttle actuator power supply	8 V or more

P2103:

Throttle actuator	Activated
Throttle actuator power supply	8 V or more
Battery voltage	8 V or more
Starter	OFF

TYPICAL MALFUNCTION THRESHOLDS

P2102:

Throttle actuator current	Less than 0.5 A

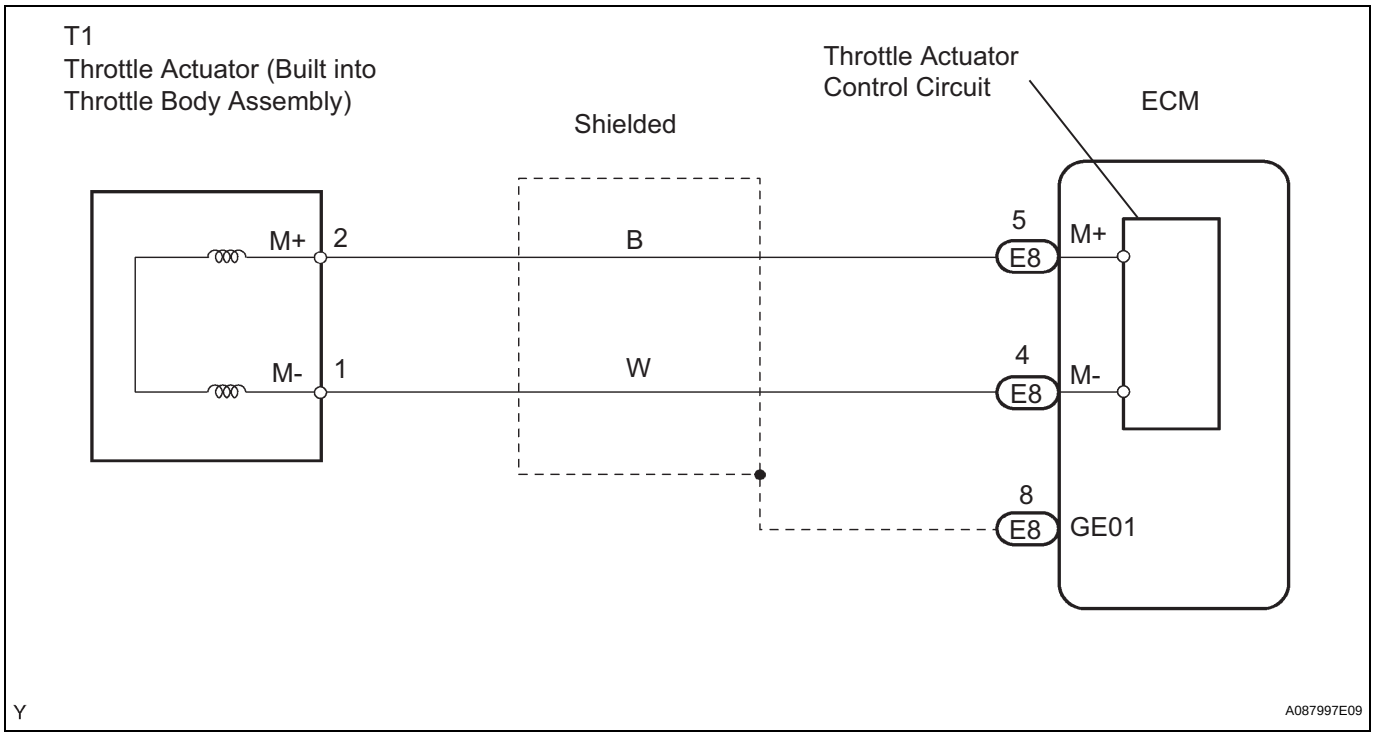
P2103:

Hybrid IC current limiter port	Fail

FAIL-SAFE

When any of these DTCs, as well as other DTCs relating to ETCS (Electronic Throttle Control System) malfunctions, are set, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator off, and the throttle valve is returned to a 6.5° 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 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



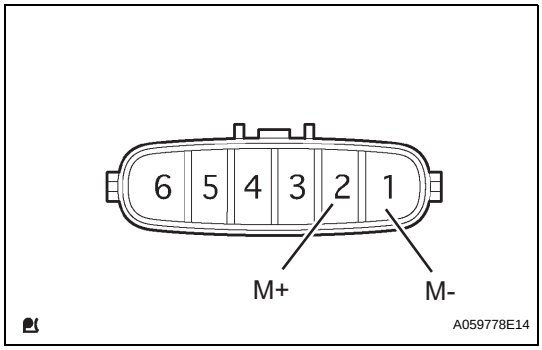
INSPECTION PROCEDURE

HINT:

- Read freeze frame data using the intelligent tester. 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.
- The throttle actuator current (THROTTLE MOT) and the throttle actuator duty ratio (THROTTLE OPN / THROTTLE CLS) can be read using the intelligent tester. However, the ECM shuts off the throttle actuator current when the ETCS malfunctions.

ES

1 INSPECT THROTTLE BODY (THROTTLE ACTUATOR RESISTANCE)



(a) Disconnect the T1 throttle body connector.
(b) Measure the resistance according to the value(s) in the table below.

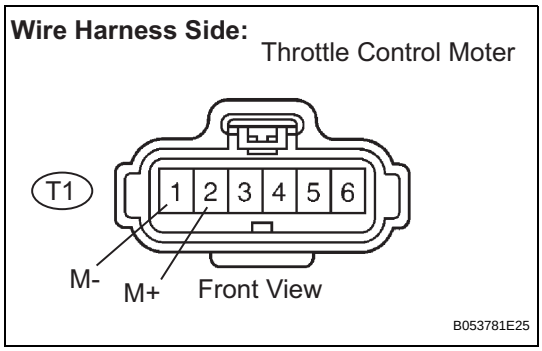
Standard resistance

Tester Connection	Specified Condition
M+ (2) - M- (1)	0.3 and 100 Ω at 20°C (68°F)

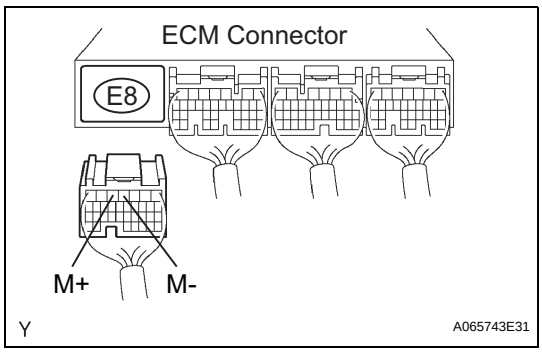
NG → **REPLACE THROTTLE BODY**

OK

2 CHECK WIRE HARNESS (THROTTLE ACTUATOR - ECM)



(a) Disconnect the T1 throttle body connector.



(b) Disconnect the E8 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
M+ (T1-2) - M+ (E8-5)	Below 1 Ω
M- (T1-1) - M- (E8-4)	Below 1 Ω
M+ (T1-2) or M+ (E8-5) - Body ground	10 kΩ or higher
M- (T1-1) or M- (E8-4) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

3	INSPECT THROTTLE BODY

(a) Check for foreign objects between the throttle valve and the housing.

NG → **REMOVE FOREIGN OBJECT AND CLEAN THROTTLE BODY**

OK

4	INSPECT THROTTLE VALVE

(a) Check if the throttle valve opens and closes smoothly.

NG → **REPLACE THROTTLE BODY**

OK

REPLACE ECM

DTC	P2111	Throttle Actuator Control System - Stuck Open

DTC	P2112	Throttle Actuator Control System - Stuck Closed

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 (TP) sensor, which is mounted on the throttle body. The TP sensor provides feedback to the ECM in order that it can control the throttle actuator, and therefore the throttle valve, appropriately in response to driver inputs.

HINT:

This ETCS (Electronic Throttle Control System) does not use a throttle cable.

DTC No.	DTC Detection Condition	Trouble Area
P2111	Throttle actuator does not close when signaled by ECM (1 trip detection logic)	• Throttle actuator • Throttle body assembly • Throttle valve
P2112	Throttle actuator does not open when signaled by ECM (1 trip detection logic)	• Throttle actuator • Throttle body assembly • Throttle valve

MONITOR DESCRIPTION

The ECM determines that there is a malfunction in the ETCS when the throttle valve remains at a fixed angle despite a high drive current from the ECM. The ECM illuminates the MIL and sets a DTC.

If the malfunction is not repaired successfully, a DTC is set when the accelerator pedal is fully depressed and released quickly (to fully open and close the throttle valve) after the engine is next started.

MONITOR STRATEGY

Related DTCs	P2111: Throttle actuator stuck open P2112: Throttle actuator stuck closed
Required Sensors/Components (Main)	Throttle actuator
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.5 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever the following DTCs are not present	None

P2111 (Throttle actuator stuck open):

All of the following conditions are met:	-
System guard*	ON
Throttle actuator current	2 A or more
Throttle actuator close duty ratio	80% or more

P2112 (Throttle actuator stuck closed):

All of the following conditions are met:	-
System guard*	ON
Throttle actuator current	2 A or more
Throttle actuator open duty-cycle	80% or more

* System guard sets when the following conditions are met:	-
Throttle actuator	ON
Throttle actuator duty calculation	Executing
Throttle position sensor	Fail determined
Throttle actuator current-cut operation	Not executing
Throttle actuator power supply	4 V or more
Throttle actuator	Fail determined

TYPICAL MALFUNCTION THRESHOLDS

P2111 (Throttle actuator stuck open):

TP sensor voltage change	No change

P2112 (Throttle actuator stuck closed):

TP sensor voltage change	No change

FAIL-SAFE

When any of these DTCs, as well as other DTCs relating to ETCS (Electronic Throttle Control System) malfunctions, are set, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator off, and the throttle valve is returned to a 6.5° 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 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 P2102 (See page ES-253).

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

1	CHECK OTHER DTC OUTPUT (IN ADDITION TO DTC P2111 OR P2112)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P2111 or P2112	A
P2111 or P2112 and other DTCs	B

HINT:
If any DTCs other than P2111 or P2112 are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

A

2 CHECK THROTTLE BODY (VISUALLY CHECK THROTTLE VALVE)

(a) Check for contamination between the throttle valve and the housing. If necessary, clean the throttle body. And check that the throttle valve moves smoothly.
OK:
Throttle valve is not contaminated with foreign objects and moves smoothly.

ES

NG → REPLACE THROTTLE BODY

OK

3 CHECK DTC OUTPUT

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTCs (See page ES-32).
(e) Start the engine, and fully depress and release the accelerator pedal quickly (to fully open and close the throttle valve).
(f) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(g) Read the DTCs.
Result

Display (DTC Output)	Proceed to
No DTC	A
P2111 or P2112	B

B → REPLACE ECM

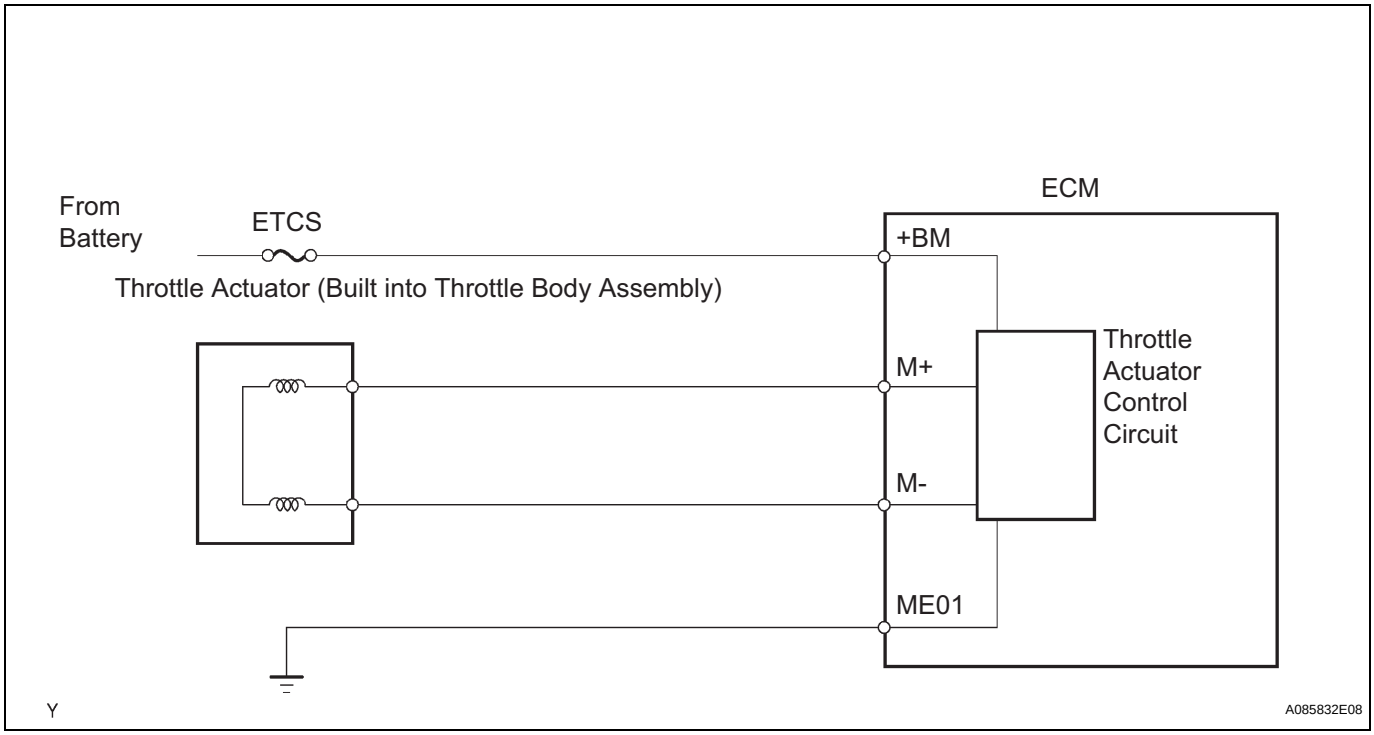
A

CHECK FOR INTERMITTENT PROBLEM

DTC	P2118	Throttle Actuator Control Motor Current Range / Performance

DESCRIPTION

The ETCS (Electronic Throttle Control System) has a dedicated power supply circuit. The voltage (+BM) is monitored and when it is low (less than 4 V), the ECM determines that there is a malfunction in the ETCS and cuts off the current to the throttle actuator.
When the voltage becomes unstable, the ETCS itself becomes unstable. For this reason, when the voltage is low, the current to the throttle actuator is cut. If repairs are made and the system returns to normal, turn the ignition switch OFF. The ECM then allows the current to flow to the throttle actuator so that it can be restarted.
HINT:
The ETCS does not use a throttle cable.



DTC No.	DTC Detection Condition	Trouble Area
P2118	Open in ETCS power source (+BM) circuit (1 trip detection logic)	• Open in ETCS power source circuit • ETCS fuse • ECM

MONITOR DESCRIPTION

The ECM monitors the battery supply voltage applied to the throttle actuator.
When the power supply voltage (+BM) drops below 4 V for 0.8 seconds or more, the ECM interprets this as an open in the power supply circuit (+BM). The ECM illuminates the MIL and sets the DTC.
If the malfunction is not repaired successfully, a DTC is set 5 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P2118: Throttle actuator power supply
Required Sensors/Components (Main)	Throttle actuator, throttle valve, ETCS fuse
Required Sensors/Components (Related)	None
Frequency of Operation	Continuous
Duration	0.8 seconds

MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Battery voltage	8 V or more
Electric throttle actuator power	ON

TYPICAL MALFUNCTION THRESHOLDS

Throttle actuator power supply voltage (+BM)	Less than 4 V

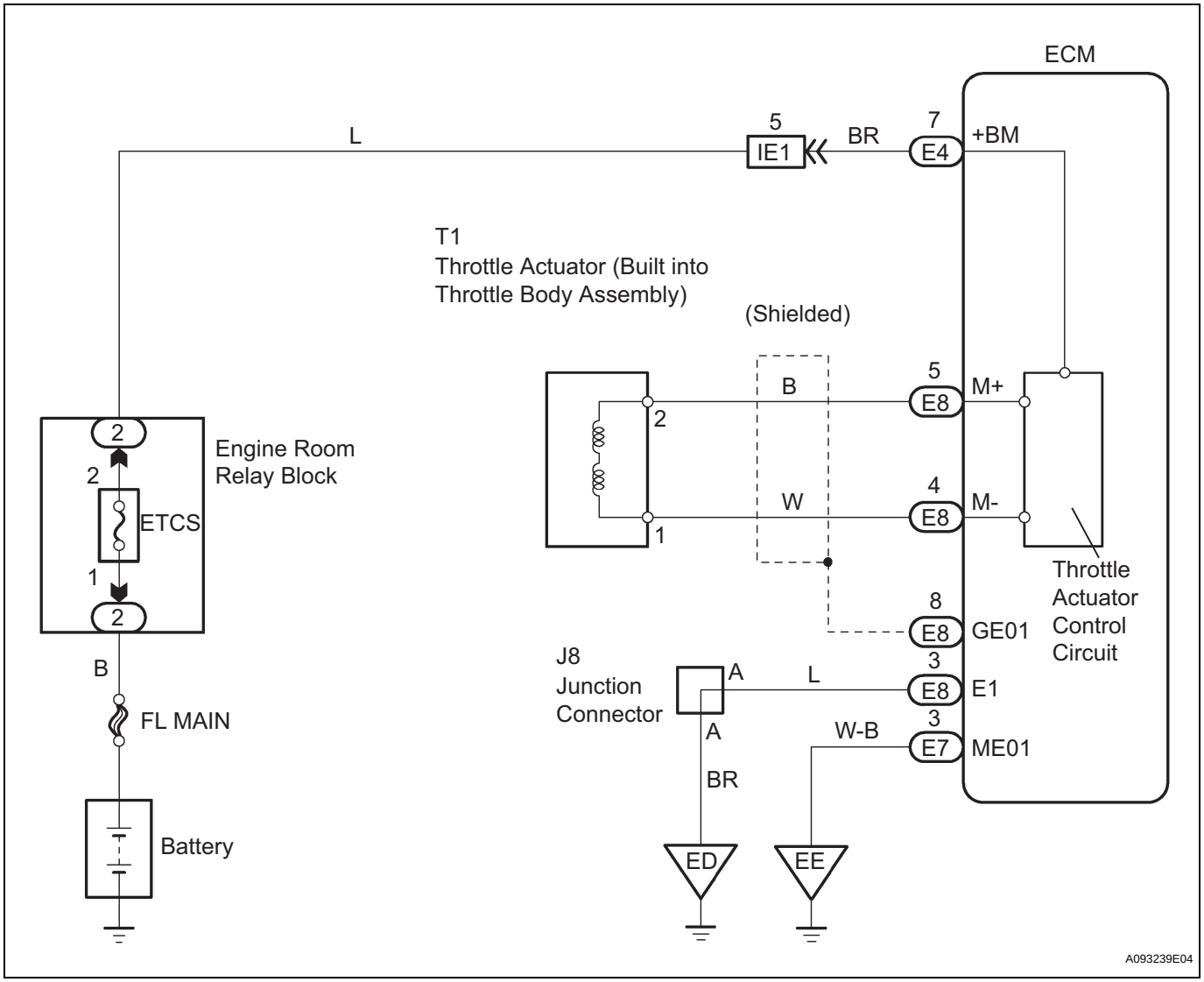
COMPONENT OPERATING RANGE

Throttle actuator power supply voltage	9 to 14 V

FAIL-SAFE

When any of these DTCs, as well as other DTCs relating to ETCS (Electronic Throttle Control System) malfunctions, are set, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator off, and the throttle valve is returned to a 6.5° 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 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

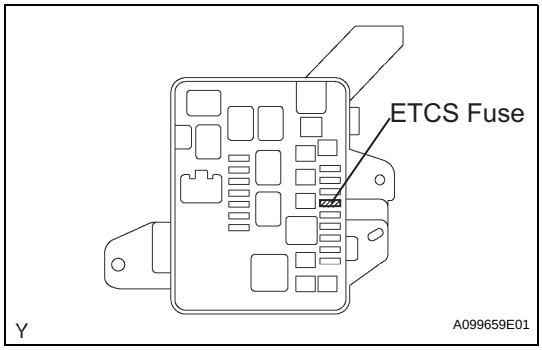


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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.

1	CHECK FUSE (ETCS)

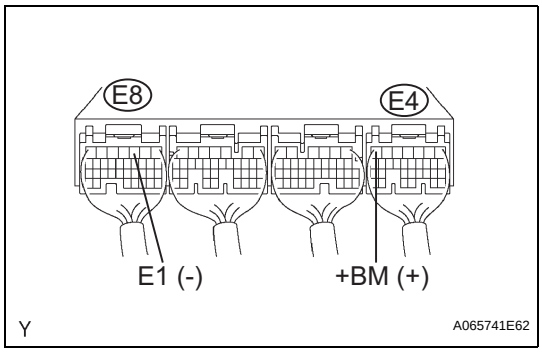


(a) Remove the ETCS fuse from the engine room relay block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

NG → **CHECK FOR SHORT IN ALL HARNESSES AND COMPONENTS CONNECTED TO FUSE**

OK

2	INSPECT ECM (+BM VOLTAGE)



(a) Measure the voltage according to the value(s) in the table below.
Standard voltage

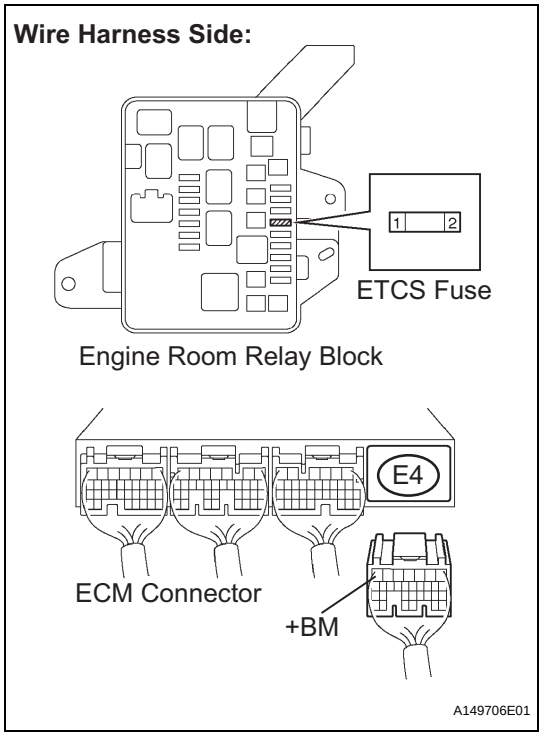
Tester Connection	Specified Condition
+BM (E4-7) - E1 (E8-3)	9 to 14 V

NG → **Go to step 3**

OK

CHECK FOR INTERMITTENT PROBLEMS

3	CHECK WIRE HARNESS (ECM - ETCS FUSE, ETCS FUSE - BATTERY)



(a) Check the wire harness between the ETCS fuse and ECM.
  (1) Remove the ETCS fuse from the engine room relay block.
  (2) Disconnect the E4 ECM connector.
  (3) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
ETCS fuse (2) - +BM (E4-7)	Below 1 Ω
ETCS fuse (2) or +BM (E4-7) - Body ground	10 kΩ or higher

(b) Check the wire harness between the ETCS fuse and positive (+) battery cable.
  (1) Remove the ETCS fuse from the engine room relay block.
  (2) Disconnect the cable from the positive (+) battery cable.
  (3) Measure the resistance according to the value(s) in the table below.
  Standard resistance

Tester Connection	Specified Condition
Positive battery cable terminal - ETCS fuse (1)	Below 1 Ω
Positive battery cable terminal or ETCS fuse (1) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

ES

DTC	P2119	Throttle Actuator Control Throttle Body Range / Performance

DESCRIPTION

The Electronic Throttle Control System (ETCS) is composed of the throttle actuator, Throttle Position (TP) sensor, Accelerator Pedal Position (APP) sensor, and ECM. The ECM operates the throttle actuator to regulate the throttle valve in response to driver inputs. The TP 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
P2119	Throttle valve opening angle continues to vary greatly from target opening angle (1 trip detection logic)	• ETCS • ECM

ES

MONITOR DESCRIPTION

The ECM determines the actual opening angle of the throttle valve from the TP sensor signal. The actual opening angle is compared to the target opening angle commanded by the ECM. If the difference between these 2 values is outside the standard range, the ECM interprets this as a malfunction in the ETCS. The ECM then illuminates the MIL and sets the DTC.
If the malfunction is not repaired successfully, the DTC is set when the accelerator pedal is quickly released (to close the throttle valve) after the engine speed reaches 5,000 rpm by the accelerator pedal being fully depressed (throttle valve fully open).

MONITOR STRATEGY

Related DTCs	P2119: ETCS malfunction
Required Sensors/Components (Main)	Throttle actuator
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	Within 1 second
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
System guard*	ON
*System guard sets when the following conditions are met:	-
Throttle actuator	ON
Throttle actuator duty calculation	Executing
TP sensor	Fail determined
Throttle actuator current-cut operation	Not executing
Throttle actuator power supply	4 V or more
Throttle actuator	Fail determined

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions A or B is met:	-
A. Commanded closed TP - current closed TP	0.3 V or more for 1 second
B. Commanded open TP - current open TP	0.3 V or more for 0.6 seconds

FAIL-SAFE

When any of these DTCs, as well as other DTCs relating to ETCS (Electronic Throttle Control System) malfunctions, are set, the ECM enters fail-safe mode. During fail-safe mode, the ECM cuts the current to the throttle actuator off, and the throttle valve is returned to a 6.5° 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 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 P2102 (See page ES-253).

INSPECTION PROCEDURE

ES

HINT:

Read freeze frame data using the intelligent tester. 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.

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P2119)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P2119	A
P2119 and other DTCs	B

HINT:

If any DTCs other than P2119 are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

A

2	CHECK WHETHER DTC OUTPUT RECURS (DTC P2119)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTCs (See page ES-32).
(e) Allow the engine to idle for 15 seconds.

CAUTION:

Exercise extreme care and take precautions at Procedure "A" and "B" below. Failure to do so may result in the vehicle unexpectedly rolling away.

(f) Securely apply the parking brake and move the gear selector lever to the D position (Procedure "A").
(g) While depressing the brake pedal securely, fully depress the accelerator pedal for 5 seconds (Procedure "B").
(h) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(i) Read the DTCs.
HINT:
The voltage output of the throttle position sensor can be checked during Procedure "B" using the intelligent tester. Variations in the voltage output indicate that the throttle actuator is in operation. To check the voltage output using the intelligent tester, enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / THROTTLE POS #1.
OK:
No DTC output.

NG → **REPLACE THROTTLE BODY**

OK

NORMAL

DTC	P2120	Throttle / Pedal Position Sensor / Switch "D" Circuit
DTC	P2122	Throttle / Pedal Position Sensor / Switch "D" Circuit Low Input
DTC	P2123	Throttle / Pedal Position Sensor / Switch "D" Circuit High Input
DTC	P2125	Throttle / Pedal Position Sensor / Switch "E" Circuit
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

DESCRIPTION

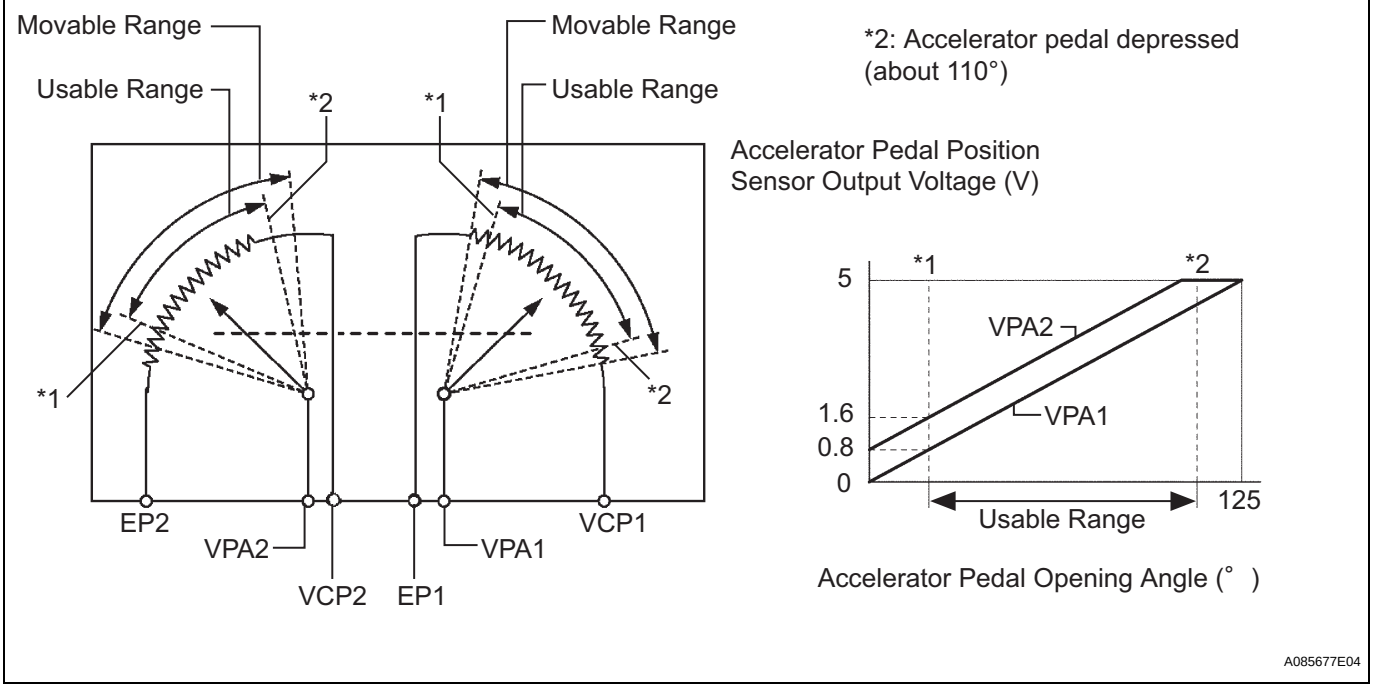
HINT:

These DTCs relate to the Accelerator Pedal Position (APP) sensor.

This ETCS (Electronic Throttle Control System) does not use a throttle cable.

The Accelerator Pedal Position (APP) sensor is mounted on the accelerator pedal bracket and has 2 sensor circuits: VPA1 (main) and VPA2 (sub). The voltage, which is applied to terminals VPA1 and VPA2 of the ECM, varies between 0 V and 5 V in proportion to the operating angle of the accelerator pedal (throttle valve). A signal from VPA1 indicates the actual accelerator pedal opening angle (throttle valve opening angle) and is used for engine control. A signal from VPA2 conveys the status of the VPA1 circuit and is used to check the APP sensor itself.

The ECM monitors the actual accelerator pedal opening angle (throttle valve opening angle) through the signals from VPA1 and VPA2, and controls the throttle actuator according to these signals.



DTC No.	DTC Detection Condition	Trouble Area
P2120	VPA1 fluctuates rapidly beyond upper and lower malfunction thresholds for 0.5 seconds or more (1 trip detection logic)	• Accelerator Pedal Position (APP) sensor • ECM
P2122	VPA1 0.4 V or less for 0.5 seconds or more when accelerator pedal fully released (1 trip detection logic)	• APP sensor • Open in VCP1 circuit • Open or ground short in VPA1 circuit • ECM
P2123	VPA1 4.8 V or more for 2.0 seconds or more (1 trip detection logic)	• APP sensor • Open in EPA circuit • ECM
P2125	VPA2 fluctuates rapidly beyond upper and lower malfunction thresholds for 0.5 seconds or more (1 trip detection logic)	• APP sensor • ECM
P2127	VPA2 1.2 V or less for 0.5 seconds or more when accelerator pedal fully released (1 trip detection logic)	• APP sensor • Open in VCP2 circuit • Open or ground short in VPA2 circuit • ECM
P2128	Conditions (a) and (b) continue for 2.0 seconds or more (1 trip detection logic): (a) VPA2 4.8 V or more (b) VPA1 between 0.4 V and 3.45 V	• APP sensor • Open in EPA2 circuit • ECM
P2138	Condition (a) or (b) continues for 2.0 seconds or more (1 trip detection logic): (a) Difference between VPA1 and VPA2 0.02 V or less (b) VPA1 0.4 V or less and VPA2 1.2 V or less	• Short between VPA1 and VPA2 circuits • APP sensor • ECM

HINT:
When any of these DTCs are set, check the APP sensor voltage by selecting the following menu items on the intelligent tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / ACCEL POS #1 and ACCEL POS #2.

Trouble Area	ACCEL POS #1 When AP Released	ACCEL POS #2 When AP Released	ACCEL POS #1 When AP Depressed	ACCEL POS #2 When AP Depressed
VCP circuit open	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V	0 to 0.2 V
Open or ground short in VPA circuit	0 to 0.2 V	1.2 to 2.0 V	0 to 0.2 V	3.4 to 5.0 V

Trouble Area	ACCEL POS #1 When AP Released	ACCEL POS #2 When AP Released	ACCEL POS #1 When AP Depressed	ACCEL POS #2 When AP Depressed
Open or ground short in VPA2 circuit	0.5 to 1.1 V	0 to 0.2 V	2.5 to 4.5 V	0 to 0.2 V
EPA 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
Normal condition	0.5 to 1.1 V	1.2 to 2.0 V	2.5 to 4.5 V	3.4 to 5.0 V

HINT:
- Accelerator pedal positions are expressed as voltages.
- AP denotes for Accelerator Pedal.

MONITOR DESCRIPTION

When either of the voltage outputs of VPA1 or VPA2 deviates from the standard range, or the difference between the voltage outputs of the 2 sensor circuits is less than the threshold, the ECM determines that there is a malfunction in the APP sensor. The ECM then illuminates the MIL and sets a DTC.
Example:
When the voltage output of VPA1 drops below 0.4 V for more than 0.5 seconds while the accelerator pedal is being fully depressed, DTC P2122 is set.
If the malfunction is not repaired successfully, a DTC is set 2 seconds after the engine is next started.

ES

MONITOR STRATEGY

Related DTCs	P2120: Accelerator Pedal Position (APP) sensor 1 range check (fluctuating) P2122: APP sensor 1 range check (low voltage) P2123: APP sensor 1 range check (high voltage) P2125: APP sensor 2 range check (fluctuating) P2127: APP sensor 2 range check (low voltage) P2128: APP sensor 2 range check (high voltage) P2138: APP sensor range check (correlation)
Required Sensors/Components (Main)	APP sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.5 seconds: P2120, P2122, P2125 and P2127 2.0 seconds: P2123, P2128 and P2138
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Either of the following conditions 1 or 2 is met:	-
1. Ignition switch	ON
2. Throttle actuator power	ON

TYPICAL MALFUNCTION THRESHOLDS

P2120:

Either of the following conditions 1 or 2 is met:	-
1. VPA voltage when VPA2 voltage 0.04 V or more	0.4 V or less
2. VPA voltage	4.8 V or more

P2122:

VPA voltage when VPA2 voltage 0.04 V or more	0.4 V or less

P2123:

VPA voltage	4.8 V or more

P2125:

Either of the following conditions 1 or 2 is met:	-
1. VPA2 voltage when VPA voltage 0.04 V or more	1.2 V or less
2. VPA2 voltage when VPA 0.4 to 3.45 V	4.8 V or more

P2127:

VPA2 voltage when VPA voltage 0.04 V or more	1.2 V or less

P2128:

VPA2 voltage when VPA 0.4 to 3.45 V	4.8 V or more

P2138:

Either of the following conditions A or B is met:	-
Condition A	-
Difference between VPA and VPA 2 voltages	0.02 V or less
Condition B	-
VPA voltage	0.4 V or less
VPA2 voltage	1.2 V or less

COMPONENT OPERATING RANGE

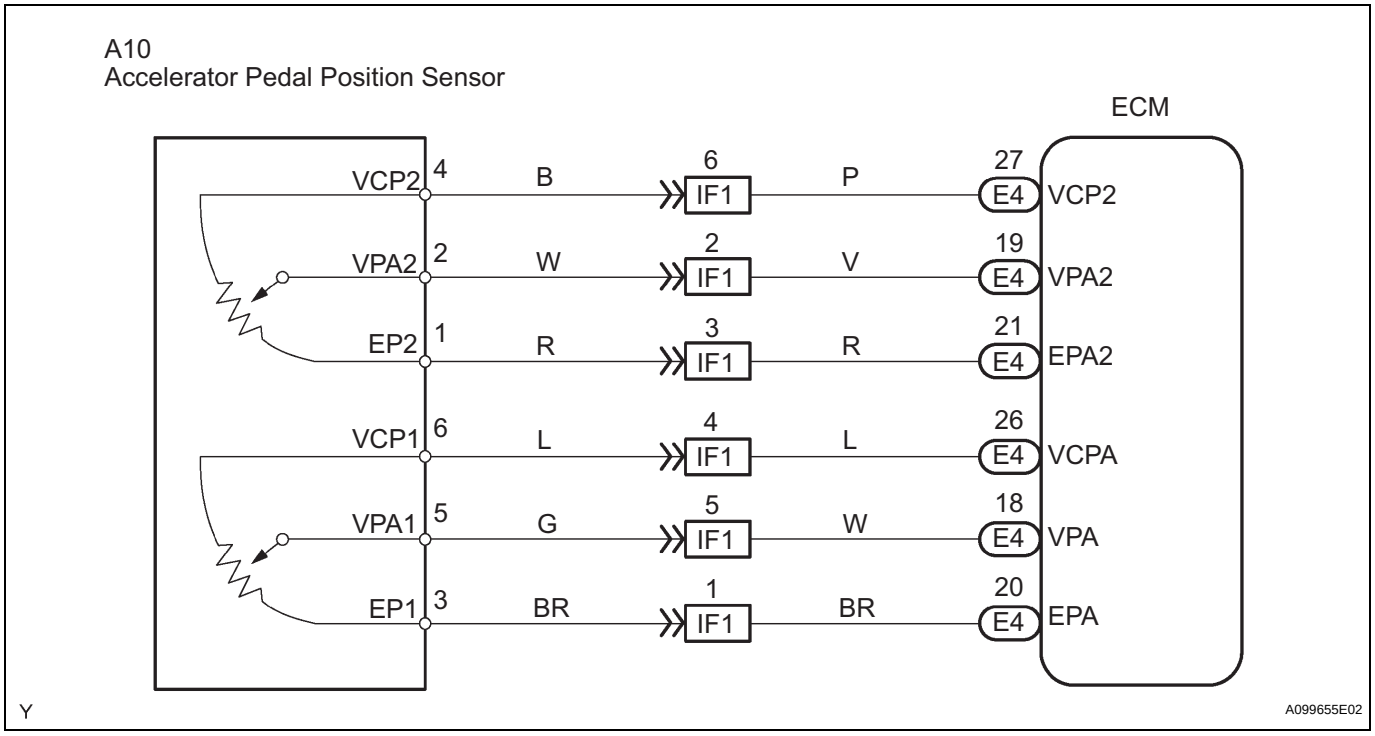
VPA1 voltage	0.5 to 4.5 V
VPA2 voltage	1.2 to 5.3 V
Difference between VPA and VAP2 voltages	More than 0.02 V

FAIL-SAFE

When any of DTCs P2120, P2121, P2122, P2123, P2125, P2127, P2128 and P2138 are set, the ECM enters fail-safe mode. If either of the 2 sensor circuits malfunctions, the ECM uses the remaining circuit to calculate the accelerator pedal position to allow the vehicle to continue driving. If both of the circuits malfunction, the ECM regards the accelerator pedal as being released. As a result, the throttle valve is closed and the engine idles.

Fail-safe mode continues until a pass condition is detected, and the ignition switch is turned off.

WIRING DIAGRAM



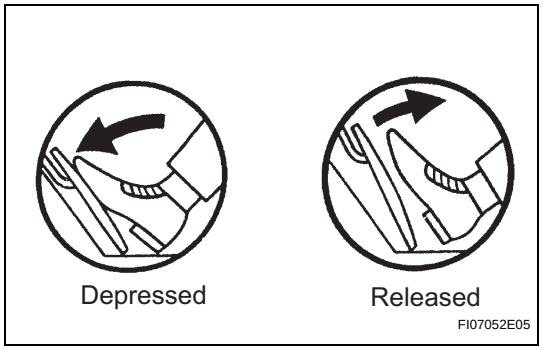
ES

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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.

1	READ VALUE USING INTELLIGENT TESTER (ACCEL POS #1 AND ACCEL POS #2)



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / ACCEL POS #1 and ACCEL POS #2.
(d) Read the values displayed on the tester.

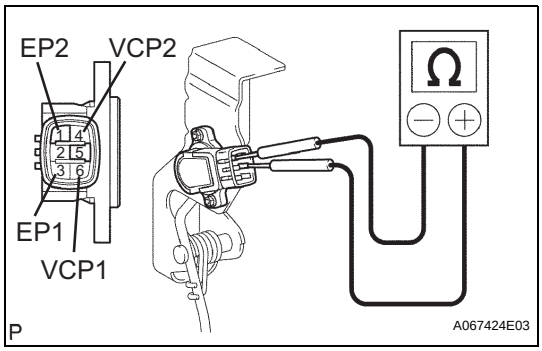
Standard voltage

Accelerator Pedal Operation	ACCEL POS #1 (AP#1)	ACCEL POS #2 (AP#2)
Released	0.5 to 1.1 V	1.2 to 2.0 V
Depressed	2.6 to 4.5 V	3.4 to 5.0 V

OK → **Go to step 6**

NG

2	INSPECT ACCELERATOR PEDAL ASSEMBLY (ACCELERATOR PEDAL POSITION SENSOR)



(a) Disconnect the A10 sensor connector.
(b) Measure the resistance according to the value(s) in the table below.

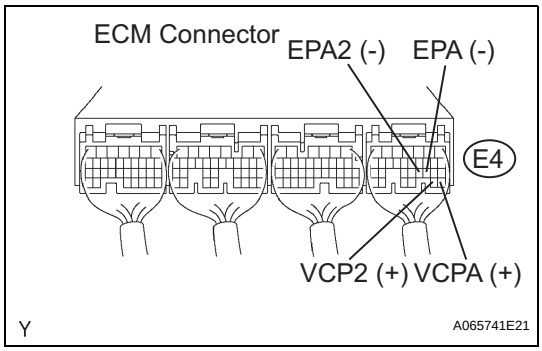
Standard resistance

Tester Connection	Specified Condition
3 - 6	1.5 to 6.0 kΩ at 20°C (68°F)
1 - 4	1.5 to 6.0 kΩ at 20°C (68°F)

NG → REPLACE ACCELERATOR PEDAL ASSEMBLY

OK

3	INSPECT ECM (VCPA AND VCP2 VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage between the terminals of the E4 ECM connector.

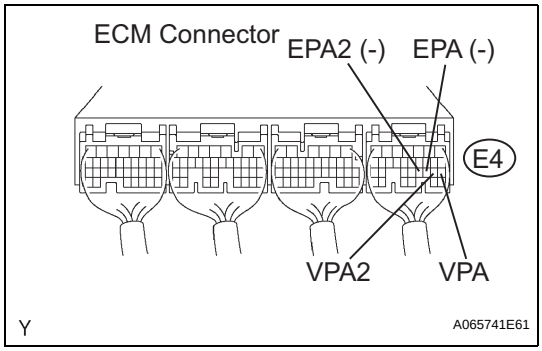
Standard voltage

Tester Connection	Specified Condition
VCPA (E4-26) - EPA (E4-20)	Between 4.5 to 5.5 V
VCP2 (E4-27) - EPA2 (E4-21)	Between 4.5 to 5.5 V

NG → REPLACE ECM

OK

4	INSPECT ECM (VPA AND VPA2 VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

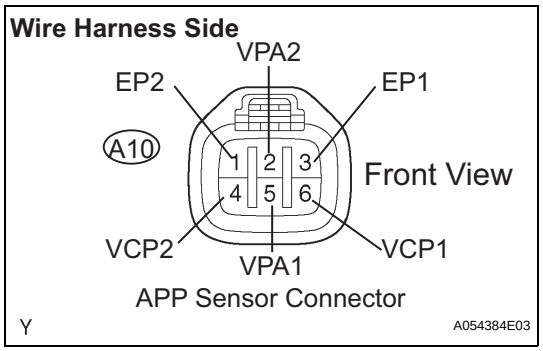
Accelerator Pedal Operation	Tester Connection	Specified Condition
Released	VPA (E4-18) - EPA (E4-20)	0.5 to 1.1 V
Depressed	VPA (E4-18) - EPA (E4-20)	2.6 to 4.5 V
Released	VPA2 (E4-19) - EPA2 (E4-21)	1.2 to 2.0 V
Depressed	VPA2 (E4-19) - EPA2 (E4-21)	3.4 to 5.3 V

NG → Go to step 5

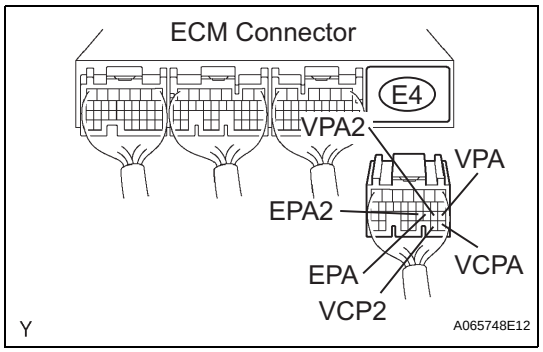
OK

REPLACE ECM

5 CHECK WIRE HARNESS (ECM - ACCELERATOR PEDAL POSITION SENSOR)



(a) Disconnect the A10 APP sensor connector.



(b) Disconnect the E4 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
VPA1 (A10-5) - VPA (E4-18)	Below 1 Ω
EP1 (A10-3) - EPA (E4-20)	Below 1 Ω
VCP1 (A10-6) - VCPA (E4-26)	Below 1 Ω
VPA2 (A10-2) - VPA2 (E4-19)	Below 1 Ω
EP2 (A10-1) - EPA2 (E4-21)	Below 1 Ω
VCP2 (A10-4) - VCP2 (E4-27)	Below 1 Ω
VPA1 (A10-5) or VPA (E4-18) - Body ground	10 kΩ or higher
EP1 (A10-3) or EPA (E4-20) - Body ground	10 kΩ or higher
VCP1 (A10-6) or VCPA (E4-26) - Body ground	10 kΩ or higher
VPA2 (A10-2) or VPA2 (E4-19) - Body ground	10 kΩ or higher
EP2 (A10-1) or EPA2 (E4-21) - Body ground	10 kΩ or higher
VCP2 (A10-4) or VCP2 (E4-27) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

6 CHECK WHETHER DTC OUTPUT RECURS (ACCELERATOR PEDAL POSITION SENSOR DTCS)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Clear the DTCs (See page ES-32).
(d) Allow the engine to idle for 15 seconds.
(e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

(f) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P2120, P2122, P2123, P2125, P2127, P2128 or P2138	A
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS

A → REPLACE ECM

DTC	P2121	Throttle / Pedal Position Sensor / Switch "D" Circuit Range / Performance

DESCRIPTION

HINT:
This DTC relates to the Accelerator Pedal Position (APP) sensor.
Refer to DTC P2120 (See page ES-267).

DTC No.	DTC Detection Condition	Trouble Area
P2121	Difference between VPA and VPA2 less than 0.4 V, or more than 1.2 V for 0.5 seconds (1 trip detection logic)	• APP sensor • ECM

ES

MONITOR DESCRIPTION

When the difference between the voltage outputs of VPA1 and VPA2 deviates from the standard range, the ECM determines that there is a malfunction in the APP sensor. The ECM then illuminates the MIL and sets the DTC.
If the malfunction has not been repaired successfully, the DTC is set 1 second after the engine is started.

MONITOR STRATEGY

Related DTCs	P2121: APP sensor rationality
Required Sensors/Components (Main)	APP 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 the following DTCs are not present	None

TYPICAL MALFUNCTION THRESHOLDS

Difference between VPA1 voltage (learned value) and VPA2 voltage (learned value)	Less than 0.4 V, or more than 1.2 V

FAIL-SAFE

When any of DTCs P2120, P2121, P2122, P2123, P2125, P2127, P2128 and P2138 are set, the ECM enters fail-safe mode. If either of the 2 sensor circuits malfunctions, the ECM uses the remaining circuit to calculate the accelerator pedal position to allow the vehicle to continue driving. If both of the circuits malfunction, the ECM regards the accelerator pedal as being released. As a result, the throttle valve is closed and the engine idles.
Fail-safe mode continues until a pass condition is detected, and the ignition switch is turned off.

WIRING DIAGRAM

Refer to DTC P2120 (See page ES-271).

INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester. 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.

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P2121)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P2121	A
P2121 and other DTCs	B

HINT:
If any DTCs other than P2121 are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

A

2	REPLACE ACCELERATOR PEDAL ASSEMBLY

(a) Replace the accelerator pedal assembly (See page ES-410).

NEXT

3	CHECK WHETHER DTC OUTPUT RECURS (DTC P2121)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTCs (See page ES-32).
(e) Allow the engine to idle for a minute.
(f) Rev up the engine several times.
(g) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(h) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P2121	A
No output	B

B → CHECK FOR INTERMITTENT PROBLEMS

A

REPLACE ECM

DTC	P2195	Oxygen (A/F) Sensor Signal Stuck Lean (Bank 1 Sensor 1)

DTC	P2196	Oxygen (A/F) Sensor Signal Stuck Rich (Bank 1 Sensor 1)

DESCRIPTION

HINT:

- Although the DTC titles say oxygen sensor, these DTCs relate to the Air-Fuel Ratio (A/F) sensor.
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.

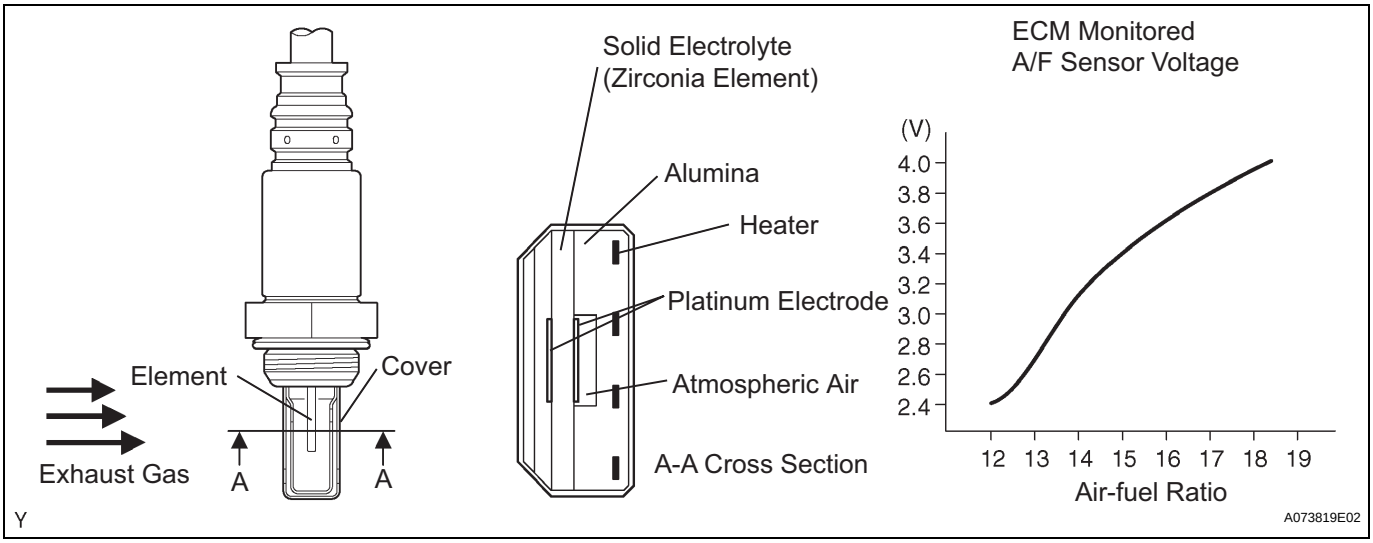
ES

The A/F 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 A/F sensor malfunctions, the ECM is unable to control the air-fuel ratio accurately.

The A/F 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 narrower than the conventional type. The heat generated by the heater is conducted to the solid electrolyte through the alumina, therefore the sensor activation is accelerated.

A three-way catalytic converter (TWC) is used in order to convert the carbon monoxide (CO), hydrocarbon (HC), and nitrogen oxide (NOx) into less harmful substances. To allow the TWC to function effectively, it is necessary to keep the air-fuel of the engine near the stoichiometric air-fuel ratio.

*: Value changes inside the ECM. Since the A/F sensor is the current output element, a current is converted to a voltage inside the ECM. Any measurements taken at the A/F sensor or ECM connectors will show a constant voltage.



DTC No.	DTC Detection Condition	Trouble Area
P2195	Conditions (a) and (b) continue for 10 seconds or more (2 trip detection logic): (a) A/F sensor voltage more than 3.8 V (b) Heated Oxygen (HO2) sensor voltage 0.15 V or more	• Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • A/F sensor (sensor 1) heater • EFI relay • A/F sensor heater and relay circuits • Air induction system • Fuel pressure • Injector • ECM
	While fuel-cut operation performed (during vehicle deceleration), A/F sensor 3.6 mA or more for 3 seconds (2 trip detection logic)	

DTC No.	DTC Detection Condition	Trouble Area
P2196	Conditions (a) and (b) continue for 2 seconds or more (2 trip detection logic): (a) A/F sensor voltage less than 2.8 V (b) HO2 sensor voltage less than 0.85 V	• Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • A/F sensor (sensor 1) heater • EFI relay • A/F sensor heater and relay circuits • Air induction system • Fuel pressure • Injector • ECM
	While fuel-cut operation performed (during vehicle deceleration), A/F sensor current less than 1.0 mA for 3 seconds (2 trip detection logic)	

HINT:
- When any of these DTCs are set, check the A/F sensor voltage output by entering the following menus on the intelligent tester: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / AFS B1S1.
- Short-term fuel trim values can also be read using the intelligent tester.
- The ECM regulates the voltage at the A1A+ and A1A- terminals of the ECM at a constant level. Therefore, the A/F sensor voltage output cannot be confirmed without using the intelligent tester.

ES

MONITOR DESCRIPTION

Under the air-fuel ratio feedback control, if the A/F sensor voltage output indicates rich or lean for a certain period of time, the ECM determines that there is a malfunction in the A/F sensor. The ECM illuminates the MIL and sets a DTC.
Example:
If the A/F sensor voltage output is less than 2.8 V (very rich condition) for 10 seconds, despite the HO2 sensor voltage output being less than 0.85 V, the ECM sets DTC P2196. Alternatively, if the A/F sensor voltage output is more than 3.8 V (very lean condition) for 10 seconds, despite the HO2 sensor voltage output being 0.15 V or more, DTC P2195 is set.

MONITOR STRATEGY

Related DTCs	P2195: A/F sensor signal stuck lean P2196: A/F sensor signal stuck rich
Required Sensors/Components (Main)	A/F sensor
Required Sensors/Components (Related)	HO2 sensor
Frequency of Operation	Continuous
Duration	10 seconds: Sensor voltage detection monitor 3 seconds: Sensor current detection monitor
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever the following DTCs are not present	P0031, P0032 (A/F sensor heater - Sensor 1) P0037, P0038 (O2 sensor heater - Sensor 2) P0100 - P0103 (MAF meter) P0110 - P0113 (IAT sensor) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for Closed Loop) P0136 (HO2 Sensor - Sensor 2) P0171, P0172 (Fuel system) P0300 - P0304 (Misfire) P0335 (CKP sensor) P0340 (CMP sensor) P0500 (VSS)

P2195 (Lean side malfunction):

Time while all of the following conditions are met	2 seconds or more
Rear HO2 sensor voltage	0.15 V or more

Time after engine start	30 seconds or more
A/F sensor status	Activated
Fuel system status	Closed-loop
Engine	Running

P2196 (Rich side malfunction):

Time while all of the following conditions are met	2 seconds or more
Rear HO2 sensor voltage	Below 0.6 V
Time after engine start	30 seconds or more
A/F sensor status	Activated
Fuel system status	Closed-loop
Engine	Running

P2195 (sensor current high), P2196 (sensor current low):

Battery voltage	11 V or higher
ECT	75°C (167°F) or higher
Atmospheric pressure	76 kPa (570 mmHg) or higher
A/F sensor status	Activated
Continuous time of fuel-cut	3 to 10 seconds

TYPICAL MALFUNCTION THRESHOLDS

P2195 (Lean side malfunction):

A/F sensor voltage	More than 3.8 V for 10 seconds

P2196 (Rich side malfunction):

A/F sensor voltage	Less than 2.8 V for 10 seconds

P2195 (sensor current high)

A/F sensor current	3.6 mA or more

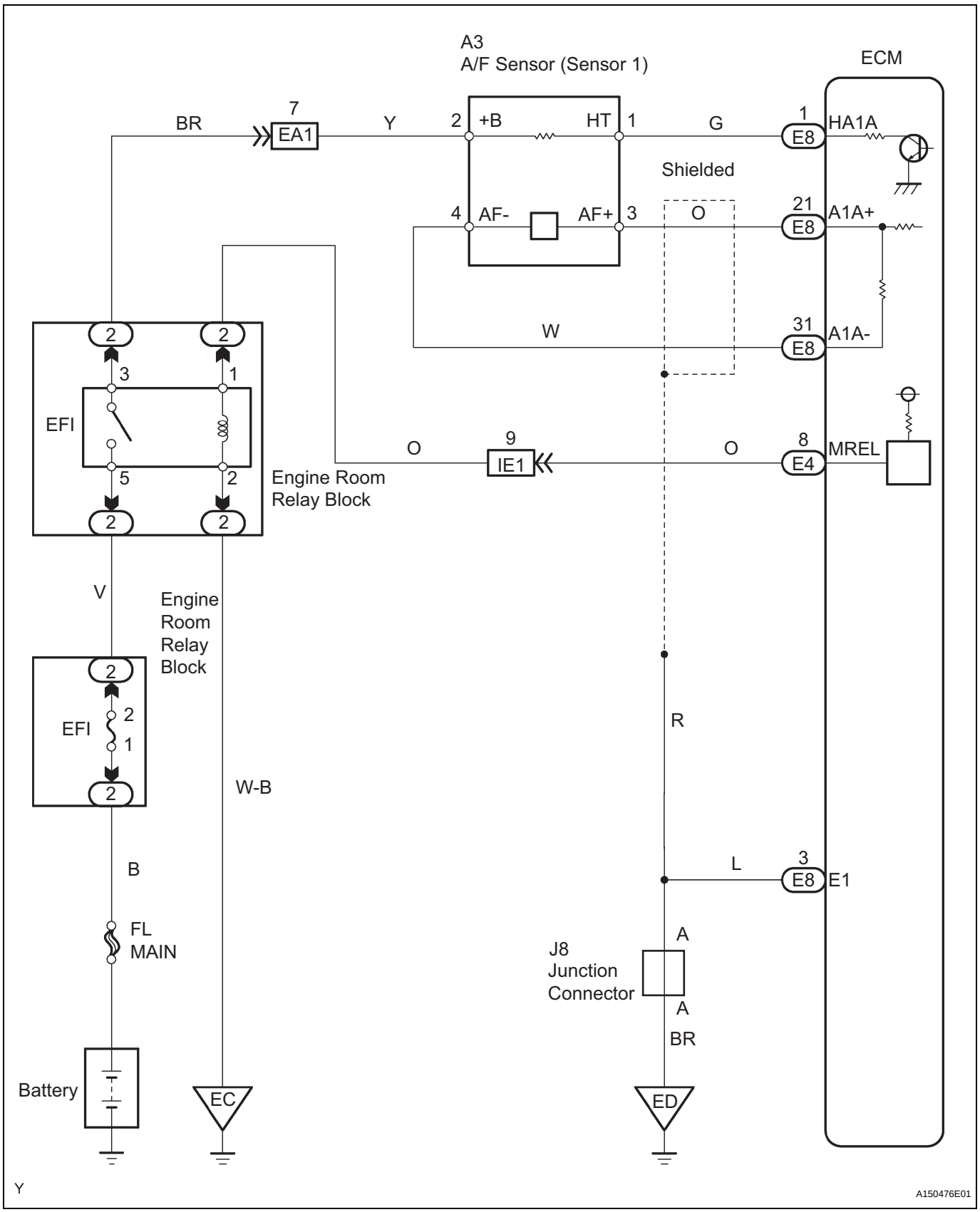
P2196 (sensor current low)

A/F sensor current	Less than 1 mA

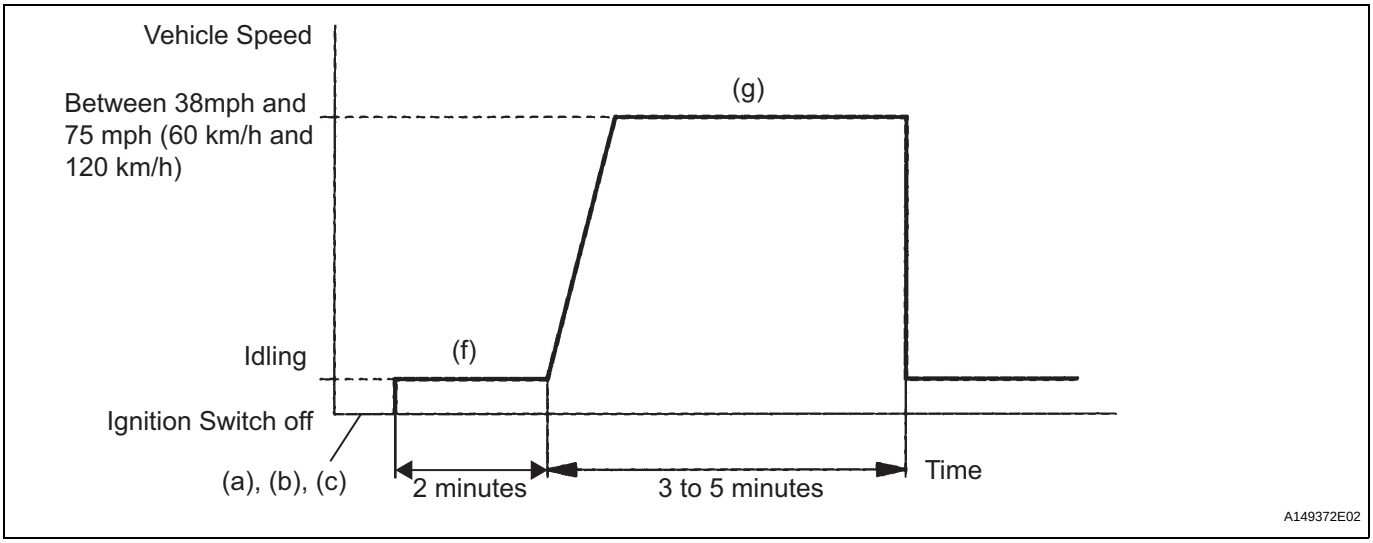
MONITOR RESULT

Refer to CHECKING MONITOR STATUS (See page ES-15).

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN



(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Clear the DTCs (See page ES-32).
(e) Switch the ECM from normal mode to check mode using the tester (See page ES-35).
(f) Start the engine and warm it up for 2 minutes with all the accessories switched OFF.
(g) Drive the vehicle at between 38 to 75 mph (60 to 120 km/h) and at an engine speed of between 1,400 rpm and 3,200 rpm for 3 to 5 minutes.

NOTICE:
If the conditions in this test are not strictly followed, no malfunction will be detected.

INSPECTION PROCEDURE

HINT:
Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.
The following instructions describe how to conduct the A/F CONTROL operation using the intelligent tester.

1. Connect the intelligent tester to the DLC3.
2. Start the engine and turn the tester on.
3. Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
4. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
5. Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
6. Monitor the output voltages of the A/F and HO2 sensors (AFS B1S1 and O2S B1S2 or AFS B2S1 and O2S B2S2) displayed on the tester.

HINT:

- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- Each sensor reacts in accordance with increases in the fuel injection volume.

Standard:

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 or AFS B2S1 (A/F)	+25%	Rich	Less than 3.0
AFS B1S1 or AFS B2S1 (A/F)	-12.5%	Lean	More than 3.35
O2S B1S2 or O2S B2S2 (HO2)	+25%	Rich	More than 0.55
O2S B1S2 or O2S B2S2 (HO2)	-12.5%	Lean	Less than 0.4

NOTICE:
The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage		HO2 Sensor (Sensor 2) Output Voltage		Main Suspected Trouble Area
1	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		-
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage More than 0.55 V Less than 0.4 V		
2	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• A/F sensor • A/F sensor heater • A/F sensor circuit
	Output Voltage Almost no reaction		Output Voltage More than 0.55 V Less than 0.4 V		
3	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• HO2 sensor • HO2 sensor heater • HO2 sensor circuit
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage Almost no reaction		
4	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)
	Output Voltage Almost no reaction		Output Voltage Almost no reaction		

- Following the A/F CONTROL procedure enables technicians to check and graph the voltage outputs of both the A/F and HO2 sensors.
- To display the graph, enter the following menus on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2 or AFS B2S1 and O2S B2S2 and press the YES button and then the ENTER button followed by the F4 button.

HINT:

- Read freeze frame data using the intelligent tester. 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.
- A low A/F sensor voltage could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A high A/F sensor voltage could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.
- *: Use the driving pattern described in "CONFIRMATION DRIVING PATTERN" above.

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO P2195 OR P2196)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.

(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P2195 or P2196	A
P2195 or P2196 and other DTCs	B

HINT:
If any DTCs other than P2195 or P2196 are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

ES

A

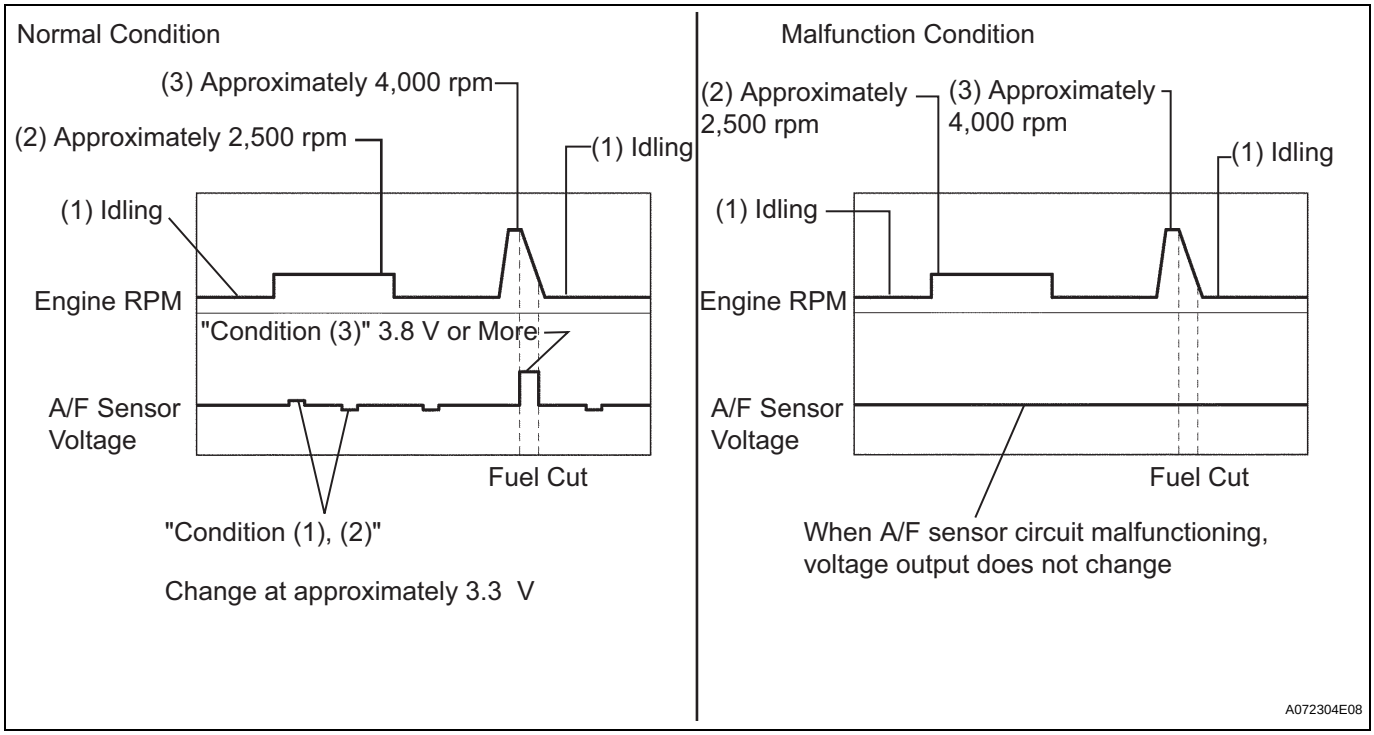
2 READ VALUE USING INTELLIGENT TESTER (OUTPUT VOLTAGE OF A/F SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Turn the tester on.
(d) Warm up the Air-Fuel Ratio (A/F) sensor at an engine speed of 2,500 rpm for 90 seconds.
(e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / SNAPSHOT / MANUAL SNAPSHOT / USER DATA / AFS B1S1 and ENGINE SPD.
(f) Check the A/F sensor voltage three times, when the engine is in each of the following conditions:
(1) While idling (check for at least 30 seconds)
(2) At an engine speed of approximately 2,500 rpm (without any sudden changes in engine speed)
(3) Raise the engine speed to 4,000 rpm and then quickly release the accelerator pedal so that the throttle valve is fully closed.

Standard voltage

Condition	A/F Sensor Voltage Variation	Reference
(1) and (2)	Changes at approximately 3.3 V	3.1 to 3.5 V
(3)	Increases to 3.8 V or more	This occurs during engine deceleration (when fuel-cut performed)

For more information, see the diagrams below.



HINT:

- If the output voltage of the A/F sensor remains at approximately 3.3 V (see Malfunction Condition diagram) under any conditions, including those above, the A/F sensor may have an open circuit (this will also happen if the A/F sensor heater has an open circuit).
- If the output voltage of the A/F sensor remains at either approximately 3.8 V or more, or 2.8 V or less (see Malfunction Condition diagram) under any conditions, including those above, the A/F sensor may have a short circuit.
- The ECM stops fuel injection (fuel cut) during engine deceleration. This causes a lean condition and results in a momentary increase in the A/F sensor output voltage.
- The ECM must establish a closed throttle valve position learning value to perform fuel cut. If the battery terminal has been reconnected, the vehicle must be driven over 10 mph (16 km/h) to allow the ECM to learn the closed throttle valve position.
- When the vehicle is driven:
  The output voltage of the A/F sensor may be below 2.8 V during fuel enrichment. For the vehicle, this translates to a sudden increase in speed with the accelerator pedal fully depressed when trying to overtake another vehicle. The A/F sensor is functioning normally.

ES

- The A/F sensor is a current output element; therefore, the current is converted into a voltage inside the ECM. Measuring the voltage at the connectors of the A/F sensor or ECM will show a constant voltage result.

NG → **Go to step 9**

OK

3	PERFORM CONFIRMATION DRIVING PATTERN*

NEXT

4	CHECK WHETHER DTC OUTPUT RECURS (DTC P2195 OR P2196)

(a) Read the DTCs using the intelligent tester.
(b) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
Result

Display (DTC Output)	Proceed to
P2195 or P2196	A
No output	B

B → **Go to step 8**

A

5	REPLACE AIR FUEL RATIO SENSOR

NEXT

6	PERFORM CONFIRMATION DRIVING PATTERN*

NEXT

7	CHECK WHETHER DTC OUTPUT RECURS (DTC P2195 OR P2196)

(a) Read the DTCs using the intelligent tester.
(b) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
Result

Display (DTC Output)	Proceed to
No output	A
P2195 or P2196	B

B → **REPLACE ECM AND PERFORM CONFIRMATION DRIVING PATTERN**

A

8 CONFIRM WHETHER VEHICLE HAS RUN OUT OF FUEL IN PAST

(a) Has the vehicle run out of fuel in the past?

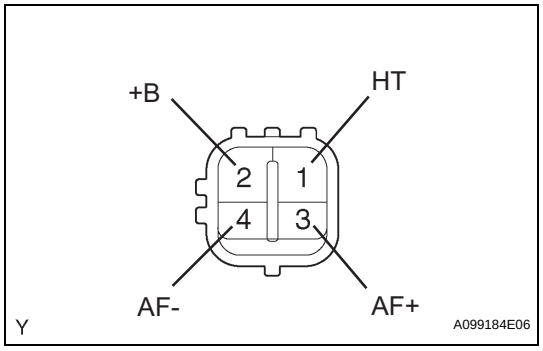
NO → **CHECK FOR INTERMITTENT PROBLEMS**

YES

DTC CAUSED BY RUNNING OUT OF FUEL

ES

9 INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)



(a) Disconnect the A3 sensor connector.
(b) Measure the resistance according to the value(s) in the table below.

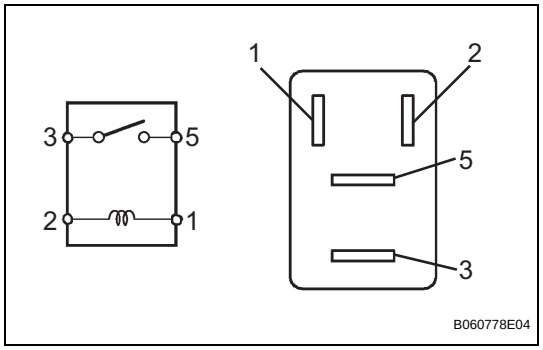
Standard resistance

Tester Connection	Specified Condition
HT (1) - +B (2)	1.8 to 3.4 Ω at 20°C (68°F)
HT (1) - AF- (4)	10 kΩ or higher

NG → **REPLACE AIR FUEL RATIO SENSOR**

OK

10 INSPECT EFI RELAY (EFI)



(a) Remove the EFI relay from the engine room relay block.
(b) Measure the resistance according to the value(s) in the table below.

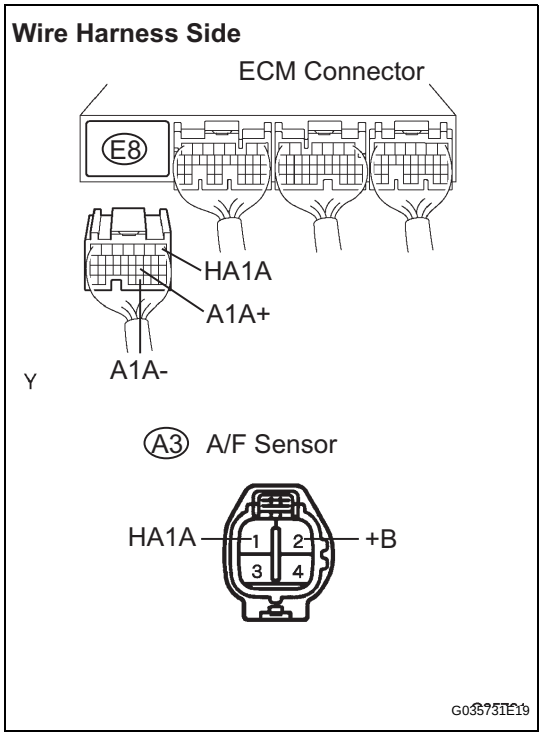
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG → **REPLACE EFI RELAY**

OK

11	CHECK WIRE HARNESS (A/F SENSOR - ECM) AND (SENSOR POWER SOURCE)



(a) Disconnect the A3 sensor connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

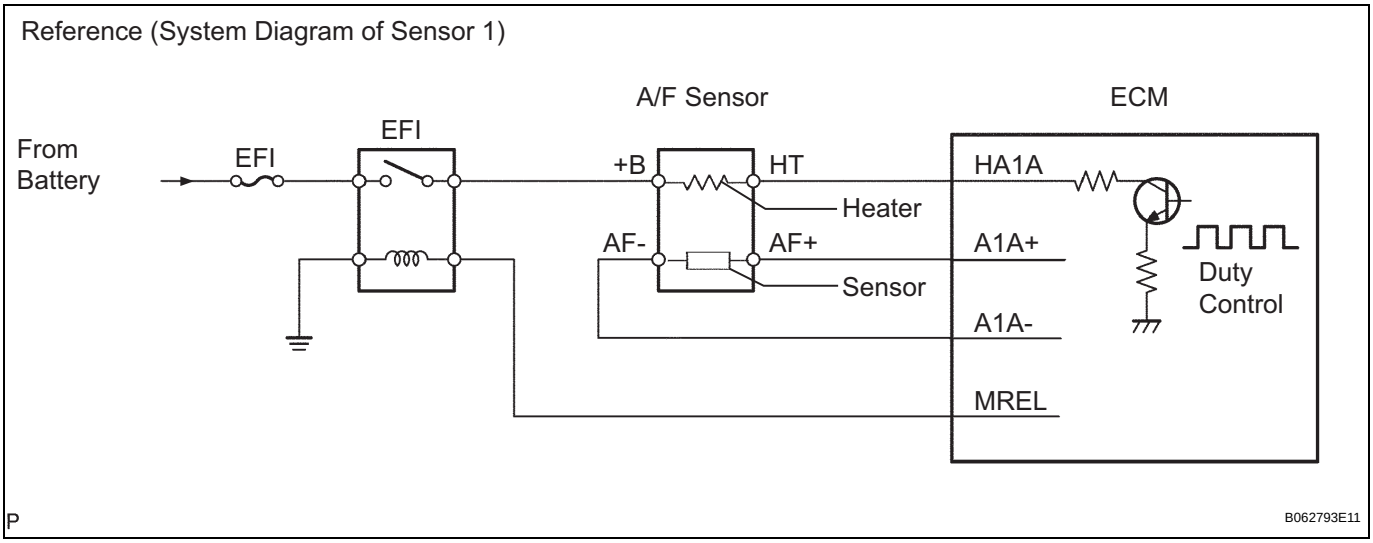
Standard voltage

Tester Connection	Specified Condition
+B (A3-2) - Body ground	Between 9 V and 14 V

(d) Turn the ignition switch off.
(e) Disconnect the E8 ECM connector.
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
HT (A3-1) - HA1A (E8-1)	Below 1 Ω
AF+ (A3-3) - A1A+ (E8-21)	Below 1 Ω
AF- (A3-4) - A1A- (E8-31)	Below 1 Ω
HT (A3-1) or HA1A (8-1) - Body ground	10 kΩ or higher
AF+ (A3-3) or A1A+ (E8-21) - Body ground	10 kΩ or higher
AF- (A3-4) or A1A- (E8-31) - Body ground	10 kΩ or higher



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

12	CHECK AIR INDUCTION SYSTEM

(a) Check the air induction system for vacuum leakage.

OK:

No leakage from air induction system.

NG → REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

13 CHECK FUEL PRESSURE

(a) Check the fuel pressure (See page FU-2).

NG → REPAIR OR REPLACE FUEL SYSTEM

OK

14 INSPECT FUEL INJECTOR ASSEMBLY

(a) Check the injector injection (whether fuel volume is high or low, and whether injection pattern is poor).

NG → REPLACE FUEL INJECTOR ASSEMBLY

OK

15 REPLACE AIR FUEL RATIO SENSOR

NEXT

16 PERFORM CONFIRMATION DRIVING PATTERN*

NEXT

17 CHECK WHETHER DTC OUTPUT RECURS (DTC P2195 OR P2196)

(a) Read the DTCs using the intelligent tester.
(b) If using the intelligent tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

Result

Display (DTC Output)	Proceed to
No output	A
P2195 or P2196	B

B → REPLACE ECM AND PERFORM CONFIRMATION DRIVING PATTERN

A

18 CONFIRM WHETHER 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

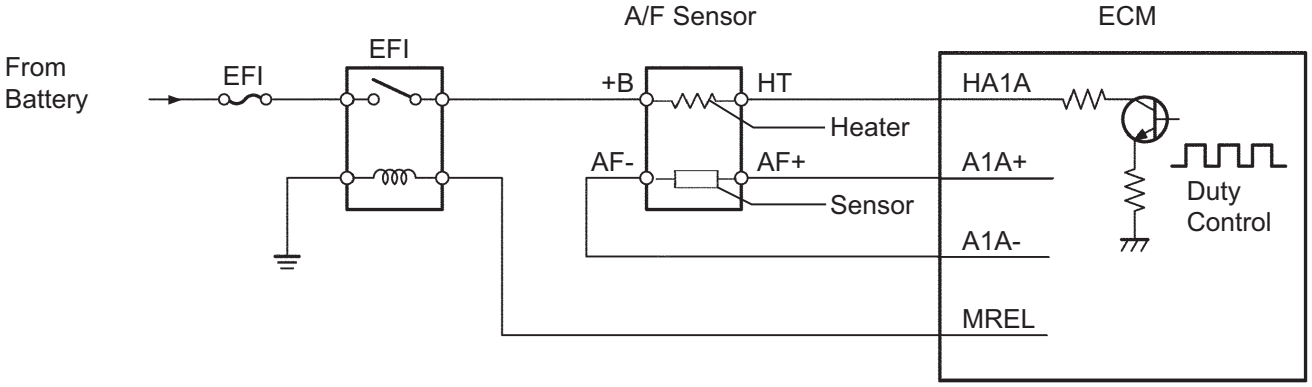
DTC	P2237	Oxygen (A/F) Sensor Pumping Current Circuit / Open (Bank 1 Sensor 1)
DTC	P2238	Oxygen (A/F) Sensor Pumping Current Circuit Low (Bank 1 Sensor 1)
DTC	P2239	Oxygen (A/F) Sensor Pumping Current Circuit High (Bank 1 Sensor 1)
DTC	P2252	Oxygen (A/F) Sensor Reference Ground Circuit Low (Bank 1 Sensor 1)
DTC	P2253	Oxygen (A/F) Sensor Reference Ground Circuit High (Bank 1 Sensor 1)

HINT:
- Although the DTC titles say oxygen sensor, these DTCs relate to the Air-Fuel Ratio (A/F) sensor.
- Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.

DESCRIPTION

These DTCs are set when there is an open or short in the A/F sensor circuit, or if A/F sensor output drops. To detect these problems, the voltage of the A/F sensor is monitored when turn the ignition switch to the ON position, 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 A/F 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 will determine that there is a malfunction in the A/F sensor. If the same malfunction is detected in next driving cycle, the MIL will be illuminated and a DTC will be stored.
The A/F sensor, which is located between the exhaust manifold and catalyst, consists of alloyed metal elements and a heater.
Depending on the engine operating conditions, the heater heats the sensor elements to activate them. Battery voltage is applied to the heater, the sensor ground is controlled by the ECM using a duty ratio. The sensor elements convert the oxygen concentration in the exhaust gas into voltage values to output. Based on the voltage, the ECM determines the air-fuel ratio and regulates the fuel injection volume depending on the air-fuel ratio and engine operating conditions. The voltage changes between 0.6 V and 4.5 V while the engine is running. If the air-fuel ratio is LEAN, which means the oxygen concentration in the exhaust gas is high, the voltage is high. If the air-fuel ratio is RICH, which means the oxygen concentration in the exhaust gas is low, the voltage is low.

Reference (System Diagram of Sensor 1)



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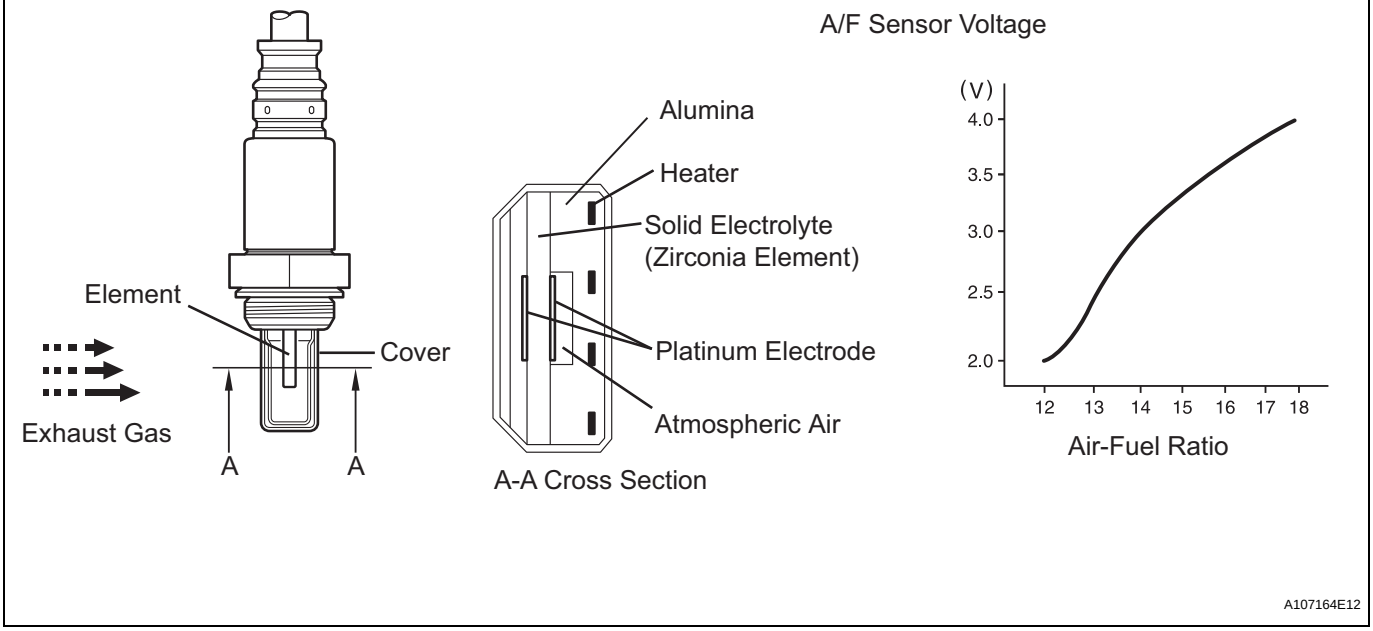

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DTC No.	DTC Detection Condition	Trouble Area
P2237	Open in the circuit between terminals AF+ and AF- of the AF sensor while engine is running (2 trip detection logic)	• Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • ECM
P2238	Any of the following conditions are met (2 trip detection logic): • AF sensor output drops while engine is running. • Voltage at terminal AF+ is 0.5 V or less. • Voltage difference between terminals AF+ and AF- is 0.1 V or less.	• Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • ECM
P2239	AF+ voltage more than 4.5 V (2 trip detection logic)	• Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • ECM
P2252	AF- voltage 0.5 V or less (2 trip detection logic)	• Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • ECM
P2253	AF- voltage more than 4.5 V (2 trip detection logic)	• Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • ECM

MONITOR DESCRIPTION

These DTCs are output when there is an open or short in the A/F sensor circuit, or if A/F sensor output drops. To detect these problems, the voltage of the A/F sensor is monitored when the ignition switch is turned to the ON position, 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 A/F 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 will determine that there is a malfunction in the A/F sensor. If the same malfunction is detected in the next driving cycle, the MIL will be illuminated and a DTC will be stored.

MONITOR STRATEGY

Related DTCs	P2237: A/F sensor open circuit between AF+ and AF- P2238: A/F sensor short circuit between AF+ and AF- P2238: A/F sensor short circuit between AF+ and GND P2238: A/F sensor admittance low P2239: A/F sensor short circuit between AF+ and +B P2252: A/F sensor short circuit between AF- and GND P2253: A/F sensor short circuit between AF- and +B
Required Sensors/Components (Main)	A/F sensor
Required Sensors/Components (Related)	Engine Coolant Temperature (ECT) sensor, Crankshaft position sensor
Frequency of Operation	Continuous
Duration	10 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever following DTCs are not present	P0031, P0032 (A/F sensor heater - Sensor 1) P0100 - P0103 (MAF meter) P0110 - P0113 (IAT sensor) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for closed loop) P0171, P0172 (Fuel trim) P0300 - P0304 (Misfire) P0335 (CKP sensor) P0340 (CMP sensor) P0441 - P0456, P2401 - P2420 (EVAP system) P0500 (VSS)

P2237: (A/F sensor open circuit between AF+ and AF-)

Estimated sensor temperature	450 to 550°C (842 to 1022°F)
Engine	Running
Battery voltage	11 V or more

P2238: (A/F sensor admittance low)

Estimated sensor temperature	700 to 800°C (1292 to 1472°F)
ECT	10°C (50°F) or more
Fuel cut	Not executed

Except P2237 (A/F sensor open circuit between AF+ and AF-) and P2238 (A/F sensor admittance low)

Battery voltage	11 V or more
Ignition switch	ON
Time after ignition switch is OFF to ON	5 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

P2237: (A/F sensor open circuit between AF+ and AF-)

A/F sensor admittance	Below 0.002 1/Ω

P2238: (A/F sensor admittance low)

A/F sensor admittance	Below 0.015 1/Ω

P2238: (A/F sensor short circuit between AF+ and AF-)

Difference between AF+ terminal and AF- terminal voltages	0.1 V or less

P2238: (A/F sensor short circuit between AF+ and GND)

AF+ terminal voltage	0.5 V or less

P2239: (A/F sensor short circuit between AF+ and +B)

AF+ terminal voltage	More than 4.5 V

P2252: (A/F sensor short circuit between AF- and GND)

AF- terminal voltage	0.5 V or less

P2253: (A/F sensor short circuit between AF- and +B)

AF- terminal voltage	More than 4.5 V

COMPONENT OPERATING RANGE

A/F sensor admittance	0.002 to 0.079 1/Ω
AF+ terminal voltage	0.5 to 4.5 V
AF- terminal voltage	0.5 to 4.5 V
Difference between AF+ and AF- terminal voltages	0.1 to 0.8 V

WIRING DIAGRAM

Refer to DTC 2195 (See page ES-281).

INSPECTION PROCEDURE

HINT:

Intelligent tester only:

Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-Fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the A/F CONTROL operation using the intelligent tester.

1. Connect the intelligent tester to the DLC3.
2. Start the engine and turn the tester on.
3. Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
4. On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
5. Perform the A/F CONTROL operation with the engine idling (press the RIGHT or LEFT button to change the fuel injection volume).
6. Monitor the output voltages of the A/F and HO2 sensors (AFS B1 S1 and O2S B1 S2) displayed on the tester.

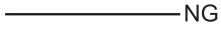
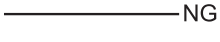
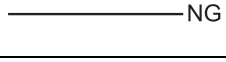
HINT:

- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- The sensors react in accordance with increases and decreases in the fuel injection volume.

Standard

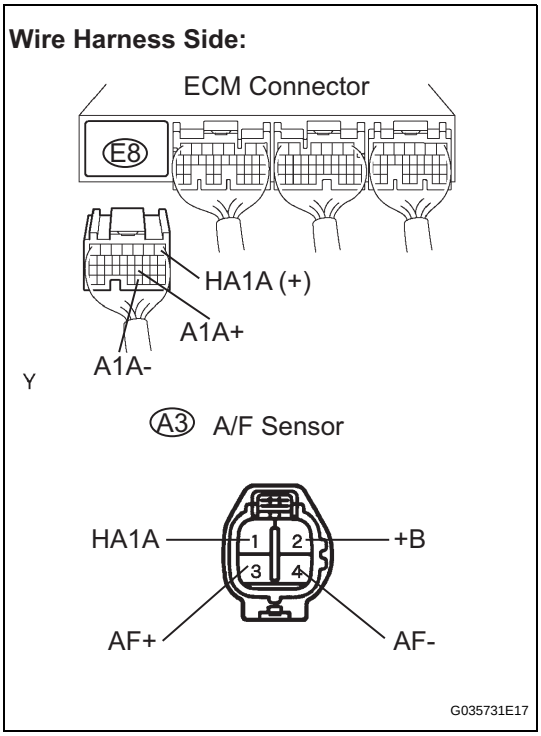
Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1 S1(A/F)	+25%	Rich	Less than 3.0
AFS B1 S1(A/F)	-12.5%	Lean	More than 3.35
O2S B1 S2 (HO2)	+25%	Rich	More than 0.5
O2S B1 S2 (HO2)	-12.5%	Lean	Less than 0.4

NOTICE:
The A/F sensor has an output delay of a few seconds and the HO2 sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage		HO2 Sensor (Sensor 2) Output Voltage		Main Suspected Trouble Area
1	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		-
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage More than 0.5 V Less than 0.4 V		
2	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• A/F sensor • A/F sensor heater • A/F sensor circuit
	Output Voltage Almost no reaction		Output Voltage More than 0.5 V Less than 0.4 V		
3	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• HO2 sensor • HO2 sensor heater • HO2 sensor circuit
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage Almost no reaction		
4	Injection volume +25% -12.5%		Injection Volume +25% -12.5%		• Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)
	Output Voltage Almost no reaction		Output Voltage Almost no reaction		

Following the A/F CONTROL procedure enables technicians to check and graph the output voltages of both the A/F and HO2 sensors.
To display the graph, select the following menu items on the tester: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1 S1 and O2S B1 S2; then press the YES button and then the ENTER button followed by the F4 button.
HINT:
Read freeze frame data using the intelligent tester. 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.

1	CHECK HARNESS AND CONNECTOR (A/F SENSOR - ECM)



(a) Disconnect the A3 A/F sensor connector.
(b) Disconnect the E8 ECM connector.
(c) Measure the resistance between the terminals of the wire harness side connectors.

Standard resistance (Check for open)

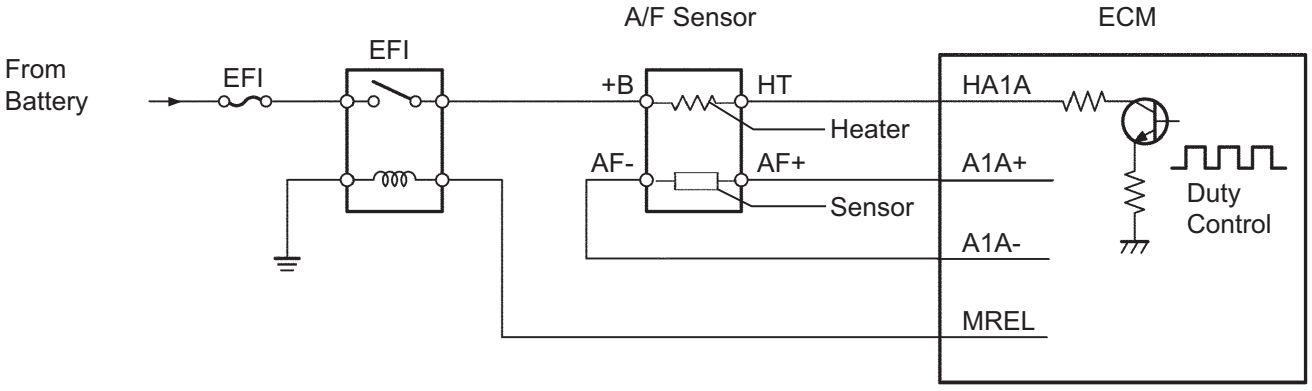
Tester Connection	Specified Condition
AF+ (A3-3) - A1A+ (E8-21)	Below 1 Ω
AF- (A3-4) - A1A- (E8-31)	Below 1 Ω

Standard resistance (Check for short)

Tester Connection	Specified Condition
AF+ (A3-3) - A1A+ (E8-21) - Body ground	10 kΩ or higher
AF- (A3-4) - A1A- (E8-31) - Body ground	10 kΩ or higher

(d) Reconnect the ECM connector.
(e) Reconnect the A/F sensor connector.

Reference (System Diagram of Sensor 1)



NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

2	REPLACE AIR-FUEL RATIO SENSOR

NEXT

3	CHECK WHETHER DTC OUTPUT RECURS

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.
(c) Clear the DTCs (See page ES-32).
(d) Start the engine.
(e) Allow the engine to idle for 5 minutes or more.
(f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
(g) Read pending DTCs.

Result

Display (DTC Output)	Proceed to
No output	A
P2237, P2238, P2239, P2252 or P2253	B

B → REPLACE ECM

A → END

DTC	P2420	Evaporative Emission System Switching Valve Control Circuit High

DTC SUMMARY

DTC No.	Monitoring Item	DTC Detection Condition	Trouble Area	Detection Timing	Detection Logic
P2420	Vent valve stuck open (vent)	The following condition is met during key-off EVAP monitor • EVAP pressure change when vent valve is closed (ON) is less than 2.3 mmHg	• Pump module (0.02 inch orifice, vacuum pump, vent valve) • Connector / wire harness (Pump module - ECM) • ECM	Engine switch off	2 trip

ES

DESCRIPTION

The circuit description can be found in the EVAP (Evaporative Emission) system (See page ES-314).

INSPECTION PROCEDURE

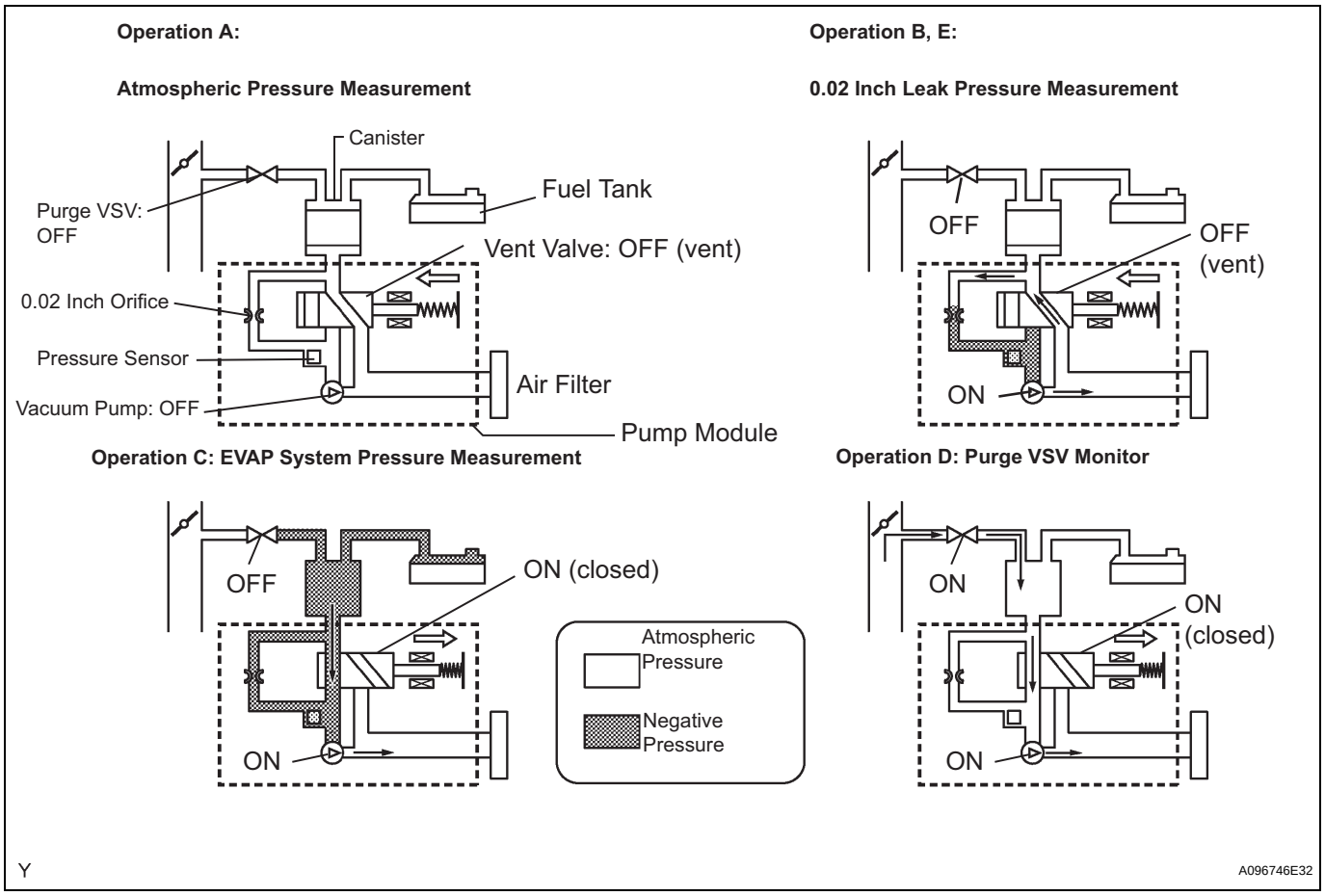
Refer to the EVAP system (See page ES-314).

MONITOR DESCRIPTION

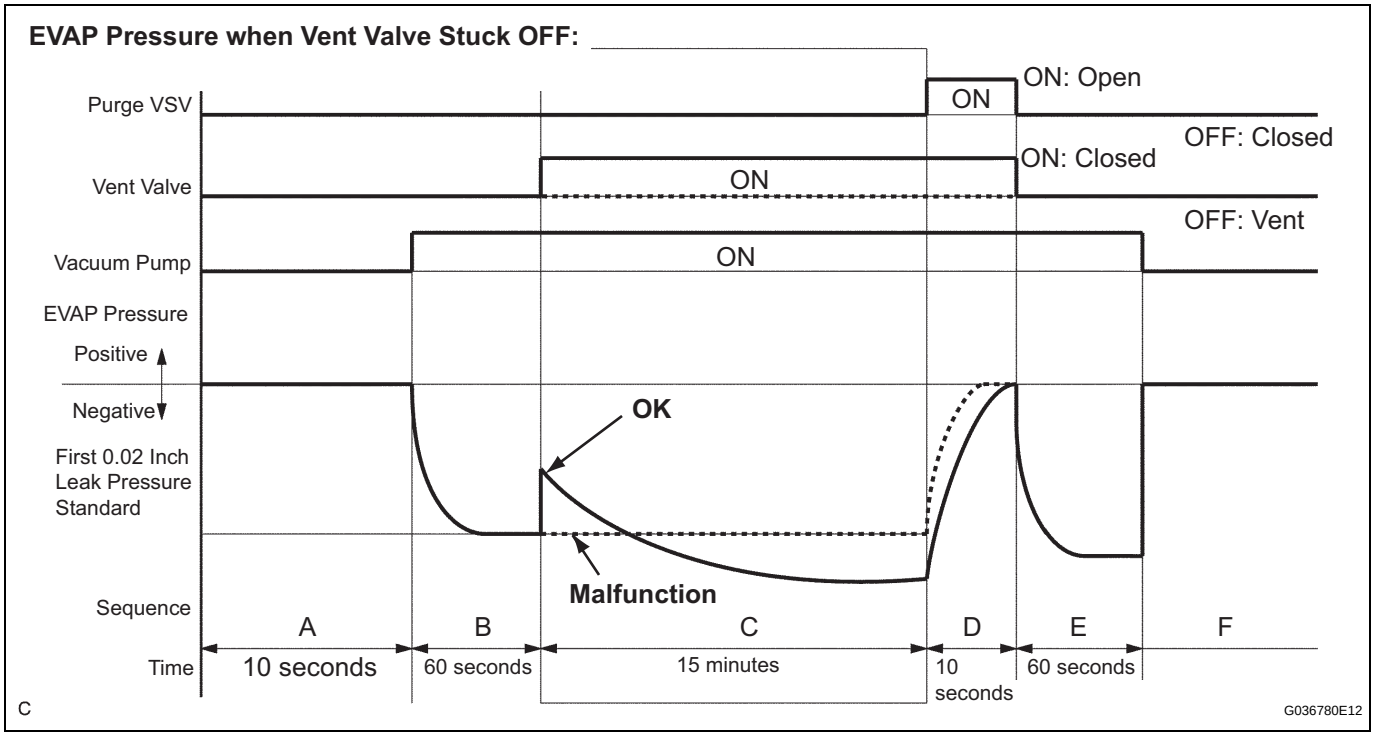
5 hours*1 after the ignition switch is turned off, the electric vacuum pump creates negative pressure (vacuum) in the EVAP (Evaporative Emission) system. The ECM monitors for leaks and actuator malfunctions based on the EVAP pressure.
HINT:
*1: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

Sequence	Operation	Description	Duration
-	ECM activation	Activated by soak timer, 5 hours (7 or 9.5 hours) after ignition switch is turned off.	-
A	Atmospheric pressure measurement	Vent valve is turned OFF (vent) and EVAP system pressure is measured by ECM in order to register atmospheric pressure. If pressure in EVAP system is not between 70 kPa and 110 kPa (525 mmHg and 825 mmHg), ECM cancels EVAP system monitor.	10 seconds
B	First 0.02 inch leak pressure measurement	In order to determine 0.02 inch leak pressure standard, vacuum pump creates negative pressure (vacuum) through 0.02 inch orifice and then ECM checks if vacuum pump and vent valve operate normally.	60 seconds
C	EVAP system pressure measurement	Vent valve is turned ON (closed) to shut EVAP system. Negative pressure (vacuum) is created in EVAP system, and then EVAP system pressure is measured. Write down measured value as they will be used in leak check. If EVAP pressure does not stabilize within 15 minutes, ECM cancels EVAP system monitor.	15 minutes*2
D	Purge VSV monitor	Purge VSV is opened and then EVAP system pressure is measured by ECM. Large increase indicates normal.	10 seconds
E	Second 0.02 inch leak pressure measurement	After second 0.02 inch leak pressure measurement, leak check is performed by comparing first and second 0.02 inch leak pressure standards. If stabilized system pressure is higher than second 0.02 inch leak pressure standard, ECM determines that there is a leak in EVAP system.	60 seconds
F	Final check	Atmospheric pressure is measured and then monitoring result is recorded by ECM.	-

*2: If only a small amount of fuel is in the fuel tank, it takes longer for the EVAP pressure to stabilize.



The vent valve turns ON (closes) and the EVAP (Evaporative Emission) system pressure is then measured by the ECM, using the pressure sensor, to conduct an EVAP leak check. If the pressure does not increase when the vent valve is open, the ECM interprets this as the vent valve being stuck open. The ECM illuminates the MIL and sets the DTC.



MONITOR STRATEGY

Related DTC	P2420: Vent valve stuck open (vent)
Required Sensors/Components	Purge VSV and pump module
Frequency of Operation	Once per driving cycle
Duration	Within 2 minutes
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Key-off monitor is run when all of the following conditions are met:	-
Atmospheric pressure	70 to 110 kPa (525 to 825 mmHg)
Battery voltage	10.5 V or more
Vehicle speed	2.5 mph (4 km/h) or less
Engine switch	OFF
Time after key-off	5, 7 or 9.5 hours
EVAP pressure sensor malfunction (P0450, P0452, P0453)	Not detected
EVAP canister purge valve	Not operated by scan tool
EVAP canister vent valve	Not operated by scan tool
EVAP leak detection pump	Not operated by scan tool
Both of the following conditions 1 and 2 are met before key-off:	-
1. Duration that vehicle has been driven	5 minutes or more
2. EVAP purge operation	Performed
ECT	4.4 to 35°C (40 to 95°F)
IAT	4.4 to 35°C (40 to 95°F)

Key-off monitor sequence 1 to 8

1. Atmospheric pressure measurement

Next sequence runs if the following condition is met:	-
Atmospheric pressure change	Less than 0.3 kPa (2.25 mmHg) in 1 second

2. First reference pressure measurement

Next sequence runs if the following conditions are met:	Conditions 1, 2 and 3
1. EVAP pressure just after reference pressure measurement start	-1 kPa (-7.5 mmHg) or less
2. Reference pressure	-4.85 to -1.057 kPa (-36.384 to -7.929 mmHg)
3. Reference pressure	Saturated

3. EVAP canister vent valve close stuck check

Next sequence runs if the following condition is met:	-
EVAP pressure change after vent valve is turned ON	0.3 kPa (2.25 mmHg) or more

4. Vacuum introduction

Next sequence runs if the following condition is met:	-
EVAP pressure	Saturated within 15 minutes

5. EVAP canister purge valve close stuck check

Next sequence runs if the following condition is met:	-
EVAP pressure change after purge valve is opened	0.3 kPa (2.25 mmHg) or more

6. Second reference pressure measurement

Next sequence runs if the following conditions are met:	Conditions 1, 2, 3 and 4
1. EVAP pressure just after reference pressure	-1 kPa (-7.5 mmHg) or less

2. Reference pressure	-4.85 to -1.057 kPa (-36.384 to -7.929 mmHg)
3. Reference pressure	Saturated
4. Difference between first reference pressure and second reference pressure	Less than 0.7 kPa (5.25 mmHg)

7. Leak check

Next sequence runs if the following condition is met:	-
EVAP pressure when vacuum introduction is complete	Lower than second reference pressure

8. Atmospheric pressure measurement

EVAP monitor is complete if the following condition is met:	-
Atmospheric pressure difference between sequence 1 and 8	Within 0.3 kPa (2.25 mmHg)

TYPICAL MALFUNCTION THRESHOLDS

EVAP pressure change after EVAP canister vent valve is turned ON	Less than 0.3 kPa (2.25 mmHg)

MONITOR RESULT

Refer to CHECKING MONITOR STATUS (See page ES-15).

DTC	P2610	ECM / PCM Internal Engine Off Timer Performance

DTC SUMMARY

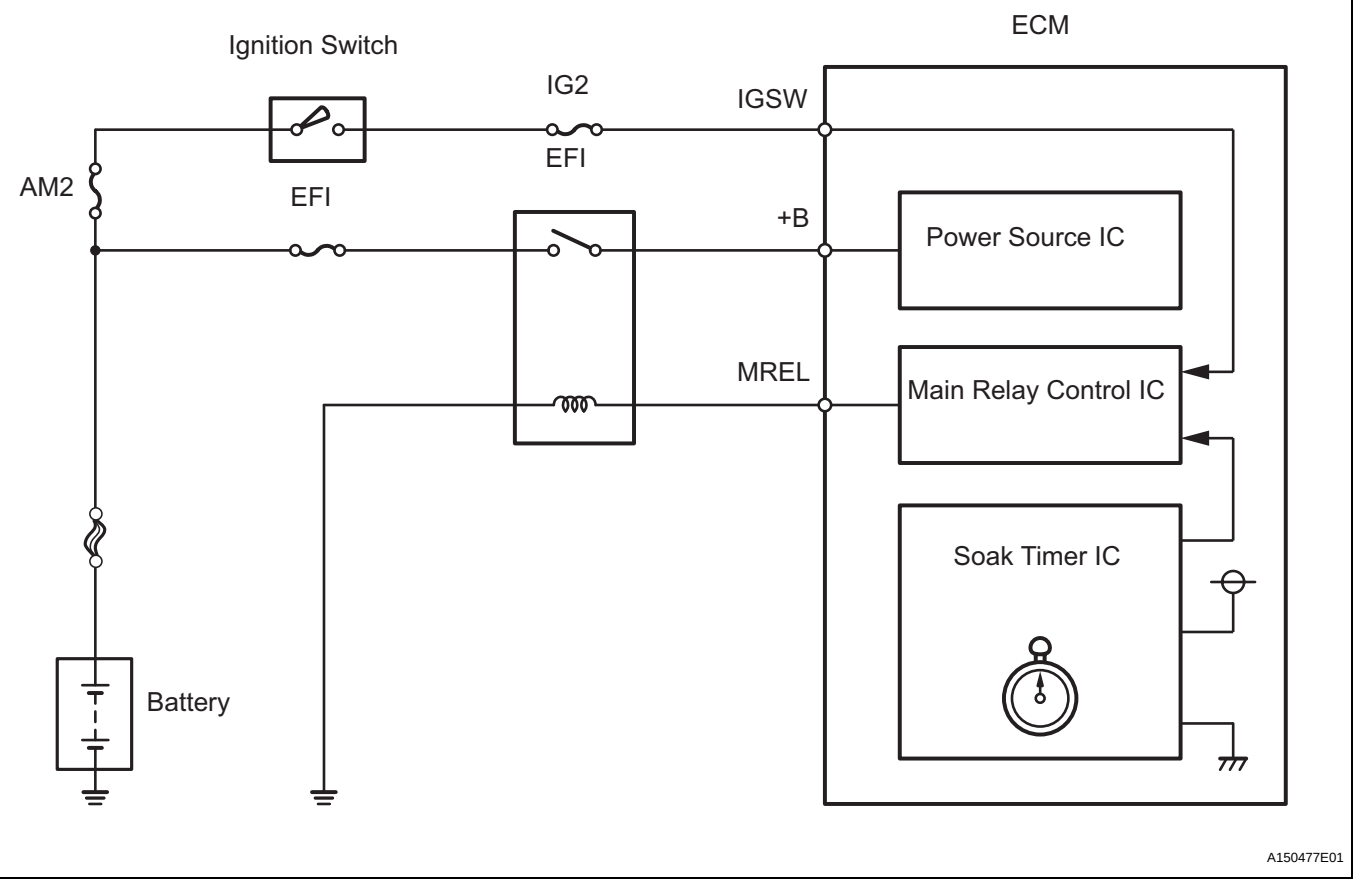
DTC No.	Monitoring Item	Malfunction Detection Condition	Trouble Area	Detection Timing	Detection Logic
P2610	Soak timer (built into ECM)	ECM internal malfunction	ECM	Engine running	2 trip

DESCRIPTION

ES

To ensure the accuracy of the EVAP (Evaporative Emission) monitor values, the soak timer, which is built into the ECM, measures 5 hours (+-15 minutes) from when the ignition switch is turned off, before the monitor is run. This allows the fuel to cool down, which stabilizes the Fuel Tank Pressure (FTP). When 5 hours have elapsed, the ECM turns on.

Soak Timer Circuit:



MONITOR DESCRIPTION

5 hours after the ignition switch is turned off, the soak timer activates the ECM to begin the EVAP system monitor. While the engine is running, the ECM monitors the synchronization of the soak timer and the CPU clock. If the soak timer and CPU clock are not synchronized, the ECM interprets this as a malfunction, illuminates the MIL and sets the DTC (2 trip detection logic).

MONITOR STRATEGY

Required Sensors/Components	ECM
Frequency of Operation	Once per driving cycle

Duration	10 minutes
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	None
Ignition switch	ON
Engine	Running

TYPICAL MALFUNCTION THRESHOLDS

Soak timer measurement when ECM CPU clock counts 10 minutes	Less than 7 minutes or more than 13 minutes

INSPECTION PROCEDURE

HINT:

- DTC P2610 is set if an internal ECM problem is detected. Diagnostic procedures are not required. ECM replacement is required.
- Read freeze frame data using the intelligent tester. 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.

1	**REPLACE ECM**

(a) Replace the ECM (See page ES-407).

NEXT

2	**CHECK WHETHER DTC OUTPUT RECURS**

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Clear the DTCs (See page ES-32).
(d) Start the engine and wait for 10 minutes or more.
(e) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
(f) If no pending DTC is displayed, the repair has been successfully completed.

NEXT

END

DTC	P2A00	A/F Sensor Circuit Slow Response (Bank 1 Sensor 1)

DESCRIPTION

HINT:

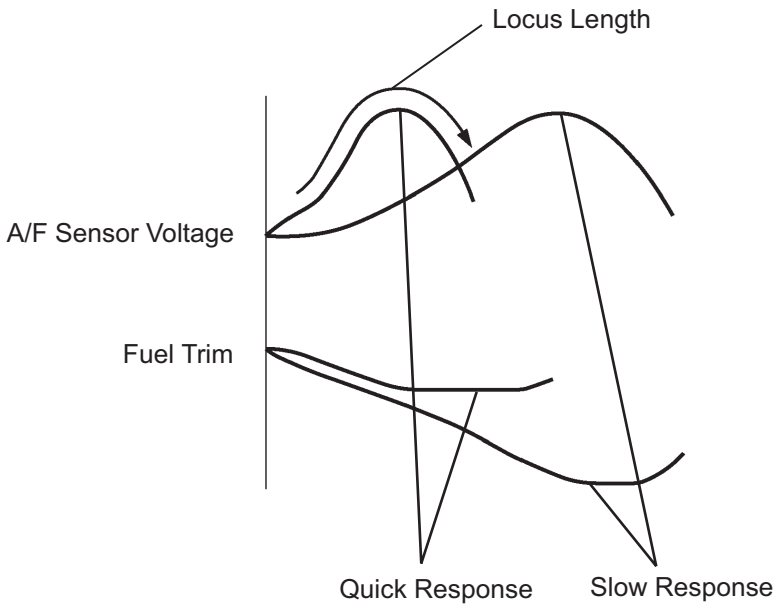
Sensor 1 refers to the sensor mounted in front of the Three-Way Catalytic Converter (TWC) and located near the engine assembly.

Refer to DTC P2195 (See page ES-278).

DTC No.	DTC Detection Condition	Trouble Area
P2A00	Calculated value of air-fuel ratio (A/F) sensor response rate deterioration level less than threshold (2 trip detection logic)	• Open or short in A/F sensor (sensor 1) circuit • A/F sensor (sensor 1) • A/F sensor heater (sensor 1) • EFI relay • A/F sensor heater and EFI relay circuits • Air induction system • Fuel pressure • Injector • PCV valve and hose • PCV hose connection • ECM

ES

MONITOR DESCRIPTION



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The output voltage of the A/F sensor varies in proportion to the air-fuel ratio. Based on these voltage variations, the ECM determines whether the actual air-fuel ratio is rich or lean, and makes adjustments to bring it close to the stoichiometric level. In addition, the ECM checks the fuel injection volume compensation value to determine whether the A/F sensor response time is normal or slow. The ECM calculates the ratio of the variations in both the A/F sensor output voltage and the fuel trim value.

MONITOR STRATEGY

Related DTCs	P2A00: Air-Fuel Ratio (A/F) sensor slow response
Required Sensors/Components (Main)	A/F sensor
Required Sensors/Components (Related)	Vehicle speed sensor, Crankshaft position sensor
Frequency of Operation	Once per driving cycle
Duration	60 seconds
MIL Operation	2 driving cycles
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever the following DTCs are not present	P0031, P0032 (A/F sensor heater - Sensor 1) P0100 - P0103 (MAF meter) P0110 - P0113 (IAT sensor) P0115 - P0118 (ECT sensor) P0120 - P0223, P2135 (TP sensor) P0125 (Insufficient ECT for Closed Loop) P0171, P0172 (Fuel system) P0300 - P0304 (Misfire) P0335 (CKP sensor) P0340 (CMP sensor) P0500 (VSS) P2196 (A/F sensor - rationality)
Active A/F control	Performing
Active A/F control performed when the following conditions are met:	-
Engine coolant temperature	75°C (167°F) or more
Battery voltage	11 V or more
Idle	OFF
Engine RPM	Less than 4,000 rpm
A/F sensor status	Activated
Fuel-cut	OFF
Engine load	10 to 70%
Shift position	2 or more
Catalyst monitor	Not yet
Intake air amount	4 to 16 g/sec.

TYPICAL MALFUNCTION THRESHOLDS

Response rate deterioration level	Less than 0.12 V

MONITOR RESULT

Refer to detailed information on "CHECKING MONITOR STATUS" (See page ES-15).

WIRING DIAGRAM

Refer to DTC P2195 (See page ES-281).

INSPECTION PROCEDURE

HINT:

Malfunctioning areas can be identified by performing the A/F CONTROL function provided in the ACTIVE TEST. The A/F CONTROL function can help to determine whether the Air-fuel Ratio (A/F) sensor, Heated Oxygen (HO2) sensor and other potential trouble areas are malfunctioning.

The following instructions describe how to conduct the A/F CONTROL operation using the intelligent tester.

1. Connect the intelligent tester to the DLC3.
2. Start the engine and turn the tester on.
3. Warm up the engine at an engine speed of 2,500 rpm for approximately 90 seconds.
4. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL.
5. Perform the A/F CONTROL operation with the engine in an idling condition (press the RIGHT or LEFT button to change the fuel injection volume).
6. Monitor the output voltages of the A/F and HO2 sensors (AFS B1S1 and O2S B1S2 or AFS B2S1 and O2S B2S2) displayed on the tester.

HINT:

- The A/F CONTROL operation lowers the fuel injection volume by 12.5% or increases the injection volume by 25%.
- Each sensor reacts in accordance with increases in the fuel injection volume.

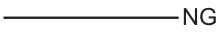
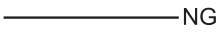
ES

Standard:

Tester Display (Sensor)	Injection Volume	Status	Voltage
AFS B1S1 or AFS B2S1 (A/F)	+25%	Rich	Less than 3.0
AFS B1S1 or AFS B2S1 (A/F)	-12.5%	Lean	More than 3.35
O2S B1S2 or O2S B2S2 (HO2)	+25%	Rich	More than 0.55
O2S B1S2 or O2S B2S2 (HO2)	-12.5%	Lean	Less than 0.4

NOTICE:

The Air-Fuel Ratio (A/F) sensor has an output delay of a few seconds and the Heated Oxygen (HO2) sensor has a maximum output delay of approximately 20 seconds.

Case	A/F Sensor (Sensor 1) Output Voltage		HO2 Sensor (Sensor 2) Output Voltage		Main Suspected Trouble Area
1	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		-
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage More than 0.55 V Less than 0.4 V		
2	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• A/F sensor • A/F sensor heater A/F sensor circuit
	Output Voltage Almost no reaction		Output Voltage More than 0.55 V Less than 0.4 V		
3	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• HO2 sensor • HO2 sensor heater • HO2 sensor circuit
	Output Voltage More than 3.35 V Less than 3.0 V		Output Voltage Almost no reaction		
4	Injection Volume +25% -12.5%		Injection Volume +25% -12.5%		• Injector • Fuel pressure • Gas leakage from exhaust system (Air-fuel ratio extremely lean or rich)
	Output Voltage Almost no reaction		Output Voltage Almost no reaction		

- Following the A/F CONTROL procedure enables technicians to check and graph the voltage outputs of both the A/F and HO2 sensors.

- To display the graph, enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / A/F CONTROL / USER DATA / AFS B1S1 and O2S B1S2 or AFS B2S1 and O2S B2S2, and press the YES button and then the ENTER button followed by the F4 button.

HINT:

- DTC P2A00 may be also set when the air-fuel ratio is stuck at rich or lean.
- A low A/F sensor voltage could be caused by a rich air-fuel mixture. Check for conditions that would cause the engine to run rich.
- A high A/F sensor voltage could be caused by a lean air-fuel mixture. Check for conditions that would cause the engine to run lean.
- Read freeze frame data using the intelligent tester. 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.

ES

1	CHECK ANY OTHER DTCS OUTPUT (IN ADDITION TO DTC P2A00)

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(e) Read the DTCs.

Result

Display (DTC Output)	Proceed to
P2A00	A
P2A00 and other DTCs	B

HINT:
If any DTCs other than P2A00 are output, troubleshoot those DTCs first.

B → GO TO DTC CHART

A

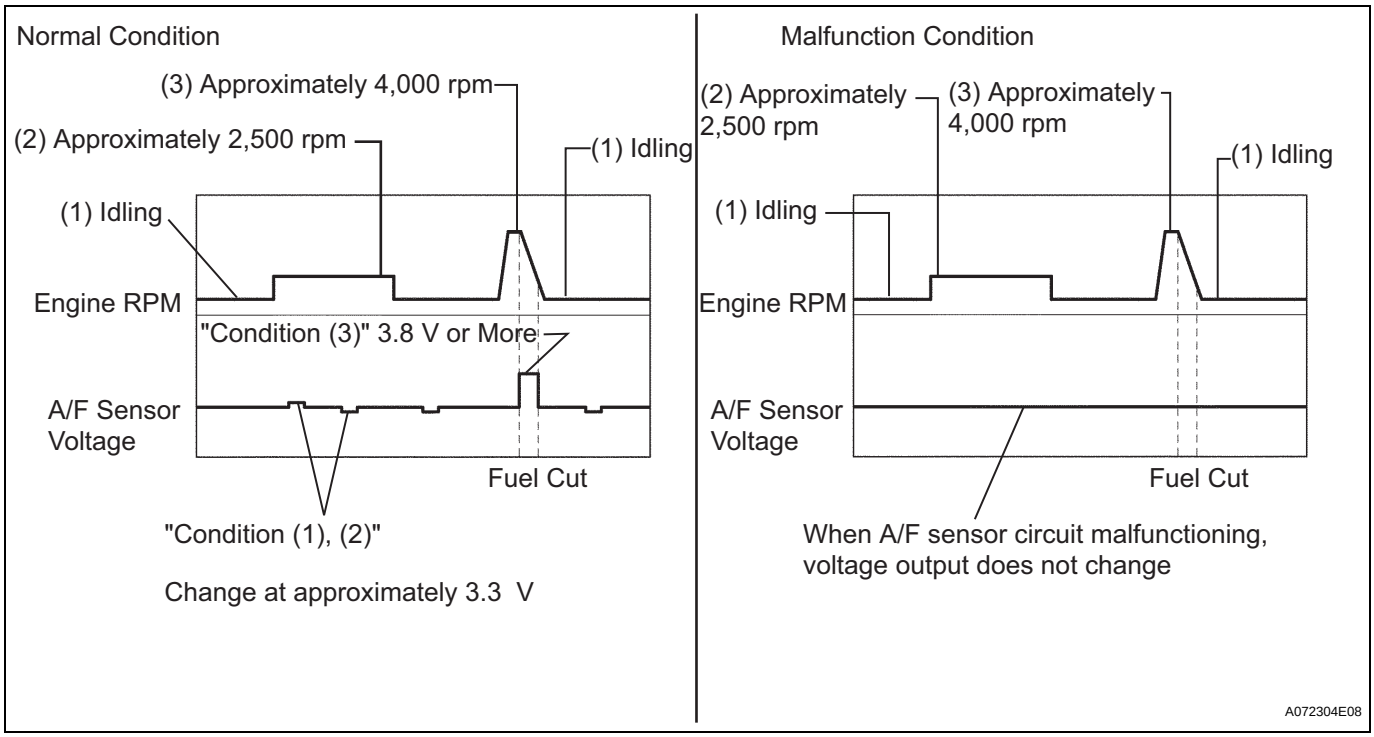
2	READ VALUE USING INTELLIGENT TESTER (OUTPUT VOLTAGE OF A/F SENSOR)

(a) Connect the intelligent tester to the DLC3.
(b) Start the engine.
(c) Turn the tester on.
(d) Warm up the Air-Fuel Ratio (A/F) sensor at an engine speed of 2,500 rpm for 90 seconds.
(e) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / SNAPSHOT / MANUAL SNAPSHOT / USER DATA / AFS B1S1 and ENGINE SPD.
(f) Check the A/F sensor voltage 3 times, when the engine is in each of the following conditions:
(1) While idling (check for at least 30 seconds)
(2) At an engine speed of approximately 2,500 rpm (without any sudden changes in engine speed)
(3) Raise the engine speed to 4,000 rpm and then quickly release the accelerator pedal so that the throttle valve is fully closed.

Standard voltage

Condition	A/F Sensor Voltage Variation	Reference
(1) and (2)	Changes at approximately 3.3 V	Between 3.1 V and 3.5 V
(3)	Increases to 3.8 V or more	This occurs during engine deceleration (when fuel-cut performed)

For more information, see the diagrams below.



HINT:

- If the output voltage of the A/F sensor remains at approximately 3.3 V (see Malfunction Condition diagram) under any conditions, including those above, the A/F sensor may have an open circuit. (This will also happen if the A/F sensor heater has an open circuit.)
- If the output voltage of the A/F sensor remains at either approximately 3.8 V or more, or 2.8 V or less (see Malfunction Condition diagram) under any conditions, including those above, the A/F sensor may have a short circuit.
- The ECM stops fuel injection (fuel cut) during engine deceleration. This causes a lean condition and results in a momentary increase in the A/F sensor output voltage.
- The ECM must establish a closed throttle valve position learning value to perform fuel cut. If the battery terminal has been reconnected, the vehicle must be driven over 10 mph (16 km/h) to allow the ECM to learn the closed throttle valve position.

- When the vehicle is driven:
  The output voltage of the A/F sensor may be below 2.8 V during fuel enrichment. For the vehicle, this translates to a sudden increase in speed with the accelerator pedal fully depressed when trying to overtake another vehicle. The A/F sensor is functioning normally.
- The A/F sensor is a current output element; therefore, the current is converted into a voltage inside the ECM. Measuring the voltage at the connectors of the A/F sensor or ECM will show a constant voltage result.

NG → **Go to step 9**

ES

OK

3 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

4 CHECK WHETHER DTC OUTPUT RECURS (DTC P2A00)

(a) Read the DTCs using the intelligent tester.
(b) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

Result

Display (DTC Output)	Proceed to
P2A00	A
No output	B

B → **Go to step 8**

A

5 REPLACE AIR FUEL RATIO SENSOR

NEXT

6 PERFORM CONFIRMATION DRIVING PATTERN

NEXT

7 CHECK WHETHER DTC OUTPUT RECURS (DTC P2A00)

(a) Read the DTCs using the intelligent tester.
(b) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.

Result

Display (DTC Output)	Proceed to
No output	A
P2A00	B

B → **REPLACE ECM AND PERFORM CONFIRMATION DRIVING PATTERN**

A

8 CONFIRM WHETHER VEHICLE HAS RUN OUT OF FUEL IN PAST

ES

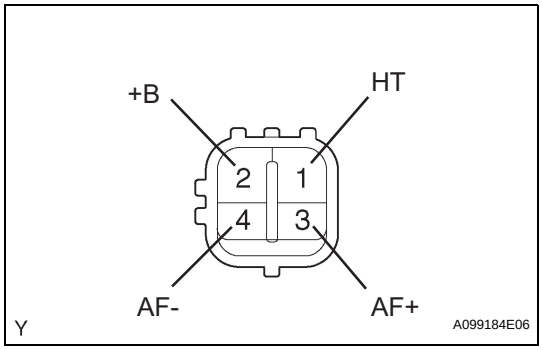
(a) Has the vehicle run out of fuel in the past?

NO → **CHECK FOR INTERMITTENT PROBLEMS**

YES

DTC CAUSED BY RUNNING OUT OF FUEL

9 INSPECT AIR FUEL RATIO SENSOR (HEATER RESISTANCE)



(a) Disconnect the A3 A/F sensor connector.
(b) Measure the resistance according to the value(s) in the table below.

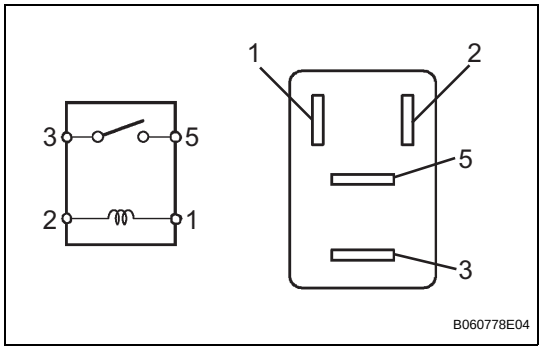
Standard resistance

Tester Connection	Specified Condition
HT (1) - +B (2)	1.8 to 3.4 Ω at 20°C (68°F)
HT (1) - AF- (4)	10 kΩ or higher

NG → **REPLACE AIR FUEL RATIO SENSOR**

OK

10 INSPECT EFI RELAY (Marking: EFI)



(a) Remove the EFI relay from the engine room relay block.
(b) Measure the resistance according to the value(s) in the table below.

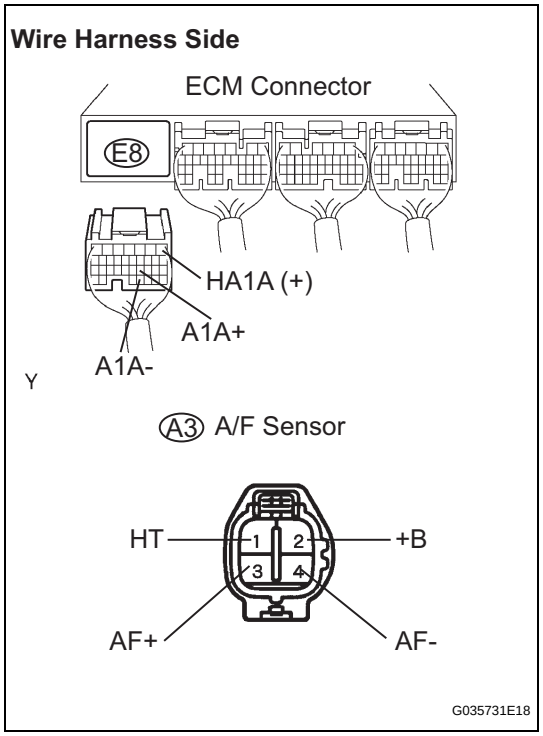
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG → **REPLACE EFI RELAY**

OK

11 CHECK WIRE HARNESS (A/F SENSOR -ECM) AND (SENSOR POWER SOURCE)



(a) Disconnect the A3 A/F sensor connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
+B (A3-2) - Body ground	9 to 14 V

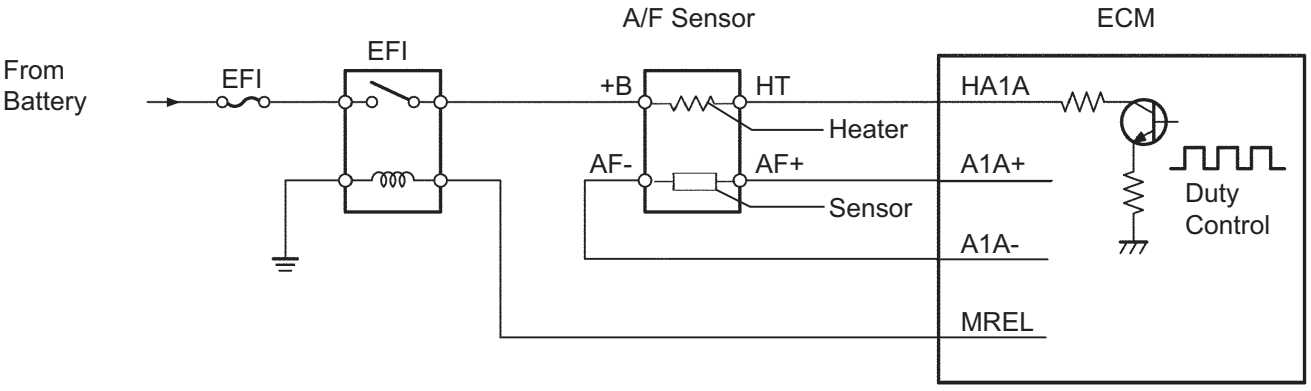
(d) Turn the ignition switch off.
(e) Disconnect the E8 ECM connector.
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
HT (A3-1) - HA1A (E8-1)	Below 1 Ω
AF+ (A3-3) - A1A+ (E8-21)	Below 1 Ω
AF- (A3-4) - A1A- (E8-31)	Below 1 Ω
HT (A3-1) or HA1A (E8-1) - Body ground	10 kΩ or higher
AF+ (A3-3) or A1A+ (E8-21) - Body ground	10 kΩ or higher
AF- (A3-4) or A1A- (E8-31) - Body ground	10 kΩ or higher

ES

Reference (System Diagram of Sensor 1)



NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

12 CHECK AIR INDUCTION SYSTEM

(a) Check the air induction system for vacuum leakage.

OK:

No leakage from air induction system.

NG → REPAIR OR REPLACE AIR INDUCTION SYSTEM

OK

13	CHECK PCV HOSE CONNECTIONS

OK:
PCV hose is connected correctly and is not damaged.

NG → REPAIR OR REPLACE PCV HOSE

OK

14	CHECK FUEL PRESSURE

(a) Check the fuel pressure.

NG → REPAIR OR REPLACE FUEL SYSTEM

OK

15	INSPECT FUEL INJECTOR

(a) Check the injector injection (whether fuel volume is high or low, and whether injection pattern is poor).

NG → REPLACE FUEL INJECTOR

OK

16	REPLACE AIR FUEL RATIO SENSOR

NEXT

17	PERFORM CONFIRMATION DRIVING PATTERN

NEXT

18	CHECK WHETHER DTC OUTPUT RECURS (DTC P2A00)

(a) Read the DTCs using the intelligent tester.
(b) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
Result

Display (DTC Output)	Proceed to
No output	A
P2A00	B

B → REPLACE ECM AND PERFORM CONFIRMATION DRIVING PATTERN

A

19	CONFIRM WHETHER 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

EVAP System

RELATED DTCS

DTCs	Monitoring Items	See page
P043E	Reference orifice clogged (built into canister pump module)	ES-186
P043F	Reference orifice high-flow (built into canister pump module)	
P0441	• Purge VSV (Vacuum Switching Valve) stuck closed • Purge VSV stuck open • Purge flow	ES-191
P0450	Canister pressure sensor (built into canister pump module) voltage abnormal fluctuation	ES-199
P0451	• Canister pressure sensor (built into canister pump module) noise • Canister pressure sensor (built into canister pump module) signal becomes fixed/flat	
P0452	Canister pressure sensor (built into canister pump module) voltage low	
P0453	Canister pressure sensor (built into canister pump module) voltage high	
P0455	EVAP gross leak	ES-207
P0456	EVAP small leak	
P2401	Leak detection pump stuck OFF (built into canister pump module)	ES-186
P2402	Leak detection pump stuck ON (built into canister pump module)	
P2419	Vent valve stuck closed (built into canister pump module)	ES-186
P2420	Vent valve stuck open (vent) (built into canister pump module)	ES-298
P2610	Soak timer (built into ECM)	ES-302

If any EVAP system DTCs are set, the malfunctioning area can be determined using the table below.

DTCs / Malfunctioning Areas	P043E P043F	P0441	P0450	P0451	P0452	P0453	P0455	P0456	P2401 P2402	P2419	P2420
Reference orifice clogged	●								●	●	
Reference orifice high-flow	●								●	●	
Purge VSV stuck open		●					●				
Purge VSV stuck closed		●									
Canister pressure sensor fixed output				●							
Canister pressure sensor noise				●							
Canister pressure sensor low output			●		●						
Canister pressure sensor high output			●			●					
Gross leak		●					●				
Small leak								●			
Leak detection pump stuck OFF	●								●	●	
Leak detection pump stuck ON	●								●	●	
Vent valve stuck closed	●								●	●	
Vent valve stuck open (vent)											●

Y

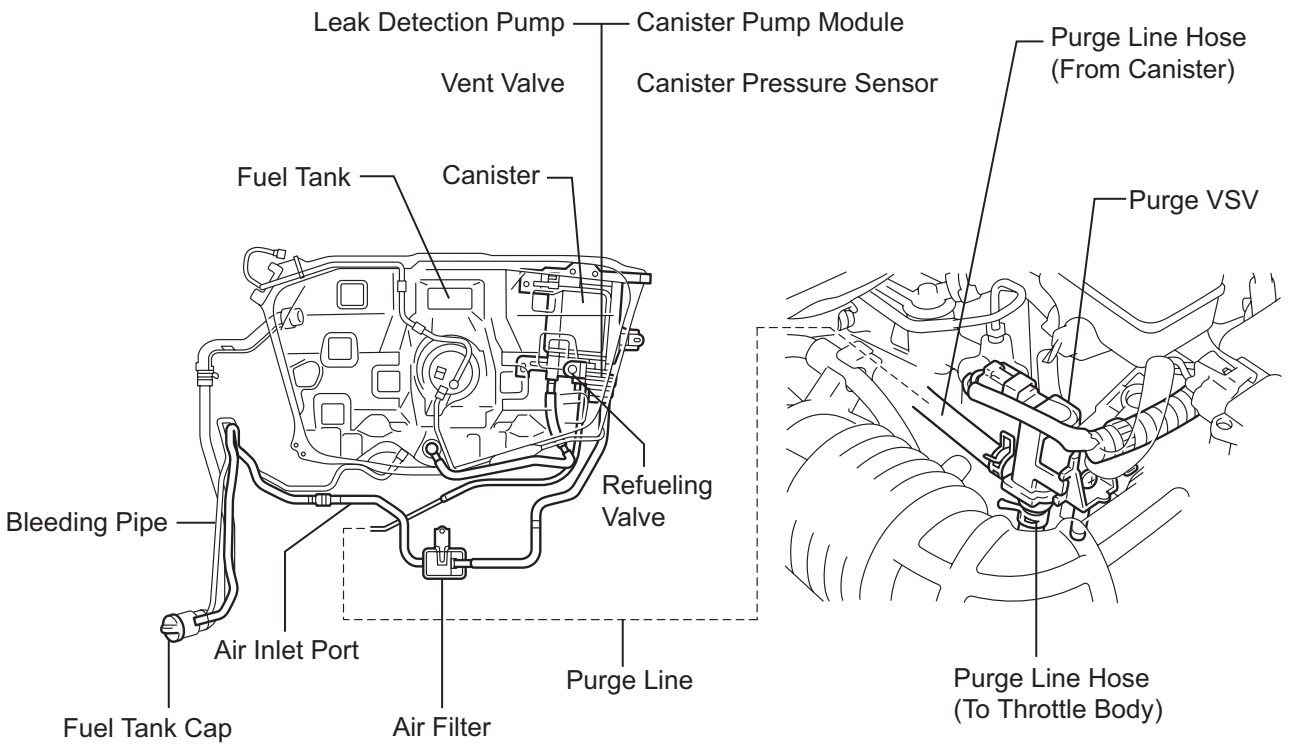
A106731E11

NOTICE:
If the reference pressure difference between the first and second checks is greater than the specification, all the DTCs relating to the reference pressure (P043E, P043F, P2401, P2402 and P2419) are stored.

ES

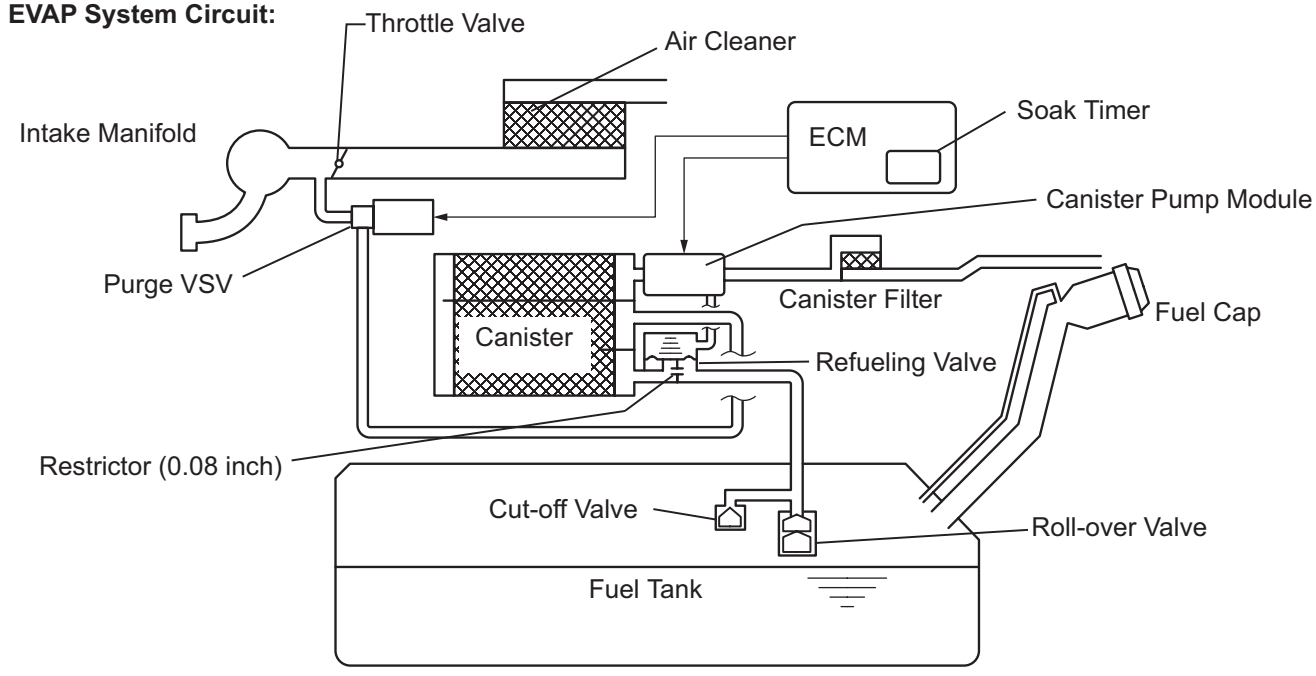
DESCRIPTION

Location of EVAP (Evaporative Emission) system



N A148334E01

EVAP System Circuit:



Y A122570E04

NOTICE:
In this vehicle's EVAP system, turning ON the vent valve does not seal off the EVAP system. To check for leaks in the EVAP system, disconnect the air inlet vent hose and apply pressure from the atmospheric side of the canister.

While the engine is running, if a predetermined condition (closed-loop, etc.) is met, the purge VSV is opened by the ECM and fuel vapors stored in the canister are purged into the intake manifold. The ECM changes the duty cycle ratio of the purge VSV to control purge flow volume.
The purge flow volume is also determined by the intake manifold pressure. Atmospheric pressure is allowed into the canister through the vent valve to ensure that the purge flow is maintained when negative pressure (vacuum) is applied to the canister.
The following two monitors run to confirm the appropriate EVAP system operation.

1. Key-off monitor

This monitor checks for EVAP (Evaporative Emission) system leaks and canister pump module malfunctions. The monitor starts 5 hours* after the ignition switch is turned off. At least 5 hours are required for the fuel to cool down to stabilize the EVAP pressure, thus making the EVAP system monitor more accurate.
The leak detection pump creates negative pressure (vacuum) in the EVAP system and the pressure is measured. Finally, the ECM monitors for leaks from the EVAP system, and malfunctions in both the canister pump module and purge VSV, based on the EVAP pressure.
HINT:
*: If the engine coolant temperature is not below 35°C (95°F) 5 hours after the ignition switch is turned off, the monitor check starts 2 hours later. If it is still not below 35°C (95°F) 7 hours after the ignition switch is turned off, the monitor check starts 2.5 hours later.

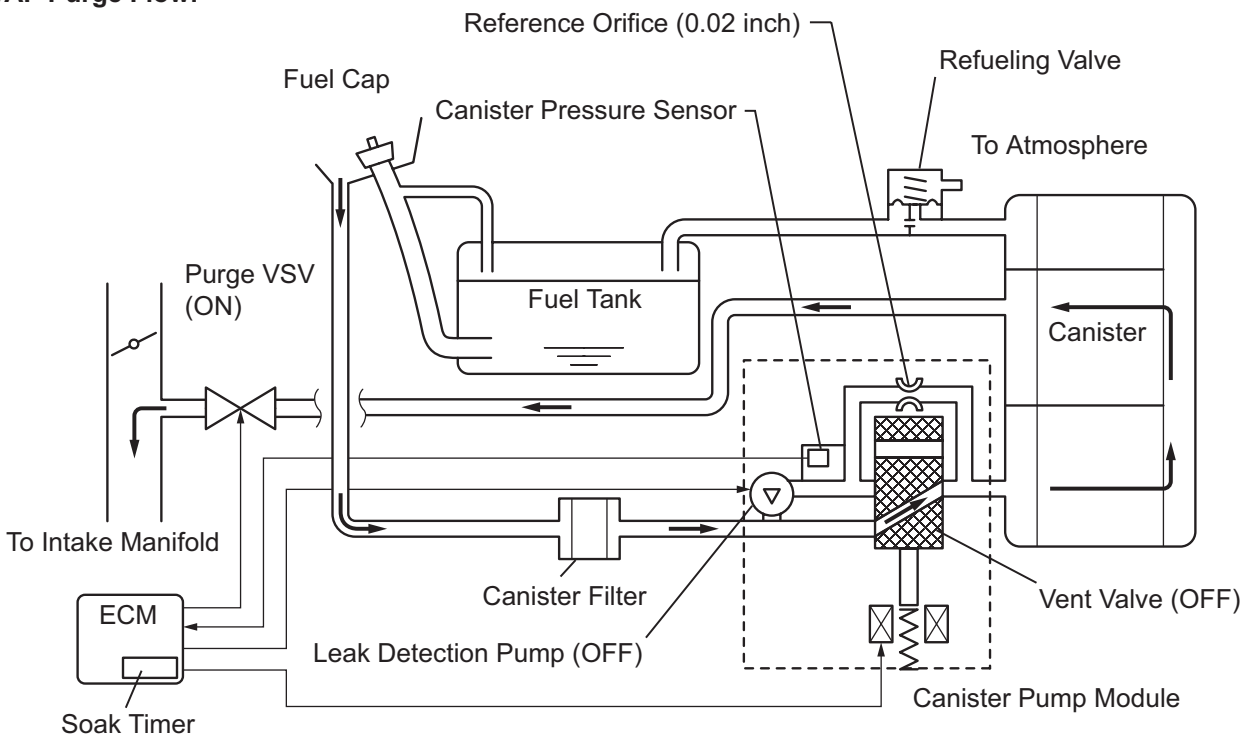
2. Purge flow monitor

The purge flow monitor consists of the two 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 VSV (Vacuum Switching Valve) is ON (open), the ECM monitors the purge flow by measuring the EVAP pressure change. If negative pressure is not created, the ECM begins the 2nd monitor.
- The 2nd monitor
  The vent valve is turned OFF (open) and the EVAP pressure is measured. If the variation in the pressure is less than 0.5 kPa-g (3.75 mmHg-g), the ECM interprets this as the purge VSV being stuck closed, and illuminates the MIL and sets 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 conduction of the purge flow monitor, is measured by the ECM.

EVAP Purge Flow:



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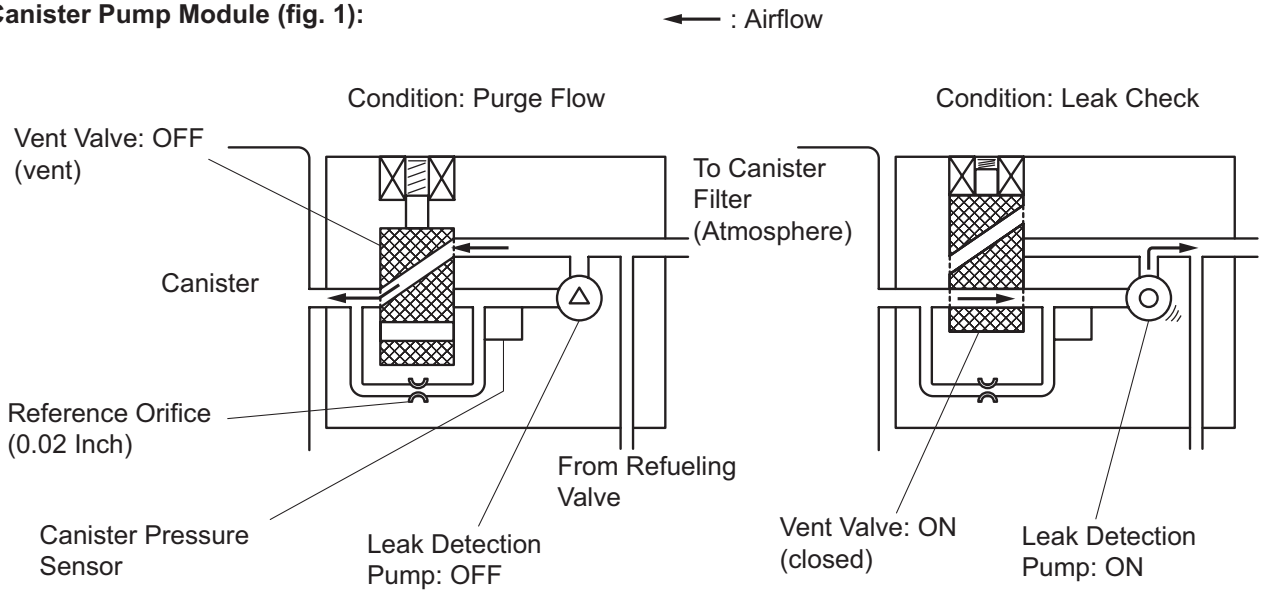
A122571E07

Component	Operation
Canister	Contains activated charcoal to absorb EVAP (Evaporative Emissions) generated in fuel tank.
Cut-off valve	Located in fuel tank. Valve floats and closes when fuel tank is 100% full.
Purge VSV (Vacuum Switching Valve)	Opens or closes line between canister and intake manifold. ECM uses purge VSV to control EVAP purge flow. In order to discharge EVAP absorbed by canister to intake manifold, ECM opens purge VSV. EVAP discharge volume to intake manifold is controlled by purge VSV duty cycle ratio (current-carrying time) (Open: ON; Closed: OFF).
Refueling valve	Controls EVAP pressure from fuel tank to canister. Valve consists of diaphragm, spring and restrictor (diameter: 0.08 inch). When fuel vapor and pressure inside fuel tank increase, valve opens. While EVAP is purged, valve closes and restrictor prevents large amount of vacuum from affecting pressure in fuel tank. Valve is opened while refueling.
Roll-over valve	Located in fuel tank. Valve is closed by its own weight when vehicle overturns to prevent fuel from spilling out.
Soak timer	Built into ECM. To ensure accurate EVAP monitor, measures 5 hours (+-15 min) after engine switch is turned off. This allows fuel to cool down, stabilizing EVAP pressure. When approximately 5 hours have elapsed, ECM is activated (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 VSV, turning on vent valve (closed) and operating leak detection pump (refer to fig. 1).
(b) Canister pressure sensor	Indicates pressure as voltages. ECM supplies regulated 5 V to canister 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 VSV, turning off vent valve and operating leak detection pump, to monitor reference pressure. Reference pressure indicates small leak of EVAP.

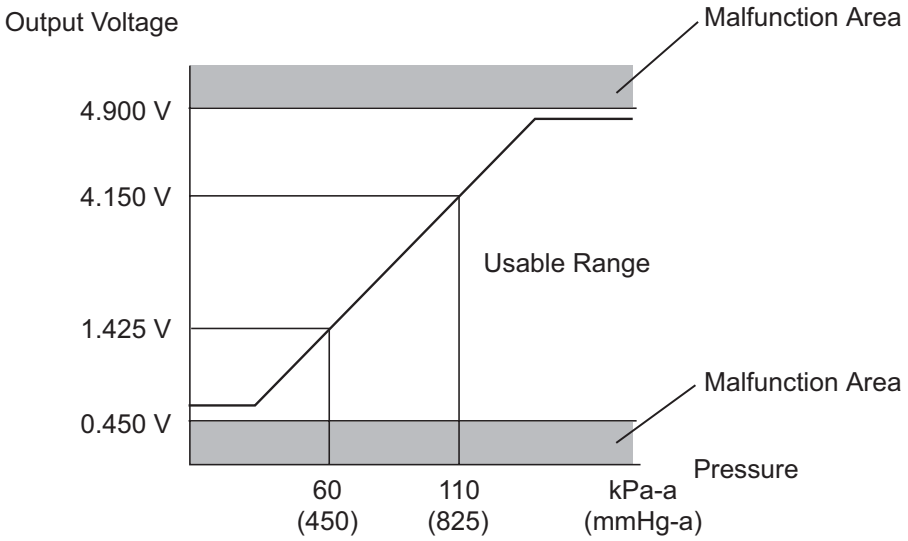
Canister Pump Module (fig. 1):



Y

A115902E02

Canister Pressure Sensor Specification (fig. 2):



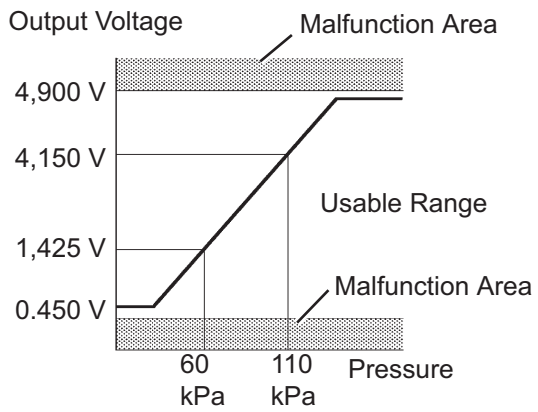
HINT:

Standard atmospheric pressure is 101.3 kPa-a (760 mmHg-a)

A115543E06

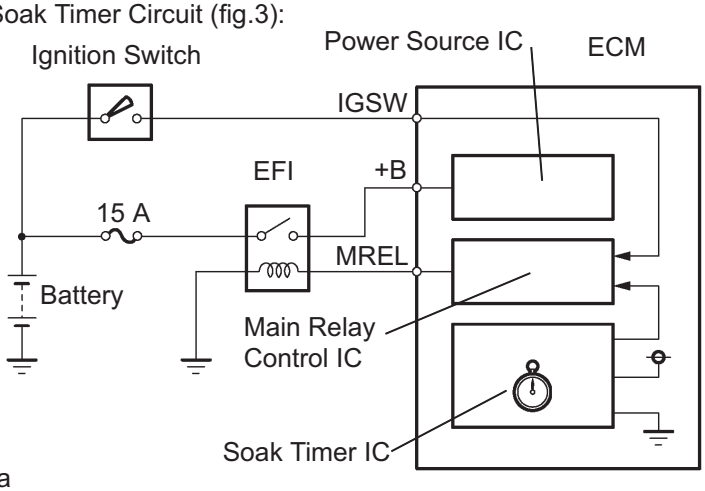
ES

Canister Pressure Sensor Specification (fig.2):



HINT: Standard atmospheric pressure is 101.3 kPa

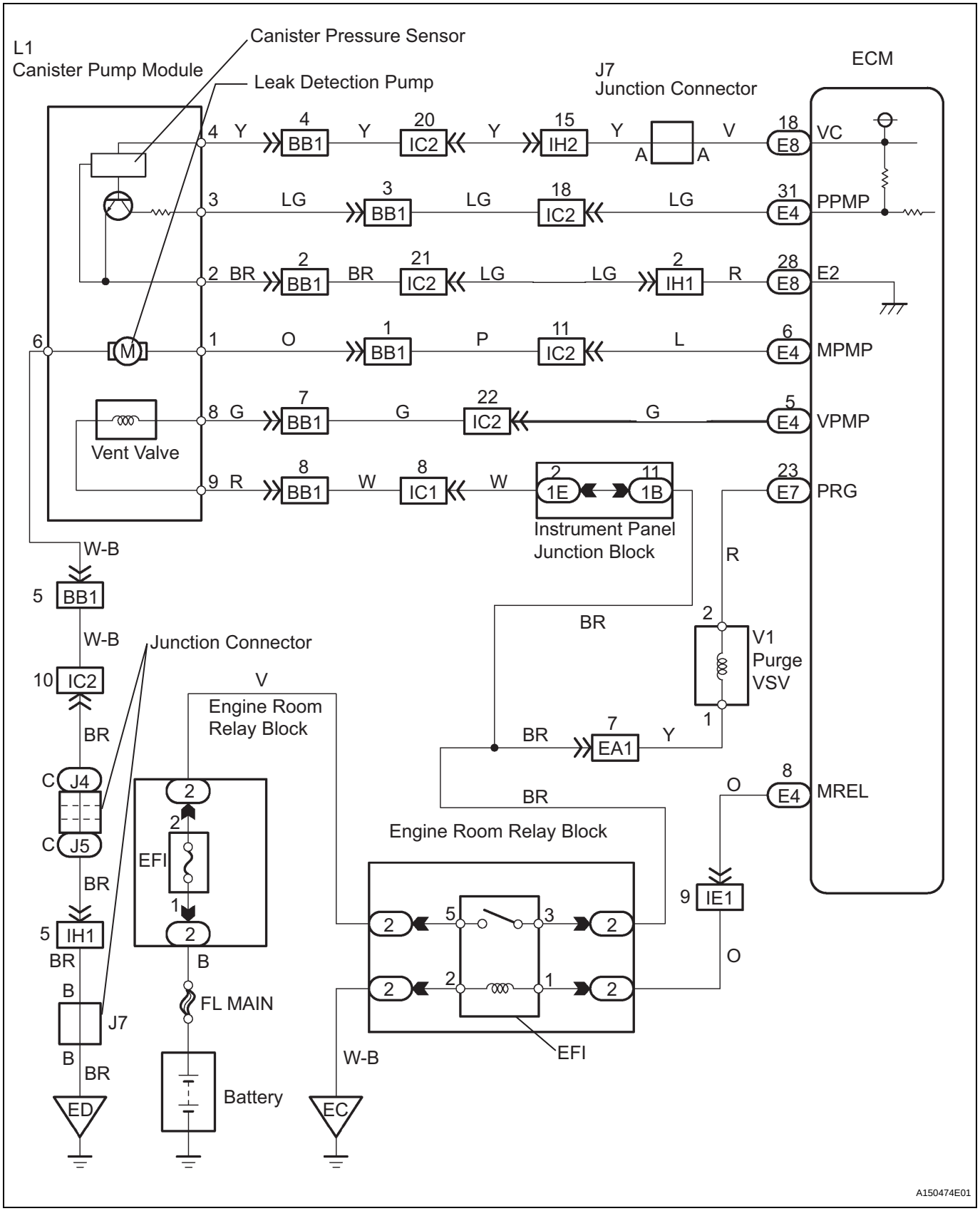
Soak Timer Circuit (fig.3):



A097612E05

ES

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

The intelligent tester is required to conduct the following diagnostic troubleshooting procedure.

HINT:

- Using intelligent tester monitor results enables the EVAP (Evaporative Emission) system to be confirmed.
- Read freeze frame data using the intelligent tester. 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 (See page ES-33).

1	CONFIRM DTC

ES

(a) Turn the ignition switch off and wait for 10 seconds.
(b) Turn the ignition switch to the ON position.
(c) Turn the ignition switch off and wait for 10 seconds.
(d) Connect an intelligent tester to the DLC3.
(e) Turn the ignition switch to the ON position and turn the tester on.
(f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
(g) Confirm DTCs and freeze frame data.
If any EVAP system DTCs are set, the malfunctioning area can be determined using the table below.
NOTICE:
If the reference pressure difference between the first and second checks is greater than the specification, all the DTCs relating to the reference pressure (P043E, P043F, P2401, P2402 and P2419) are stored.

DTCs / Malfunctioning Areas	P043E P043F	P0441	P0450	P0451	P0452	P0453	P0455	P0456	P2401 P2402	P2419	P2420
Reference orifice clogged	●								●	●	
Reference orifice high-flow	●								●	●	
Purge VSV stuck open		●					●				
Purge VSV stuck closed		●									
Canister pressure sensor fixed output				●							
Canister pressure sensor noise				●							
Canister pressure sensor low output			●		●						
Canister pressure sensor high output			●			●					
Gross leak		●					●				
Small leak								●			
Leak detection pump stuck OFF	●								●	●	
Leak detection pump stuck ON	●								●	●	
Vent valve stuck closed	●								●	●	
Vent valve stuck open (vent)											●

Y

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NEXT

2	PERFORM EVAP SYSTEM CHECK (AUTO OPERATION)

NOTICE:

- **The EVAP SYSTEM CHECK (AUTO OPERATION) consists of 5 steps performed automatically by the intelligent tester. It takes a maximum of approximately 18 minutes.**
- **Do not perform the EVAP 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 EVAP SYSTEM CHECK, keep the temperature below 35°C (95°F).**

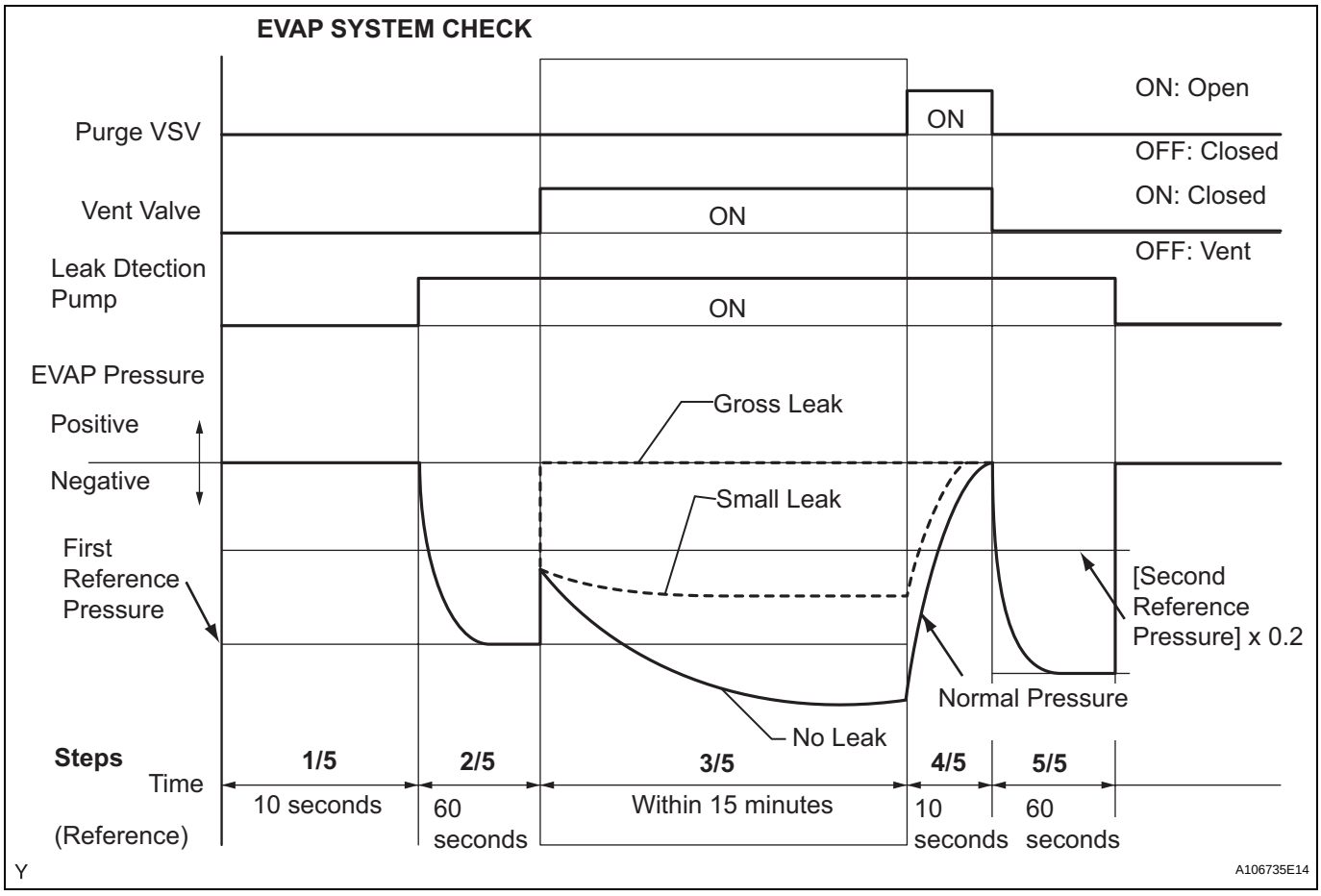
(a) Clear the DTCs (See page ES-32).

(b) On the tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / EVAP SYS CHECK / AUTO OPERATION.
(c) After the EVAP SYSTEM CHECK is completed, check for pending DTCs by selecting the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
HINT:
If no pending DTCs are displayed, perform the MONITOR CONFIRMATION (see "Diagnostic Help" menu). After this confirmation, check for pending DTCs. If no DTCs are displayed, the EVAP system is normal.

ES

NEXT

3	PERFORM EVAP SYSTEM CHECK (MANUAL OPERATION)



NOTICE:

- **In the EVAP SYSTEM CHECK (MANUAL OPERATION), perform the series of 5 EVAP SYSTEM CHECK steps manually using the intelligent tester.**
- **Do not perform the EVAP 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 EVAP SYSTEM CHECK, keep the temperature below 35°C (95°F).**

(a) Clear the DTCs (See page ES-32).

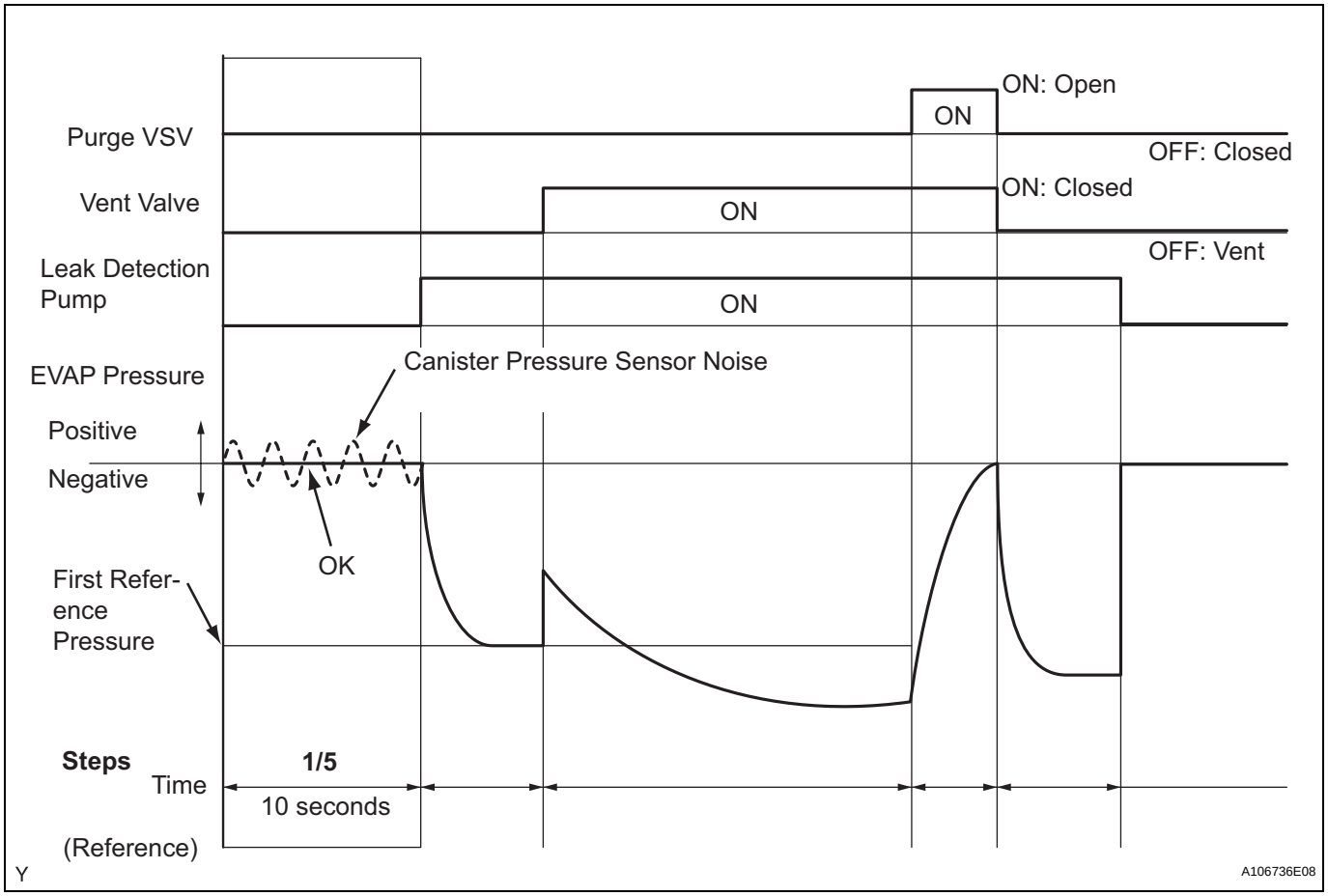
(b) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / EVAP SYS CHECK / MANUAL OPERATION.

NEXT

4	PERFORM EVAP SYSTEM CHECK (STEP 1/5)

ES

(a) Check the EVAP pressure in step 1/5.



Result

DTCs*	Test Result	Suspected Trouble Area	Proceed to
-	Virtually no variation in EVAP pressure	Not yet determined	A
P0451	EVAP pressure fluctuates by +-0.3 kPa-g (2.25 mmHg-g) or more	Canister pressure sensor noise	B

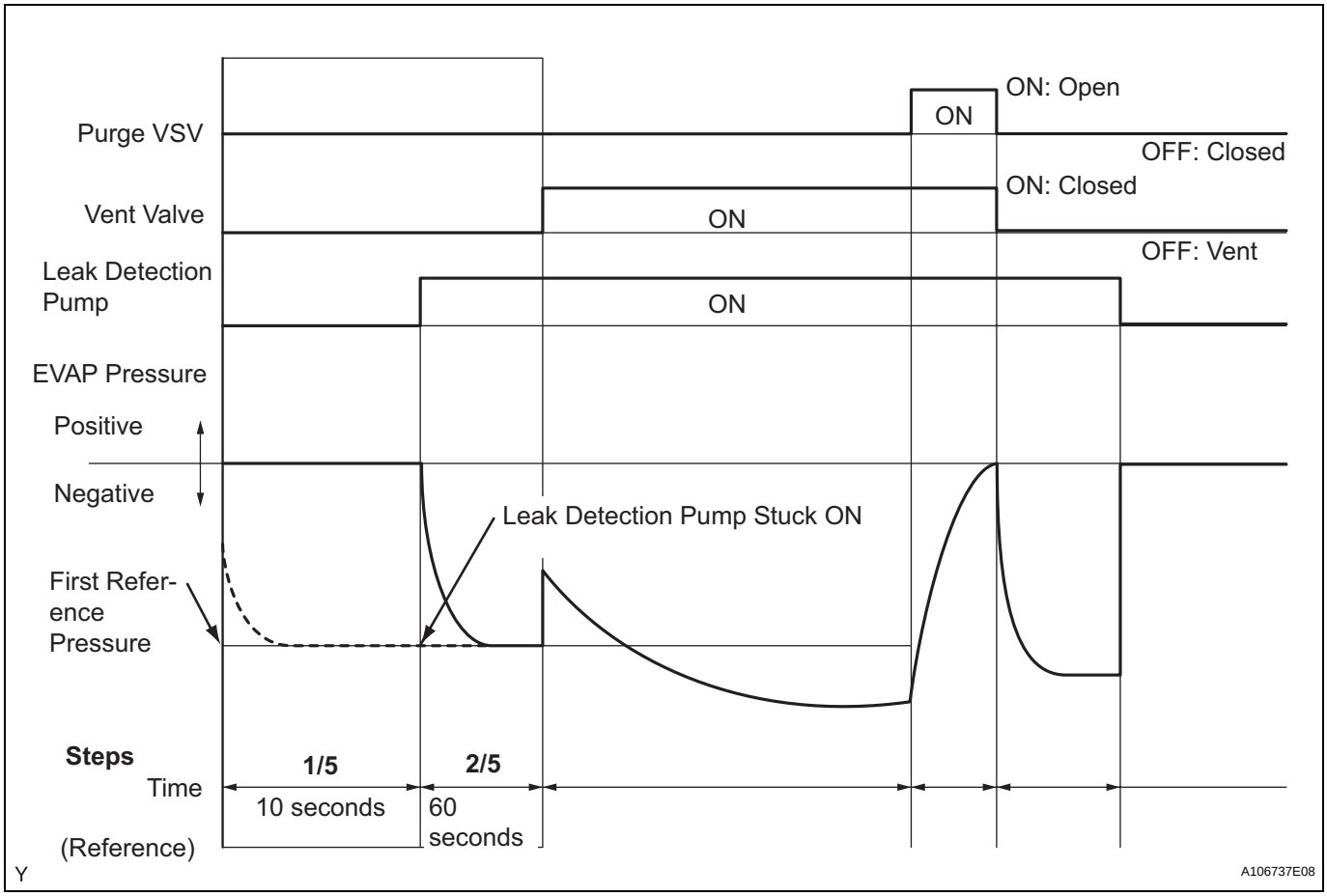
*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "CONFIRM DTC" procedures above.

B	Go to step 29

A

5	PERFORM EVAP SYSTEM CHECK (STEP 1/5 TO 2/5)

(a) Check the EVAP pressure in steps 1/5 and 2/5.



Result

DTCs*	Test Result	Suspected Trouble Area	Proceed to
-	Virtually no variation in EVAP pressure during step 1/5. Then EVAP pressure decreases to reference pressure.	Not yet determined	A
P2402	Small difference between EVAP pressures during steps 1/5 and 2/5	Leak detection pump stuck ON	B

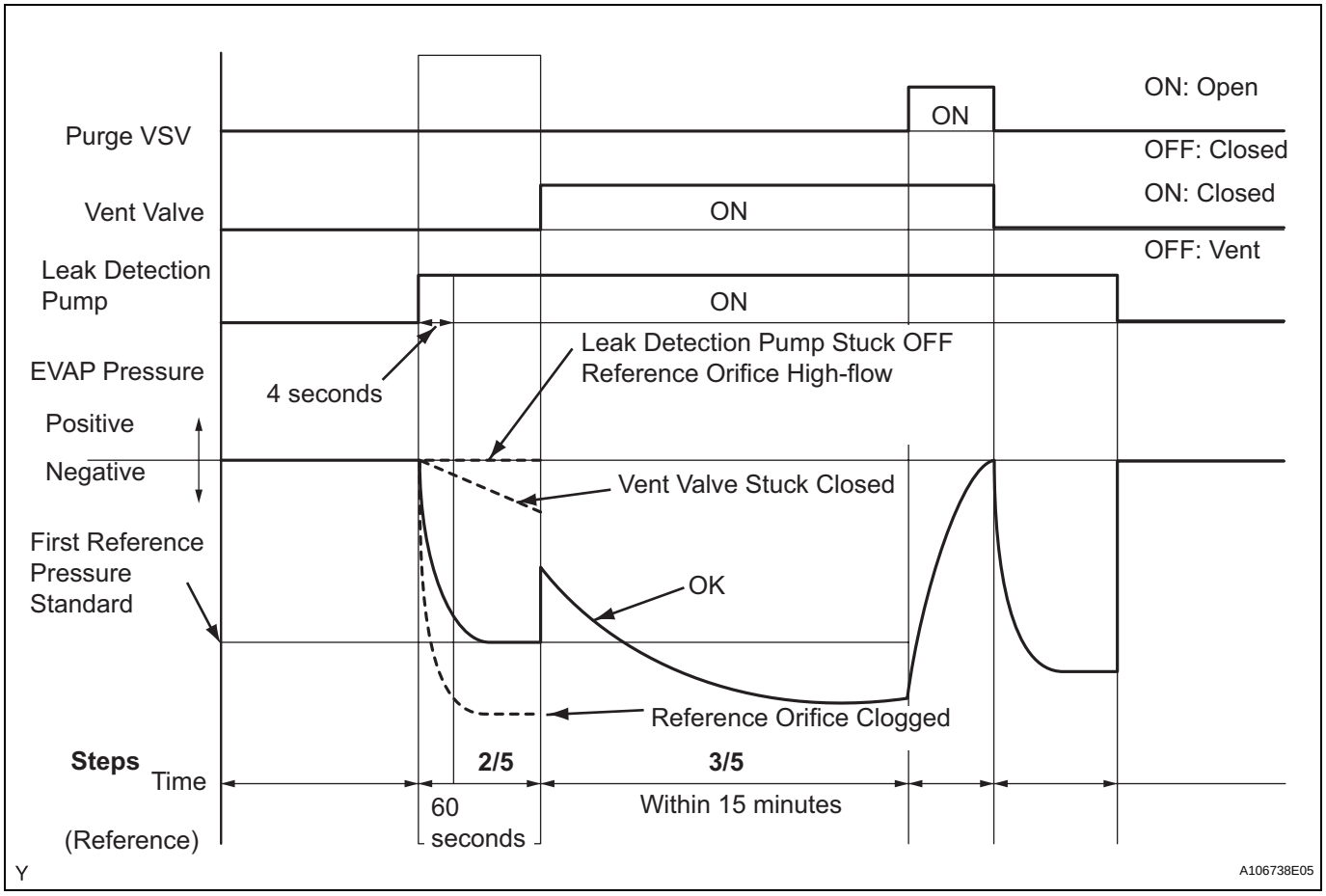
*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "CONFIRM DTC" procedures above.
HINT:
The first reference pressure is the value determined in step 2/5.

B → Go to step 22

A

6	PERFORM EVAP SYSTEM CHECK (STEP 2/5)

HINT:
Make a note of the pressures checked in steps "A" and "B" below.



(a) Check the EVAP pressure 4 seconds after the leak detection pump is activated* (Step "A").
*: The leak detection pump begins to operate as step 1/5 finishes and step 2/5 starts.
(b) Check the EVAP pressure again when it has stabilized. This pressure is the reference pressure (Step "B").

Result

DTCs*	Test Result	Suspected Trouble Area	Proceed to
-	EVAP pressure in step (b) between -4.85 kPa-g and -1.057 kPa-g (-36.4 mmHg-g and -7.93 mmHg-g)	Not yet determined	A
P043F and P2401	EVAP pressure in step (b) -1.057 kPa-g (-7.93 mmHg-g) or more	• Reference orifice high-flow • Leak detection pump stuck OFF	B
P043E	EVAP pressure in step (b) below -4.85 kPa-g (-36.4 mmHg-g)	Reference orifice clogged	C
P2419	EVAP pressure in step (a) more than -1.057 kPa-g (-7.93 mmHg-g)	Vent valve stuck closed	D

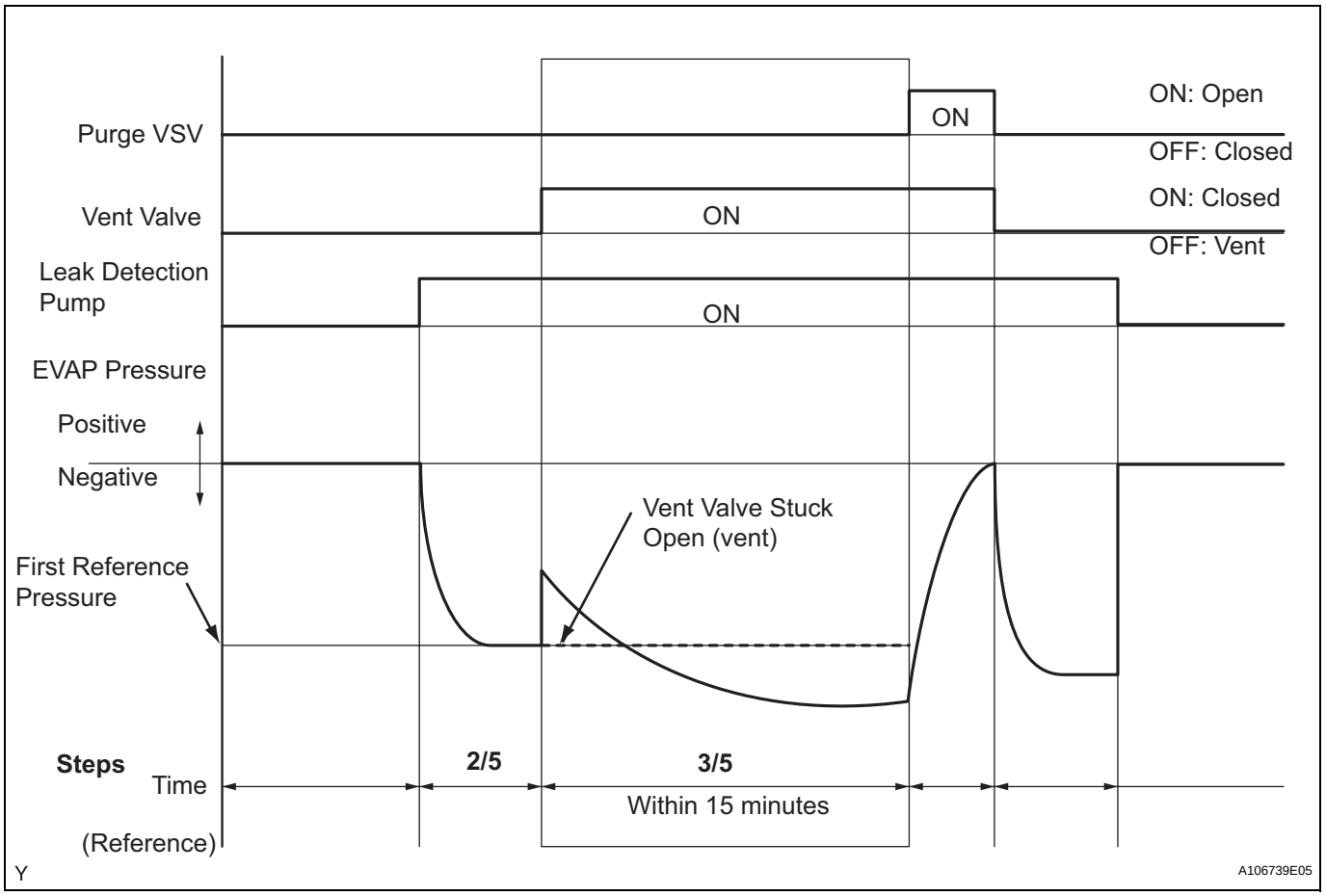
*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "CONFIRM DTC" procedures above.

B	Go to step 11
C	Go to step 29
D	Go to step 20

A

7	PERFORM EVAP SYSTEM CHECK (STEP 2/5 TO 3/5)

(a) Check the EVAP pressure increase in step 3/5.



Result

DTCs*	Test Result	Suspected Trouble Area	Proceed to
-	EVAP pressure increases by 0.3 kPa-g (2.25 mmHg-g) or more within 10 seconds of proceeding from step 2/5 to step 3/5	Not yet determined	A
P2420	No variation in EVAP pressure despite proceeding from step 2/5 to step 3/5	Vent valve stuck open (vent)	B
P0451	No variation in EVAP pressure during steps 1/5 through 3/5	Canister pressure sensor malfunction fixed	C

*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "CONFIRM DTC" procedures above.

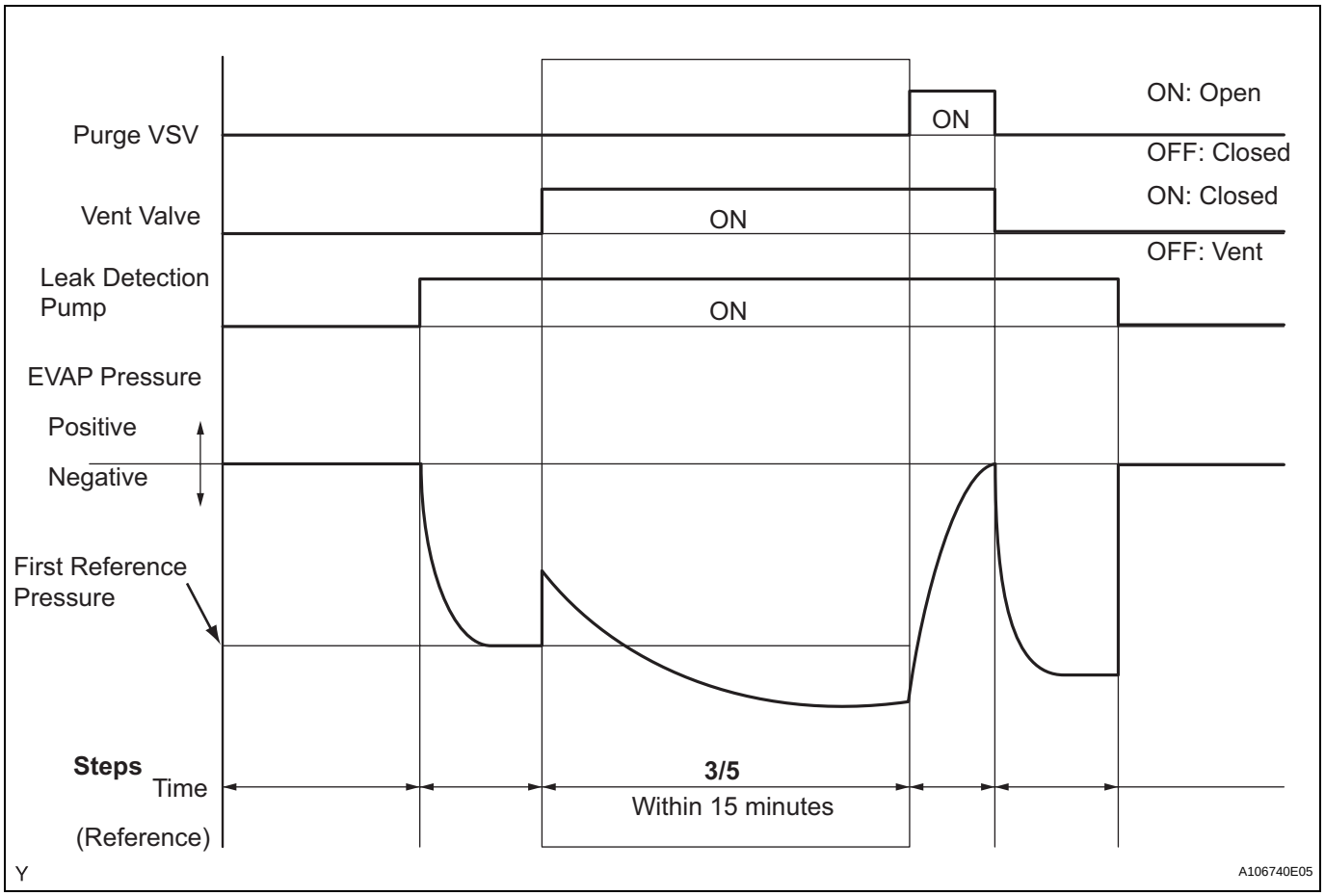
B	Go to step 19

C → Go to step 29

A

8	PERFORM EVAP SYSTEM CHECK (STEP 3/5)

(a) Wait until the EVAP pressure change is less than 0.1 kPa-g (0.75 mmHg-g) for 30 seconds.



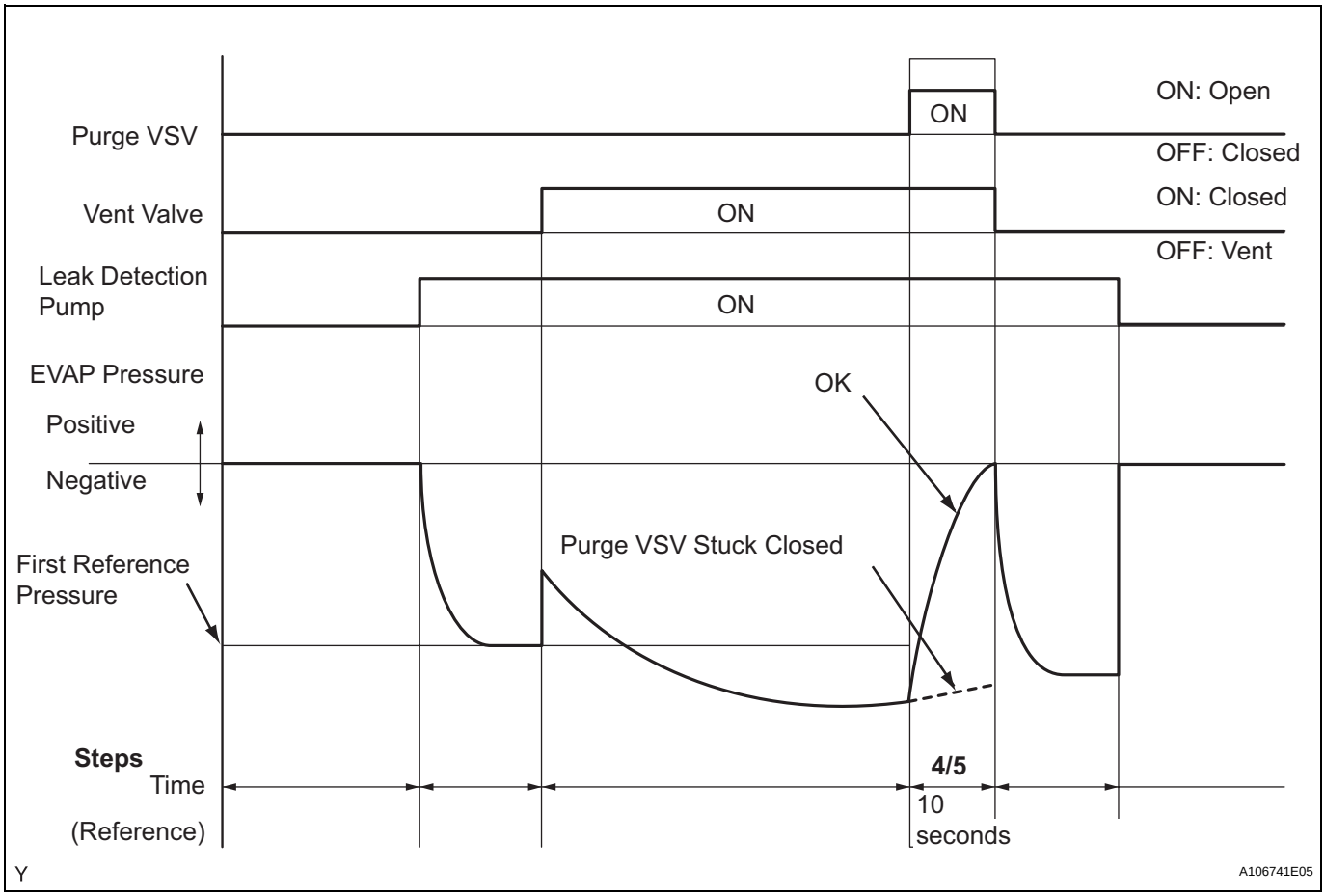
(b) Measure the EVAP pressure and record it.
HINT:
A few minutes are required for the EVAP pressure to become saturated. When there is little fuel in the fuel tank, it takes up to 15 minutes.

NEXT

9	PERFORM EVAP SYSTEM CHECK (STEP 4/5)

(a) Check the EVAP pressure in step 4/5.

ES



Result

DTCs*	Test Result	Suspected Trouble Area	Proceed to
-	EVAP pressure increases by 0.3 kPa-g (2.25 mmHg-g) or more within 10 seconds of proceeding from step 3/5 to step 4/5	Not yet determined	A
P0441	EVAP pressure increases by 0.3 kPa-g (2.25 mmHg-g) or more within 10 seconds of proceeding from step 3/5 to step 4/5	Problems in EVAP hose between purge VSV and intake manifold	B
P0441	Variation in EVAP pressure less than 0.3 kPa-g (2.25 mmHg-g) for 10 seconds, after proceeding from step 3/5 to step 4/5	Purge VSV stuck closed	C

*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "CONFIRM DTC" procedures above.

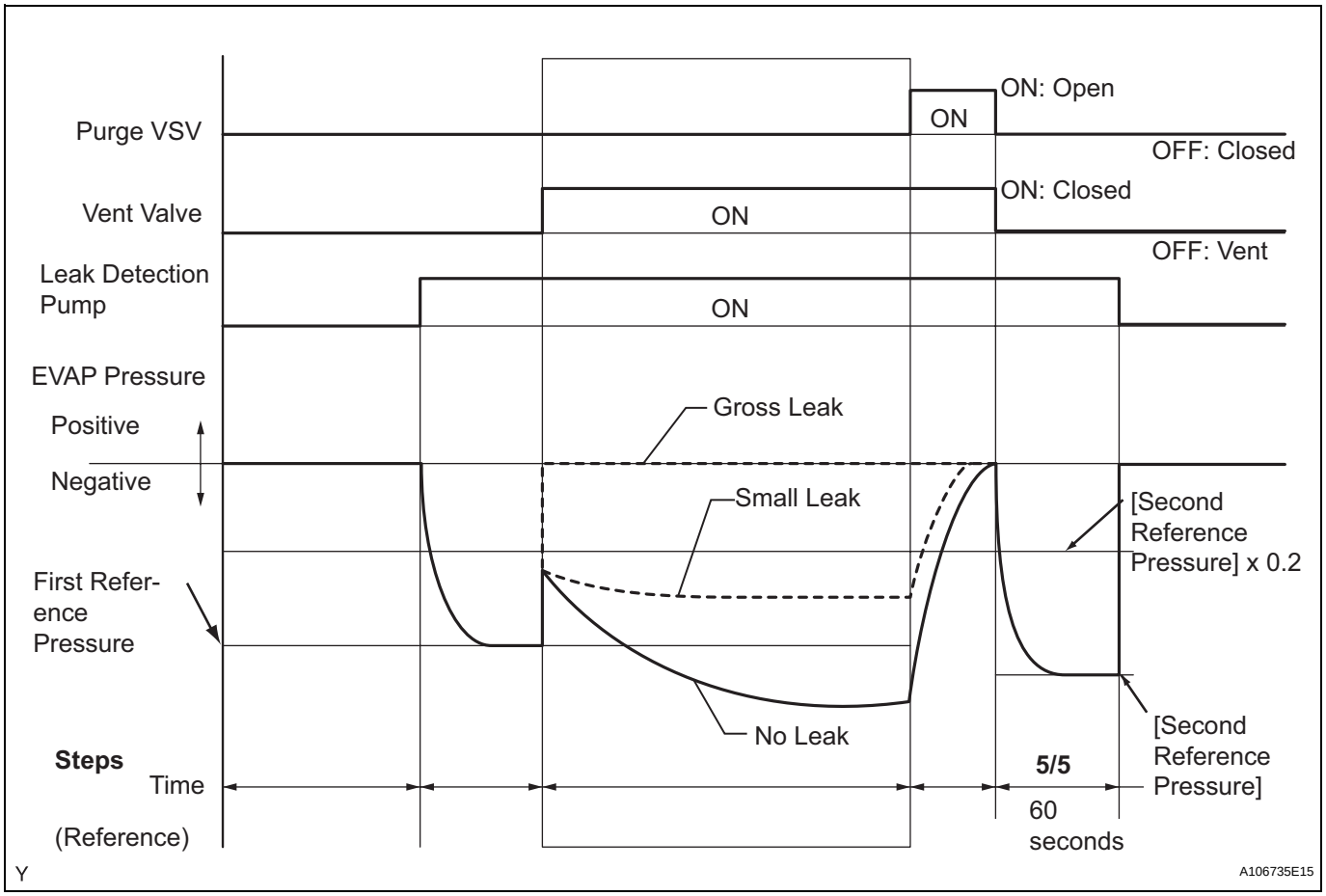
B → **Go to step 15**

C → **Go to step 12**

A

10	PERFORM EVAP SYSTEM CHECK (STEP 5/5)

(a) Check the EVAP pressure in step 5/5.



(b) Compare the EVAP pressure in step 3/5 and the second reference pressure (step 5/5).

Result

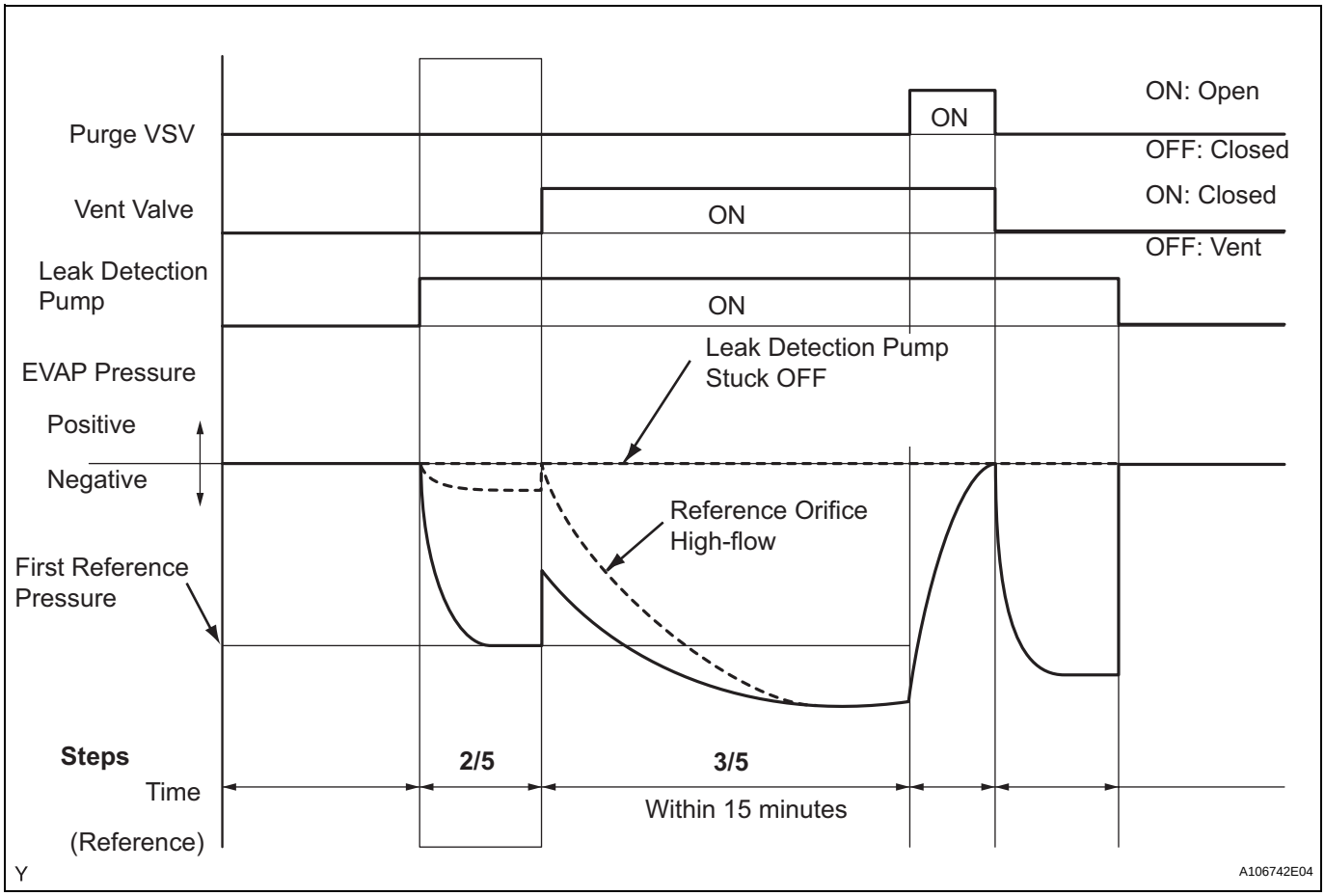
DTCs*	Test Result	Suspected Trouble Area	Proceed to
-	EVAP pressure (step 3/5) lower than second reference pressure (step 5/5)	Not yet determined (no leakage from EVAP system)	A
P0441 and P0455	EVAP pressure (step 3/5) higher than [second reference pressure (step 5/5) x 0.2]	• Purge VSV stuck open • EVAP gross leak	B
P0456	EVAP pressure (step 3/5) higher than second reference pressure (step 5/5)	EVAP small leak	B

*: These DTCs are already present in the ECM when the vehicle arrives and are confirmed in the "CONFIRM DTC" procedures above.

A	Go to step 35
B	Go to step 12

11	PERFORM EVAP SYSTEM CHECK (STEP 3/5)

(a) Check the EVAP pressure in step 3/5.



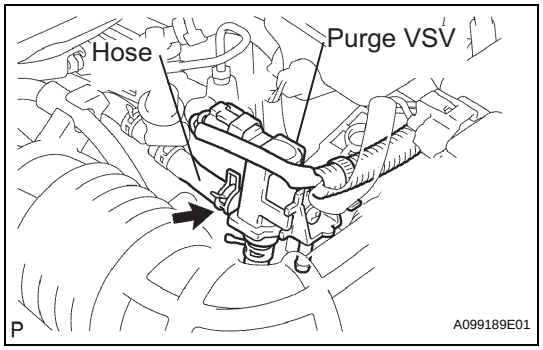
Result

DTCs*	Test Result	Suspected Trouble Area	Proceed to
P043F	EVAP pressure less than reference pressure measured at 2/5	Reference orifice high-flow	A
P2401	EVAP pressure almost same as reference pressure measured at 2/5	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" procedures above.
HINT:
The first reference pressure is the value determined in step 2/5.

A	Go to step 29
B	Go to step 22

12 PERFORM ACTIVE TEST USING INTELLIGENT TESTER (PURGE VSV)



(a) On the intelligent tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / EVAP VSV (ALONE).
(b) Disconnect the hose (connected to the canister) from the purge VSV.
(c) Start the engine.
(d) Using the tester, turn off the purge VSV (EVAP VSV: OFF).
(e) Use your finger to confirm that the purge VSV has no suction.
(f) Using the tester, turn on the purge VSV (EVAP VSV: ON).
(g) Use your finger to confirm that the purge VSV has suction.

ES

Result

Test Result	Suspected Trouble Area	Proceed to
No suction when purge VSV turned OFF, and suction applied when turned ON	Purge VSV normal	A
Suction applied when purge VSV turned OFF	Purge VSV stuck open	B
No suction when purge VSV turned ON	• Purge VSV stuck closed • Problems with EVAP hose between purge VSV and intake manifold	C

(h) Reconnect the hose.

B → Go to step 14

C → Go to step 15

A

13 CHECK FUEL CAP ASSEMBLY

(a) Check that the fuel cap is correctly installed and confirm the fuel cap meets OEM specifications.
(b) Tighten the fuel cap until a click sounds are heard.
HINT:
If an EVAP tester is available, check the fuel cap using the tester.
1. Remove the fuel cap and install it onto a fuel cap adapter.
2. Connect an EVAP tester pump hose to the adapter, and pressurize the cap to 3.2 to 3.7 kPa (24 to 28 mmHg) using an EVAP tester pump.
3. Seal the adapter and wait for 2 minutes.
4. Check the pressure. If the pressure is 2 kPa (15 mmHg) or more, the fuel cap is normal.

Result

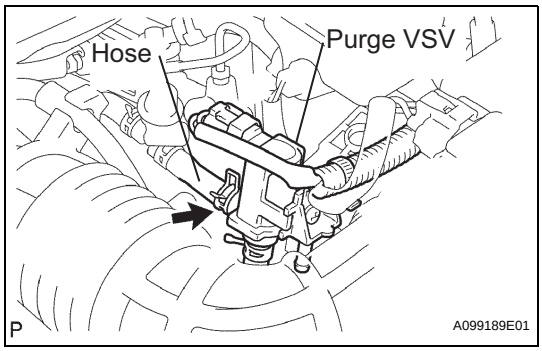
Test Result	Suspected Trouble Area	Proceed to
Fuel cap correctly installed	-	A

Test Result	Suspected Trouble Area	Proceed to
Fuel cap loose	• Fuel cap improperly installed • Defective fuel cap • Fuel cap does not meet OEM specifications	B
Defective fuel cap	-	B
No fuel cap	-	C

(c) Reinstall the fuel cap.

A	Go to step 28
B	Go to step 26
C	Go to step 27

14 INSPECT DUTY VACUUM SWITCHING VALVE (PURGE VSV)



(a) Turn the ignition switch off.
(b) Disconnect the V1 purge VSV connector.
(c) Disconnect the hose (connected to the canister) from the purge VSV.
(d) Start the engine.
(e) Use your finger to confirm that the purge VSV has no suction.

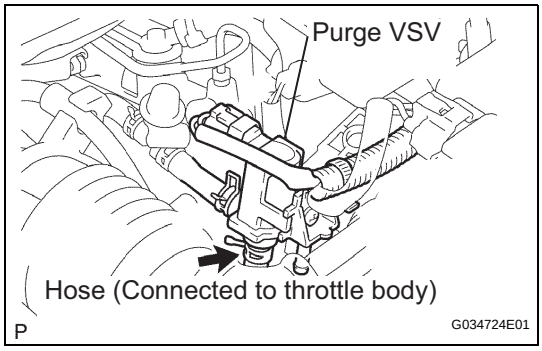
Result

Test Result	Suspected Trouble Area	Proceed to
No suction	ECM	A
Suction applied	Purge VSV	B

(f) Reconnect the purge VSV connector.
(g) Reconnect the hose.

A	Go to step 34
B	Go to step 30

15 CHECK EVAP HOSE (PURGE VSV - INTAKE MANIFOLD)



(a) Disconnect the hose (connected to the intake manifold) from the purge VSV.
(b) Start the engine.
(c) Use your finger to confirm that the hose has suction.

Result

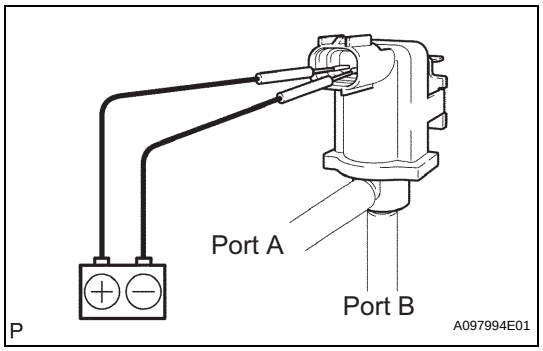
Test Result	Suspected Trouble Area	Proceed to
Suction applied	EVAP hose between purge VSV and intake manifold normal	A
No suction	• Intake manifold port • EVAP hose between purge VSV and intake manifold	B

(d) Reconnect the hose.

B → Go to step 25

A

16 INSPECT DUTY VACUUM SWITCHING VALVE (PURGE VSV)



(a) Remove the purge VSV.
(b) Apply the battery voltage to the terminals of the purge VSV.
(c) Using an air gun, confirm that air flows from port A to port B.

Result

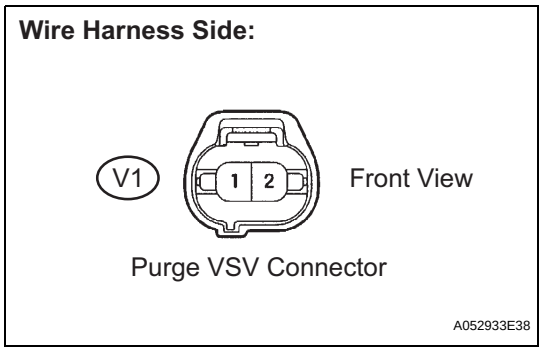
Test Result	Suspected Trouble Area	Proceed to
Air flows	Purge VSV normal	A
No air flow	Purge VSV	B

(d) Install the purge VSV.

B → Go to step 30

A

17 CHECK HARNESS AND CONNECTOR (POWER SOURCE OF PURGE VSV)



(a) Disconnect the V1 purge VSV connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage between terminal 2 of the purge VSV connector and body ground.

Result

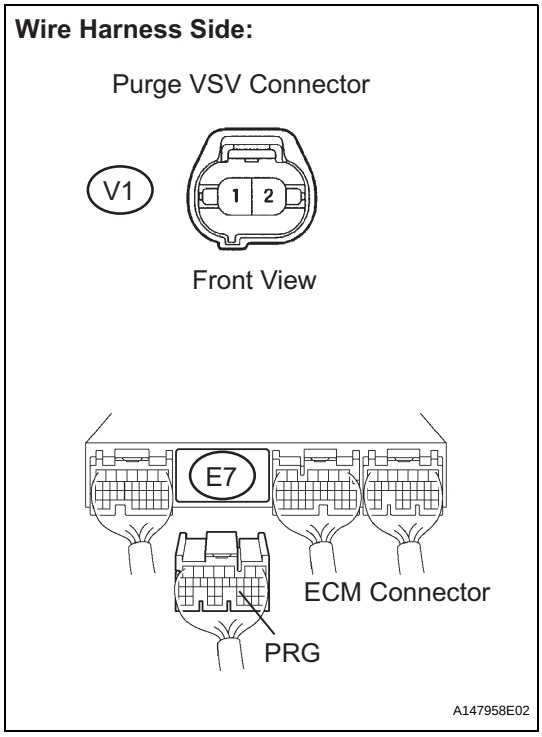
Test Result	Suspected Trouble Area	Proceed to
11 to 14 V	Normal	A
Other than result above	Wire harness or connectors between purge VSV and ECM	B

(d) Reconnect the purge VSV connector.

B	Go to step 31

A

18 CHECK HARNESS AND CONNECTOR (PURGE VSV - ECM)



(a) Disconnect the E7 ECM connector and the V1 purge VSV connector.
(b) Measure the resistance according to the value(s) in the table below..

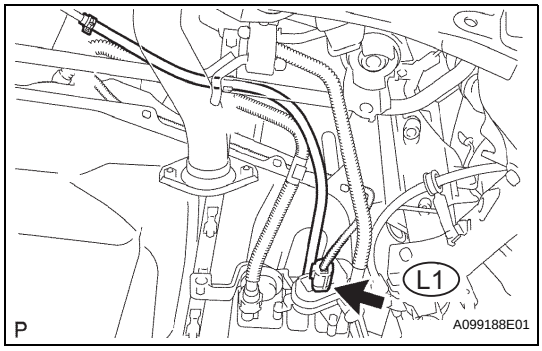
Standard resistance

Tester Connection	Specified Condition
E7-23 (PRG) - V1-2 (Purge VSV)	Below 1 Ω
E7-23 (PRG) - Body ground	10 kΩ or higher
V1-2 (Purge VSV) - Body ground	10 kΩ or higher

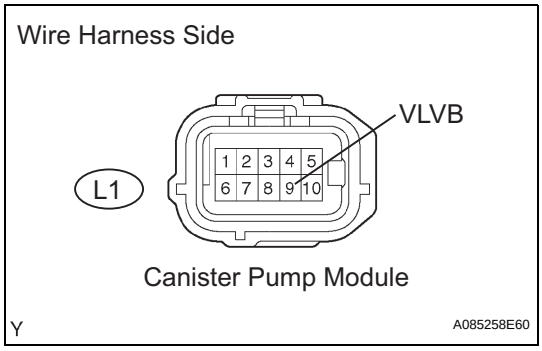
(c) Reconnect the purge VSV connector.
(d) Reconnect the ECM connector.

OK	Go to step 34
NG	Go to step 31

19 INSPECT CANISTER PUMP MODULE (POWER SOURCE FOR VENT VALVE)



(a) Turn the ignition switch off.
(b) Disconnect the L1 canister pump module connector.
(c) Turn the ignition switch to the ON position.



(d) Measure the voltage between the VLVB terminal of the canister pump module connector and body ground.

Result

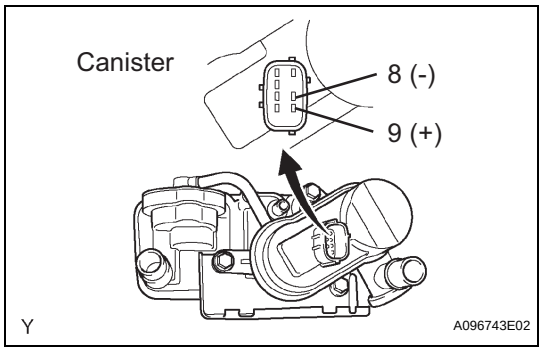
Test Result	Suspected Trouble Area	Proceed to
9 to 14 V	1. Wire harness between vent valve and ECM 2. Vent valve 3. ECM	A
Below 3 V	Power source wire harness of vent valve	B

(e) Reconnect the canister pump module connector.

B → Go to step 31

A

20 INSPECT CANISTER PUMP MODULE (VENT VALVE OPERATION)



(a) Turn the ignition switch off.
(b) Disconnect the L1 canister pump module connector.
(c) Apply battery voltage to the 9 and 8 terminals of the canister pump module.
(d) Touch the canister pump module to confirm the vent valve operation.

Result

Test Result	Suspected Trouble Area	Proceed to
Operating	1. Wire harness between vent valve and ECM 2. ECM	A
Not operating	Vent valve	B

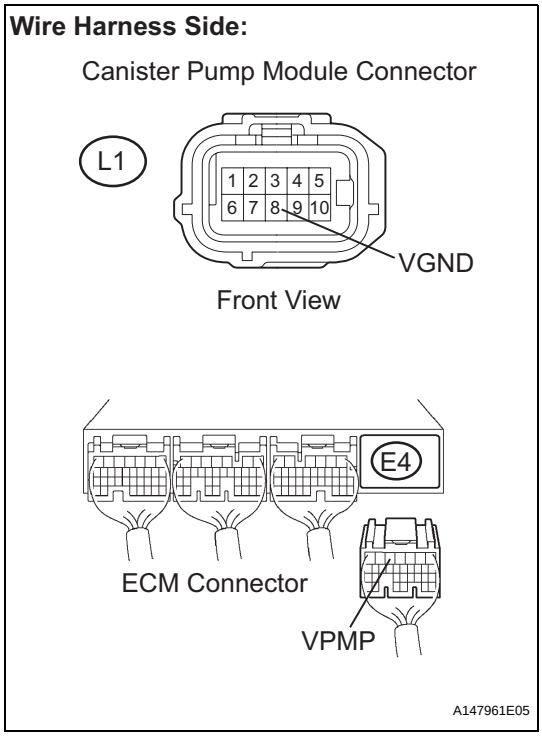
(e) Reconnect the canister connector.

B → Go to step 29

A

ES

21	CHECK HARNESS AND CONNECTOR (ECM - CANISTER PUMP MODULE)



(a) Disconnect the E4 ECM connector.
(b) Disconnect the L1 canister pump module connector.
(c) Measure the resistance between the VPMP terminal of the ECM connector and the VGND terminal of the canister pump module connector.

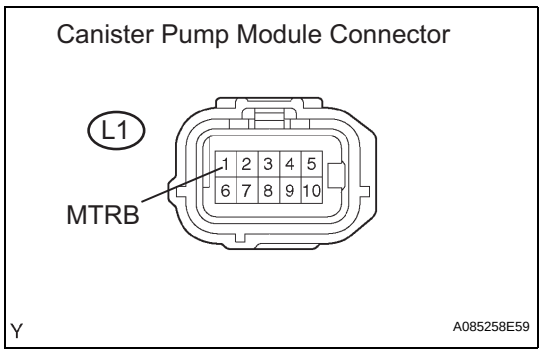
Result

Test Result	Suspected Trouble Area	Proceed to
Below 1 Ω	ECM	A
10 kΩ or higher	Wire harness between ECM and canister pump module	B

(d) Reconnect the ECM connector.
(e) Reconnect the canister pump module connector.

A	Go to step 34
B	Go to step 31

22	PERFORM ACTIVE TEST USING INTELLIGENT TESTER (VACUUM PUMP (ALONE))



(a) Turn the ignition switch off.
(b) Disconnect the L1 canister pump module connector.
(c) Turn the ignition switch to the ON position.
(d) On the intelligent tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VACUUM PUMP.
(e) Measure the voltage between the MTRB terminal of the canister pump module connector and body ground when the leak detection pump is turned ON and OFF using the tester.

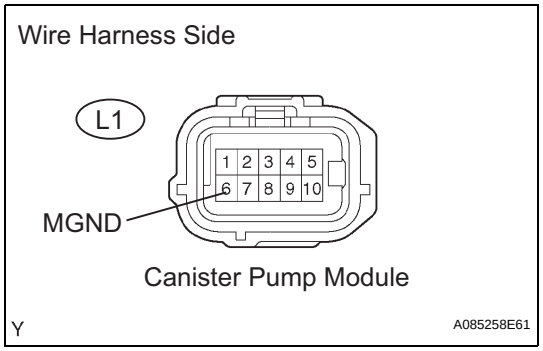
Result

Test Result	Suspected Trouble Area	Proceed to
Below 3 V when OFF 9 to 14 V when ON	1. Wire harness between leak detection pump and body ground 2. Leak detection pump	A
Below 3 V when OFF and ON	1. Wire harness between leak detection pump and ECM 2. ECM	B

B → Go to step 24

A

23 CHECK HARNESS AND CONNECTOR (CANISTER PUMP MODULE - BODY GROUND)



(a) Turn the ignition switch off.
(b) Disconnect the L1 canister pump module connector.
(c) Measure the resistance between the MGND terminal of the canister pump module connector and body ground.

Result

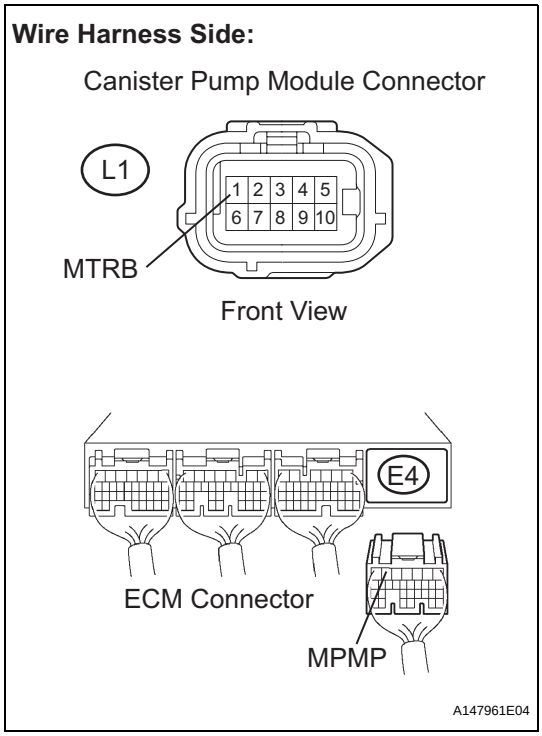
Test Result	Suspected Trouble Area	Proceed to
Below 1 Ω	Leak detection pump	A
10 kΩ or higher	Wire harness between canister pump module and body ground	B

(d) Reconnect the canister pump module connector.

A → Go to step 29

B → Go to step 31

24 CHECK HARNESS AND CONNECTOR (ECM - CANISTER PUMP MODULE)



(a) Turn the ignition switch off.
(b) Disconnect the L1 canister pump module connector.
(c) Disconnect the E4 ECM connector.
(d) Measure the resistance between the MPMP terminal of the ECM connector and the MTRB terminal of the canister pump module connector.

Result

Test Result	Suspected Trouble Area	Proceed to
Below 1 Ω	ECM	A
10 kΩ or higher	Wire harness between ECM and canister pump module	B

(e) Reconnect the canister pump module connector.
(f) Reconnect the ECM connector.

A	Go to step 34
B	Go to step 31

25 INSPECT INTAKE MANIFOLD (EVAP PURGE PORT)

(a) Stop the engine.
(b) Disconnect the EVAP hose from the intake manifold.
(c) Start the engine.
(d) Use your finger to confirm that the port of the intake manifold has suction.

Result

Test Result	Suspected Trouble Area	Proceed to
Suction applied	EVAP hose between intake manifold and purge VSV	A
No suction	Intake manifold	B

(e) Reconnect the EVAP hose.

A	Go to step 32
B	Go to step 33

26	CORRECTLY REINSTALL OR REPLACE FUEL CAP

HINT:
- When reinstalling the fuel cap, tighten it until a few click sounds are heard.
- When replacing the fuel cap, use a fuel cap that meets OEM specifications, and install it until a click sounds are heard.

NEXT	Go to step 36

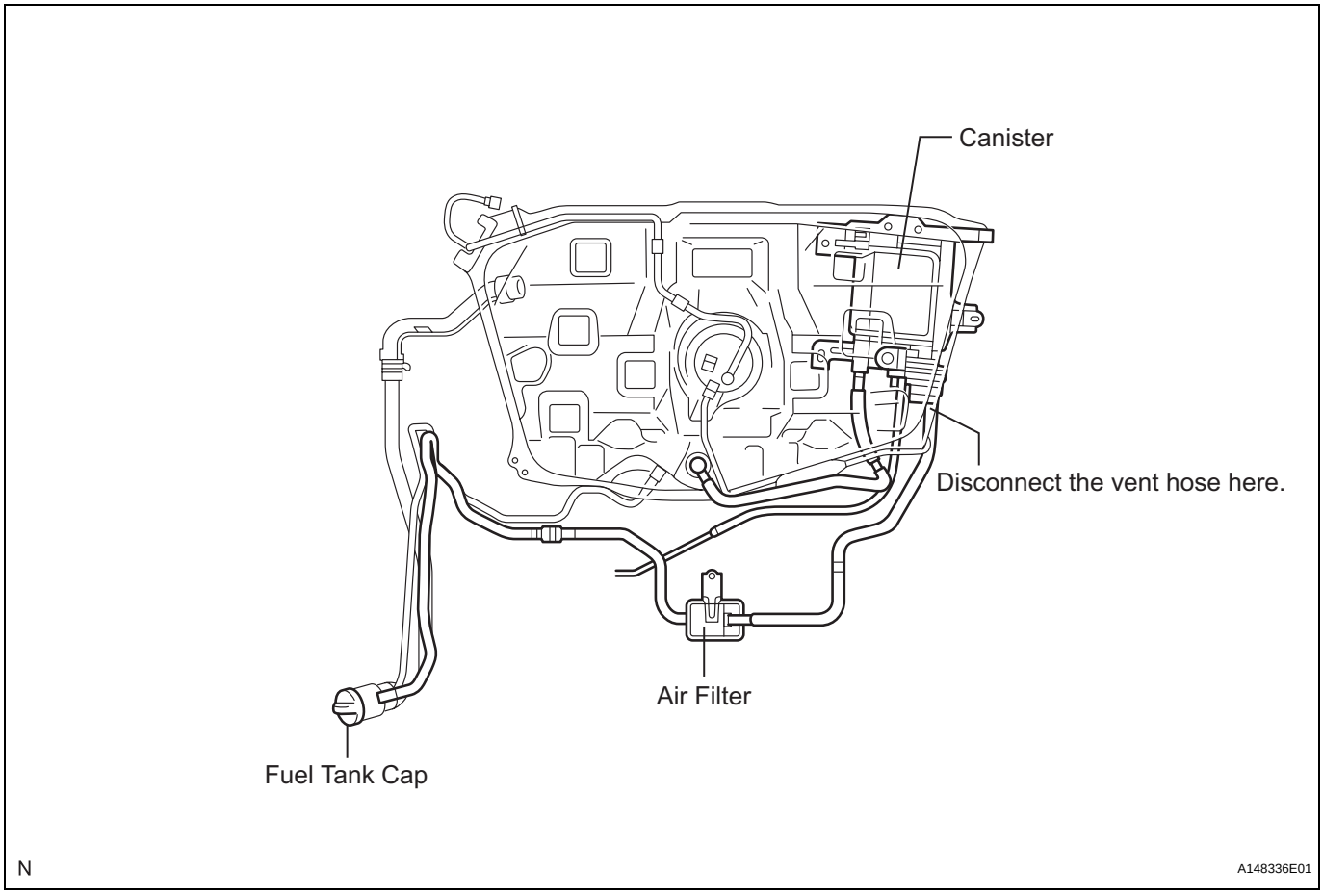
27	REPLACE FUEL CAP

HINT:
When installing the fuel cap, tighten it until a few click sounds are heard.

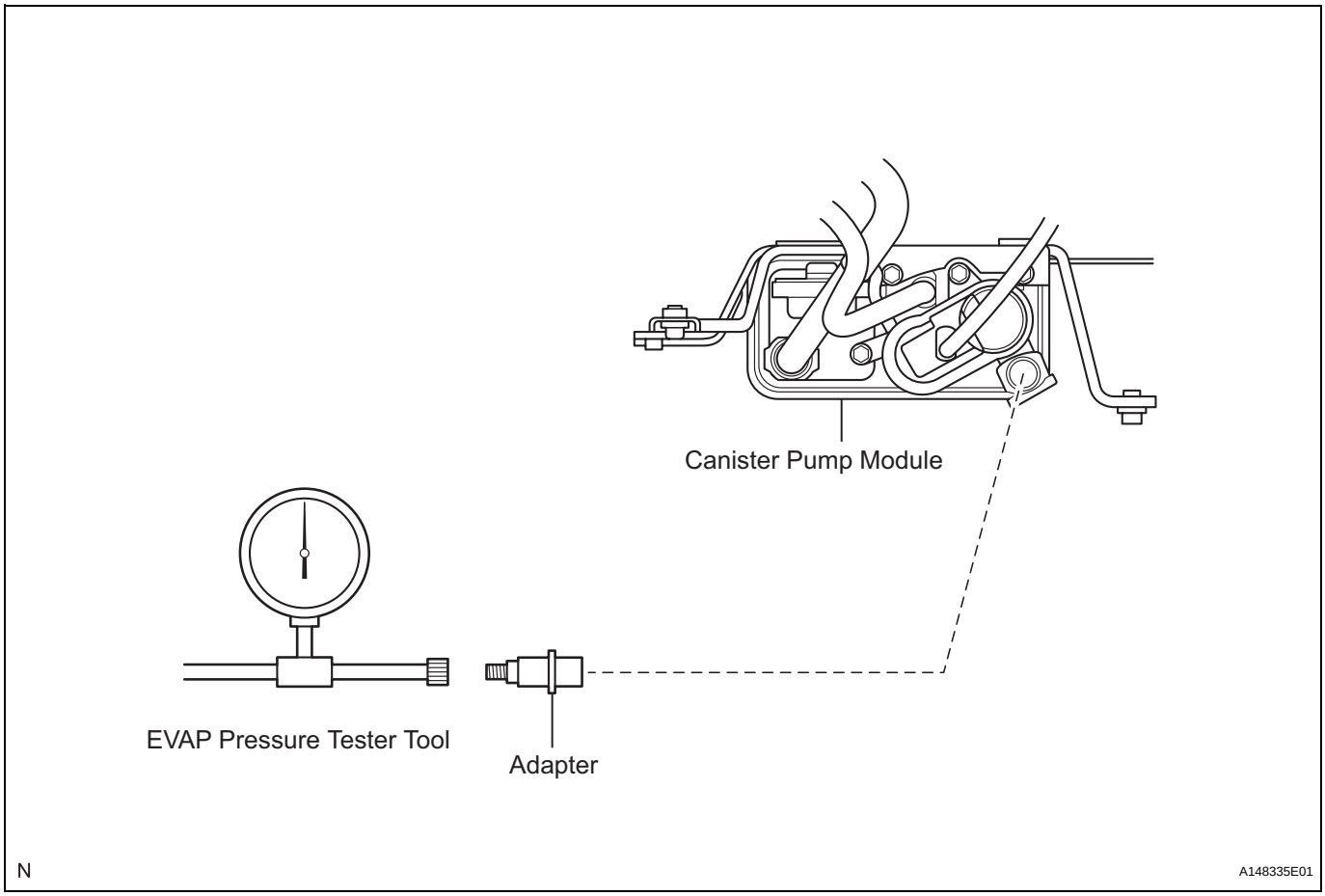
NEXT	Go to step 36

28	LOCATE EVAP LEAK PART

(a) Disconnect the vent hose.



(b) Connect the EVAP pressure tester tool to the canister pump module with the adapter.



(c) Pressurize the EVAP system to 3.2 to 3.7 kPa (24 to 28 mmHg).
(d) Apply soapy water to the piping and connecting parts of the EVAP system.
(e) Look for areas where bubbles appear. This indicates the leak point.
(f) Repair or replace the leak point.
HINT:
Disconnect the hose between the canister and the fuel tank from the canister. Block the canister side and conduct an inspection. In this way, the fuel tank can be excluded as an area suspected of causing fuel leaks.

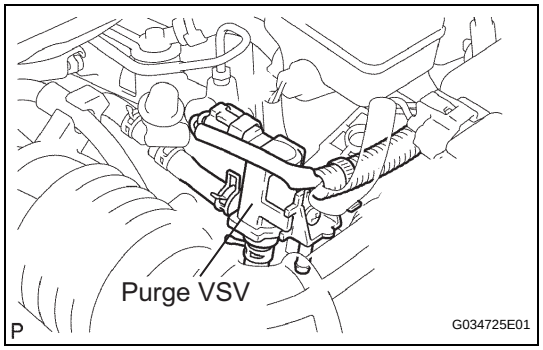
NEXT	Go to step 36

29	REPLACE CHARCOAL CANISTER ASSEMBLY

(a) Replace the canister assembly (See page EC-5).

NEXT	Go to step 36

30	REPLACE DUTY VACUUM SWITCHING VALVE (PURGE VSV)



(a) Disconnect the connector and the hoses from the purge VSV.
(b) Remove the purge VSV.
(c) Install a new purge VSV.
(d) Reconnect the connector and hoses.

NEXT → Go to step 36

ES

31	REPAIR OR REPLACE HARNESS OR CONNECTOR

NEXT → Go to step 36

32	REPLACE EVAP HOSE (INTAKE MANIFOLD - PURGE VSV)

NEXT → Go to step 36

33	INSPECT INTAKE MANIFOLD (EVAP PURGE PORT)

(a) Check that the EVAP purge port of the intake manifold is not clogged. If necessary, replace the intake manifold.

NEXT → Go to step 36

34	REPLACE ECM

(a) Replace the ECM (See page ES-407).

NEXT → Go to step 36

35	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 36

36	PERFORM EVAP SYSTEM CHECK (AUTO OPERATION)

NOTICE:

- **The EVAP SYSTEM CHECK (AUTO OPERATION) consists of 5 steps performed automatically by the intelligent tester. It takes a maximum of approximately 18 minutes.**
- **Do not perform the EVAP 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 EVAP SYSTEM CHECK, keep the temperature below 35°C (95°F).**

(a) Clear the DTCs (See page ES-32).

(b) On the intelligent tester, select the following menu items: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK / EVAP SYS CHECK / AUTO OPERATION.

(c) After the SYSTEM CHECK is completed, check for pending DTCs by selecting the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
HINT:
If no pending DTCs are found, the repair has been successfully completed.

NEXT

COMPLETED

CONFIRMATION DRIVING PATTERN

HINT:
After a repair, check Monitor Status by performing the Key-Off Monitor Confirmation and Purge Flow Monitor Confirmation described below.

1. KEY-OFF MONITOR CONFIRMATION

(a) Preconditions
The monitor will not run unless:
- The vehicle has been driven for 10 minutes or more (in a city area or on a freeway).
- The fuel tank is less than 90% full.
- The altitude is less than 8,000 ft (2,400 m).
- The Engine Coolant Temperature (ECT) is between 4.4°C and 35°C (40°F and 95°F).
- The Intake Air Temperature (IAT) is between 4.4°C and 35°C (40°F and 95°F).
- The vehicle remains stationary (the vehicle speed is 0 mph (0 km/h)).

(b) Monitor Conditions
1. Allow the engine to idle for at least 5 minutes.
2. Turn the ignition switch off and wait for 6 hours (8 or 10.5 hours).
HINT:
Do not start the engine until checking MONITOR STATUS. If the engine is started, the steps described above must be repeated.

(c) Monitor Status
1. Connect the intelligent tester to the DLC3.
2. Turn the ignition switch to the ON position and turn the tester on.
3. Select the following menu items: DIAGNOSIS / ENHANCED OBD II / MONITOR STATUS.
4. Check the Monitor Status displayed on the tester.
HINT:
If INCMP is displayed, the monitor is not complete. Make sure that the preconditions have been met, and perform the Monitor Conditions again.

2. PURGE FLOW MONITOR CONFIRMATION (P0441)

HINT:
Perform this monitor confirmation after the Key-Off Monitor Confirmation shows COMPL (complete).

(a) Preconditions
The monitor will not run unless:
- The vehicle has been driven for 10 minutes or more (in a city area or on a freeway)
- The ECT is between 4.4°C and 35°C (40°F and 95°F)
- The IAT is between 4.4°C and 35°C (40°F and 95°F)

(b) Monitor Conditions
1. Release the pressure from the fuel tank by removing and reinstalling the fuel cap.
2. Warm the engine up until the ECT reaches more than 75°C (167°F).
3. Increase the engine speed to 3,000 rpm once.
4. Allow the engine to idle and turn A/C ON for 1 minute.

(c) Monitor Status
1. Turn the ignition switch off (if ON or the engine is running).
2. Connect the intelligent tester to the DLC3.
3. Turn the ignition switch to the ON position and turn the tester on.
4. Select the following menu items: DIAGNOSIS / ENHANCED OBD II / MONITOR STATUS.
5. Check the Monitor Status displayed on the tester.
HINT:
If INCMP is displayed, the monitor is not complete. Make sure that the preconditions have been met, and perform the Monitor Conditions again.

MONITOR RESULT

Refer to CHECKING MONITOR STATUS (See page ES-15).

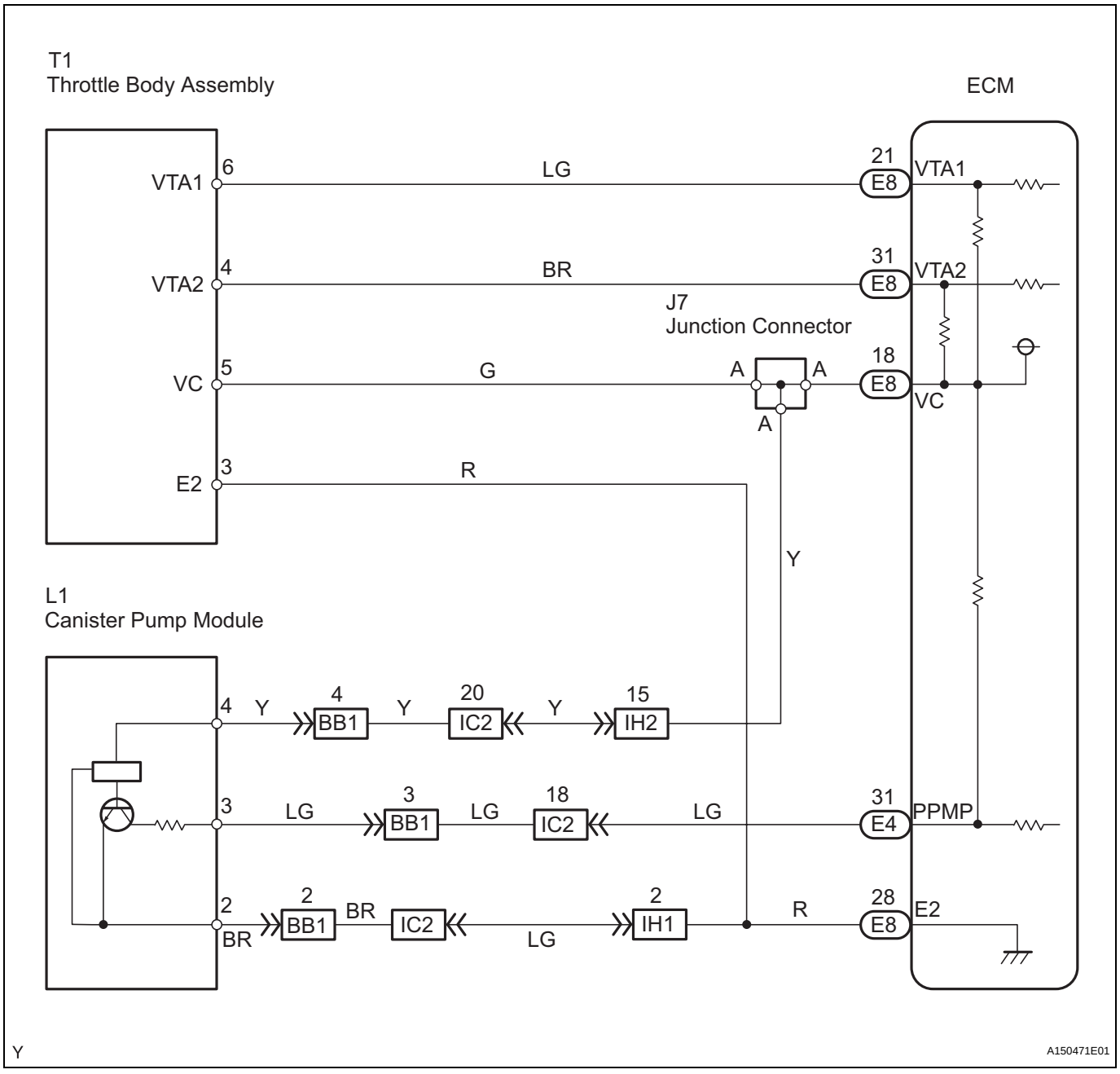
ES

VC Output Circuit

DESCRIPTION

The VC voltage (5 V) is generated in the ECM. The voltage is used to supply power to the throttle position sensor, canister pump module, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK MIL

(a) Check that MIL (Malfunction Indicator Lamp) lights up when turning the ignition switch to the ON position.

Standard:
MIL lights up

OK → **SYSTEM OK**

NG

2 CHECK CONNECTION BETWEEN INTELLIGENT TESTER AND ECM

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the intelligent tester on.
(c) Check the communication between the intelligent tester and ECM.

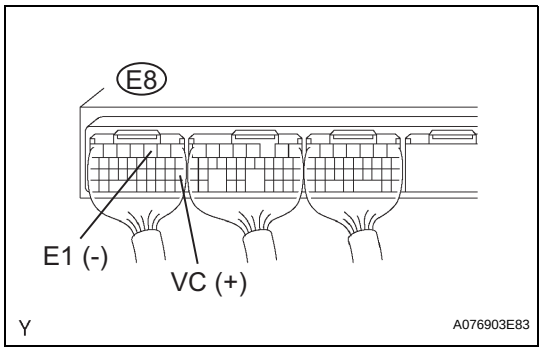
Result

Condition	Proceed to
Communication is possible	A
Communication is not possible	B

A → **GO TO MIL CIRCUIT**

B

3 INSPECT ECM (VC VOLTAGE)



(a) Turn the ignition switch to the ON position.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
E8-18 (VC) - E8-3 (E1)	Voltage is not 5 V

NEXT

4 CHECK MIL (THROTTLE POSITION SENSOR)

(a) Disconnect the T1 throttle body connector.
(b) Turn the ignition switch to the ON position.
(c) Check the MIL.

Result

Condition	Proceed to
MIL illuminates	A
MIL does not illuminate	B

A → **REPLACE THROTTLE BODY**

B

5 CHECK MIL (CANISTER PUMP MODULE)

(a) Disconnect the T1 throttle body connector.
(b) Turn the ignition switch to the ON position.
(c) Check the MIL.

Result

Condition	Proceed to
MIL illuminates	A
MIL does not illuminate	B

A → **REPLACE CANISTER**

B

6 CHECK WIRE HARNESS (ECM - BODY GROUND)

(a) Disconnect the T1 throttle body connector.
(b) Disconnect the L1 canister pump module connector.
(c) Disconnect the E8 ECM connector.
(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
E8-18 (VC) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

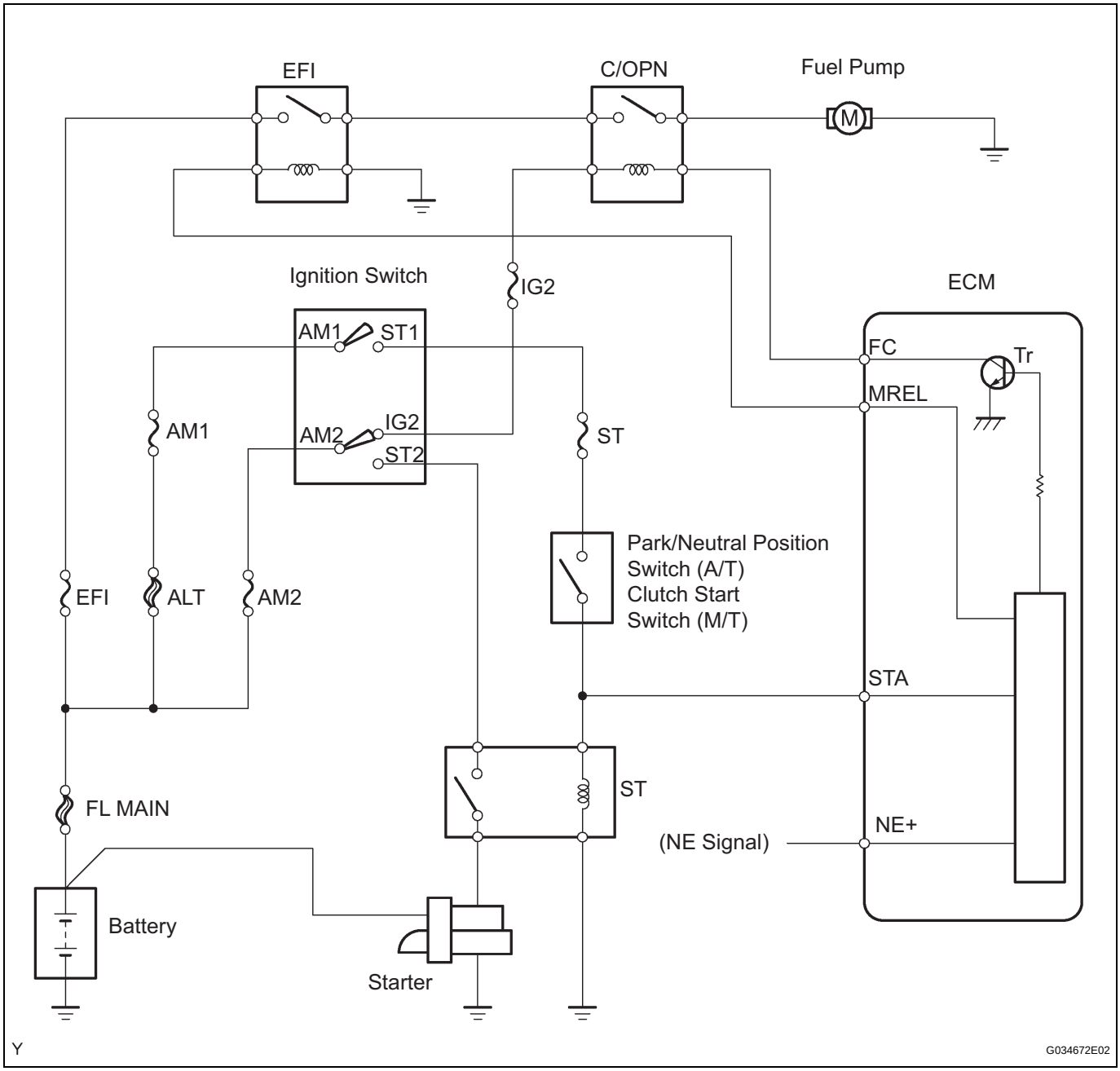
REPLACE ECM

Fuel Pump Control Circuit

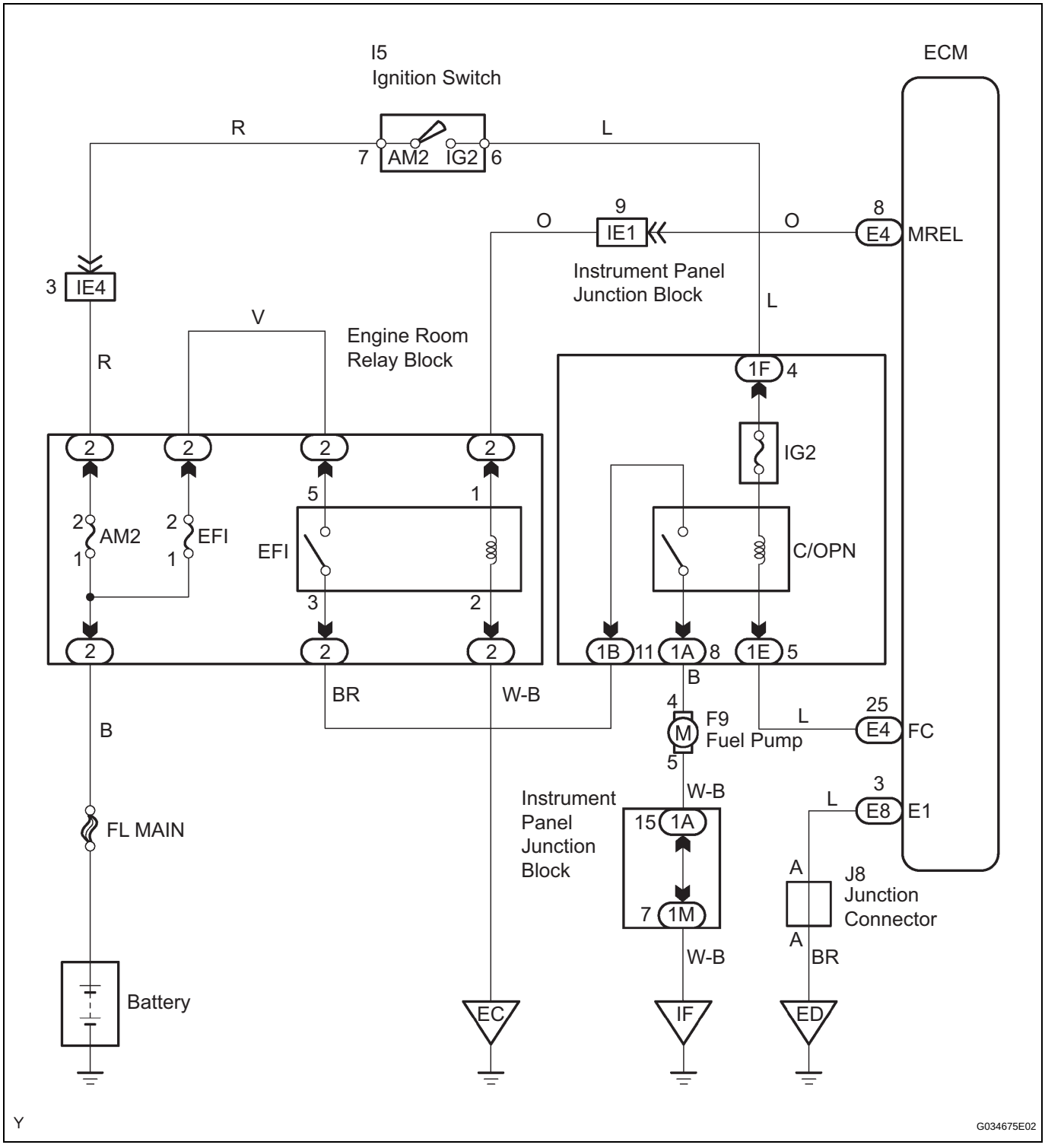
DESCRIPTION

When the engine is cranked, a current flows from terminal ST2 of the ignition switch into the starter relay (Marking: ST) coil and a current also flows into terminal STA of the ECM (STA signal).
When the STA and NE signals are received by the ECM, Tr (power transistor) is switched ON, allowing a current to flow into the circuit opening relay coil. The circuit opening relay (Marking: C/OPN) switches ON, power is supplied to the fuel pump and the fuel pump operates.
While the NE signal is being generated (engine running), the ECM keeps Tr ON, therefore keeping the circuit opening relay ON, so that the fuel pump continues to operate.

ES



WIRING DIAGRAM



INSPECTION PROCEDURE

1	**PERFORM ACTIVE TEST USING INTELLIGENT TESTER (OPERATION OF CIRCUIT OPENING RELAY)**

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position and turn the tester on.

(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / FUEL PUMP/SPD.
(d) Check whether operating sounds can be heard while operating the relay using the tester.
OK:
Operating sounds can be heard from relay.

OK → **Go to step 7**

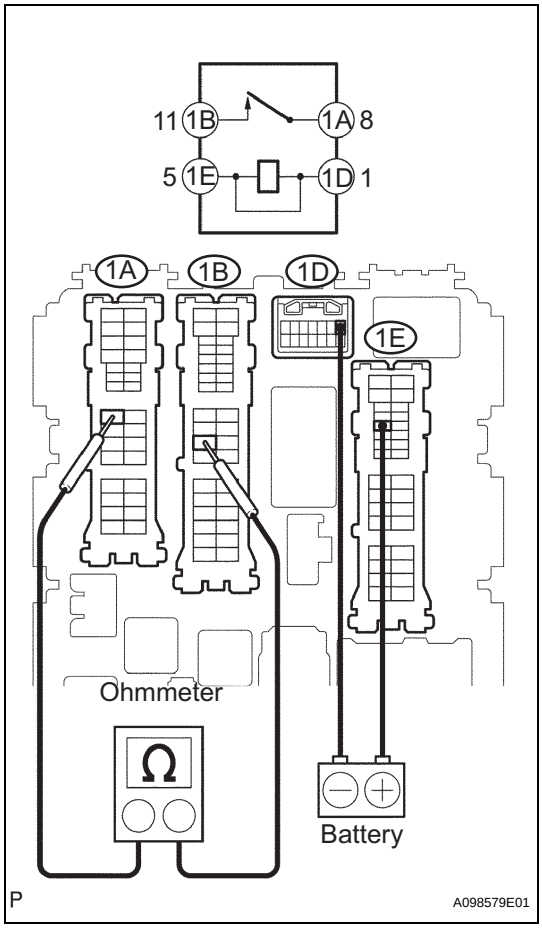
NG

2	INSPECT ECM POWER SOURCE CIRCUIT

NG → **REPAIR OR REPLACE POWER SOURCE CIRCUIT**

OK

3	INSPECT CIRCUIT OPENING RELAY (C/OPN)



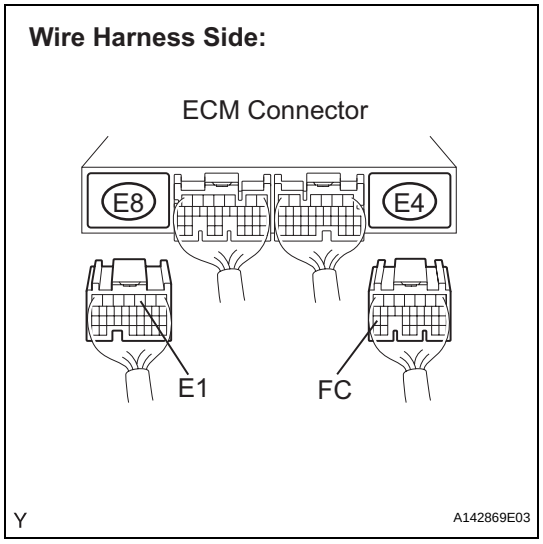
(a) Disconnect the 1A, 1B, 1D and 1E instrument panel junction block connectors.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
1B (11) - 1A (8)	10 kΩ or higher
1B (11) - 1A (8)	Below 1 Ω (when battery voltage is applied to terminals 1E (5) and 1D (1))

NG → **REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY**

OK

4	INSPECT ECM (FC VOLTAGE)



(a) Disconnect the E4 and E8 connectors.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

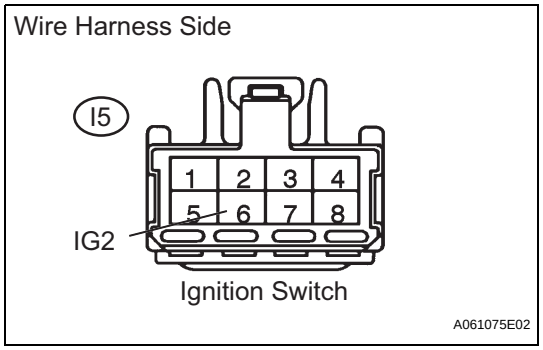
Standard voltage

Tester Connection	Specified Condition
FC (E4-25) - E1 (E8-1)	9 to 14 V

OK → **REPLACE ECM**

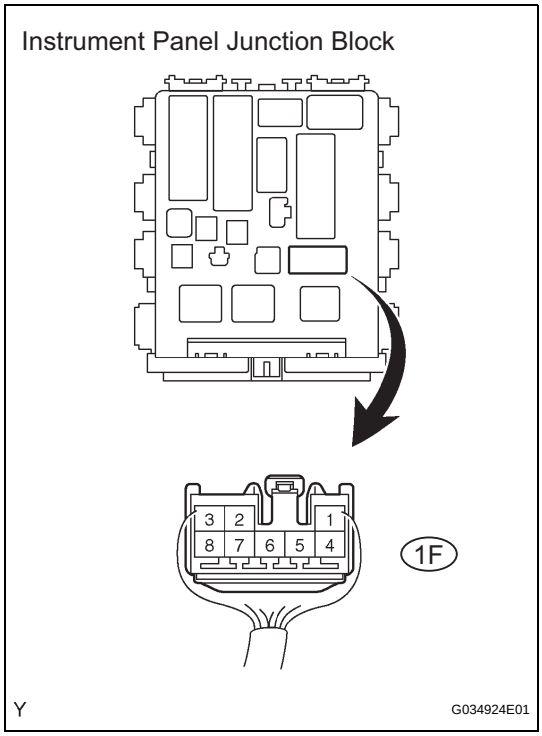
NG

5	CHECK WIRE HARNESS (IGNITION SWITCH - CIRCUIT OPENING RELAY (C/OPN))



(a) Disconnect the I5 ignition switch connector.

ES



(b) Disconnect the 1F instrument panel junction block connector.
(c) Measure the resistance according to the value(s) in the table below.

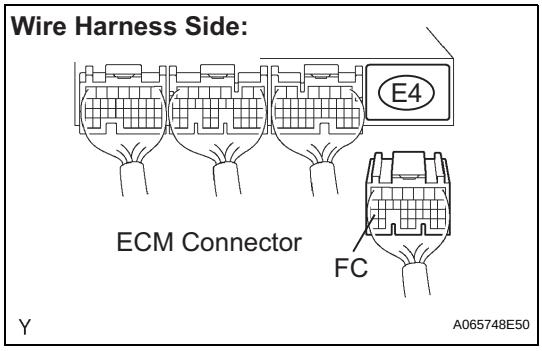
Standard resistance

Tester Connection	Specified Condition
IG2 (I5-6) - Instrument panel junction block (1F-4)	Below 1 Ω
IG2 (I5-6) or Instrument panel junction block (1F-4) - Body ground	10 kΩ or higher

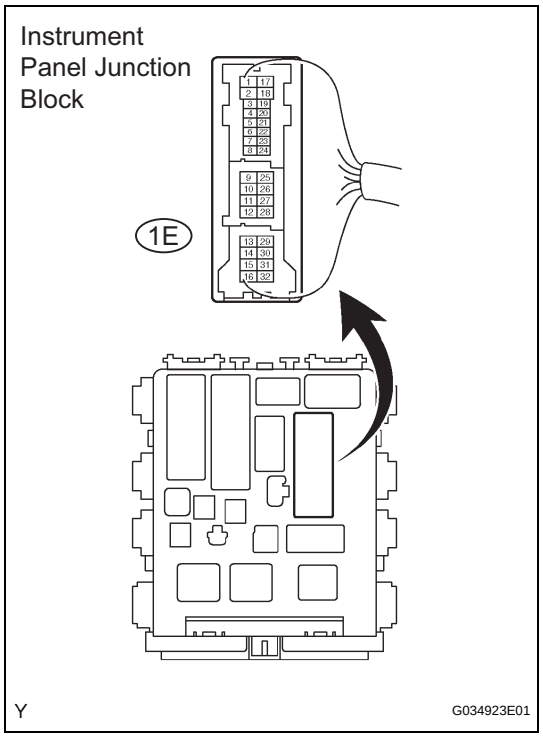
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

6 CHECK WIRE HARNESS (ECM - CIRCUIT OPENING RELAY)



(a) Disconnect the E4 ECM connector.



(b) Disconnect the 1E instrument panel junction block connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
FC (E4-25) - Instrument panel junction block (1E-5)	Below 1 Ω
FC (E4-25) or Instrument panel junction block (1E-5) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE ECM

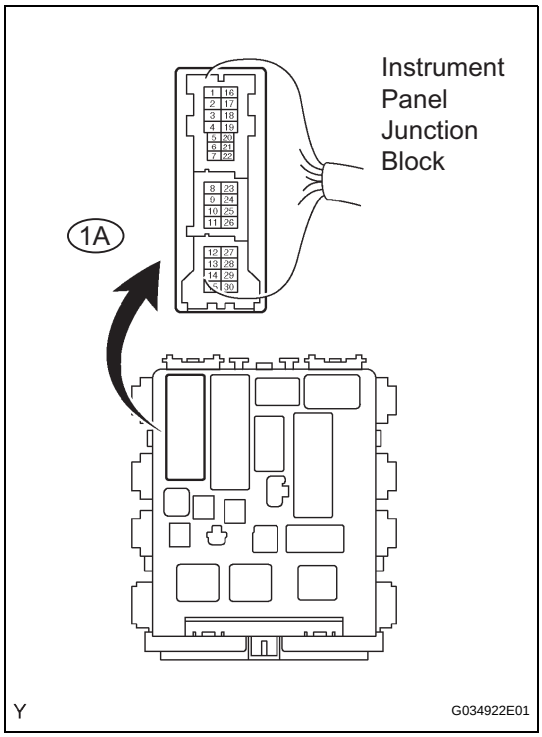
7 INSPECT FUEL PUMP

(a) Inspect the fuel pump (See page FU-21).

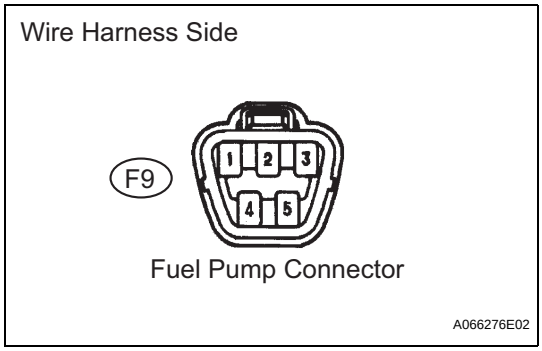
NG → **REPLACE FUEL PUMP**

OK

8	CHECK WIRE HARNESS (FUEL PUMP - CIRCUIT OPENING RELAY (C/OPN), BODY GROUND)



(a) Disconnect the 1A instrument panel junction block connector.



(b) Disconnect the F9 fuel pump connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
Instrument panel junction block (1A-8) - Fuel pump (F9-4)	Below 1 Ω
Fuel pump (F9-5) - Body ground	Below 1 Ω
Instrument panel junction block (1A-8) or Fuel pump (F9-4) - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

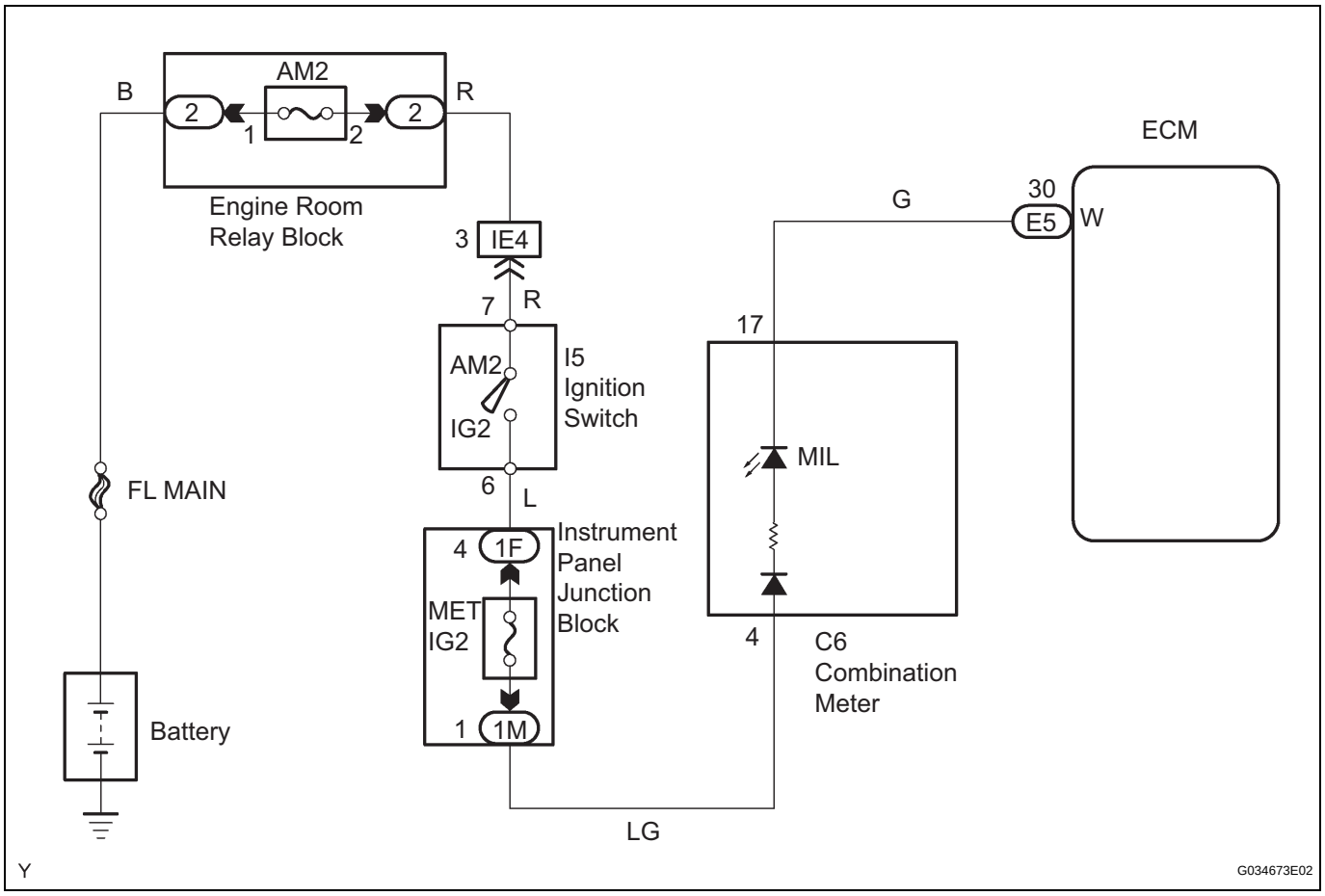
CHECK AND REPAIR HARNESS AND CONNECTOR (EFI RELAY - CIRCUIT OPENING RELAY)

MIL Circuit

DESCRIPTION

The Malfunction Indicator Lamp (MIL) is used to indicate vehicle malfunction detected by the ECM.
By turning the ignition switch to the ON position, power is supplied to the MIL circuit, and the ECM provides the circuit ground which illuminates the MIL.
The MIL operation can be checked visually. When the ignition switch is first turned to the ON position, the MIL should be illuminated and should then turn off. If the MIL remains illuminated or is not illuminated, conduct the following troubleshooting procedure using the intelligent tester.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK THAT MIL IS ILLUMINATED

(a) Perform troubleshooting in accordance with the chart below.
Result

Condition	Proceed to
MIL remains illuminated	A
MIL not illuminated	B

B	Go to step 4

A

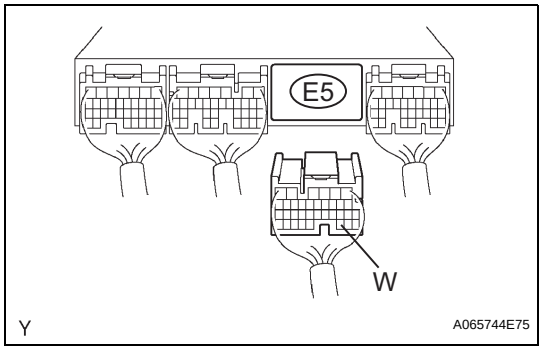
2	CHECK WHETHER MIL TURNS OFF

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Check whether any DTCs have been stored (See page ES-32). Note them down if necessary.
(e) Clear the DTCs (See page ES-32).
(f) Check if the MIL turns off.
OK:
MIL should turn off.

OK	REPAIR CIRCUIT INDICATED BY OUTPUT DTC

NG

3	CHECK WIRE HARNESS (FOR SHORT)



(a) Disconnect the E5 ECM connector.
(b) Turn the ignition switch to the ON position.
(c) Check that the MIL is not illuminated.
OK:
MIL is not illuminated

OK	REPLACE ECM

NG

CHECK AND REPAIR HARNESS AND CONNECTOR (COMBINATION METER - ECM)

4	CHECK THAT MIL IS ILLUMINATED

(a) Check if the MIL is illuminated when the ignition switch is turned to the ON position.
OK:
MIL should be illuminated.

OK	SYSTEM OK

NG

5	CHECK THAT ENGINE STARTS

(a) Turn the ignition switch to the ON position.
(b) Start the engine.

Result

Result	Proceed to
Engine starts	A
Engine does not start*	B

HINT:
*: The intelligent tester cannot communicate with the ECM.

B → **GO TO VC OUTPUT CIRCUIT**

A

6 INSPECT COMBINATION METER (MIL CIRCUIT)

(a) See the combination meter troubleshooting procedure (See page ME-4).

NG → **REPAIR OR REPLACE BULB OR COMBINATION METER ASSEMBLY**

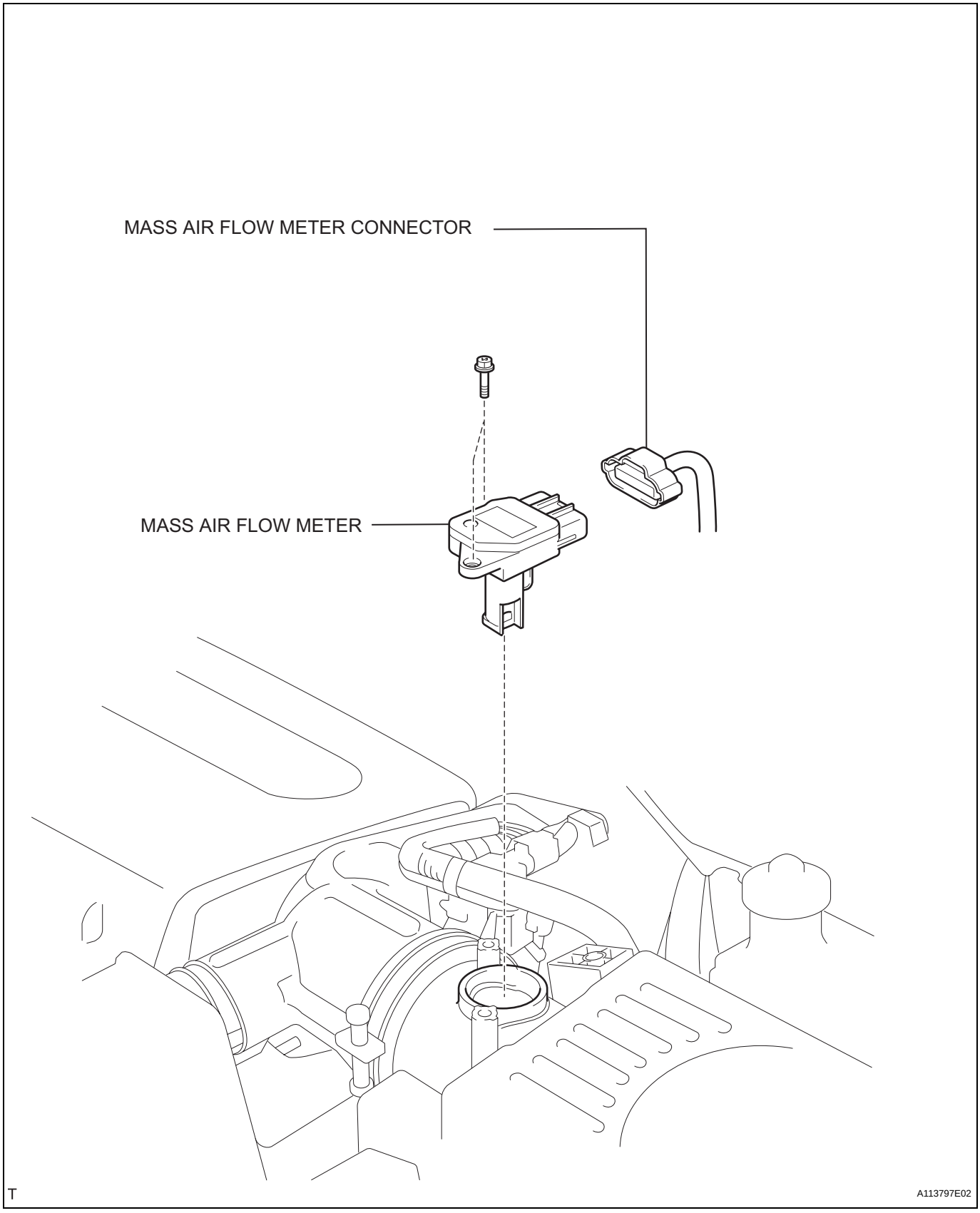
OK

CHECK AND REPAIR HARNESS AND CONNECTOR (COMBINATION METER - ECM)

MASS AIR FLOW METER

COMPONENTS

ES

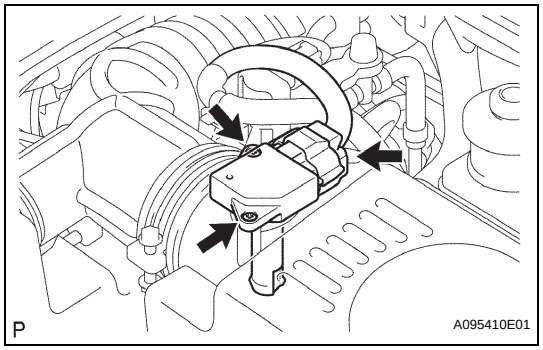


REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



2. REMOVE MASS AIR FLOW METER

(a) Disconnect the mass air flow meter connector.

(b) Remove the 2 screws and mass air flow meter.

INSPECTION

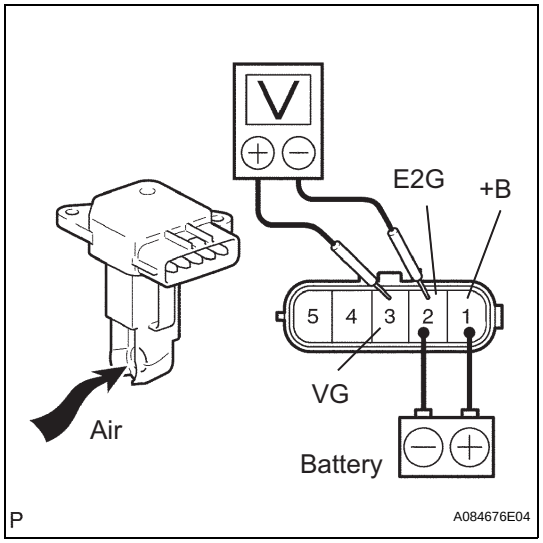
1. INSPECT MASS AIR FLOW METER

(a) Measure the voltage to check the mass air flow sensor.

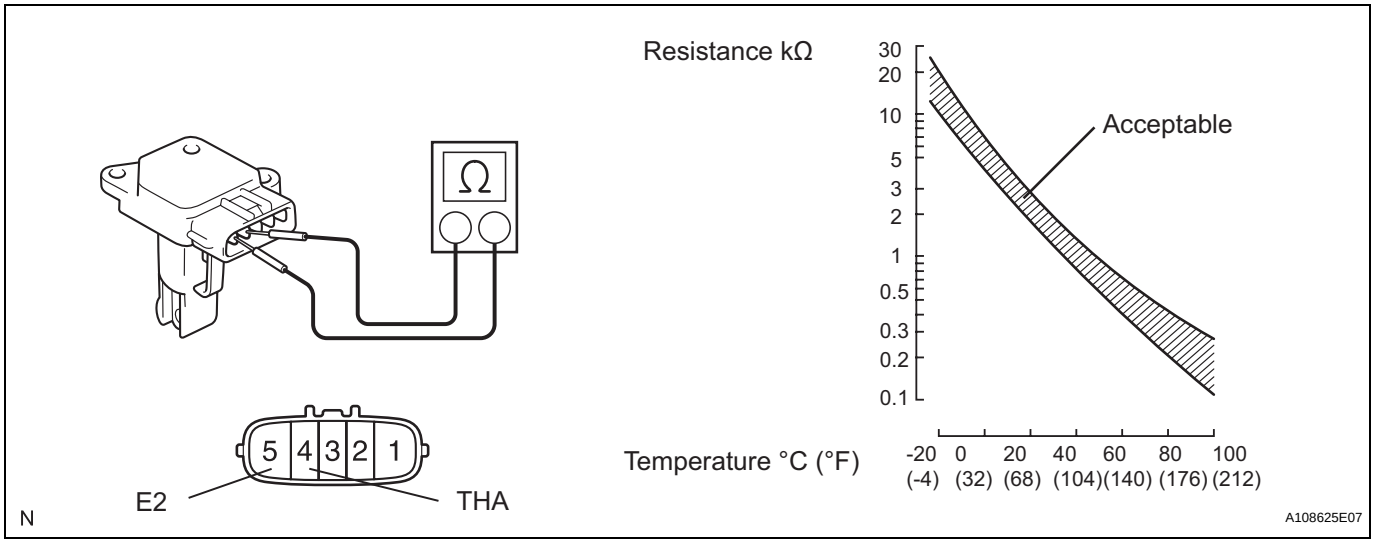
(1) Apply battery voltage across terminals 1 (+B) and 2 (E2G).

(2) Using a voltmeter, connect the positive (+) tester probe to terminal 3 (VG), and negative (-) tester probe to terminal 2 (E2G).

(3) Blow air into the mass air flow meter, and then check that the voltage fluctuates.
If the voltage does not fluctuate, replace the mass air flow meter.



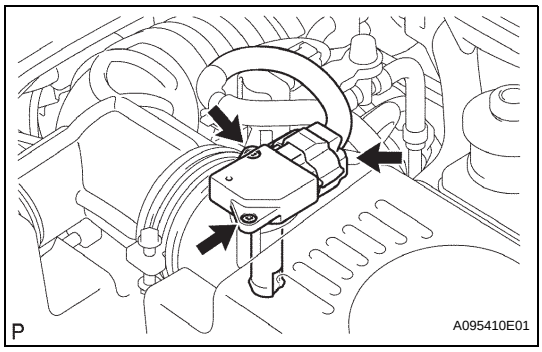
(b) Measure the resistance to check the intake air temperature sensor.



(1) Using an ohmmeter, measure the resistance between the terminals 4 (THA) and 5 (E2).
Standard resistance

Tester Connection	Specified Condition
4 (THA) - 5 (E2)	13.6 to 18.4 kΩ at -20°C (-4°F)
4 (THA) - 5 (E2)	2.21 to 2.69 kΩ at 20°C (68°F)
4 (THA) - 5 (E2)	0.493 to 0.667 kΩ at 60°C (140°F)

If the result is not as specified, replace the mass air flow meter.



INSTALLATION

1. INSTALL MASS AIR FLOW METER

(a) Install the mass air flow meter with the 2 screws.
NOTICE:
Make sure that the O-ring is not cracked or jammed when installing.

(b) Connect the mass air flow meter connector.

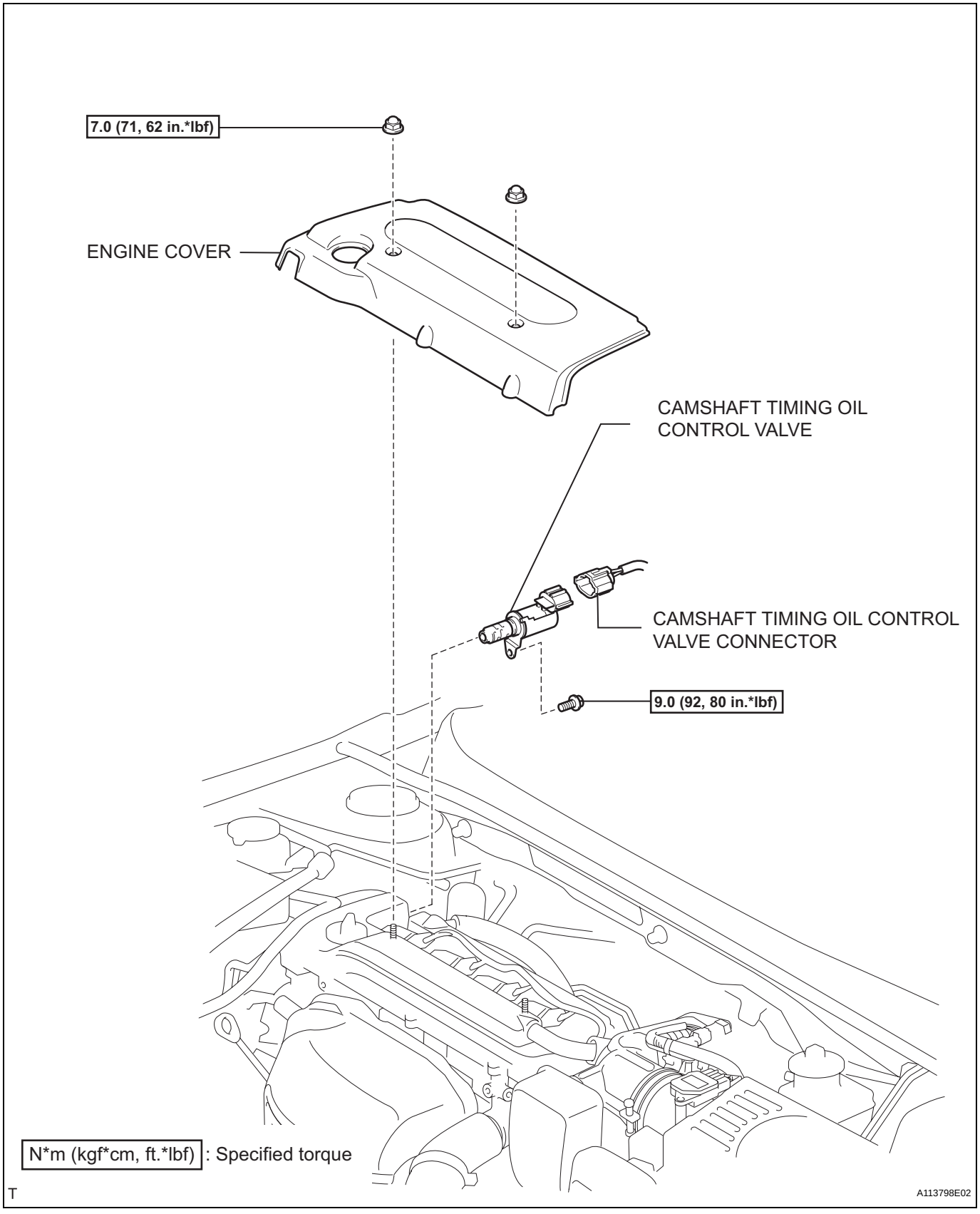
2. CONNECT CABLE TO BATTERY NEGATIVE TERMINAL

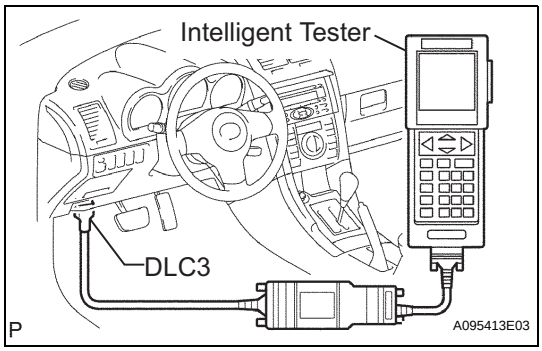
3. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY

COMPONENTS





ON-VEHICLE INSPECTION

1. CHECK CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY

(a) Check the operation.

(1) Connect the intelligent tester to the DLC3.

(2) Turn the ignition switch ON.

(3) Turn the Intelligent tester main switch ON.

(4) Start and warm up the engine.

(5) Select the menu items: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VVT CTRL B1.

(6) Operate the OCV using the intelligent tester, and then check the engine speed.

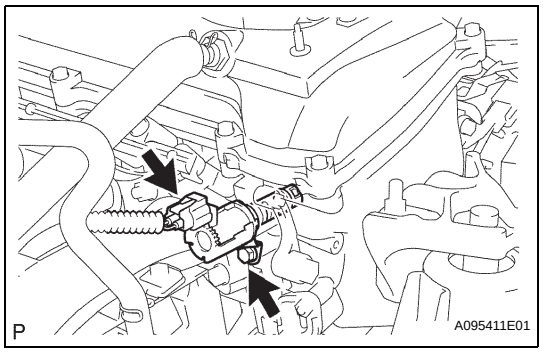
Standard condition

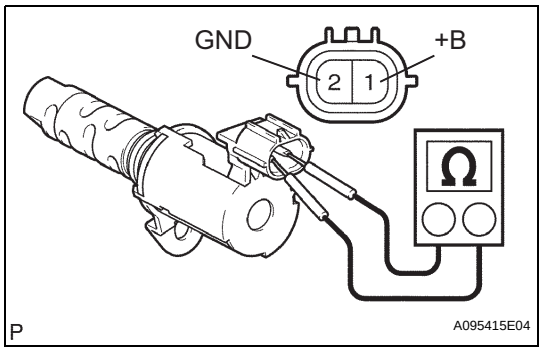
Tester Operation	Specified Condition
OCV is OFF	**Normal engine speed**
OCV is ON	**Rough idling or engine stalls**

If the operation is not as specified, check the oil control valve, wire harness and ECM.

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE ENGINE COVER (See page ES-382)**
3. **REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY**
   (a) Disconnect the oil control valve connector.
   (b) Remove the bolt and oil control valve.





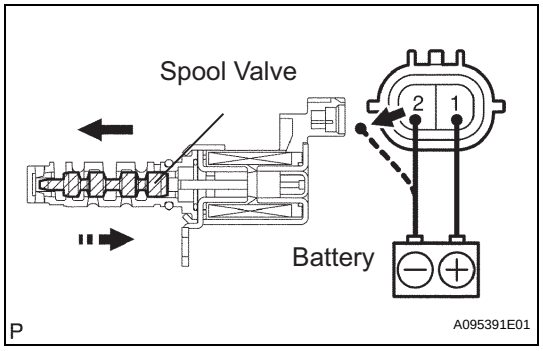
INSPECTION

1. **INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY**
   (a) Measure the resistance of the oil control valve.
   Standard resistance

Tester Connection	Specified Condition
1 (+B) - 2 (GND)	6.9 to 7.9 Ω at 20°C (68°F)

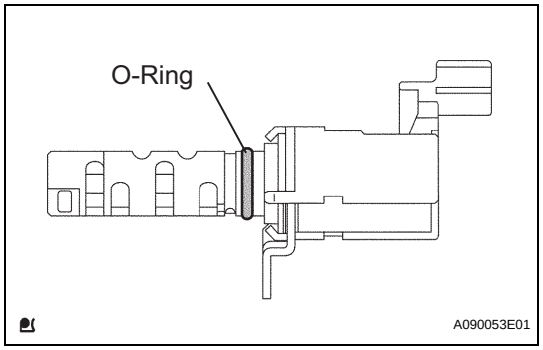
   If the result is not as specified, replace the oil control valve assembly.

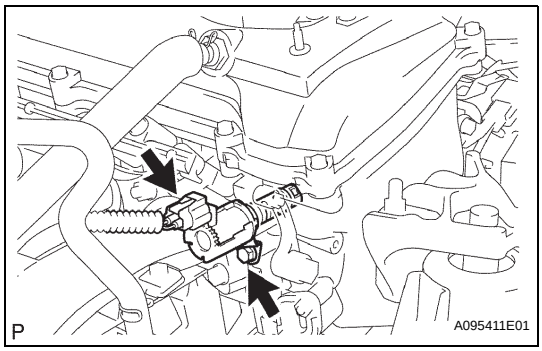
   (b) Check the operation.
   (1) Apply battery voltage across the terminals and check that the spool valve operates.
   NOTICE:
   Check that the spool valve is not stuck.
   HINT:
   The spool valve may not return if foreign objects are caught in it. This may cause subtle pressure leaks to the advance side, and a DTC may be set.



INSTALLATION

1. **INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY**
   (a) Apply a light coat of engine oil to the O-ring of the oil control valve.





(b) Install the oil control valve with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
NOTICE:
Make sure that the O-ring is not cracked or jammed.
(c) Connect the oil control valve connector.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

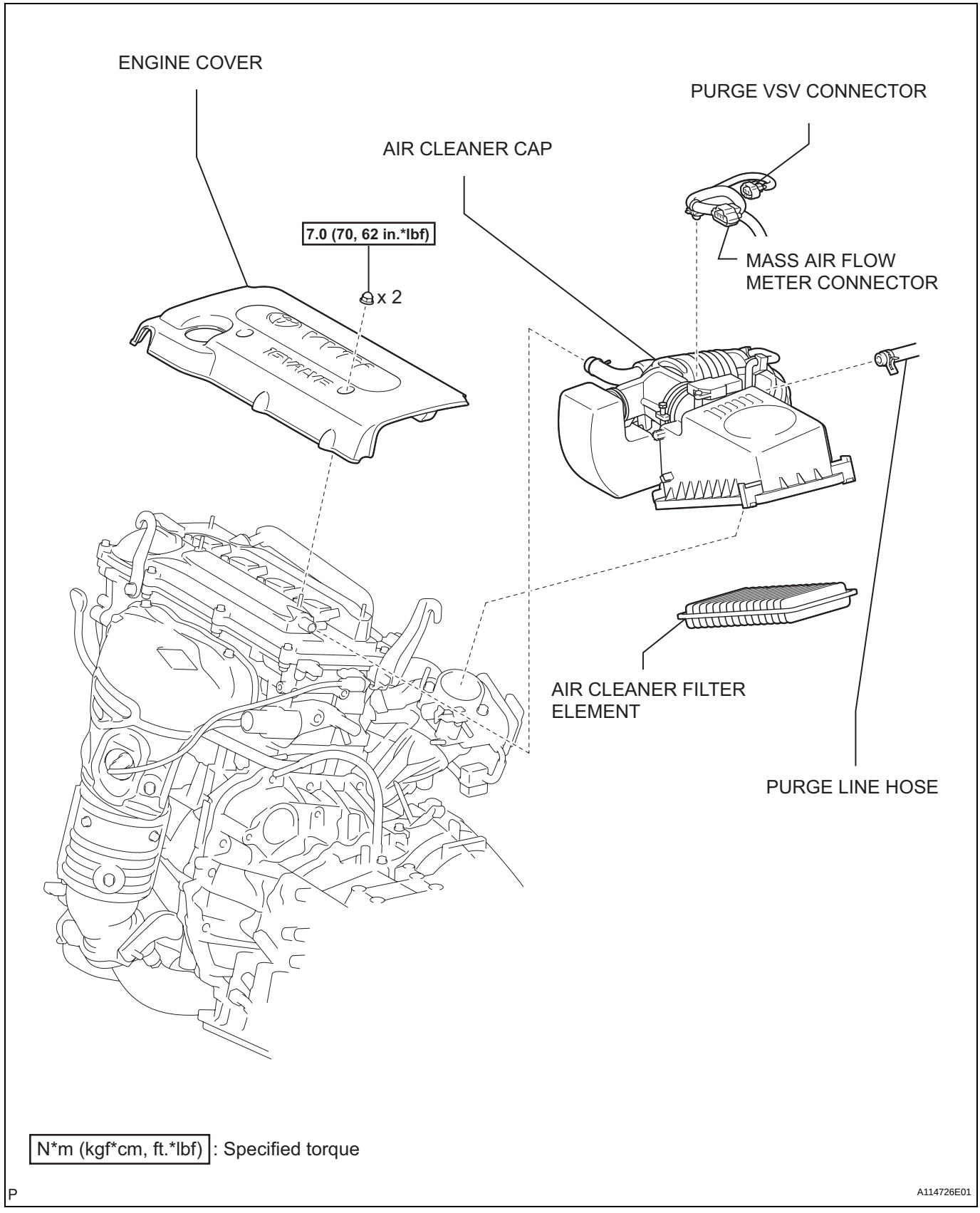
3. CHECK FOR ENGINE OIL LEAKS
(a) Start the engine, and check that there are no oil leaks.

4. INSTALL ENGINE COVER (See page ES-389)

5. PERFORM INITIALIZATION
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

CAMSHAFT POSITION SENSOR

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

P

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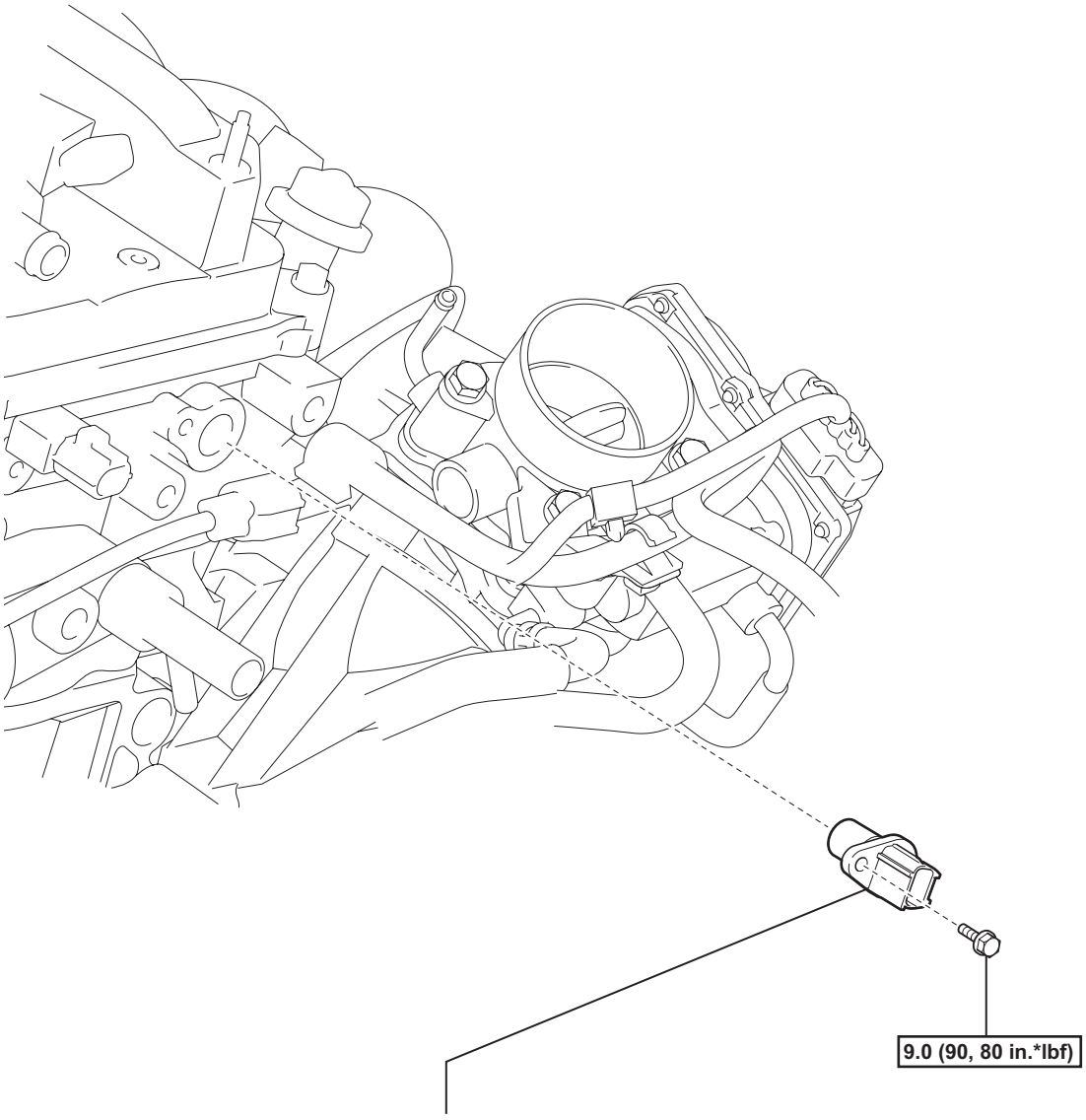


N*m (kgf*cm, ft.*lbf) : Specified torque

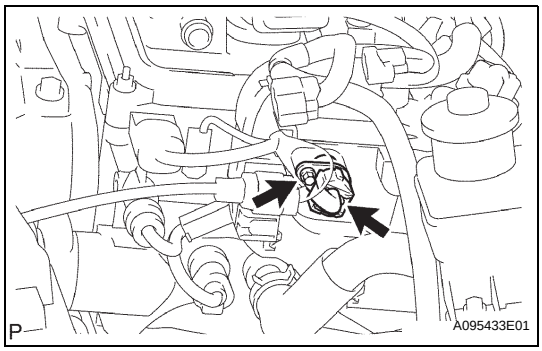
P

A114717E01

ES

REMOVAL

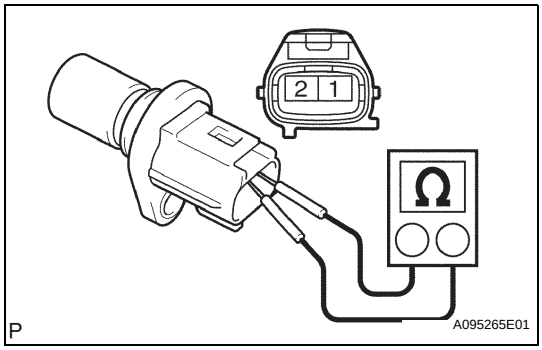
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE ENGINE COVER (See page ES-382)**
3. **REMOVE AIR CLEANER CAP (See page ES-383)**
4. **REMOVE CAMSHAFT POSITION SENSOR**
   (a) Disconnect the sensor connector.
   (b) Remove the bolt and sensor.



INSPECTION

1. **INSPECT CAMSHAFT POSITION SENSOR**
   (a) Measure the resistance of the sensor.
   Standard resistance

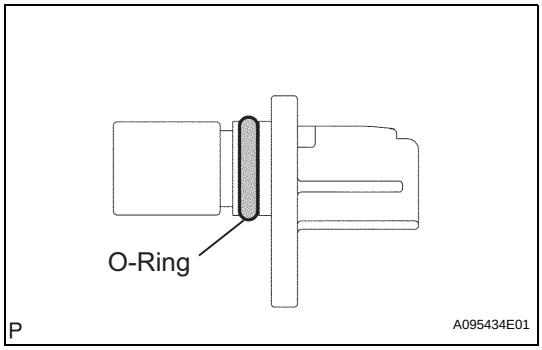
Tester Connection	Specified Condition
1 (G+) - 2 (G-)	835 to 1,400 Ω at cold
1 (G+) - 2 (G-)	1,060 to 1,645 Ω at hot

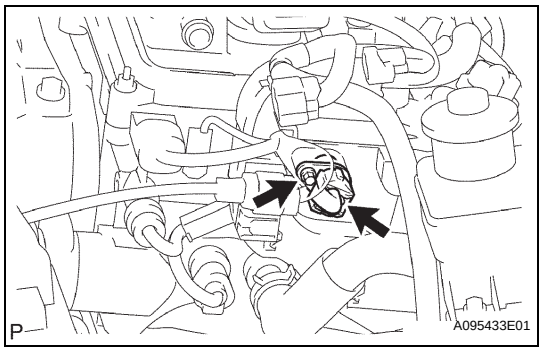


NOTICE:
Cold and Hot mean the temperature of the coils themselves. Cold is from -10 to 50°C (14 to 122 °F) and Hot is from 50 to 100°C (122 to 212°F).
If the result is not as specified, replace the camshaft position sensor.

INSTALLATION

1. **INSTALL CAMSHAFT POSITION SENSOR**
   NOTICE:
   Make sure that the O-ring is not cracked or jammed when installing.
   (a) Apply a light coat of engine oil to the O-ring of the sensor.





(b) Install the sensor with the bolt.
Torque: 9.0 N*m (90 kgf*cm, 80 in.*lbf)
(c) Connect the sensor connector.

2. INSTALL AIR CLEANER CAP (See page ES-387)

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

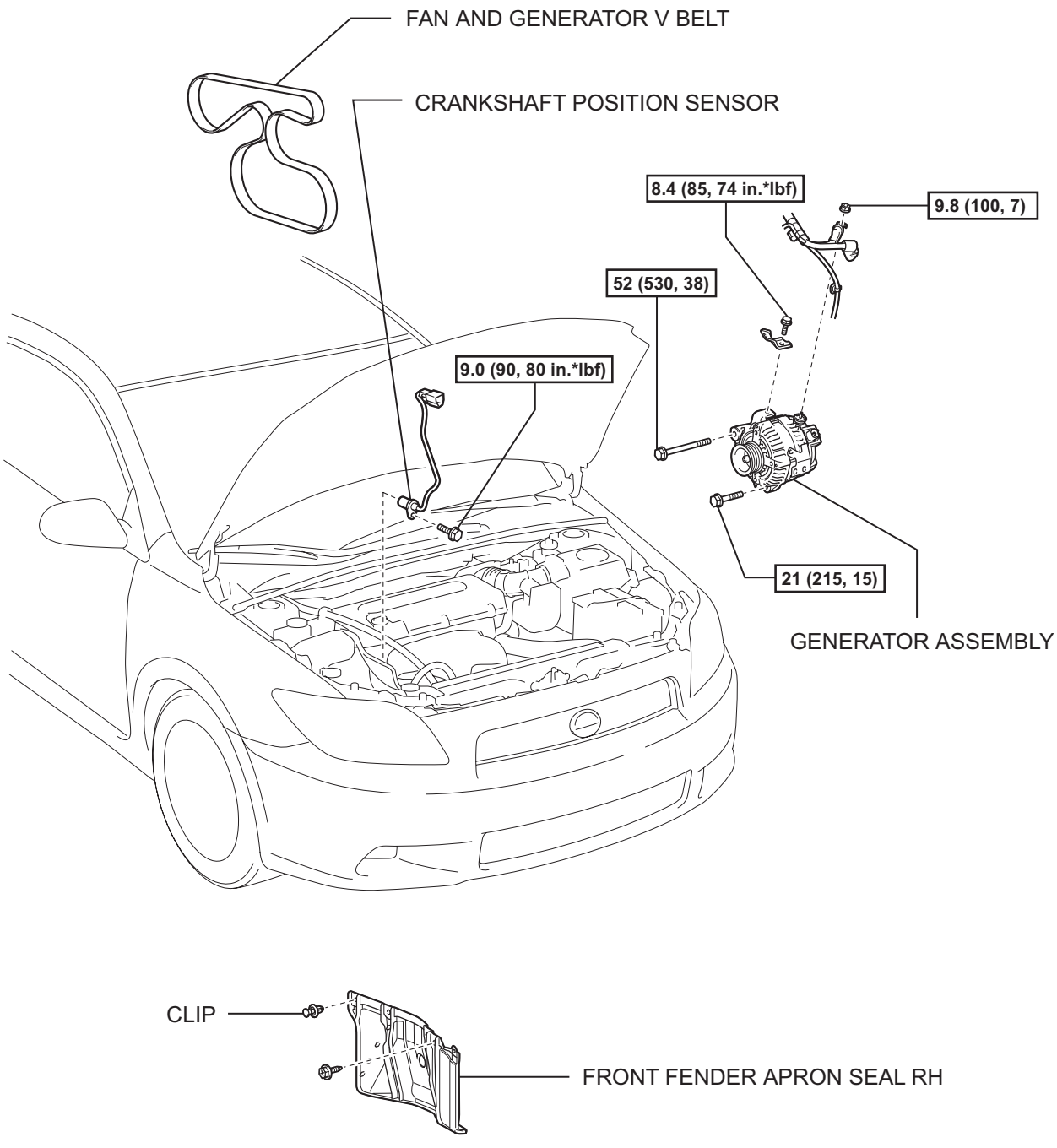
4. CHECK FOR ENGINE OIL LEAKAGE

5. INSTALL ENGINE COVER (See page ES-389)

6. PERFORM INITIALIZATION
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

CRANKSHAFT POSITION SENSOR

COMPONENTS



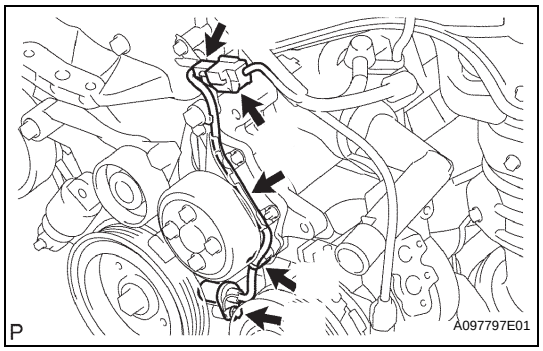
N*m (kgf*cm, ft.*lbf) : Specified torque

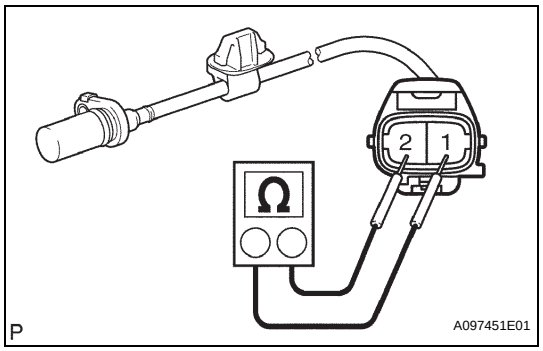
P

A114718E01

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT FENDER APRON SEAL RH (See page CH-10)**
3. **REMOVE FAN AND GENERATOR V BELT (See page EM-6)**
4. **REMOVE GENERATOR ASSEMBLY (See page CH-10)**
5. **REMOVE CRANKSHAFT POSITION SENSOR**
   (a) Disconnect the sensor connector.
   (b) Remove the connector clamp.
   (c) Remove the wire harness from the wire harness clamp bracket.
   (d) Remove the wire harness clamp.
   (e) Remove the bolt and sensor.





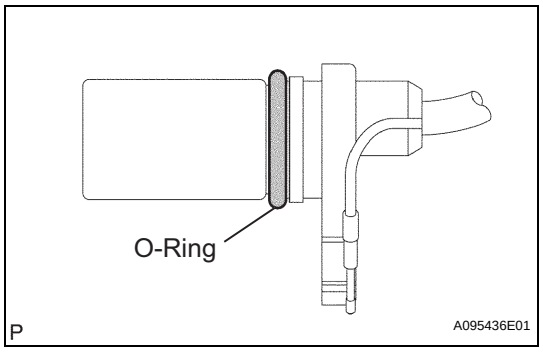
INSPECTION

1. **INSPECT CRANKSHAFT POSITION SENSOR**
   (a) Measure the resistance of the sensor.
   Standard resistance

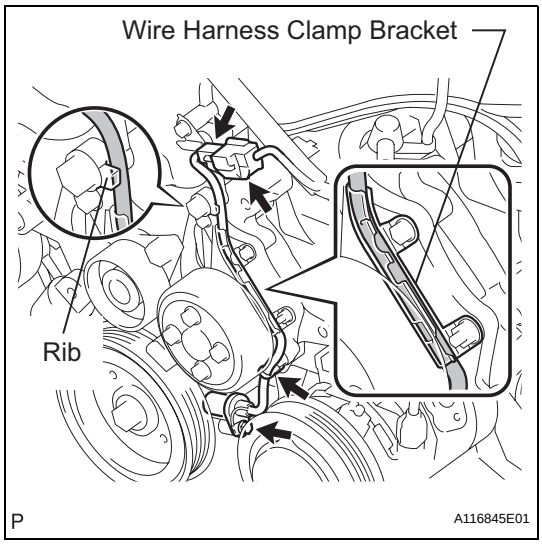
Tester Connection	Specified Condition
1 (NE+) - 2 (NE-)	985 to 1,600 Ω at cold
1 (NE+) - 2 (NE-)	1,265 to 1,890 Ω at hot

NOTICE:
Cold and Hot mean the temperature of the coils themselves. Cold is from -10 to 50°C (14 to 122°F) and Hot is from 50 to 100°C (122 to 212°F).
If the result is not as specified, replace the crankshaft position sensor.

INSTALLATION



1. **INSTALL CRANKSHAFT POSITION SENSOR**
   NOTICE:
   Make sure that the O-ring is not cracked or jammed when installing.
   (a) Apply a light coat of engine oil to the O-ring of the sensor.



(b) Install the sensor with the bolt.
Torque: 9.0 N*m (90 kgf*cm, 80 in.*lbf)
(c) Install the wire harness clamp.
(d) Install the connector clamp.
(e) Connect the sensor connector.
(f) Confirm that the wire harness of the sensor is secured to the wire harness clamp bracket through the back of the rib of the timing chain cover.

2. INSTALL GENERATOR ASSEMBLY (See page CH-17)

3. INSTALL FAN AND GENERATOR V BELT (See page EM-6)

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

5. CHECK FOR ENGINE OIL LEAKAGE

6. INSTALL FRONT FENDER APRON SEAL RH (See page CH-18)

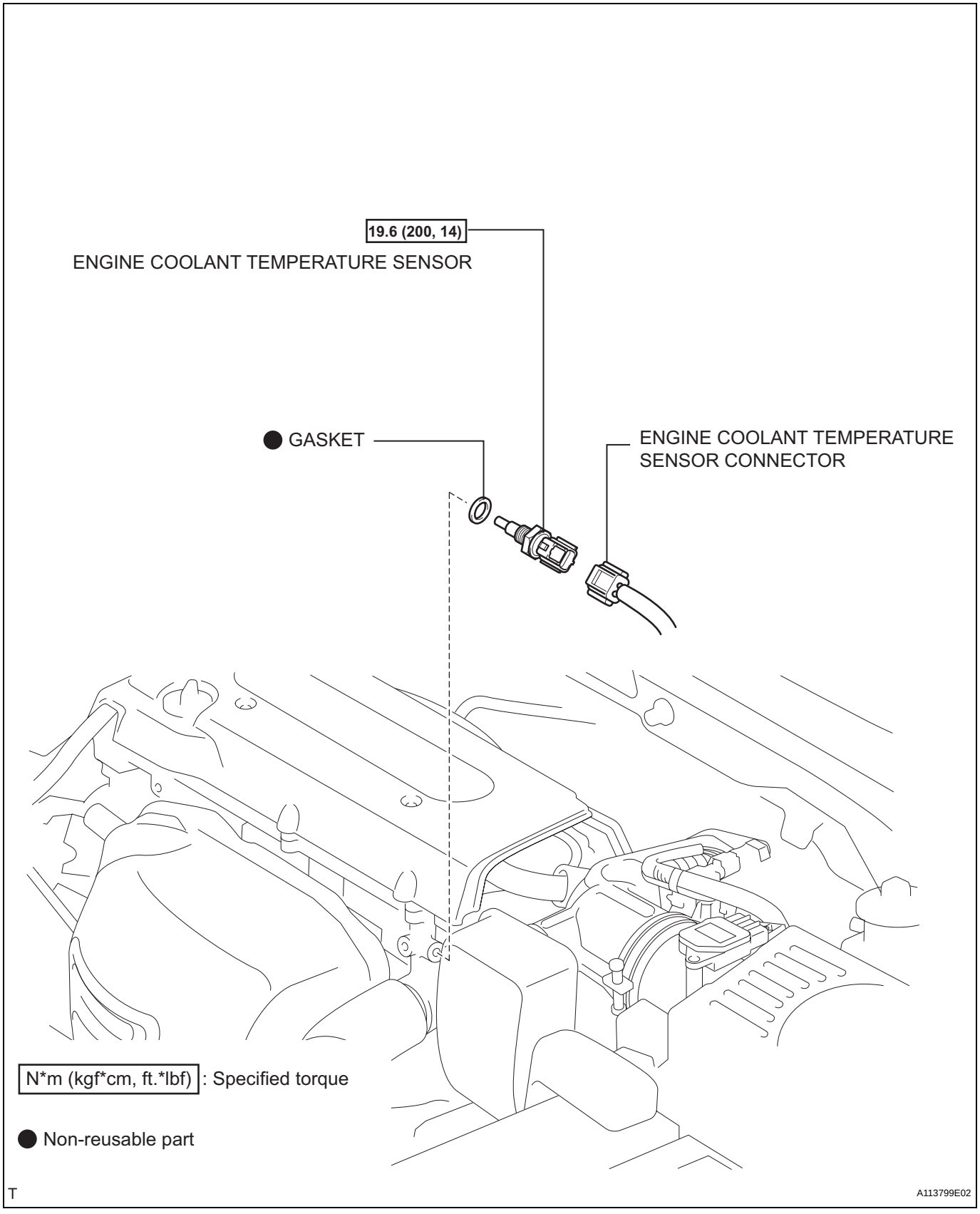
7. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ES

ENGINE COOLANT TEMPERATURE SENSOR

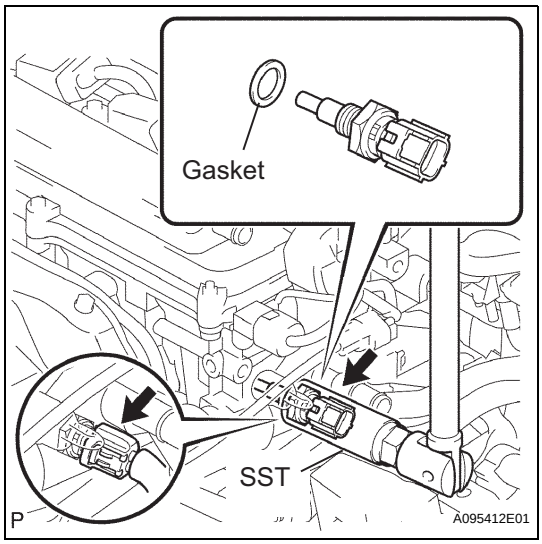
COMPONENTS



ES

REMOVAL

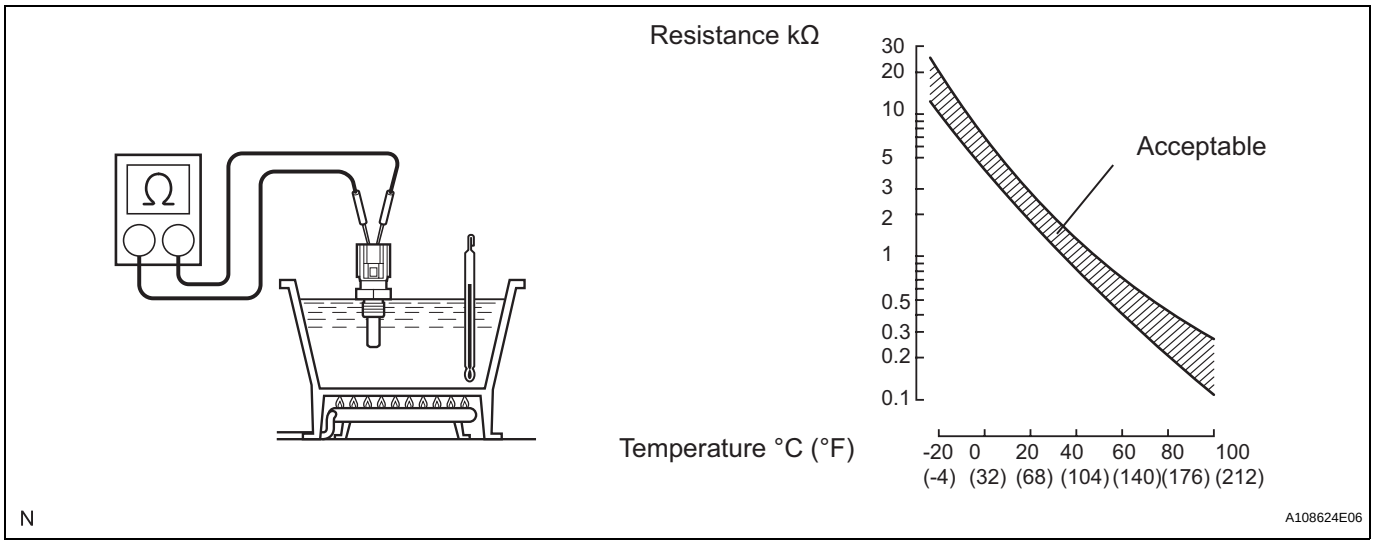
1. **DRAIN ENGINE COOLANT (See page CO-6)**
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
3. **REMOVE ENGINE COOLANT TEMPERATURE SENSOR**
   (a) Disconnect the sensor connector.
   (b) Using SST, remove the sensor and gasket.
   SST 09817-33190



INSPECTION

1. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

(a) Measure the resistance of the sensor.



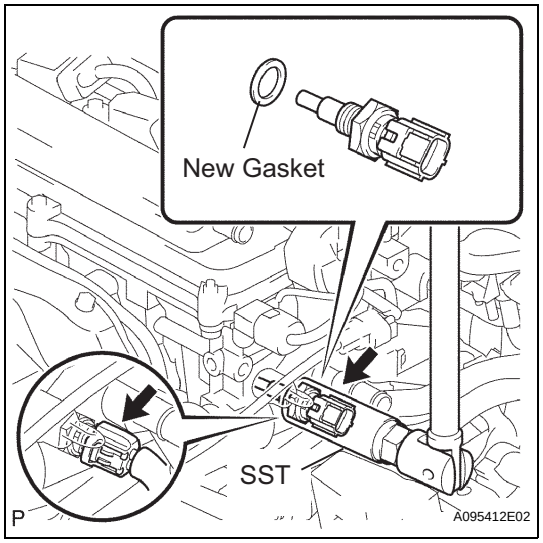
Standard resistance

Tester Connection	Specified Condition
1 (E2) - 2 (THW)	2.32 to 2.59 kΩ at 20°C (68°F)
1 (E2) - 2 (THW)	0.310 to 0.326 kΩ at 80°C (176°F)

NOTICE:
If checking the sensor in water, be careful not to allow water to contact the terminals. After checking, wipe the water off the sensor.

If the result is not as specified, replace the sensor.

INSTALLATION



1. INSTALL ENGINE COOLANT TEMPERATURE SENSOR

(a) Install a new gasket onto the sensor.

(b) Using SST, install the sensor.

SST 09817-33190

Torque: 19.6 N*m (200 kgf*cm, 14 ft.*lbf)

(c) Connect the sensor connector.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. ADD ENGINE COOLANT (See page CO-6)

4. CHECK FOR COOLANT LEAKAGE (See page CO-1)

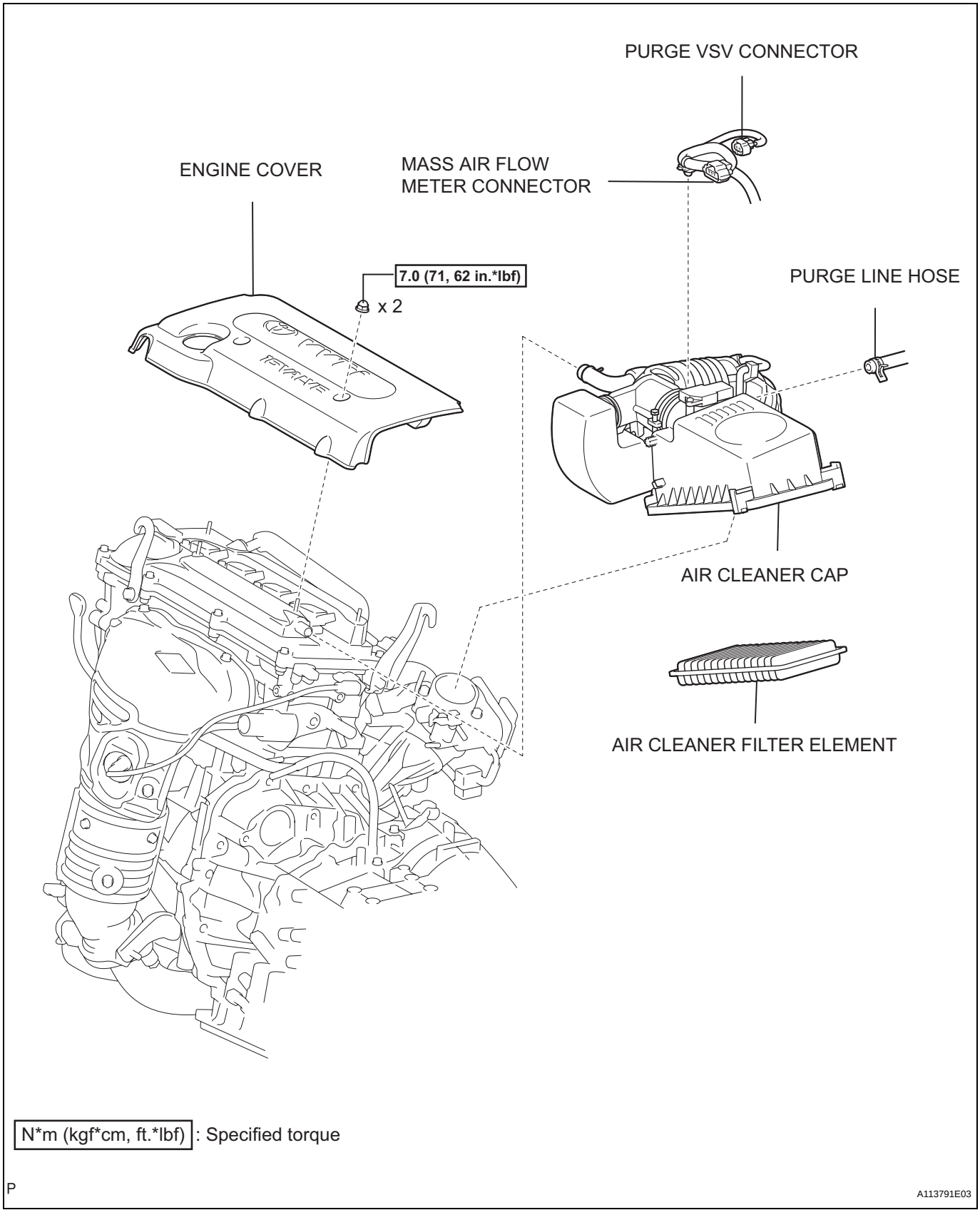
5. PERFORM INITIALIZATION

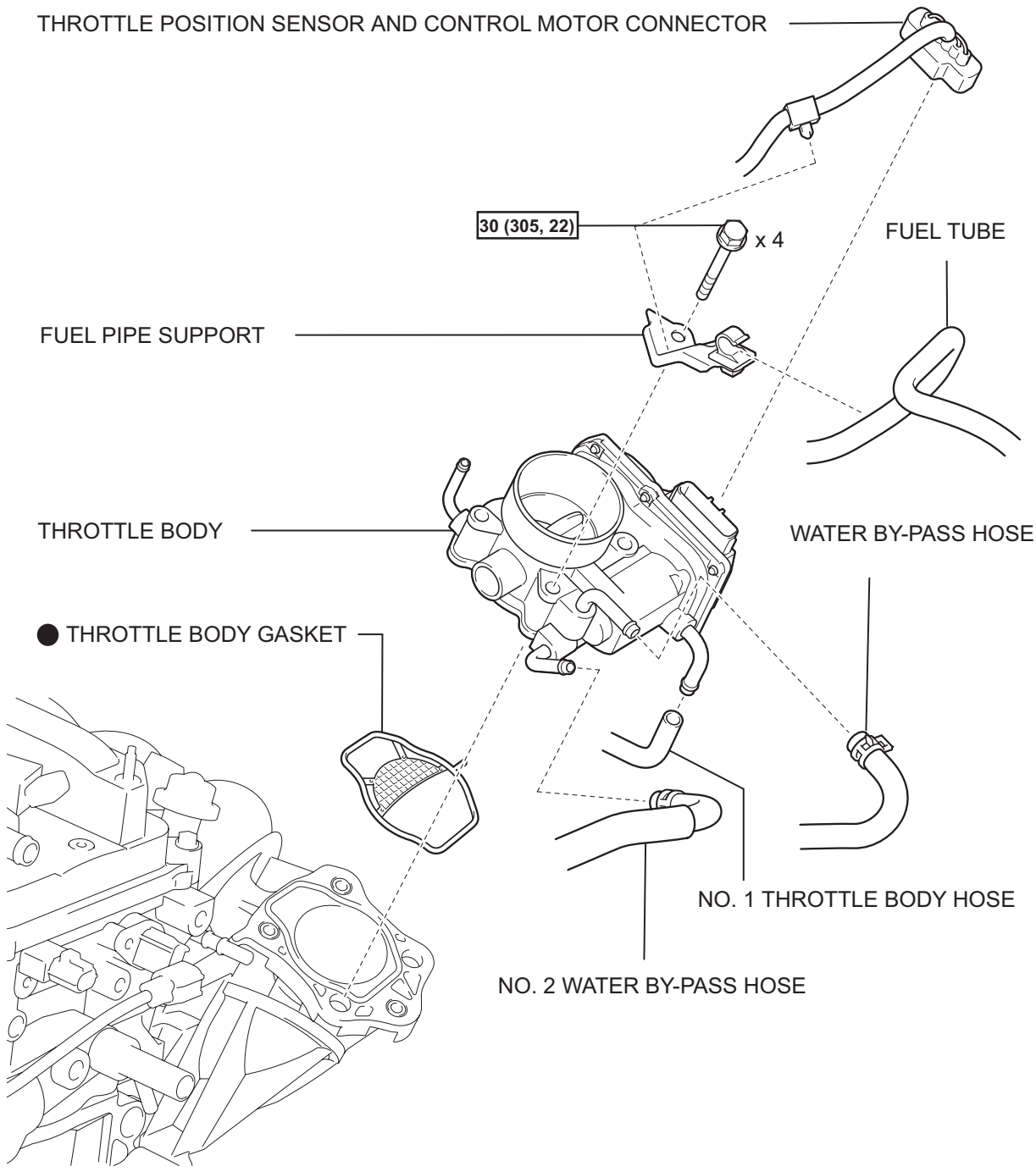
(a) Perform initialization (see page IN-23).

NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

THROTTLE BODY

COMPONENTS





N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

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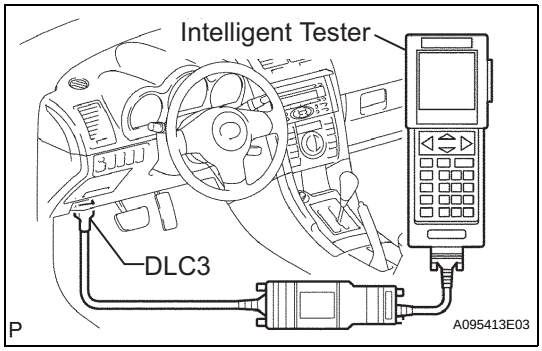
ES

ON-VEHICLE INSPECTION

1. CHECK THROTTLE BODY

(a) Check the throttle control motor operating sounds.
  (1) Turn the ignition switch ON.
  (2) When pressing the accelerator pedal, check the operating sound of the running motor. Make sure that no friction noises emit from the motor. If friction noise exists, replace the throttle body.



(b) Check the throttle position sensor.
  (1) Connect the intelligent tester to the DLC3.
  (2) Turn the ignition switch ON.
  (3) Push the intelligent tester main switch ON.
  (4) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / THROTTLE POS.
  (5) Depress the accelerator pedal. When the throttle valve is fully opened, check that the value of "THROTTLE POS" is within the specification.

Standard throttle valve opening percentage: 60% or more

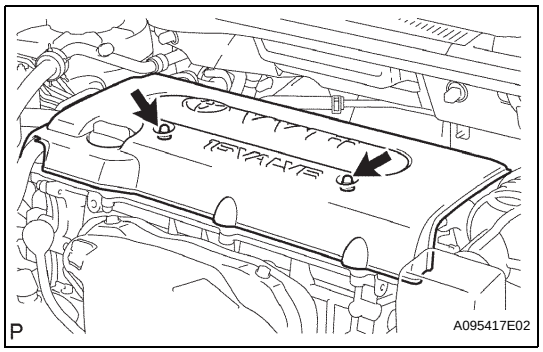
NOTICE:

When checking the standard throttle valve opening percentage, the shift lever should be in the N position.

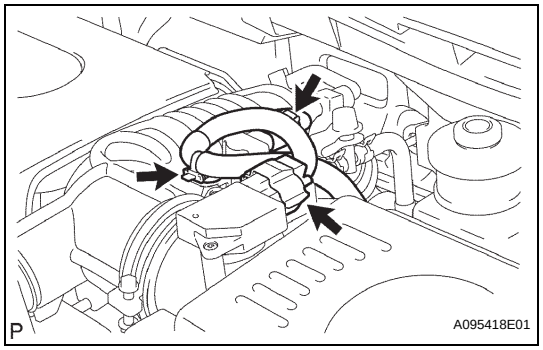
If the percentage is less than 60%, replace the throttle body.

REMOVAL

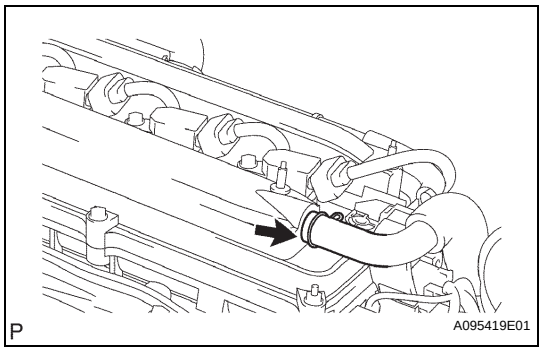
1. **DRAIN ENGINE COOLANT (See page CO-6)**
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
3. **REMOVE ENGINE COVER**
   (a) Remove the 2 nuts and engine cover.



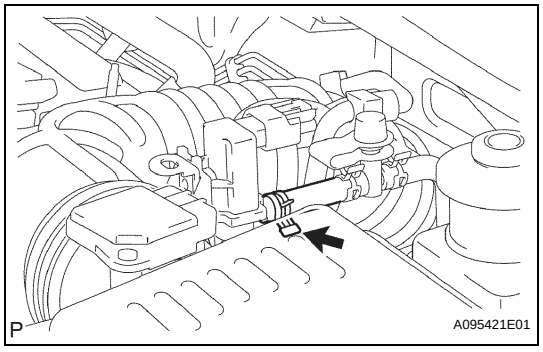
4. **REMOVE AIR CLEANER CAP**
   (a) Disconnect the mass air flow meter connector.
   (b) Disconnect the purge VSV connector.
   (c) Remove the wire harness clamp.



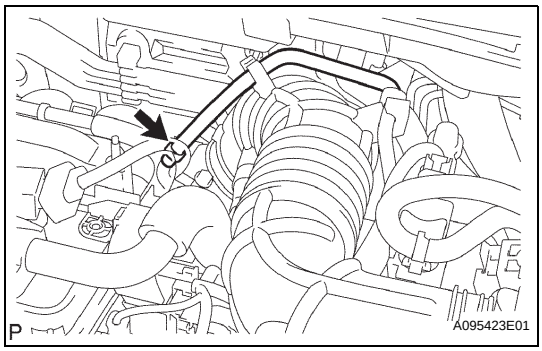
   (d) Disconnect the No. 2 ventilation hose from the cylinder head cover.



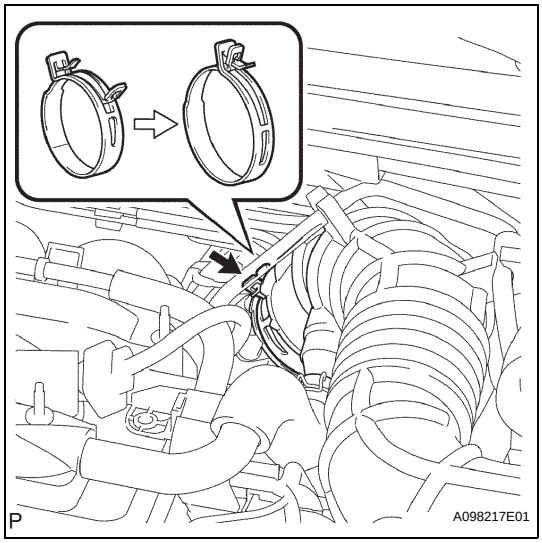
   (e) Disconnect the purge line hose from the purge VSV.



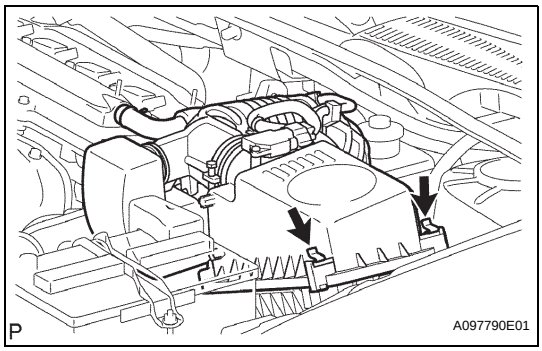
ES



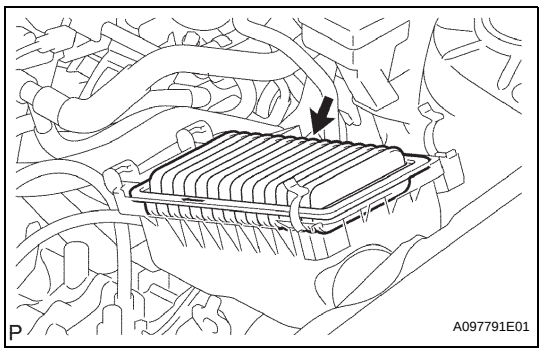
(f) Disconnect the purge line hose from the throttle body.



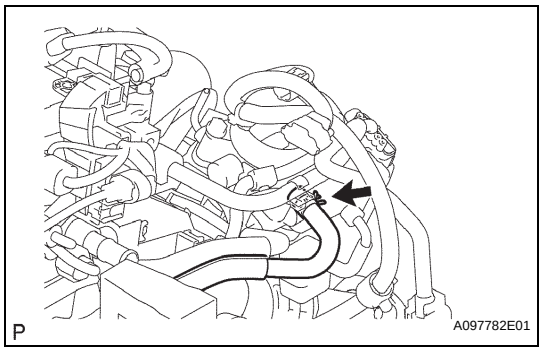
(g) Lock the No. 1 air cleaner hose clamp, and then disconnect the No. 1 air cleaner hose from the throttle body.



(h) Unfasten the 2 hook clamps, and then remove the air cleaner cap.

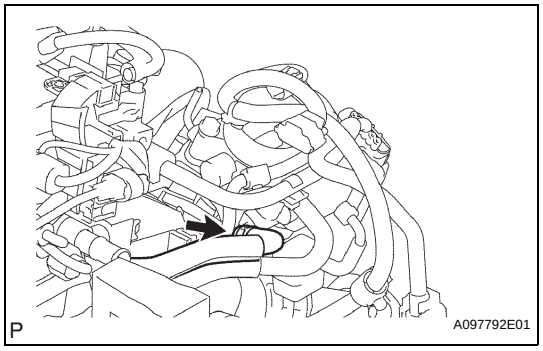


(i) Remove the air cleaner filter element from the air cleaner case.

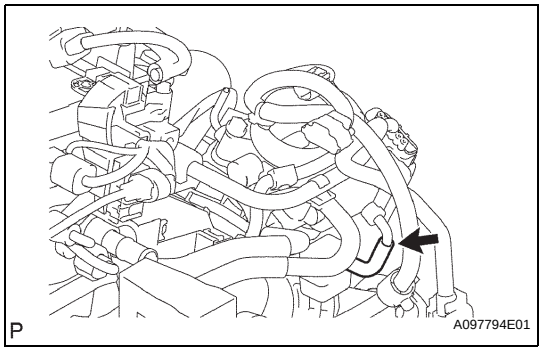


5. REMOVE THROTTLE BODY

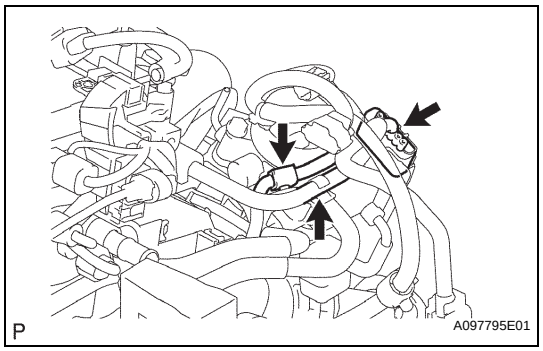
(a) Disconnect the water by-pass hose from the throttle body.



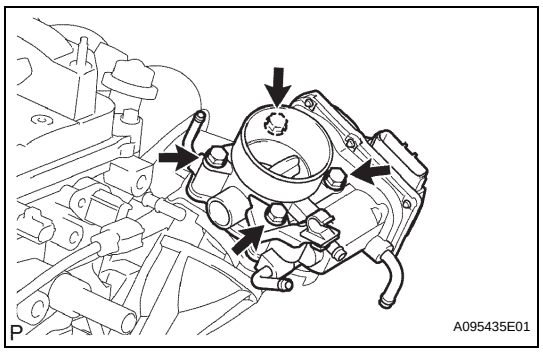
(b) Disconnect the No. 2 water by-pass hose from the throttle body.



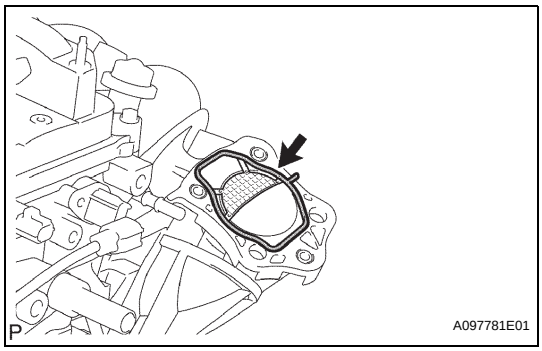
(c) Disconnect the No. 1 throttle body hose from the throttle body.



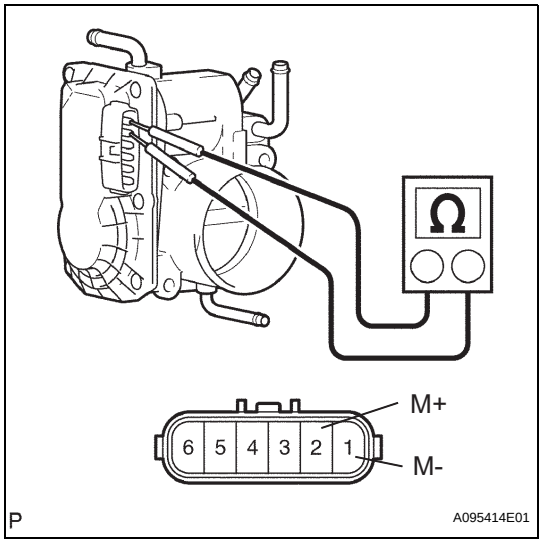
(d) Disconnect the throttle position sensor and control motor connector.
(e) Remove the wire harness clamp.
(f) Remove the fuel tube from the clamp.



(g) Remove the 4 bolts, and then remove the fuel pipe support and throttle body.



(h) Remove the gasket from the intake manifold.



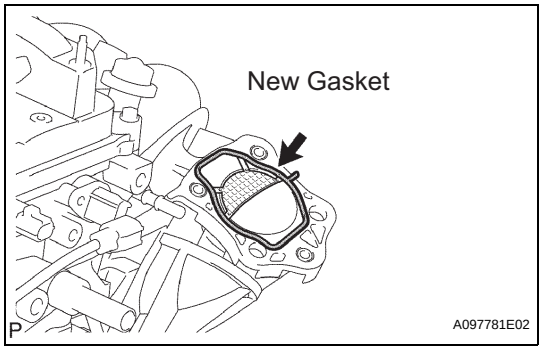
INSPECTION

1. INSPECT THROTTLE BODY

(a) Measure the resistance of the throttle control motor.
Standard resistance

Tester Connection	Specified Condition
1 (M-) - 2 (M+)	0.3 to 100 Ω at 20°C (68°F)

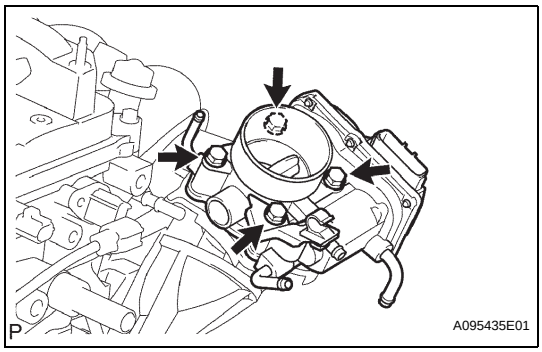
If the result is not as specified, replace the throttle body.



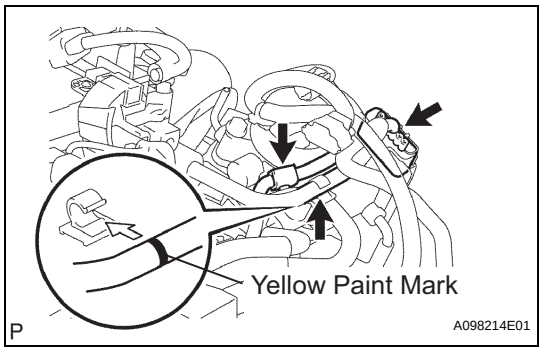
INSTALLATION

1. INSTALL THROTTLE BODY

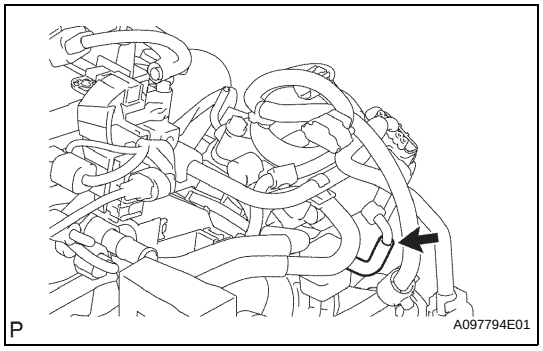
(a) Install a new gasket onto the intake manifold.



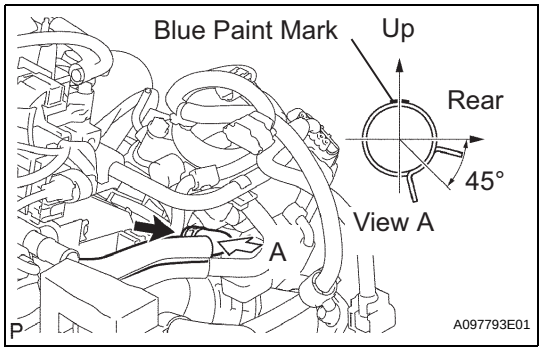
(b) Install the throttle body and fuel pipe clamp with the 4 bolts.
Torque: 30 N*m (305 kgf*cm, 22 in.*lbf)



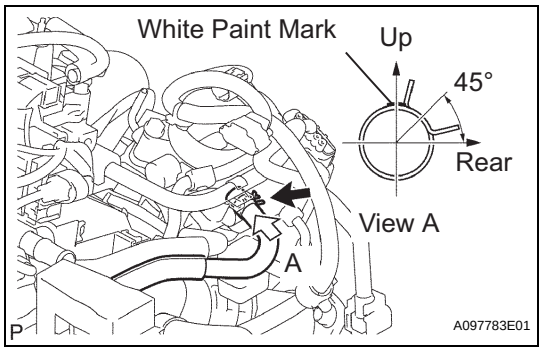
(c) Fit the fuel tube into the clamp.
(d) Install the wire harness clamp.
(e) Connect the throttle position sensor and control motor connector.



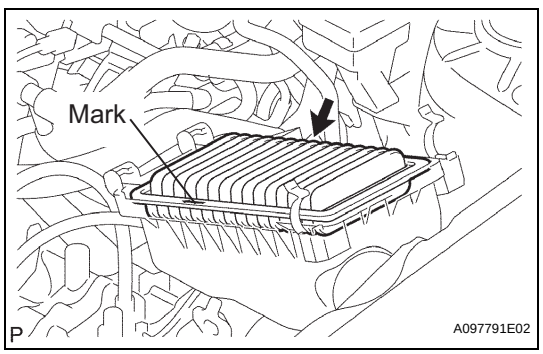
(f) Connect the No. 1 throttle body hose to the throttle body.



(g) Connect the No. 2 water by-pass hose to the throttle body.
NOTICE:
Make sure that the paint mark and hose clamp are at the correct angle.

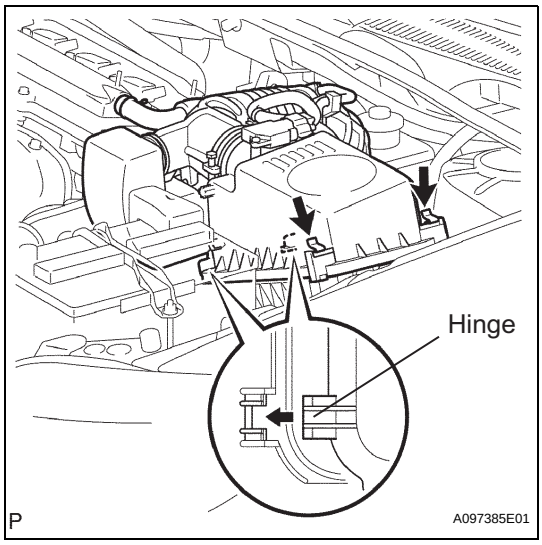


(h) Connect the water by-pass hose to the throttle body.
NOTICE:
Make sure that the paint mark and hose clamp are at the correct angle.

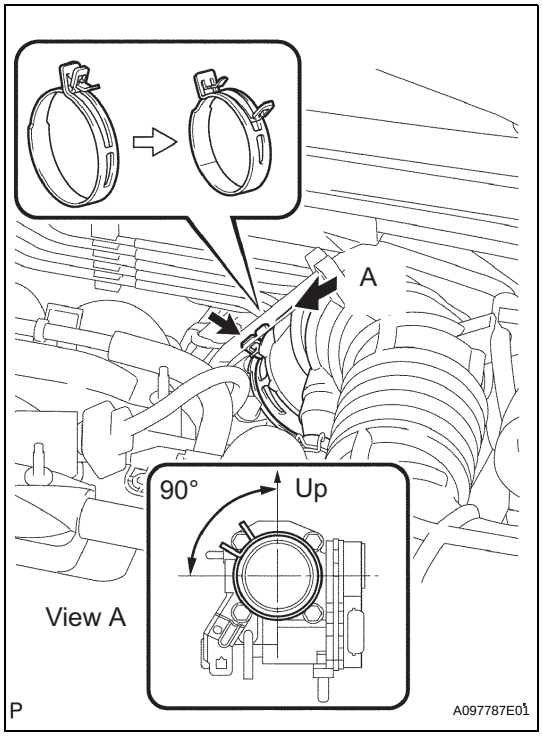


2. INSTALL AIR CLEANER CAP

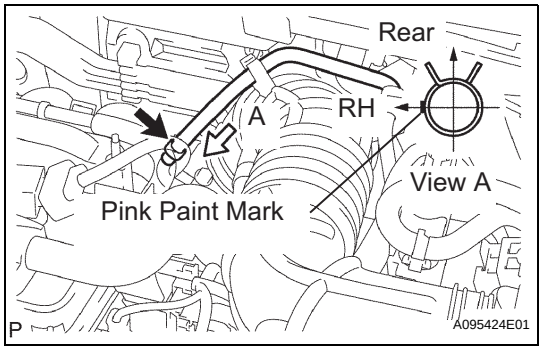
(a) Install the air cleaner filter element onto the air cleaner case.
NOTICE:
Make sure that the air cleaner filter element is in the correct direction when installing.



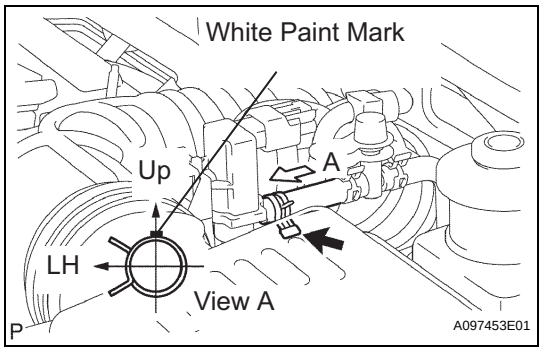
(b) Insert the hinge part of the air cleaner cap into the air cleaner case, then hang the 2 hook clamps.



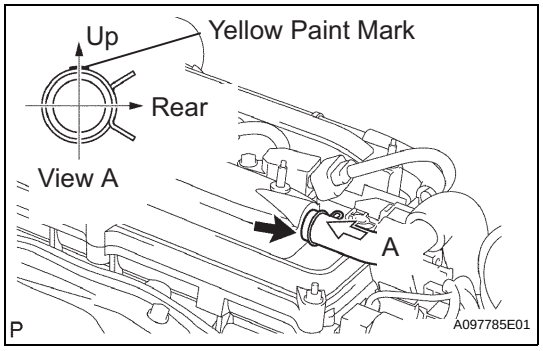
(c) Align the matchmarks of the No. 1 air cleaner hose and throttle body, and then connect the air cleaner hose No. 1 to the throttle body and unfasten the No. 1 air cleaner hose clamp.
NOTICE:
Make sure that the hose clamp is at the correct angle.



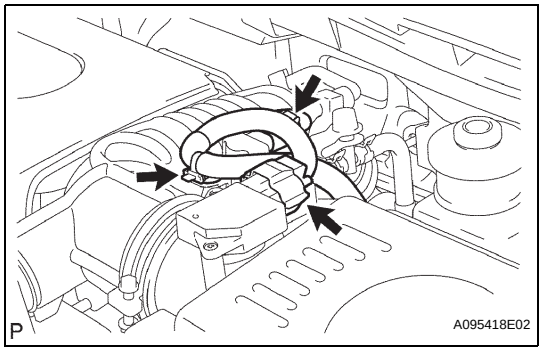
(d) Connect the purge line hose to the throttle body.
NOTICE:
Make sure that the paint mark and hose clamp are at the correct angle.



(e) Connect the purge line hose to the purge VSV.
NOTICE:
Make sure that the paint mark and hose clamp are at the correct angle.



(f) Connect the No. 2 ventilation hose to the cylinder head cover.
NOTICE:
Make sure that the paint mark and hose clamp are at the correct angle.

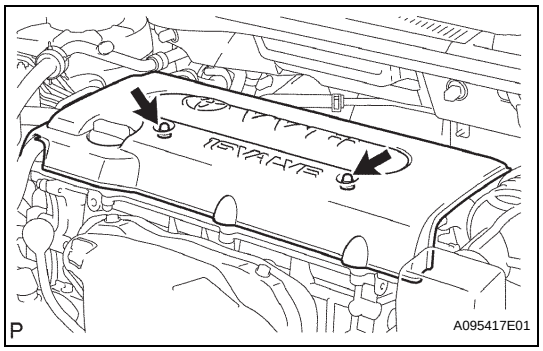


(g) Install the wire harness clamp.
(h) Connect the purge VSV connector.
(i) Connect the mass air flow meter connector.

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. ADD ENGINE COOLANT (See page CO-6)

5. CHECK FOR ENGINE COOLANT LEAKAGE (See page CO-1)



6. INSTALL ENGINE COVER

(a) Install the cover with the 2 nuts.
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)

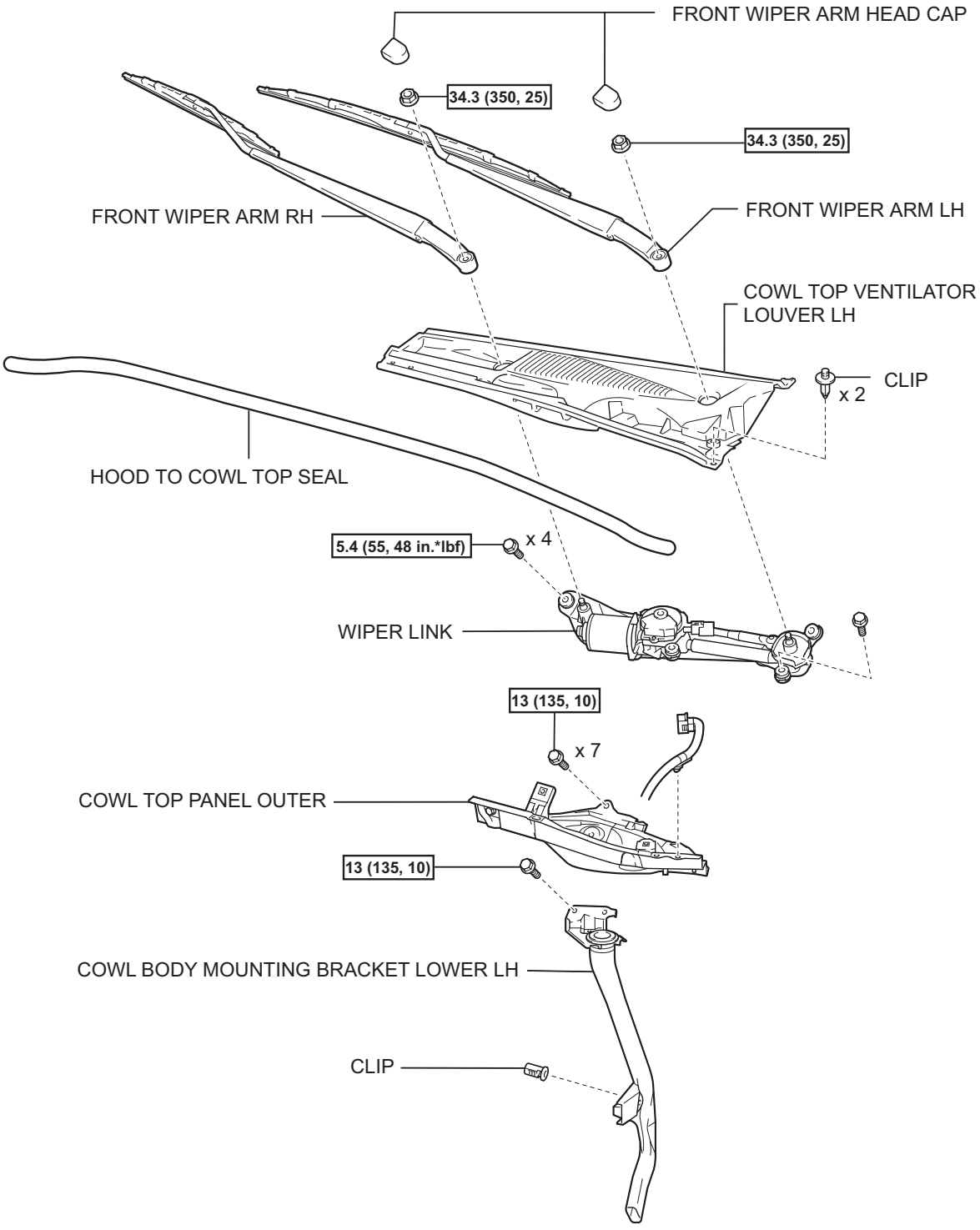
7. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ES

KNOCK SENSOR

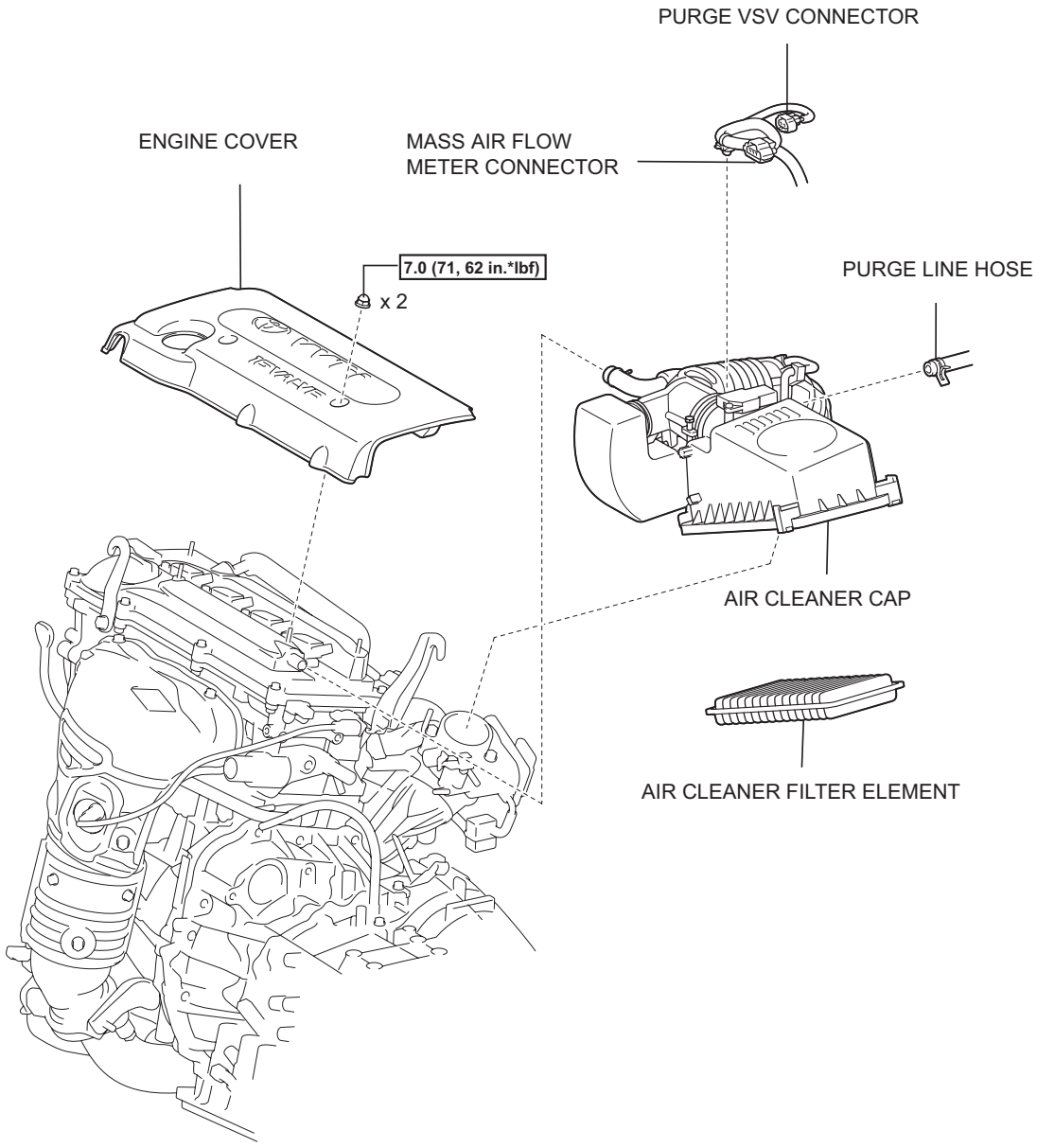
COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

P

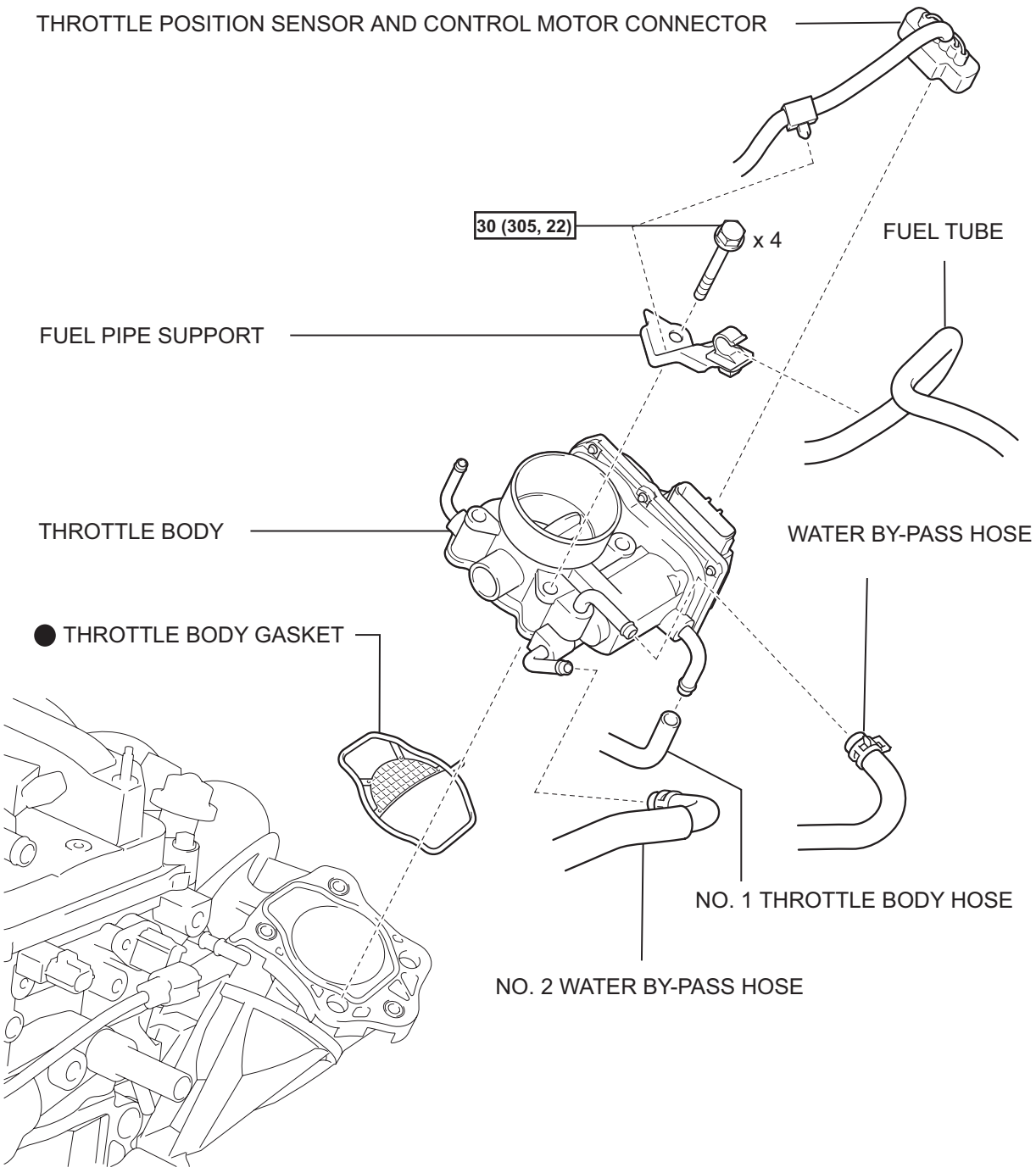
A113793E02



N*m (kgf*cm, ft.*lbf) : Specified torque

P

A113791E05

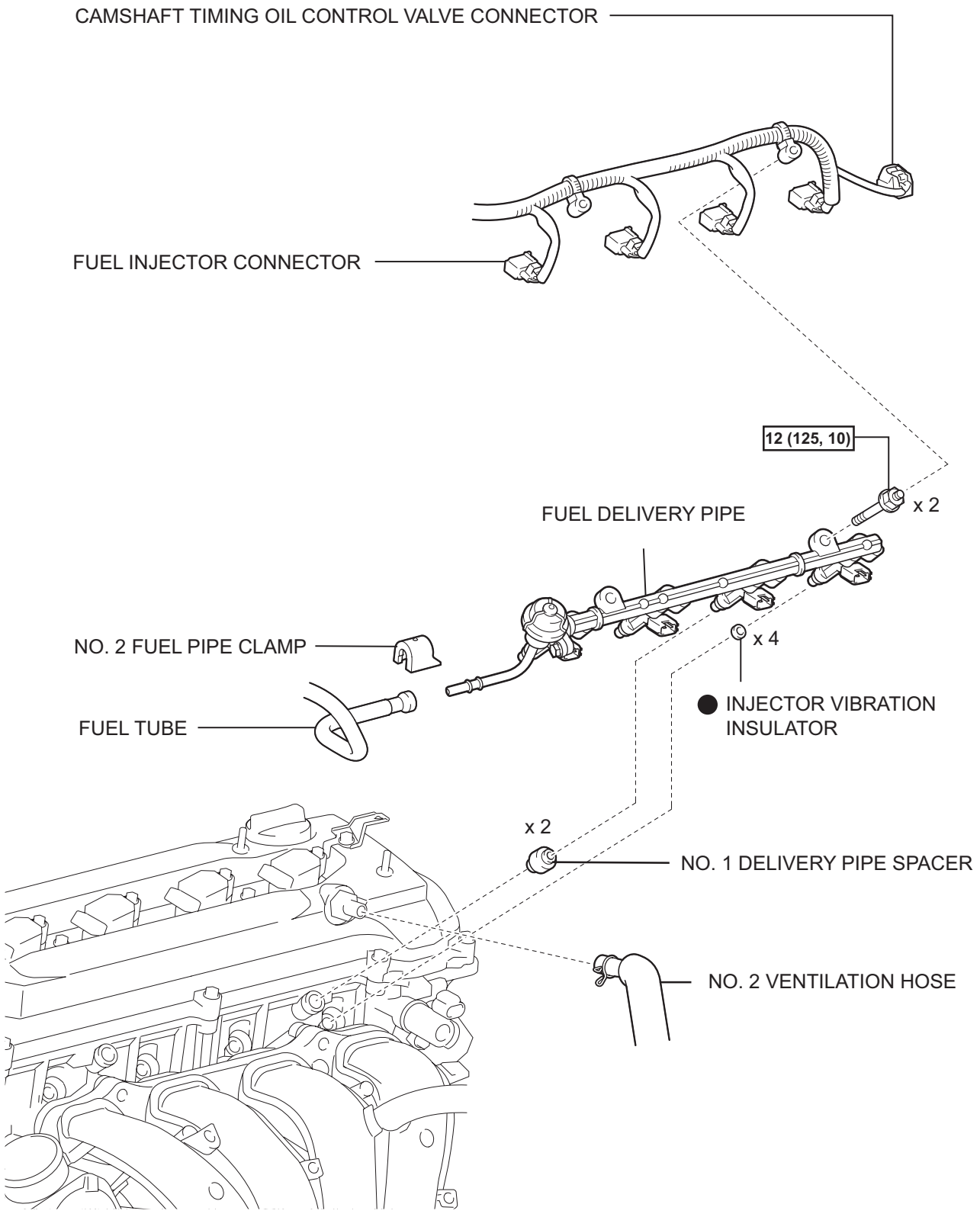


N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

A113792E04



N*m (kgf*cm, ft.*lbf) : Specified torque

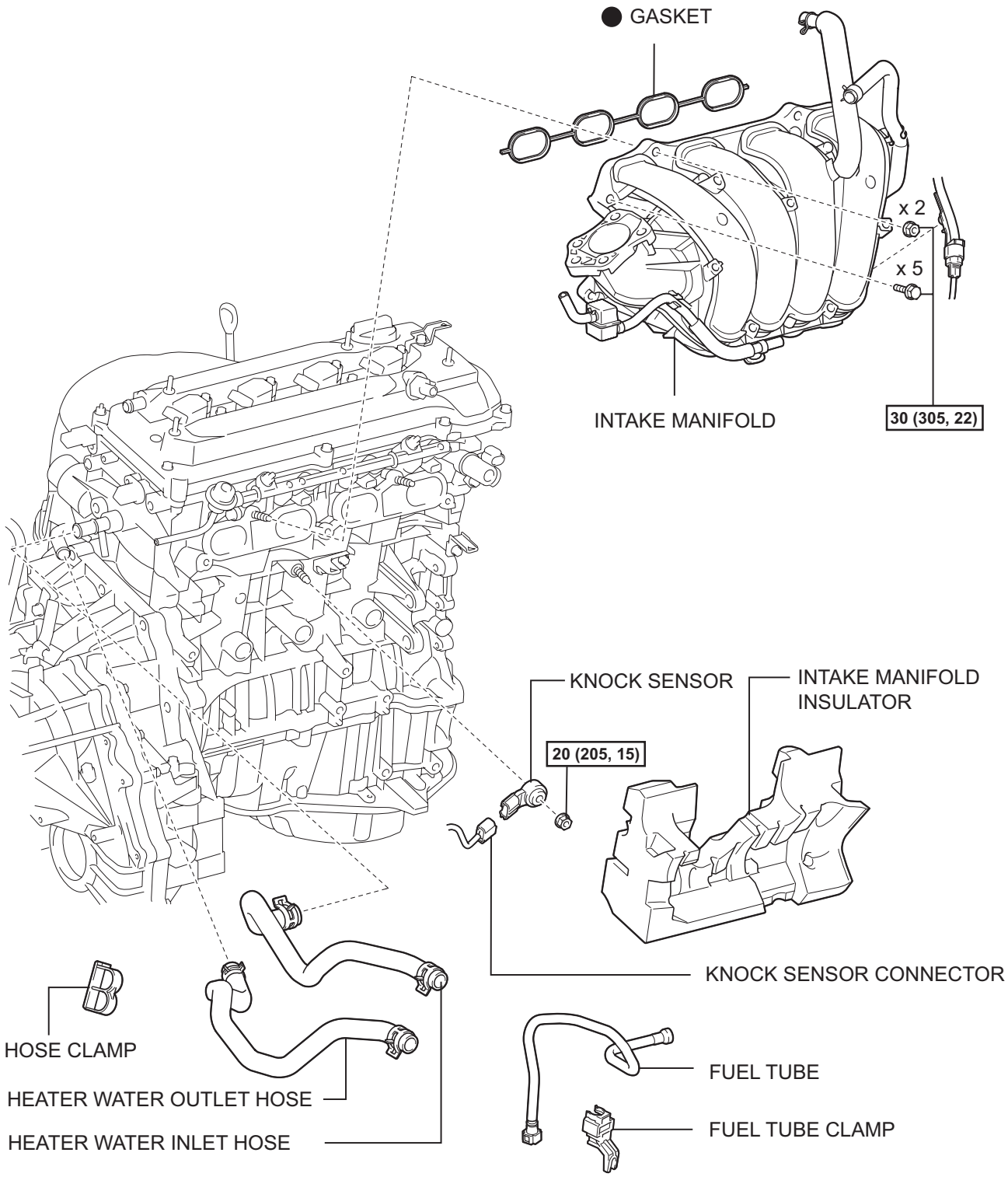
● Non-reusable part

P

A113795E02

ES

ES



N*m (kgf*cm, ft.*lbf) : Specified torque

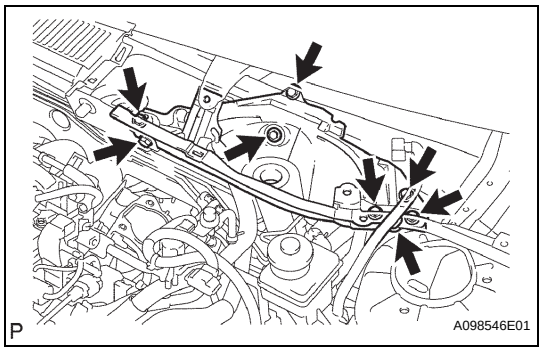
● Non-reusable part

P

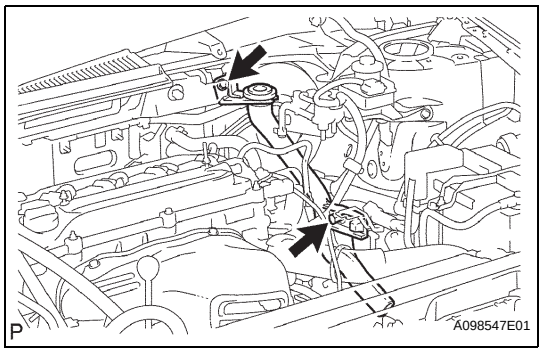
A113796E02

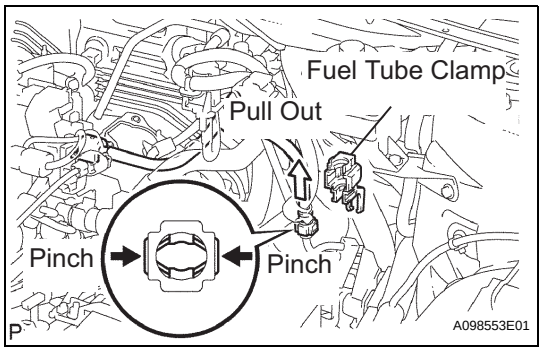
REMOVAL

1. **DISCHARGE FUEL SYSTEM PRESSURE (See page FU-7)**
2. **DRAIN COOLANT (See page CO-6)**
3. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
4. **REMOVE FRONT WIPER ARM HEAD CAP (See page WW-4)**
5. **REMOVE FRONT WIPER ARM LH (See page WW-4)**
6. **REMOVE FRONT WIPER ARM RH (See page WW-4)**
7. **REMOVE HOOD TO COWL TOP SEAL (See page WW-4)**
8. **REMOVE COWL TOP VENTILATOR LOUVER LH (See page WW-4)**
9. **REMOVE WIPER LINK (See page WW-5)**
10. **REMOVE COWL TOP PANEL OUTER**
    (a) Remove the wire harness clamp.
    (b) Remove the 7 bolts and panel.



11. **REMOVE COWL BODY MOUNTING BRACKET LOWER LH**
    (a) Remove the bolt, clip and bracket.
12. **REMOVE ENGINE COVER (See page ES-382)**
13. **REMOVE AIR CLEANER CAP (See page ES-383)**
14. **REMOVE THROTTLE BODY (See page ES-384)**
15. **REMOVE FUEL DELIVERY PIPE (See page FU-8)**





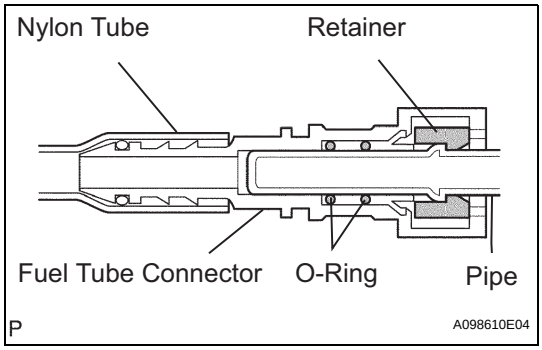
16. REMOVE FUEL TUBE

(a) Remove the fuel tube clamp.

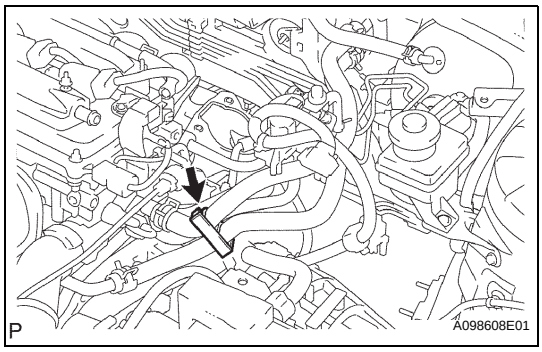
(b) Pinch the retainer as illustrated, and then pull the fuel tube connector out of the pipe.

NOTICE:

- **Remove any dirt and foreign objects on the fuel tube connector before performing this work.**

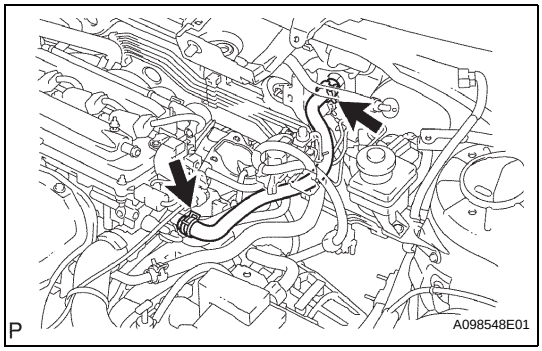


- **When disconnecting the connector, do not damage the connector and pipe, and do not allow foreign matter to contact the connector and pipe. Damage or foreign matter may damage the O-ring that seals the pipe and lead to leaks.**
- **Perform this work by hand. Do not use any tools.**
- **Do not forcibly bend, twist or turn the nylon tube.**
- **Protect the disconnected part by covering it with a plastic bag after disconnecting the fuel tube.**
- **If the fuel tube connector and pipe are stuck, push and pull to release them.**

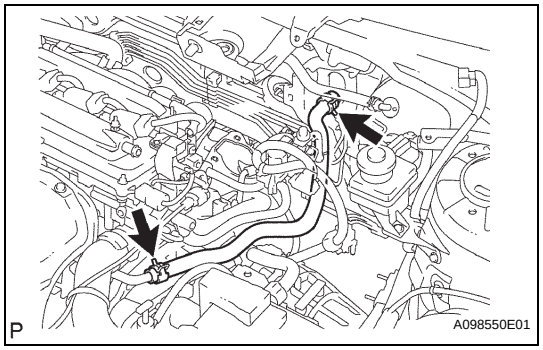


17. REMOVE HEATER WATER INLET HOSE

(a) Remove the hose clamp.

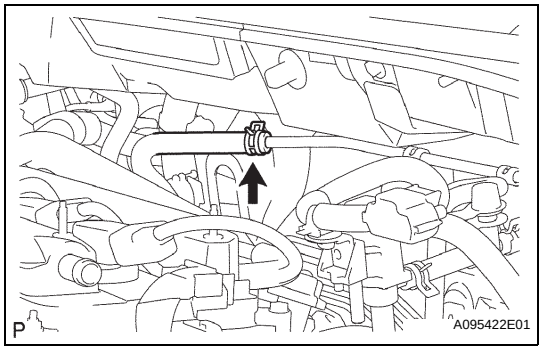


(b) Remove the heater water inlet hose from the heater radiator unit and cylinder head.



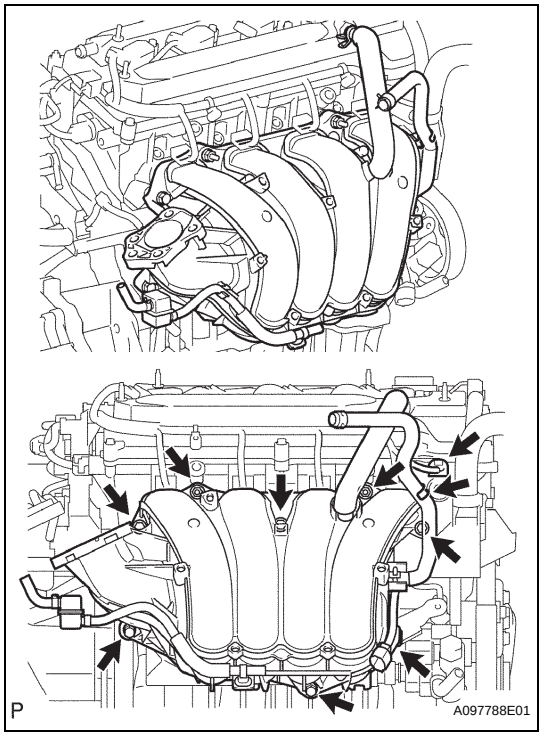
18. REMOVE HEATER WATER OUTLET HOSE

(a) Remove the heater water outlet hose from the heater radiator unit and water by-pass pipe.

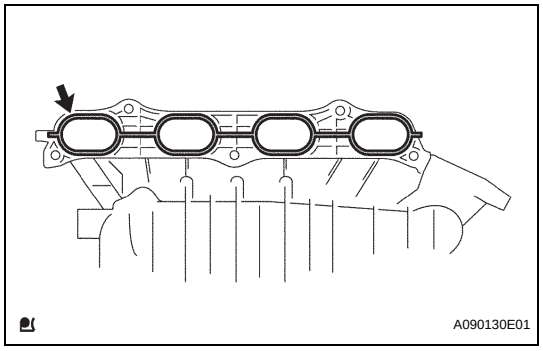


19. REMOVE INTAKE MANIFOLD

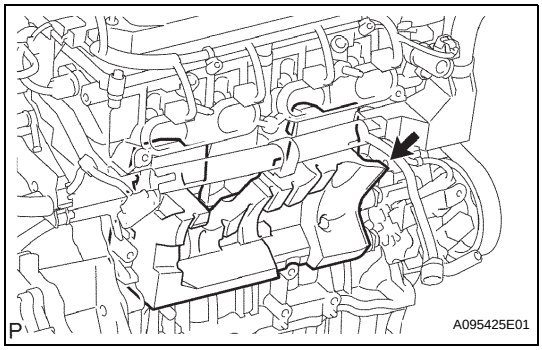
(a) Disconnect the union to check valve hose from the brake booster.



(b) Disconnect the camshaft timing oil control valve connector.
(c) Remove the wire harness clamp.
(d) Remove the union to check valve hose from the vacuum hose clamp.
(e) Remove the 5 bolts, 2 nuts and intake manifold.

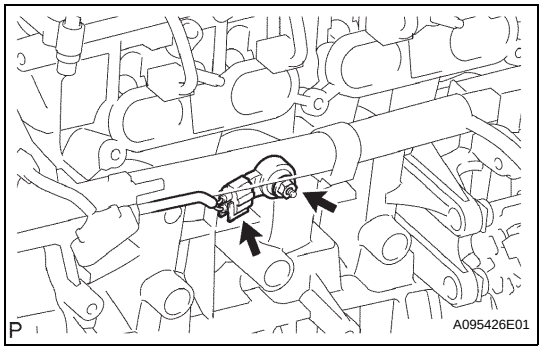


(f) Remove the gasket from the intake manifold.



20. REMOVE INTAKE MANIFOLD INSULATOR

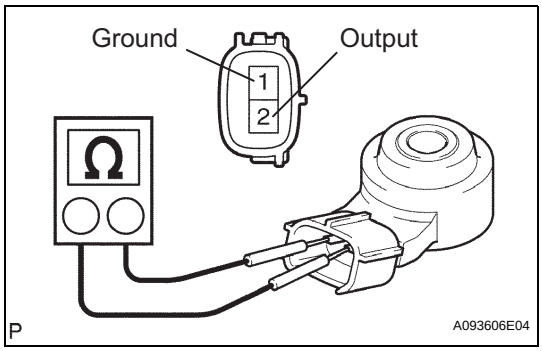
(a) Remove the intake manifold insulator from the cylinder block.



21. REMOVE KNOCK SENSOR

(a) Disconnect the sensor connector.

(b) Remove the nut and sensor.



INSPECTION

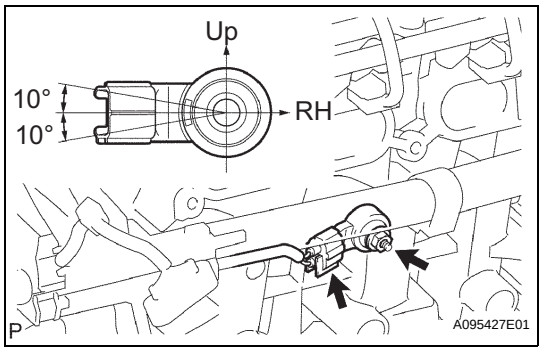
1. INSPECT KNOCK SENSOR

(a) Measure the resistance of the sensor.

Standard resistance

Tester Connection	Specified Condition
1 (Ground) - 2 (Output)	120 to 280 kΩ at 20°C (68°F)

If the result is not as specified, replace the knock sensor.



INSTALLATION

1. INSTALL KNOCK SENSOR

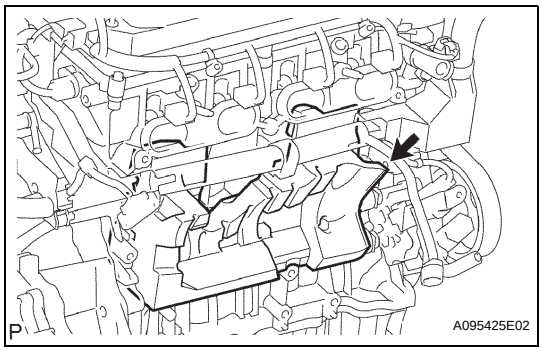
(a) Install the sensor with the nut.

Torque: 20 N*m (205 kgf*cm, 15 ft.*lbf)

NOTICE:

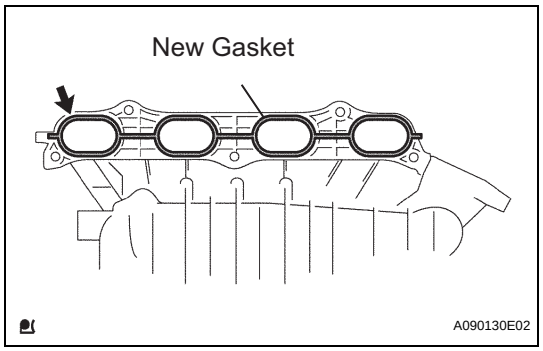
Make sure that the knock sensor is in the correct direction.

(b) Connect the sensor connector.



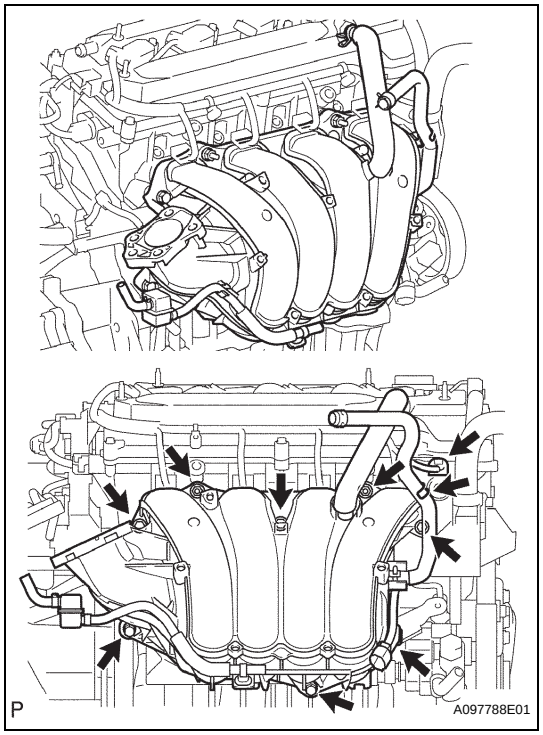
2. INSTALL INTAKE MANIFOLD INSULATOR

(a) Install the intake manifold insulator onto the cylinder block.



3. INSTALL INTAKE MANIFOLD

(a) Install a new gasket into the intake manifold.

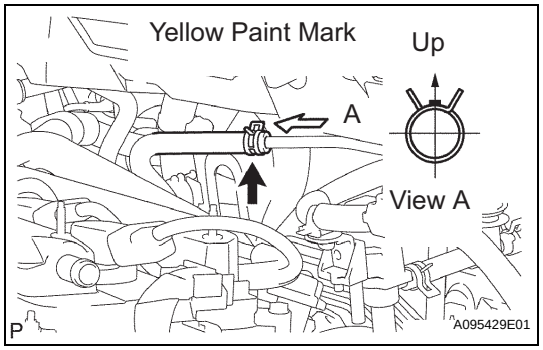


(b) Install the intake manifold with the 5 bolts and 2 nuts.
Torque: 30 N*m (305 kgf*cm, 22 ft.*lbf)

(c) Fit the union to check valve hose into the vacuum hose clamp.

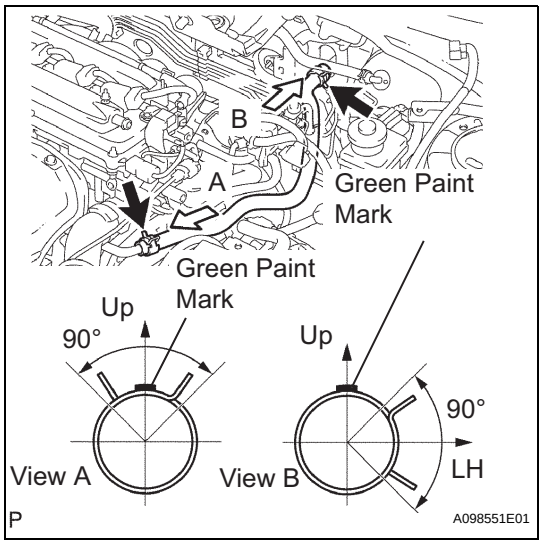
(d) Install the wire harness clamp.

(e) Connect the camshaft timing oil control valve connector.



(f) Connect the union to check valve hose to the brake booster.
NOTICE:
Make sure that the paint mark and hose clamp are at the correct angle.

ES

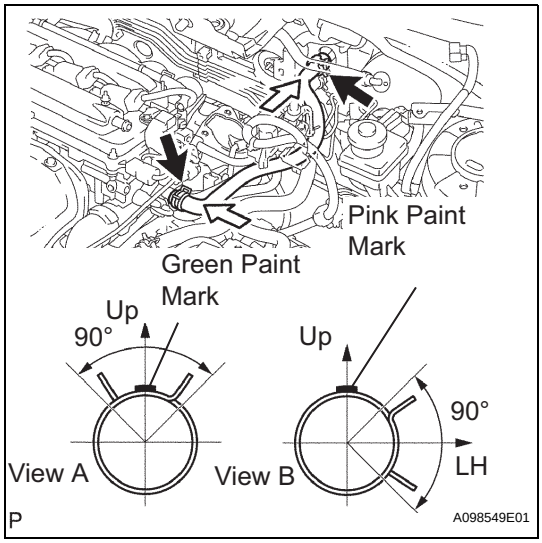


4. CONNECT HEATER WATER OUTLET HOSE

(a) Install the heater water outlet hose to the water by-pass pipe and heater radiator unit.

NOTICE:

Make sure that the paint mark and hose clamp are at the correct angle.

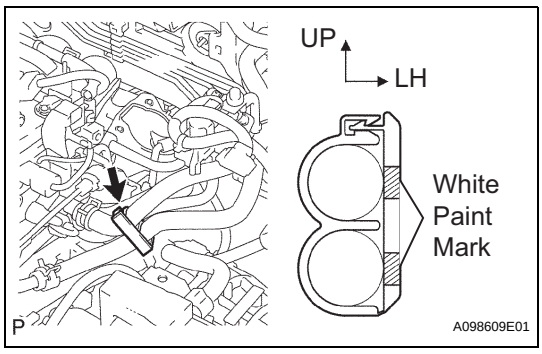


5. CONNECT HEATER WATER INLET HOSE

(a) Install the heater water inlet hose to the cylinder head and heater radiator unit.

NOTICE:

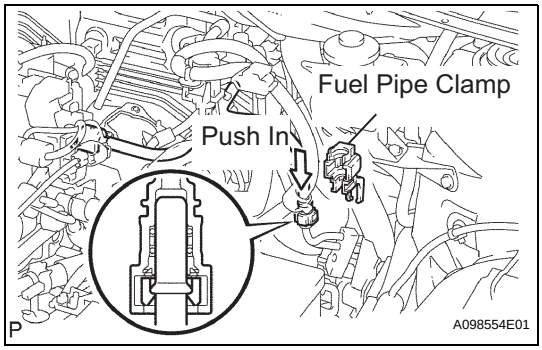
Make sure that the paint mark and hose clamp are at the correct angle.



(b) Install the hose clamp.

NOTICE:

Make sure that the paint mark and hose clamp are at the correct angle.



6. INSTALL FUEL TUBE

(a) Align the fuel tube connector with the pipe, and then push the fuel tube connector until the retainer makes a "click" sound to connect the fuel tube to the pipe.

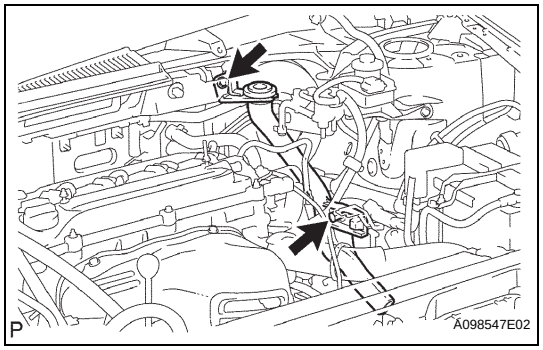
NOTICE:

- **Check that there are no scratches or foreign objects around the connected part of the fuel tube connector and pipe before performing this work.**

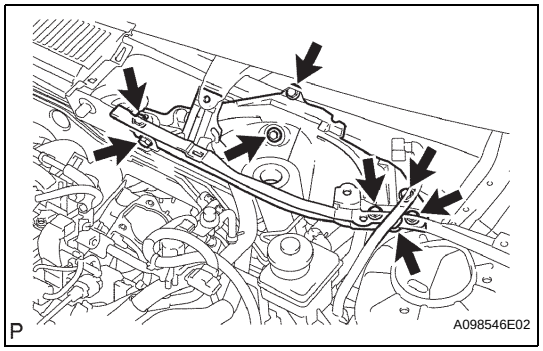
ES

- **After connecting the fuel tube connector, check that the fuel tube connector and pipe are securely connected by pulling them.**

7. **INSTALL FUEL DELIVERY PIPE (See page FU-11)**
8. **INSTALL THROTTLE BODY (See page ES-386)**
9. **INSTALL AIR CLEANER CAP (See page ES-387)**
10. **INSTALL COWL BODY MOUNTING BRACKET LOWER LH**
    (a) Install the bracket with the bolt and clip.
    Torque: 13 N*m (135 kgf*cm, 10 ft.*lbf)



11. **INSTALL COWL TOP PANEL OUTER**
    (a) Install the panel with the 7 bolts.
    Torque: 13 N*m (135 kgf*cm, 10 ft.*lbf)
    (b) Install the wire harness clamp.
12. **INSTALL WIPER LINK (See page WW-7)**
13. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
14. **ADD ENGINE COOLANT (See page CO-6)**
15. **CHECK FOR ENGINE COOLANT LEAKAGE (See page CO-1)**
16. **CHECK FOR FUEL LEAKAGE (See page FU-2)**
17. **INSTALL ENGINE COVER (See page ES-389)**
18. **INSTALL COWL TOP VENTILATOR LOUVER LH (See page WW-7)**
19. **INSTALL HOOD TO COWL TOP SEAL (See page WW-7)**
20. **INSTALL FRONT WIPER ARM RH (See page WW-8)**
21. **INSTALL FRONT WIPER ARM LH (See page WW-7)**
22. **REMOVE FRONT WIPER ARM HEAD CAP**
23. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting the cable from the negative (-) battery terminal.



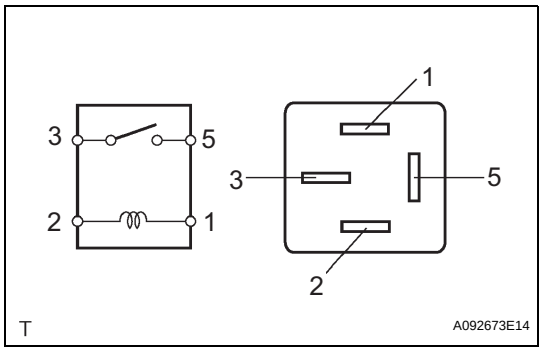
ES

IG1 RELAY

ON-VEHICLE INSPECTION

1. REMOVE RELAY (Marking: IG1)

(a) Remove the IG1 relay from the instrument panel junction block.



2. INSPECT RELAY

(a) Measure the IG1 relay resistance.

Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

If the result is not as specified, replace the relay.

3. INSTALL RELAY

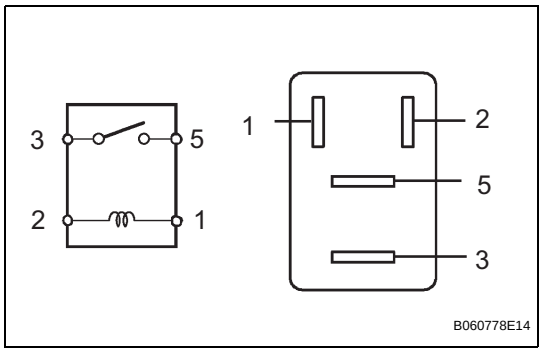
IG2 RELAY

ON-VEHICLE INSPECTION

1. REMOVE IG2 RELAY (Marking: IG2)

(a) Remove the engine room relay block cover.

(b) Remove the IG2 relay from the engine room relay block.



2. INSPECT IG2 RELAY

(a) Measure the EFI relay resistance.

Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

If the result is not as specified, replace the relay.

3. INSTALL IG2 RELAY

ES

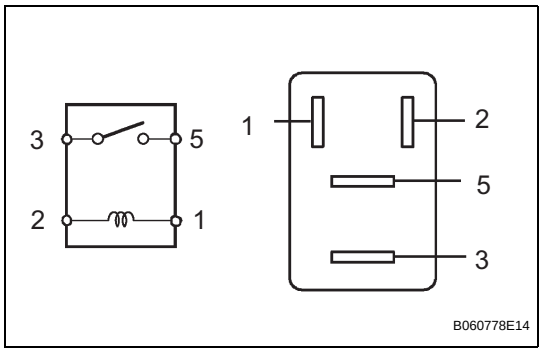
EFI RELAY

ON-VEHICLE INSPECTION

1. REMOVE EFI RELAY (Marking: EFI)

(a) Remove the engine room relay block cover.

(b) Remove the EFI relay from the engine room relay block.



2. INSPECT EFI RELAY

(a) Measure the EFI relay resistance.

Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

If the result is not as specified, replace the relay.

3. INSTALL EFI RELAY

CIRCUIT OPENING RELAY

ON-VEHICLE INSPECTION

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

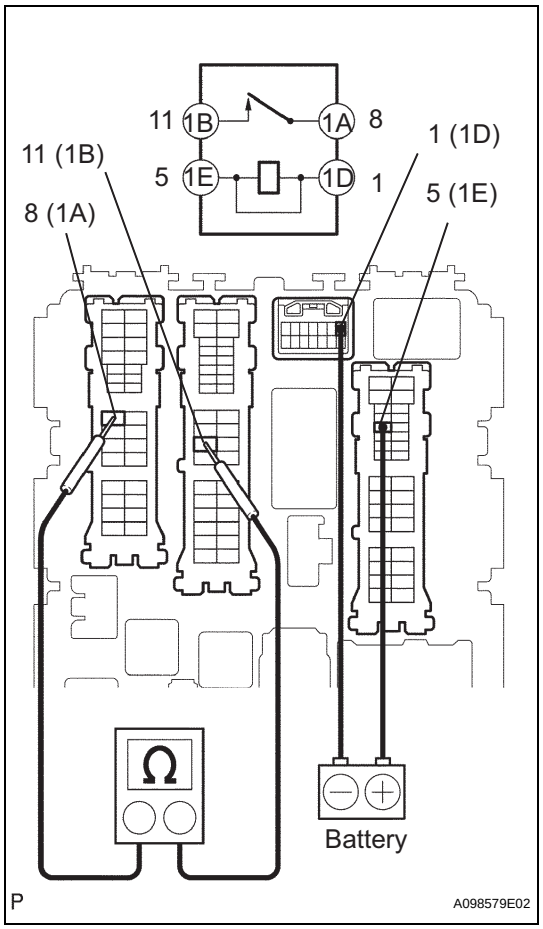
2. INSPECT CIRCUIT OPENING RELAY

(a) Measure the resistance between the terminals.

Standard resistance

Tester Connection	Specified Condition
1B (11) - 1A (8)	10 kΩ or higher
1B (11) - 1A(8)	Below 1 Ω (when battery voltage is applyed to terminals 1E (5) and 1D (1))

If the result is not as specified, replace the instrument panel junction block.



3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

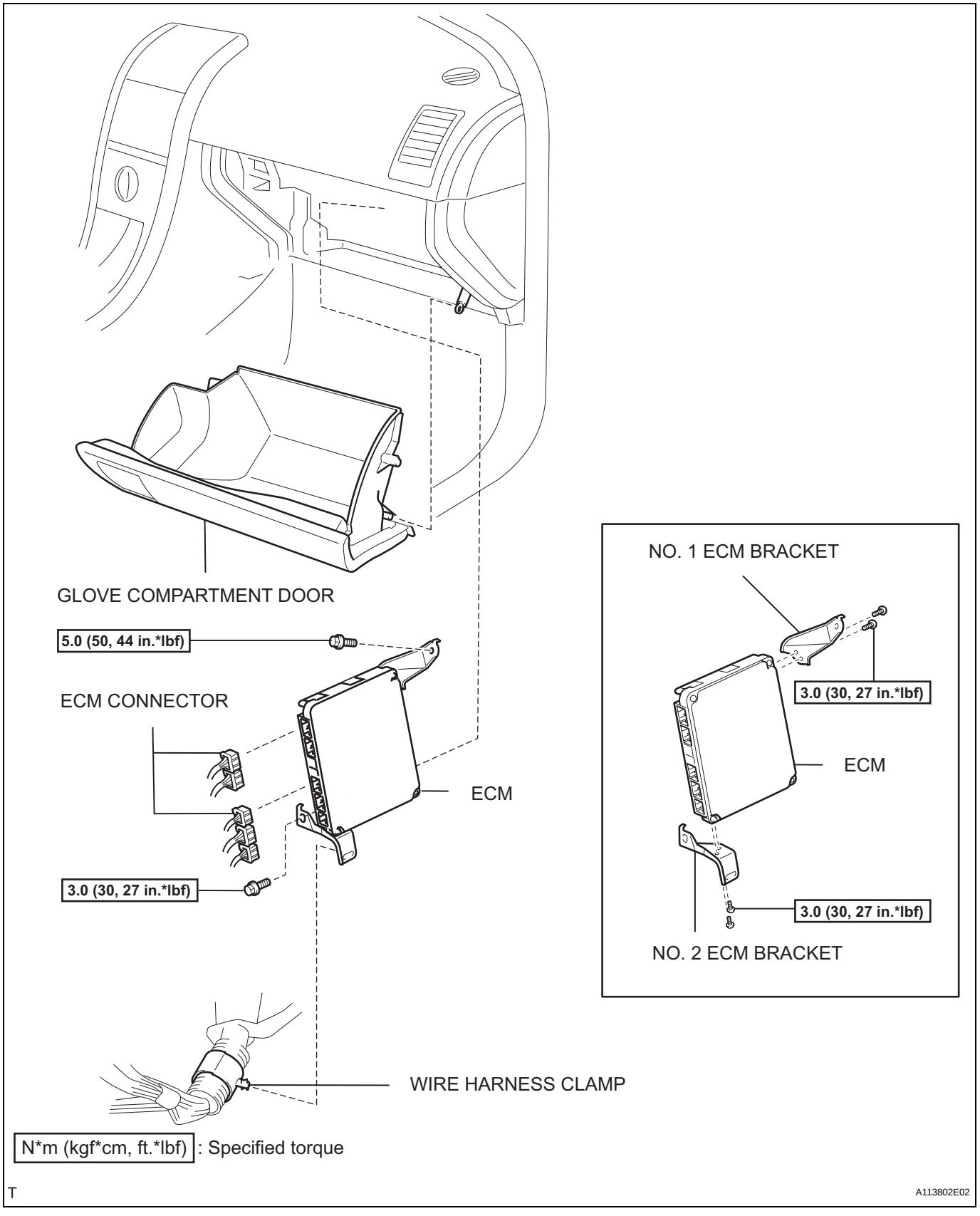
NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery

ES

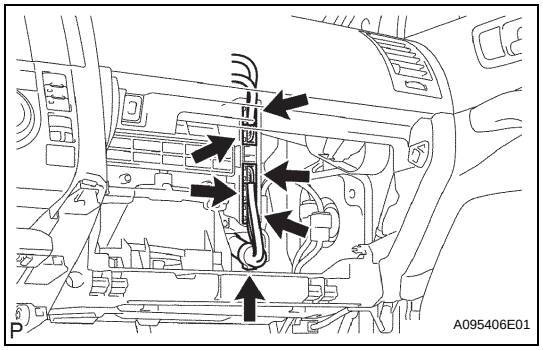
ECM

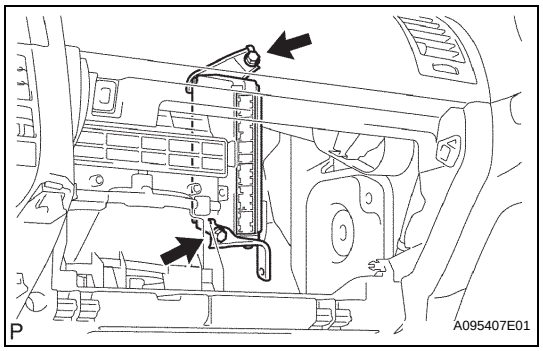
COMPONENTS



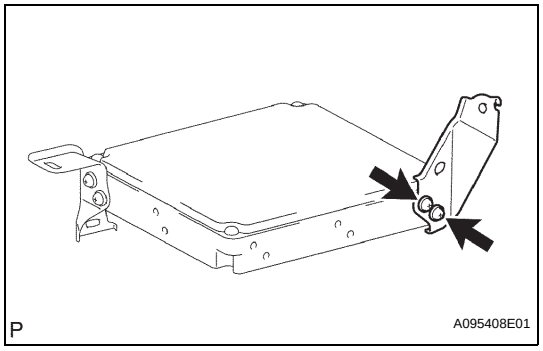
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE GLOVE COMPARTMENT DOOR (See page IP-6)**
3. **REMOVE ECM**
   (a) Disconnect the wire harness clamp.
   (b) Disconnect the 5 ECM connectors.

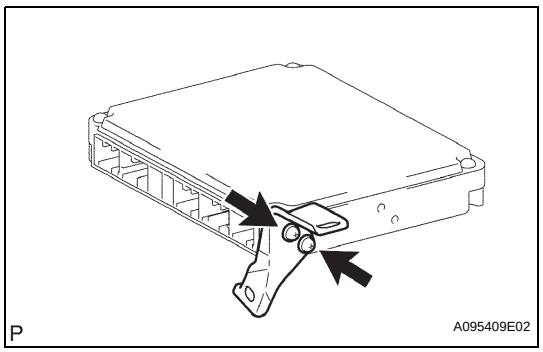




(c) Remove the bolt, screw and ECM.

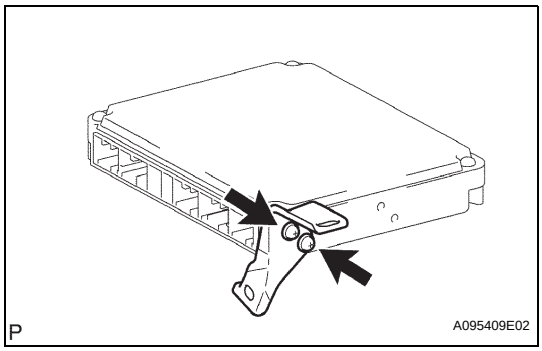


(d) Remove the 2 screws and No. 1 ECM bracket.



(e) Remove the 2 screws and No. 2 ECM bracket.

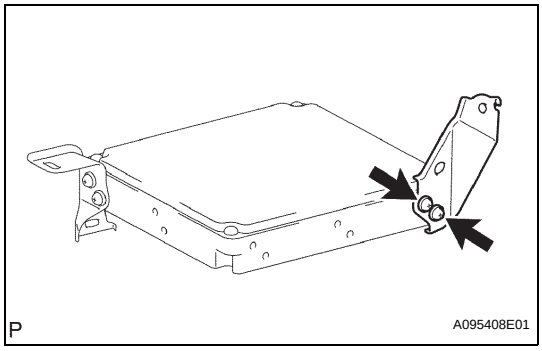
ES



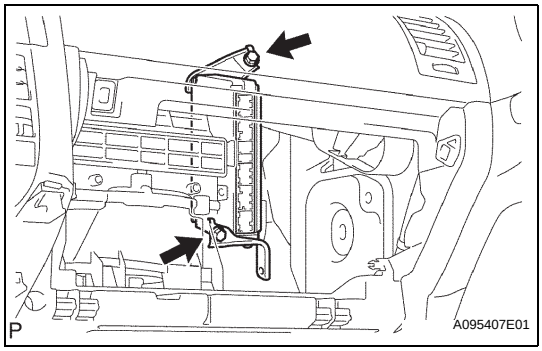
INSTALLATION

1. INSTALL ECM

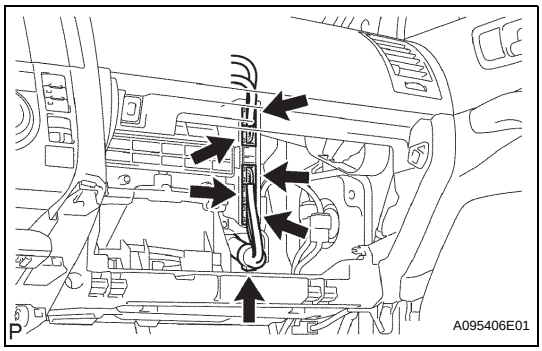
(a) Install the No. 2 ECM bracket with the 2 screws.
Torque: 3.0 N*m (30 kgf*cm, 27 in.*lbf)



(b) Install the No. 1 ECM bracket with the 2 screws.
Torque: 3.0 N*m (30 kgf*cm, 27 in.*lbf)



(c) Install the ECM with the bolt and screw.
Torque: 5.0 N*m (50 kgf*cm, 44 in.*lbf) for bolt
3.0 N*m (30 kgf*cm, 27 in.*lbf) for screw



(d) Connect the 5 ECM connectors.
(e) Install the wire harness clamp.

2. INSTALL GLOVE COMPARTMENT DOOR (See page IP-11)

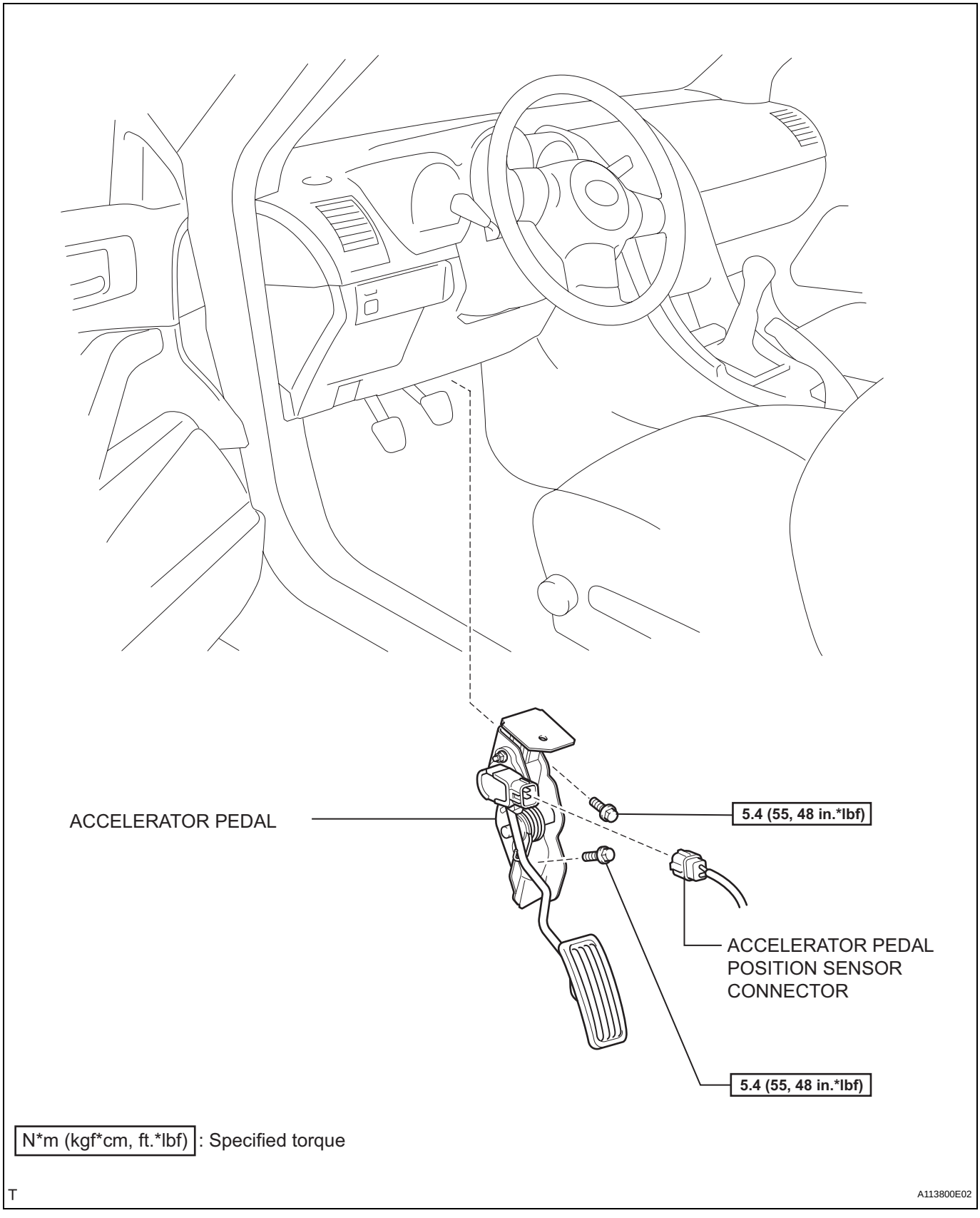
3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

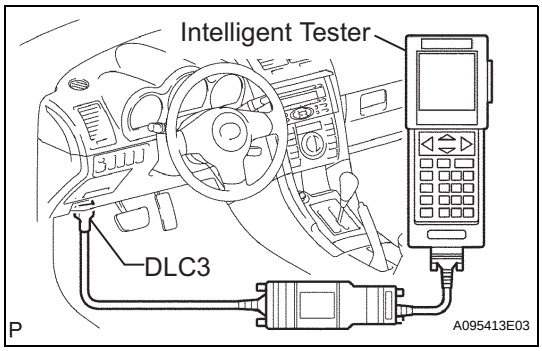
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ACCELERATOR PEDAL

COMPONENTS



ES



ON-VEHICLE INSPECTION

1. CHECK ACCELERATOR PEDAL

(a) Check the voltage.

(1) Connect the intelligent tester to the DLC3.

(2) Turn the ignition switch ON.

(3) Turn the intelligent tester ON.

(4) Select the menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / ALL / ACCEL POS #1, ACCEL POS #2.

(5) Operate the accelerator pedal, and then check that the ACCEL POS #1 and ACCEL POS #2 values are within the specifications.

Standard voltage (ACCEL POS #1)

Accelerator Pedal Condition	Specified Condition
Released	0.5 to 1.1 V
Depressed	2.5 to 4.5 V

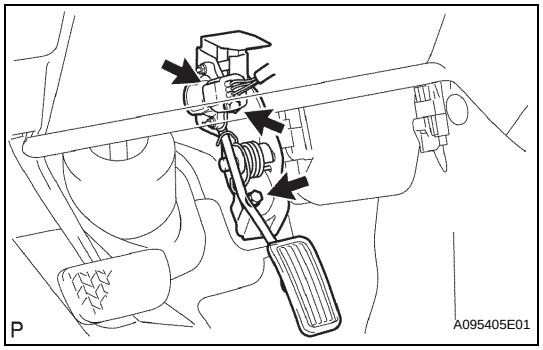
Standard voltage (ACCEL POS #2)

Accelerator Pedal Condition	Specified Condition
Released	1.2 to 2.0 V
Depressed	3.4 to 5.0 V

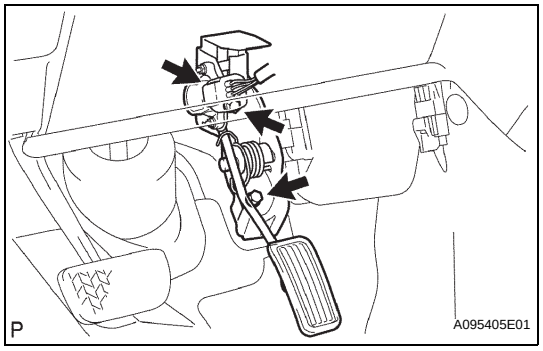
If the result is not as specified, check the accelerator pedal, wire harness or ECM.

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



2. **REMOVE ACCELERATOR PEDAL**
   (a) Disconnect the accelerator pedal position sensor connector.
   (b) Remove the 2 bolts and accelerator pedal.



INSTALLATION

1. **INSTALL ACCELERATOR PEDAL**
   (a) Install the accelerator pedal with the 2 bolts.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)
   (b) Connect the accelerator pedal position sensor connector.

2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

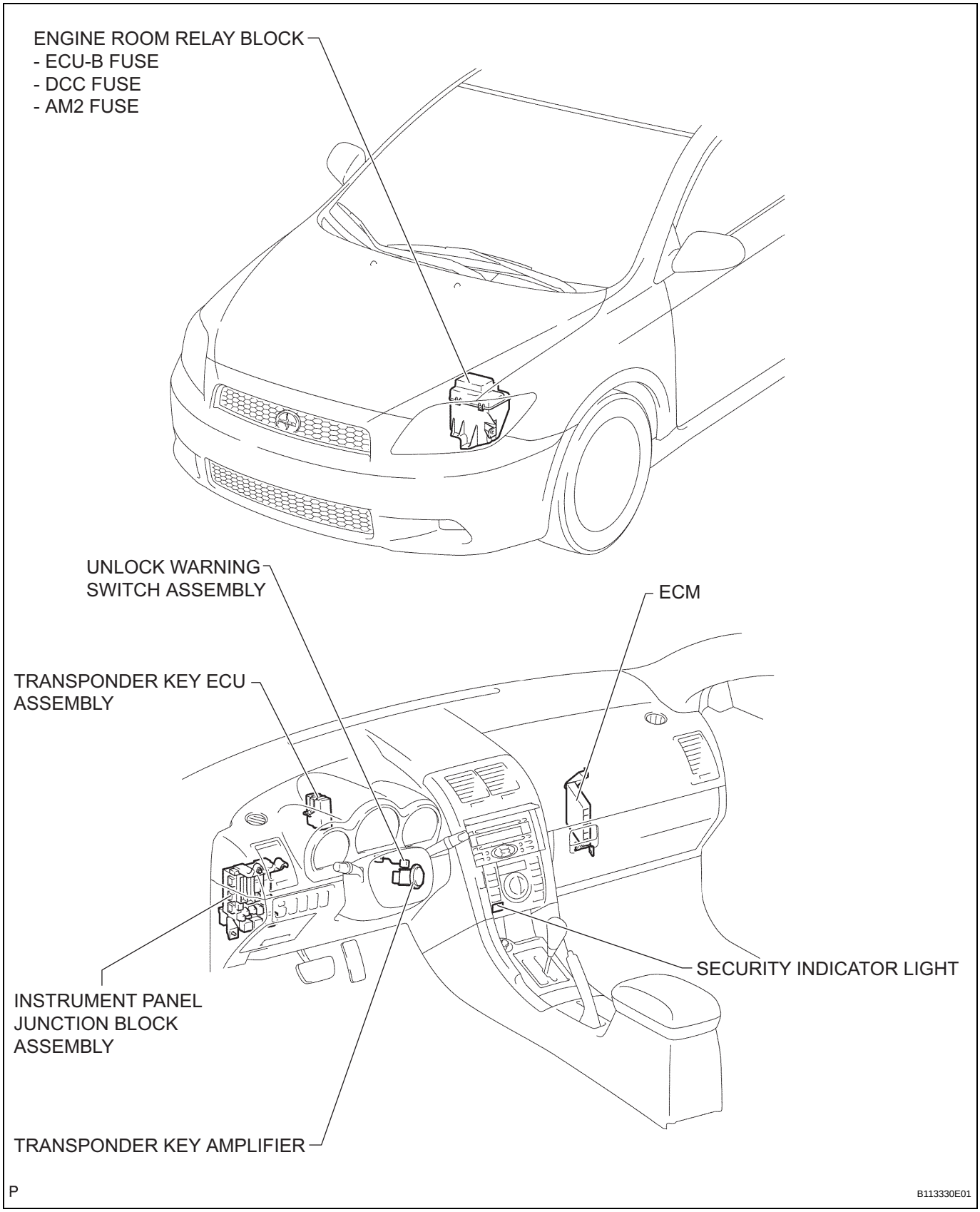
ENGINE IMMOBILISER SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

System Name	See procedure
Power Window Control System (w/ Jam Protection Function)	IN-23
Sliding Roof System	

PARTS LOCATION



SYSTEM DESCRIPTION

1. ENGINE IMMOBILISER SYSTEM DESCRIPTION

- The engine immobiliser system is designed to prevent the vehicle from being stolen. This system uses a transponder key ECU that stores the key codes of authorized ignition keys. If an attempt is made to start the engine using an unauthorized key, the ECU sends a signal to the ECM to prohibit fuel delivery and ignition, effectively disabling the engine.
- When the ECU detects that the unlock warning switch is ON, the ECU provides current to the transponder key coil and produce a faint electric wave. A transponder chip in the key grip receives the faint electric wave. Upon receiving the faint electric wave, the transponder chip outputs a key ID codes signal. The transponder key coil receives this signal, the transponder key amplifies it, and then the signal is transmitted to the ECU. The ECU matches the key's ID code with the vehicle's ID code, which was previously registered in the ECU, and then communicates with the ECM using the SFI communication.
- After the identification results show that the key's ID code matches the vehicle's ID code and the ECU has confirmed their match: 1) the immobiliser system is canceled the engine and the engine starting systems (fuel injection control and ignition control) enter standby mode; and 2) the ECU turns off the security indicator light.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Using the procedure to troubleshoot the engine immobiliser system.
- *: Use the intelligent tester.

EI

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	CRANK ENGINE FOR MORE THAN 10 SECONDS

NEXT

4	CHECK FOR DTC*

(a) Check for DTCs and note any codes that are output (see page EI-21).
(b) Delete the DTC.
(c) Recheck for DTCs. Based on the DTC output above, try to force output of the same SFI system DTC or engine immobiliser system DTC by simulating the operation indicated by the DTC.

Result:

Result	Proceed to
DTC output does not reoccur	A
SFI system DTC output reoccurs	B
Engine immobiliser system DTC output reoccurs	C

B → **Go to SFI SYSTEM**

C → **Go to step 7**

A

5	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 7**

A

6	OVERALL ANALYSIS AND TROUBLESHOOTING*

(a) DATA LIST / ACTIVE TEST (see page EI-19)
(b) Terminals of ECU (see page EI-13)
(c) On-vehicle inspection (see page EI-42)

NEXT

7	ADJUST, REPAIR AND REPLACE

NEXT

8	CONFIRMATION TEST

NEXT

END

REGISTRATION

1. DESCRIPTION OF CODE REGISTRATION

HINT:

- The key has 2 codes: the key code (immobiliser code), the wireless code. All of these code types need to be registered. Refer to the following key code registration procedures and the wireless code registration procedures.
- The key code is needed when the transponder key ECU, ECM, or key is replaced with a new one.

2. PART REPLACEMENT AND KEY REGISTRATION PROCEDURES

(a) The following table shows ECU replacement and key registration procedures in case the malfunctioning ECU has been specified after troubleshooting the engine immobiliser system.

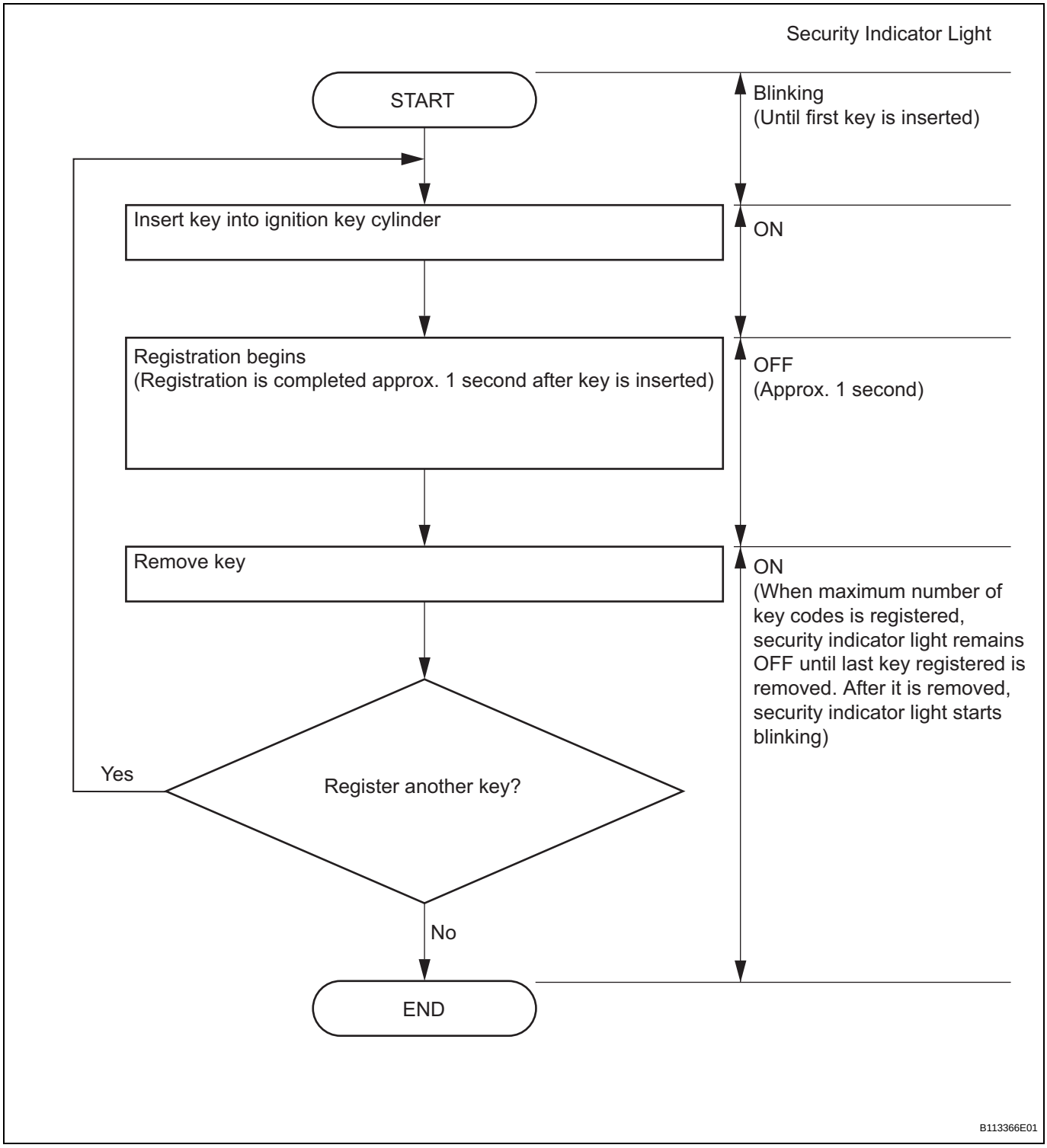
HINT:

- The following procedures indicated in the table below require the use of the intelligent tester:
  New key ID registration
  Additional key ID registration
  Key ID erasure
  ECU code registration
- If all of the registered keys are not available, replacement of the transponder key ECU is also required.
- A maximum of 5 key codes for 3 master keys and 2 sub-keys can be registered.

Part to be replaced	Procedure
Transponder key ECU	1. Replace transponder key ECU 2. Reregister all keys (new key ID registration) 3. Using SST (09843-018040), connect terminals TC and CG of DLC3 4. Turn ignition switch ON and leave it as is for 30 minutes
ECM	1. Replace ECM 2. Using SST (09843-018040), connect terminals TC and CG of DLC3 3. Turn ignition switch ON and leave it as is for 30 minutes
Key	1. Using remaining key, erase key code of lost key (key ID erasure) 2. Register additional keys as necessary (additional key ID registration)

3. KEY REGISTRATION IN AUTOMATIC REGISTRATION (NEW REGISTRATION)

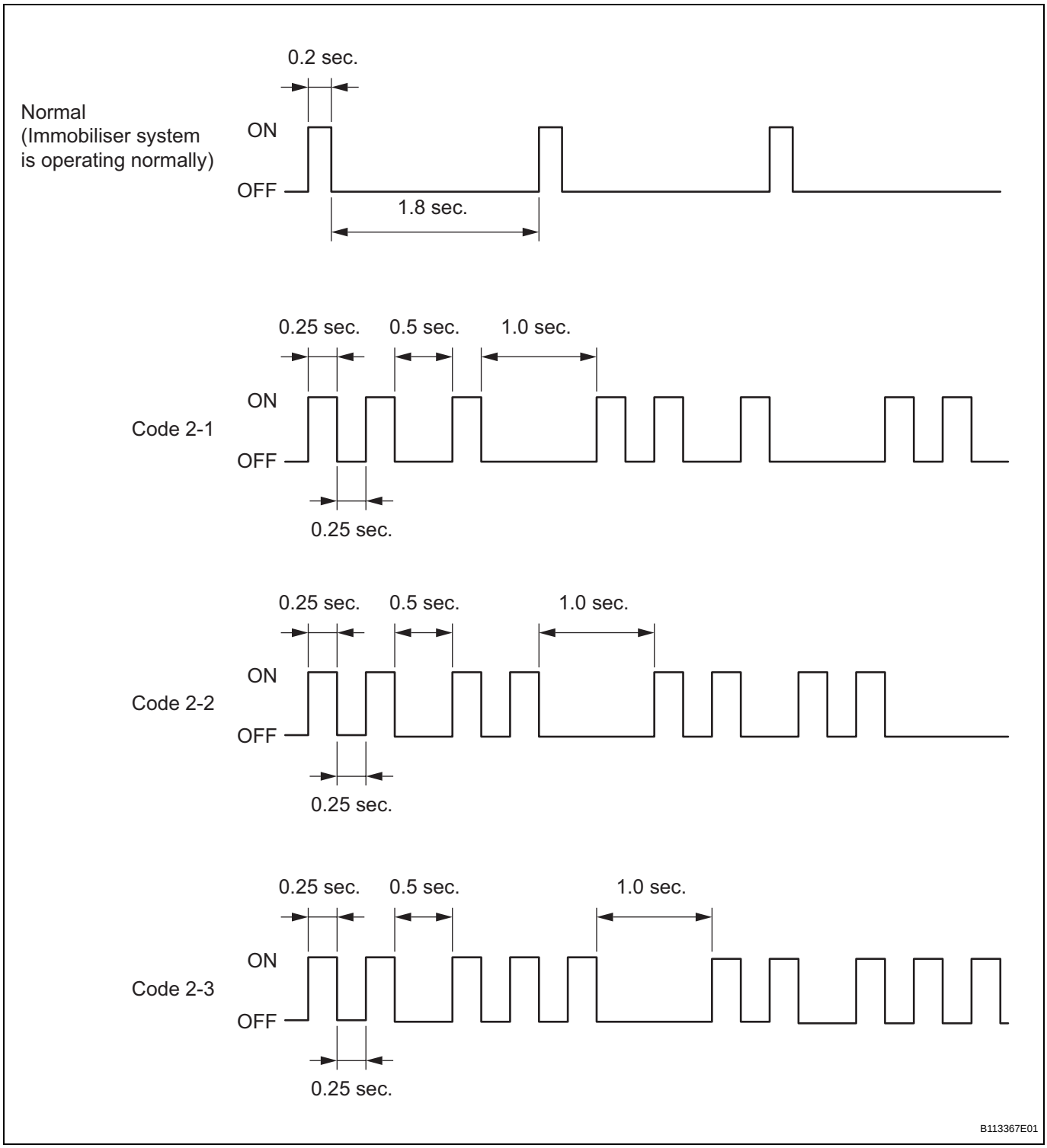
(a) When an ignition key is inserted into the ignition key cylinder, the key code (immobiliser code) registration is automatic. In this mode, a maximum of 5 key codes for 3 master keys and 2 sub-keys can be registered. Any order of registration for the master keys and sub-key can be registered because the transponder key ECU can distinguish between different types of keys.
HINT:
- When a new transponder key ECU is installed, key codes (immobiliser codes) must be registered in the transponder key ECU.
- New transponder key ECUs are automatically set to automatic key code registration mode.



HINT:

- When no key is inserted into the ignition key cylinder in automatic key code registration mode, the security indicator light remains ON.
- When the immobiliser system is operating normally and the key is pulled out, the security indicator light blinks continuously.

- If the key code registration has failed in automatic key code registration mode, code 2-1 will be output from the security indicator light. Trying to reregister an already registered key will cause code 2-2 to be output when the key is inserted. If the number of registered key codes exceeds the limit, code 2-3 will be output from the security indicator light. The output details are shown below.

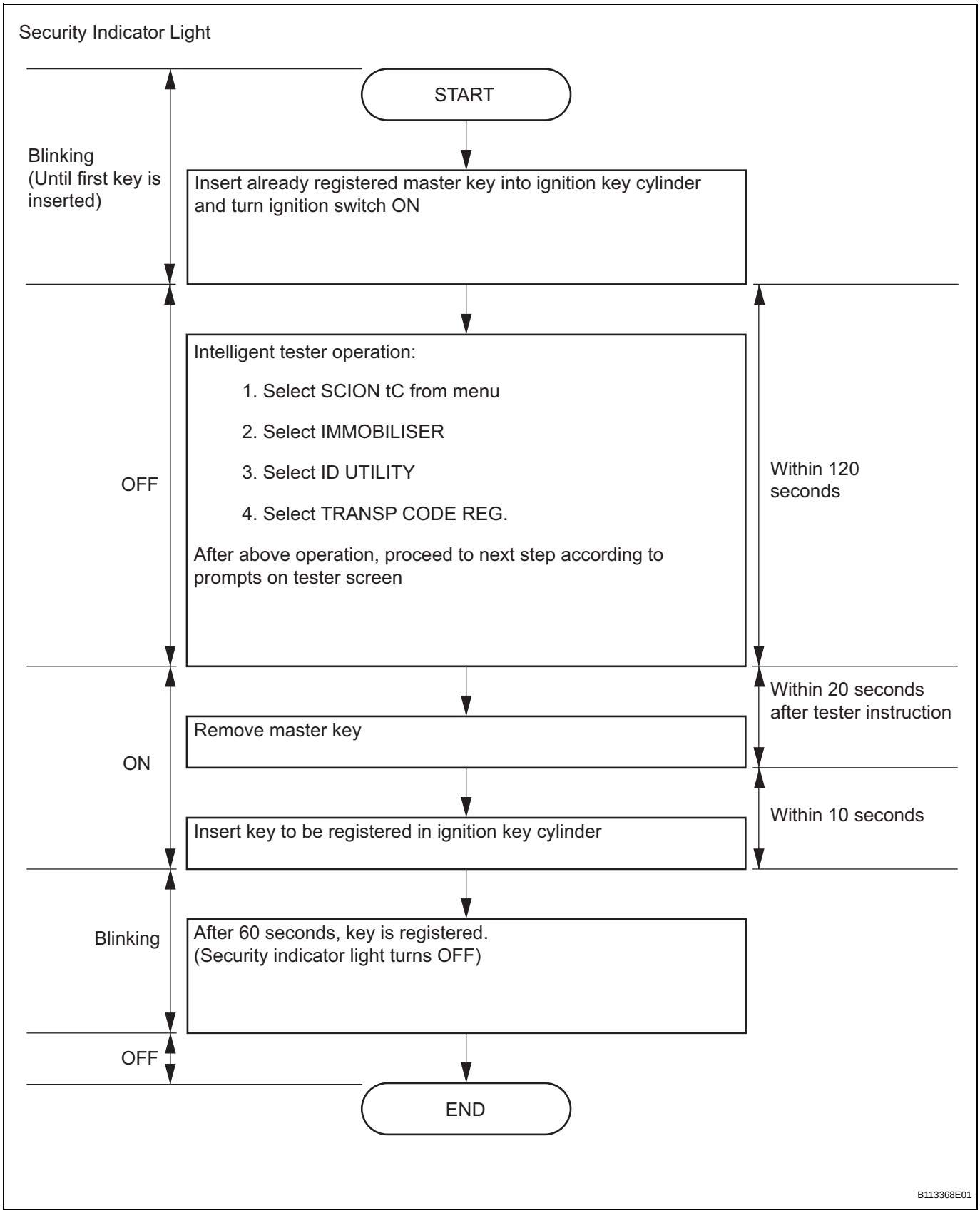


(b) Finish the automatic key code registration mode.
HINT:
The automatic key code registration mode can be forced to end when at least 1 key code (immobiliser code) for the master key has been registered.
(1) Turn the ignition switch ON and OFF 5 times within 10 seconds using the already registered master key.

4. REGISTRATION OF ADDITIONAL KEY (ADDITIONAL REGISTRATION)

(a) Register an additional key using the intelligent tester.
HINT:
- A maximum of 5 key codes and 3 sub-key codes can be registered.
- Registration mode will be ended if each step is not completed within the specified time.
- When the ignition key cylinder or the door key cylinder set is replaced, remove the transmitter module from the original master key. Then install this transmitter module to a new key and use the new key as the master key. If necessary, use this master key to register other keys.

NOTICE:
When the ignition key cylinder has been replaced, locking and unlocking doors are possible with the new master key's transmitter module (taken from the original master key). However, the new master key will not be able to lock and unlock doors through the door key cylinder. Keep the original master key. If the new master key's transmitter module's battery fails, the original master key can be used to lock and unlock doors through the door key cylinder.



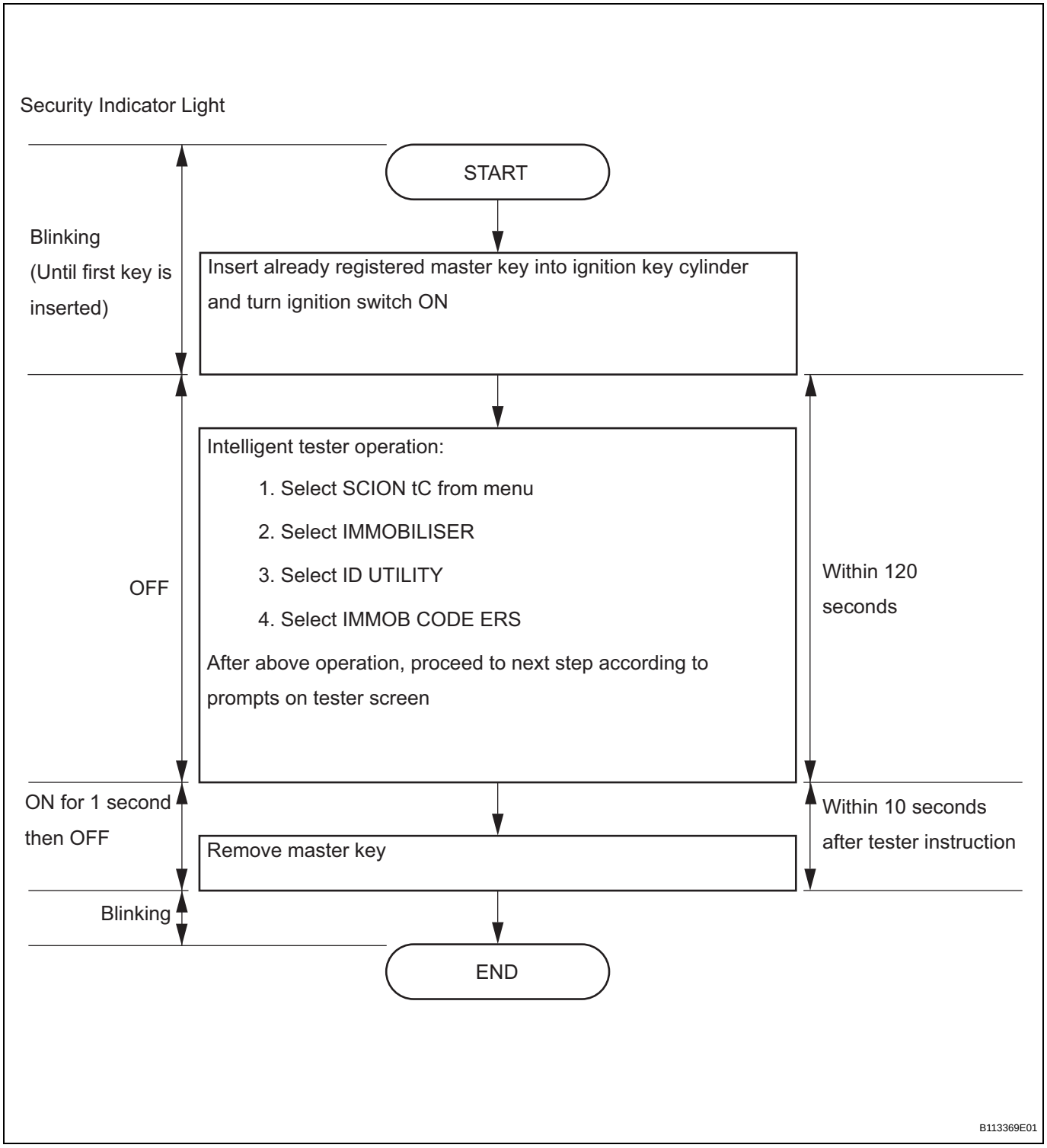
HINT:

- A brief outline of procedures for key code registration is shown above. For more detailed information, refer to the intelligent tester screen's instructions.

- When the immobiliser system is operating normally and key is pulled out, the security indicator light blinks continuously.
- If the key code registration has failed in automatic key code registration mode, code 2-1 will be output from the security indicator light. Trying to reregister an already registered key will be cause code 2-2 to be output when the key is inserted. If the number of registered key codes exceeds the limit, code 2-3 will be output from the security indicator light. The output details are shown in the "KEY REGISTRATION IN AUTOMATIC REGISTRATION (NEW REGISTRATION)" procedures.

5. ERASURE OF KEY CODE

(a) Erase the key codes using the intelligent tester.
HINT:
- All key codes are erased except for the master key that is used to erase the key codes. In order to use a key whose code has been erased, a new key code must be registered.
- Registration will be canceled if each step is not completed within the specified time.



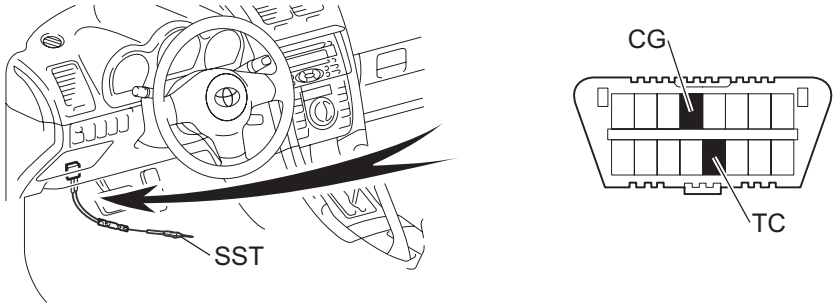
HINT:

- A brief outline of procedures for the key code erasure is shown above. For more detailed information, refer to the intelligent tester screen's instructions.
- When the immobiliser system is operating normally and key is pulled out, the security indicator light blinks continuously.

6. ECU COMMUNICATION ID REGISTRATION

NOTICE:

- **If the transponder key ECU and / or ECM has been replaced, register the ECU COMMUNICATION ID to both in order to match their IDs.**
- **The engine cannot be started unless the ECU COMMUNICATION ID matches.**



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B113359E01

(a) Register the ECU COMMUNICATION ID.

(1) Using SST, connect terminals TC and CG of the DLC3.

SST 09843-18040

(2) Turn the ignition switch ON (do not start the engine) and leave it as is for 30 minutes.

(3) Turn the ignition switch OFF and disconnect terminals TC and CG.

(4) Check that the engine starts.

PROBLEM SYMPTOMS TABLE

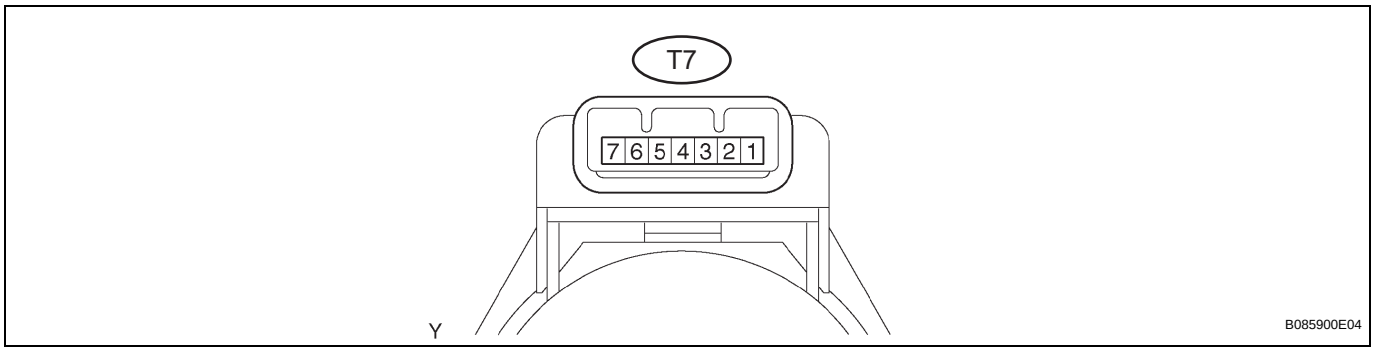
HINT:
Use the table below to help determine the cause of the problem symptom. The potential cases of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected area in the order they are listed. Replace parts as necessary.

ENGINE IMMOBILISER SYSTEM

Symptom	Suspected Area	See page
Engine does not start	1. Power source circuit	EI-38
	2. SFI system	ES-6

TERMINALS OF ECU

1. CHECK TRANSPONDER KEY AMPLIFIER



(a) Disconnect the T7 amplifier connector.
(b) Measure the resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (T7-7) - Body ground	V - Body ground	Ground	Always	Below 1 Ω

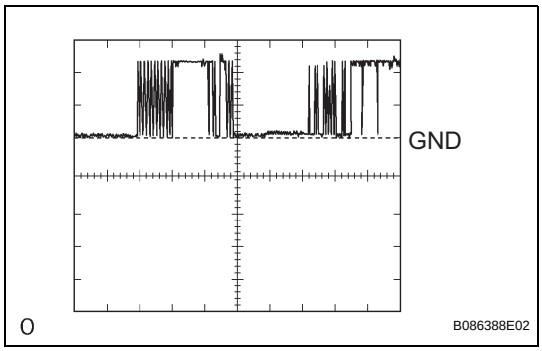
If the result is not as specified, there may be a malfunction on the wire harness side.

(c) Reconnect the T7 amplifier connector.
(d) Measure the resistance and voltage of the connector.

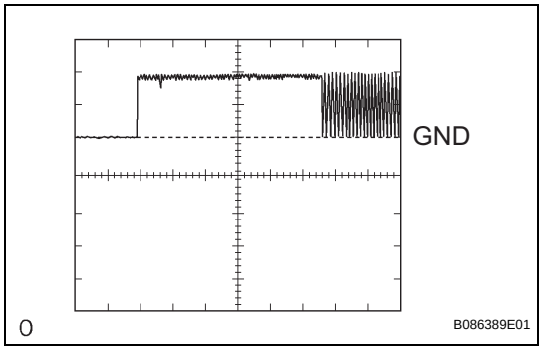
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (T7-7) - Body ground	V - Body ground	Ground	Always	Below 1 Ω
VC5 (T7-1) - GND (T7-7)	L - V	Power source	No key in ignition key cylinder	Below 1 V
			Key inserted	4.6 to 5.4 V
CODE (T7-4) - GND (T7-7)	Y - V	Demodulated signal of key code data	No key in ignition key cylinder	Below 1 V
			Key inserted	Pulse generation (see waveform 1)
TXCT (T7-5) - GND (T7-7)	R - V	Key code output signal	No key in ignition key cylinder	Below 1 V
			Key inserted	Pulse generation (see waveform 2)

If the result is not as specified, the amplifier may have a malfunction.

(e) Inspect using an oscilloscope.
(1) Waveform 1 (Reference)



Item	Content
Symbols (Terminal No.)	CODE (T7-4) - GND (T7-7)
Tool Setting	2 V/DIV., 20 msec./DIV.
Condition	Key inserted

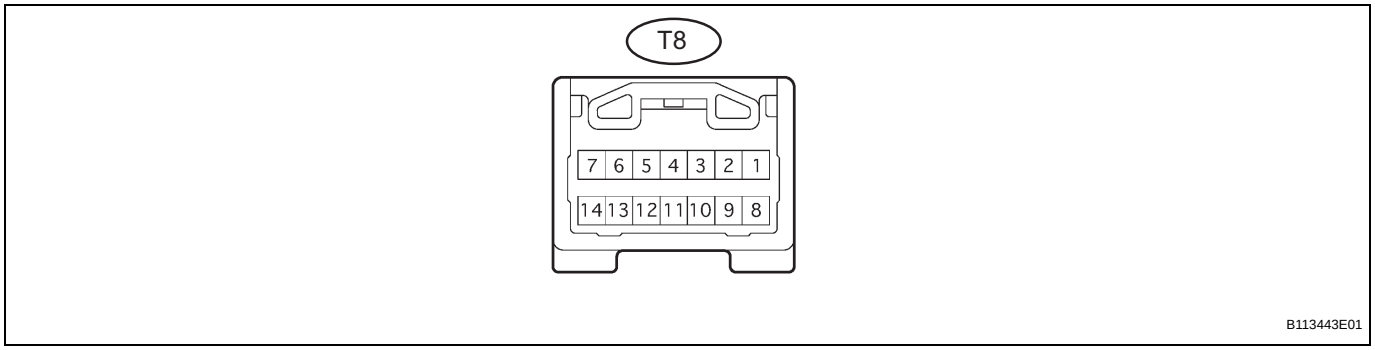


(2) Waveform 2 (Reference)

Item	Content
Symbols (Terminal No.)	TXCT (T7-5) - GND (T7-7)
Tool Setting	2 V/DIV., 20 msec./DIV.
Condition	Key inserted

2. CHECK TRANSPONDER KEY ECU ASSEMBLY

EI



(a) Disconnect the T8 ECU connector.
(b) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
AGND (T8-13) - Body ground	V - Body ground	Ground	Always	Below 1 Ω
GND (T8-14) - Body ground	BR-W - Body ground	Ground	Always	Below 1 Ω
+B (T8-1) - GND (T8-14)	P - BR-W	Power source supply	Always	10 to 14 V
IG (T8-2) - GND (T8-14)	LG - BR-W	Ignition power supply	Ignition switch OFF	Below 1 V
			Ignition switch ON	10 to 14 V
KSW (T8-10) - GND (T8-14)	B - BR-W	Unlock warning switch	No key in ignition key cylinder	10 kΩ or higher
			Key inserted	Below 1 Ω

If the result is not as specified, there may be a malfunction on the wire harness side.
(c) Reconnect the T8 ECU connector.
(d) Measure the voltage of the connector.

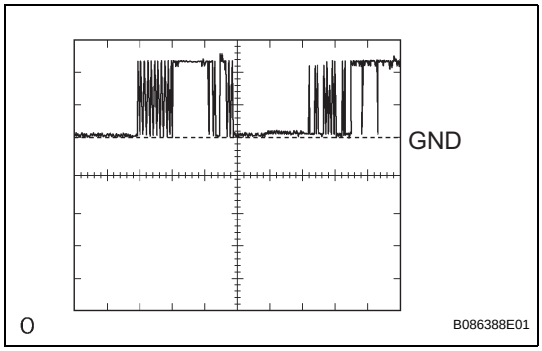
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
KSW (T8-10) - GND (T8-14)	B - BR-W	Unlock warning switch	No key in ignition key cylinder	10 to 14 V
			Key inserted	Below 1 V
VC5 (T8-8) - GND (T8-14)	L - BR-W	Power source of transponder key amplifier	Ignition switch OFF	Below 1 V
			Ignition switch ON	4.6 to 5.4 V
CODE (T8-11) - AGND (T8-13)	Y - V	Transponder key amplifier communication signal	Ignition switch OFF	Below 1 V
			Ignition switch ON	Pulse generation (see waveform 1)
TXCT (T8-12) - AGND (T8-13)	R - V	Transponder key amplifier communication signal	Ignition switch OFF	Below 1 V
			Ignition switch ON	Pulse generation (see waveform 2)

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
EFIO (T8-6) - GND (T8-14)	O - BR-W	ECM output signal	Ignition switch OFF	Below 1 V
			Ignition switch ON	Pulse generation (see waveform 3)
EFII (T8-7) - GND (T8-14)	GR - BR-W	ECM output signal	Ignition switch OFF	Below 1 V
			Ignition switch ON	Pulse generation (see waveform 4)
CTY (T8-4) - GND (T8-14)	BR - BR-W	Door courtesy switch	Driver side door fully closed	10 to 14 V
			Driver side door open	Below 1 V
IND (T8-3) - GND (T8-14)	B - BR-W	Security indicator light	Engine immobiliser system set (indicator is blinking)	Alternating between 10 to 14 V (0.2 sec.) and below 1 V (1.8 sec.)

If the result is not as specified, the ECU may have a malfunction.

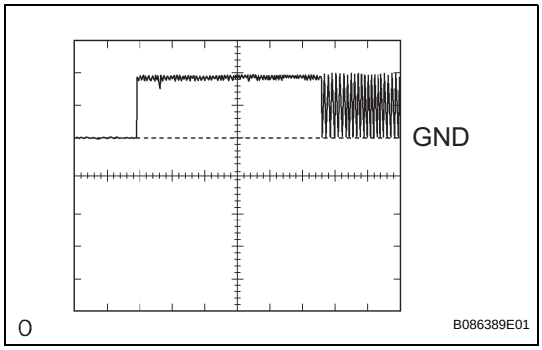
(e) Inspect using an oscilloscope.

(1) Waveform 1 (Reference)



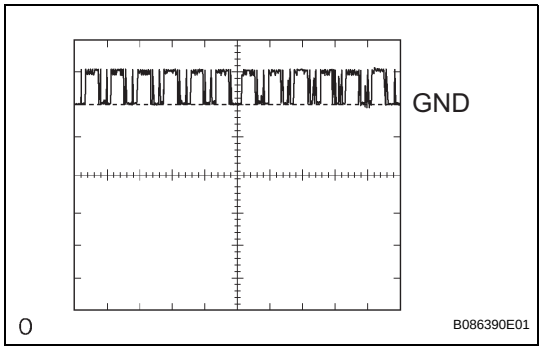
Item	Content
Symbols (Terminal No.)	CODE (T8-11) - AGND (T8-13)
Tool Setting	2 V/DIV., 20 msec./DIV.
Condition	Key inserted

(2) Waveform 2 (Reference)

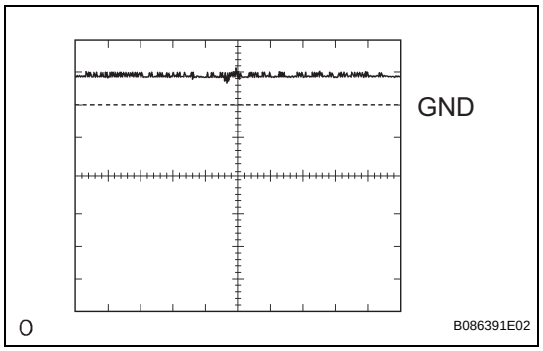


Item	Content
Symbols (Terminal No.)	TXCT (T8-12) - AGND (T8-13)
Tool Setting	2 V/DIV., 20 msec./DIV.
Condition	Key inserted

(3) Waveform 3 (Reference)



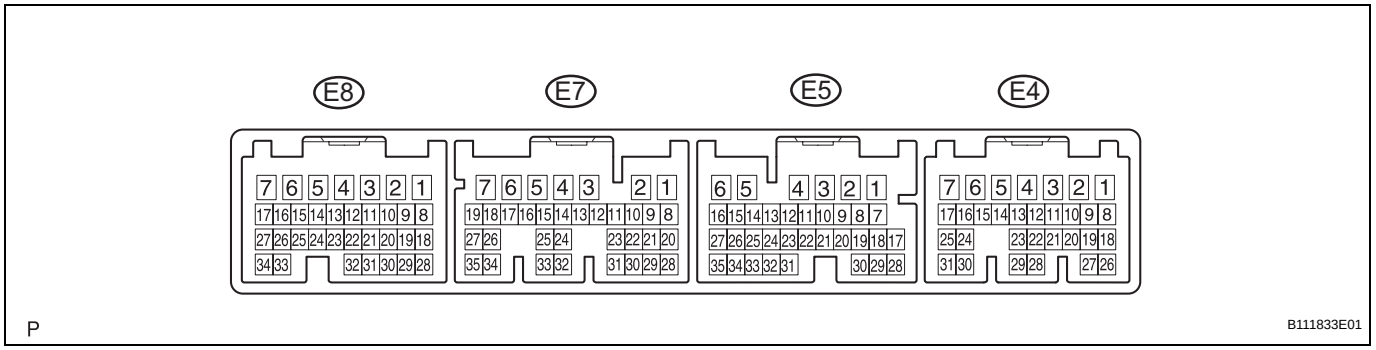
Item	Content
Symbols (Terminal No.)	EFIO (T8-6) - GND (T8-14)
Tool Setting	10 V/DIV., 100 msec./DIV.
Condition	Ignition switch ON



(4) Waveform 4 (Reference)

Item	Content
Symbols (Terminal No.)	EFII (T8-7) - GND (T8-14)
Tool Setting	10 V/DIV., 100 msec./DIV.
Condition	Ignition switch ON

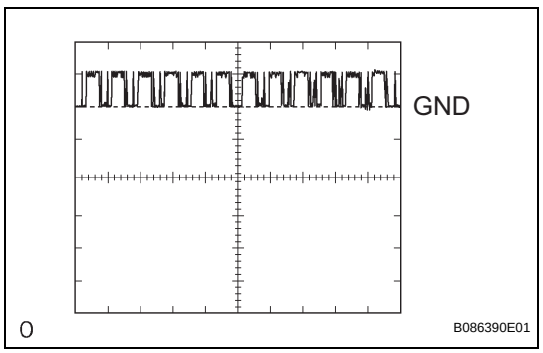
3. CHECK ECM



(a) Measure the voltage and resistance of the connectors.

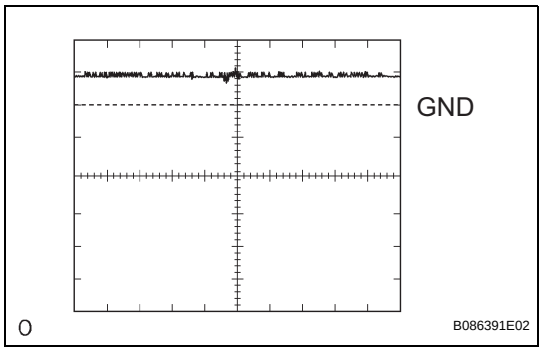
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
E01 (E8-7) - Body ground	B - Body ground	Ground	Always	Below 1 Ω
E0M (E4-29)* - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
E02 (E8-6) - Body ground	P - Body ground	Ground	Always	Below 1 Ω
E1 (E8-3) - Body ground	L - Body ground	Ground	Always	Below 1 Ω
BATT (E4-3) - E1 (E8-3)	V - L	Battery	Always	10 to 14 V
+B (E4-1) - E1 (E8-3)	GR - L	Ignition power supply	Ignition switch ON	10 to 14 V
IMI (E5-16) - E1 (E8-3)	O - W-B	Transponder key ECU input signal	Ignition switch OFF	Below 1 V
			Ignition switch ON	Pulse generation (see waveform 1)
IMO (E5-15) - E1 (E8-3)	GR -W-B	Transponder key ECU output signal	Ignition switch OFF	Below 1 V
			Ignition switch ON	Pulse generation (see waveform 2)

*: for Malfunction Indicator Lamp
If the result is not as specified, the ECM may have a malfunction.



(b) Inspect using an oscilloscope.
(1) Waveform 1 (Reference)

Item	Content
Symbols (Terminal No.)	IMI (E5-27) - E1 (E8-3)
Tool Setting	10 V/DIV., 100 msec./DIV.
Condition	Ignition switch ON



(2) Waveform 2 (Reference)

Item	Content
Symbols (Terminal No.)	IMO (E5-26) - E1 (E8-3)
Tool Setting	10 V/DIV., 100 msec./DIV.
Condition	Ignition switch ON

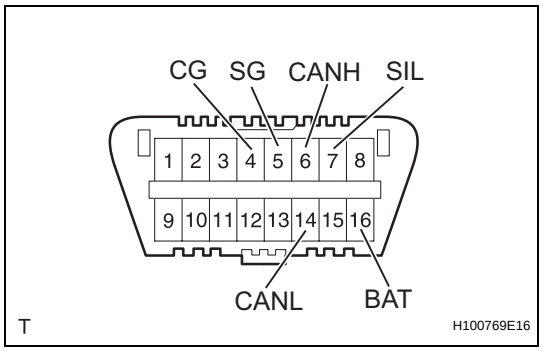
DIAGNOSIS SYSTEM

1. DESCRIPTION

(a) The transponder key ECU controls the vehicle's immobiliser system functions. Immobiliser system data and Diagnostic Trouble Codes (DTCs) can be read using the intelligent tester after it is attached to the Data Link Connector 3 (DLC3). In some cases, a malfunction may be occurring in the immobiliser system even though the security indicator light is not illuminated.
If the system seems to be malfunctioning, use the intelligent tester to inspect the operation of the system before performing repairs.

2. CHECK DLC3

(a) The vehicle's ECU uses ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

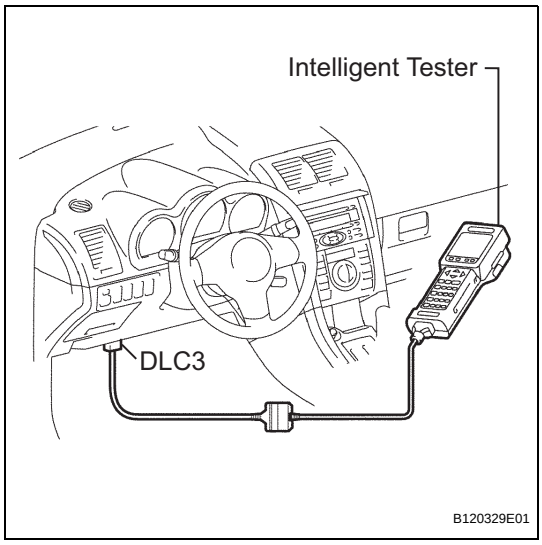


Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	10 to 14 V
CANH (6) - CANL (14)	CAN bus line	Ignition switch OFF*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Ignition switch OFF*	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Ignition switch OFF*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Ignition switch OFF*	6 kΩ or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Ignition switch OFF*	6 kΩ or higher

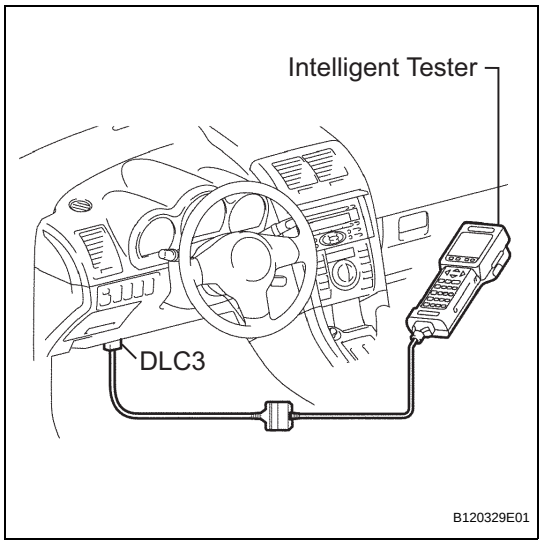
NOTICE:

***: 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 and connector.



(b) Connect the cable of the intelligent tester (with CAN VIM) to the DLC3, turn the ignition switch to the ON position and attempt to use the intelligent tester. If the screen displays a communication error message, a problem exists in the vehicle side of the tester side.
HINT:
- If communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself. Consult the Service Department listed in the tool's instruction manual.



DTC CHECK / CLEAR

1. CHECK DTC

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON.
(c) Read the DTCs by following the directions on the tester's screen.
HINT:
Refer to the intelligent tester operator's manual for further details.

2. CLEAR DTC

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON.
(c) Erase the DTCs by following the directions on the tester's screen.
HINT:
Refer to the intelligent tester operator's manual for further details.

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON.
(c) Read the DATA LIST by following the directions on the tester screen.

Transponder key ECU assembly:

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
KEY SW	Unlock warning switch signal / ON or OFF	OFF: No key is in ignition key cylinder ON: Key is in ignition key cylinder	-
IG SW	Ignition switch signal / ON or OFF	OFF: Ignition switch OFF or ACC ON: Ignition switch ON	-
IMMOBILISER	Immobiliser system status / SET or UNSET	UNSET: Ignition switch ON SET: No key is in ignition key cylinder	-
PERMIT (START)	Engine starting control / OK or NG	OK: Engine starting is permitted NG: Engine starting is not permitted	-
RESPONSE	Transponder chip data / NG or OK	NG: Data error OK: Data OK	-
FRAME	Transponder chip data / NG or OK	NG: Data error OK: Data OK	-
SERIAL NUMBER	Transponder chip data / NG or OK	NG: Data error OK: Data OK	-
ENCRYPT CODE	Transponder chip data / NG or OK	NG: Data error OK: Data OK	-
STATUS	Transponder chip data / NG or OK	NG: Data error OK: Data OK	-
BCC	Transponder chip signal / NG or OK	NG: Incorrect data sent OK: Correct data sent	-
SUB KEY	Sub-key code signal / NO MATCH or MATCH	NOMATCH: Unmatched sub-key code is sent MATCH: Registered sub-key code is sent	-
MASTER KEY	Master key code signal / NOMATCH or MATCH	NOMATCH: Unmatched master key code is sent MATCH: Registered master key code is sent	-
REGIST SUB CODE	Number of registered sub-keys / min.: 0, max.: 3	Number of registered sub-keys	-
REGIST MAS CODE	Number of registered master keys / min.: 0, max.: 5	Number of registered master keys	-
REG CODE SPACE	Memory space for key code registration / NOT FUL or FULL	NOT FUL: Possible to register more key codes FULL: Cannot register any more key codes	-
+B	+B judgment / NORMAL or BREAK	NORMAL: Battery supply is normal BREAK: Battery supply is malfunctioning	-

Item	Measurement Item/ Display (Range)	Normal Condition	Diagnostic Note
ANTENNA CIOL	Transponder key coil condition / NORMAL or FAIL	NORMAL: Transponder key coil is normal FAIL: Transponder key coil is malfunctioning	-

2. PERFORM ACTIVE TEST

HINT:

Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed during the ACTIVE TEST.

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON.
(c) Perform the ACTIVE TEST by following the directions on the tester screen.

Transponder key ECU assembly:

Item	Test Details	Diagnostic Note
SECURITY INDIC	Turn security indicator light ON/OFF	-

DIAGNOSTIC TROUBLE CODE CHART

1. TRANSPONDER KEY ECU ASSEMBLY DTC CHART

TRANSPONDER KEY ECU ASSEMBLY

DTC Code	Detection Item	Trouble Area	See page
B2780	Push Switch / Key Unlock Warning Switch Malfunction	- Unlock warning switch assembly - Wire harness - Transponder key ECU assembly	EI-22
B2784	Antenna Coil Open / Short	- Wire harness - Transponder key amplifier - Transponder key ECU assembly	EI-25
B2793	Transponder Chip Malfunction	Key	EI-27
B2794	Unmatched Encryption Code	Key	EI-28
B2795	Unmatched Key Code	Key	EI-29
B2796	No Communication in Immobiliser System	- Key - Wire harness - Transponder key amplifier - Transponder key ECU assembly	EI-30
B2797	Communication Malfunction No. 1	- Key - Wire harness - Transponder key amplifier - Transponder key ECU assembly	EI-33
B2798	Communication Malfunction No. 2	Key	EI-30

2. ECM DTC CHART

NOTICE:

The DTC for the immobiliser system is specified. If other codes are output, check the DTC chart of the SFI system.

ECM

DTC Code	Detection Item	Trouble Area	See page
B2799	Engine Immobiliser System Malfunction	- Wire harness - ECM	EI-36

EI

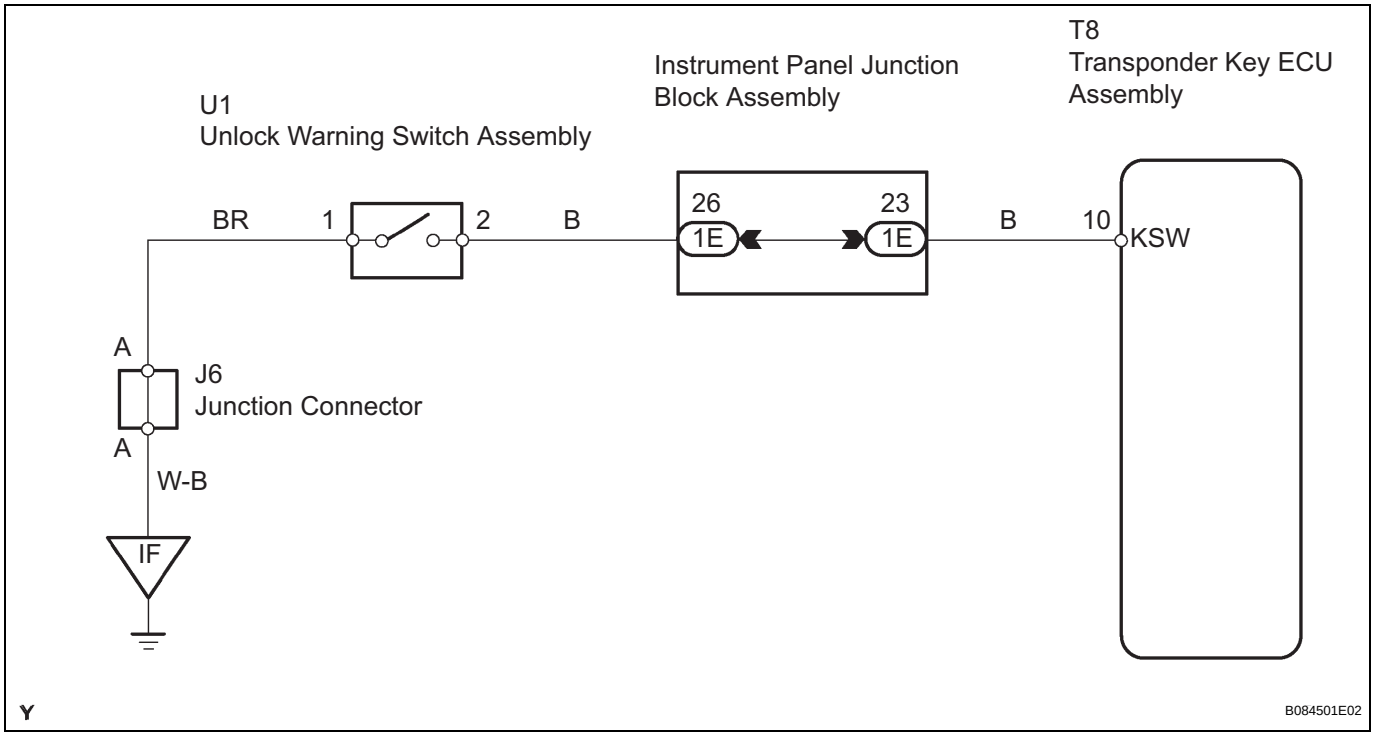
DTC	B2780	Push Switch / Key Unlock Warning Switch Malfunction

DESCRIPTION

This DTC will be output when the key is inserted into the ignition key cylinder, but the transponder key ECU does not detect the ON condition of the unlock warning switch. Normally, inserting the key into the ignition key cylinder turns ON the unlock warning switch, which is then detected by the ECU.

DTC No.	DTC Detection Condition	Trouble Area
B2780	Unlock warning switch ON condition is not detected when key is in ignition key cylinder	• Unlock warning switch assembly • Wire harness • Transponder key ECU assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE OF INTELLIGENT TESTER (UNLOCK WARNING SWITCH ASSEMBLY)

(a) Check the DATA LIST for proper functioning of the unlock warning switch.

Transponder key ECU assembly

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
KEY SW	Unlock warning switch signal / ON or OFF	ON: Key is in ignition key cylinder OFF: No key is in ignition key cylinder	-

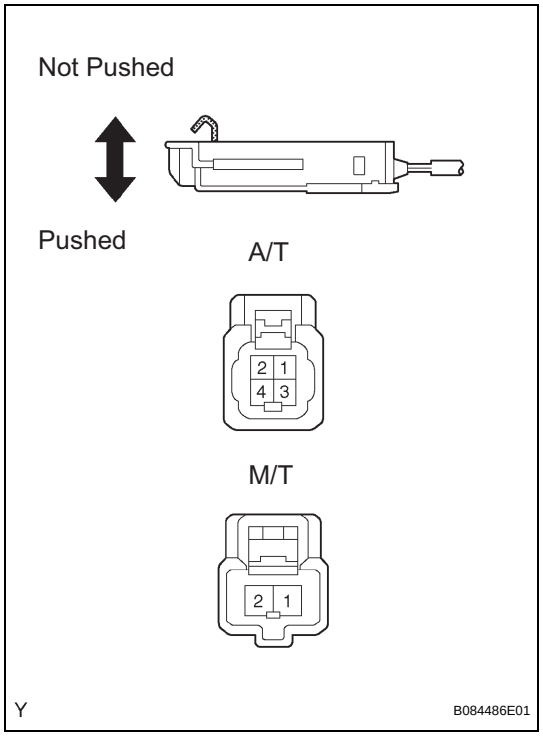
OK:

ON (key is in ignition key cylinder) appears on the screen.

OK → REPLACE TRANSPONDER KEY ECU ASSEMBLY

NG

2 INSPECT UNLOCK WARNING SWITCH ASSEMBLY



(a) Remove the unlock warning switch.
(b) Measure the resistance of the switch.
Standard resistance

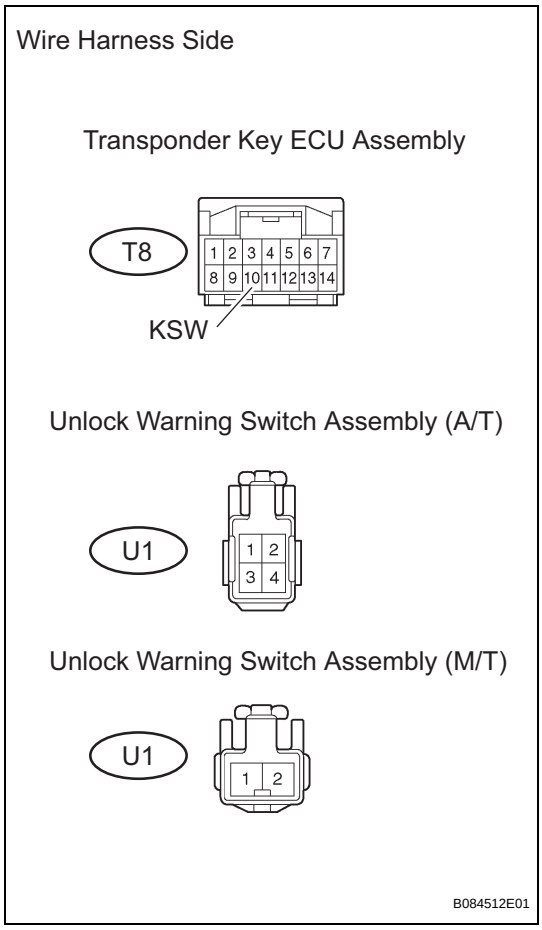
Tester Connection	Switch Condition	Specified Condition
1 - 2	Pushed	Below 1 Ω
	Not pushed	10 kΩ or higher

NG → REPLACE UNLOCK WARNING SWITCH ASSEMBLY

OK

EI

3	CHECK WIRE HARNESS (UNLOCK WARNING SWITCH - TRANSPONDER KEY ECU AND BODY GROUND)



(a) Disconnect the U1 switch connector.
(b) Disconnect the T8 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T8-10 (KSW) - U1-2	Below 1 Ω
U1-1 - Body ground	

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE TRANSPONDER KEY ECU ASSEMBLY

DTC	B2784	Antenna Coil Open / Short

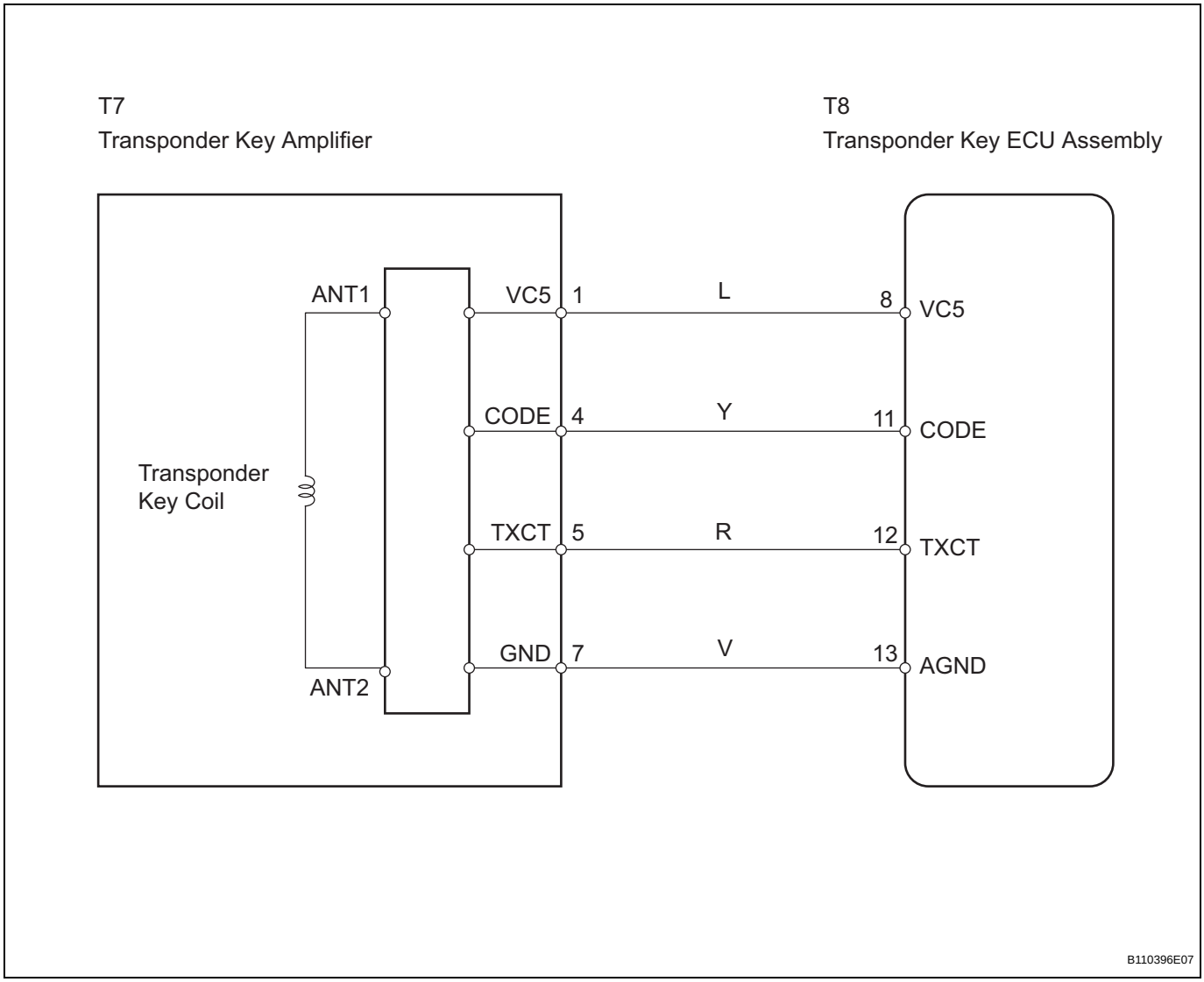
DESCRIPTION

This DTC is detected when the transponder key coil is open or short circuited.

DTC No.	DTC Detection Condition	Trouble Area
B2784	Transponder key coil open / short	• Wire harness • Transponder key amplifier • Transponder key ECU assembly

EI

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE OF INTELLIGENT TESTER (TRANSPONDER KEY COIL)

(a) Check the DATA LIST for proper functioning of the transponder key coil.

Transponder key ECU assembly

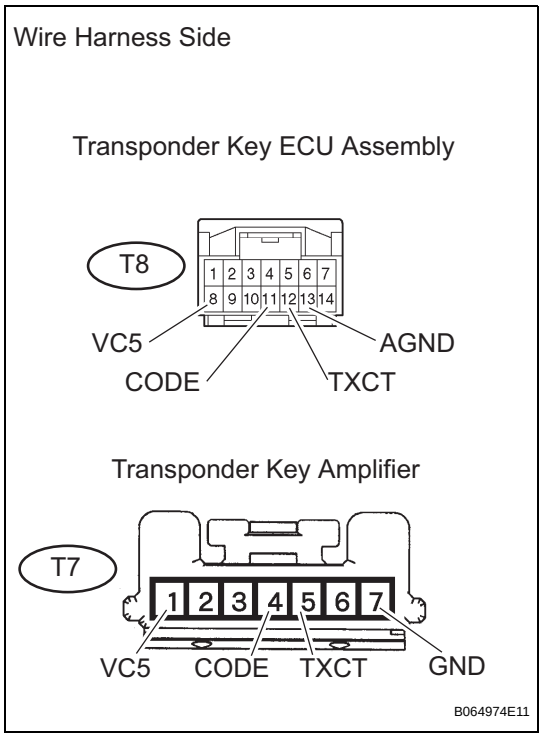
Item	Measurement Item / display (Range)	Normal Condition	Diagnostic Note
ANTENNA COIL	Transponder key coil condition / NORMAL or FAIL	NORMAL: Antenna coil is normal FAIL: Antenna coil is malfunctioning	-

OK:
NORMAL (transponder key coil is normal) appears on the screen.

OK → **REPLACE TRANSPONDER KEY ECU ASSEMBLY**

NG

2	CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSEMBLY - TRANSPONDER KEY AMPLIFIER)



(a) Disconnect the T8 ECU connector.
(b) Disconnect the T7 amplifier connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T8-8 (VC5) - T7-1 (VC5)	Below 1 Ω
T8-11 (CODE) - T7-4 (CODE)	
T8-12 (TXCT) - T7-5 (TXCT)	
T8-13 (AGND) - T7-7 (GND)	
T8-8 (VC5) or T7-1 (VC5) - Body ground	10 kΩ or higher
T8-11 (CODE) or T7-4 (CODE) - Body ground	
T8-12 (TXCT) or T7-5 (TXCT) - Body ground	
T8-13 (ANGD) or T7-7 (GND) - Ground ground	

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE TRANSPONDER KEY AMPLIFIER

DTC	B2793	Transponder Chip Malfunction

DESCRIPTION

This DTC is output when: 1) during key code registration, a key malfunction occurs; 2) the key code was unable to be registered properly.

DTC No.	DTC Detection Condition	Trouble Area
B2793	Transponder chip malfunction	Key

INSPECTION PROCEDURE

1	REREGISTER KEY

(a) Delete the DTC (see page EI-19).
(b) Reregister the key and insert this key into the ignition key cylinder. Check that the engine starts with the key.
OK:
Engine starts.

NG → **REPLACE KEY**

OK

END

DTC	B2794	Unmatched Encryption Code

DESCRIPTION

This DTC is output when a key with an incomplete key code is inserted into the ignition key cylinder.

DTC No.	DTC Detection Condition	Trouble Area
B2784	Key with incomplete key code is inserted	key

INSPECTION PROCEDURE

1	REREGISTER KEY

(a) Delete the DTC (see page EI-19).
(b) Reregister the key and insert this key into the ignition key cylinder. Check that the engine starts with the key.
OK:
Engine starts.

NG → **REPLACE KEY**

OK

END

DTC	B2795	Unmatched Key Code

DESCRIPTION

This DTC is output when a key with a key code that has not been registered in the transponder key ECU is inserted into the ignition key cylinder.

DTC No.	DTC Detection Condition	Trouble Area
B2795	Key with unregistered key code is inserted	Key

INSPECTION PROCEDURE

1	REREGISTER KEY

(a) Delete the DTC (see page EI-19).
(b) Reregister the key and insert this key into the ignition key cylinder. Check that the engine starts with the key.
OK:
Engine starts.

NG → **REPLACE KEY**

OK ↓

END

DTC	B2796	No Communication in Immobiliser System

DTC	B2798	Communication Malfunction No. 2

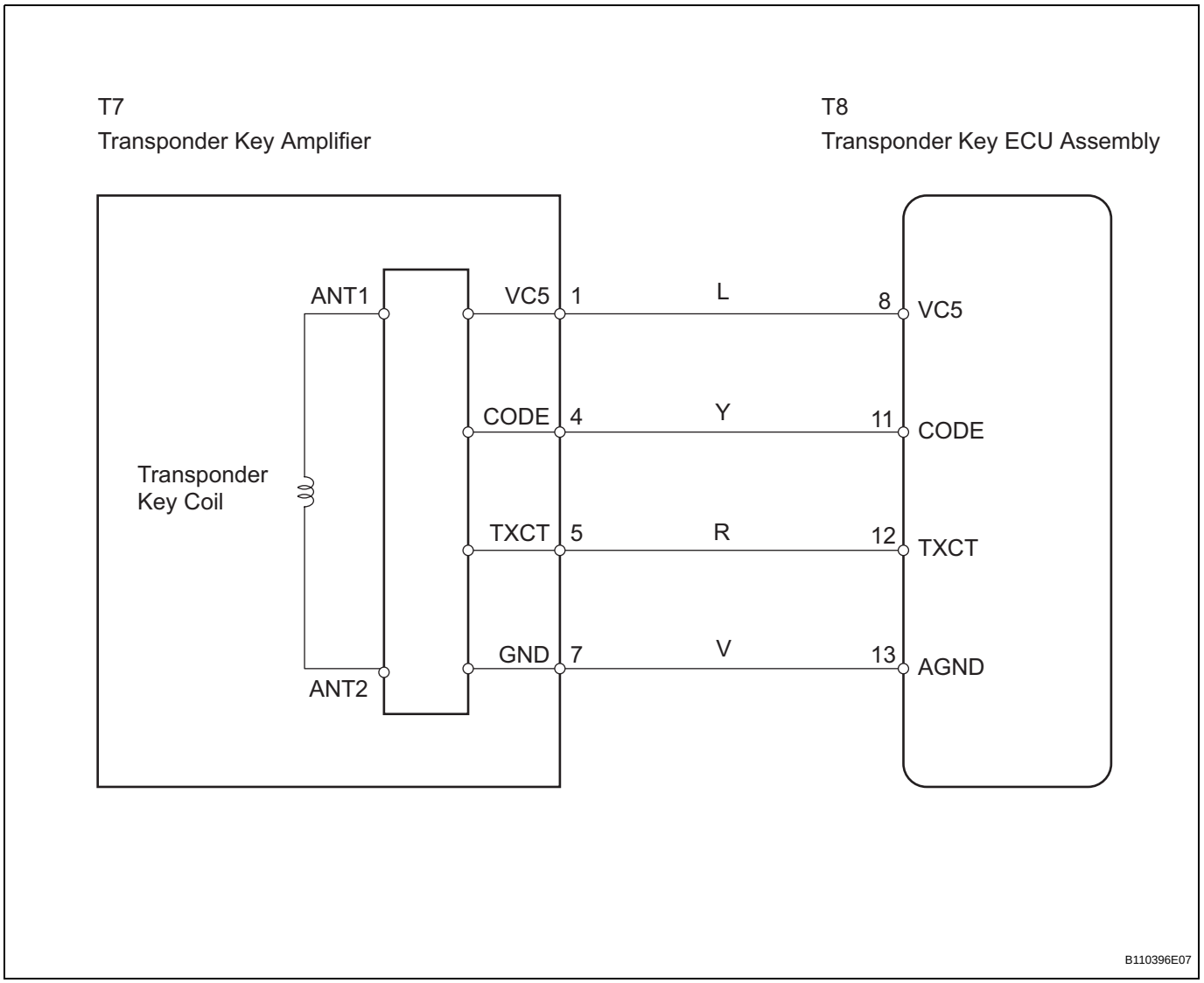
DESCRIPTION

This DTC is output when a key that does not have a transponder chip is inserted into the ignition key cylinder or if communication between the key, transponder key amplifier and transponder key ECU is not possible.

EI

DTC No.	DTC Detection Condition	Trouble Area
B2796	No communication	• Key • Wire harness • Transponder key amplifier • Transponder key ECU assembly
B2798	Communication error	Key

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE OF INTELLIGENT TESTER (IMMOBILISER SYSTEM)

(a) Check the DATA LIST for proper functioning of the engine immobiliser system.

Transponder key ECU assembly:

Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
IMMOBILISER	Immobiliser system status / SET or UNSET	SET: Without key UNSET: Ignition switch ON	-

OK:
UNSET (ignition switch ON) appears on the screen.

OK → **Go to step 3**

NG

2	CHECK WHETHER ENGINE STARTS WITH OTHER KEYS

(a) Check if the engine starts with the vehicle's other keys.
OK:
Engine starts.

OK → **REPLACE TRANSPONDER KEY ECU ASSEMBLY**

NG

3	READ VALUE OF INTELLIGENT TESTER (TRANSPONDER KEY COIL)

(a) Check the DATA LIST for proper functioning of the transponder key coil.

Transponder key ECU assembly:

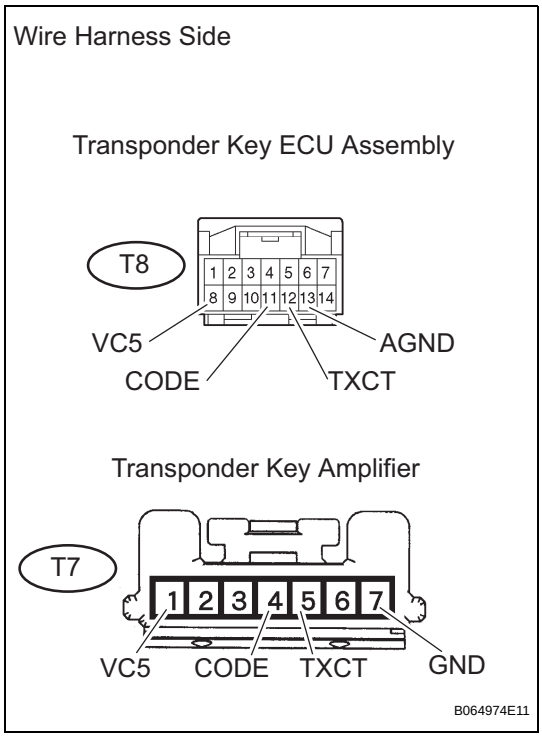
Item	Measurement Item / Display (Range)	Normal Condition	Diagnostic Note
ANTENNA COIL	Transponder key coil Condition / NORMAL or FALL	NORMAL: Transponder key coil is normal FAIL: Antenna coil is malfunctioning	-

OK:
NORMAL (transponder key coil) appears on the screen.

OK → **REPLACE TRANSPONDER KEY ECU ASSEMBLY**

NG

4	CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSEMBLY - TRANSPONDER KEY AMPLIFIER)



(a) Disconnect the T8 ECU connector.
(b) Disconnect the T7 amplifier connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T8-8 (VC5) - T7-1 (VC5)	Below 1 Ω
T8-11 (CODE) - T7-4 (CODE)	
T8-12 (TXCT) - T7-5 (TXCT)	
T8-13 (AGND) - T7-7 (GND)	
T8-8 (VC5) or T7-1 (VC5) - Body ground	10 kΩ or higher
T8-11 (CODE) or T7-4 (CODE) - Body ground	
T8-12 (TXCT) or T7-5 (TXCT) - Body ground	
T8-13 (ANGD) or T7-7 (GND) - Ground ground	

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

5	CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER

(a) After replacing the transponder key amplifier with a normally functioning transponder key amplifier, check that the engine starts.

OK:

Engine starts.

NG → **REPLACE TRANSPONDER KEY ECU ASSEMBLY**

OK

END (TRANSPONDER KEY AMPLIFIER DEFECTIVE)

DTC	B2797	Communication Malfunction No. 1

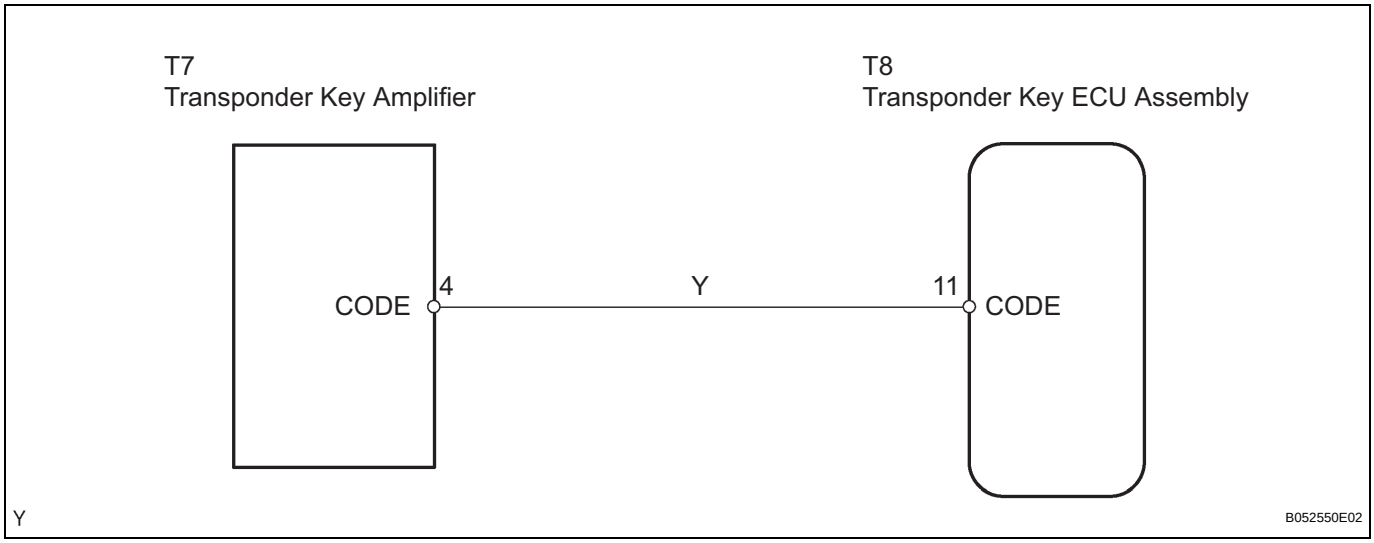
DESCRIPTION

This DTC is output when a communication error occurs between the transponder key amplifier and transponder key ECU. A possible reason for the communication error is that noise is occurring on the communication line.

DTC No.	DTC Detection Condition	Trouble Area
B2797	Keys are positioned too close to each other, or noise occurred in communication line	• Key • Wire harness • Transponder key amplifier • Transponder key ECU assembly

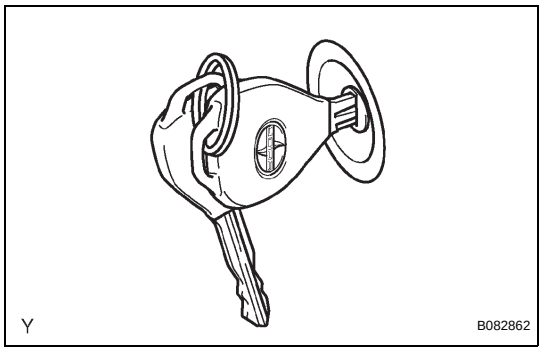
EI

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK KEY



(a) Check if the ignition key being used is near other ignition keys, as shown in the illustration. Also, check if the key ring is in contact with the key grip.

Result:

Result	Proceed to
Key is near other keys and / or key ring is in contact with key grip	A
Key is not near other keys and / or key ring is not in contact with key grip	B

B → **Go to step 3**

A

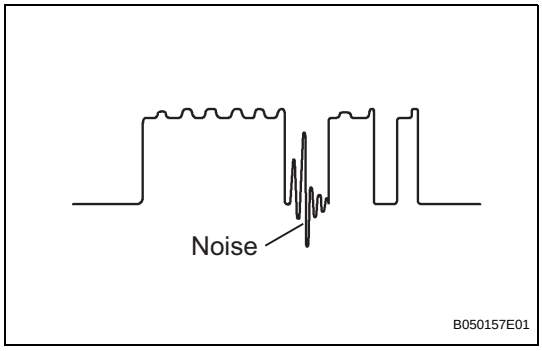
2 CHECK FOR DTC

(a) Separate the keys from each other or remove the key ring.
(b) Delete the DTC (see page EI-19).
(c) Insert a key into the ignition key cylinder. Then remove it. Repeat for all the other keys.
(d) Check that no code is output.

OK → **END**

NG

3 CHECK TRANSPONDER KEY AMPLIFIER



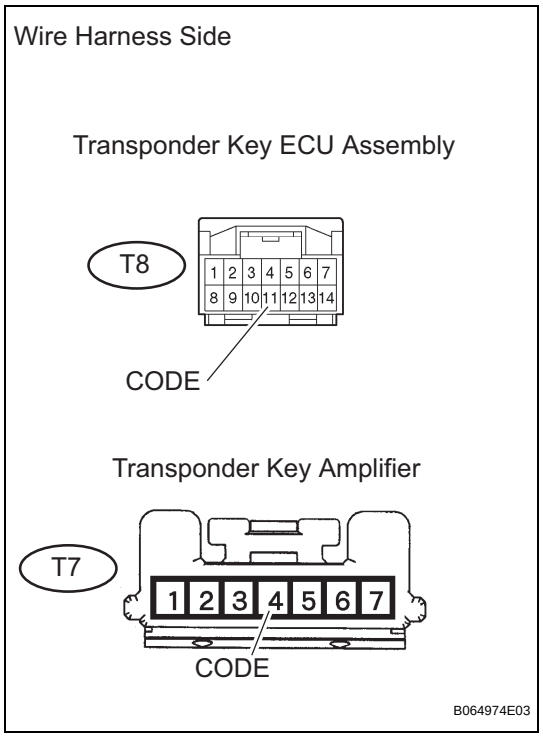
(a) Using an oscilloscope or the intelligent tester, check for noise in the waveform between the terminals of the T7 amplifier connector and T8 ECU connector.
OK:
No noise is present (see illustration).

Tester Connection	Tool Setting	Condition	Specified Condition
T8-11 (CODE) - T7-4 (CODE)	2 V/DIV., 20 msec./DIV.	Ignition switch ON	No noise is present

NG → **FIND CAUSE OF NOISE AND REMOVE IT**

OK

4	CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSEMBLY - TRANSPONDER KEY AMPLIFIER)



(a) Disconnect the T8 ECU connector.
(b) Disconnect the T7 amplifier connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T8-11 (CODE) - T7-4 (CODE)	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

5	CHECK OPERATION OF TRANSPONDER KEY AMPLIFIER

(a) After replacing the transponder key amplifier with a normally functioning transponder key amplifier, check that the engine starts.

OK:

Engine starts.

NG → **REPLACE TRANSPONDER KEY ECU ASSEMBLY**

OK

END (TRANSPONDER KEY AMPLIFIER IS DEFECTIVE)

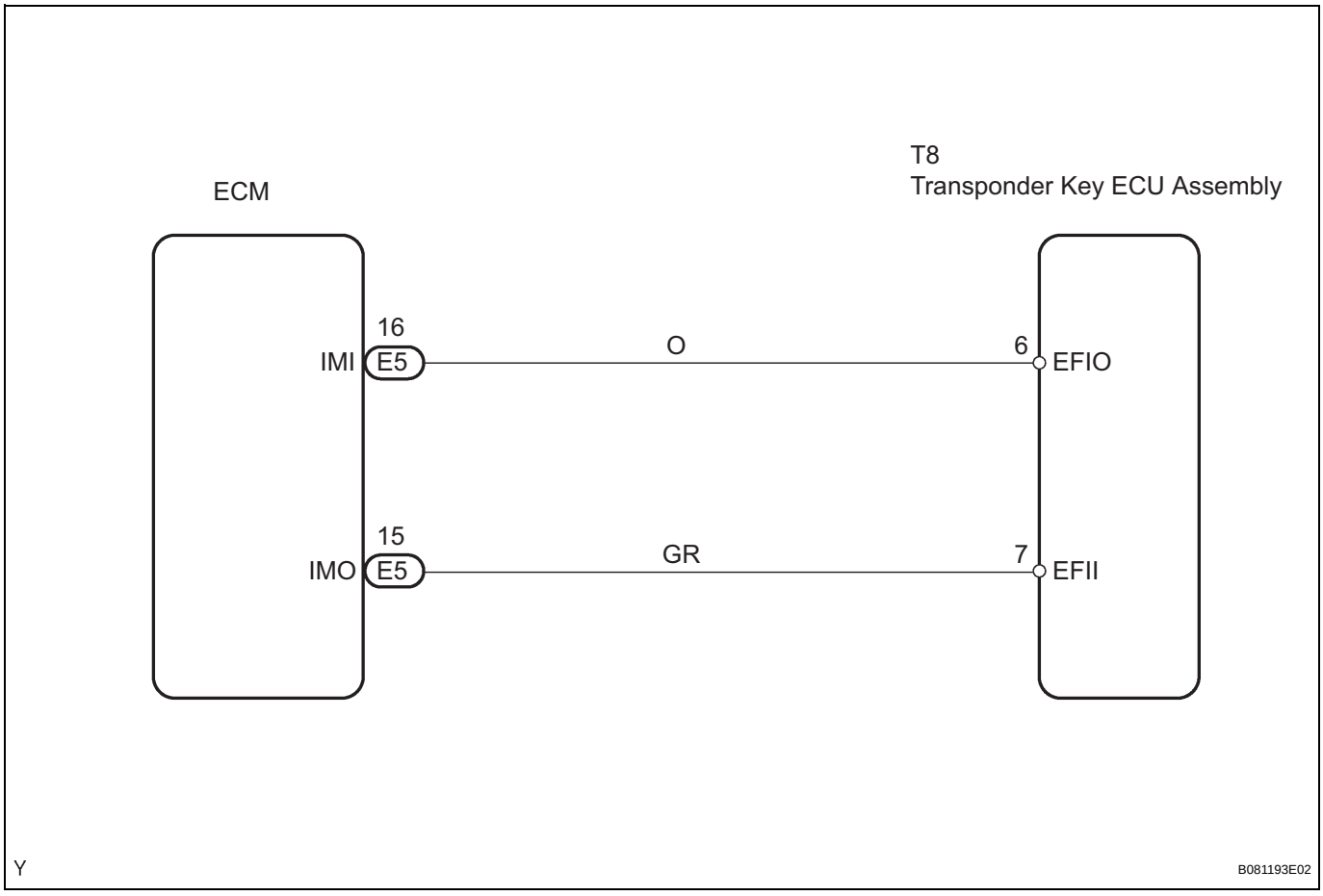
DTC	B2799	Engine Immobiliser System Malfunction

DESCRIPTION

This DTC is output when one of the following occurs: 1) the ECM detects errors in its own communications with the transponder key ECU: 2) the ECM detects errors in the communication lines: or 3) the ECU communication ID between the transponder key ECU and ECM is different and an engine start is attempted.

DTC No.	DTC Detection Condition	Trouble Area
B2799	One of following conditions is met: • Error in communication between ECM and transponder key ECU assembly • Error in communication lines • Communication ID is different during communication with transponder key ECU assembly	• Wire harness • ECM

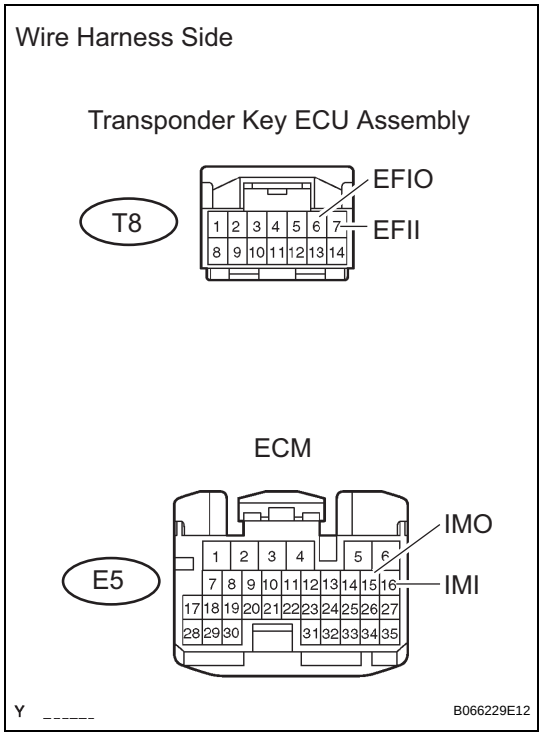
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Before troubleshooting for this DTC, make sure no transponder key ECU DTCs are present. If present, troubleshoot the transponder key ECU DTCs first.

1	CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSEMBLY - ECM)



(a) Disconnect the T8 ECU connector.
(b) Disconnect the E5 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
T8-6 (EFIO) - E5-16 (IMI)	Below 1 Ω
T8-7 (EFII) - E5-15 (IMO)	
T8-6 (EFIO) or E5-16 (IMI) - Body ground	10 kΩ or higher
T8-7 (EFII) or E5-15 (IMO) - Body ground	

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE ECM

EI

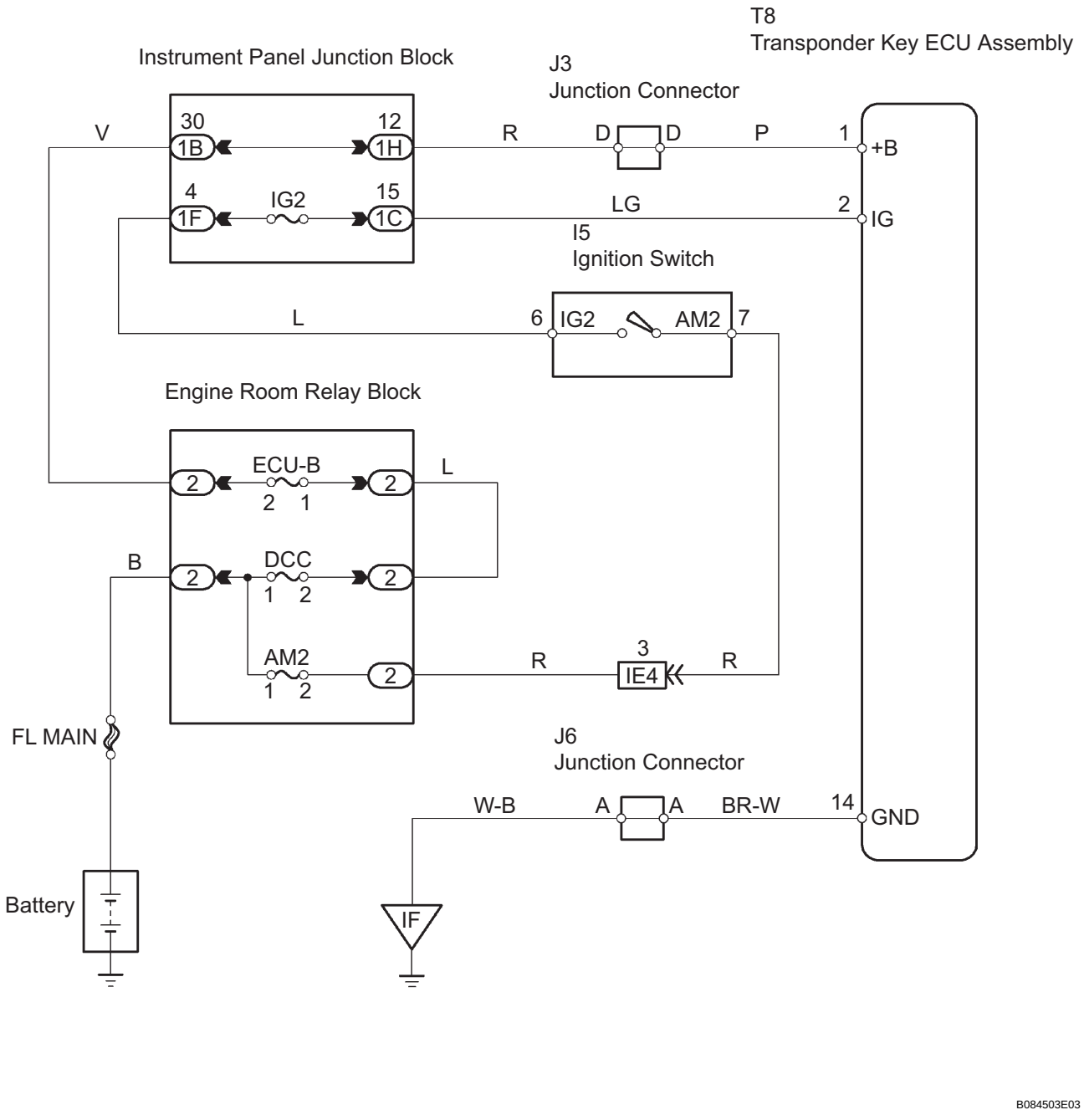
Power Source Circuit

DESCRIPTION

This circuit provides power to operate the transponder key ECU.

WIRING DIAGRAM

EI



INSPECTION PROCEDURE

1 **INSPECT FUSE (IG2, ECU-B, AM2, DCC)**

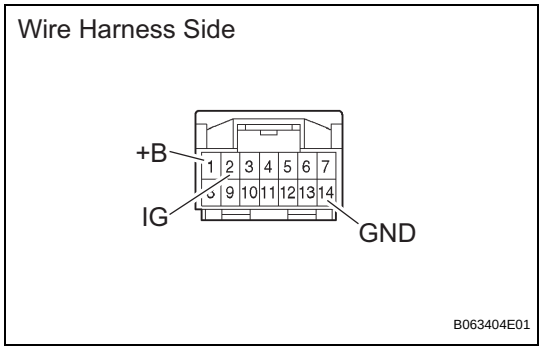
(a) Remove the IG2 fuse from the instrument panel junction block.
(b) Remove the ECU-B, DCC and AM2 fuses from the engine room relay block.
(c) Measure the resistance of the fuses.

Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

OK

2 **CHECK WIRE HARNESS (TRANSPONDER KEY ECU ASSEMBLY - BATTERY AND BODY GROUND)**



(a) Disconnect the T8 ECU connector.
(b) Measure the resistance and voltage of the wire harness and connector.

Standard resistance

Tester Connection	Specified Condition
T8-14 (GND) - Body ground	Below 1 Ω

Standard voltage

Tester Connection	Condition	Specified Condition
T8-2 (IG) - Body ground	Ignition switch OFF	Below 1 V
	Ignition switch ON	10 to 14 V
T8-1 (+B) - Body ground	Always	

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

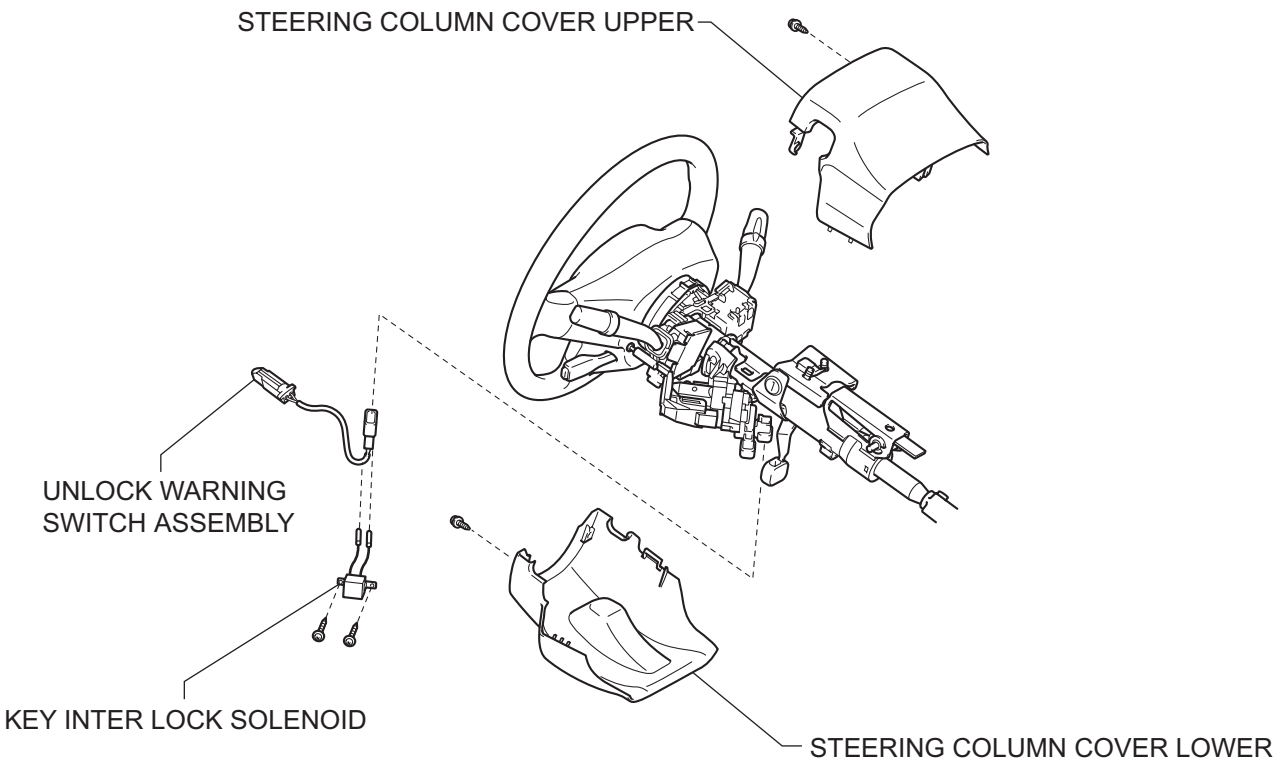
OK

REPLACE TRANSPONDER KEY ECU ASSEMBLY

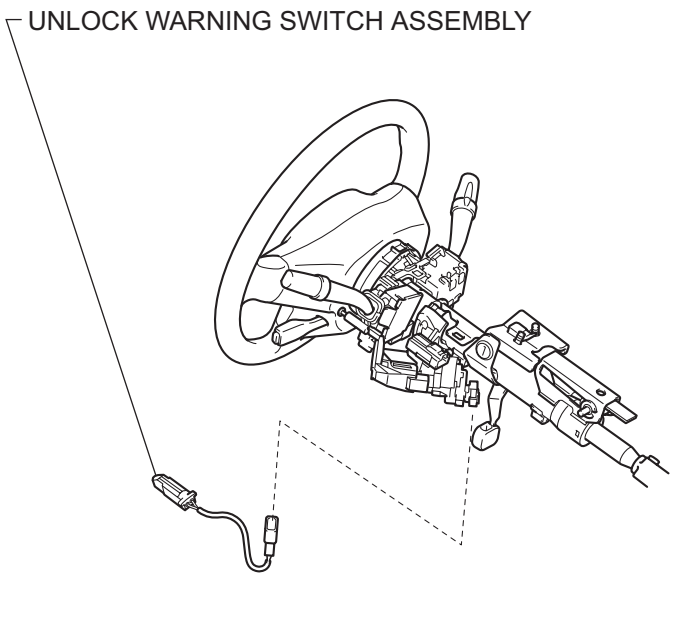
UNLOCK WARNING SWITCH

COMPONENTS

Automatic Transaxle



Manual Transaxle



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REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

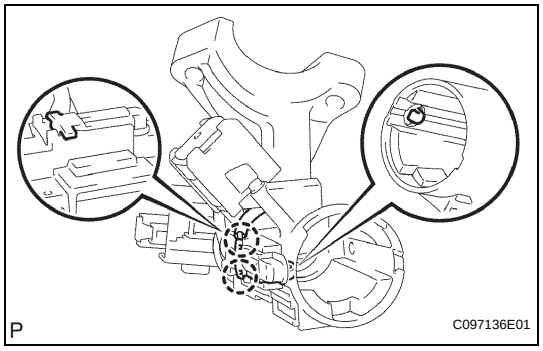
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE STEERING COLUMN COVER

(a) Remove the 2 screws, steering column cover lower and steering column cover upper.

HINT:

- Tilt the steering column assembly to the lowermost position when removing the steering column cover upper.
- Tilt it to the uppermost position when removing the steering column cover lower.

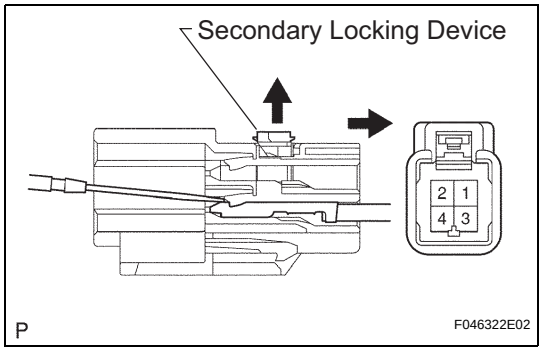


3. REMOVE UNLOCK WARNING SWITCH ASSEMBLY

(a) Disconnect the unlock warning switch connector from the ignition switch.

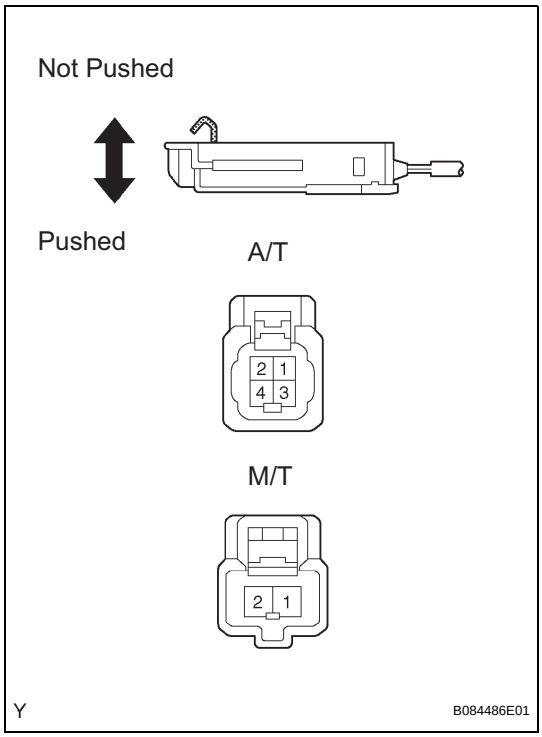
(b) Remove the unlock warning switch assembly by pushing up on the center part and disengaging the 2 claws.

(c) Manual transaxle:
Remove the clamp from the steering column upper bracket assembly.



(d) Automatic transaxle:
Disengage the secondary locking device.

(e) Automatic transaxle:
Using a screwdriver, disengage the locking lug of terminals 3 and 4, and pull the terminals out from the unlock warning switch assembly connector rear side.



INSPECTION

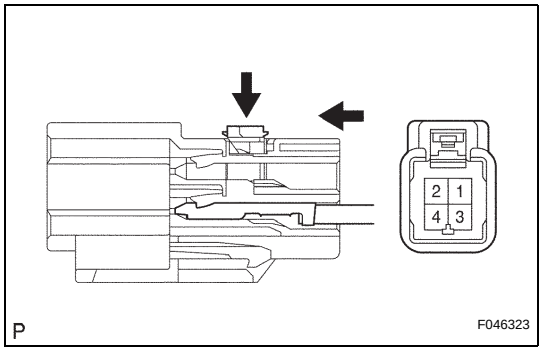
1. INSPECT UNLOCK WARNING SWITCH ASSEMBLY

(a) Measure the resistance of the switch.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Pushed	Below 1 Ω
	Not pushed	10 kΩ or higher

If the result is not as specified, replace the switch assembly.



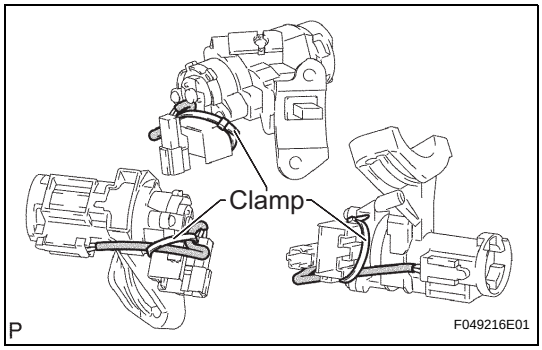
INSTALLATION

1. INSTALL UNLOCK WARNING SWITCH ASSEMBLY

(a) Install the unlock warning switch assembly.

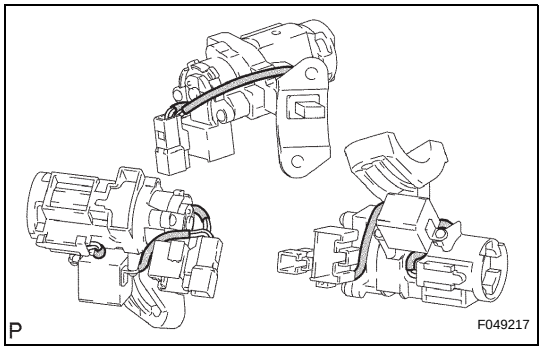
(b) Automatic transaxle:
Connect terminals 3 and 4 of the unlock warning switch connector.

(c) Connect the unlock warning switch assembly connector to the ignition switch.



(d) Manual transaxle:
Secure the unlock warning switch wire harness to the steering column upper bracket with a new clamp as shown in the illustration.

NOTICE:
Do not overtighten the clamp when securing the wire harness as the wire harness could be cut.



(e) Automatic transaxle:
Secure the unlock warning switch wire harness to the steering column upper bracket as shown in the illustration.

2. INSTALL STEERING COLUMN COVER

(a) Install the steering column cover lower and steering column cover upper with the 2 screws.
HINT:
- Tilt the steering column assembly to the lowermost position when installing the steering column cover upper.
- Tilt it to the uppermost position when installing the steering column cover lower.

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ENGINE

ON-VEHICLE INSPECTION

1. INSPECT ENGINE COOLANT

2. INSPECT ENGINE OIL

3. INSPECT BATTERY

4. INSPECT AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY

(a) Remove the air cleaner cap sub-assembly.
(b) Remove the air filter element.
(c) Visually check that the air filter is not excessively damaged or oily.
If necessary, replace the air filter.

5. INSPECT SPARK PLUG

6. INSPECT FAN AND GENERATOR V BELT

HINT:
You do not need to check the belt deflection because the auto tensioner has been adopted.

7. INSPECT IGNITION TIMING

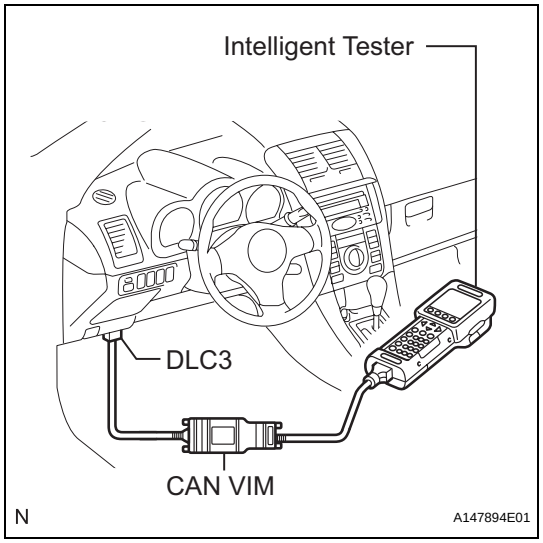
NOTICE:

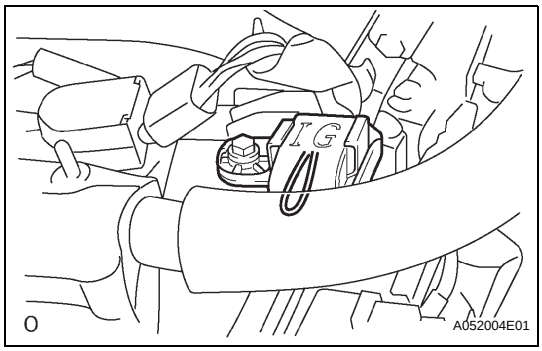
- **Turn all the electrical systems and the A/C OFF.**
- **Inspect the ignition timing with the cooling fan OFF.**
- **When checking the ignition timing, shift the transmission to the neutral position.**

(a) Warm up and stop the engine.

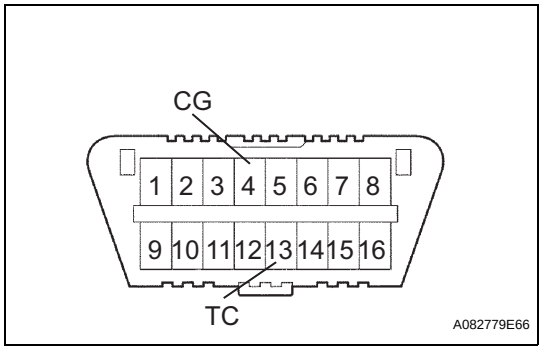
(b) When using the intelligent tester:
(1) Connect the intelligent tester to the DLC3.
(2) Allow the engine to idle.
(3) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST.
(4) Read IGN ADVANCE to check the ignition timing.
Standard ignition timing:
5 to 15° BTDC at idle
(5) Check that the ignition timing advances immediately when the engine speed is increased.
(6) Turn the ignition switch OFF.
(7) Disconnect the intelligent tester from the DLC3.

(c) When not using the intelligent tester:
(1) Remove the No. 1 engine cover (see page EM-22).
(2) Open the IG cover located in the right of the No. 4 ignition coil.

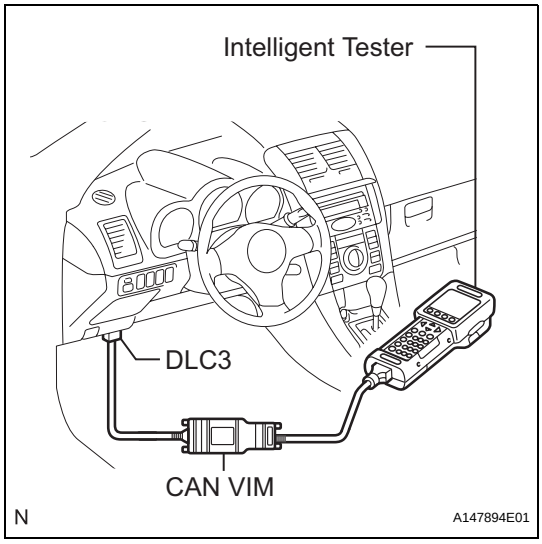




(3) Pull out the wire harness as shown in the illustration.
(4) Connect the timing light to the wire harness.
NOTICE:
Use a timing light that detects the first signal.



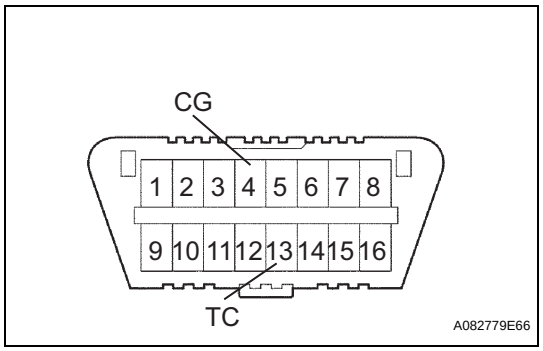
(5) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843-18040
(6) Allow the engine to idle and check the ignition timing.
Standard ignition timing:
8 to 12° BTDC at idle
HINT:
Run the engine speed at 1,000 to 1,300 rpm for 5 seconds, then check that the engine speed returns to the idling speed.
(7) Remove the SST from the DLC3.
(8) Allow the engine to idle and check the ignition timing.
Standard ignition timing:
5 to 15° BTBC
(9) Check that the ignition timing advances immediately when the engine speed is increased.
(10) Turn the ignition switch OFF.
(11) Remove the timing light.
(12) Close the IG cover.
(13) Install the No. 1 engine cover (see page EM-42).



8. INSPECT ENGINE IDLE SPEED
(a) With intelligent tester:
(1) Turn OFF all the accessories and air conditioning.
(2) Move the shift lever to P or neutral.
(3) Connect the intelligent tester to the DLC3.
(4) Warm up the engine.
(5) Select the tester menus: DIAGNOSIS, ENHANCED OBD II and DATA LIST.
(6) Read ENGINE SPEED to check the idle speed while the radiator-cooling fan is not rotating.
Standard idle speed

Item	Specified Condition
A/T vehicle	610 to 710 rpm
M/T vehicle	650 to 750 rpm

(7) Turn the ignition switch OFF.
(8) Disconnect the tester from the DLC3.



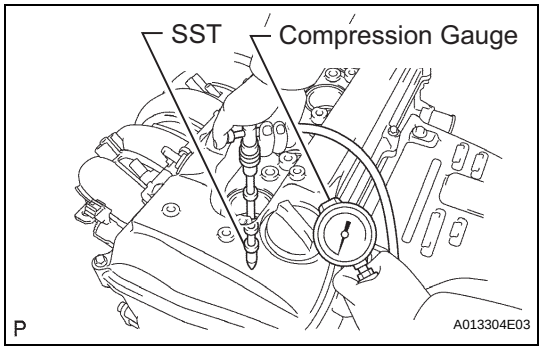
(b) Without intelligent tester:
(1) Turn OFF all the accessories and air conditioning.
(2) Move the shift lever to P or neutral.
(3) Connect the SST to 9 (TAC) of the DLC3 terminal, and then connect a tachometer to the SST.
SST 09843-18030
(4) Warm up the engine.
(5) Check the idle speed while the radiator-cooling fan is not rotating.
Standard idle speed

Item	Specified Condition
A/T vehicle	610 to 710 rpm
M/T vehicle	650 to 750 rpm

(6) Turn the ignition switch OFF.
(7) Remove the tachometer and disconnect the SST from the DLC3.

9. INSPECT COMPRESSION

(a) Warm up and stop the engine.
(b) Remove the No. 1 engine cover (see page EM-22).
(c) Remove the 4 ignition coils (see page IG-9).
(d) Remove the 4 spark plugs.
(e) Disconnect the 4 fuel injector connectors.



(f) Set SST and a compression gauge.
SST 09992-00500
(g) Insert the compression gauge into the spark plug hole.
(h) While cranking the engine, measure the compression pressure.
Standard compression pressure:
1,300 kPa (13.3 kgf/cm^2, 189 psi)
Minimum pressure:
1,000 kPa (10.2 kgf/cm^2, 145 psi)
Standard difference between each cylinder:
100 kPa (1.0 kgf/cm^2, 14 psi)
NOTICE:
- **Always use a fully charged battery to obtain an engine speed of 250 rpm or more.**
- **Check the other cylinders' compression pressures in the same way.**
- **This measurement must be done as quickly as possible.**

If the cylinder compression is low, pour a small amount of engine oil into the cylinder through the spark plug hole and inspect again.
HINT:
- If adding oil increases the compression, the piston rings and/or cylinder bore may be worn or damaged.

EM

- If pressure stays low, a valve may be stuck or seated improperly, or there may be leakage in the gasket.

10. INSPECT CO/HC

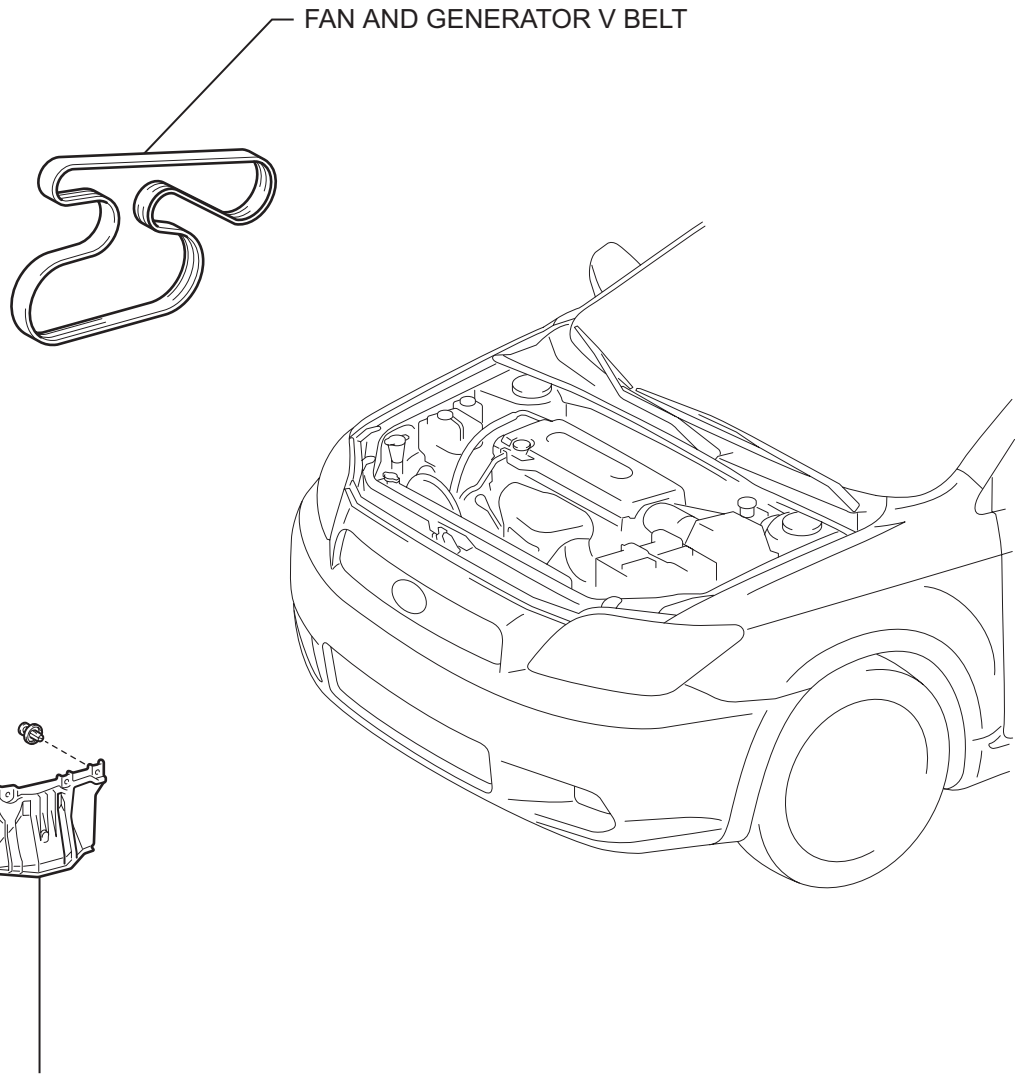
HINT:
The ECM properly controls the CO/HC concentration in the emission gas.

(a) Start and warm up the engine.
(b) Run the engine at 2,500 rpm for approximately 180 seconds.
(c) Insert the CO/HC meter testing probe at least 40 cm (1.3 ft.) into the tailpipe while idling.
(d) Inspect the CO/HC concentration while idling and/or at 2,500 rpm.
If the CO/HC concentration is not as specified, perform troubleshooting in the order given below.
(1) See the table below for possible causes, and then inspect and repair the applicable causes if necessary.

CO	HC	Problems	Causes
Normal	High	Rough idle	1. Faulty ignition: – Incorrect timing – Fouled, shorted or improperly gapped plugs 2. Incorrect valve clearance 3. Leaks in intake and exhaust valves 4. Leaks in cylinders
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leakage: – Ventilation hoses – Intake manifold – Throttle body – Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve Faulty SFI system: – Faulty pressure regulator – Faulty engine coolant temperature sensor – Faulty mass air flow meter – Faulty ECM – Faulty injectors – Faulty throttle body

DRIVE BELT

COMPONENTS



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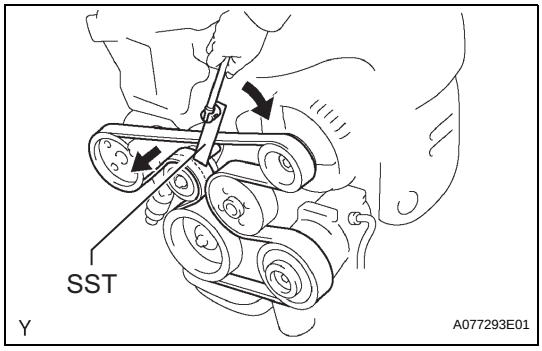
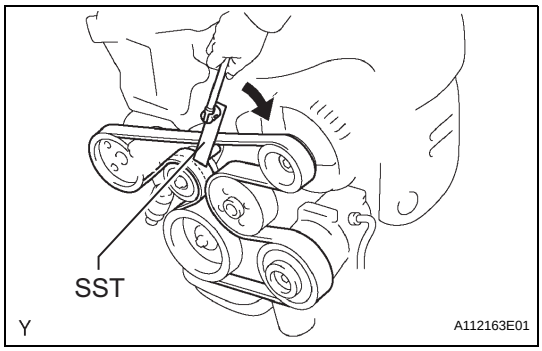




REMOVAL

1. **REMOVE FRONT FENDER APRON SEAL RH (See page CH-10)**

2. **REMOVE FAN AND GENERATOR V BELT**
   (a) Using SST, loosen the V-ribbed belt tensioner arm clockwise, then remove the fan and generator V belt.
   SST 09249-63010
   NOTICE:
   - **Be sure to connect SST and the tools so that they are in line when using.**
   - **When retracting the tensioner, turn it clockwise slowly in 3 seconds or more. Do not apply force rapidly.**
   - **After the tensioner is retracted all the way, do not apply force any more than necessary.**

INSTALLATION

1. **INSTALL FAN AND GENERATOR V BELT**
   (a) Using SST, loosen the V-ribbed belt tensioner arm clockwise, then install the fan and generator V belt.
   SST 09249-63010
   NOTICE:
   - **Be sure to connect SST and the tools so that they are in line when using.**
   - **When retracting the tensioner, turn it clockwise slowly in 3 seconds or more. Do not apply force rapidly.**
   - **After the tensioner is retracted all the way, do not apply force any more than necessary.**

2. **INSTALL FRONT FENDER APRON SEAL RH (See page CH-18)**

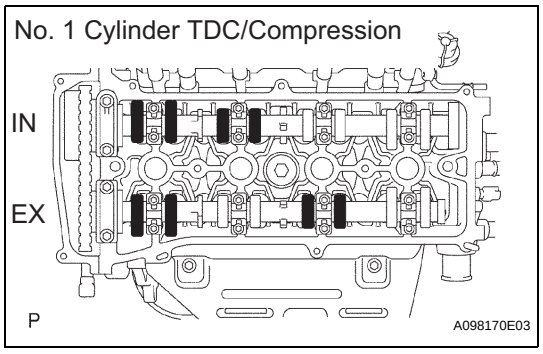
VALVE CLEARANCE

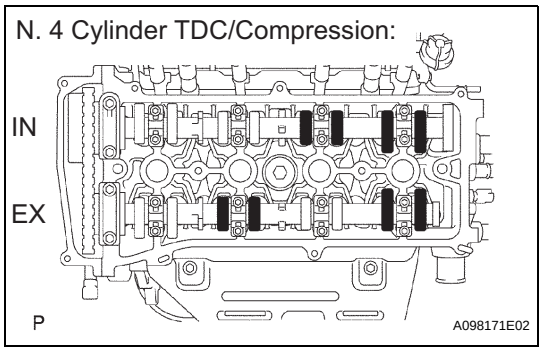
ADJUSTMENT

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT WHEEL RH**
3. **REMOVE ENGINE UNDER COVER RH**
4. **REMOVE ENGINE UNDER COVER LH**
5. **REMOVE FRONT FENDER APRON SEAL RH**
6. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-22)**
7. **REMOVE FAN AND GENERATOR V BELT (See page EM-6)**
8. **REMOVE VANE PUMP ASSEMBLY**
9. **REMOVE ENGINE MOUNTING INSULATOR RH (See page EM-22)**
10. **REMOVE IGNITION COIL ASSEMBLY (See page IG-9)**
11. **REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-24)**
12. **SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page EM-26)**
13. **CHECK VALVE CLEARANCE**
    (a) Check only the valves indicated.
    (1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
    Standard valve clearance (cold)

Item	Standard Condition
Intake	0.19 to 0.29 mm (0.0075 to 0.0114 in.)
Exhaust	0.30 to 0.40 mm (0.0118 to 0.0158 in.)

    (2) Record any out-of-specification valve clearance measurements. They will be used later to determine the required replacement valve clearance lifters.
    (b) Turn the crankshaft 1 revolution (360°) and set the No. 4 cylinder to the TDC/compression.





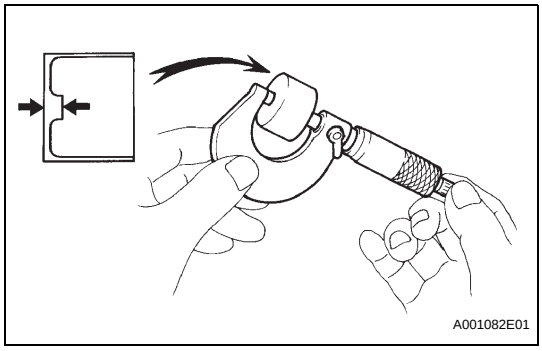
(c) Check only the valves indicated.
(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
Standard valve clearance (cold)

Item	Standard Condition
Intake	0.19 to 0.29 mm (0.0075 to 0.0114 in.)
Exhaust	0.30 to 0.40 mm (0.0118 to 0.0158 in.)

(2) Record any out-of-specification valve clearance measurements. They will be used later to determine the required replacement valve lifters.

14. ADJUST VALVE CLEARANCE

(a) Remove the No. 2 camshaft (see page EM-59).
(b) Remove the camshaft (see page EM-60).
(c) Remove the valve lifters.



(d) Using a micrometer, measure the thickness of the removed valve lifters.
(e) Calculate the thickness of a new lifter so that the valve clearance comes within the specified values.
New lifter thickness

Item	Specification
Intake	A = B + (C - 0.24 mm (0.0095 in.))
Exhaust	A = B + (C - 0.35 mm (0.0138 in.))

A	New lifter thickness
B	Used lifter thickness
C	Measured valve clearance

EXAMPLE (Intake):
Measured intake valve clearance = 0.40 mm (0.0158 in.)
0.40 mm (0.0158 in.) - 0.24 mm (0.0095 in.) = 0.16 mm (0.0063 in.)
(Measured - Specification = Excess clearance)
Used lifter measurement = 5.250 mm (0.2067 in.)
0.16 mm (0.0063 in.) + 5.250 mm (0.2067 in.) = 5.410 mm (0.2130 in.)
(Excess clearance + Used lifter = Ideal new lifter)
Closest new lifter = 5.410 mm (0.2130 in.)
Select No. 42 lifter

(f) Select a new lifter with a thickness as close as possible to the calculated values.
HINT:
Lifters are available in 35 sizes in increments of 0.020 mm (0.0008 in.), from 5.060 to 5.740 mm (0.1992 to 0.2260 in.).

(g) Install the selected valve lifter.

EM

Valve Lifter Selection Chart (Intake)

Installed lifter thickness mm (in.) \ Measured clearance mm (in.)	0.000 - 0.030 (0.0000 - 0.0012)	0.031 - 0.050 (0.0012 - 0.0020)	0.051 - 0.070 (0.0020 - 0.0028)	0.071 - 0.090 (0.0028 - 0.0035)	0.091 - 0.110 (0.0036 - 0.0043)	0.111 - 0.130 (0.0044 - 0.0051)	0.131 - 0.150 (0.0052 - 0.0059)	0.151 - 0.170 (0.0059 - 0.0067)	0.171 - 0.189 (0.0067 - 0.0074)	0.190 - 0.290 (0.0075 - 0.0114)	0.291 - 0.310 (0.0115 - 0.0122)	0.311 - 0.330 (0.0122 - 0.0130)	0.331 - 0.350 (0.0130 - 0.0138)	0.351 - 0.370 (0.0138 - 0.0146)	0.371 - 0.390 (0.0146 - 0.0154)	0.391 - 0.410 (0.0154 - 0.0161)	0.411 - 0.430 (0.0162 - 0.0169)	0.431 - 0.450 (0.0170 - 0.0177)	0.451 - 0.470 (0.0178 - 0.0185)	0.471 - 0.490 (0.0185 - 0.0193)	0.491 - 0.510 (0.0193 - 0.0201)	0.511 - 0.530 (0.0201 - 0.0209)	0.531 - 0.550 (0.0209 - 0.0217)	0.551 - 0.570 (0.0217 - 0.0224)	0.571 - 0.590 (0.0225 - 0.0232)	0.591 - 0.610 (0.0233 - 0.0240)	0.611 - 0.630 (0.0241 - 0.0248)	0.631 - 0.650 (0.0248 - 0.0256)	0.651 - 0.670 (0.0256 - 0.0264)	0.671 - 0.690 (0.0264 - 0.0272)	0.691 - 0.710 (0.0272 - 0.0280)	0.711 - 0.730 (0.0280 - 0.0287)	0.731 - 0.750 (0.0288 - 0.0295)	0.751 - 0.770 (0.0296 - 0.0303)	0.771 - 0.790 (0.0304 - 0.0311)	0.791 - 0.810 (0.0311 - 0.0319)	0.811 - 0.830 (0.0319 - 0.0327)	0.831 - 0.850 (0.0327 - 0.0335)	0.851 - 0.870 (0.0335 - 0.0343)	0.871 - 0.890 (0.0343 - 0.0350)	0.891 - 0.910 (0.0351 - 0.0358)	0.911 - 0.930 (0.0359 - 0.0366)
5.060 (0.1992)											12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74
5.080 (0.2000)										06	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74
5.100 (0.2008)									06	08	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	
5.120 (0.2016)								06	08	10	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74		
5.140 (0.2024)							06	08	10	12	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74			
5.160 (0.2031)						06	08	10	12	14	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74				
5.180 (0.2039)					06	08	10	12	14	16	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74					
5.200 (0.2047)				06	08	10	12	14	16	18	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74						
5.210 (0.2051)			06	08	10	12	14	16	18	20	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74						
5.220 (0.2055)			06	08	10	12	14	16	18	20	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74						
5.230 (0.2059)			06	08	10	12	14	16	18	20	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74							
5.240 (0.2063)			08	10	12	14	16	18	20	22	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74							
5.250 (0.2067)	06	08	10	12	14	16	18	20	22	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74								
5.260 (0.2071)	06	10	12	14	16	18	20	22	24	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74								
5.270 (0.2075)	08	10	12	14	16	18	20	22	24	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74									
5.280 (0.2079)	08	12	14	16	18	20	22	24	26	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74									
5.290 (0.2083)	10	12	14	16	18	20	22	24	26	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74										
5.300 (0.2087)	10	14	16	18	20	22	24	26	28	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74										
5.310 (0.2091)	12	14	16	18	20	22	24	26	28	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74											
5.320 (0.2094)	12	16	18	20	22	24	26	28	30	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74											
5.330 (0.2098)	14	16	18	20	22	24	26	28	30	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74												
5.340 (0.2102)	14	18	20	22	24	26	28	30	32	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74												
5.350 (0.2106)	16	18	20	22	24	26	28	30	32	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74													
5.360 (0.2110)	16	20	22	24	26	28	30	32	34	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74													
5.370 (0.2114)	18	20	22	24	26	28	30	32	34	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74														
5.380 (0.2118)	18	22	24	26	28	30	32	34	36	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74														
5.390 (0.2122)	20	22	24	26	28	30	32	34	36	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74															
5.400 (0.2126)	20	24	26	28	30	32	34	36	38	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74															
5.410 (0.2130)	22	24	26	28	30	32	34	36	38	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74																
5.420 (0.2134)	22	26	28	30	32	34	36	38	40	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74																
5.430 (0.2138)	24	26	28	30	32	34	36	38	40	50	52	54	56	58	60	62	64	66	68	70	72	74	74																	
5.440 (0.2142)	24	28	30	32	34	36	38	40	42	50	52	54	56	58	60	62	64	66	68	70	72	74	74																	
5.450 (0.2146)	26	28	30	32	34	36	38	40	42	52	54	56	58	60	62	64	66	68	70	72	74	74																		
5.460 (0.2150)	26	30	32	34	36	38	40	42	44	52	54	56	58	60	62	64	66	68	70	72	74	74																		
5.470 (0.2154)	28	30	32	34	36	38	40	42	44	54	56	58	60	62	64	66	68	70	72	74	74																			
5.480 (0.2157)	28	32	34	36	38	40	42	44	46	54	56	58	60	62	64	66	68	70	72	74	74																			
5.490 (0.2161)	30	32	34	36	38	40	42	44	46	56	58	60	62	64	66	68	70	72	74	74																				
5.500 (0.2165)	30	34	36	38	40	42	44	46	48	56	58	60	62	64	66	68	70	72	74	74																				
5.510 (0.2169)	32	34	36	38	40	42	44	46	48	58	60	62	64	66	68	70	72	74	74																					
5.520 (0.2173)	32	36	38	40	42	44	46	48	50	58	60	62	64	66	68	70	72	74	74																					
5.530 (0.2177)	34	36	38	40	42	44	46	48	50	60	62	64	66	68	70	72	74	74																						
5.540 (0.2181)	34	38	40	42	44	46	48	50	52	60	62	64	66	68	70	72	74	74																						
5.550 (0.2185)	36	38	40	42	44	46	48	50	52	62	64	66	68	70	72	74	74																							
5.560 (0.2189)	36	40	42	44	46	48	50	52	54	62	64	66	68	70	72	74	74																							
5.570 (0.2193)	38	40	42	44	46	48	50	52	54	64	66	68	70	72	74	74																								
5.580 (0.2197)	38	42	44	46	48	50	52	54	56	64	66	68	70	72	74	74																								
5.590 (0.2201)	40	42	44	46	48	50	52	54	56	66	68	70	72	74	74																									
5.600 (0.2205)	40	44	46	48	50	52	54	56	58	66	68	70	72	74	74																									
5.620 (0.2213)	42	46	48	50	52	54	56	58	60	68	70	72	74	74																										
5.640 (0.2220)	44	48	50	52	54	56	58	60	62	70	72	74	74	74																										
5.660 (0.2228)	46	50	52	54	56	58	60	62	64	72	74	74	74																											
5.680 (0.2236)	48	52	54	56	58	60	62	64	66	74	74	74																												
5.700 (0.2244)	50	54	56	58	60	62	64	66	68	74	74																													
5.720 (0.2252)	52	56	58	60	62	64	66	68	70	74																														
5.740 (0.2260)	54	58	60	62	64	66	68	70	72																															

G

A112165E03

New Lifter Thickness

Lifter No.	Thickness mm (in.)	Lifter No.	Thickness mm (in.)	Lifter No.	Thickness mm (in.)
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.2181)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.2189)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.2197)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.2205)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.2213)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.2220)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.2228)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.2236)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.2244)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.2252)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.2260)
28	5.280 (0.2079)	52	5.520 (0.2173)	-	-

EM

Standard intake valve clearance (cold):
0.19 to 0.29 mm (0.008 to 0.011 in.)

EXAMPLE:
The 5.250 mm (0.2067 in.) lifter is installed, and the measured clearance is 0.400 mm (0.0157 in.).
Replace the 5.250 mm (0.2067 in.) lifter with a new No. 42 lifter.

EM

Valve Litter Selection Chart (Exhaust)

Measured clearance mm (in.) / Installed lifter thickness mm (in.)	0.000 - 0.030 (0.0000 - 0.0012)	0.031 - 0.050 (0.0012 - 0.0020)	0.051 - 0.070 (0.0020 - 0.0028)	0.071 - 0.090 (0.0028 - 0.0035)	0.091 - 0.110 (0.0036 - 0.0043)	0.111 - 0.130 (0.0044 - 0.0051)	0.131 - 0.150 (0.0052 - 0.0059)	0.151 - 0.170 (0.0059 - 0.0067)	0.171 - 0.190 (0.0067 - 0.0075)	0.191 - 0.210 (0.0075 - 0.0083)	0.211 - 0.230 (0.0083 - 0.0091)	0.231 - 0.250 (0.0091 - 0.0098)	0.251 - 0.270 (0.0099 - 0.0106)	0.271 - 0.290 (0.0107 - 0.0114)	0.291 - 0.299 (0.0115 - 0.0118)	0.300 - 0.400 (0.0118 - 0.0157)	0.401 - 0.420 (0.0158 - 0.0165)	0.421 - 0.440 (0.0166 - 0.0173)	0.441 - 0.460 (0.0174 - 0.0181)	0.461 - 0.480 (0.0181 - 0.0189)	0.481 - 0.500 (0.0189 - 0.0197)	0.501 - 0.520 (0.0197 - 0.0205)	0.521 - 0.540 (0.0205 - 0.0213)	0.541 - 0.560 (0.0213 - 0.0220)	0.561 - 0.580 (0.0221 - 0.0228)	0.581 - 0.600 (0.0229 - 0.0236)	0.601 - 0.620 (0.0237 - 0.0244)	0.621 - 0.640 (0.0244 - 0.0252)	0.641 - 0.660 (0.0252 - 0.0260)	0.661 - 0.680 (0.0260 - 0.0268)	0.681 - 0.700 (0.0268 - 0.0276)	0.701 - 0.720 (0.0276 - 0.0283)	0.721 - 0.740 (0.0284 - 0.0291)	0.741 - 0.760 (0.0292 - 0.0299)	0.761 - 0.780 (0.0300 - 0.0307)	0.781 - 0.800 (0.0307 - 0.0315)	0.801 - 0.820 (0.0315 - 0.0323)	0.821 - 0.840 (0.0323 - 0.0331)	0.841 - 0.860 (0.0331 - 0.0339)	0.861 - 0.880 (0.0339 - 0.0346)	0.881 - 0.900 (0.0347 - 0.0354)	0.901 - 0.920 (0.0355 - 0.0362)	0.921 - 0.940 (0.0363 - 0.0370)	0.941 - 0.960 (0.0370 - 0.0378)	0.961 - 0.980 (0.0378 - 0.0386)	0.981 - 1.000 (0.0386 - 0.0394)	1.001 - 1.020 (0.0394 - 0.0402)	1.021 - 1.040 (0.0402 - 0.0409)	1.041 - 1.060 (0.0410 - 0.0417)	1.061 - 1.080 (0.0418 - 0.0425)
5.060 (0.1992)																											28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74
5.080 (0.2000)															06	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74	
5.100 (0.2008)														06	08	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74	
5.120 (0.2016)													06	08	10	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74		
5.140 (0.2024)												06	08	10	12	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74			
5.160 (0.2031)											06	08	10	12	14	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74				
5.180 (0.2039)									06	08	10	12	14	16	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74					
5.200 (0.2047)								06	08	10	12	14	16	18	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74						
5.210 (0.2051)								06	08	10	12	14	16	18	20	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74					
5.220 (0.2055)								06	08	10	12	14	16	18	20	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74						
5.230 (0.2059)							06	08	10	12	14	16	18	20	22	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74						
5.240 (0.2063)							06	08	10	12	14	16	18	20	22	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74							
5.250 (0.2067)						06	08	10	12	14	16	18	20	22	24	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74							
5.260 (0.2071)						06	08	10	12	14	16	18	20	22	24	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74								
5.270 (0.2075)					06	08	10	12	14	16	18	20	22	24	26	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74								
5.280 (0.2079)					06	08	10	12	14	16	18	20	22	24	26	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74									
5.290 (0.2083)				06	08	10	12	14	16	18	20	22	24	26	28	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74									
5.300 (0.2087)				06	08	10	12	14	16	18	20	22	24	26	28	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74										
5.310 (0.2091)			06	08	10	12	14	16	18	20	22	24	26	28	30	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74										
5.320 (0.2094)			06	08	10	12	14	16	18	20	22	24	26	28	30	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74											
5.330 (0.2098)		06	08	10	12	14	16	18	20	22	24	26	28	30	32	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74											
5.340 (0.2102)		06	08	10	12	14	16	18	20	22	24	26	28	30	32	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74												
5.350 (0.2106)	06	08	10	12	14	16	18	20	22	24	26	28	30	32	34	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74												
5.360 (0.2110)	06	08	10	12	14	16	18	20	22	24	26	28	30	32	34	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74													
5.370 (0.2114)	08	10	12	14	16	18	20	22	24	26	28	30	32	34	36	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74													
5.380 (0.2118)	08	10	12	14	16	18	20	22	24	26	28	30	32	34	36	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74														
5.390 (0.2122)	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74														
5.400 (0.2126)	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74															
5.410 (0.2130)	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74															
5.420 (0.2134)	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74																
5.430 (0.2138)	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	48	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74																
5.440 (0.2142)	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74																	
5.450 (0.2146)	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	50	52	54	56	58	60	62	64	66	68	70	72	74	74	74																	
5.460 (0.2150)	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	52	54	56	58	60	62	64	66	68	70	72	74	74	74																		
5.470 (0.2154)	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	52	54	56	58	60	62	64	66	68	70	72	74	74	74																		
5.480 (0.2157)	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	54	56	58	60	62	64	66	68	70	72	74	74	74																			
5.490 (0.2161)	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	54	56	58	60	62	64	66	68	70	72	74	74	74																			
5.500 (0.2165)	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	56	58	60	62	64	66	68	70	72	74	74	74																				
5.510 (0.2169)	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	56	58	60	62	64	66	68	70	72	74	74	74																				
5.520 (0.2173)	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	58	60	62	64	66	68	70	72	74	74	74																					
5.530 (0.2177)	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	58	60	62	64	66	68	70	72	74	74	74																					
5.540 (0.2181)	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	60	62	64	66	68	70	72	74	74	74																						
5.550 (0.2185)	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	60	62	64	66	68	70	72	74	74	74																						
5.560 (0.2189)	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	62	64	66	68	70	72	74	74	74																							
5.570 (0.2193)	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	62	64	66	68	70	72	74	74	74																							
5.580 (0.2197)	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	64	66	68	70	72	74	74	74																								
5.590 (0.2201)	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	64	66	68	70	72	74	74	74																								
5.600 (0.2205)	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	66	68	70	72	74	74	74																									
5.620 (0.2213)	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	68	70	72	74	74	74																										
5.640 (0.2220)	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	70	72	74	74	74																											
5.660 (0.2228)	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	72	74	74	74																												
5.680 (0.2236)	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	74	74	74																													
5.700 (0.2244)	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	74	74																														
5.720 (0.2252)	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	74																															
5.740 (0.2260)	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72																																

A120034E01

New Lifter Thickness

Lifter No.	Thickness mm (in.)	Lifter No.	Thickness mm (in.)	Lifter No.	Thickness mm (in.)
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.2181)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.2189)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.2197)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.2205)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.2213)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.2220)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.2228)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.2236)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.2244)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.2252)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.2260)
28	5.280 (0.2079)	52	5.520 (0.2173)	-	-

EM

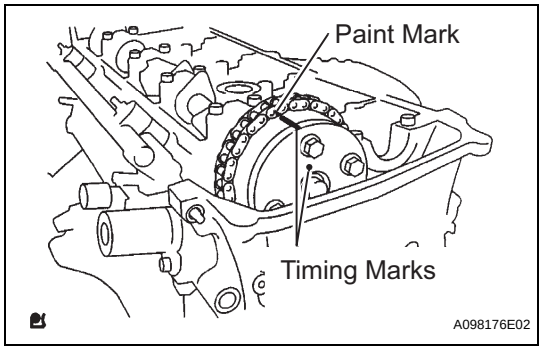
Standard exhaust valve clearance (cold):
0.30 to 0.40 mm (0.012 to 0.016 in.)

EXAMPLE:
The 5.340 mm (0.2102 in.) lifter is installed, and the measured clearance is 0.440 mm (0.0173 in.).
Replace the 5.340 mm (0.2102 in.) lifter with a new No. 4 lifter.

15. INSTALL CAMSHAFT

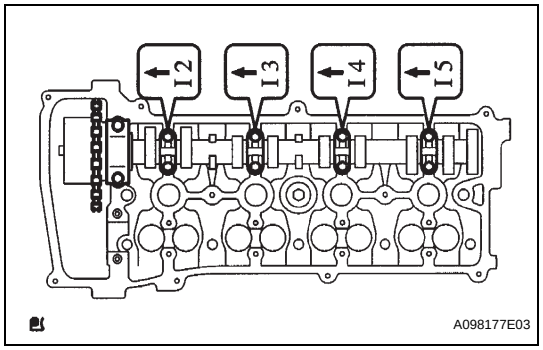
(a) Apply a light coat of engine oil to the journal portion of the camshaft.

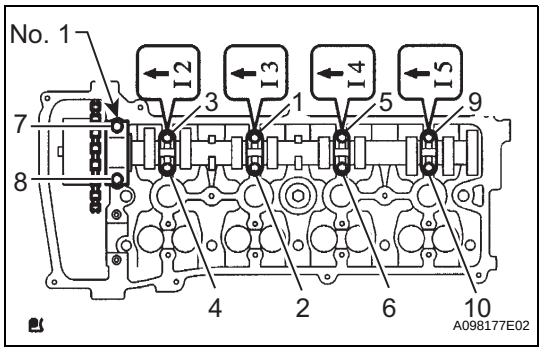
(b) Install the timing chain onto the camshaft timing gear with the paint mark aligned with the timing mark in the camshaft timing gear as shown in the illustration.



(c) Examine the front marks and numbers and check that the order is as shown in the illustration. Then install the bearing caps into the cylinder head.

(d) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.





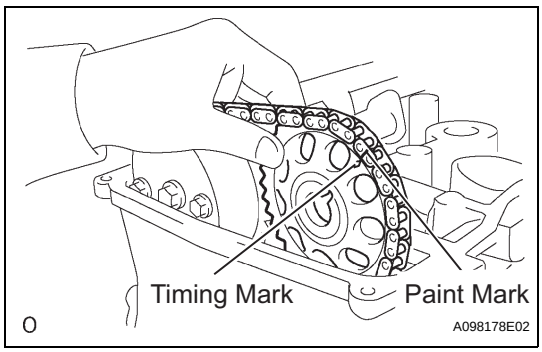
(e) Using several steps, uniformly tighten the 10 bearing cap bolts in the sequence shown in the illustration.

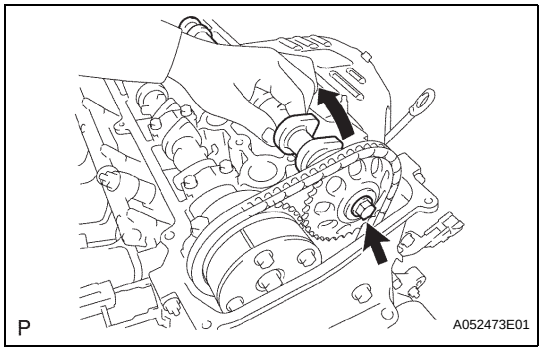
Torque: 29.5 N*m (301 kgf*cm, 22 ft.*lbf) for No. 1 bearing cap
9.0 N*m (92 kgf*cm, 80 in.*lbf) for No. 3 bearing cap

16. INSTALL NO. 2 CAMSHAFT

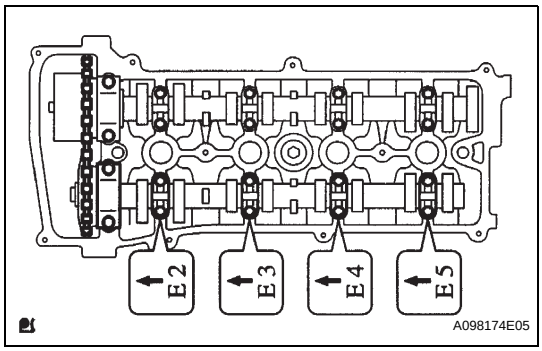
(a) Apply a light coat of engine oil to the journal portion of the No. 2 camshaft.

(b) Put the No. 2 camshaft on the cylinder head with the paint mark of the chain aligned with the timing mark in the camshaft timing sprocket.



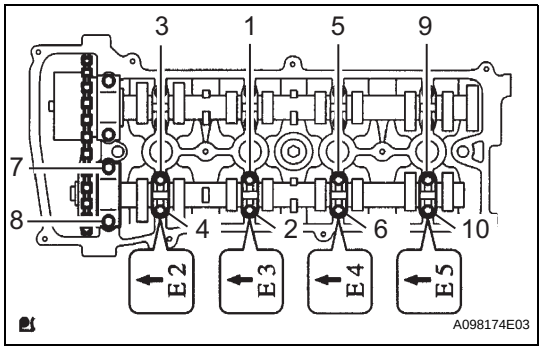


(c) While holding the No. 2 camshaft by hand, temporarily tighten the camshaft timing sprocket set bolt.



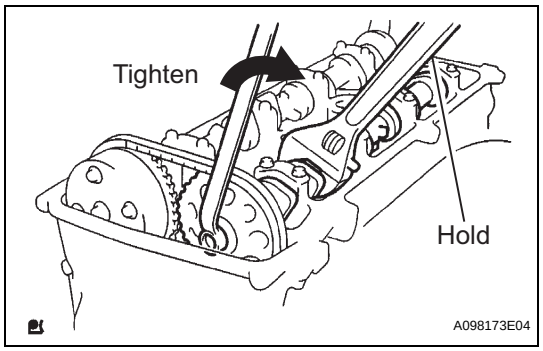
(d) Examine the front marks and numbers and check that the order is as shown in the illustration. Then install the bearing caps onto the cylinder head.

(e) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts.

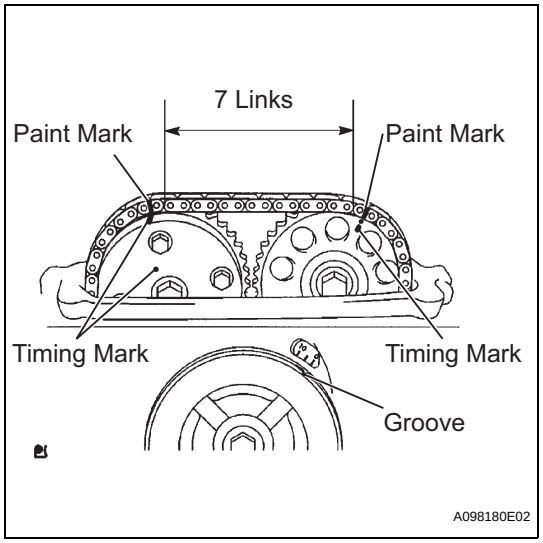


(f) Using several steps, uniformly tighten the 10 bearing cap bolts in the sequence shown in the illustration.

Torque: 29.5 N*m (301 kgf*cm, 22 ft.*lbf) for No. 1 bearing cap
9.0 N*m (92 kgf*cm, 80 in.*lbf) for No. 3 bearing cap



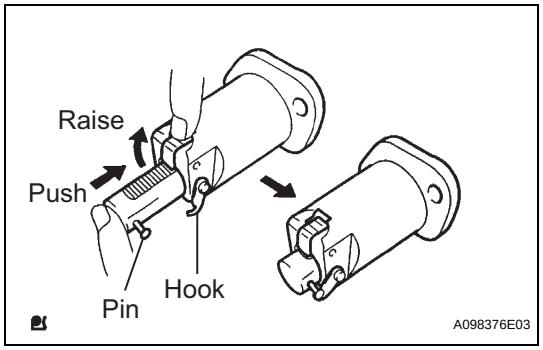
(g) While holding the camshaft with a wrench, tighten the camshaft timing sprocket set bolt.
Torque: 54 N*m (551 kgf*cm, 40 ft.*lbf)
NOTICE:
Be careful not to damage the valve lifter.



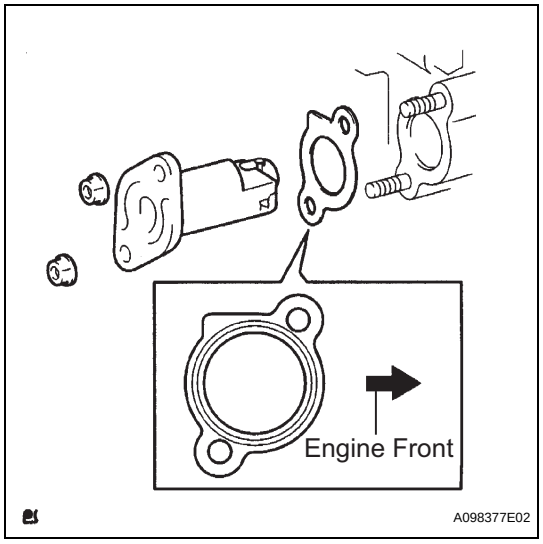
(h) Check that the paint marks on the chain and camshaft timing gear and sprocket are aligned. Also, check that the crankshaft pulley groove is aligned with the timing mark "0" of the timing chain cover.

EM

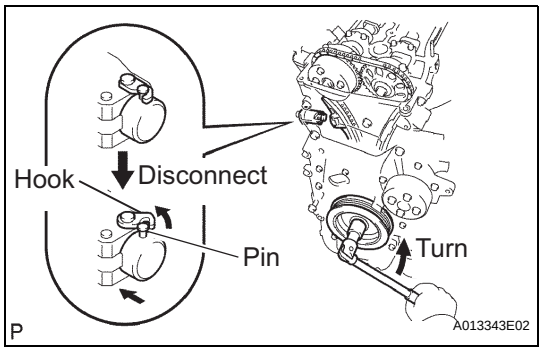
17. INSTALL NO. 1 CHAIN TENSIONER



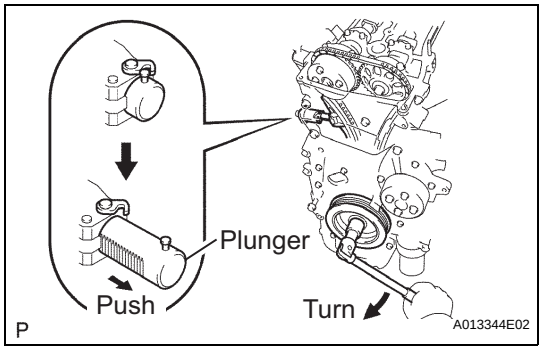
(a) Release the ratchet pawl, then fully push in the plunger and hook the hook to the pin so that the plunger is in the position shown in the illustration.



(b) Install a new gasket and the chain tensioner with the 2 nuts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
NOTICE:
When installing the chain tensioner, set the hook again if the hook releases the plunger.



(c) Turn the crankshaft counterclockwise, then disconnect the plunger knock pin from the hook.

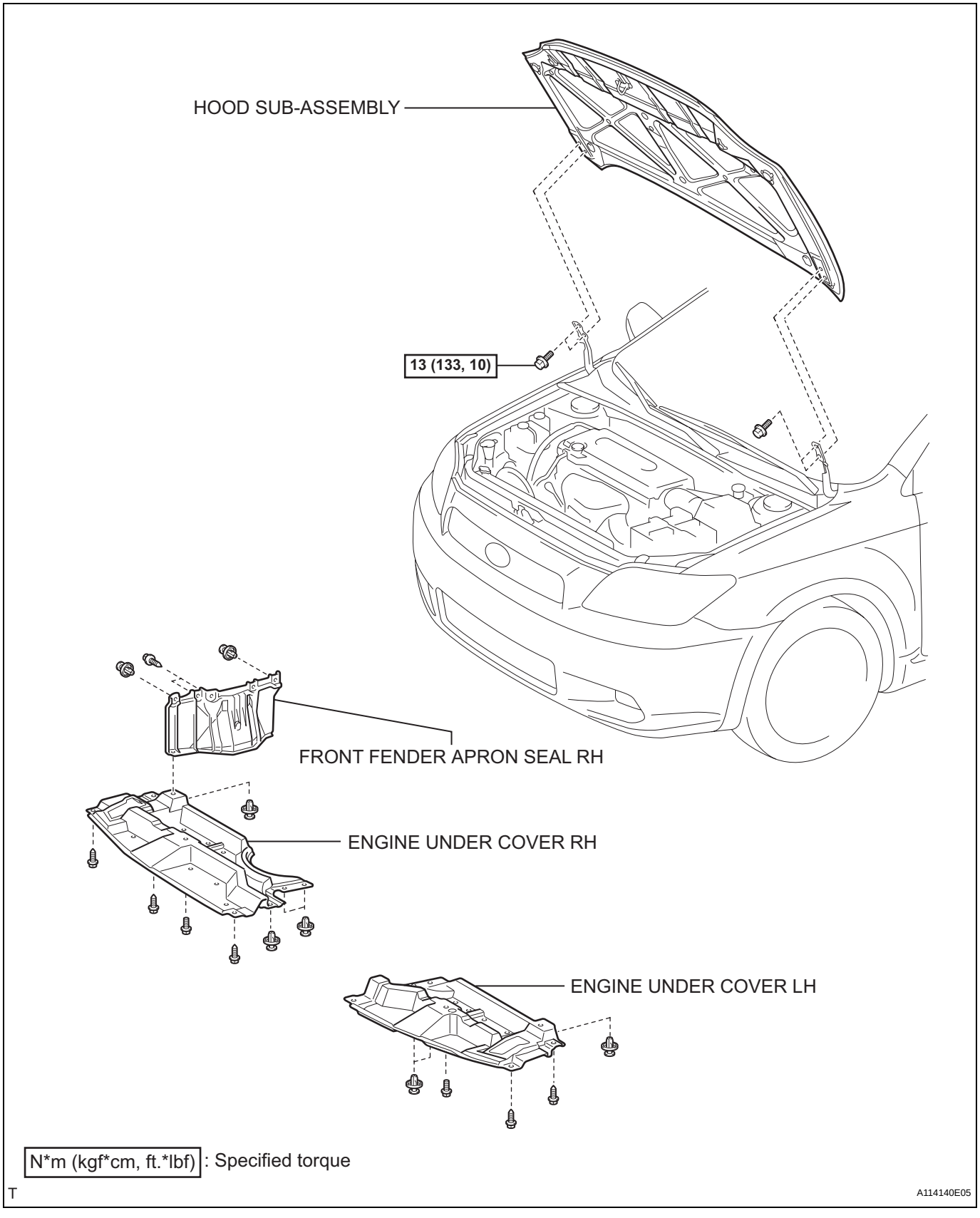


(d) Turn the crankshaft clockwise, then check that the plunger is extended.

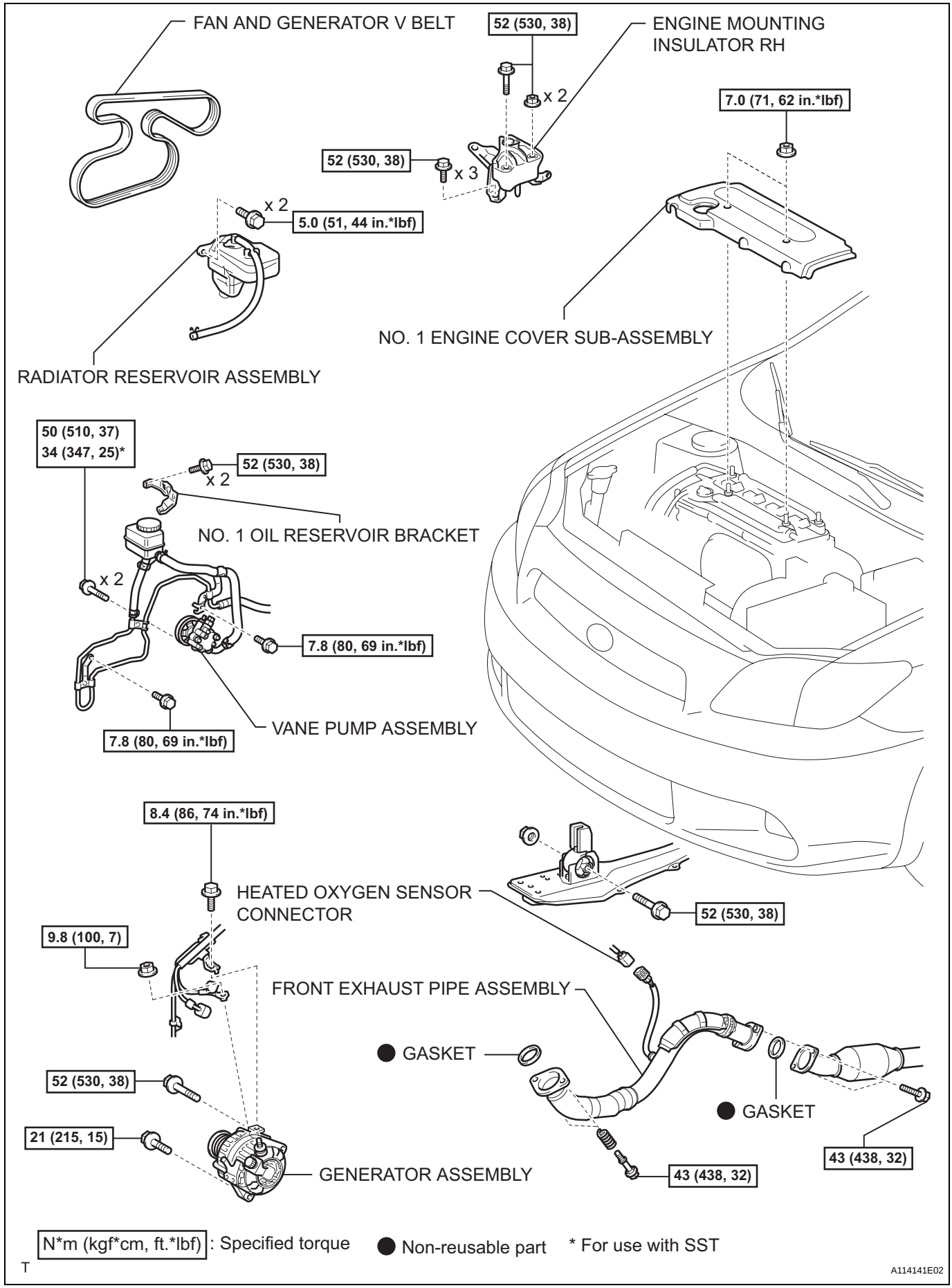
18. **INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-39)**
19. **INSTALL IGNITION COIL ASSEMBLY (See page IG-9)**
20. **INSTALL ENGINE MOUNTING INSULATOR RH (See page EM-40)**
21. **INSTALL VANE PUMP ASSEMBLY**
22. **INSTALL FAN AND GENERATOR V BELT (See page EM-6)**
23. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
24. **CHECK FOR ENGINE OIL LEAKS**
25. **INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-42)**
26. **INSTALL FRONT FENDER APRON SEAL RH**
27. **INSTALL ENGINE UNDER COVER LH**
28. **INSTALL ENGINE UNDER COVER RH**
29. **INSTALL FRONT WHEEL RH**
30. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

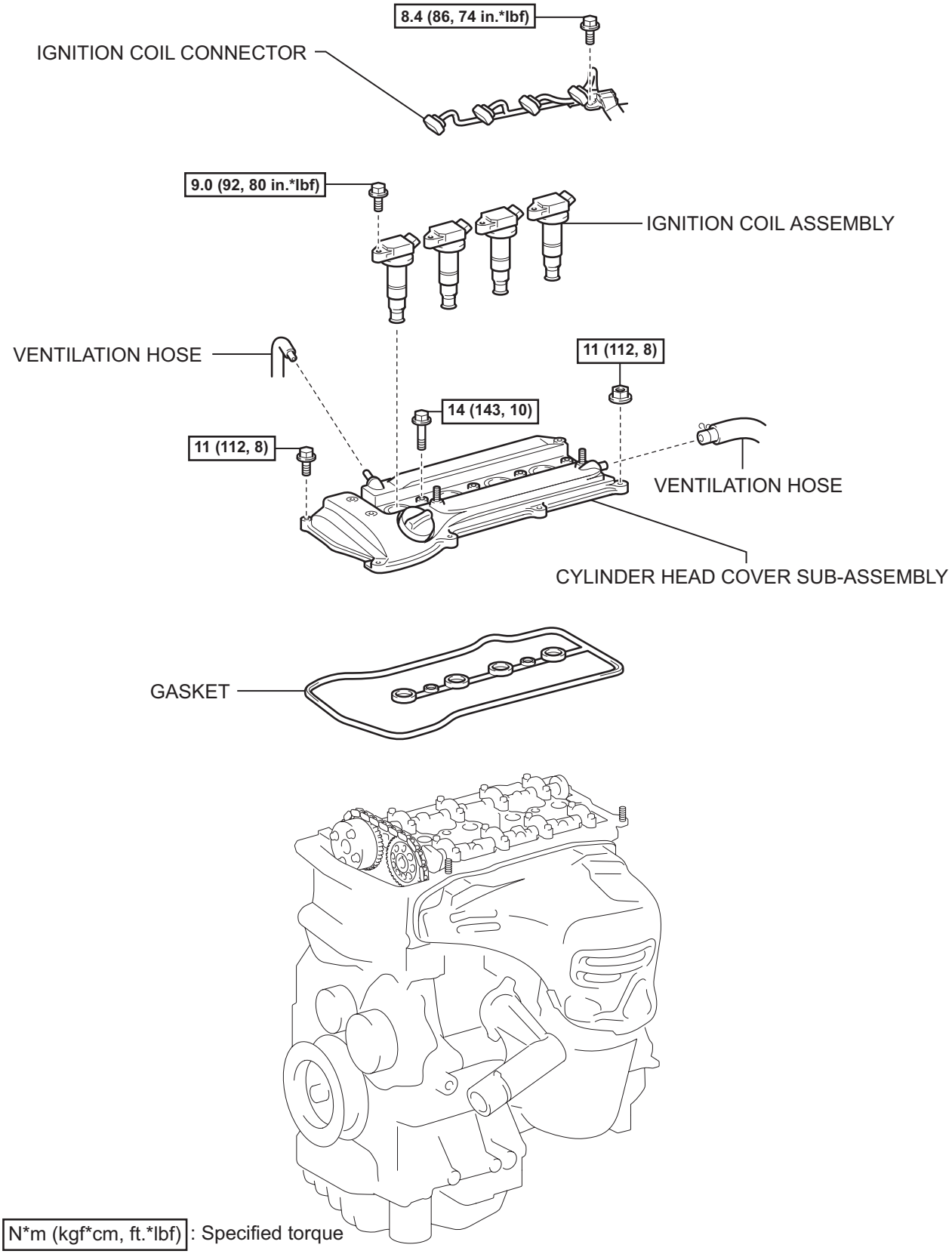
TIMING CHAIN

COMPONENTS



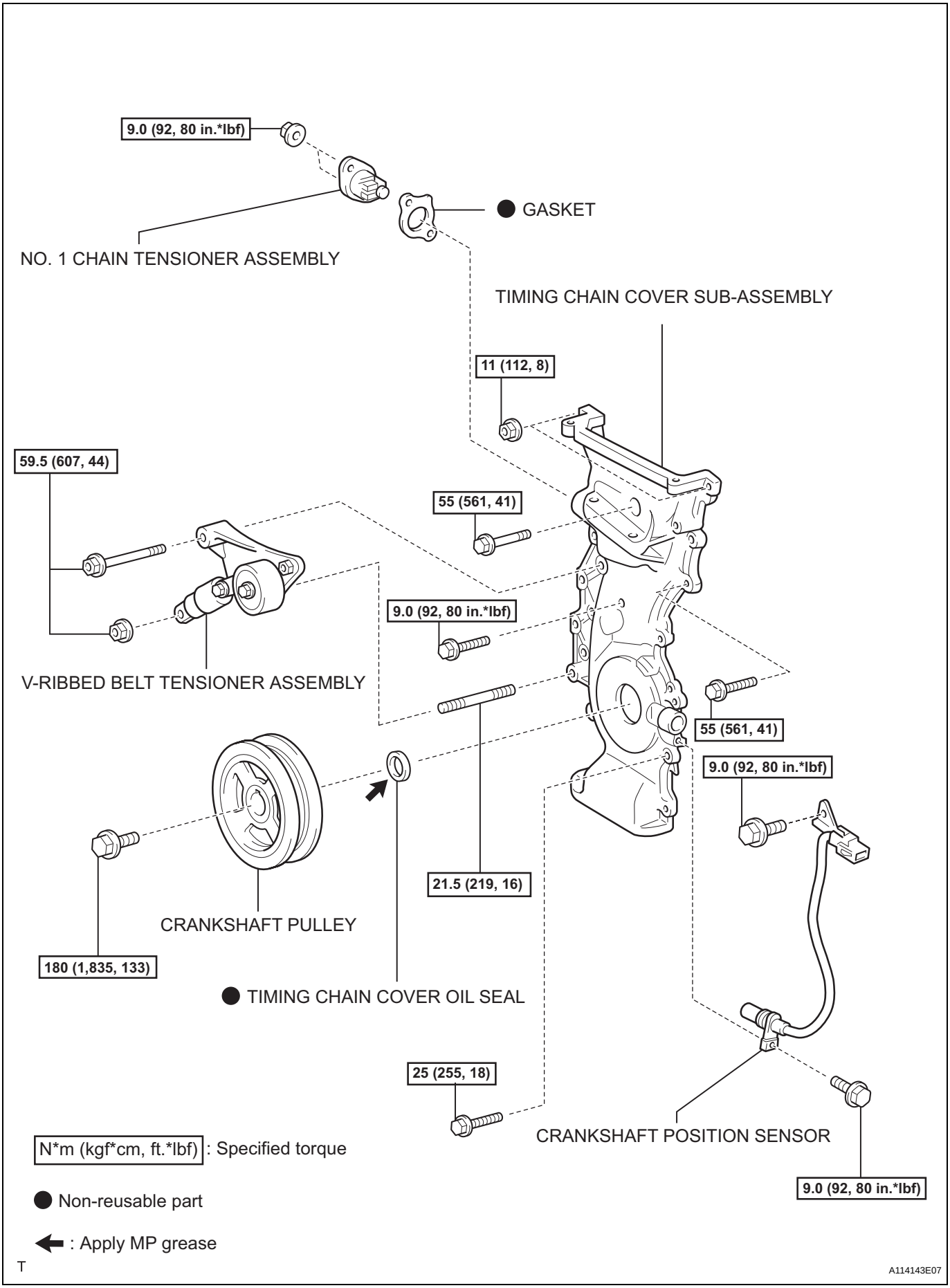
EM

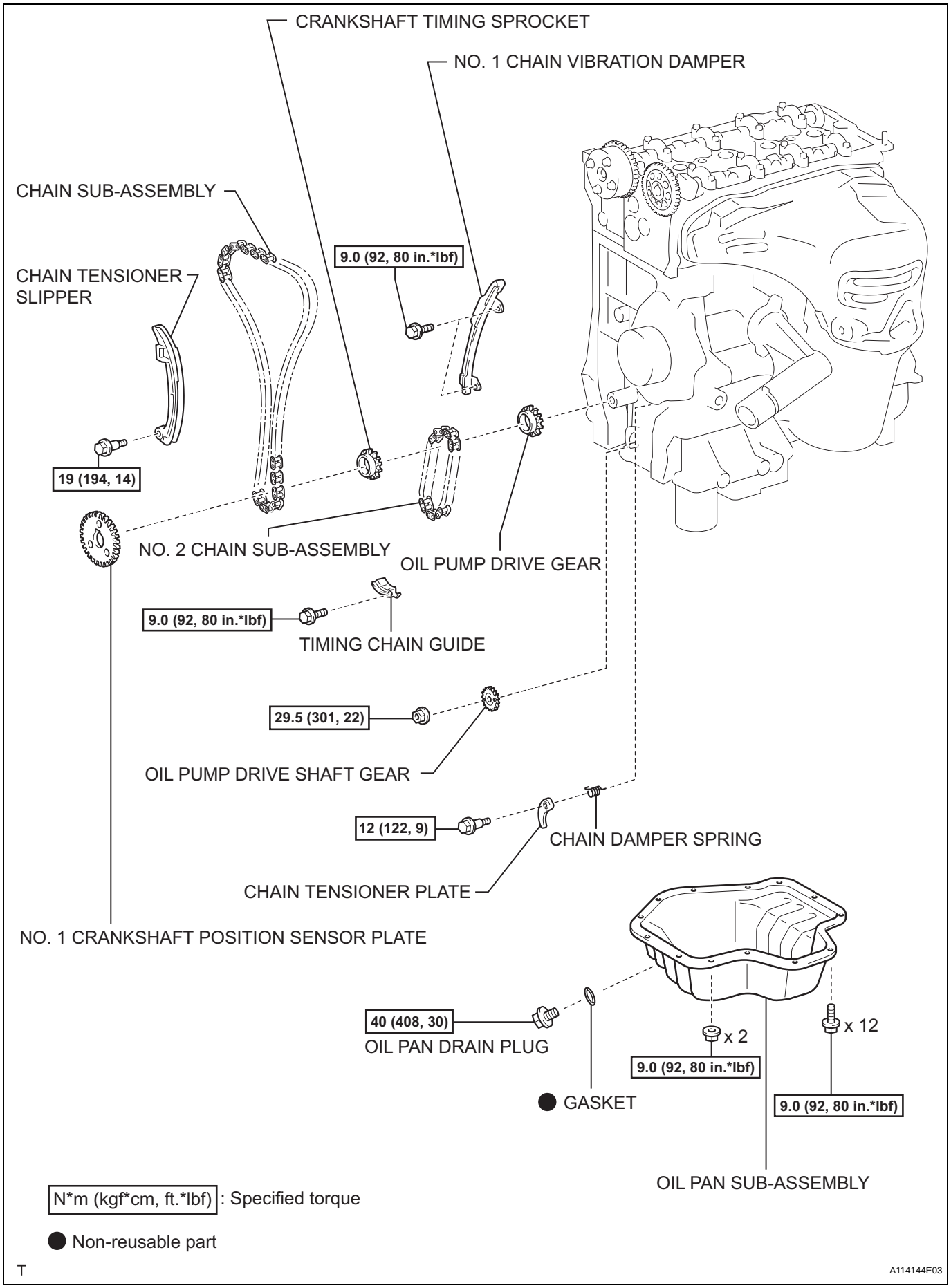

FAN AND GENERATOR V BELT
52 (530, 38)
x 2
ENGINE MOUNTING INSULATOR RH
7.0 (71, 62 in.*lbf)
52 (530, 38)
x 3
x 2
5.0 (51, 44 in.*lbf)
NO. 1 ENGINE COVER SUB-ASSEMBLY
RADIATOR RESERVOIR ASSEMBLY
50 (510, 37)
34 (347, 25)*
52 (530, 38)
x 2
NO. 1 OIL RESERVOIR BRACKET
x 2
7.8 (80, 69 in.*lbf)
VANE PUMP ASSEMBLY
7.8 (80, 69 in.*lbf)
8.4 (86, 74 in.*lbf)
HEATED OXYGEN SENSOR CONNECTOR
52 (530, 38)
9.8 (100, 7)
FRONT EXHAUST PIPE ASSEMBLY
GASKET
52 (530, 38)
GASKET
21 (215, 15)
43 (438, 32)
GENERATOR ASSEMBLY
43 (438, 32)
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
* For use with SST
A114141E02


8.4 (86, 74 in.*lbf)
IGNITION COIL CONNECTOR
9.0 (92, 80 in.*lbf)
IGNITION COIL ASSEMBLY
VENTILATION HOSE
11 (112, 8)
14 (143, 10)
11 (112, 8)
VENTILATION HOSE
CYLINDER HEAD COVER SUB-ASSEMBLY
GASKET
N*m (kgf*cm, ft.*lbf): Specified torque
T
A114142E02

EM

EM

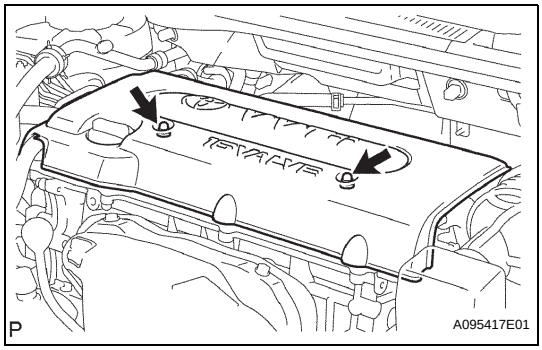

9.0 (92, 80 in.*lbf)
GASKET
NO. 1 CHAIN TENSIONER ASSEMBLY
TIMING CHAIN COVER SUB-ASSEMBLY
11 (112, 8)
59.5 (607, 44)
55 (561, 41)
9.0 (92, 80 in.*lbf)
V-RIBBED BELT TENSIONER ASSEMBLY
55 (561, 41)
9.0 (92, 80 in.*lbf)
21.5 (219, 16)
CRANKSHAFT PULLEY
180 (1,835, 133)
TIMING CHAIN COVER OIL SEAL
25 (255, 18)
CRANKSHAFT POSITION SENSOR
9.0 (92, 80 in.*lbf)
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
: Apply MP grease
T
A114143E07


CRANKSHAFT TIMING SPROCKET
NO. 1 CHAIN VIBRATION DAMPER
CHAIN SUB-ASSEMBLY
CHAIN TENSIONER SLIPPER
9.0 (92, 80 in.*lbf)
19 (194, 14)
NO. 2 CHAIN SUB-ASSEMBLY
OIL PUMP DRIVE GEAR
9.0 (92, 80 in.*lbf)
TIMING CHAIN GUIDE
29.5 (301, 22)
OIL PUMP DRIVE SHAFT GEAR
12 (122, 9)
CHAIN DAMPER SPRING
CHAIN TENSIONER PLATE
NO. 1 CRANKSHAFT POSITION SENSOR PLATE
40 (408, 30)
OIL PAN DRAIN PLUG
x 2
9.0 (92, 80 in.*lbf)
x 12
9.0 (92, 80 in.*lbf)
GASKET
OIL PAN SUB-ASSEMBLY
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
T
A114144E03

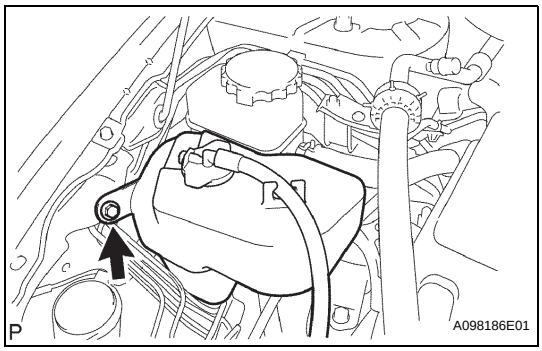
EM

REMOVAL

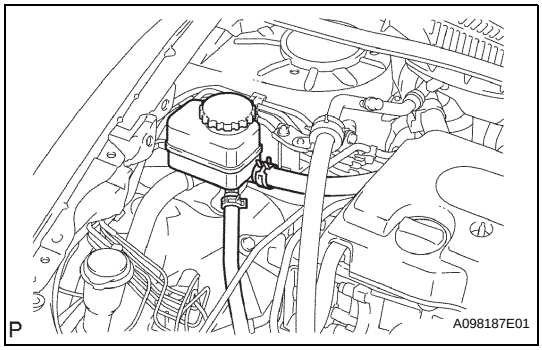
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE HOOD SUB-ASSEMBLY**
3. **REMOVE FRONT WHEEL RH**
4. **REMOVE ENGINE UNDER COVER RH**
5. **REMOVE ENGINE UNDER COVER LH**
6. **REMOVE FRONT FENDER APRON SEAL RH**
7. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY**
   (a) Remove the 2 nuts and cover.



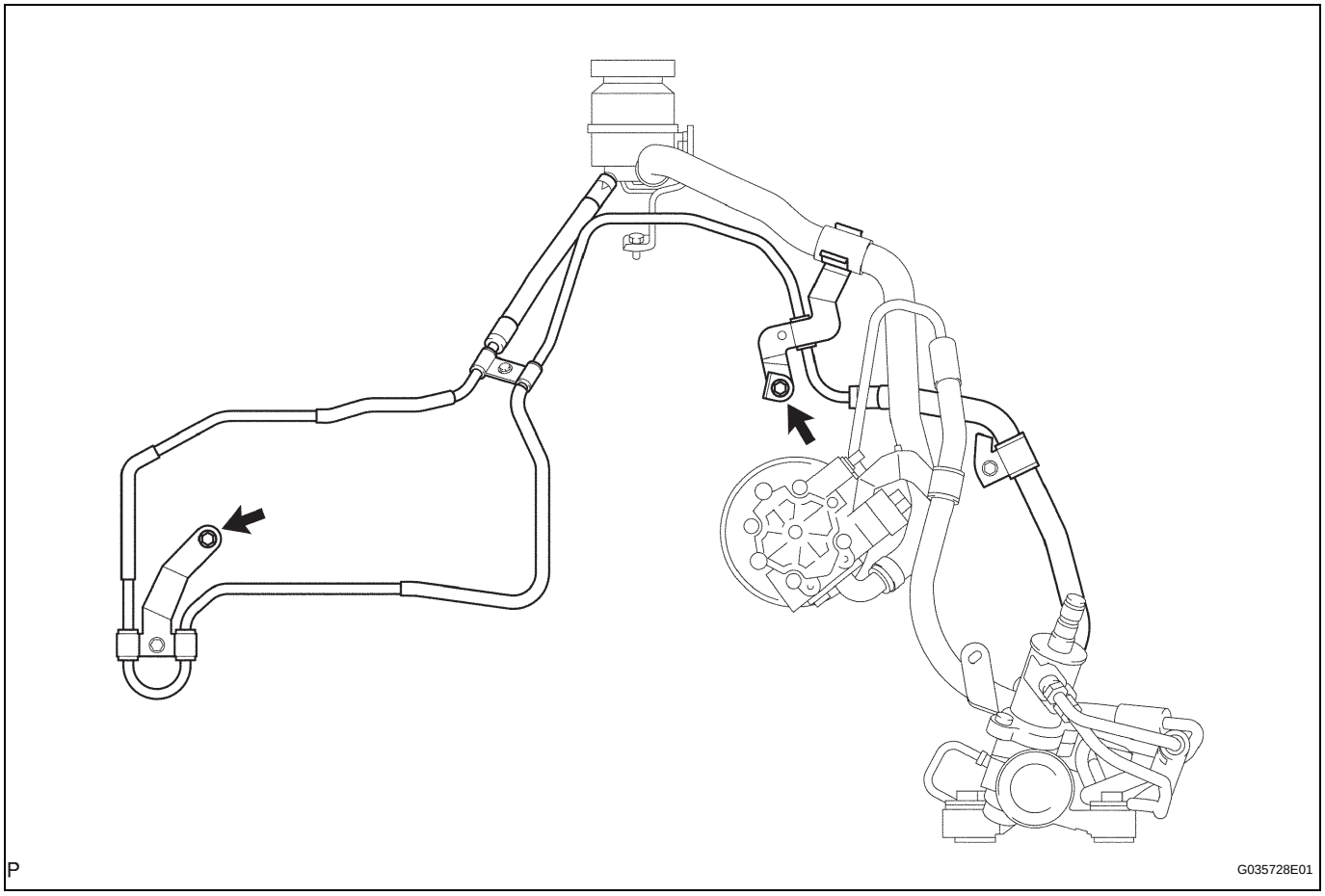
8. **DRAIN ENGINE COOLANT (See page CO-6)**
9. **REMOVE FRONT EXHAUST PIPE ASSEMBLY (See page EX-2)**
10. **REMOVE FAN AND GENERATOR V BELT (See page EM-6)**
11. **REMOVE GENERATOR ASSEMBLY (See page CH-10)**
12. **REMOVE VANE PUMP ASSEMBLY**
13. **REMOVE ENGINE MOUNTING INSULATOR RH**
    (a) Remove the bolt and radiator reservoir.

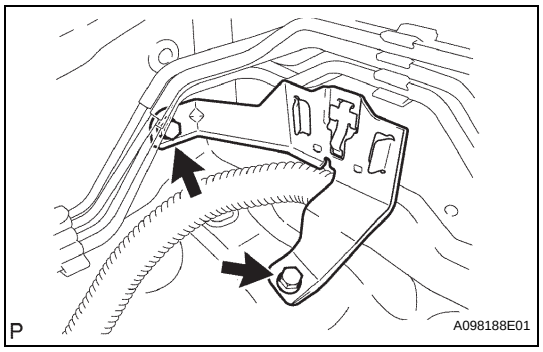


(b) Separate the vane pump oil reservoir from the No. 1 oil reservoir bracket.
NOTICE:
Do not disconnect the 2 oil reservoir hoses.

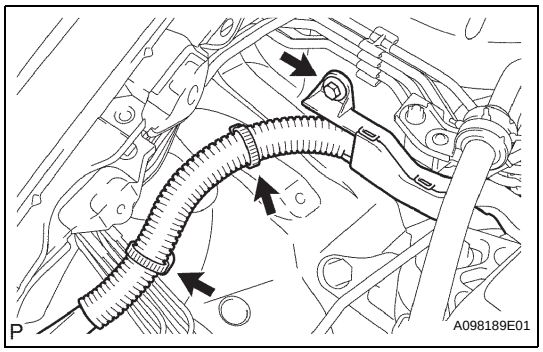


(c) Remove the 2 bolts.

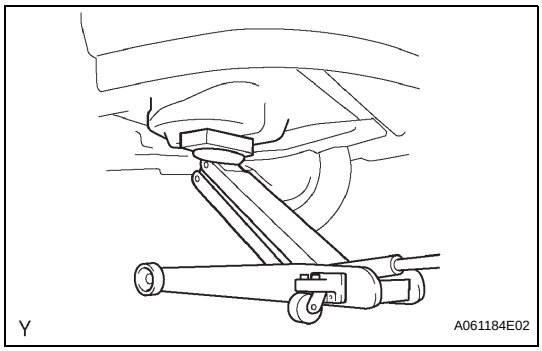




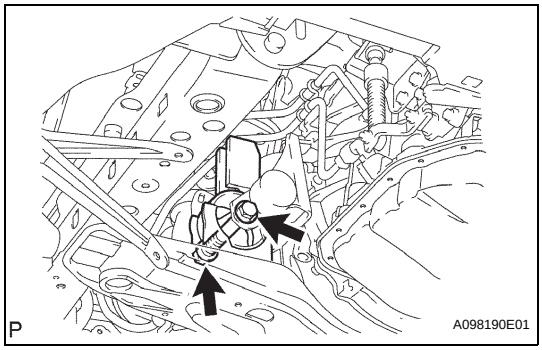
(d) Remove the 2 bolts and No. 1 oil reservoir bracket.



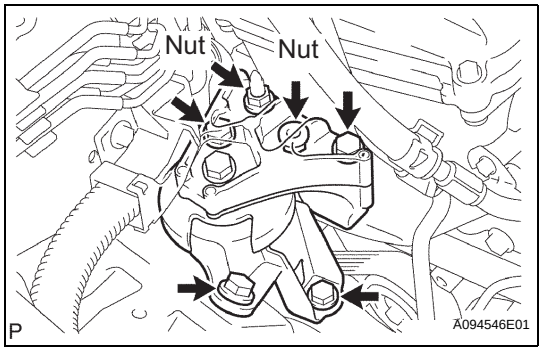
(e) Remove the bolt of the wire harness protector.
(f) Disconnect the 2 clamps of the engine wire.



(g) Place a transmission jack underneath the engine, then put a wooden block on the jack.



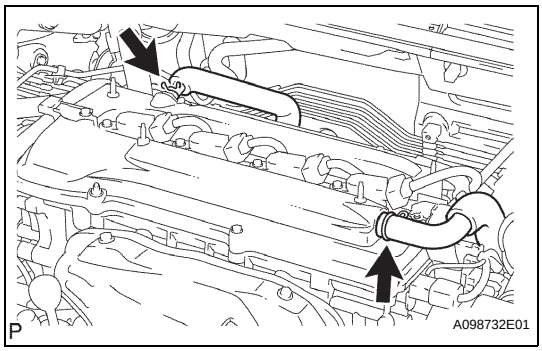
(h) Remove the bolt, nut and front engine mounting insulator from the front engine mounting bracket.



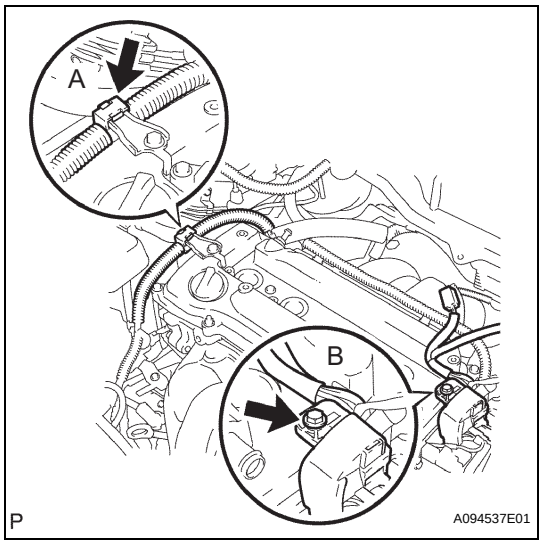
(i) Remove the 4 bolts, 2 nuts and engine mounting insulator RH.
NOTICE:
Do not apply excessive force to the return tube when removing the engine mounting insulator RH.
HINT:
Keep clearance by lowering the engine using the transmission jack when removing the engine mounting insulator RH.

14. REMOVE IGNITION COIL ASSEMBLY (See page IG-9)

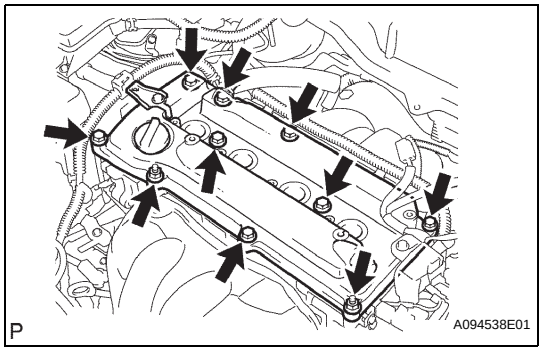
15. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY



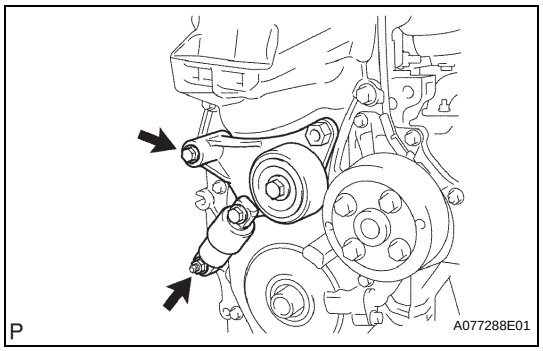
(a) Disconnect the 2 ventilation hoses from the cylinder head cover.



(b) Disconnect the clamp of the engine wire (labeled A).
(c) Remove the bolt, then disconnect the engine wire (labeled B).



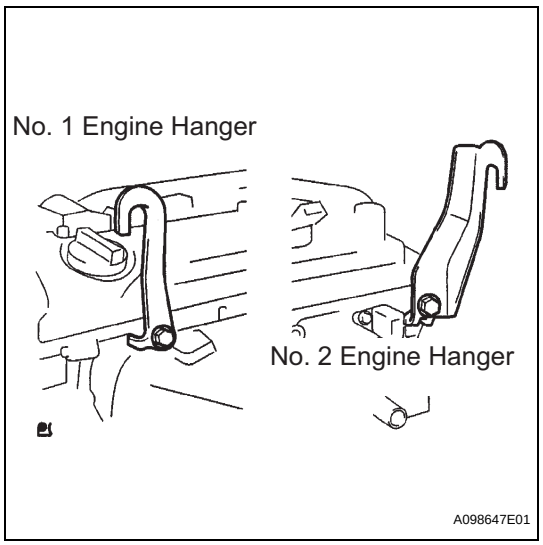
(d) Remove the 8 bolts, 2 nuts and cylinder head cover.



16. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY

(a) Lift the engine upward using the transmission jack.
NOTICE:
Do not lift the engine more than necessary.
(b) Remove the bolt, nut and V-ribbed belt tensioner.

17. REMOVE CRANKSHAFT POSITION SENSOR (See page ES-375)

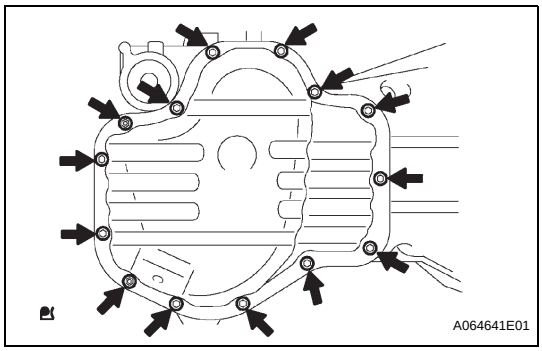


18. REMOVE OIL PAN SUB-ASSEMBLY

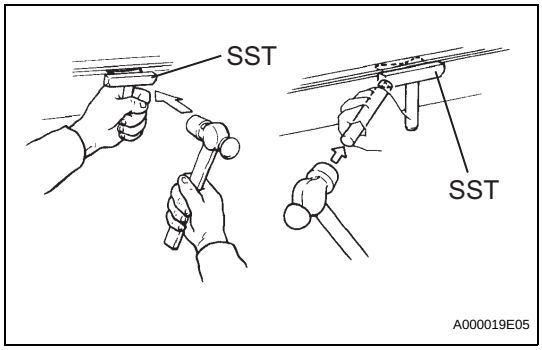
(a) Install the No. 1 and No. 2 engine hangers with the bolts.
Torque: 38 N*m (387 kgf*cm, 28 ft.*lbf)
Parts No.

Item	Part No.
No. 1 engine hanger	12281-28010
No. 2 engine hanger	12282-28010
Bolt	91512-61020

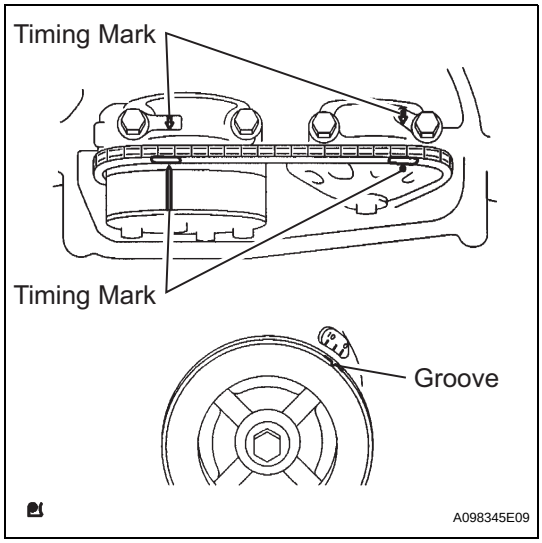
(b) Using a chain block and sling device, hold the engine.



(c) Remove the 12 bolts and 2 nuts.



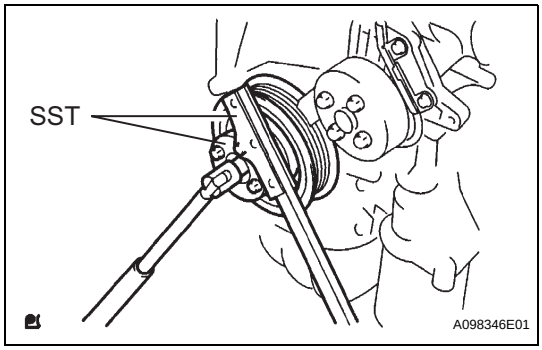
(d) Insert the blade of SST between the crankcase, chain cover and oil pan, then cut off the applied sealer and remove the oil pan.
SST 09032-00100
NOTICE:
Be careful not to damage the contact surface of the crankcase, chain cover and oil pan.



19. SET NO. 1 CYLINDER TO TDC/COMPRESSION

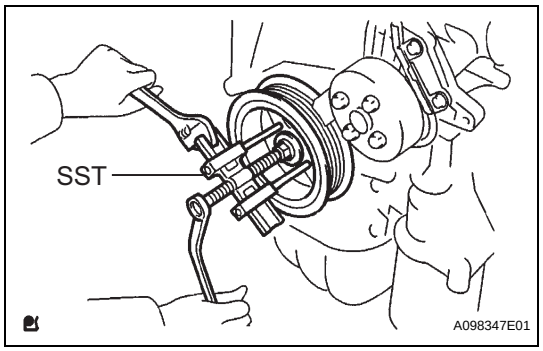
(a) Turn the crankshaft pulley until its groove and the timing mark "0" of the timing chain cover are aligned.

(b) Check that each timing mark of the camshaft timing gears is aligned with each timing mark located on the No. 1 and No. 2 bearing caps as shown in the illustration.
If not, turn the crankshaft by 1 revolution (360°) to align the timing marks as above.

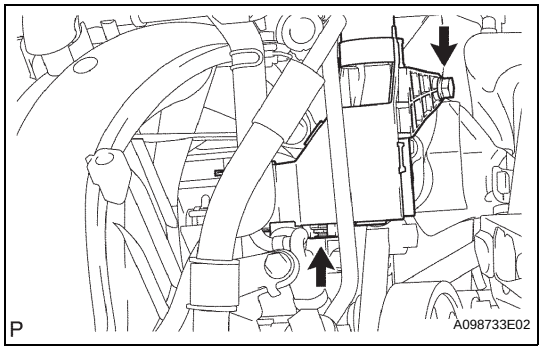


20. REMOVE CRANKSHAFT PULLEY

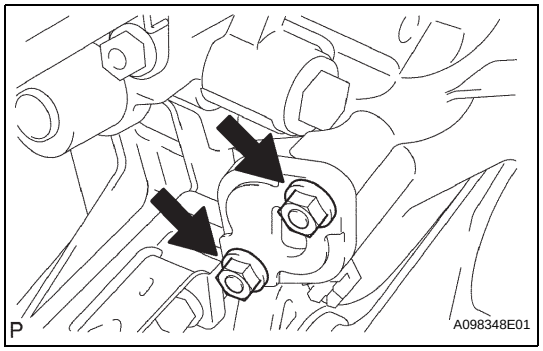
(a) Using SST, fix the pulley and loosen the pulley bolt.
SST 09213-54015 (91651-60855), 09330-00021



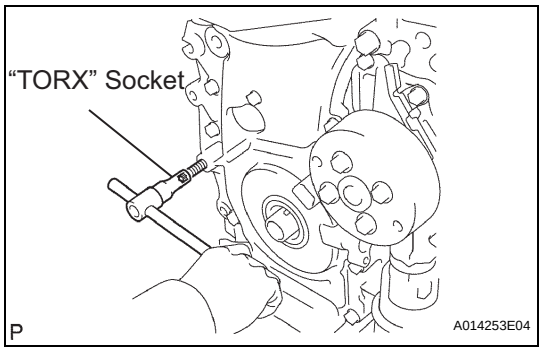
(b) Using SST and the pulley bolt, remove the crankshaft pulley.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)



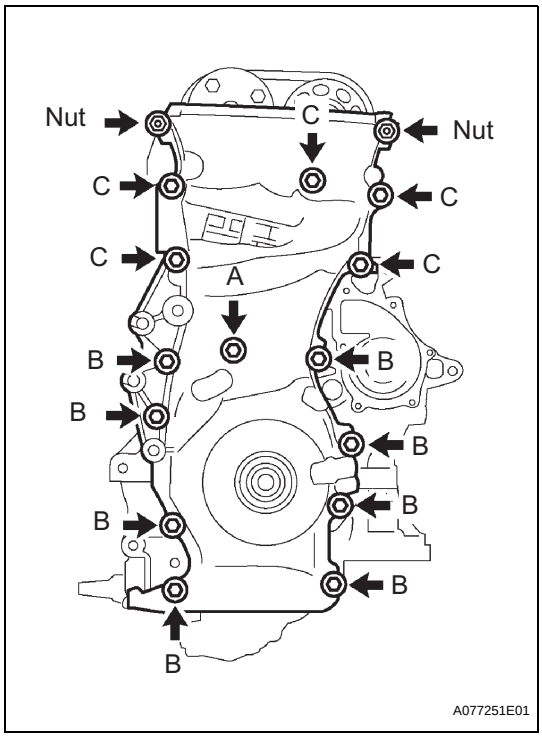
21. REMOVE NO. 1 CHAIN TENSIONER ASSEMBLY
(a) Remove the bolt.
(b) Disconnect the wire harness protector clamp.



(c) Remove the 2 nuts, chain tensioner and gasket.
NOTICE:
Do not turn the crankshaft without the chain tensioner.

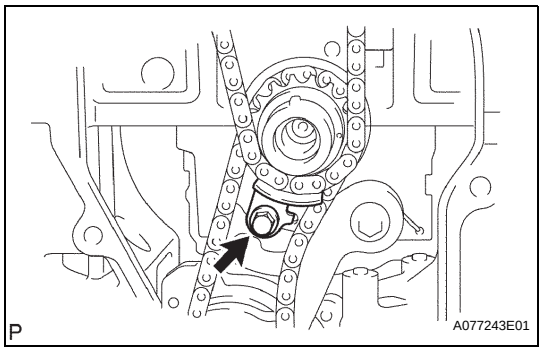


22. REMOVE TIMING CHAIN COVER SUB-ASSEMBLY
(a) Using an E10 "TORX" socket, remove the stud bolt for the V-ribbed belt tensioner.



(b) Remove the 14 bolts and 2 nuts.
(c) Remove the timing chain cover by prying the portions between the timing chain cover, cylinder head and cylinder block with a screwdriver.
NOTICE:
Be careful not to damage the contact surfaces of the timing chain cover, cylinder head and cylinder block.

23. REMOVE NO. 1 CRANKSHAFT POSITION SENSOR PLATE



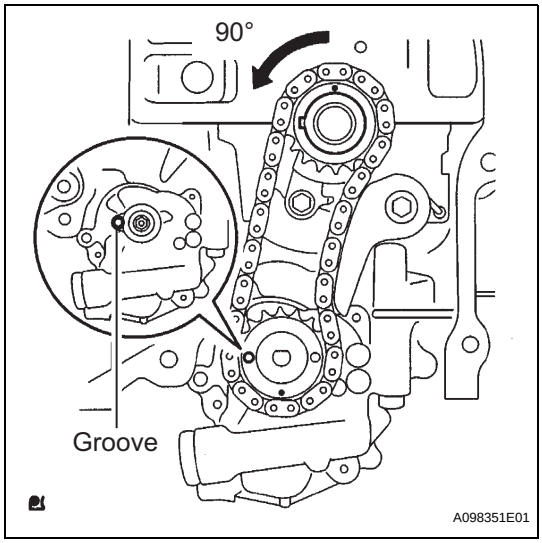
24. REMOVE TIMING CHAIN GUIDE
(a) Remove the bolt and timing chain guide.

25. REMOVE CHAIN TENSIONER SLIPPER
(a) Remove the bolt and chain tensioner slipper.

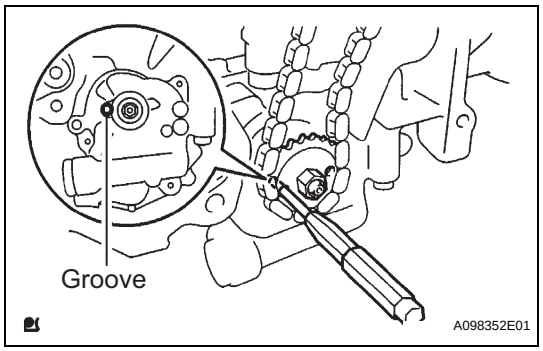
26. REMOVE CHAIN SUB-ASSEMBLY

27. REMOVE NO. 1 CHAIN VIBRATION DAMPER
(a) Remove the 2 bolts and chain vibration damper.

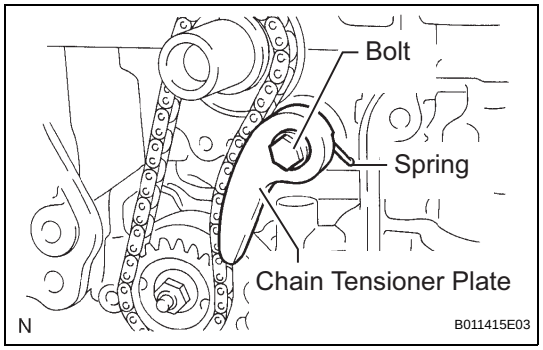
28. REMOVE CRANKSHAFT TIMING SPROCKET



29. REMOVE NO. 2 CHAIN SUB-ASSEMBLY
(a) Turn the crankshaft by 90° counterclockwise to align the adjusting hole of the oil pump drive shaft gear with the groove of the oil pump.



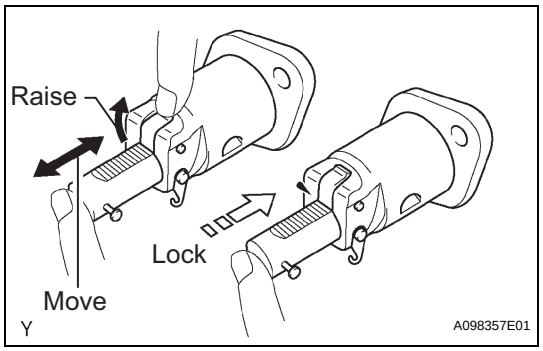
(b) Insert a 4 mm diameter bar into the adjusting hole of the oil pump drive shaft gear to lock the gear in position, then remove the nut.



(c) Remove the bolt, chain tensioner plate and spring.
(d) Remove the oil pump drive gear, oil pump drive shaft gear and No. 2 chain.

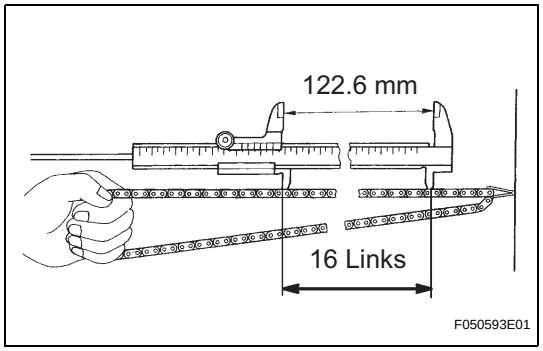
EM

INSPECTION



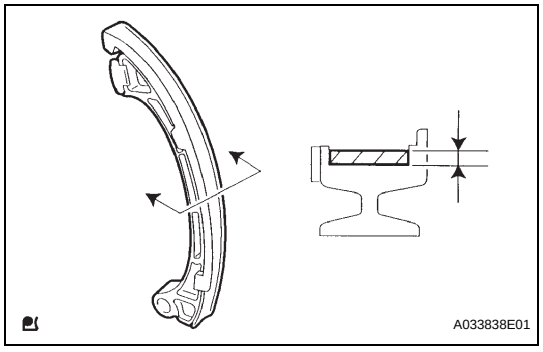
1. INSPECT NO. 1 CHAIN TENSIONER

(a) Check that the plunger moves smoothly when the ratchet pawl is raised with your finger.
(b) Release the ratchet pawl, then check that the plunger is locked in place by the ratchet pawl and does not move when pushed with your finger.



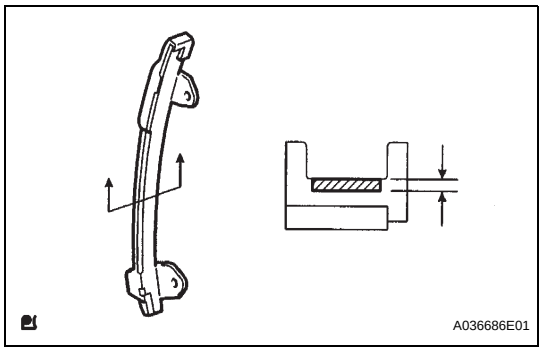
2. INSPECT CHAIN SUB-ASSEMBLY

(a) Using vernier calipers, measure the length of the 16 links with the chain fully stretched.
Maximum chain elongation:
122.6 mm (4.827 in.)
If the chain elongation is greater than the maximum, replace the chain sub-assembly.
HINT:
Take the same measurements by pulling at 3 or more places selected at random.



3. INSPECT CHAIN TENSIONER SLIPPER

(a) Using vernier calipers, measure the tensioner slipper wear.
Maximum wear:
1.0 mm (0.039 in.)
If the wear is greater than the maximum, replace the chain tensioner slipper.

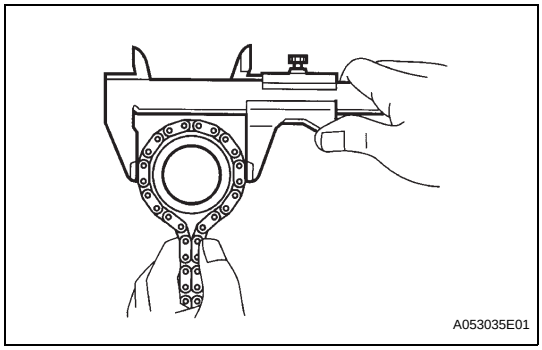


4. INSPECT NO. 1 CHAIN VIBRATION DAMPER

(a) Using vernier calipers, measure the vibration damper wear.

Maximum wear:
1.0 mm (0.039 in.)

If the wear is greater than the maximum, replace the No. 1 chain vibration damper.



5. INSPECT CRANKSHAFT TIMING SPROCKET

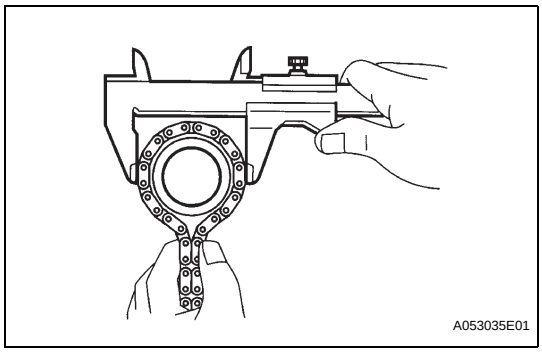
(a) Wrap the chain around the timing sprocket.

(b) Using vernier calipers, measure the timing gear diameter with the chain.

Minimum gear diameter (with chain):
51.6 mm (2.031 in.)

NOTICE:
Vernier calipers must be in contact with the chain rollers when measuring.

If the gear diameter is less than the minimum, replace the chain sub-assembly and crankshaft timing sprocket.



6. INSPECT OIL PUMP DRIVE GEAR

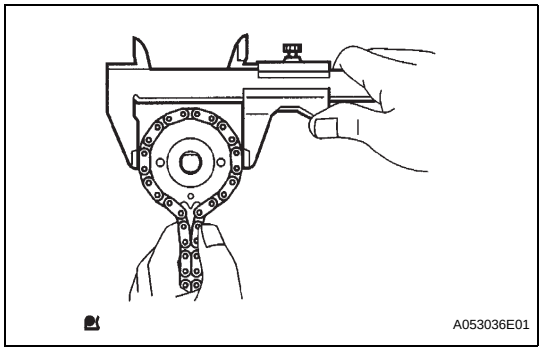
(a) Wrap the chain around the drive gear.

(b) Using vernier calipers, measure the drive gear diameter with the chain.

Minimum gear diameter (with chain):
48.2 mm (1.898 in.)

NOTICE:
Vernier calipers must be in contact with the chain rollers when measuring.

If the gear diameter is less than the minimum, replace the No. 2 chain sub-assembly and oil pump drive gear.



7. INSPECT OIL PUMP DRIVE SHAFT GEAR

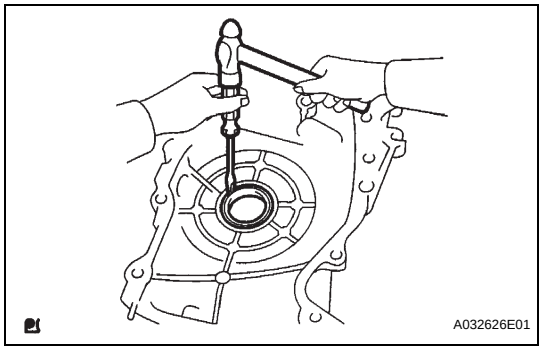
(a) Wrap the chain around the drive shaft gear.

(b) Using vernier calipers, measure the drive shaft gear diameter with the chain.

Minimum gear diameter (with chain):
48.2 mm (1.898 in.)

NOTICE:
Vernier calipers must be in contact with the chain rollers when measuring.

If the gear diameter is less than the minimum, replace the No. 2 chain sub-assembly and oil pump drive shaft gear.



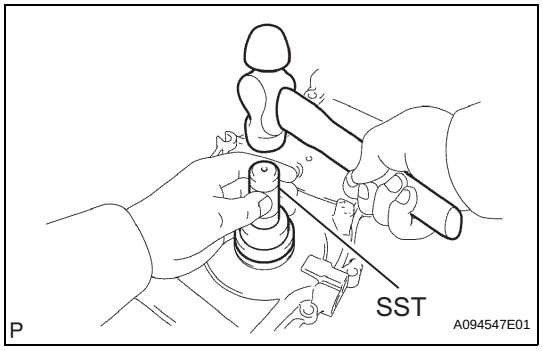
REPLACEMENT

1. REMOVE TIMING CHAIN COVER OIL SEAL

(a) Using a screwdriver and hammer, tap out the oil seal.

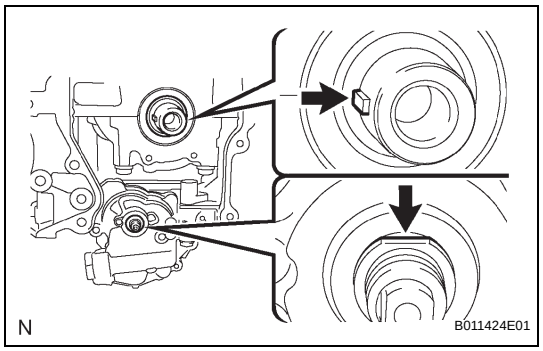
2. INSTALL TIMING CHAIN COVER OIL SEAL

(a) Place the oil seal retainer on wooden blocks.



(b) Using SST and a hammer, tap in the oil seal until its surface is flush with the timing gear case edge.
SST 09223-22010
NOTICE:
- **Keep the lip free from foreign matter.**
- **Do not tap the oil seal at an angle.**

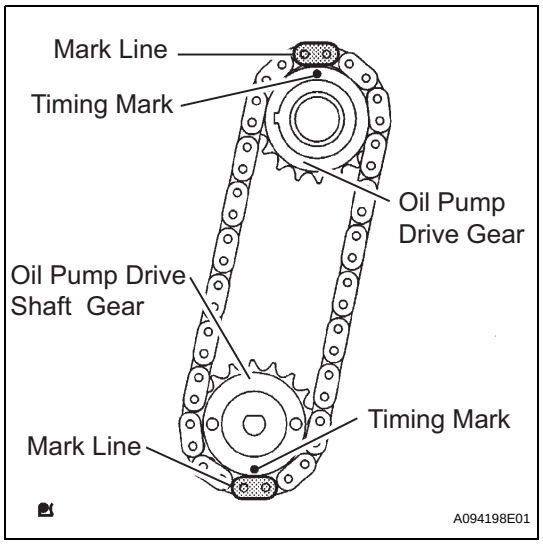
HINT:
Apply a light coat of MP grease to the lip of a new oil seal.



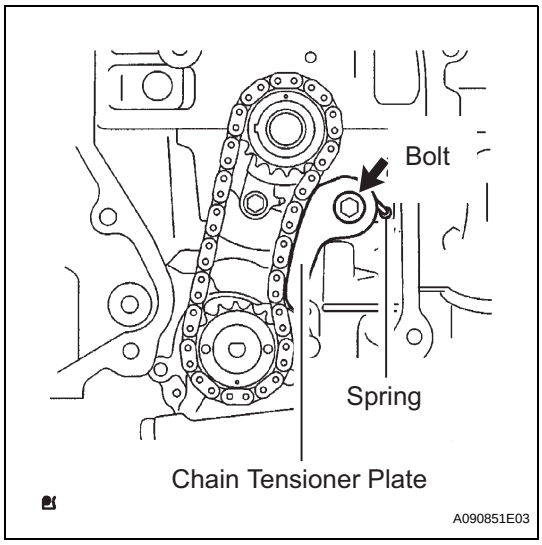
INSTALLATION

1. INSTALL NO. 2 CHAIN SUB-ASSEMBLY

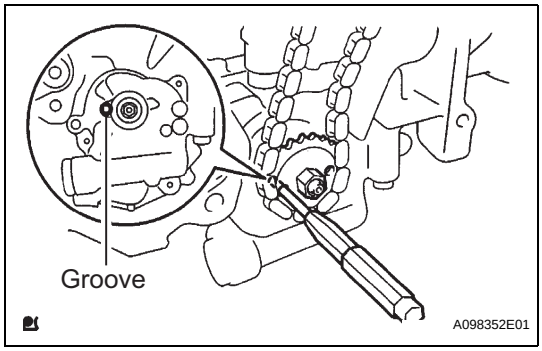
(a) Set the crankshaft key in the left horizontal position.
(b) Turn the cutout of the drive shaft to the top.



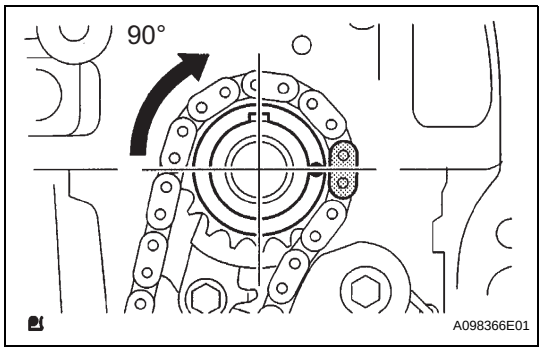
(c) Align the yellow mark links with the timing marks of the each gear as shown in the illustration.
(d) Install the gears onto the crankshaft and oil pump shaft with the chain wrapped on the gears.
(e) Temporarily tighten the oil pump drive shaft gear with the nut.



(f) Insert the damper spring into the adjusting hole, then install the chain tensioner plate with the bolt.
Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)



(g) Align the adjusting hole of the oil pump drive shaft gear with the groove of the oil pump.
(h) Insert a 4 mm diameter bar into the adjusting hole of the oil pump drive shaft gear to lock the gear in position, then tighten the nut.
Torque: 29.5 N*m (301 kgf*cm, 22 ft.*lbf)

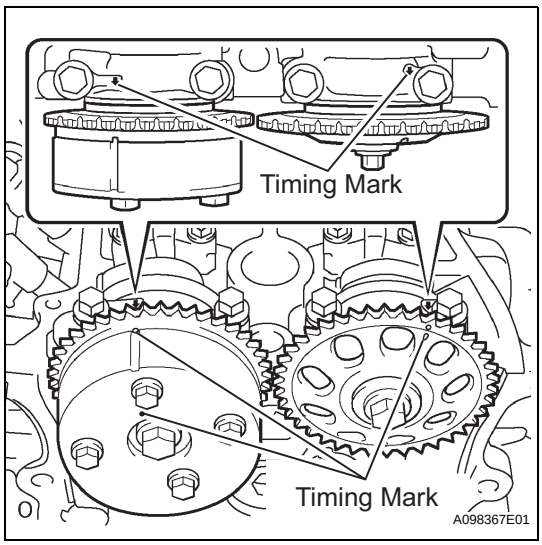


(i) Turn the crankshaft clockwise by 90° to position the crankshaft key upward.

2. INSTALL CRANKSHAFT TIMING SPROCKET

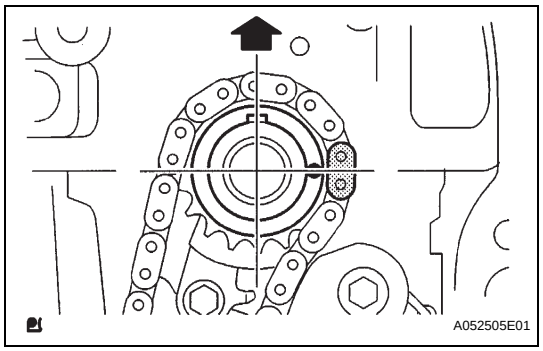
3. INSTALL NO. 1 CHAIN VIBRATION DAMPER

(a) Install the chain vibration damper with the 2 bolts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

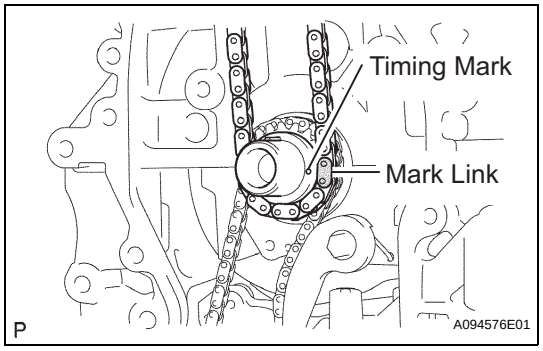


4. INSTALL CHAIN SUB-ASSEMBLY

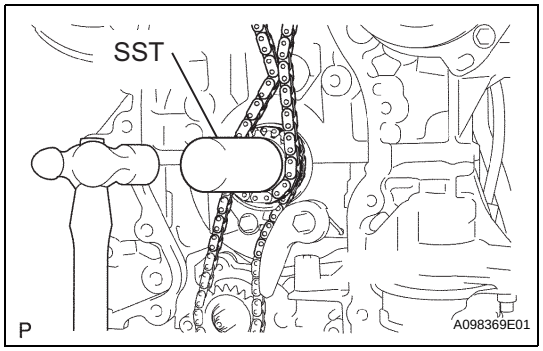
(a) Set the No. 1 cylinder to TDC/compression.
(1) Turn the camshafts with a wrench in the hexagonal lobe to align the timing marks of the camshaft timing gear with each timing mark located on the No. 1 and No. 2 bearing caps as shown in the illustration.



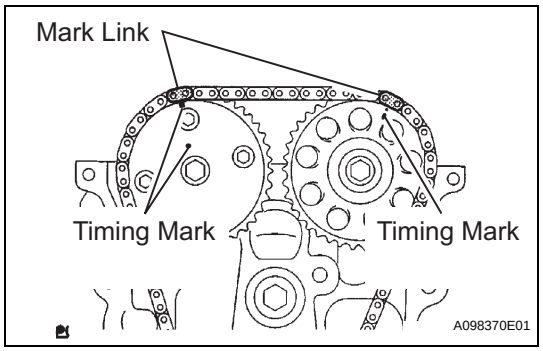
(2) Using the crankshaft pulley bolt, turn the crankshaft to position the key on the crankshaft upward.



(b) Install the chain onto the crankshaft timing sprocket with the gold or orange mark link aligned with the timing mark on the crankshaft timing gear.



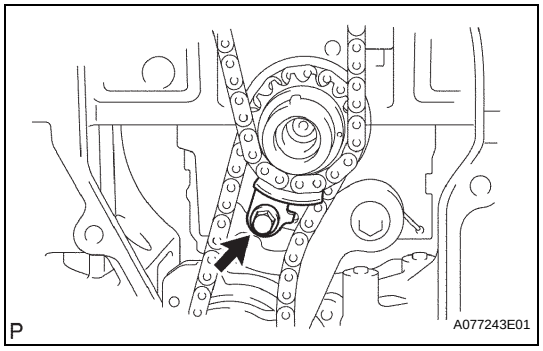
(c) Using SST and a hammer, tap in the crankshaft timing sprocket.
SST 09309-37010



(d) Align the gold or yellow links with each timing mark located on the camshaft timing gear and sprocket, then install the chain.

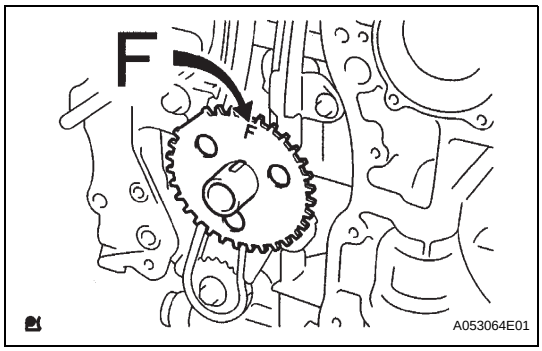
5. INSTALL CHAIN TENSIONER SLIPPER

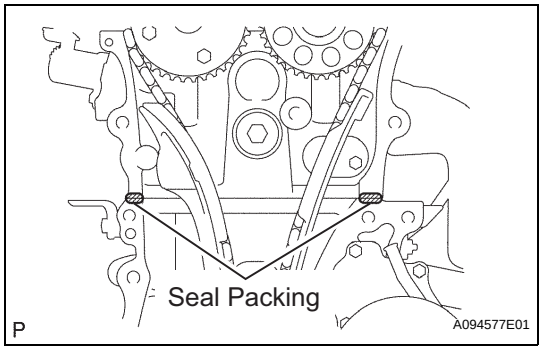
(a) Install the chain tensioner slipper with the bolt.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)



6. INSTALL TIMING CHAIN GUIDE

(a) Install the timing chain guide with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)





7. INSTALL NO. 1 CRANKSHAFT POSITION SENSOR PLATE

(a) Install the sensor plate with the "F" mark facing forward.

8. INSTALL TIMING CHAIN COVER SUB-ASSEMBLY

(a) Remove any old packing material and be careful not to drop any oil on the contact surfaces of the timing chain cover, cylinder head and cylinder block.

(b) Apply of seal packing (Diameter 2.0 mm (0.079 in.)) as shown in the illustration.

Seal packing:

Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent

NOTICE:

- **Remove any oil from the contact surface.**
- **Install the chain cover within 3 minutes of applying seal packing.**
- **Do not add engine oil for at least 2 hours after installing the chain cover.**

(c) Apply a continuous bead of seal packing as shown in the illustration.

Seal packing:

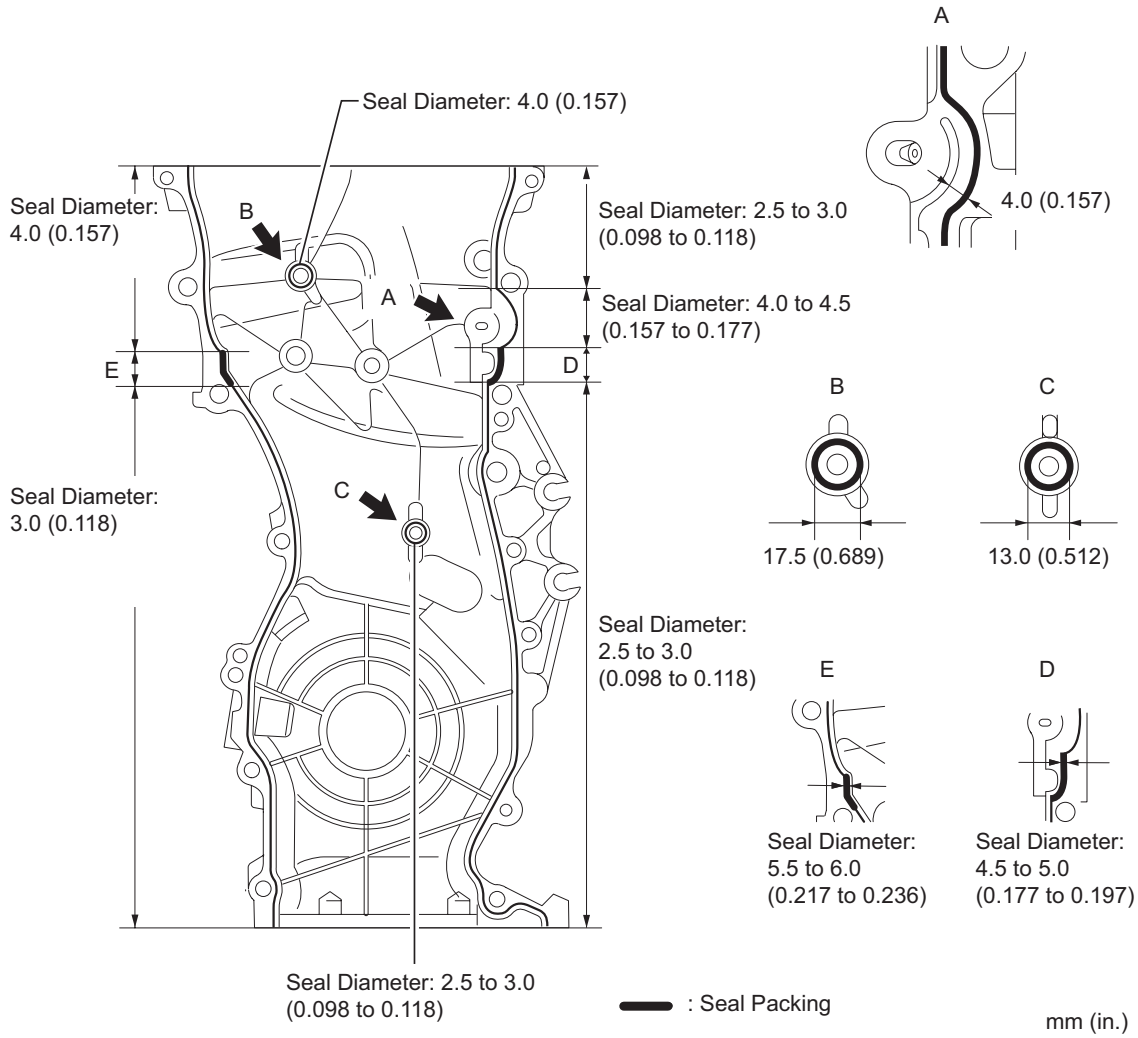
Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent

NOTICE:

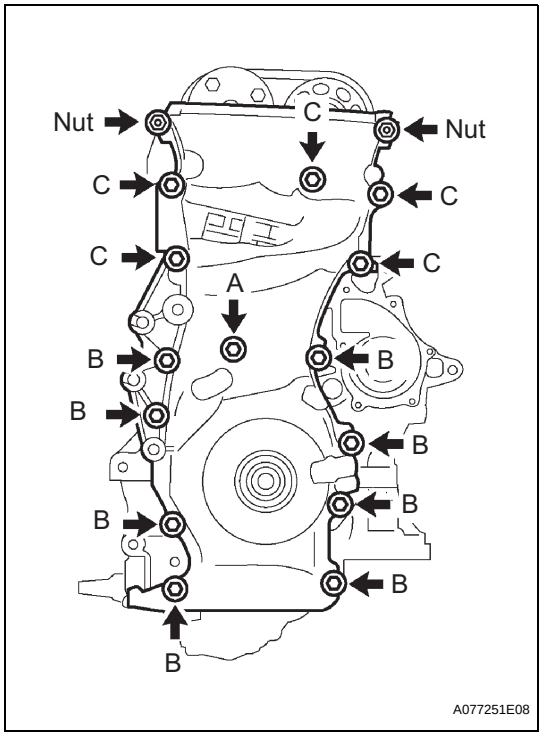
- **Remove any oil from the contact surface.**
- **Install the chain cover within 3 minutes of applying seal packing.**

EM

- **Do not add engine oil for at least 2 hours after installing the chain cover.**



EM

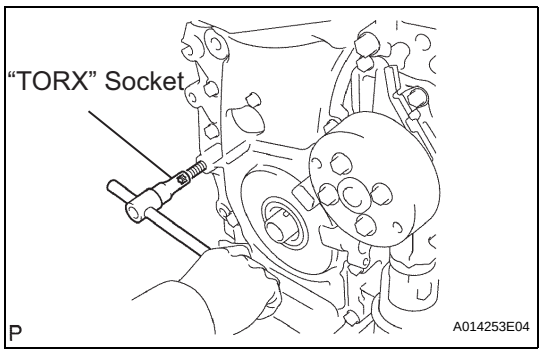


(d) Install the timing chain cover with the 14 bolts and 2 nuts.

Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf) for bolt A
25 N*m (255 kgf*cm, 18 ft.*lbf) for bolt B
55 N*m (561 kgf*cm, 41 ft.*lbf) for bolt C
11 N*m (112 kgf*cm, 8 ft.*lbf) for nut

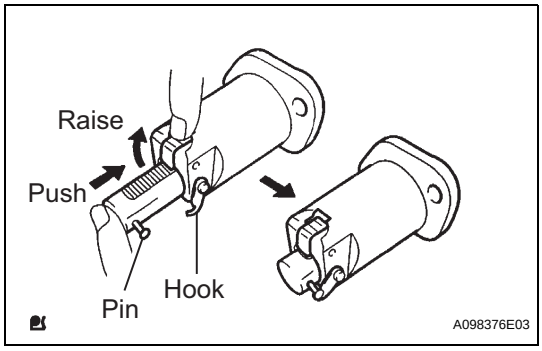
HINT:
Bolt length:

Bolt A	30 mm (1.18 in.) length for 10 mm head
Bolt B	30 mm (1.18 in.) length for 12 mm head
Bolt C	40 mm (1.57 in.) length for 14 mm head
Bolt D	65 mm (2.56 in.) length for 14 mm head



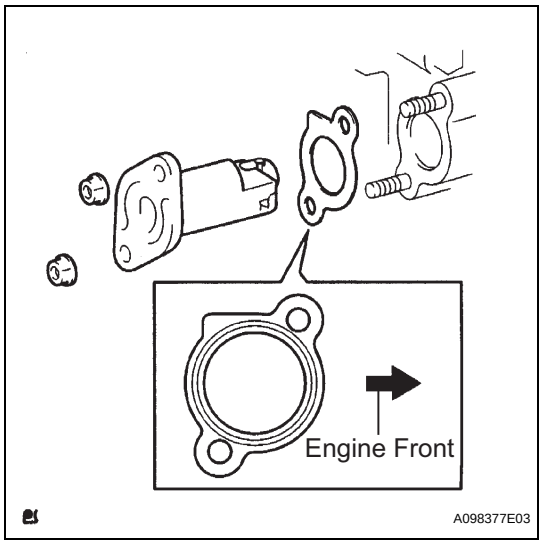
(e) Using an E10 "torx" socket, install the stud bolt for the V-ribbed belt tensioner.

Torque: 21.5 N*m (219 kgf*cm, 16 ft.*lbf)

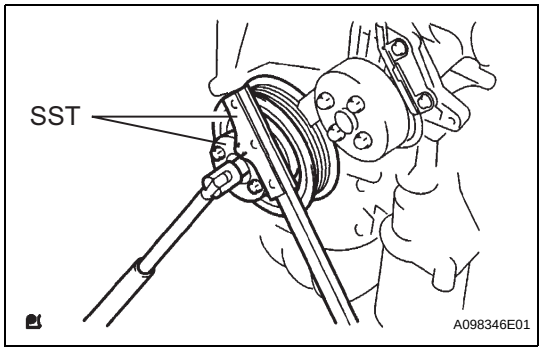


9. INSTALL NO. 1 CHAIN TENSIONER ASSEMBLY

(a) Release the ratchet pawl, then fully push in the plunger and hook the hook to the pin so that the plunger is in the position shown in the illustration.

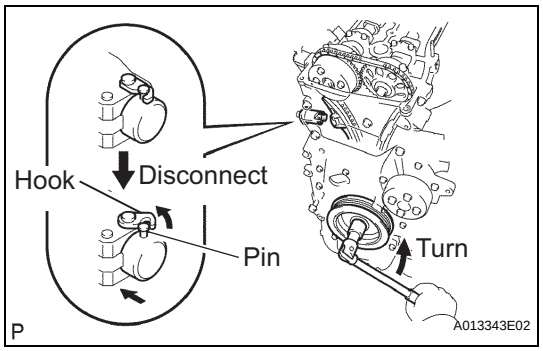


(b) Install a new gasket and the chain tensioner with the 2 nuts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
NOTICE:
When installing the chain tensioner, set the hook again if the hook releases the plunger.

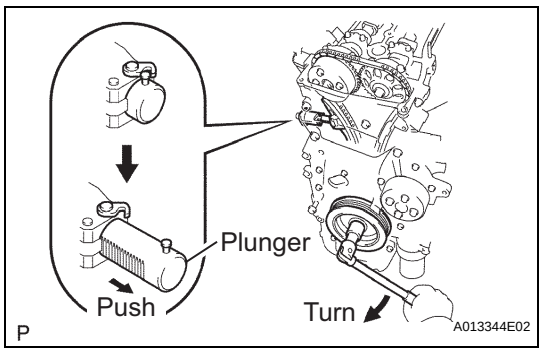


10. INSTALL CRANKSHAFT PULLEY

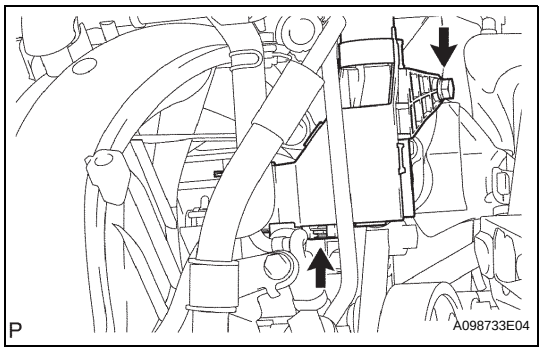
(a) Using SST, fix the pulley in place and tighten the bolt.
SST 09213-54015 (91651-60855), 09330-00021
Torque: 180 N*m (1,835 kgf*cm, 133 ft.*lbf)



(b) Turn the crankshaft counterclockwise, then disconnect the plunger knock pin from the hook.



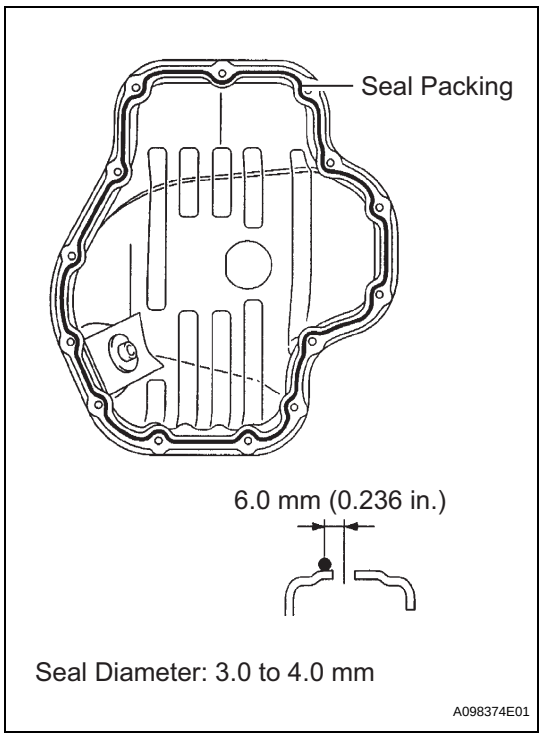
(c) Turn the crankshaft clockwise, then check that the plunger is extended.



(d) Connect the wire harness protector clamp.
(e) Install the bolt.
Torque: 8.4 N*m (85 kgf*cm, 74 in.*lbf)

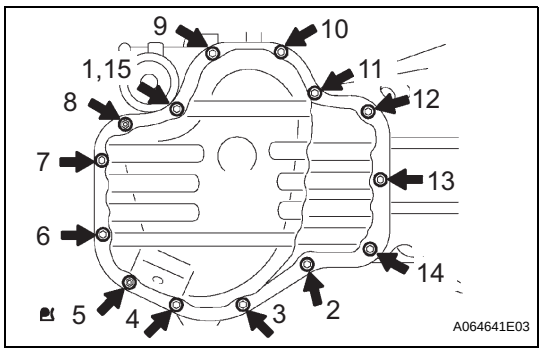
11. INSTALL OIL PAN SUB-ASSEMBLY

(a) Remove any old packing material and be careful not to drop any oil on the contact surfaces of the cylinder block and oil pan.

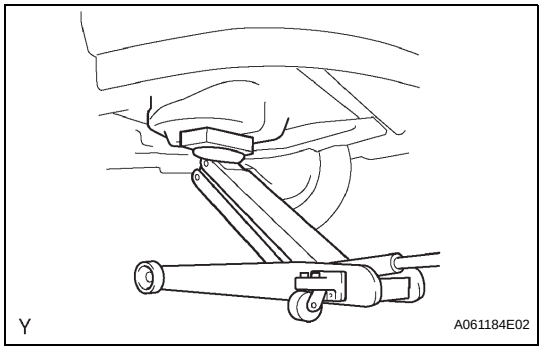


(b) Apply a continuous bead of seal packing (Diameter 3.0 to 4.0 mm (0.118 to 0.157 in.)) as shown in the illustration.
Seal packing:
Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Install the oil pan within 3 minutes of applying seal packing.**
- **Do not add engine oil for at least 2 hours after installing the oil pan.**

(c) Install the oil pan to the cylinder block.

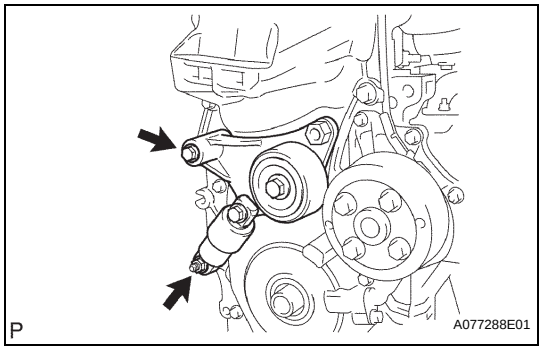


(d) Uniformly tighten the 12 bolts and 2 nuts in the sequence shown in the illustration.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)



(e) Place a transmission jack underneath the engine, then put a wooden block on the jack.
(f) Remove the chain block and sling device.
(g) Remove the No. 1 and No. 2 engine hangers.

12. INSTALL CRANKSHAFT POSITION SENSOR (See page ES-375)

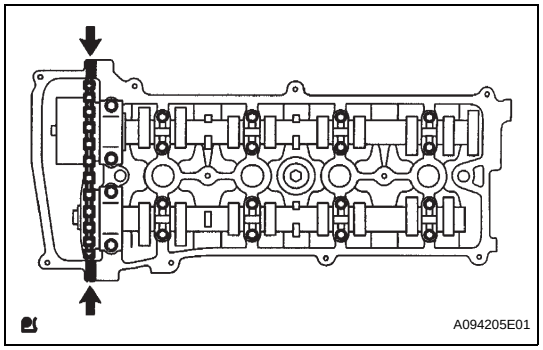


13. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY

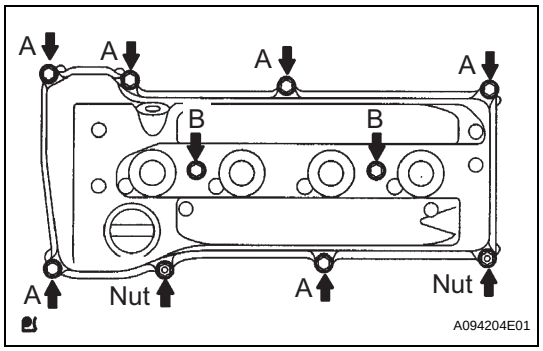
(a) Install the V-ribbed belt tensioner with the bolt and nut.
Torque: 59.5 N*m (607 kgf*cm, 44 ft.*lbf)
NOTICE:
Do not lift the engine more than necessary.

14. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY

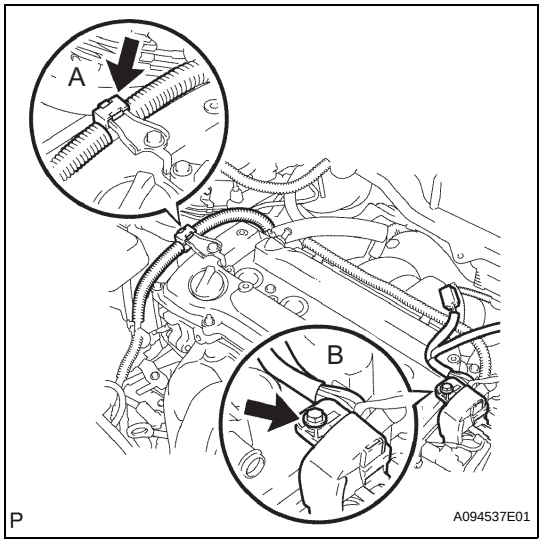
(a) Remove any old packing material from the contact surface.



(b) Apply seal packing to the 2 locations shown in the illustration.
Seal packing:
Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent
NOTICE:
- **Remove any oil from the contact surface.**
- **Install the oil pan within 3 minutes of applying seal packing.**
- **Do not add engine oil for at least 2 hours after installing the oil pan.**



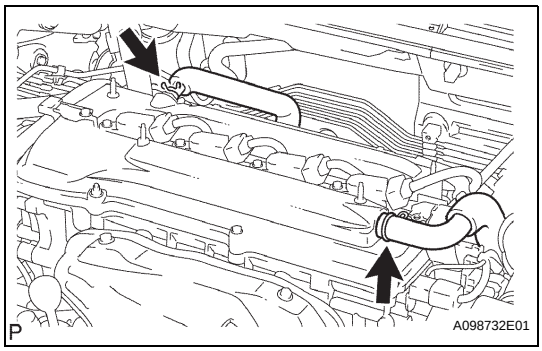
(c) Install the cylinder head cover with the 8 bolts and 2 nuts.
Torque: 11 N*m (112 kgf*cm, 8 ft.*lbf) for bolt A
14 N*m (143 kgf*cm, 10 ft.*lbf) for bolt B
11 N*m (112 kgf*cm, 8 ft.*lbf) for nut



(d) Install the engine wire with the bolt (labeled A).
Torque: 8.4 N*m (86 kgf*cm, 74 in.*lbf)

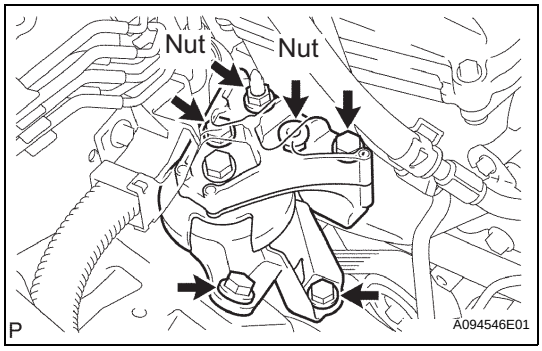
(e) Connect the clamp of the engine wire (labeled B).

EM



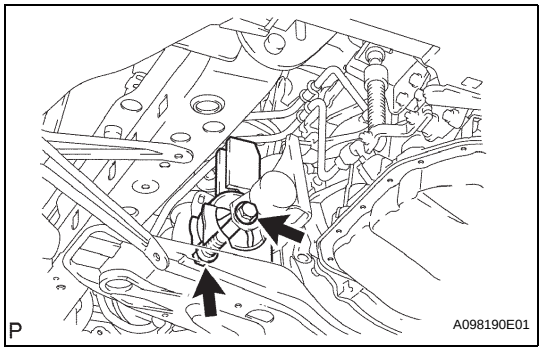
(f) Connect the 2 ventilation hoses to the cylinder head cover.

15. INSTALL IGNITION COIL ASSEMBLY (See page IG-9)

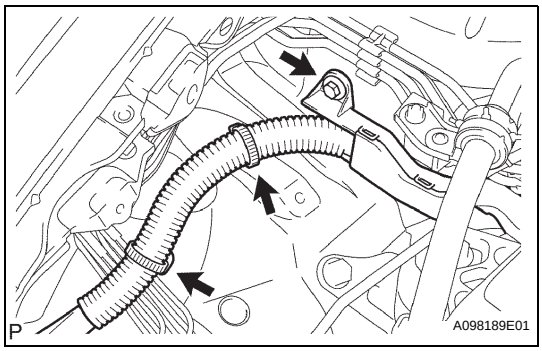


16. INSTALL ENGINE MOUNTING INSULATOR RH

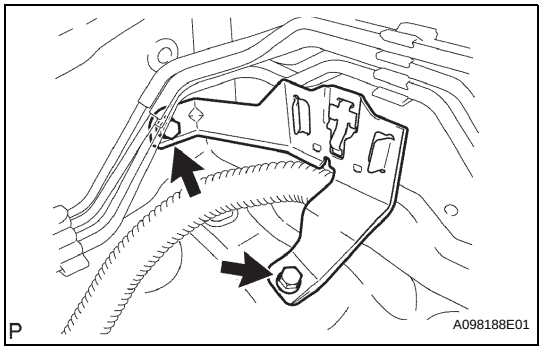
(a) Install the engine mounting insulator RH with the 4 bolts and 2 nuts.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)



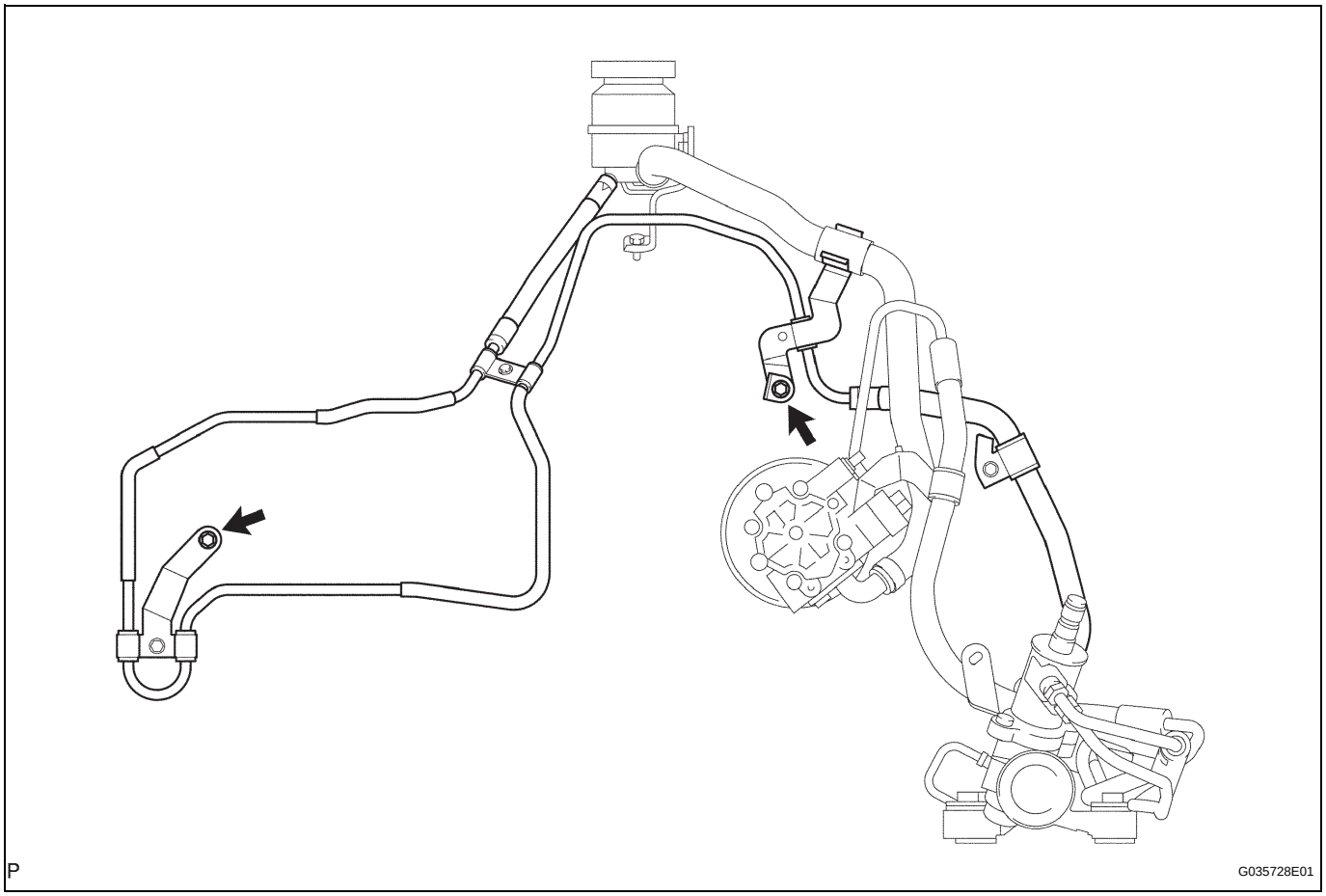
(b) Install the front engine mounting insulator with the bolt and nut.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)

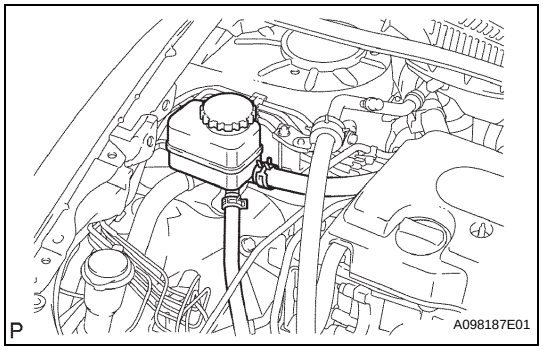


(c) Connect the 2 clamps of the engine wire.
(d) Install the wire harness protector with the bolt.

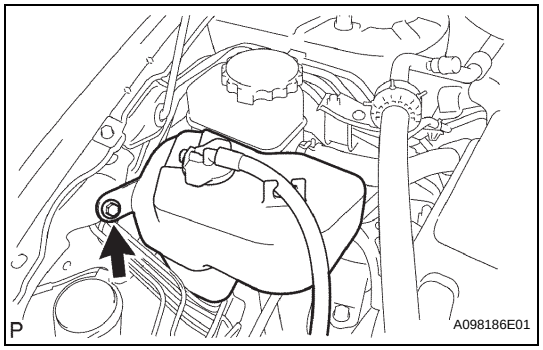


(e) Install the No. 1 oil reservoir bracket with the 2 bolts.
Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)
(f) Install the return tube with the 2 bolts.
Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)



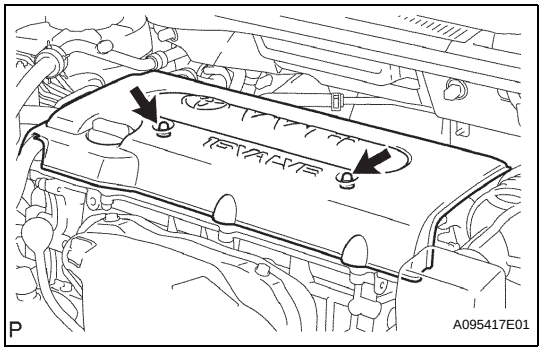


(g) Install the vane pump oil reservoir onto the No. 1 oil reservoir bracket.



(h) Install the radiator reservoir with the bolt.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)

17. **INSTALL VANE PUMP ASSEMBLY**
18. **INSTALL GENERATOR ASSEMBLY (See page CH-17)**
19. **INSTALL FAN AND GENERATOR V BELT (See page EM-6)**
20. **INSTALL FRONT EXHAUST PIPE ASSEMBLY (See page EX-3)**
21. **ADD ENGINE OIL (See page LU-3)**
22. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
23. **CHECK FOR ENGINE OIL LEAKS**



24. CHECK FOR EXHAUST GAS LEAKS

25. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY

(a) Install the engine cover with the 2 nuts.
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)

26. INSTALL FRONT FENDER APRON SEAL RH

27. INSTALL ENGINE UNDER COVER LH

28. INSTALL ENGINE UNDER COVER RH

29. INSTALL FRONT WHEEL RH

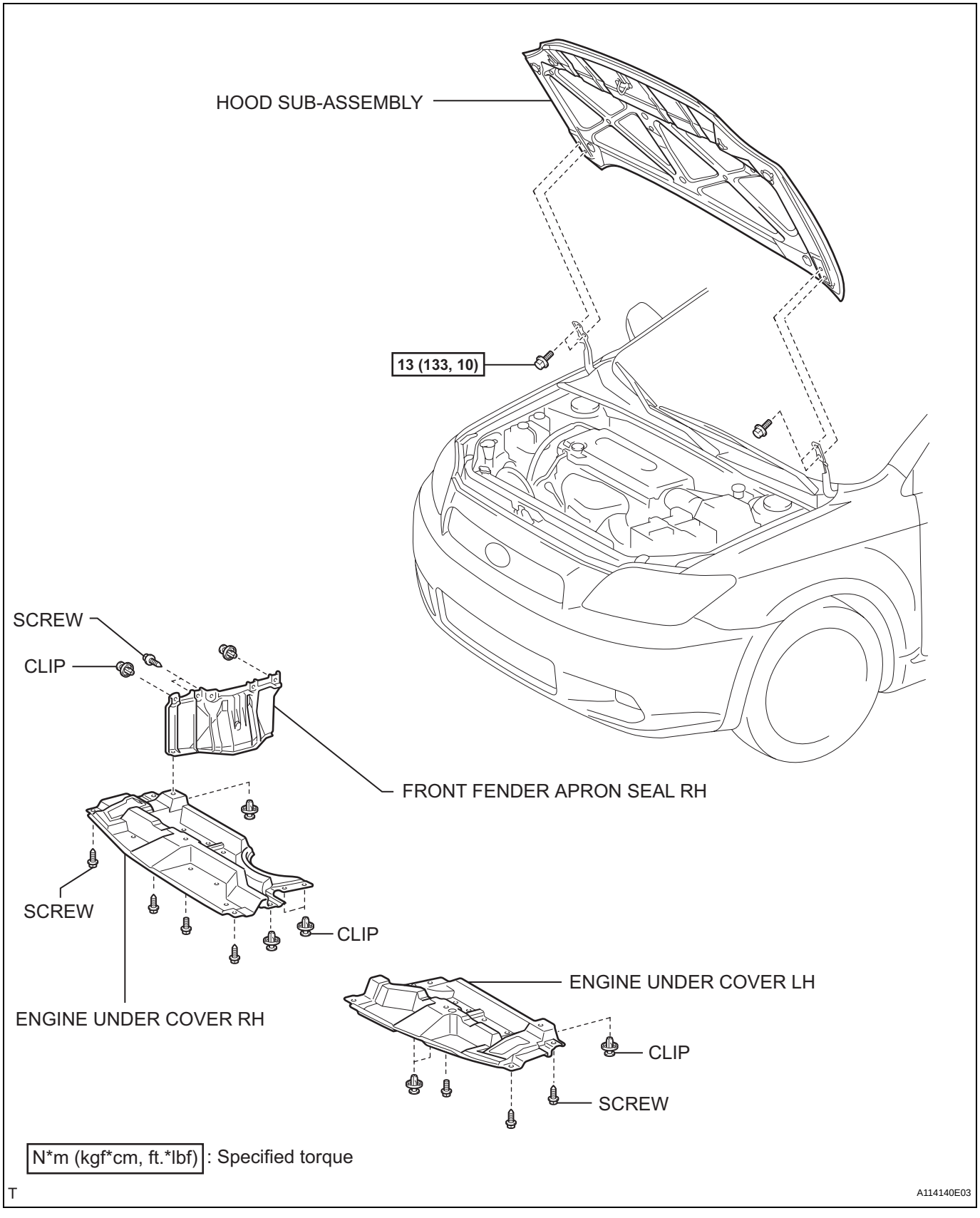
30. INSTALL HOOD SUB-ASSEMBLY

31. PERFORM INITIALIZATION

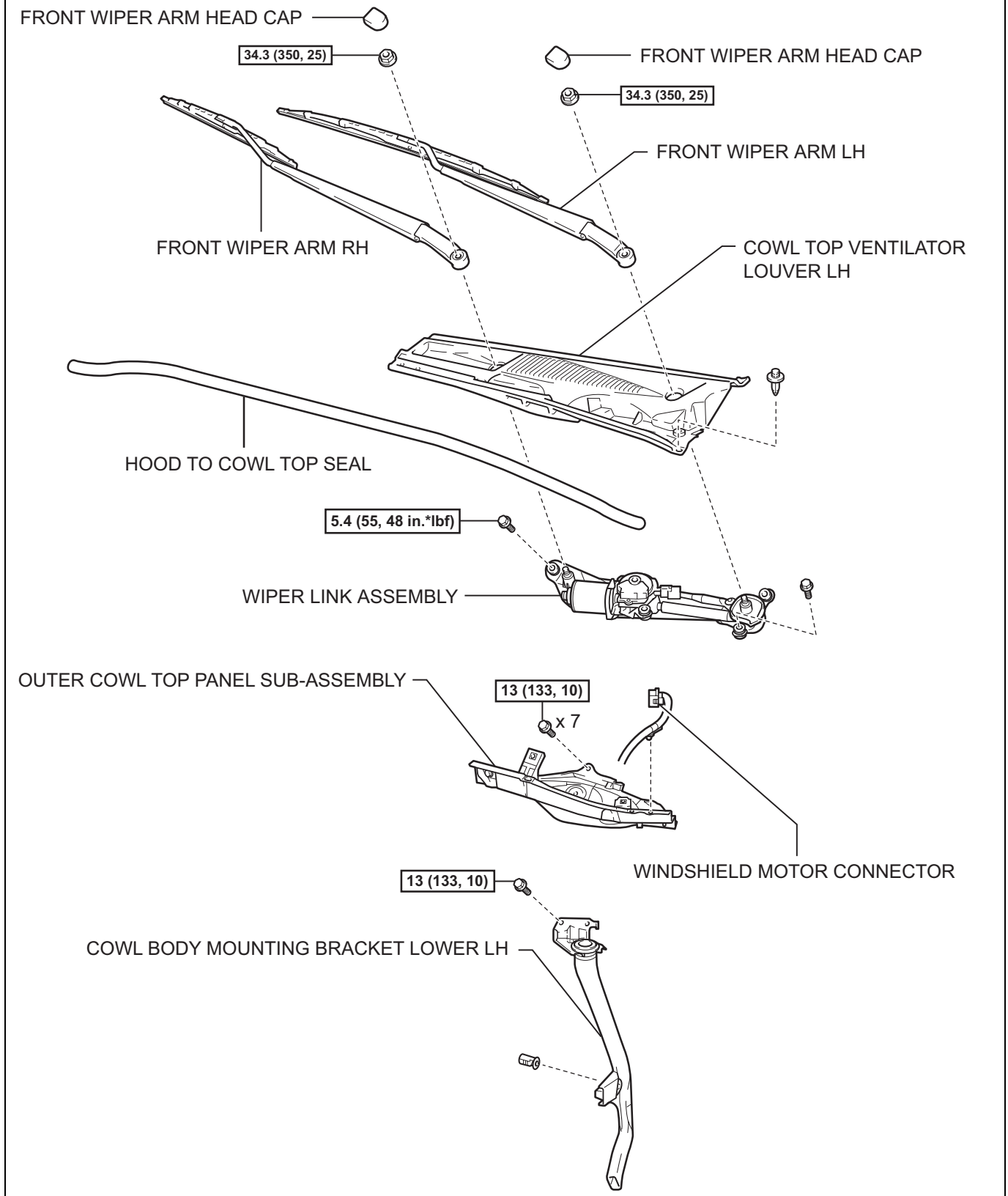
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

CYLINDER HEAD

COMPONENTS



EM



N*m (kgf*cm, ft.*lbf) : Specified torque

T

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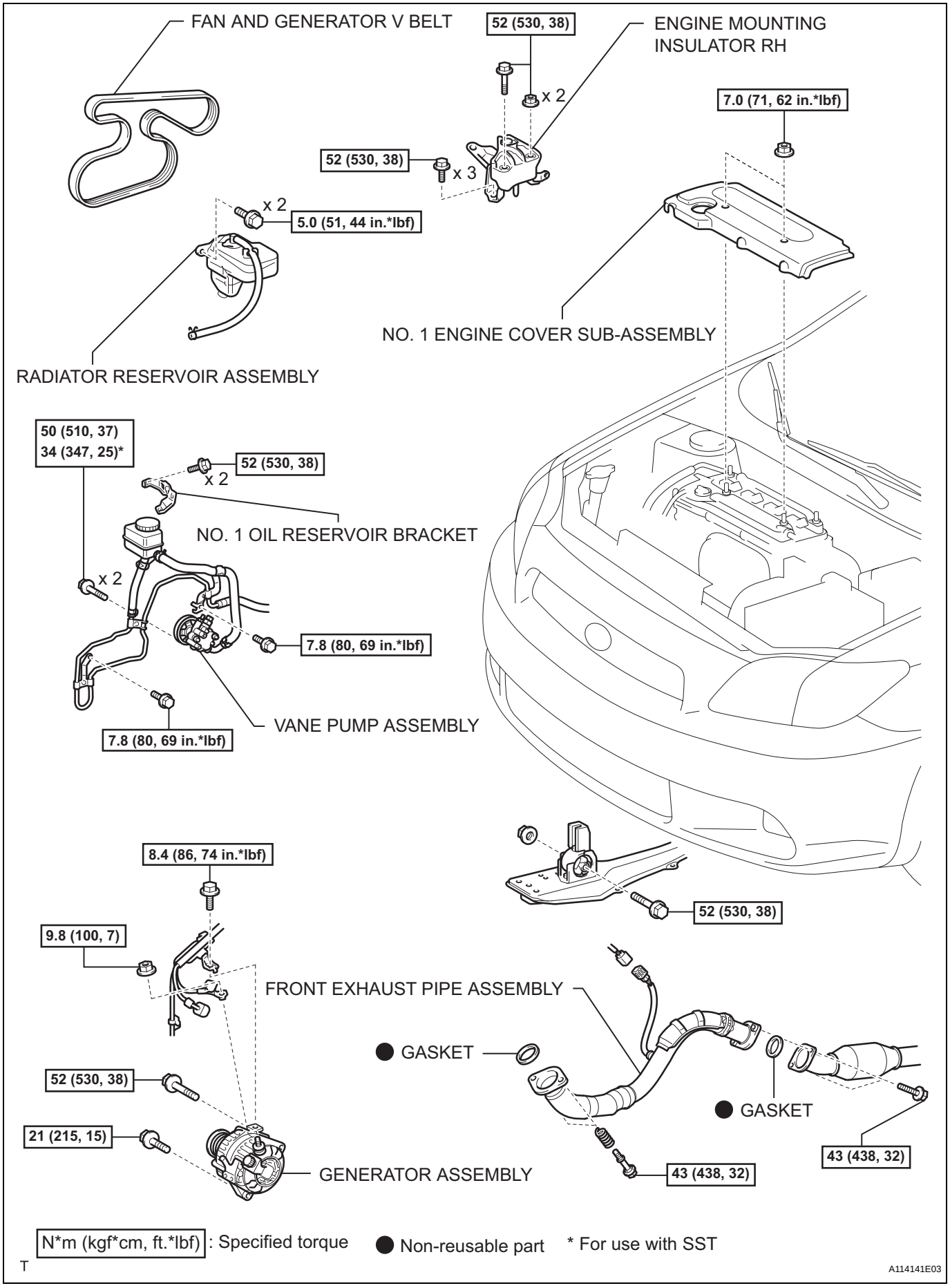
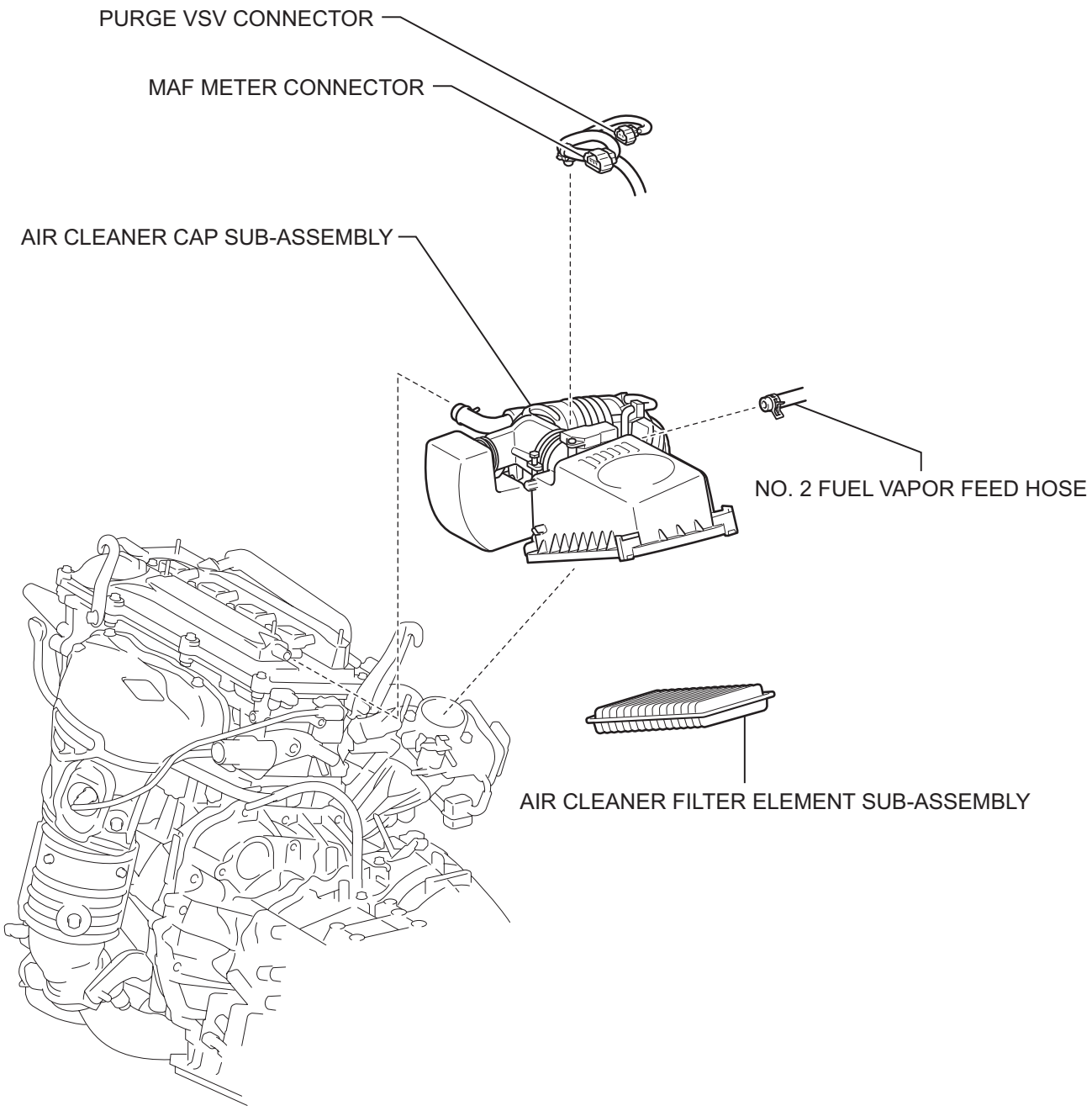

FAN AND GENERATOR V BELT
52 (530, 38)
x 2
ENGINE MOUNTING INSULATOR RH
7.0 (71, 62 in.*lbf)
52 (530, 38)
x 3
x 2
5.0 (51, 44 in.*lbf)
NO. 1 ENGINE COVER SUB-ASSEMBLY
RADIATOR RESERVOIR ASSEMBLY
50 (510, 37)
34 (347, 25)*
52 (530, 38)
x 2
NO. 1 OIL RESERVOIR BRACKET
x 2
7.8 (80, 69 in.*lbf)
VANE PUMP ASSEMBLY
7.8 (80, 69 in.*lbf)
8.4 (86, 74 in.*lbf)
52 (530, 38)
9.8 (100, 7)
FRONT EXHAUST PIPE ASSEMBLY
GASKET
52 (530, 38)
GASKET
21 (215, 15)
43 (438, 32)
GENERATOR ASSEMBLY
43 (438, 32)
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
* For use with SST
A114141E03

EM

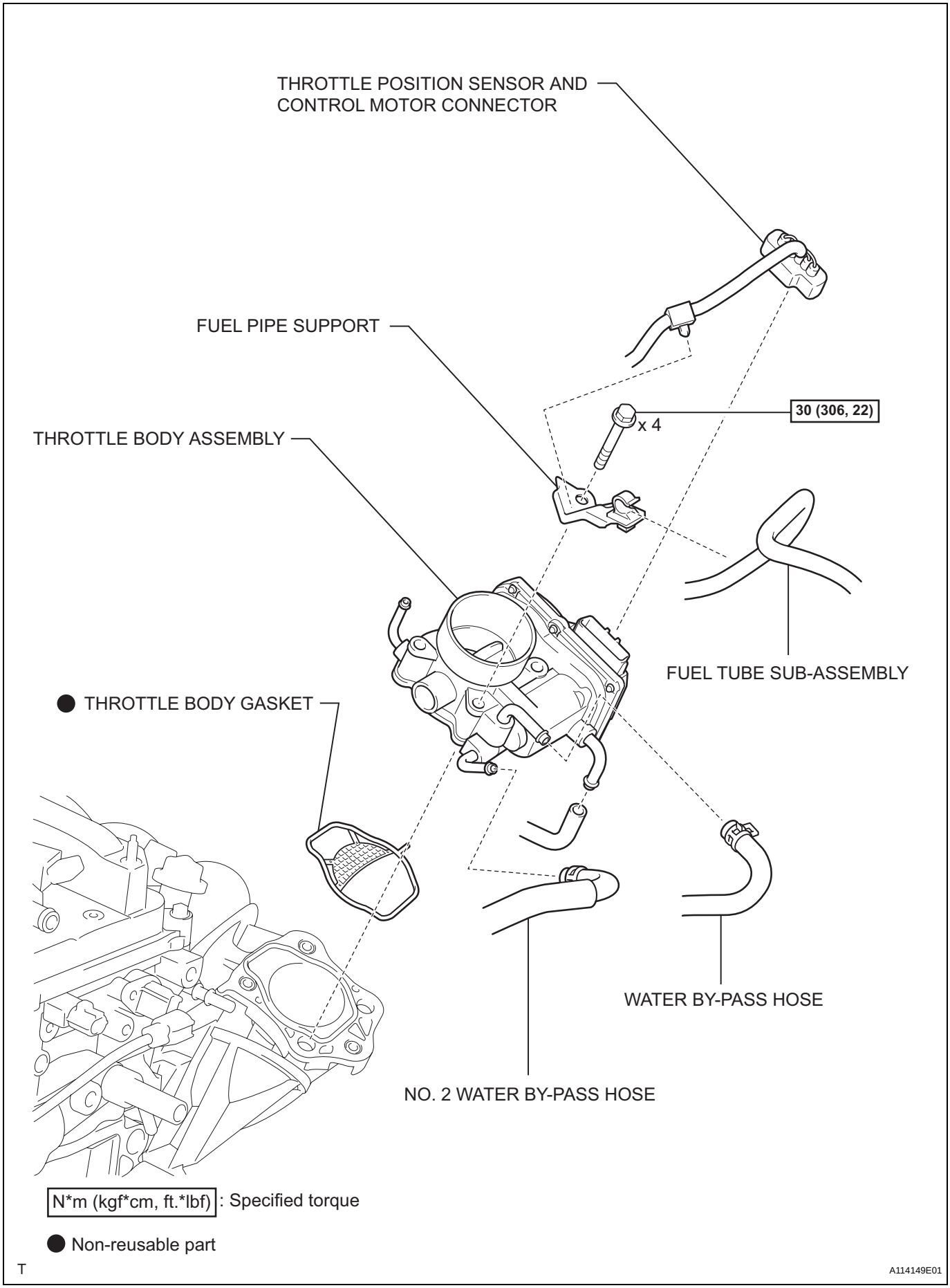
T

EM

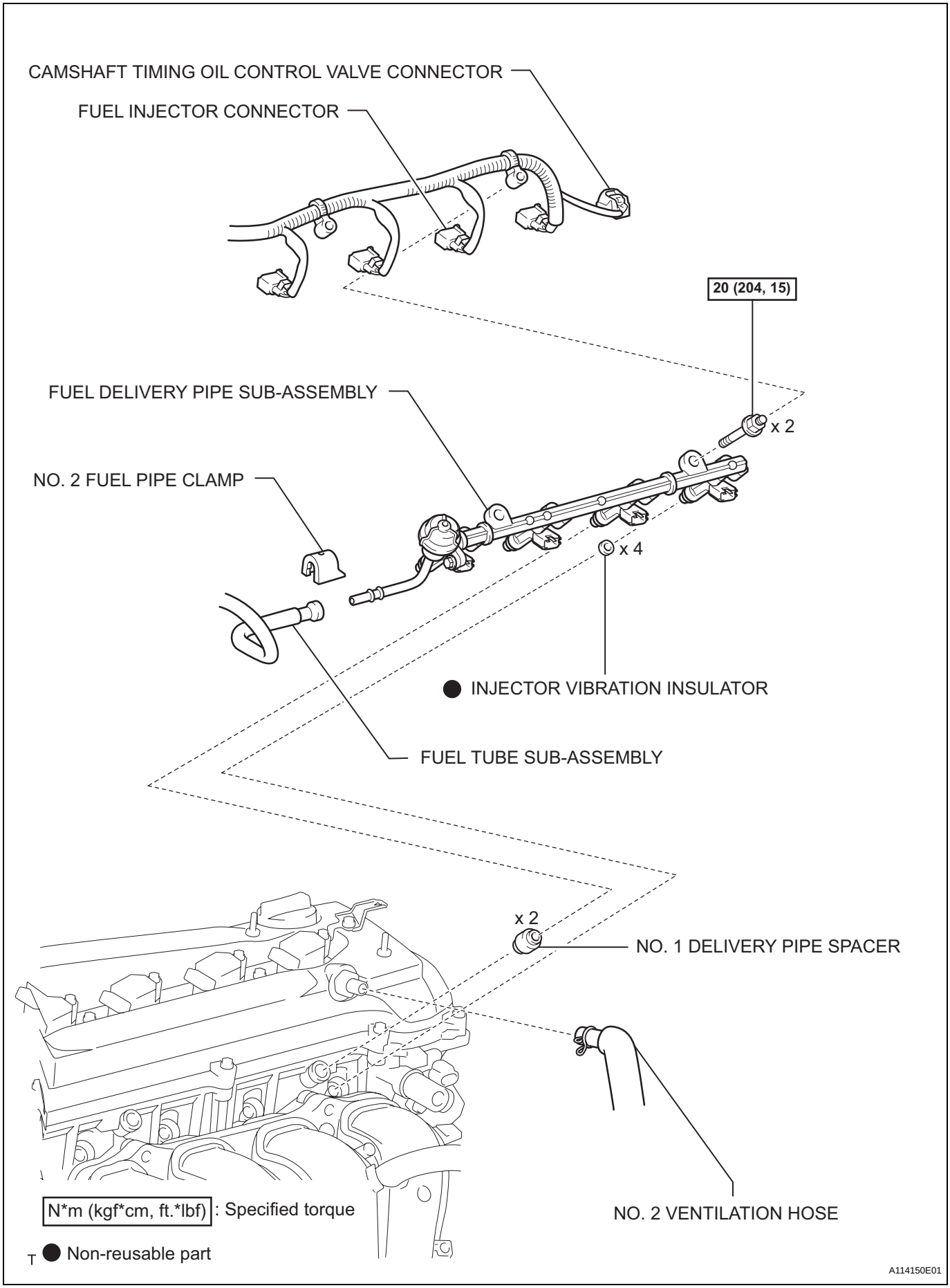


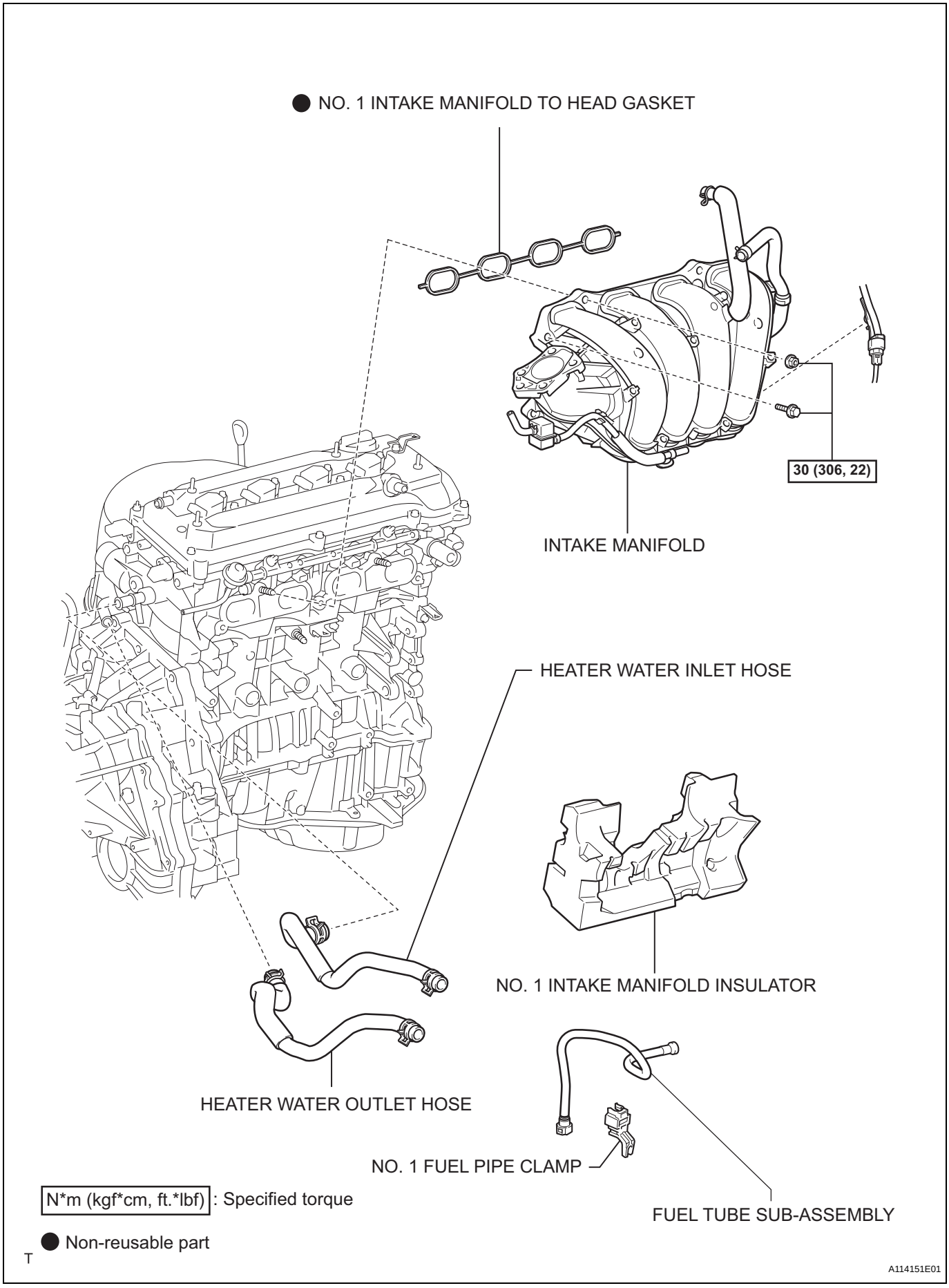
T

A114148E01


THROTTLE POSITION SENSOR AND CONTROL MOTOR CONNECTOR
FUEL PIPE SUPPORT
30 (306, 22)
x 4
THROTTLE BODY ASSEMBLY
FUEL TUBE SUB-ASSEMBLY
● THROTTLE BODY GASKET
WATER BY-PASS HOSE
NO. 2 WATER BY-PASS HOSE
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
T
A114149E01

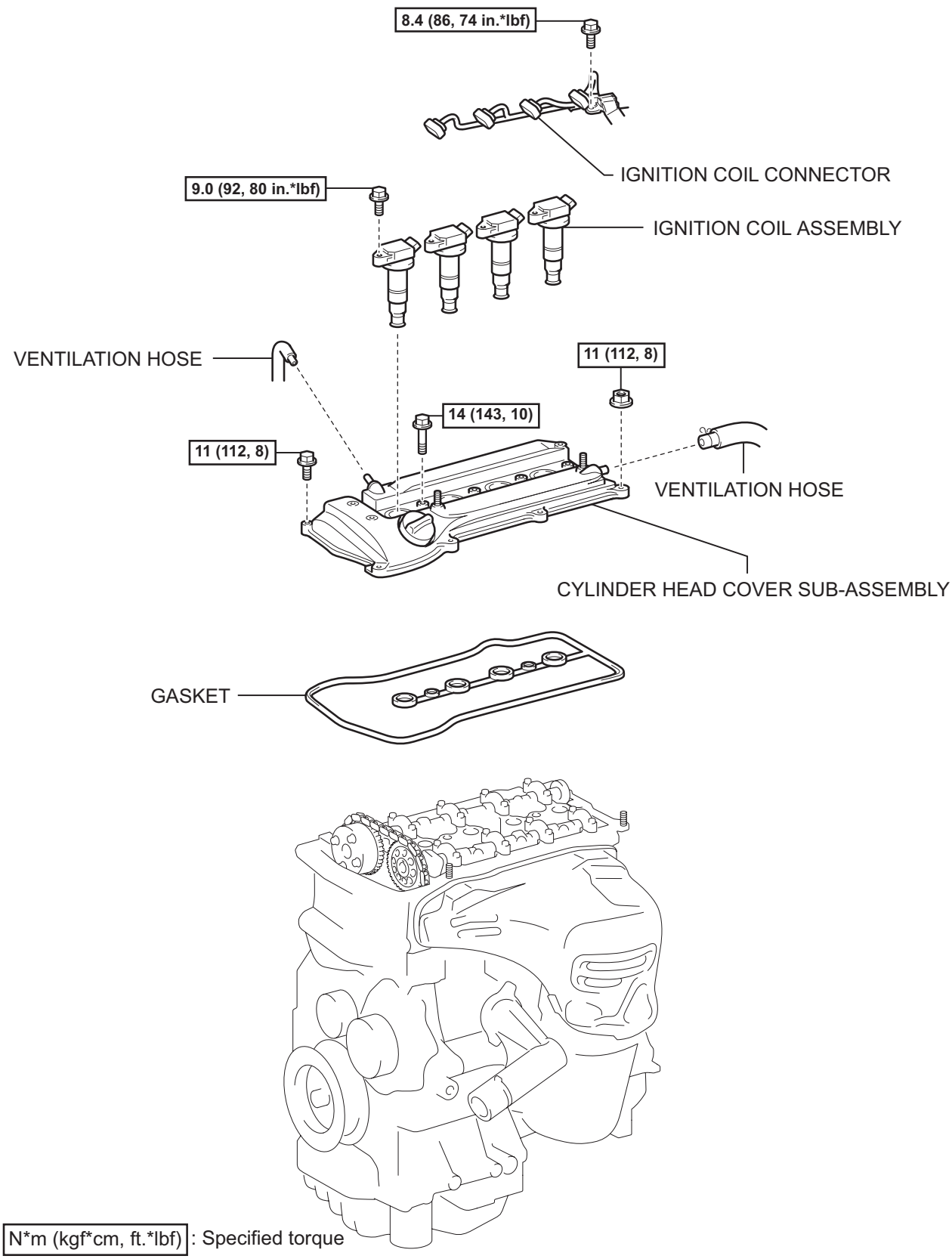
EM


CAMSHAFT TIMING OIL CONTROL VALVE CONNECTOR
FUEL INJECTOR CONNECTOR
20 (204, 15)
x 2
FUEL DELIVERY PIPE SUB-ASSEMBLY
NO. 2 FUEL PIPE CLAMP
x 4
● INJECTOR VIBRATION INSULATOR
FUEL TUBE SUB-ASSEMBLY
x 2
NO. 1 DELIVERY PIPE SPACER
NO. 2 VENTILATION HOSE
N*m (kgf*cm, ft.*lbf) : Specified torque
T ● Non-reusable part
A114150E01


● NO. 1 INTAKE MANIFOLD TO HEAD GASKET
30 (306, 22)
INTAKE MANIFOLD
HEATER WATER INLET HOSE
NO. 1 INTAKE MANIFOLD INSULATOR
HEATER WATER OUTLET HOSE
NO. 1 FUEL PIPE CLAMP
FUEL TUBE SUB-ASSEMBLY
N*m (kgf*cm, ft.*lbf): Specified torque
● Non-reusable part
T
A114151E01

EM

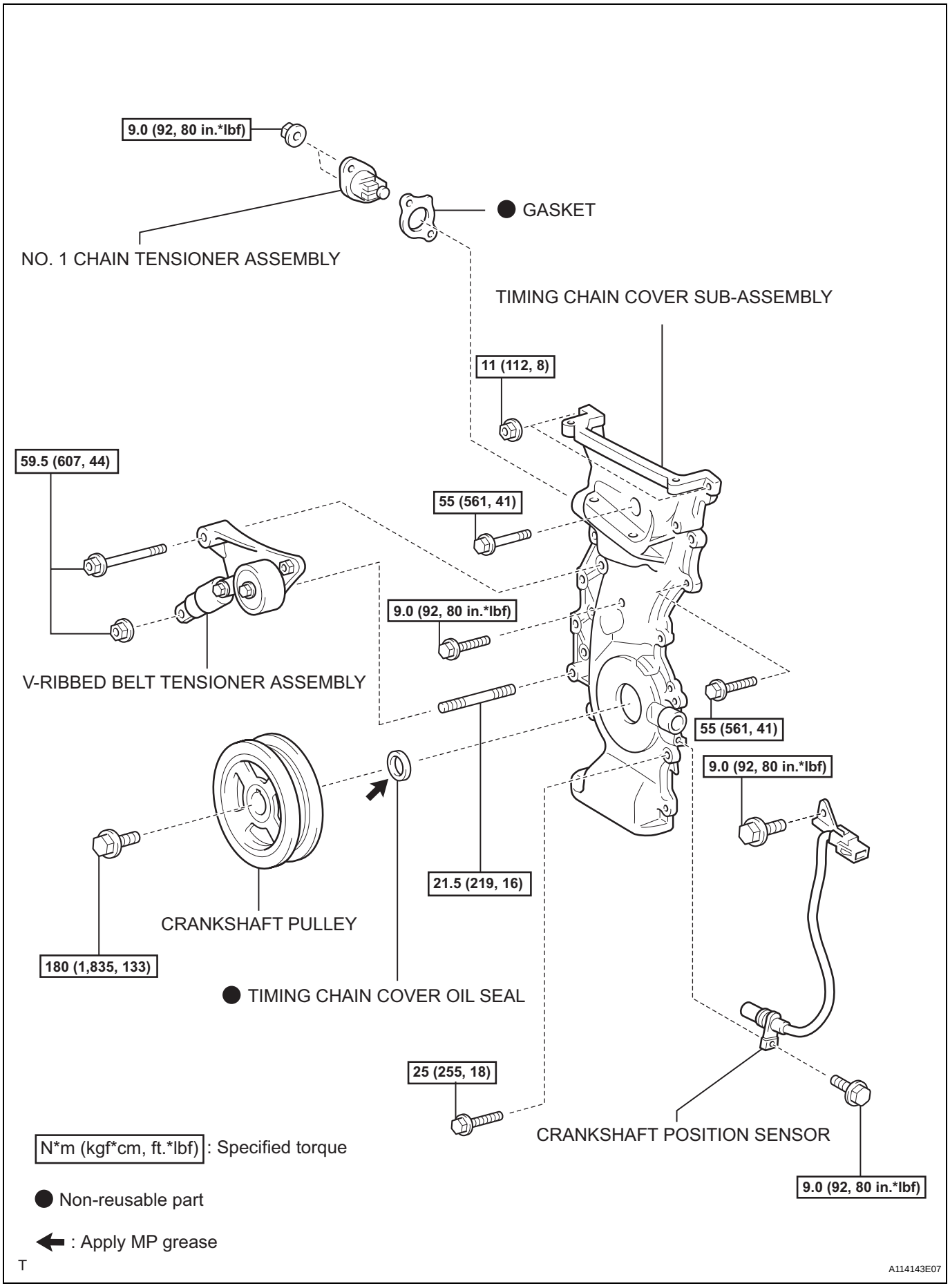
EM

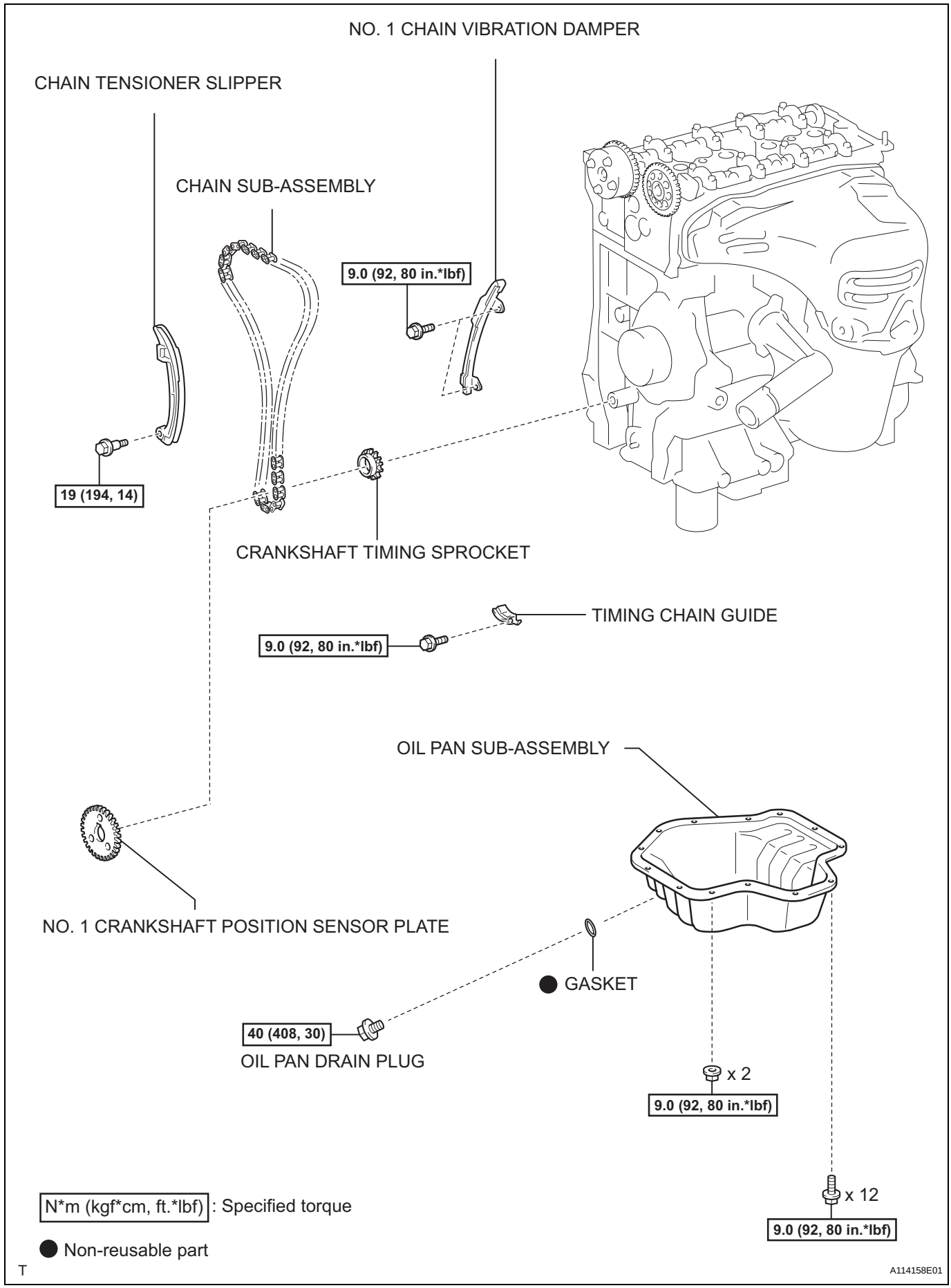


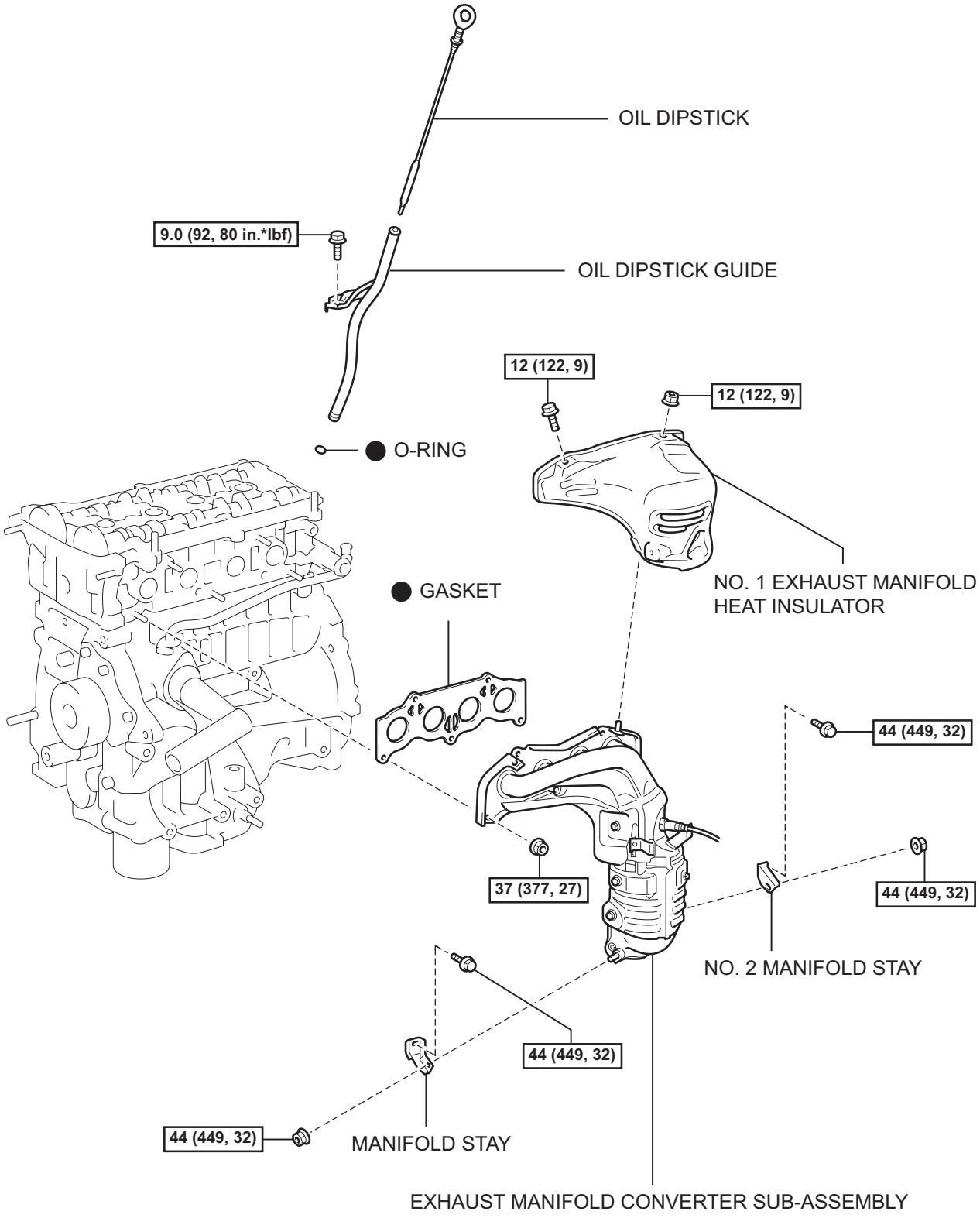
N*m (kgf*cm, ft.*lbf) : Specified torque

T

A114142E04


9.0 (92, 80 in.*lbf)
GASKET
NO. 1 CHAIN TENSIONER ASSEMBLY
TIMING CHAIN COVER SUB-ASSEMBLY
11 (112, 8)
59.5 (607, 44)
55 (561, 41)
9.0 (92, 80 in.*lbf)
V-RIBBED BELT TENSIONER ASSEMBLY
55 (561, 41)
9.0 (92, 80 in.*lbf)
21.5 (219, 16)
CRANKSHAFT PULLEY
180 (1,835, 133)
TIMING CHAIN COVER OIL SEAL
25 (255, 18)
CRANKSHAFT POSITION SENSOR
9.0 (92, 80 in.*lbf)
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
: Apply MP grease
T
A114143E07


NO. 1 CHAIN VIBRATION DAMPER
CHAIN TENSIONER SLIPPER
CHAIN SUB-ASSEMBLY
9.0 (92, 80 in.*lbf)
19 (194, 14)
CRANKSHAFT TIMING SPROCKET
TIMING CHAIN GUIDE
9.0 (92, 80 in.*lbf)
OIL PAN SUB-ASSEMBLY
NO. 1 CRANKSHAFT POSITION SENSOR PLATE
GASKET
40 (408, 30)
OIL PAN DRAIN PLUG
x 2
9.0 (92, 80 in.*lbf)
x 12
9.0 (92, 80 in.*lbf)
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
A114158E01



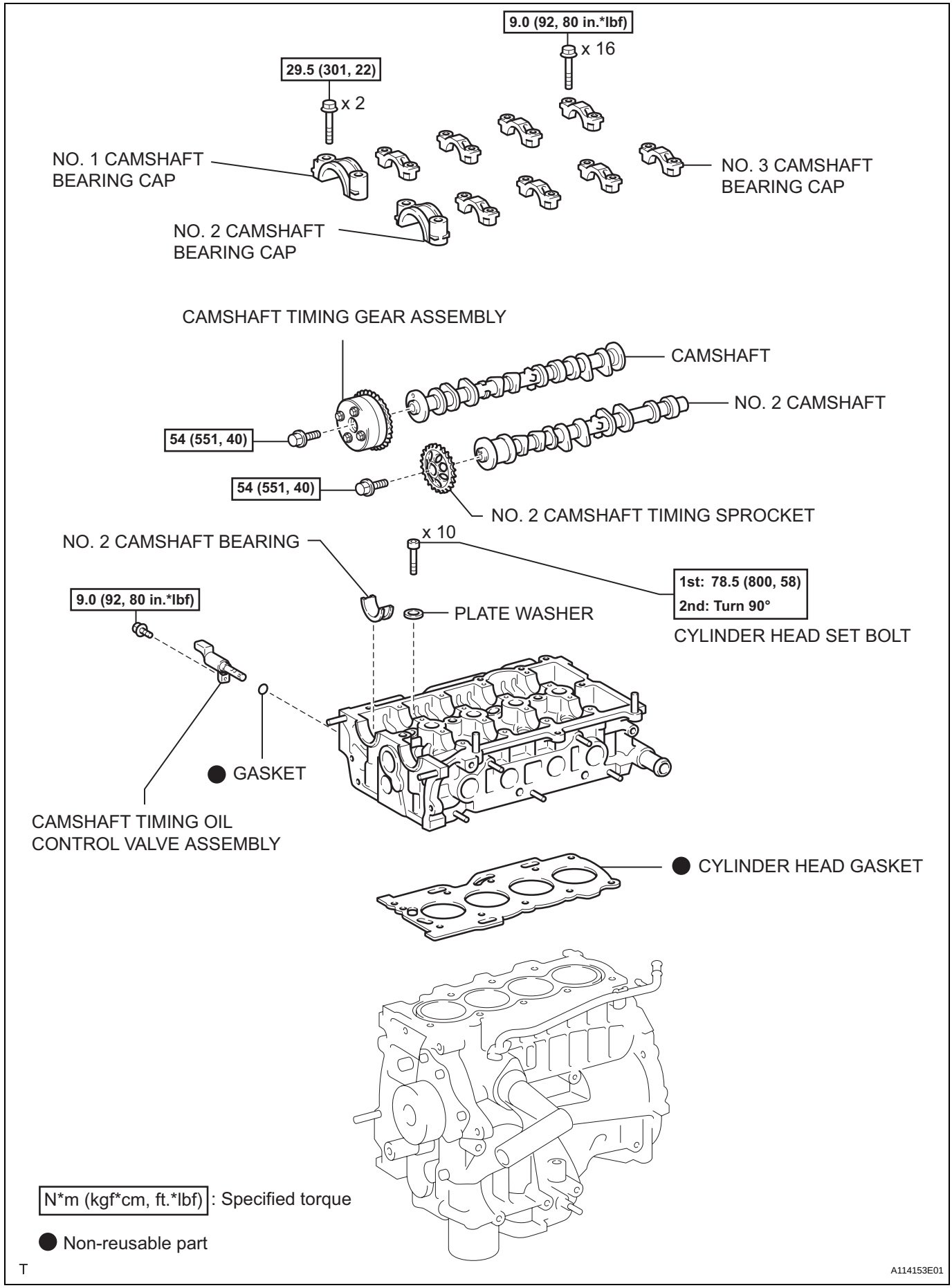
EM

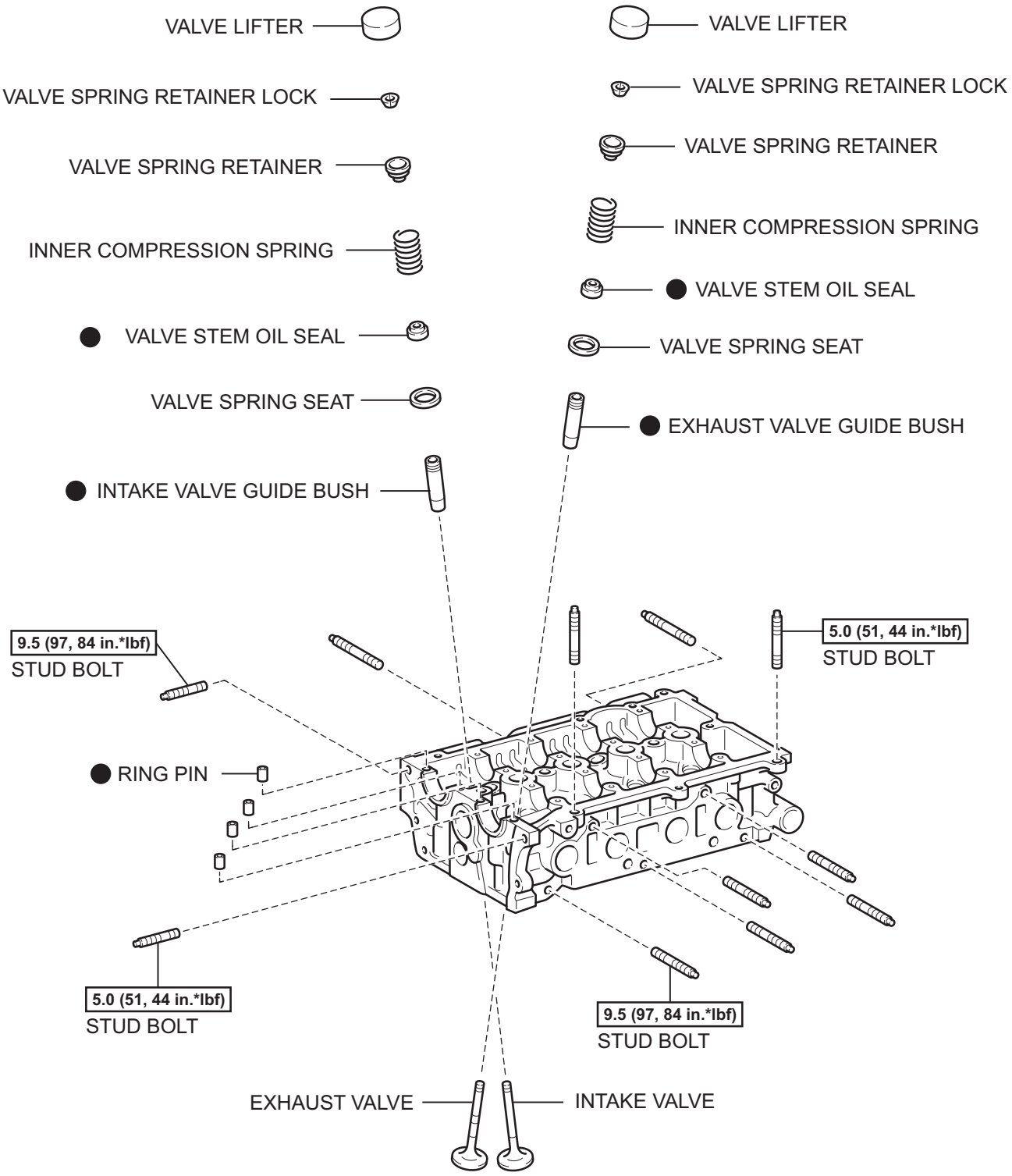
N*m (kgf*cm, ft.*lbf): Specified torque

● Non-reusable part

T

A114152E01


9.0 (92, 80 in.*lbf)
x 16
29.5 (301, 22)
x 2
NO. 1 CAMSHAFT BEARING CAP
NO. 3 CAMSHAFT BEARING CAP
NO. 2 CAMSHAFT BEARING CAP
CAMSHAFT TIMING GEAR ASSEMBLY
CAMSHAFT
NO. 2 CAMSHAFT
54 (551, 40)
54 (551, 40)
NO. 2 CAMSHAFT TIMING SPROCKET
NO. 2 CAMSHAFT BEARING
x 10
1st: 78.5 (800, 58)
2nd: Turn 90°
CYLINDER HEAD SET BOLT
9.0 (92, 80 in.*lbf)
PLATE WASHER
GASKET
CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY
CYLINDER HEAD GASKET
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
T
A114153E01



N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

T

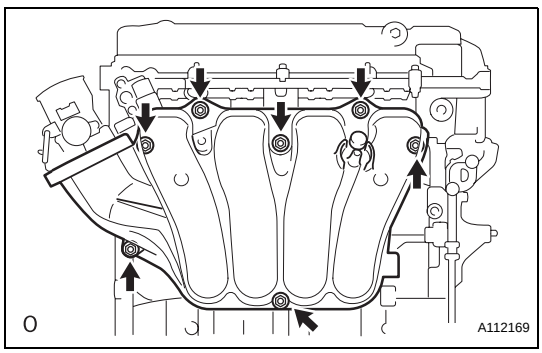
A114154E01

EM

EM

REMOVAL

1. **DISCHARGE FUEL SYSTEM PRESSURE (See page FU-7)**
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
3. **REMOVE HOOD SUB-ASSEMBLY**
4. **REMOVE FRONT WHEEL RH**
5. **REMOVE ENGINE UNDER COVER RH**
6. **REMOVE ENGINE UNDER COVER LH**
7. **REMOVE FRONT FENDER APRON SEAL RH**
8. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-22)**
9. **REMOVE FRONT WIPER ARM HEAD CAP**
10. **REMOVE FRONT WIPER ARM LH**
11. **REMOVE FRONT WIPER ARM RH**
12. **REMOVE HOOD TO COWL TOP SEAL**
13. **REMOVE COWL TOP VENTILATOR LOUVER LH**
14. **REMOVE WIPER LINK ASSEMBLY**
15. **REMOVE OUTER COWL TOP PANEL SUB-ASSEMBLY**
16. **REMOVE COWL BODY MOUNTING BRACKET LOWER LH**
17. **DRAIN ENGINE COOLANT (See page CO-6)**
18. **DRAIN ENGINE OIL (See page LU-3)**
19. **REMOVE AIR CLEANER CAP SUB-ASSEMBLY (See page ES-383)**
20. **REMOVE THROTTLE BODY ASSEMBLY (See page ES-384)**
21. **REMOVE FUEL DELIVERY PIPE SUB-ASSEMBLY (See page FU-8)**
22. **REMOVE INTAKE MANIFOLD**
    (a) Disconnect the 2 water by-pass hoses from the throttle body.
    (b) Remove the 5 bolts, 2 nuts, intake manifold and gasket.
23. **REMOVE NO. 1 INTAKE MANIFOLD INSULATOR (See page ES-398)**
24. **REMOVE FRONT EXHAUST PIPE ASSEMBLY (See page EX-2)**

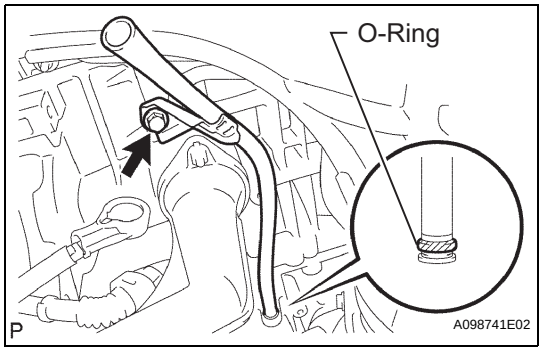


25. REMOVE OIL DIPSTICK

26. REMOVE OIL DIPSTICK GUIDE

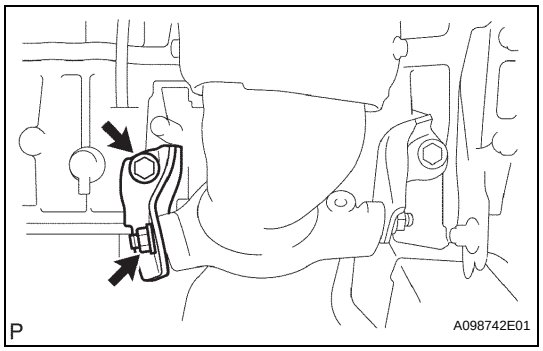
(a) Remove the bolt and guide.

(b) Remove the O-ring from the guide.



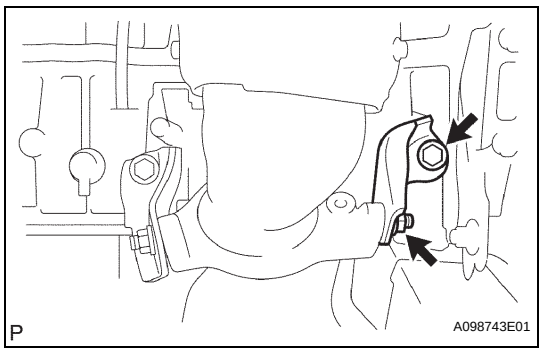
27. REMOVE MANIFOLD STAY

(a) Remove the bolt, nut and stay.



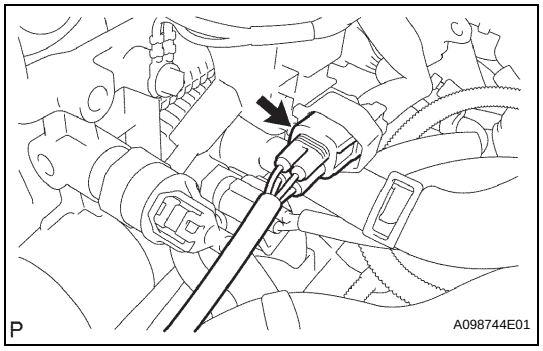
28. REMOVE NO. 2 MANIFOLD STAY

(a) Remove the bolt, nut and stay.

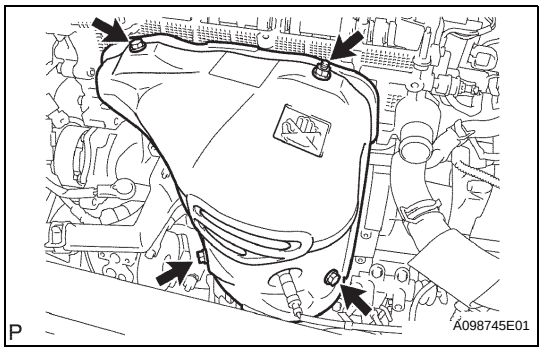


29. REMOVE NO. 1 EXHAUST MANIFOLD HEAT INSULATOR

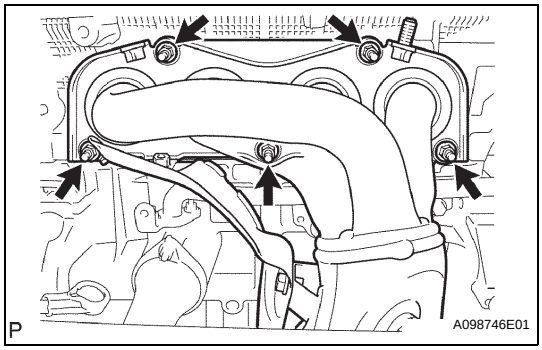
(a) Disconnect the air fuel ratio sensor connector.



EM



(b) Remove the 3 bolts, nut and heat insulator.



30. REMOVE EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY

(a) Remove the 5 nuts, manifold converter and gasket.

31. REMOVE FAN AND GENERATOR V BELT (See page EM-6)

32. REMOVE GENERATOR ASSEMBLY (See page CH-10)

33. REMOVE VANE PUMP ASSEMBLY

34. REMOVE ENGINE MOUNTING INSULATOR RH (See page EM-22)

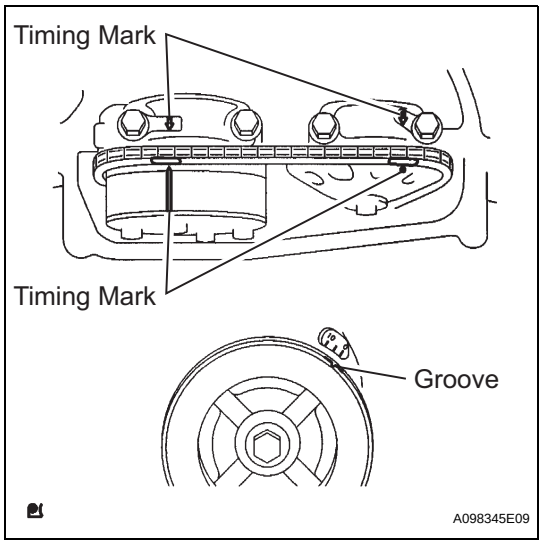
35. REMOVE IGNITION COIL ASSEMBLY (See page IG-9)

36. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-24)

37. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY (See page EM-25)

38. REMOVE CRANKSHAFT POSITION SENSOR (See page ES-375)

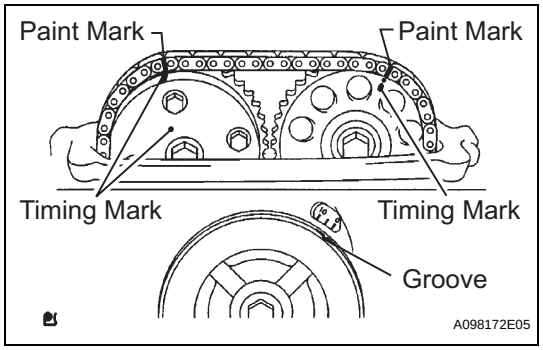
39. REMOVE OIL PAN SUB-ASSEMBLY (See page EM-25)



40. SET NO. 1 CYLINDER TO TDC/COMPRESSION

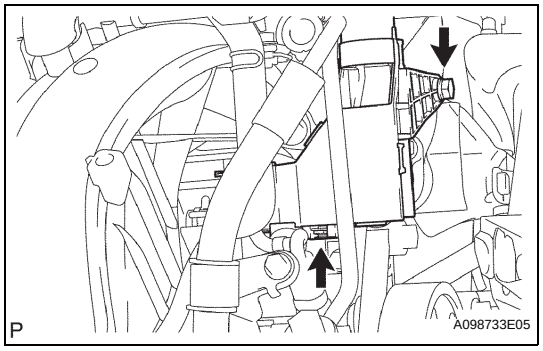
(a) Turn the crankshaft pulley until its groove and the timing mark "0" of the timing chain cover are aligned.

(b) Check that each timing mark of the camshaft timing gears is aligned with each timing mark located on the No. 1 and No. 2 bearing caps as shown in the illustration.
If not, turn the crankshaft by 1 revolution (360°) to align the timing marks as above.

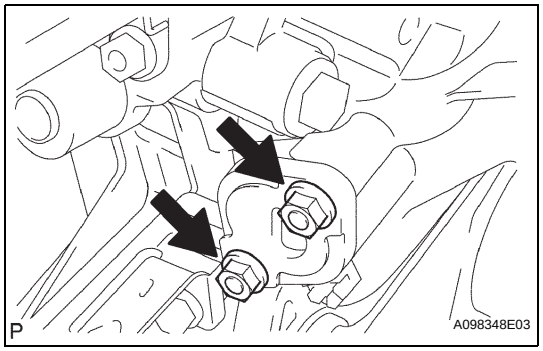


41. REMOVE NO. 2 CAMSHAFT

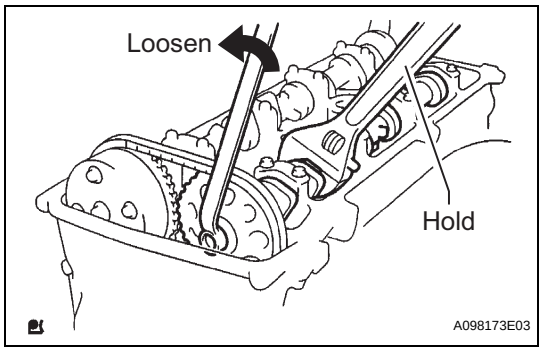
(a) Place paint marks on the chain and camshaft timing gears.



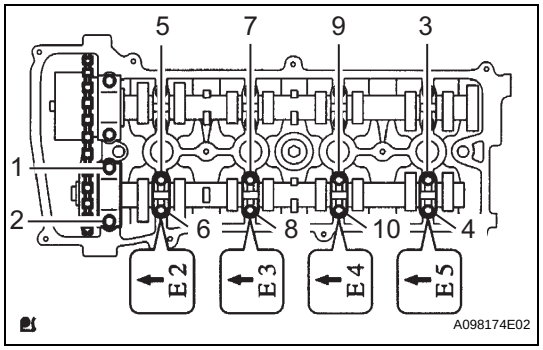
(b) Remove the bolt.
(c) Disconnect the wire harness protector clamp.



(d) Remove the 2 nuts, tensioner and gasket.

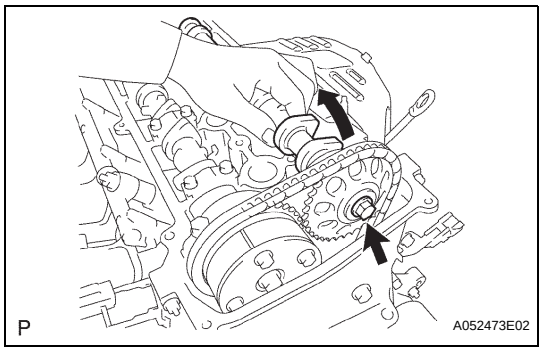


(e) While holding the camshaft with a wrench, loosen the camshaft timing set bolt.

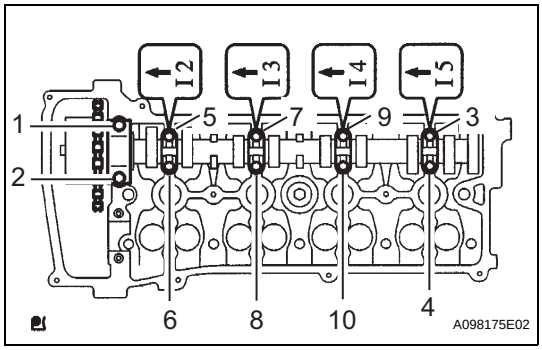


(f) Using several steps, uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration.
(g) Remove the 5 bearing caps.

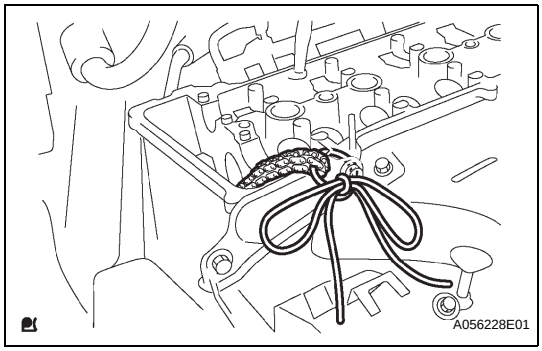
EM



(h) While holding the No. 2 camshaft by hand, remove the camshaft timing sprocket set bolt.
(i) Remove the camshaft timing sprocket from the No. 2 camshaft with the timing chain wrapped on the sprocket.
(j) Remove the camshaft timing sprocket from the timing chain.



42. REMOVE CAMSHAFT
(a) Using several steps, uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration.
(b) Remove the 5 bearing caps.
(c) Remove the camshaft and camshaft timing gear while holding the timing chain by hand.



(d) Tie the timing chain with a string as shown in the illustration.
NOTICE:
Be careful not to drop anything inside the timing chain cover.

43. REMOVE CRANKSHAFT PULLEY (See page EM-26)

44. REMOVE TIMING CHAIN COVER SUB-ASSEMBLY (See page EM-27)

45. REMOVE NO. 1 CRANKSHAFT POSITION SENSOR PLATE

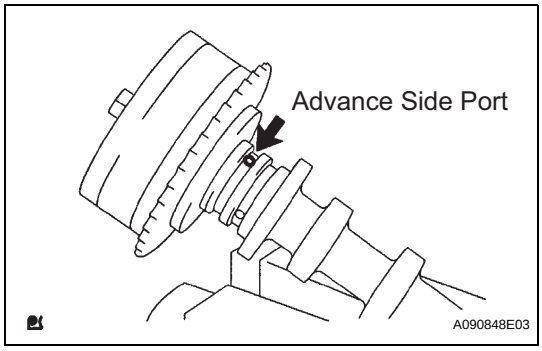
46. REMOVE TIMING CHAIN GUIDE (See page EM-28)

47. REMOVE CHAIN TENSIONER SLIPPER (See page EM-28)

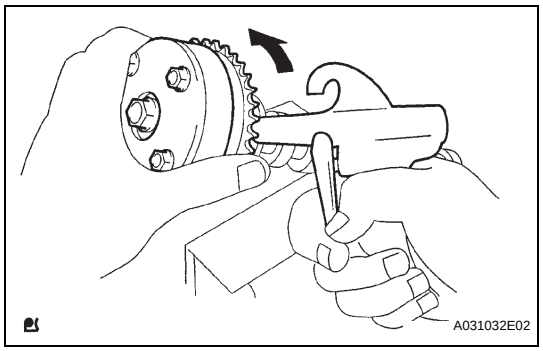
48. REMOVE CHAIN SUB-ASSEMBLY

49. REMOVE NO. 1 CHAIN VIBRATION DAMPER (See page EM-28)

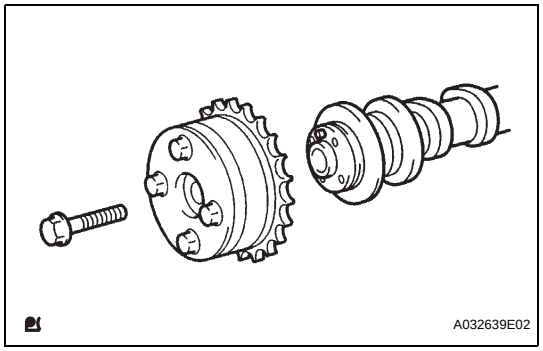
50. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (See page ES-368)



51. REMOVE CAMSHAFT TIMING GEAR ASSEMBLY
(a) Clamp the camshaft in a vise, and make sure that the camshaft timing gear does not rotate.
(b) Cover all the oil ports with vinyl tape except the advance side port shown in the illustration.

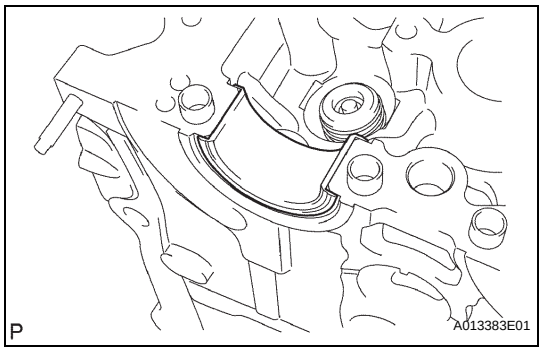


(c) Apply air pressure of 100 kPa (1.0 kgf/cm^2, 14 psi) to the oil path, then turn the camshaft timing gear to the advance direction (counterclockwise) by hand.
CAUTION:
Cover the paths with a shop rag to avoid oil splashes.
HINT:
Depending on the air pressure, the camshaft timing gear will turn to the advance angle side without applying force by hand. Also, under the condition that the pressure can hardly be applied because of air leakage from the port, there may be the case that the lock pin can hardly be released.

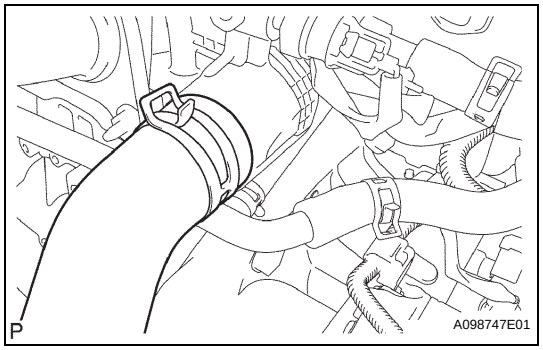


(d) Remove the flange bolt of the camshaft timing gear.
NOTICE:
- **Be sure not to remove the other 4 bolts.**
- **When reusing the camshaft timing gear, release the straight pin lock first, then install the gear.**

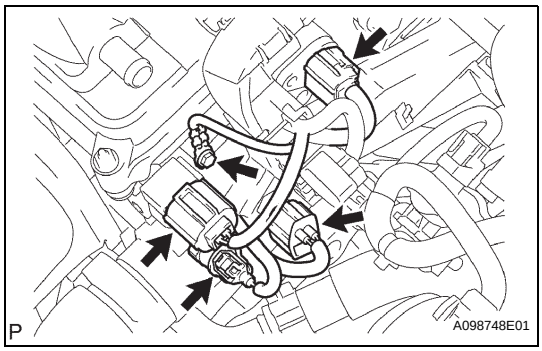
EM



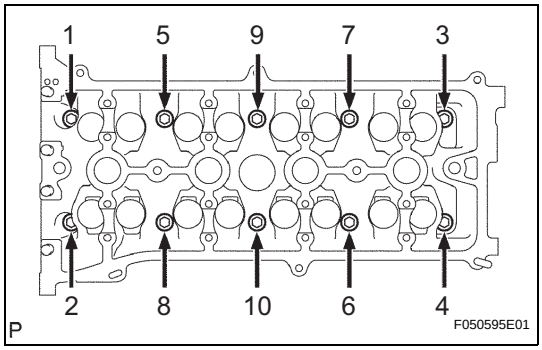
52. REMOVE NO. 2 CAMSHAFT BEARING
(a) Remove the camshaft bearing.



53. REMOVE CYLINDER HEAD SUB-ASSEMBLY
(a) Disconnect the radiator hose inlet.



(b) Disconnect the radio setting condenser connector.
(c) Disconnect the engine oil pressure switch connector.
(d) Disconnect the engine coolant temperature sensor connector.
(e) Disconnect the camshaft position sensor connector.
(f) Remove the bolt and ground cable.



(g) Using several steps, uniformly loosen and remove the 10 cylinder head bolts and 10 plate washers with a 10 mm bi-hexagon wrench in the sequence shown in the illustration.
NOTICE:
- **Be careful not to drop the plate washers into the cylinder head.**
- **Head warpage or cracking could result from removing the bolts in the wrong order.**

54. REMOVE CYLINDER HEAD GASKET

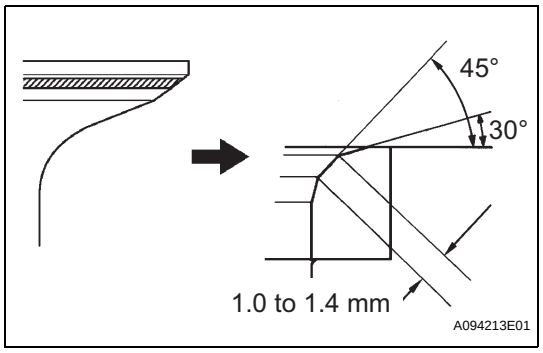
EM

REPAIR

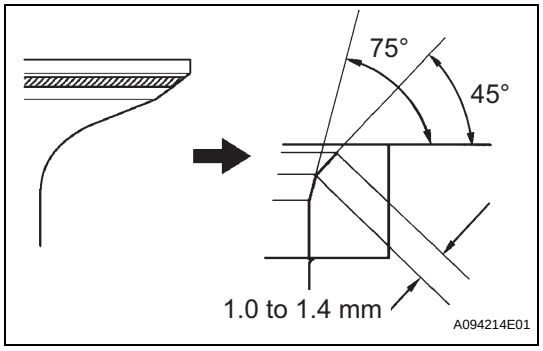
1. REPAIR VALVE SEATS

NOTICE:

Releasing the seat cutter pressure gradually helps to make the valve seat faces smoother.



(a) If the seating is too high on the valve face, use 30°and 45°cutters to correct the seat.



(b) If the seating is too low on the valve face, use 75°and 45°cutters to correct the seat.

(c) Lap the valve and valve seat by hand with an abrasive compound.

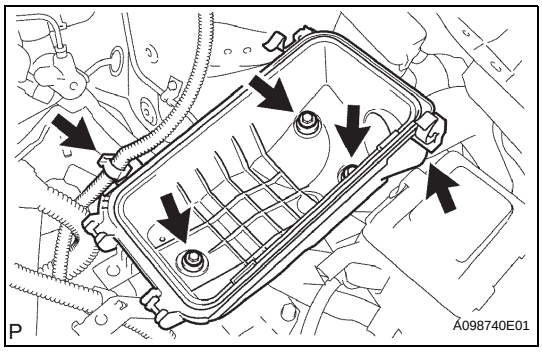
(d) Recheck the valve seating position.

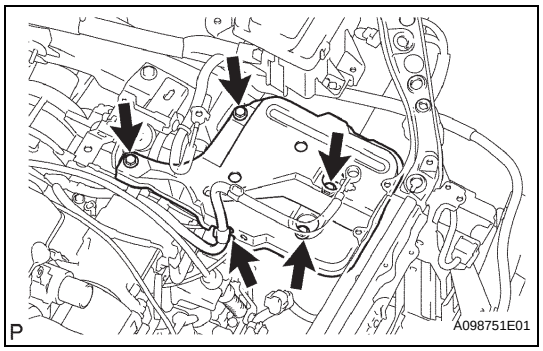
EM

EM

REMOVAL

1. **DISCHARGE FUEL SYSTEM (See page FU-7)**
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
3. **REMOVE BATTERY**
   (a) Loosen the 2 nuts and remove the battery clamp.
4. **REMOVE BATTERY TRAY**
5. **REMOVE FRONT WHEEL**
6. **REMOVE ENGINE UNDER COVER RH**
7. **REMOVE ENGINE UNDER COVER LH**
8. **REMOVE FRONT FENDER APRON SEAL RH (See page CH-10)**
9. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-22)**
10. **DRAIN ENGINE COOLANT (See page CO-6)**
11. **DRAIN AUTOMATIC TRANSAXLE FLUID (for Automatic Transaxle) (See page AX-149)**
12. **DRAIN TRANSAXLE OIL (for Manual Transaxle) (See page MX-18)**
13. **DISCONNECT RADIATOR HOSE INLET**
14. **DISCONNECT RADIATOR HOSE OUTLET**
15. **DISCONNECT NO. 1 OIL COOLER INLET TUBE (for Automatic Transaxle)**
16. **DISCONNECT NO. 1 OIL COOLER OUTLET TUBE (for Automatic Transaxle)**
17. **REMOVE RADIATOR ASSEMBLY (See page CO-21)**
18. **REMOVE AIR CLEANER ASSEMBLY**
    (a) Remove the air cleaner cap and element (see page ES-383).
    (b) Remove the clamp of the engine wire.
    (c) Remove the 3 bolts from the air cleaner case.
    (d) Disconnect the air cleaner case from the No. 1 air cleaner inlet.



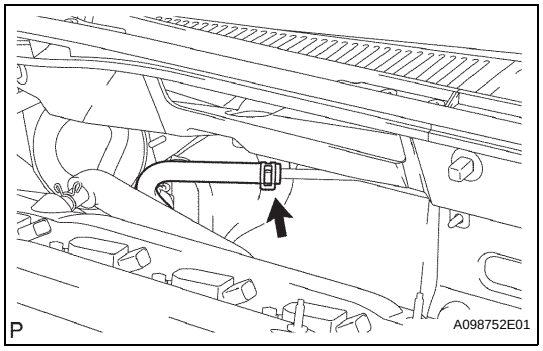


19. REMOVE BATTERY CARRIER

(a) Disconnect the clamp of the engine wire.

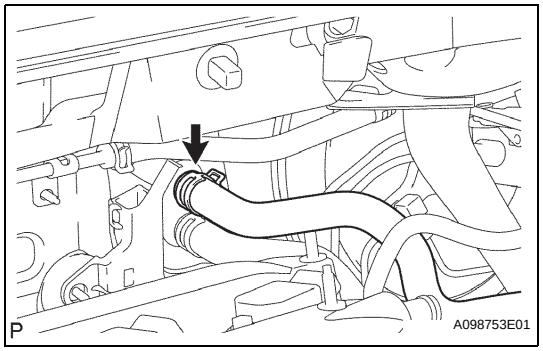
(b) Remove the 4 bolts and battery carrier.

20. DISCONNECT FUEL MAIN TUBE (See page FU-7)



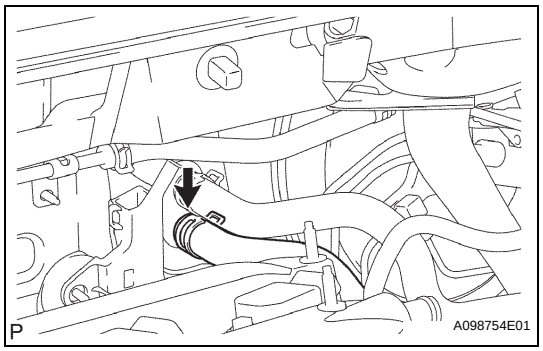
21. DISCONNECT UNION TO CONNECTOR TUBE HOSE

(a) Disconnect the union to connector tube hose from the booster vacuum tube.



22. DISCONNECT HEATER WATER INLET HOSE

(a) Disconnect the heater water inlet hose from the booster vacuum tube.



23. DISCONNECT HEATER WATER OUTLET HOSE

(a) Disconnect the heater water outlet hose from the air conditioner tube.

24. REMOVE TRANSMISSION CONTROL CABLE ASSEMBLY (for Automatic Transaxle) (See page AX-126)

25. REMOVE TRANSMISSION CONTROL CABLE ASSEMBLY (for Manual Transaxle) (See page MX-10)

26. REMOVE CLUTCH RELEASE CYLINDER ASSEMBLY (for Manual Transaxle) (See page MX-19)

27. REMOVE FAN AND GENERATOR V BELT (See page EM-6)

28. REMOVE GENERATOR ASSEMBLY (See page CH-10)

29. REMOVE COOLER COMPRESSOR ASSEMBLY

HINT:

Disconnect the compressor together with the low-pressure and high-pressure hoses, then secure it to the vehicle side using rope.

EM

30. REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY (See page IP-6)

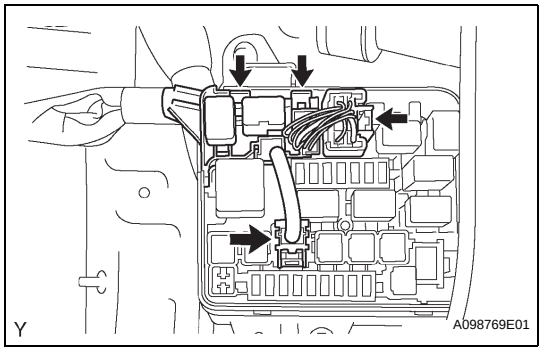
31. DISCONNECT ENGINE WIRE

(a) Disconnect the engine wire from the ECM and junction block.

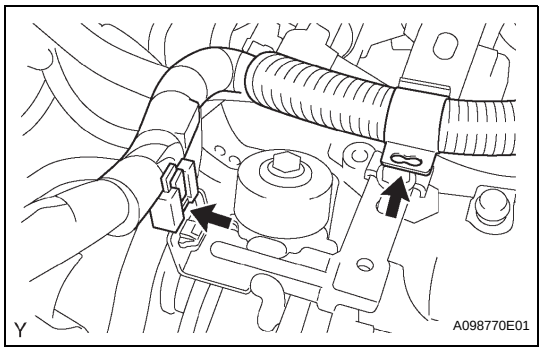
(b) Pull out the engine wire.

(c) Remove the engine room relay block cover.

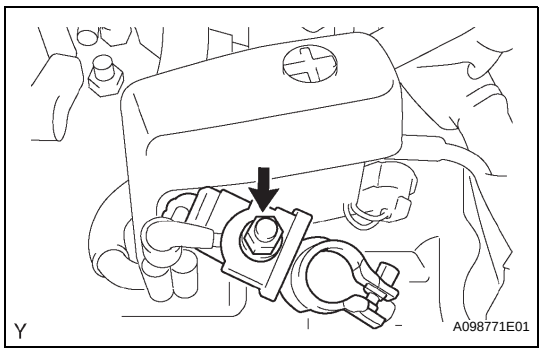
(d) Remove the 2 claws and 2 connectors, and push the engine wire harness up.



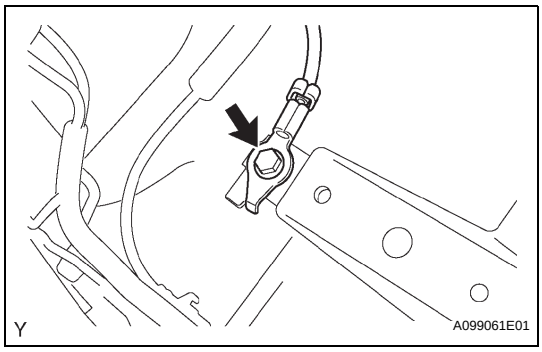
(e) Remove the 2 clamps of the engine wire.



(f) Remove the nut from the battery positive (+) terminal to disconnect the engine wire.



(g) Remove the bolt and ground cable.



32. REMOVE FRONT EXHAUST PIPE ASSEMBLY (See page EX-2)

33. REMOVE COLUMN HOLE COVER SILENCER SHEET (See page SR-9)

34. REMOVE NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY (See page SR-9)

35. REMOVE FRONT AXLE HUB NUT (See page DS-5)

36. DISCONNECT FRONT STABILIZER LINK ASSEMBLY LH (See page SP-29)

37. **DISCONNECT FRONT STABILIZER LINK ASSEMBLY RH (See page SP-29)**

38. **DISCONNECT FRONT SPEED SENSOR LH (See page SP-15)**

39. **DISCONNECT FRONT SPEED SENSOR RH (See page SP-15)**

40. **SEPARATE TIE ROD END LH SUB-ASSEMBLY (See page DS-6)**

41. **REMOVE TIE ROD END RH SUB-ASSEMBLY (See page DS-7)**

42. **SEPARATE FRONT NO. 1 SUSPENSION ARM SUB-ASSEMBLY LOWER LH (See page SP-22)**

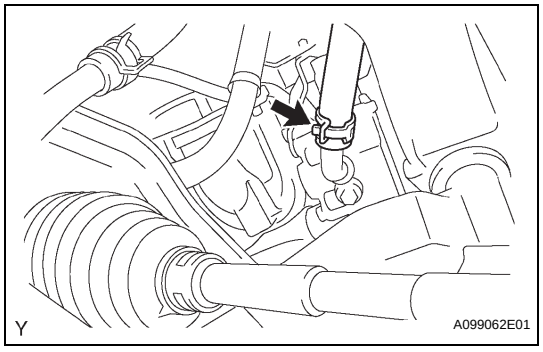
43. **SEPARATE FRONT NO. 1 SUSPENSION ARM SUB-ASSEMBLY LOWER RH (See page SP-22)**

44. **REMOVE FRONT AXLE HUB LH SUB-ASSEMBLY (See page AH-9)**

45. **REMOVE FRONT AXLE HUB RH SUB-ASSEMBLY (See page AH-9)**

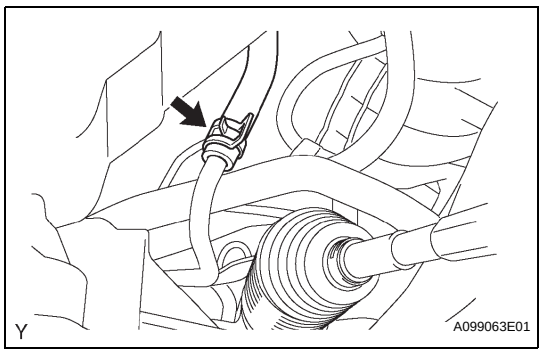
46. **REMOVE ENGINE ASSEMBLY WITH TRANSAXLE**

(a) Disconnect the No. 1 pump hose.

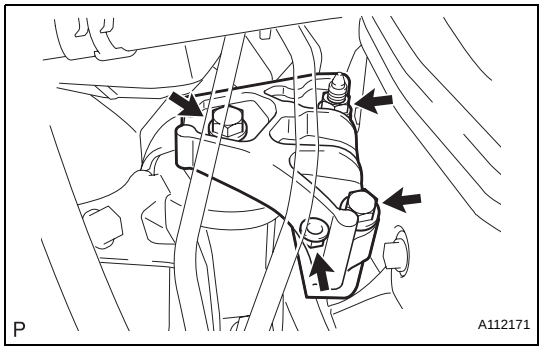


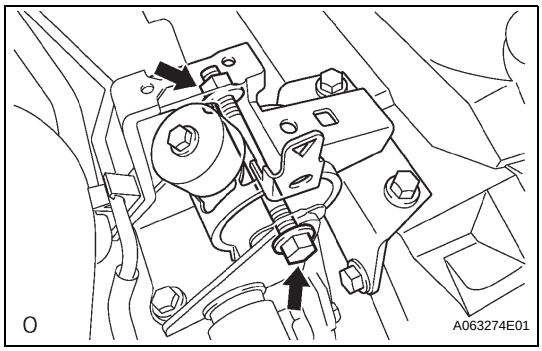
(b) Disconnect the return tube.

(c) Set the engine lifter.

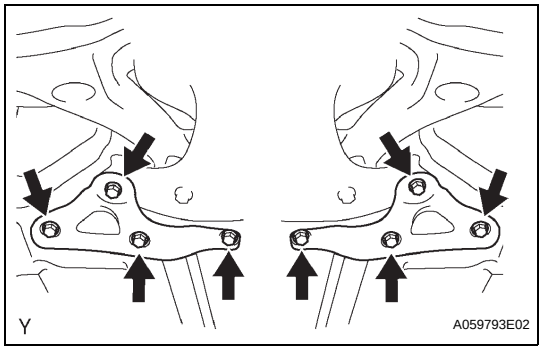


(d) Remove the 2 bolts, 2 nuts and engine mounting insulator RH.

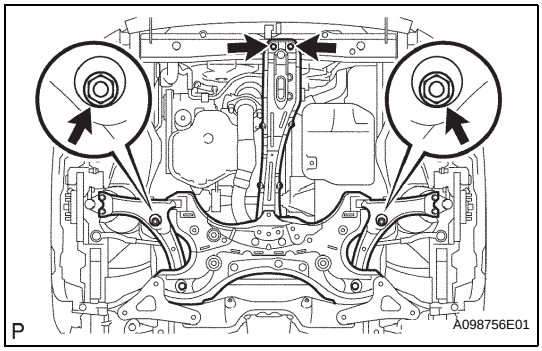




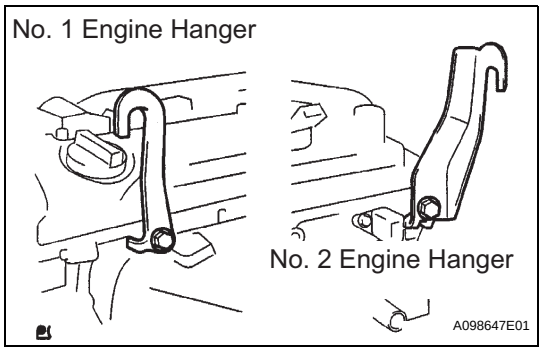
(e) Remove the through bolt, nut and engine mounting insulator LH.



(f) Remove the 8 bolts and front suspension member brace rear RH and LH.



(g) Remove the 2 bolts and 2 nuts shown in the illustration.
(h) Carefully remove the engine with transaxle from the vehicle.



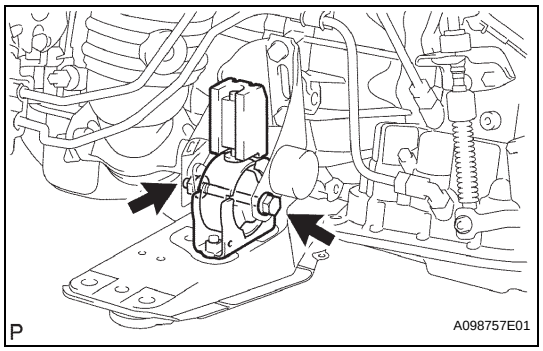
(i) Install the No. 1 and No. 2 engine hangers with the bolts as shown in the illustration.
Parts No.

Item	Part No.
No. 1 Engine hanger	12281-28010
No. 2 Engine hanger	12282-28010
Bolt	91512-61020

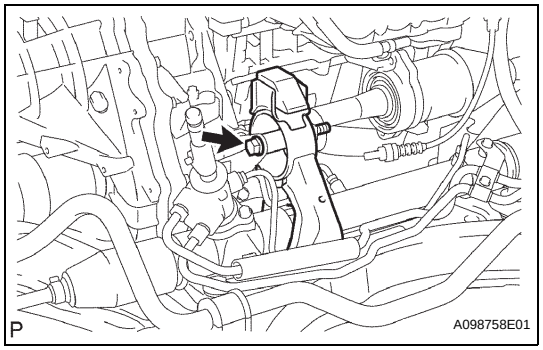
Torque: 38 N*m (387 kgf*cm, 28 ft.*lbf)

(j) Attach the sling device and the engine with the chain block.

47. REMOVE VANE PUMP ASSEMBLY



48. **REMOVE FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY WITH CENTER MEMBER**
    (a) Remove the through bolt, nut and engine mounting insulator FR from the engine mounting bracket FR.



    (b) Remove the through bolt and engine mounting insulator RR from the engine mounting bracket RR.
    (c) Separate the engine and transaxle assembly from the suspension crossmember and the engine mounting member.

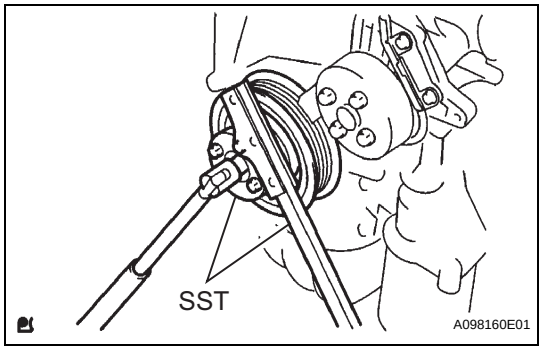
49. **REMOVE FRONT DRIVE SHAFT ASSEMBLY LH (See page DS-6)**

50. **REMOVE FRONT DRIVE SHAFT ASSEMBLY RH (See page DS-7)**

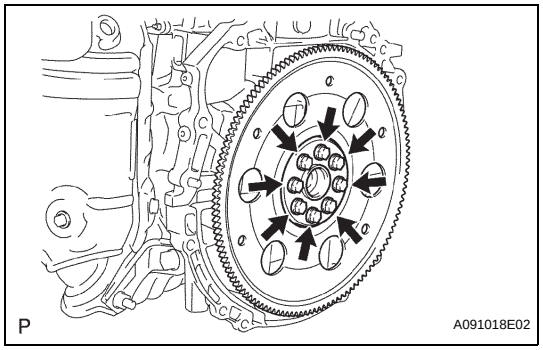
51. **REMOVE STARTER ASSEMBLY (See page ST-6)**

52. **REMOVE AUTOMATIC TRANSAXLE ASSEMBLY (See page AX-152)**

53. **REMOVE TORQUE CONVERTER CLUTCH ASSEMBLY (for Automatic Transaxle)**



54. **REMOVE DRIVE PLATE SUB-ASSEMBLY (for Automatic Transaxle)**
    (a) Using SST, hold the crankshaft.
    SST 09213-54015 (91651-60855), 09330-00021



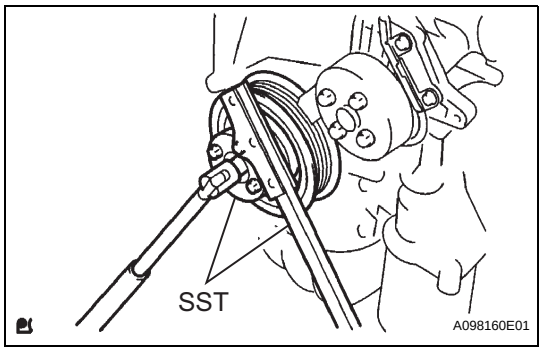
    (b) Remove the 8 bolts, rear spacer, drive plate and front spacer.

55. **REMOVE MANUAL TRANSAXLE ASSEMBLY (See page MX-20)**

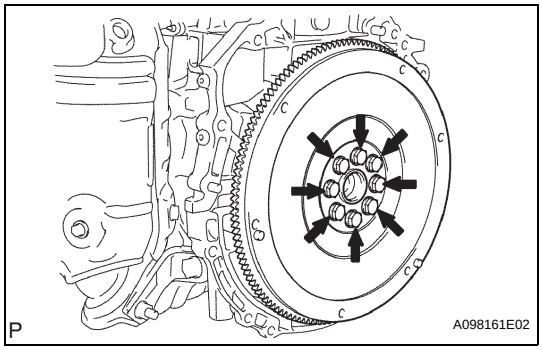
56. **REMOVE CLUTCH COVER ASSEMBLY (for Manual Transaxle) (See page CL-19)**

57. **REMOVE CLUTCH DISC ASSEMBLY (for Manual Transaxle) (See page CL-19)**

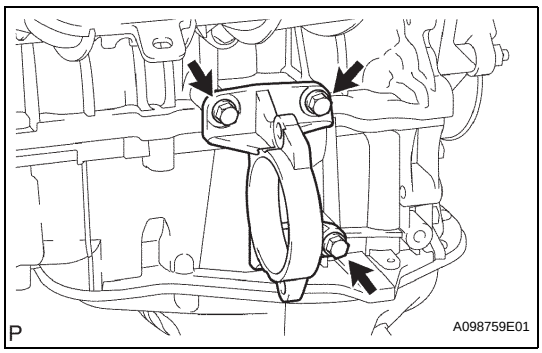
EM



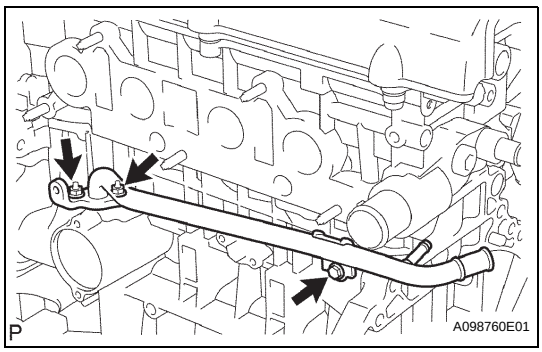
58. **REMOVE FLYWHEEL SUB-ASSEMBLY (for Manual Transaxle)**
    (a) Using SST, hold the crankshaft.
    SST 09213-54015 (91651-60855), 09330-00021



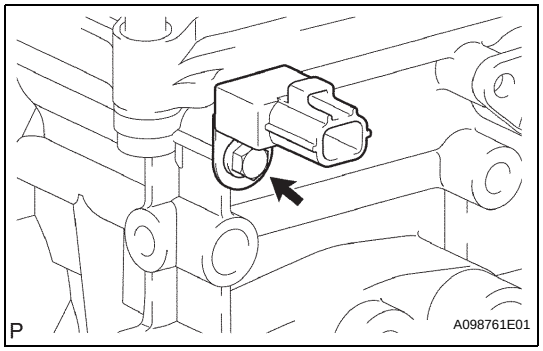
    (b) Remove the 8 bolts and flywheel.



59. **REMOVE DRIVE SHAFT BEARING BRACKET**
    (a) Remove the 3 bolts and drive shaft bearing bracket.
60. **REMOVE OIL DIPSTICK**
61. **REMOVE OIL DIPSTICK GUIDE (See page EM-57)**
62. **REMOVE MANIFOLD STAY (See page EM-57)**
63. **REMOVE NO. 2 MANIFOLD STAY (See page EM-57)**
64. **REMOVE NO. 1 EXHAUST MANIFOLD HEAT INSULATOR (See page EM-57)**
65. **REMOVE EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY (See page EM-58)**
66. **REMOVE WATER INLET (See page CO-14)**
67. **REMOVE THERMOSTAT**



68. **REMOVE NO. 1 WATER BY-PASS PIPE**
    (a) Remove the bolt, 2 nuts and water by-pass pipe.
    (b) Remove the gasket from the cylinder block.
69. **REMOVE INTAKE MANIFOLD ASSEMBLY (See page ES-397)**
70. **REMOVE NO. 1 INTAKE MANIFOLD INSULATOR (See page ES-398)**
71. **REMOVE V-RIBBED BELT TENSIONER ASSEMBLY (See page EM-25)**
72. **REMOVE IGNITION COIL ASSEMBLY (See page IG-9)**
73. **REMOVE FUEL DELIVERY PIPE SUB-ASSEMBLY (See page FU-8)**
74. **REMOVE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (See page ES-368)**



75. REMOVE KNOCK SENSOR (See page ES-398)

76. REMOVE RADIO SETTING CONDENSER

(a) Remove the bolt and condenser.

77. REMOVE ENGINE OIL PRESSURE SWITCH ASSEMBLY

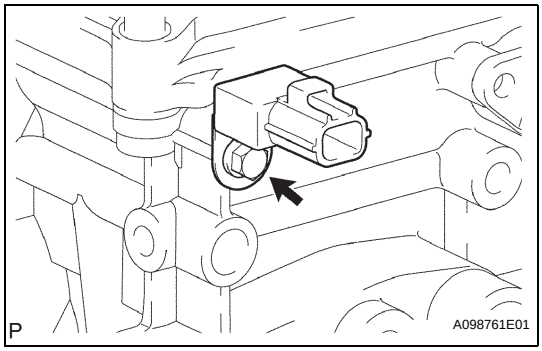
78. REMOVE ENGINE COOLANT TEMPERATURE SENSOR (See page ES-378)

79. REPLACE PARTIAL ENGINE ASSEMBLY

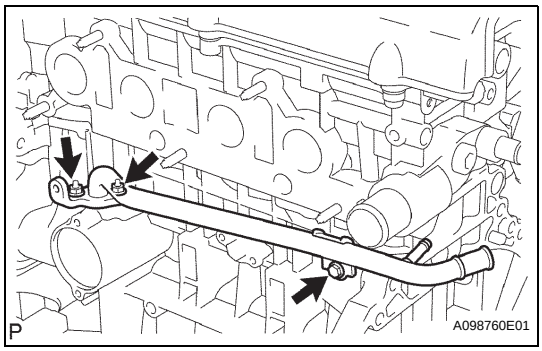
EM

INSTALLATION

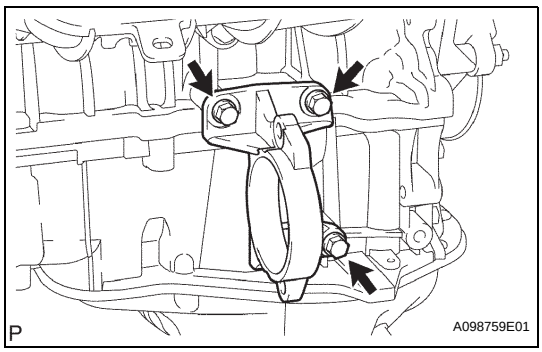
1. **INSTALL ENGINE COOLANT TEMPERATURE SENSOR (See page ES-379)**
2. **INSTALL ENGINE OIL PRESSURE SWITCH ASSEMBLY**
3. **INSTALL RADIO SETTING CONDENSER**
   (a) Install the condenser with the bolt.
   Torque: 10 N*m (102 kgf*cm, 7 ft.*lbf)



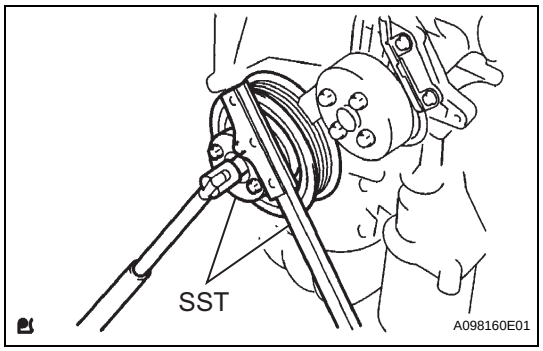
4. **INSTALL KNOCK SENSOR (See page ES-398)**
5. **INSTALL CAMSHAFT TIMING CONTROL VALVE ASSEMBLY (See page ES-369)**
6. **INSTALL FUEL DELIVERY PIPE SUB-ASSEMBLY (See page FU-11)**
7. **INSTALL IGNITION COIL ASSEMBLY (See page IG-9)**
8. **INSTALL V-RIBBED BELT TENSIONER ASSEMBLY (See page EM-39)**
9. **INSTALL NO. 1 INTAKE MANIFOLD INSULATOR (See page ES-398)**
10. **INSTALL INTAKE MANIFOLD ASSEMBLY (See page ES-399)**
11. **INSTALL NO. 1 WATER BY-PASS PIPE**
    (a) Install a new gasket and the water by-pass pipe with the bolt and 2 nuts.
    Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)



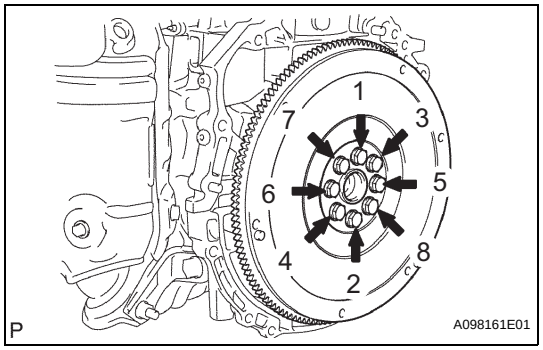
12. **INSTALL THERMOSTAT (See page CO-14)**
13. **INSTALL WATER INLET (See page CO-15)**
14. **INSTALL EXHAUST MANIFOLD CONVERTER SUB-ASSEMBLY (See page EM-78)**
15. **INSTALL NO. 1 EXHAUST MANIFOLD HEAT INSULATOR (See page EM-79)**
16. **INSTALL NO. 2 MANIFOLD STAY (See page EM-79)**
17. **INSTALL MANIFOLD STAY (See page EM-79)**
18. **INSTALL OIL DIPSTICK GUIDE (See page EM-79)**
19. **INSTALL OIL DIPSTICK (See page EM-79)**
20. **INSTALL DRIVE SHAFT BEARING BRACKET**
    (a) Install the drive shaft bearing bracket with the 3 bolts.
    Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)



21. **INSTALL FLYWHEEL SUB-ASSEMBLY (for Manual Transaxle)**
    (a) Clean the 8 bolts and 8 bolt holes.
    (b) Apply adhesive to 2 or 3 threads of the 8 bolts.
    Adhesive:
    Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent



(c) Using SST, hold the crankshaft.
SST 09213-54015 (91651-60855), 09330-00021



(d) Using several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.
Torque: 130 N*m (1,326 kgf*cm, 96 ft.*lbf)

22. INSTALL CLUTCH DISC ASSEMBLY (for Manual Transaxle) (See page CL-21)

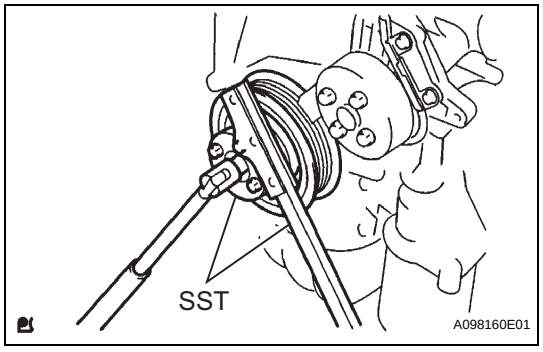
23. INSTALL CLUTCH COVER ASSEMBLY (for Manual Transaxle) (See page CL-21)

24. INSTALL MANUAL TRANSAXLE ASSEMBLY (for Manual Transaxle) (See page MX-21)

25. INSTALL DRIVE PLATE SUB-ASSEMBLY (for Automatic Transaxle)

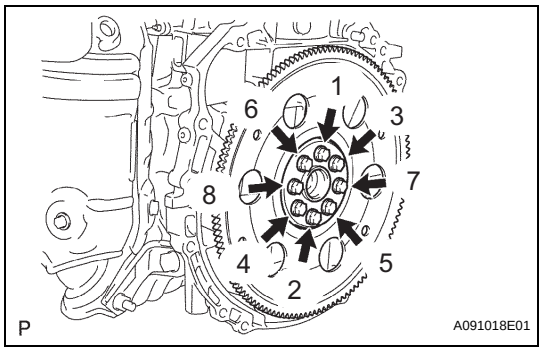
(a) Clean the 8 bolts and 8 bolt holes.

(b) Apply adhesive to 2 or 3 threads of the 8 bolts.
Adhesive:
Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent



(c) Using SST, hold the crankshaft.
SST 09213-54015 (91651-60855), 09330-00021

(d) Install the front spacer, drive plate and rear spacer onto the crankshaft.



(e) Using several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.
Torque: 98 N*m (1,000 kgf*cm, 72 ft.*lbf)

26. INSTALL TORQUE CONVERTER CLUTCH ASSEMBLY (for Automatic Transaxle) (See page AX-154)

27. INSTALL AUTOMATIC TRANSAXLE ASSEMBLY (See page AX-155)

28. INSTALL STARTER ASSEMBLY (See page ST-14)

29. INSTALL FRONT DRIVE SHAFT ASSEMBLY LH (See page DS-17)

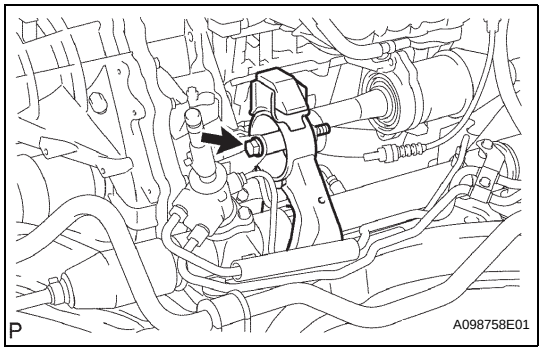
EM

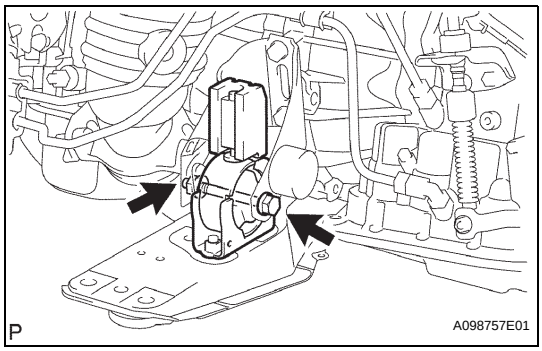
30. INSTALL FRONT DRIVE SHAFT ASSEMBLY RH (See page DS-17)

31. INSTALL FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY WITH CENTER MEMBER

(a) Attach the engine and transaxle assembly to the suspension crossmember and engine mounting member.

(b) Install the through bolt which is used to secure the rear engine mounting insulator, into the rear engine mounting bracket.
Torque: 87 N*m (887 kgf*cm, 64 ft.*lbf)



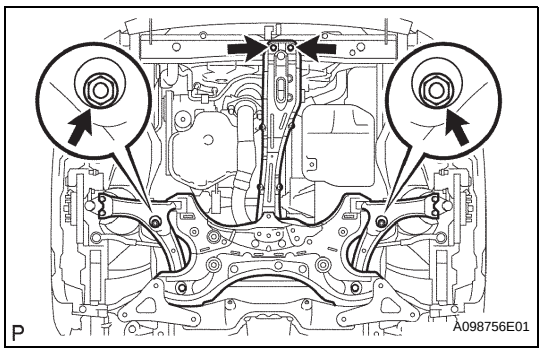


(c) Install the bolt which is used to secure the front engine mounting bracket.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)

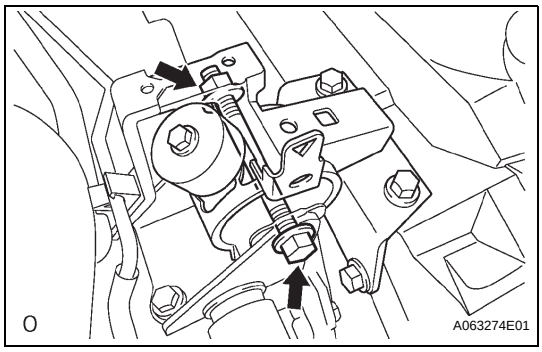
32. INSTALL VANE PUMP ASSEMBLY

33. INSTALL ENGINE ASSEMBLY WITH TRANSAXLE

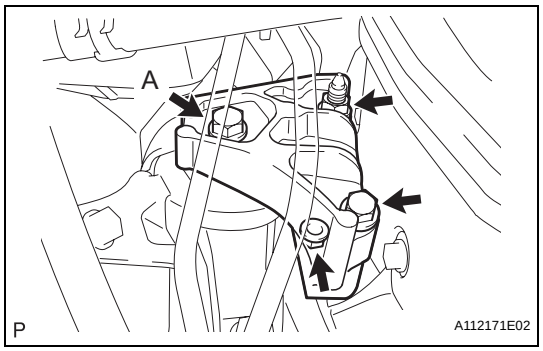
(a) Set the engine assembly with transaxle on the engine lifter.



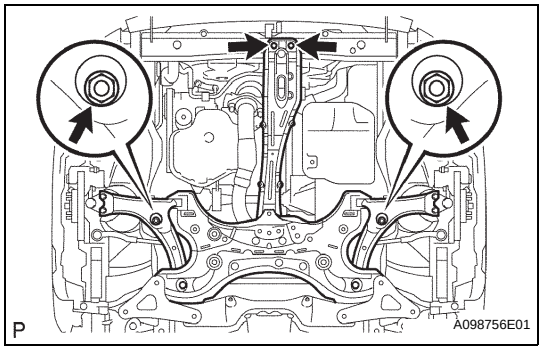
(b) Temporarily install the suspension crossmember with the 2 bolts and 2 nuts.



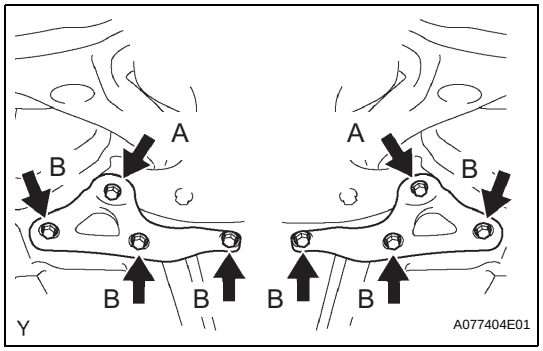
(c) Install the engine mounting insulator LH with the through bolt and nut.
Torque: 87 N*m (887 kgf*cm, 64 ft.*lbf)



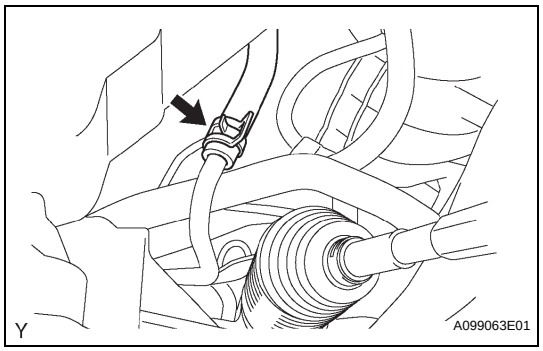
(d) Install the engine mounting insulator RH with the 2 bolts and 2 nuts.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)
113 N*m (1,152 kgf*cm, 83 ft.*lbf) for bolt A



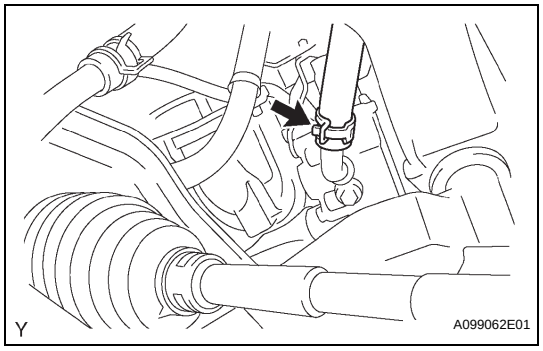
(e) Tighten the 2 bolts and 2 nuts.
Torque: 45 N*m (459 kgf*cm, 33 ft.*lbf) for bolt
133 N*m (1,356 kgf*cm, 98 ft.*lbf) for nut



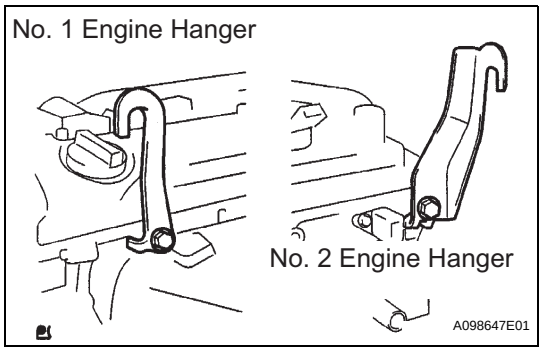
(f) Install the front suspension member brace rear RH and LH with the 8 bolts.
Torque: 133 N*m (1,356 kgf*cm, 98 ft.*lbf) for bolt A
80 N*m (816 kgf*cm, 59 ft.*lbf) for bolt B
NOTICE:
When installing the crossmember, check that the positioning holes on the crossmember and vehicle are aligned with each other.



(g) Connect the return tube.

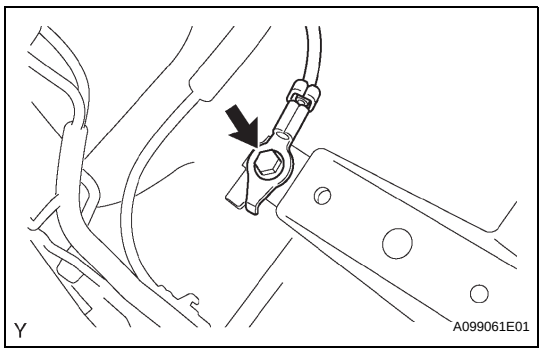


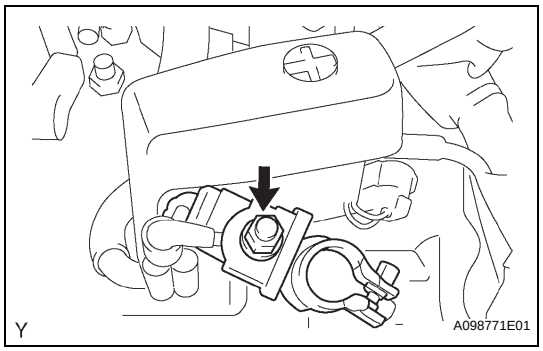
(h) Connect the oil reservoir to No. 1 pump hose.



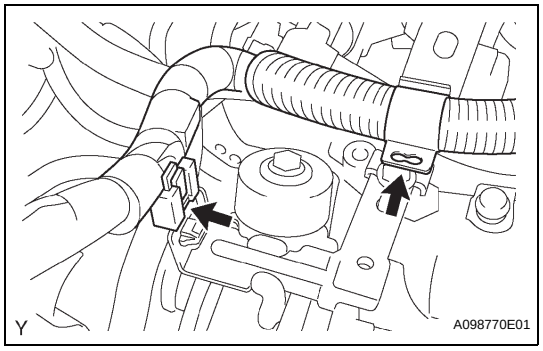
(i) Remove the No. 1 and No. 2 engine hangers.

34. **INSTALL FRONT AXLE HUB SUB-ASSEMBLY (See page AH-10)**
35. **INSTALL FRONT AXLE HUB HOLE SNAP RING (See page AH-10)**
36. **CONNECT FRONT NO. 1 SUSPENSION ARM LOWER SUB-ASSEMBLY LH (See page SP-23)**
37. **CONNECT FRONT NO. 1 SUSPENSION ARM LOWER SUB-ASSEMBLY RH (See page SP-23)**
38. **INSTALL TIE ROD END SUB-ASSEMBLY LH (See page SP-27)**
39. **INSTALL TIE ROD END SUB-ASSEMBLY RH (See page SP-27)**
40. **INSTALL FRONT SPEED SENSOR LH (See page SP-19)**
41. **INSTALL FRONT SPEED SENSOR RH (See page SP-19)**
42. **INSTALL FRONT STABILIZER LINK ASSEMBLY LH (See page SP-19)**
43. **INSTALL FRONT STABILIZER LINK ASSEMBLY RH (See page SP-19)**
44. **INSTALL FRONT AXLE HUB NUT LH (See page AH-11)**
45. **INSTALL FRONT AXLE HUB NUT RH (See page AH-11)**
46. **CONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY (See page SR-14)**
47. **INSTALL COLUMN HOLE COVER SILENCER SHEET**
48. **INSTALL FRONT EXHAUST PIPE ASSEMBLY (See page EX-3)**
49. **CONNECT ENGINE WIRE**
    (a) Install the ground cable with the bolt.

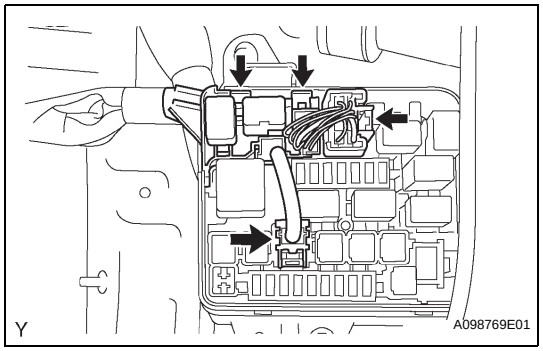




(b) Install the engine wire to the battery positive terminal with the nut.



(c) Install the 2 clamps of the engine wire.



(d) Install the engine wire harness with the 2 claws.
(e) Connect the 2 connectors.

50. INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY (See page IP-11)

51. INSTALL COOLER COMPRESSOR ASSEMBLY (See page AC-55)

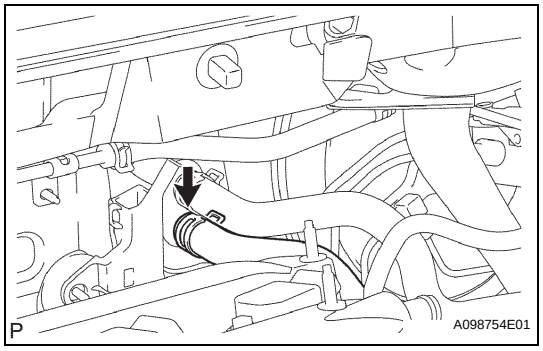
52. INSTALL GENERATOR ASSEMBLY (See page CH-17)

53. INSTALL FAN AND GENERATOR V BELT (See page EM-6)

54. INSTALL CLUTCH RELEASE CYLINDER ASSEMBLY (for Manual Transaxle) (See page MX-22)

55. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY (for Manual Transaxle) (See page MX-10)

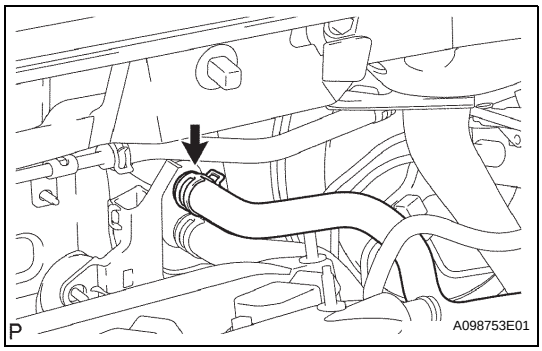
56. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY (for Automatic Transaxle) (See page AX-126)



57. CONNECT HEATER WATER OUTLET HOSE

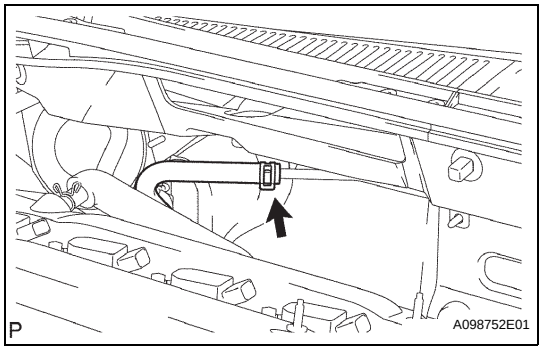
(a) Connect the heater outlet hose to the air conditioner tube.

EM



58. CONNECT HEATER WATER INLET HOSE

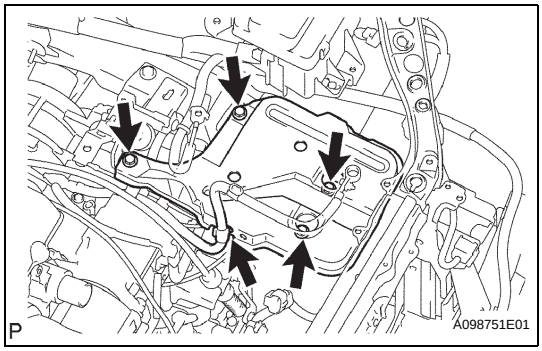
(a) Connect the heater inlet hose to the air conditioner tube.



59. CONNECT UNION TO CONNECTOR TUBE HOSE

(a) Connect the union to connector tube to the booster vacuum tube.

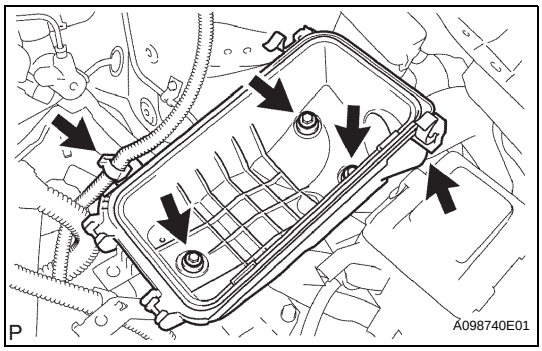
60. CONNECT FUEL MAIN TUBE (See page FU-11)



61. INSTALL BATTERY CARRIER

(a) Install the battery carrier with the 4 bolts.
Torque: 12.8 N*m (131 kgf*cm, 9 ft.*lbf)

(b) Connect the clamp of the engine wire.



62. INSTALL AIR CLEANER CASE SUB-ASSEMBLY

(a) Connect the air cleaner case to the No. 1 air cleaner inlet.

(b) Install the air cleaner case with the 3 bolts.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)

(c) Connect the clamp of the engine wire.

63. INSTALL AIR CLEANER FILTER ELEMENT SUB-ASSEMBLY (See page ES-387)

64. INSTALL AIR CLEANER CAP SUB-ASSEMBLY (See page ES-387)

65. INSTALL RADIATOR ASSEMBLY (See page CO-25)

66. CONNECT NO. 1 OIL COOLER OUTLET TUBE (for Automatic Transaxle)

67. CONNECT NO. 1 OIL COOLER INLET TUBE (for Automatic Transaxle)

68. CONNECT RADIATOR HOSE OUTLET

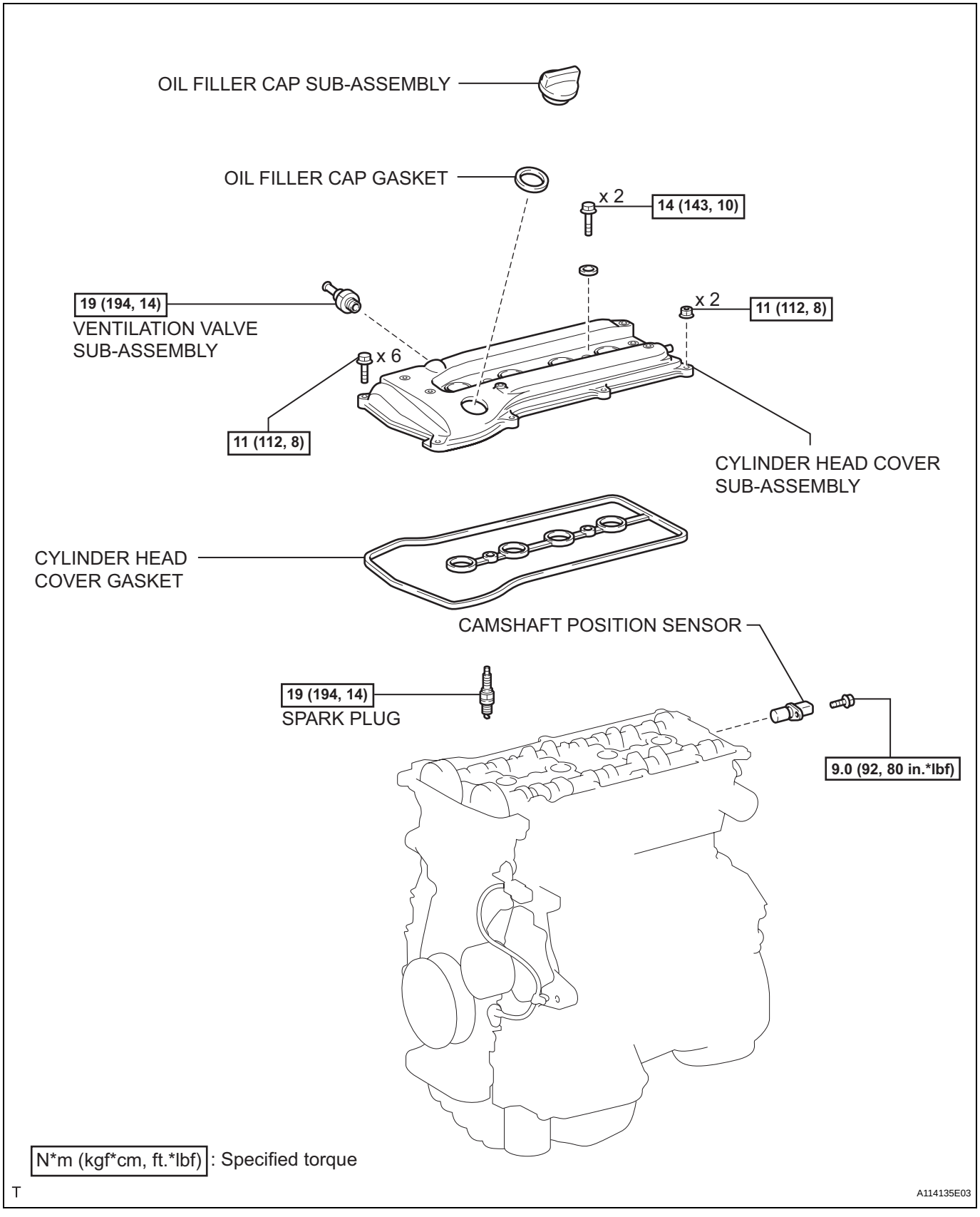
69. CONNECT RADIATOR HOSE INLET

70. INSTALL BATTERY TRAY

71. **INSTALL BATTERY**
72. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
73. **ADD MANUAL TRANSAXLE OIL (See page MX-105)**
74. **ADD AUTOMATIC TRANSAXLE FLUID (See page AX-160)**
75. **ADD ENGINE COOLANT (See page CO-6)**
76. **CHECK FOR FUEL LEAKAGE (See page FU-2)**
77. **CHECK FOR ENGINE COOLANT LEAKS**
    (a) Check for the engine coolant leaks (see page CO-6).
78. **CHECK FOR MANUAL TRANSAXLE OIL LEAKS**
79. **CHECK FOR AUTOMATIC TRANSAXLE FLUID LEAKS**
80. **INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-42)**
81. **INSTALL FRONT FENDER APRON SEAL RH (See page CH-18)**
82. **INSTALL ENGINE UNDER COVER LH**
83. **INSTALL ENGINE UNDER COVER RH**
84. **INSTALL FRONT WHEEL (See page BR-29)**
85. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

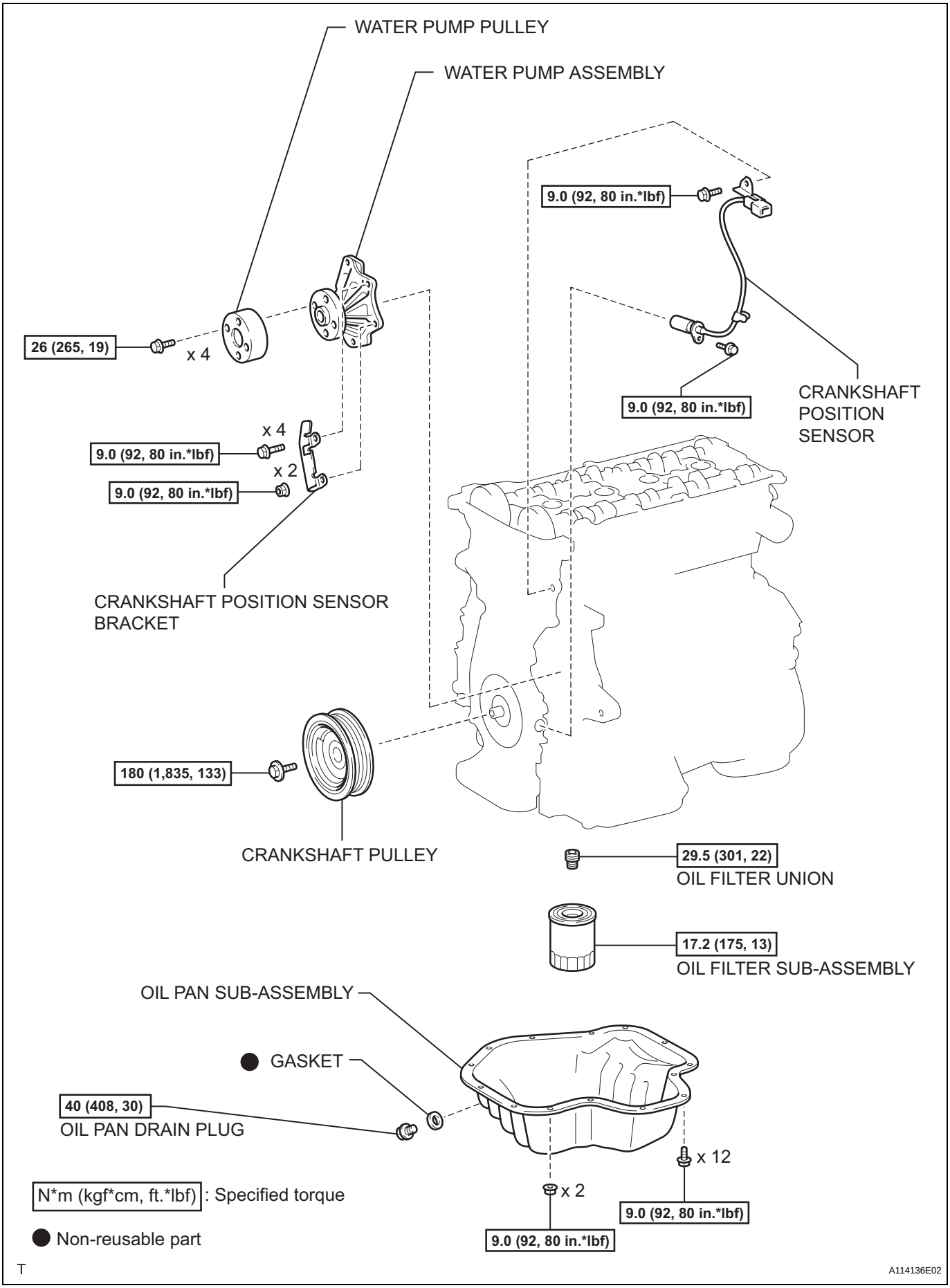
ENGINE UNIT

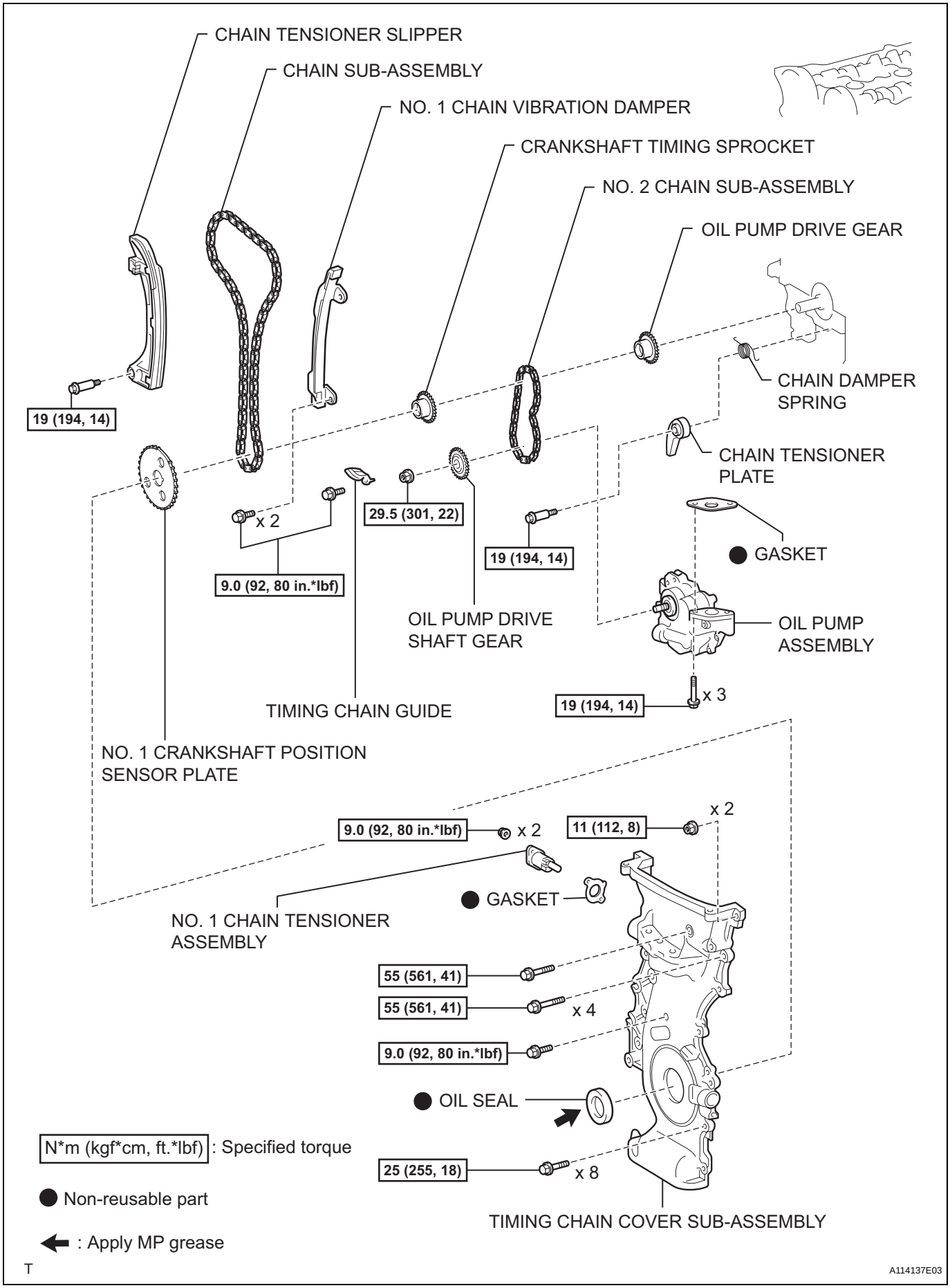
COMPONENTS



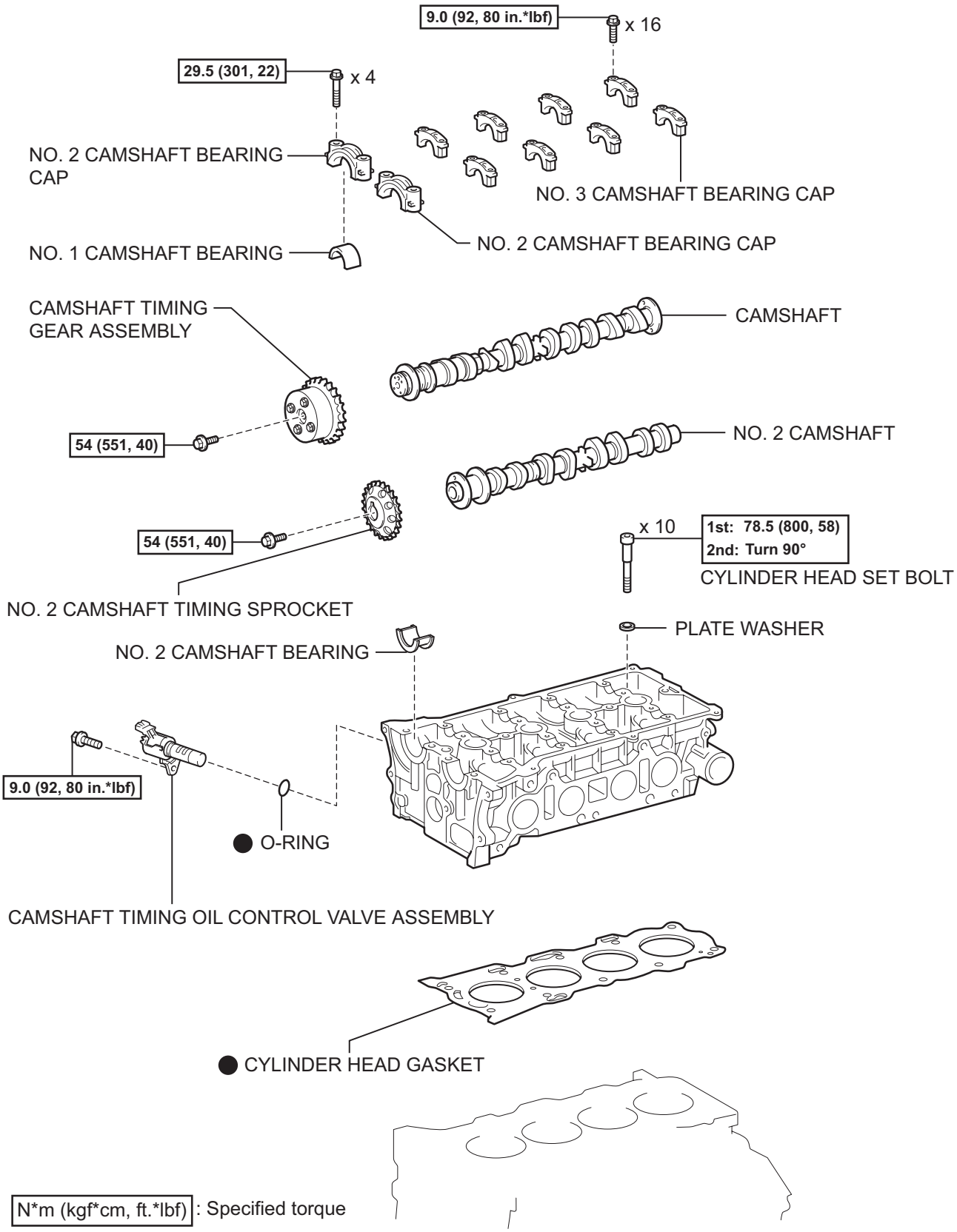
EM

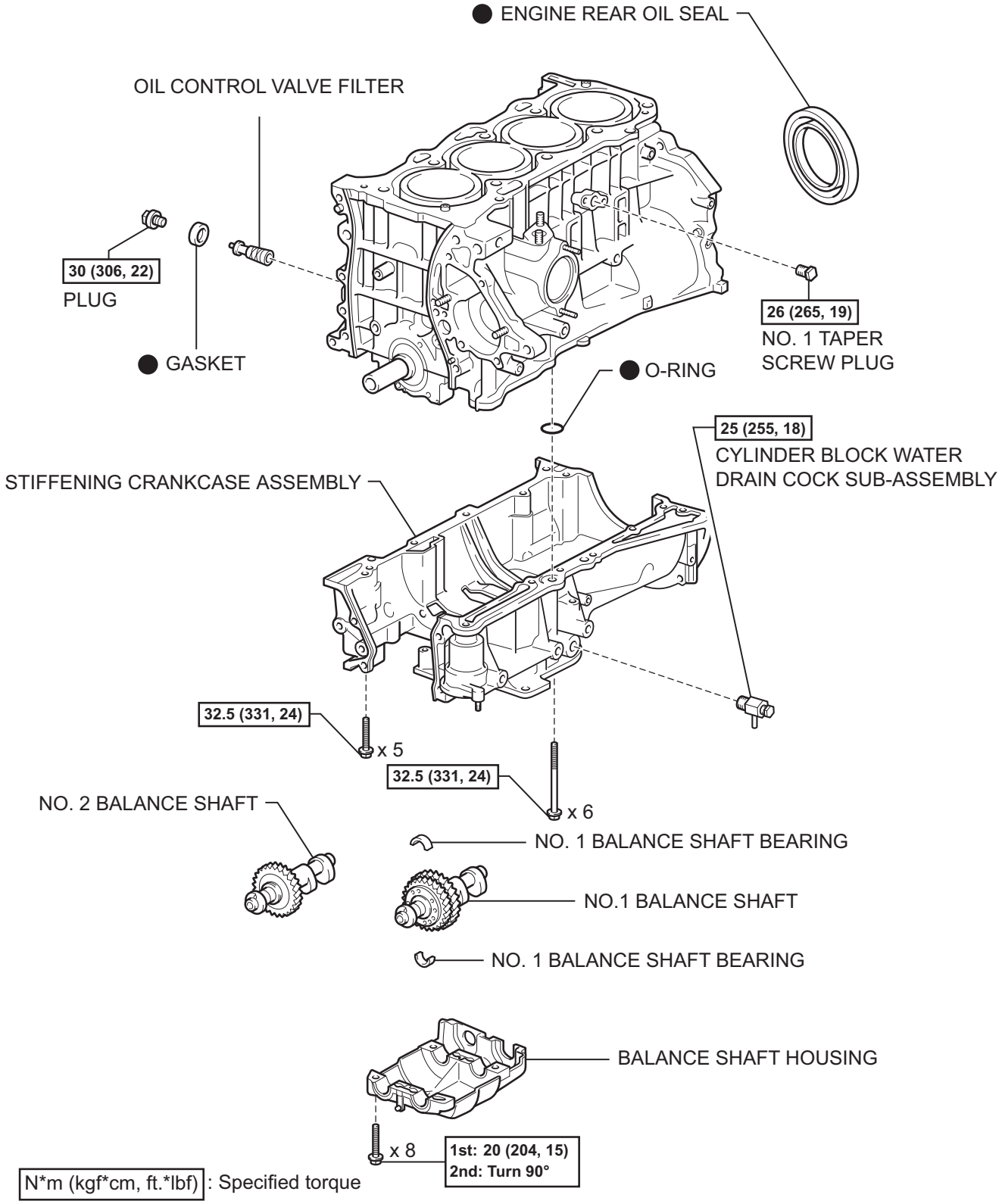
EM


WATER PUMP PULLEY
WATER PUMP ASSEMBLY
9.0 (92, 80 in.*lbf)
26 (265, 19)
x 4
9.0 (92, 80 in.*lbf)
CRANKSHAFT POSITION SENSOR
x 4
9.0 (92, 80 in.*lbf)
x 2
9.0 (92, 80 in.*lbf)
CRANKSHAFT POSITION SENSOR BRACKET
180 (1,835, 133)
CRANKSHAFT PULLEY
29.5 (301, 22)
OIL FILTER UNION
17.2 (175, 13)
OIL FILTER SUB-ASSEMBLY
OIL PAN SUB-ASSEMBLY
GASKET
40 (408, 30)
OIL PAN DRAIN PLUG
x 12
x 2
9.0 (92, 80 in.*lbf)
9.0 (92, 80 in.*lbf)
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
T
A114136E02


CHAIN TENSIONER SLIPPER
CHAIN SUB-ASSEMBLY
NO. 1 CHAIN VIBRATION DAMPER
CRANKSHAFT TIMING SPROCKET
NO. 2 CHAIN SUB-ASSEMBLY
OIL PUMP DRIVE GEAR
CHAIN DAMPER SPRING
CHAIN TENSIONER PLATE
GASKET
OIL PUMP ASSEMBLY
OIL PUMP DRIVE SHAFT GEAR
TIMING CHAIN GUIDE
NO. 1 CRANKSHAFT POSITION SENSOR PLATE
NO. 1 CHAIN TENSIONER ASSEMBLY
GASKET
OIL SEAL
TIMING CHAIN COVER SUB-ASSEMBLY
19 (194, 14)
x 2
9.0 (92, 80 in.*lbf)
29.5 (301, 22)
19 (194, 14)
x 3
9.0 (92, 80 in.*lbf)
x 2
11 (112, 8)
x 2
55 (561, 41)
55 (561, 41)
x 4
9.0 (92, 80 in.*lbf)
25 (255, 18)
x 8
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
: Apply MP grease
T
A114137E03

EM

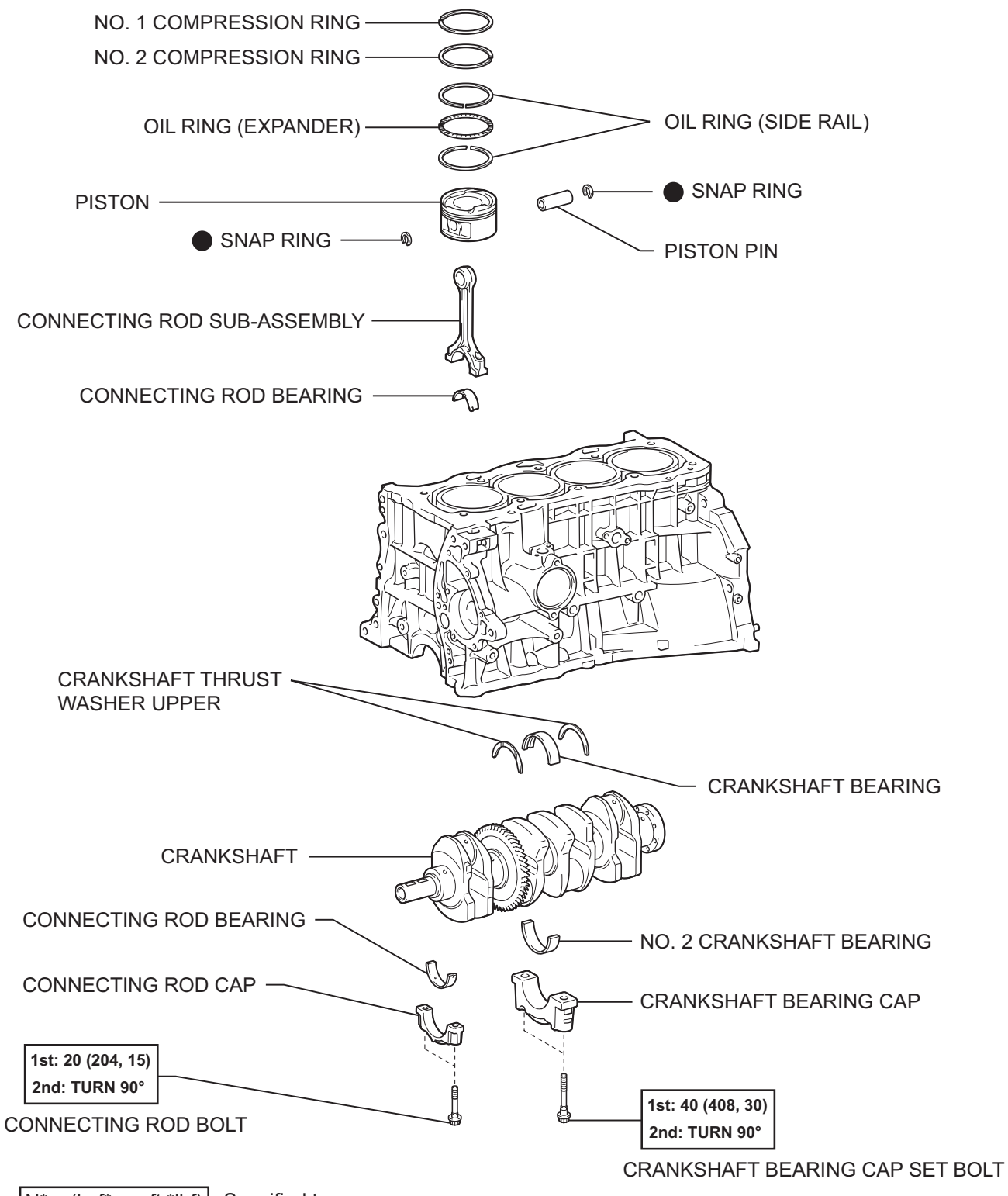

9.0 (92, 80 in.*lbf)
x 16
29.5 (301, 22)
x 4
NO. 2 CAMSHAFT BEARING CAP
NO. 3 CAMSHAFT BEARING CAP
NO. 2 CAMSHAFT BEARING CAP
NO. 1 CAMSHAFT BEARING
CAMSHAFT TIMING GEAR ASSEMBLY
CAMSHAFT
54 (551, 40)
NO. 2 CAMSHAFT
54 (551, 40)
x 10
1st: 78.5 (800, 58)
2nd: Turn 90°
CYLINDER HEAD SET BOLT
NO. 2 CAMSHAFT TIMING SPROCKET
PLATE WASHER
NO. 2 CAMSHAFT BEARING
9.0 (92, 80 in.*lbf)
O-RING
CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY
CYLINDER HEAD GASKET
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
T
A114138E02



EM

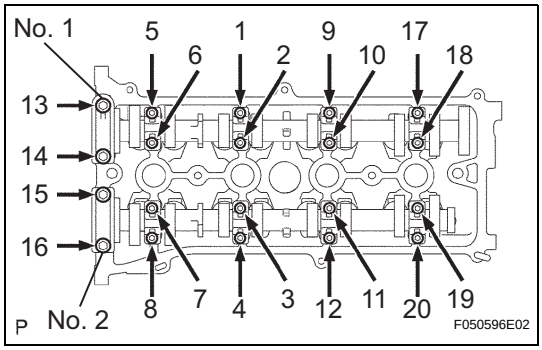
T

A114139E03


NO. 1 COMPRESSION RING
NO. 2 COMPRESSION RING
OIL RING (EXPANDER)
OIL RING (SIDE RAIL)
PISTON
SNAP RING
SNAP RING
PISTON PIN
CONNECTING ROD SUB-ASSEMBLY
CONNECTING ROD BEARING
CRANKSHAFT THRUST WASHER UPPER
CRANKSHAFT BEARING
CRANKSHAFT
CONNECTING ROD BEARING
NO. 2 CRANKSHAFT BEARING
CONNECTING ROD CAP
CRANKSHAFT BEARING CAP
1st: 20 (204, 15)
2nd: TURN 90°
CONNECTING ROD BOLT
1st: 40 (408, 30)
2nd: TURN 90°
CRANKSHAFT BEARING CAP SET BOLT
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
P
A114217E02

DISASSEMBLY

1. **REMOVE SPARK PLUG**
2. **REMOVE OIL FILLER CAP SUB-ASSEMBLY**
3. **REMOVE OIL FILLER CAP GASKET**
4. **REMOVE VENTILATION VALVE SUB-ASSEMBLY**
5. **REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-24)**
6. **REMOVE CYLINDER HEAD COVER GASKET**
7. **REMOVE OIL FILTER SUB-ASSEMBLY (See page LU-3)**
8. **REMOVE OIL FILTER UNION**
   (a) Using a 12 mm socket hexagon wrench, remove the oil filter union.
9. **REMOVE CAMSHAFT POSITION SENSOR (See page ES-372)**
10. **REMOVE CRANKSHAFT POSITION SENSOR (See page ES-375)**
11. **REMOVE WATER PUMP PULLEY (See page CO-10)**
12. **REMOVE WATER PUMP ASSEMBLY (See page CO-10)**
13. **REMOVE OIL PAN DRAIN PLUG**
    (a) Remove the oil pan drain plug and gasket.
14. **REMOVE OIL PAN SUB-ASSEMBLY (See page EM-25)**
15. **REMOVE CRANKSHAFT PULLEY (See page EM-26)**
16. **REMOVE NO. 1 CHAIN TENSIONER ASSEMBLY (See page EM-27)**
17. **REMOVE TIMING CHAIN COVER SUB-ASSEMBLY (See page EM-27)**
18. **REMOVE TIMING CHAIN COVER OIL SEAL (See page EM-31)**
19. **REMOVE NO. 1 CRANKSHAFT POSITION SENSOR PLATE**
20. **REMOVE TIMING CHAIN GUIDE (See page EM-28)**
21. **REMOVE CHAIN TENSIONER SLIPPER (See page EM-28)**
22. **REMOVE CHAIN SUB-ASSEMBLY**
23. **REMOVE NO. 1 CHAIN VIBRATION DAMPER (See page EM-28)**
24. **REMOVE CRANKSHAFT TIMING SPROCKET**
25. **REMOVE NO. 2 CHAIN SUB-ASSEMBLY (See page EM-28)**



26. REMOVE OIL PUMP DRIVE GEAR

27. REMOVE OIL PUMP ASSEMBLY (See page LU-11)

28. REMOVE CAMSHAFT

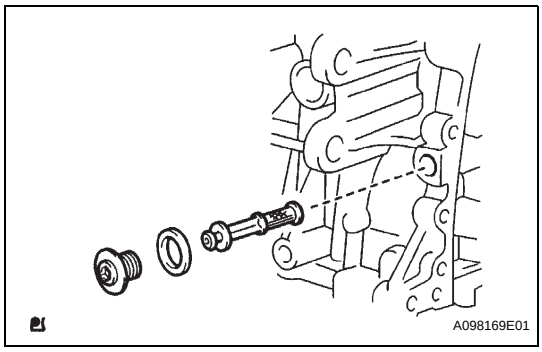
(a) Using several steps, uniformly loosen and remove the 20 bearing cap bolts in the sequence shown in the illustration.

(b) Remove the 10 bearing caps, then remove the camshaft and No. 2 camshaft.

29. REMOVE CYLINDER HEAD SUB-ASSEMBLY (See page EM-61)

30. REMOVE CYLINDER HEAD GASKET

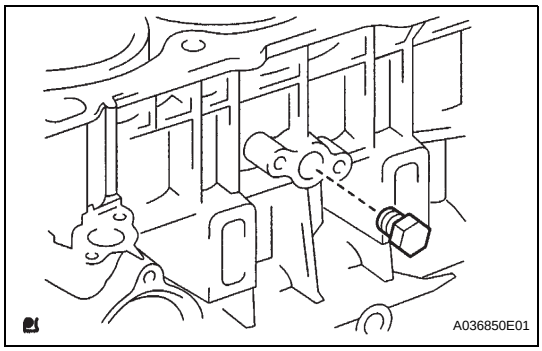
31. REMOVE CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY



32. REMOVE OIL CONTROL VALVE FILTER

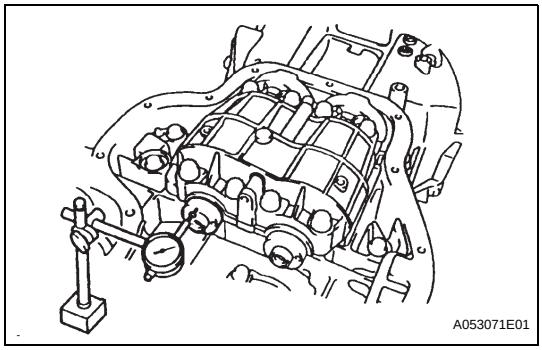
(a) Using a 6 mm socket hexagon wrench, remove the plug and gasket.

(b) Remove the oil control valve filter.



33. REMOVE NO. 1 TAPER SCREW PLUG

(a) Remove the plug from the cylinder block.

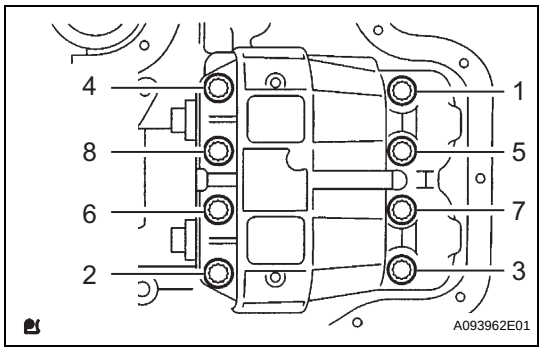


34. INSPECT BALANCE SHAFT THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance while moving the balance shaft back and forth.

Standard thrust clearance:
0.05 to 0.09 mm (0.0020 to 0.0035 in.)
Maximum thrust clearance:
0.09 mm (0.0035 in.)

If the thrust clearance is greater than the maximum, replace the balance shaft housing and bearings. If necessary, replace the balance shaft.



35. INSPECT BALANCE SHAFT OIL CLEARANCE

(a) Using several steps, uniformly loosen and remove the 8 bolts in the sequence shown in the illustration.

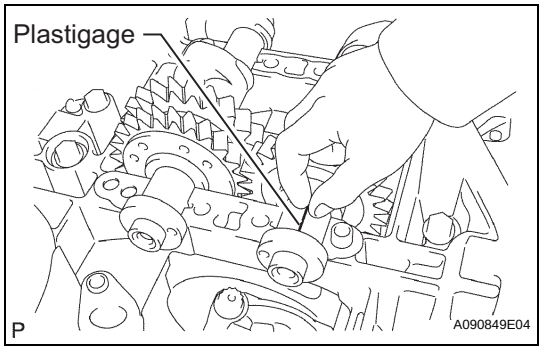
(b) Remove the balance shaft housing from the crankcase.
HINT:
Keep the lower bearing and balance shaft housing together.

(c) Lift out the No. 1 and No. 2 balance shafts.
HINT:
Keep the upper bearing with the crankcase.

(d) Clean each bearing and journal.

(e) Check each bearing and journal for pitting and scratches.
If a bearing or journal is damaged, replace the bearings. If necessary, replace the balance shaft.

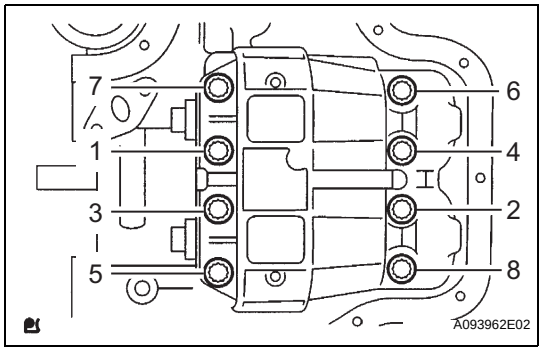
(f) Place the No. 1 and No. 2 balance shafts onto the crankcase.



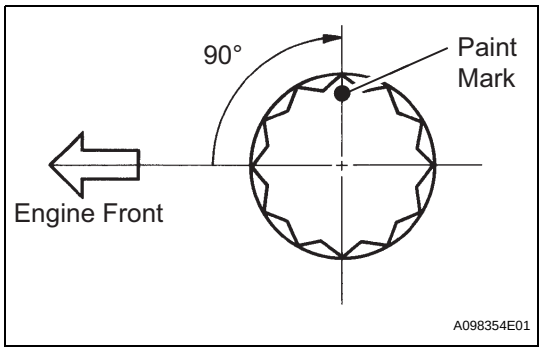
(g) Lay a strip of Plastigage across each journal.

(h) Install the balance shaft housing.

(i) Apply a light coat of engine oil on the threads and under the heads of the bolts.



(j) Using several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.
Torque: 21.6 N*m (220 kgf*cm, 16 ft.*lbf)



(k) Mark the front of the bolts with paint.

(l) Retighten the bolts 90° as shown in the illustration.

(m) Check that the paint mark is now at a 90° angle to the front.

(n) Remove the balance shaft housing from the crankcase.

(o) Measure the Plastigage at its widest point.
Standard oil clearance:
0.004 to 0.049 mm (0.0002 to 0.0019 in.)
Maximum oil clearance:
0.049 mm (0.0019 in.)
NOTICE:
Remove the Plastigage completely after the measurement.

EM

If the oil clearance is greater than the maximum, replace the bearing. If necessary, replace the balance shaft.
HINT:
If replacing a bearing, select a new one with the same number.

Standard balance shaft housing journal bore diameter

Item	Specified Condition
Mark 1	26.000 to 26.006 mm (1.0236 to 1.0239 in.)
Mark 2	26.007 to 26.012 mm (1.0239 to 1.0214 in.)
Mark 3	26.013 to 26.018 mm (1.0241 to 1.0243 in.)

Standard balance shaft journal diameter:
22.985 to 23.000 mm (0.9049 to 0.9055 in.)

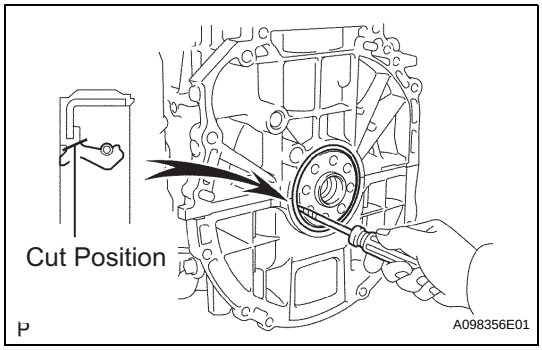
Standard bearing center wall thickness

Item	Specified Condition
Mark 1	1.486 to 1.489 mm (0.0585 to 0.0586 in.)
Mark 2	1.490 to 1.492 mm (0.0587 to 0.0587 in.)
Mark 3	1.493 to 1.495 mm (0.0588 to 0.0589 in.)

36. REMOVE BALANCE SHAFT

37. REMOVE NO. 1 BALANCE SHAFT BEARING

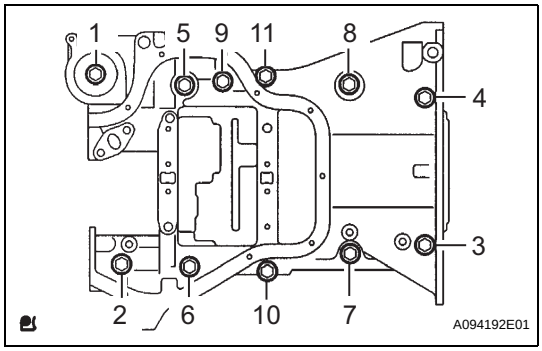
38. REMOVE ENGINE REAR OIL SEAL



(a) Using a knife, cut off the lip of the oil seal.
(b) Using a screwdriver with its tip wrapped with tape, pry out the oil seal.

NOTICE:
After removing, check the crankshaft for damage. If damaged, smooth the surface with 400-grit sandpaper.

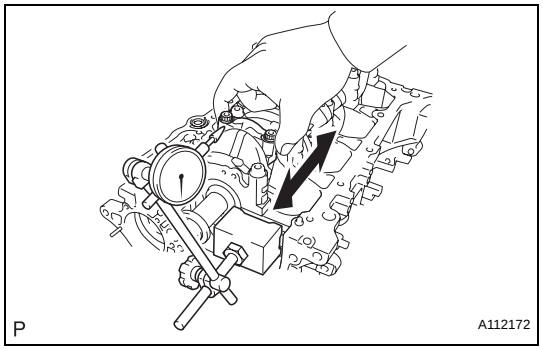
39. REMOVE STIFFENING CRANKCASE ASSEMBLY



(a) Using several steps, uniformly loosen and remove the 11 bolts in the sequence shown in the illustration.
(b) Remove the crankcase by prying the portions between the crankcase and cylinder block.

NOTICE:
Be careful not to damage the contact surfaces of the crankcase and cylinder bock.

(c) Remove the O-ring from the cylinder block.

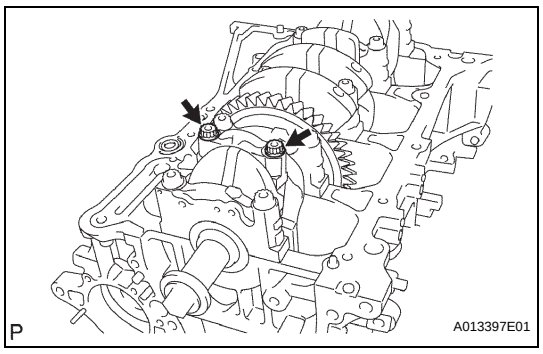


40. INSPECT CONNECTING ROD THRUST CLEARANCE

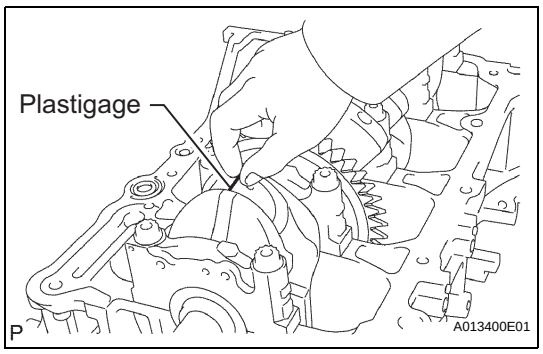
(a) Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.
Standard thrust clearance:
0.160 to 0.362 mm (0.0063 to 0.0143 in.)
Maximum thrust clearance:
0.362 mm (0.0143 in.)
If the thrust clearance is greater than the maximum, replace the connecting rod. If necessary, replace the crankshaft.

41. INSPECT CONNECTING ROD OIL CLEARANCE
NOTICE:
Do not turn the crankshaft during the measurement.

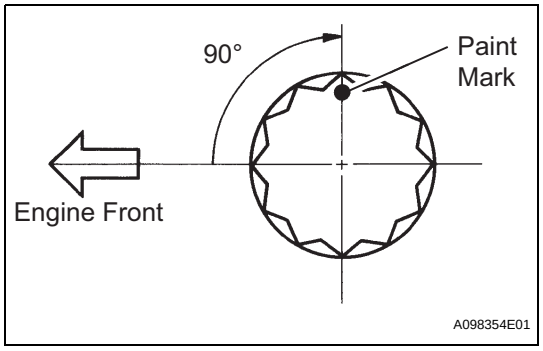
(a) Using marking paint, write the matched cylinder number on each connecting rod and cap.
HINT:
The matchmarks in the connecting rods and caps are for ensuring correct reassembly.



(b) Using a 12 mm socket wrench, remove the 2 bolts and connecting rod cap.
(c) Clean the crank pin and bearing.
(d) Check the crank pin and bearing for pitting and scratches.



(e) Lay a strip of Plastigage on the crank pin.
(f) Check that the front mark of the connecting rod cap is facing in the correct direction.
(g) Apply a light coat of engine oil to the threads and under the heads of the connecting rod bolts.
(h) Using a 12 mm socket wrench, tighten the bolts in several passes to the specified torque.
Torque: 24.5 N*m (250 kgf*cm, 18 ft.*lbf)



(i) Mark the front of the connecting rod bolts with paint.
(j) Retighten the cap bolts 90° as shown in the illustration.
(k) Check that the crankshaft turns smoothly.
(l) Using a 12 mm socket wrench, remove the 2 bolts and connecting rod cap.
(m) Measure the Plastigage at its widest point.
Standard oil clearance:
0.024 to 0.048 mm (0.0009 to 0.0019 in.)
Maximum oil clearance:
0.08 mm (0.0032 in.)
NOTICE:
Remove the Plastigage completely after the measurement.

EM

If the oil clearance is greater than the maximum, replace the connecting rod bearing. If necessary, grind or replace the crankshaft.
HINT:
If replacing a bearing, select a new one with the same number as marked on the connecting rod. There are 3 sizes of standard bearings, marked "1", "2" and "3" accordingly.

Standard connecting rod large end bore diameter

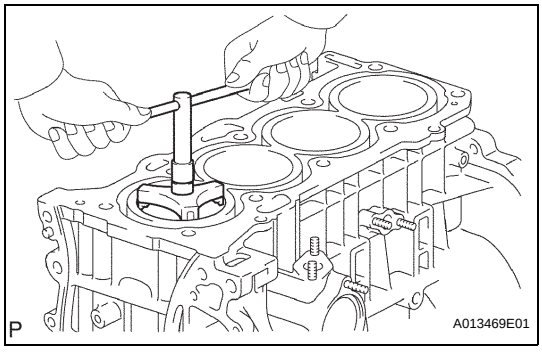
Mark	Specified Condition
Mark 1	51.000 to 51.007 mm (2.0079 to 2.0082 in.)
Mark 2	51.008 to 51.013 mm (2.0082 to 2.0084 in.)
Mark 3	51.014 to 51.020 mm (2.0084 to 2.0087 in.)

Standard connecting rod bearing thickness

Mark	Specified Condition
Mark 1	1.485 to 1.488 mm (0.0585 to 0.0586 in.)
Mark 2	1.489 to 1.491 mm (0.0586 to 0.0587 in.)
Mark 3	1.492 to 1.494 mm (0.0587 to 0.0588 in.)

Standard crankshaft pin diameter

Mark	Specified Condition
-	47.990 to 48.000 (1.8894 to 1.8898 in.)



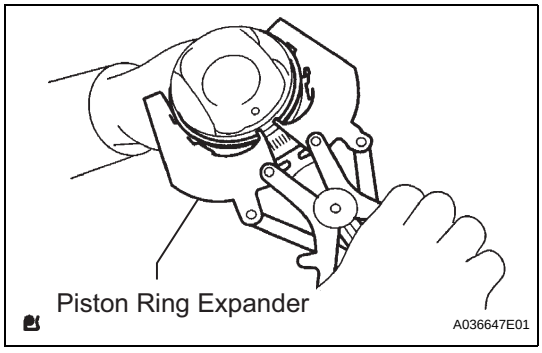
42. REMOVE PISTON SUB-ASSEMBLY WITH CONNECTING ROD

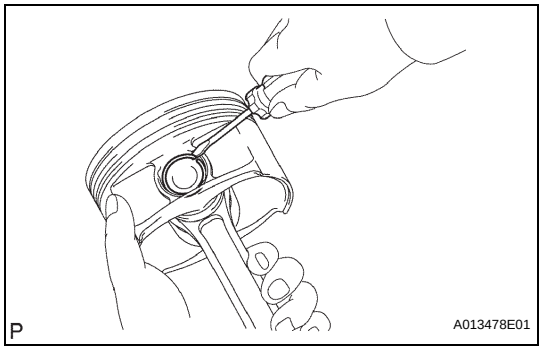
(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.
(b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.
HINT:
- Keep the bearing, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in the correct order.

43. REMOVE CONNECTING ROD BEARING

44. REMOVE PISTON RING SET

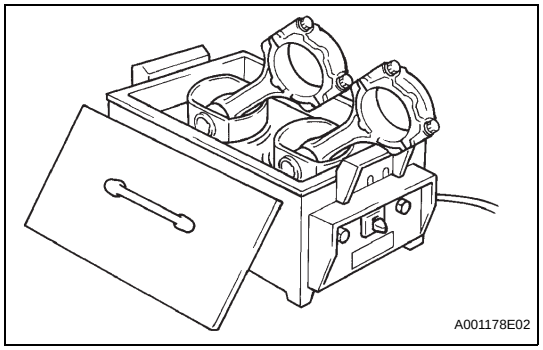
(a) Using a piston ring expander, remove the 2 compression rings.
(b) Remove the 2 side rails and expander by hand.





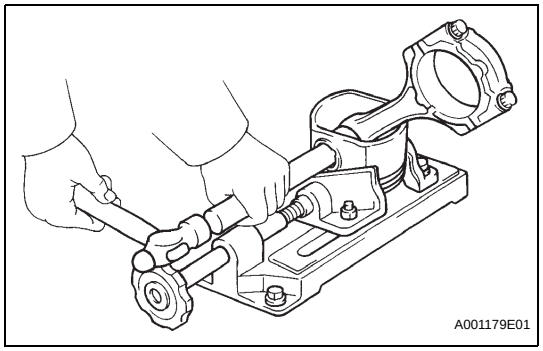
45. REMOVE PISTON PIN HOLE SNAP RING

(a) Using a small screwdriver, pry out the 2 snap rings.

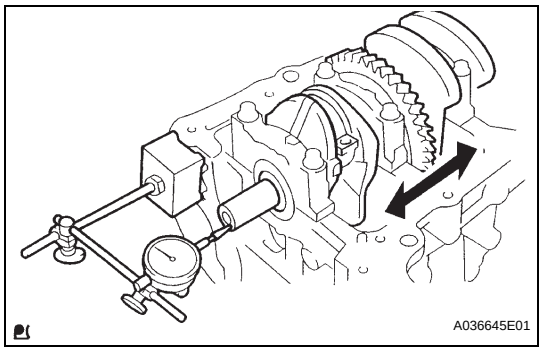


46. REMOVE PISTON

(a) Gradually heat the piston up to 80 to 90°C (176 to 194°F).



(b) Using a plastic hammer and brass bar, lightly tap out the piston pin, then remove the connecting rod.
HINT:
- The piston and pin are a matched set.
- Arrange the piston, pin, ring, connecting rod and bearings in the correct order.



47. INSPECT CRANKSHAFT THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

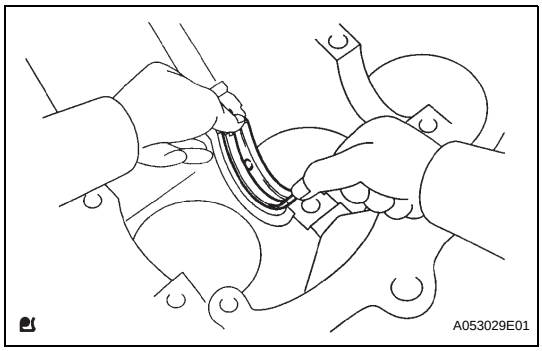
Standard thrust clearance:
0.04 to 0.24 mm (0.0016 to 0.0095 in.)
Maximum thrust clearance:
0.30 mm (0.0118 in.)

If the thrust clearance is greater than the maximum, replace the thrust washers as a set.
HINT:
The thrust washer thickness is 1.93 to 1.98 mm (0.0760 to 0.0780 in.).

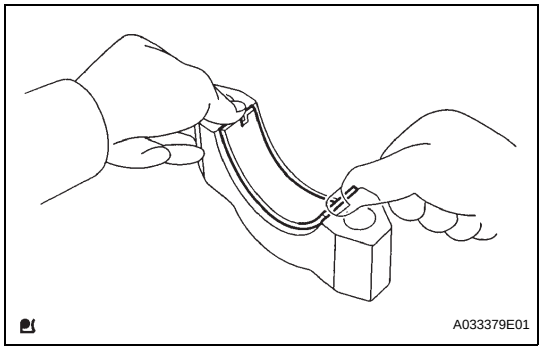
48. INSPECT CRANKSHAFT OIL CLEARANCE

NOTICE:
Do not turn the crankshaft during the measurement.

(a) Clean each main journal and bearing.
(b) Check each main journal and bearing for pitting and scratches.

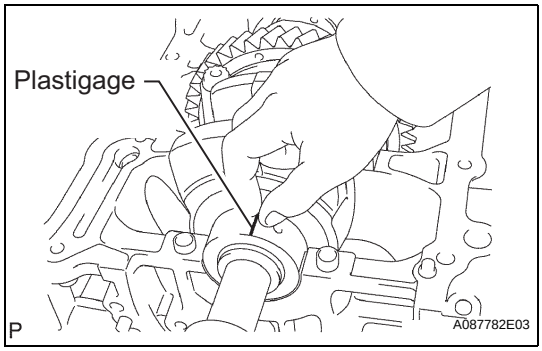


(c) Install the upper bearing with an oil groove onto the cylinder block.
NOTICE:
Do not apply engine oil to the bearing or its contact surface.

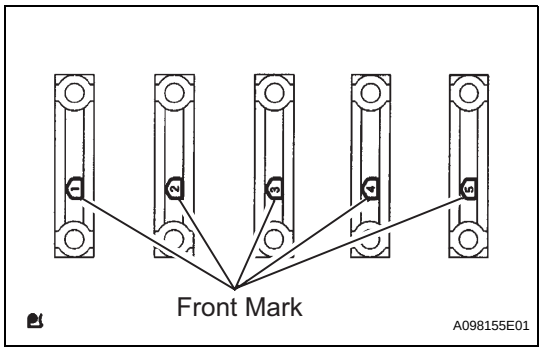


(d) Install the lower bearing onto the bearing cap.
NOTICE:
Do not apply engine oil to the bearing or its contact surface.

(e) Place the crankshaft onto the cylinder block.

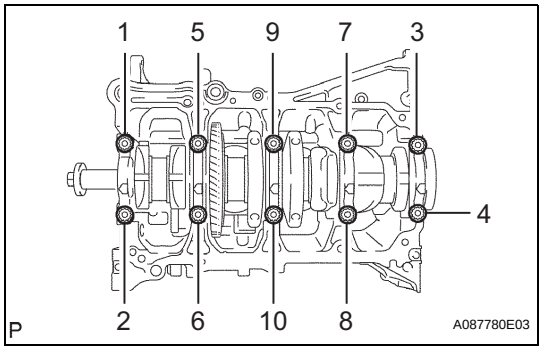


(f) Lay a strip of Plastigage across each journal.

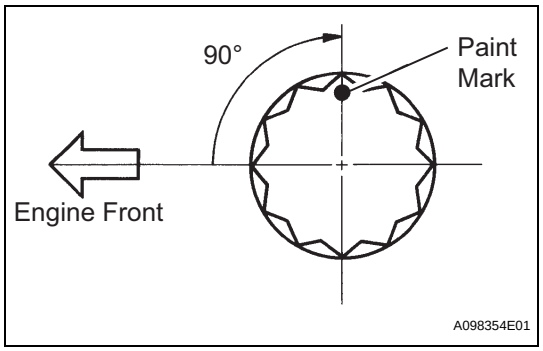


(g) Examine the front marks and numbers and install the bearing caps onto the cylinder block in the order shown in the illustration.

(h) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts.



(i) Using several steps, uniformly install and tighten the 10 bearing cap bolts in the sequence shown in the illustration.
Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)



(j) Mark the front of the bearing cap bolts with paint.
(k) Retighten the 10 bearing cap bolts by 90°.
(l) Check that the paint marks are at a 90° angle to the front.
(m) Remove the bearing caps.
(n) Measure the Plastigage at its widest point.

Standard oil clearance:
0.017 to 0.040 mm (0.0007 to 0.0016 in.)
Maximum oil clearance:
0.050 mm (0.0020 in.)
NOTICE:
Remove the Plastigage completely after the measurement.

If the oil clearance is greater than the maximum, replace the crankshaft bearing. If necessary, replace the crankshaft.

HINT:

If replacing a bearing, select a new one with the same number. If the number of the bearing cannot be determined, calculate the correct bearing number by adding together the numbers imprinted on the cylinder block and crankshaft. Then select a new bearing with the calculated number. There are 4 sizes of standard bearings, marked "1", "2", "3" and "4" accordingly.

Cylinder block + Crankshaft	0 to 2	3 to 5	6 to 8	9 to 11
Use bearing	"1"	"2"	"3"	"4"

EXAMPLE

- Imprinted number on the cylinder block is 3.
- Imprinted number on the crankshaft is 4. 3 + 4 = 7

  Select the bearing marked "7".

Standard cylinder block journal bore diameter

Mark	Specified Condition
0	59.000 to 59.002 mm (2.3228 to 2.3229 in.)
1	59.003 to 59.004 mm (2.3230 to 2.3230 in.)
2	59.005 to 59.006 mm (2.3230 to 2.3231 in.)
3	59.007 to 59.009 mm (2.3231 to 2.3232 in.)
4	59.010 to 59.011 mm (2.3232 to 2.3233 in.)
5	59.012 to 59.013 mm (2.3233 to 2.3234 in.)
6	59.014 to 59.016 mm (2.3234 to 2.3235 in.)

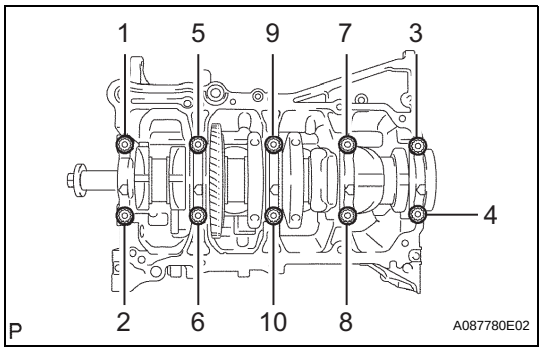
Standard crankshaft journal diameter

Mark	Specified Condition
0	54.999 to 55.000 mm (2.1653 to 2.1654 in.)

Mark	Specified Condition
1	54.997 to 54.998 mm (2.1652 to 2.1653 in.)
2	54.995 to 54.996 mm (2.1652 to 2.1652 in.)
3	54.993 to 54.994 mm (2.1651 to 2.1651 in.)
4	54.991 to 54.992 mm (2.1650 to 2.1650 in.)
5	54.988 to 54.990 mm (2.1649 to 2.1650 in.)

Standard bearing center wall thickness

Mark	Specified Condition
1	1.993 to 1.996 mm (0.0785 to 0.0786 in.)
2	1.997 to 1.999 mm (0.0786 to 0.0787 in.)
3	2.000 to 2.002 mm (0.0787 to 0.0788 in.)
4	2.003 to 2.005 mm (0.0789 to 0.0789 in.)



49. REMOVE CRANKSHAFT

(a) Using several steps, uniformly loosen and remove the 10 bearing cap bolts in the sequence shown in the illustration.
(b) Remove the 5 bearing caps from the cylinder block.
(c) Remove the crankshaft from the cylinder block.

50. REMOVE CRANKSHAFT THRUST WASHER UPPER

51. REMOVE CRANKSHAFT BEARING

HINT:
Arrange the bearings in the correct order.

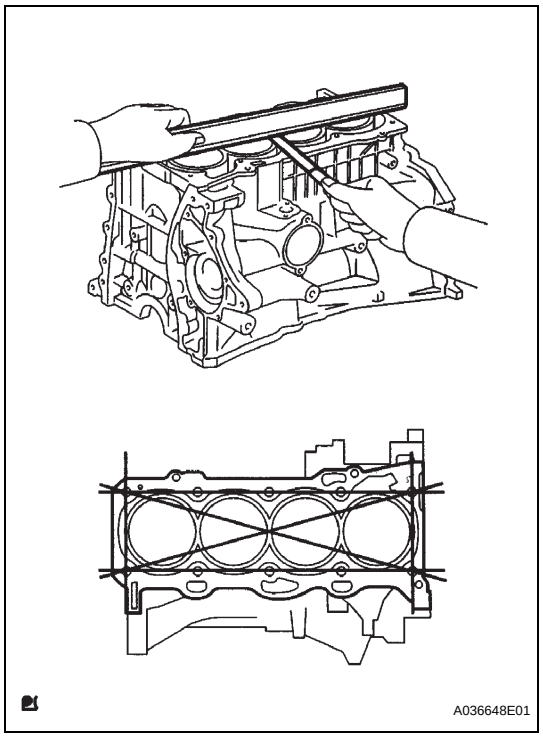
52. REMOVE NO. 2 CRANKSHAFT BEARING

HINT:
Arrange the bearings in the correct order.

53. REMOVE STUD BOLT

(a) Remove the 8 stud bolts.

INSPECTION



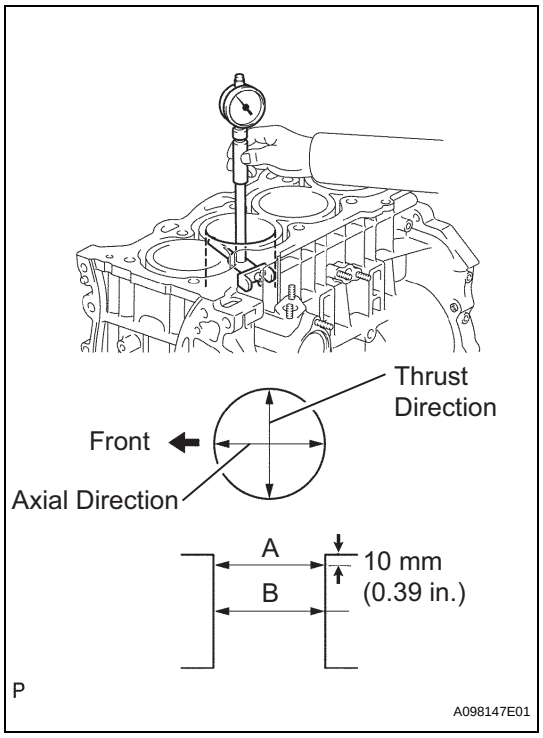
1. INSPECT CYLINDER BLOCK FOR WARPAGE

(a) Using a precision straightedge and feeler gauge, measure the warpage of the surface that is in contact with the cylinder head gasket.

Maximum warpage:

0.05 mm (0.0020 in.)

If the warpage is greater than the maximum, replace the cylinder block.



2. INSPECT CYLINDER BORE

(a) Using a cylinder gauge, measure the cylinder bore diameter at positions A and B in the thrust and axial directions.

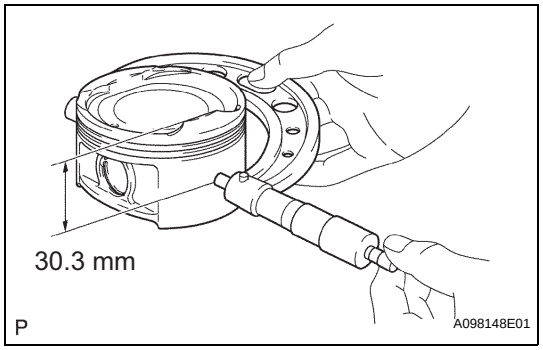
Standard diameter:

88.500 to 88.513 mm (3.4843 to 3.4848 in.)

Maximum diameter:

88.633 mm (3.4895 in.)

If the average diameter of the 4 positions is greater than the maximum, replace the cylinder block.



3. INSPECT PISTON

(a) Using a micrometer, measure the piston diameter at right angles to the piston pin hole, and at the piston 30.3 mm (1.193 in.) from the piston head.

Standard piston diameter:

88.439 to 88.449 mm (3.4819 to 3.4822 in.)

If the diameter is not as specified, replace the piston.

4. INSPECT PISTON OIL CLEARANCE

(a) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:
0.051 to 0.074 mm (0.0020 to 0.0029 in.)
Maximum oil clearance:
0.10 mm (0.0039 in.)

If the oil clearance is greater than the maximum, replace all the pistons. If necessary, replace the cylinder block.

5. INSPECT RING GROOVE CLEARANCE

(a) Using a feeler gauge, measure the clearance between the new piston ring and wall of the ring groove.

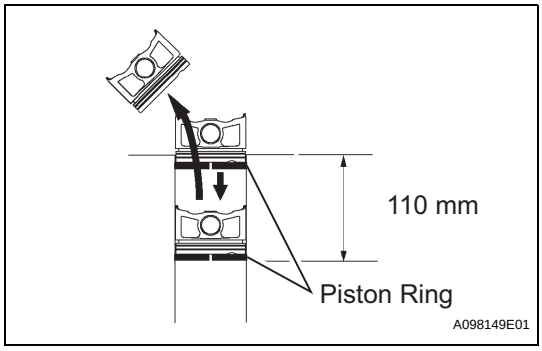
Standard ring groove clearance

Item	Specified Condition
No. 1 ring	0.17 to 0.22 mm (0.0067 to 0.0087 in.)
No. 2 ring	0.17 to 0.21 mm (0.0067 to 0.0083 in.)
Oil ring	0.21 to 0.29 mm (0.0083 to 0.0114 in.)

If the groove clearance is not as specified, replace the piston.

6. INSPECT PISTON RING END GAP

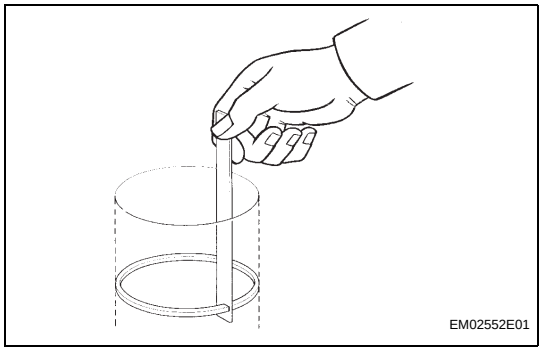
(a) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 110 mm (4.33 in.) from the top of the cylinder block.



(b) Using a feeler gauge, measure the end gap.

Standard end gap

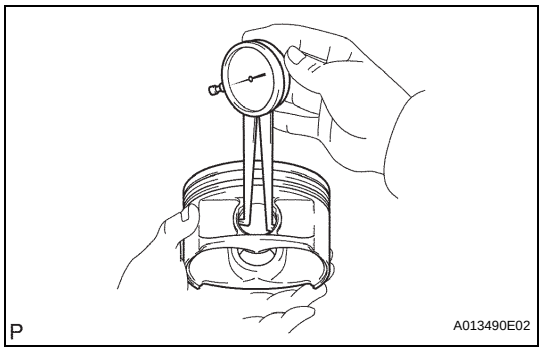
Item	Specified Condition
No. 1 ring	0.22 to 0.32 mm (0.0087 to 0.0126 in.)
No. 2 ring	0.50 to 0.60 mm (0.0197 to 0.0236 in.)
Oil ring	0.10 to 0.35 mm (0.0039 to 0.0138 in.)



Maximum end gap

Item	Specified Condition
No. 1 ring	0.89 mm (0.0350 in.)
No. 2 ring	1.35 mm (0.0531 in.)
Oil ring	0.73 mm (0.0287 in.)

If the end gap is greater than the maximum, replace the piston ring. If the end gap is greater than the maximum, even with a new piston ring, replace the cylinder block.



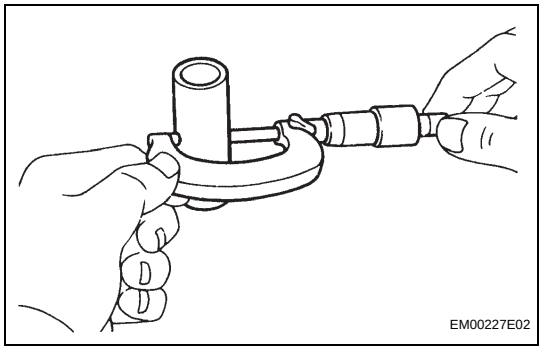
7. INSPECT PISTON PIN OIL CLEARANCE

(a) Using a caliper gauge, measure the piston pin bore diameter.

Standard piston pin bore diameter:
22.001 to 22.010mm (0.8662 to 0.8665 in.)

Item	Specified Condition
A	22.001 to 22.004 mm (0.8662 to 0.8663 in.)
B	22.005 to 22.007 mm (0.8663 to 0.8664 in.)
C	22.008 to 22.010 mm (0.8665 to 0.8665 in.)

If the diameter is not as specified, replace the piston.

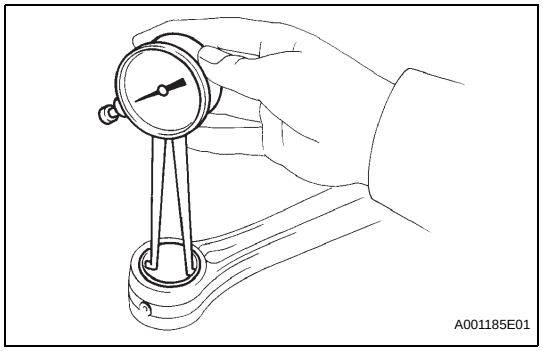


(b) Using a micrometer, measure the piston pin diameter.

Standard piston pin diameter:
21.997 to 22.006 mm (0.8660 to 0.8664 in.)

Item	Specified Condition
A	21.997 to 22.000 mm (0.8660 to 0.8661 in.)
B	22.001 to 22.003 mm (0.8662 to 0.8663 in.)
C	22.004 to 22.006 mm (0.8663 to 0.8664 in.)

If the diameter is not as specified, replace the piston pin.



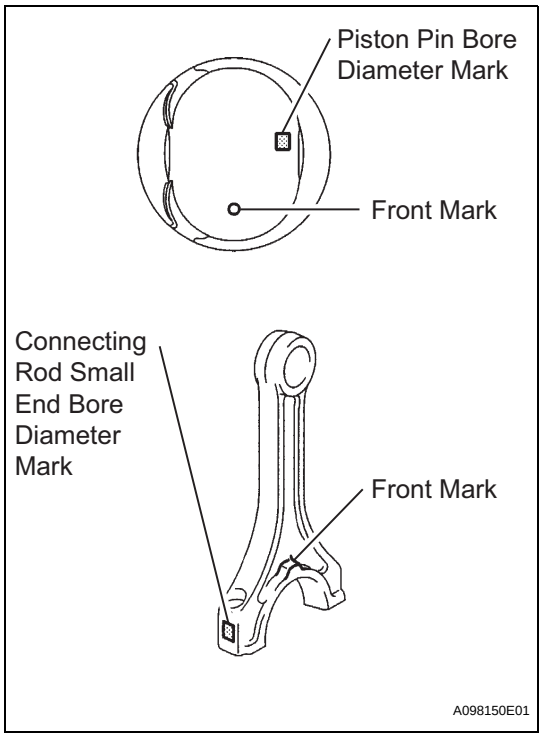
(c) Using a caliper gauge, measure the connecting rod small end bore diameter.

Standard connecting rod small end bore diameter:
22.005 to 22.014 mm (0.8663 to 0.8667 in.)

Item	Specified Condition
A	22.005 to 22.008 mm (0.8663 to 0.8665 in.)
B	22.009 to 22.011 mm (0.8665 to 0.8666 in.)
C	22.012 to 22.014 mm (0.8666 to 0.8667 in.)

If the diameter is not as specified, replace the connecting rod.

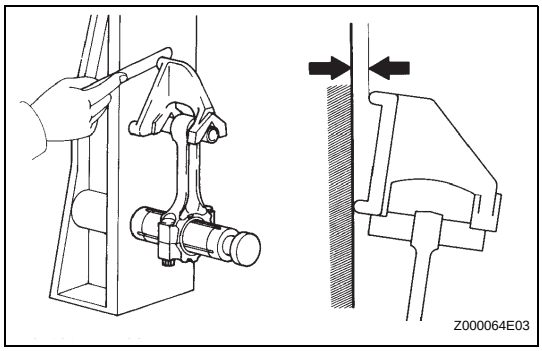
EM



(d) Subtract the piston pin diameter measurement from the piston pin bore diameter measurement.
Standard oil clearance:
0.001 to 0.007 mm (0.00004 to 0.0003 in.)
Maximum oil clearance:
0.013 mm (0.0005 in.)
If the oil clearance is greater than the maximum, replace the connecting rod. If necessary, replace the piston and piston pin as a set.

(e) Subtract the piston pin diameter measurement from the connecting rod small end bore diameter measurement.
Standard oil clearance:
0.005 to 0.011 mm (0.0002 to 0.0004 in.)
Maximum oil clearance:
0.017 mm (0.0007 in.)
If the oil clearance is greater than the maximum, replace the connecting rod. If necessary, replace the connecting rod and piston pin as a set.

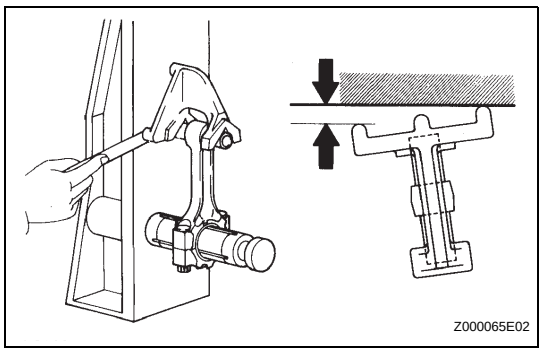
EM



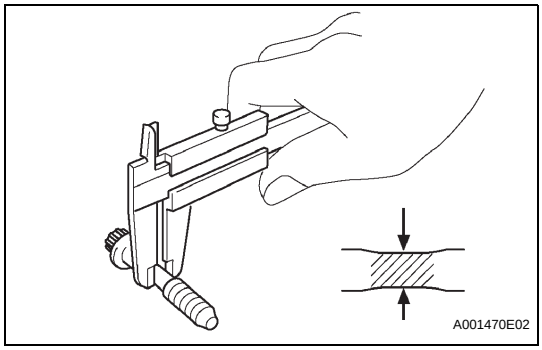
8. INSPECT CONNECTING ROD SUB-ASSEMBLY

(a) Using a connecting rod aligner and feeler gauge, check the connecting rod alignment.

(1) Check for misalignment.
Maximum misalignment:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)
If the misalignment is greater than the maximum, replace the connecting rod.

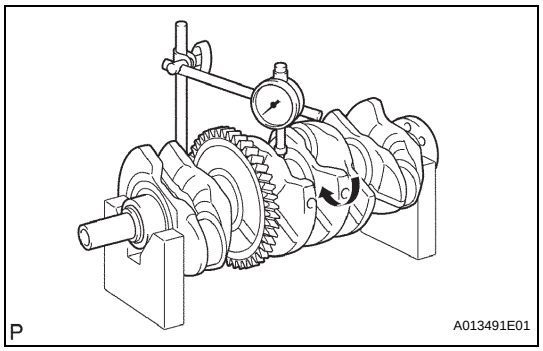


(2) Check for twist.
Maximum twist:
0.15 mm (0.0059 in.) per 100 mm (3.94 in.)
If the twist is greater than the maximum, replace the connecting rod.



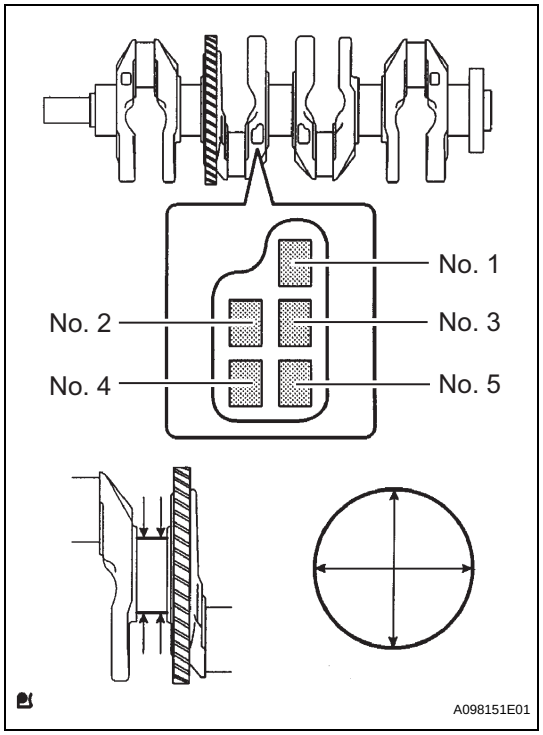
9. INSPECT CONNECTING ROD BOLT

(a) Using vernier calipers, measure the tension portion diameter of the bolt.
Standard diameter:
7.2 to 7.3 mm (0.283 to 0.287 in.)
Maximum diameter:
7.0 mm (0.276 in.)
If the diameter is less than the minimum, replace the connecting rod bolt.



10. INSPECT CRANKSHAFT

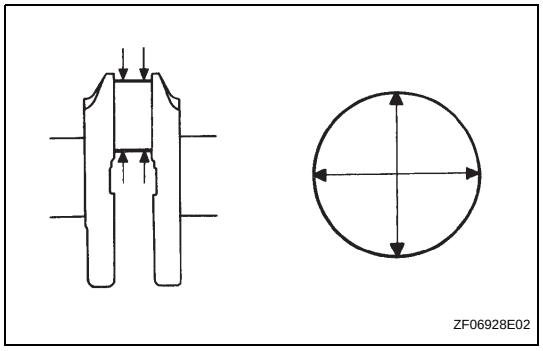
(a) Using a dial indicator and V-blocks, measure the circle runout as shown in the illustration.
Maximum taper and distortion:
0.003 mm (0.0001 in.)
If the taper and distortion are greater than the maximum, replace the crankshaft.



(b) Using a micrometer, measure the diameter of each main journal.
Standard diameter:
54.998 to 55.000 mm (2.1649 to 2.1654 in.)
If the diameter is not as specified, check the crankshaft oil clearance.

(c) Check each main journal for taper and distortion as shown in the illustration.
Maximum taper and distortion:
0.003 mm (0.0001 in.)
If the taper and distortion are greater than the maximum, replace the crankshaft.
Standard diameter (Reference)

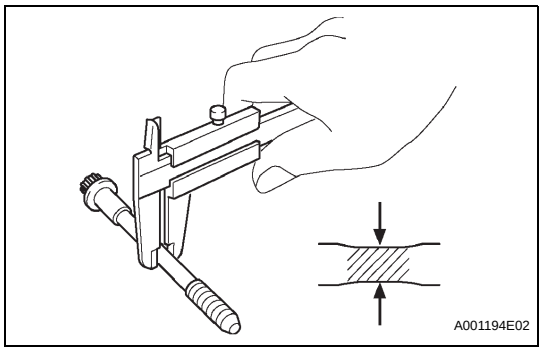
Mark	Specified Condition
0	54.999 to 55.000 mm (2.1653 to 2.1654 in.)
1	54.997 to 54.998 mm (2.1652 to 2.1653 in.)
2	54.995 to 54.996 mm (2.1652 to 2.1652 in.)
3	54.993 to 54.994 mm (2.1651 to 2.1651 in.)
4	54.991 to 54.992 mm (2.1650 to 2.1650 in.)
5	54.998 to 54.990 mm (2.1649 to 2.1650 in.)



(d) Using a micrometer, measure the diameter of each crank pin.
Standard diameter:
47.990 to 48.000 mm (1.8894 to 1.8898 in.)
If the diameter is not as specified, check the connecting rod oil clearance.

(e) Inspect each crank pin for taper and distortion as shown in the illustration.
Maximum taper and distortion:
0.003 mm (0.0001 in.)
If the taper and distortion are greater than the maximum, replace the crankshaft.

EM



11. INSPECT CRANKSHAFT BEARING CAP SET BOLT

(a) Using vernier calipers, measure the tension portion diameter of the bolts.

Standard diameter:

7.5 to 7.6 mm (0.295 to 0.299 in.)

Minimum diameter:

7.5 mm (0.295 in.)

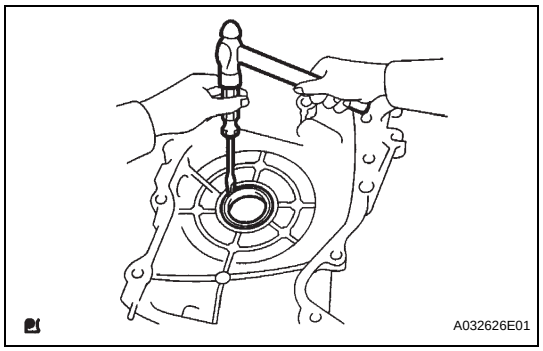
If the diameter is less than the minimum, replace the bolt.

REPLACEMENT

1. REPLACE TIMING CHAIN COVER OIL SEAL

HINT:

There are 2 methods to replace the oil seal.



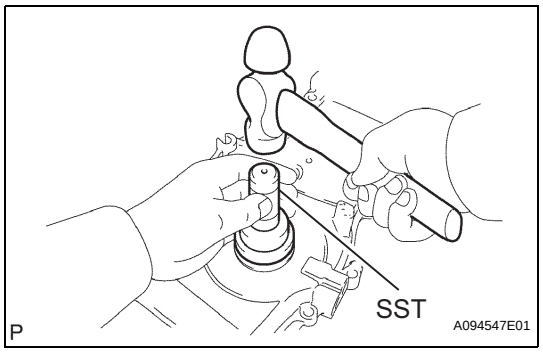
(a) If the timing chain cover is removed from the cylinder block:

(1) Using a screwdriver and hammer, tap out the oil seal.

(2) Apply multi-purpose grease to the lip of a new oil seal.

NOTICE:

Keep the lip free of foreign objects.



(3) Using SST and a hammer, tap in the new oil seal until its surface is flush with the timing chain cover edge.

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NOTICE:

Wipe any extra grease off the crankshaft.

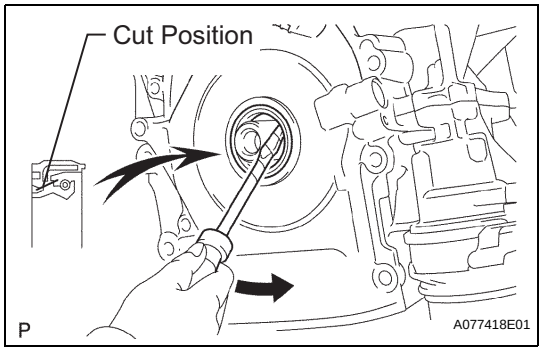
(b) If the timing chain cover oil seal is installed to the cylinder block:

(1) Remove the front wheel RH.

(2) Remove the front fender apron seal RH (see page ES-375).

(3) Remove fan and generator V belt (see page EM-6).

(4) Remove the crankshaft pulley (see page EM-26).



(5) Using a knife, cut off the lip of the oil seal.

(6) Using a screwdriver with its tip wrapped with tape, pry out the oil seal.

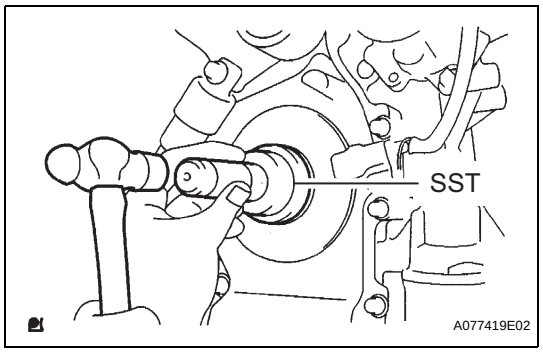
NOTICE:

After removing, check the crankshaft for damage. If damaged, smooth the surface with 400-grit sandpaper.

(7) Apply multi-purpose grease to the lip of a new oil seal.

NOTICE:

Keep the lip free of foreign objects.



(8) Using SST and a hammer, tap in the new oil seal until its surface is flush with the timing chain cover edge.

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(9) Install the crankshaft pulley (see page EM-37).

(10) Install the fan and generator V belt (see page EM-6).

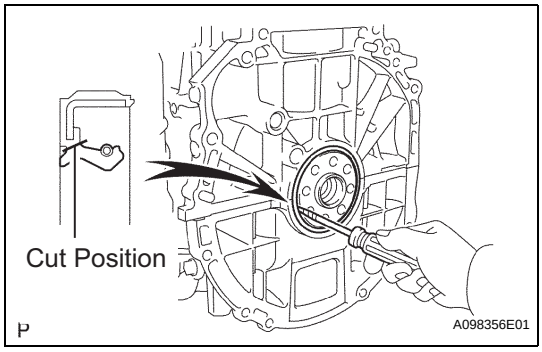
(11) Install the front fender apron seal (see page ES-376).

(12) Install the front wheel RH (see page BR-29).

EM

2. REPLACE ENGINE REAR OIL SEAL

(a) If the engine is installed to the vehicle, perform the following procedures.
  (1) Remove the automatic transaxle assembly (for automatic transaxle) (see page AX-147).
  (2) Remove the drive plate sub-assembly (for automatic transaxle) (see page EM-99).
  (3) Remove the manual transaxle assembly (for manual transaxle) (see page MX-13).
  (4) Remove the clutch cover assembly (for manual transaxle) (see page CL-20).
  (5) Remove the clutch disc assembly (for manual transaxle).



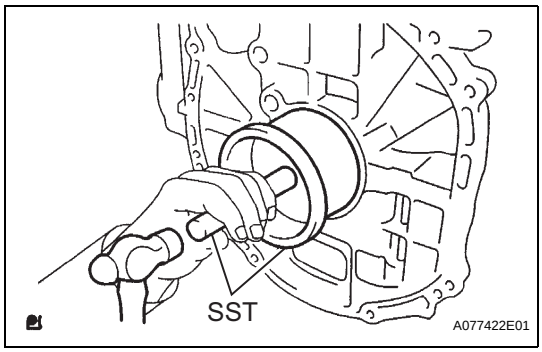
(b) Using a knife, cut off the lip of the oil seal.

(c) Using a screwdriver with its tip wrapped with tape, pry out the oil seal.

NOTICE:
After removing, check the crankshaft for damage. If damaged, smooth the surface with 400-grit sandpaper.

(d) Apply multi-purpose grease to the lip of a new oil seal.

CAUTION:
Keep the lip free of foreign objects.



(e) Using SST and a hammer, tap in the new oil seal until its surface is flush with the rear oil seal retainer edge.

SST 09223-15030, 09950-70010 (09951-07100)

NOTICE:
Wipe any extra grease off the crankshaft.

(f) If the engine is installed to the vehicle, perform the following procedures.
  (1) Install the drive plate sub-assembly (for automatic transaxle) (see page EM-102)
  (2) Install the automatic transaxle assembly (for automatic transaxle) (see page AX-154).
  (3) Install the clutch disc assembly (for manual transaxle) (see page CL-21).
  (4) Install the clutch cover assembly (for manual transaxle) (see page CL-21).
  (5) Install the manual transaxle assembly (for manual transaxle) (see page MX-21).

REASSEMBLY

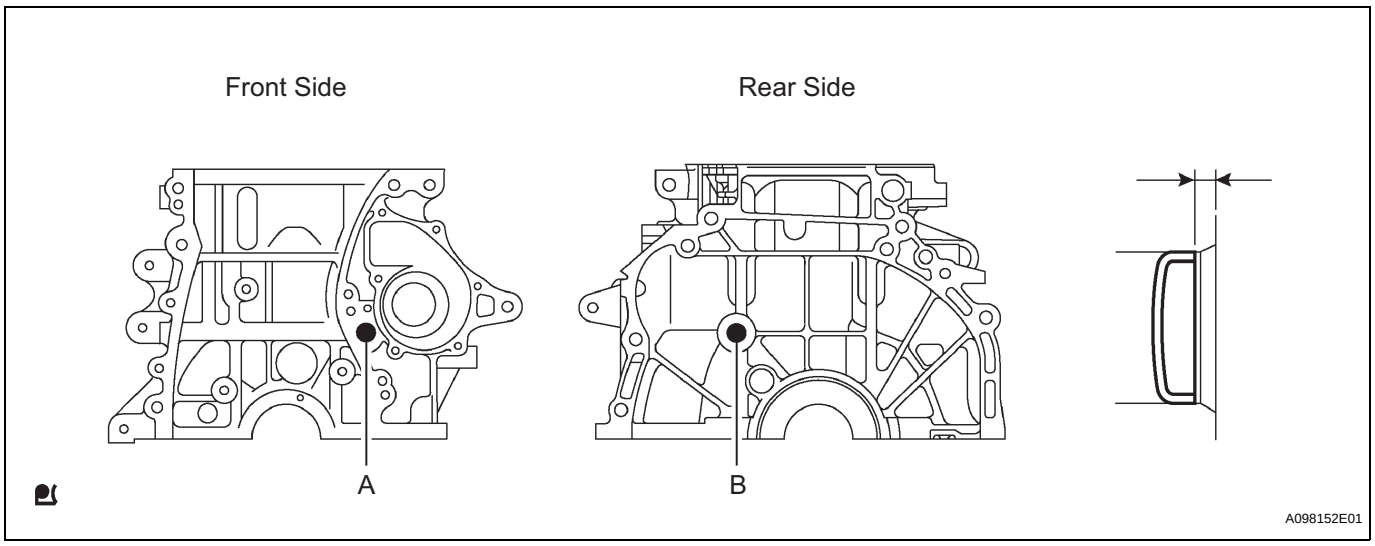
1. INSTALL TIGHT PLUG

(a) Apply adhesive around the new tight plugs.

Adhesive:

Toyota Genuine Adhesive 1324, Three bond 1324 or equivalent

(b) Using SST, install the 2 tight plugs.



SST 09950-60010 (09951-00200), 09950-70010 (09951-07100)

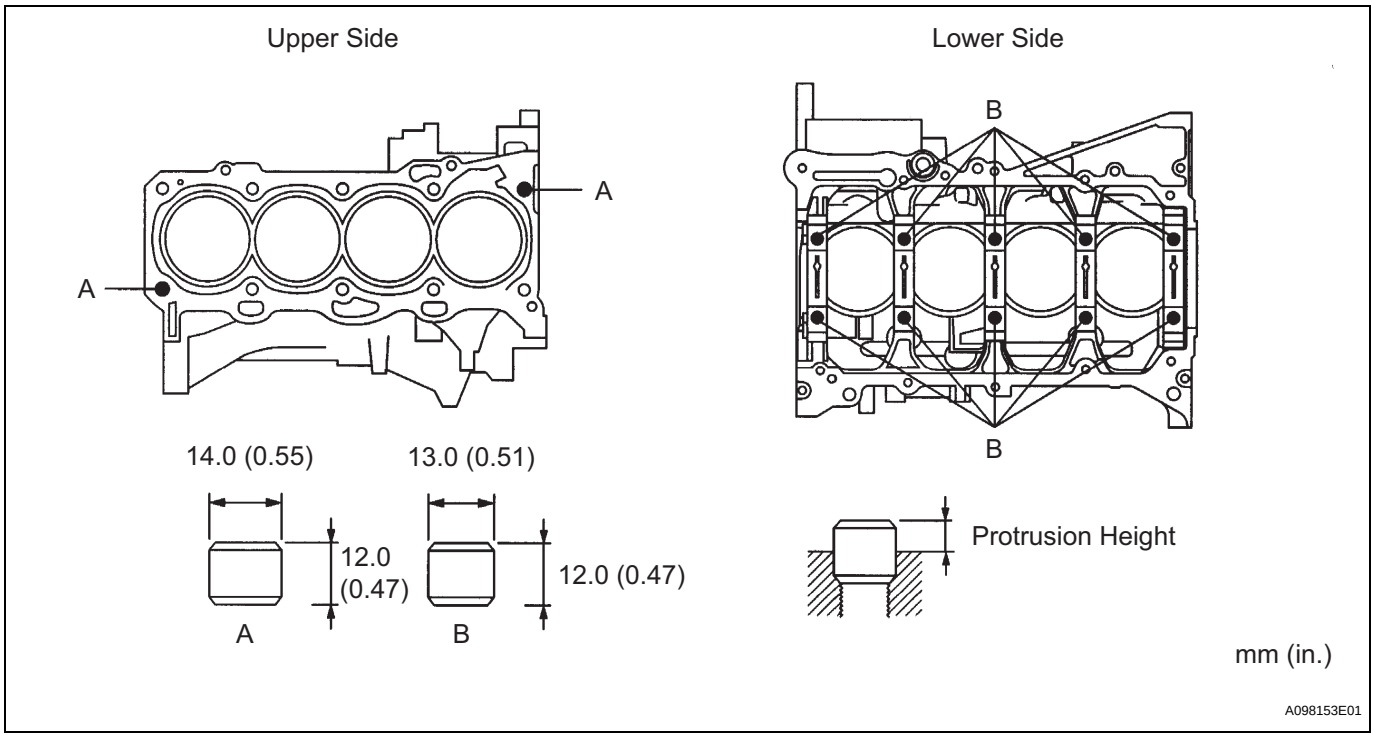
Standard depth

Item	Specified Condition
A	1.7 to 2.7 mm (0.067 to 0.106 in.)
B	2.2 to 3.2 mm (0.087 to 0.126 in.)

EM

2. INSTALL RING PIN

(a) Using a plastic hammer, install 12 new ring pins.



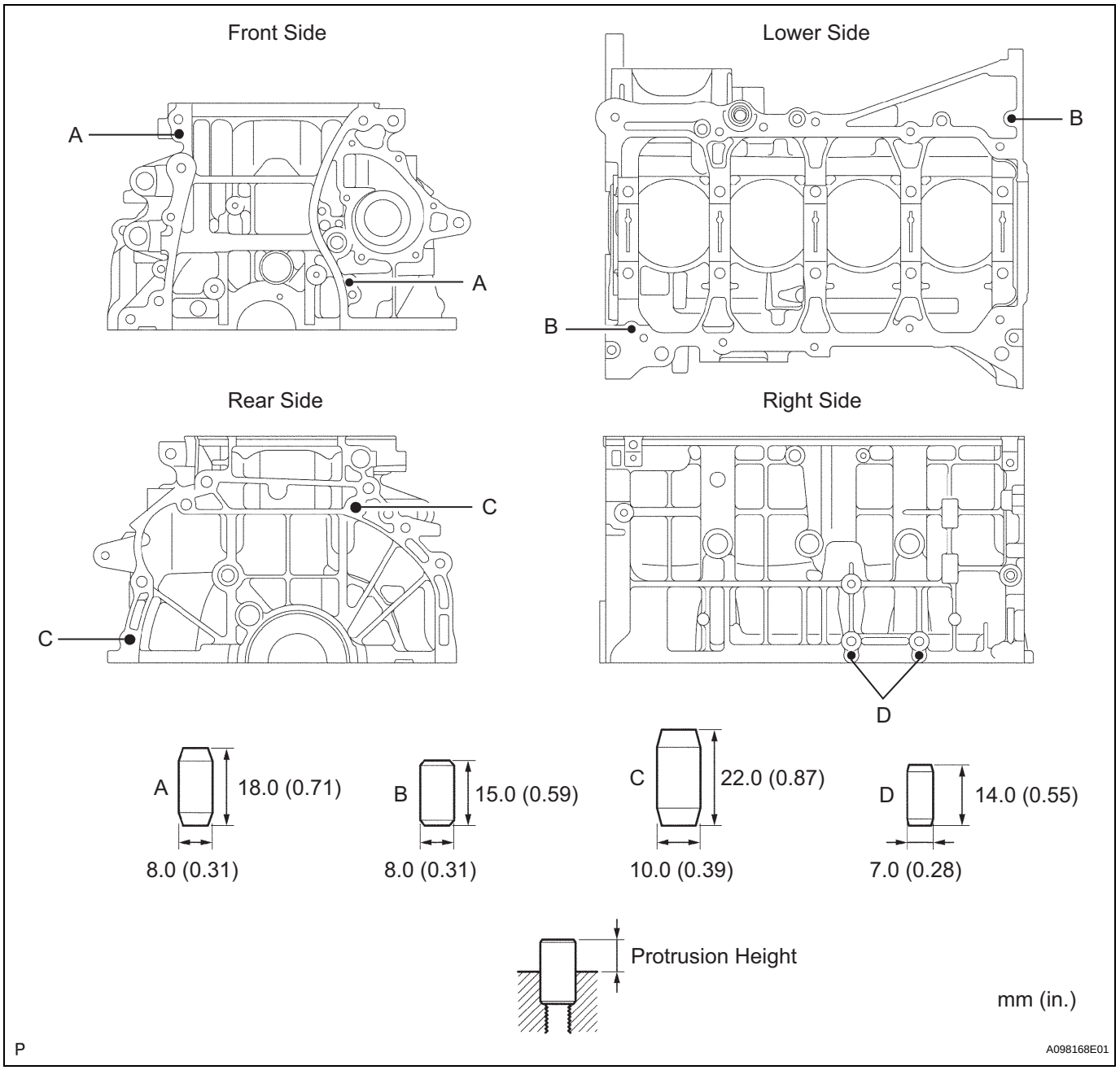
EM

Standard protrusion height

Item	Specified Condition
A	6.0 mm (0.236 in.)
B	5.0 mm (0.197 in.)

3. INSTALL STRAIGHT PIN

(a) Using a plastic hammer, install 8 new straight pins.

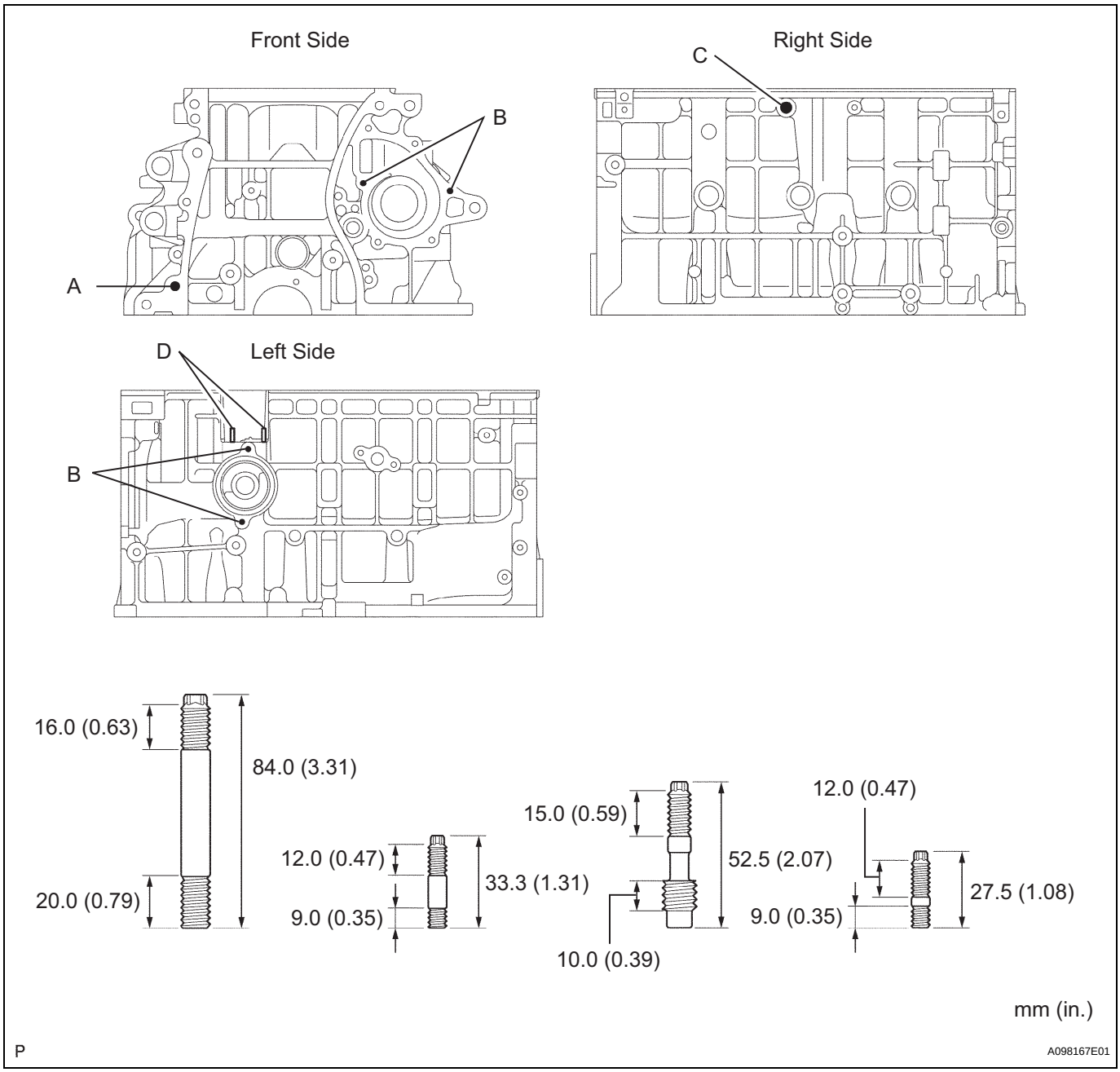


Standard protrusion height

Item	Specified Condition
A	8.0 mm (0.315 in.)
B	7.5 mm (0.295 in.)
C	12.0 mm (0.472 in.)
D	5.0 mm (0.197 in.)

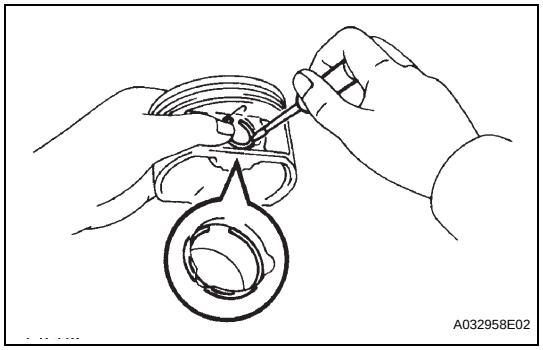
4. INSTALL STUD BOLT

(a) Install the 8 stud bolts into the cylinder block.



Torque

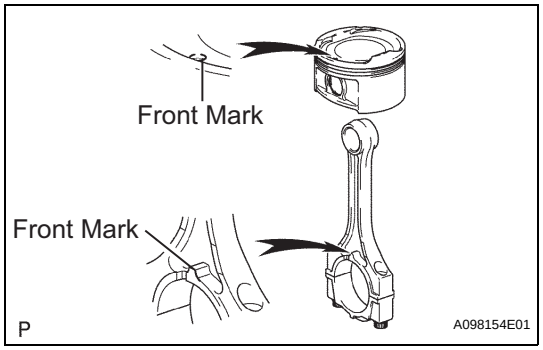
Item	Specified Condition
A	5.0 N*m (51 kgf*cm, 44 in.*lbf)
B	21.5 N*m (219 kgf*cm, 16 ft.*lbf)
C	5.0 N*m (51 kgf*cm, 44 in.*lbf)
D	9.5 N*m (97 kgf*cm, 84 in.*lbf)



5. INSTALL PISTON

(a) Using a small screwdriver, install a new snap ring onto one end of the piston pin hole.
HINT:
Make sure that the end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

(b) Gradually heat the piston up to 80 to 90°C (176 to 194°F).

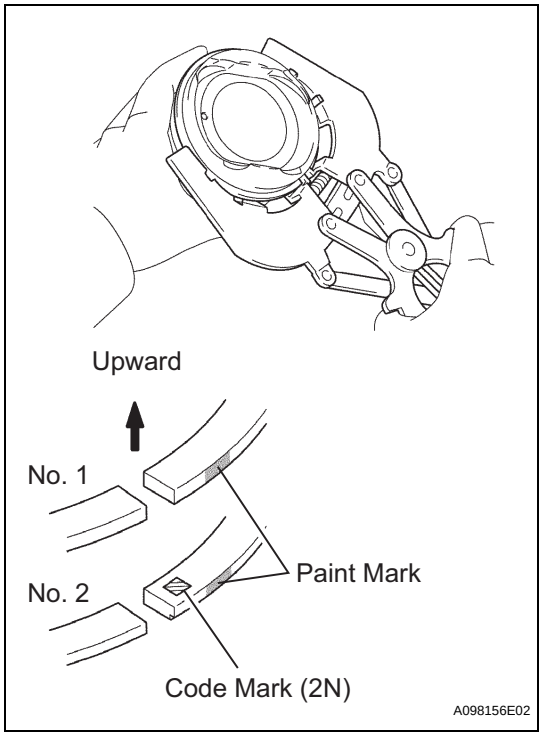


(c) Align the front marks of the piston and connecting rod, then push in the piston pin with your thumb until the pin comes into contact with the snap pin hole.
HINT:
Make sure that the end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

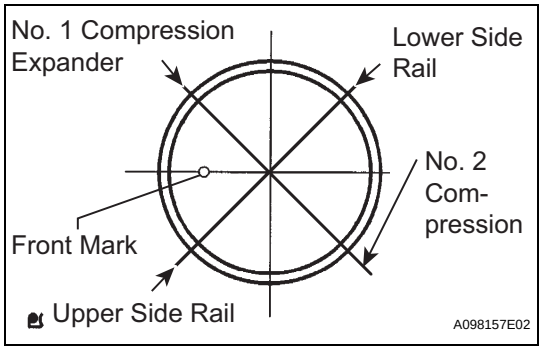
EM

6. INSTALL PISTON RING SET

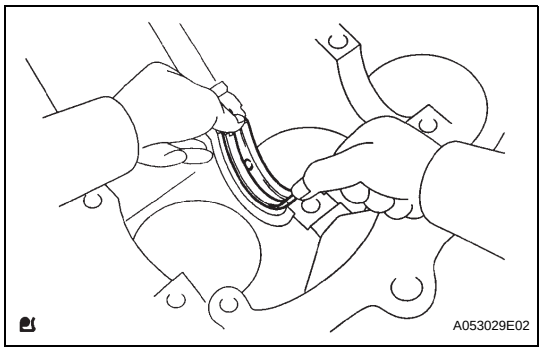
(a) Install the expander and 2 side rails by hand.



(b) Using a piston ring expander, install the 2 compression rings with the paint mark as shown in the illustration.
NOTICE:
Install No. 2 compression ring with the cord mark (2N) facing upward.



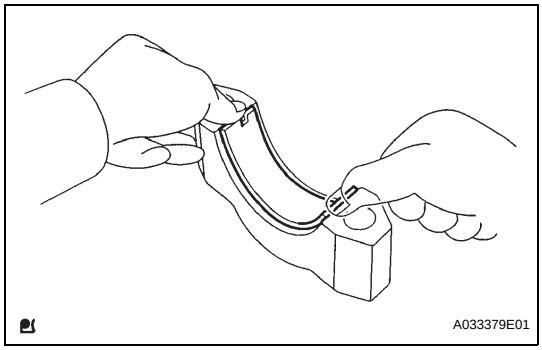
(c) Position the piston rings so that the ring ends are as shown in the illustration.



7. INSTALL CRANKSHAFT BEARING

(a) Install the upper bearing with an oil groove onto the cylinder block.

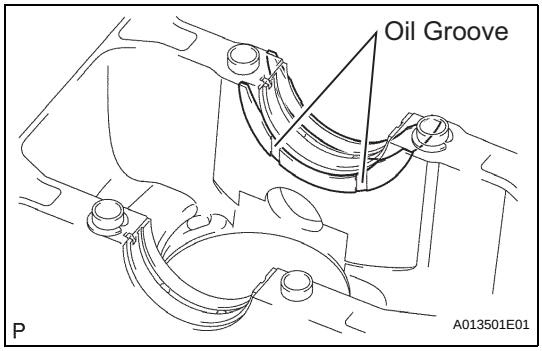
NOTICE:
Do not apply engine oil to the bearing or its contact surface.



8. INSTALL NO. 2 CRANKSHAFT BEARING

(a) Install the lower bearing onto the bearing cap.

NOTICE:
Do not apply engine oil to the bearing or its contact surface.

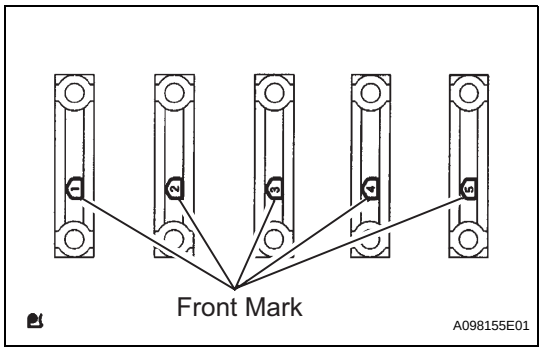


9. INSTALL CRANKSHAFT THRUST WASHER UPPER

(a) Install the 2 thrust washers onto the No. 3 journal position of the cylinder block with the oil groove facing outward.

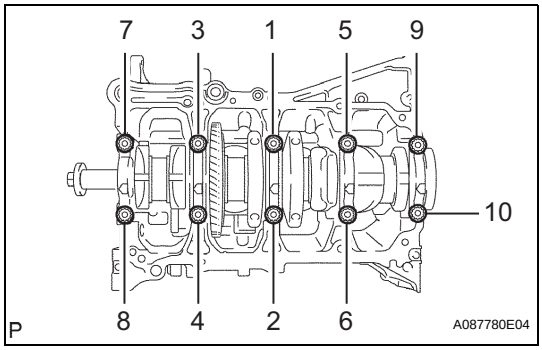
10. INSTALL CRANKSHAFT

(a) Apply engine oil to the upper bearing, and install the crankshaft onto the cylinder block.



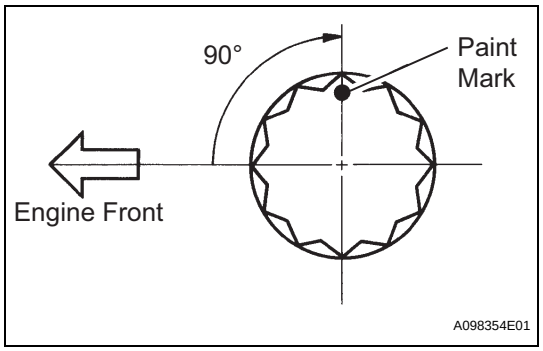
(b) Examine the front marks and numbers and install the bearing caps onto the cylinder block in the order shown in the illustration.

(c) Apply a light coat of engine oil to the threads and under the heads of the bearing cap bolts.

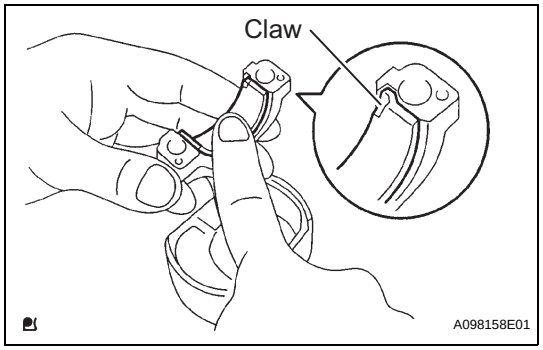


(d) Using several steps, uniformly install and tighten the 10 bearing cap bolts in the sequence shown in the illustration.

Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)



(e) Mark the front of the bearing cap bolts with paint.
(f) Retighten the 8 bearing cap bolts by 90° in the same sequence.
(g) Check that the paint marks are now at a 90° angle to the front.
(h) Check that the crankshaft turns smoothly.

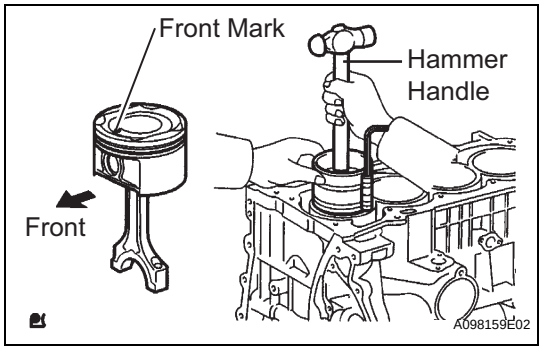


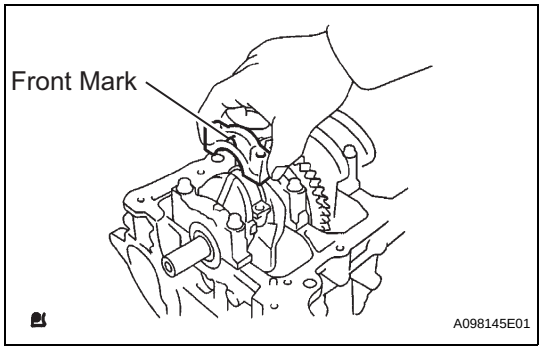
11. INSTALL CONNECTING ROD BEARING

(a) Align the bearing claw with the oil groove of the connecting rod or connecting rod cap.
NOTICE:
Do not apply engine oil to the bearing or its contact surface.

12. INSTALL PISTON SUB-ASSEMBLY WITH CONNECTING ROD

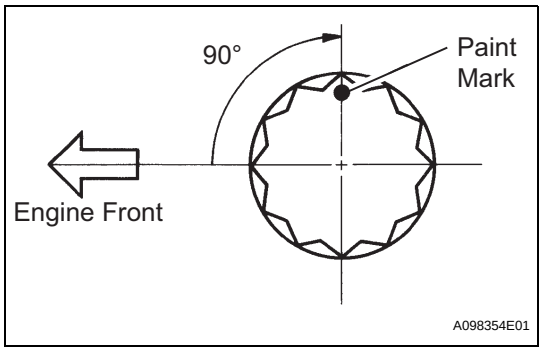
(a) Apply engine oil to the cylinder walls, pistons, and surfaces of connecting rod bearings.
(b) Check the position of the piston ring ends.
(c) Using a piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.



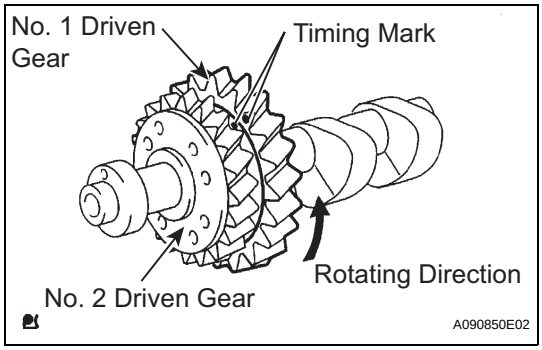


(d) Check that the front mark of the connecting rod cap is facing in the correct direction.
NOTICE:
Match the numbered connecting rod cap with the connecting rod.
(e) Apply a light coat of engine oil to the threads and under the heads of the connecting rod bolts.
(f) Using a 12 mm socket wrench, tighten the bolts in several passes to the specified torque.
Torque: 24.5 N*m (250 kgf*cm, 18 ft.*lbf)

EM

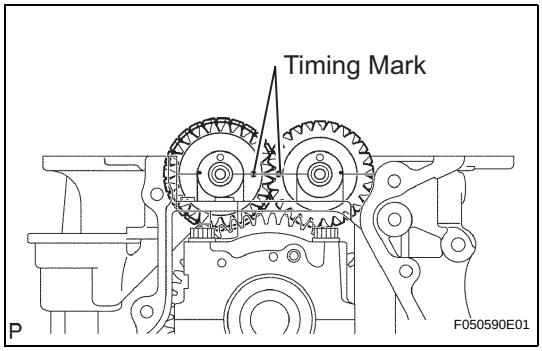


(g) Mark the front of the connecting rod bolts with paint.
(h) Retighten the cap bolts 90°as shown in the illustration.
(i) Check that the crankshaft turns smoothly.

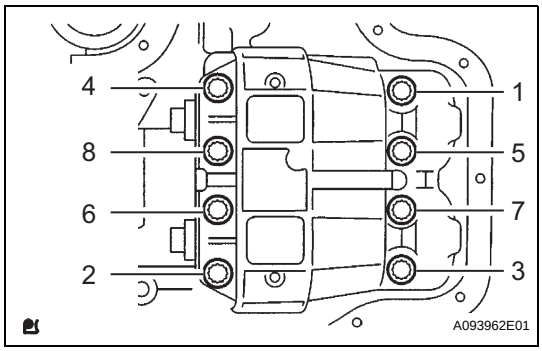


13. INSTALL BALANCE SHAFT

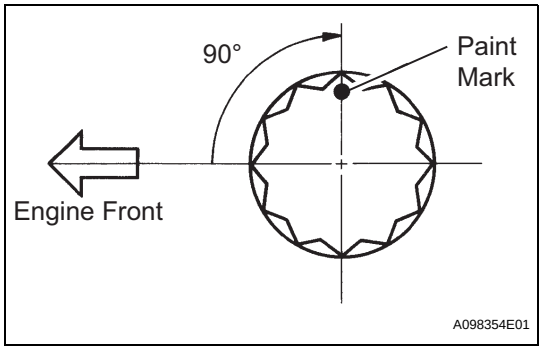
(a) Rotate the No. 1 driven gear of the No. 1 balance shaft in the rotating direction until it hits the stopper.
(b) Confirm that the matchmarks on the No. 1 and No. 2 driven gears are aligned.



(c) Align the matchmarks of the No. 1 and No. 2 balance shafts as shown in the illustration.
(d) Place the No. 1 and No. 2 balance shafts onto the crankcase.
(e) Apply a light coat of engine oil to the threads and under the heads of the bolts.



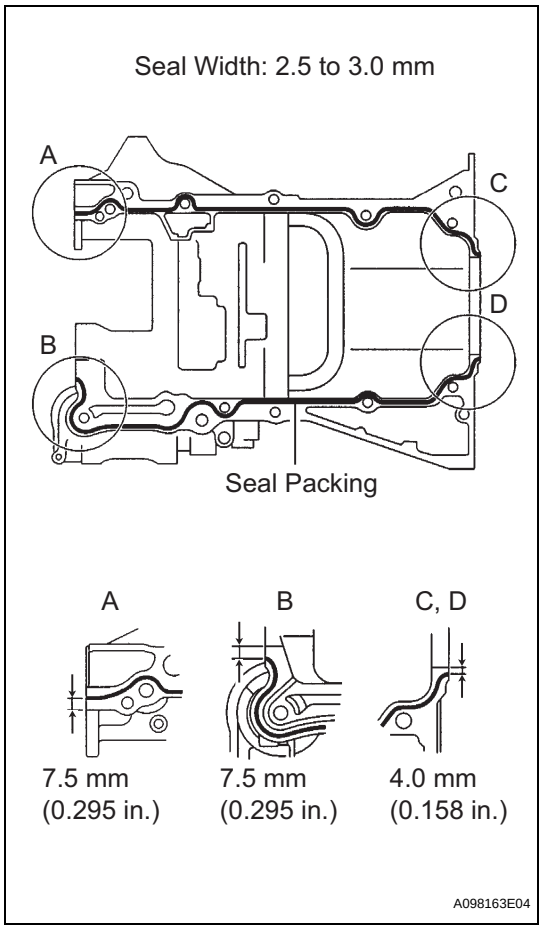
(f) Using several steps, uniformly install and tighten the 8 bolts in the sequence shown in the illustration.
Torque: 21.6 N*m (224 kgf*cm, 16 ft.*lbf)
(g) Mark the front of the bolts with paint.
(h) Retighten the bolts 90°as shown in the illustration.



(i) Check that the paint mark is now at a 90°angle to the front.

14. INSTALL STIFFENING CRANKCASE ASSEMBLY

(a) Remove any old packing material and be careful not to drop any oil on the contact surfaces of the cylinder block and crankcase.



(b) Apply a continuous bead of seal packing (Diameter 2.5 to 3.0 mm (0.098 to 0.118 in.)) as shown in the illustration.

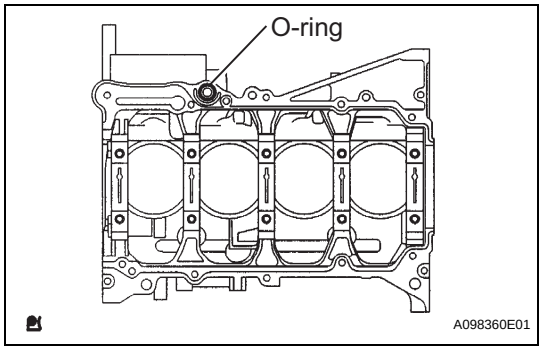
Seal packing:

Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent

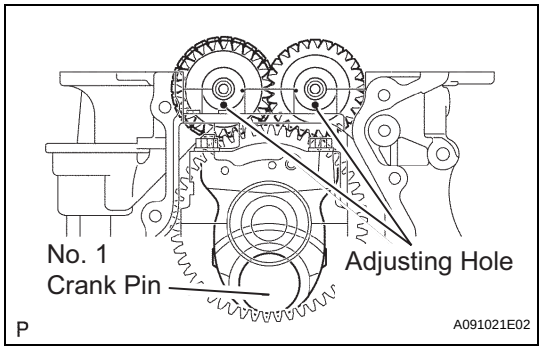
NOTICE:

- **Remove any oil from the contact surface,**
- **Install the crankcase within 3 minutes of applying seal packing.**
- **Do not add engine oil for at least 2 hours after installing the crankcase.**

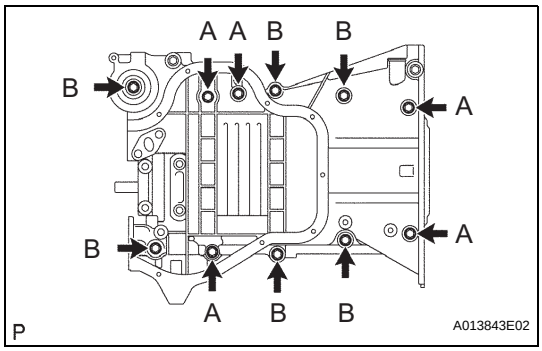
EM



(c) Place a new O-ring on the cylinder block as shown in the illustration.

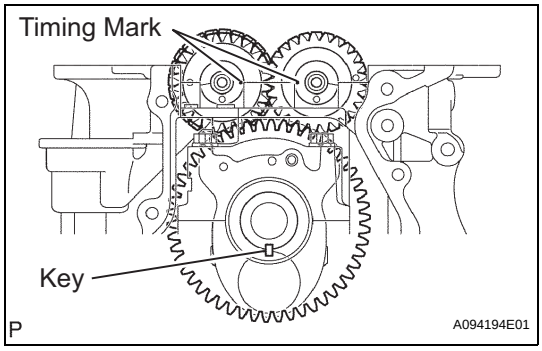


(d) With the No. 1 crank pin of the crankshaft placed at the 6 o'clock position, install the No. 1 and No. 2 balance shafts and align the adjusting holes as shown in the illustration.



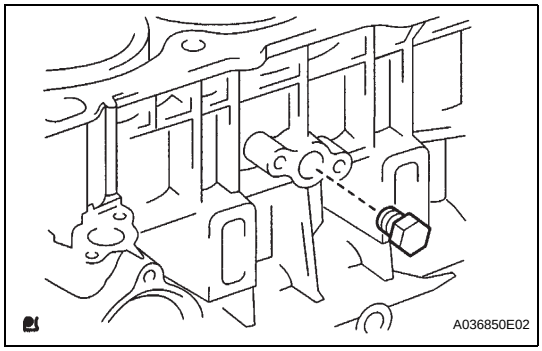
(e) Temporarily install the crankcase with the 11 bolts.
HINT:
- Bolt length: 112 mm (4.41 in.) for A of 12 mm head
- 35 mm (1.38 in.) for B of 12 mm head

(f) Uniformly tighten the bolts.
Torque: 32.5 N*m (331 kgf*cm, 24 ft.*lbf)



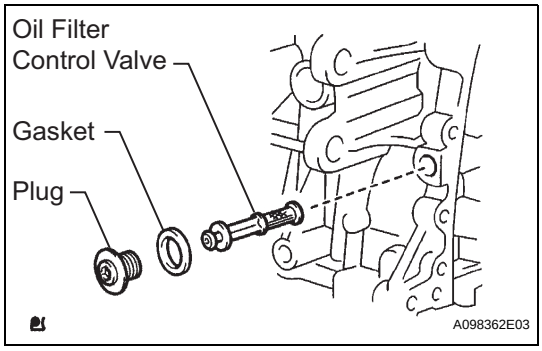
(g) Confirm that the timing marks of the balance shafts are aligned when the key groove is placed at the 6 o'clock position, as shown in the illustration.

15. INSTALL ENGINE REAR OIL SEAL (See page EM-131)



16. INSTALL NO. 1 TAPER SCREW PLUG

(a) Apply adhesive to 2 or 3 threads of the plug, and install it.
Torque: 26 N*m (265 kgf*cm, 19 ft.*lbf)
Adhesive:
Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent
HINT:
- Install the plug within 3 minutes of applying adhesive.
- Do not add coolant for at least an hour after installing the plug.



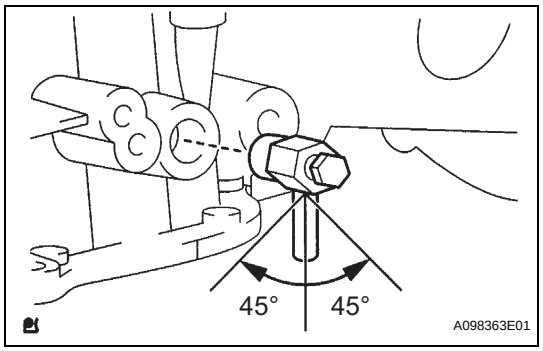
17. INSTALL OIL CONTROL VALVE FILTER

(a) Check that there is no foreign objects on the mesh part of the oil control valve filter.

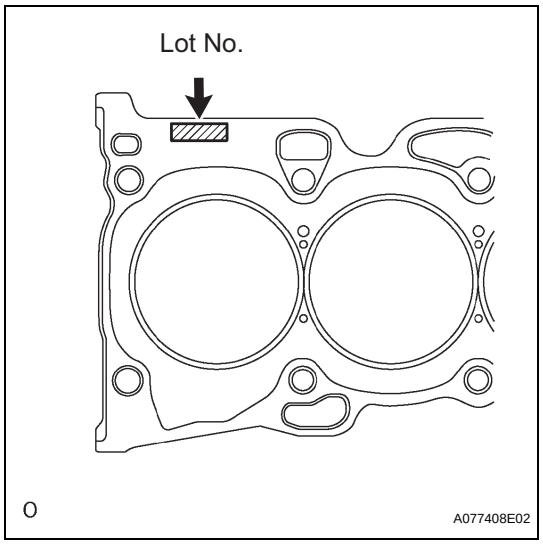
(b) Using a 6 mm socket hexagon wrench, install a new gasket and the oil control valve filter with the plug.
Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)

18. INSTALL CYLINDER BLOCK WATER DRAIN COCK SUB-ASSEMBLY

(a) Apply adhesive to 2 or 3 threads of the drain cock.
Adhesive:
Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent



(b) After tightening the drain cock to the specified torque, turn the drain cock clockwise as shown in the illustration.
Torque: 25 N*m (255 kgf*cm, 18 ft.*lbf)
NOTICE:
- **Install the drain cock within 3 minutes of applying adhesive.**
- **Do not add coolant for at least an hour after installing the drain cock.**
- **Do not turn the drain cock by more than 1 revolution (360°) after tightening the drain cock to the specified torque.**
- **Do not loosen the drain cock after setting it correctly.**

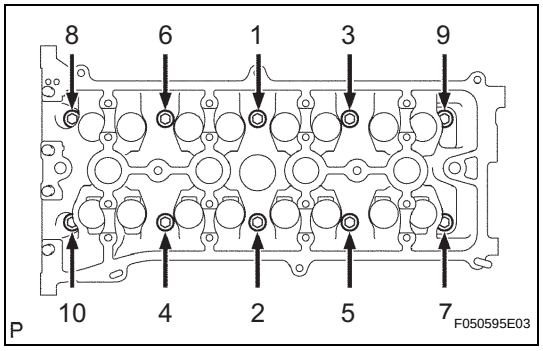


19. INSTALL CYLINDER HEAD GASKET

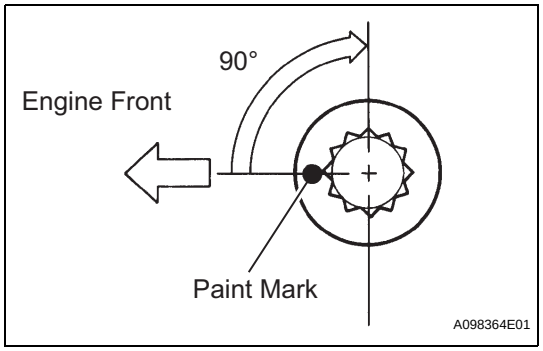
(a) Place a new gasket on the cylinder block surface with the Lot No. stamp upward.
NOTICE:
- **Remove any oil from the contact surface.**
- **Be careful of the installation direction.**
- **Place the cylinder head gently in order to avoid damaging the gasket with the bottom part of the head.**

20. INSTALL CYLINDER HEAD SUB-ASSEMBLY
NOTICE:
The cylinder head bolts are tightened in 2 successive steps.

(a) Apply a light coat of engine oil to the threads and under the heads of the cylinder head bolts.



(b) Using several steps, uniformly install and tighten the 10 cylinder head bolts and plate washers with a 10 mm bi-hexagon wrench in the sequence shown in the illustration.
Torque: 78.5 N*m (800 kgf*cm, 58 ft.*lbf)

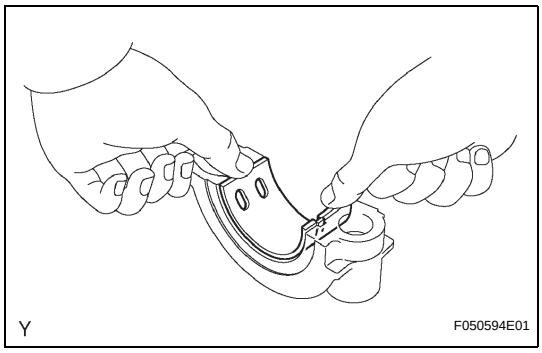


(c) Mark the front of the cylinder head bolts with paint.
(d) Retighten the cylinder head bolts so that the paint marks are at a 90° angle to the front.

21. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY

(a) Apply a light coat of engine oil to a new O-ring, then install it onto the camshaft timing oil control valve.
(b) Install the camshaft timing oil control valve with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

22. INSTALL CAMSHAFT TIMING GEAR ASSEMBLY (See page EM-77)



23. **INSTALL NO. 2 CAMSHAFT TIMING SPROCKET (See page EM-77)**
24. **INSTALL NO. 2 CAMSHAFT BEARING (See page EM-77)**
25. **INSTALL NO. 1 CAMSHAFT BEARING**
    (a) Clean the contact surfaces of the bearing and the No. 1 bearing cap.
    (b) Align the bearing claw with the claw groove of the No. 1 bearing cap and push in the bearing.
    NOTICE:
    Do not apply engine oil to the bearing and its contact surface.
26. **INSTALL CAMSHAFT (See page EM-77)**
27. **INSTALL OIL PUMP ASSEMBLY (See page LU-13)**
28. **INSTALL CHAIN SUB-ASSEMBLY (See page EM-31)**
29. **INSTALL CRANKSHAFT TIMING SPROCKET**
30. **INSTALL NO. 1 CHAIN VIBRATION DAMPER (See page EM-32)**
31. **INSTALL CHAIN SUB-ASSEMBLY (See page EM-32)**
32. **INSTALL CHAIN TENSIONER SLIPPER (See page EM-33)**
33. **INSTALL TIMING CHAIN GUIDE (See page EM-33)**
34. **INSTALL CRANKSHAFT POSITION SENSOR PLATE NO.1 (See page EM-34)**
35. **INSTALL TIMING CHAIN COVER OIL SEAL (See page EM-130)**
36. **INSTALL TIMING CHAIN COVER SUB-ASSEMBLY (See page EM-34)**
37. **INSTALL NO. 1 CHAIN TENSIONER ASSEMBLY (See page EM-36)**
38. **INSTALL CRANKSHAFT PULLEY (See page EM-37)**
39. **INSTALL OIL PAN SUB-ASSEMBLY (See page EM-38)**
40. **INSTALL OIL PAN DRAIN PLUG**
    (a) Place a new gasket on the oil pan drain plug, then install it onto the oil pan.
    Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)
41. **INSTALL WATER PUMP ASSEMBLY (See page CO-11)**
42. **INSTALL WATER PUMP PULLEY (See page CO-12)**
43. **INSTALL CRANKSHAFT POSITION SENSOR (See page ES-375)**
44. **INSTALL CAMSHAFT POSITION SENSOR (See page ES-372)**

45. INSTALL OIL FILTER UNION

(a) Using a 12 mm socket hexagon wrench, install the oil filter union.

Torque: 29.5 N*m (301 kgf*cm, 22 ft.*lbf)

46. INSTALL OIL FILTER SUB-ASSEMBLY (See page LU-3)

47. SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page EM-26)

48. CHECK VALVE CLEARANCE (See page EM-7)

49. ADJUST VALVE CLEARANCE (See page EM-8)

50. INSTALL CAMSHAFT (See page EM-13)

51. INSTALL NO. 2 CAMSHAFT (See page EM-14)

52. INSTALL NO. 1 CHAIN TENSIONER ASSEMBLY (See page EM-15)

53. INSTALL CYLINDER HEAD GASKET

(a) Install the gasket onto the cylinder head cover.

54. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-39)

55. INSTALL VENTILATION VALVE SUB-ASSEMBLY

(a) Apply adhesive to the threads of the ventilation valve.

Adhesive:
Toyota Genuine Adhesive 1324, Three Bond 1324 or equivalent

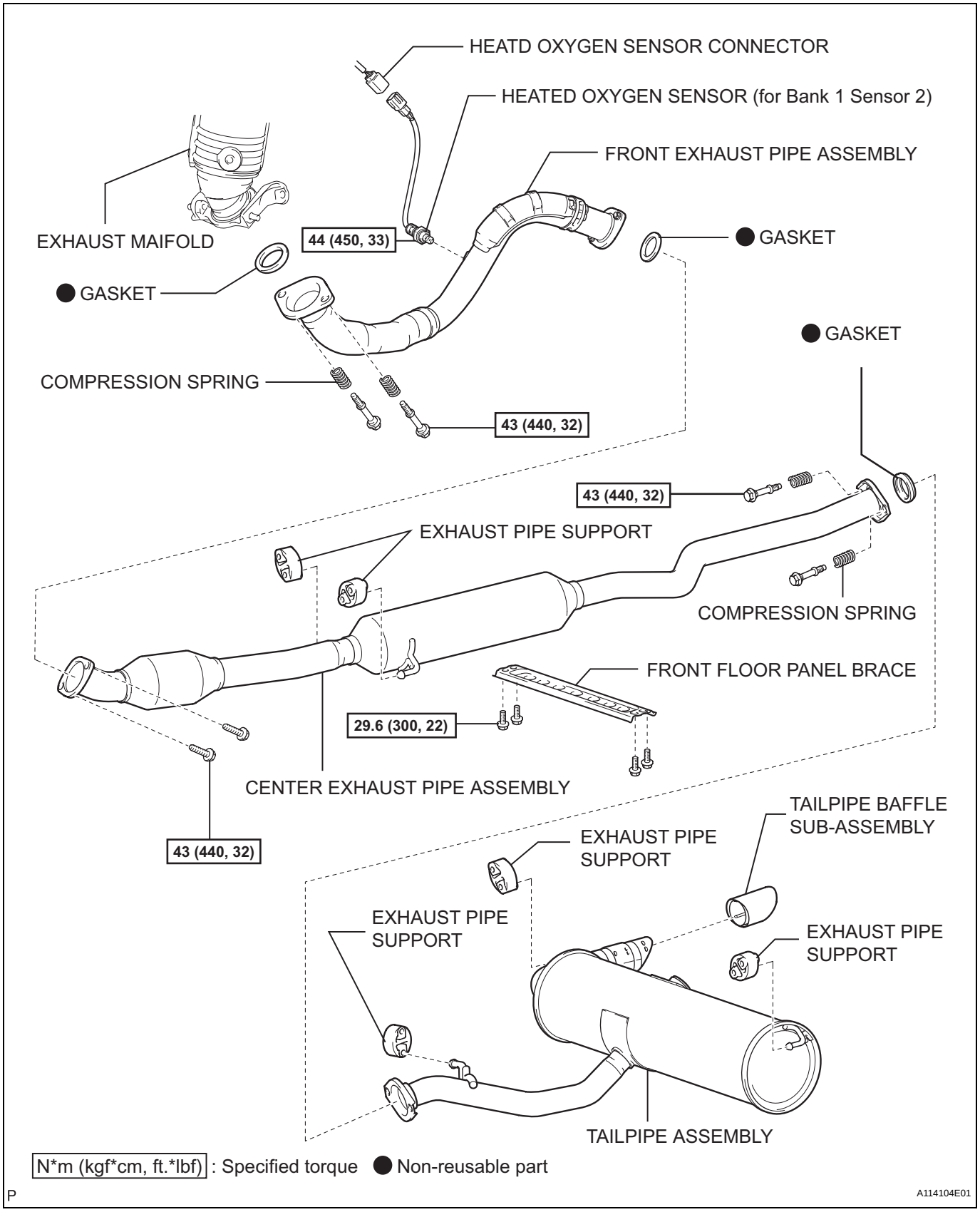
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

56. INSTALL OIL FILLER CAP SUB-ASSEMBLY

Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

EXHAUST PIPE

COMPONENTS

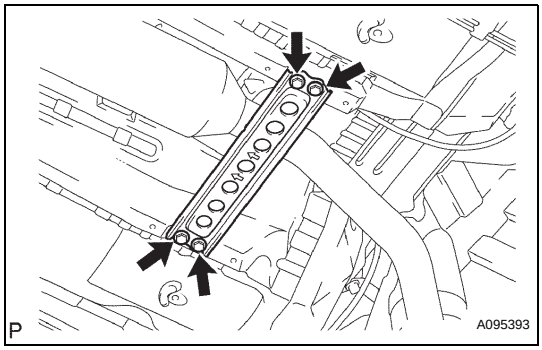


REMOVAL

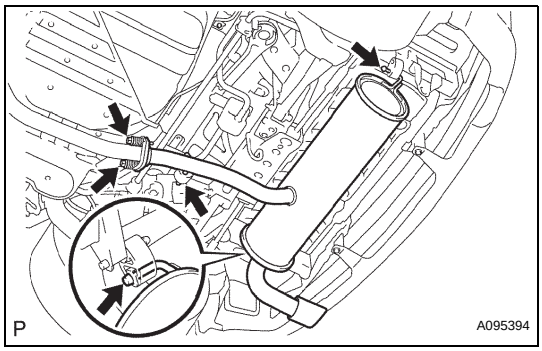
1. **DISCONNECT CABLE FROM BATTERY NEGATIVE TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. **REMOVE HEATED OXYGEN SENSOR (for Bank 1 Sensor 2) (See page EC-21)**

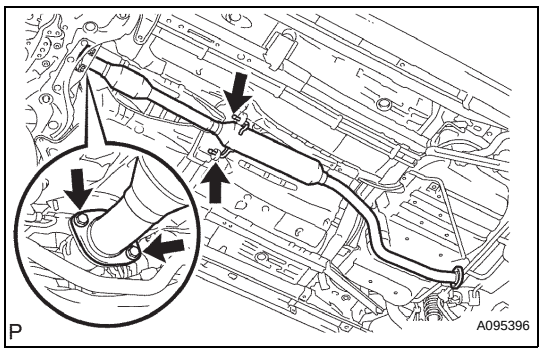
3. **REMOVE FRONT FLOOR PANEL BRACE**
   (a) Remove the 4 bolts and floor panel brace.



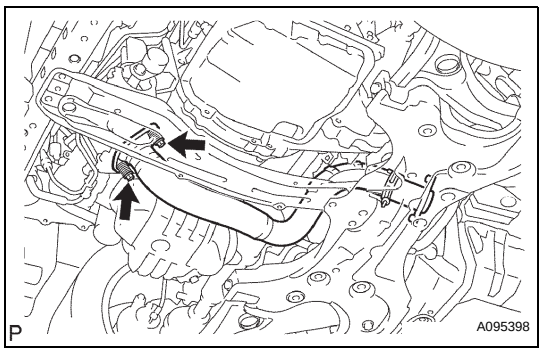
4. **REMOVE TAILPIPE ASSEMBLY**
   (a) Remove the 2 bolts and 2 compression springs.
   (b) Remove the tailpipe from the 3 pipe supports.
   (c) Remove the gasket from the center exhaust pipe.

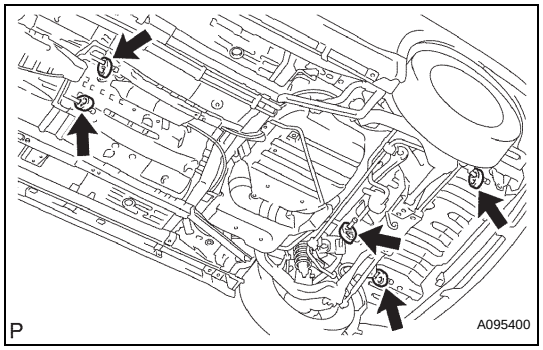


5. **REMOVE CENTER EXHAUST PIPE ASSEMBLY**
   (a) Remove the 2 bolts.
   (b) Remove the center exhaust pipe from the 2 pipe supports.
   (c) Remove the gasket from the front exhaust pipe.



6. **REMOVE FRONT EXHAUST PIPE ASSEMBLY**
   (a) Remove the 2 bolts, 2 compression springs and front exhaust pipe.
   (b) Remove the gasket from the manifold.

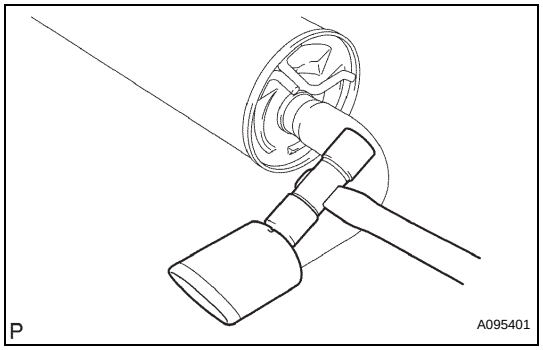




7. REMOVE EXHAUST PIPE SUPPORT

(a) Remove the 5 exhaust pipe supports from the body.

DISASSEMBLY

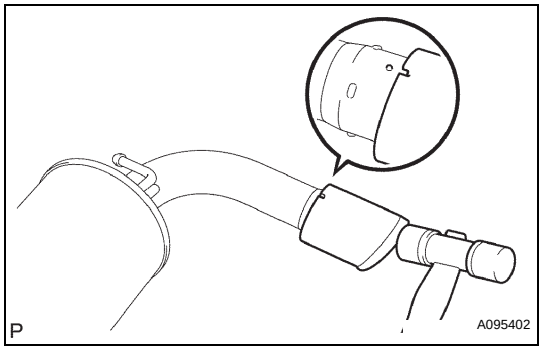


1. REMOVE TAILPIPE BAFFLE SUB-ASSEMBLY

(a) Using a plastic-faced hammer, uniformly tap out the baffle.

EX

REASSEMBLY

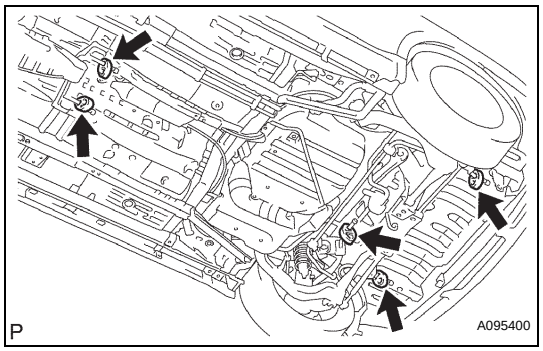


1. INSTALL TAILPIPE BAFFLE SUB-ASSEMBLY

(a) Align the baffle with the protruding part of the tailpipe as shown in the illustration.

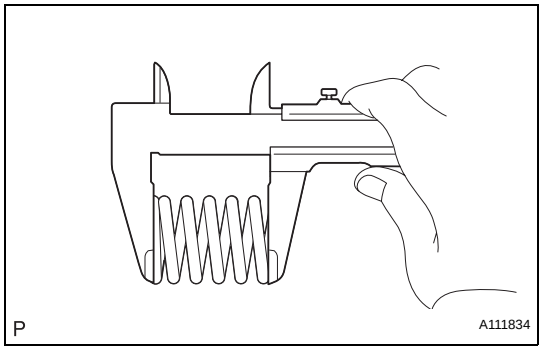
(b) Using a plastic-faced hammer, uniformly tap the baffle onto the tailpipe.

INSTALLATION



1. INSTALL EXHAUST PIPE SUPPORT

(a) Install the 5 exhaust pipe supports to the body.



2. INSTALL FRONT EXHAUST PIPE ASSEMBLY

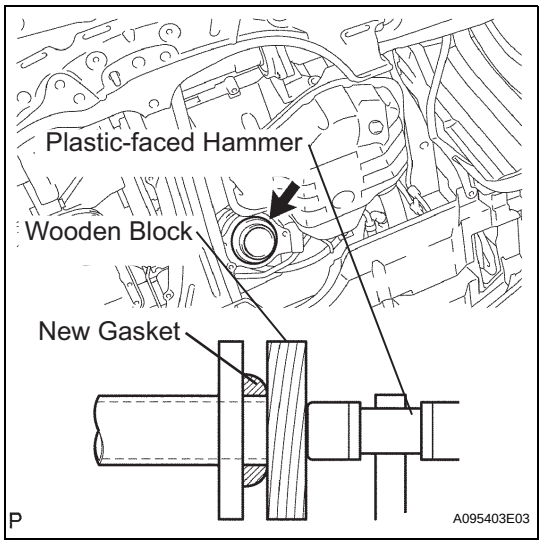
(a) Check the free length.

(1) Using a vernier caliper, measure the free length of the compression spring.

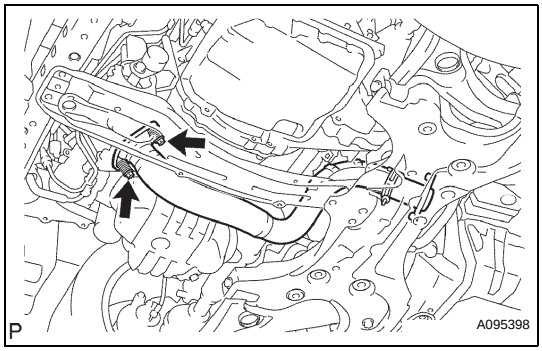
Minimum length:

40.5 mm (1.594 in.)

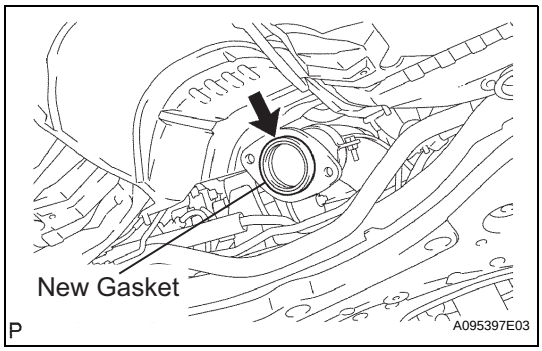
If the free length is less than minimum, replace the compression spring.



(b) Using a wooden block and plastic-faced hammer, tap a new gasket until it is flush with the exhaust manifold.
NOTICE:
- **Make sure that the gasket is in the correct direction when installing.**
- **Do not reuse a removed gasket.**
- **Never push the gasket into the exhaust manifold by installing the front exhaust pipe onto the exhaust manifold.**

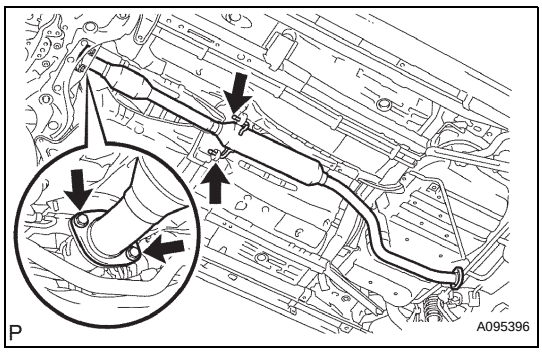


(c) Install the front exhaust pipe with the 2 compression springs and 2 bolts.
Torque: 43 N*m (440 kgf*cm, 32 ft.*lbf)



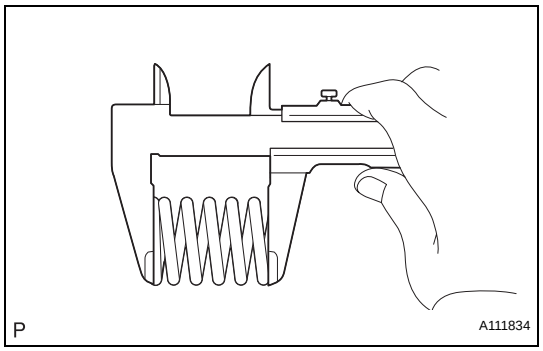
3. INSTALL CENTER EXHAUST PIPE ASSEMBLY

(a) Install a new gasket onto the front exhaust pipe.



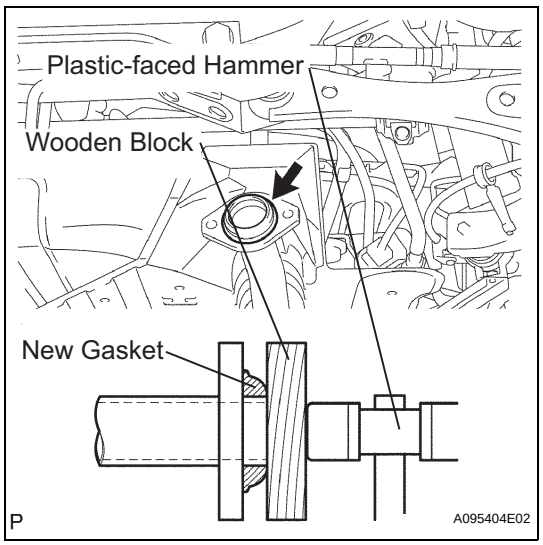
(b) Install the exhaust pipe center onto the 2 exhaust pipe supports.

(c) Install the 2 bolts.
Torque: 43 N*m (440 kgf*cm, 32 ft.*lbf)

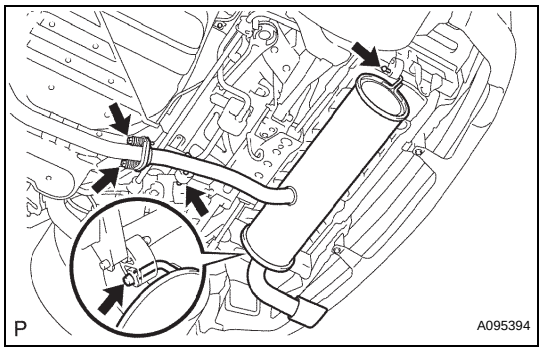


4. INSTALL TAILPIPE ASSEMBLY

(a) Using a vernier caliper, measure the free length of the compression spring.
Minimum free length:
38.5 mm (1.516 in.)
If the free length is less than the minimum, replace the compression spring.



(b) Using a wooden block and plastic-faced hammer, tap a new gasket until it is flush with the center exhaust pipe.
NOTICE:
- **Make sure that the gasket is in the correct direction when installing.**
- **Do not reuse a removed gasket.**
- **Never push the gasket onto the exhaust pipe center by installing the exhaust pipe tail onto the exhaust pipe center.**

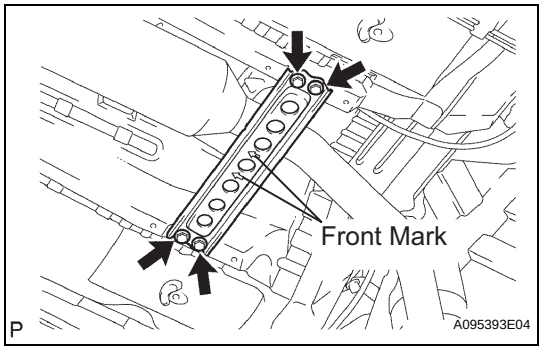


(c) Install the tailpipe to the 3 exhaust pipe supports.
(d) Install the 2 compression springs and 2 bolts.
Torque: 43 N*m (440 kgf*cm, 32 ft.*lbf)

5. INSTALL HEATED OXYGEN SENSOR (for Bank 1 Sensor 2) (See page EC-21)

6. CONNECT CABLE TO BATTERY NEGATIVE TERMINAL

7. CHECK EXHAUST GAS LEAKS



8. INSTALL FRONT FLOOR PANEL BRACE

(a) Install the front floor panel brace with the 4 bolts.
Torque: 29.6 N*m (300 kgf*cm, 22 ft.*lbf)
NOTICE:
Make sure that the front floor panel brace is at the correct direction when installing.

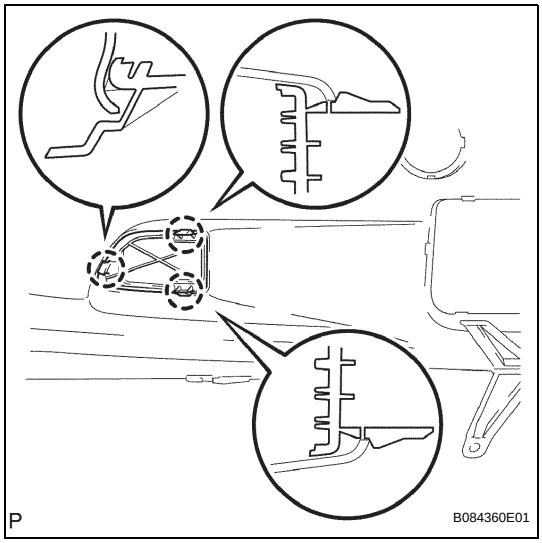
9. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

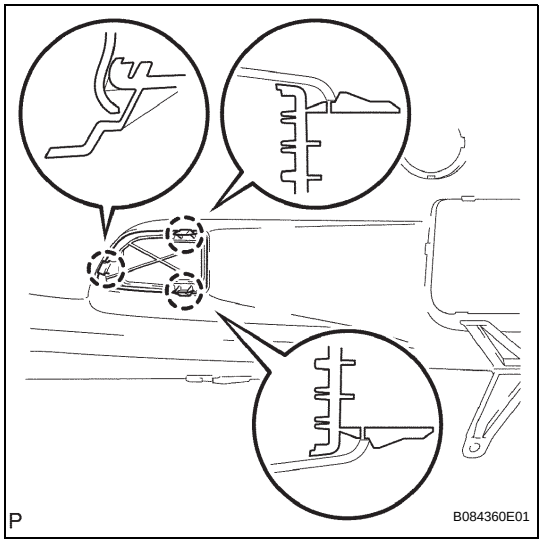
EX

DISASSEMBLY

1. **REMOVE HOOD TO FRONT END PANEL SEAL**
   (a) Using a clip remover, detach the 8 clips and remove the panel seal.
2. **REMOVE FRONT BUMPER REINFORCEMENT**
   (a) Using a clip remover, remover the 2 clips and reinforcement from the bumper cover.
3. **REMOVE RADIATOR GRILLE LOWER**
4. **REMOVE FRONT BUMPER HOLE COVER**
5. **REMOVE FRONT BUMPER GUARD COVER LH**
   (a) Using a screwdriver, detach the 3 claws and remove the cover.
   HINT:
   Tape the screwdriver tip before use.
6. **REMOVE FRONT BUMPER GUARD COVER RH**
   HINT:
   Use the same procedures described for the LH side.



REASSEMBLY



1. **INSTALL FRONT BUMPER GUARD COVER LH**
   (a) Attach the 3 claws to install the cover.
2. **INSTALL FRONT BUMPER GUARD COVER RH**
   HINT:
   Use the same procedures described for the LH side.
3. **INSTALL FRONT BUMPER HOLE COVER**
4. **INSTALL RADIATOR GRILLE LOWER**
5. **INSTALL FRONT BUMPER REINFORCEMENT**
   (a) Install the reinforcement to the bumper cover with the 2 clips.
6. **INSTALL HOOD TO FRONT END PANEL SEAL**
   (a) Attach the 8 clips to install the panel seal.

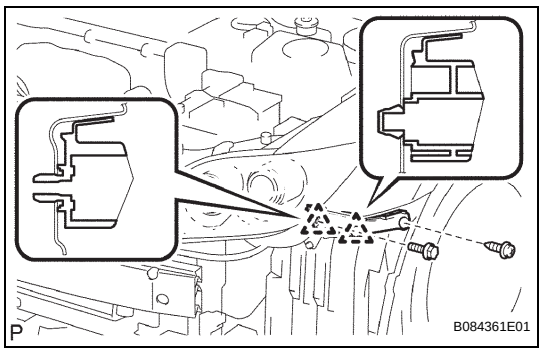
INSTALLATION

HINT:
A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

1. INSTALL FRONT BUMPER SIDE SUPPORT LH

(a) Attach the 2 clips to install the side support.

(b) Install the screw and bolt.
Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf) for screw
12 N*m (122 kgf*cm, 9 ft.*lbf) for bolt



2. INSTALL FRONT BUMPER SIDE SUPPORT RH

(a) Attach the 2 clips to install the side support.

(b) Install the screw and bolt.
Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf) for screw
12 N*m (122 kgf*cm, 9 ft.*lbf) for bolt

3. INSTALL FRONT BUMPER REINFORCEMENT

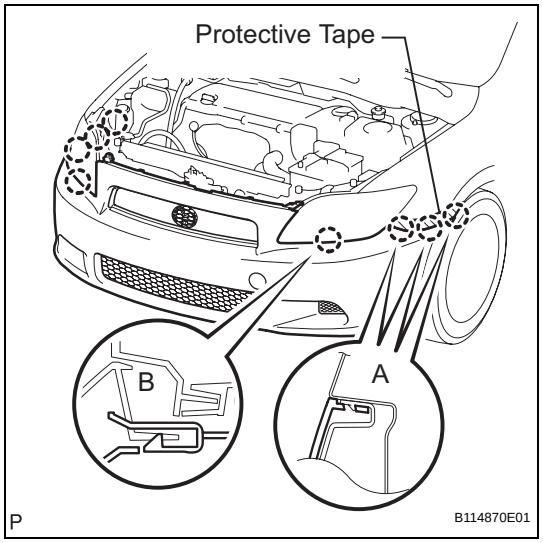
(a) Install the reinforcement with the 6 nuts.

4. INSTALL FRONT BUMPER ENERGY ABSORBER

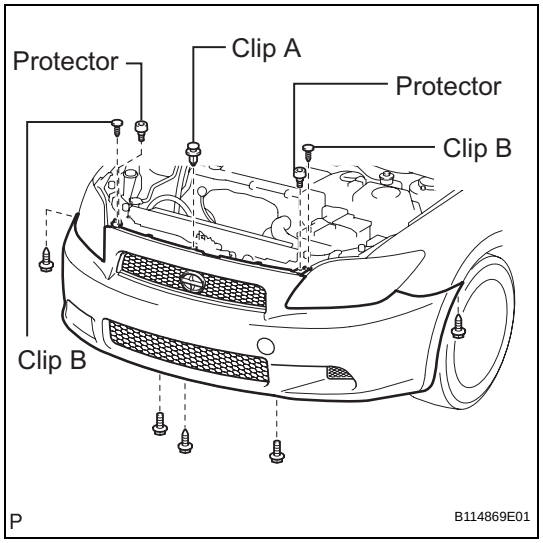
5. INSTALL FRONT BUMPER COVER

(a) Put protective tape under the front fender.

(b) Attach the 6 claws labeled A and 2 claws to install the bumper cover.



(c) Install the 3 screws, 2 bolts, clip labeled A, 2 clips labeled B and 2 radiator protectors.
Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf) for screw
12 N*m (122 kgf*cm, 9 ft.*lbf) for bolt



6. INSTALL FRONT FENDER LINER LH

(a) Install the fender liner with the 3 screws.
Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf)

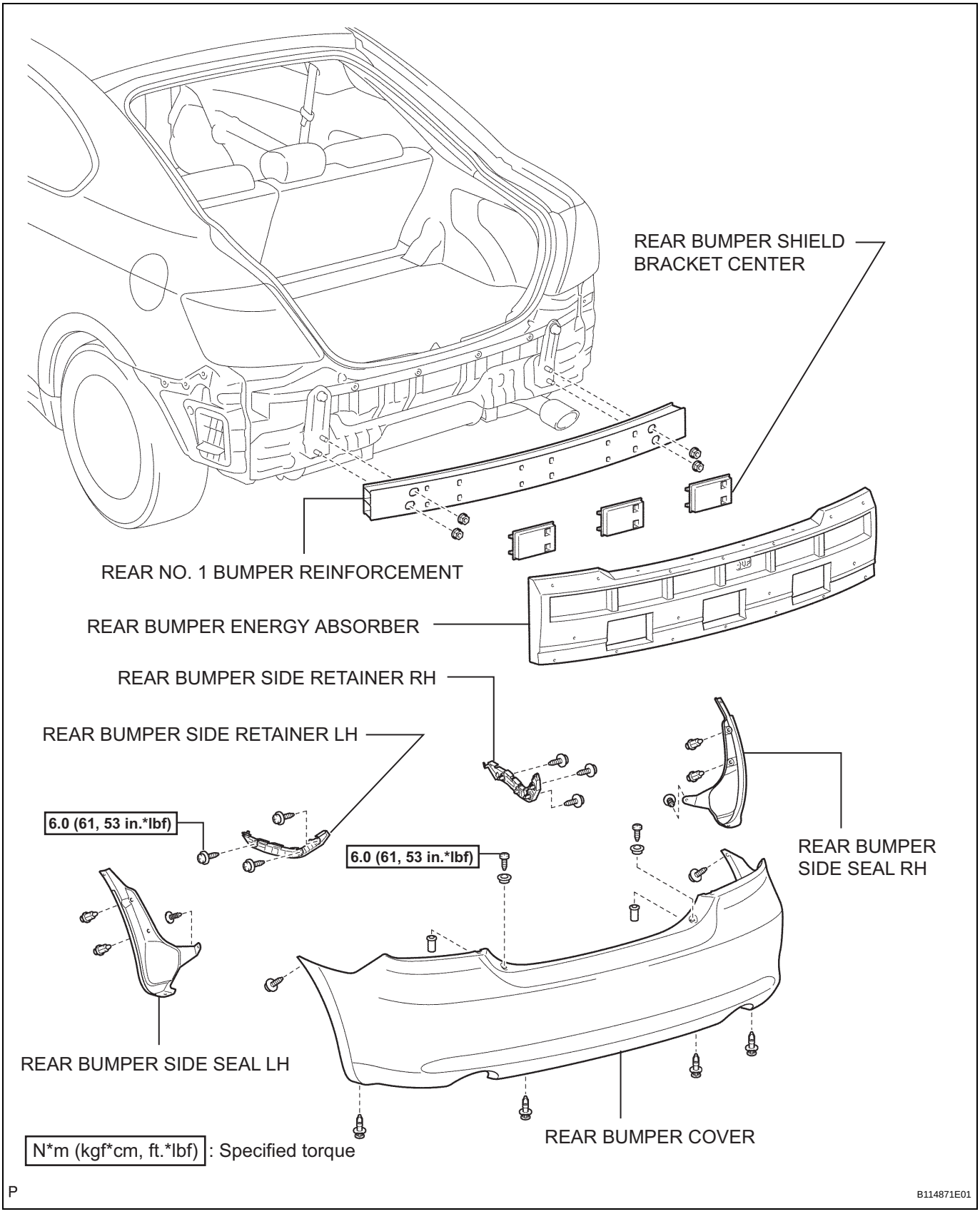
7. INSTALL FRONT FENDER LINER RH

(a) Install the fender liner with the 3 screws.
Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf)

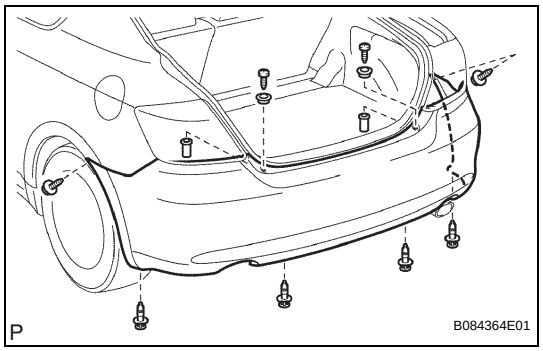
ET

REAR BUMPER

COMPONENTS



ET

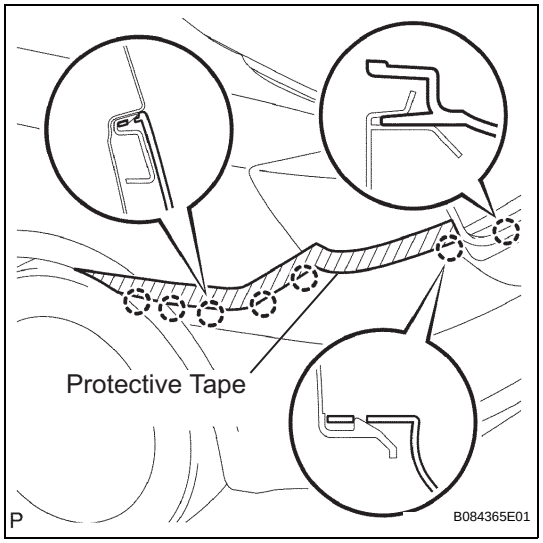


REMOVAL

1. REMOVE REAR BUMPER COVER

(a) Remove the 4 screws.

(b) Using a clip remover, remove the 4 clips.

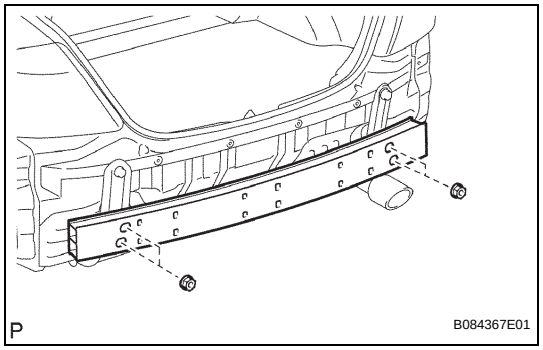


(c) Put protective tape under the quarter panel.

(d) Using a screwdriver, detach the 14 claws and remove the bumper cover.
HINT:
- The illustration only shows the LH side of the vehicle. The remaining claws are on the RH side.
- Tape the screwdriver tip before use.

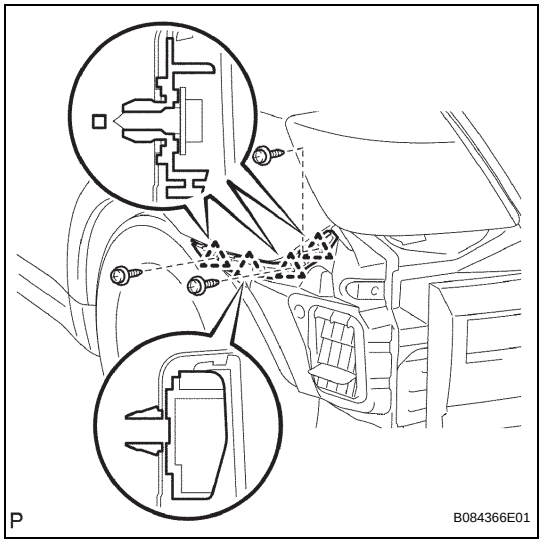
2. REMOVE REAR BUMPER ENERGY ABSORBER

3. REMOVE REAR BUMPER SHIELD BRACKET CENTER



4. REMOVE REAR NO. 1 BUMPER REINFORCEMENT

(a) Remove the 4 nuts and reinforcement.



5. REMOVE REAR BUMPER SIDE RETAINER LH

(a) Remove the 3 screws.

(b) Using a screwdriver, detach the 4 clips and remove the retainer.
HINT:
Tape the screwdriver tip before use.

6. REMOVE REAR BUMPER SIDE RETAINER RH

HINT:
Use the same procedures described for the LH side.

7. REMOVE REAR BUMPER SIDE SEAL LH

(a) Using a clip remover, remove the 3 clips and seal.

8. REMOVE REAR BUMPER SIDE SEAL RH

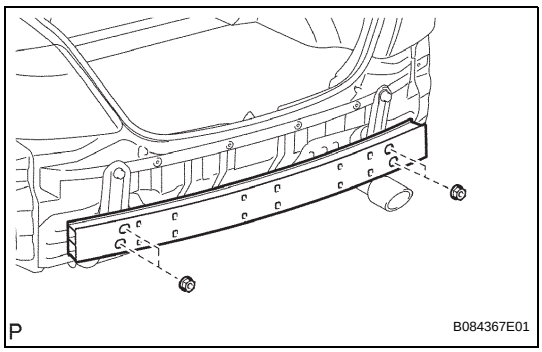
(a) Using a clip remover, remove the 3 clips and seal.

ET

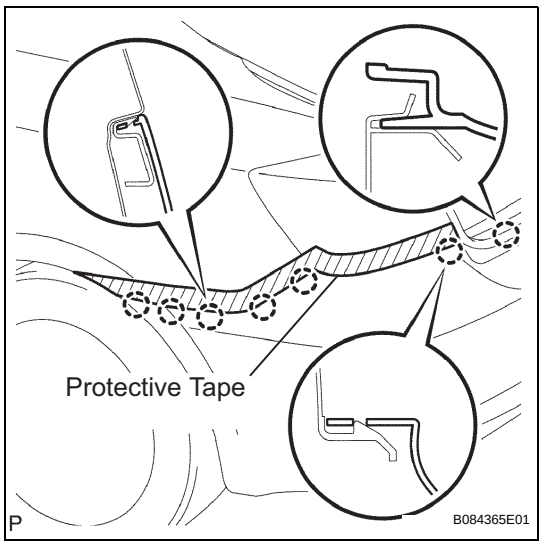
INSTALLATION

HINT:
A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

1. **INSTALL REAR BUMPER SIDE SEAL LH**
   (a) Install the seal with the 3 clips.
2. **INSTALL REAR BUMPER SIDE SEAL RH**
   (a) Install the seal with the 3 clips.
3. **INSTALL REAR BUMPER SIDE RETAINER LH**
   (a) Attach the 4 clips to install the retainer.
   (b) Install the 3 screws.
   Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf)
4. **INSTALL REAR BUMPER SIDE RETAINER RH**
   (a) Attach the 4 clips to install the retainer.
   (b) Install the 3 screws.
   Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf)

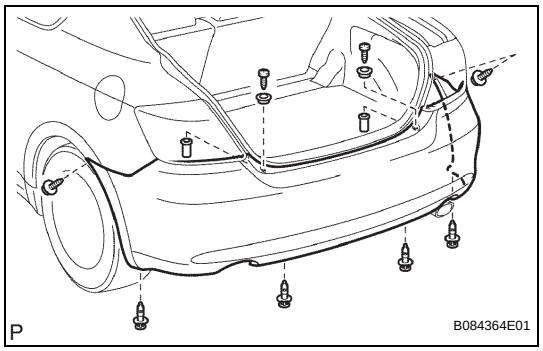


5. **INSTALL REAR NO. 1 BUMPER REINFORCEMENT**
   (a) Install the reinforcement with the 4 nuts.
6. **INSTALL REAR BUMPER SHIELD BRACKET CENTER**
7. **INSTALL REAR BUMPER ENERGY ABSORBER**



8. **INSTALL REAR BUMPER COVER**
   (a) Put protective tape under the quarter panel.
   (b) Attach the 14 claws to install the bumper cover.
   HINT:
   The illustration only shows the LH side of the vehicle. The remaining claws are on the RH side.

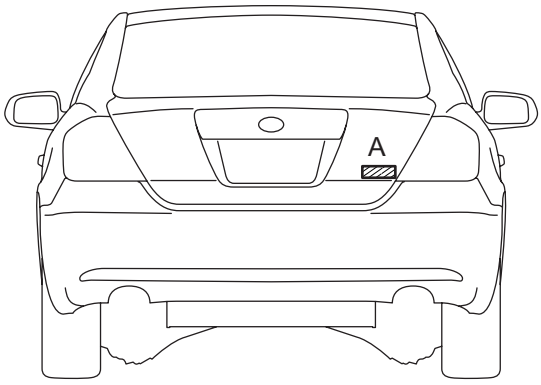
ET

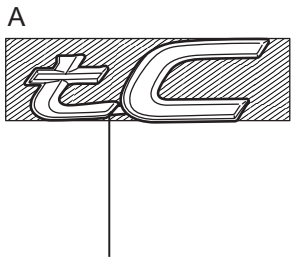


(c) Install the 4 screws and 4 clips.
Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf)

NAME PLATE

COMPONENTS





NO. 5 BACK DOOR NAME PLATE

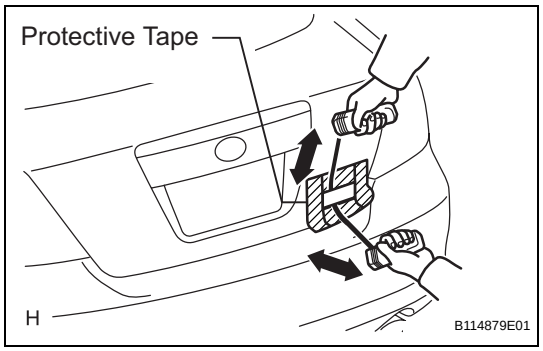
H

B114878E01

REMOVAL

NOTICE:
Do not heat the vehicle body, emblem and name plate excessively.
HINT:
When removing the emblem and name plate, heat the vehicle body, emblem and name plate using a heat light.
Standard heating temperature

Item	Temperature
Vehicle Body	40 to 60°C (104 to 140°F)
Name Plate	20 to 30°C (68 to 86°F)



1. REMOVE NO. 5 BACK DOOR NAME PLATE

(a) Put protective tape around the name plate.
(b) Insert a piano wire between the vehicle body and name plate.
(c) Tie objects that can serve as handles (for example, wooden blocks) to both wire ends.
(d) Pull the piano wire and scrape off the double-sided tape that holds the name plate to the vehicle body.
NOTICE:
- **If reusing the name plate, take care not to damage the name plate.**
- **Be careful not to damage the vehicle body.**

INSTALLATION

NOTICE:
Do not heat the vehicle body, emblem and name plate excessively.
HINT:
When installing the emblem and name plate, heat the vehicle body, emblem and name plate using a heat light.
Standard heating temperature

Item	Temperature
Vehicle Body	40 to 60°C (104 to 140°F)
Name Plate	20 to 30°C (68 to 86°F)

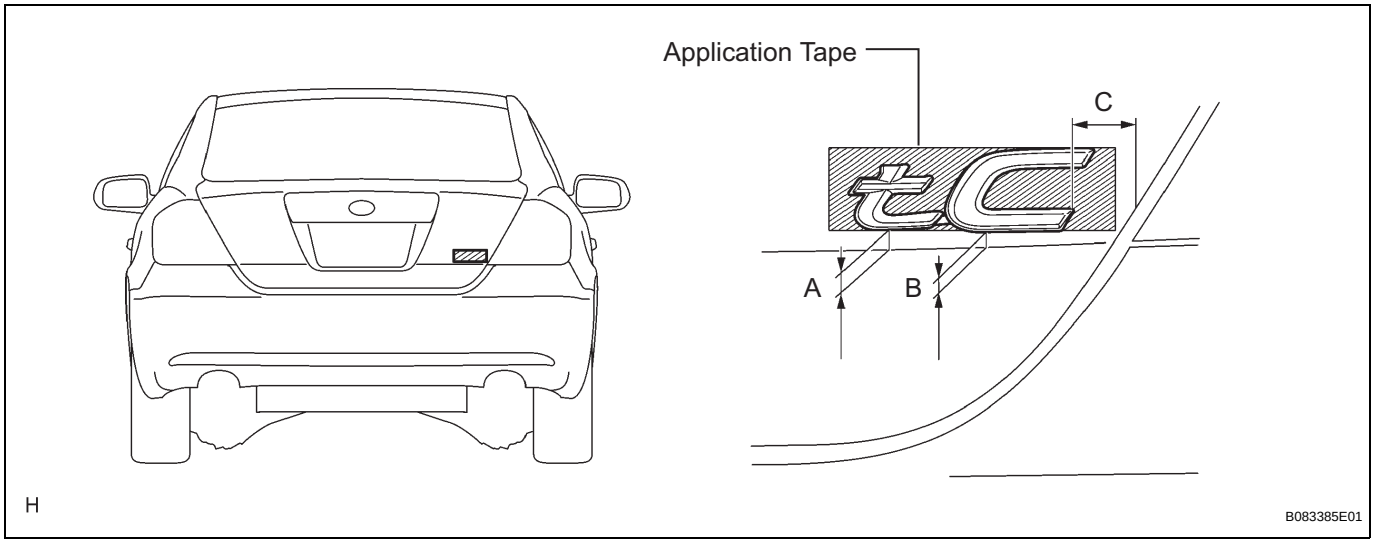
1. INSTALL NO. 5 BACK DOOR NAME PLATE

(a) Clean the vehicle body surface.
  (1) Using a heat light, heat the vehicle body surface.
  (2) Remove the double-sided tape from the vehicle body.
  (3) Wipe off any tape adhesive residue with cleaner.

(b) If reusing the name plate:
Clean the name plate.
  (1) Using a heat light, heat the name plate.
  (2) Remove the double-sided tape from the name plate.
  (3) Wipe off any tape adhesive residue with cleaner.
  (4) Apply new double-sided tape to the emblem.

(c) Install the name plate.
  (1) Using a heat light, heat the vehicle body and name plate.
  (2) Remove the peeling paper from the face of the name plate.
  HINT:
  After removing the peeling paper, keep the exposed adhesive free from foreign matter.
  (3) Install the name plate.
  NOTICE:
  Install the name plate exactly according to the specifications below.

ET

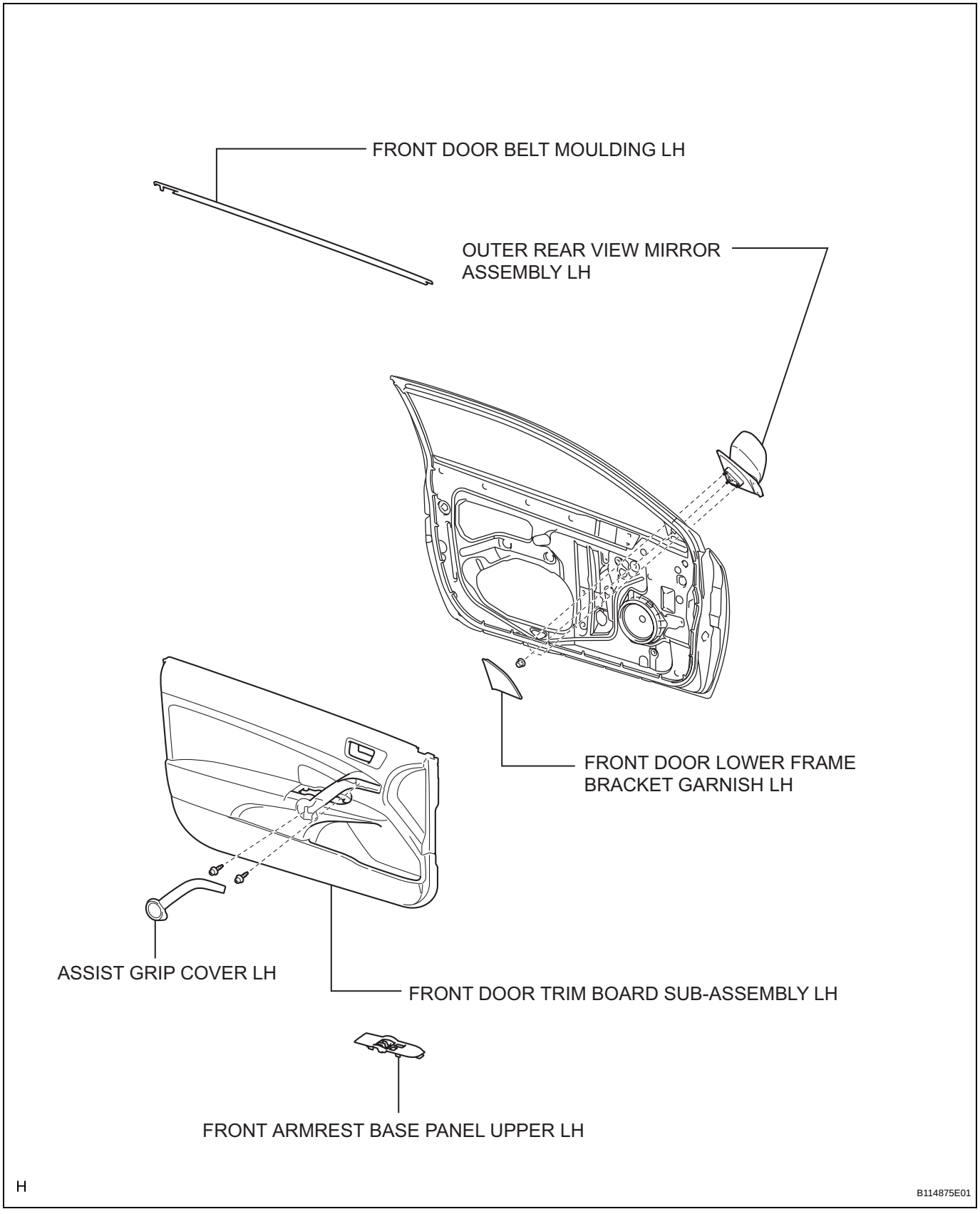


Standard measurement

Area	Measurement
A	8.7 mm (0.343 in.)
B	7.1 mm (0.280 in.)
C	24.7 mm (0.972 in.)

FRONT DOOR BELT MOULDING

COMPONENTS



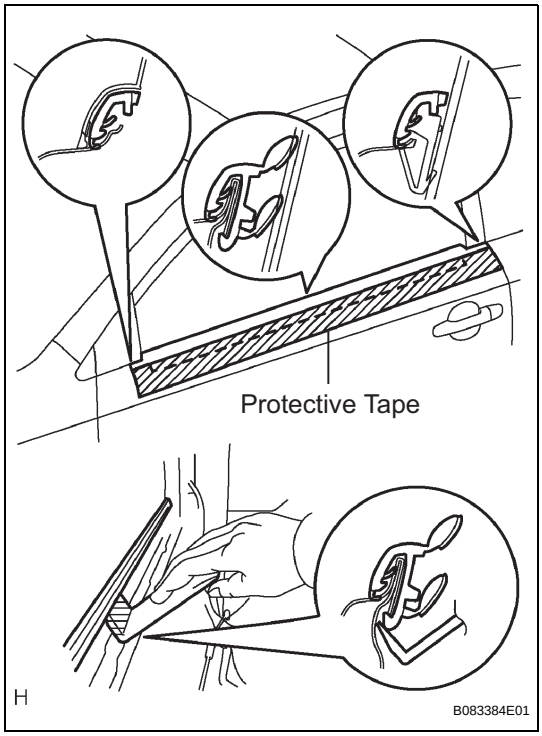
ET

REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- Before removing the moulding, fully open the door glass.

1. **REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH (See page ED-8)**
2. **REMOVE ASSIST GRIP COVER LH (See page ED-8)**
3. **REMOVE FRONT ARMREST BASE PANEL UPPER LH (See page ED-8)**
4. **REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH (See page ED-9)**
5. **REMOVE OUTER REAR VIEW MIRROR ASSEMBLY LH (See page MI-8)**
6. **REMOVE FRONT DOOR BELT MOULDING LH**
   (a) Put protective tape under the moulding.
   (b) Using a moulding remover, pry out the moulding as shown in the illustration.
   HINT:
   Tape the remover tip before use.
   NOTICE:
   Be careful when removing the moulding as there are clips attached to the front and rear ends of the moulding.

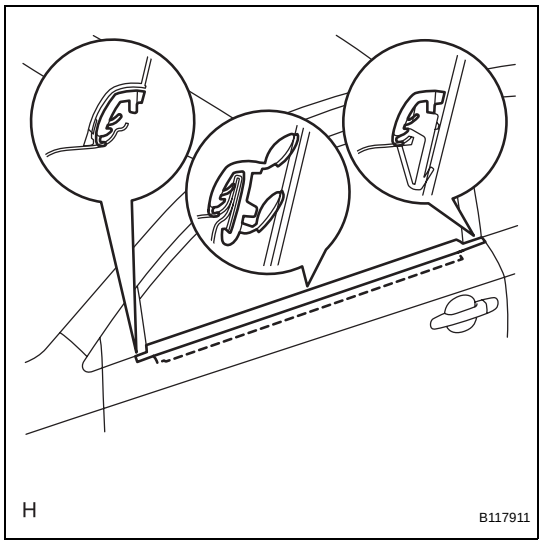


ET

INSTALLATION

HINT:

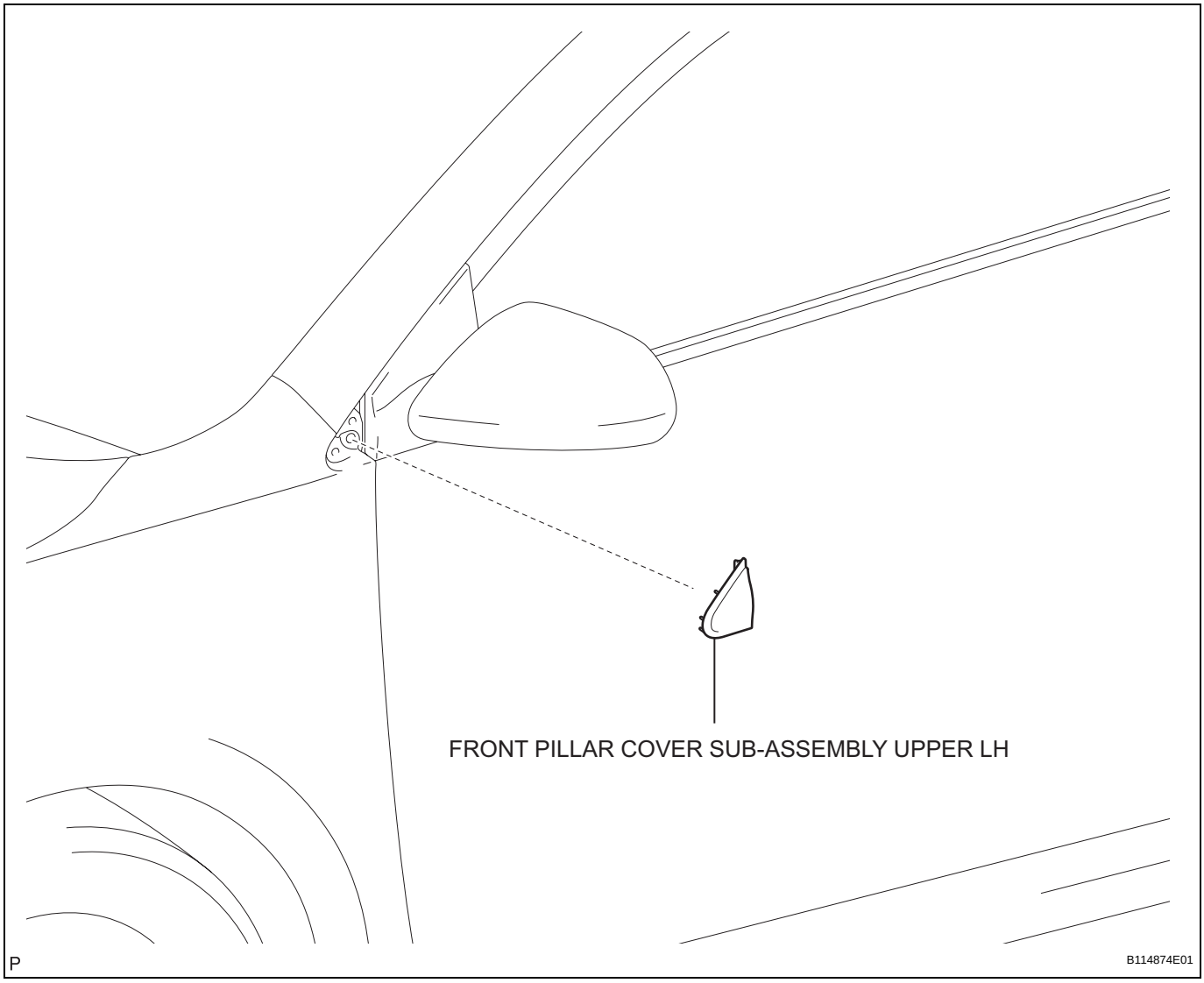
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

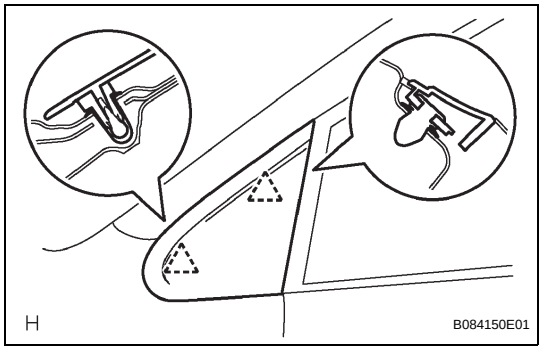


1. **INSTALL FRONT DOOR BELT MOULDING LH**
   (a) Install the moulding as shown in the illustration.
2. **INSTALL OUTER REAR VIEW MIRROR ASSEMBLY LH (See page MI-10)**
3. **INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH (See page ED-19)**
4. **INSTALL FRONT ARMREST BASE PANEL UPPER LH (See page ED-20)**
5. **INSTALL ASSIST GRIP COVER LH (See page ED-21)**
6. **INSTALL FRONT DOOR LOWER FRAME BRACKET GARNISH LH (See page ED-21)**

FRONT PILLAR UPPER COVER

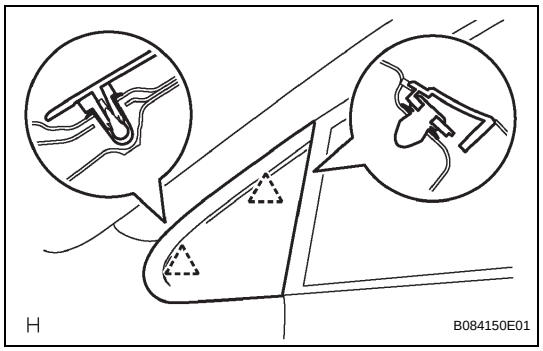
COMPONENTS





REMOVAL

1. **REMOVE FRONT PILLAR COVER SUB-ASSEMBLY UPPER LH**
   (a) Using a moulding remover, detach the 2 clips and remove the pillar cover.



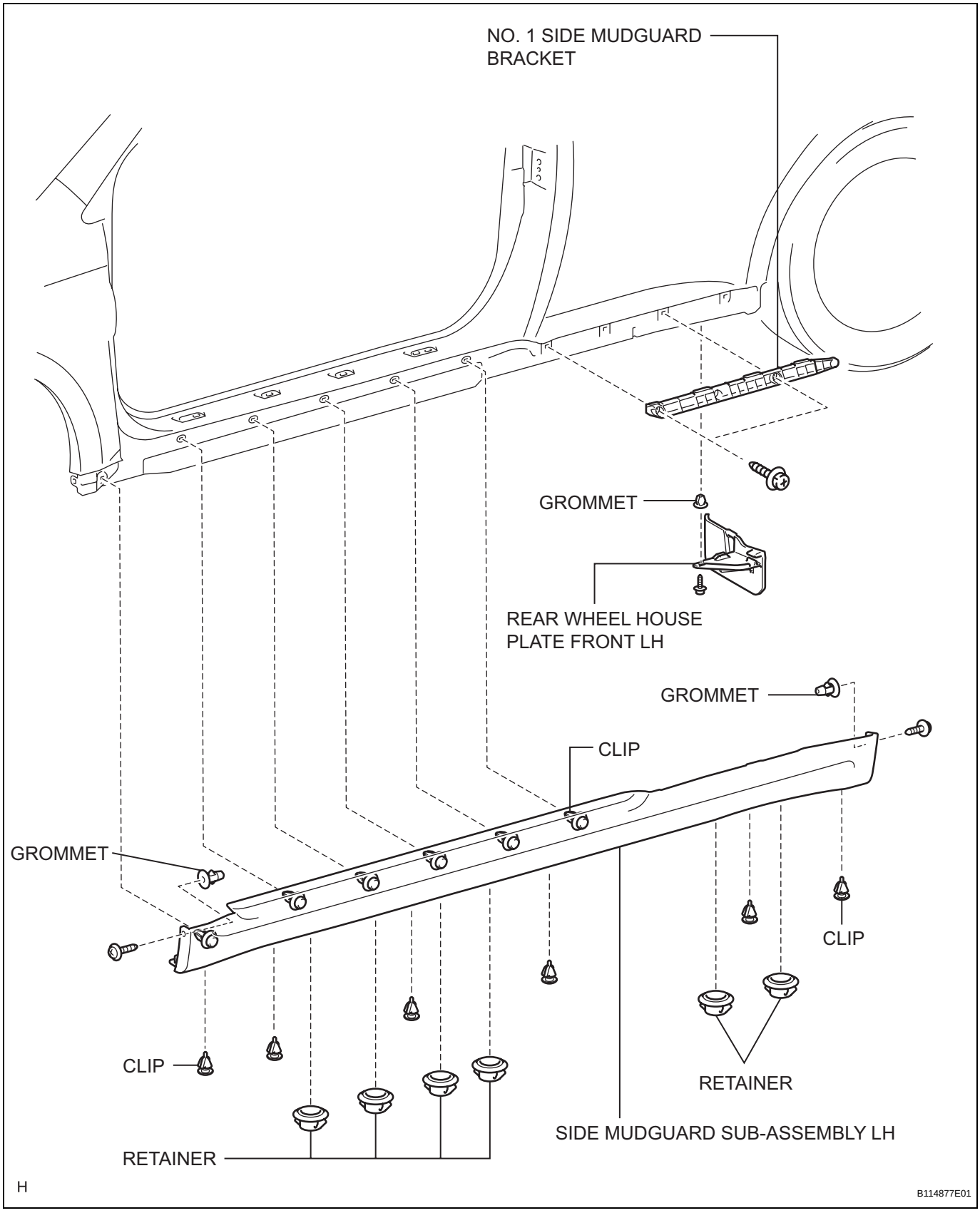
INSTALLATION

1. INSTALL FRONT PILLAR COVER SUB-ASSEMBLY UPPER LH

(a) Attach the 2 clips to install the pillar cover.

SIDE MUDGUARD

COMPONENTS

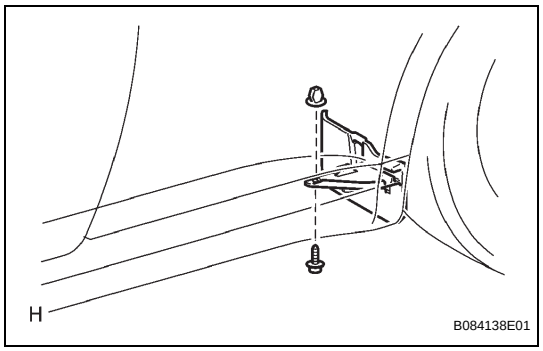


ET

REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



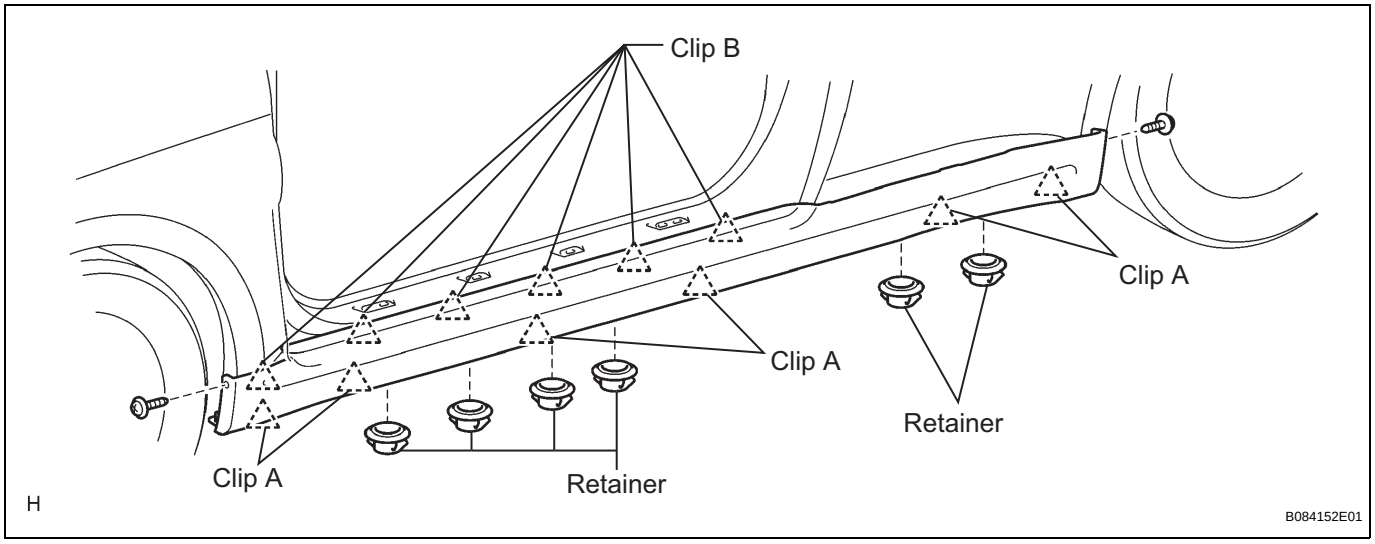
1. REMOVE REAR WHEEL HOUSE PLATE FRONT LH

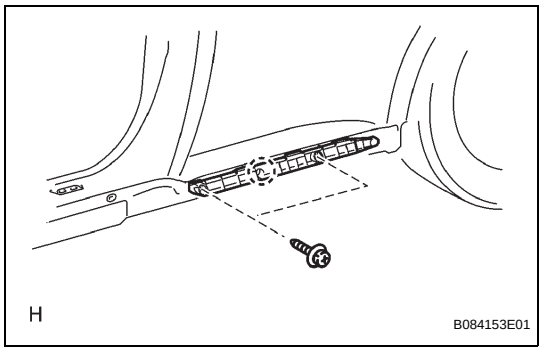
(a) Remove the screw and wheel house plate.

2. REMOVE SIDE MUDGUARD SUB-ASSEMBLY LH

(a) Remove the 2 screws, 6 retainers, 2 grommets and 6 clips labeled A.

(b) Detach the 6 clips labeled B and remove the mudguard.





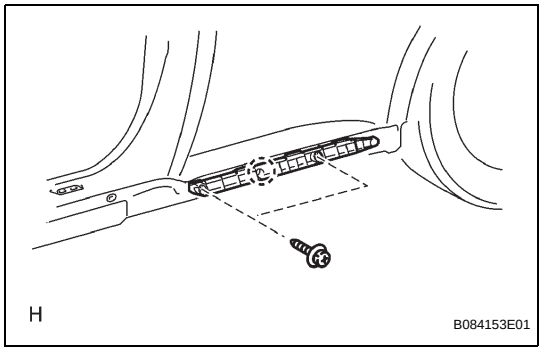
3. REMOVE NO. 1 SIDE MUDGUARD BRACKET

(a) Remove the 2 screws.

(b) Detach the claw and remove the bracket.

ET

INSTALLATION



1. INSTALL NO. 1 SIDE MUDGUARD BRACKET

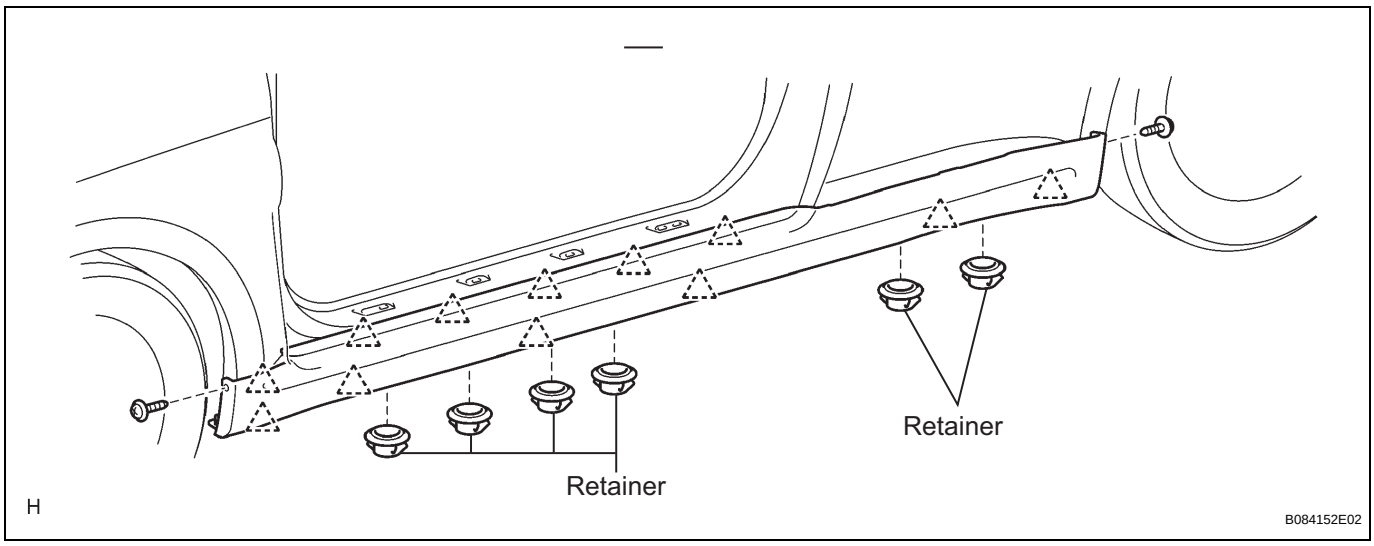
(a) Attach the claw to install the bracket.

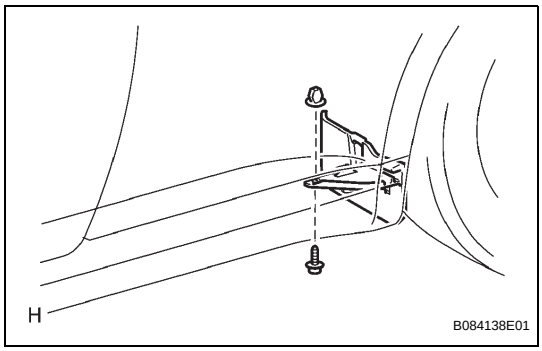
(b) Install the 2 screws.

2. INSTALL SIDE MUDGUARD SUB-ASSEMBLY LH

(a) Attach the 12 clips to install the mudguard.

(b) Install the 6 retainers, 2 grommets and 2 screws.



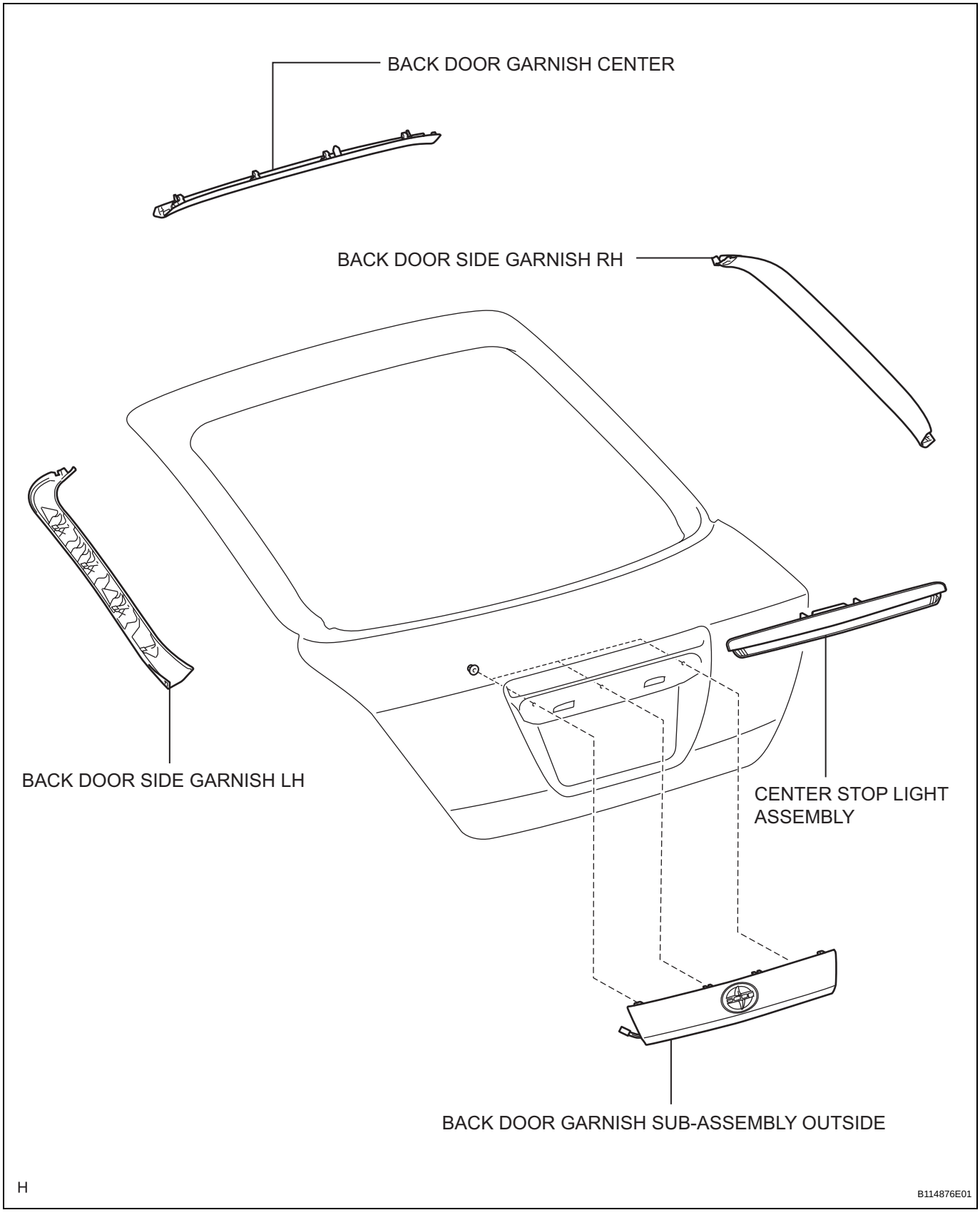


3. INSTALL REAR WHEEL HOUSE PLATE FRONT LH

(a) Install the wheel house plate with the screw.

BACK DOOR OUTSIDE GARNISH

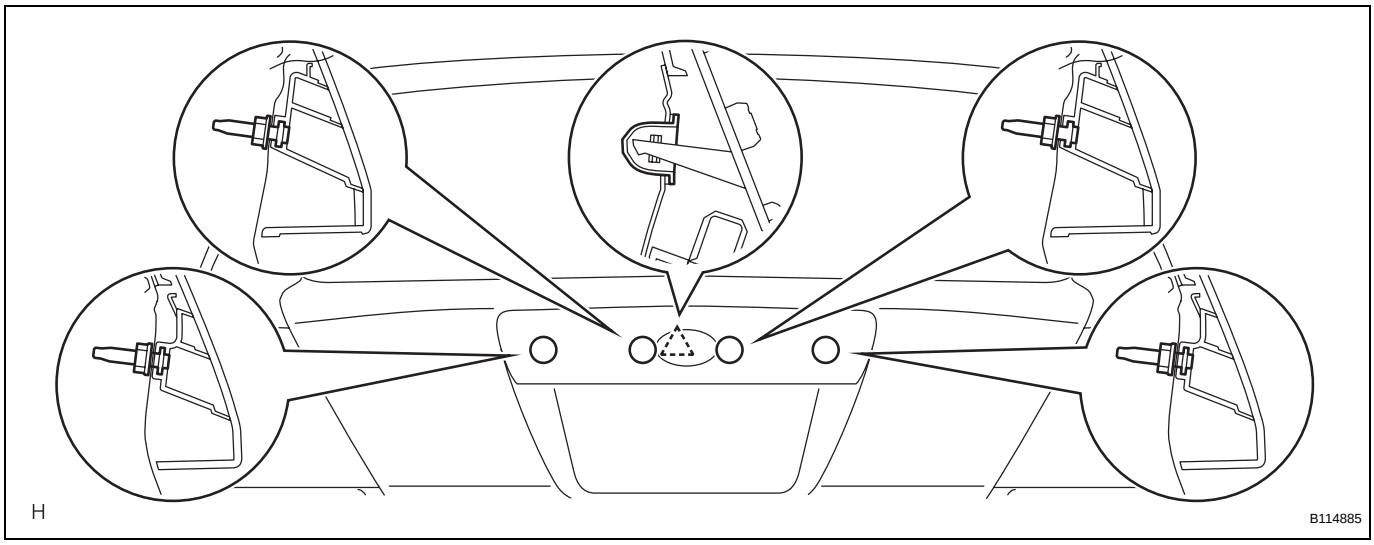
COMPONENTS

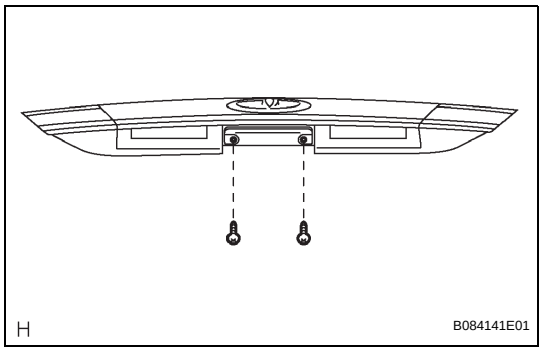


ET

REMOVAL

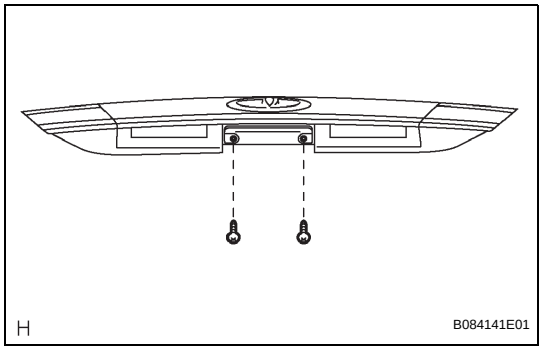
1. **REMOVE BACK DOOR GARNISH CENTER (See page ED-24)**
2. **REMOVE BACK DOOR SIDE GARNISH LH (See page ED-24)**
3. **REMOVE BACK DOOR SIDE GARNISH RH (See page ED-24)**
4. **REMOVE CENTER STOP LIGHT ASSEMBLY (See page LI-28)**
5. **REMOVE BACK DOOR GARNISH SUB-ASSEMBLY OUTSIDE**
   (a) Remove the 4 nuts.
   (b) Detach the clip and disconnect the connector. Then remove the garnish.





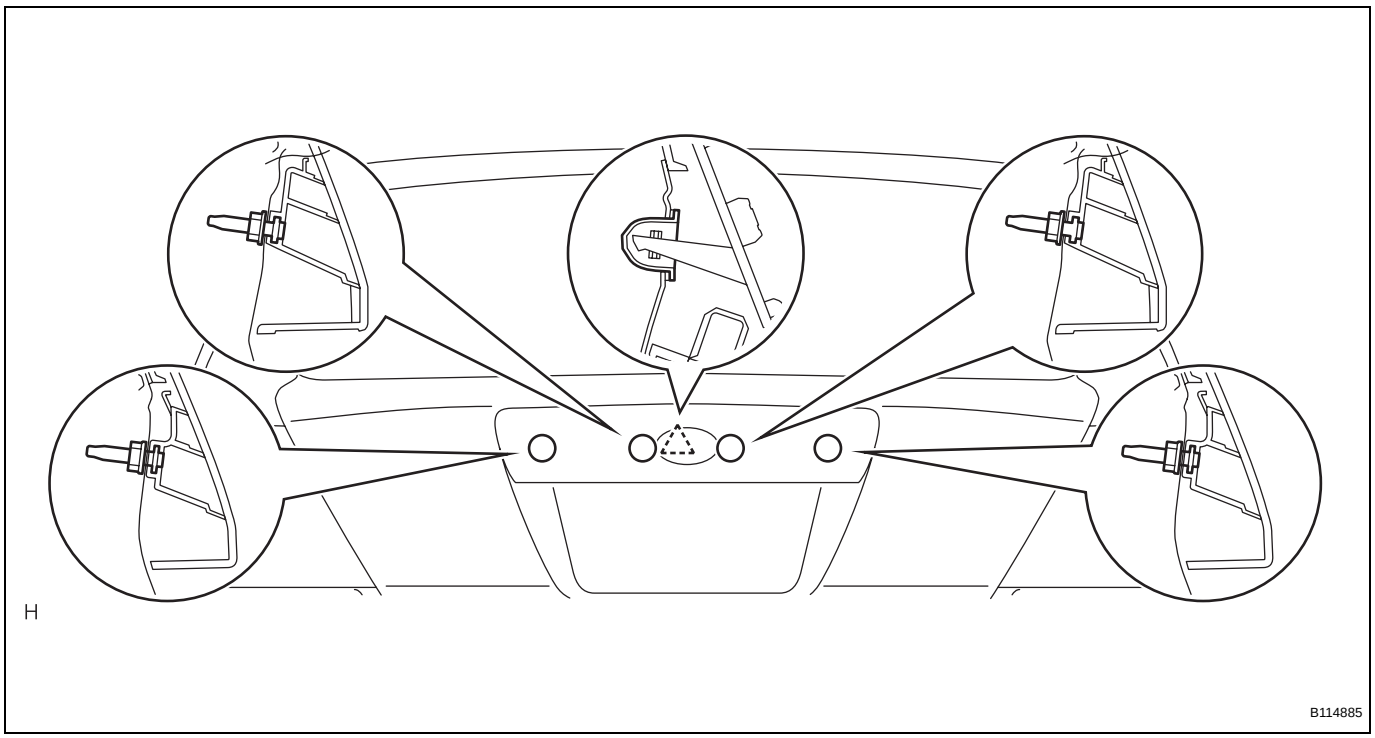
(c) Remove the 2 screws and opener switch.

INSTALLATION



1. **INSTALL BACK DOOR GARNISH SUB-ASSEMBLY OUTSIDE**
   (a) Install the opener switch with the 2 screws.
   (b) Connect the connector.
   (c) Attach the clip to install the garnish.

(d) Install the 4 nuts.



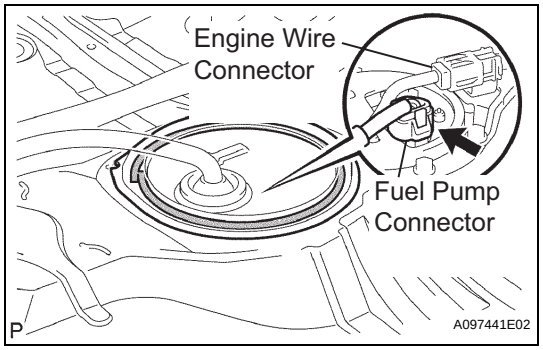
2. **INSTALL CENTER STOP LIGHT ASSEMBLY (See page LI-28)**
3. **INSTALL BACK DOOR SIDE GARNISH LH (See page ED-28)**
4. **INSTALL BACK DOOR SIDE GARNISH RH (See page ED-28)**
5. **INSTALL BACK DOOR GARNISH CENTER (See page ED-28)**

FUEL SYSTEM

PRECAUTION

1. BEFORE WORKING ON FUEL SYSTEM

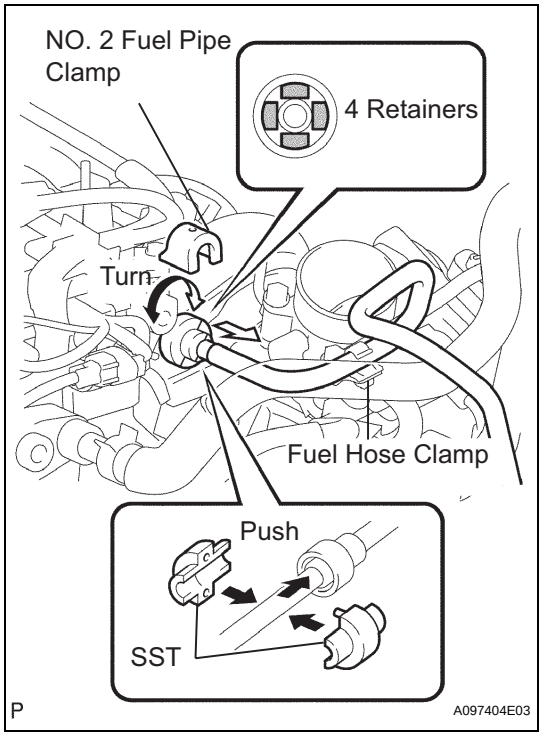
(a) Do not work near an open flame.
(b) Keep gasoline away from rubber and leather parts.
(c) Discharge the fuel pressure before disconnecting the fuel line to prevent gasoline slipping out. Refer to the following procedure.



2. DISCHARGE FUEL PRESSURE

NOTICE:
DTC P0171 lean fuel trim may be present. Clear DTCs after the repair.

(a) Remove the rear seat cushion and rear floor service hole cover.
(b) Disconnect the fuel pump connector.
(c) Allow the engine to idle until the engine stops.
(d) Turn the ignition switch OFF.
(e) Remove the fuel cap to release the fuel tank pressure.
(f) Connect the fuel pump connector.
(g) Install the rear floor service hole cover and rear seat cushion.

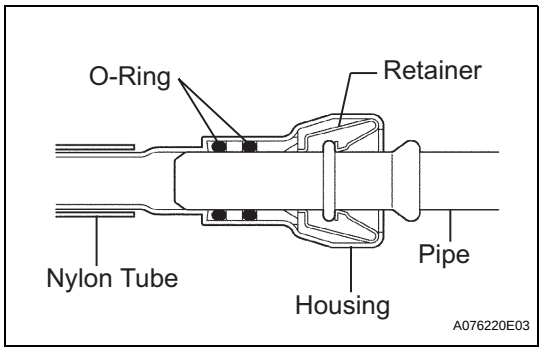


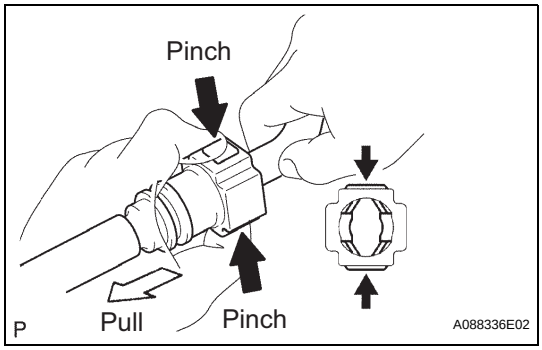
3. DISCONNECT FUEL MAIN TUBE

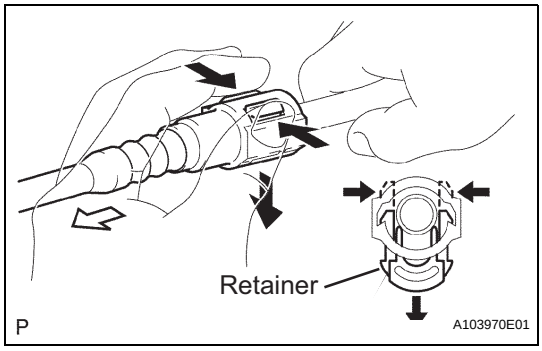
NOTICE:
Do not forcibly bend and twist the fuel main tube.

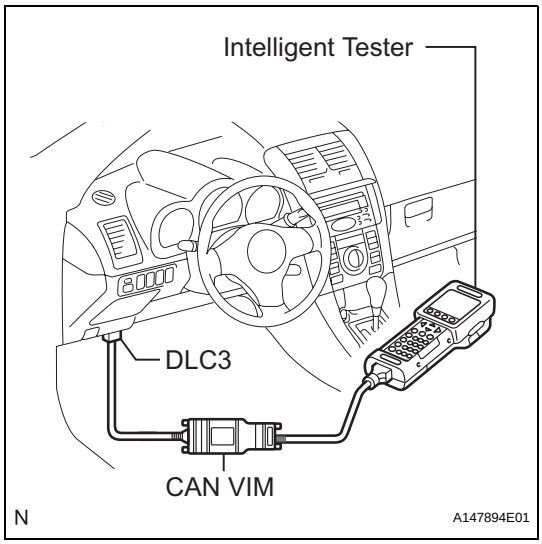
(a) Remove the fuel pipe clamp.
(b) Wipe off dirt on the fuel tube connector.
(c) Hold the fuel tube connector, and then install the SST.
SST 09268-21010
(d) Turn the SST to align the retainer inside the fuel tube connector with the chamfered part of the SST.
(e) Insert the SST into the fuel tube and hold it. Then push the fuel tube connector toward the SST side.
(f) Mount the retainer of the fuel tube connector onto the chamfered part of the SST.

FU









(g) Slide the SST and fuel tube connector together towards the fuel tube until they make a click sound, and then disconnect the fuel tube.
(h) Drain the fuel remaining inside the fuel tube.
(i) Cover the fuel tube and fuel pipe with a plastic bag to protect the disconnected part.

4. CONNECT FUEL MAIN TUBE
(a) Connect the fuel main tube.
(b) Push the fuel tube connector until it makes a click sound.
(c) Install the fuel pipe clamp.
(d) Install the fuel tube into the fuel hose clamp.

5. DISCONNECT FUEL TUBE CONNECTOR A TYPE
(a) Wipe off dirt on the fuel tube connector.
(b) Pinch the fuel tube connector, and then disconnect the fuel tube. DO not use any tools.
(c) Drain the fuel remaining inside the fuel tube.
(d) Cover the fuel tube and fuel pipe with a plastic bag to protect the disconnected part.

6. CONNECT FUEL TUBE CONNECTOR A TYPE
(a) Connect the fuel tube connector to the fuel pipe.
(b) Push the fuel connector until it makes a click sound.

HINT:
If it is difficult to connect the fuel tube connector, apply a small amount of new engine oil on the tip of the pipe.

7. DISCONNECT FUEL TUBE CONNECTOR B TYPE
(a) Wipe off dirt on the fuel tube connector.
(b) Detach the 2 claws of the connector retainer, and then disconnect the fuel tube. DO not use any tools.
(c) Drain the fuel remaining inside the fuel tube.
(d) Cover the fuel tube and fuel pipe with a plastic bag to protect the disconnected part.

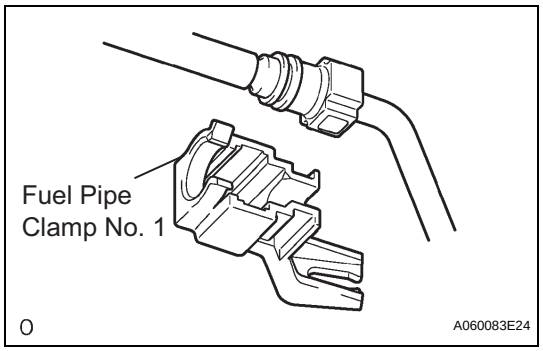
ON-VEHICLE INSPECTION

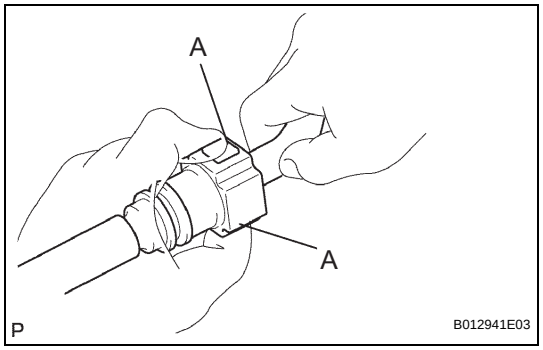
1. CHECK FUEL PUMP OPERATION
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch ON. Do not start the engine.
(c) Select the tester menus: DIAGNOSIS, ENHANCED OBD II, ACTIVE TEST and FUEL PUMP/SPD, to operate the fuel pump.
(d) Touch the fuel hose in the engine compartment to check the fuel flow.
(e) Stop the fuel pump.
If there is no fuel flow, the fuel pump may not operate. Check the fuel pump circuit (see page ES-354).

2. CHECK FUEL PRESSURE
(a) Check that the battery positive voltage is above 12 V.

(b) Disconnect the cable from the negative (-) battery terminal.

(c) Remove the fuel pipe clamp No. 1 from the fuel tube connector.

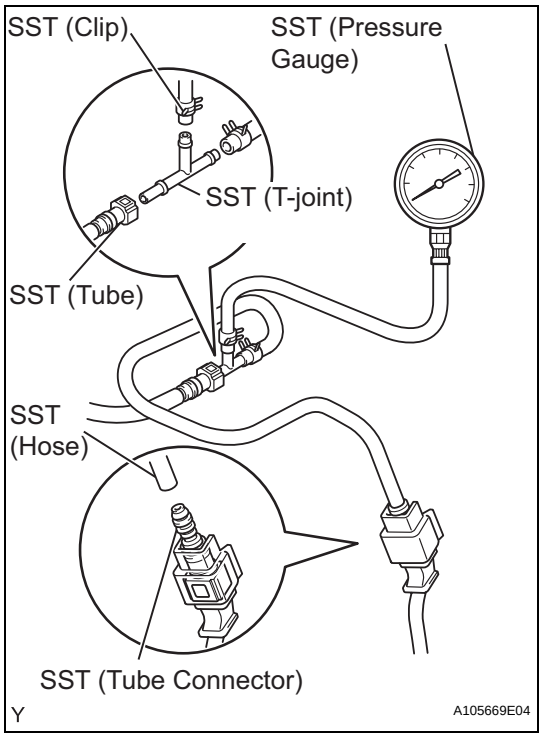




(d) Disconnect the fuel tube connector from the fuel pipe by pinching part A with your fingers, as shown in the illustration.

CAUTION:

- **Always read the precautions (See page FU-1) before disconnecting the fuel tube connector (quick type).**
- **The fuel pipe line may spray fuel as a result of retained pressure that remains in it. Do not allow fuel to be sprayed in the engine compartment.**



(e) Install SST (pressure gauge) and the fuel tube connector using SST as shown in the illustration.

SST 09268-31011 (09268-41500, 90467-13001, 95336-08070), 09268-45014 (09268-41200, 09268-41220, 09268-41250)

(f) Wipe up any gasoline.

(g) Connect the cable to the negative (-) battery terminal.

(h) When using the intelligent tester:
Operate the fuel pump (See step 1).

(i) Measure the fuel pressure.

Fuel pressure:

304 to 343 kPa (3.1 to 3.5 kgf/cm^2, 44 to 50 psi)

If the pressure is high, replace the fuel pressure regulator.

If the pressure is low, check the fuel hoses and connections, fuel pump, fuel filter and fuel pressure regulator.

(j) Start the engine.

(k) Measure the fuel pressure at idle.

Fuel pressure:

304 to 343 kPa (3.1 to 3.5 kgf/cm^2, 44 to 50 psi)

(l) Stop the engine.

(m) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.

Fuel pressure:

147 kPa (1.5 kgf/cm^2, 21 psi)

If the pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.

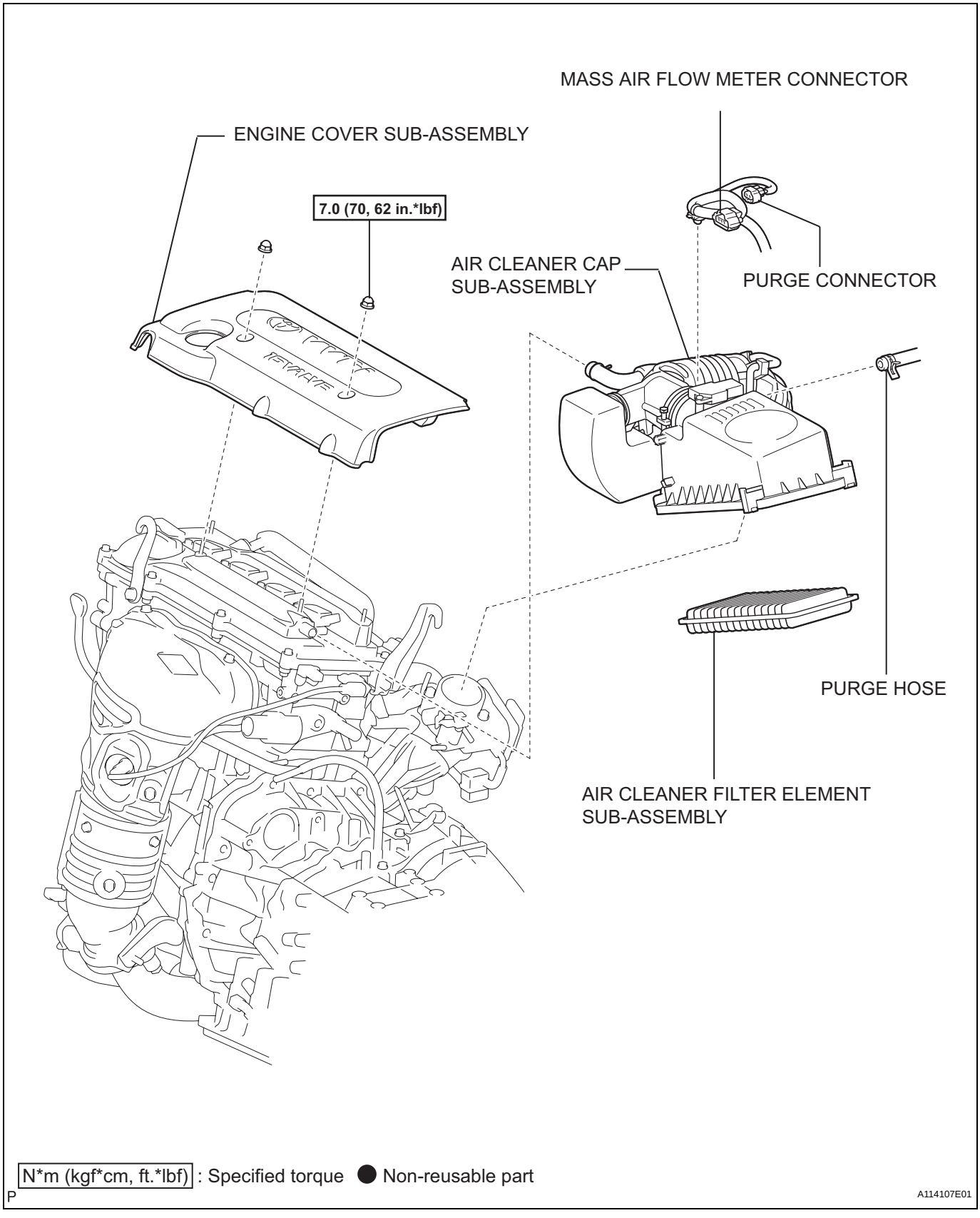
FU

(n) After checking the fuel pressure, disconnect the cable from the negative (-) battery terminal and carefully remove SST and the fuel tube connector to prevent gasoline from spraying.

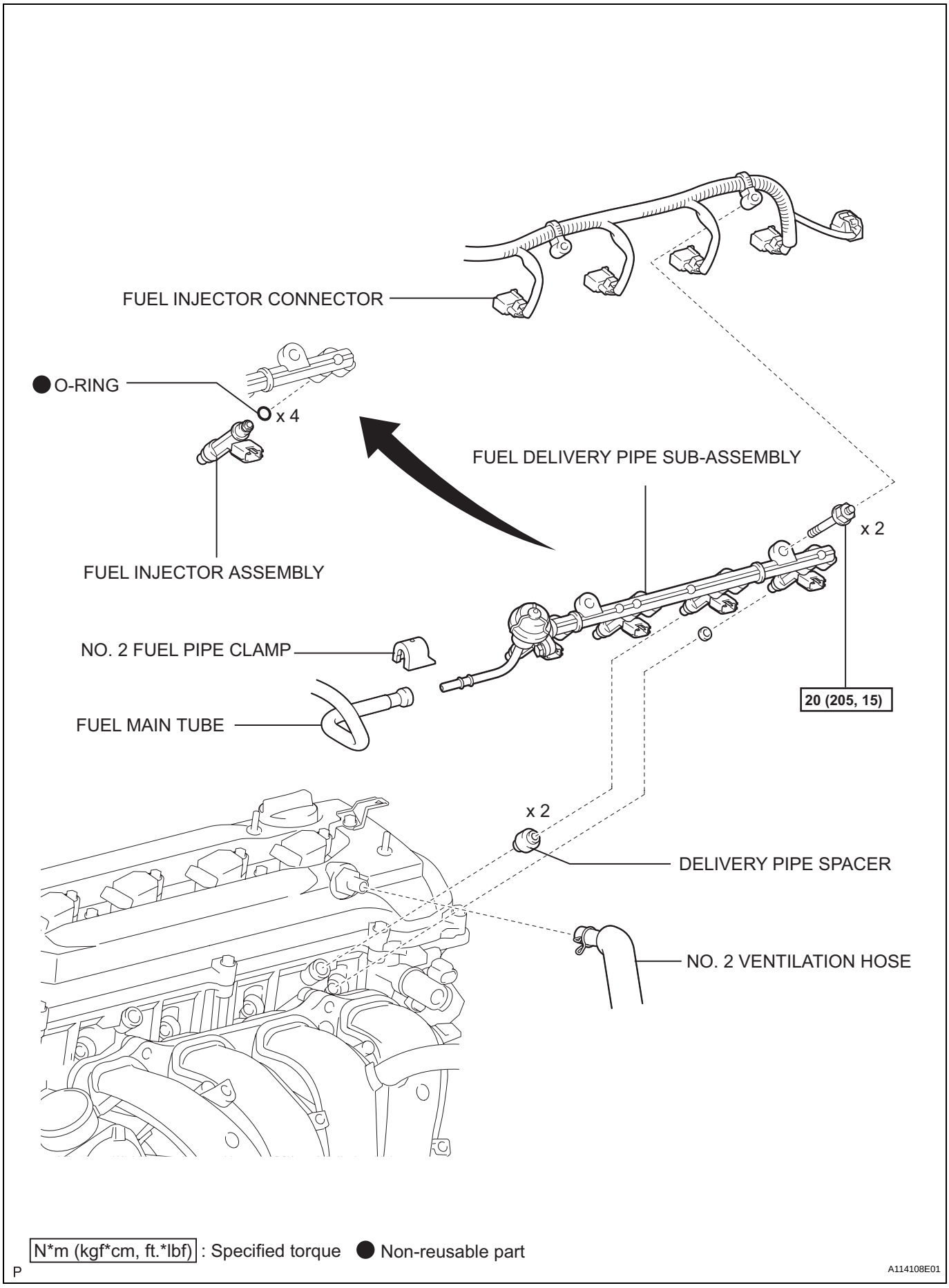
(o) Reconnect the fuel inlet tube (fuel tube connector).
CAUTION:
Always read the precautions (See page FU-1) before connecting the fuel tube connector (quick type).

FUEL INJECTOR

COMPONENTS

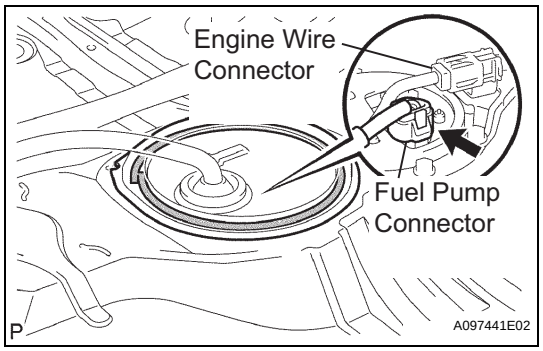


FU



N*m (kgf*cm, ft.*lbf) : Specified torque ● Non-reusable part

A114108E01



REMOVAL

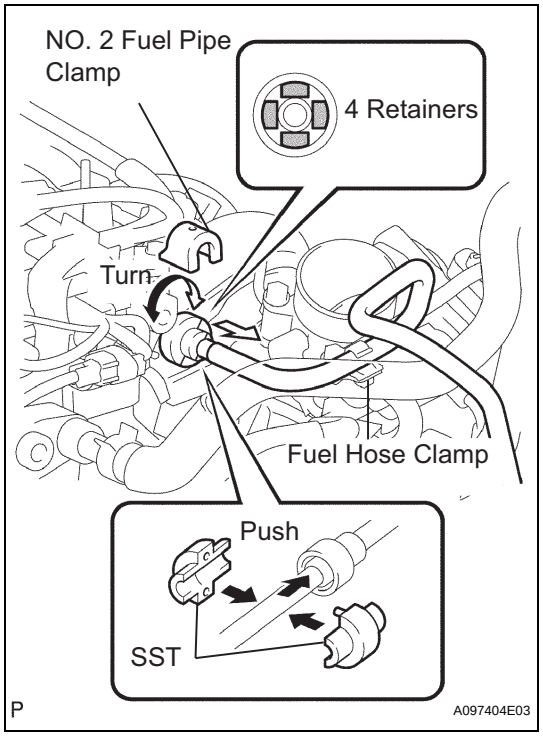
1. **DISCHARGE FUEL SYSTEM PRESSURE**
   NOTICE:
   DTC P0171 lean fuel trim may be present. Clear DTCs after the repair.
   (a) Remove the rear seat cushion and rear floor service hole cover.
   (b) Disconnect the fuel pump connector.
   (c) Allow the engine to idle until the engine stops.
   (d) Turn the ignition switch OFF.
   (e) Remove the fuel cap to release the fuel tank pressure.
   (f) Connect the fuel pump connector.
   (g) Install the rear floor service hole cover and rear seat cushion.

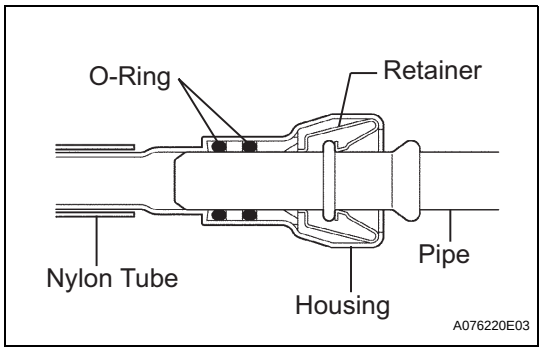
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**

3. **REMOVE ENGINE COVER SUB-ASSEMBLY (See page ES-382)**

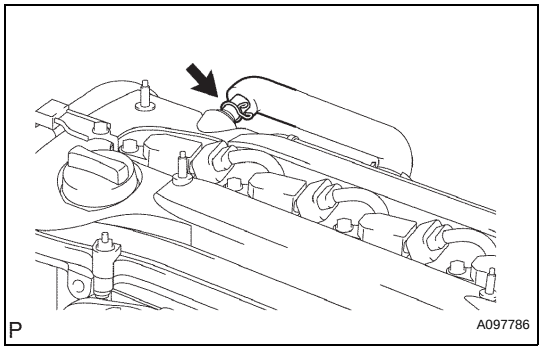
4. **REMOVE AIR CLEANER CAP SUB-ASSEMBLY (See page ES-383)**

5. **DISCONNECT FUEL MAIN TUBE**
   NOTICE:
   DO not forcibly bend and twist the fuel main tube.
   (a) Remove the fuel pipe clamp.
   (b) Wipe off dirt on the fuel tube connector.
   (c) Hold the fuel tube connector, and then install the SST.
   SST 09268-21010
   (d) Turn the SST to align the retainer inside the fuel tube connector with the chamfered part of the SST.
   (e) Insert the SST into the fuel tube and hold it. Then push the fuel tube connector toward the SST side.
   (f) Mount the retainer of the fuel tube connector onto the chamfered part of the SST.



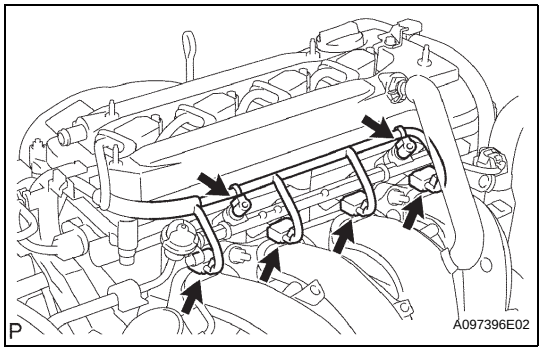


(g) Slide the SST and fuel tube connector together towards the fuel tube until they make a click sound, and then disconnect the fuel tube.
(h) Drain the fuel remaining inside the fuel tube.
(i) Cover the fuel tube and fuel pipe with a plastic bag to protect the disconnected part.



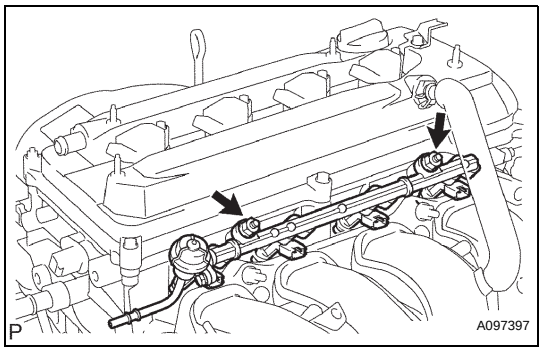
6. DISCONNECT NO. 2 VENTILATION HOSE

(a) Disconnect the No. 2 ventilation hose from the ventilation valve.

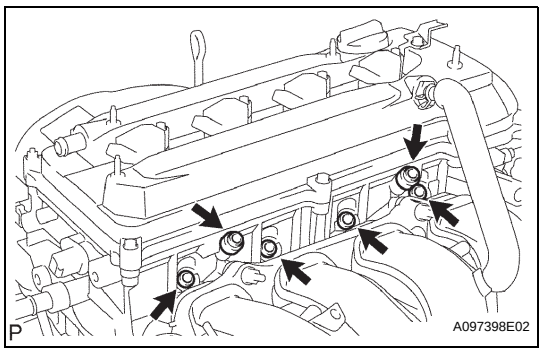


7. REMOVE FUEL DELIVERY PIPE SUB-ASSEMBLY

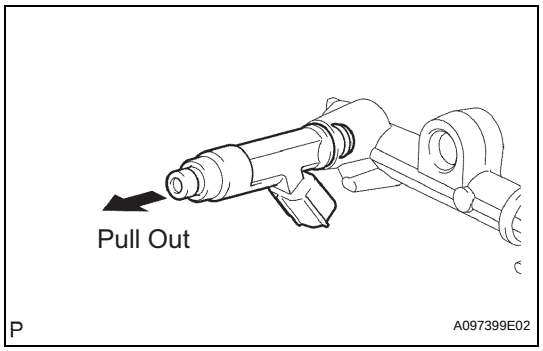
(a) Remove the 2 wire harness clamps.
(b) Disconnect the 4 fuel injector connectors.



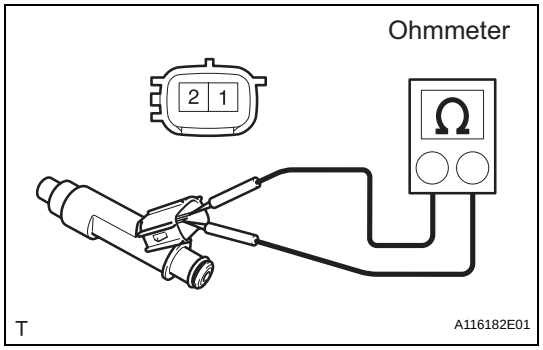
(c) Remove the 2 bolts, then remove the fuel delivery pipe together with the 4 fuel injectors.
NOTICE:
Be careful not to drop the fuel injectors when removing the fuel delivery pipe.



(d) Remove the 2 delivery pipe spacers from the cylinder head.
(e) Remove the 4 insulators from the cylinder head.

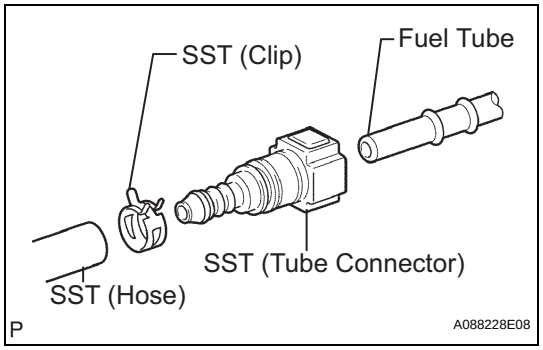


8. **REMOVE FUEL INJECTOR ASSEMBLY**
   (a) Pull the 4 fuel injectors out of the fuel delivery pipe.

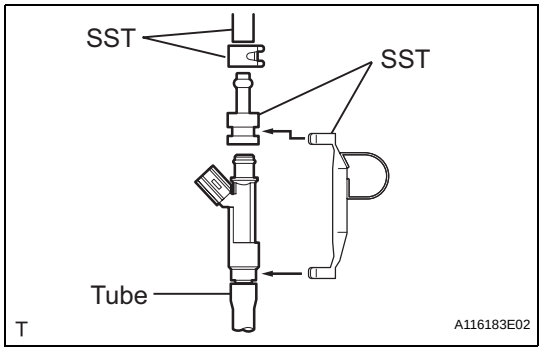


INSPECTION

1. **INSPECT FUEL INJECTOR ASSEMBLY**
   (a) Measure the resistance between the injector terminals.
   Standard resistance:
   11.6 to 12.4 Ω at 20°C (68°F)
   If the result is not as specified, replace the injector.
   (b) Inspect the injector injection volume.
   CAUTION:
   - **This test involves high-pressure fuel and electricity.**
   - **Take every precaution regarding safe handling of both the fuel and the electricity.**
   - **Perform this test in a safe area, and avoid any sparks or flame.**
   - **Do not smoke.**

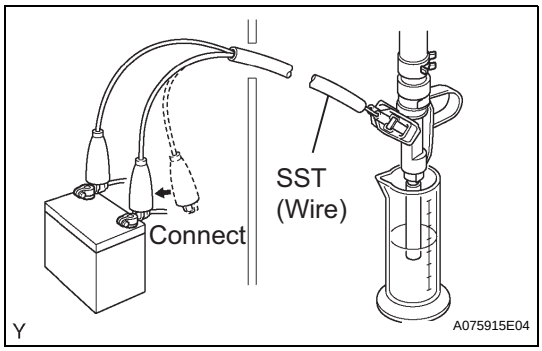


   (1) Connect SST (fuel tube connector) to SST (hose), then connect them to the fuel pipe (vehicle side).
   SST 09268-31011 (09268-41500, 90467-13001, 95336-08070)
   CAUTION:
   Always read the precautions (See page FU-1) before connecting the fuel tube connector (quick type).
   (2) Install the O-ring to the fuel injector.

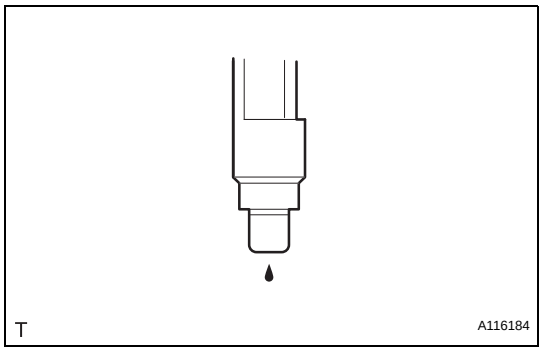


   (3) Connect SST (adapter and hose) to the injector, and hold the injector and union with SST (clamp).
   SST 09268-31011 (09268-41110, 09268-41300, 90467-13001)
   (4) Put the injector into the graduated cylinder.
   CAUTION:
   Install a suitable vinyl tube onto the injector to contain gasoline spray.
   (5) Operate the fuel pump (See page FU-2).

FU



(6) 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.
SST 09842-30080
Standard injection volume:
76 to 92 cm^3 (4.6 to 5.6 cu in.) per 15 seconds
Standard difference between each injector:
16 cm^3 (1.0 cu in.) or less
NOTICE:
Always turn on and off the voltage on the battery side, not the fuel pump side.

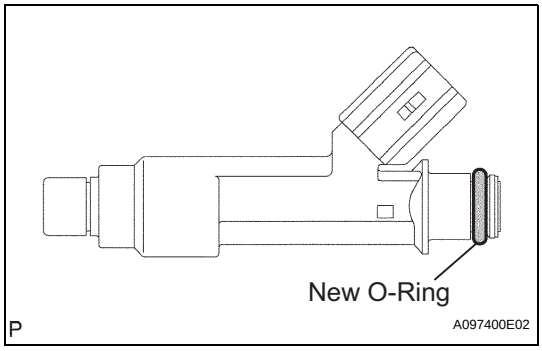


(c) Inspect the fuel leakage.
(1) Disconnect the SST (wire) tester probes from the battery and check the fuel leakage from the injector.
Standard fuel drop:
1 drop or less per 12 minutes
(2) Turn the ignition switch off.
(3) Disconnect the cable from the negative (-) battery terminal.
(4) Remove the SST.
(5) Disconnect the intelligent tester from the DLC3.
(6) Reconnect the fuel inlet hose (rear fuel pipe) to the fuel main tube.

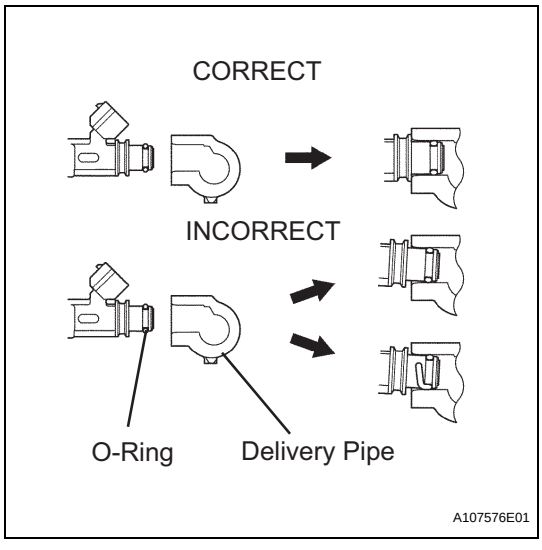
INSTALLATION

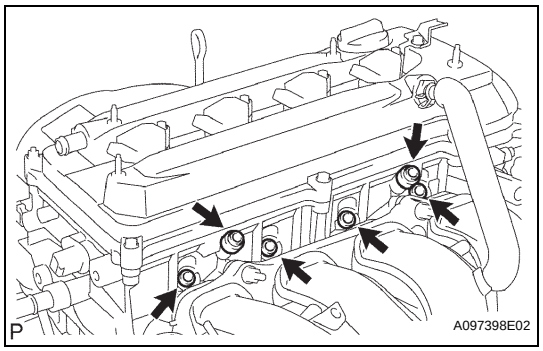
1. INSTALL FUEL INJECTOR ASSEMBLY

(a) Apply a light coat of gasoline or spindle oil to new O-rings, then install one onto each fuel injector.



(b) Apply a light coat of gasoline or spindle oil to the fuel delivery pipe which comes into contact with the O-ring of the fuel injector.
(c) Apply a light coat of gasoline or spindle oil to the O-ring again, then install the fuel injector right and left onto the fuel delivery pipe.
NOTICE:
Make sure that the O-ring is not cracked or jammed when installing.
(d) Check that the fuel injector rotate smoothly. If the fuel injector does not rotate, replace the O-ring.

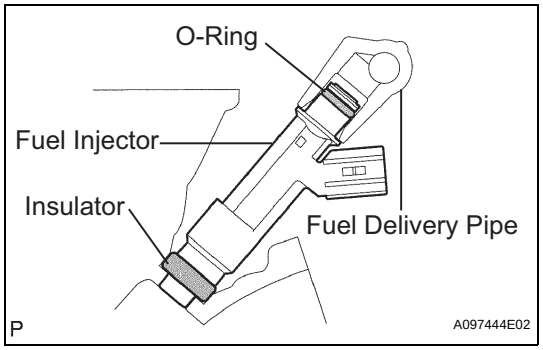




2. INSTALL FUEL DELIVERY PIPE SUB-ASSEMBLY

(a) Install 4 new insulators into the cylinder head.

(b) Install the 2 delivery pipe spacers onto the cylinder head.



(c) Install the fuel delivery pipe together with the 4 fuel injectors, then temporarily tighten the 2 bolts.

NOTICE:

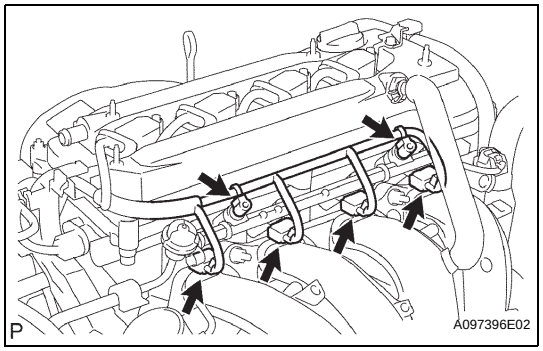
Be careful not to drop the fuel injectors when installing the fuel delivery pipe.

(d) Check that the fuel injector rotate smoothly.

If the fuel injector does not rotate, replace the O-ring.

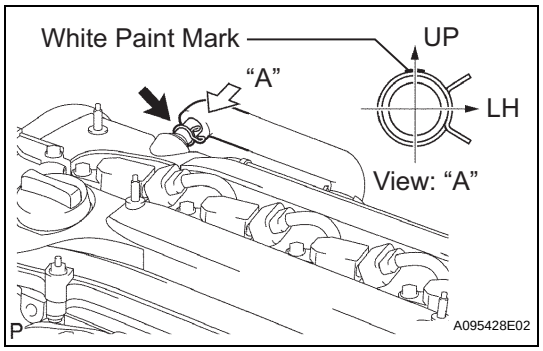
(e) Retighten the 2 bolts to specified torque.

Torque: 20 N*m (205 kgf*cm, 15 ft.*lbf)



(f) Connect the 4 fuel injector connectors.

(g) Install the 2 wire harness clamps.



3. CONNECT NO. 2 VENTILATION HOSE

(a) Connect the ventilation hose to the ventilation valve.

NOTICE:

Make sure that the paint mark and hose clamp are at the correct angle when installing.

4. CONNECT FUEL MAIN TUBE

(a) Connect the fuel main tube.

(b) Push the fuel tube connector until it makes a click sound.

(c) Install the fuel pipe clamp.

(d) Install the fuel tube into the fuel hose clamp.

5. INSTALL AIR CLEANER CAP SUB-ASSEMBLY (See page ES-387)

6. INSTALL ENGINE COVER SUB-ASSEMBLY (See page ES-389)

7. CONNECT CABLE TO BATTERY NEGATIVE TERMINAL

8. CHECK FOR FUEL LEAKAGE

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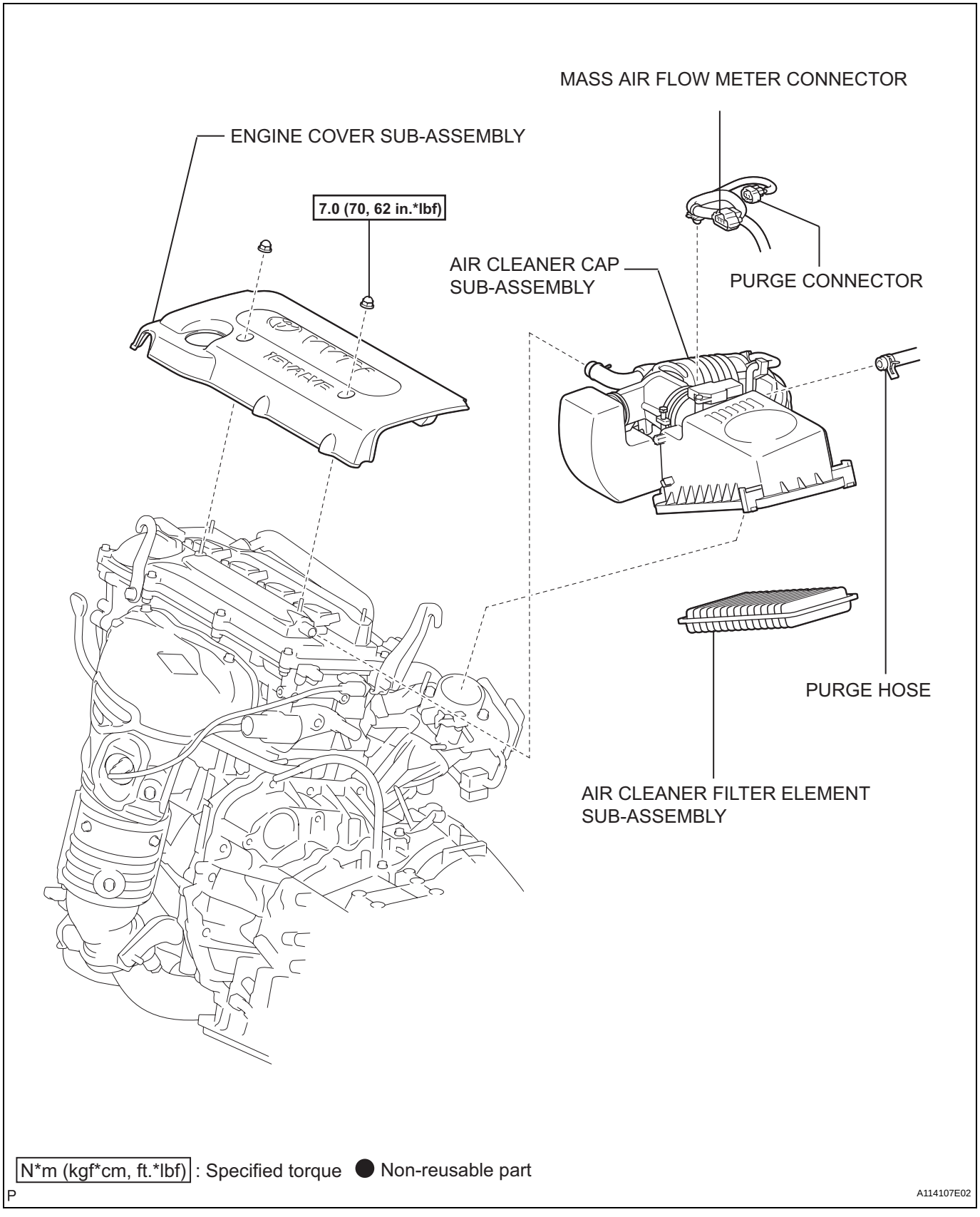
9. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

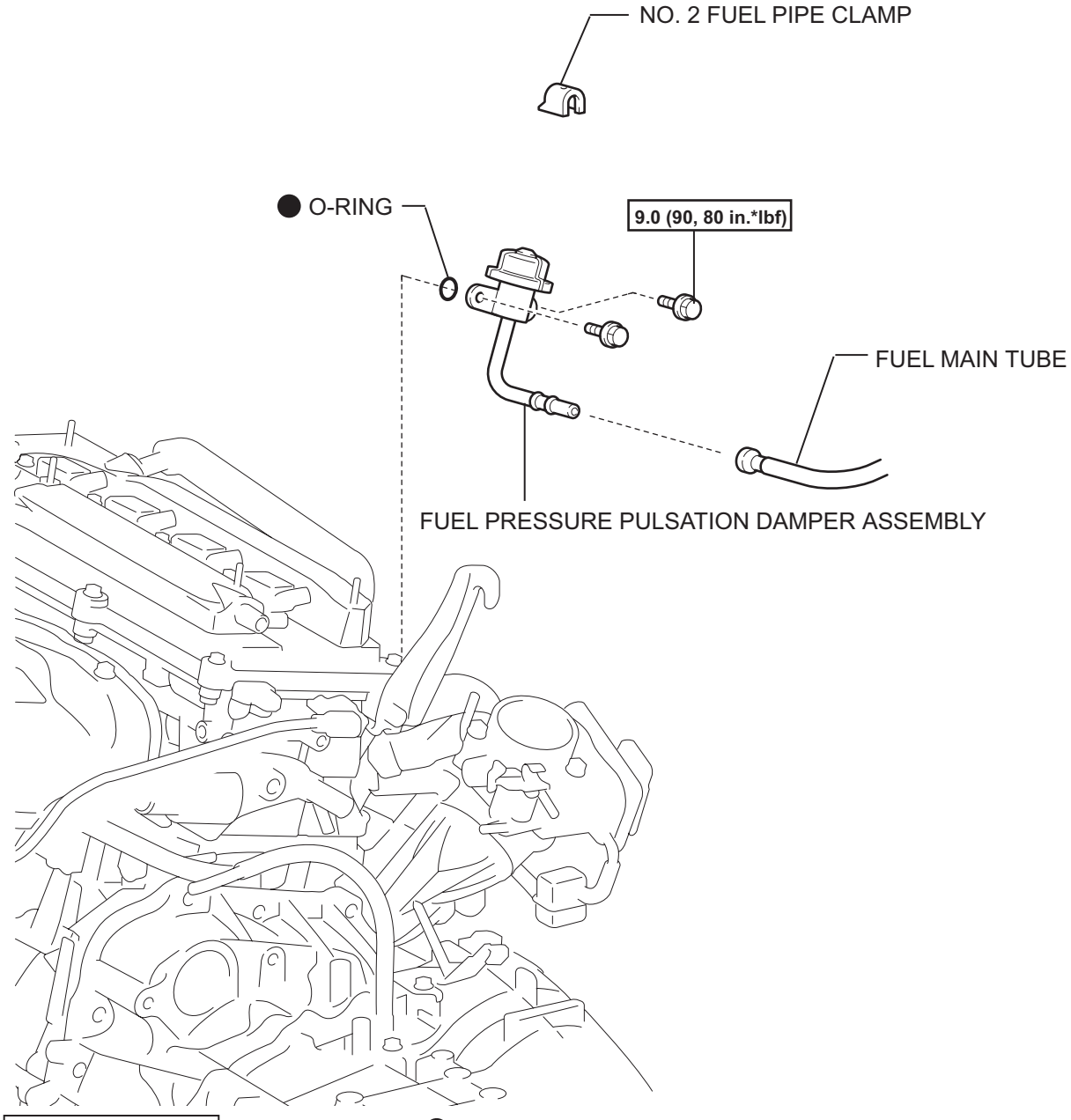
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

FUEL PRESSURE PULSATION DAMPER

COMPONENTS



FU



N*m (kgf*cm, ft.*lbf) : Specified torque ● Non-reusable part

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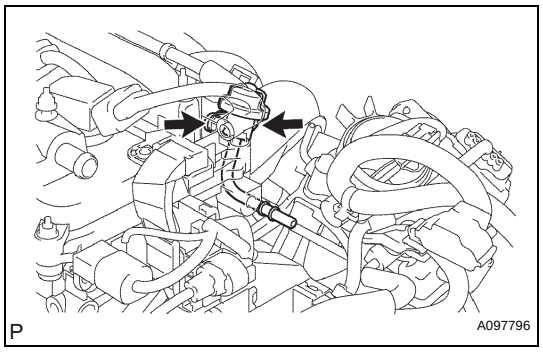
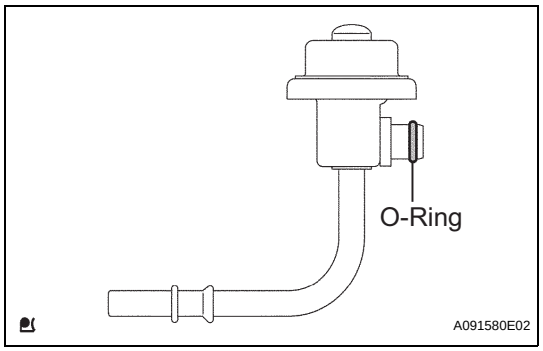
REMOVAL

1. **DISCHARGE FUEL SYSTEM PRESSURE (See page FU-7)**
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
3. **REMOVE ENGINE COVER SUB-ASSEMBLY (See page ES-382)**
4. **REMOVE AIR CLEANER CAP SUB-ASSEMBLY (See page ES-383)**
5. **DISCONNECT FUEL MAIN TUBE (See page FU-7)**
6. **REMOVE FUEL PRESSURE PULSATION DAMPER ASSEMBLY**
   (a) Remove the 2 bolts, then remove the fuel pulsation damper.

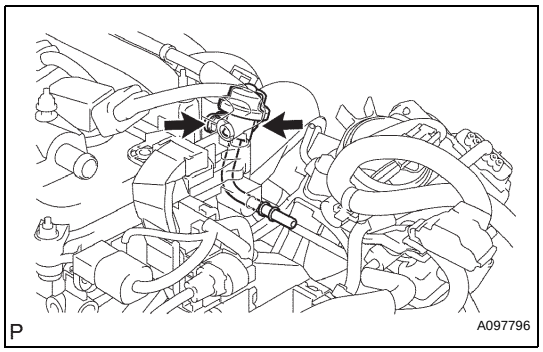


INSTALLATION

1. **INSTALL FUEL PRESSURE PULSATION DAMPER ASSEMBLY**
   (a) Apply a light coat of the gasoline or spindle oil to the O-ring of the fuel pressure pulsation damper.



   (b) Install the fuel pressure pulsation damper with the 2 bolts.
   Torque: 9.0 N*m (90 kgf*cm, 80 in.*lbf)
   NOTICE:
   Make sure that the O-ring is not cracked or jammed when installing.



2. **INSTALL FUEL MAIN TUBE (See page FU-11)**
3. **INSTALL AIR CLEANER CAP SUB-ASSEMBLY (See page ES-387)**
4. **INSTALL ENGINE COVER SUB-ASSEMBLY (See page ES-389)**
5. **CONNECT CABLE TO BATTERY NEGATIVE TERMINAL**
6. **CHECK FOR FUEL LEAKS**

7. PERFORM INITIALIZATION

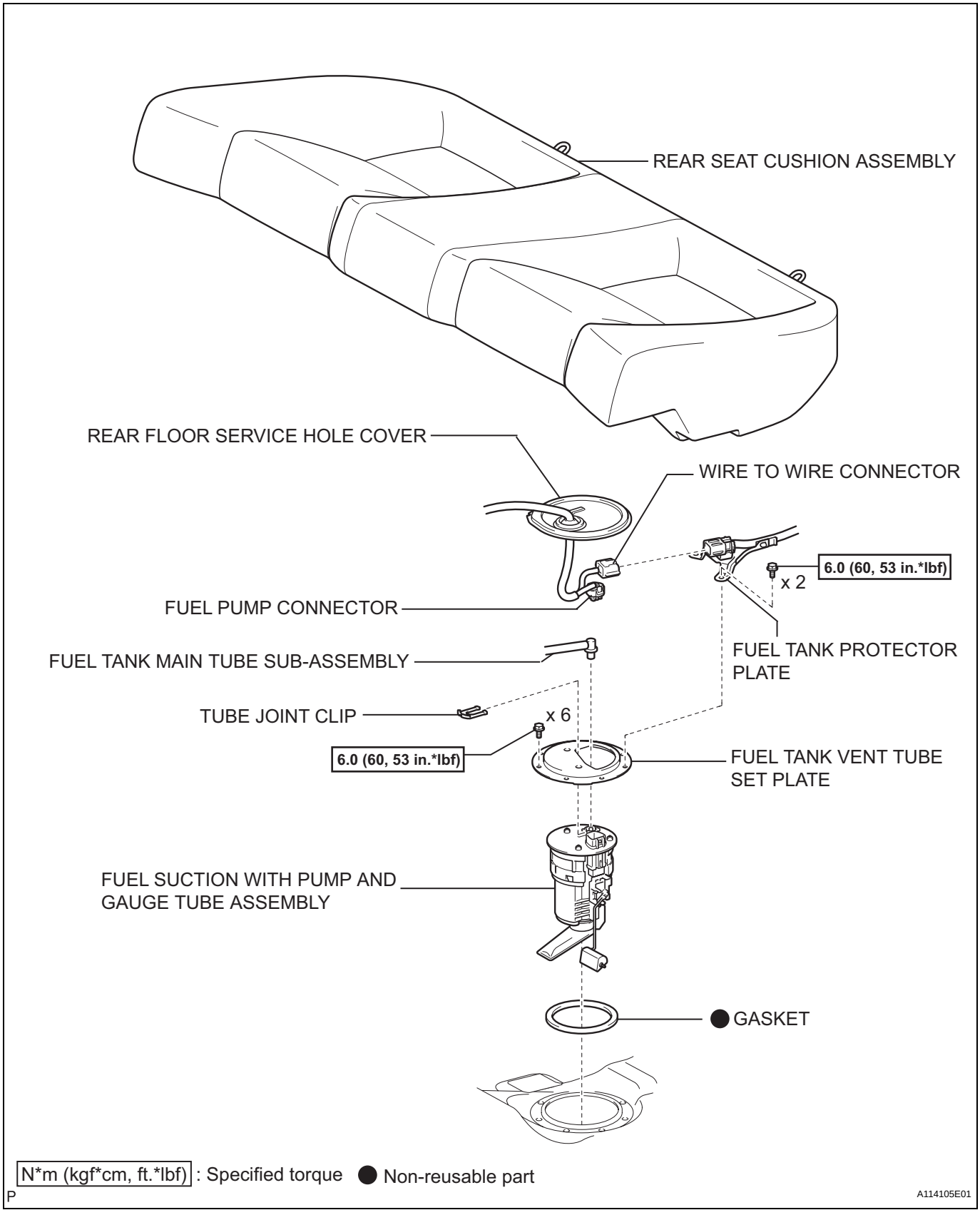
(a) Perform initialization (see page IN-23).

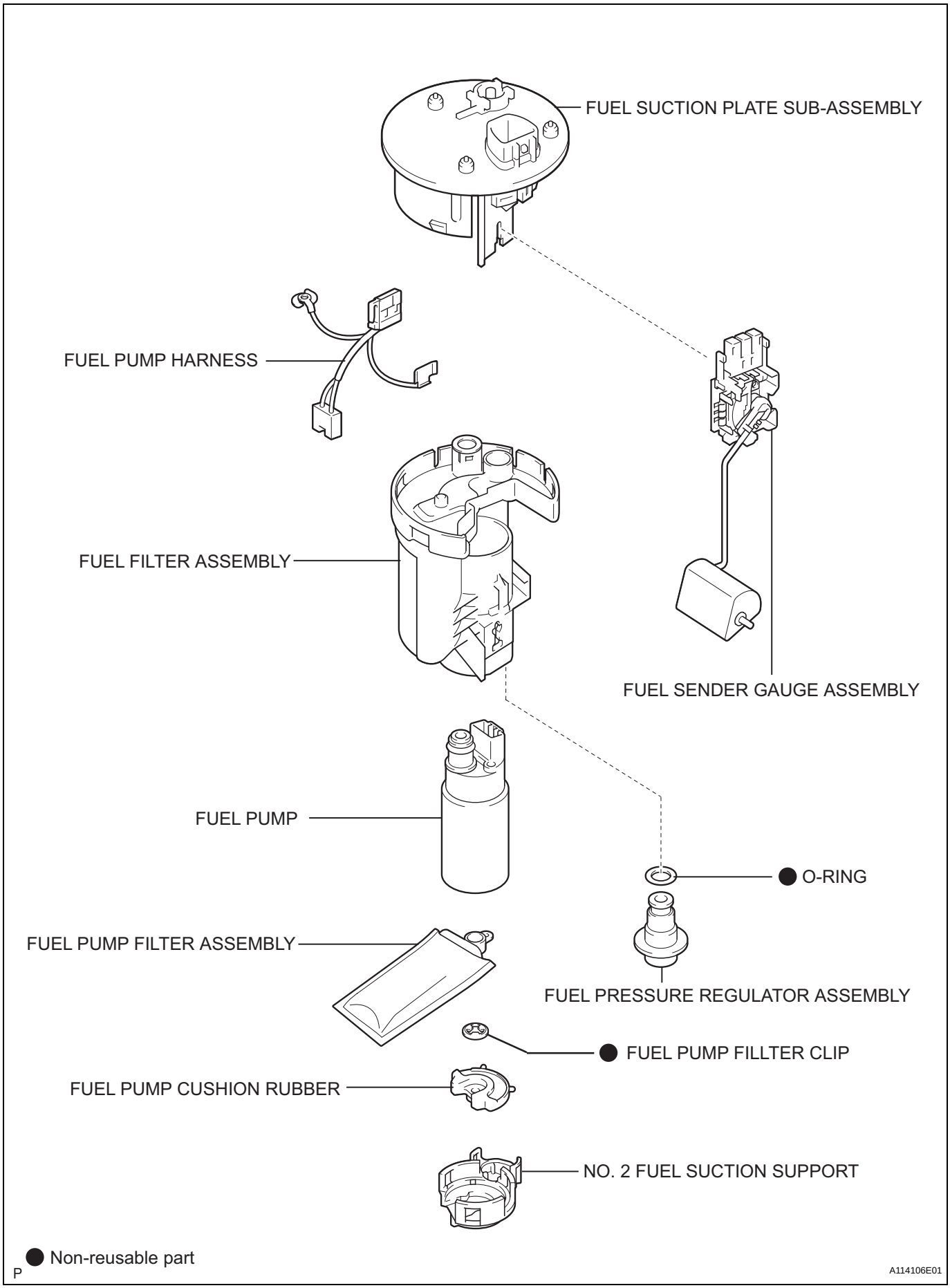
NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

FUEL PUMP

COMPONENTS




FUEL SUCTION PLATE SUB-ASSEMBLY
FUEL PUMP HARNESS
FUEL FILTER ASSEMBLY
FUEL SENDER GAUGE ASSEMBLY
FUEL PUMP
● O-RING
FUEL PUMP FILTER ASSEMBLY
FUEL PRESSURE REGULATOR ASSEMBLY
● FUEL PUMP FILLTER CLIP
FUEL PUMP CUSHION RUBBER
NO. 2 FUEL SUCTION SUPPORT
● Non-reusable part
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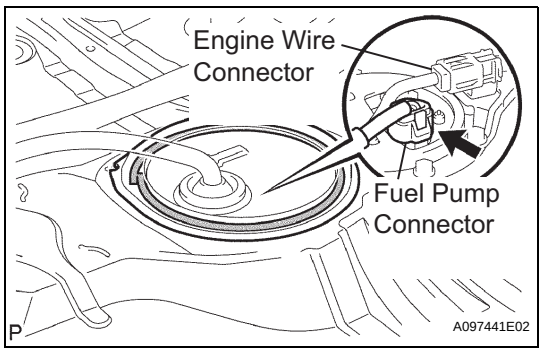
REMOVAL

1. REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)

2. REMOVE REAR FLOOR SERVICE HOLE COVER

(a) Remove the butyl tape, and remove the rear floor service hole cover.



(b) Disconnect the fuel pump connector.

(c) Discharge the fuel system pressure.

(1) Start the engine.

(2) Turn the ignition switch OFF after the engine stops.

HINT:

DTC P0171 (system to lean) may be present.

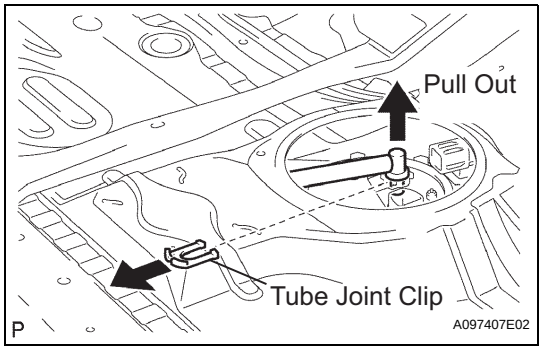
(3) Crank the engine again and check that the engine does not start.

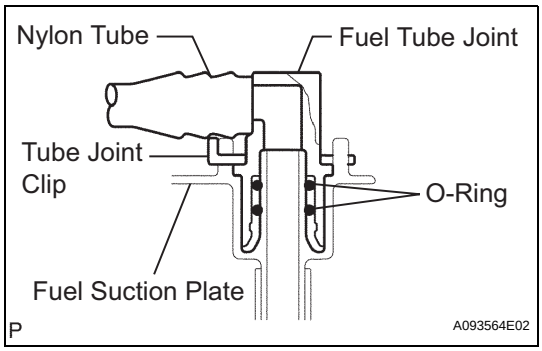
(4) Remove the fuel tank cap, and discharge the pressure in the fuel tank completely.

(d) Disconnect the wire to wire connector.

3. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

4. REMOVE FUEL SUCTION WITH PUMP AND GAUGE TUBE ASSEMBLY



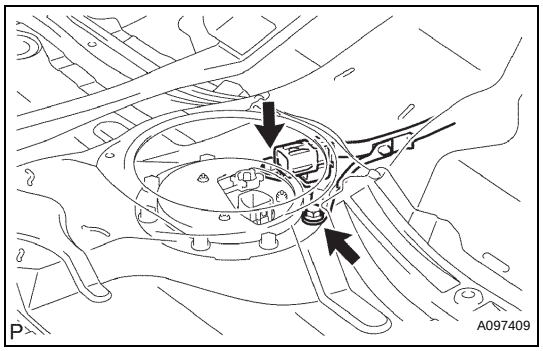


(a) Disconnect the fuel tank main tube.

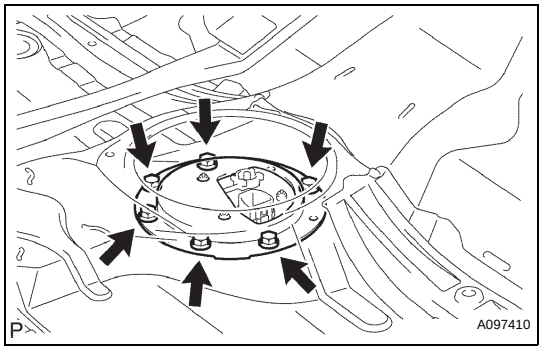
(1) Remove the tube joint clip, and pull the fuel tube joint out of the plug of the fuel suction plate.

NOTICE:

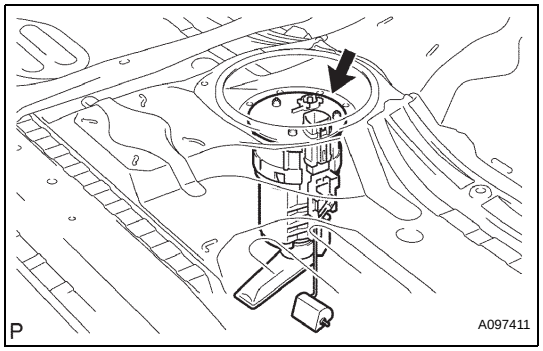
- **Remove dirt and foreign objects on the fuel tube joint before performing this work.**
- **Do not allow any scratches or foreign objects on the parts when disconnecting, as the fuel tube joint has the O-ring that seals the plug.**
- **Perform this work by hand. Do not use any tools.**
- **Do not forcibly bend, twist or turn the nylon tube.**
- **Protect the disconnected part by covering it with a plastic bag and protective tape after disconnecting the fuel tank main tube.**



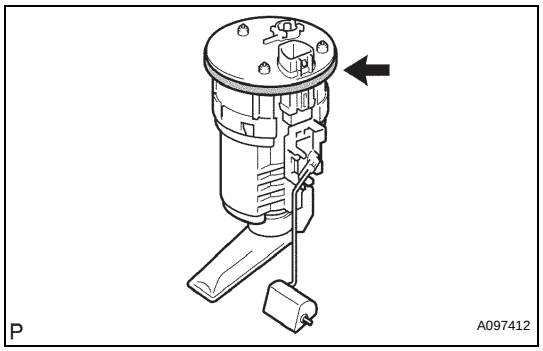
(b) Remove the 2 bolts and fuel tank protector plate.



(c) Remove the 6 bolts and fuel tank vent tube set plate.



(d) Remove the fuel suction with pump and gauge tube from the fuel tank.
NOTICE:
- **Do not damage the fuel pump filter.**
- **Make sure that the fuel sender gauge arm does not bend.**

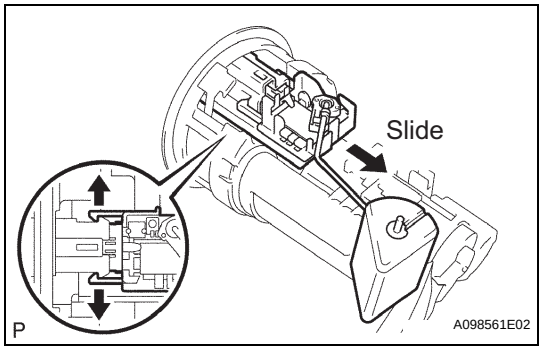


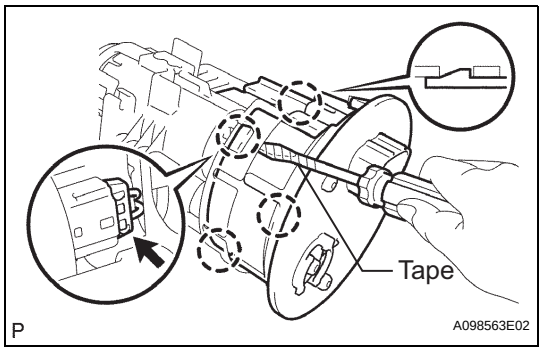
(e) Remove the gasket from the fuel suction tube with pump and gauge tube.

DISASSEMBLY

1. REMOVE FUEL SENDER GAUGE ASSEMBLY

(a) Separate the 2 claws fittings, then slide the fuel sender gauge to remove it from the fuel filter.





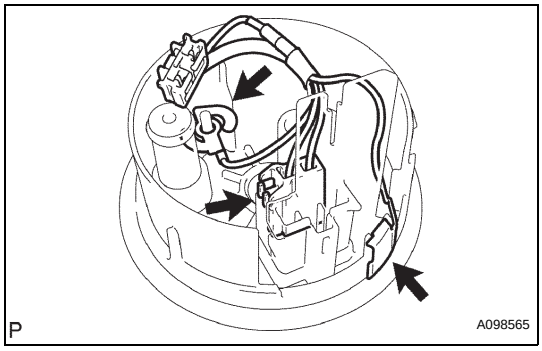
2. REMOVE FUEL SUCTION PLATE SUB-ASSEMBLY

(a) Disconnect the fuel pump harness connector.

(b) Using a screwdriver with its tip wrapped in tape, separate the 4 claws fittings. Then remove the fuel suction plate.

NOTICE:

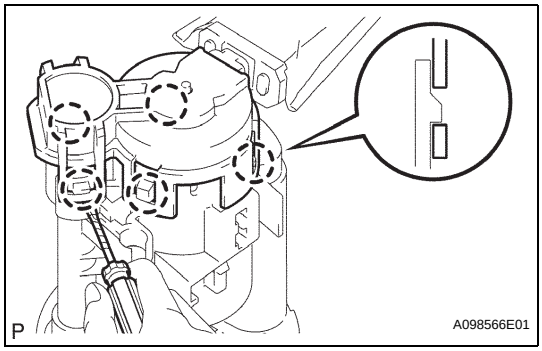
Do not damage the fuel suction plate or fuel tank fuel filter.



3. REMOVE FUEL PUMP HARNESS

(a) Remove the 2 pump harness terminals.

(b) Disconnect the pump harness connector, then remove the fuel pump harness.

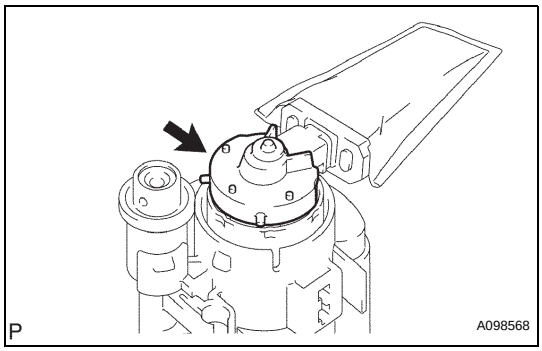


4. REMOVE NO. 2 FUEL SUCTION SUPPORT

(a) Using a screwdriver with its tip wrapped in tape, separate the 5 claws fittings. Then remove the fuel suction support.

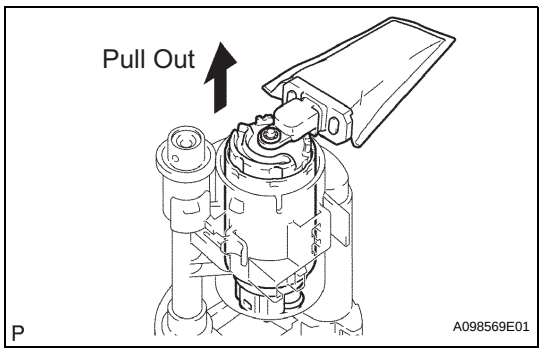
NOTICE:

Do not damage the fuel suction support or fuel tank fuel filter.



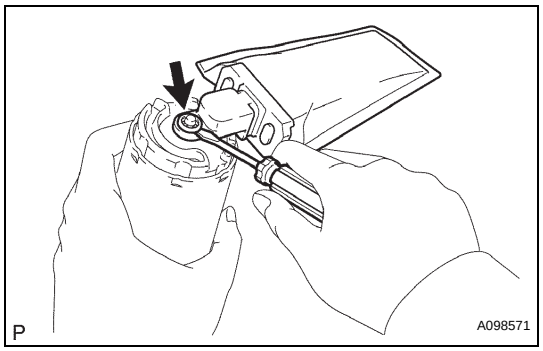
5. REMOVE FUEL PUMP CUSHION RUBBER

(a) Remove the fuel pump cushion rubber from the fuel pump.



6. REMOVE FUEL PUMP

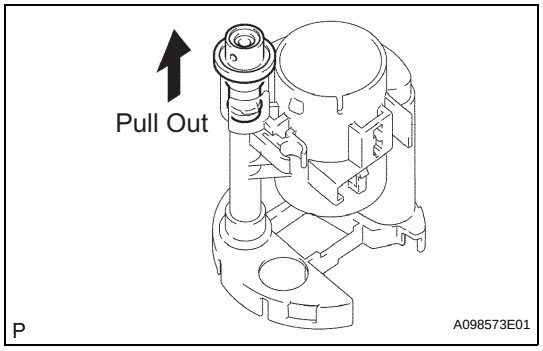
(a) Pull the fuel pump out of the fuel filter.



7. REMOVE FUEL PUMP FILTER

(a) Using a small screwdriver, pry out the clip.

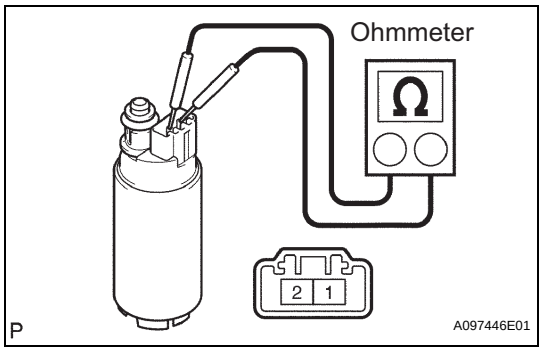
(b) Remove the fuel pump filter from the fuel pump.



8. REMOVE FUEL PRESSURE REGULATOR ASSEMBLY

(a) Pull the fuel pressure regulator out of the fuel tank fuel filter.

(b) Remove the O-ring from the fuel pressure regulator.



INSPECTION

1. INSPECT FUEL PUMP

(a) Check the fuel pump resistance.

(1) Using an ohmmeter, measure the resistance between terminals 1 and 2.

Standard resistance:

0.2 to 3.0 Ω at 20°C (68°F)

If the result is not as specified, replace the fuel pump.

(b) Check fuel pump operation.

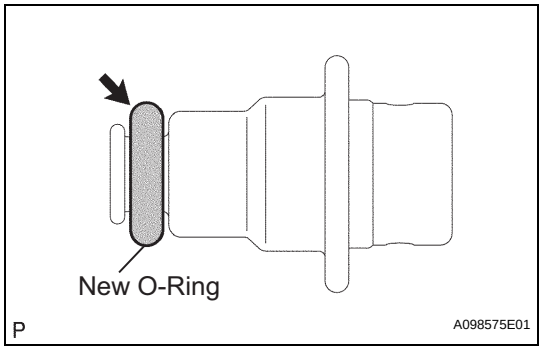
(1) Apply battery voltage to terminals 1 and 2. Check that the pump operates.

NOTICE:

- **These tests must be completed 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, not the fuel pump side.**

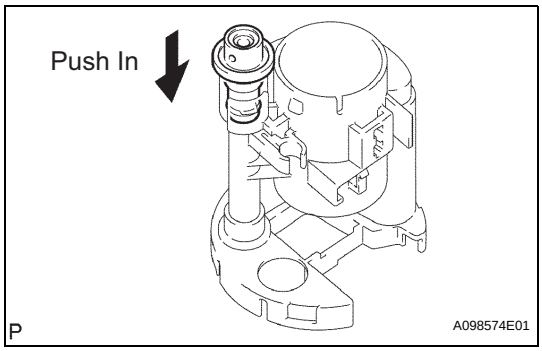
If the pump does not operate, replace the fuel pump.

REASSEMBLY



1. INSTALL FUEL PRESSURE REGULATOR ASSEMBLY

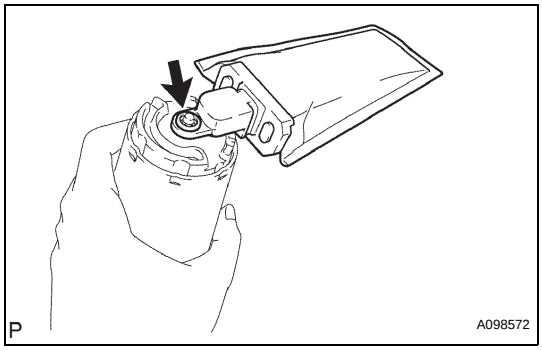
(a) Apply a light coat of gasoline or spindle oil to a new O-ring, then install it onto the fuel pressure regulator.



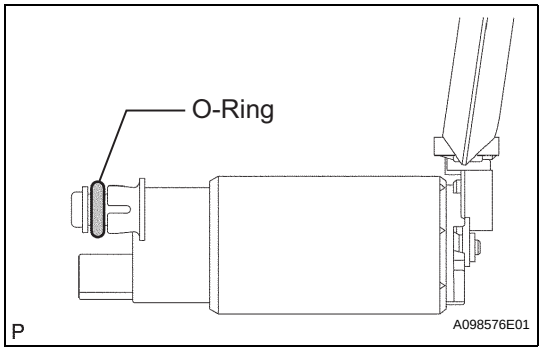
(b) Apply a light coat of gasoline or spindle oil to the O-ring again, then push the fuel pressure regulator into the fuel tank fuel filter.
NOTICE:
Make sure that the O-ring is not cracked or jammed when installing.

2. INSTALL FUEL PUMP FILTER

(a) Install the fuel pump filter onto the fuel pump.

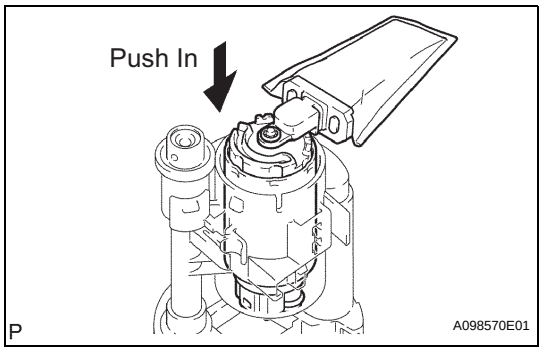


(b) Install a new clip.

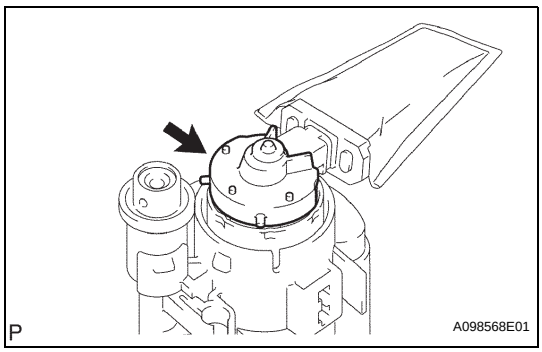


3. INSTALL FUEL PUMP

(a) Apply a light coat of gasoline or spindle oil to the O-ring.

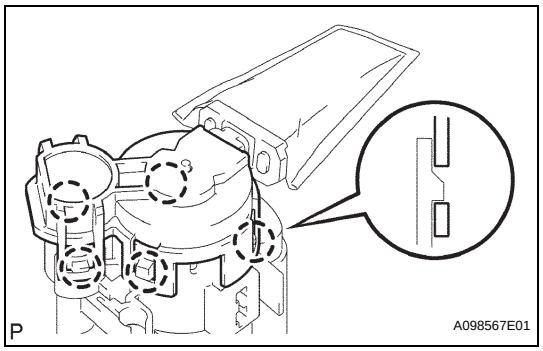


(b) Push the fuel pump into the fuel tank fuel filter.
NOTICE:
Make sure that the O-ring is not cracked or jammed when installing.



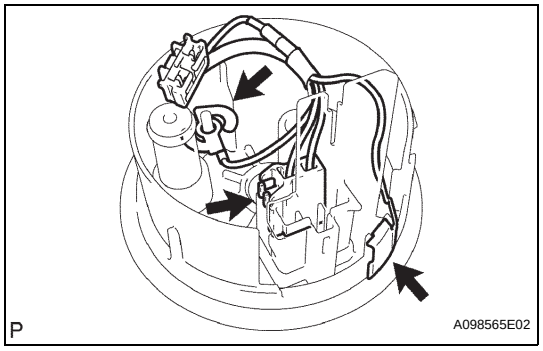
4. INSTALL FUEL PUMP CUSHION RUBBER

(a) Install the fuel pump cushion rubber onto the fuel pump.



5. INSTALL NO. 2 FUEL SUCTION SUPPORT

(a) Align the claw positions, then install the fuel suction support onto the fuel filter.



6. INSTALL FUEL PUMP HARNESS

(a) Connect the pump harness connector.

(b) Install the 2 pump harness terminals.

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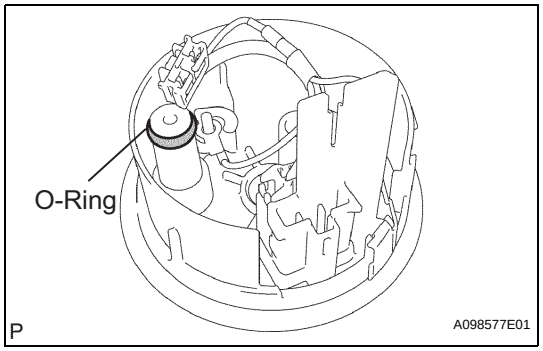
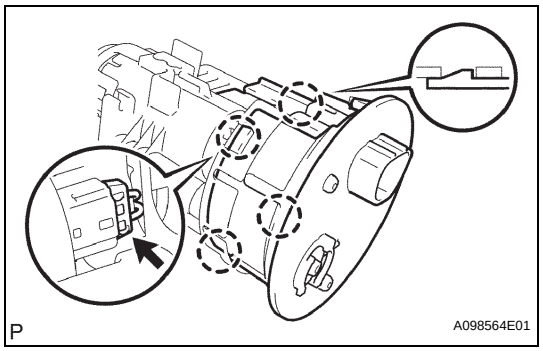


7. INSTALL FUEL SUCTION PLATE SUB-ASSEMBLY

(a) Apply a light coat of gasoline or spindle oil to the O-ring of the fuel suction plate.

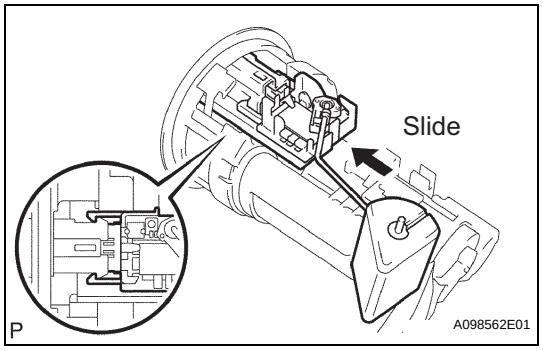


(b) Align the claw positions, then install the fuel suction plate into the fuel filter.

NOTICE:

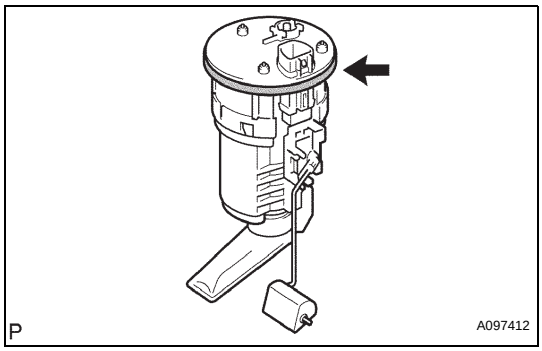
Make sure that the O-ring is not cracked or jammed when installing.

(c) Connect the fuel pump harness connector.



8. INSTALL FUEL SENDER GAUGE ASSEMBLY

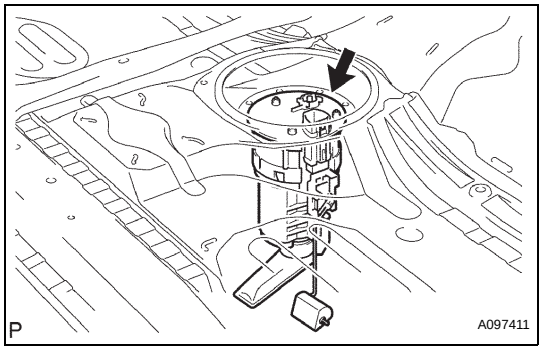
(a) Slide the fuel sender gauge to fit the claws.



INSTALLATION

1. INSTALL FUEL SUCTION WITH PUMP AND GAUGE TUBE ASSEMBLY

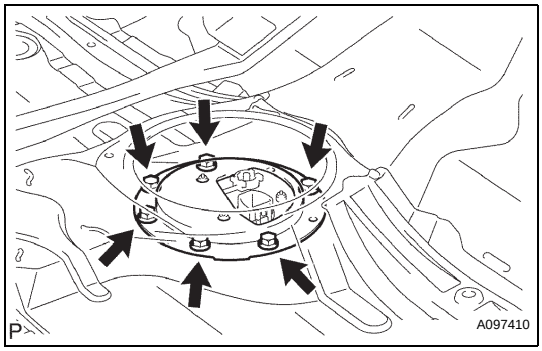
(a) Install a new gasket onto the fuel suction with pump and gauge tube.



(b) Install the fuel suction with pump and gauge tube into the fuel tank.

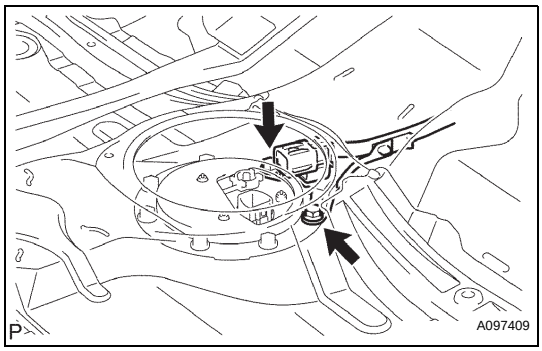
NOTICE:

- **Do not damage the fuel pump filter.**
- **Make sure that the fuel sender gauge arm does not bend.**



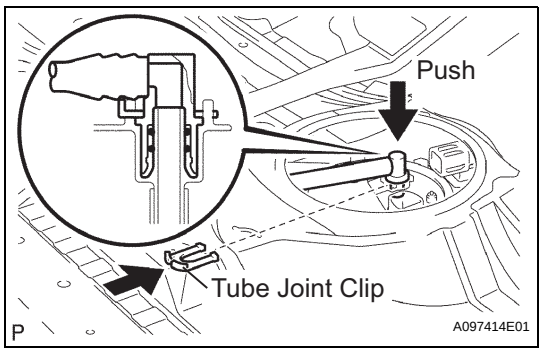
(c) Install the fuel tank vent tube set plate with the 6 bolts.

Torque: 6.0 N*m (60 kgf*cm, 53 in.*lbf)



(d) Install the fuel tank protector plate with the 2 bolts.

Torque: 6.0 N*m (60 kgf*cm, 53 in.*lbf)

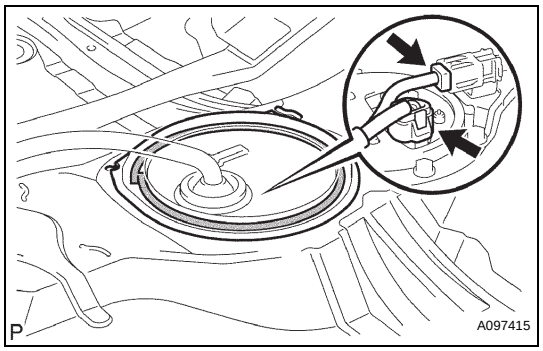


(e) Connect the fuel tank main tube.

NOTICE:

- **Check that there are no scratches or foreign objects around the connected part of the fuel tube joint and plug before performing this work.**
- **Check that the fuel tube joint is securely inserted to the end.**
- **Check that the tube joint clip is on the collar of the fuel tube joint.**

- **After installing the tube joint clip, check that the fuel tank main tube cannot be pulled out.**



2. INSTALL REAR FLOOR SERVICE HOLE COVER

(a) Attach new butyl tape to the service hole cover.
(b) Connect the wire to wire connector.
(c) Connect the fuel pump connector.
(d) Install the rear floor service hole cover, making sure it is aligned with the 2 convexes of the floor panel.
NOTICE:
Make sure that the rear floor service hole cover does not mount on the convex of the floor panel when installing.

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

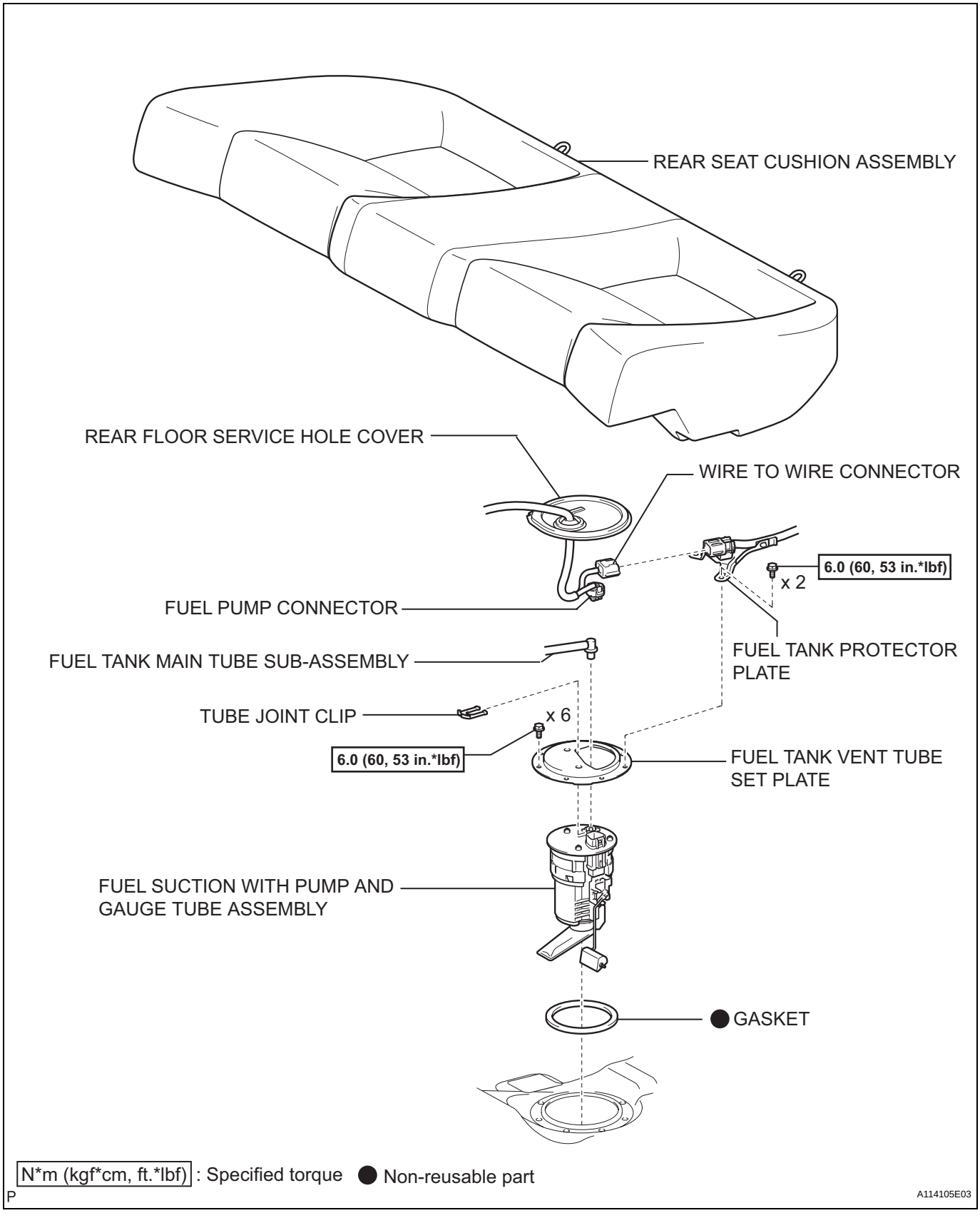
5. CHECK FOR FUEL LEAKS (See page FU-2)

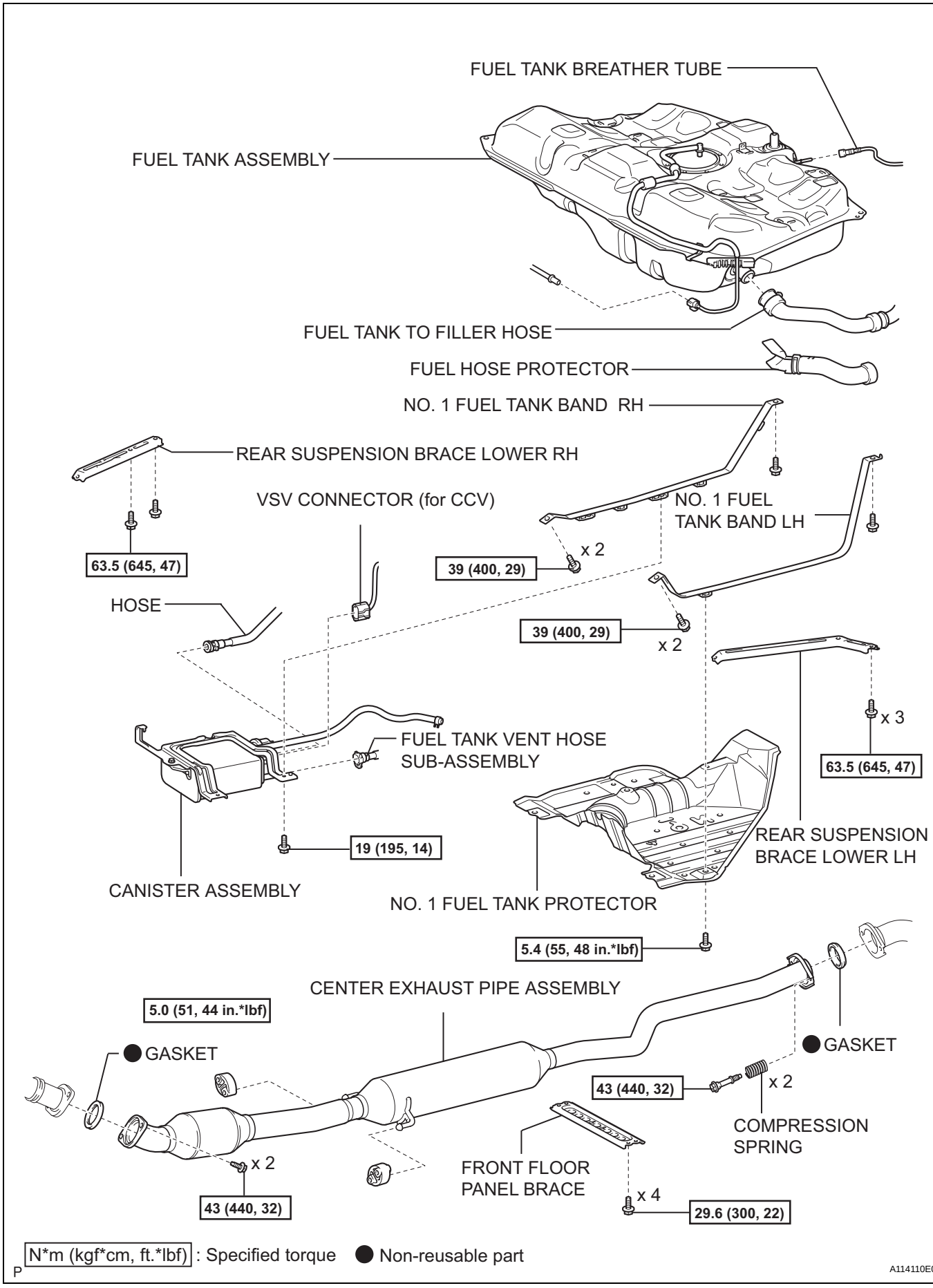
6. INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)

FU

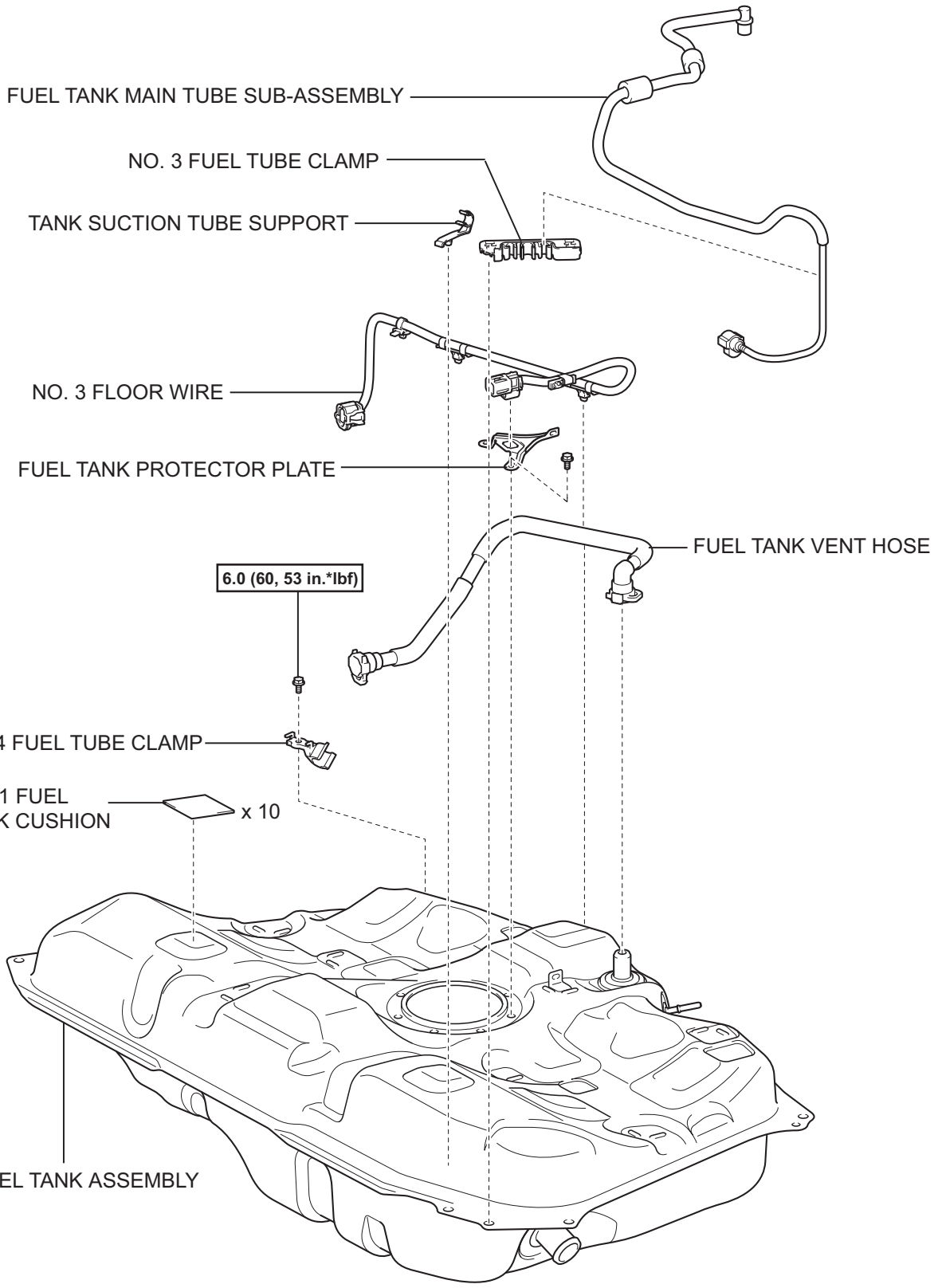
FUEL TANK

COMPONENTS




FUEL TANK BREATHER TUBE
FUEL TANK ASSEMBLY
FUEL TANK TO FILLER HOSE
FUEL HOSE PROTECTOR
NO. 1 FUEL TANK BAND RH
REAR SUSPENSION BRACE LOWER RH
VSV CONNECTOR (for CCV)
NO. 1 FUEL TANK BAND LH
63.5 (645, 47)
39 (400, 29)
x 2
HOSE
39 (400, 29)
x 2
x 3
63.5 (645, 47)
FUEL TANK VENT HOSE SUB-ASSEMBLY
19 (195, 14)
CANISTER ASSEMBLY
NO. 1 FUEL TANK PROTECTOR
REAR SUSPENSION BRACE LOWER LH
5.4 (55, 48 in.*lbf)
CENTER EXHAUST PIPE ASSEMBLY
5.0 (51, 44 in.*lbf)
GASKET
GASKET
43 (440, 32)
x 2
COMPRESSION SPRING
x 2
43 (440, 32)
FRONT FLOOR PANEL BRACE
x 4
29.6 (300, 22)
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
A114110E01

FU



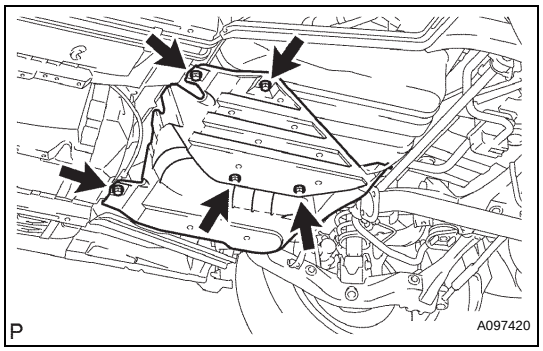
N*m (kgf*cm, ft.*lbf) : Specified torque ● Non-reusable part

P

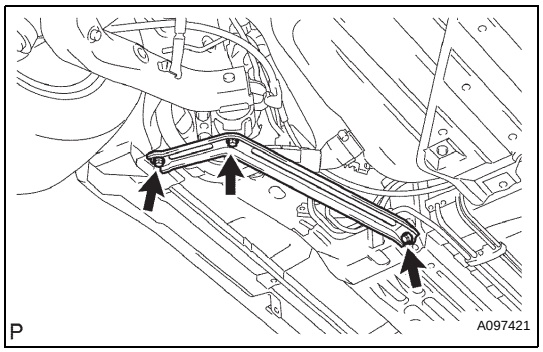
A114111E01

REMOVAL

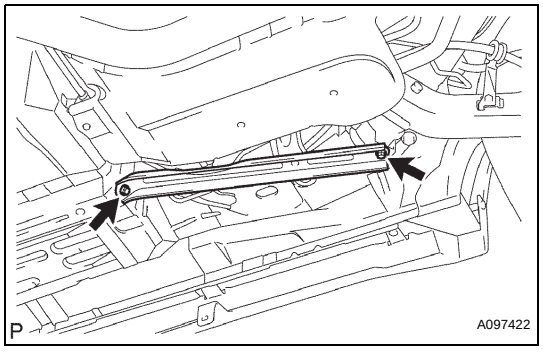
1. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
2. **REMOVE REAR FLOOR SERVICE HOLE COVER (See page FU-18)**
3. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
4. **REMOVE FUEL SUCTION WITH PUMP AND GAUGE TUBE ASSEMBLY (See page FU-18)**
5. **DRAIN FUEL**
6. **REMOVE CENTER EXHAUST PIPE ASSEMBLY (See page EX-2)**



7. **REMOVE NO. 1 FUEL TANK PROTECTOR**
   (a) Remove the 5 bolts and fuel tank protector.
8. **REMOVE CANISTER ASSEMBLY (See page EC-5)**

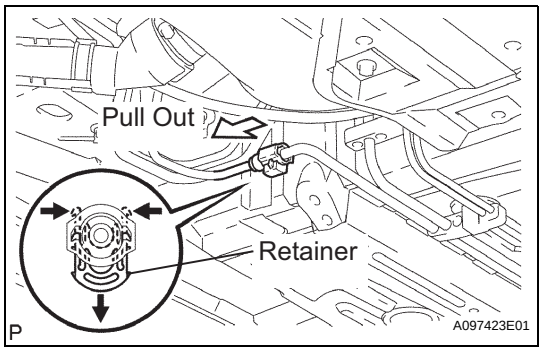


9. **REMOVE REAR SUSPENSION BRACE LOWER LH**
   (a) Remove the 3 bolts and rear suspension brace lower.



10. **REMOVE REAR SUSPENSION BRACE LOWER RH**
    (a) Remove the 2 bolts and rear suspension brace lower.

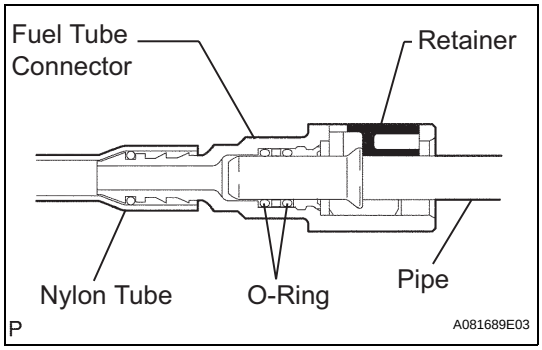
FU



11. REMOVE FUEL TANK ASSEMBLY

(a) Disconnect the fuel tank main tube.

(1) Pinch the tab of the retainer of the fuel tube connector to remove the lock claws and push it down as shown in the illustration.

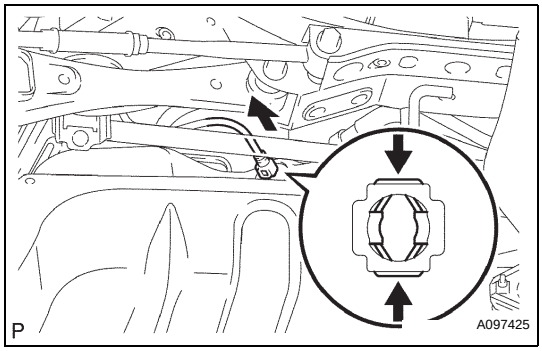


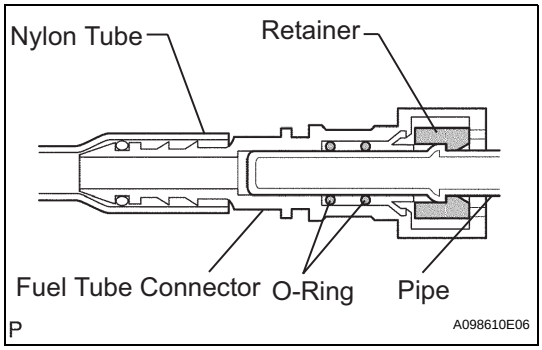
(2) Pull the fuel tank main tube out of the pipe.

NOTICE:

- **Remove any dirt and foreign objects on the fuel tube connector before performing this work.**
- **Do not allow any scratches or foreign objects on the parts when disconnecting, as the fuel tube connector has the O-ring that seals the pipe.**
- **Perform this work by hand. Do not use any tools.**
- **Do not forcibly bend, twist or turn the nylon tube.**
- **Protect the disconnected part by covering it with a plastic bag after disconnecting the fuel tank main tube.**
- **If the fuel tube connector and pipe are stuck, push and pull to release them.**

(b) Disconnect the fuel tank breather tube from the fuel tank.



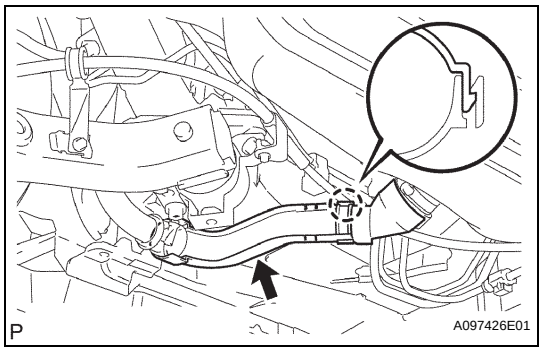


(1) Pinch the retainer as illustrated, then pull the fuel tube connector out of the pipe.

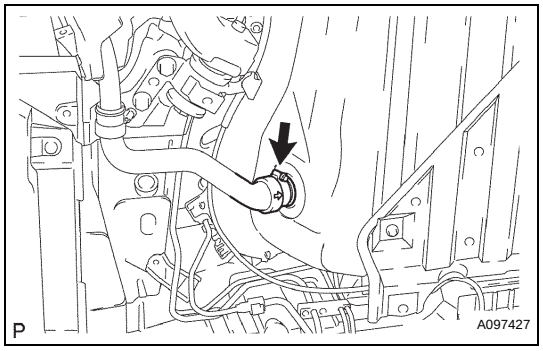
NOTICE:

- **Remove any dirt and foreign objects on the fuel tube connector before performing this work.**
- **Do not allow any scratches or foreign objects on the parts when disconnecting, as the fuel tube connector has the O-ring that the seals the pipe.**
- **Perform this work by hand. Do not use any tools.**
- **Do not forcibly bend, twist or turn the nylon tube.**

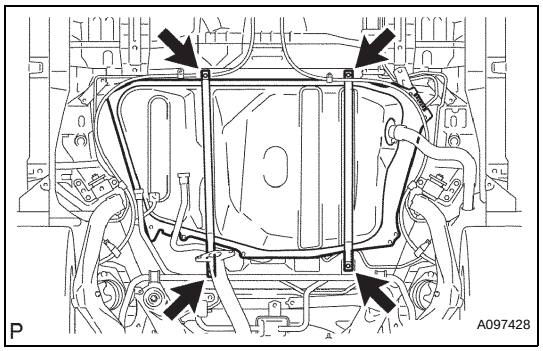
- **Protect the disconnected part by covering it with a plastic bag after disconnecting the fuel tube.**
- **If the fuel tube connector and pipe are stuck, push and pull to release them.**



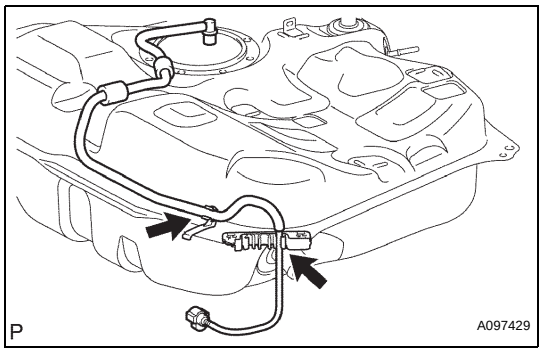
(c) Separate the claw fitting, then remove the fuel hose protector.



(d) Loosen the hose clamp bolt, then disconnect the fuel tank to filler pipe hose.
(e) Hold the fuel tank using a transmission jack.



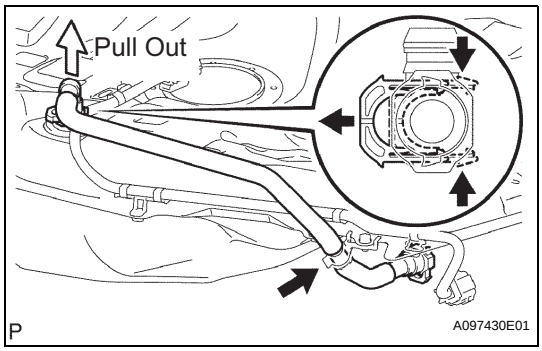
(f) Remove the 4 bolts and 2 fuel tank bands.
(g) Operate the transmission jack, then remove the fuel tank.



DISASSEMBLY

1. REMOVE FUEL TANK MAIN TUBE SUB-ASSEMBLY

(a) Remove the fuel tank main tube from the fuel tube clamp and tank suction tube support.



2. REMOVE FUEL TANK VENT HOSE

(a) Remove the hose from the hose clamp.

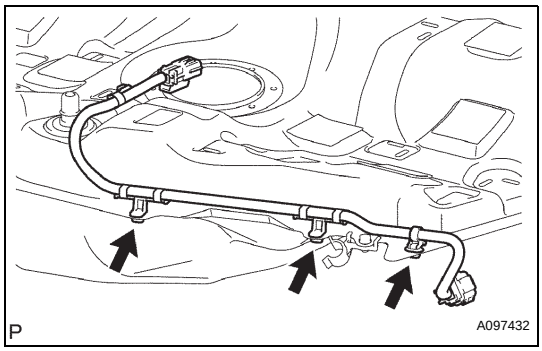
(b) Pinch the tab of the retainer of the hose connector to remove the lock claws and slide it as shown in the illustration.

(c) Pull the fuel tank vent hose out of the pipe.

NOTICE:

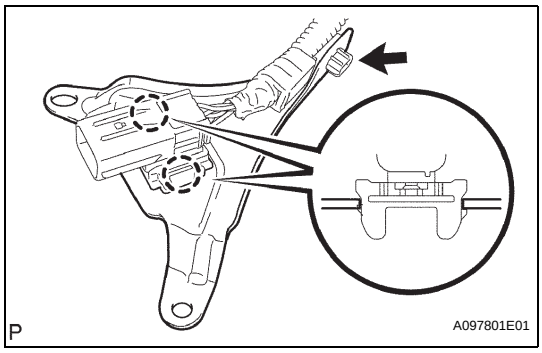
- **Remove any dirt and foreign objects on the hose connector before performing this work.**
- **Do not allow any scratches or foreign objects on the parts when disconnecting, as the hose connector has the O-ring that seals the pipe.**
- **Perform this work by hand. Do not use any tools.**
- **Do not forcibly bend, twist or turn the nylon tube.**
- **Protect the disconnected part by covering it with a plastic bag after disconnecting the fuel tank vent hose.**
- **If the hose connector and pipe are stuck, push and pull to release them.**

FU



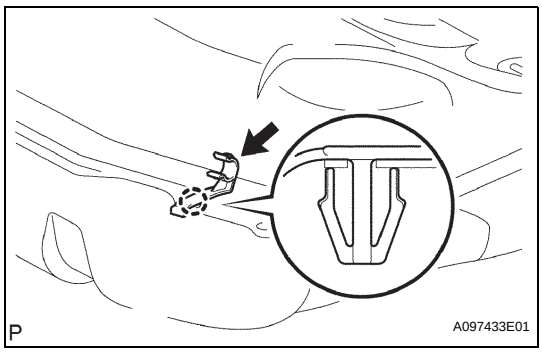
3. REMOVE NO. 3 FLOOR WIRE

(a) Remove the 3 wire harness clamps and floor wire.



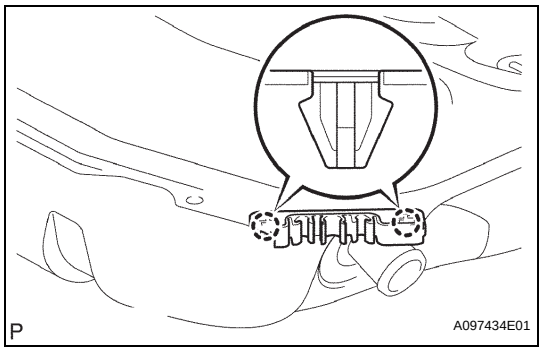
(b) Remove the wire harness clamp.

(c) Separate the 2 claws fittings, then remove the fuel tank protector plate.



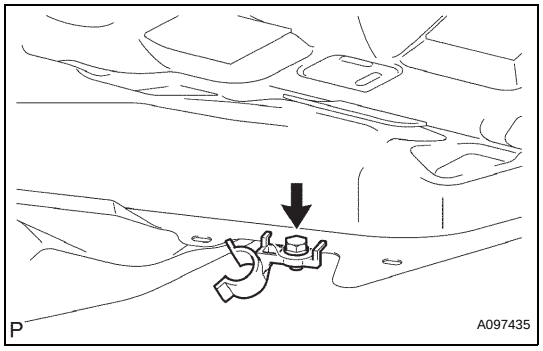
4. REMOVE TANK SUCTION TUBE SUPPORT

(a) Separate the clip fittings, then remove the tank suction tube support.



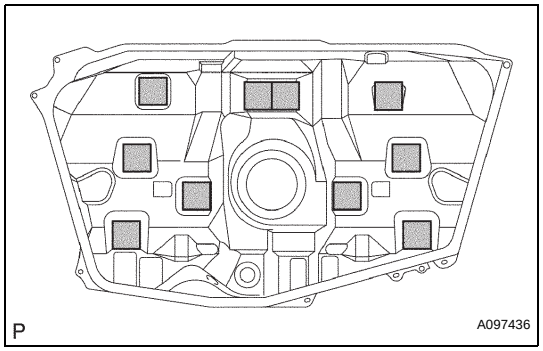
5. REMOVE NO. 3 FUEL TUBE CLAMP

(a) Separate the 2 clips fittings, then remove the fuel tube clamp.



6. REMOVE NO. 4 FUEL TUBE CLAMP

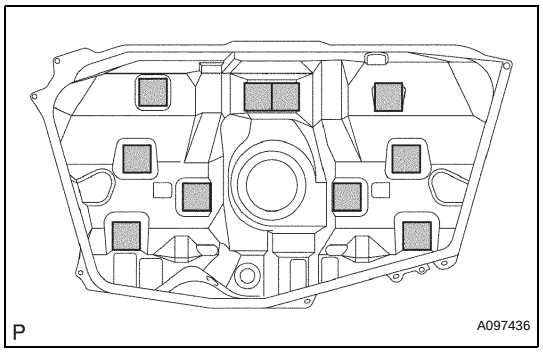
(a) Remove the bolt and fuel tube clamp.



7. REMOVE NO. 1 FUEL TANK CUSHION

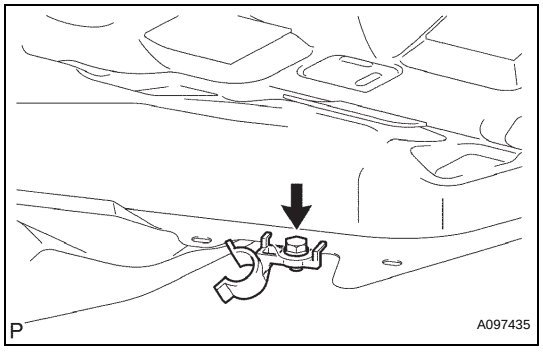
(a) Remove the 10 fuel tank cushions from the fuel tank.

REASSEMBLY



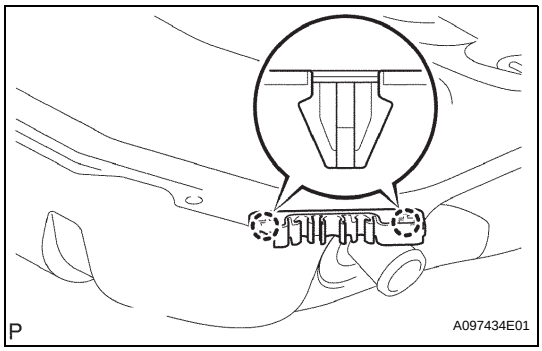
1. INSTALL NO. 1 FUEL TANK CUSHION

(a) Install 10 new fuel tank cushions onto the fuel tank as shown in the illustration.



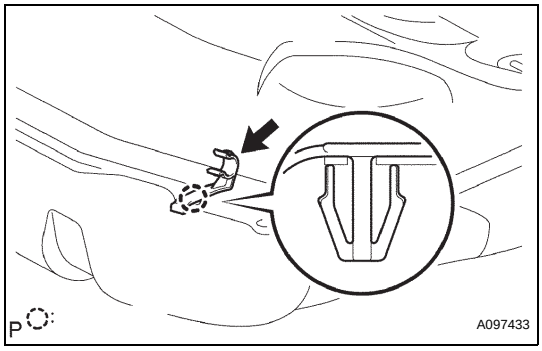
2. INSTALL NO. 4 FUEL TUBE CLAMP

(a) Install the fuel tube clamp with the bolt.
Torque: 6.0 N*m (60 kgf*cm, 53 in.*lbf)



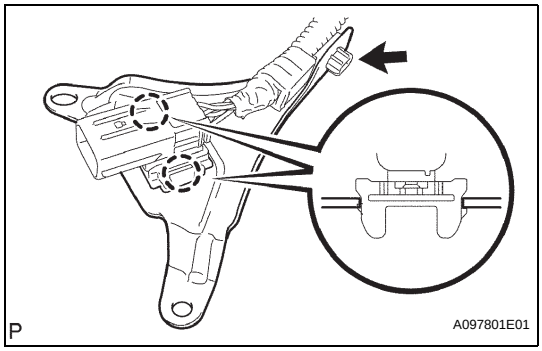
3. INSTALL NO. 3 FUEL TUBE CLAMP

(a) Align the clip positions, then install the fuel tube clamp.



4. INSTALL TANK SUCTION TUBE SUPPORT

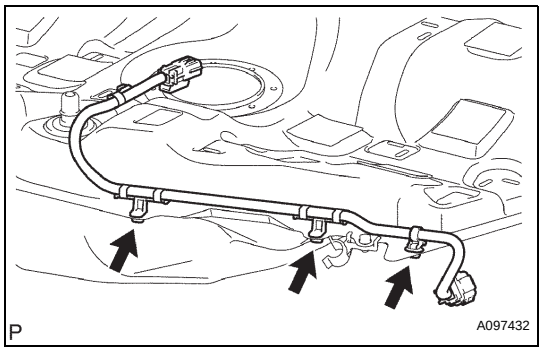
(a) Align the clip position, then install the tank suction tube support.



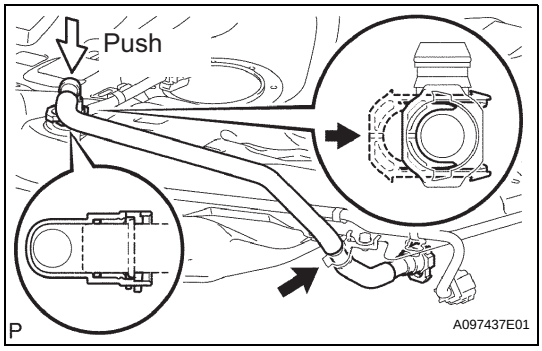
5. INSTALL NO. 3 FLOOR WIRE

(a) Align the claws positions, then install the fuel tank protector plate.

(b) Install the wire harness clamp.



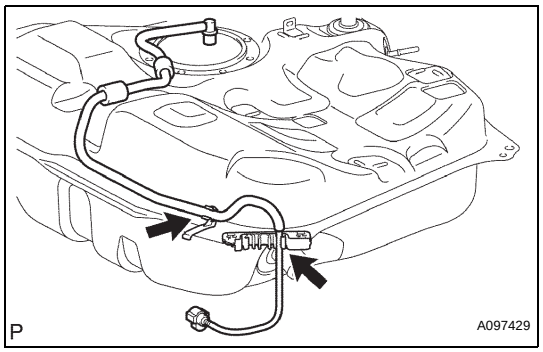
(c) Install the floor wire with the 3 wire harness clamps.



6. INSTALL FUEL TANK VENT HOSE

(a) Align the hose connector with the pipe, then push in the hose connector until it comes into contact with the seat to connect the fuel tank vent hose to the pipe. Then push the retainer up until to the claws lock.

(b) Install the hose into the hose clamp.
NOTICE:
- **Check that there are no scratches or foreign objects around the connected part of the fuel tube connector and pipe before performing this work.**
- **After connecting the fuel tank vent hose, check that the fuel tank vent hose is securely connected by pulling the hose connector and pipe.**



7. INSTALL FUEL TANK MAIN TUBE SUB-ASSEMBLY

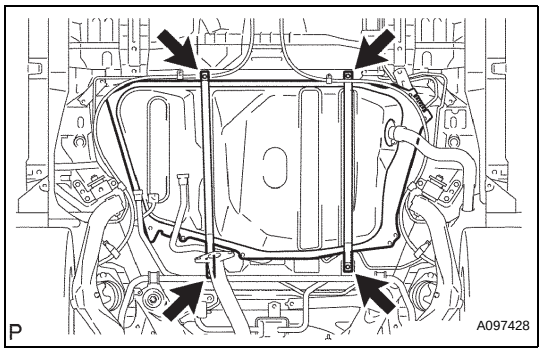
(a) Fit the fuel tank main tube into the fuel tube clamp and tank suction tube support.

INSTALLATION

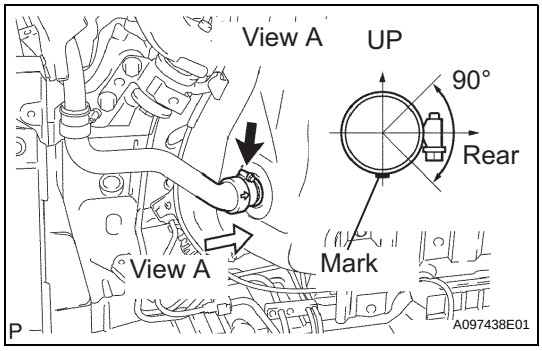
1. INSTALL FUEL TANK ASSEMBLY

(a) Set the fuel tank onto a transmission jack.

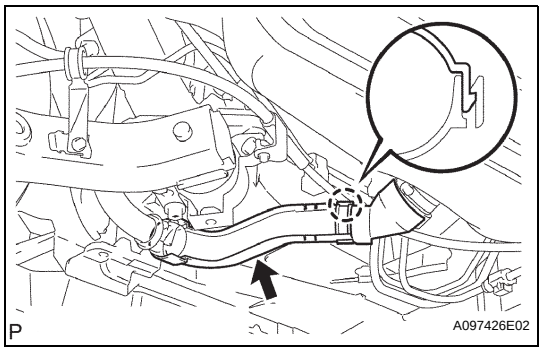
(b) Operate the transmission jack, then install the fuel tank into the vehicle.



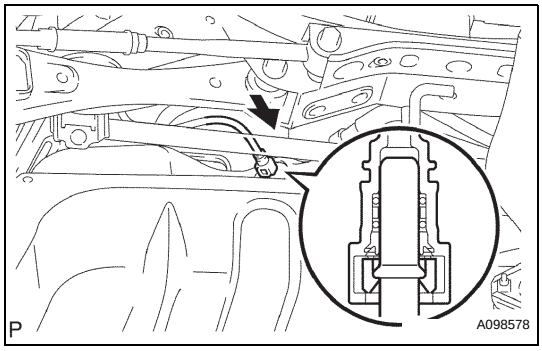
(c) Install the 2 fuel tank bands with the 4 bolts.
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)



(d) Connect the fuel tank to filler pipe hose to the fuel tank, then tighten the hose clamp.
NOTICE:
Make sure that the mark and hose clamp are at the correct angle when installing.

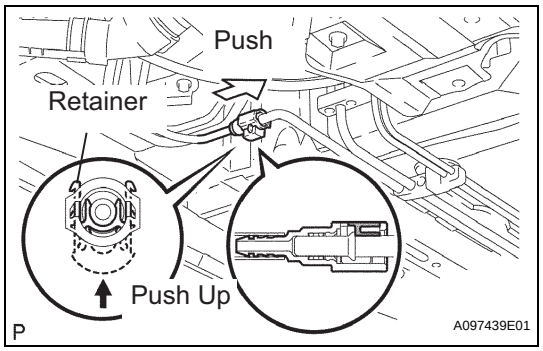


(e) Install the fuel hose protector.

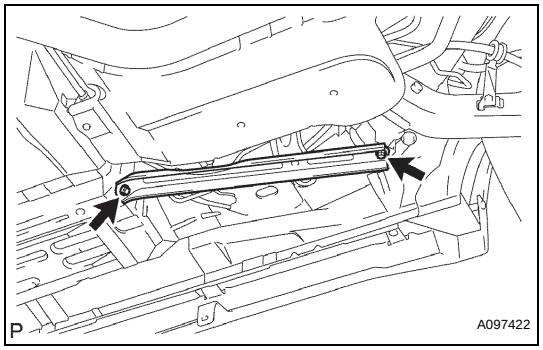


(f) Connect the fuel tank breather tube to the fuel tank.

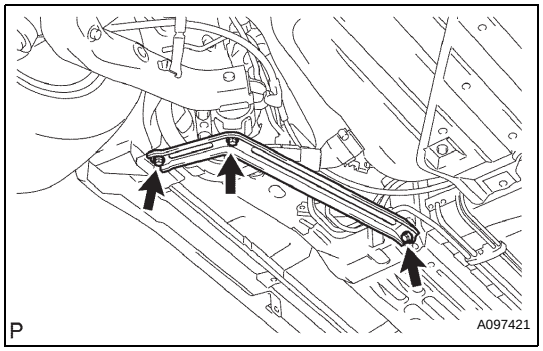
(1) Align the fuel tube connector with the pipe, then push the fuel tube connector until the retainer makes a "click" sound to connect the fuel tube breather tube to the pipe.
NOTICE:
- **Check that there are no scratches or foreign objects around the connected part of the fuel tube connector and pipe before performing this work.**
- **After connecting the fuel tube connector, check that the fuel tube connector and pipe are securely connected by pulling them.**



(g) Connect the fuel tank main tube.
(1) Align the fuel tube connector with the pipe, then push the fuel tube connector until the it comes into contact with the seat to connect the fuel tank main tube to the pipe. Then push the retainer up until the claws lock.
NOTICE:
- **Check that there are no scratches or foreign objects around the connected part of the fuel tube connector and pipe before performing this work.**
- **After connecting the fuel tank main tube, check that the fuel tank main tube is securely connected by pulling the fuel tube connector and pipe.**

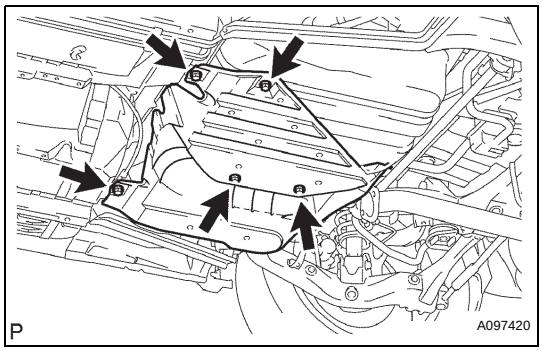


2. INSTALL REAR SUSPENSION BRACE LOWER RH
(a) Install the rear suspension brace lower with the 2 bolts.
Torque: 63.5 N*m (645 kgf*cm, 47 ft.*lbf)



3. INSTALL REAR SUSPENSION BRACE LOWER LH
(a) Install the rear suspension brace lower with the 3 bolts.
Torque: 63.5 N*m (645 kgf*cm, 47 ft.*lbf)

4. INSTALL CANISTER ASSEMBLY (See page EC-8)



5. INSTALL NO. 1 FUEL TANK PROTECTOR
(a) Install the No. 1 fuel tank protector with the 5 bolts.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

6. INSTALL CENTER EXHAUST PIPE ASSEMBLY (See page EX-4)

7. ADD FUEL

8. INSTALL FUEL SUCTION WITH PUMP AND GAUGE TUBE ASSEMBLY (See page FU-24)

9. INSTALL REAR FLOOR SERVICE HOLE COVER (See page FU-25)

10. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

FU

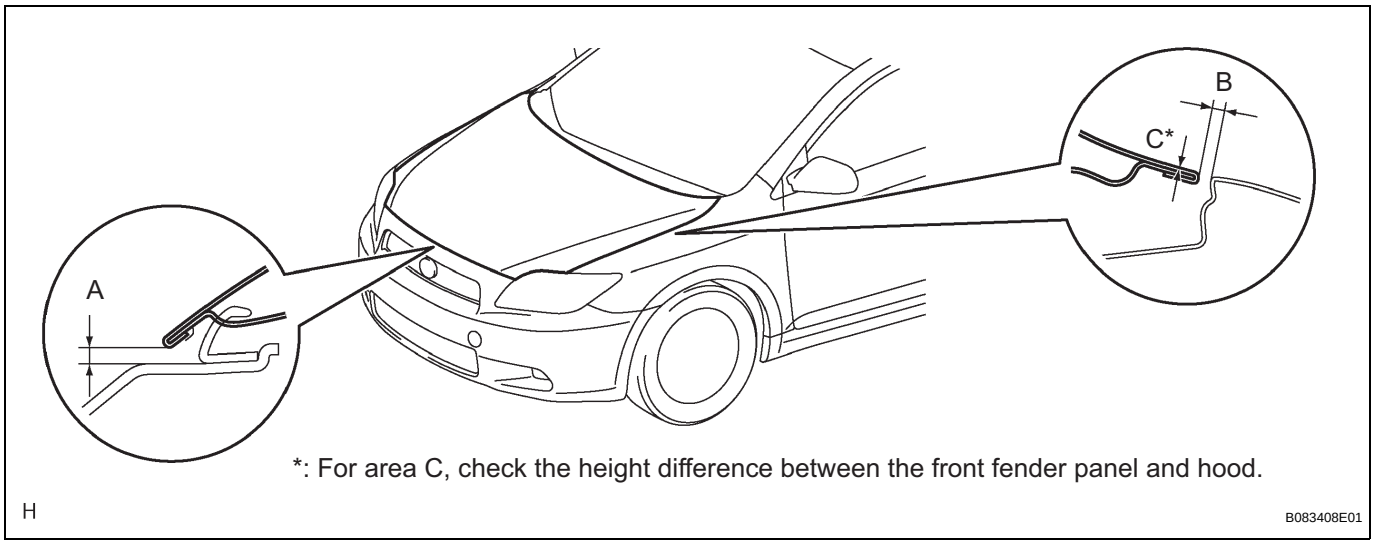
11. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
12. **CHECK FOR FUEL LEAKS (See page FU-2)**
13. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**

HOOD

ON-VEHICLE INSPECTION

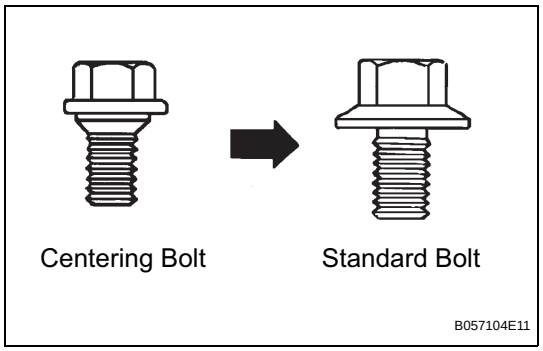
1. INSPECT HOOD SUB-ASSEMBLY

(a) Check that the clearance measurements of areas A to C are within the standard range.



Standard measurement:

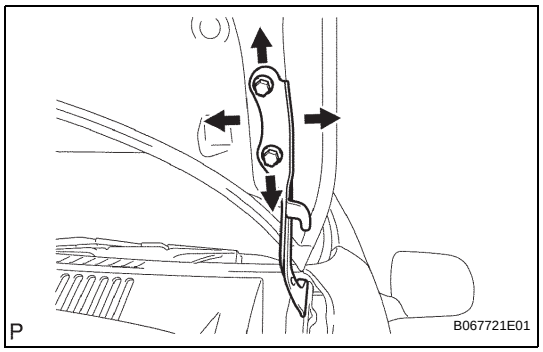
Area	Measurement	Area	Measurement
A (center of hood only)	4.5 +- 1.5 mm (0.177 +- 0.059 in.)	C	0.0 +- 1.5 mm (0.000 +- 0.059 in.)
B	3.8 +- 1.5 mm (0.150 +- 0.059 in.)	-	-



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 on. Substitute the centering bolts with standard bolts (with washers) when making adjustments.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).



1. ADJUST HOOD SUB-ASSEMBLY

(a) Adjust the hood's position.

(1) Loosen the hood's 4 hinge bolts.

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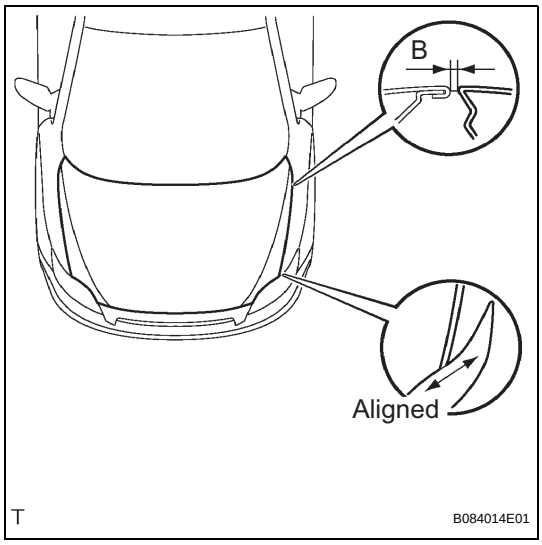
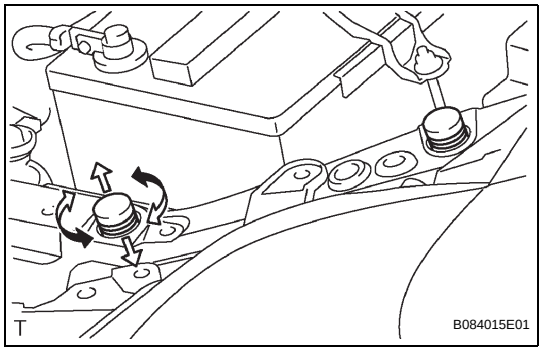
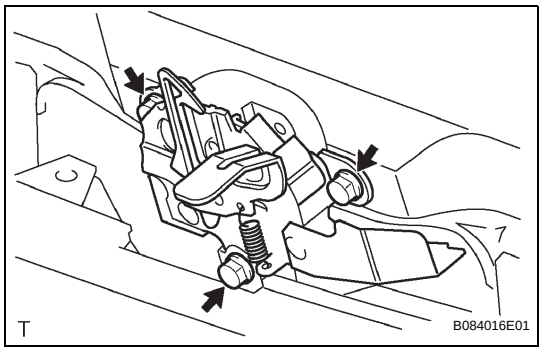


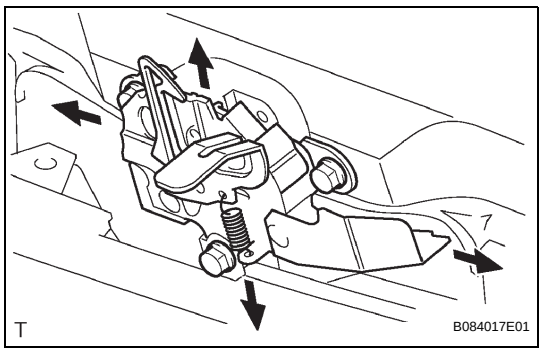
(2) Move the hood and adjust the clearance between the hood and front fender. Make sure that the clearance is within the standard.
Standard clearance (B):
3.8 +- 1.5 mm (0.150 +- 0.059 in.)
(3) Tighten the hood's hinge bolts after the adjustment.
Torque: 13 N*m (133 kgf*cm, 10 ft.*lbf)



(b) Adjust the cushion rubber so that the height of the hood and fender are aligned.
(1) Raise or lower the hood's front end by turning the cushion rubber. Make sure that the clearance is within the standard range.
Standard clearance (C):
0.0 +- 1.5 mm (0.000 +- 0.059 in.)



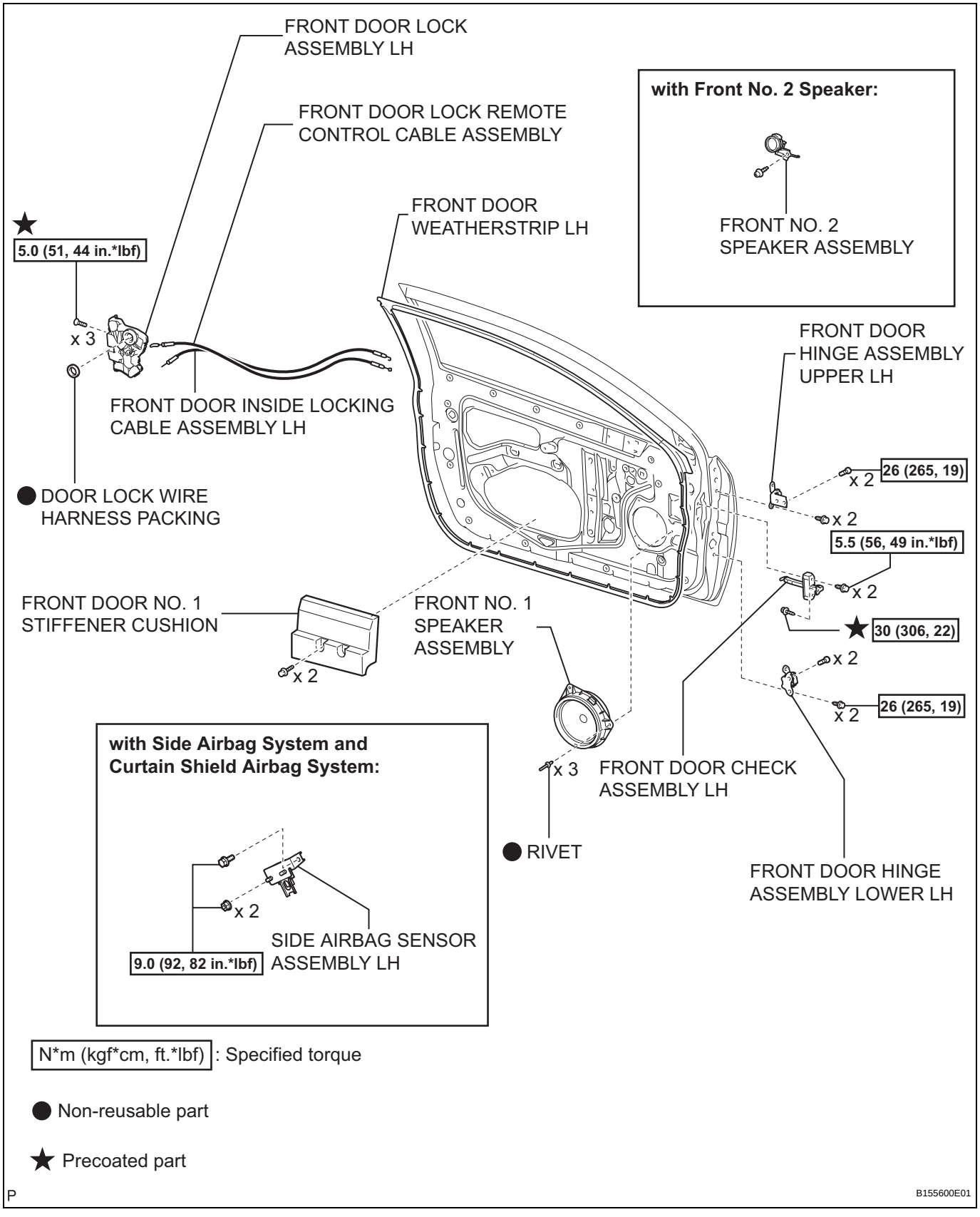
(c) Adjust the hood lock.
(1) Loosen the 3 bolts.



(2) Adjust the hood lock position so that the striker can enter it smoothly.
(3) Tighten the bolts after the adjustment.
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)

FRONT DOOR

COMPONENTS



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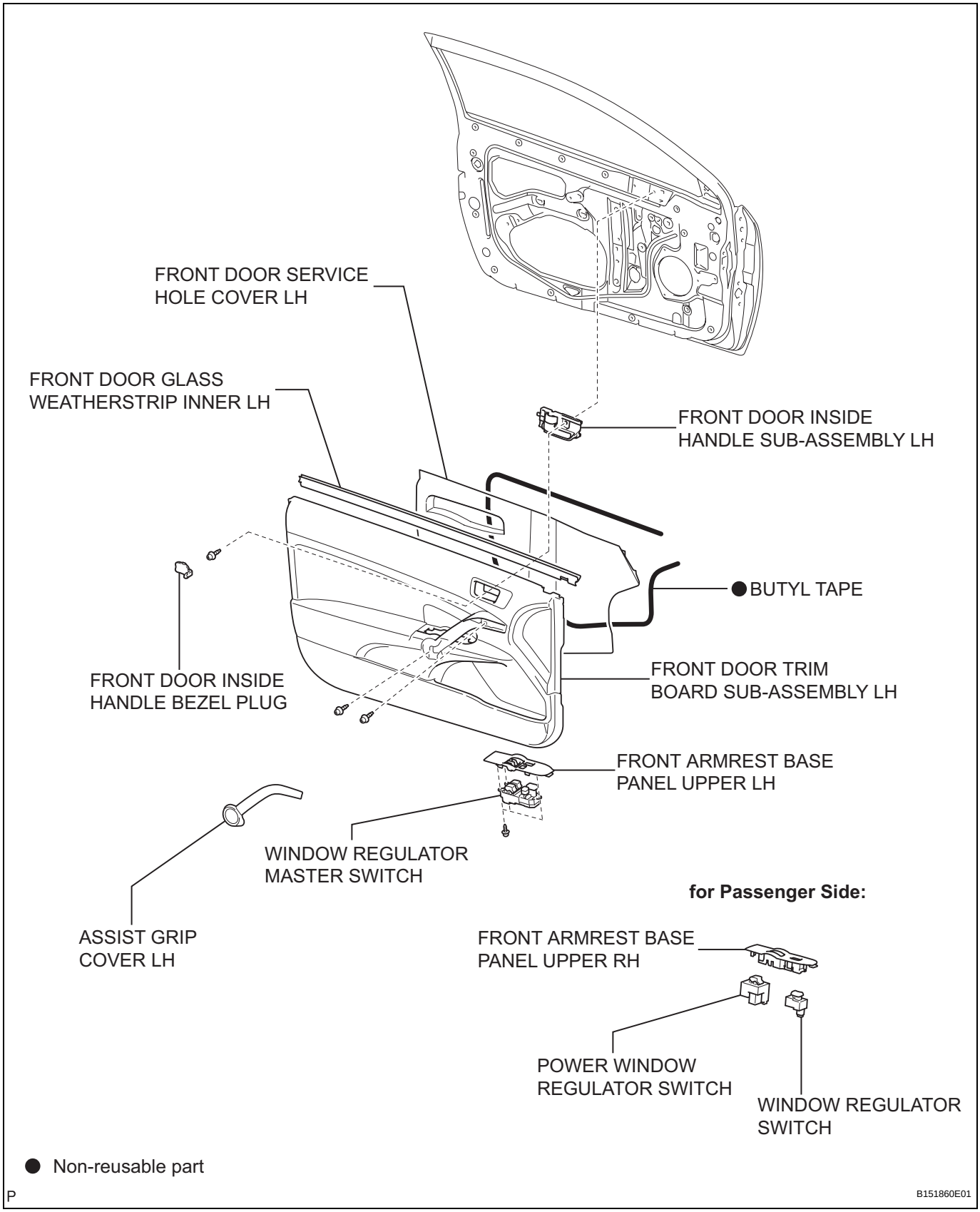
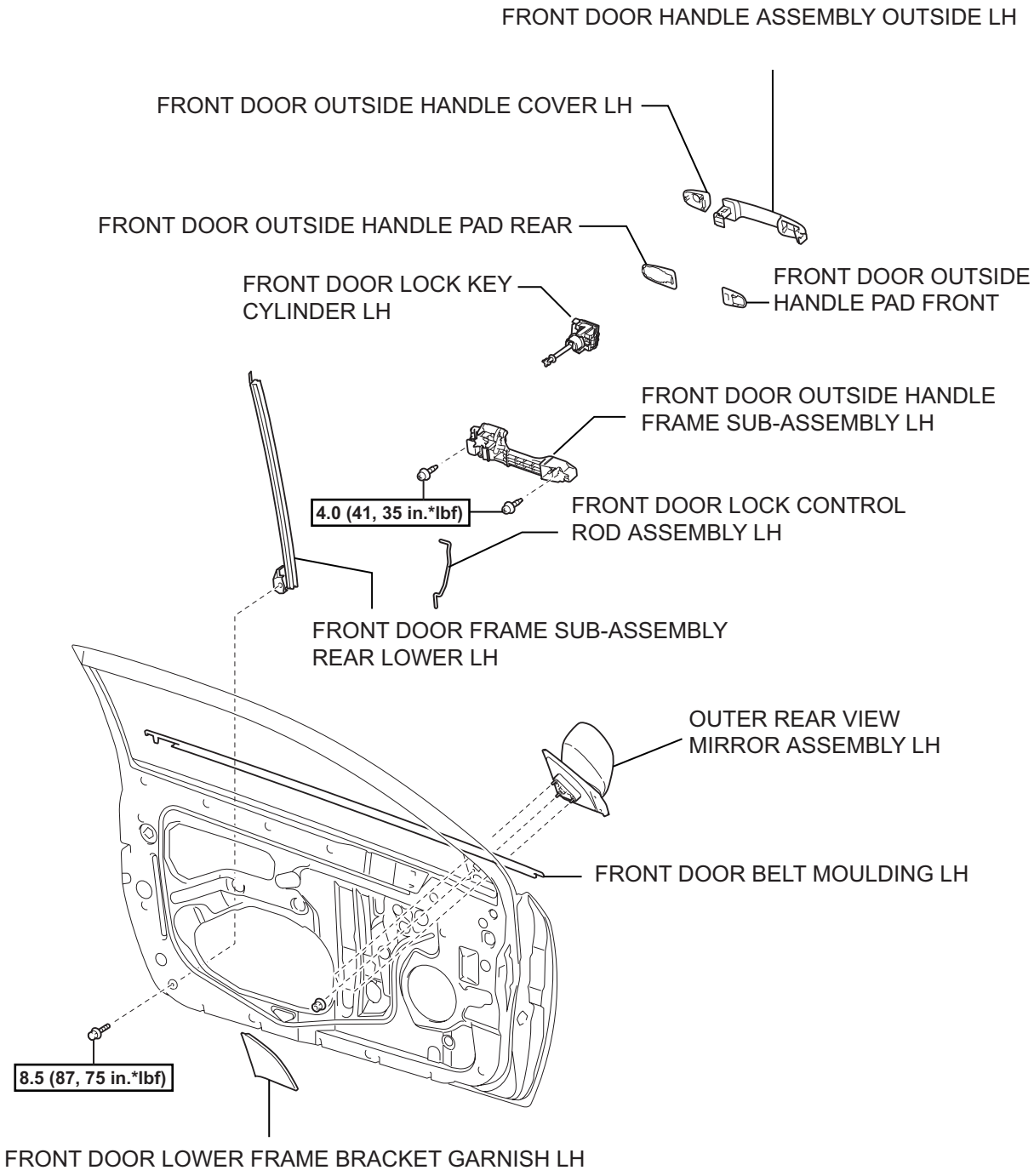

FRONT DOOR SERVICE HOLE COVER LH
FRONT DOOR GLASS WEATHERSTRIP INNER LH
FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY LH
● BUTYL TAPE
FRONT DOOR INSIDE HANDLE BEZEL PLUG
FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH
FRONT ARMREST BASE PANEL UPPER LH
WINDOW REGULATOR MASTER SWITCH
ASSIST GRIP COVER LH
for Passenger Side:
FRONT ARMREST BASE PANEL UPPER RH
POWER WINDOW REGULATOR SWITCH
WINDOW REGULATOR SWITCH
● Non-reusable part
P
B151860E01

ED

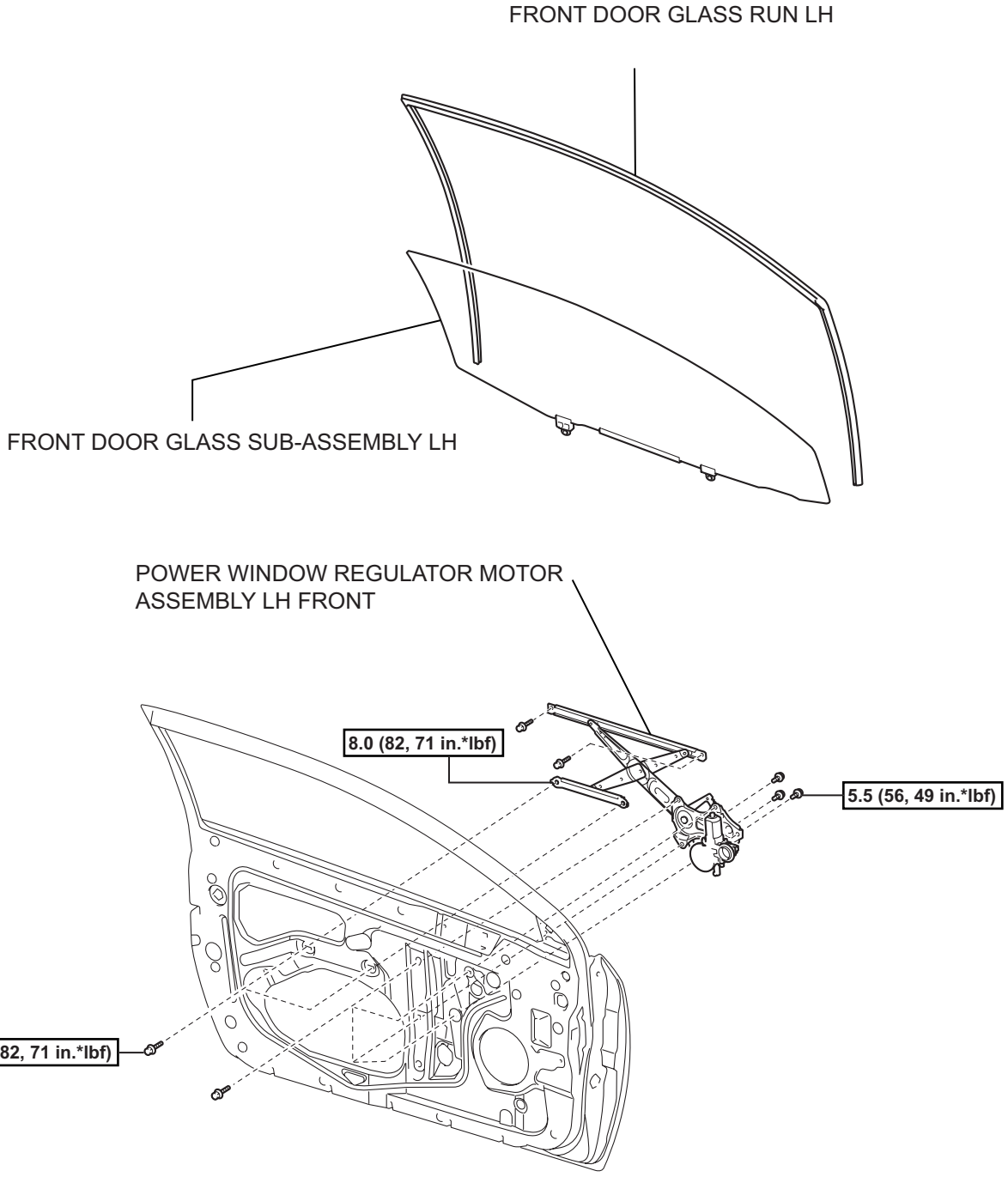


N*m (kgf*cm, ft.*lbf) : Specified torque

H

B112881E03

ED



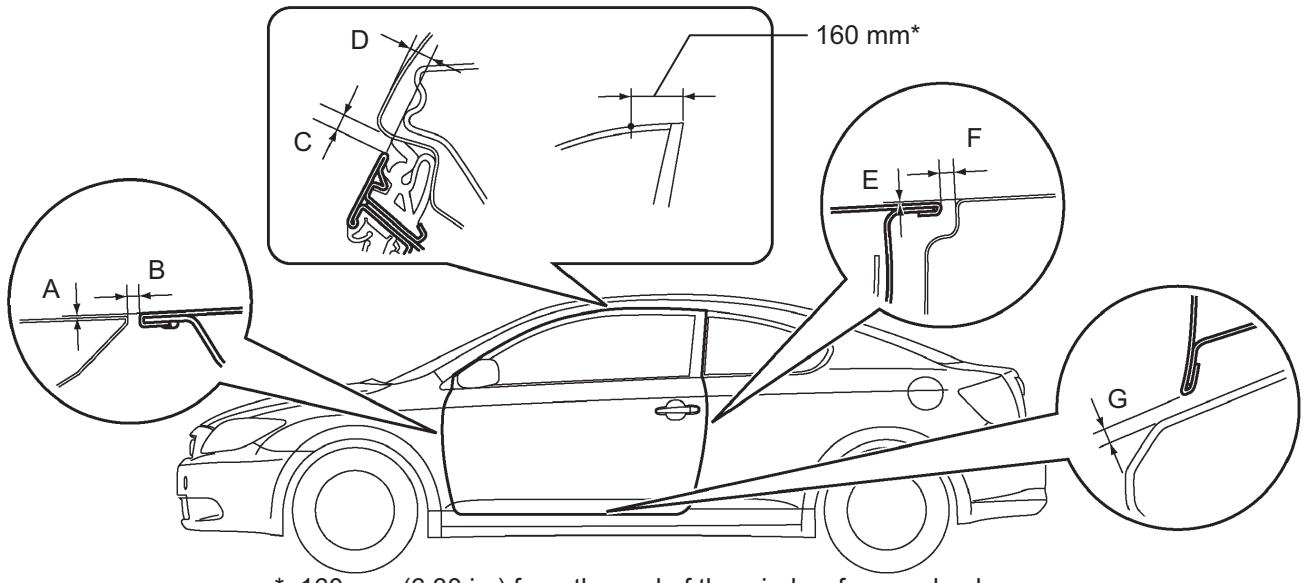
N*m (kgf*cm, ft.*lbf) : Specified torque

B112880E04

ON-VEHICLE INSPECTION

1. INSPECT FRONT DOOR PANEL SUB-ASSEMBLY LH

(a) Check that the clearance measurements of areas A to G are within the standard range.



*: 160 mm (6.30 in.) from the end of the window frame, check the clearances of C and D as illustrated in the cross section.

H B083406E03

Standard measurement:

Area	Measurement	Area	Measurement
A	0.0 +- 1.5 mm (0.000 +- 0.059 in.)	E	0.0 +- 1.5 mm (0.000 +- 0.059 in.)
B	4.3 +- 1.5 mm (0.169 +- 0.059 in.)	F	4.3 +- 1.5 mm (0.169 +- 0.059 in.)
C	5.5 +- 1.5 mm (0.217 +- 0.059 in.)	G	5.3 +- 1.5 mm (0.209 +- 0.059 in.)
D	6.4 +- 1.5 mm (0.252 +- 0.059 in.)	-	-

DISASSEMBLY

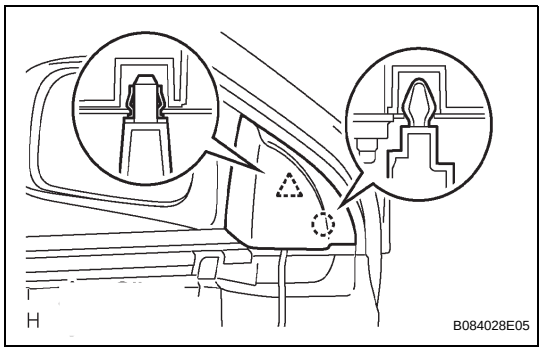
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

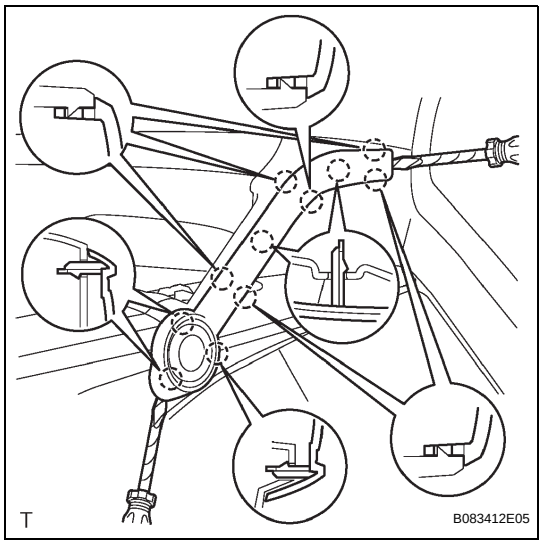


2. REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH

(a) Using a screwdriver, detach the clip and claw, and remove the garnish.

HINT:

Tape the screwdriver tip before use.

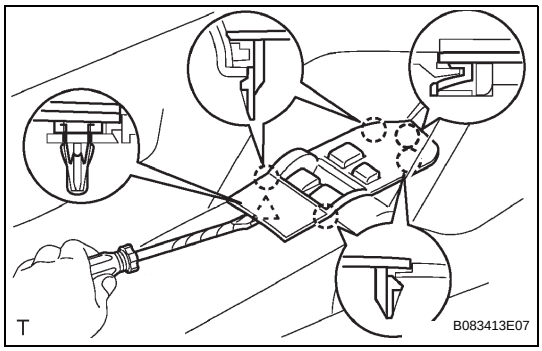


3. REMOVE ASSIST GRIP COVER LH

(a) Using a screwdriver, detach the 11 claws and remove the grip cover.

HINT:

Tape the screwdriver tip before use.



4. REMOVE FRONT ARMREST BASE PANEL UPPER LH

(a) Driver's side:

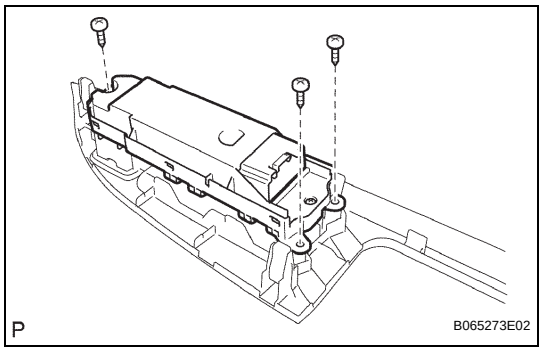
(1) Using a screwdriver, detach the clip and 5 claws, and remove the armrest base panel upper LH together with the window regulator master switch.

HINT:

Tape the screwdriver tip before use.

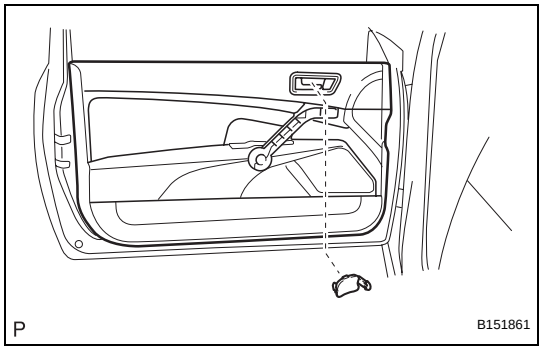
(2) Disconnect the switch connector.

ED



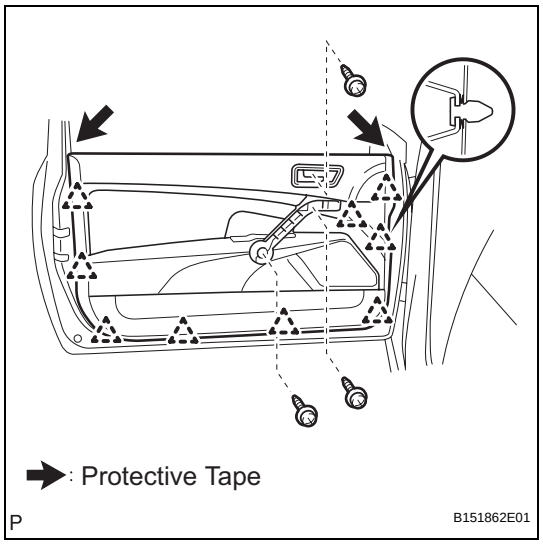
(3) Remove the 3 screws and window regulator master switch from the armrest base panel upper LH.
NOTICE:
Be careful when removing the screws as the master switch may fall and become damaged.

(b) Passenger's side:
(1) Using a screwdriver, detach the clip and 5 claws, and remove the armrest base panel upper RH together with the window regulator switch.
HINT:
Tape the screwdriver tip before use.
(2) Disconnect the switch connector.
(3) Using a screwdriver, detach the 2 claws and remove the power window regulator switch from the armrest base panel upper RH.
HINT:
Tape the screwdriver tip before use.
NOTICE:
Be careful when detaching the claws as the switch may fall and become damaged.



5. REMOVE FRONT DOOR INSIDE HANDLE BEZEL PLUG

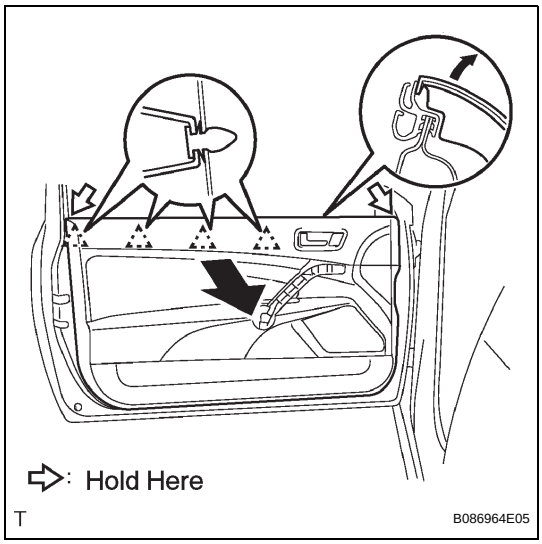
(a) Using a screwdriver, detach the claw, and remove the front door inside handle bezel plug.



6. REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH

(a) Prevent damage to the door panel by applying protective tape to the areas indicated by the arrows in the illustration.
(b) Remove the 3 screws.
(c) Using a screwdriver, detach the 9 clips.
HINT:
Tape the screwdriver tip before use.

ED



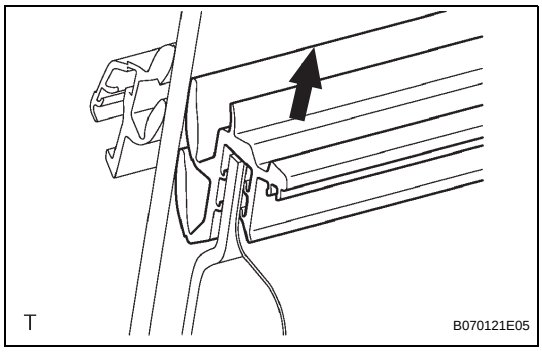
(d) Prepare to remove the door trim by holding the locations indicated by the arrows in the illustration.
(e) Horizontally pull out the door trim to detach the 4 clips.
NOTICE:
To prevent damage to the 2 pins, be sure to keep the door trim horizontal while removing it.

7. REMOVE OUTER REAR VIEW MIRROR ASSEMBLY LH (See page MI-8)

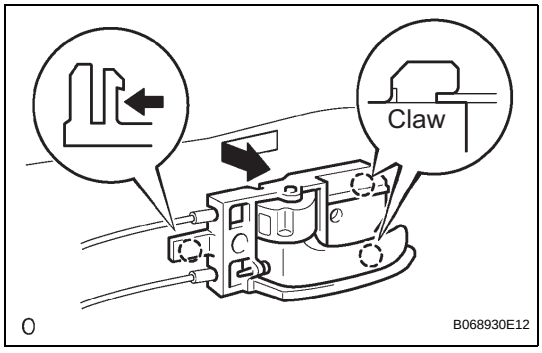
8. REMOVE FRONT DOOR BELT MOULDING LH (See page ET-14)

9. REMOVE FRONT NO. 1 SPEAKER ASSEMBLY (See page AV-18)

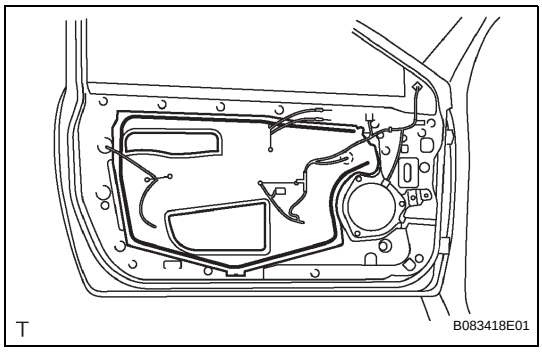
10. REMOVE FRONT NO. 2 SPEAKER ASSEMBLY (w/ Front No. 2 Speaker) (See page AV-22)



11. REMOVE FRONT DOOR GLASS WEATHERSTRIP INNER LH
(a) Remove the weatherstrip inner.



12. REMOVE FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY LH
(a) Using a screwdriver, detach the claw.
HINT:
Tape the screwdriver tip before use.
(b) Move the inside handle in the direction indicated by the arrow mark in the illustration. This will release the claw and allow removal of the inside handle.
(c) Disconnect the 2 cables from the inside handle.



13. REMOVE FRONT DOOR SERVICE HOLE COVER LH
(a) Remove the service hole cover.
NOTICE:
Remove the remaining tape on the door side.

14. REMOVE SIDE AIRBAG SENSOR ASSEMBLY LH (w/ Side Airbag System and Curtain Shield Airbag System) (See page RS-398)

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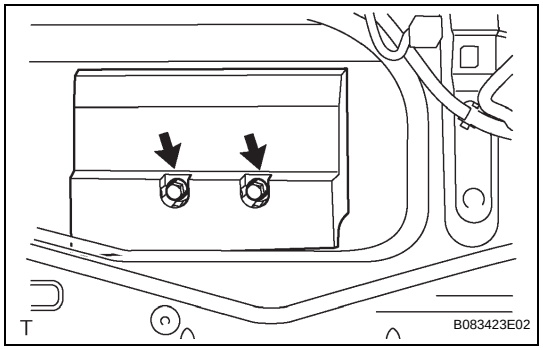
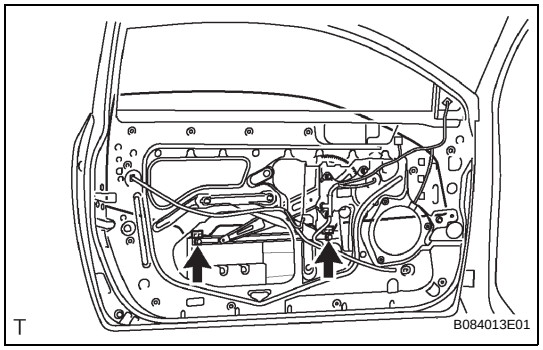


15. REMOVE FRONT DOOR NO. 1 STIFFENER CUSHION

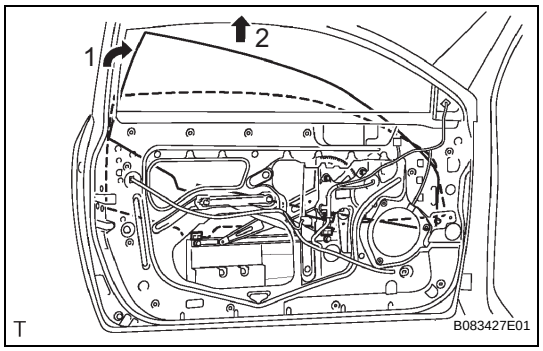
(a) Remove the 2 bolts and cushion.
HINT:
Remove the sensor through the service hole.



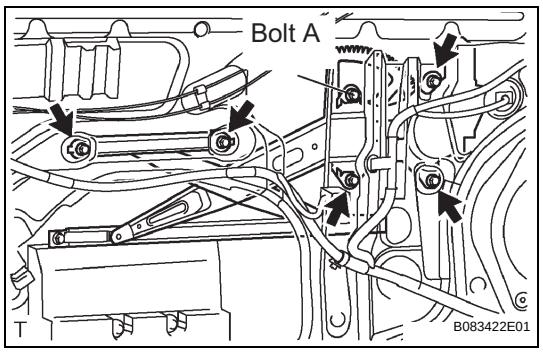
16. REMOVE FRONT DOOR GLASS SUB-ASSEMBLY LH

HINT:
Insert a cushion inside the door panel to prevent the glass from being scratched.

(a) Driver's side:
Temporarily install the window regulator master switch.
(b) Passenger's side:
Temporarily install the power window regulator switch.
(c) Move the door glass until the 2 bolts appear in the service holes.
(d) Remove the 2 bolts.
NOTICE:
Be careful when removing the bolts as the glass may fall and become damaged.



(e) Remove the door glass in the direction indicated by the arrow marks in the illustration.
NOTICE:
Be careful not to damage the glass.
(f) Driver's side:
Remove the window regulator master switch.
(g) Passenger's side:
Remove the power window regulator switch.



17. REMOVE FRONT DOOR WINDOW REGULATOR SUB-ASSEMBLY LH

(a) Disconnect the connector.
(b) Loosen bolt A.
(c) Remove the 5 bolts and regulator.
HINT:
Remove the window regulator through the service hole.
NOTICE:
Be careful when removing the bolts as the window regulator may fall and become damaged.
(d) Remove bolt A.

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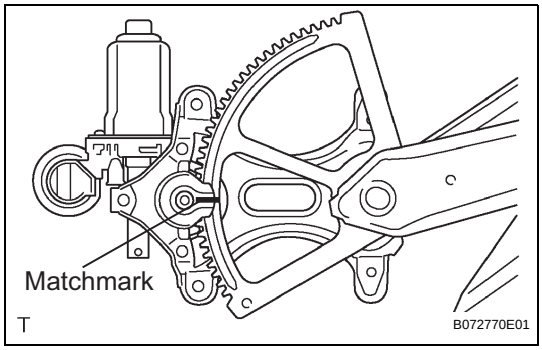
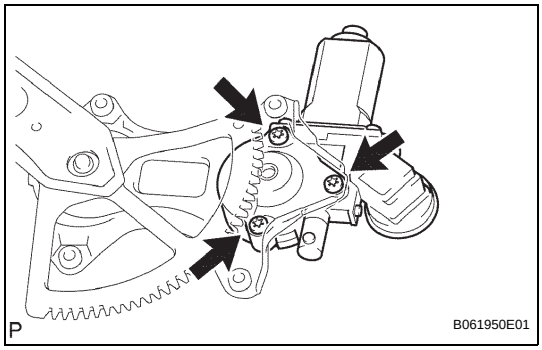
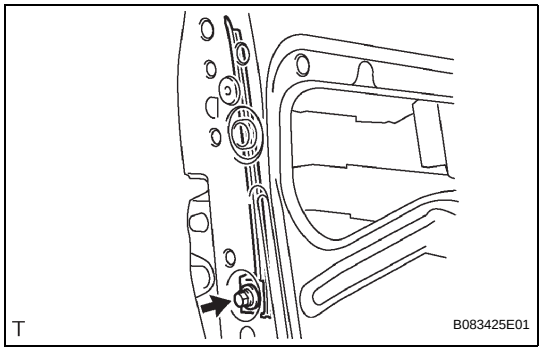


18. REMOVE POWER WINDOW REGULATOR MOTOR ASSEMBLY LH FRONT

(a) Place matchmarks on the window regulator motor bracket and regulator gear.

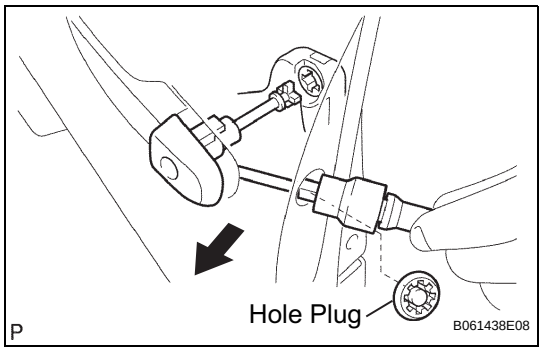


(b) Using a T25 "torx" driver, remove the 3 screws and motor.



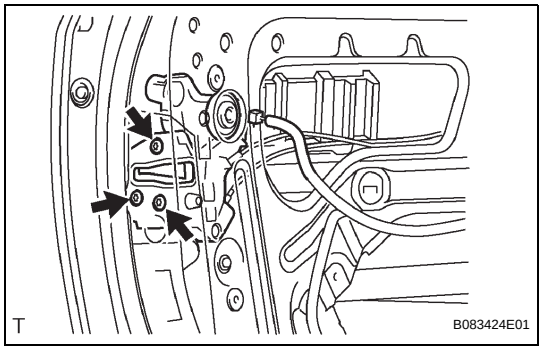
19. REMOVE FRONT DOOR FRAME SUB-ASSEMBLY REAR LOWER LH

(a) Remove the bolt and frame.
HINT:
Remove the frame through the service hole.
NOTICE:
Be careful when removing the bolts as the frame may fall and become damaged.



20. REMOVE FRONT DOOR OUTSIDE HANDLE COVER LH

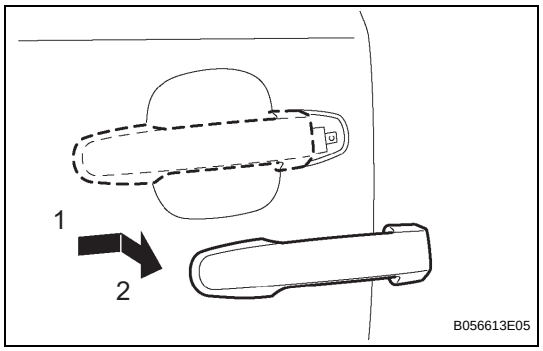
(a) Remove the hole plug.
(b) Using a T30 "torx" socket, loosen the screw and remove the cover with the door lock key cylinder installed.



21. REMOVE FRONT DOOR LOCK ASSEMBLY LH

(a) Using a T30 "torx" socket, remove the 3 screws and the door lock.
HINT:
Remove the door lock through the service hole.
NOTICE:
Be careful when removing the screws as the door lock may fall and become damaged.

ED

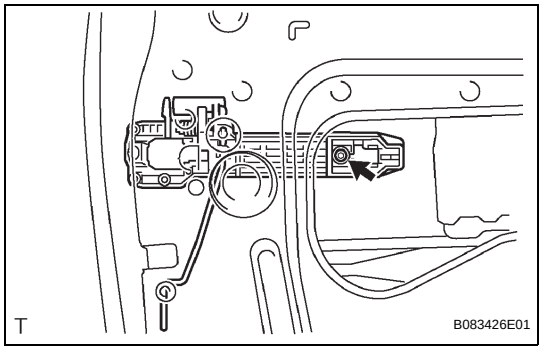


22. REMOVE FRONT DOOR HANDLE ASSEMBLY OUTSIDE LH

(a) Remove the handle by sliding and pulling it in the direction indicated by the arrow mark in the illustration.

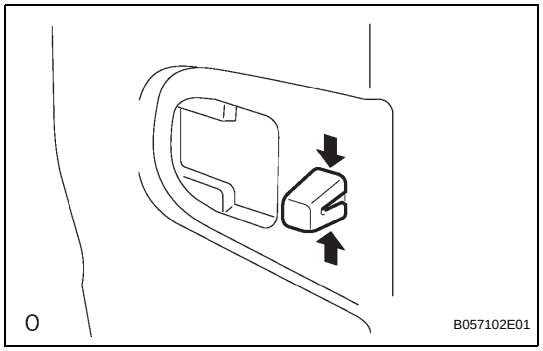
NOTICE:

If the bellcrank lever is not pulled and held when removing the handle, the bellcrank lever will interfere with the handle and become damaged.



23. REMOVE FRONT DOOR OUTSIDE HANDLE FRAME SUB-ASSEMBLY LH

(a) Using a T30 "torx" socket, loosen the screw of the frame.



(b) Using pliers, squeeze the clip and remove the frame.

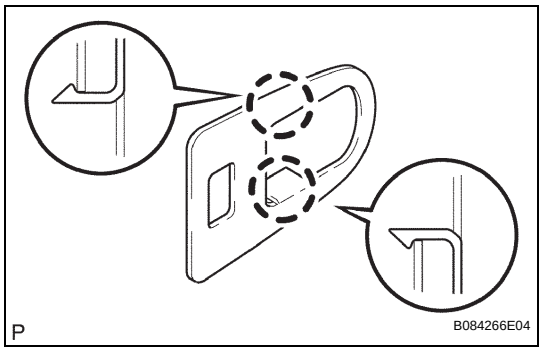
HINT:

Remove the frame through the service hole.

NOTICE:

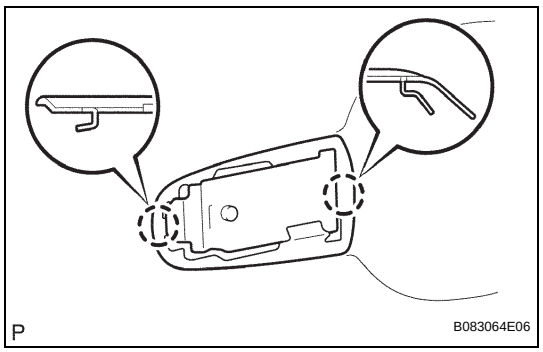
Be sure to remove the outside handle frame together with the clips, as the clips will be damaged if they remain attached to the door panel.

(c) Remove the lock control rod.



24. REMOVE FRONT DOOR OUTSIDE HANDLE PAD FRONT

(a) Detach the 2 claws and remove the pad.



25. REMOVE FRONT DOOR OUTSIDE HANDLE PAD REAR

(a) Detach the 2 claws and remove the pad.

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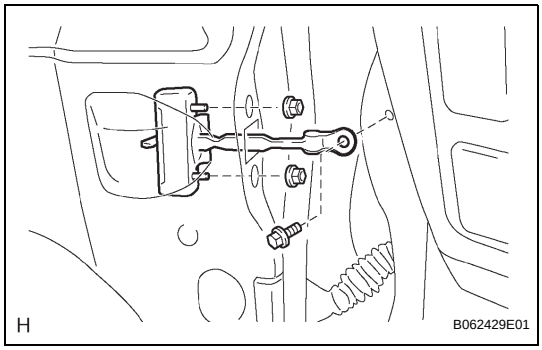
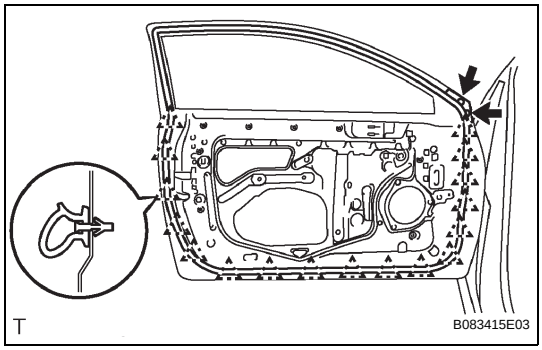


26. REMOVE FRONT DOOR CHECK ASSEMBLY LH

(a) Remove the bolt, 2 nuts and the door check.
HINT:
Remove the check through the service hole.



27. REMOVE FRONT DOOR WEATHERSTRIP LH

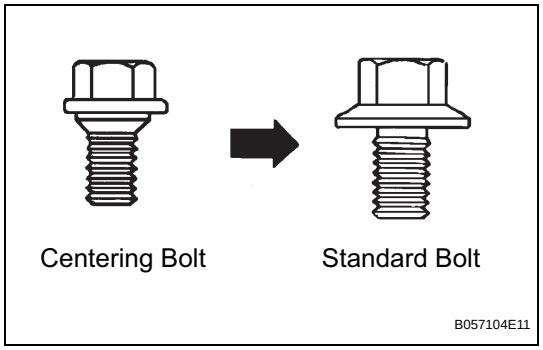
(a) Using a clip remover, remove the 2 clips indicated by the 2 arrow marks in the illustration.

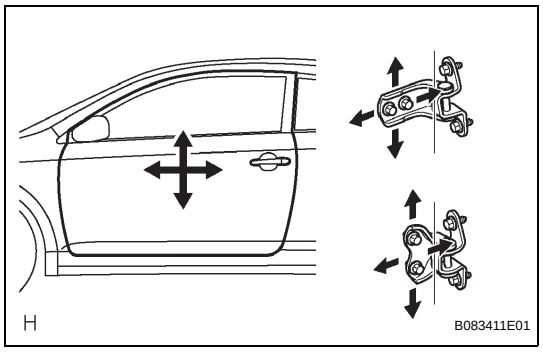
(b) Using a clip remover, detach the 17 clips and remove the weatherstrip.
HINT:
If clips are damaged during removal, replace them.

ADJUSTMENT

HINT:

- Before adjusting the door position for vehicles equipped with side airbags and curtain shield airbags, be sure to disconnect the battery. After adjustment, inspect the SRS warning light, the side airbag system and the curtain shield airbag system for normal operation. Then initialize both airbag systems.
- Use the same procedures for the RH side and LH side.
- The procedures listed below are 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 on. Substitute the centering bolts with standard bolts (with washers) when making adjustmenst.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

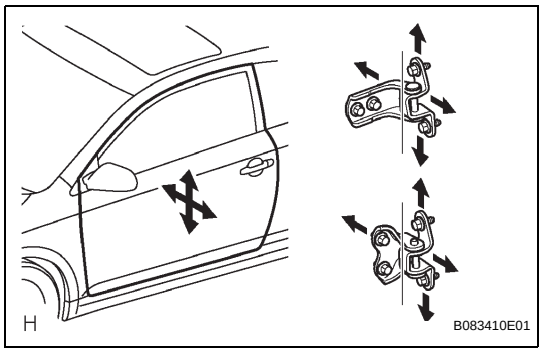




1. ADJUST FRONT DOOR PANEL SUB-ASSEMBLY LH

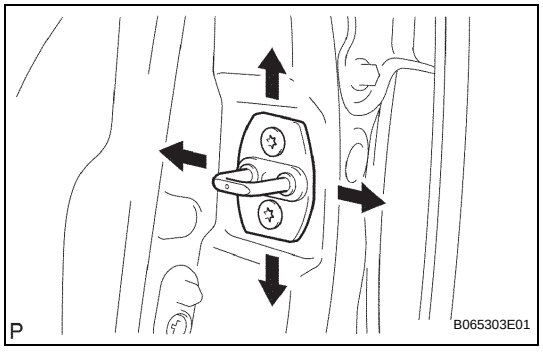
(a) Using SST, loosen the body's hinge bolts and adjust the door's position.
SST 09812-00010, 09812-00020

(b) Tighten the body's hinge bolts after the adjustment.
Torque: 26 N*m (265 kgf*cm, 19 ft.*lbf)



(c) Loosen the door's hinge bolts and adjust the door's position.

(d) Tighten the door's hinge bolts after the adjustment.
Torque: 26 N*m (265 kgf*cm, 19 ft.*lbf)



(e) Adjust the striker position by slightly loosening the striker mounting screws and hitting the striker with a plastic-faced hammer.

(f) Tighten the striker mounting screws after the adjustment.
Torque: 23 N*m (235 kgf*cm, 17 ft.*lbf)

(g) Connect the battery cable.

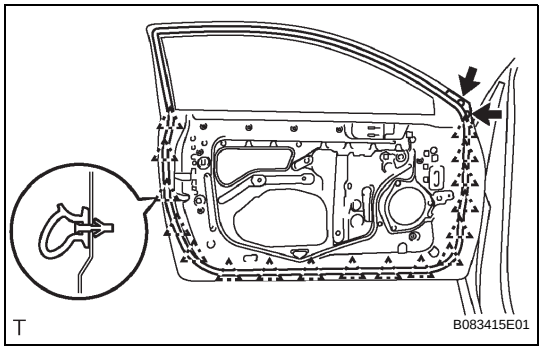
(h) Inspect the SRS warning light (see page RS-11).

ED

REASSEMBLY

HINT:

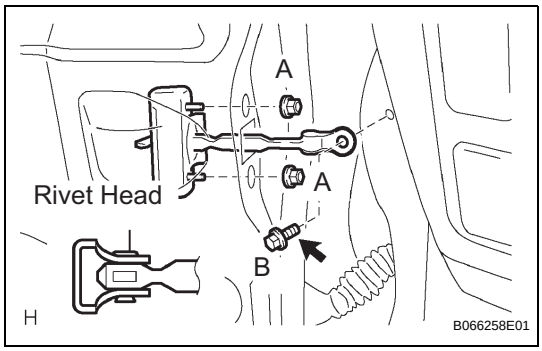
- Use the same procedure for the RH side and LH side.
- The procedures listed below are for the LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).



1. INSTALL FRONT DOOR WEATHERSTRIP LH

(a) Install the weatherstrip and attach the 17 clips.

(b) Attach the 2 clips indicated by the 2 arrow marks in the illustration.



2. INSTALL FRONT DOOR CHECK ASSEMBLY LH

(a) Apply MP grease to the sliding areas of the door check.

(b) Install the door check to the door panel with the 2 nuts.

Torque: 5.5 N*m (56 kgf*cm, 46 in.*lbf) for bolt A

(c) Apply adhesive to the bolt.

Adhesive:

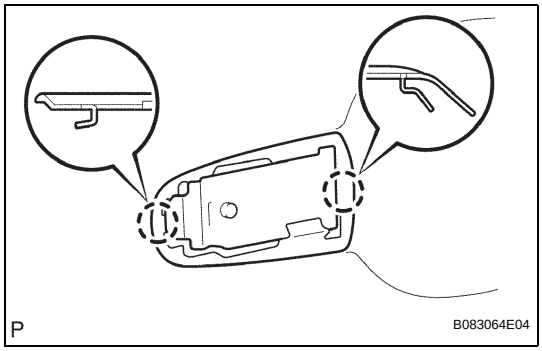
Part No. 08833-00070, THREE BOND 1324 or equivalent

(d) Install the door check to the body panel with the bolt.

Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)

HINT:

Install the door check so that the rivet head is facing up.



3. INSTALL FRONT DOOR OUTSIDE HANDLE PAD REAR

(a) Attach the 2 claws to install the pad.

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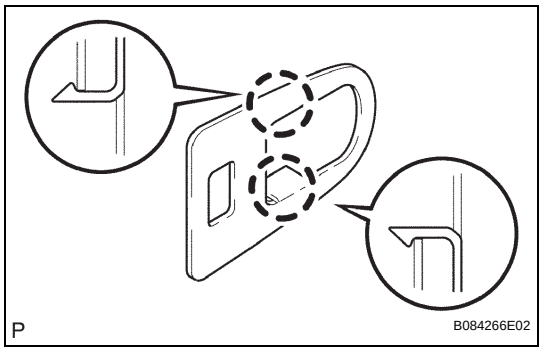
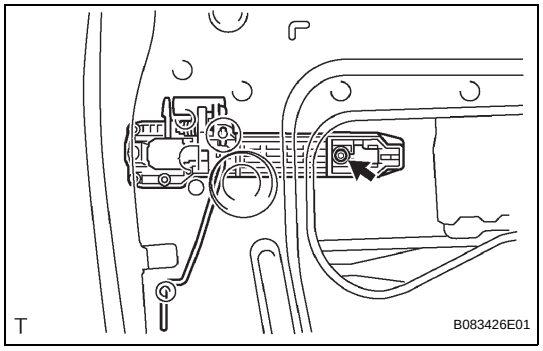


4. INSTALL FRONT DOOR OUTSIDE HANDLE PAD FRONT

(a) Attach the 2 claws to install the pad.



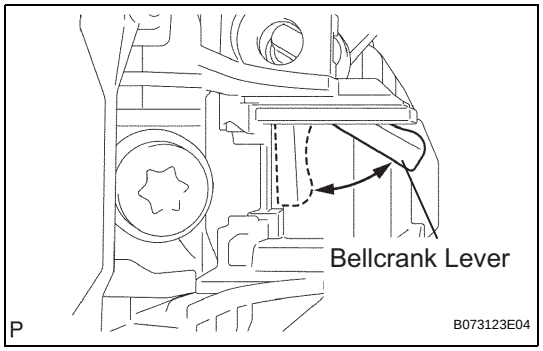
5. INSTALL FRONT DOOR OUTSIDE HANDLE FRAME SUB-ASSEMBLY LH

(a) Install the front door lock open rod.

(b) Apply MP grease to the sliding areas of the frame.

(c) Using a T30 "torx" socket, install the frame with the screw.

Torque: 4.0 N*m (41 kgf*cm, 35 in.*lbf)



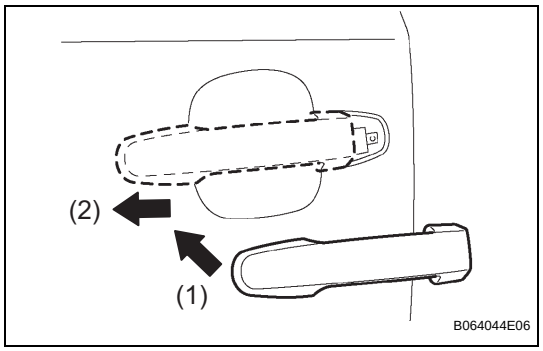
6. INSTALL FRONT DOOR HANDLE ASSEMBLY OUTSIDE LH

(a) Pull and hold the bellcrank lever of the frame as shown in the illustration.

(b) Install the handle by pushing it in the direction of the arrow marks in the illustration.

NOTICE:

If the bellcrank lever is not pulled and held when installing the handle, the bellcrank lever will interfere with the handle and become damaged.



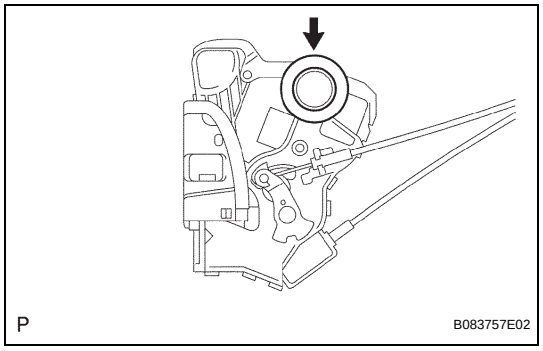
7. INSTALL FRONT DOOR LOCK ASSEMBLY LH

(a) Apply MP grease to the sliding and rotating areas of the door lock.

(b) Install a new door lock wire harness packing.

CAUTION:

- **When reinstalling the door lock, always use new packing.**
- **Do not allow grease or dirt to contaminate the gap between the door panel and packing.**
- **Old or damaged packing cannot effectively protect against water, which can damage the door lock.**



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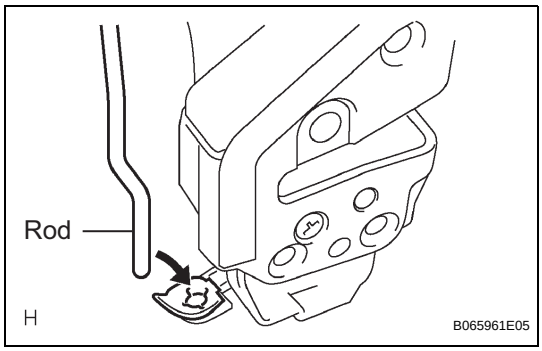
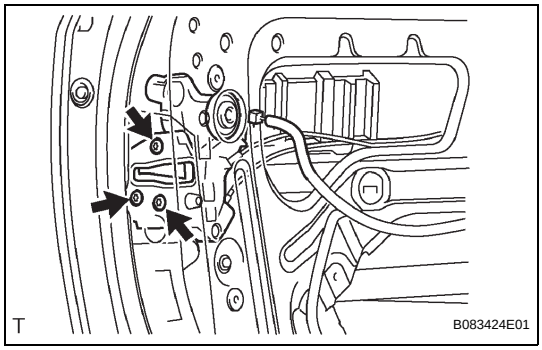
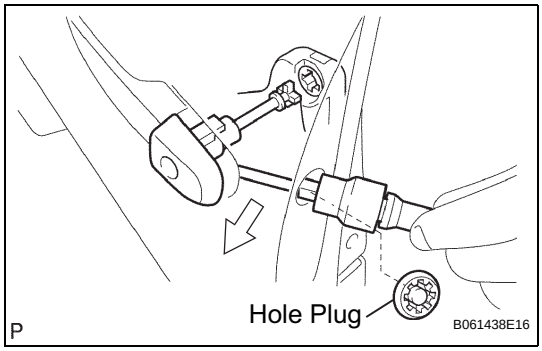


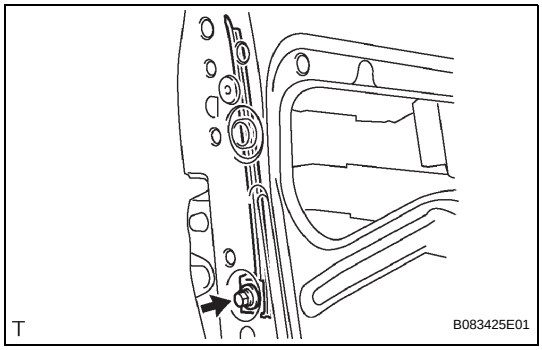
(c) Insert the control rod into the door lock, and then set it to the door panel.
NOTICE:
Make sure that the rod is securely engaged with the lock.



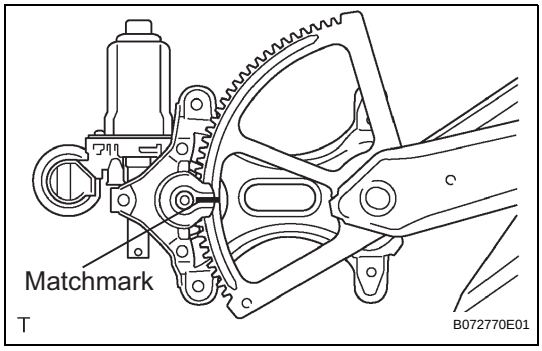
(d) Apply adhesive to the threads of the 3 screws.
Adhesive:
Part No. 08833-00070, THREE BOND 1324 or equivalent
(e) Using a T30 "torx" socket, install the door lock with the 3 screws.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
(f) Connect the door lock connector.



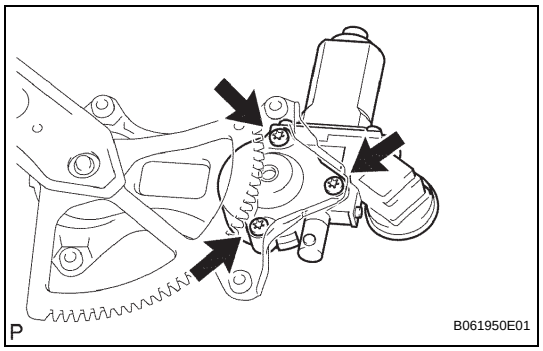
8. INSTALL FRONT DOOR OUTSIDE HANDLE COVER LH
(a) Using a T30 "torx" socket, install the cover (with the door key cylinder installed) with the screw.
Torque: 4.0 N*m (41 kgf*cm, 35 ft.*lbf)
(b) Install the hole plug.



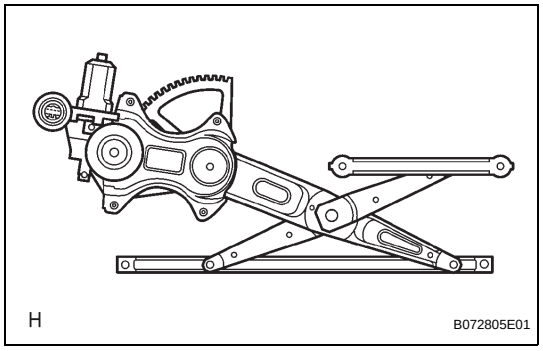
9. INSTALL FRONT DOOR FRAME SUB-ASSEMBLY REAR LOWER LH
(a) Install the frame with the bolt.
Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)



10. INSTALL POWER WINDOW REGULATOR MOTOR ASSEMBLY LH FRONT
(a) Align the matchmarks. Keep them aligned until the window glass installation is complete.

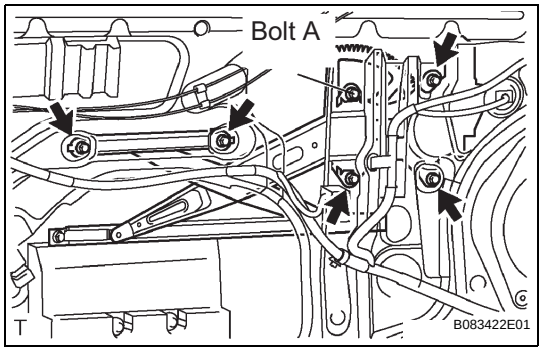


(b) Using a T25 "torx" driver, install the motor with the 3 screws.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



11. INSTALL FRONT DOOR WINDOW REGULATOR SUB-ASSEMBLY LH

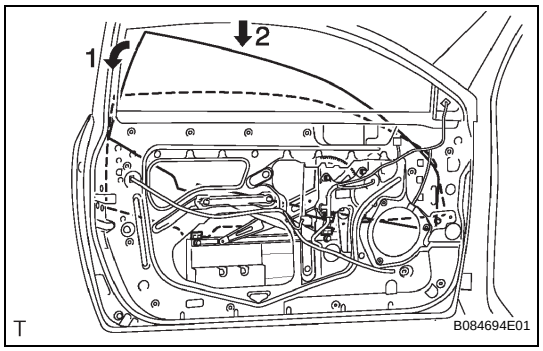
(a) Apply MP grease to the sliding and rotating areas of the window regulator.
NOTICE:
Do not apply grease to the spring of the window regulator.



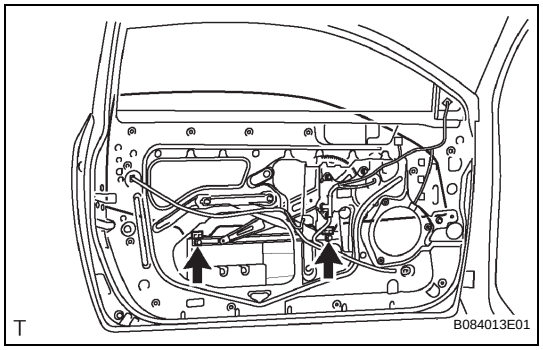
(b) Loosely screw bolt A onto the window regulator.
(c) Insert the window regulator into the door panel. Use bolt A to hang the window regulator on the door panel.
(d) Install the window regulator with the 5 bolts and tighten bolt A.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
NOTICE:
Be careful not to drop the window regulator as it may become damaged.

12. INSTALL FRONT DOOR GLASS SUB-ASSEMBLY LH

(a) Install the glass run.
CAUTION:
Be careful not to damage the glass.



(b) Insert the door glass into the door panel along the glass run as indicated by the arrows in the illustration.



(c) Install the glass to the window regulator with the 2 bolts.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

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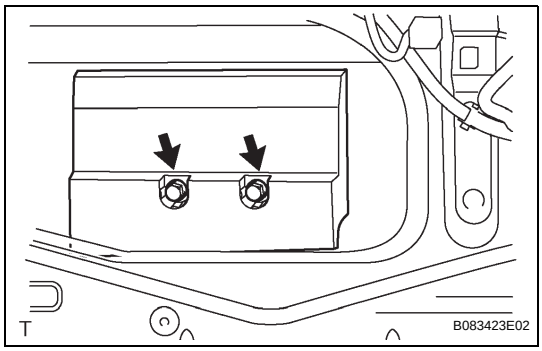
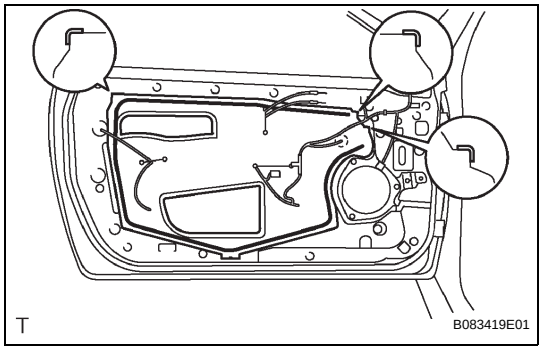


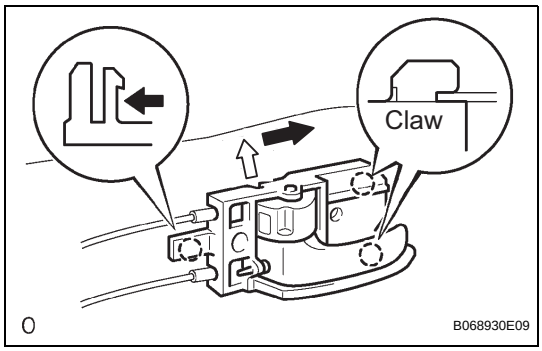
13. **INSTALL FRONT DOOR NO. 1 STIFFENER CUSHION**
    (a) Install the stiffener cushion to the front door with the 2 bolts.

14. **INSTALL SIDE AIRBAG SENSOR ASSEMBLY LH (w/ Side Airbag System and Curtain Shield Airbag System) (See page RS-398)**



15. **INSTALL FRONT DOOR SERVICE HOLE COVER LH**
    (a) Install a new service hole cover.
    HINT:
    - When installing the service hole cover, pull out the links and connectors through the service hole cover.
    - There should be no wrinkles or folds after attaching the service hole cover.
    - After attaching the service hole cover, check that it is installed properly.

    (b) Connect each connector.



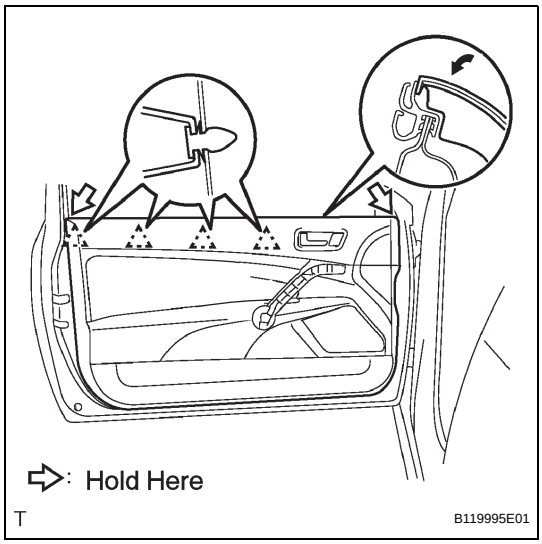
16. **INSTALL FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY LH**
    (a) Move the inside handle in the direction indicated by the arrow in the illustration to install the inside handle.
    (b) Connect the 2 cables to the inside handle.

17. **INSTALL FRONT DOOR GLASS WEATHERSTRIP INNER LH**

18. **INSTALL FRONT NO. 2 SPEAKER ASSEMBLY (w/ Front No. 2 Speaker) (See page AV-23)**

19. **INSTALL FRONT NO. 1 SPEAKER ASSEMBLY (See page AV-19)**

20. **INSTALL OUTER REAR VIEW MIRROR ASSEMBLY LH (See page MI-10)**



21. **INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH**
    (a) Attach the 4 clips and install the trim board.

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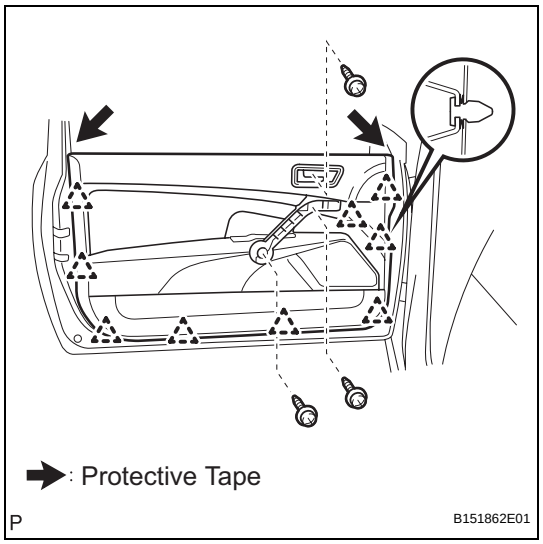
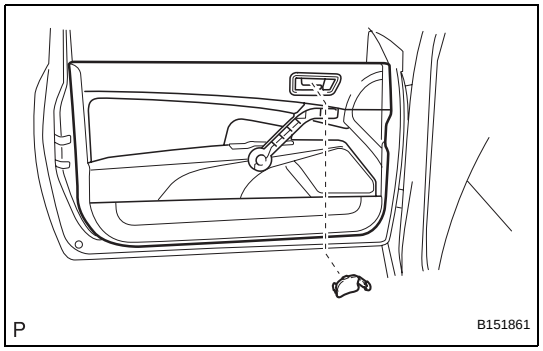
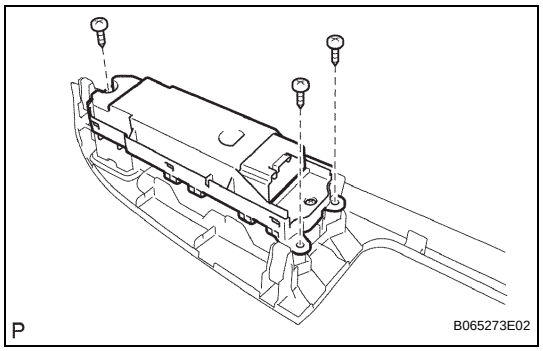


(b) Attach the 9 clips and install the 2 screws.



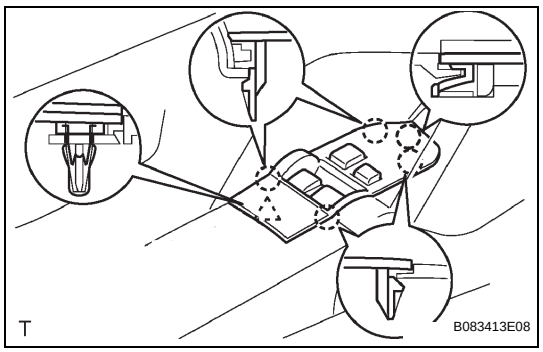
22. INSTALL FRONT DOOR INSIDE HANDLE BEZEL PLUG

(a) Attach the claw and install the front door inside handle bezel plug.



23. INSTALL FRONT ARMREST BASE PANEL UPPER LH

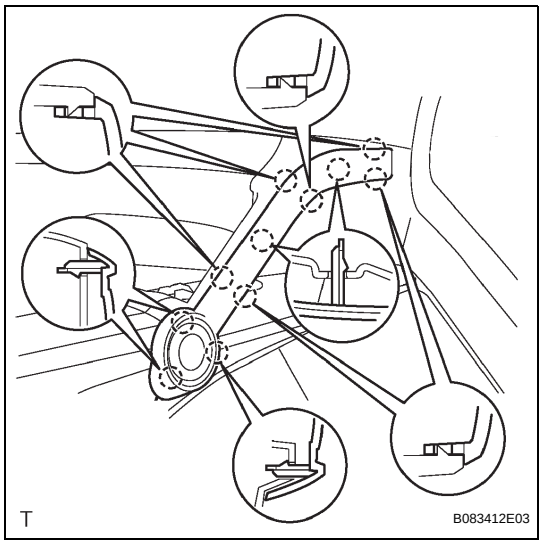
(a) Driver's side:
  (1) Install the window regulator master switch to the armrest base panel upper LH with the 3 screws.
  (2) Connect the switch connector.



  (3) Attach the clip and 5 claws to install the armrest base panel upper LH together with the window regulator master switch.

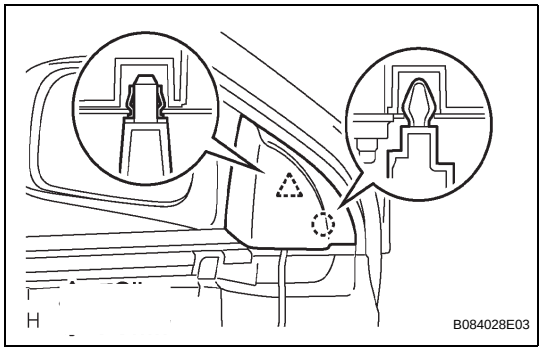
(b) Passenger's side:
  (1) Install the power window regulator switch to the armrest base panel upper RH with the 2 screws.
  (2) Connect the connector.
  (3) Attach the clip and 5 claws to install the armrest base panel upper RH together with the power window regulator switch.

ED



24. INSTALL ASSIST GRIP COVER LH

(a) Install the grip cover and attach the 11 claws.



25. INSTALL FRONT DOOR LOWER FRAME BRACKET GARNISH LH

(a) Attach the clip and claw to install the garnish.

26. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

27. INSPECT SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

28. PERFORM INITIALIZATION

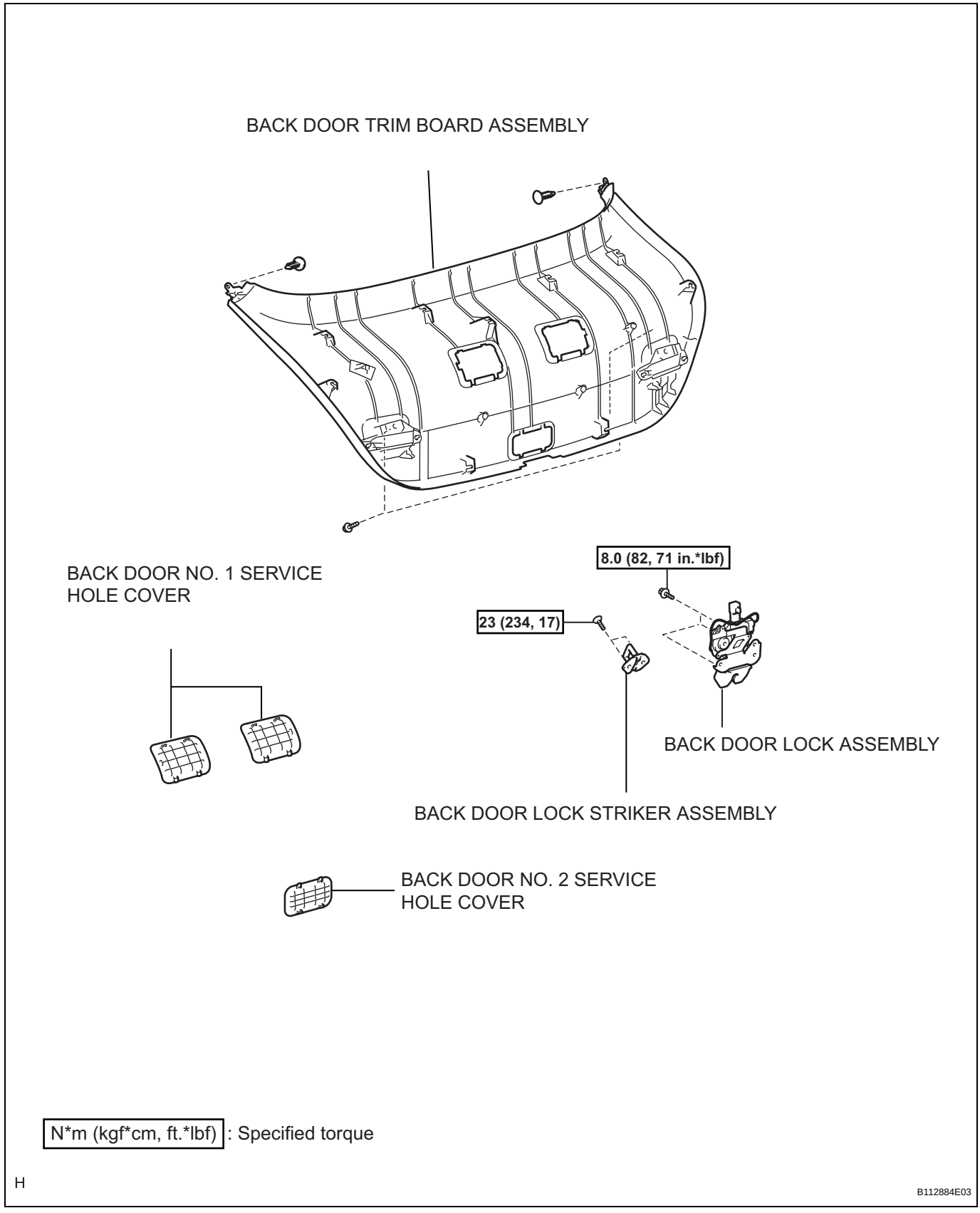
(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

BACK DOOR

COMPONENTS



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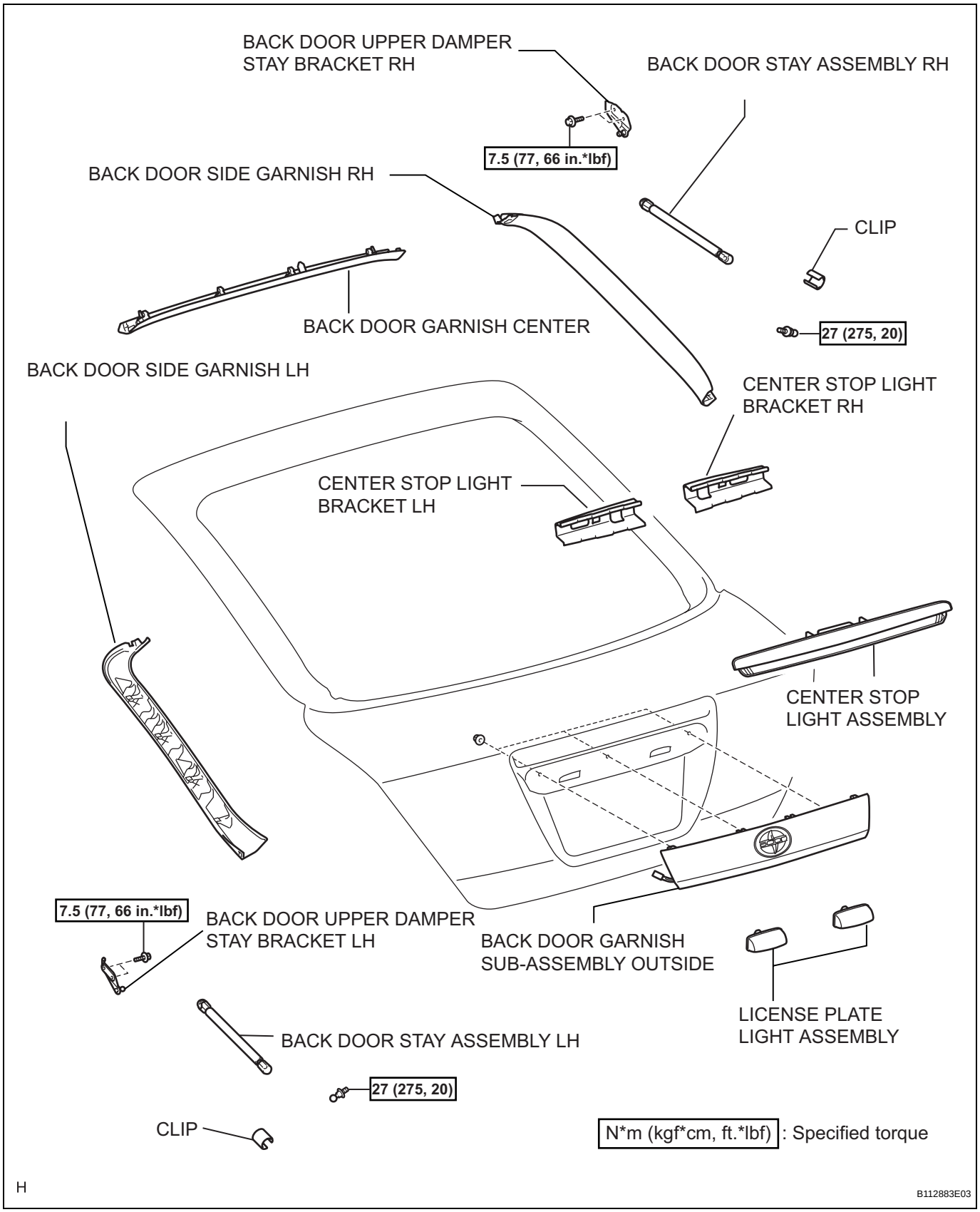
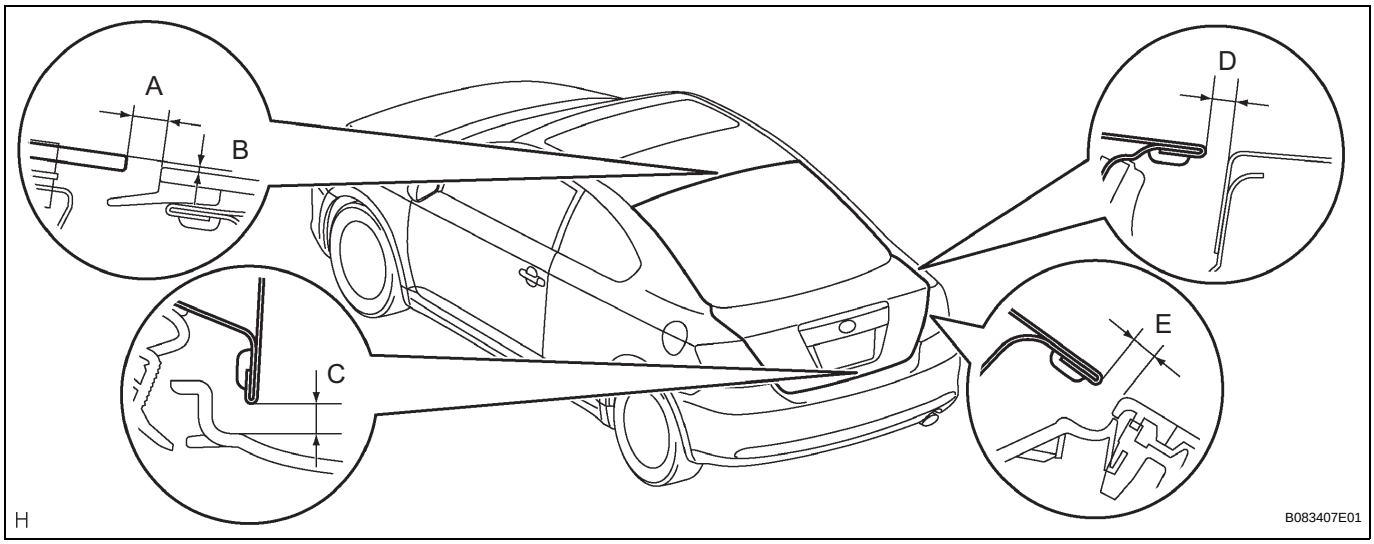

BACK DOOR UPPER DAMPER STAY BRACKET RH
BACK DOOR STAY ASSEMBLY RH
7.5 (77, 66 in.*lbf)
BACK DOOR SIDE GARNISH RH
CLIP
BACK DOOR GARNISH CENTER
27 (275, 20)
BACK DOOR SIDE GARNISH LH
CENTER STOP LIGHT BRACKET RH
CENTER STOP LIGHT BRACKET LH
CENTER STOP LIGHT ASSEMBLY
7.5 (77, 66 in.*lbf)
BACK DOOR UPPER DAMPER STAY BRACKET LH
BACK DOOR GARNISH SUB-ASSEMBLY OUTSIDE
LICENSE PLATE LIGHT ASSEMBLY
BACK DOOR STAY ASSEMBLY LH
27 (275, 20)
CLIP
N*m (kgf*cm, ft.*lbf) : Specified torque
H
B112883E03

ED

ON-VEHICLE INSPECTION

1. INSPECT BACK DOOR PANEL SUB-ASSEMBLY

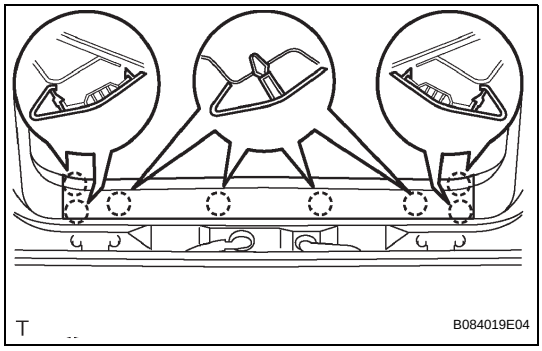
(a) Check that the clearance measurements of areas A to E are within the standard range.



Standard measurement:

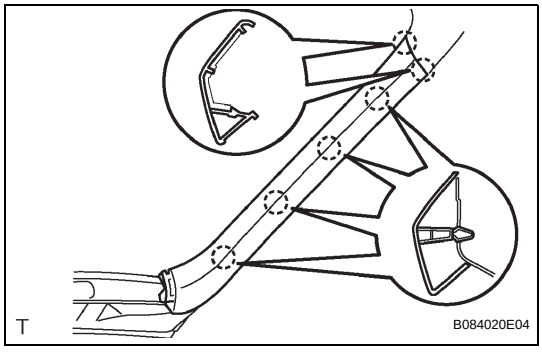
Area	Measurement	Area	Measurement
A	7.0 +- 2.0 mm (0.276 +- 0.079 in.)	D	4.8 +- 1.5 mm (0.189 +- 0.059 in.)
B	1.0 +- 2.0 mm (0.039 +- 0.079 in.)	E	5.2 +- 1.5 mm (0.205 +- 0.059 in.)
C	6.0 +- 1.5 mm (0.236 +- 0.059 in.)	-	-

DISASSEMBLY



1. REMOVE BACK DOOR GARNISH CENTER

(a) Using a screwdriver, detach the 8 claws and remove the garnish.
HINT:
Tape the screwdriver tip before use.



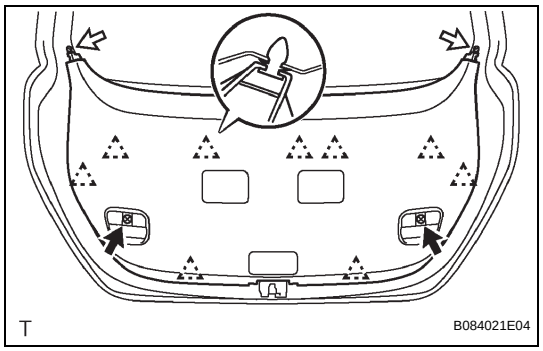
2. REMOVE BACK DOOR SIDE GARNISH LH

(a) Using a screwdriver, detach the 6 claws and remove the garnish.
HINT:
Tape the screwdriver tip before use.

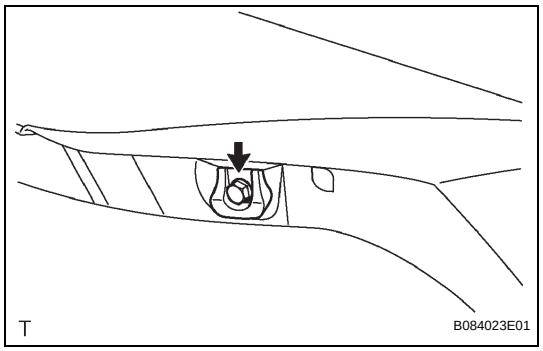
3. REMOVE BACK DOOR SIDE GARNISH RH

(a) Using a screwdriver, detach the 6 claws and remove the garnish.
HINT:
Tape the screwdriver tip before use.

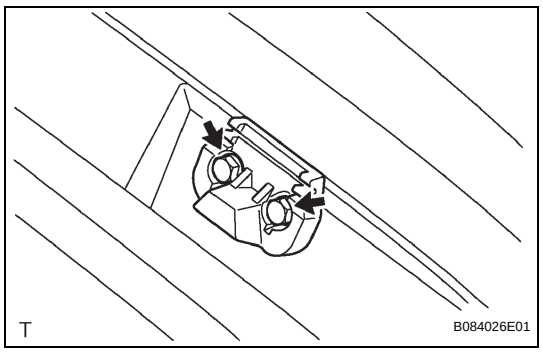
ED



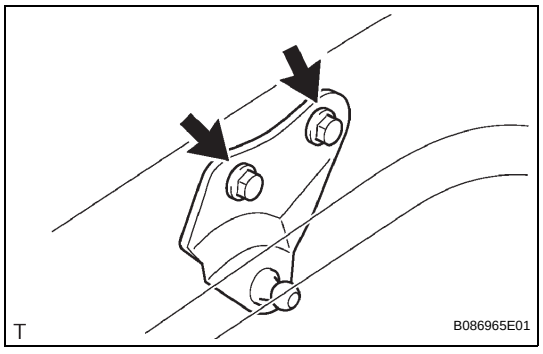
4. **REMOVE BACK DOOR TRIM BOARD ASSEMBLY**
   (a) Remove the 2 screws indicated by the 2 black arrows in the illustration.
   (b) Using a clip remover, remove the 2 clips indicated by the 2 white arrows in the illustration.
   (c) Using a screwdriver, detach the 9 clips and remove the trim.
   HINT:
   Tape the screwdriver tip before use.
   (d) Remove the No. 1 service hole cover.
   (e) Remove the No. 2 service hole cover.
5. **REMOVE CENTER STOP LIGHT ASSEMBLY (See page LI-28)**
6. **REMOVE BACK DOOR GARNISH SUB-ASSEMBLY OUTSIDE (See page ET-22)**
7. **REMOVE LICENSE PLATE LIGHT ASSEMBLY (See page LI-25)**



8. **REMOVE BACK DOOR STOPPER LOWER**
   (a) Remove the bolt and stopper.

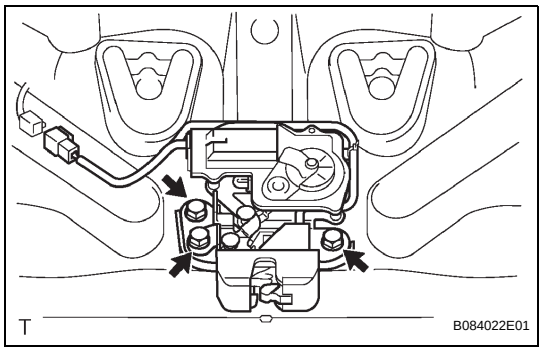


9. **REMOVE BACK DOOR LOWER STOPPER CUSHION**
   (a) Remove the 2 bolts and stopper cushion.
10. **REMOVE BACK DOOR STAY ASSEMBLY LH (See page ED-29)**
11. **REMOVE BACK DOOR STAY ASSEMBLY RH**
    HINT:
    Use the same procedures described for the LH side.



12. **REMOVE BACK DOOR UPPER DAMPER STAY BRACKET LH**
    (a) Remove the 2 bolts and bracket.
13. **REMOVE BACK DOOR UPPER DAMPER STAY BRACKET RH**
    (a) Remove the 2 bolts and bracket.

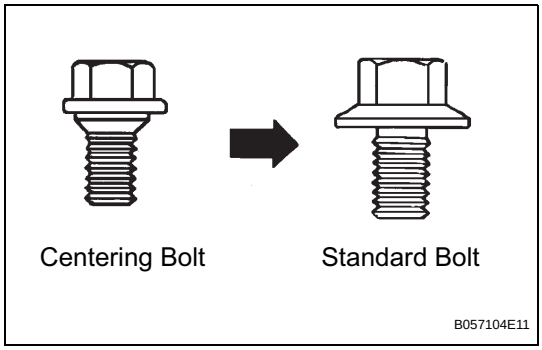
ED



14. REMOVE BACK DOOR LOCK ASSEMBLY

(a) Disconnect the connector and clamp.

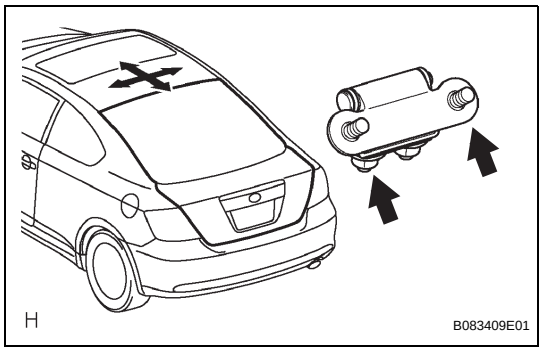
(b) Remove the 3 bolts and lock.



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 (with washers) when making adjustments.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).



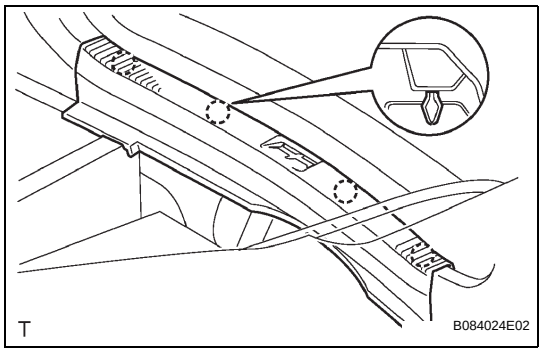
1. ADJUST BACK DOOR PANEL SUB-ASSEMBLY

(a) Adjust the door's position.

(1) Loosen the door's hinge bolts and adjust the door's position.

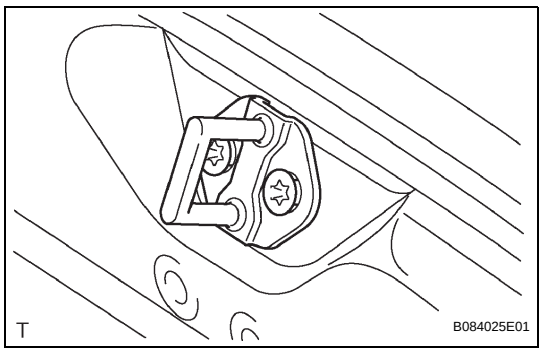
(2) Tighten the door's hinge bolts after the adjustment.

Torque: 19.5 N*m (199 kgf*cm, 14 ft.*lbf)



(b) Adjust the striker.

(1) Using a screwdriver, detach the 4 claws and remove the finish panel.



(2) Adjust the striker position by slightly loosening the striker mounting screws and hitting the striker with a plastic-faced hammer.

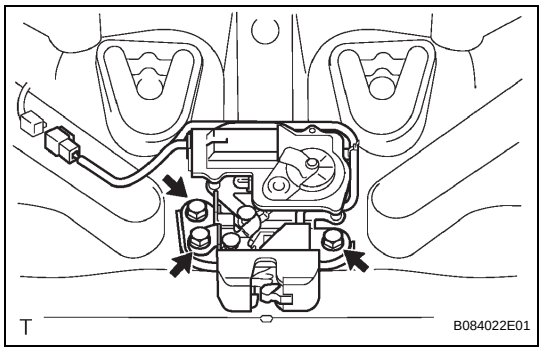
(3) Tighten the striker mounting screws after the adjustment.

Torque: 23 N*m (234 kgf*cm, 17 ft.*lbf)

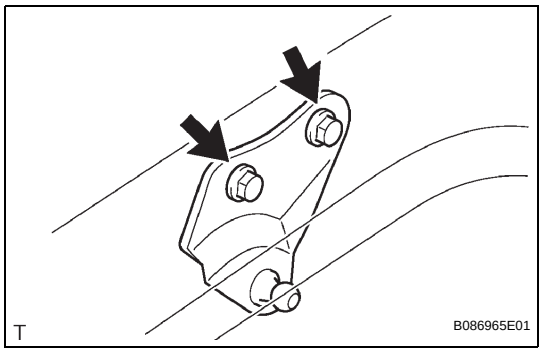
ED

REASSEMBLY

HINT:
A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).



1. **INSTALL BACK DOOR LOCK ASSEMBLY**
   (a) Install the lock with the 3 bolts.
   (b) Connect the connector and clamp.
   Torque: 8.0 N*m (82 kgf*cm, 70 in.*lbf)

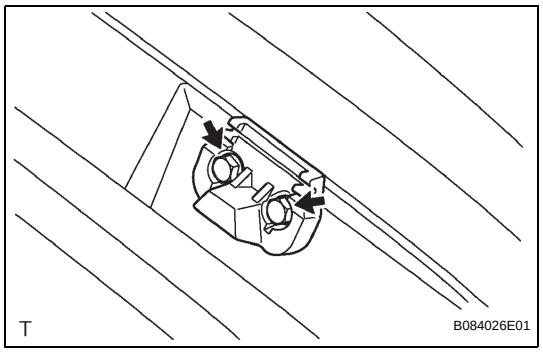


2. **INSTALL BACK DOOR UPPER DAMPER STAY BRACKET LH**
   (a) Install the bracket with the 2 bolts.
   Torque: 7.5 N*m (77 kgf*cm, 66 in.*lbf)

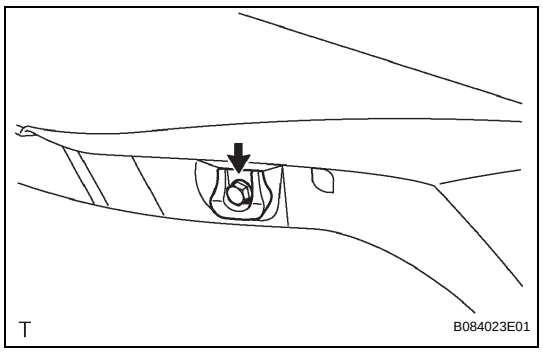
3. **INSTALL BACK DOOR UPPER DAMPER STAY BRACKET RH**
   (a) Install the bracket with the 2 bolts.
   Torque: 7.5 N*m (77 kgf*cm, 66 in.*lbf)

4. **INSTALL BACK DOOR STAY ASSEMBLY LH (See page ED-29)**

5. **INSTALL BACK DOOR STAY ASSEMBLY RH (See page ED-29)**



6. **INSTALL BACK DOOR LOWER STOPPER CUSHION**
   (a) Install the cushion with the 2 bolts.
   Torque: 4.0 N*m (41 kgf*cm, 35 in.*lbf)

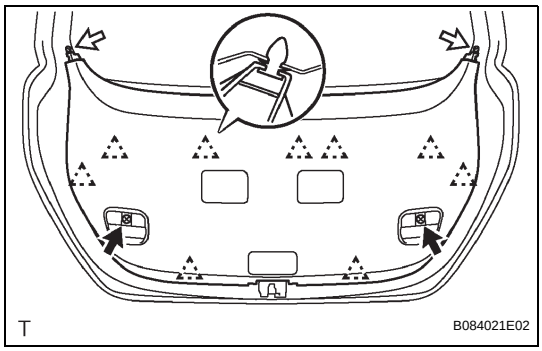


7. **INSTALL BACK DOOR STOPPER LOWER**
   (a) Install the stopper with the bolt.
   Torque: 19.5 N*m (199 kgf*cm, 14.5 ft.*lbf)

8. **INSTALL LICENSE PLATE LIGHT ASSEMBLY (See page LI-26)**

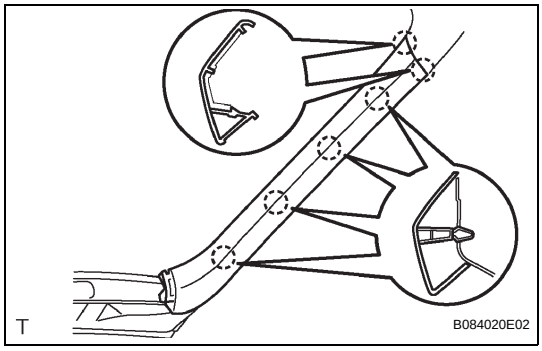
9. **INSTALL BACK DOOR GARNISH SUB-ASSEMBLY OUTSIDE (See page ET-22)**

10. **INSTALL CENTER STOP LIGHT ASSEMBLY (See page LI-28)**



11. INSTALL BACK DOOR TRIM BOARD ASSEMBLY

(a) Install the No. 2 service hole cover.
(b) Install the No. 1 service hole cover.
(c) Attach the 9 clips to install the trim board.
(d) Install the 2 clips indicated by the 2 white arrows in the illustration.
(e) Install the 2 screws indicated by the 2 black arrows in the illustration.

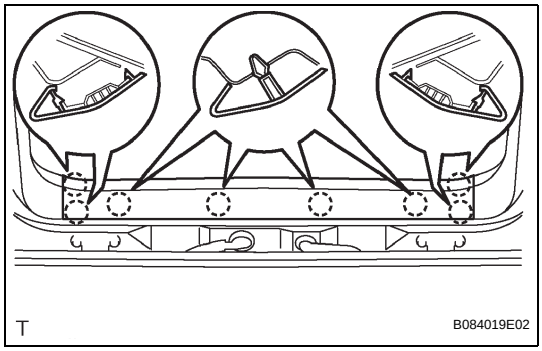


12. INSTALL BACK DOOR SIDE GARNISH LH

(a) Attach the 6 claws to install the garnish.

13. INSTALL BACK DOOR SIDE GARNISH RH

(a) Attach the 6 claws to install the garnish.



14. INSTALL BACK DOOR GARNISH CENTER

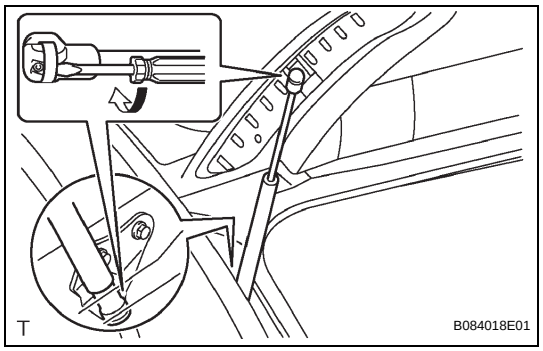
(a) Attach the 8 claws to install the garnish.

BACK DOOR SUPPORT

REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. REMOVE BACK DOOR STAY ASSEMBLY LH

(a) Using a screwdriver, remove the 2 stop rings and stay.

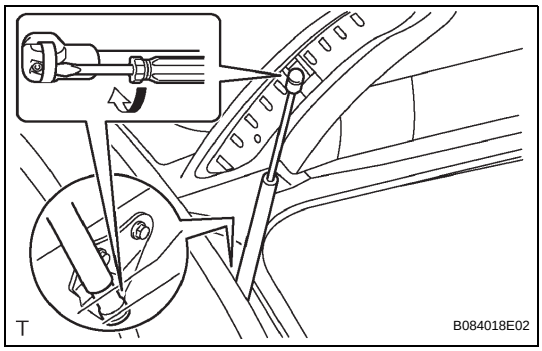
HINT:

Remove the door stay while supporting the back door with your free hand.

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

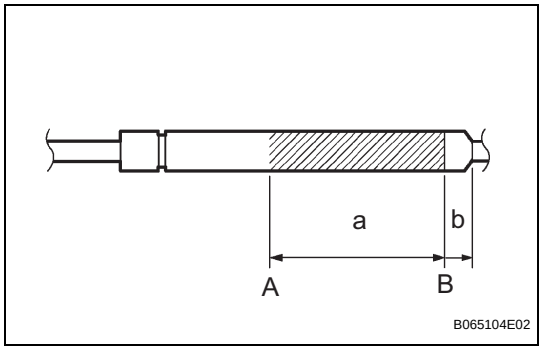


1. INSTALL BACK DOOR STAY ASSEMBLY LH

(a) Install the stay with the 2 stop rings.

DISPOSAL

HINT:
Use the same procedures for the LH side and RH side.



1. DISPOSE OF BACK DOOR STAY ASSEMBLY LH

(a) Horizontally fix the stay in a vise with the piston rod pulled out.

(b) Using a metal saw, gradually cut any area between A and B to release the gas.

Standard measurement:

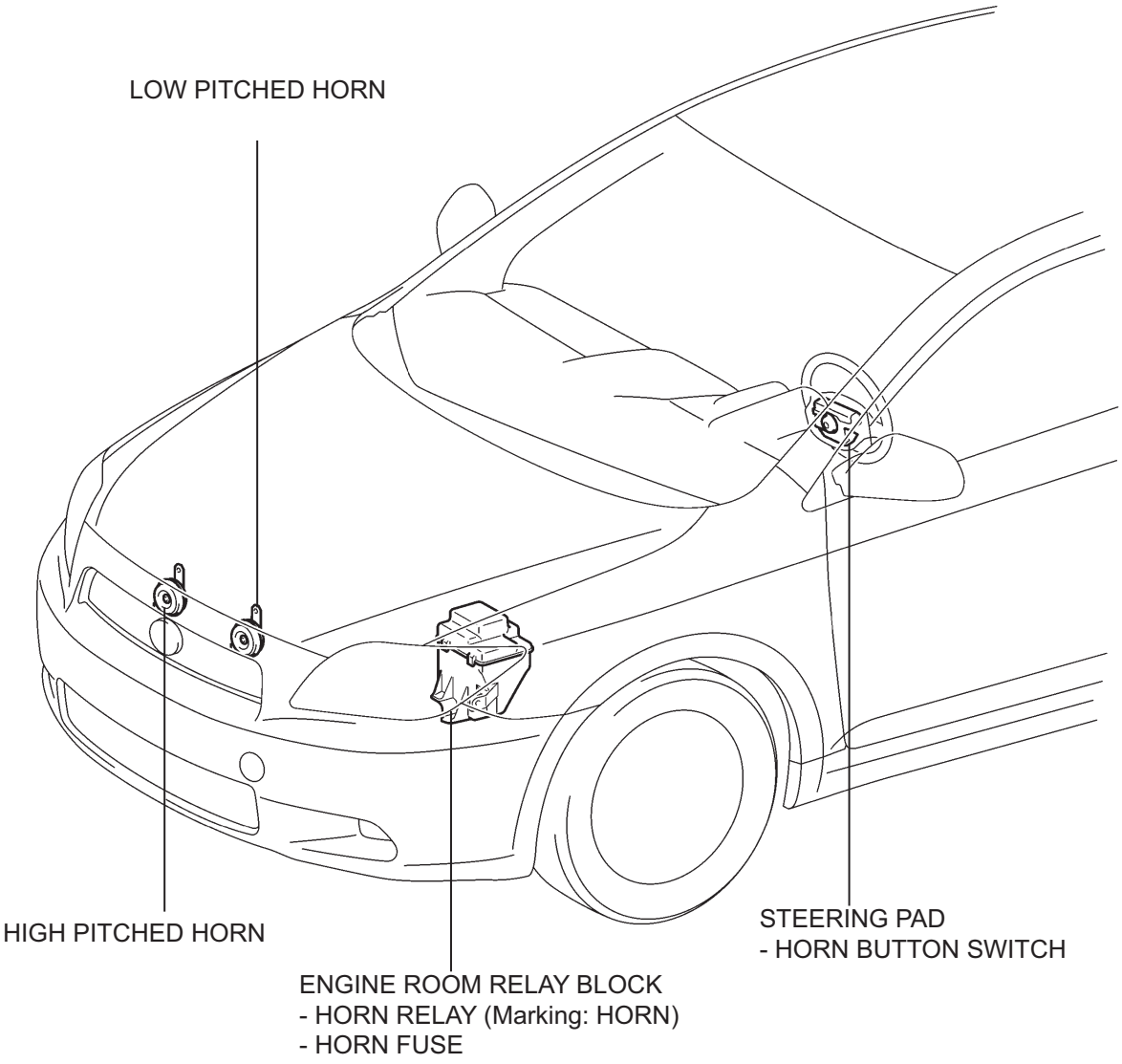
Area	Measurement
a	80 mm (3.15 in.)
b	20 mm (0.80 in.)

CAUTION:
As metal debris may be blown outward by the gas, you must:
- **Wear protective glasses.**
- **Cover the area being cut.**

NOTICE:
The gas is colorless, odorless and harmless.

HORN SYSTEM

PARTS LOCATION



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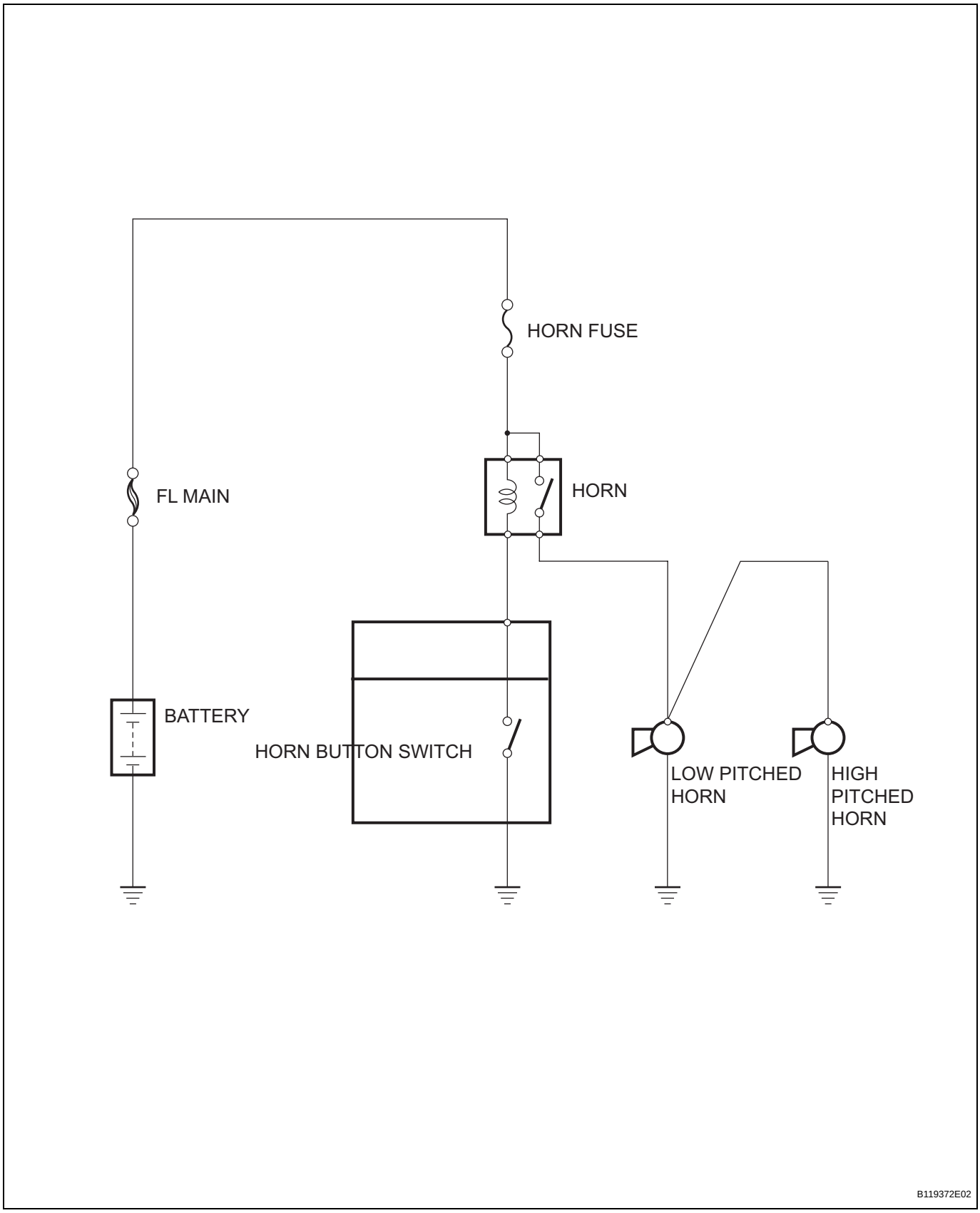
SYSTEM DIAGRAM

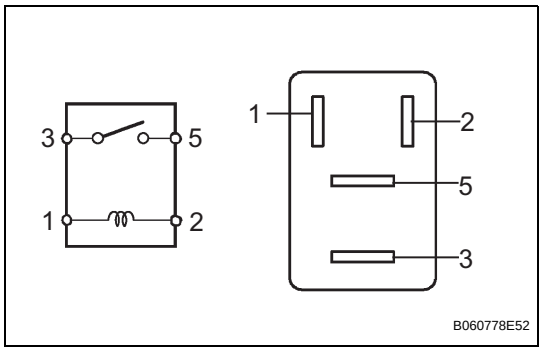


PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cases of the problem symptom. 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 order they are listed. Replace parts as necessary.

Horn system

Symptom	Suspected Area	See page
Horn does not sound	1. HORN relay	HO-4
	2. Low pitched horn	HO-5
	3. High pitched horn	HO-7
	4. Steering pad horn button switch	RS-342
	5. Wire harness	-



HORN RELAY

INSPECTION

1. INSPECT HORN RELAY (Marking: HORN)

(a) Remove the horn relay from the engine room relay block.

(b) Measure the resistance of the relay.

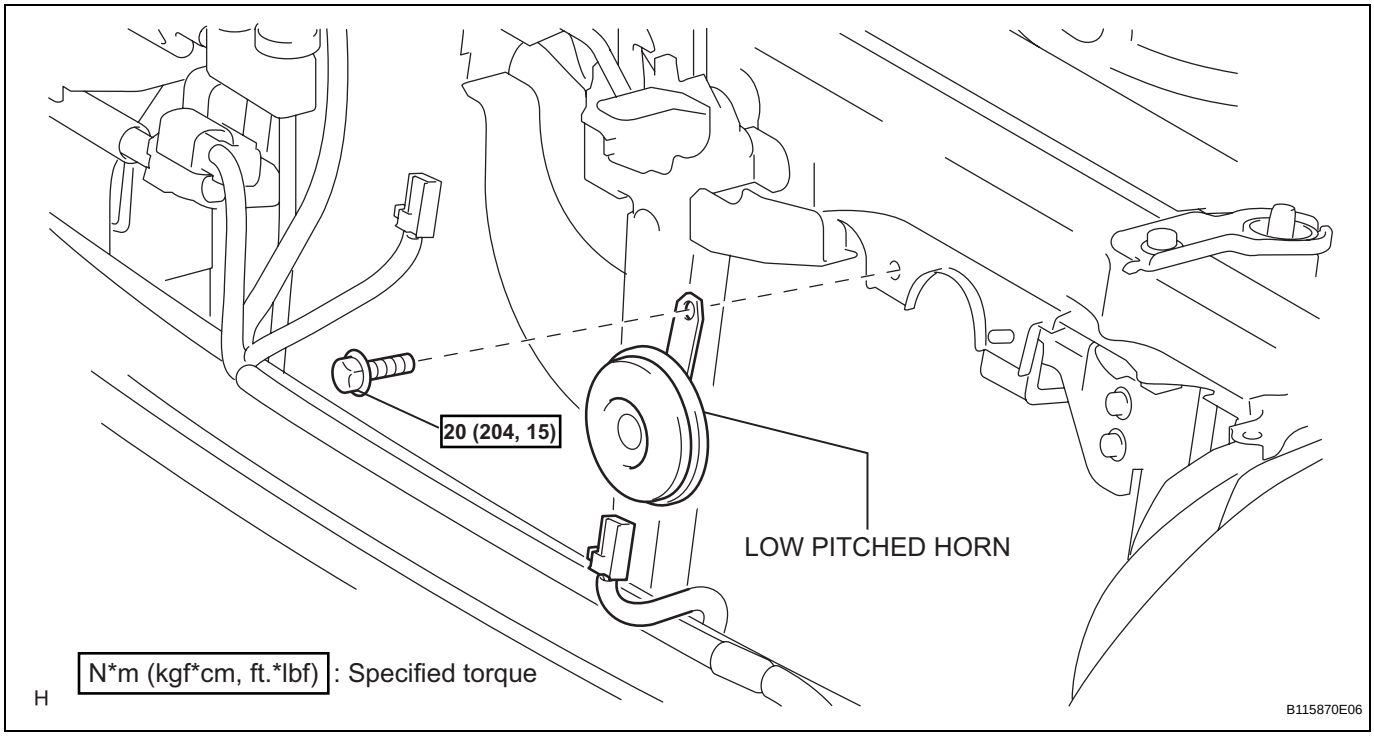
Standard resistance

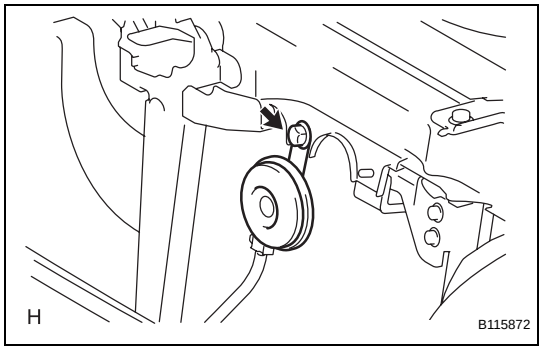
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

If the result is not as specified, replace the relay.

LOW PITCHED HORN

COMPONENTS



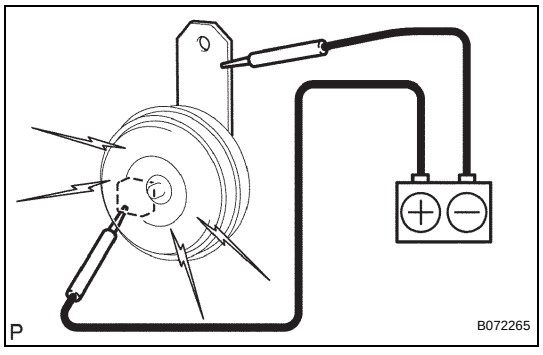


REMOVAL

1. REMOVE LOW PITCHED HORN

(a) Disconnect the connector.

(b) Remove the bolt and horn.



INSPECTION

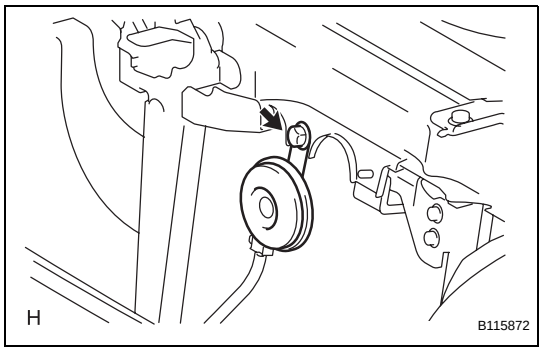
1. INSPECT LOW PITCHED HORN

(a) Apply battery voltage to the horn and check the operation of the horn.

OK

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 1	Horn sounds
Battery negative (-) → Horn bracket	

If the result is not as specified, replace the horn. If all the check results are as specified above and the wire harness is normal but the horn does not sound, replace the horn button switch (steering pad) (see page RS-345).



INSTALLATION

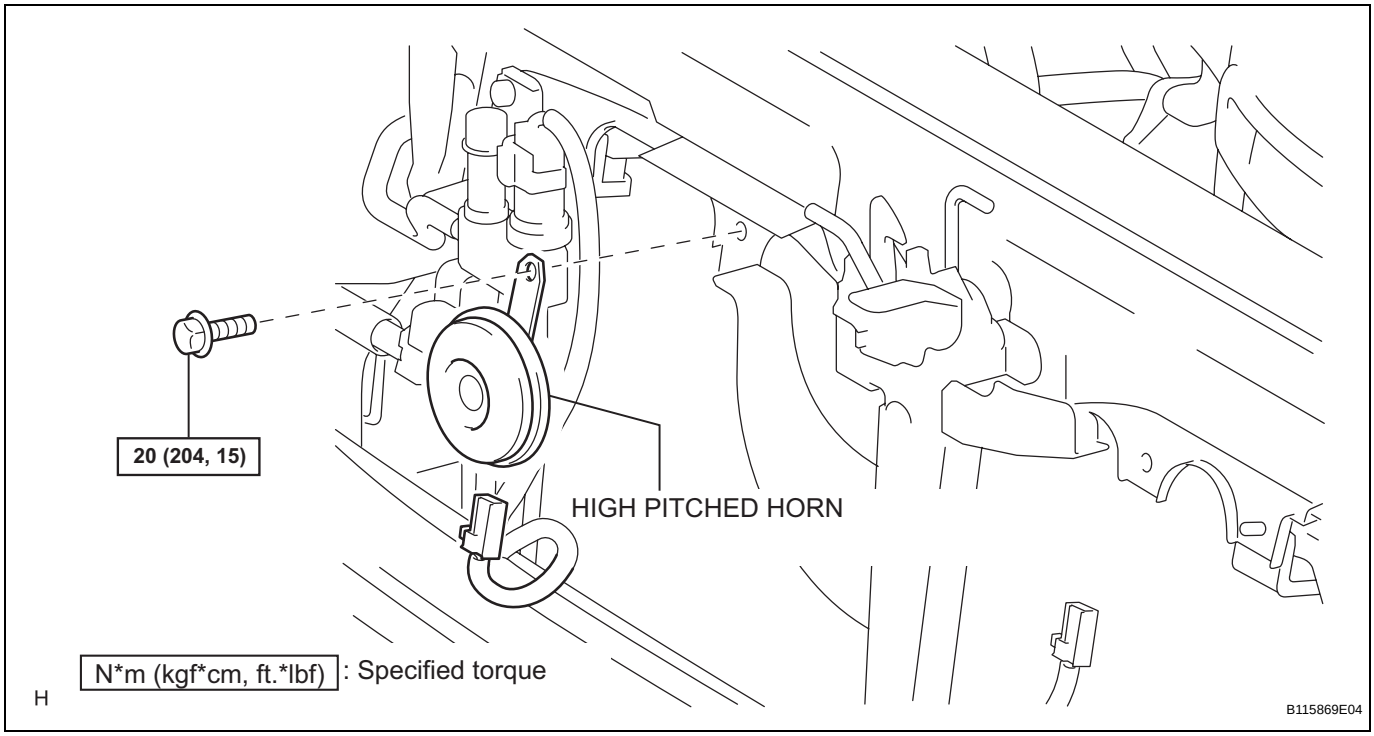
1. INSTALL LOW PITCHED HORN

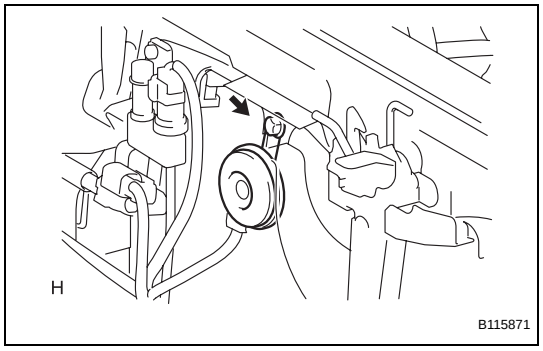
(a) Attach the horn stay to the body panel and then install the horn with the bolt.
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)

(b) Connect the connector.

HIGH PITCHED HORN

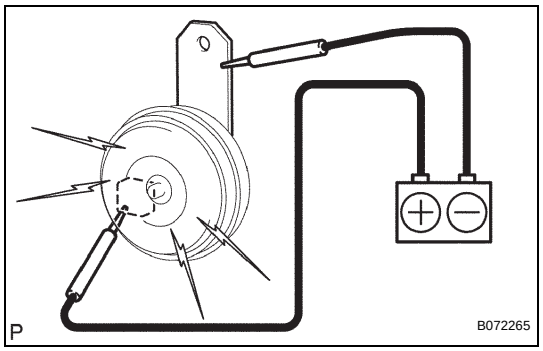
COMPONENTS





REMOVAL

1. **REMOVE HIGH PITCHED HORN**
   (a) Disconnect the connector.
   (b) Remove the bolt and horn.

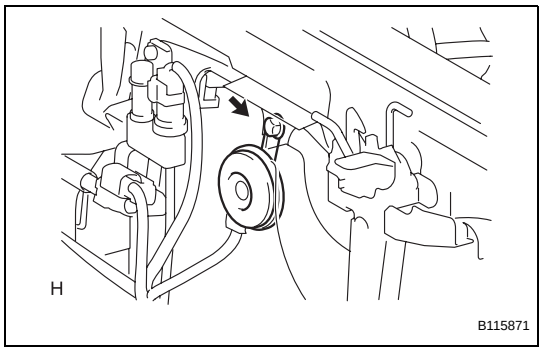


INSPECTION

1. **INSPECT HIGH PITCHED HORN**
   (a) Apply battery voltage to the horn and check the operation of the horn.
   OK

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 1	Horn sounds
Battery negative (-) → Horn bracket	

If the result is not as specified, replace the horn. If all the check results are as specified above and the wire harness is normal but the horn does not sound, replace the horn button switch (steering pad) (see page RS-345).



INSTALLATION

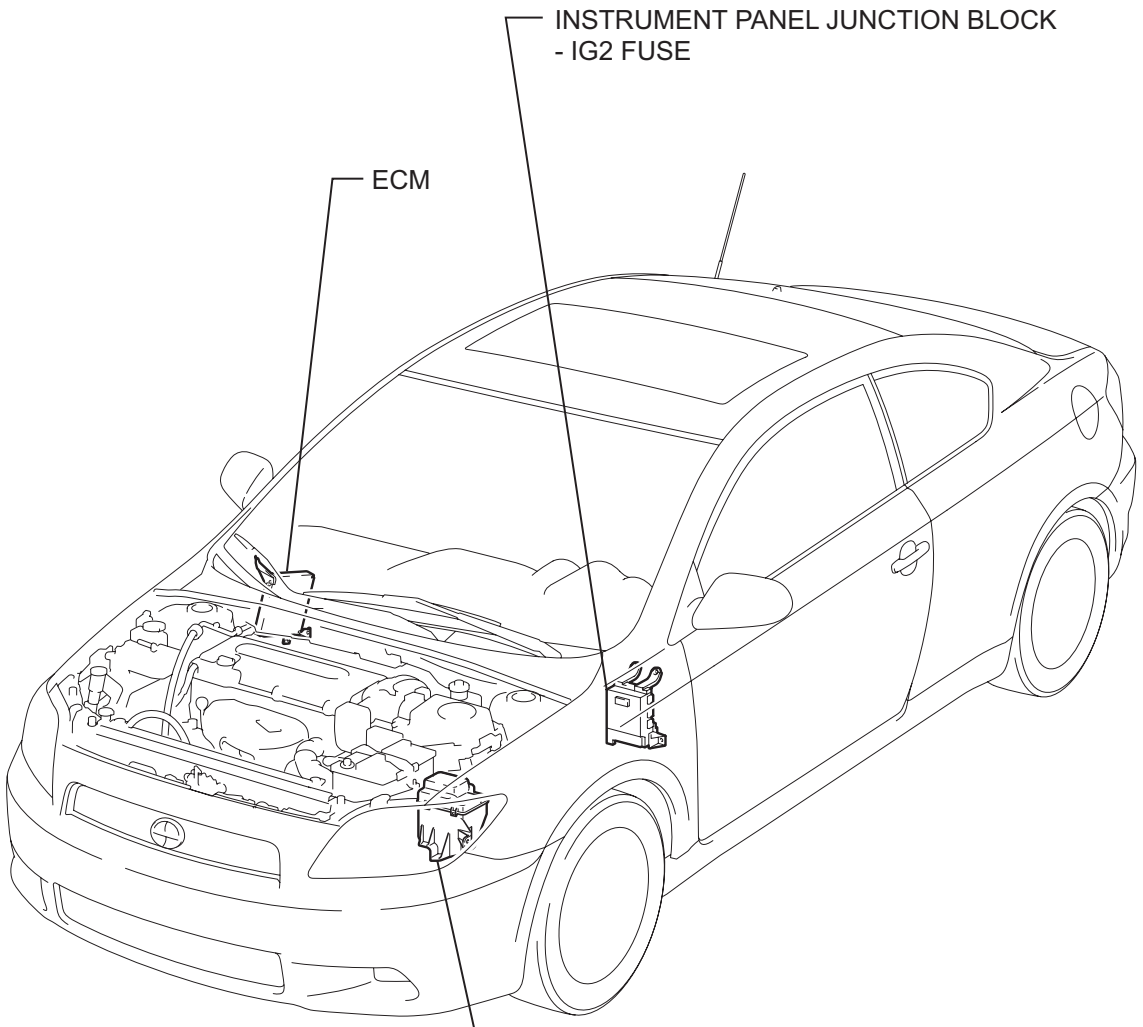
1. INSTALL HIGH PITCHED HORN

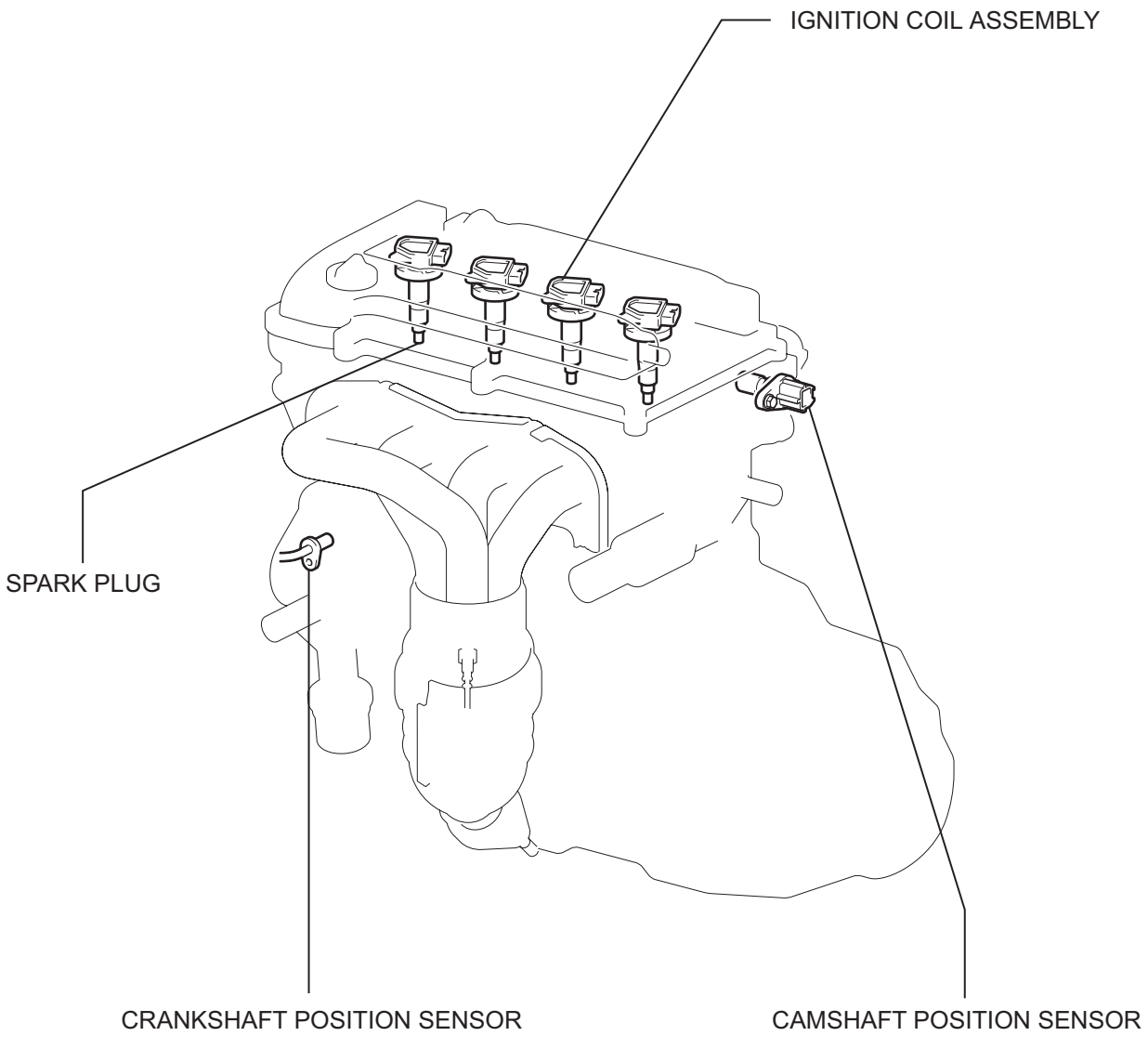
(a) Attach the horn stay to the body panel and then install the horn with the bolt.
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)

(b) Connect the connector.

IGNITION SYSTEM

PARTS LOCATION





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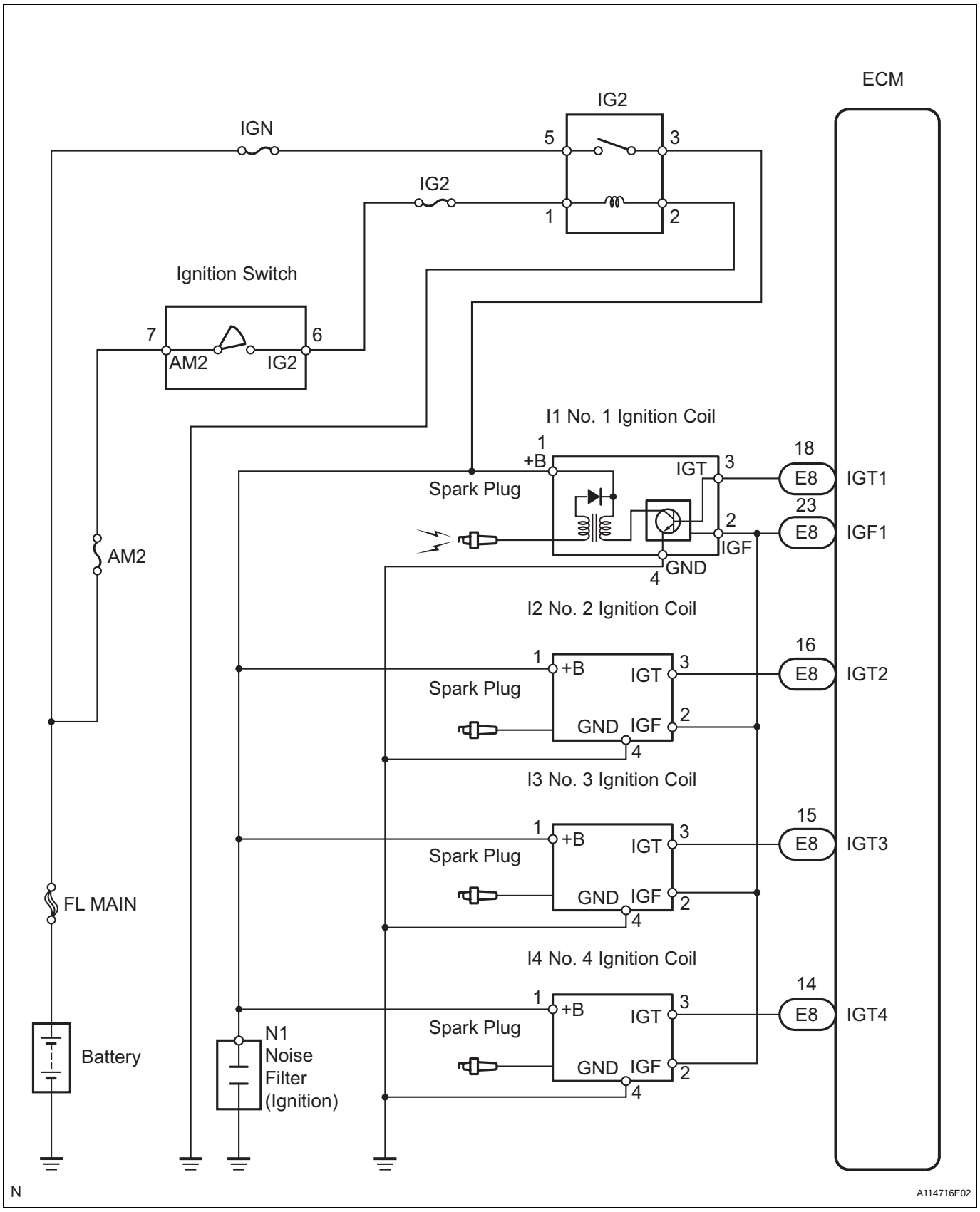
SYSTEM DIAGRAM



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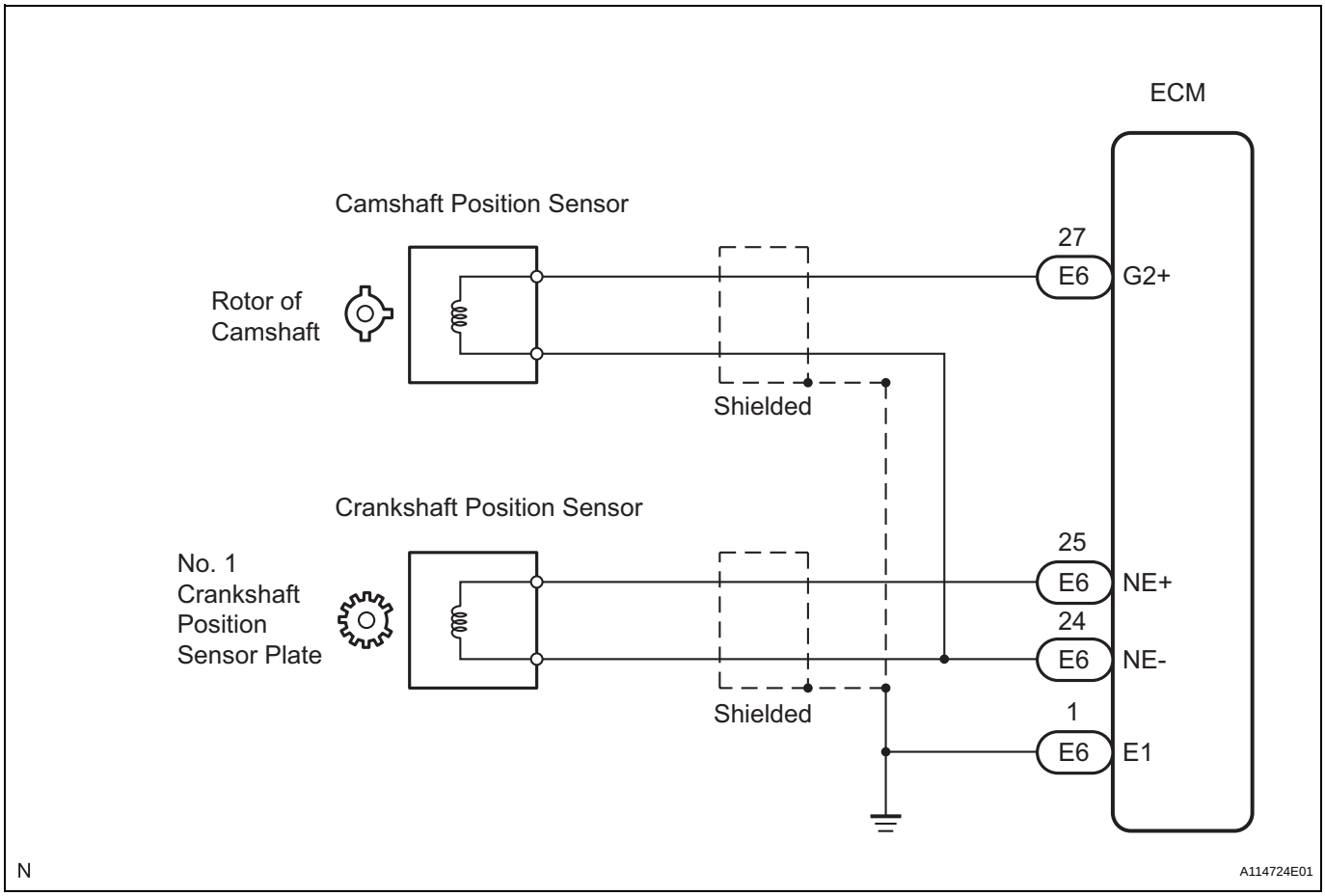

ECM
Camshaft Position Sensor
Rotor of Camshaft
27
E6
G2+
Shielded
Crankshaft Position Sensor
No. 1 Crankshaft Position Sensor Plate
25
E6
NE+
24
E6
NE-
Shielded
1
E6
E1
N
A114724E01

ON-VEHICLE INSPECTION

1. INSPECT IGNITION COIL ASSEMBLY AND SPARK TEST

NOTICE:

In this section, the terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately -10 to 50°C (14 to 122°F). "Hot" means approximately 50 to 100°C (122 to 212°F).

(a) Check the DTCs.

NOTICE:

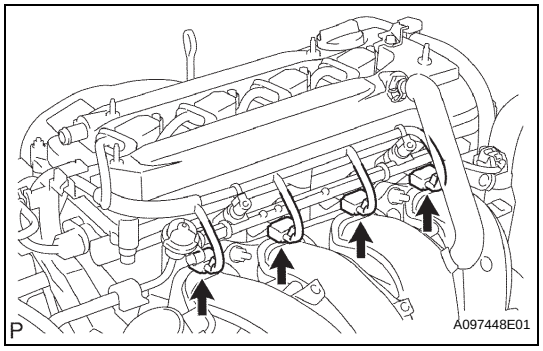
If a DTC is present, perform troubleshooting in accordance with the procedure for that DTC.

(b) Check that sparks occur.

(1) Remove the No. 1 engine cover.

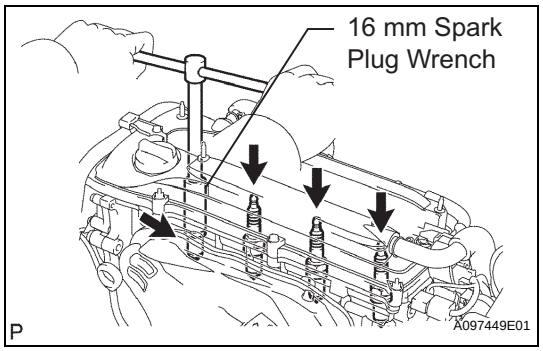
(2) Remove the ignition coil.

(3) Disconnect the 4 fuel injector connectors.



(4) Using a 16 mm spark plug wrench, remove the 4 spark plugs.

Torque: 19 N*m (195 kgf*cm, 14 ft.*lbf)



(5) Install each spark plug into an ignition coil, and then connect the ignition coil connectors.

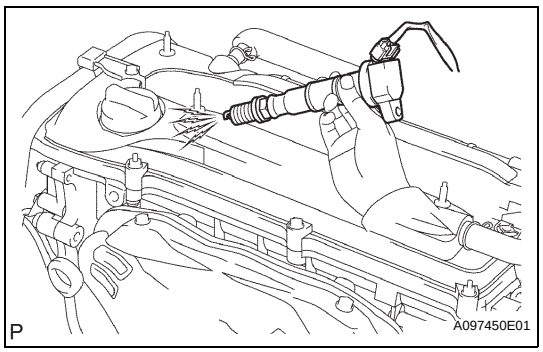
(6) Ground the spark plugs.

(7) Check that a spark occurs at each spark plug while the engine is being cranked.

NOTICE:

- **Be sure to ground the spark plugs when checking.**
- **Replace the ignition coil if a physical impact is felt while holding the spark plug.**
- **Do not crank the engine for more than 2 seconds.**

If spark do not occur, perform the following procedures.



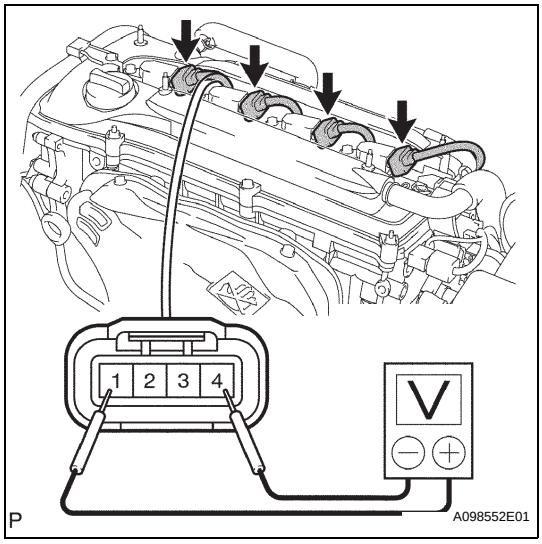
(c) Perform the spark test according to the flowchart below.

(1) Perform spark test on each ignition coil.

1. Replace the ignition coil with a normal one.
2. Perform the spark test again.

Result

Result	Proceed to
OK	Replace ignition coil
NG	Go to next step



(2) Check the power supply to the ignition coil.

1. Disconnect the ignition coil connector.
2. Turn the ignition switch ON.
3. Measure the voltage of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
1 (+B) - 4 (GND)	9.0 to 14 V

Result

Result	Proceed to
NG	Check wire harness and connector
OK	Go to next step

(3) Measure the resistance of the camshaft position sensor.

Result

Temperature	Specified Condition
Cold	835 to 1,400 Ω
Hot	1,060 to 1,645 Ω

Result

Result	Proceed to
NG	Replace camshaft position sensor
OK	Go to next step

(4) Measure the resistance of the crankshaft position sensor.

Result

Temperature	Specified Condition
Cold	985 to 1,600 Ω
Hot	1,265 to 1,890 Ω

Result

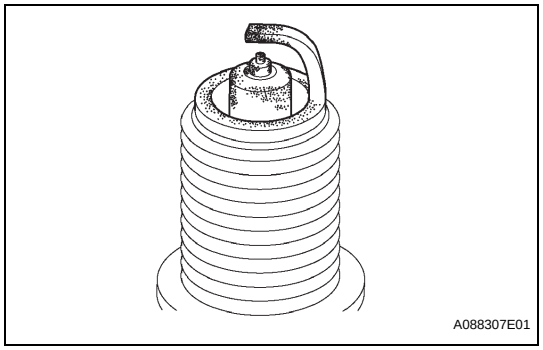
Result	Proceed to
NG	Replace crankshaft position sensor
OK	Go to next step

(5) Check IGT signal from the ECM.

Result

Result	Proceed to
NG	Replace ECM
OK	Repair wire harness or connector

IG

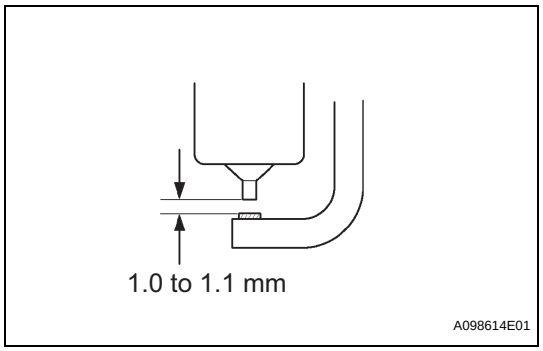

A088307E01

2. INSPECT SPARK PLUG

(a) Check the appearance.

(1) Check the spark plug for any damage on its thread and insulator.
If there is any damage, replace the spark plug.
Recommended spark plug:

Manufacturer	Product
DENSO	SK20R11
NGK	IFR6A11

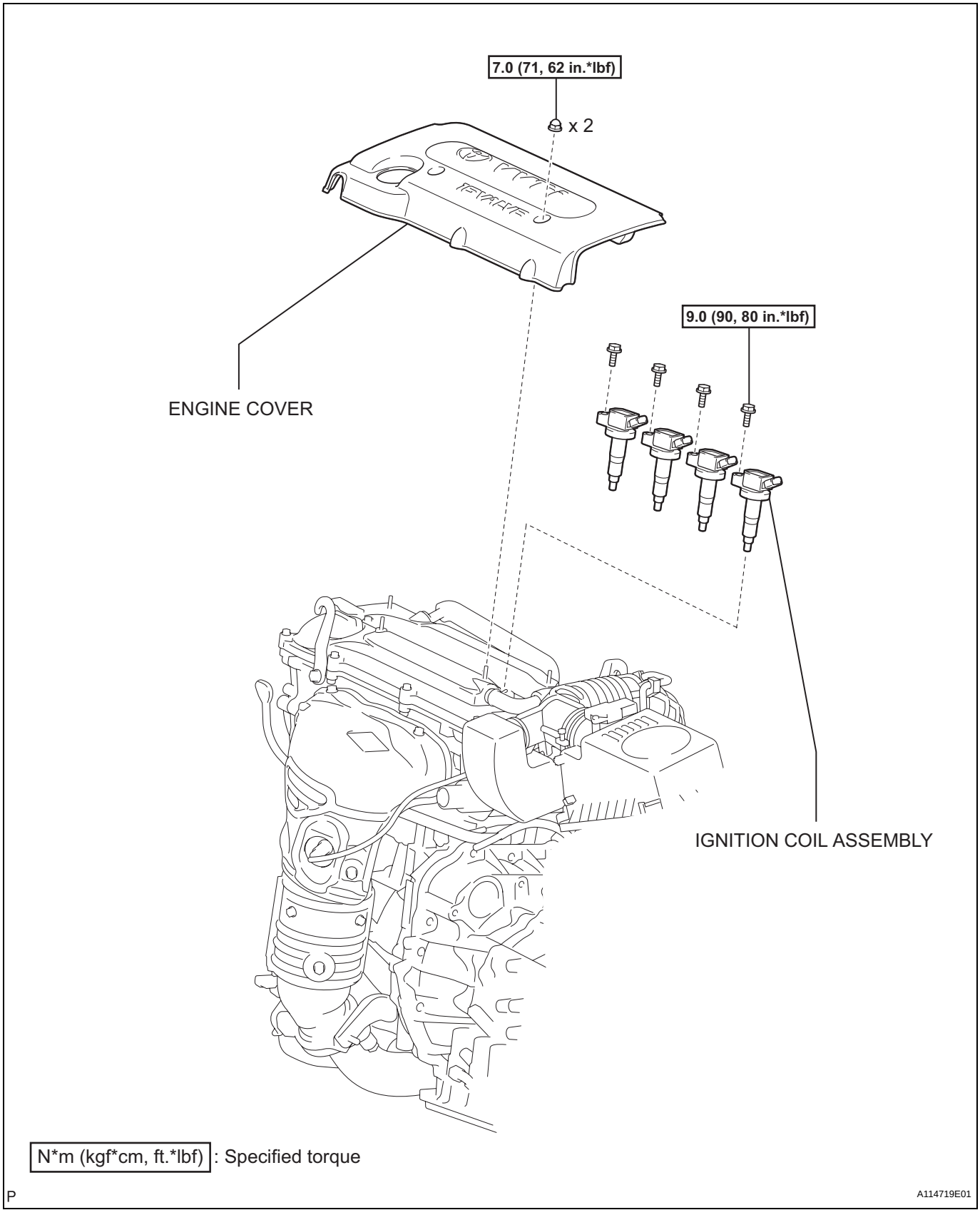


A098614E01

(b) Check the electrode gap.
Standard electrode gap:
1.0 to 1.1 mm (0.039 to 0.043 in.) for new spark plug
Maximum electrode gap:
1.3 mm (0.051 in.) for used spark plug
If the electrode gap is greater than the maximum, replace the spark plug.

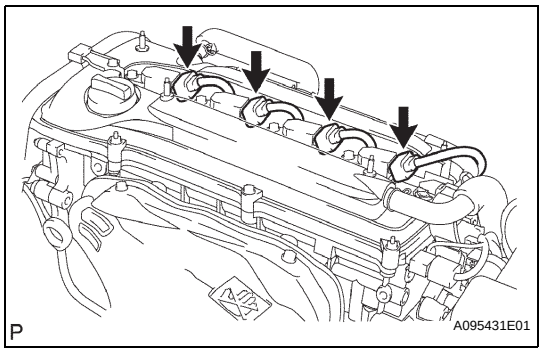
IGNITION COIL

COMPONENTS

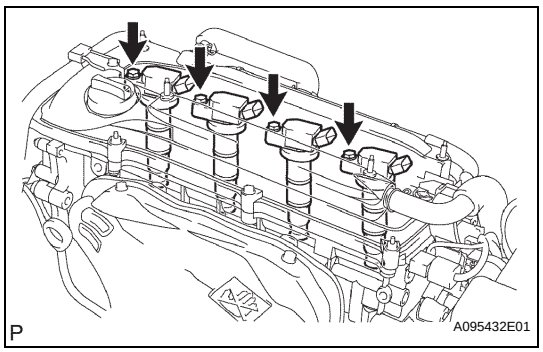


REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE ENGINE COVER (See page ES-382)**
3. **REMOVE IGNITION COIL ASSEMBLY**
   (a) Disconnect the 4 ignition coil connectors.

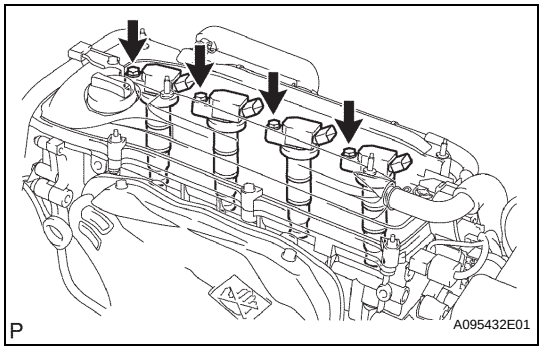


   (b) Remove the 4 bolts and 4 ignition coils.

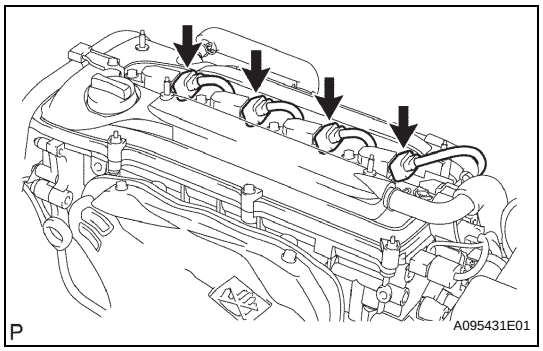


INSTALLATION

1. **INSTALL IGNITION COIL ASSEMBLY**
   (a) Install the 4 ignition coil with the 4 bolts.
   Torque: 9.0 N*m (90 kgf*cm, 80 in.*lbf)



   (b) Connect the 4 ignition coil connectors.



2. **INSTALL ENGINE COVER (See page ES-389)**
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
4. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

IG

UPPER INSTRUMENT PANEL

PRECAUTION

1. PRECAUTION FOR VEHICLE WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

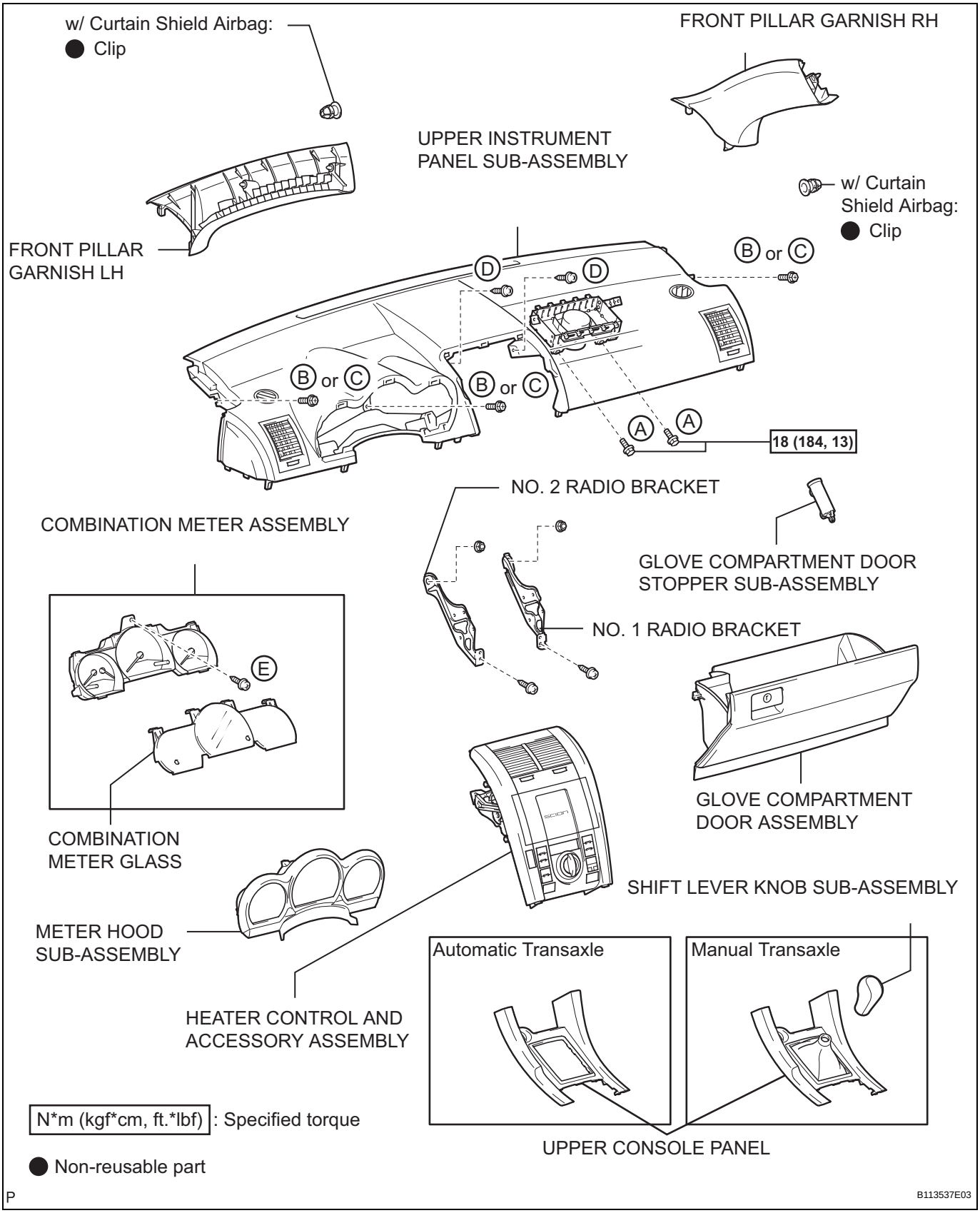
(a) Some operations in this section may affect the SRS airbags. Prior to performing the corresponding operations, read the SRS airbag NOTICE (See page RS-1).

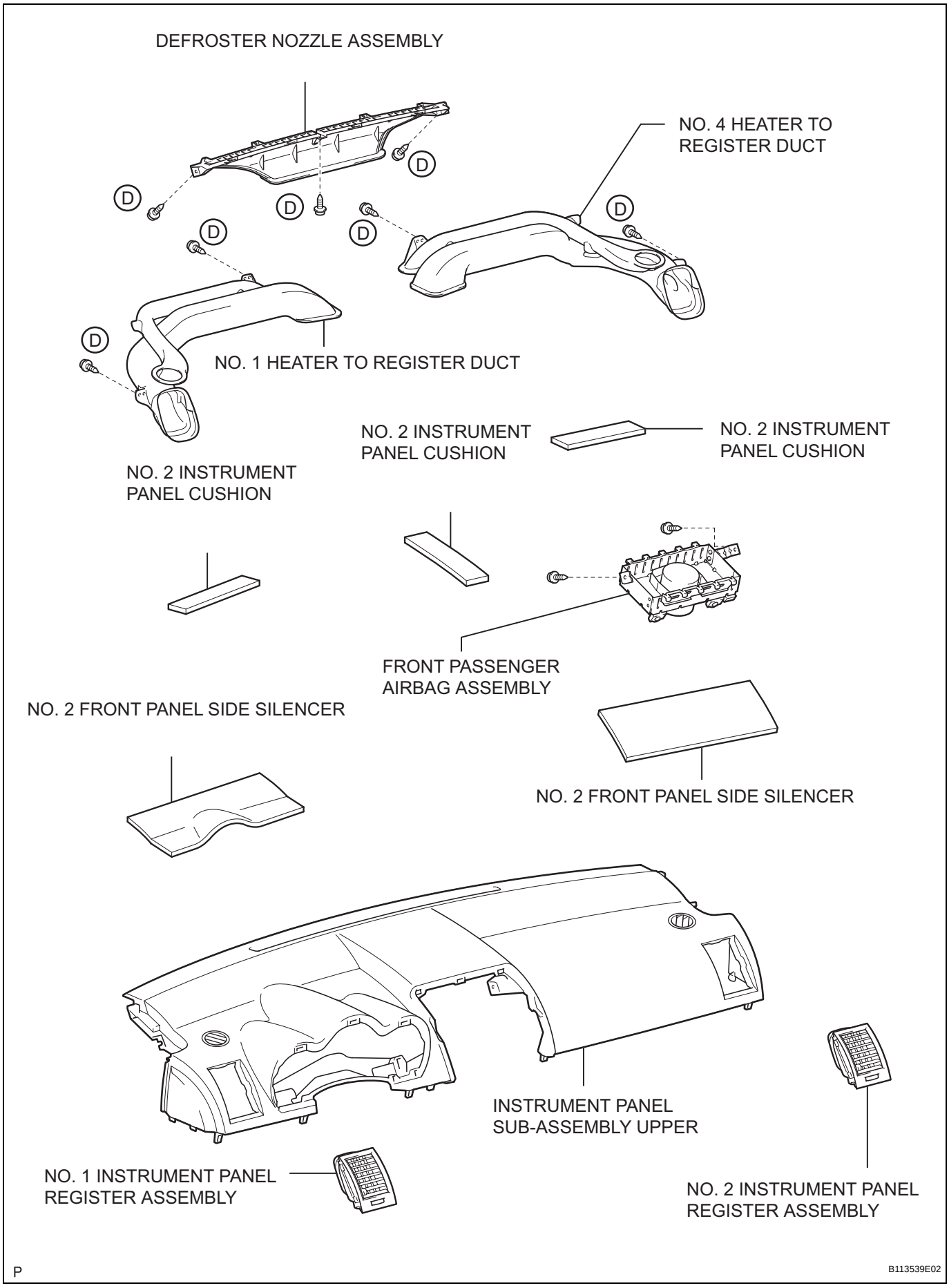
NOTICE:

When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

System Name	See Procedure
Power Window Control System	WS-5
Sliding Roof System	RF-3

COMPONENTS


w/ Curtain Shield Airbag:
● Clip
FRONT PILLAR GARNISH RH
UPPER INSTRUMENT PANEL SUB-ASSEMBLY
w/ Curtain Shield Airbag:
● Clip
FRONT PILLAR GARNISH LH
B or C
D
A
18 (184, 13)
NO. 2 RADIO BRACKET
COMBINATION METER ASSEMBLY
GLOVE COMPARTMENT DOOR STOPPER SUB-ASSEMBLY
NO. 1 RADIO BRACKET
E
GLOVE COMPARTMENT DOOR ASSEMBLY
COMBINATION METER GLASS
SHIFT LEVER KNOB SUB-ASSEMBLY
METER HOOD SUB-ASSEMBLY
Automatic Transaxle
Manual Transaxle
HEATER CONTROL AND ACCESSORY ASSEMBLY
UPPER CONSOLE PANEL
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
P
B113537E03

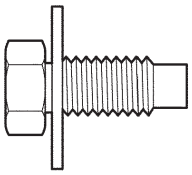
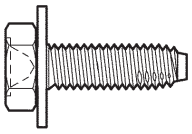
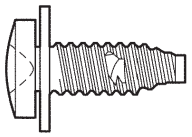
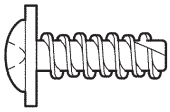
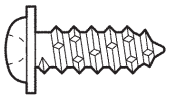

DEFROSTER NOZZLE ASSEMBLY
NO. 4 HEATER TO REGISTER DUCT
D
NO. 1 HEATER TO REGISTER DUCT
NO. 2 INSTRUMENT PANEL CUSHION
NO. 2 INSTRUMENT PANEL CUSHION
NO. 2 INSTRUMENT PANEL CUSHION
FRONT PASSENGER AIRBAG ASSEMBLY
NO. 2 FRONT PANEL SIDE SILENCER
NO. 2 FRONT PANEL SIDE SILENCER
INSTRUMENT PANEL SUB-ASSEMBLY UPPER
NO. 1 INSTRUMENT PANEL REGISTER ASSEMBLY
NO. 2 INSTRUMENT PANEL REGISTER ASSEMBLY
P
B113539E02

IP

REMOVAL

1. BOLT, SCREW AND NUT TABLE

HINT:
All bolts, screws and nuts relevant to installing and removing the instrument panel are shown along with their alphabet code in the table below.

Code	Shape	Code	Shape	Code	Shape
<A>	 φ= 8 (0.32) L = 20 (0.79) 91633-60820	<B>	 φ= 6 (0.24) L = 20 (0.79) 90159-60610	<C>	 φ= 7 (0.28) L = 20 (0.79) 90159-70004
<D>	 φ= 5 (0.20) L = 14 (0.55) 93568-55014	<E>	 φ= 5 (0.20) L = 16 (0.63) 93567-15016		

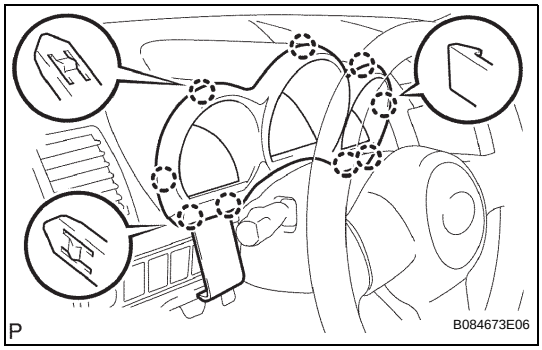
mm (in.) (L = Length)

P B086148E01

IP

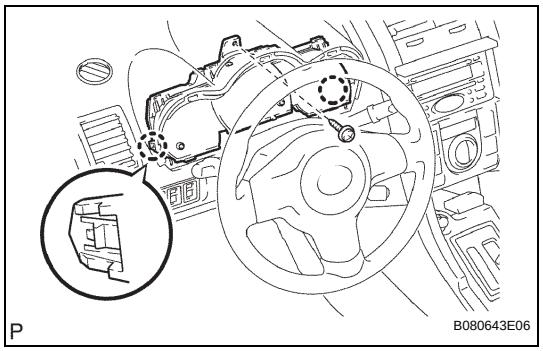
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



3. REMOVE METER HOOD SUB-ASSEMBLY

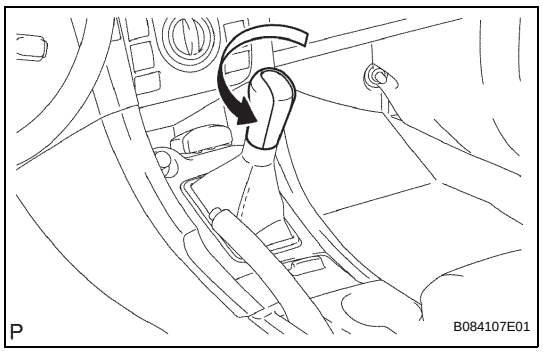
(a) Tilt the steering column assembly down as far as possible.
(b) Using a moulding remover, detach the 9 claws.
HINT:
Tape the moulding remover tip before use.
(c) Remove the meter hood.



4. REMOVE COMBINATION METER ASSEMBLY

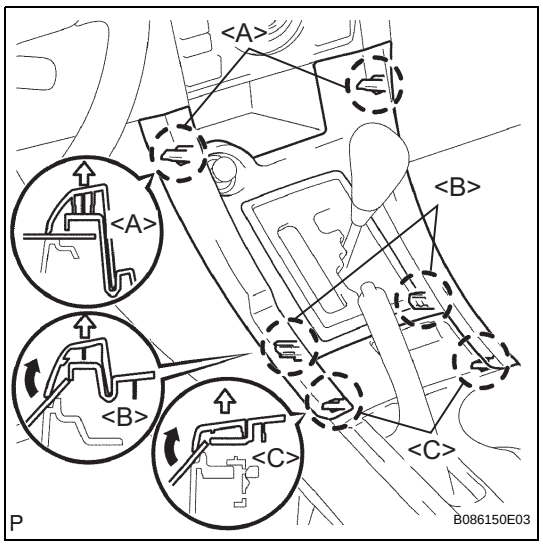
(a) Remove the screw, and detach the 2 claws.

(b) Remove the combination meter and disconnect the connector.



5. REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (Manual Transaxle)

(a) Turn the shift lever knob counterclockwise and remove the shift lever knob.

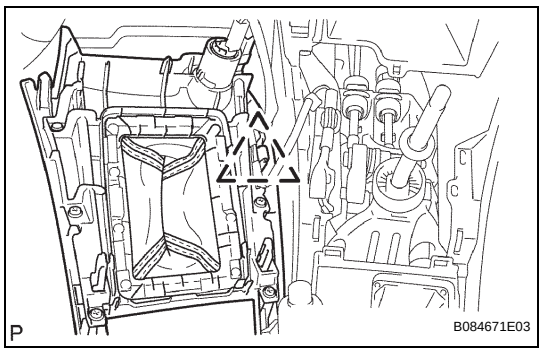


6. REMOVE UPPER CONSOLE PANEL

(a) Using a moulding remover, detach the 6 claws.
HINT:
Tape the moulding remover tip before use.

(b) Disconnect the connector.

(c) Remove the clamp and console panel.



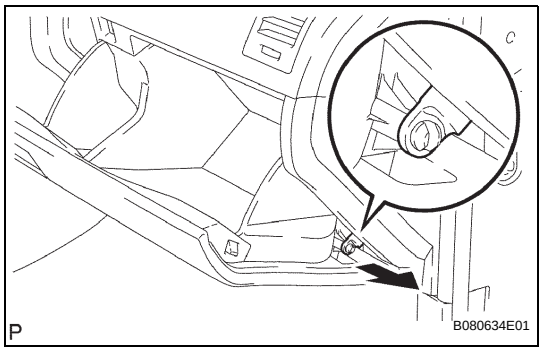
7. REMOVE HEATER CONTROL AND ACCESSORY ASSEMBLY

8. REMOVE NO. 1 RADIO BRACKET

(a) Remove the nut, screw and No. 1 radio bracket.

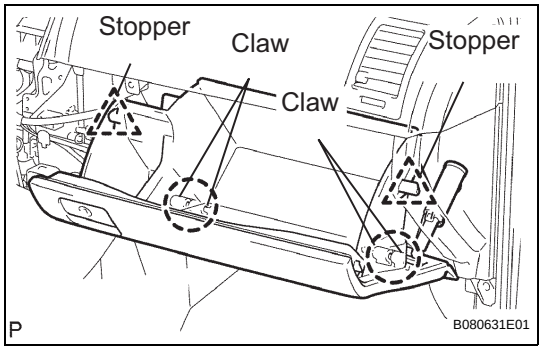
9. REMOVE NO. 2 RADIO BRACKET

(a) Remove the nut, screw and No. 2 radio bracket.



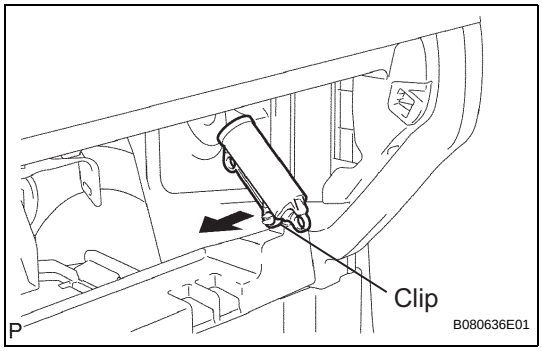
10. REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY

(a) Disconnect the glove compartment door stopper from the glove compartment door.



(b) Slightly press in on the upper sides of the glove compartment door assembly to release the 2 stoppers.

(c) Detach the 4 claws and remove the glove compartment door.



11. REMOVE GLOVE COMPARTMENT DOOR STOPPER SUB-ASSEMBLY

(a) Detach the clip and remove the glove compartment door stopper.

12. REMOVE FRONT PILLAR GARNISH LH (w/o Curtain Shield Airbag) (See page IR-12)

13. REMOVE FRONT PILLAR GARNISH LH (w/ Curtain Shield Airbag) (See page IR-12)

14. REMOVE FRONT PILLAR GARNISH RH (w/o Curtain Shield Airbag)

HINT:
Use the same procedures for the RH side and LH side.

15. REMOVE FRONT PILLAR GARNISH RH (w/ Curtain Shield Airbag)

HINT:
Use the same procedures for the RH side and LH side.

16. DISCONNECT PASSENGER AIRBAG CONNECTOR

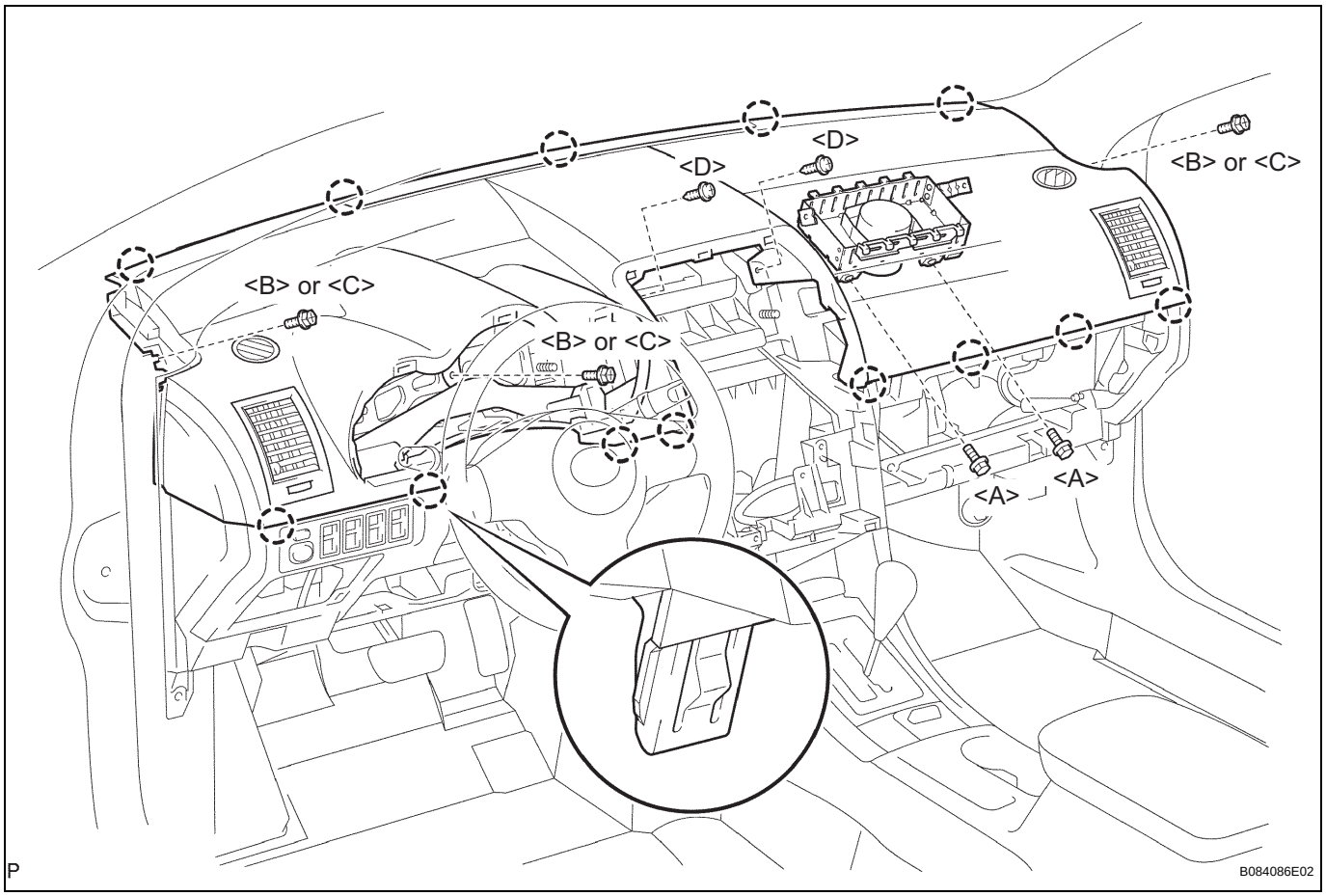
17. REMOVE UPPER INSTRUMENT PANEL SUB-ASSEMBLY

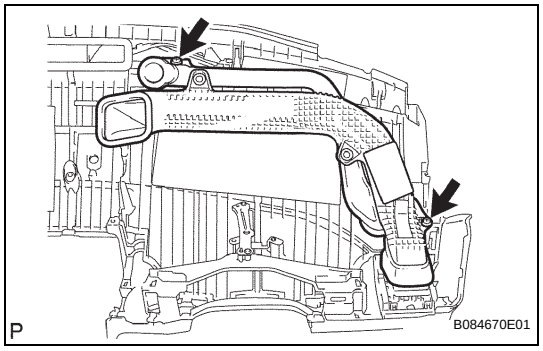
(a) Remove the 5 screws and 2 bolts.

(b) Detach the 13 claws.

IP

(c) Pull the upper instrument panel rearward to remove it.

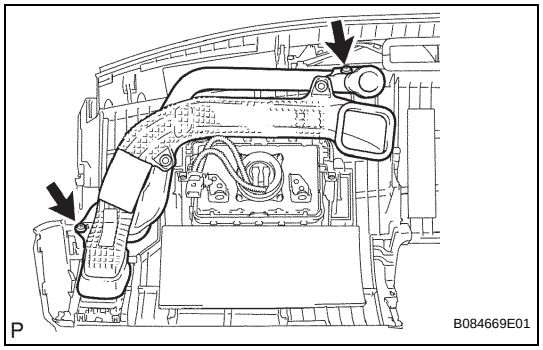




DISASSEMBLY

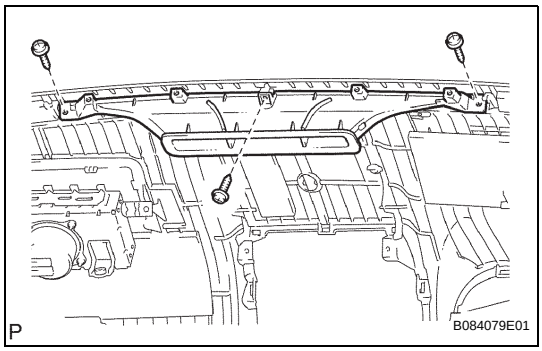
1. REMOVE NO. 1 HEATER TO REGISTER DUCT

(a) Remove the 2 screws and No. 1 heater to register duct.



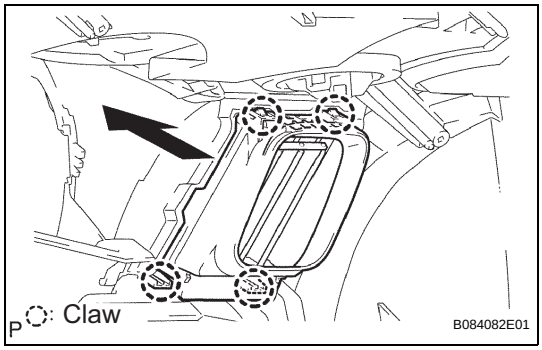
2. REMOVE NO. 4 HEATER TO REGISTER DUCT

(a) Remove the 2 screws and No. 4 heater to register duct.



3. REMOVE DEFROSTER NOZZLE ASSEMBLY

(a) Remove the 3 screws and the defroster nozzle assembly.



4. REMOVE NO. 1 INSTRUMENT PANEL REGISTER ASSEMBLY

(a) Detach the 4 claws, then remove the No. 1 instrument panel register assembly.

5. REMOVE NO. 2 INSTRUMENT PANEL REGISTER ASSEMBLY

HINT:

Use the same procedures for the No. 2 instrument panel register assembly and No. 1 instrument panel register assembly.

6. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

(a) Remove the front passenger airbag (see page RS-367).

7. REMOVE NO. 2 INSTRUMENT PANEL CUSHION

8. REMOVE NO. 2 FRONT PANEL SIDE SILENCER

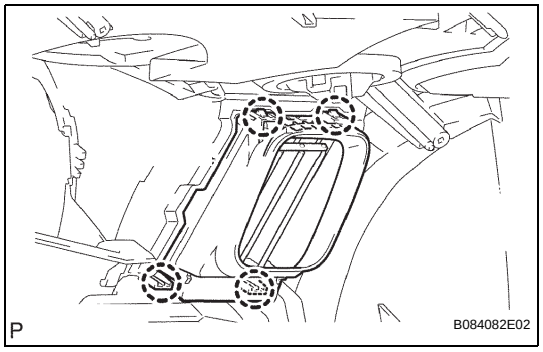
REASSEMBLY

1. INSTALL NO. 2 FRONT PANEL SIDE SILENCER

2. INSTALL NO. 2 INSTRUMENT PANEL CUSHION

3. INSTALL FRONT PASSENGER AIRBAG ASSEMBLY

(a) Install the front passenger airbag (see page RS-11).



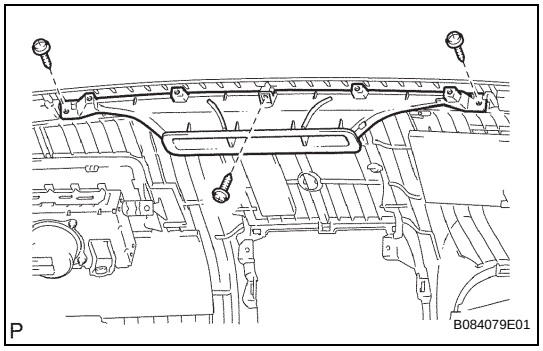
4. INSTALL NO. 1 INSTRUMENT PANEL REGISTER ASSEMBLY

(a) Attach the 4 claws to install the No. 2 instrument panel register.

5. INSTALL NO. 2 INSTRUMENT PANEL REGISTER ASSEMBLY

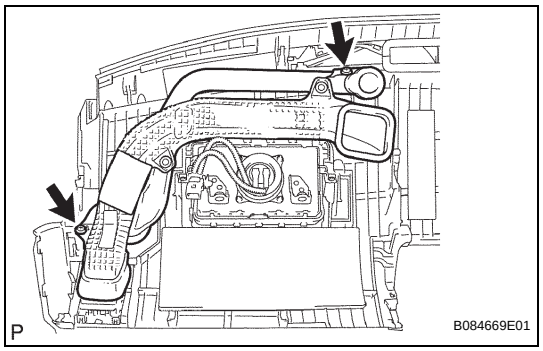
HINT:

Use the same procedures for the No. 2 instrument panel register and No. 1 instrument panel register.



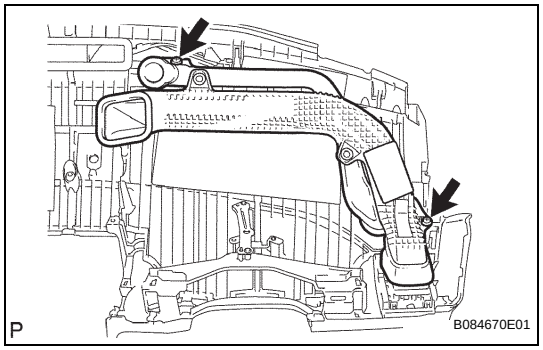
6. INSTALL DEFROSTER NOZZLE ASSEMBLY

(a) Install the defroster nozzle with the 3 screws.



7. INSTALL NO. 4 HEATER TO REGISTER DUCT

(a) Install the No. 4 heater to register duct with the 2 screws.



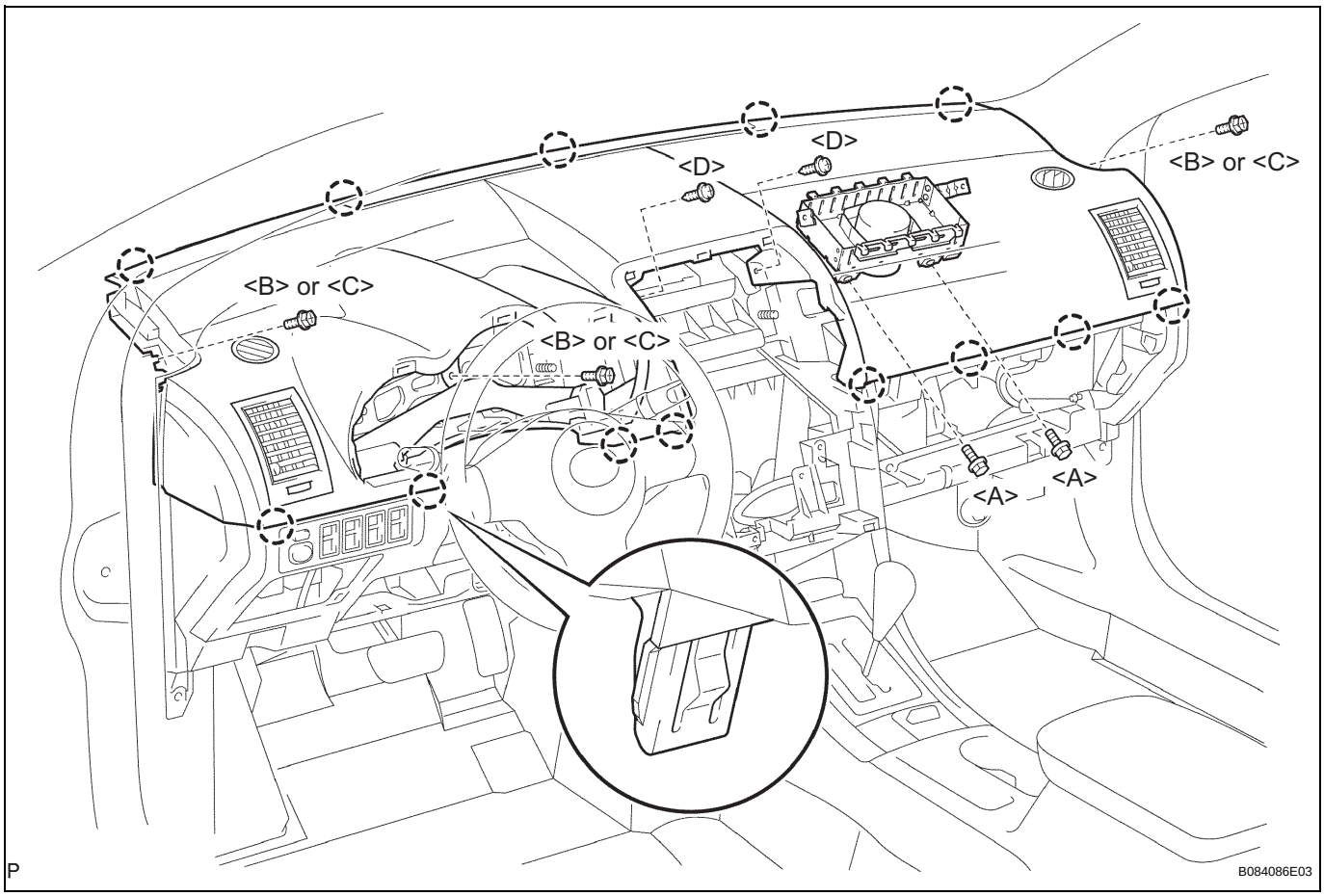
8. INSTALL NO. 1 HEATER TO REGISTER DUCT

(a) Install the No. 1 heater to register duct with the 2 screws.

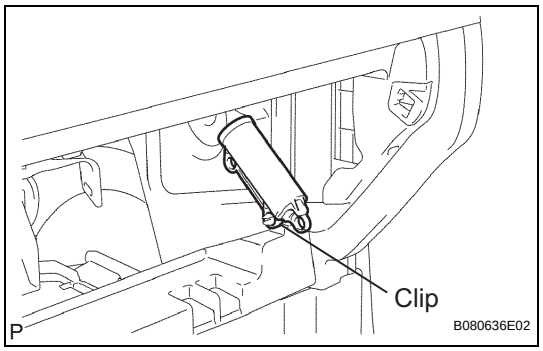
IP

INSTALLATION

1. **INSTALL UPPER INSTRUMENT PANEL SUB-ASSEMBLY**
   (a) Detach the 13 claws to install the upper instrument panel.
   (b) Install the 5 screws and 2 bolts.
   Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf) for Bolt

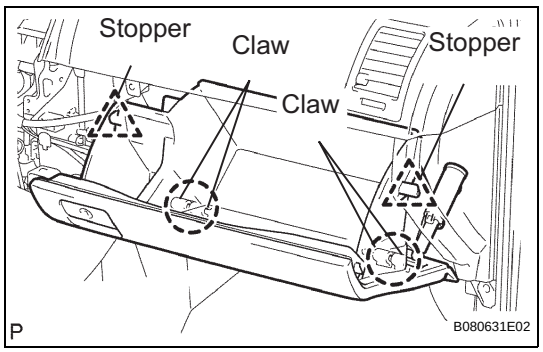


2. **INSTALL PASSENGER AIRBAG CONNECTOR**
3. **INSTALL FRONT PILLAR GARNISH LH (w/o Curtain Shield Airbag) (See page IR-17)**
4. **INSTALL FRONT PILLAR GARNISH LH (w/ Curtain Shield Airbag) (See page IR-17)**
5. **INSTALL FRONT PILLAR GARNISH RH (w/o Curtain Shield Airbag)**
   HINT:
   Use the same procedures for the RH side and LH side.
6. **INSTALL FRONT PILLAR GARNISH RH (w/ Curtain Shield Airbag)**
   HINT:
   Use the same procedures for the RH side and LH side.



7. INSTALL GLOVE COMPARTMENT DOOR STOPPER SUB-ASSEMBLY

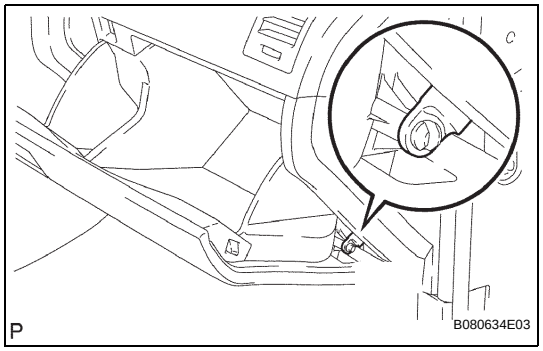
(a) Attach the claw to install the glove compartment door



8. INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY

(a) Attach the 4 claws to install the glove compartment door assembly.

(b) Slightly press in on the upper sides of the glove compartment door assembly to engage the 2 stoppers.



(c) Connect the glove compartment door stopper to the glove compartment door assembly.

9. INSTALL NO. 1 RADIO BRACKET

(a) Install the No. 1 radio bracket with the nut and screw.

10. INSTALL NO. 2 RADIO BRACKET

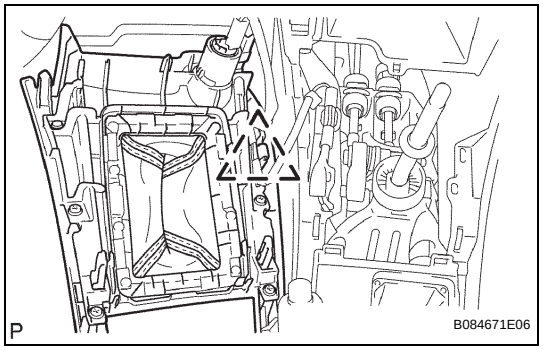
(a) Install the No. 2 radio bracket with the nut and screw.

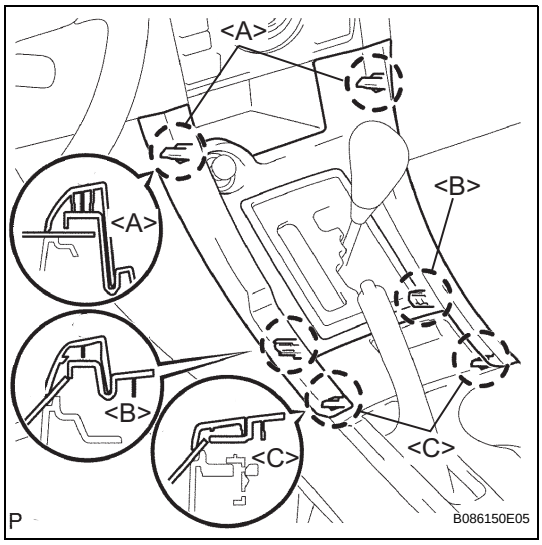
11. INSTALL HEATER CONTROL AND ACCESSORY ASSEMBLY

12. INSTALL UPPER CONSOLE PANEL

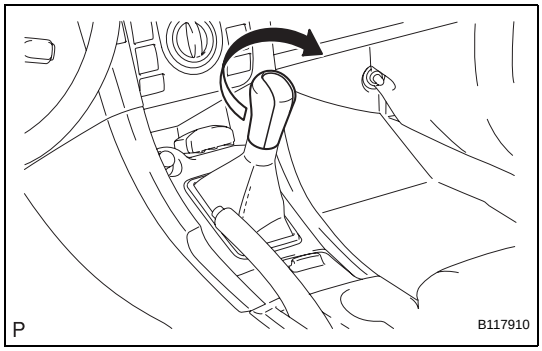
(a) Install the clamp and console panel.

(b) Connect the connector.





(c) Attach the 6 claws to install the console panel.

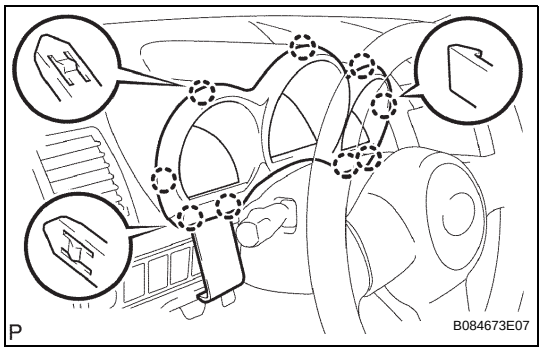


13. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (Manual Transaxle)

(a) Turn the shift lever knob clockwise and install the shift lever knob.

14. INSTALL COMBINATION METER ASSEMBLY

(a) Connect the connector.
(b) Attach the 2 claws to install the combination meter.
(c) Install the screw.



15. INSTALL METER HOOD SUB-ASSEMBLY

(a) Attach the 9 claws to install the meter hood.

16. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

17. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

18. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

LOWER INSTRUMENT PANEL

PRECAUTION

1. PRECAUTION FOR VEHICLE WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

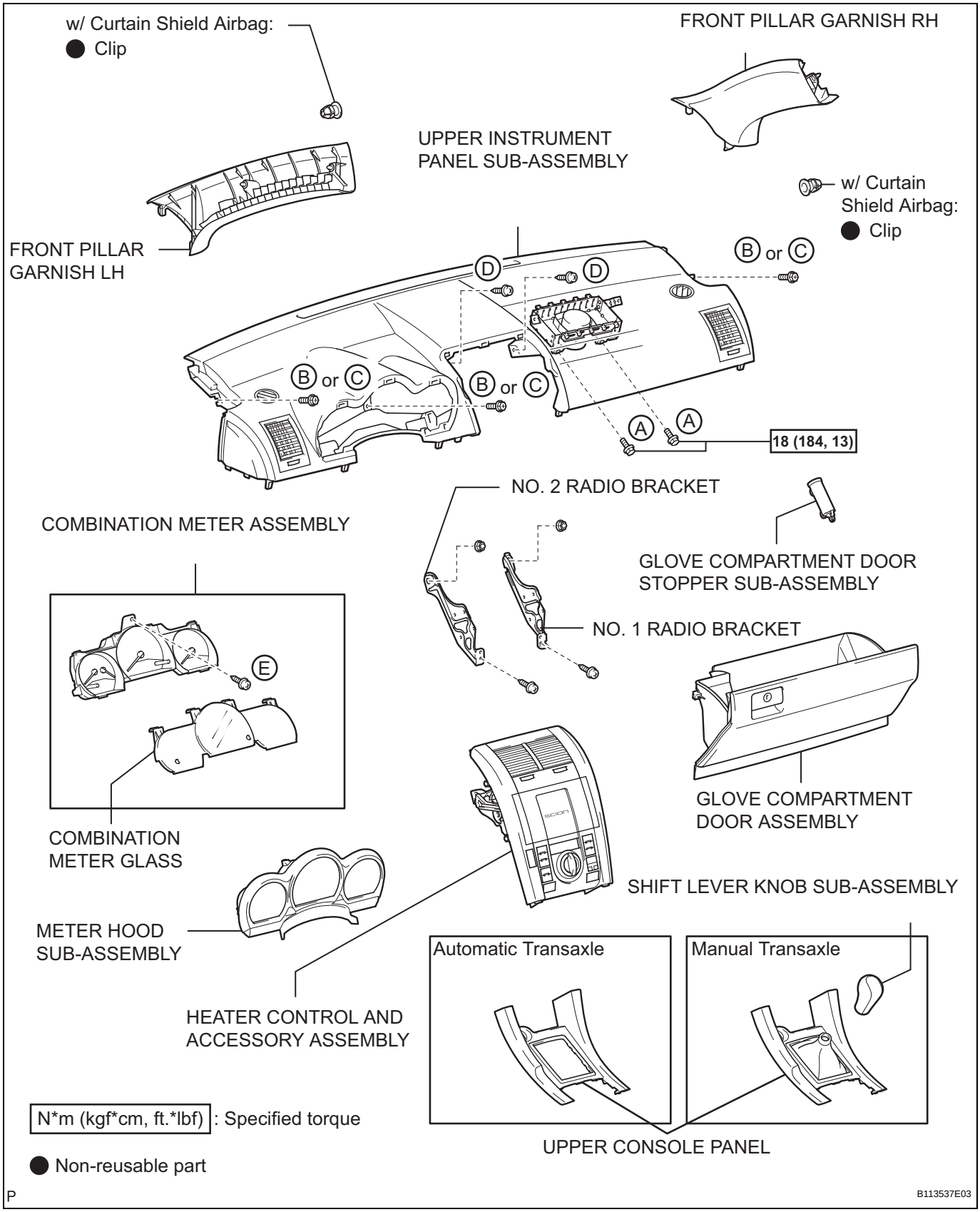
(a) Some operations in this section may affect the SRS airbags. Prior to performing the corresponding operations, read the SRS airbag NOTICE (See page RS-1).

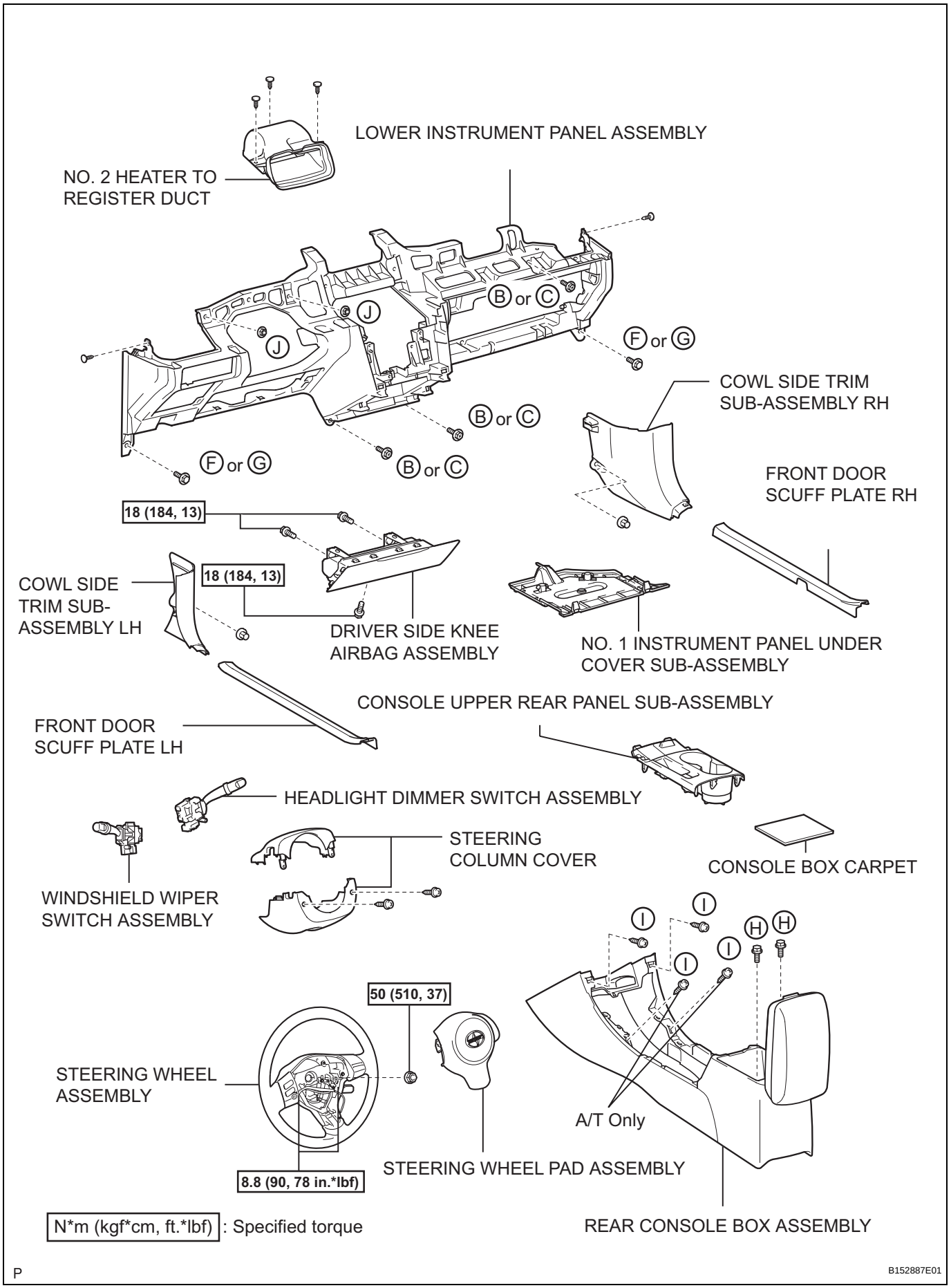
NOTICE:

When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

System Name	See Procedure
Power Window Control System	WS-5
Sliding Roof System	RF-3

COMPONENTS

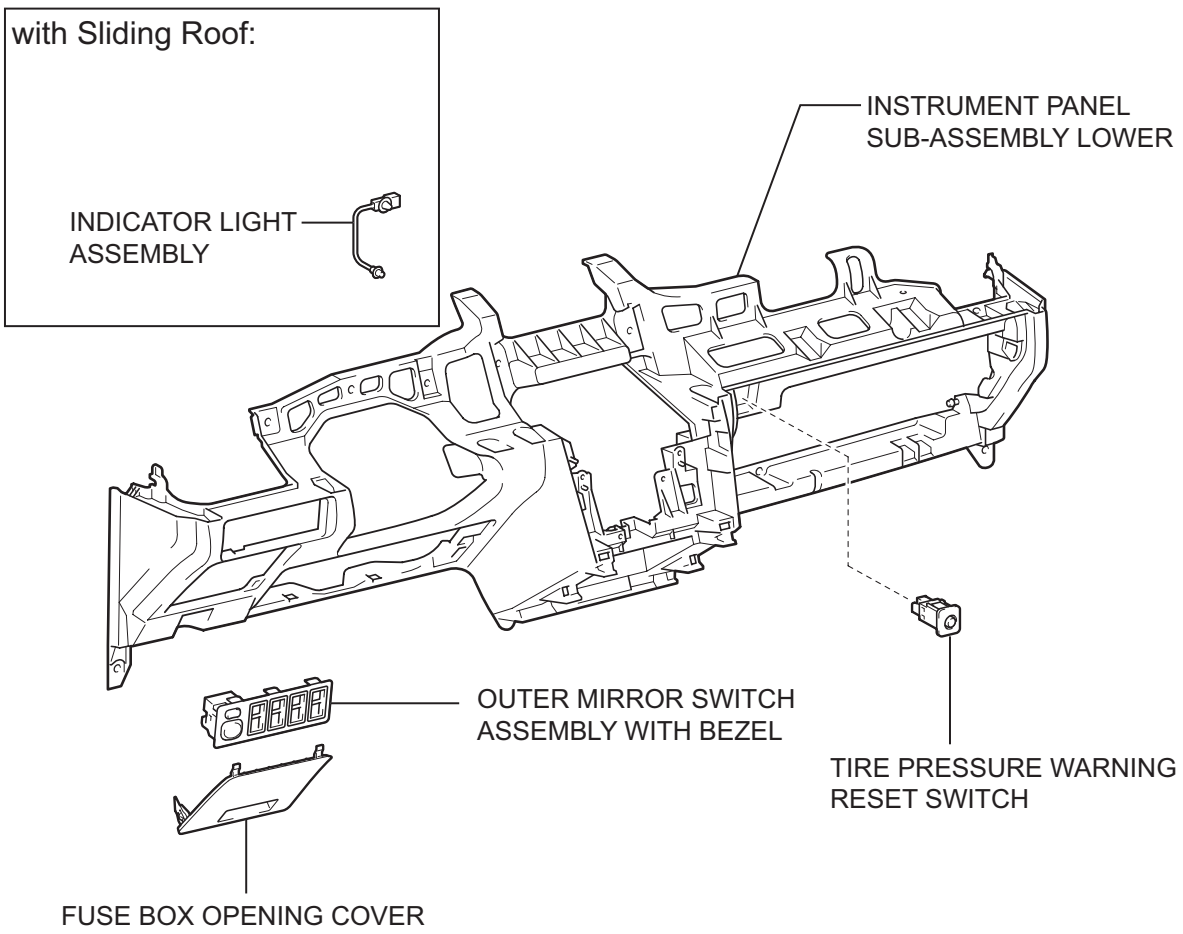

w/ Curtain Shield Airbag:
● Clip
FRONT PILLAR GARNISH RH
UPPER INSTRUMENT PANEL SUB-ASSEMBLY
w/ Curtain Shield Airbag:
● Clip
FRONT PILLAR GARNISH LH
B or C
D
A
18 (184, 13)
NO. 2 RADIO BRACKET
COMBINATION METER ASSEMBLY
GLOVE COMPARTMENT DOOR STOPPER SUB-ASSEMBLY
NO. 1 RADIO BRACKET
E
GLOVE COMPARTMENT DOOR ASSEMBLY
COMBINATION METER GLASS
SHIFT LEVER KNOB SUB-ASSEMBLY
METER HOOD SUB-ASSEMBLY
Automatic Transaxle
Manual Transaxle
HEATER CONTROL AND ACCESSORY ASSEMBLY
UPPER CONSOLE PANEL
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
P
B113537E03



IP

P

B152887E01


with Sliding Roof:
INDICATOR LIGHT ASSEMBLY
INSTRUMENT PANEL SUB-ASSEMBLY LOWER
OUTER MIRROR SWITCH ASSEMBLY WITH BEZEL
TIRE PRESSURE WARNING RESET SWITCH
FUSE BOX OPENING COVER
P
B113540E04

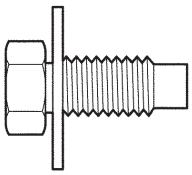
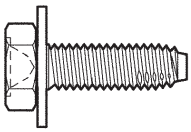
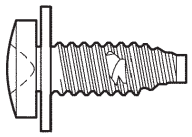
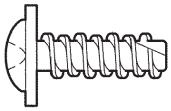
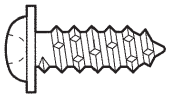
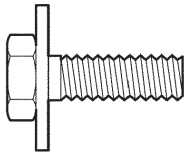
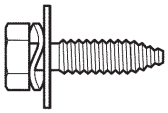
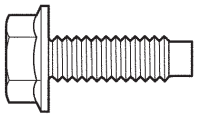
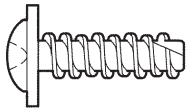
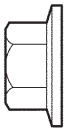
REMOVAL

1. BOLT, SCREW AND NUT TABLE

HINT:

All bolts, screws and nuts relevant to installing and removing the instrument panel are shown along with their alphabet code in the table below.

mm (in.) (L=Length)

Code	Shape	Code	Shape	Code	Shape
<A>	 φ = 8 (0.32) L = 20 (0.79) 91633-60820	<B>	 φ = 6 (0.24) L = 20 (0.79) 90159-60610	<C>	 φ = 7 (0.28) L = 20 (0.79) 90159-70004
<D>	 φ = 5 (0.20) L = 14 (0.55) 93568-55014	<E>	 φ = 5 (0.20) L = 16 (0.63) 93567-15016	<F>	 φ = 6 (0.24) L = 16 (0.63) 91635-60616
<G>	 φ = 6 (0.24) L = 20 (0.79) 90119-06077	<H>	 φ = 6 (0.24) L = 16 (0.63) 91553-80616	<I>	 φ = 5 (0.20) L = 16 (0.63) 93568-55016
<J>	 φ = 6 (0.24) 90179-06026				

B086147E02

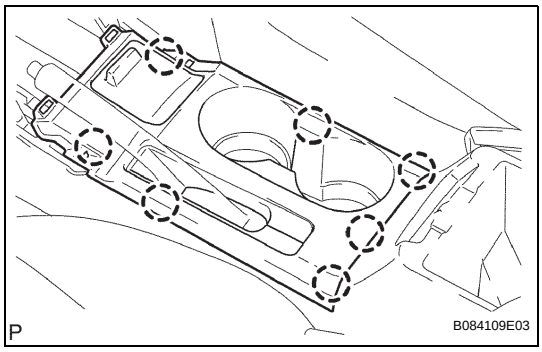
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

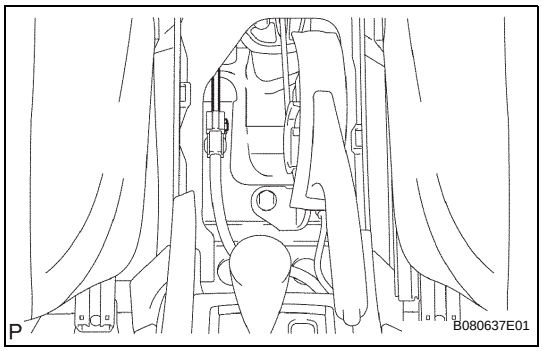
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

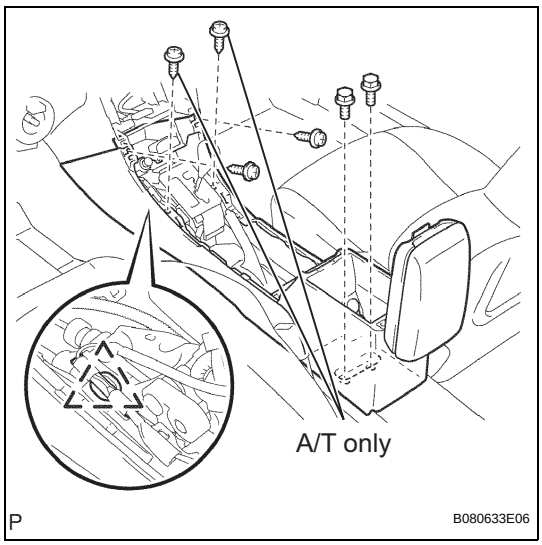
IP

3. **REMOVE UPPER INSTRUMENT PANEL SUB-ASSEMBLY**
   (a) Remove the upper instrument panel (see page IP-4).
4. **REMOVE STEERING WHEEL PAD ASSEMBLY (See page RS-345)**
5. **REMOVE STEERING WHEEL ASSEMBLY (See page SR-8)**
6. **REMOVE STEERING COLUMN COVER (See page SR-8)**
7. **REMOVE HEADLIGHT DIMMER SWITCH ASSEMBLY (See page LI-41)**
8. **REMOVE WINDSHIELD WIPER SWITCH ASSEMBLY (See page WW-12)**
9. **REMOVE CONSOLE UPPER REAR PANEL SUB-ASSEMBLY**
   (a) Detach the 7 claws and remove the console upper rear panel.

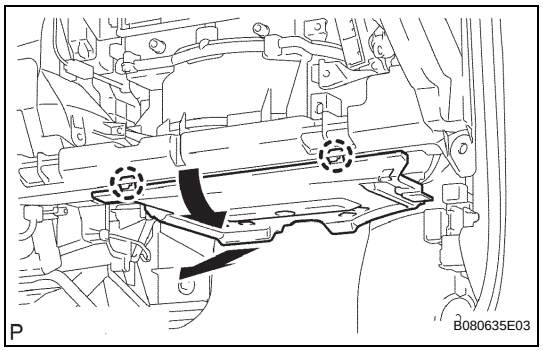


10. **REMOVE REAR CONSOLE BOX ASSEMBLY**
    (a) Disconnect the connector.
    (b) Remove the console box carpet.





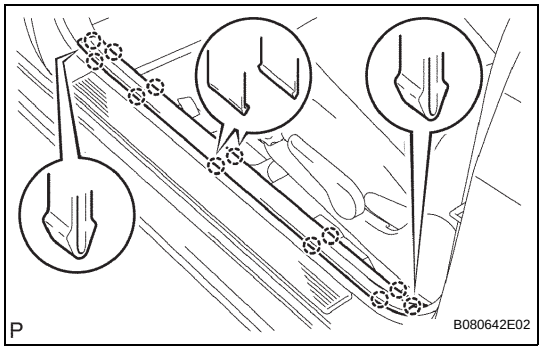
   (c) Manual transaxle:
   Remove the 2 screws.
   (d) Automatic transaxle:
   Remove the 4 screws.
   (e) Remove the 2 bolts.
   (f) Remove the clamp and console box, and disconnect the connector.
11. **REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY**
    (a) Remove the driver side knee airbag (see page RS-359).



12. REMOVE NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

(a) Detach the 2 claws.

(b) Remove the instrument panel under cover, as shown in the illustration.



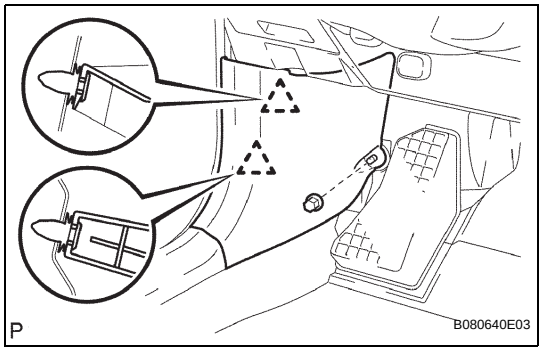
13. REMOVE FRONT DOOR SCUFF PLATE LH

(a) Detach the 12 claws and remove the front door scuff plate.

14. REMOVE FRONT DOOR SCUFF PLATE RH

HINT:

Use the same procedures for the RH side and LH side.



15. REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH

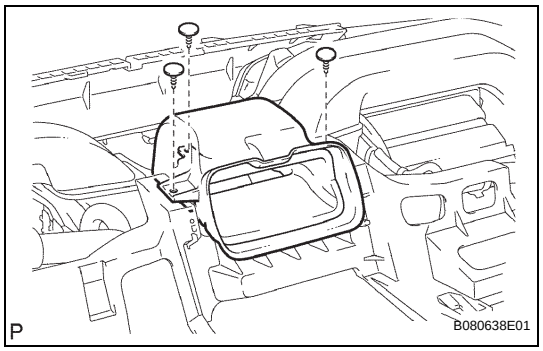
(a) Remove the clip.

(b) Remove the 2 clips and cowl side trim.

16. REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH

HINT:

Use the same procedures for the RH side and LH side.



17. REMOVE NO. 2 HEATER TO REGISTER DUCT

(a) Remove the 3 clips, and No. 2 heater to register duct.

18. REMOVE LOWER INSTRUMENT PANEL ASSEMBLY

(a) Disconnect the hood lock control cable.

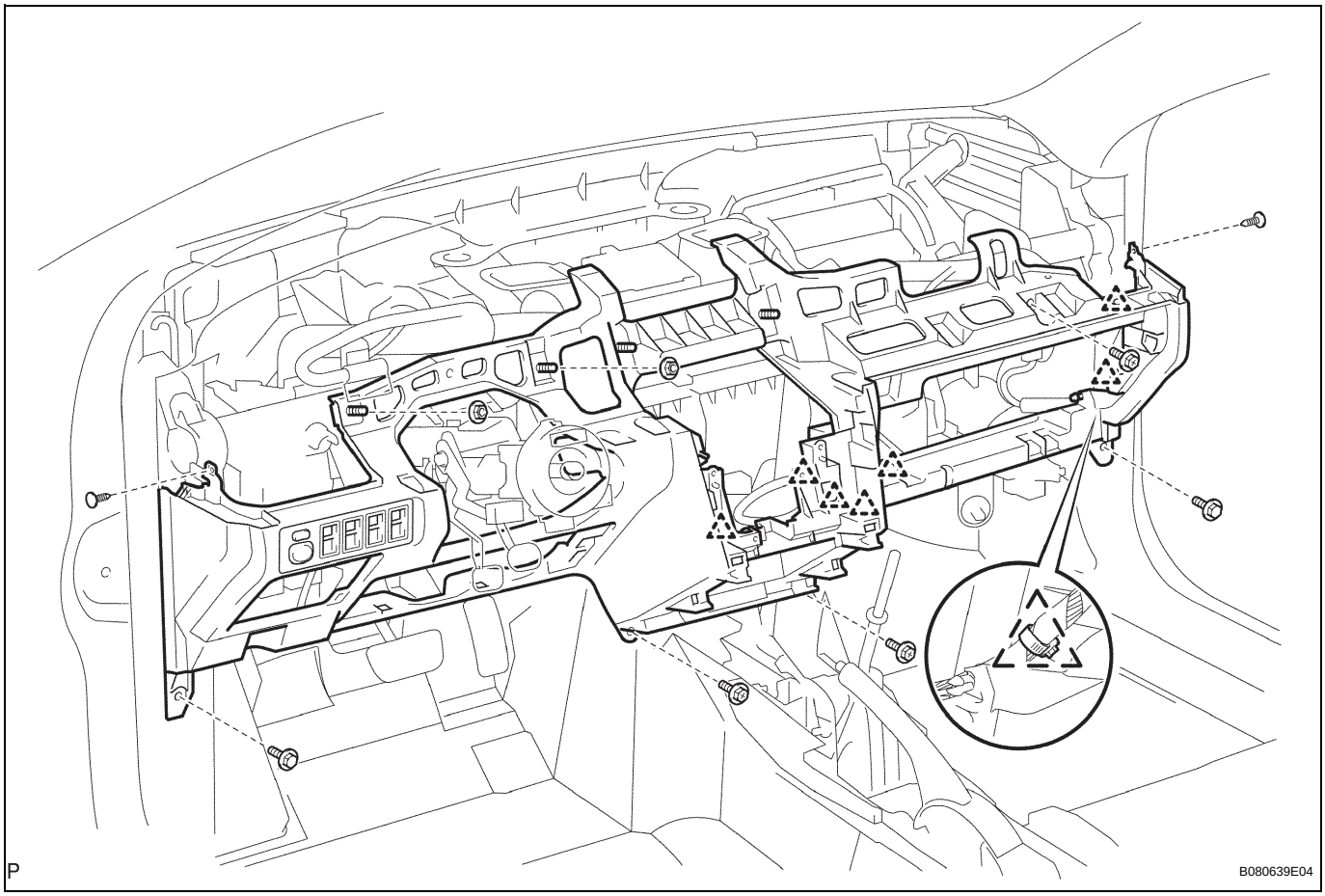
(b) Remove the 3 screws, 2 bolts and 2 nuts.

(c) Remove the 2 clips.

(d) Detach the 7 wire harness clamps.

(e) Disconnect the 3 connectors.

(f) Pull the lower instrument panel toward the rear of the vehicle, and check that the wire harnesses are not caught, and then remove the lower instrument panel.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DISASSEMBLY

1. **REMOVE FUSE BOX OPENING COVER**
2. **REMOVE OUTER MIRROR SWITCH ASSEMBLY WITH BEZEL**
3. **REMOVE TIRE PRESSURE WARNING RESET SWITCH**
4. **REMOVE INDICATOR LIGHT ASSEMBLY (w/ Sliding Roof)**
5. **REMOVE INSTRUMENT PANEL SUB-ASSEMBLY LOWER**

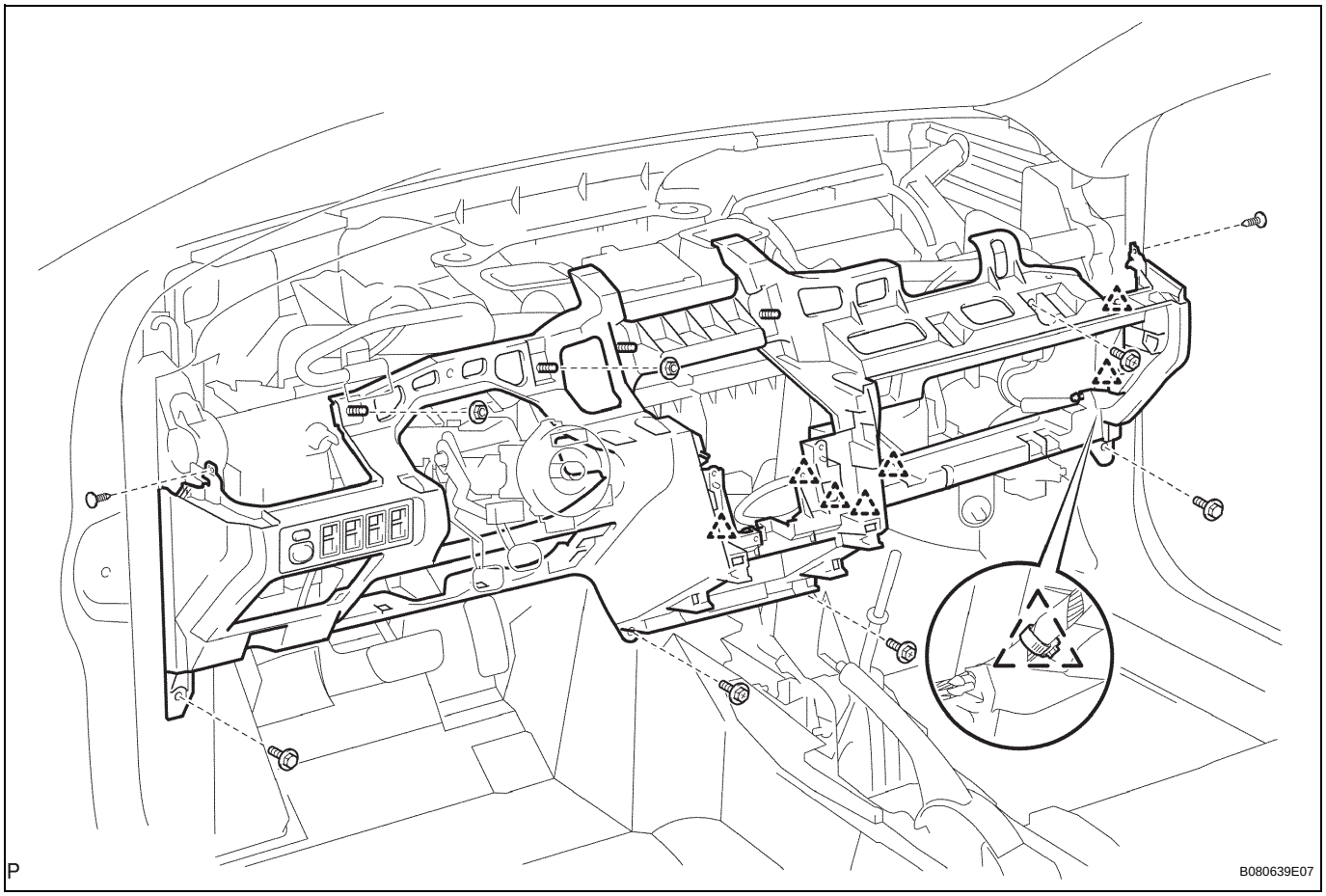
REASSEMBLY

1. **INSTALL STEREO JACK ADAPTER ASSEMBLY**
2. **INSTALL INSTRUMENT PANEL SUB-ASSEMBLY LOWER**
3. **INSTALL INDICATOR LIGHT ASSEMBLY (w/ Sliding Roof)**
4. **INSTALL TIRE PRESSURE WARNING RESET SWITCH**
5. **INSTALL OUTER MIRROR SWITCH ASSEMBLY WITH BEZEL**
6. **INSTALL FUSE BOX OPENING COVER**

INSTALLATION

1. INSTALL LOWER INSTRUMENT PANEL ASSEMBLY

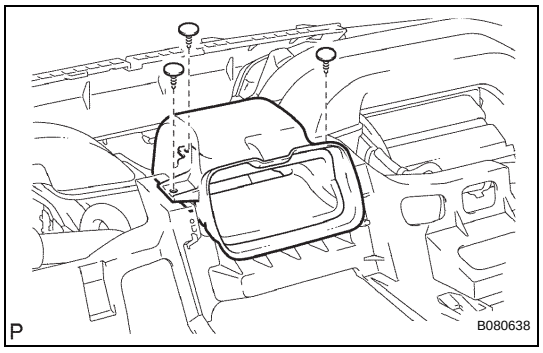
(a) Install the lower instrument panel, and check that the wire harness are not caught.

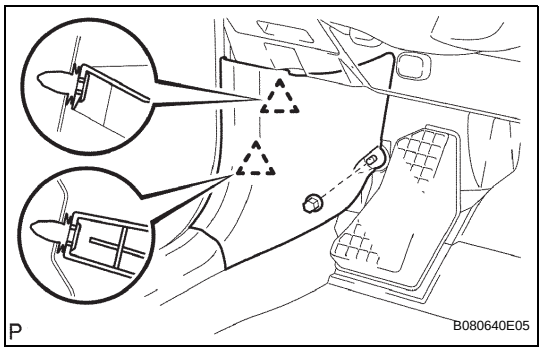


(b) Connect the 3 connectors.
(c) Attach the 7 wire harness clamps.
(d) Install the 2 clips.
(e) Install the 3 screws, 2 bolts and 2 nuts.
(f) Connect the hood lock control cable.

2. INSTALL NO. 2 HEATER TO REGISTER DUCT

(a) Install the No. 2 heater to register duct with the 3 clips.





3. INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH

(a) Attach the 2 clips to install the cowl side trim.
(b) Install the clip.

4. INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH

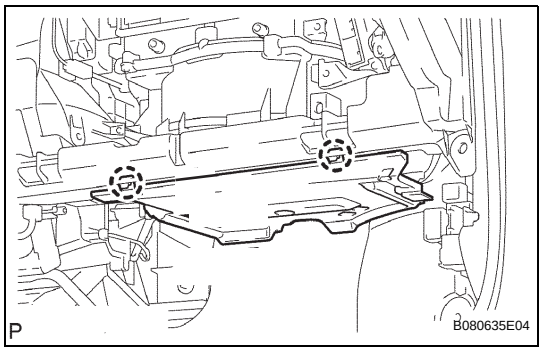
HINT:
Use the same procedures for the RH side and LH side.

5. INSTALL FRONT DOOR SCUFF PLATE LH

(a) Attach the 12 claws to install the front door scuff plate LH.

6. INSTALL FRONT DOOR SCUFF PLATE RH

HINT:
Use the same procedures for the RH side and LH side.

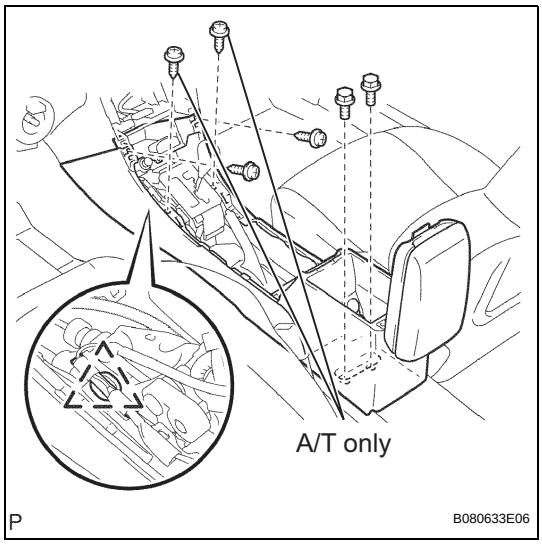


7. INSTALL NO. 1 INSTRUMENT PANEL UNDER COVER SUB-ASSEMBLY

(a) Install the instrument panel under cover, as shown in the illustration.
(b) Attach the 2 claws.

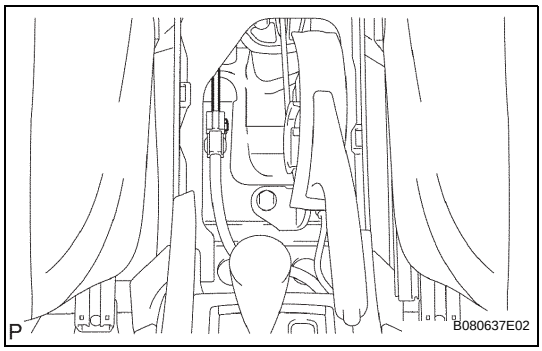
8. INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY

(a) Install the driver side knee airbag (see page RS-358).



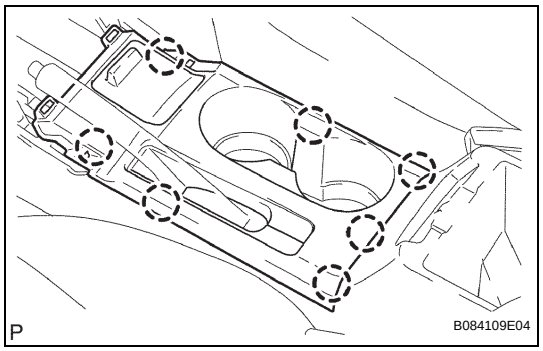
9. INSTALL REAR CONSOLE BOX ASSEMBLY

(a) Connect the clamp and install the console box.
(b) Install the 2 bolts.
(c) Manual transaxle:
Install the 2 screws.
(d) Automatic transaxle:
Install the 4 screws.



(e) Install the console box carpet.
(f) Connect the connector.

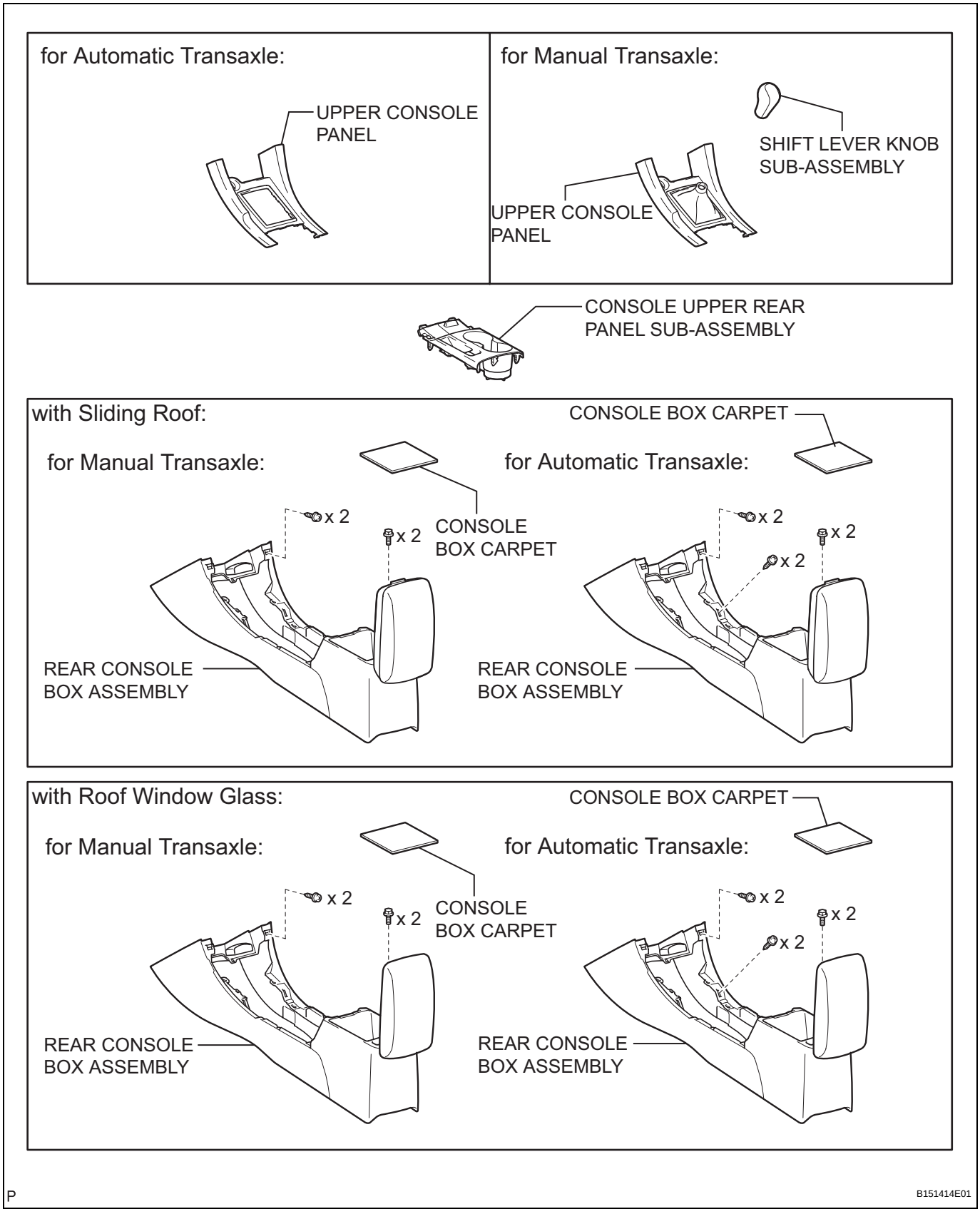
IP



10. **INSTALL CONSOLE UPPER REAR PANEL SUB-ASSEMBLY**
    (a) Attach the 7 claws to install the console upper rear panel.
11. **INSTALL WINDSHIELD WIPER SWITCH ASSEMBLY (See page WW-13)**
12. **INSTALL HEADLAMP DIMMER SWITCH ASSEMBLY (See page LI-42)**
13. **INSTALL STEERING COLUMN COVER**
14. **INSTALL STEERING WHEEL ASSEMBLY (See page SR-15)**
15. **INSTALL STEERING WHEEL PAD ASSEMBLY (See page RS-346)**
16. **INSTALL UPPER INSTRUMENT PANEL ASSEMBLY**
    (a) Install the upper instrument panel (see page IP-9).
17. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
18. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
19. **CHECK SRS WARNING LIGHT**
    (a) Check the SRS warning light (see page RS-11).

REAR CONSOLE BOX

COMPONENTS



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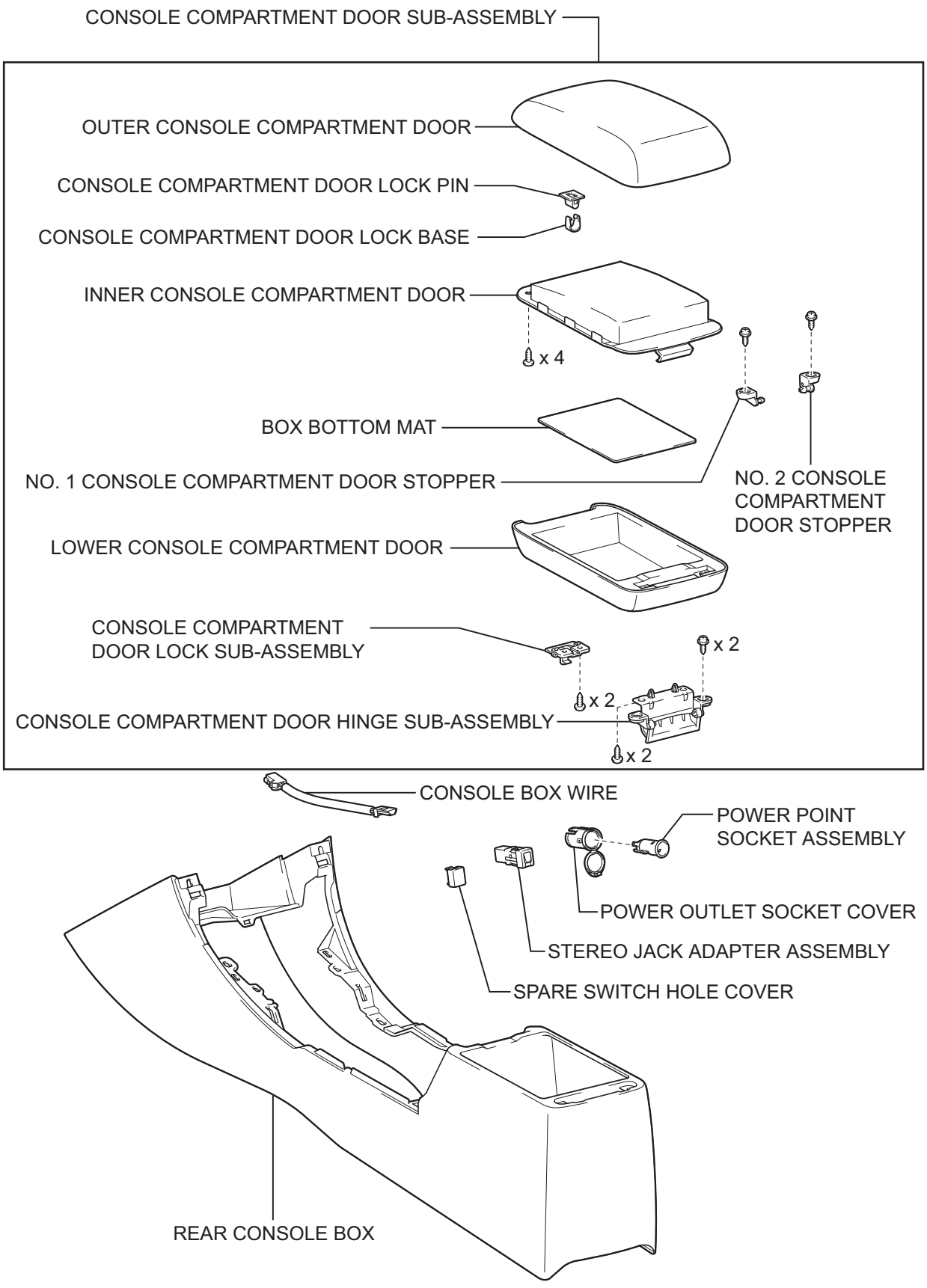
with Sliding Roof:



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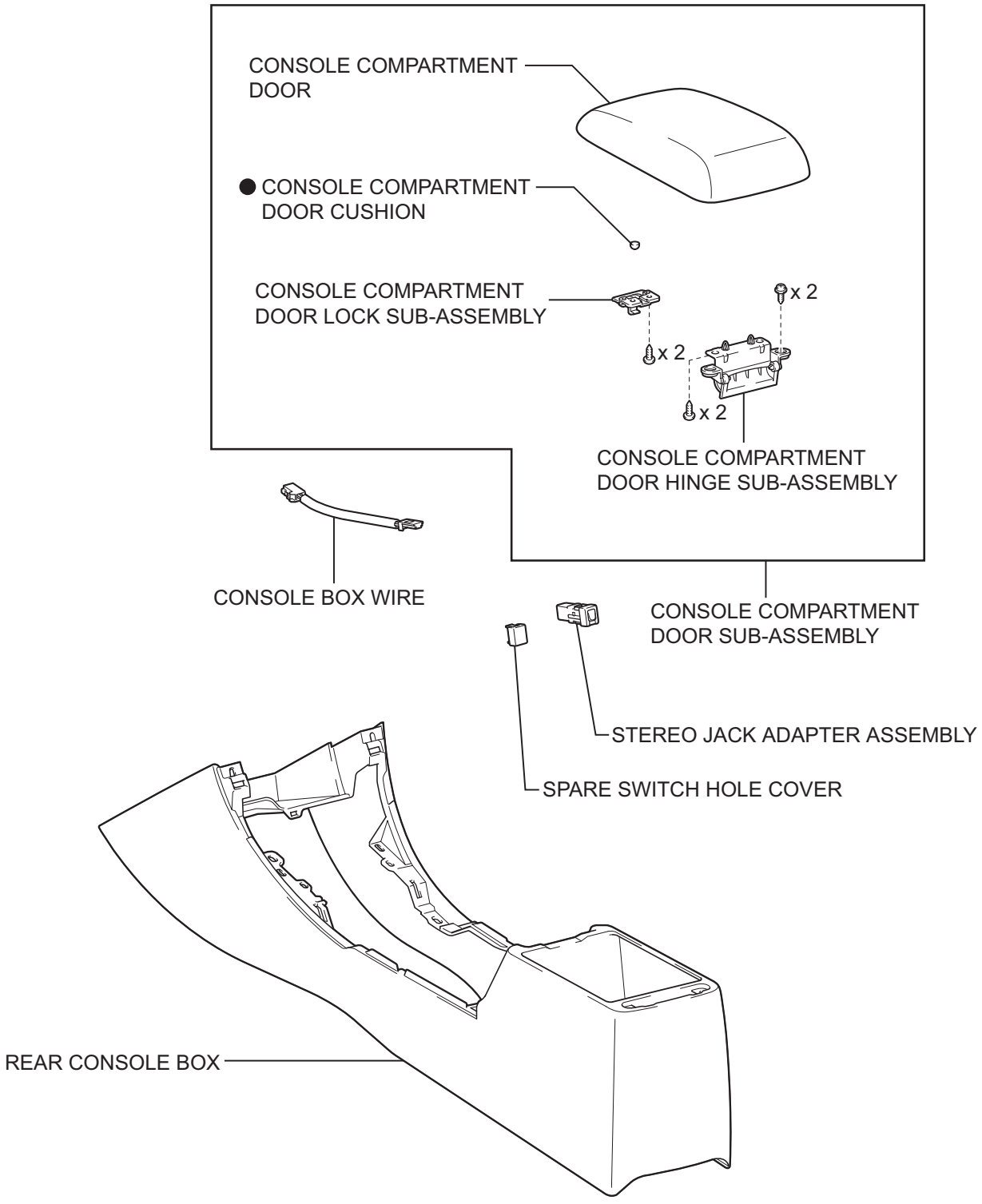
IP

with Roof Window Glass:



● Non-reusable part

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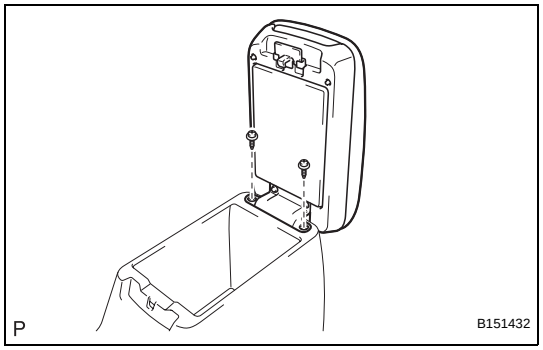
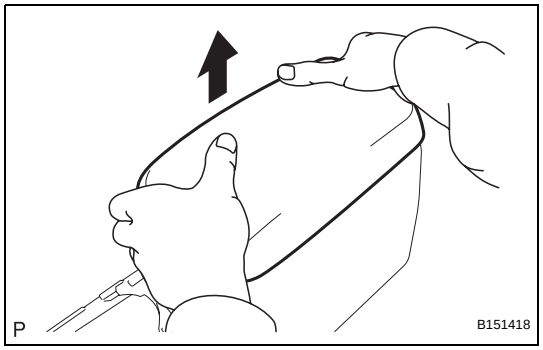
REMOVAL

1. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (See page IP-5)**
2. **REMOVE UPPER CONSOLE PANEL (See page IP-5)**
3. **REMOVE CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-18)**
4. **REMOVE REAR CONSOLE BOX ASSEMBLY (See page IP-18)**

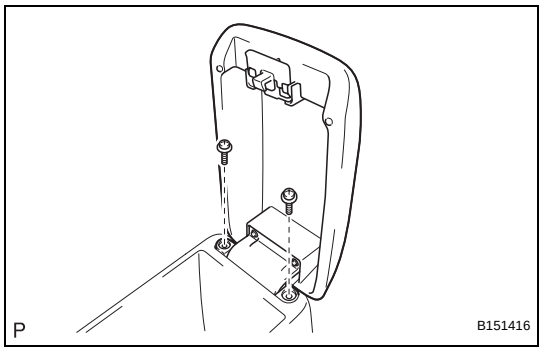
DISASSEMBLY



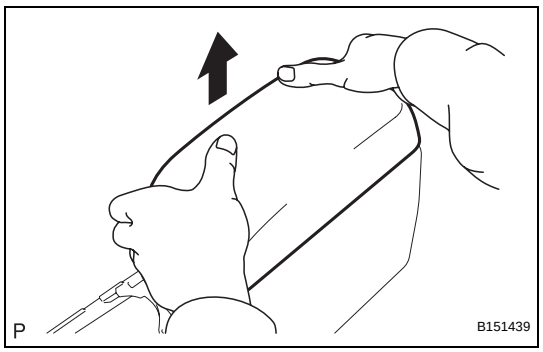
1. **REMOVE CONSOLE COMPARTMENT DOOR SUB-ASSEMBLY (w/ Sliding Roof)**
   (a) Remove the 2 screws.



   (b) Remove the console compartment door sub-assembly as shown in the illustration.

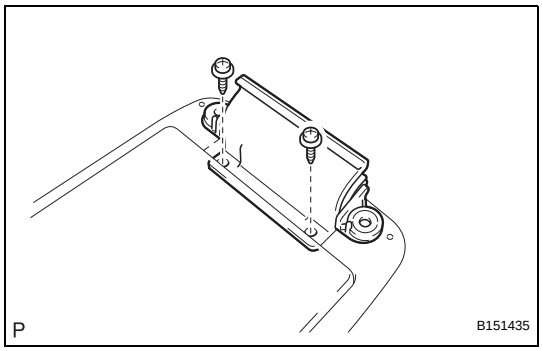


2. **REMOVE CONSOLE COMPARTMENT DOOR SUB-ASSEMBLY (w/ Roof Window Glass)**
   (a) Remove the 2 screws.



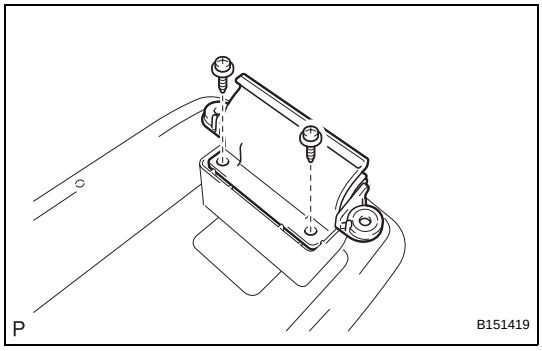
   (b) Remove the console compartment door sub-assembly as shown in the illustration.

IP



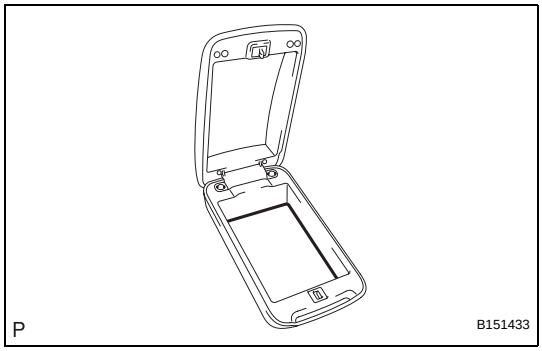
3. REMOVE CONSOLE COMPARTMENT DOOR HINGE SUB-ASSEMBLY (w/ Sliding Roof)

(a) Remove the 2 screws and the console compartment door hinge sub-assembly.



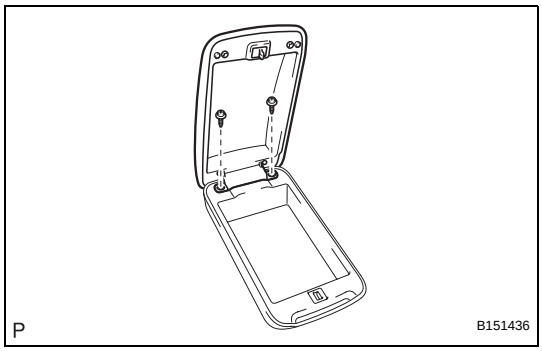
4. REMOVE CONSOLE COMPARTMENT DOOR HINGE SUB-ASSEMBLY (w/ Roof Window Glass)

(a) Remove the 2 screws and the console compartment door hinge sub-assembly.



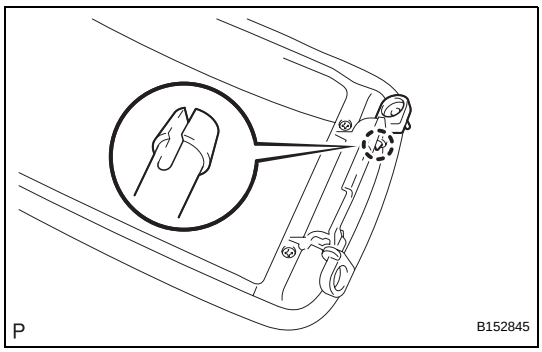
5. REMOVE BOX BOTTOM MAT (w/ Sliding Roof)

(a) Remove the box bottom mat.



6. REMOVE OUTER CONSOLE COMPARTMENT DOOR (w/ Sliding Roof)

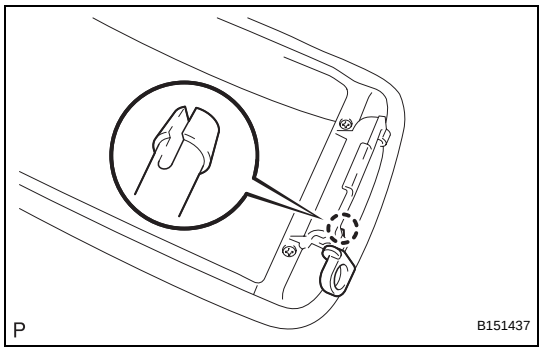
(a) Remove the 2 screws and outer console compartment door.



7. REMOVE NO. 1 CONSOLE COMPARTMENT DOOR STOPPER (w/ Sliding Roof)

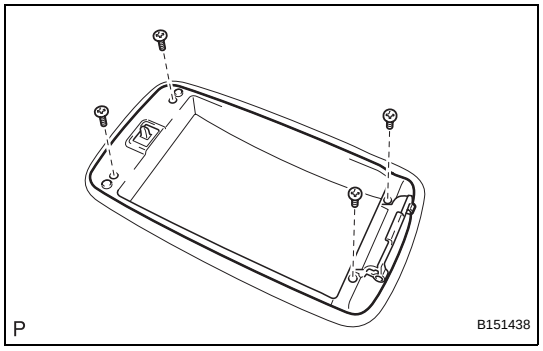
(a) Disengage the claw and remove the No. 1 console compartment door stopper.

IP



8. REMOVE NO. 2 CONSOLE COMPARTMENT DOOR STOPPER (w/ Sliding Roof)

(a) Disengage the claw and remove the No. 2 console compartment door stopper.

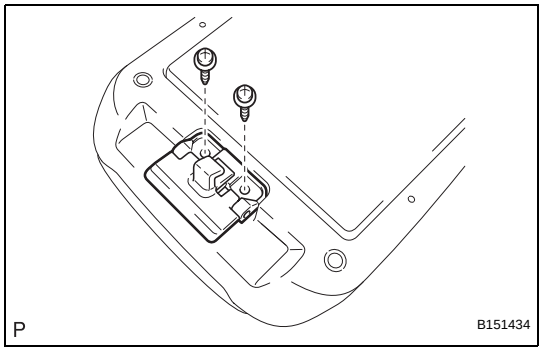


9. REMOVE INNER CONSOLE COMPARTMENT DOOR (w/ Sliding Roof)

(a) Remove the 4 screws and inner console compartment door.

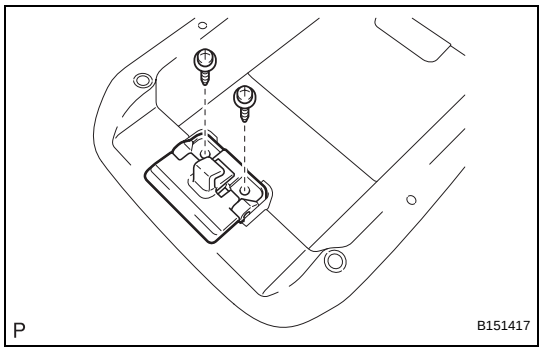
10. REMOVE CONSOLE COMPARTMENT DOOR LOCK PIN (w/ Sliding Roof)

11. REMOVE CONSOLE COMPARTMENT DOOR LOCK BASE (w/ Sliding Roof)



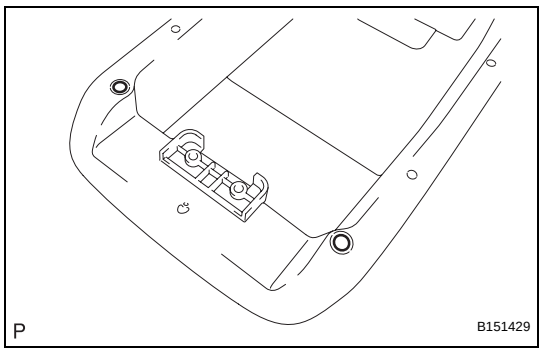
12. REMOVE CONSOLE COMPARTMENT DOOR LOCK SUB-ASSEMBLY (w/ Sliding Roof)

(a) Remove the 2 screws and remove the console compartment door lock sub-assembly.



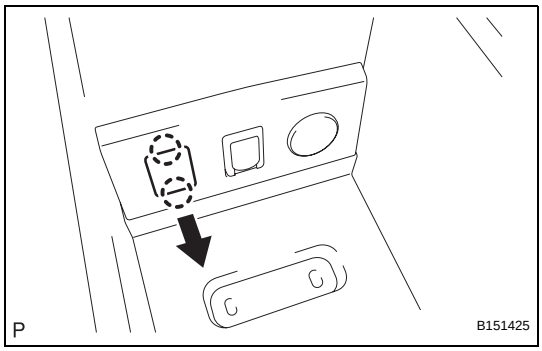
13. REMOVE CONSOLE COMPARTMENT DOOR LOCK SUB-ASSEMBLY (w/ Roof Window Glass)

(a) Remove the 2 screws and remove the console compartment door lock sub-assembly.



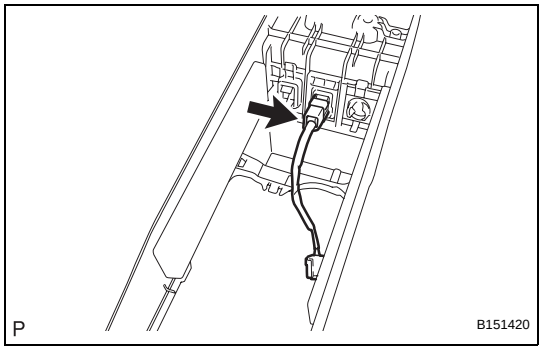
14. REMOVE CONSOLE COMPARTMENT DOOR CUSHION (w/ Roof Window Glass)

(a) Remove the 2 console compartment door cushions.



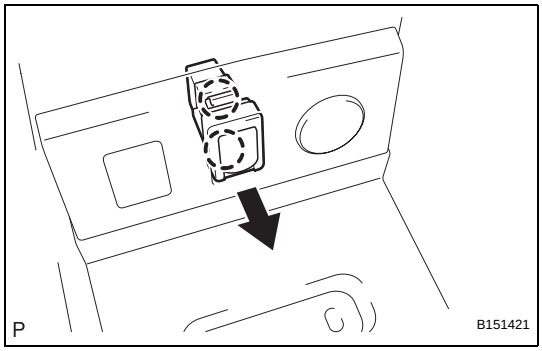
15. REMOVE SPARE SWITCH HOLE COVER

(a) Disengage the 2 claws and remove the spare switch hole cover.



16. REMOVE CONSOLE BOX WIRE

(a) Disconnect the connector and remove the console box wire.



17. REMOVE STEREO JACK ADAPTER ASSEMBLY

(a) Remove the 2 claws and stereo jack adapter assembly.

18. REMOVE POWER POINT SOCKET ASSEMBLY (w/ Sliding Roof) (See page OT-5)

19. REMOVE POWER OUTLET SOCKET COVER (w/ Sliding Roof)

(a) Disengage the 2 claws and remove the power outlet socket cover.

REASSEMBLY

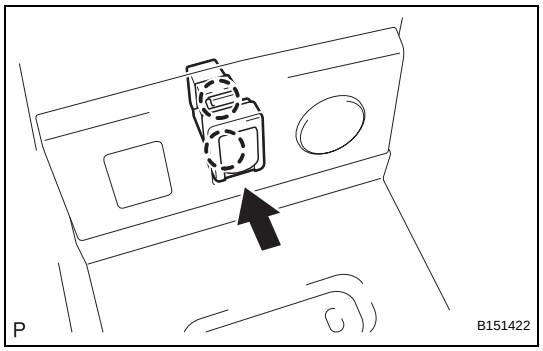
1. INSTALL POWER OUTLET SOCKET COVER (w/ Sliding Roof)

(a) Engage the 2 claws and install the power outlet socket cover.

2. INSTALL POWER POINT SOCKET ASSEMBLY (w/ Sliding Roof)

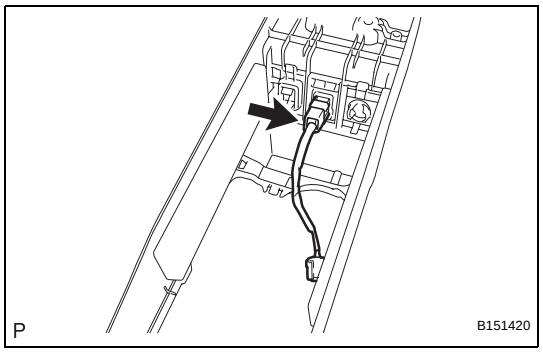
3. INSTALL STEREO JACK ADAPTER ASSEMBLY

(a) Engage the 2 claws and install the stereo jack adapter assembly.



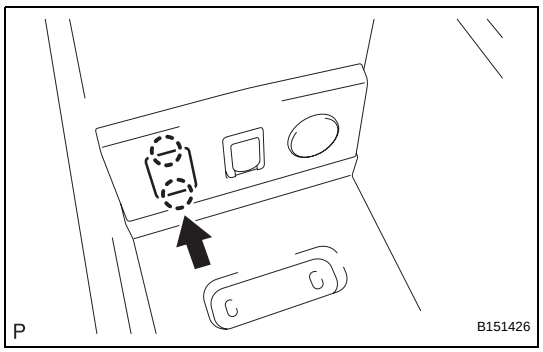
4. INSTALL CONSOLE BOX WIRE

(a) Connect the connector and install the console box wire.



5. INSTALL SPARE SWITCH HOLE COVER

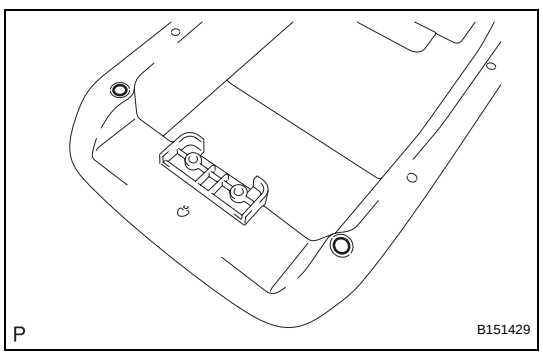
(a) Engage the 2 claws and install the spare switch hole cover.



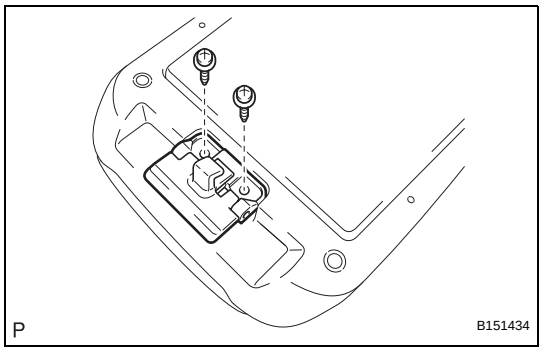
6. INSTALL CONSOLE COMPARTMENT DOOR CUSHION (w/ Roof Window Glass)

(a) Peel off the release paper from console compartment door cushion.

(b) Install 2 new console compartment door cushions.

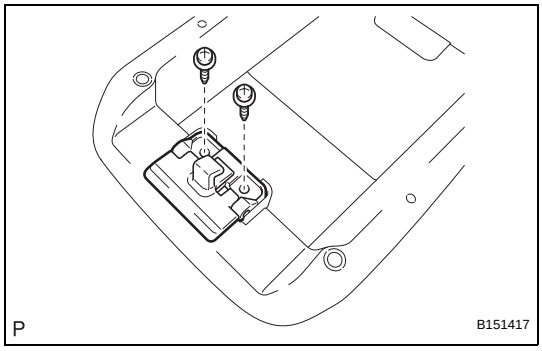


IP



7. INSTALL CONSOLE COMPARTMENT DOOR LOCK SUB-ASSEMBLY (w/ Sliding Roof)

(a) Install the console compartment door lock sub-assembly with the 2 screws.

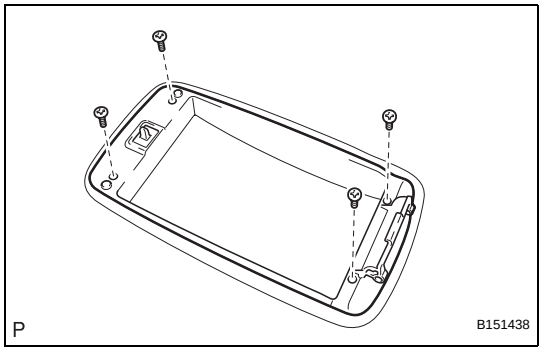


8. INSTALL CONSOLE COMPARTMENT DOOR LOCK SUB-ASSEMBLY (w/ Roof Window Glass)

(a) Install the console compartment door lock sub-assembly with the 2 screws.

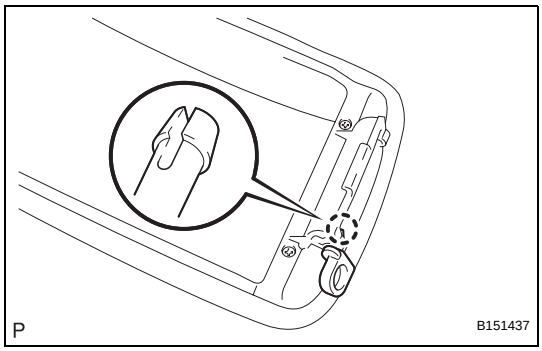
9. INSTALL CONSOLE COMPARTMENT DOOR LOCK BASE (w/ Sliding Roof)

10. INSTALL CONSOLE COMPARTMENT DOOR LOCK PIN (w/ Sliding Roof)



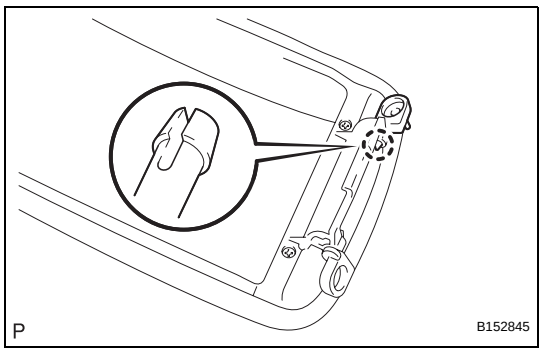
11. INSTALL INNER CONSOLE COMPARTMENT DOOR (w/ Sliding Roof)

(a) Install the inner console compartment door with the 4 screws.



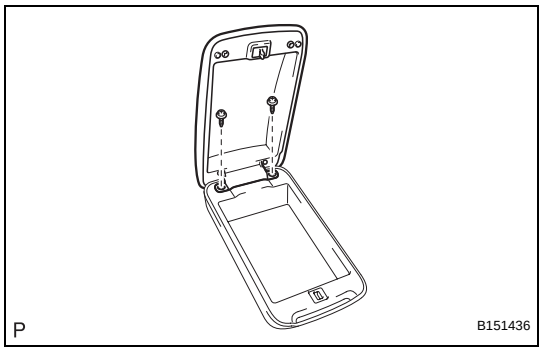
12. INSTALL NO. 2 CONSOLE COMPARTMENT DOOR STOPPER (w/ Sliding Roof)

(a) Engage the claw and install the No. 2 console compartment door stopper.



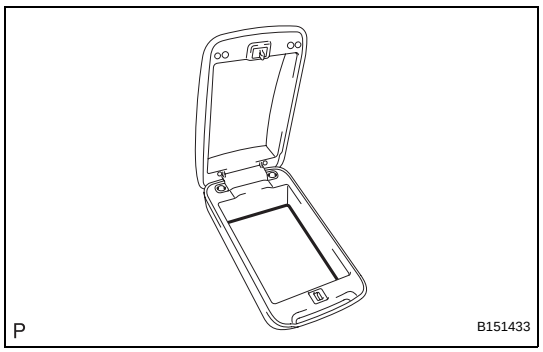
13. INSTALL NO. 1 CONSOLE COMPARTMENT DOOR STOPPER (w/ Sliding Roof)

(a) Engage the claw and install the No. 1 console compartment door stopper.



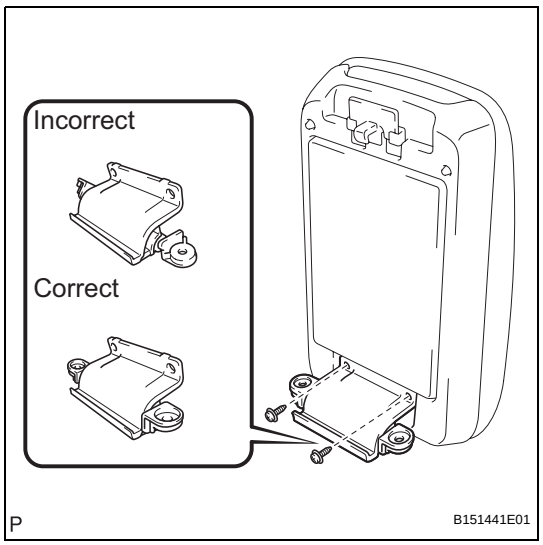
14. INSTALL OUTER CONSOLE COMPARTMENT DOOR (w/ Sliding Roof)

(a) Install the outer console compartment door with the 2 screws.



15. INSTALL BOX BOTTOM MAT (w/ Sliding Roof)

(a) Install the box bottom mat.

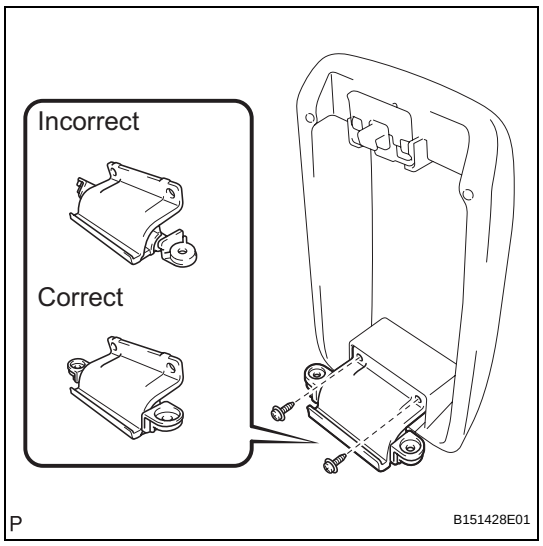


16. INSTALL CONSOLE COMPARTMENT DOOR HINGE SUB-ASSEMBLY (w/ Sliding Roof)

(a) Install the console compartment door hinge sub-assembly with the 2 screws.

NOTICE:

Make sure that the stopper is positioned as shown in the illustration.



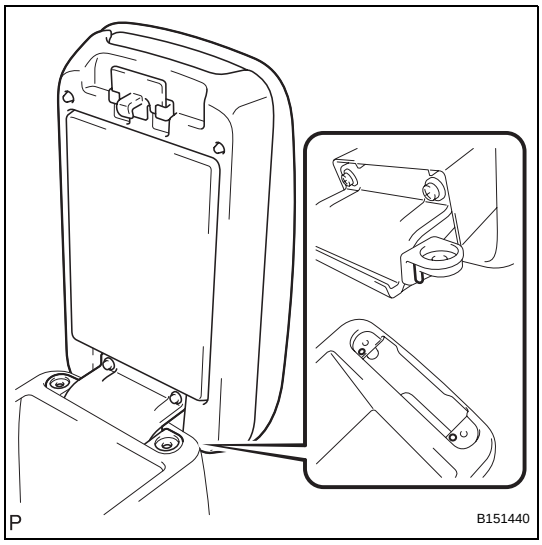
17. INSTALL CONSOLE COMPARTMENT DOOR HINGE SUB-ASSEMBLY (w/ Roof Window Glass)

(a) Install the console compartment door hinge sub-assembly with the 2 screws.

NOTICE:

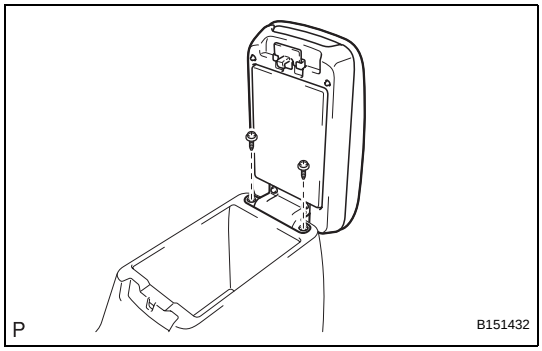
Make sure that the stopper is positioned as shown in the illustration.

IP

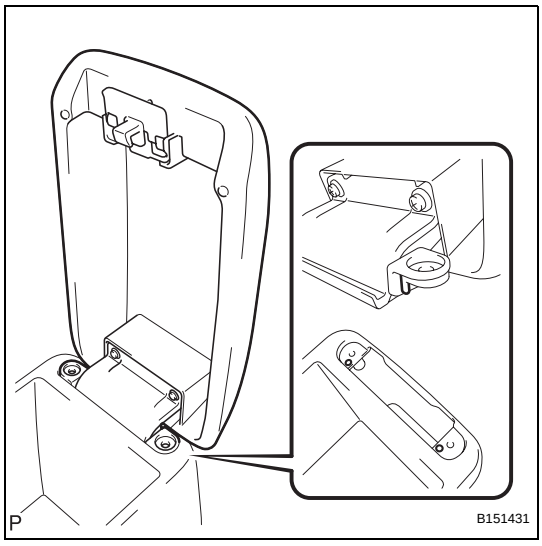


18. INSTALL CONSOLE COMPARTMENT DOOR SUB-ASSEMBLY (w/ Sliding Roof)

(a) Insert the pins on the console compartment door into the guide holes on the console box to temporarily install the console compartment door.

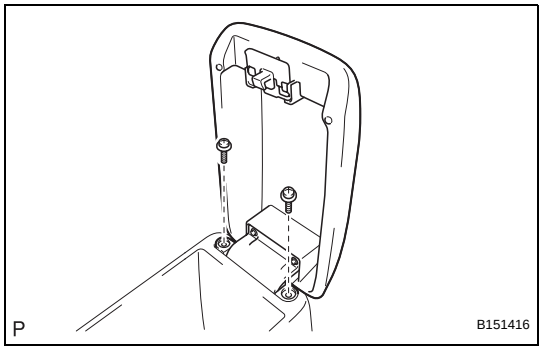


(b) Install the console compartment door sub-assembly with the 2 screws.



19. INSTALL CONSOLE COMPARTMENT DOOR SUB-ASSEMBLY (w/ Roof Window Glass)

(a) Insert the pins on the console compartment door into the guide holes on the console box to temporarily install the console compartment door.



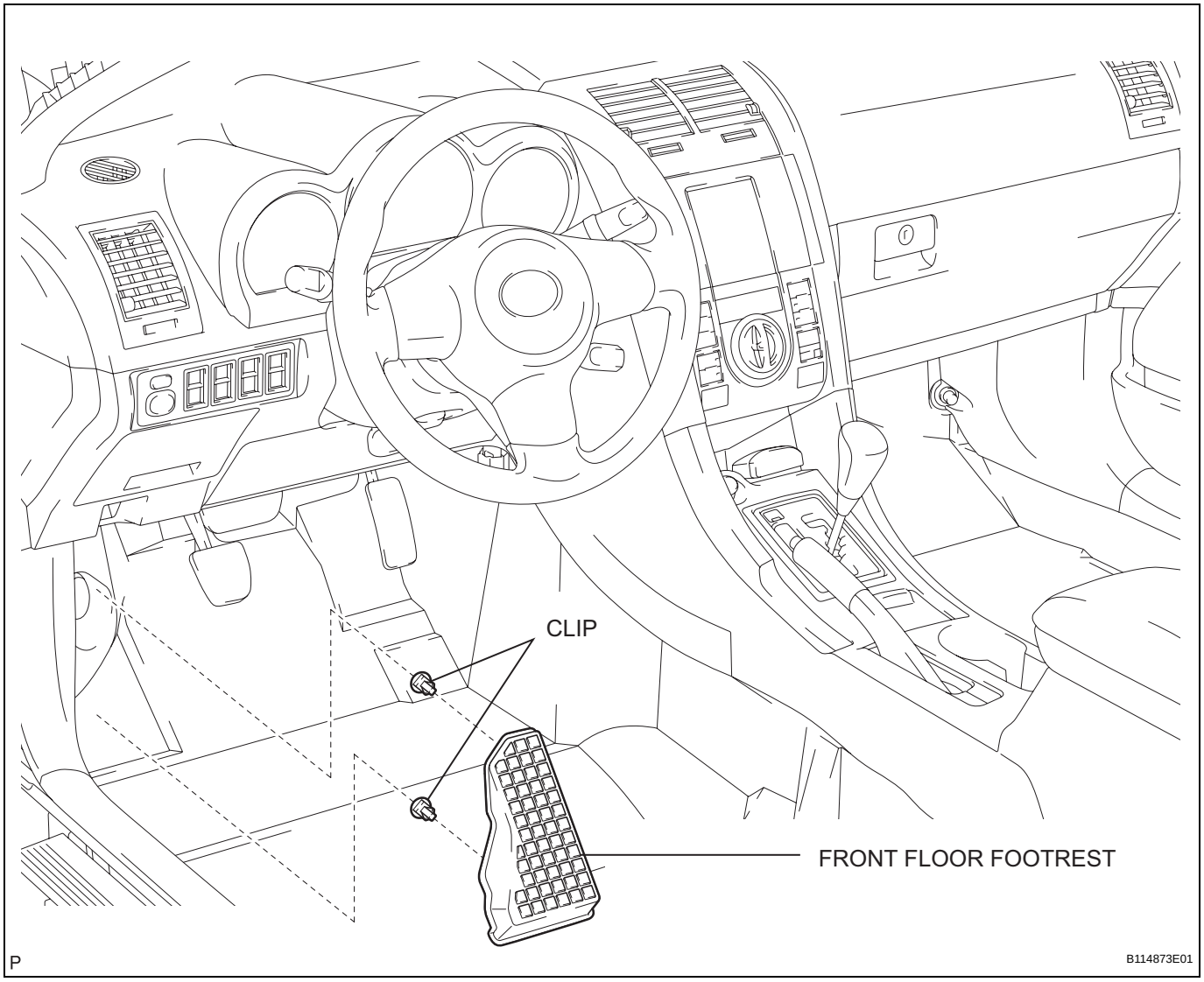
(b) Install the console compartment door sub-assembly with the 2 screws.

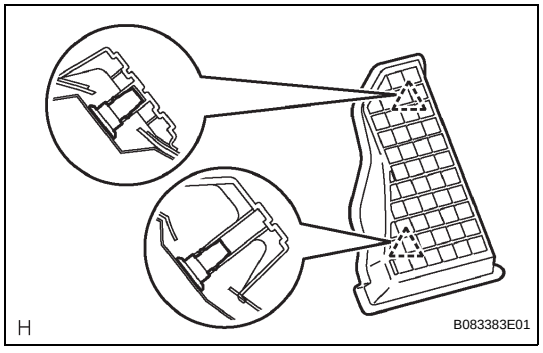
INSTALLATION

1. **INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-22)**
2. **INSTALL CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-23)**
3. **INSTALL UPPER CONSOLE PANEL (See page IP-11)**
4. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-12)**

FRONT FLOOR FOOTREST

COMPONENTS

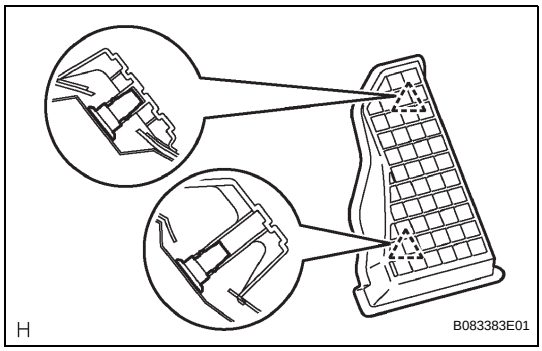




REMOVAL

1. REMOVE FRONT FLOOR FOOTREST

(a) Using a screwdriver, detach the 2 clips and remove the footrest.
HINT:
Tape the screwdriver tip before use.



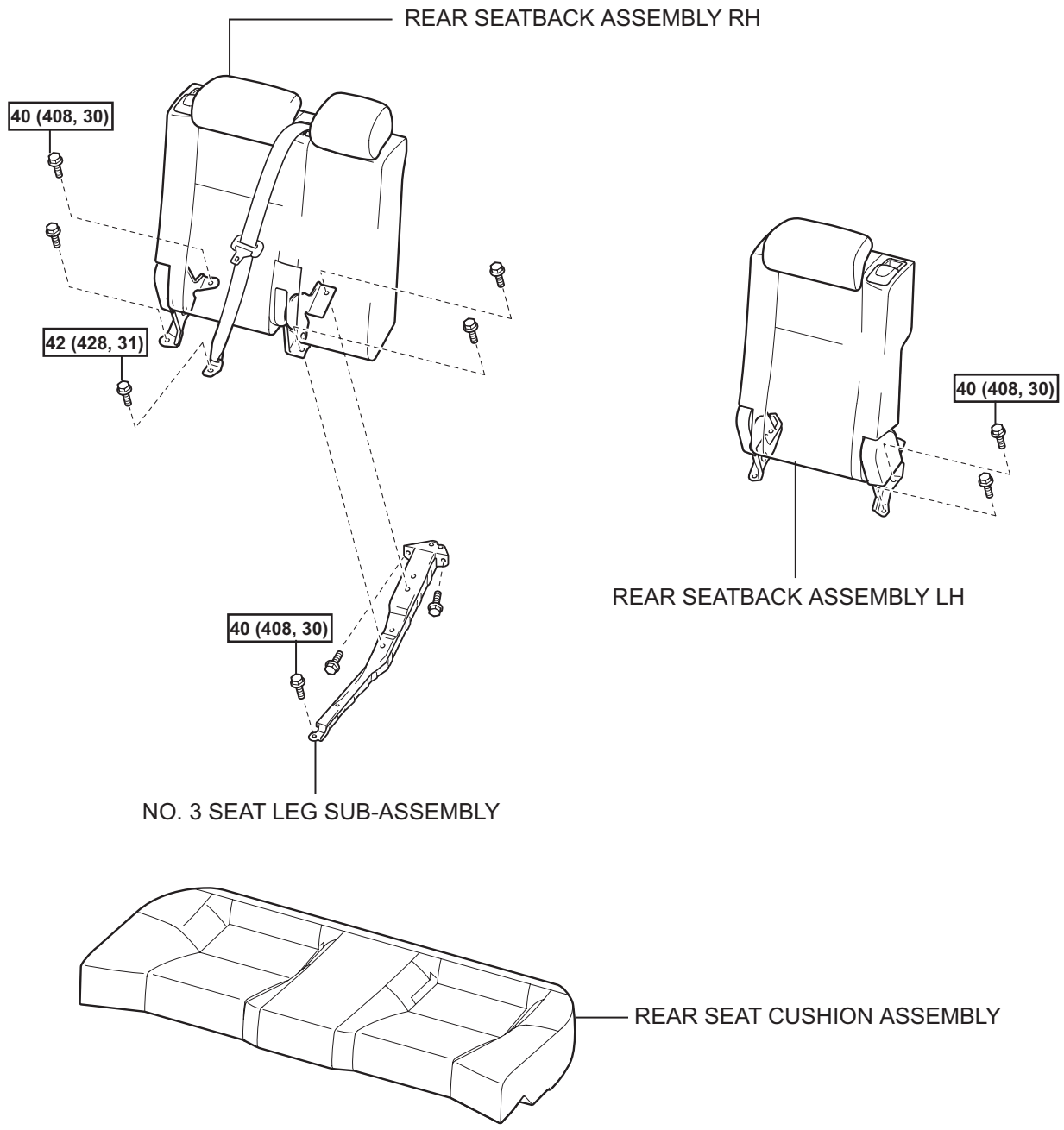
INSTALLATION

1. INSTALL FRONT FLOOR FOOTREST

(a) Attach the 2 clips to install the footrest.

ROOF HEADLINING

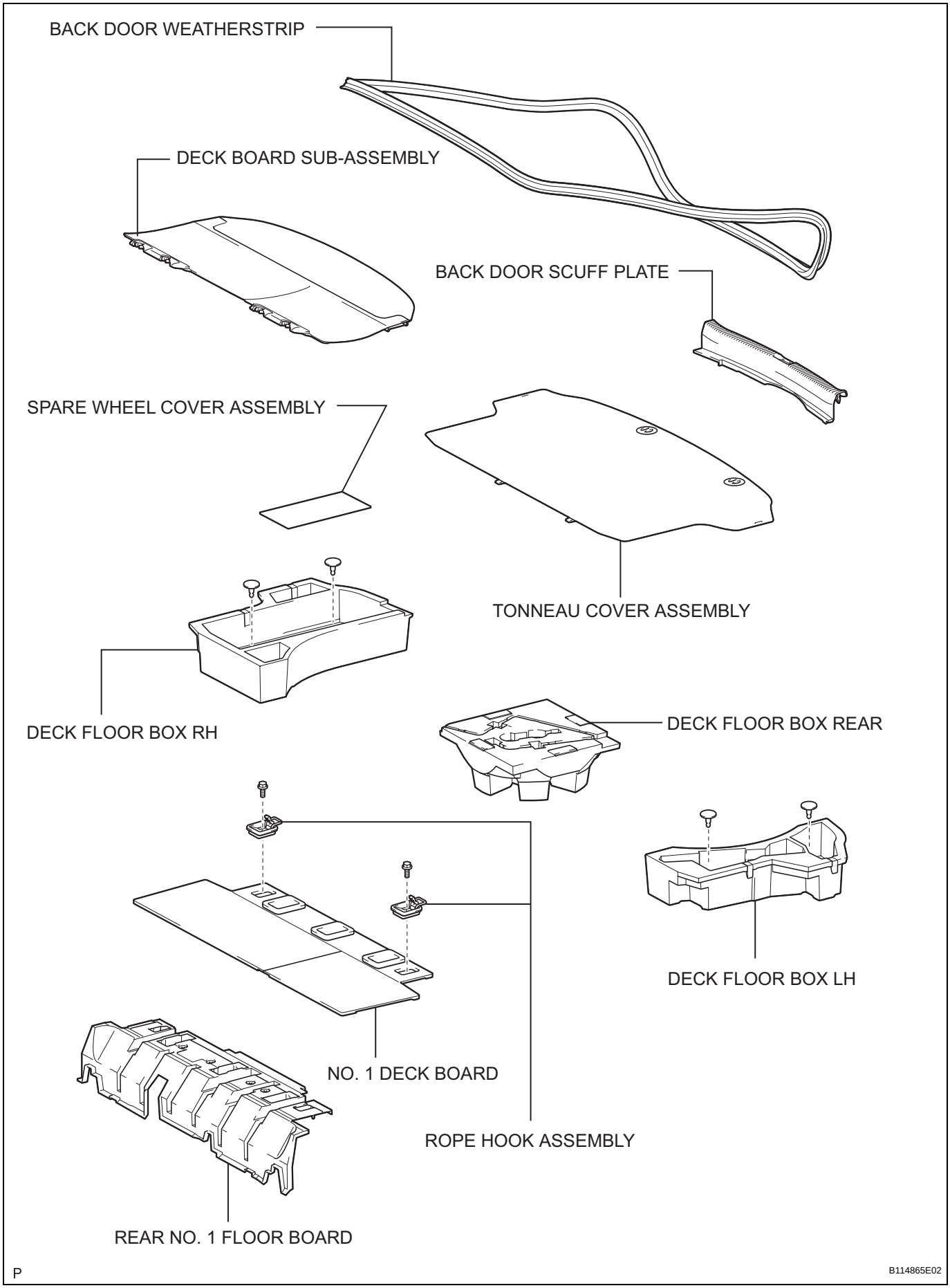
COMPONENTS

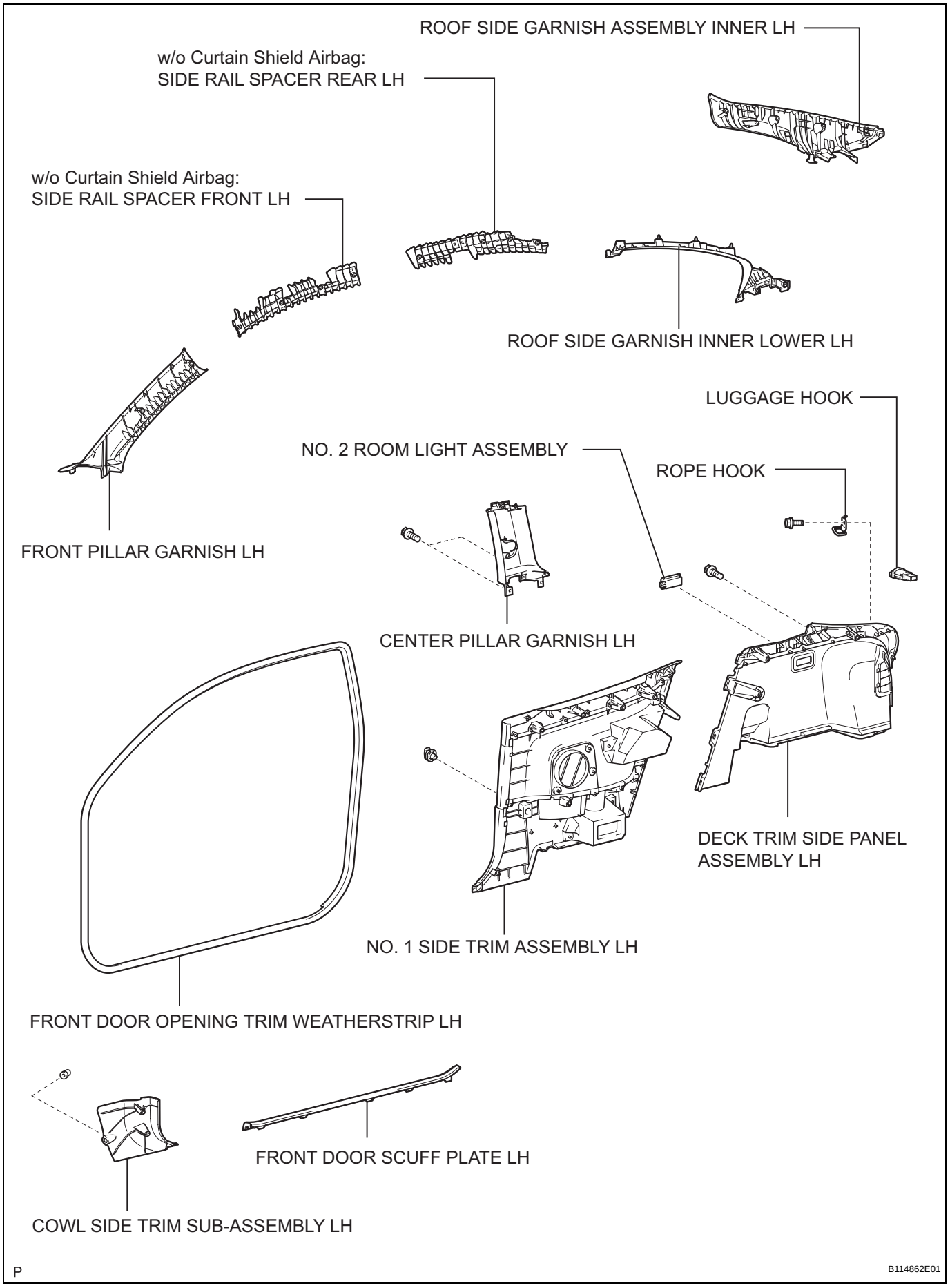


IR

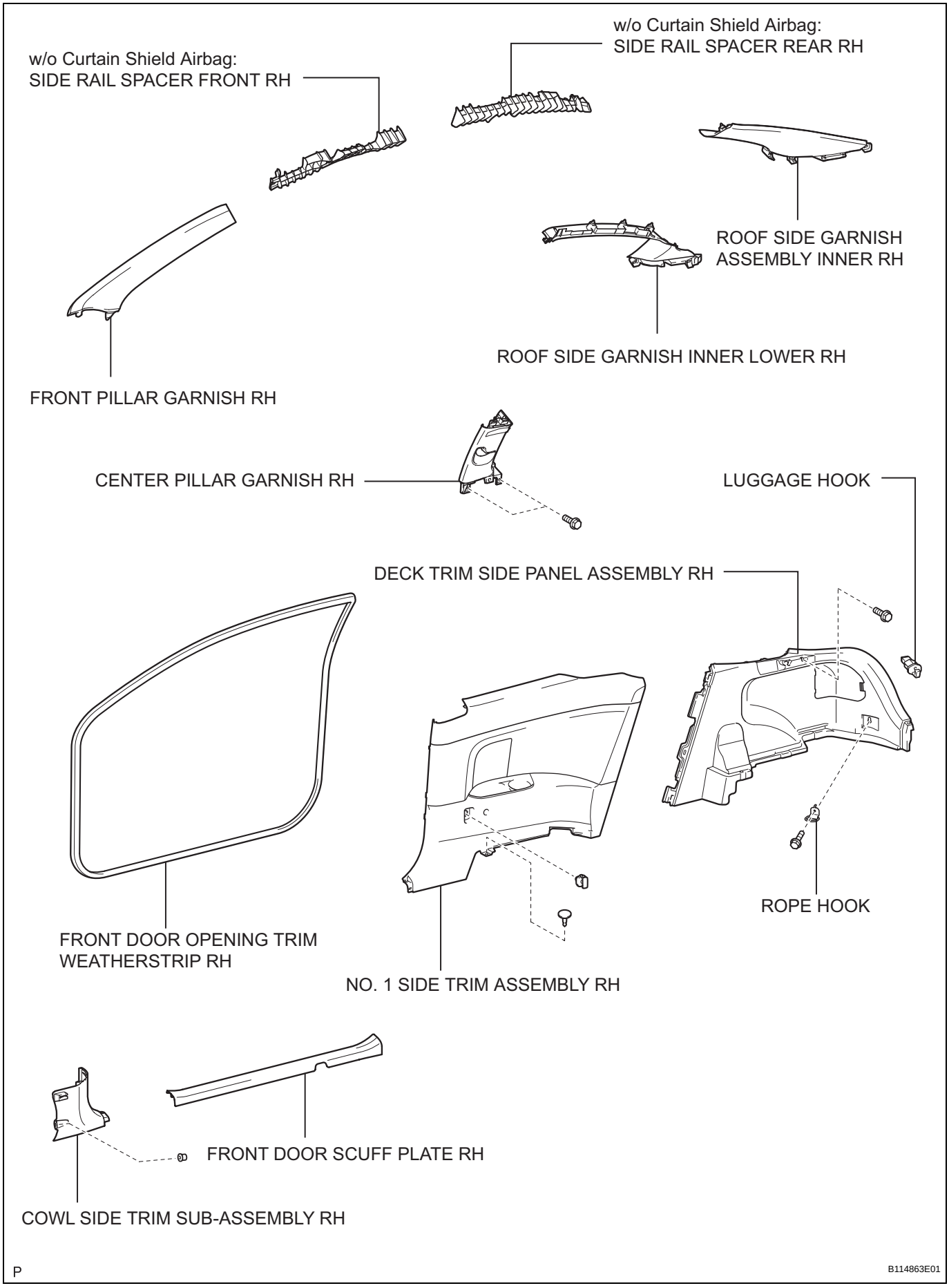
N*m (kgf*cm, ft.*lbf) : Specified torque

B117915E01


BACK DOOR WEATHERSTRIP
DECK BOARD SUB-ASSEMBLY
BACK DOOR SCUFF PLATE
SPARE WHEEL COVER ASSEMBLY
TONNEAU COVER ASSEMBLY
DECK FLOOR BOX RH
DECK FLOOR BOX REAR
DECK FLOOR BOX LH
NO. 1 DECK BOARD
ROPE HOOK ASSEMBLY
REAR NO. 1 FLOOR BOARD
P
B114865E02


ROOF SIDE GARNISH ASSEMBLY INNER LH
w/o Curtain Shield Airbag:
SIDE RAIL SPACER REAR LH
w/o Curtain Shield Airbag:
SIDE RAIL SPACER FRONT LH
ROOF SIDE GARNISH INNER LOWER LH
LUGGAGE HOOK
NO. 2 ROOM LIGHT ASSEMBLY
ROPE HOOK
FRONT PILLAR GARNISH LH
CENTER PILLAR GARNISH LH
DECK TRIM SIDE PANEL
ASSEMBLY LH
NO. 1 SIDE TRIM ASSEMBLY LH
FRONT DOOR OPENING TRIM WEATHERSTRIP LH
FRONT DOOR SCUFF PLATE LH
COWL SIDE TRIM SUB-ASSEMBLY LH
P
B114862E01

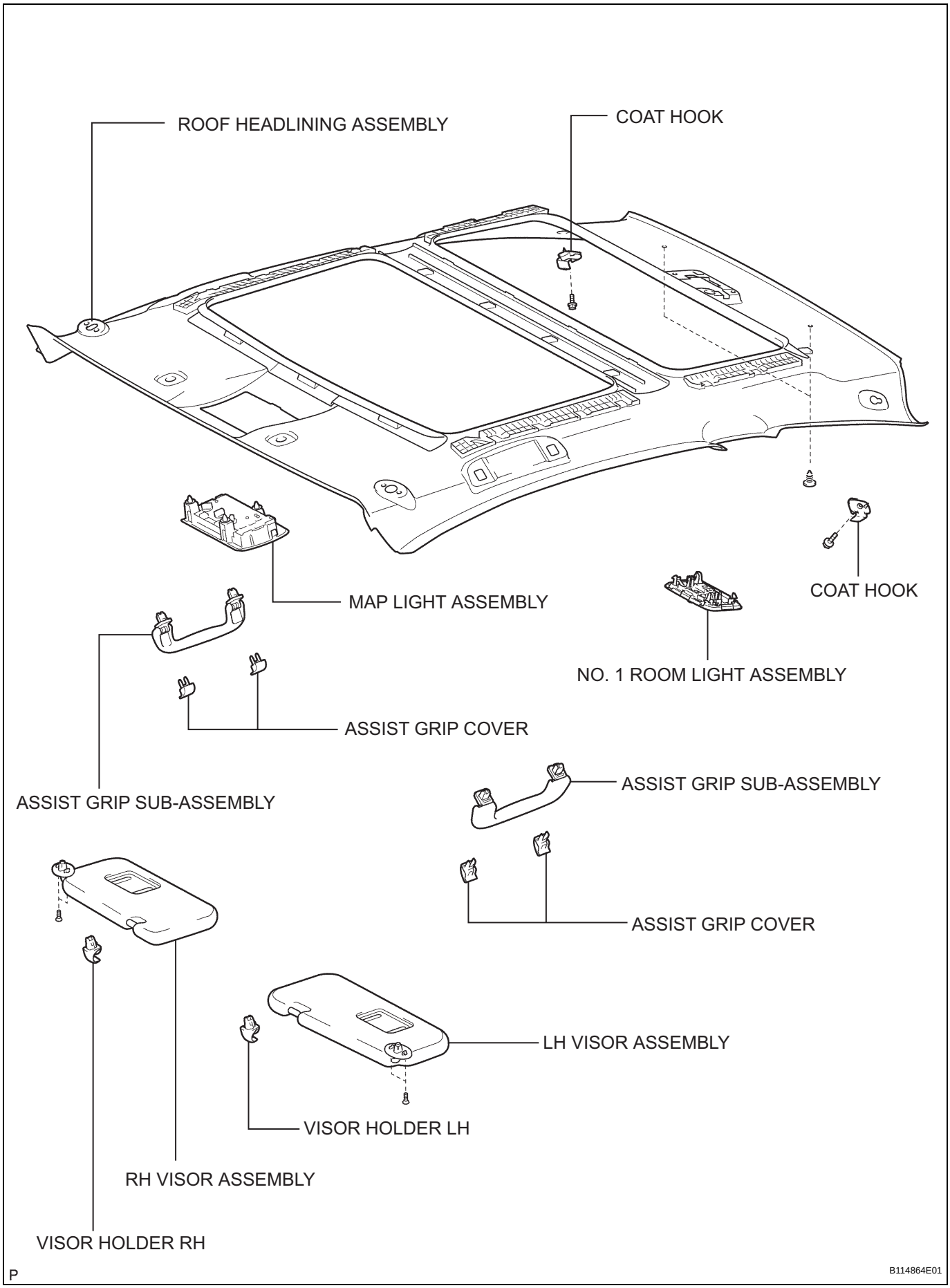
IR



IR

P

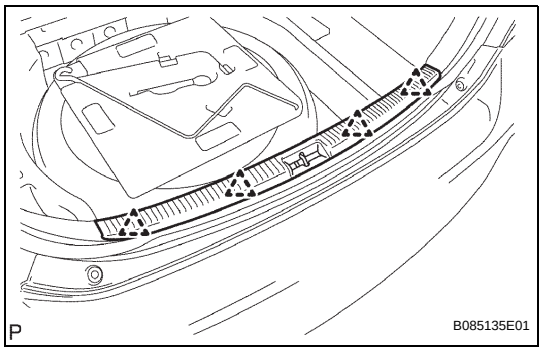
B114863E01

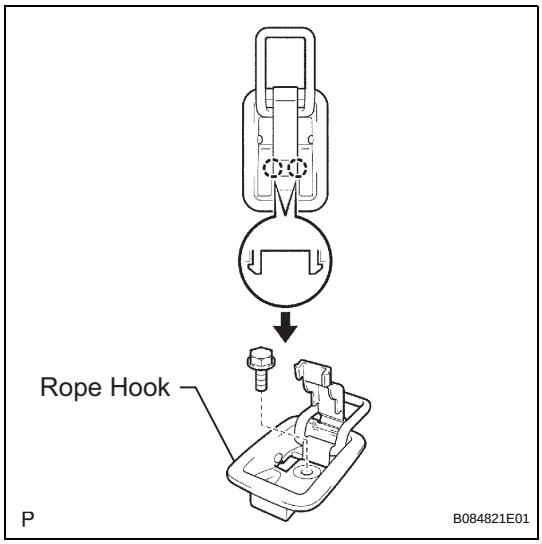

ROOF HEADLINING ASSEMBLY
COAT HOOK
MAP LIGHT ASSEMBLY
COAT HOOK
NO. 1 ROOM LIGHT ASSEMBLY
ASSIST GRIP COVER
ASSIST GRIP SUB-ASSEMBLY
ASSIST GRIP SUB-ASSEMBLY
ASSIST GRIP COVER
LH VISOR ASSEMBLY
VISOR HOLDER LH
RH VISOR ASSEMBLY
VISOR HOLDER RH
P
B114864E01

IR

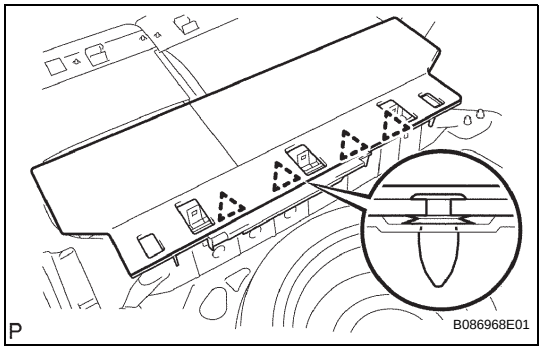
REMOVAL

1. **REMOVE TONNEAU COVER ASSEMBLY**
2. **REMOVE DECK BOARD SUB-ASSEMBLY**
3. **REMOVE BACK DOOR SCUFF PLATE**
   (a) Using a clip remover, detach the 4 clips and remove the scuff plate.
4. **REMOVE BACK DOOR WEATHERSTRIP**
5. **REMOVE SPARE WHEEL COVER ASSEMBLY**
6. **REMOVE DECK FLOOR BOX LH**
   (a) Using a clip remover, remove the 2 clips and box.
7. **REMOVE DECK FLOOR BOX RH**
   (a) Using a clip remover, remove the 2 clips and box.
8. **REMOVE DECK FLOOR BOX REAR**
9. **REMOVE NO. 1 DECK BOARD**
   (a) Using a screwdriver, detach the 2 claws and remove the bolt and rope hook.
   HINT:
   Tape the screwdriver tip before use.

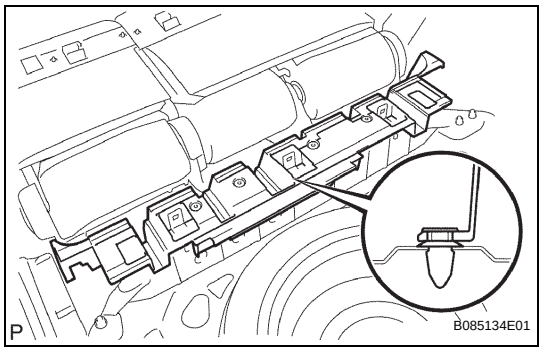




   (b) Using a clip remover, detach the 4 clips and remove the deck board.

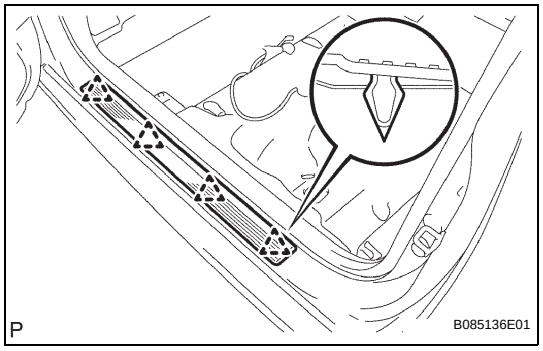


IR



10. REMOVE REAR NO. 1 FLOOR BOARD

(a) Using a clip remover, detach the clip and remove the board.

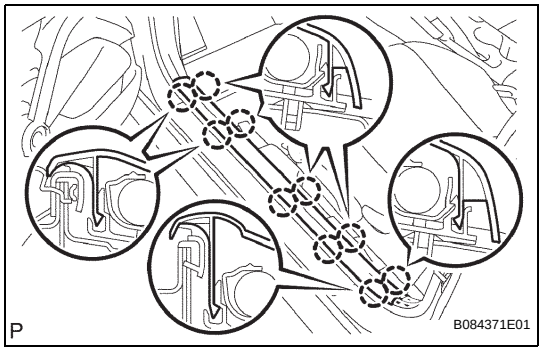


11. REMOVE FRONT DOOR SCUFF PLATE OUTSIDE LH

(a) Using a screwdriver, detach the 4 clips and remove the scuff plate.
HINT:
Tape the screwdriver tip before use.

12. REMOVE FRONT DOOR SCUFF PLATE OUTSIDE RH

HINT:
Use the same procedures described for the LH side.

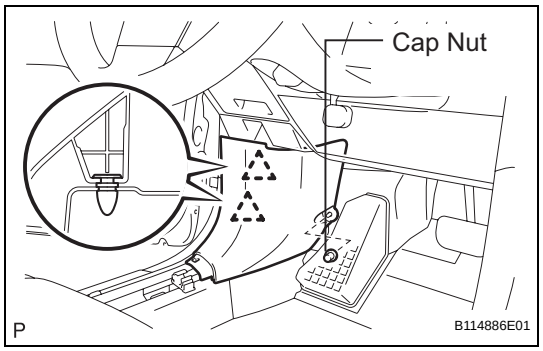


13. REMOVE FRONT DOOR SCUFF PLATE LH

(a) Using a screwdriver, detach the 10 claws and remove the scuff plate.
HINT:
Tape the screwdriver tip before use.

14. REMOVE FRONT DOOR SCUFF PLATE RH

HINT:
Use the same procedures described for the LH side.



15. REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH

(a) Remove the cap nut.
(b) Using a clip remover, detach the 2 clips and remove the trim.

16. REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.

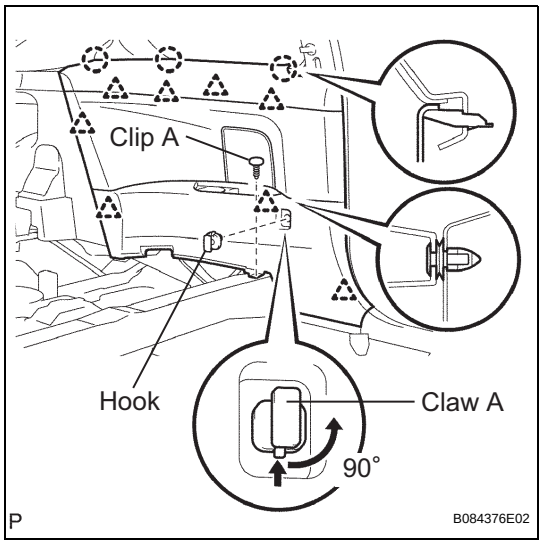
17. REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)

18. REMOVE REAR SEATBACK ASSEMBLY LH (See page SE-17)

19. REMOVE REAR SEATBACK ASSEMBLY RH (See page SE-18)

20. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH

21. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH

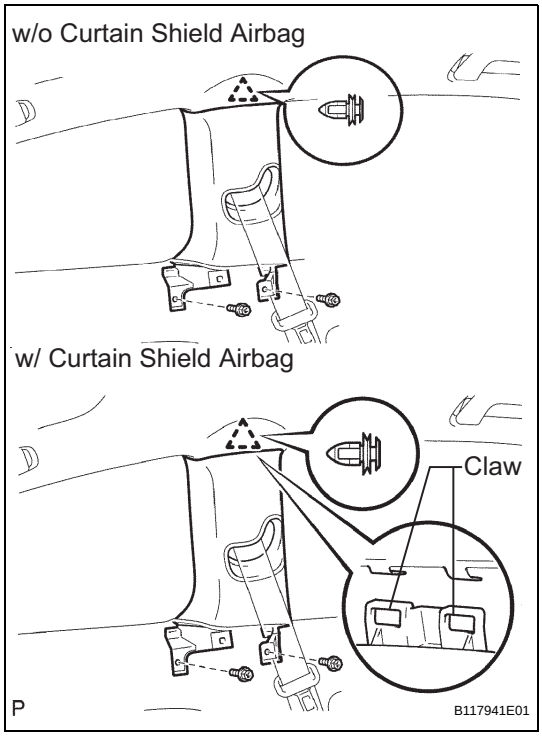


22. REMOVE NO. 1 SIDE TRIM ASSEMBLY LH

(a) Remove the 2 floor anchor bolts (front and rear seat belt).
(b) Using a clip remover, remove the clip labeled A.
(c) Using a screwdriver, detach the claw labeled A and remove the hook of the trim by turning it counterclockwise.
HINT:
Tape the screwdriver tip before use.
(d) Using a clip remover, detach the 8 clips.
(e) Detach the 3 claws and remove the trim.

23. REMOVE NO. 1 SIDE TRIM ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.

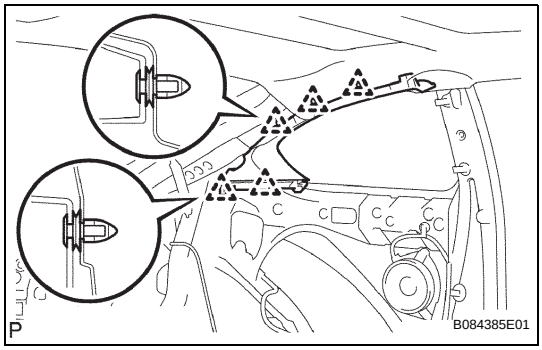


24. REMOVE CENTER PILLAR GARNISH LH

(a) Remove the 2 screws.
(b) w/o Curtain shield airbag:
Using a clip remover, detach the clip and remove the garnish.
(c) w/ Curtain shield airbag:
Using a screwdriver, detach the 2 claws and clip, and remove the garnish.
HINT:
Tape the screwdriver tip before use.

25. REMOVE CENTER PILLAR GARNISH RH

HINT:
Use the same procedures described for the LH side.



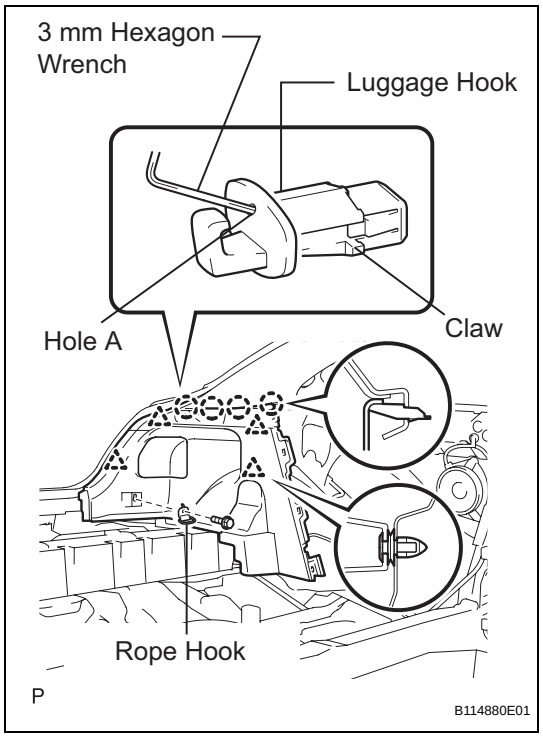
26. REMOVE ROOF SIDE GARNISH INNER LOWER LH

(a) Using a clip remover, detach the 5 clips and remove the garnish.

27. REMOVE ROOF SIDE GARNISH INNER LOWER RH

HINT:
Use the same procedures described for the LH side.

IR

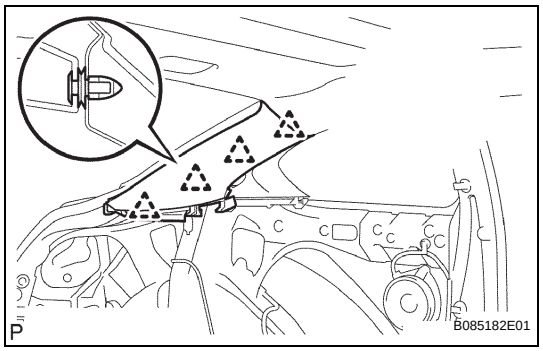


28. REMOVE DECK TRIM SIDE PANEL ASSEMBLY LH

(a) Insert a 3 mm hexagon wrench into the hole A to disengage the claw, then remove the luggage hook from the side panel.
(b) Remove the luggage hook, bolt and rope hook.
(c) Using a clip remover, detach the 4 clips.
(d) Using a screwdriver, detach the 4 claws and remove the side panel.
HINT:
Tape the screwdriver tip before use.

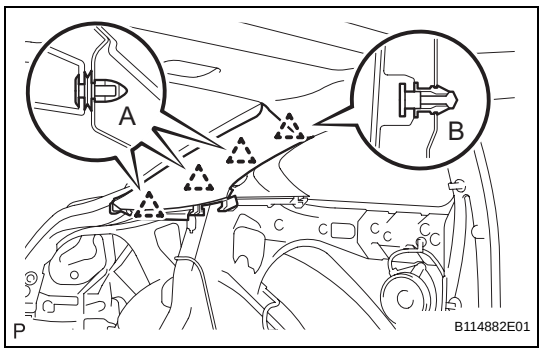
29. REMOVE DECK TRIM SIDE PANEL ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.



30. REMOVE ROOF SIDE GARNISH ASSEMBLY INNER LH

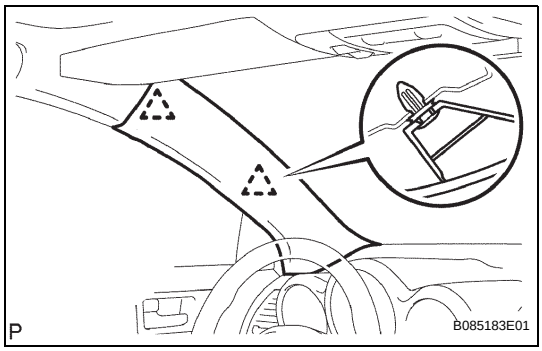
(a) w/o Curtain shield airbag:
Using a clip remover, detach the 4 clips and remove the garnish.



(b) w/ Curtain shield airbag:
(1) Using a clip remover, detach the 3 clips labeled A.
(2) Using a screwdriver, firmly push the pin to disengage the clip labeled B.
HINT:
- Clip B cannot be reused.
- Tape the screwdriver tip before use.

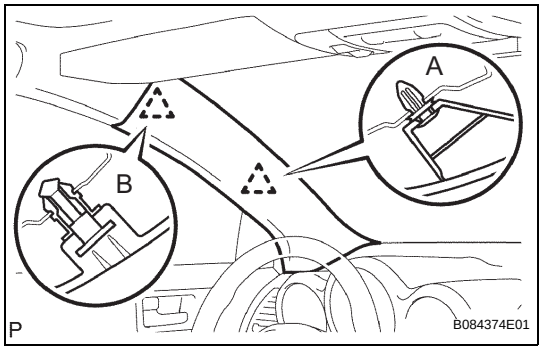
31. REMOVE ROOF SIDE GARNISH ASSEMBLY INNER RH

HINT:
Use the same procedures described for the LH side.

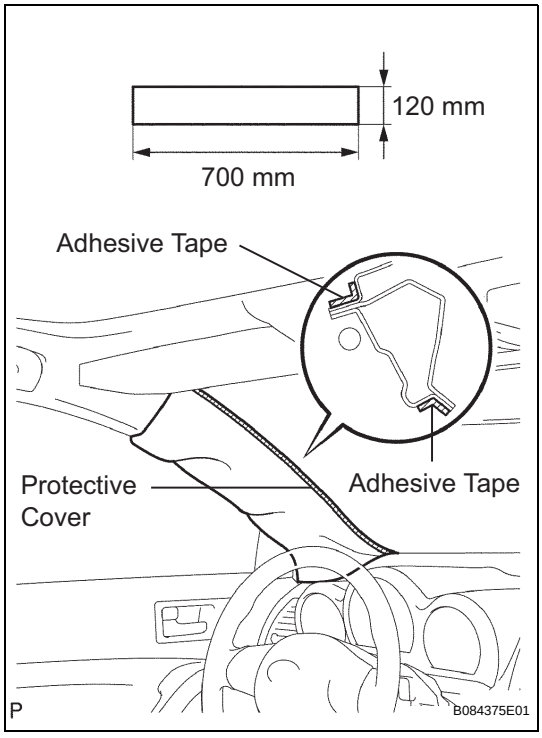


32. REMOVE FRONT PILLAR GARNISH LH

(a) w/o Curtain shield airbag:
Using a clip remover, detach the 2 clips and remove the garnish.



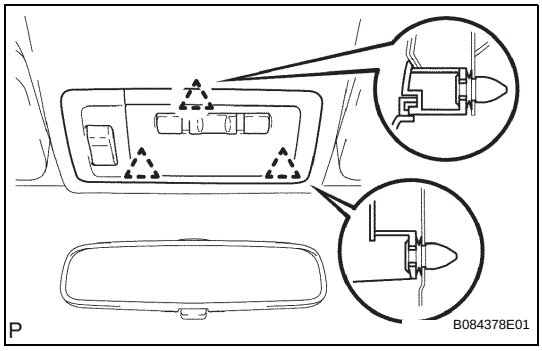
(b) w/ Curtain shield airbag:
(1) Using a clip remover, detach the clip labeled A.
(2) Using a screwdriver, firmly push the pin to detach the clip B.
HINT:
- Clip B cannot be reused.
- Tape the screwdriver tip before use.



(c) w/ Curtain shield airbag:
Protect the curtain shield airbag LH.
(1) Thoroughly cover the airbag with a piece of cloth or nylon that is 700 mm (27.56 in.) x 120 mm (4.72 in.) and fix the ends of the cover with adhesive tape, as shown in the illustration.
NOTICE:
Cover the curtain shield airbag with the protective cover as soon as the pillar garnish is removed.

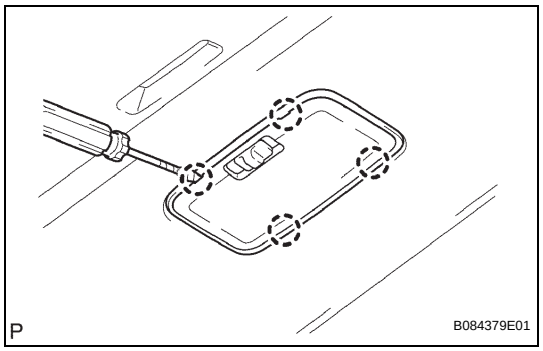
33. REMOVE FRONT PILLAR GARNISH RH

HINT:
Use the same procedures described for the LH side.



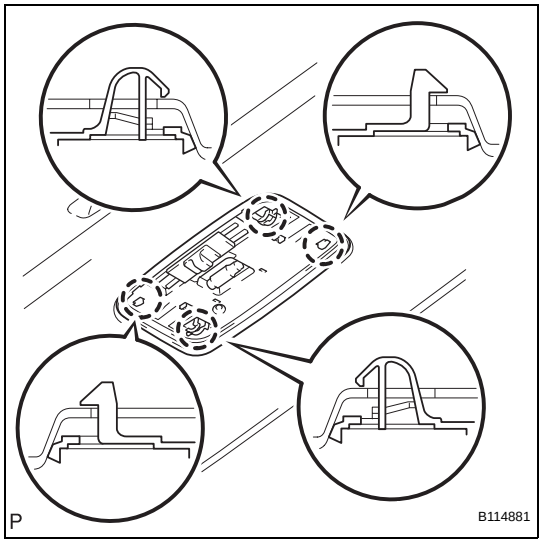
34. REMOVE MAP LIGHT ASSEMBLY

(a) Using a clip remover, detach the 3 clips and remove the light.
(b) Disconnect the map light connector.



35. REMOVE NO. 1 ROOM LIGHT ASSEMBLY

(a) Using a screwdriver, detach the 4 claws and remove the lens.
HINT:
Tape the screwdriver tip before use.



(b) Using a screwdriver, detach the 4 claws and remove the light.
HINT:
Tape the screwdriver tip before use.

(c) Disconnect the light connector.

36. REMOVE NO. 2 ROOM LIGHT ASSEMBLY

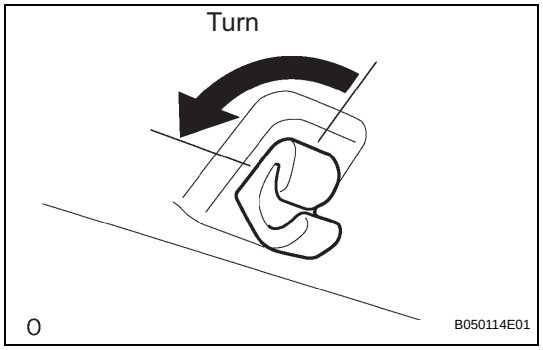
(a) Using a screwdriver, detach the light from the deck trim side panel LH.
HINT:
Tape the screwdriver tip before use.

37. REMOVE LH VISOR ASSEMBLY

(a) Remove the 2 screws and visor.

38. REMOVE RH VISOR ASSEMBLY

(a) Remove the 2 screws and visor.

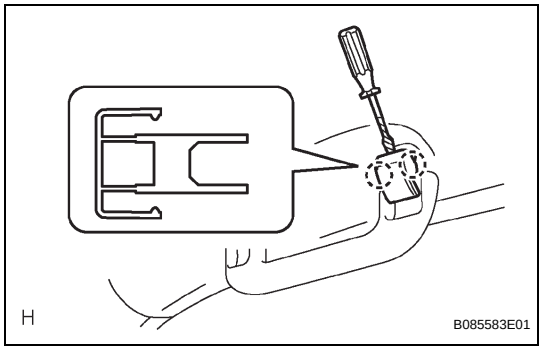


39. REMOVE VISOR HOLDER LH

(a) Remove the visor holder by turning it counterclockwise.

40. REMOVE VISOR HOLDER RH

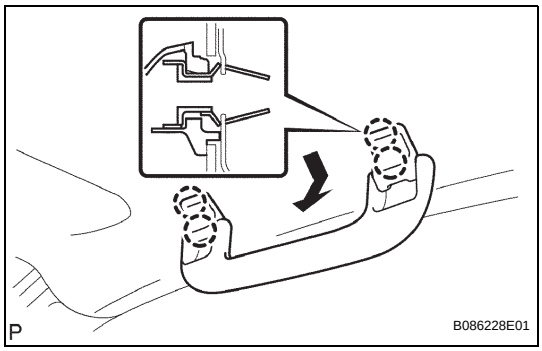
(a) Remove the visor holder by turning it counterclockwise.



41. REMOVE ASSIST GRIP COVER

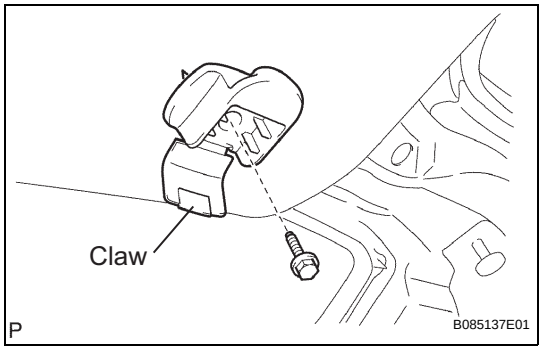
(a) Using a screwdriver, detach the 4 claws and remove the 2 covers.
HINT:
Tape the screwdriver tip before use.

IR



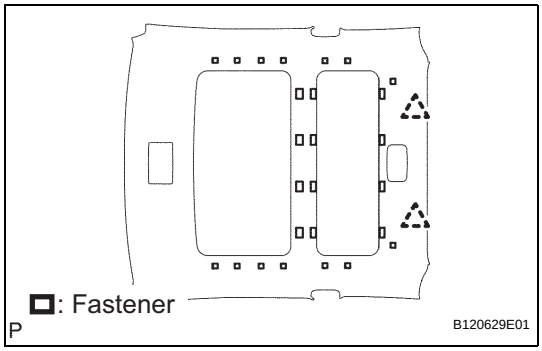
42. REMOVE ASSIST GRIP SUB-ASSEMBLY

(a) Using a screwdriver, detach the 4 claws and remove the assist grip.
HINT:
Tape the screwdriver tip before use.



43. REMOVE COAT HOOK

(a) Using a screwdriver, detach the claw and remove bolt and coat hook.
HINT:
Tape the screwdriver tip before use.



44. REMOVE ROOF HEADLINING ASSEMBLY

(a) Using a clip remover, remove the 2 clips.
(b) Detach the 26 fasteners and remove the headlining.
(c) Remove the tape and the wire harness.

45. REMOVE SIDE RAIL SPACER FRONT LH (w/o Curtain Shield Airbag)

46. REMOVE SIDE RAIL SPACER FRONT RH (w/ Curtain Shield Airbag)

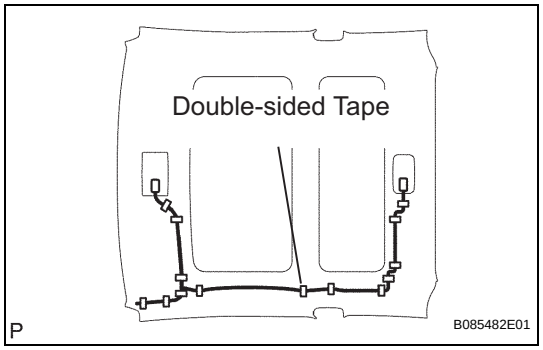
47. REMOVE SIDE RAIL SPACER REAR LH (w/o Curtain Shield Airbag)

48. REMOVE SIDE RAIL SPACER REAR RH (w/o Curtain Shield Airbag)

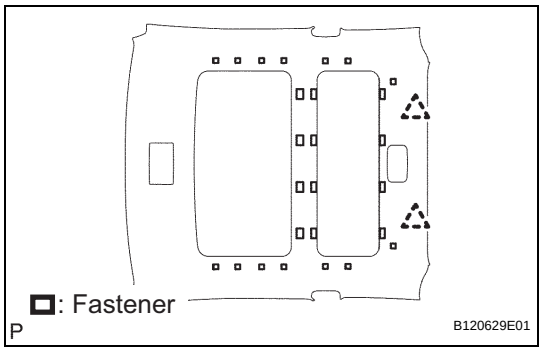
INSTALLATION

HINT:
A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

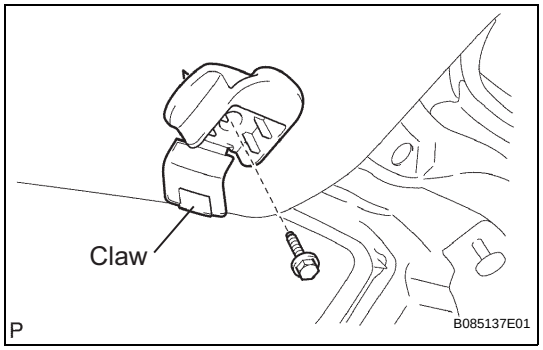
1. **INSTALL SIDE RAIL SPACER FRONT LH (w/o Curtain Shield Airbag)**
2. **INSTALL SIDE RAIL SPACER FRONT RH (w/o Curtain Shield Airbag)**
3. **INSTALL SIDE RAIL SPACER REAR LH (w/o Curtain Shield Airbag)**
4. **INSTALL SIDE RAIL SPACER REAR RH (w/o Curtain Shield Airbag)**
5. **INSTALL ROOF HEADLINING ASSEMBLY**
   (a) Attach the wire harness to the headlining with tape as shown in the illustration.
   HINT:
   Be careful that dirt and foreign matter do not contaminate the tape's adhesive.
   (b) Attach the roof wire harness with tape.
   NOTICE:
   Attach the roof wire harness securely.



   (c) Attach the 26 fasteners to install the headlining.
   (d) Install the 2 clips.



6. **INSTALL COAT HOOK**
   (a) Install the coat hook with the bolt and attach the claw.



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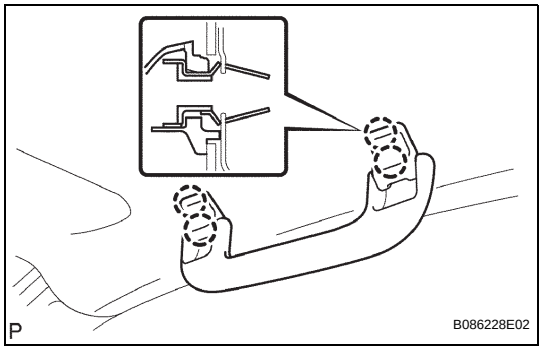
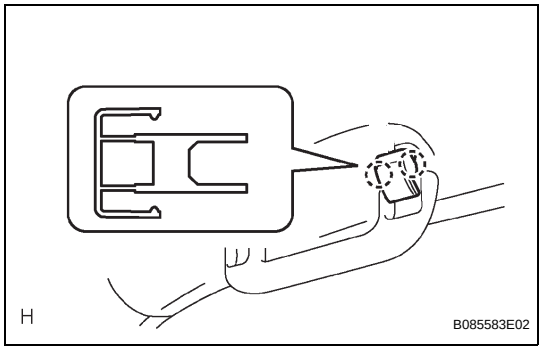


7. INSTALL ASSIST GRIP SUB-ASSEMBLY
(a) Attach the 4 claws to install the assist grip.



8. INSTALL ASSIST GRIP COVER
(a) Attach the 4 claws to install the 2 covers.

9. INSTALL VISOR HOLDER LH
(a) Install the visor holder by turning it clockwise.

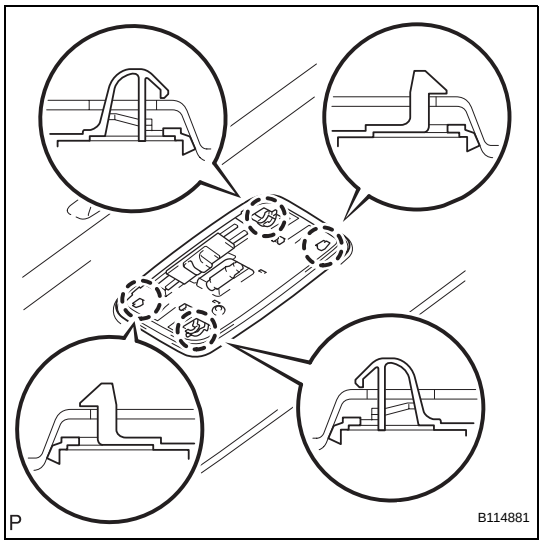
10. INSTALL VISOR HOLDER RH
(a) Install the visor holder by turning it clockwise.

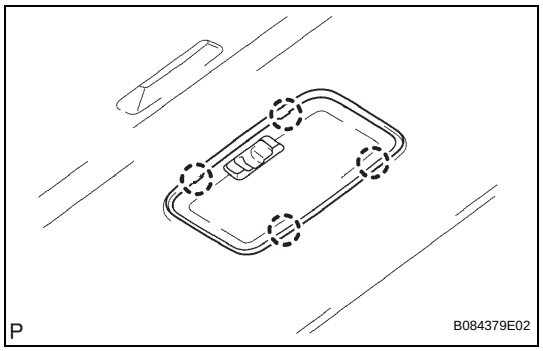
11. INSTALL LH VISOR ASSEMBLY
(a) Install the visor with the 2 screws.

12. INSTALL RH VISOR ASSEMBLY
(a) Install the visor with the 2 screws.

13. INSTALL NO. 2 ROOM LIGHT ASSEMBLY
(a) Attach the light to the deck trim side panel LH.

14. INSTALL NO. 1 ROOM LIGHT ASSEMBLY
(a) Connect the room light connector.
(b) Attach the 4 claws to install the light.

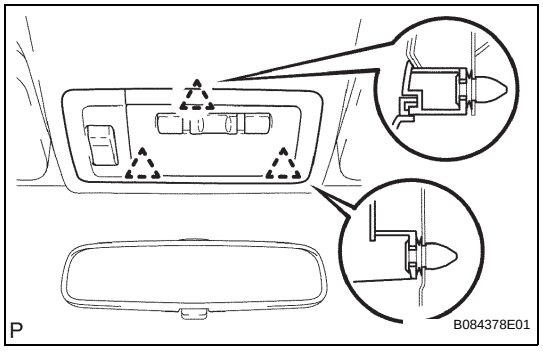




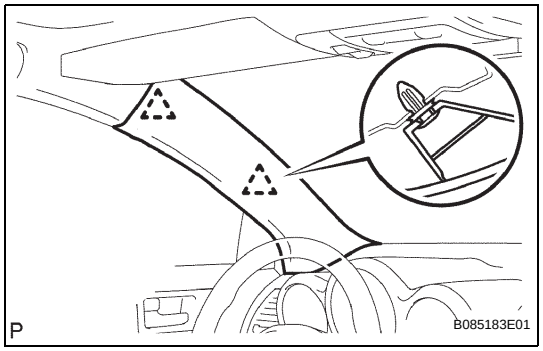
(c) Attach the 4 claws to install the lens.

15. INSTALL MAP LIGHT ASSEMBLY

(a) Connect the map light connector.

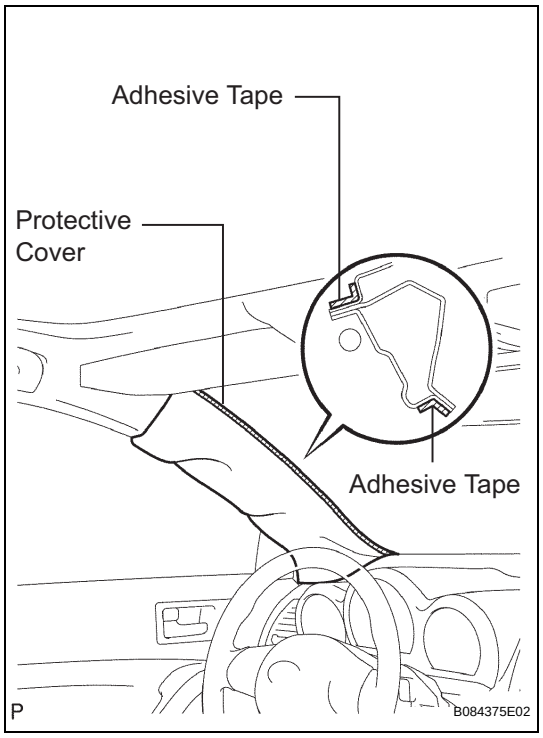


(b) Attach the 3 clips to install the light.



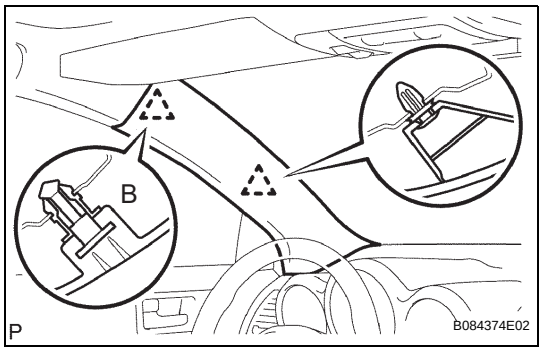
16. INSTALL FRONT PILLAR GARNISH LH

(a) w/o Curtain shield airbag:
Attach the 2 clips to install the garnish.



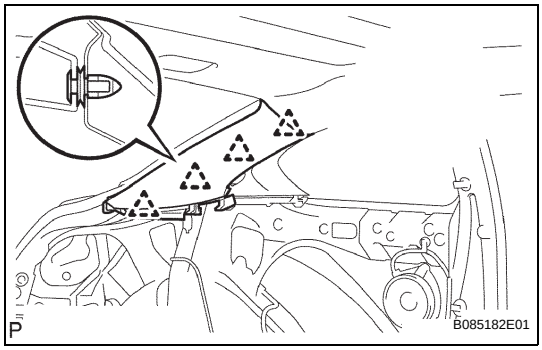
(b) w/ Curtain shield airbag:
(1) Remove the protective cover.

IR

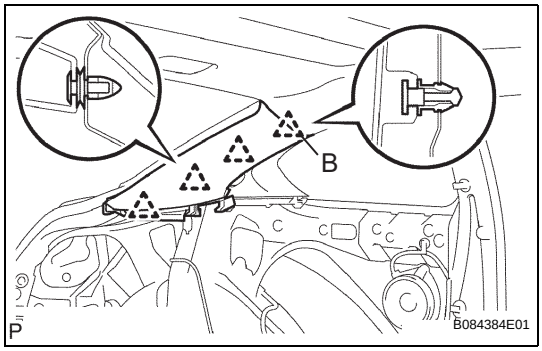


(2) Attach the 2 clips to install the garnish.
HINT:
Clip B cannot be reused.

17. INSTALL FRONT PILLAR GARNISH RH
HINT:
Use the same procedures described for the LH side.

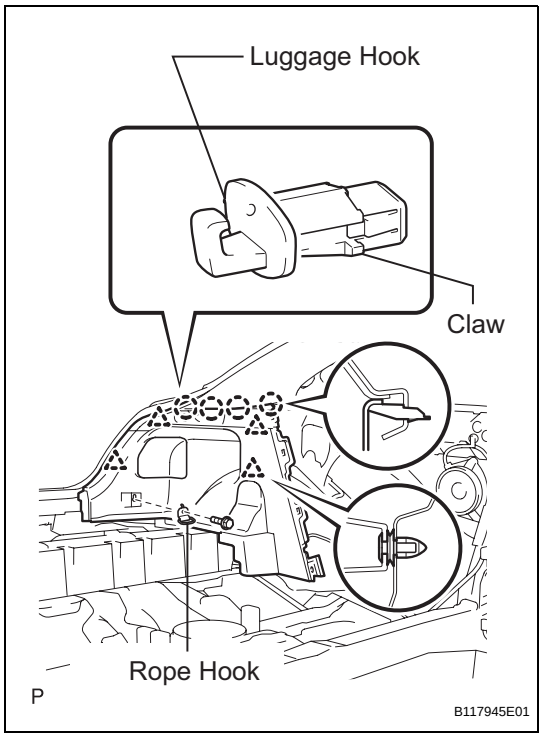


18. INSTALL ROOF SIDE GARNISH ASSEMBLY INNER LH
(a) w/o Curtain shield airbag:
Attach the 4 clips to install the garnish.



(b) w/ Curtain shield airbag:
Attach the 4 clips to install the garnish.
HINT:
Clip B cannot be reused.

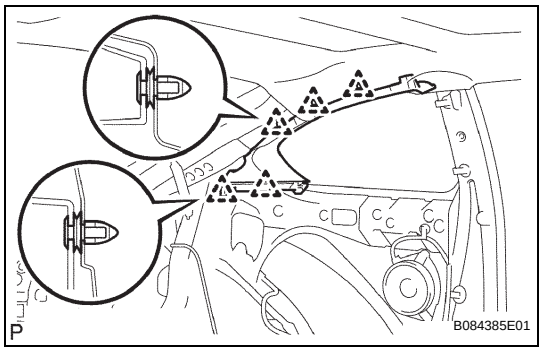
19. INSTALL ROOF SIDE GARNISH ASSEMBLY INNER RH
HINT:
Use the same procedures described for the LH side.



20. INSTALL DECK TRIM SIDE PANEL ASSEMBLY LH
(a) Attach the 4 claws and 4 clips to install the side panel.
(b) Install the rope hook with the bolt.
(c) Install the luggage hook.

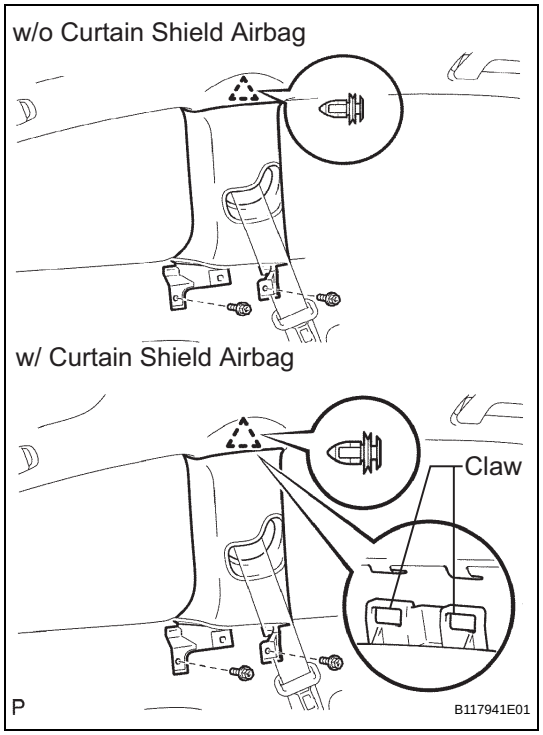
21. INSTALL DECK TRIM SIDE PANEL ASSEMBLY RH
HINT:
Use the same procedures described for the LH side.

IR



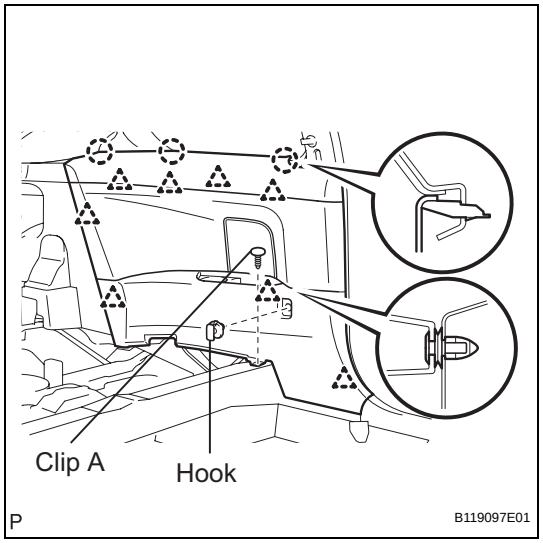
22. **INSTALL ROOF SIDE GARNISH INNER LOWER LH**
    (a) Attach the 5 clips to install the garnish.

23. **INSTALL ROOF SIDE GARNISH INNER LOWER RH**
    HINT:
    Use the same procedures described for the LH side.



24. **INSTALL CENTER PILLAR GARNISH LH**
    (a) w/o Curtain shield airbag:
    Attach the clip to install the garnish.
    (b) w/ Curtain shield airbag:
    Attach the 2 claws and clip to install the garnish.
    (c) Install the 2 screws.

25. **INSTALL CENTER PILLAR GARNISH RH**
    HINT:
    Use the same procedures described for the LH side.



26. **INSTALL NO. 1 SIDE TRIM ASSEMBLY LH**
    (a) Attach the 3 claws and 8 clips to install the trim.
    (b) Attach the clip labeled A.
    (c) Install the hook.
    (d) Install the 2 floor anchor bolts (front and rear seat belt).

27. **INSTALL NO. 1 SIDE TRIM ASSEMBLY RH**
    HINT:
    Use the same procedures described for the LH side.

28. **INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH**

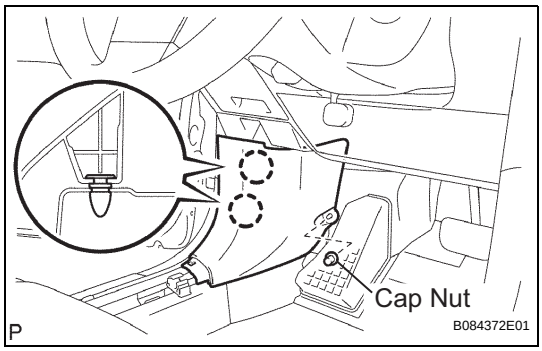
29. **INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH**

30. **INSTALL REAR SEATBACK ASSEMBLY LH (See page SE-28)**

31. **INSTALL REAR SEATBACK ASSEMBLY RH (See page SE-28)**

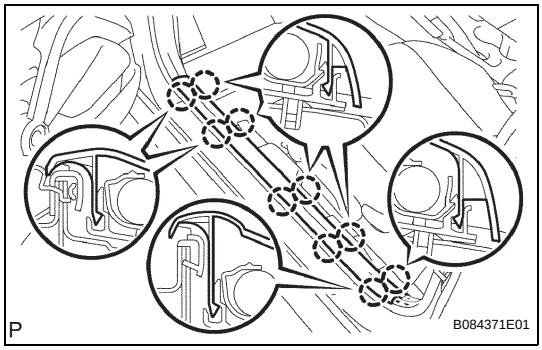
32. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**

IR



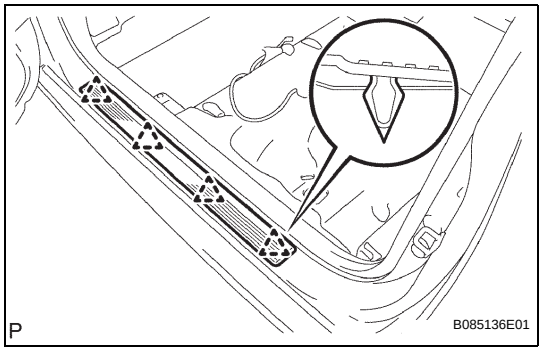
33. INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH
(a) Attach the 2 clips to install the trim.
(b) Install the cap nut.

34. INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH
HINT:
Use the same procedures described for the LH side.



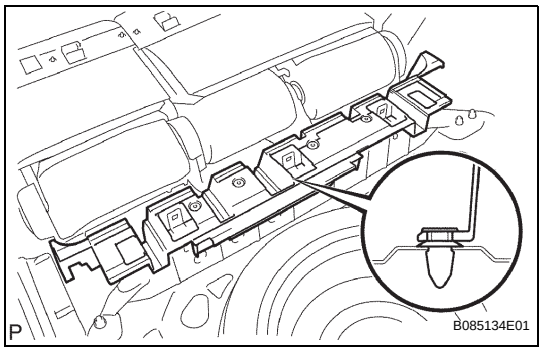
35. INSTALL FRONT DOOR SCUFF PLATE LH
(a) Attach the 10 claws to install the scuff plate.

36. INSTALL FRONT DOOR SCUFF PLATE RH
HINT:
Use the same procedures described for the LH side.

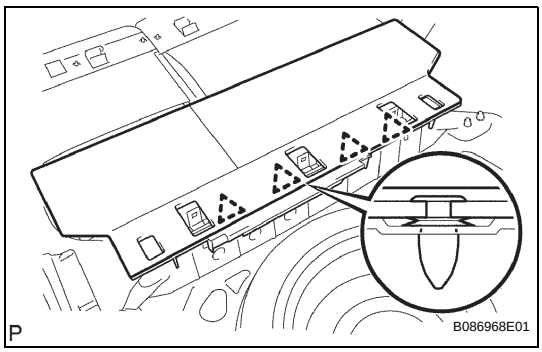


37. INSTALL FRONT DOOR SCUFF PLATE OUTSIDE LH
(a) Attach the 4 clips to install the scuff plate.

38. INSTALL FRONT DOOR SCUFF PLATE OUTSIDE RH
HINT:
Use the same procedures described for the LH side.



39. INSTALL REAR NO. 1 FLOOR BOARD
(a) Attach the clip to install the board.



40. INSTALL NO. 1 DECK BOARD
(a) Attach the 4 clips to install the deck board.
(b) Install the rope hook with the bolt.

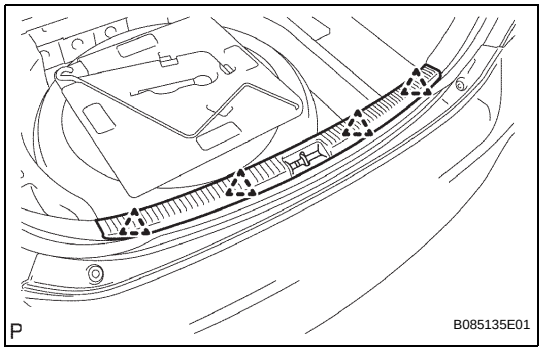
41. INSTALL DECK FLOOR BOX REAR

42. INSTALL DECK FLOOR BOX LH
(a) Install the box with the 2 clips.

43. INSTALL DECK FLOOR BOX RH
(a) Install the box with the 2 clips.

44. INSTALL SPARE WHEEL COVER ASSEMBLY

IR



45. INSTALL BACK DOOR WEATHERSTRIP

46. INSTALL BACK DOOR SCUFF PLATE

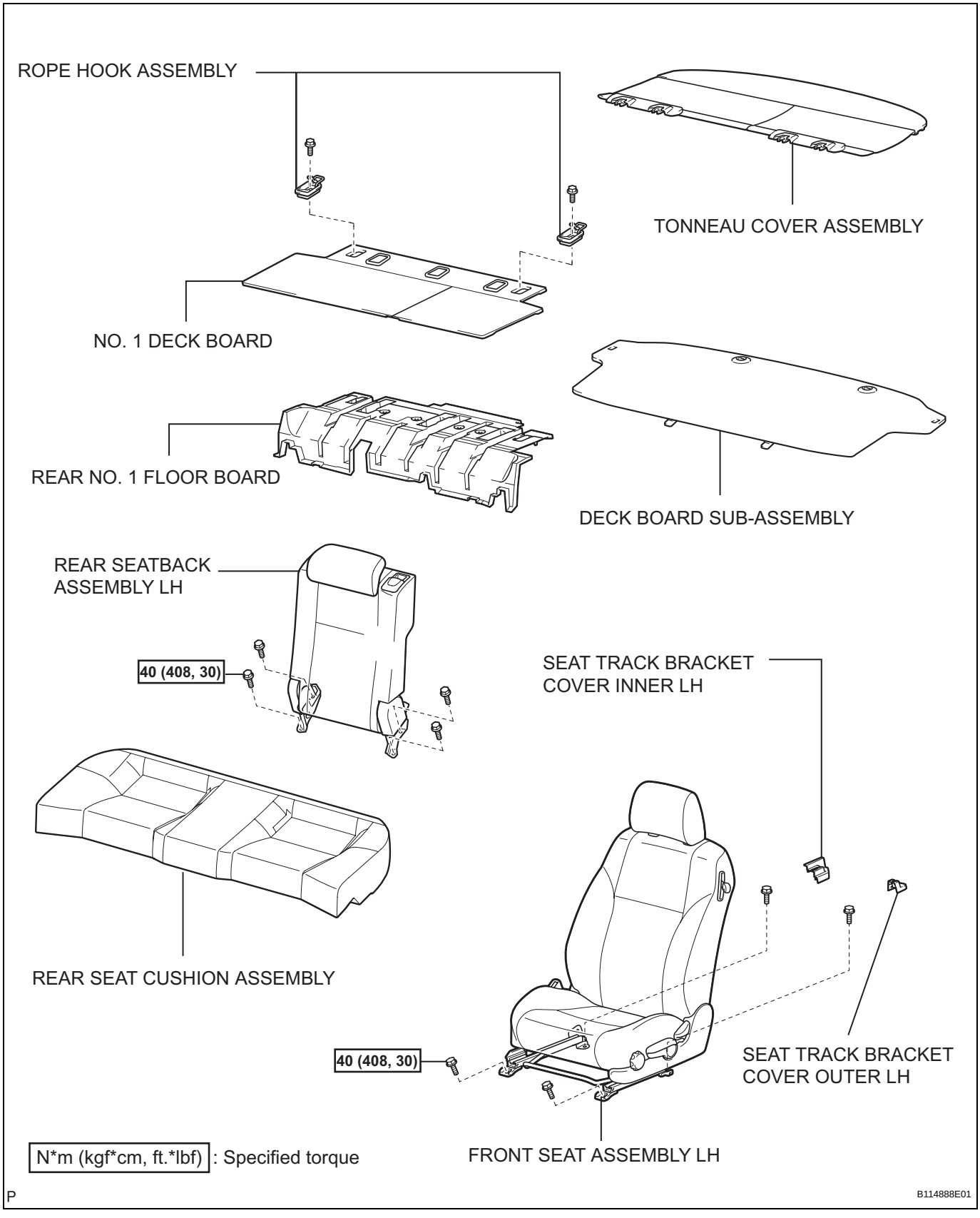
(a) Attach the 4 clips to install the scuff plate.

47. INSTALL DECK BOARD SUB-ASSEMBLY

48. INSTALL TONNEAU COVER ASSEMBLY

FUEL LID LOCK CONTROL

COMPONENTS



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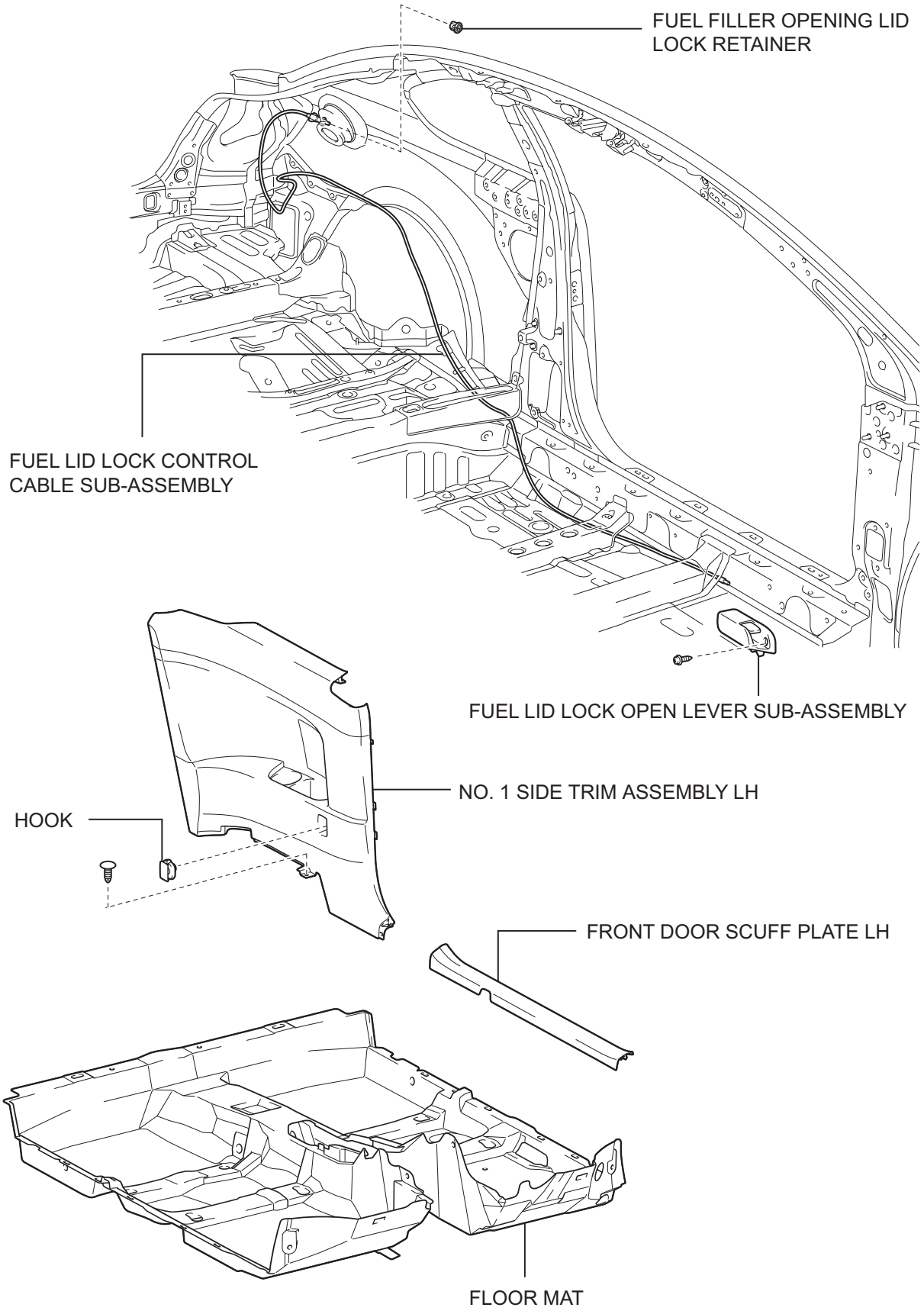
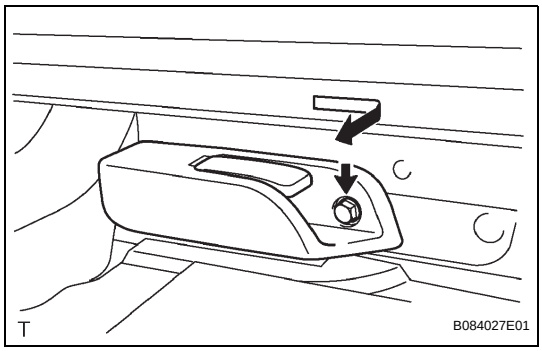

FUEL FILLER OPENING LID LOCK RETAINER
FUEL LID LOCK CONTROL CABLE SUB-ASSEMBLY
FUEL LID LOCK OPEN LEVER SUB-ASSEMBLY
NO. 1 SIDE TRIM ASSEMBLY LH
HOOK
FRONT DOOR SCUFF PLATE LH
FLOOR MAT
P
B114889E01

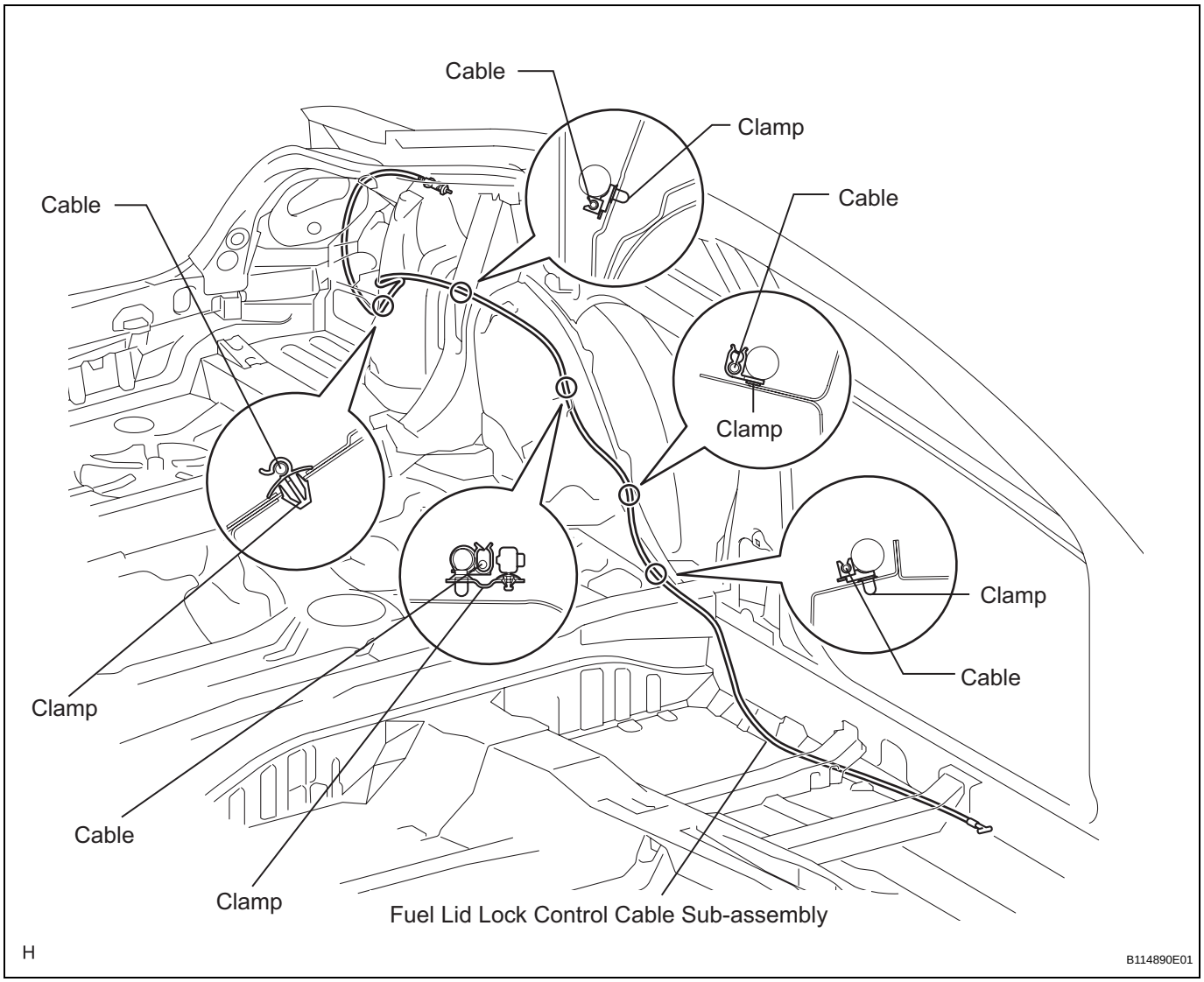
IR



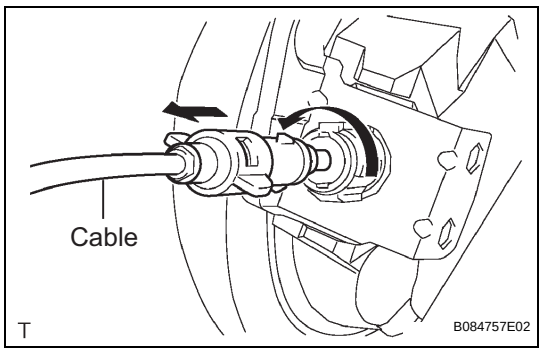
REMOVAL

1. **REMOVE FUEL LID LOCK OPEN LEVER SUB-ASSEMBLY**
   (a) Remove the screw.
   (b) Remove the cover in the direction indicated by the arrow mark in the illustration.
   (c) Remove the cable.
2. **REMOVE FRONT SEAT ASSEMBLY LH**
   (a) Remove the front seat (see page SE-5).
3. **REMOVE TONNEAU COVER ASSEMBLY**
4. **REMOVE DECK BOARD SUB-ASSEMBLY**
5. **REMOVE NO. 1 DECK BOARD (See page IR-8)**
6. **REMOVE REAR NO. 1 FLOOR BOARD (See page IR-9)**
7. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
8. **REMOVE REAR SEATBACK ASSEMBLY LH (See page SE-17)**
9. **REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-9)**
10. **REMOVE NO. 1 SIDE TRIM ASSEMBLY LH (See page IR-10)**
11. **REMOVE FUEL LID LOCK CONTROL CABLE SUB-ASSEMBLY**
    (a) Remove the floor mat.
    HINT:
    It is not necessary to fully remove the floor mat. Partially remove it so that the cable can be removed later.

(b) Remove the cable from the clamps as shown in the illustration.



(c) Detach the claws and remove the cable.



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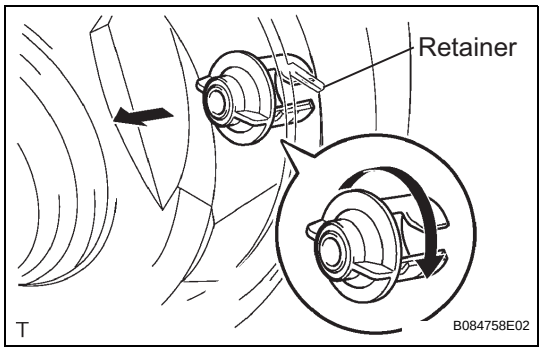
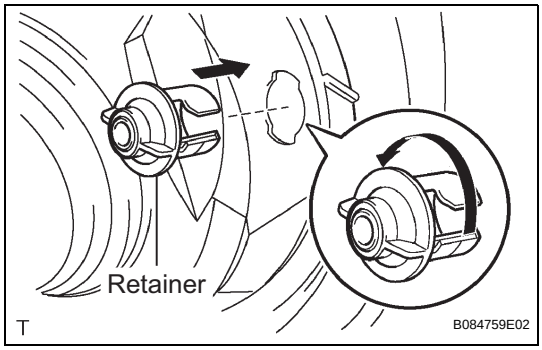


12. REMOVE FUEL FILLER OPENING LID LOCK RETAINER

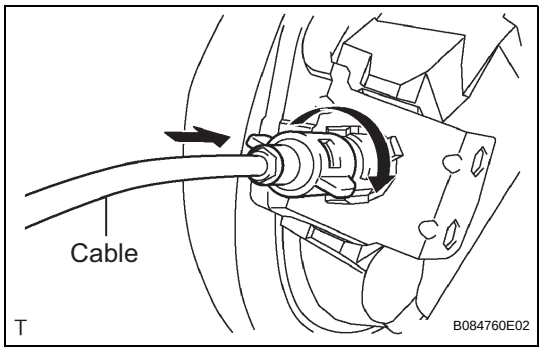
(a) Remove the lock retainer as shown in the illustration.



INSTALLATION

1. INSTALL FUEL FILLER OPENING LID LOCK RETAINER

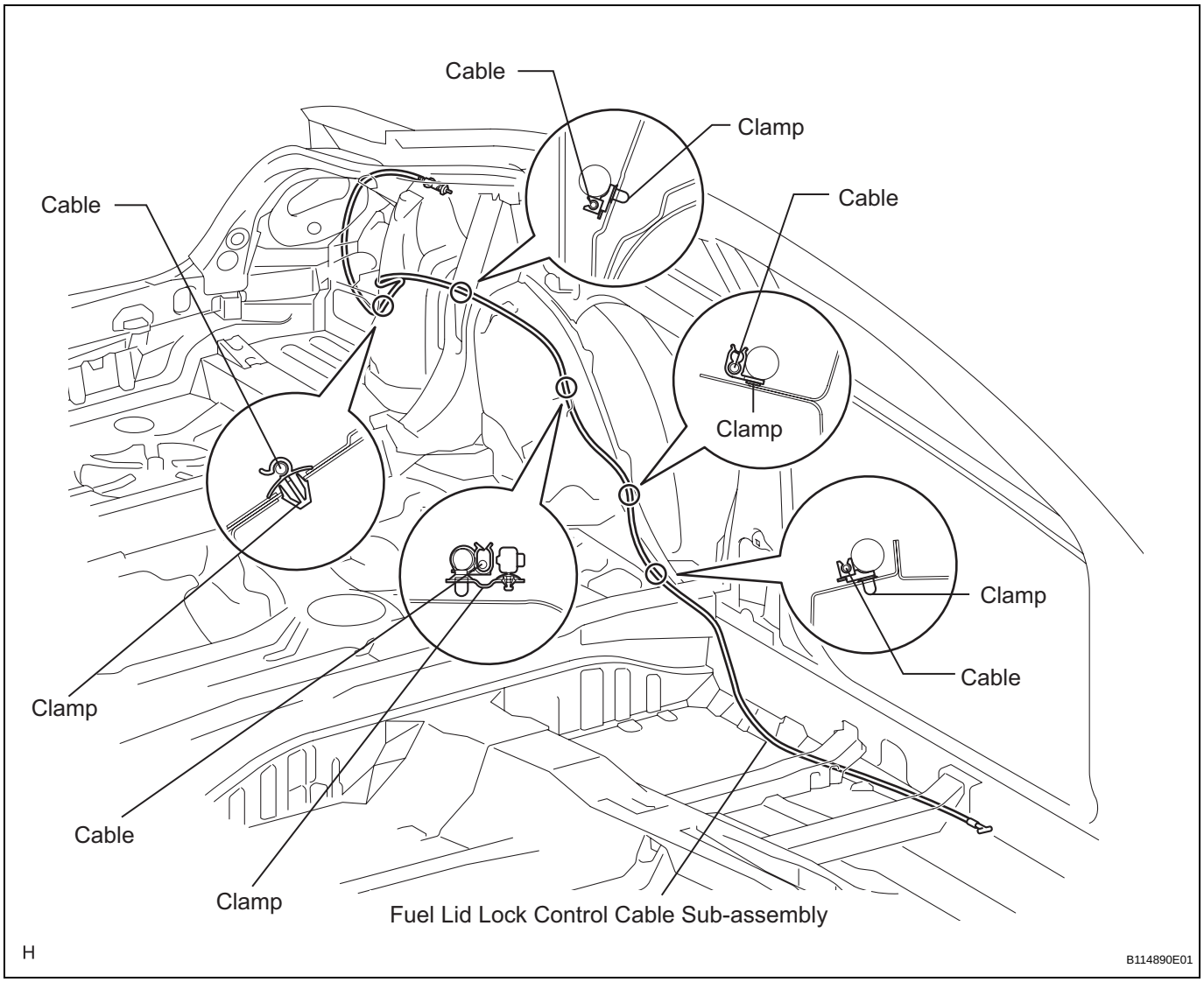
(a) Install the lock retainer as shown in the illustration.



2. INSTALL FUEL LID LOCK CONTROL CABLE SUB-ASSEMBLY

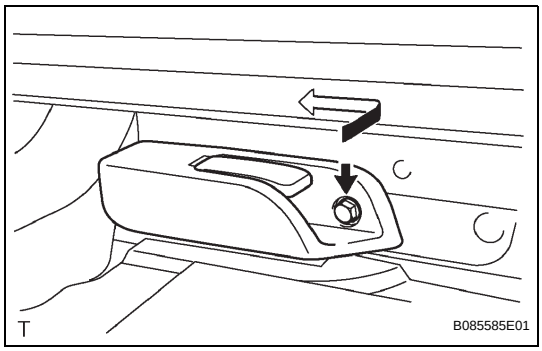
(a) Install the cable and turn it clockwise, as shown in the illustration.

(b) Install the cable to the clamps as shown in the illustration.



(c) Install the floor mat.

3. **INSTALL NO. 1 SIDE TRIM ASSEMBLY LH (See page IR-19)**
4. **INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-20)**
5. **INSTALL REAR SEATBACK ASSEMBLY LH (See page SE-28)**
6. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**
7. **INSTALL REAR NO. 1 FLOOR BOARD (See page IR-20)**
8. **INSTALL NO. 1 DECK BOARD (See page IR-20)**
9. **INSTALL DECK BOARD SUB-ASSEMBLY**
10. **INSTALL TONNEAU COVER ASSEMBLY**



11. INSTALL FRONT SEAT ASSEMBLY LH

(a) Install the front seat (see page SE-11).

12. INSTALL FUEL LID LOCK OPEN LEVER SUB-ASSEMBLY

(a) Install the cable.

(b) Install the cover in the direction indicated by arrow mark.

(c) Install the screw.

HOW TO USE THIS MANUAL

GENERAL INFORMATION

1. GENERAL DESCRIPTION

(a) This manual is written in accordance with SAE J2008.
  (1) Diagnosis
  (2) Removing / Installing, Replacing, Disassembling / Reassembling, Checking and Adjusting
  (3) Final Inspection

(b) The following procedures are omitted from this manual. However, these procedures must be performed.
  (1) Use a jack or lift to perform operations.
  (2) Clean all removed parts.
  (3) Perform a visual check.

2. INDEX

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

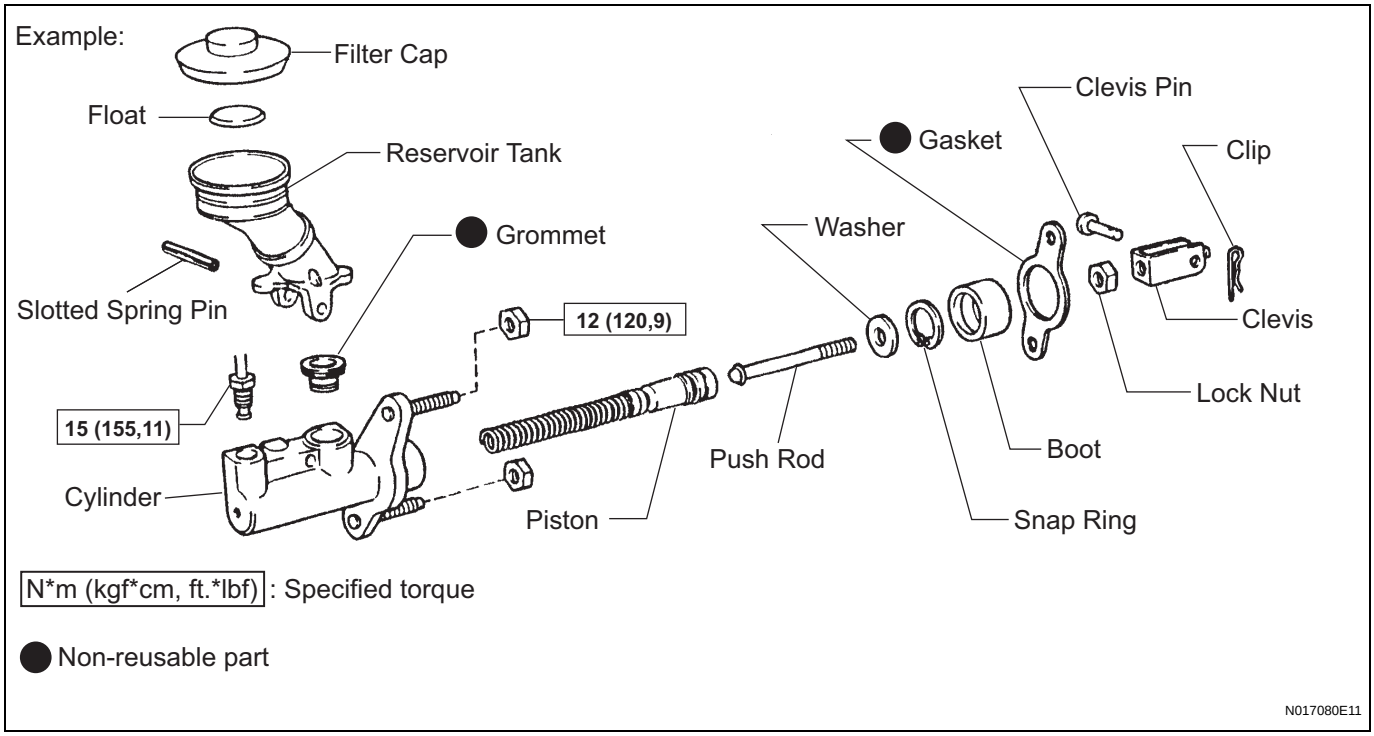
3. PREPARATION

(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 working procedures 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	• 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

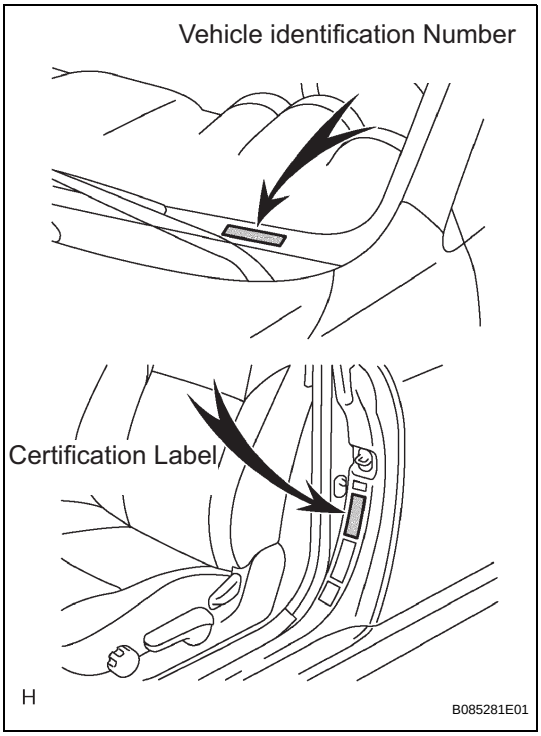
(a) The units used in this manual comply with the International System of Units (SI UNIT) standard. Units from the metric system and the English system are also provided.
Example:
Torque: 30 N*m (310 kgf*cm, 22 ft.*lbf)

IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION AND SERIAL NUMBERS

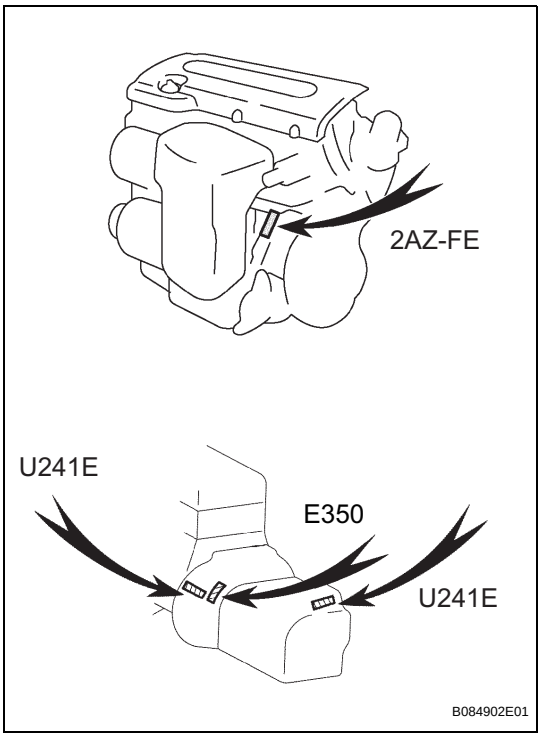
1. VEHICLE IDENTIFICATION NUMBER

(a) The vehicle identification number is stamped on the vehicle body and on the certification label, as shown in the illustration.
(1) Vehicle Identification Number
(2) Certification Label



2. ENGINE SERIAL NUMBER AND TRANSAXLE SERIAL NUMBER

(a) The engine serial number is stamped on the cylinder block of the engine and the transaxle serial number is stamped on the housing as shown in the illustration.
(1) Engine Serial Number
(2) Transaxle Serial Number

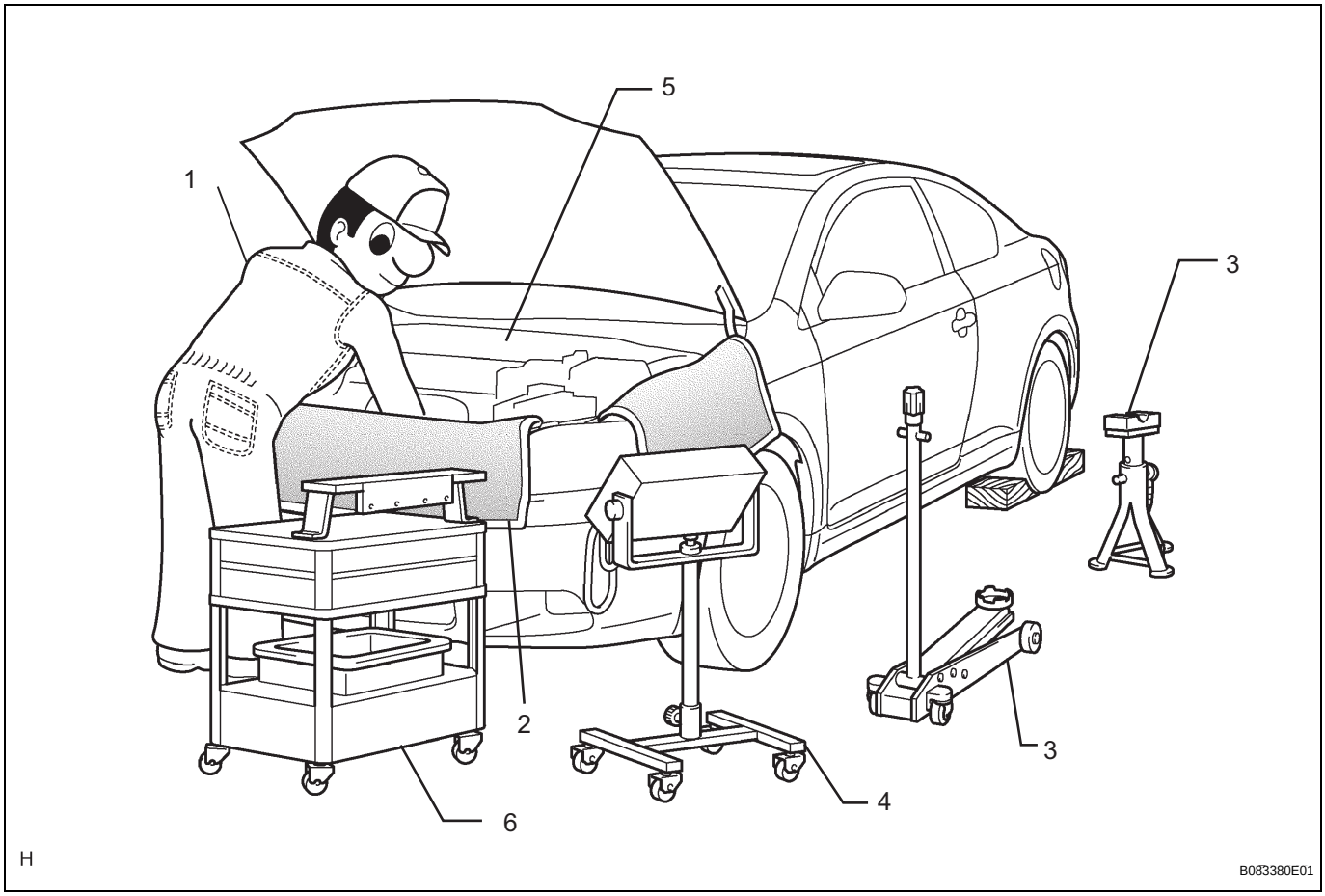


REPAIR INSTRUCTION

PRECAUTION

1. BASIC REPAIR HINT

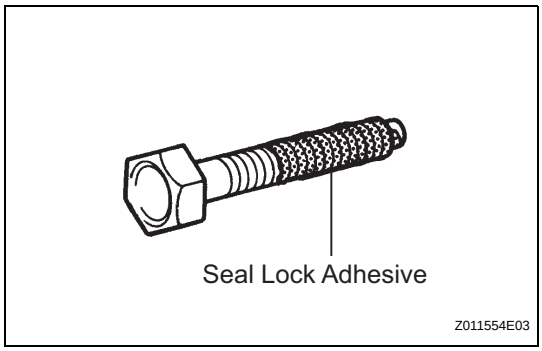
(a) HINTS ON OPERATIONS



1	Attire	• Always wear a clean uniform. • Hat and safety shoes must be worn.
2	Vehicle protection	Prepare a grille cover, fender cover, seat cover and floor mat before starting the operation.
3	Safe operation	• When working with 2 or more persons, be sure to check safety for 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 location with a safety stand. • When lifting up the vehicle, use appropriate safety equipment.
4	Preparation of tools and measuring gauge	Before starting operation, prepare a tool stand, SST, gauge, oil and parts for replacement.
5	Removal and installation, disassembly and assembly operations	• Diagnose with a thorough understanding of proper procedures and of the reported problem. • Before removing the parts, check the general condition of the assembly and for deformation and damage. • When the assembly is complicated, take notes. For example, note the total number of electrical connections, bolts, or hoses removed. Add matchmarks to insure 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	• Place the removed parts in a separate box to avoid mixing them up with the 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.

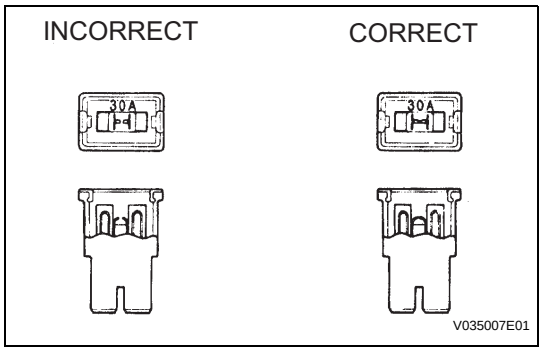
(b) JACKING UP AND SUPPORTING VEHICLE
(1) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.



(c) PRECOATED PARTS
(1) Precoated parts are bolts and nuts that are coated with a 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 appropriate 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 torques. Always use a torque wrench.



(f) FUSES
(1) When inspecting a fuse, check that the wire of the fuse is not broken.
(2) When replacing fuses, be sure that the new fuse has the correct amperage rating. Do not exceed the rating or use one with a lower rating.

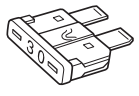
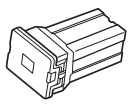
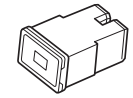
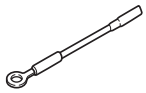
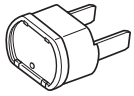
Illustration	Symbol	Part Name	Abbreviation
 N	N	FUSE	FUSE
 N	N	MEDIUM CURRENT FUSE	M-FUSE

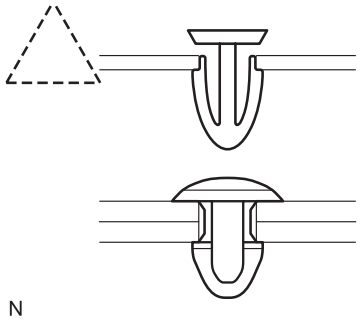
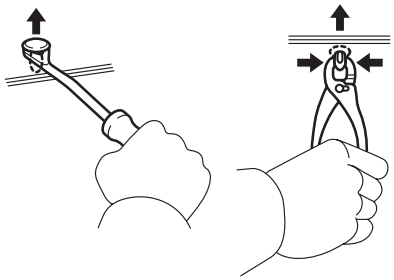
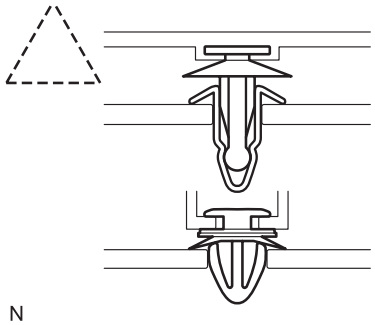
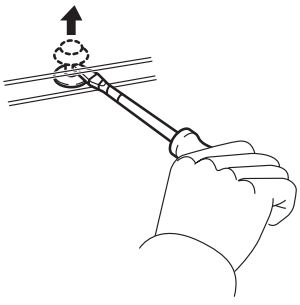
Illustration	Symbol	Part Name	Abbreviation
 N	N	HIGH CURRENT FUSE	H-FUSE
 N	N	FUSIBLE LINK	FL
 N	N	CIRCUIT BREAKER	CB

(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 clip with a new clip.

Shape (Example)	Illustration	Procedures
 N	 N	1. Remove clips with clip remover or pliers.
 N	 N	1. Remove fasteners with clip remover or screwdriver.

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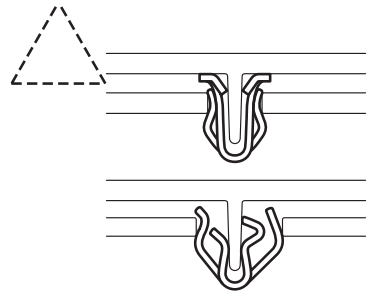
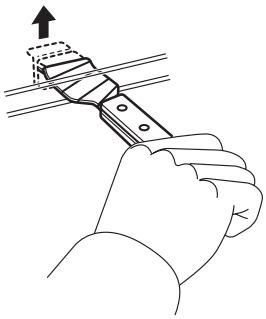
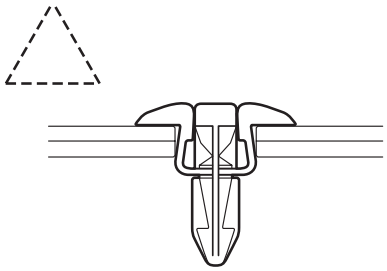
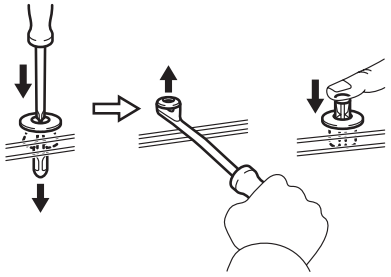
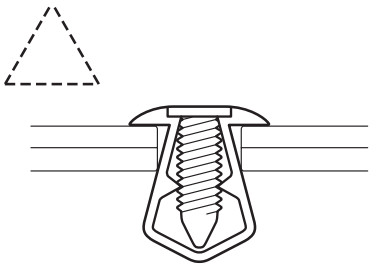
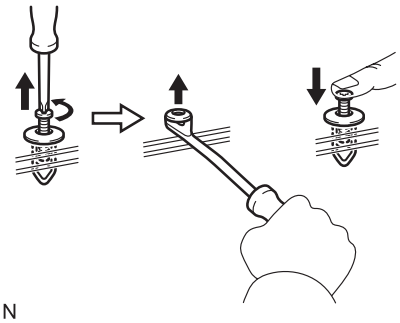
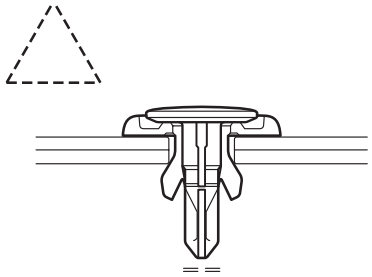
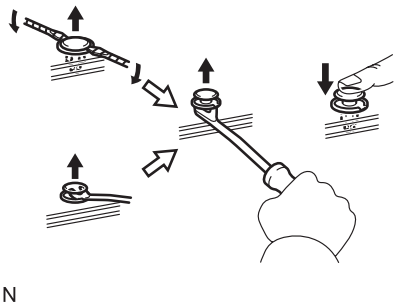
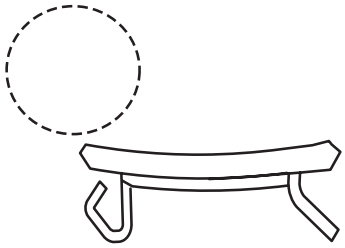
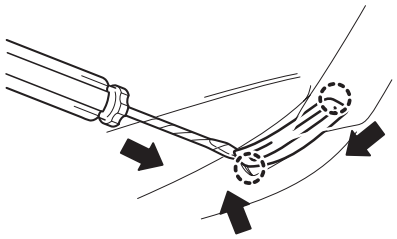
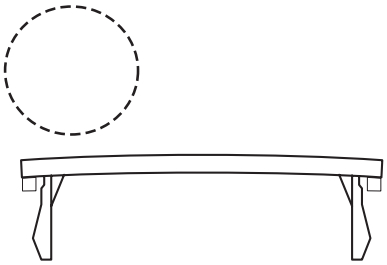
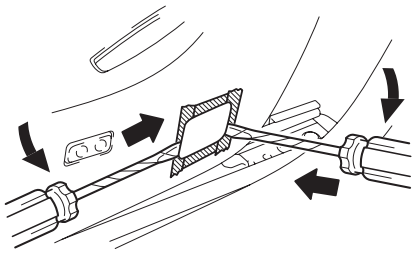
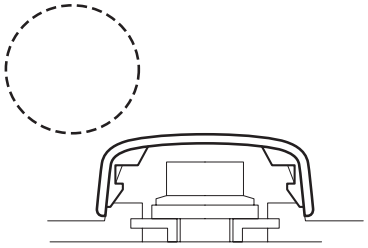
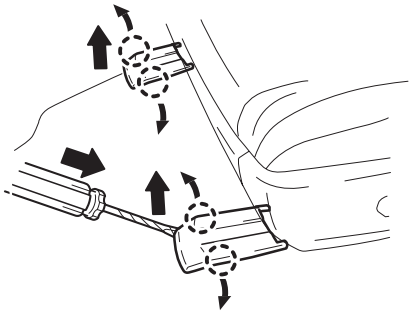
Shape (Example)	Illustration	Procedures
 N	 N	1. Remove clips with wide scraper to prevent panel damage.
 N	 N	1. Remove clips by pushing center pin through and prying out shell.
 N	 N	1. Remove clips by unscrewing center pin and prying out shell.
 N	 N	1. Remove clips by prying out pin and then prying out shell.

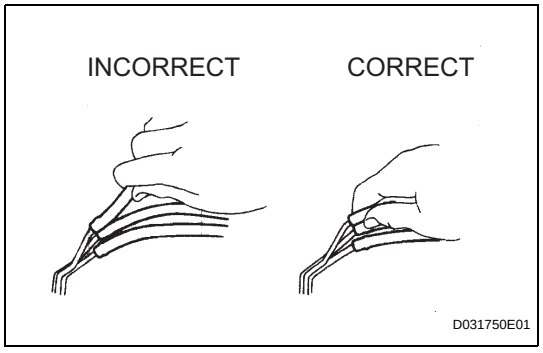
(h) CLAWS

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

HINT:

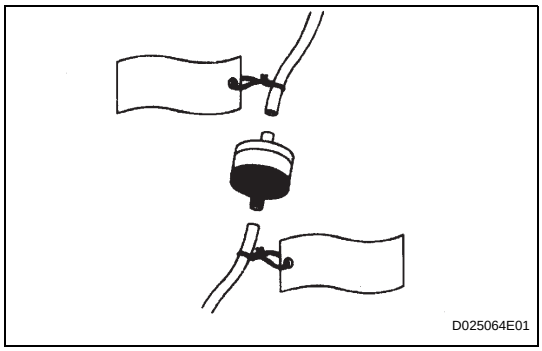
If claws are damaged during a procedure, always replace the damaged claws with a new caps or covers.

Shape (Example)	Illustration	Procedures
		1. Using a screwdriver, detach the claws and remove the cap or covers.
		1. Using a screwdriver, detach the claws and remove the cap or covers.
		1. Using a screwdriver, detach the claws and remove the cap or covers.



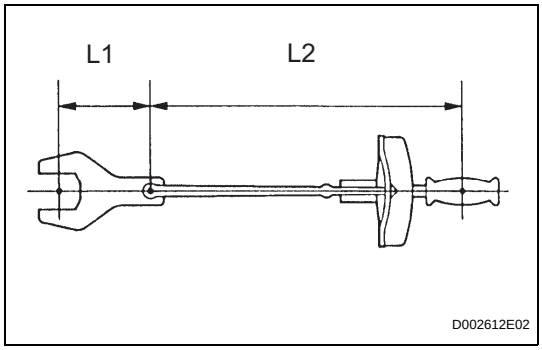
(i) REMOVAL AND INSTALLATION OF VACUUM HOSES

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


D025064E01

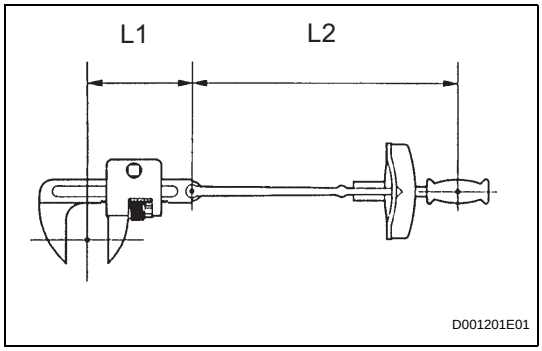
(2) When disconnecting vacuum hoses, use tags to identify where they should be reconnected.
(3) After completing any hose related repairs, double check that the vacuum hoses are properly connected. The label under the hood shows the proper layout.
(4) When using a vacuum gauge, never force the hose onto a connector that is too large. If a hose has been stretched, it may leak air. Use a step-down adapter if necessary.

(j) TORQUE WHEN USING TORQUE WRENCH WITH EXTENSION TOOL



D002612E02

(1) Use the formula below to calculate special torque values for situations where SST or an extension tool is combined with the torque wrench.
Formula:
T' = L2/(L1 + L2) * T



D001201E01

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 the wrench is 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

The SCION tC is equipped with a Supplemental Restraint System (SRS) and seat belt pretensioner.

CAUTION:
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, installation, inspection or replacement of parts), be sure to read the following section carefully.

(a) GENERAL NOTICE

(1) 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 the DTCs before disconnecting the battery.

(2) 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, clock and audio system memory is erased. 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 erasing system memory. The back-up power source may inadvertently power the SRS and cause it to deploy.

(3) In minor collisions where the SRS does not deploy, the steering pad, front passenger airbag assembly, curtain shield airbag assembly, front seat side airbag assembly, instrument panel lower airbag assembly and front seat outer belt assembly with pretensioner should be inspected before further use of the vehicle.

(4) Never use SRS parts from another vehicle. When replacing parts, use new parts.

(5) Before repairs, remove the airbag sensor assemblies if impacts are likely to be applied to the sensor during repairs.

(6) Never disassemble and attempt to repair the steering pad, front passenger airbag assembly, curtain shield airbag assembly, front seat side airbag assembly, instrument panel lower airbag assembly and front seat outer belt assembly with pretensioner.

(7) Replace the steering pad, front passenger airbag assembly, curtain shield airbag assembly, front seat side airbag assembly, instrument panel lower airbag assembly and front seat outer belt assembly with pretensioner if: 1) damage has occurred from being dropped, or 2) cracks, dents or other defects in the case, bracket or connector are present.

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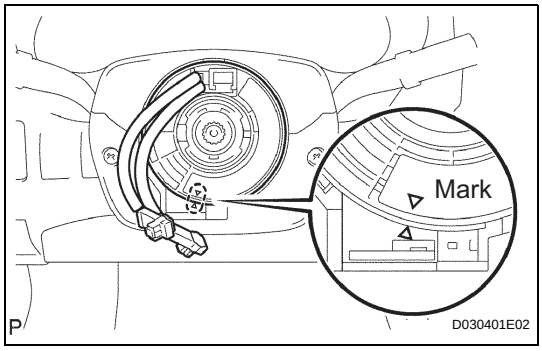
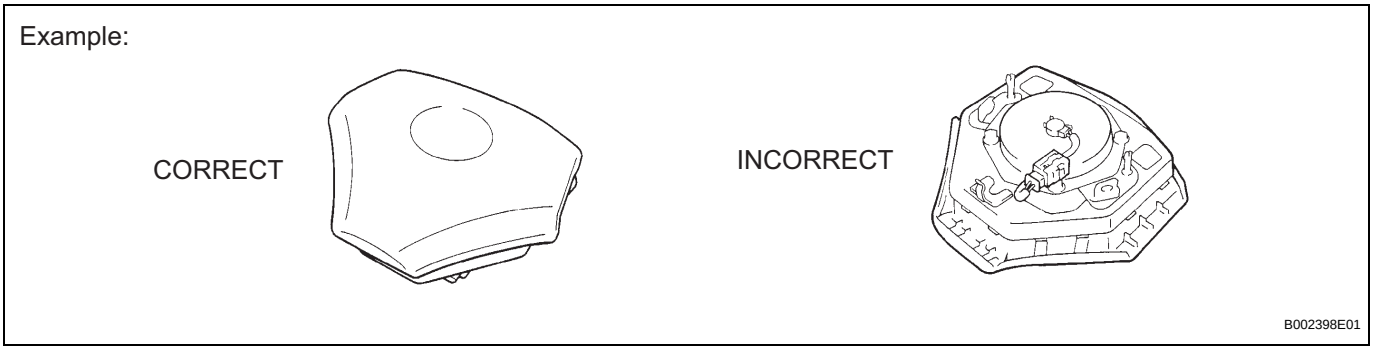
(8) Do not directly expose the airbag sensor assembly or airbag assembly to hot air or flames.
(9) Use a voltmeter / ohmmeter with high impedance (minimum=10 kΩ) for troubleshooting electrical circuits.
(10) Information labels are attached to the SRS components. Follow the instructions on the labels.
(11) After work on the SRS is completed, check the SRS warning light.

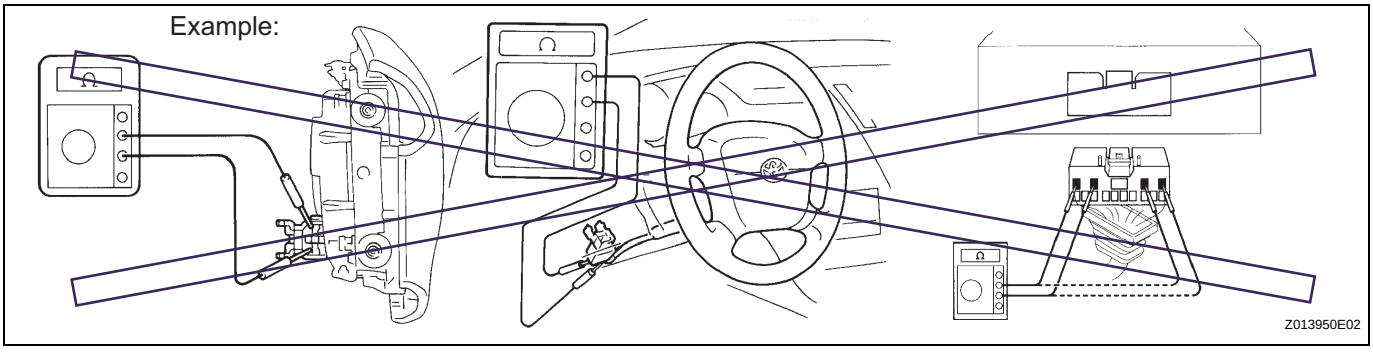


(b) SPIRAL CABLE
(1) The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, as cable disconnection and other problems may occur. Refer to the information about correct installation of the steering wheel.

(c) STEERING PAD
(1) Always place a removed or new steering pad surface upward as shown in the illustration. Placing the horn button with the pad surface facing down could cause a serious accident if the airbag inflates. Also, do not place anything on top of the horn button.



(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



(3) Grease or detergents of any kind should not be applied to the horn button.

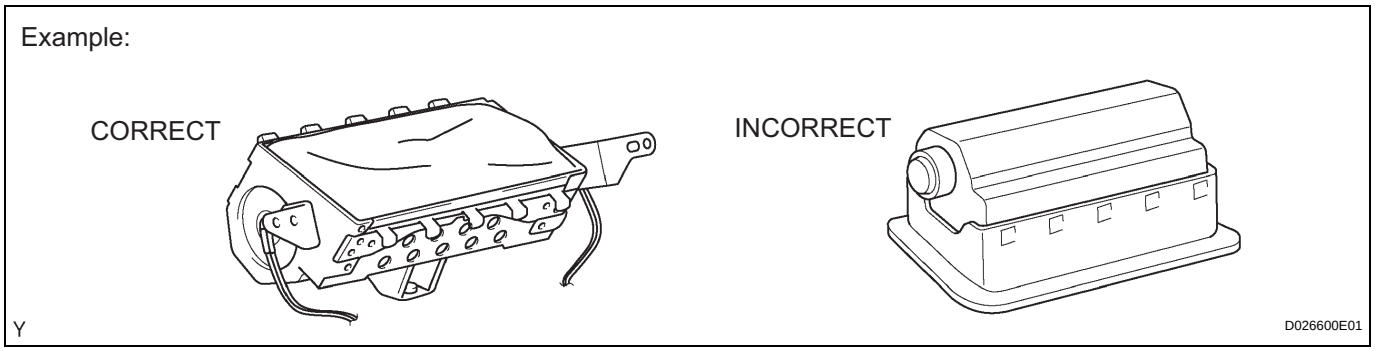
(4) Store the horn button assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

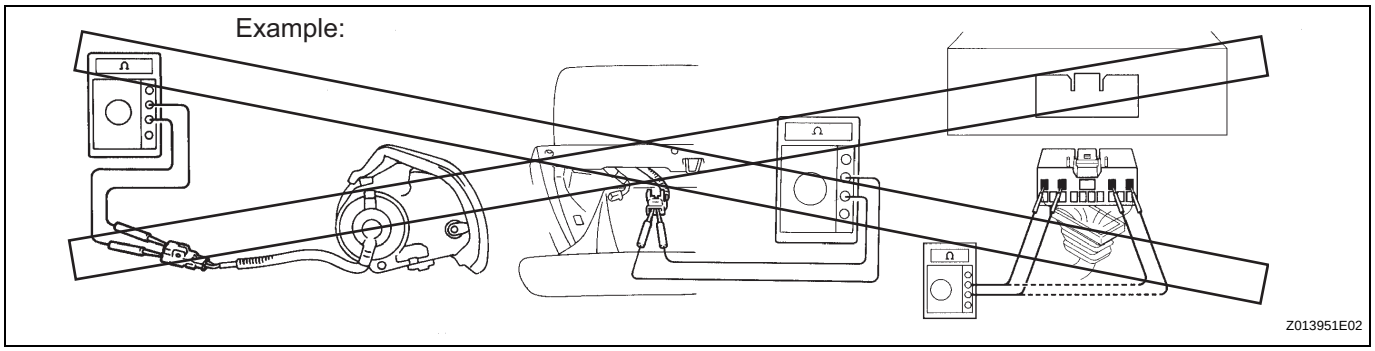
(6) When disposing of the vehicle or the horn button assembly by itself, the airbag should be deployed using SST before disposal. Activate the airbag in a safe place away from electrical noise.

(d) FRONT PASSENGER AIRBAG ASSEMBLY

(1) Always place a removed or new front passenger airbag assembly with the pad surface facing upward as shown in the illustration. Placing the airbag assembly with the airbag inflation direction facing down could cause a serious accident if the airbag inflates.



(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



(3) Grease or detergents of any kind should not be applied to the front passenger airbag assembly.

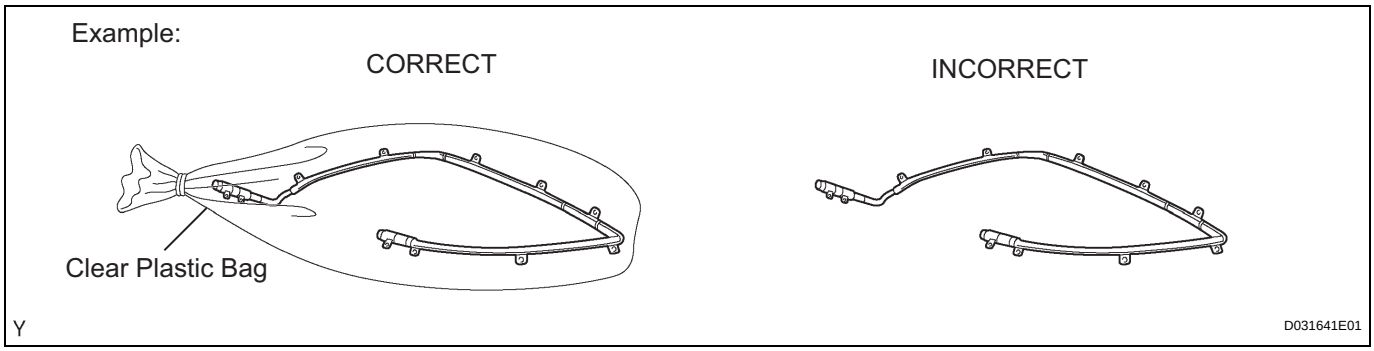
(4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents 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. Activate in a safe place away from electrical noise.

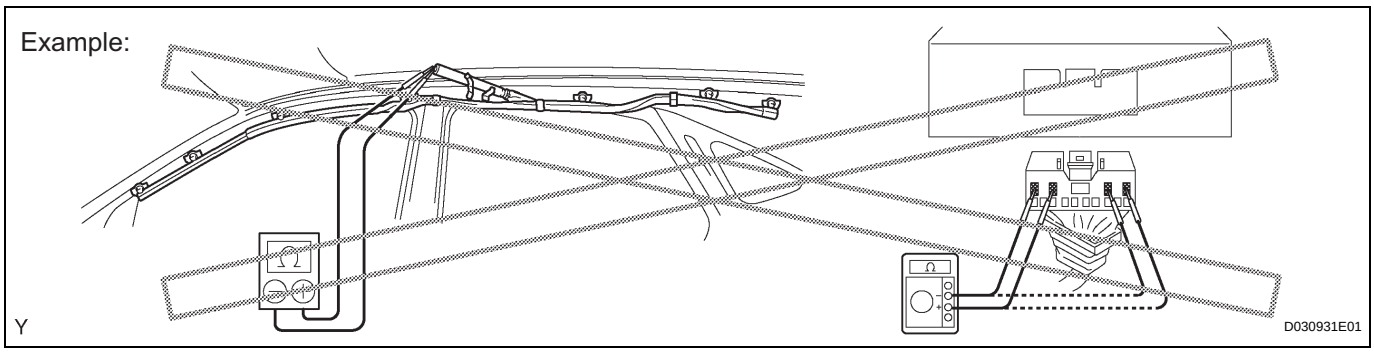
(e) CURTAIN SHIELD AIRBAG ASSEMBLY

(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 is not reusable.
NOTICE:
Never disassemble the curtain shield airbag assembly.

(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



(3) Grease or detergents of any kind should not be applied to the curtain shield airbag assembly.

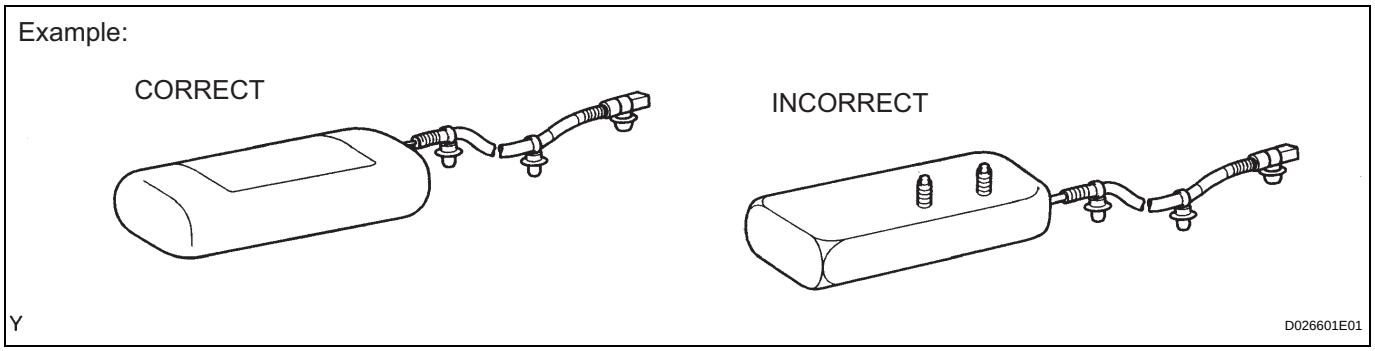
(4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (4 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

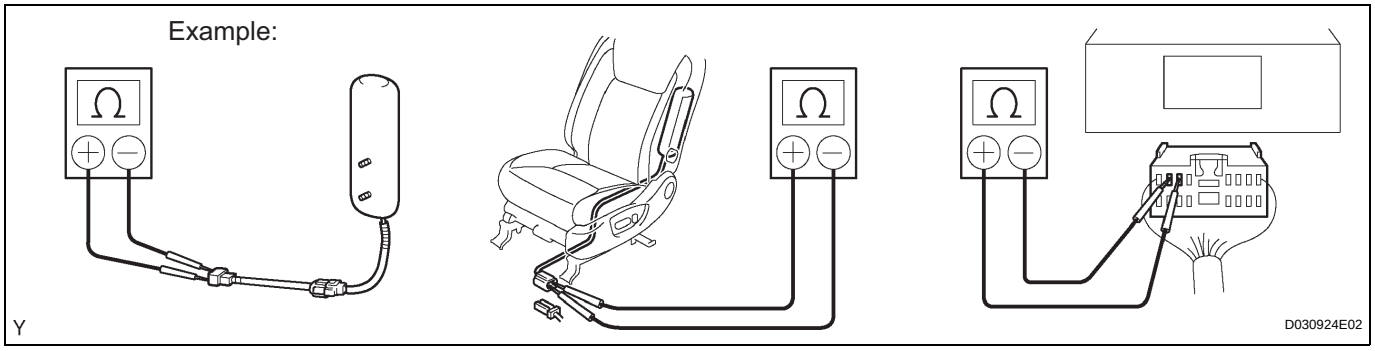
(6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal. Activate in a safe place away from electrical noise.

(f) FRONT SEAT SIDE AIRBAG ASSEMBLY

(1) Always place a removed or new front seat airbag assembly with the airbag inflation direction facing up.



(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



(3) Grease or detergents of any kind should not be applied to the front seat airbag assembly.

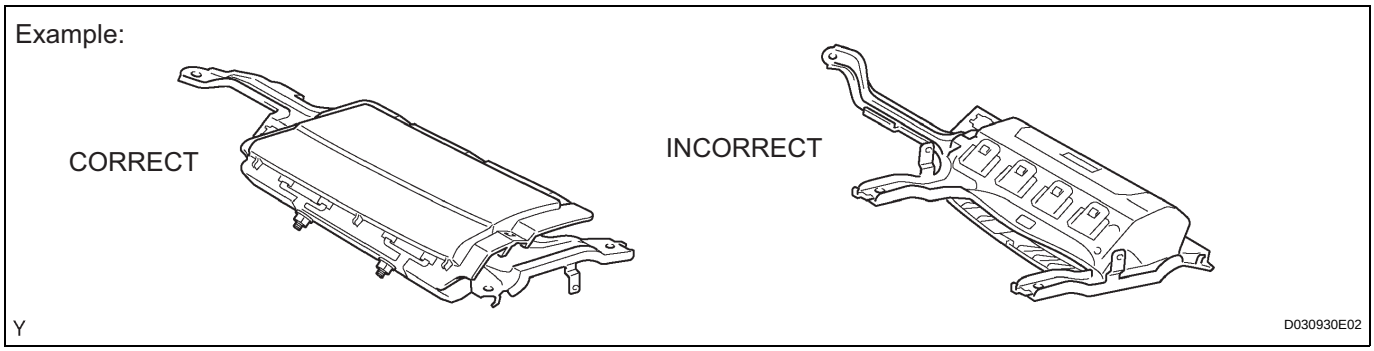
(4) Store the airbag assembly in an area where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

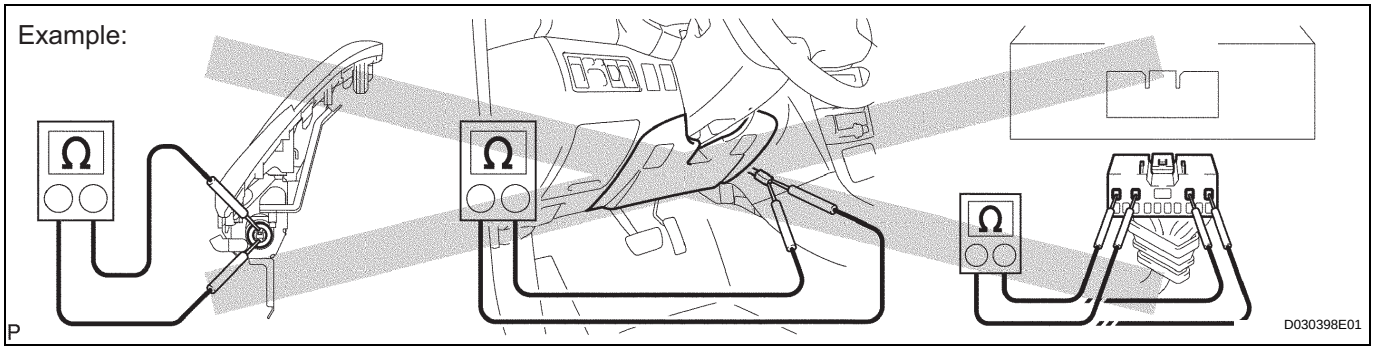
(6) When disposing of a vehicle or the airbag assembly unit by itself, the airbag should be deployed using SST before disposal. Activate in a safe place away from electrical noise.

(g) DRIVER SEAT SIDE KNEE AIRBAG ASSEMBLY AND FRONT PASSENGER SEAT SIDE KNEE AIRBAG ASSEMBLY

(1) Always place a removed or new knee airbag assembly with the airbag inflation direction facing upward. Placing the airbag assembly with the airbag inflation direction facing downward could cause a serious accident if the airbag inflates.



(2) Never measure the resistance of the airbag squib. This may cause the airbag to inflate, which could cause serious injury.



(3) Grease or detergents of any kind should not be applied to the knee airbag assembly.

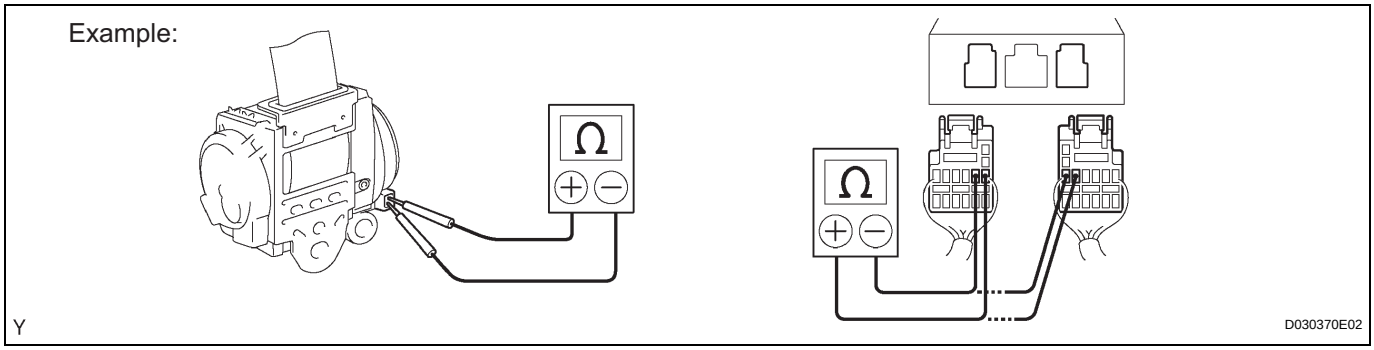
(4) Store the knee airbag assembly where the ambient temperature is below 93°C (200°F), the humidity is not high and there is no electrical noise.

(5) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the airbag deploying due to currents entering the squib wiring.

(6) When disposing of a vehicle or knee airbag assembly unit by itself, the airbag should be inflated using SST before disposal. Activate in a safe place away from electrical noise.

(h) FRONT SEAT OUTER BELT ASSEMBLY with PRETENSIONER

(1) Never measure the resistance of the seat outer belt. This may cause the pretensioner of the seat belt to activate, which could cause serious injury.



(2) Never disassemble the seat outer belt.

(3) Never install the seat outer belt on another vehicle.

(4) Store the seat outer belt 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) When using electric welding anywhere on the vehicle, disconnect the airbag ECU connectors (2 pins). These connectors contain shorting springs. This feature reduces the possibility of the pretensioner deploying due to currents entering the squib wiring.

(6) When disposing of a vehicle or the seat outer belt assembly by itself, the seat outer belt should be activated before disposal. Activate in a safe place away from electrical noise.

(7) As the seat outer belt is hot after the pretensioner is activated, allow some time for it to cool down sufficiently before disposal. Never apply water to try to cool down the seat outer belt.

(8) Grease, detergents, oil or water should not be applied to the front seat outer belt.

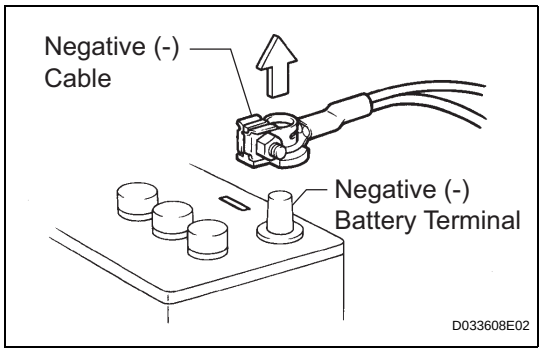
(i) AIRBAG SENSOR ASSEMBLY

(1) Never reuse an airbag sensor assembly that has been involved in a collision where the SRS has deployed.

(2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor placed on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not placed on the floor, 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 set bolts of the airbag sensor assembly.

(j) WIRE HARNESS AND CONNECTOR
(1) The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken, repair or replace it.



3. ELECTRONIC CONTROL

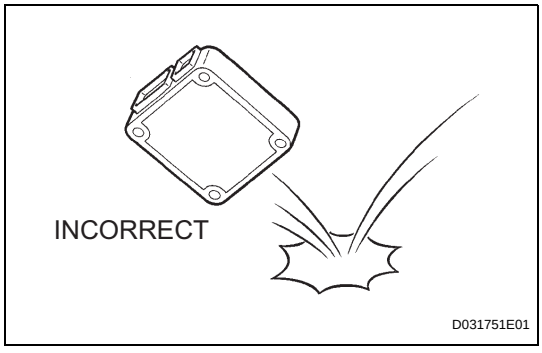
(a) REMOVAL AND INSTALLATION OF BATTERY TERMINAL

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

(1) Before performing electronic work, disconnect the cable from the negative (-) battery terminal to prevent component and wire damage caused by accidental short circuits.
(2) When disconnecting the cable, turn the ignition switch OFF and headlight dimmer 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 are erased when the cable is disconnected from the negative (-) battery terminal. Write down any necessary data before disconnecting the cable.

(b) HANDLING OF ELECTRONIC PARTS
(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 the wires when disconnecting electronic connectors. Pull the connector itself.



(3) Be careful not to 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 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 of a wire connector, insert the tester probe carefully to prevent 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.

(2) Never work in a pit or near a pit as vaporized fuel will collect in those places.

(b) REMOVING AND INSTALLING FUEL SYSTEM PARTS

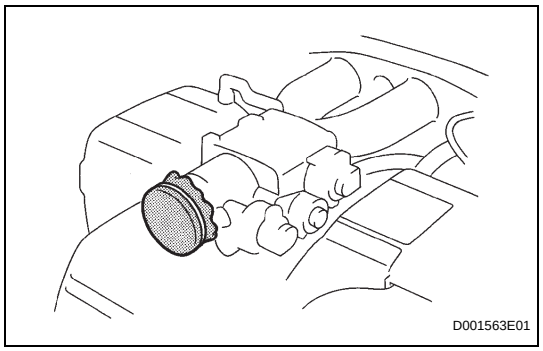
(1) Prepare a fire extinguisher before starting the operation.

(2) To prevent static electricity, install a ground wire to the fuel changer, vehicle and fuel tank, and do not spray the surrounding area with water. Be careful when performing work in this area, as the work 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, working 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.

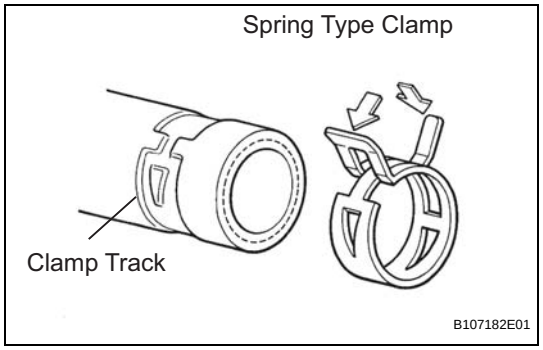


5. REMOVAL AND INSTALLATION OF ENGINE INTAKE PARTS

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

(b) When removing and installing inlet system parts, cover the openings of the removed parts and engine openings. Use gummed tape or other suitable materials.

(c) When installing inlet system parts, check that no metal particles have entered the engine or the installed parts.



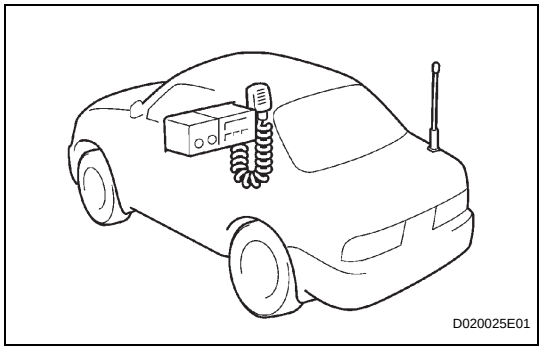
6. HANDLING OF HOSE CLAMPS

(a) Before removing the 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, you may want to spread the tabs slightly after installation by pushing in the direction of the arrows as shown in the illustration.



7. 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 an antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle electronic systems. For details about ECU and sensors locations, refer to the section on the applicable components.

(c) Keep the antenna and feeder separate from other wirings as much as possible. This will prevent signals 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 any high-powered mobile communication system.

8. FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER

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

(a) Use only unleaded gasoline.
(b) Avoid idling the engine for more than 20 minutes.
(c) Avoid performing unnecessary spark jump tests.
  (1) Perform a spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
  (2) While testing, never race the engine.
(d) Avoid a prolonged engine compression measurement. Engine compression measurements must be performed as rapidly as possible.
(e) 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.

VEHICLE LIFT AND SUPPORT LOCATIONS

1. NOTICE ABOUT VEHICLE CONDITION WHEN JACKING UP VEHICLE

(a) The vehicle must be unloaded before jacking up / lifting up the vehicle. Never jack up / lift up a heavily loaded vehicle.

(b) When removing heavy parts such as the engine and transmission, the center of gravity of the vehicle may shift. To stabilize the vehicle, place a balance weight in a location where it will not roll or shift, or use a mission jack to hold the jacking support.

2. NOTICE FOR USING 4 POST LIFT

(a) Follow the safety procedures outlined in the lift instruction manual.

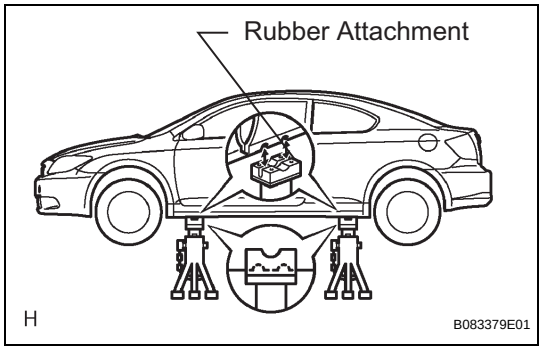
(b) Use precautionary measures to prevent the free wheel beam from damaging tires or wheels.

(c) Use wheel chocks to secure the vehicle.

3. NOTICE FOR USING JACK AND SAFETY STAND

(a) Work in a flat area using wheel chocks at all times.

(b) Use a safety stand with a rubber attachment, as shown in the illustration.



(c) Set the jack and rigid rack to the specified location on the vehicle.

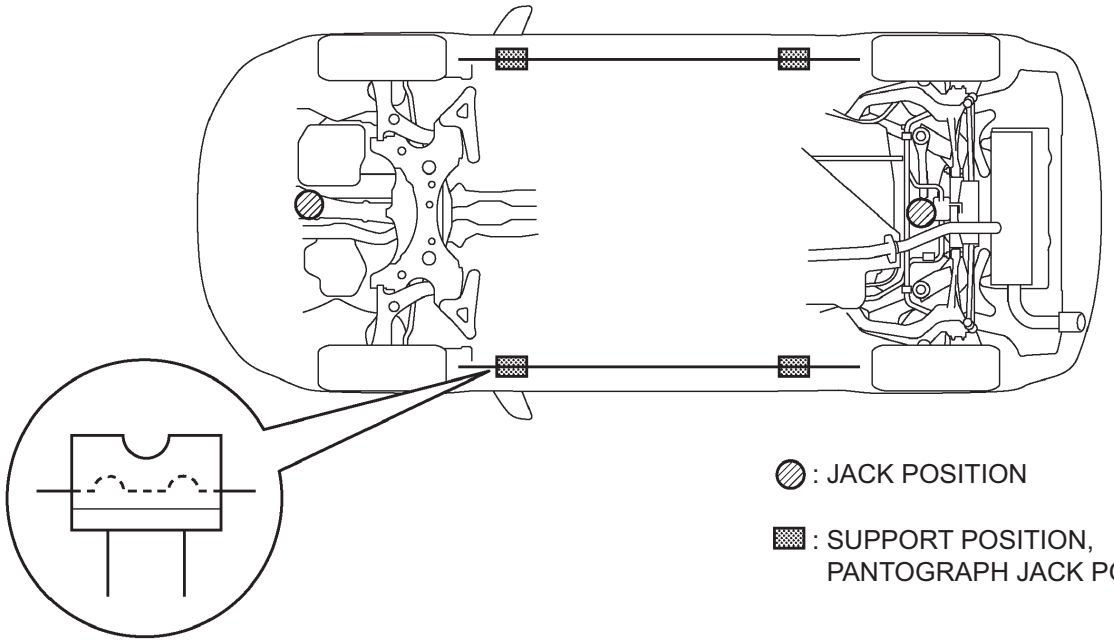
(d) When jacking up the front wheels, release the parking brake and place wheel chocks only behind the rear wheels. When jacking up the rear wheels, place wheel chocks only in front of the front wheels.

(e) The jack should not be used without the rigid rack.

(f) When jacking up only the front wheels or only the rear wheels, place wheel chocks on both sides of the wheels touching the ground.

(g) When lowering the vehicle with its front wheels jacked up, release the parking brake and place wheel chocks only in front of the rear wheels. When lowering a vehicle with its rear wheels jacked up, place wheel chocks only behind the front wheels.

IN



4. NOTICE FOR USING SWING ARM TYPE LIFT

(a) Follow safety procedures outlined in its instruction manual.
(b) Use a swing arm equipped with a rubber attachment, as shown in the illustration.
(c) When using the lift, make sure that the vehicle is stabilized so that it will not tilt while work is being performed. Stabilize the vehicle by adjusting the lift arm's length and vehicle's position.
(d) When using the lift, its center should be as close to the vehicle's center of gravity as possible (length of "L" in the illustration should be as short as possible).
(e) Set the vehicle on the lift as level as possible. Then match the groove of the cradle to the rigid rack support location.
(f) Be sure to lock the swing arms before lifting and during work (if equipped with arm locks).
(g) Lift the vehicle up off the ground. Stand at a safe distance and shake the vehicle to check its stability.
5. NOTICE FOR USING PLATE TYPE LIFT

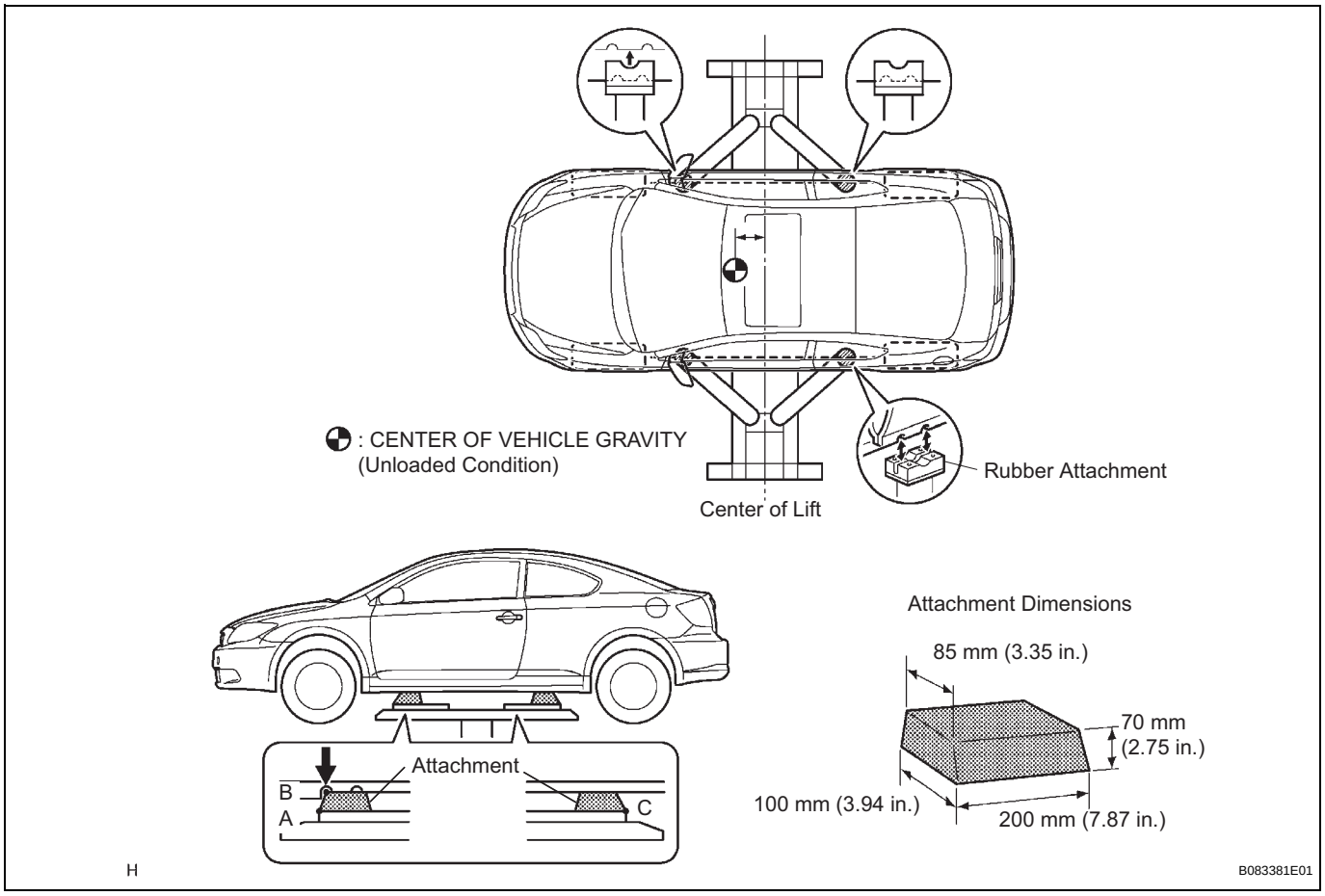
5. NOTICE FOR USING PLATE TYPE LIFT

(a) Follow safety procedures outlined in its instruction manual.
(b) Use plate lift attachments (rubber lifting blocks) on top of the plate surface.

(c) Refer to the table below to determine how to properly set the vehicle.
HINT:

Right and left set position	Place the vehicle over the center of the lift.
Front and rear set position	Front and rear set position Place the attachments at the ends of the rubber plate surface, under the vehicle lift pad (A and C in the illustration). Raise the plate slightly and reposition the vehicle so the top of the attachment (B in the illustration) is aligned with the front side notch in the vehicle rocker flange.

(d) Use the lift to raise the vehicle up off the ground, and shake it to make sure that it is stable.



INITIALIZATION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.
Initialization procedures are below the table.

System Name
Power Window Control System (with Jam Protection Function)
Sliding Roof System

1. POWER WINDOW CONTROL SYSTEM (WITH JAM PROTECTION FUNCTION)

NOTICE:

- **Resetting the power window motors (initializing the pulse sensor) is necessary if: 1) the battery terminal is disconnected; 2) the power window regulator master switch, power window regulator switch, wire harness, power window regulator and power window motor are replaced or removed / installed; or 3) the GAUGE fuse, AM1 fuse, FL DOOR fuse and FR DOOR fuse are replaced. The AUTO operation function, jam protection function and remote operation function via the power window regulator master switch will not operate unless the motors are reset.**
- **Be sure to reset the power window regulator motors using the power window switch on each door. The motors cannot be reset by remote operation through the power window master switch.**
- **In order to prevent a large amount of current from being flowed into the system, do not simultaneously reset 2 or more power window regulator motors.**
- **If the power window switch has been continuously operated for a long time, the power window regulator motor will stop so that no additional load can be applied to the motor. Continuing to operate the switch even after the motor has stopped will cause the switch to blink while restricting the AUTO UP / DOWN function and the remote UP/DOWN function. If this happens, reset the motor again after a few minutes have passed.**

(a) Turn the ignition switch ON.
(b) Halfway open the power window by pressing the power window switch.
(c) Fully pull up the switch until the power window is fully closed and continue to hold the switch for approximately 1 second after the power window is fully closed.

(d) Check that the AUTO UP / DOWN function operates normally.
HINT:
If the AUTO/DOWN function operates normally, reset operations are complete. If not normal, perform the following 3 steps below.
(e) Disconnect the negative (-) battery terminal for 10 seconds.
(f) Connect the battery terminal.
(g) Perform the first 4 steps above.
HINT:
If the AUTO / DOWN function operates normally, reset operations are complete. If not normal, perform the following 4 steps below.
(h) Turn the ignition switch ON.
(i) Halfway open the power window by pressing the power window switch.
(j) Fully pull up the switch until the power window is fully closed and continue to hold the switch for approximately 12 seconds after the power window is fully closed.
(k) Check that the AUTO UP / DOWN function operates normally.

2. SLIDING ROOF SYSTEM

NOTICE:

The drive gear (motor) must be reset (pulse sensor's location must be set) when one of the following occurs: 1) the battery cable has been disconnected from the negative (-) battery terminal, 2) the drive gear connector is connected /disconnected, or 3) the sliding roof is replaced or installed / removed. If the drive gear is not reset, the AUTO function will not operate.

(a) The sliding roof AUTO operation and the jam protection function may not operate normally if the battery cable is disconnected / reconnected, the battery replaced or recharged. Initialize the sliding roof system using the method below.
(1) Turn the ignition switch ON.
(2) Press the CLOSE switch to activate the close operation. Fully close the roof and continue to press the CLOSE switch for approximately 2 seconds. When the sliding roof control ECU initialization is finished, the roof will automatically open and stop a few millimeters from the fully open position.
HINT:
If the battery cable is disconnected, the sliding roof control ECU may not detect the position of the roof glass. If the sliding roof AUTO operation is still disabled even after the drive gear has been initialized, the Hall IC may be malfunctioning. The Hall IC is built into the drive gear and detects the roof glass position.

If the result is not as specified, replace the drive gear assembly (sliding roof control ECU).

HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

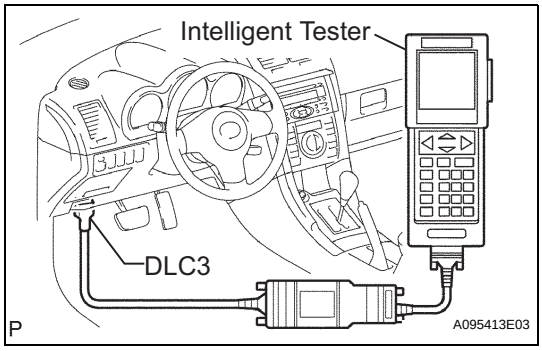
GENERAL INFORMATION

A large number of ECU controlled systems are used in the SCION tC. 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's circuits one by one. An adequate understanding of the system and a basic knowledge of electricity is enough to perform effective troubleshooting, accurate diagnoses and necessary repairs.

FOR USING INTELLIGENT TESTER

Connect the cable of the intelligent tester to the DLC3, turn the ignition switch ON and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem either with the vehicle or with the tester.

* If the communication is normal when the tester is connected to another vehicle, inspect the DLC3 of the original vehicle.
* If communication is still not possible when the tester is connected to another vehicle, the problem may be in the tester itself. Consult the Service Department listed in the tester's instruction manual.



HOW TO PROCEED WITH TROUBLESHOOTING

1. OPERATION FLOW

HINT:
Perform troubleshooting in accordance with the procedures below. The following is an outline of basic troubleshooting procedures. Confirm the troubleshooting procedures 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.

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) Check the results obtained in step 4. Then 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 TABLE

(a) Check the results obtained in step 4. Then 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) Confirm 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, confirm that the malfunction no longer exists. If the malfunction does not reoccur, perform a confirmation test under the same conditions and in the same environment as when the malfunction occurred for the first time.

NEXT

END

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

3. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE

HINT:

The diagnostic system in the SCION tC 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 is more effective. Diagnostic functions are incorporated in the following system in the SCION tC.

System	DTC Check (Normal Mode)	DTC Check (Check Mode)	Sensor Check/Test Mode (Input Signal Check)	Data List	Active Test
2AZ-FE SFI System	○	○		○	○
U241E Automatic Transaxle System	○	○		○	○
Tire Pressure Warning System	○		○	○	
Anti-lock Brake System	○		○	○	○
Airbag System	○	○		○	
Occupant Classification System	○			○	
Engine Immobilizer System	○			○	○
Cruise Control System	○			○	

- In the DTC check, it is very important to determine whether the problem indicated by the DTC is either: 1) still occurring, or 2) occurred in the past but has since 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 DTCs may, depending on the case, result in unnecessary troubleshooting for systems operating normally or lead to repairs not related to the problem. Follow the procedures 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 DTCS DISPLAYED AND THEN CLEAR MEMORY**

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**

NEXT

5	DTC CHECK

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B → **TROUBLESHOOTING OF PROBLEM INDICATED BY DTC**

A

6	SYMPTOM CONFIRMATION

Result

Result	Proceed to
Symptoms exist	A
No symptoms exist	B

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 → **SYSTEM NORMAL**

A

TROUBLESHOOTING OF EACH PROBLEM SYMPTOM

The problem is still occurring in a place other than the diagnostic circuit (the DTC displayed first is either for 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.

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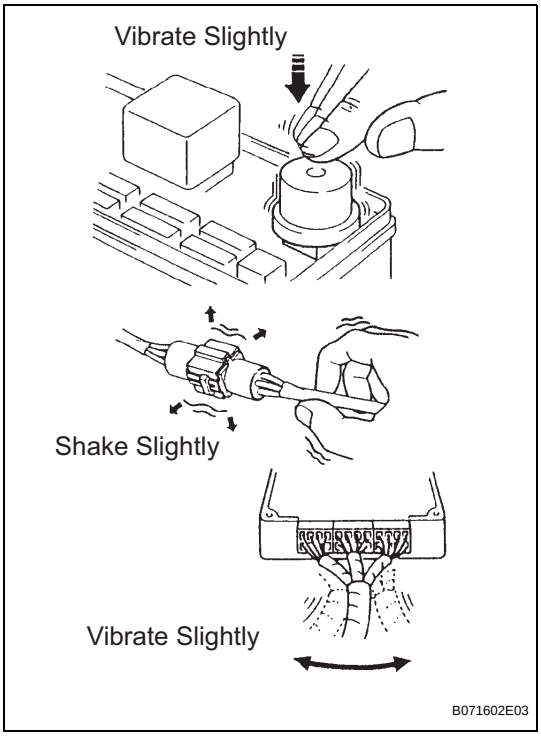
For example:

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 on a vehicle with a warmed-up engine. Vibration, heat or water penetration (moisture) is difficult to reproduce. The symptom simulation tests below are effective substitutes for the conditions and can be applied on 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 the problem symptoms table for each system to narrow down the possible causes.



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

(1) PART AND SENSOR

Apply slight vibration with a finger to the part of the sensor suspected to be the cause of the problem, and check whether or not the malfunction occurs.

NOTICE:

Applying strong vibration to relays may open them.

(2) CONNECTORS

Slightly shake the connector vertically and horizontally.

(3) WIRE HARNESS

Slightly shake the wire harness vertically and horizontally.

HINT:

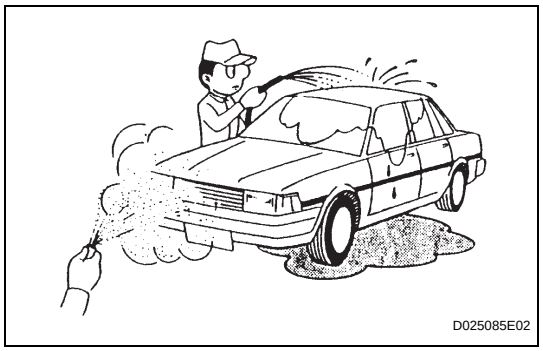
The connector joint and fulcrum of the vibration are the major areas that should be checked thoroughly.

(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.

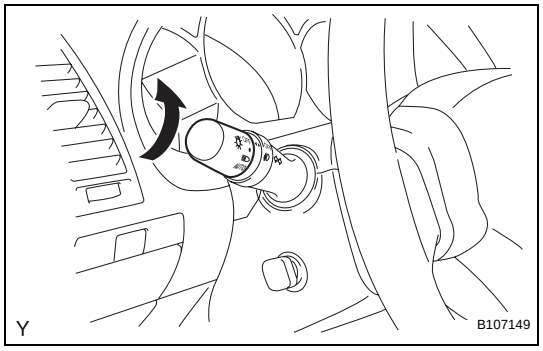
NOTICE:

- **Do not heat to more than 60°C (140°F). Exceeding this temperature may damage components.**
- **Do not apply heat directly to the parts in the 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 leakage problem, the leakage 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 electrical load is excessive.
(1) Turn on the heater blower, headlight, rear window defogger and all other electrical loads. Check if the malfunction reoccurs.

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 are below.

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

6. PROBLEM SYMPTOMS TABLE

When a "Normal" code is output during a DTC check but the problem is still occurring, use the Problem Symptoms Table. The suspected areas (circuits or parts) for each problem symptom are in the table. The suspected areas are listed in order of probability. A description of each of the chart's columns are below.

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

Item	Description
Problem Symptom	-

Item	Description
Circuit Inspection, Inspection Order	Indicates the order in which the circuits need to be checked
Circuit or Part Name	Indicates the circuit or part which needs to be checked
See Page	Indicates the page where the flowchart for each circuit is located

7. CIRCUIT INSPECTION

A description of the main areas of each circuit inspection is below.

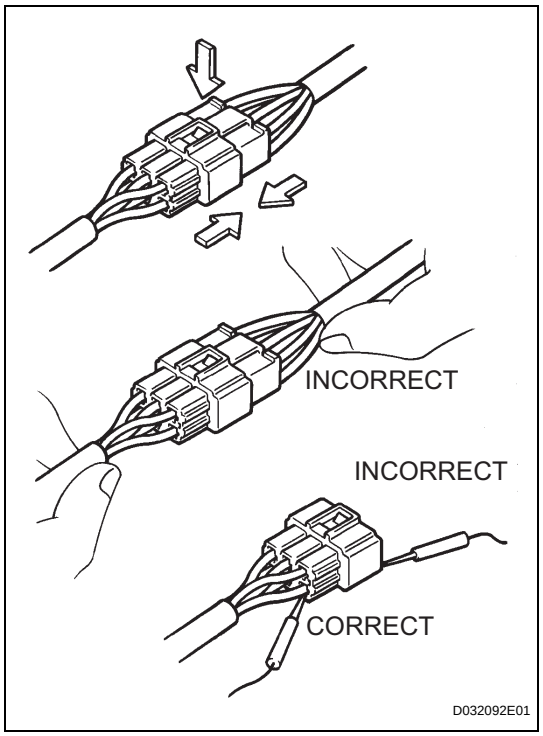
Item	Description
Circuit Description	The major role, operation of the circuit and its component parts are explained.
Diagnostic Trouble Code No. and Detection Item	Indicates the diagnostic trouble codes, diagnostic trouble code settings and suspected areas for a problem
Wiring Diagram	This shows a wiring diagram of the circuit. Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit. Wire colors are indicated by an alphabetical code: • 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 The first letter indicates the basic wire color and the second letter indicates the color of the stripe.
Inspection Procedures	Use the inspection procedures to determine if the circuit is normal or abnormal. If abnormal, use the inspection procedures to determine whether the problem is located in the sensors, actuators, wire harnesses or ECU.
Indicates the condition of the connector of the ECU during the check	Connector being checked is connected. Connections of tester are indicated by (+) or (-) after the terminal name. Connector being checked is disconnected. For illustrations of inspections between a connector and body ground, information about the body ground is not shown in the illustration.

ELECTRONIC CIRCUIT INSPECTION PROCEDURE

1. BASIC INSPECTION

(a) WHEN MEASURING RESISTANCE OF ELECTRONIC PARTS

(1) Unless otherwise stated, all resistance measurements should be made 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

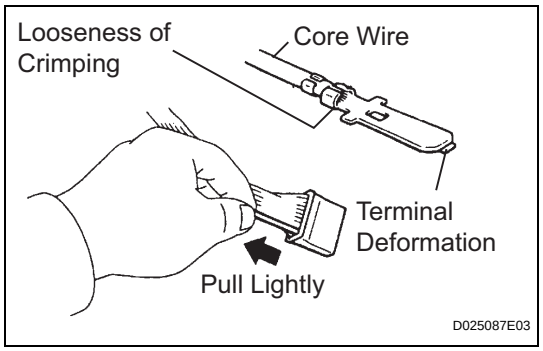
(1) When disconnecting a connector, first squeeze the mating halves tightly together to release the lock, and then press the lock claw and separate the connector.

(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 deformed, damaged, loose or missing terminals.

(4) When connecting a connector, press firmly until it locks with a "click" sound.

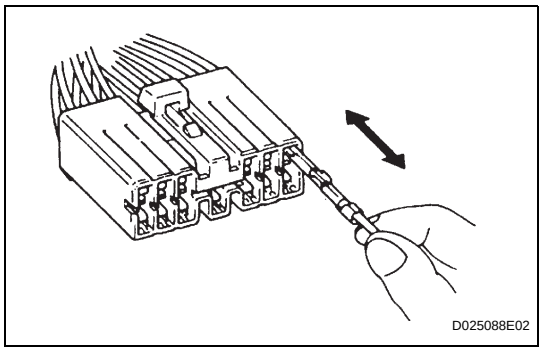
(5) If checking a connector with a TOYOTA electrical tester, check the connector from the backside (harness side) using a mini test lead.
NOTICE:
- **As a waterproof connector cannot be checked from the backside, check it by connecting a sub-harness.**
- **Do not damage the terminals by moving the inserted tester needle.**



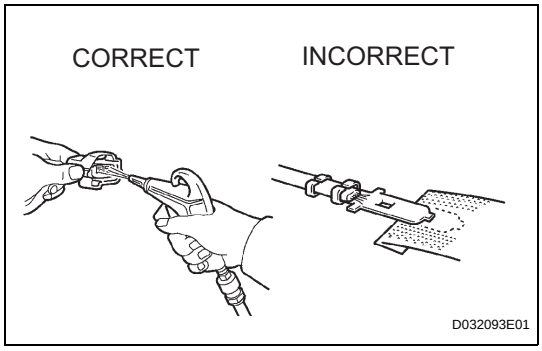
(c) CHECKING CONNECTORS

(1) Checking when a connector is disconnected: Squeeze the connector together to confirm that they are fully connected and locked.

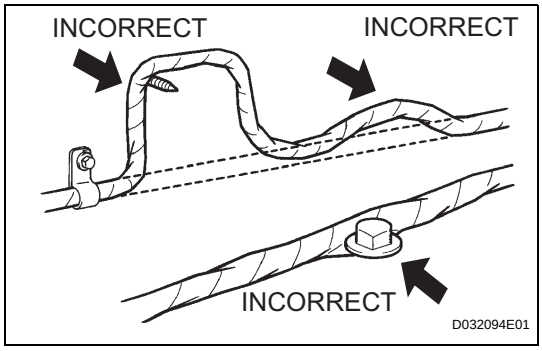
(2) Checking when a connector is disconnected: Check by pulling the wire harness lightly from the backside of the connector. Look for unlatched terminals, missing terminals, loose crimps or broken conductor wires. Check visually for corrosion, metallic or foreign matter and water, and bent, rusted, overheated, contaminated, or deformed terminals.



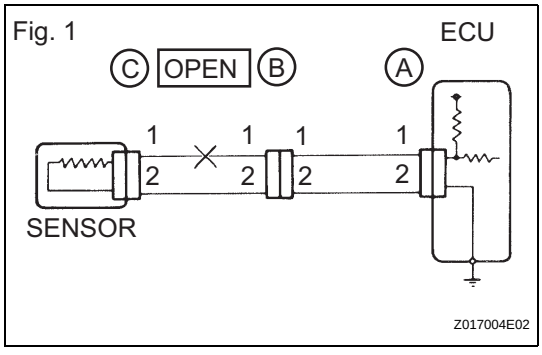
(3) Checking the contact pressure of the terminal:
Prepare a spare male terminal. Insert it into a female terminal, and check for ample tension when inserting and after full engagement.
NOTICE:
When testing a gold-plated female terminal, always use a gold-plated male terminal.



(d) REPAIR METHOD OF CONNECTOR TERMINAL
(1) If there is any foreign matter on the terminal, clean the contact point using an air gun or 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.



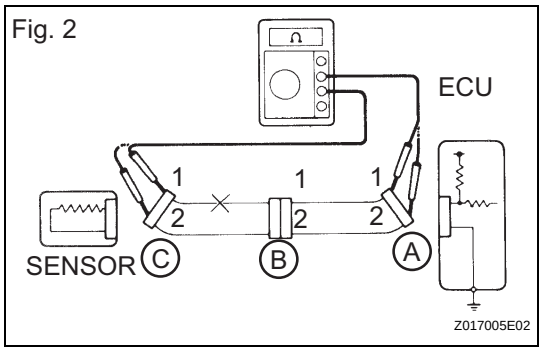
(e) HANDLING OF WIRE HARNESS
(1) If removing a wire harness, check the wiring and clamping before proceeding so that it can be restored in the same way.
(2) Never twist, pull or slacken the wire harness more than necessary.
(3) The wire harness should never come into contact with a high temperature part, or 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, replace it or repair it with vinyl tape.



2. CHECK FOR OPEN CIRCUIT

(a) For an open circuit in the wire harness in Fig. 1, check the resistance or voltage, as described below.

Fig. 2



(b) Check the resistance.

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

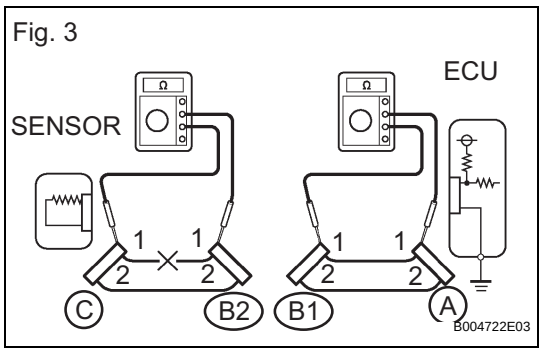
Standard resistance (Fig. 2)

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 examples above, an open circuit exists between terminal 1 of connector A and terminal 1 of connector C.

Fig. 3



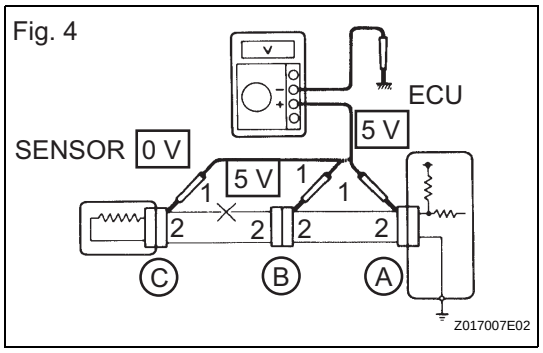
(2) Disconnect connector B and measure the resistance between the connectors.

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 examples above, an open circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

Fig. 4



(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 the body ground and these 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 examples above, an open circuit exists in the wire harness between terminal 1 of connector B and terminal 1 of connector C.

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Fig. 5

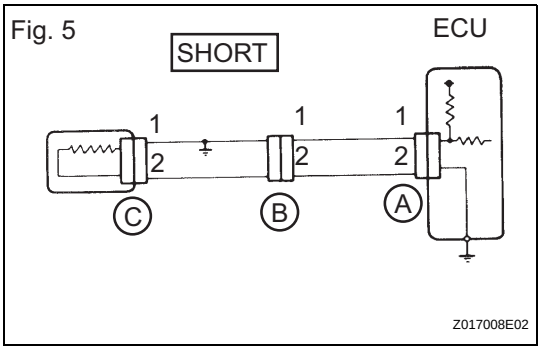


Fig. 6

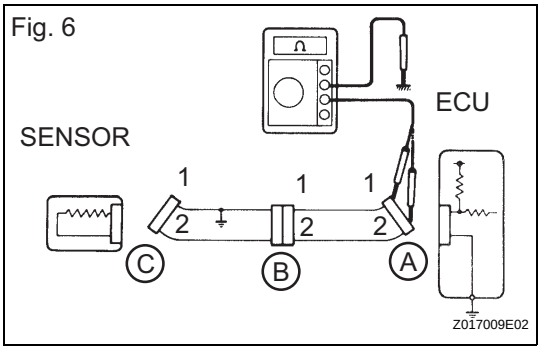
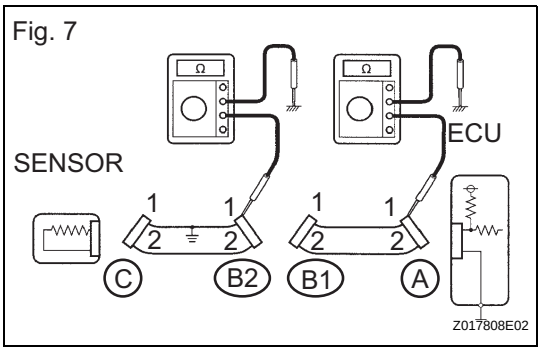


Fig. 7



3. CHECK FOR SHORT CIRCUIT

(a) If the wire harness is ground shorted (Fig. 5), locate the section by conducting a resistance check with the body ground (below).

(b) Check the resistance with the 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 kΩ or higher

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally. If the results match the examples 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)

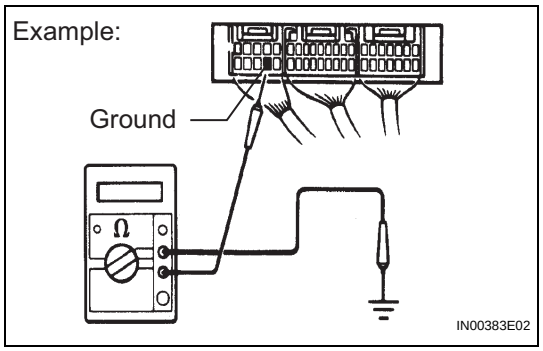
Tester Connection	Specified Condition
Connector A terminal 1 - Body ground	10 kΩ or higher
Connector B2 terminal 1 - Body ground	Below 1 Ω

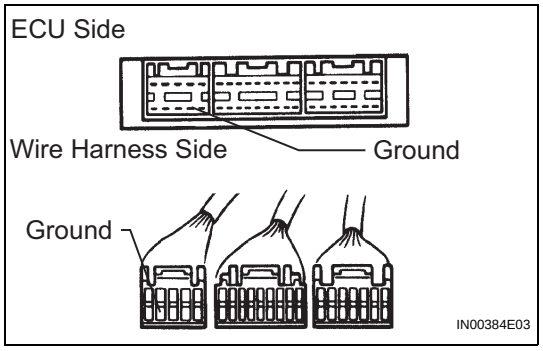
If the results match the examples above, a short circuit exists between terminal 1 of connector B2 and terminal 1 of connector C.

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.
Standard resistance:
Below 1 Ω

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

IN

TERMS

ABBREVIATIONS USED IN MANUAL

Abbreviations	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
ACTR	Actuator
A.D.D	Automatic Disconnecting Differential
A/F	Air-Fuel Ratio
AHC	Active Height Control Suspension
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
APPROX.	Approximately
ASSY	Assembly
A/T, ATM	Automatic Transmission (Transaxle)
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
AWD	All Wheel Drive Vehicle
B+	Battery Voltage
BA	Brake Assist
BACS	Boost Altitude Compensation System
BAT	Battery
BDC	Bottom Dead Center
B/L	Bi-Level
B/S	Bore-Stroke Ratio
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
CAN	Controller Area Network
CB	Circuit Breaker
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
COMB.	Combination
CPE	Coupe
CPS	Combustion Pressure Sensor
CPU	Central Processing Unit

Abbreviations	Meaning
CRS	Child Restraint System
CTR	Center
C/V	Check Valve
CV	Control Valve
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 Coating
EDU	Electronic Driving Unit
EDIC	Electric Diesel Injection Control
EFI	Electronic Fuel Injection
E/G	Engine
EGR	Exhaust Gas Recirculation
EGR-VM	EGR-Vacuum Modulator
ELR	Emergency Locking Retractor
EPS	Electric Power Steering
ENG	Engine
ES	Easy & Smooth
ESA	Electronic Spark Advance
ETCS-i	Electronic Throttle Control System-intelligent
EVAP	Evaporative Emission Control
EVP	Evaporator
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
F/P	Fuel Pump

Abbreviations	Meaning
FPU	Fuel Pressure Up
FR	Front
F/W	Flywheel
FW/D	Flywheel Damper
FWD	Front-Wheel-Drive
GAS	Gasoline
GND	Ground
GPS	Global Positioning System
GSA	Gear Shift Actuator
HAC	High Altitude Compensator
H/B	Hatchback
H-FUSE	High Current Fuse
HI	High
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
IN	Intake (Manifold, Valve)
INT	Intermittent
I/P	Instrument Panel
IRS	Independent Rear Suspension
ISC	Idle Speed Control
J/B	Junction Block
J/C	Junction Connector
KD	Kick-Down
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
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
LO	Low
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

Abbreviations	Meaning
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, MTM	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
OHC	Overhead Camshaft
OHV	Overhead Valve
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
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
R/B	Relay Block
RBS	Recirculating Ball Type Steering
REAS	Relative Absorber System
R/F	Reinforcement
RFS	Rigid Front Suspension
RH	Right-Hand
RHD	Right-Hand Drive
RLY	Relay
ROM	Read Only Memory

Abbreviations	Meaning
RR	Rear
RRS	Rigid Rear Suspension
RSE	Rear Seat Entertainment
RWD	Rear-Wheel Drive
SC	Supercharger
SCV	Swirl Control Valve
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SOC	State Of Charge
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
STJ	Cold-Start Fuel Injection
SW	Switch
SYS	System
T/A	Transaxle
TACH	Tachometer
TBI	Throttle Body Electronic Fuel Injection
TC	Turbocharger
TCCS	TOYOTA Computer-Controlled System
TCM	Transmission Control Module
TCV	Timing Control Valve
TDC	Top Dead Center
TEMP.	Temperature
TFT	TOYOTA Free-Tronic
TIS	Total Information System for Vehicle Development
T/M	Transmission
TMC	TOYOTA Motor Corporation
TMMIN	PT. TOYOTA Motor Manufacturing Indonesia
TMMK	TOYOTA Motor Manufacturing Kentucky, Inc.
TMT	TOYOTA Motor Thailand Co. Ltd.
TRAC/TRC	Traction Control System
TURBO	Turbocharge
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

Abbreviations	Meaning
VPS	Variable Power Steering
VSC	Vehicle Skid Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
VVT-i	Variable Valve Timing-intelligent
W/	With
WGN	Wagon
W/H	Wire Harness
W/O	Without
1ST	First
2ND	Second
2WD	Two Wheel Drive Vehicle (4 x 2)
3RD	Third
4TH	Fourth
4WD	Four Wheel Drive Vehicle (4 x 4)
4WS	Four Wheel Steering System
5TH	Fifth

IN

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 ABBREVIATIONS	SAE TERMS	SCION TERMS ( )-ABBREVIATIONS
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	HAC
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) Erasable Programmable Read Only Memory (EPROM)
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	-
FEPROM	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_2S)
IAC	Idle Air Control	Idle Speed Control (ISC)

SAE ABBREVIATIONS	SAE TERMS	SCION TERMS ( )-ABBREVIATIONS
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 Light	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_2S)
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)

SAE ABBREVIATIONS	SAE TERMS	SCION TERMS ( )-ABBREVIATIONS
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	-

LIGHTING SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

System	See Procedure
Power window control system (with Jam Protection Function)	IN-23
Sliding roof system	

1. PRECAUTION OF HEADLIGHT BULB REPLACEMENT

(a) If even a thin film of oil is left on the surface of the halogen light, its service life will be shortened because the light will burn at a higher temperature.
(b) Handle any halogen light with great care. Dropping, hitting or damaging the bulb, in any way, may result in it exploding and shattering because the internal pressure is high.
(c) Always prepare a new bulb for immediate replacement. While replacing the bulb, the lens may attract dust and moisture if removed from the vehicle for too long.
(d) Always use a bulb of the same wattage for replacement.
(e) Firmly reinstall the socket after bulb replacement. The lens may become cloudy or the light cavity may be filled with water through the gaps around the socket.

PROBLEM SYMPTOMS TABLE

HINT:
Use the table below, with suspected areas listed in numerical order, to determine the cause of the problem. Inspect and repair or replace parts as necessary according to the steps on the following pages.

Headlight and taillight system

Symptom	Suspected Area	See page
LO beam does not come on (One side).	1. Bulb	-
	2. H-LP LH LO/H-LP RH LO fuse	-
	3. Wire harness or connector	-
LO beam does not come on (All).	1. Headlight (H-LP) relay	LI-57
	2. Headlight dimmer switch assembly	LI-41
	3. Integration relay (Instrument panel junction block assembly)	LI-54
	4. Wire harness and connector	-
HI beam does not come on (One side).	1. Bulb	-
	2. H-LP LH LO/H-LP RH HI fuse	-
	3. Wire harness and connector	-
HI beam does not come on (All).	1. Headlight (H-LP) relay	LI-57
	2. Headlight dimmer switch assembly	LI-41
	3. Integration relay (instrument panel junction block assembly)	LI-54
	4. Wire harness or connector	-
Flash does not operate (All).	1. Headlight (H-LP) relay	LI-57
	2. Headlight dimmer switch assembly	LI-41
	3. Integration relay (Instrument panel junction block assembly)	LI-54
	4. Wire harness and connector	-
Headlight is dark.	1. Bulb	-
	2. Wire harness and connector	-
Only one taillight comes on.	1. Bulb	-
	2. Rear combination light assembly	LI-21
	3. Wire harness and connector	-
Only one license plate light comes on.	1. Bulb	-
	2. License plate light assembly	LI-25
	3. Wire harness or connector	-
All tail / license plate lights do not come on (Headlights are normal)	1. TAIL fuse	-
	2. Taillight (T-LP) relay	LI-59
	3. Headlight dimmer switch assembly	LI-41
	4. Integration relay (Instrument panel junction block assembly)	LI-54
	5. Wire harness and connector	-
All tail / license plate lights do not come on (Headlights do not come on).	1. Headlight dimmer switch assembly	LI-41
	2. Wire harness and connector	-

Turn signal and hazard warning system

Symptom	Suspected Area	See page
Hazard and Turn do not come on.	1. TURN-HAZ fuse	-
	2. Turn signal flasher (FLASH) relay (Instrument panel junction block assembly)	LI-54
	3. Wire harness and connector	-

Symptom	Suspected Area	See page
Hazard warning light does not come on (Turn is normal).	1. Air conditioning amplifier assembly (Hazard warning signal switch)	LI-44
	2. Turn signal flasher (FLASH) relay (Instrument panel junction block assembly)	LI-54
	3. Wire harness and connector	-
Turn signal does not come on (Hazard is normal).	1. Headlight dimmer switch assembly	LI-41
	2. Turn signal flasher (FLASH) relay (Instrument panel junction block assembly)	LI-54
	3. Wire harness and connector	-
Turn signal does not come on in one direction.	1. Headlight dimmer switch assembly	LI-41
	2. Turn signal flasher (FLASH) relay (Instrument panel junction block assembly)	LI-54
	3. Wire harness and connector	-
Only one bulb comes on.	1. Bulb	-
	2. Turn signal flasher (FLASH) relay (Instrument panel junction block assembly)	LI-54
	3. Wire harness and connector	-

Stop light system

Symptom	Suspected Area	See page
Both stop lights do not come on.	1. STOP fuse	-
	2. Stop light switch assembly	LI-46
	3. Wire harness and connector	-
Both stop lights always remain on.	1. Stop light switch assembly	LI-46
	2. Wire harness and connector	-
Stop light does not come on (One side).	1. Rear combination light assembly	LI-21
	2. Wire harness and connector	-

Back-up light system

Symptom	Suspected Area	See page
Both back-up lights do not come on.	1. GAUGE fuse	-
	2. Back-up light switch assembly (Manual Transaxle)	LI-48
	3. Park/Neutral position switch assembly (Automatic Transaxle)	AX-110
	4. Wire harness and connector	-
Both back-up lights always remain on.	1. Back-up light switch assembly (Manual Transaxle)	LI-48
	2. Park/Neutral position switch assembly (Automatic Transaxle)	AX-110
	3. Wire harness and connector	-
Back-up light does not come on (One side).	1. Bulb	-
	2. Wire harness and connector	-

Interior light system

Symptom	Suspected Area	See page
Interior light does not come on (All).	1. DOME fuse	-
	2. Integration relay (Instrument panel Junction block assembly)	LI-5
	3. Wire harness and connector	-

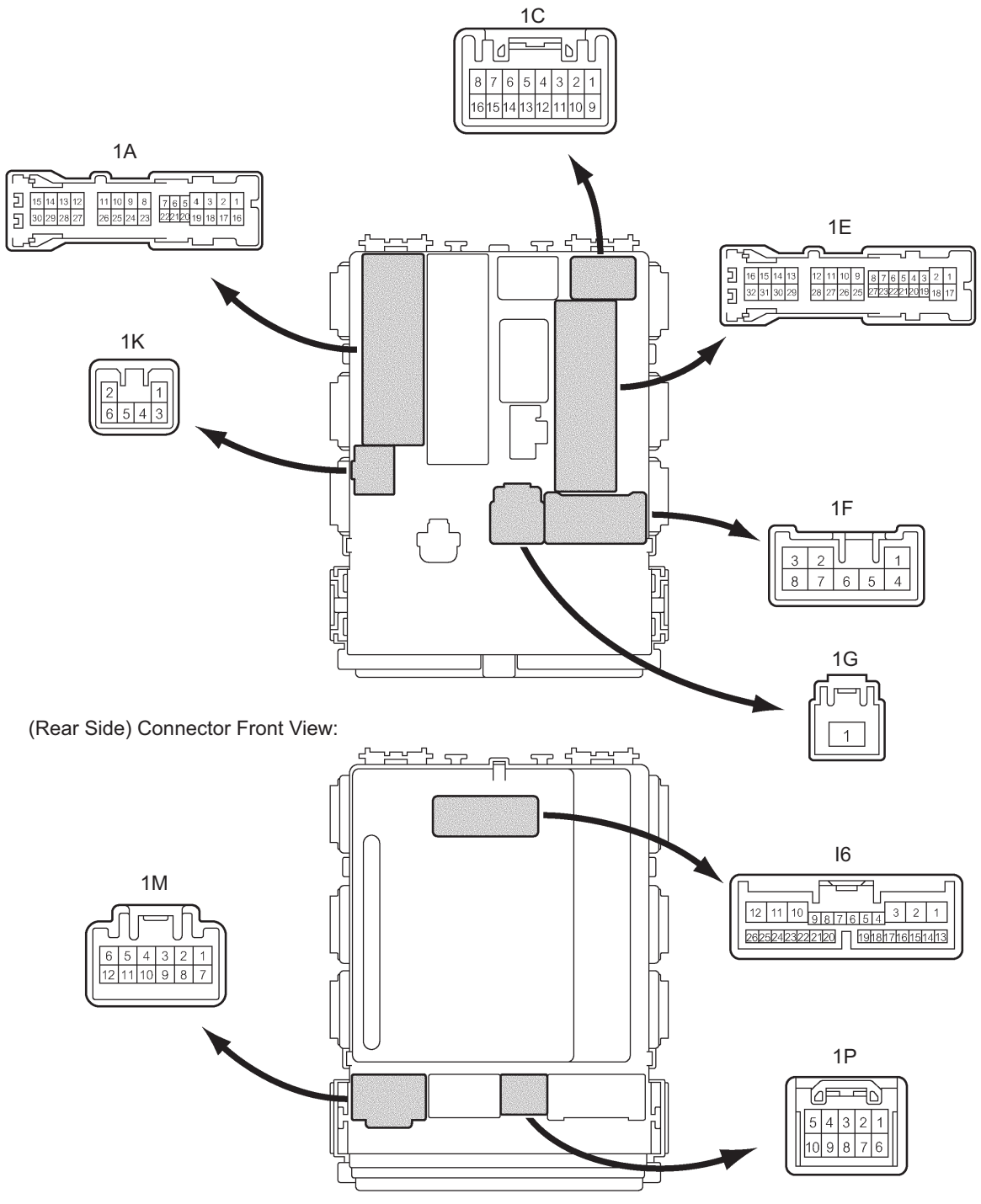
Symptom	Suspected Area	See page
Illuminated entry system does not operate.	1. DOME fuse	-
	2. ECU-IG fuse	-
	3. Front door courtesy light switch assembly	LI-50
	4. Back door lock assembly (Back door courtesy light switch)	LI-52
	5. Integration relay (Instrument panel junction block assembly)	LI-5
	6. Wire harness and connector	-
Map light assembly does not come on (No. 1 room light assembly is normal).	1. Bulb	-
	2. Map light assembly	LI-31
	3. Integration relay (Instrument panel junction block assembly)	LI-5
	4. Wire harness and connector	-
No. 1 room light assembly does not come on (Map light assembly is normal).	1. Bulb	-
	2. No. 1 room light assembly	LI-33
	3. Integration relay (Instrument panel junction block assembly)	LI-5
	4. Wire harness and connector	-
No. 2 room light assembly does not come on (Map light assembly and No. 1 room light assembly are normal).	1. Bulb	-
	2. Bank door lock assembly	LI-52
	3. No. 2 room light assembly	LI-35
	4. Wire harness and connector	-

Illumination system

Symptom	Suspected Area	See page
Indicator light assembly does not come on (Taillight is normal).	1. PANEL fuse	-
	2. Taillight (T-LP) relay	LI-59
	3. Bulb	-
	4. Indicator light assembly (Front console illumination)	LI-39
	5. Wire harness and connector	-

ON-VEHICLE INSPECTION

1. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY



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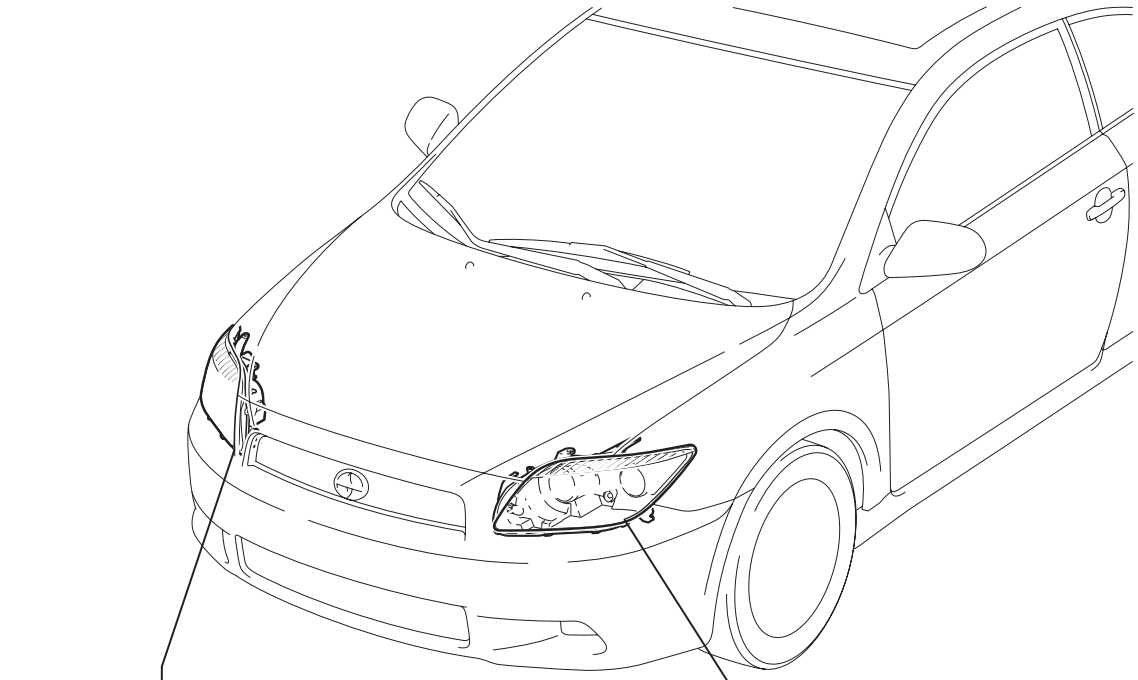
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
BCTY (1A - 7) - GND (1E - 17), (1M - 7)	V - W - B	Back door courtesy switch signal	Back door is opened	Below 1 V
BCTY (1A - 7) - GND (1E - 17), (1M - 7)	V - W - B	Back door courtesy switch signal	Back door is closed	10 to 14 V
DCTY (1A - 21) - GND (1E - 17), (1M - 7)	O - W -B	Driver side door courtesy switch signal	Driver side door is opened	Below 1 V
DCTY (1A - 21) - GND (1E - 17), (1M - 7)	O - W - B	Driver side door courtesy switch signal	Driver side door is closed	10 to 14 V
TRLY (1A - 21) - GND (1E - 17), (1M - 7)	BR - W - B	TAIL signal (Rear combination light circuit)	Light control switch OFF	Below 1 V
TRLY (1A - 21) - GND (1E - 17), (1M - 7)	BR - W - B	TAIL signal (Rear combination light circuit)	Light control switch is in TAIL position	10 to 14 V
PCTY (1C - 14) - GND (1E - 17), (1M - 7)	L - W - B	Passenger side door courtesy switch signal	Passenger side door is opened	Below 1 V
PCTY (1C - 14) - GND (1E - 17), (1M - 7)	L - W - B	Passenger side door courtesy switch signal	Passenger side door is closed	10 to 14 V
GND (1E - 17) - Body ground	W - B - Body ground	Ground	Always	Below 1 V
ILL (1E -27) - GND (1E - 17), (1M - 7)	O - W - B	Ignition key cylinder light signal	Ignition key cylinder light comes on	Below 1 V
ILL (1E -27) - GND (1E - 17), (1M - 7)	O - W - B	Ignition key cylinder light signal	Ignition key cylinder light goes off	10 to 14 V
SIG (1G - 1) - GND (1E - 17), (1M - 7)	W - W - B	Power source signal	Always	10 to 14 V
ILL (1K - 2) - GND (1E - 17), (1M - 7)	L - W - B	Interior illumination signal (Map light / Room light No. 1 circuit)	Interior light is in DOOR position	Below 1 V
ILL (1K - 2) - GND (1E - 17), (1M - 7)	L - W - B	Interior illumination signal (Map light / Room light No. 1 circuit)	Interior light is in any position except DOOR	10 to 14 V
GND (1M - 7) - Body ground	W - B - Body ground	Ground	Always	Below 1 V
TRLY (1P - 9) - GND (1E - 17), (1M - 7)	GR - W - B	TAIL signal (Indicator light (Front console illumination) circuit)	Light control switch OFF	Below 1 V
TRLY (1P - 9) - GND (1E - 17), (1M - 7)	GR - W - B	TAIL signal (Indicator light (Front console illumination) circuit)	Light control switch is in TAIL position	10 to 14 V
TAIL (16 - 13) - GND (1E - 17), (1M - 7)	BR - W - B	Light control switch (TAIL) signal	Light control switch is in TAIL position	Below 1 V
TAIL (16 - 13) - GND (1E - 17), (1M - 7)	BR - W - B	Light control switch (TAIL) signal	Light control switch is in any position except TAIL	10 to 14 V
HRLY (16 - 14) - GND (1E - 17), (1M - 7)	B - W - B	HEAD operation signal	Headlight comes on	Below 1 V
HRLY (16 - 14) - GND (1E - 17), (1M - 7)	B - W - B	HEAD operation signal	Headlight goes off	10 to 14 V
HEAD (16 - 17) - GND (1E - 17), (1M - 7)	V - W - B	Light control switch (HEAD) signal	Light control switch is in HEAD position	Below 1 V
HEAD (16 - 17) - GND (1E - 17), (1M - 7)	V - W - B	Light control switch (HEAD) signal	Light control switch is in any position except HEAD	10 to 14 V

HEADLIGHT ASSEMBLY

COMPONENTS



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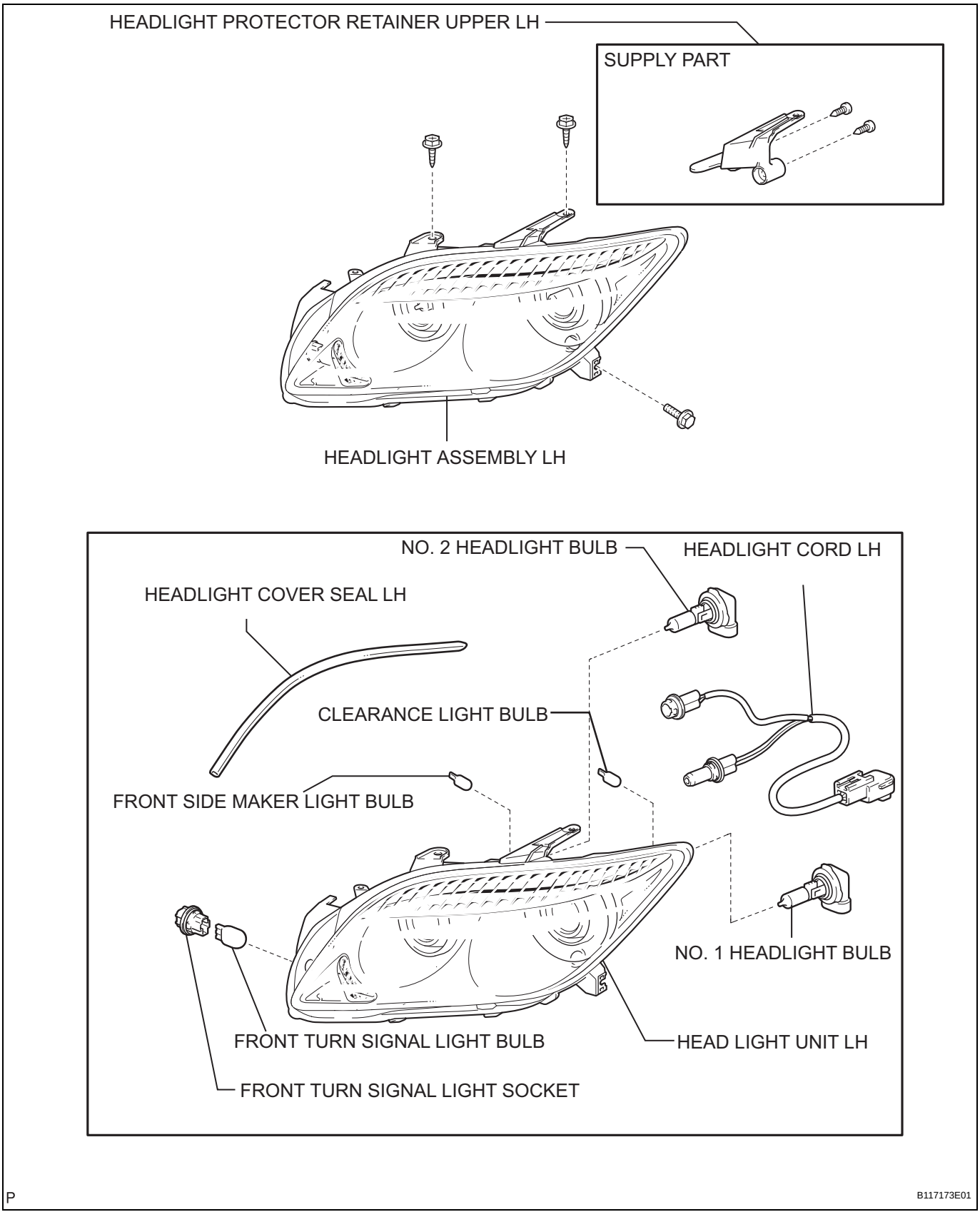
HEADLIGHT PROTECTOR RETAINER UPPER LH
SUPPLY PART
HEADLIGHT ASSEMBLY LH
NO. 2 HEADLIGHT BULB
HEADLIGHT CORD LH
HEADLIGHT COVER SEAL LH
CLEARANCE LIGHT BULB
FRONT SIDE MAKER LIGHT BULB
NO. 1 HEADLIGHT BULB
FRONT TURN SIGNAL LIGHT BULB
HEAD LIGHT UNIT LH
FRONT TURN SIGNAL LIGHT SOCKET
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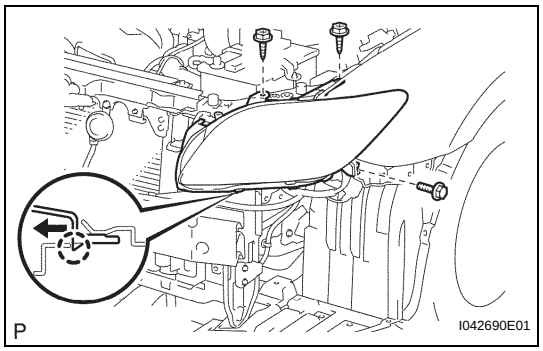
REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

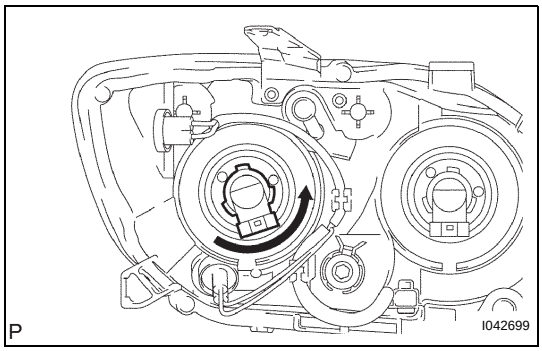
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT FENDER LINER LH (See page ET-2)**
3. **REMOVE FRONT FENDER LINER RH (See page ET-2)**
4. **REMOVE FRONT BUMPER COVER (See page ET-3)**
5. **REMOVE HEADLIGHT ASSEMBLY LH**
   (a) Remove the 2 screws and bolt and disengage the claw.
   (b) Disconnect the connectors and remove the headlight.



DISASSEMBLY

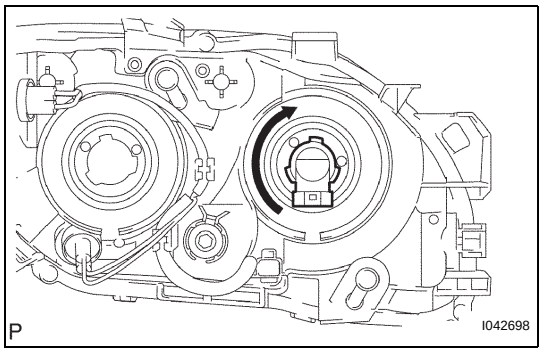
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



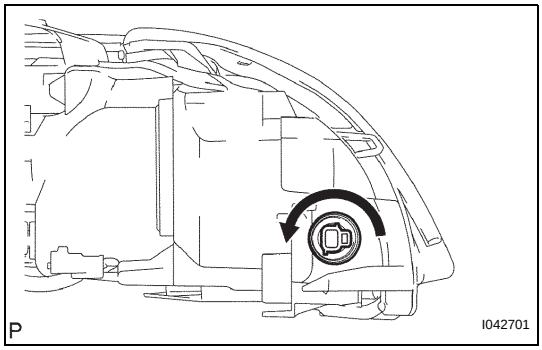
1. REMOVE NO. 1 HEADLIGHT BULB

(a) Remove the No. 1 bulb as shown in the illustration.



2. REMOVE NO. 2 HEADLIGHT BULB

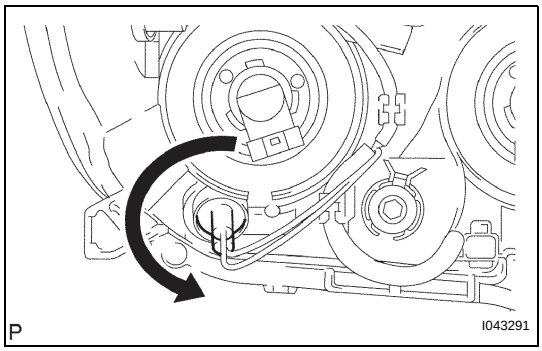
(a) Remove the No. 2 bulb as shown in the illustration.



3. REMOVE FRONT TURN SIGNAL LIGHT BULB

(a) Remove the front turn signal light socket as shown in the illustration.

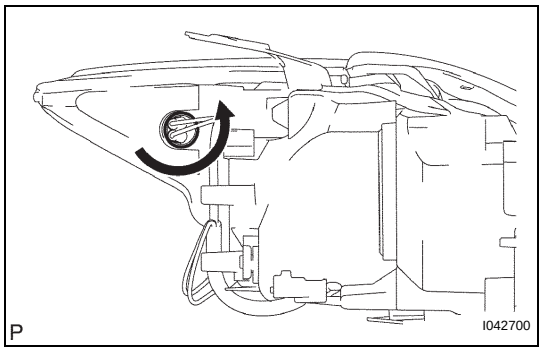
(b) Remove the front turn signal light bulb from the socket.



4. REMOVE CLEARANCE LIGHT BULB

(a) Remove the clearance light socket as shown in the illustration.

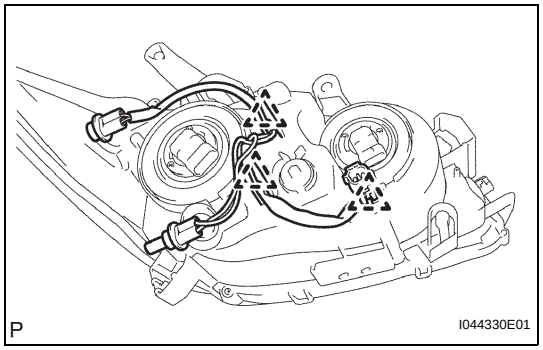
(b) Remove the clearance light bulb from the socket.



5. REMOVE FRONT SIDE MAKER LIGHT BULB

(a) Remove the front side maker light socket as shown in the illustration.

(b) Remove the front side maker light bulb from the socket.



6. REMOVE HEADLIGHT CORD LH

(a) Detach the 3 clamps and remove the headlight cord LH.

ADJUSTMENT

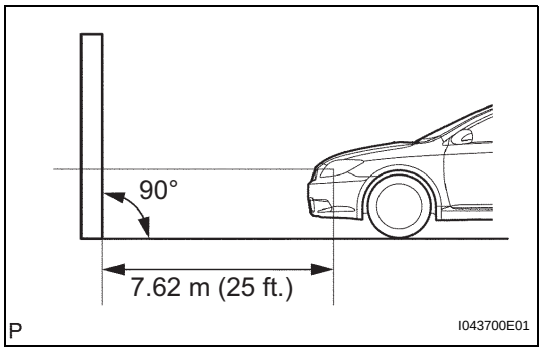
1. VEHICLE PREPARATION FOR HEADLIGHT AIM ADJUSTMENT

(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.
- Place the spare tire, tools, and jack in their original position.
- Unload the trunk.
- Seat a person of average weight (68 kg, 150 lb) in the driver's seat.

2. PREPARATION FOR HEADLIGHT AIMING (Using a tester)

(a) Prepare the vehicle for headlight aim check.
(b) Adjust in accordance with headlight tester instructions.

3. PREPARATION FOR HEADLIGHT AIMING (Using a screen)

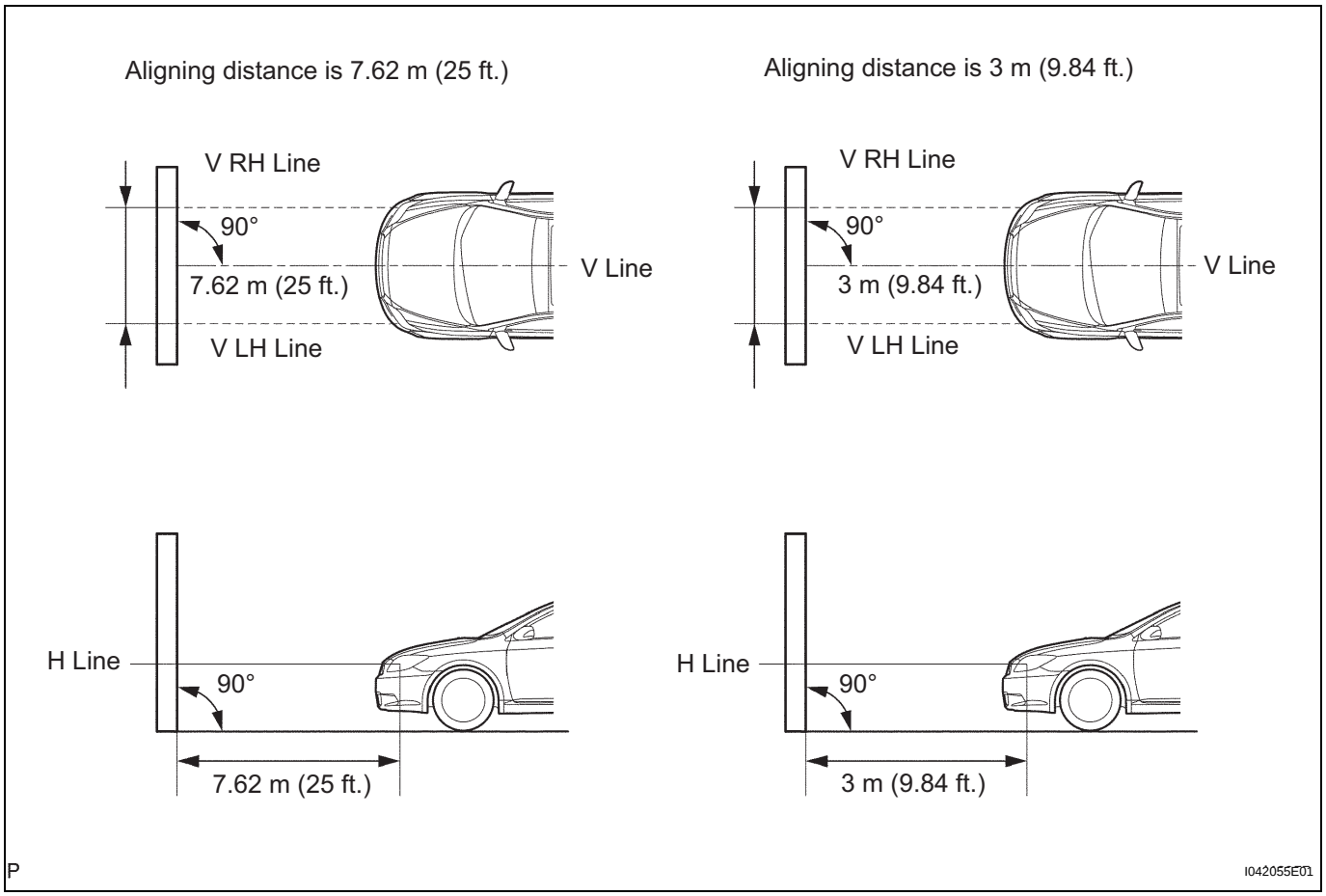


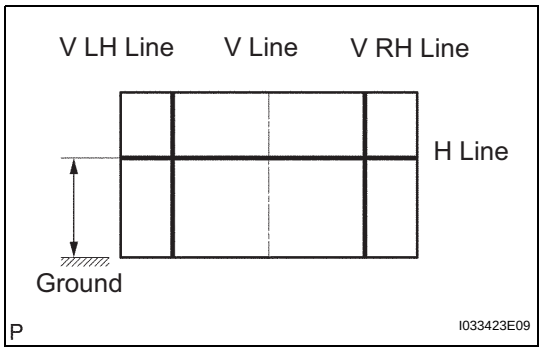
(a) Prepare the vehicle according to the following conditions:
- Place the vehicle in a location that is dark enough to clearly observe the cutoff line. The cutoff line is a distinct line, below which light from the headlights can be observed and above which it cannot.
- Place the vehicle at a 90° angle to the wall.
- Create a 7.62 m (25 ft.) distance between the vehicle (headlight bulb center) and the wall.
- Place the vehicle on a level surface.
- Bounce the vehicle up and down to settle the suspension.

NOTICE:
A distance of 7.62 m (25 ft.) between the vehicle and the wall is necessary for proper aim adjustment. If unavailable, secure a distance of exactly 3 m (9.84 ft.) for check and adjustment. (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 screen (V line).
(d) Set the screen as shown in the illustration.
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 line, V LH, V RH lines) on the screen as shown in the illustration.
HINT:
- The base lines differ for "low-beam inspection" and "high-beam inspection".
- Follow the same procedures for "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 two vertical lines so that they intersect the H line at each center mark (aligned with the center of the low-beam headlight bulbs).

LI

4. INSPECT HEADLIGHT AIMING

(a) Cover or disconnect the connector of the headlight on the opposite side to prevent light from the headlight not being inspected from affecting headlight aiming inspection.

NOTICE:

Do not keep the headlight covered for more than 3 minutes. The headlight lens is made of synthetic resin, and may easily melt or be damaged due to heat.

HINT:

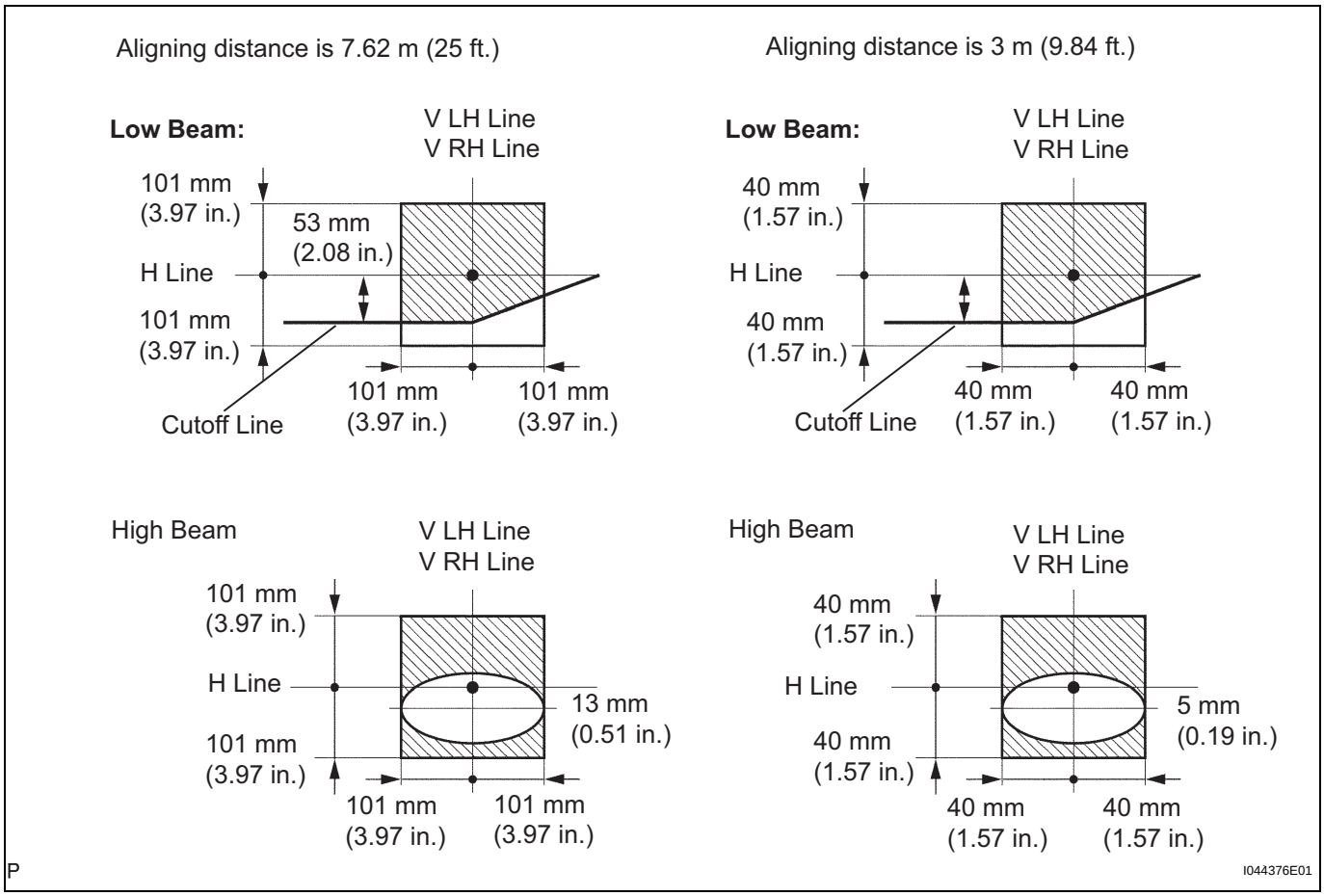
When checking the aim of the high-beam, cover the low-beam or disconnect the connector.

(b) Start the engine.

NOTICE:

Engine rpm must be 1,500 or more.

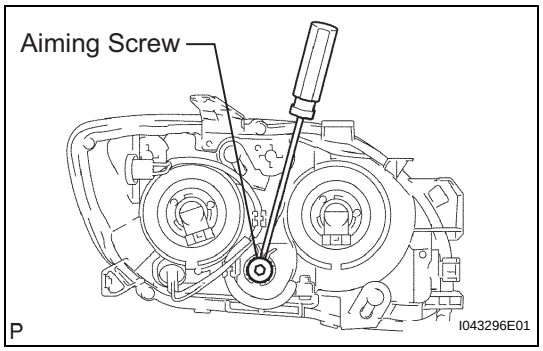
(c) Turn on the headlight and make sure that the cutoff line falls within the specified area, as shown in the illustration.



HINT:

- Alignment distance is 7.62 m (25 ft.):
- The cutoff line is 101 mm (3.97 in.) above and below the H line as well as left and right of the V line with low-beam (SAE J599).
- Alignment distance is 3 m (9.84 ft.):

- The cutoff line is 40 mm (1.57 in.) above and below the H line as well as left and right of the V line with low-beam (SAE J599).
- Alignment distance is 7.62 m (25 ft.):
- The cutoff line is 101 mm (3.97 in.) above and below the H line as well as left and right of the V line with high-beam (SAE J599).
- Alignment distance is 3 m (9.84 ft.):
- The cutoff line is 40 mm (1.57 in.) above and below the H line as well as left and right of the V line with high-beam (SAE J599).
- Alignment distance is 7.62 m (25 ft.):
- The cutoff line is 53 mm (2.08 in.) below the H line with low-beam.
- Alignment distance is 3 m (9.84 ft.):
- The cutoff line is 21 mm (0.82 in.) below the H line with low-beam.
- Since the low-beam light and the high-beam light are a unit, if the aim on one is correct, the other should also be correct. However, check both beams just to make sure.



5. ADJUST HEADLIGHT AIMING

(a) Adjust the aim vertically.

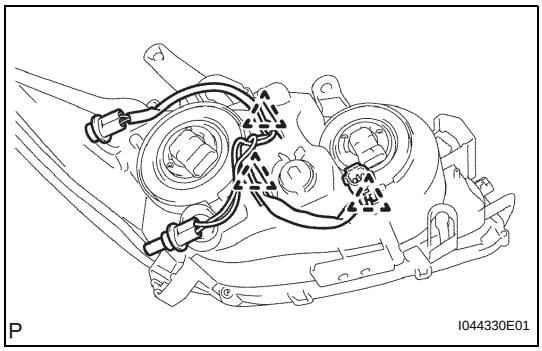
(b) Adjust the headlight aim into the specified range by turning the aiming screw with a screwdriver.

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:

- Perform low-beam aim adjustment.
- The headlight aim moves up when turning the aiming screw clockwise, and moves down when turning the aiming screw counterclockwise.



REASSEMBLY

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. INSTALL HEADLIGHT CORD LH

(a) Attach the 3 clamps to install the headlight cord LH.

2. INSTALL FRONT SIDE MAKER LIGHT BULB

(a) Install the front side maker light bulb to the socket.
(b) Install the front side maker light socket.

3. INSTALL CLEARANCE LIGHT BULB

(a) Install the clearance light bulb to the front socket.
(b) Install the clearance light socket.

4. INSTALL FRONT TURN SIGNAL LIGHT BULB

(a) Install the front turn signal light bulb to the socket.
(b) Install the front turn signal light socket.

5. INSTALL NO. 2 HEADLIGHT BULB

6. INSTALL NO.1 HEADLIGHT BULB

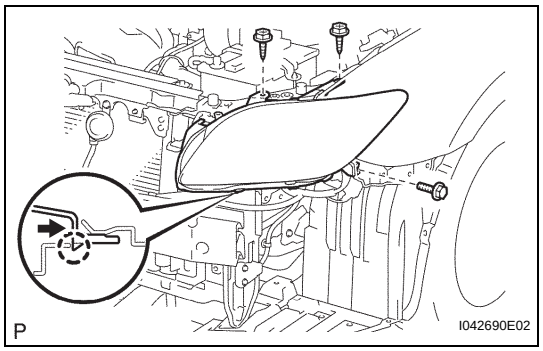
7. INSTALL HEADLIGHT ASSEMBLY LH

(a) Connect the connectors, and attach the claw to install the headlight assembly LH.
(b) Install the 2 screws and bolt.

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. **INSTALL HEADLIGHT ASSEMBLY LH**
   (a) Connect the connectors, and install the LH headlight assembly.
   (b) Install the 2 screws and bolt and attach the claw.
2. **INSTALL FRONT BUMPER COVER (See page ET-5)**
3. **INSTALL FRONT FENDER LINER RH (See page ET-5)**
4. **INSTALL FRONT FENDER LINER LH (See page ET-5)**
5. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
6. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
7. **VEHICLE PREPARATION FOR HEADLIGHT AIM ADJUSTMENT (See page LI-10)**
8. **PREPARATION FOR HEADLIGHT AIMING (Using a tester) (See page LI-11)**
9. **PREPARATION FOR HEADLIGHT AIMING (Using a screen) (See page LI-11)**
10. **INSPECT HEADLIGHT AIMING (See page LI-13)**
11. **ADJUST HEADLIGHT AIMING (See page LI-14)**

REPAIR

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. INSTALL HEADLIGHT PROTECTOR RETAINER UPPER LH

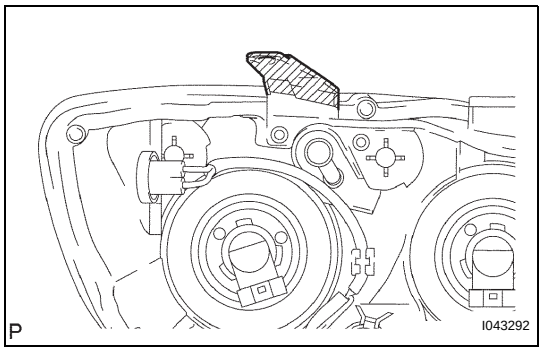
HINT:

- If the installation area of the headlight is damaged, use the supply bracket for low-cost repair.
- Ensure that the headlight assembly is not damaged.

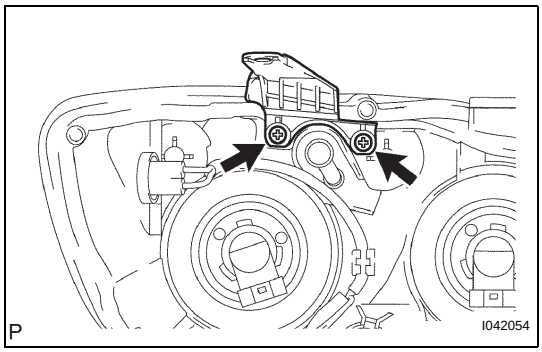
(a) Cut off the part shaded in the illustration and smooth with sandpaper.

NOTICE:

After cutting off the part, place the headlight protector retainer upper against the bosses and gradually file away until installation is possible.

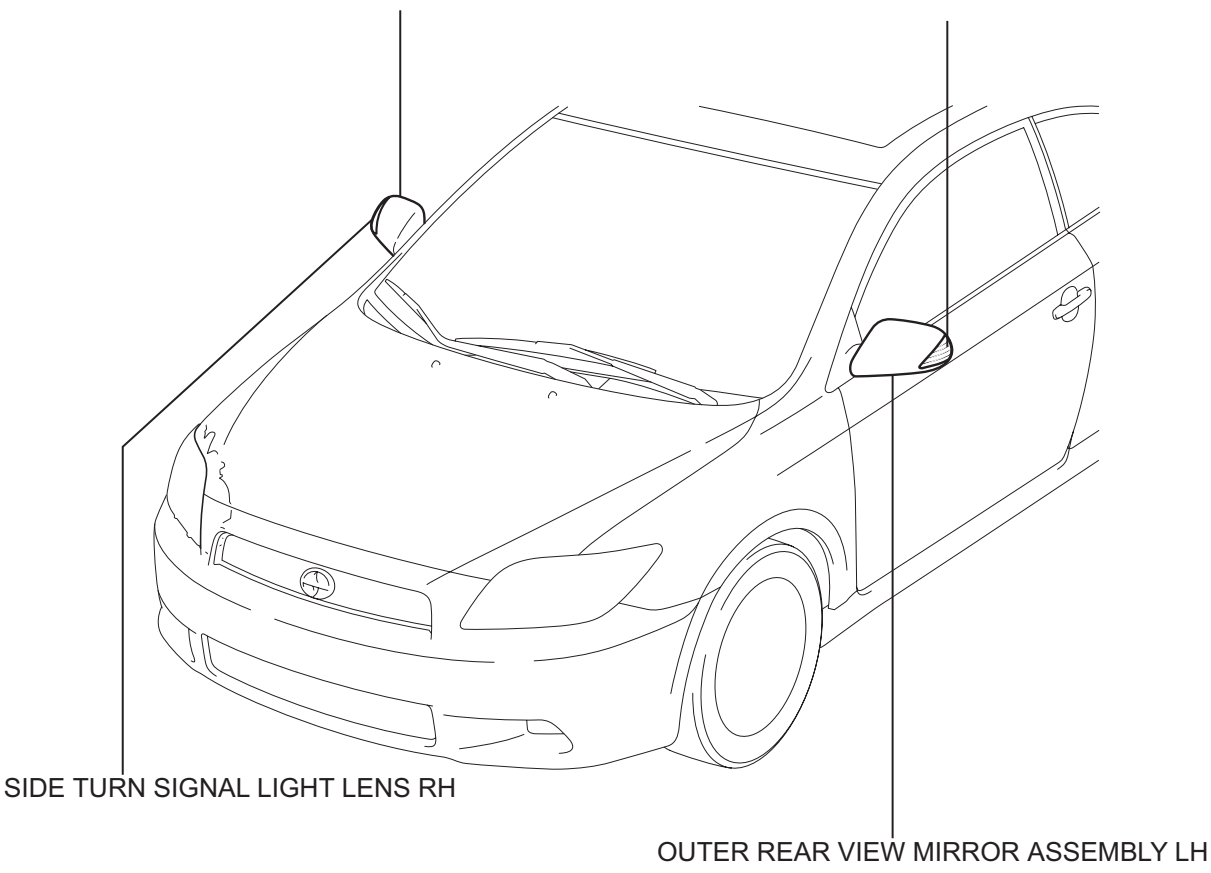


(b) Install the headlight protector retainer upper LH with the 2 screws.



SIDE TURN SIGNAL LIGHT ASSEMBLY

COMPONENTS



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REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

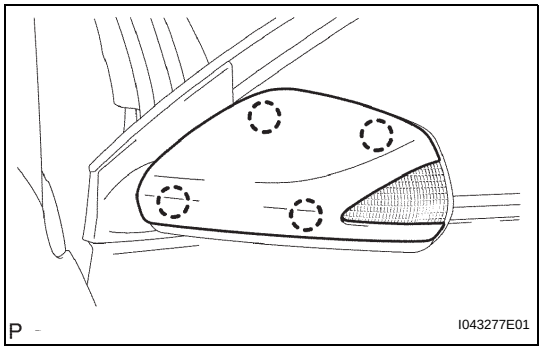
CAUTION:

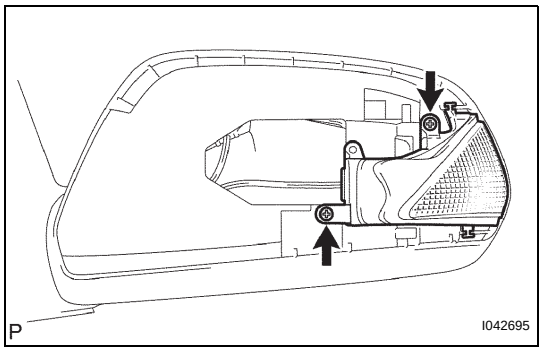
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE OUTER REAR VIEW MIRROR ASSEMBLY LH (See page MI-8)

3. REMOVE SIDE TURN SIGNAL LIGHT LENS LH

(a) Detach the 4 claws and remove the cover.





(b) Remove the 2 screws.

(c) Disconnect the connector and remove the side turn signal light lens LH.

INSTALLATION

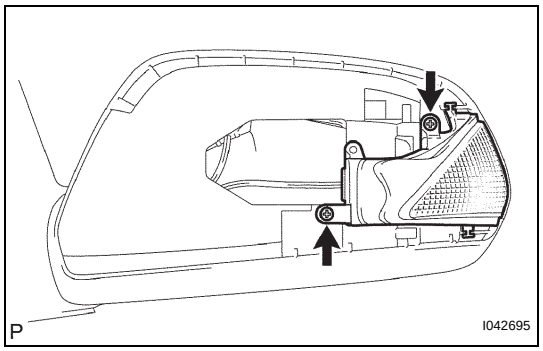
HINT:

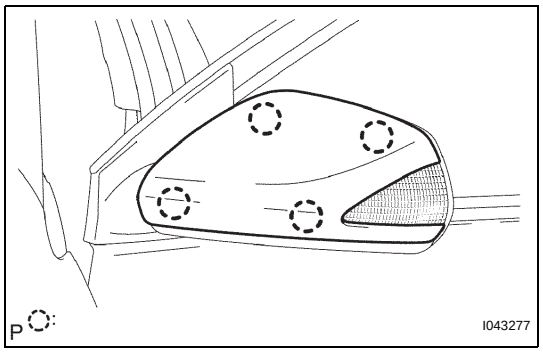
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. INSTALL SIDE TURN SIGNAL LIGHT LENS LH

(a) Connect the connector and install the side turn signal light lens LH.

(b) Install the 2 screws.





(c) Attach the 4 claws and install the cover.

2. INSTALL OUTER REAR VIEW MIRROR ASSEMBLY LH (See page MI-10)

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

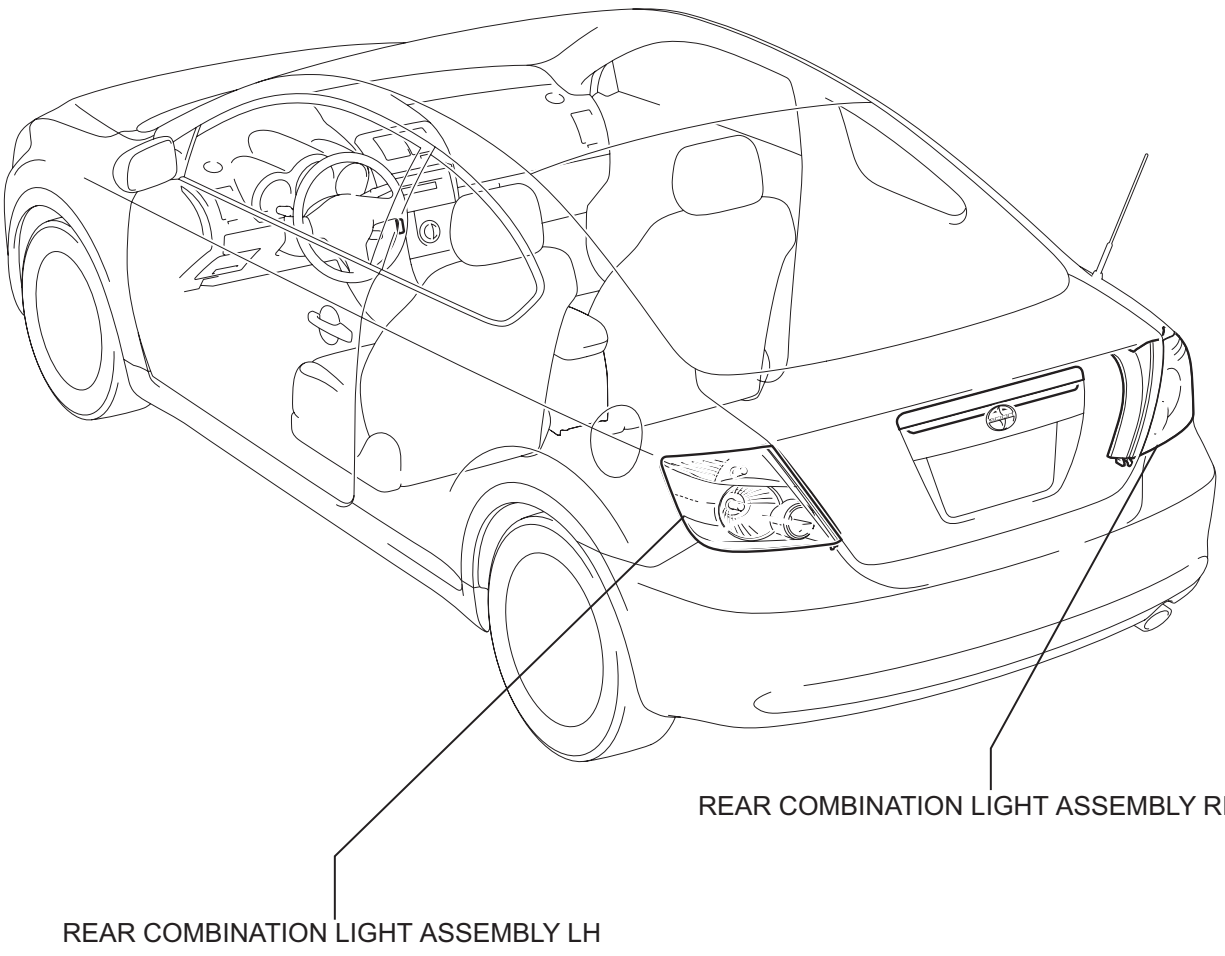
(a) Perform initialization (see page IN-23).

NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

LI

REAR COMBINATION LIGHT ASSEMBLY

COMPONENTS



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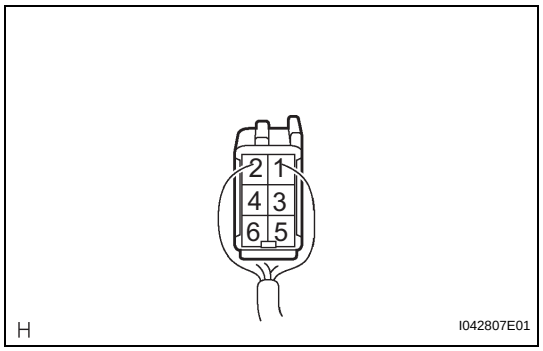


ON-VEHICLE INSPECTION

1. INSPECT REAR COMBINATION LIGHT ASSEMBLY

(a) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
2 - 6	Light control switch is in TAIL position	10 to 14 V
3 - 6	Shift R position	10 to 14 V
4 - 6	Turn signal switch is in LH (RH) position	Alternating between 0 to 9 V (60 to 120 times per minute)
5 - 6	Brake pedal is depressed	10 to 14 V

REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

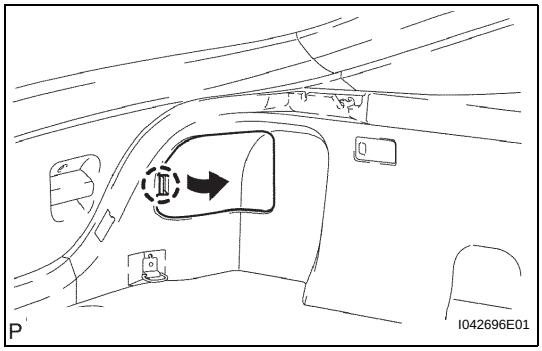
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE REAR BUMPER COVER (See page ET-7)

3. REMOVE REAR FLOOR SERVICE HOLE COVER

(a) Detach the claw and remove the rear floor service hole cover.

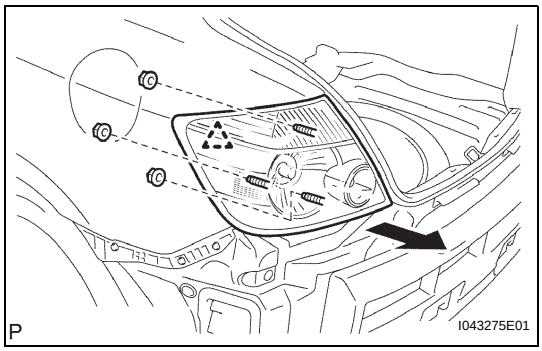


4. REMOVE REAR COMBINATION LIGHT ASSEMBLY LH

(a) Disconnect the connector.

(b) Remove the 3 nuts.

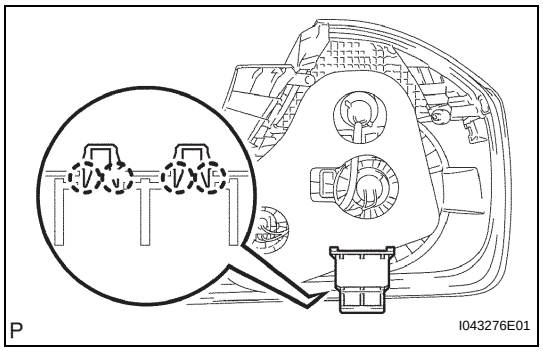
(c) Remove the pin, and then remove the rear combination light.



DISASSEMBLY

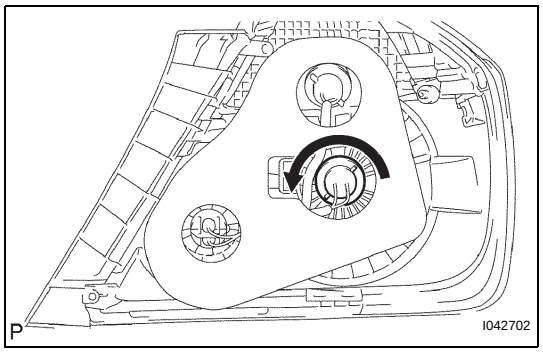
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



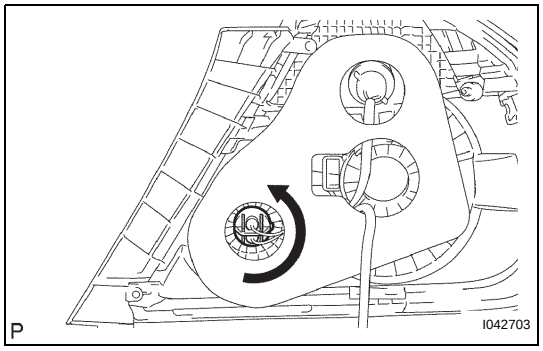
1. REMOVE REAR SIDE BRACKET LH

(a) Using needle nose pliers, detach the claws and remove the rear bumper side bracket from the rear combination light assembly.



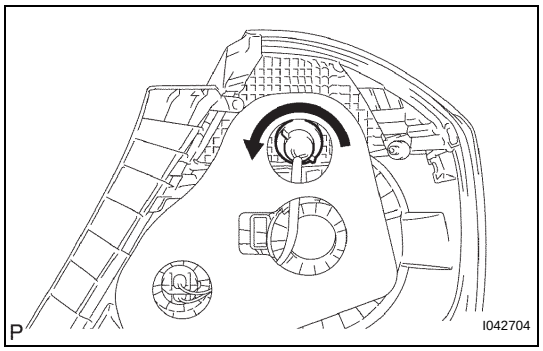
2. REMOVE TAIL AND STOP LIGHT BULB

(a) Remove the light socket as shown in the illustration.
(b) Remove the light bulb from the light socket.



3. REMOVE BACK-UP LIGHT BULB

(a) Remove the light socket as shown in the illustration.
(b) Remove the rear combination light bulb from the light socket.



4. REMOVE REAR TURN SIGNAL LIGHT BULB

(a) Remove the light socket as shown in the illustration.
(b) Remove the rear combination light bulb from the light socket.

5. REMOVE REAR COMBINATION LIGHT BODY PACKING LH

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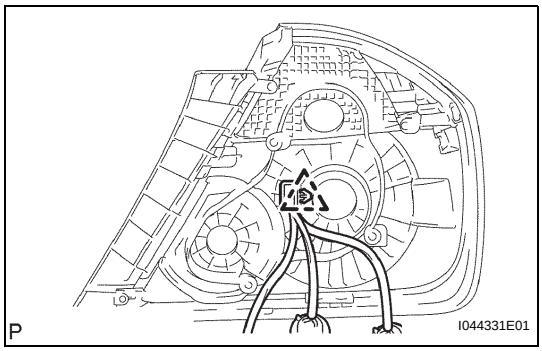


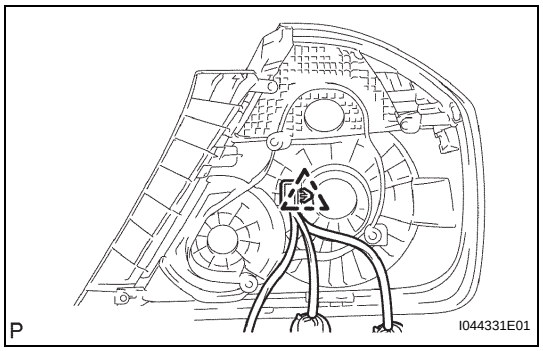
6. REMOVE REAR COMBINATION LIGHT SOCKET AND WIRE SUB-ASSEMBLY

(a) Detach the clamp and remove the rear combination light socket and wire.

REASSEMBLY

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. INSTALL REAR COMBINATION LIGHT SOCKET AND WIRE SUB-ASSEMBLY

(a) Attach the clamp and install the rear combination light socket and wire.

2. INSTALL REAR COMBINATION LIGHT BODY GASKET LH

3. INSTALL REAR TURN SIGNAL LIGHT BULB

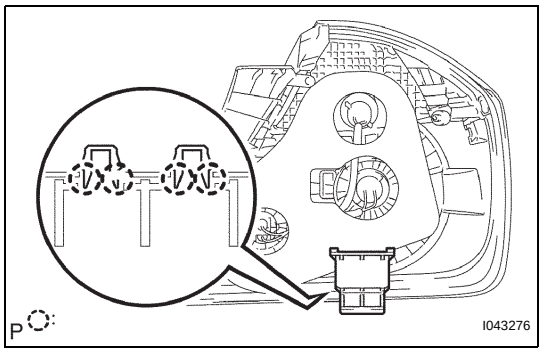
(a) Install the light bulb to the light socket.
(b) Install the light socket.

4. INSTALL BACK-UP LIGHT BULB

(a) Install the light bulb to the light socket.
(b) Install the light socket.

5. INSTALL TAIL AND STOP LIGHT BULB

(a) Install the light bulb to the light socket.
(b) Install the light socket.



6. INSTALL REAR BUMPER SIDE BRACKET LH

(a) Install the rear bumper side bracket to the rear combination light.

LI

INSTALLATION

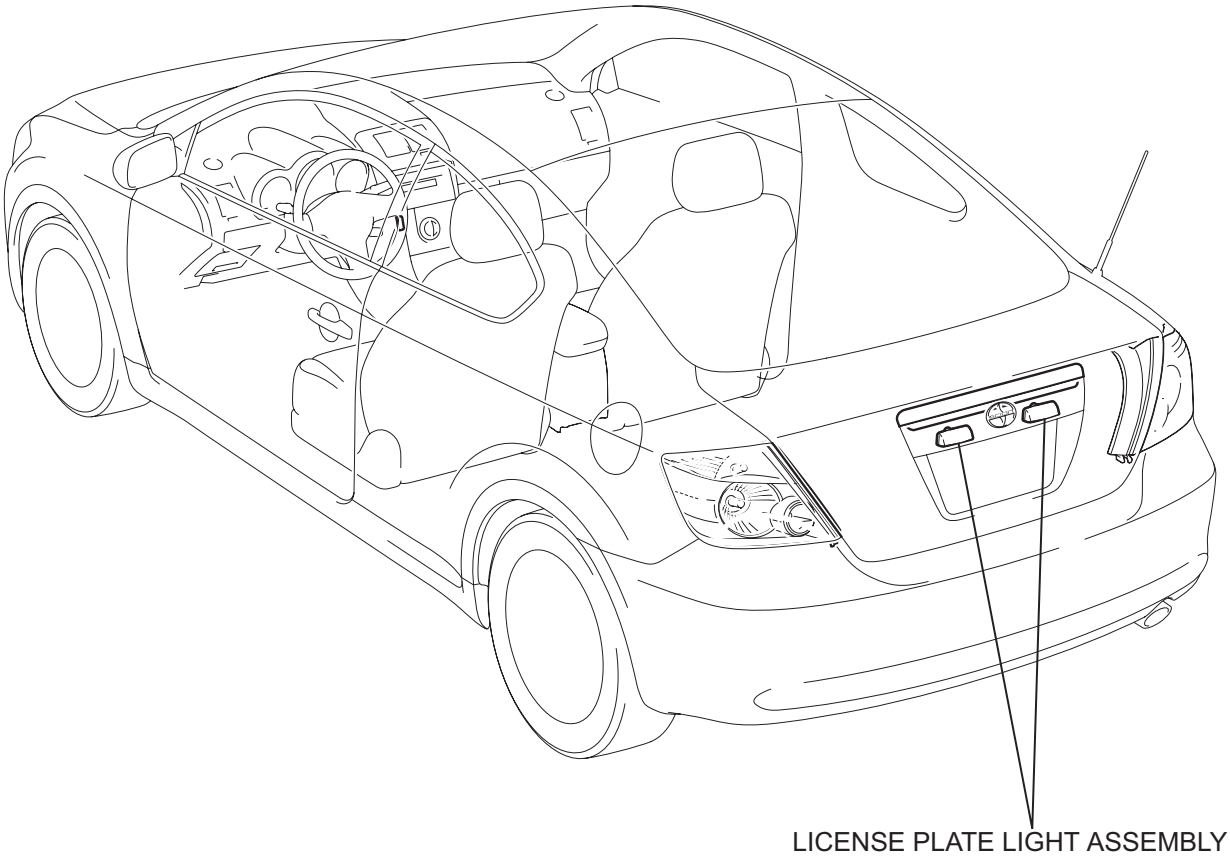
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **INSTALL REAR COMBINATION LIGHT ASSEMBLY LH**
   (a) Install the pin, and then install the rear combination light assembly LH.
   (b) Install the 3 nuts.
   (c) Connect the connector.
2. **INSTALL REAR FLOOR SERVICE HOLE COVER**
   (a) Install the rear floor service hole cover.
3. **INSTALL REAR BUMPER COVER (See page ET-8)**
4. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
5. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

LICENSE PLATE LIGHT ASSEMBLY

COMPONENTS



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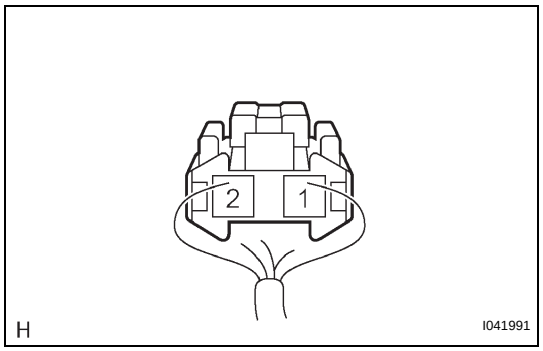


ON-VEHICLE INSPECTION

1. INSPECT LICENSE PLATE LIGHT ASSEMBLY

(a) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
1 - 2	Light control switch is in TAIL position	10 to 14 V

REMOVAL

HINT:

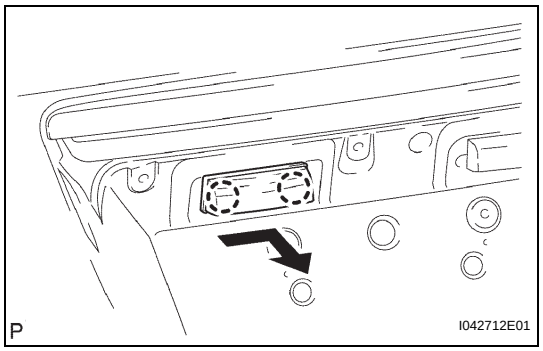
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE BACK DOOR GARNISH CENTER (See page ED-24)**
3. **REMOVE BACK DOOR SIDE GARNISH LH (See page ED-24)**
4. **REMOVE BACK DOOR SIDE GARNISH RH (See page ED-24)**
5. **REMOVE BACK DOOR GARNISH SUB - ASSEMBLY OUTSIDE (See page ET-22)**

DISASSEMBLY

HINT:

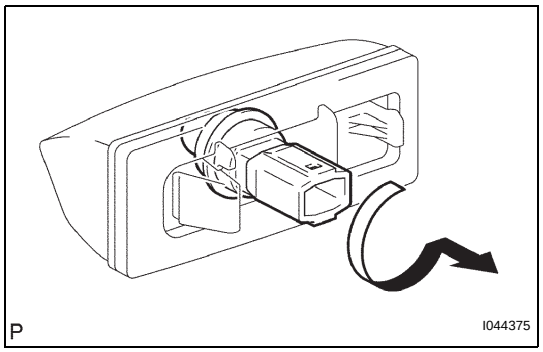
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. REMOVE LICENSE PLATE LIGHT ASSEMBLY

(a) Disconnect the connector.

(b) Detach the 2 claws and remove the license plate light as shown in the illustration.



2. REMOVE LICENSE PLATE LIGHT BULB

(a) Turn in the direction indicated by the arrow and remove the license plate light bulb, and the license plate light socket and wire as a unit.

(b) Remove the license plate light bulb from the license plate light socket and wire.

3. REMOVE LICENSE PLATE LIGHT LENS

REASSEMBLY

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. INSTALL LICENSE PLATE LIGHT LENS

2. INSTALL LICENSE PLATE LIGHT BULB

(a) Install the license plate light bulb to the license plate light socket.

(b) Install the light bulb, light socket and wire as a unit.

INSTALLATION

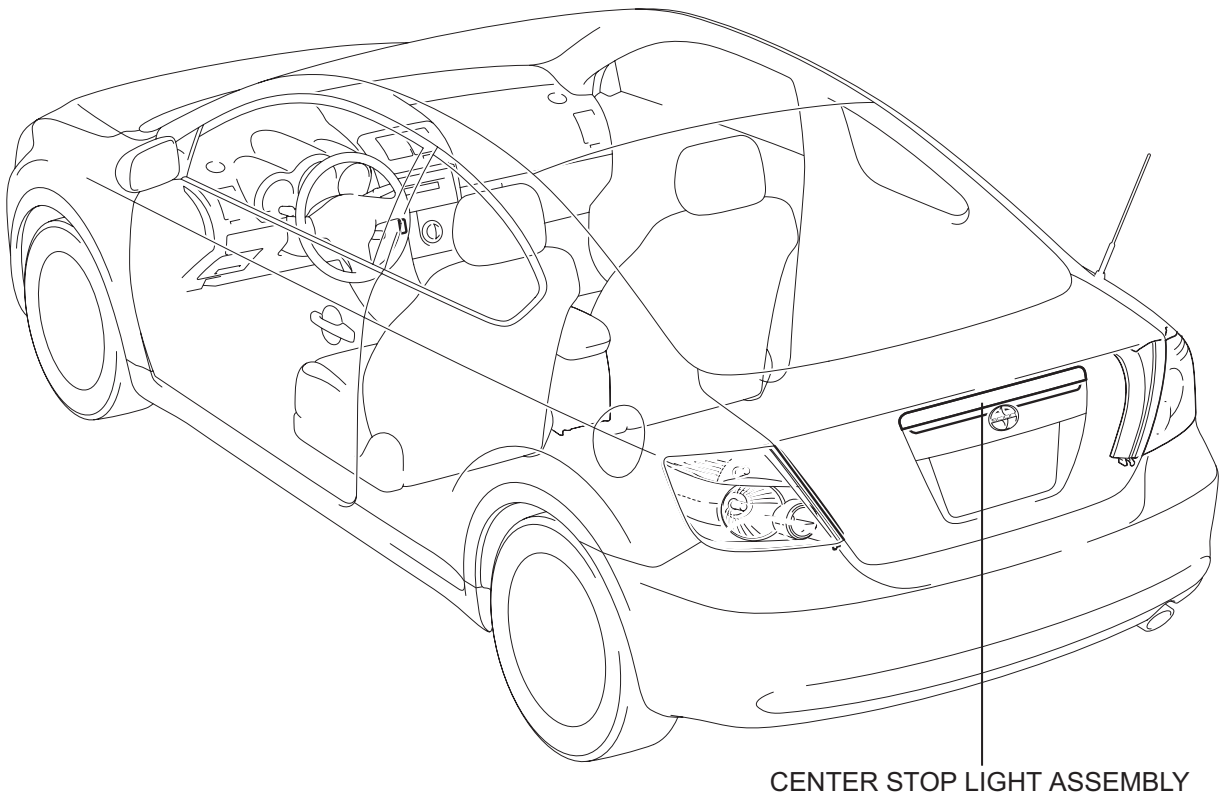
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **INSTALL LICENSE PLATE LIGHT ASSEMBLY**
   (a) Attach the 2 claws and install the license plate light assembly.
   (b) Connect the connector.
2. **INSTALL BACK DOOR GARNISH SUB-ASSEMBLY OUTSIDE**
3. **INSTALL BACK DOOR SIDE GARNISH RH (See page ED-28)**
4. **INSTALL BACK DOOR SIDE GARNISH LH (See page ED-28)**
5. **INSTALL BACK DOOR GARNISH CENTER (See page ED-28)**
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
7. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

HIGH MOUNTED STOP LIGHT ASSEMBLY

COMPONENTS



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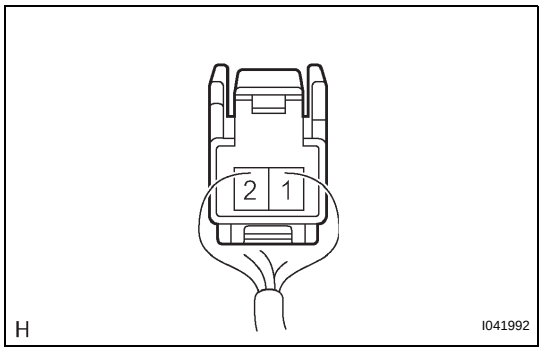


ON-VEHICLE INSPECTION

1. INSPECT CENTER STOP LIGHT ASSEMBLY

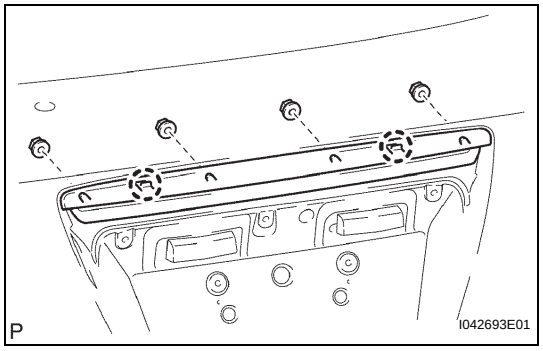
(a) Measure the voltage according to the value(s) in the table below.

Standard resistance

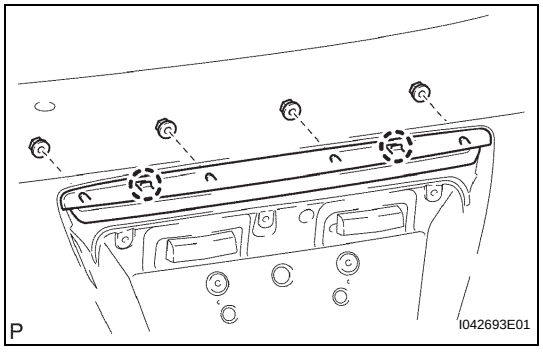
Tester Connection	Condition	Specified Condition
1 - 2	Brake pedal is depressed	10 to 14 V

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE BACK DOOR GARNISH CENTER (See page ED-24)**
3. **REMOVE BACK DOOR SIDE GARNISH LH (See page ED-24)**
4. **REMOVE BACK DOOR SIDE GARNISH RH (See page ED-24)**
5. **REMOVE BACK DOOR GARNISH SUB-ASSEMBLY OUTSIDE**
6. **REMOVE CENTER STOP LIGHT ASSEMBLY**
   (a) Disconnect the connector.
   (b) Remove the 4 nuts and detach the 2 claws, and then remove the center stop light.



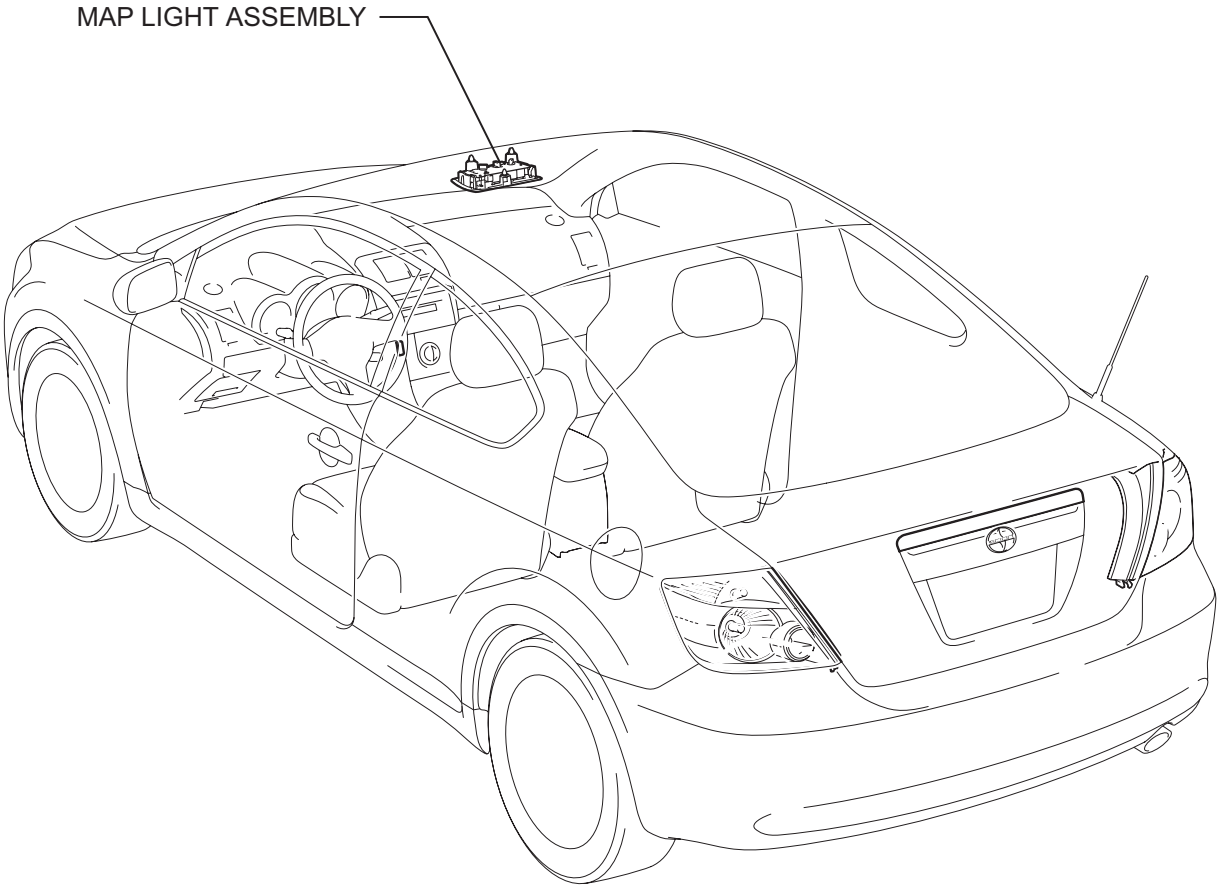
INSTALLATION



1. **INSTALL CENTER STOP LIGHT ASSEMBLY**
   (a) Install the 4 nuts and attach the 2 claws, and then install the center stop light.
   (b) Connect the connector.
2. **INSTALL BACK DOOR GARNISH SUB-ASSEMBLY OUTSIDE**
3. **INSTALL BACK DOOR SIDE GARNISH RH (See page ED-28)**
4. **INSTALL BACK DOOR SIDE GARNISH LH (See page ED-28)**
5. **INSTALL BACK DOOR GARNISH CENTER (See page ED-28)**
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
7. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

MAP LIGHT ASSEMBLY

COMPONENTS



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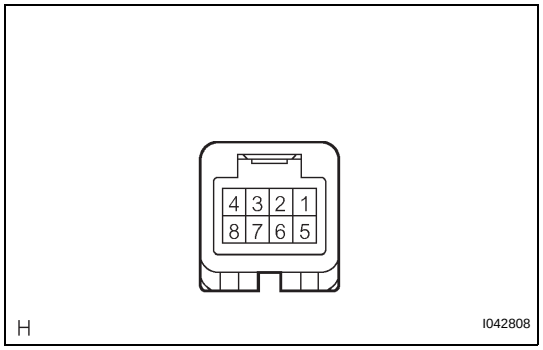
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. **REMOVE MAP LIGHT ASSEMBLY (See page IR-12)**

INSPECTION



1. **INSPECT MAP LIGHT ASSEMBLY**
   (a) Measure the resistance according to the value(s) in the table below.
   Standard resistance

Tester Connection	Condition	Specified Condition
3 - 4 3 - 8	Switch is OFF	10 kΩ or higher

   (b) Connect the battery positive (+) lead to terminal 3 and the battery negative (-) lead to terminal 8, and then check that the light comes on when the switch is in the DOOR position.
   OK:
   Light comes on.
   (c) Connect the battery positive (+) lead to terminal 3 and the battery negative (-) lead to terminal 4, and then check that the light comes on when the switch is in the ON position.
   OK:
   Light comes on.

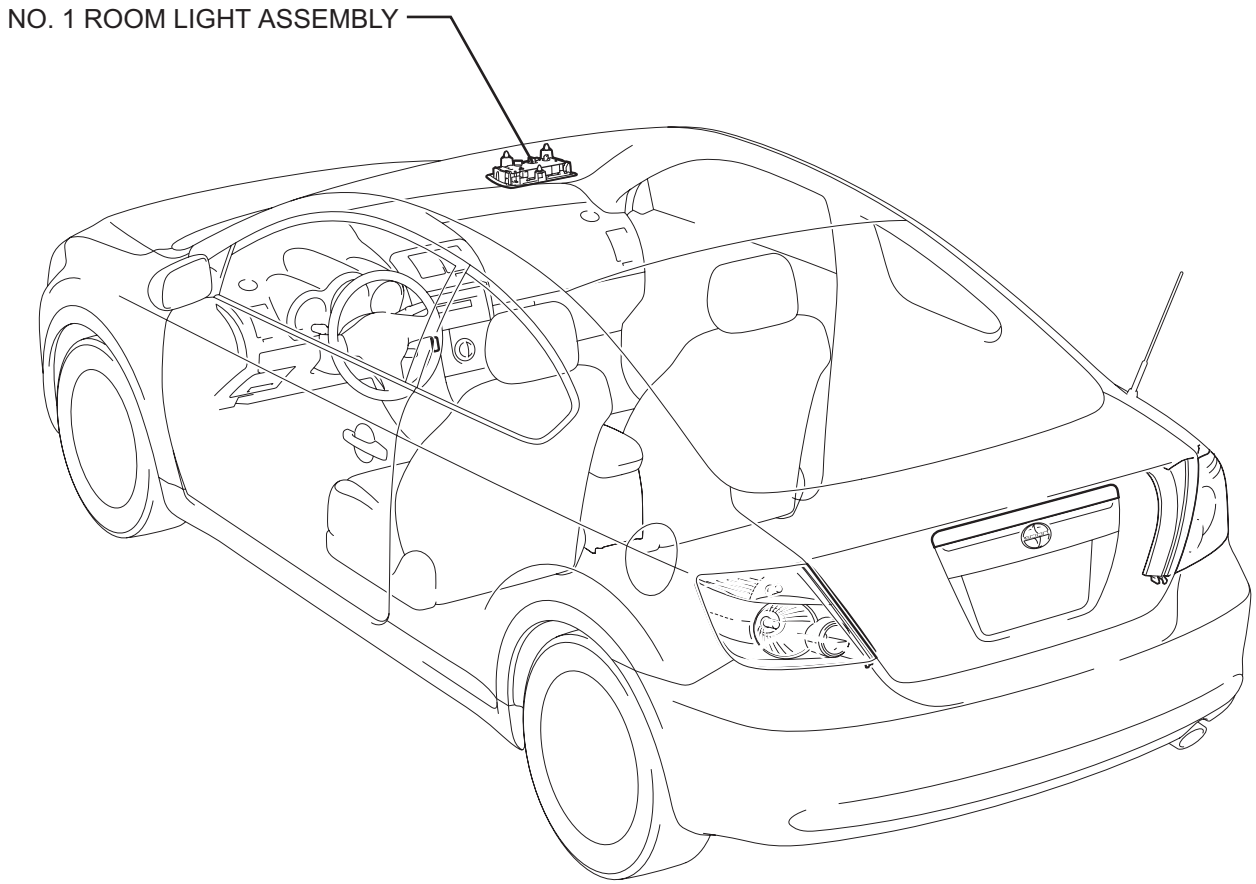
LI

INSTALLATION

1. **INSTALL MAP LIGHT ASSEMBLY (See page IR-16)**
2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ROOM LIGHT ASSEMBLY

COMPONENTS



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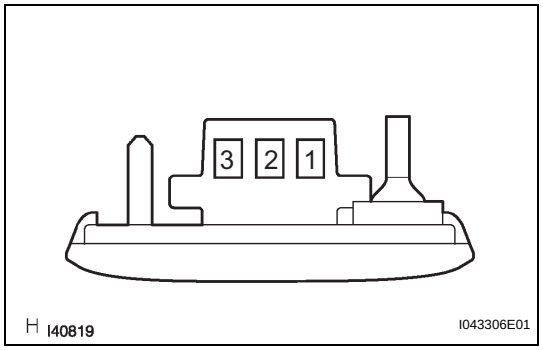
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE NO. 1 ROOM LIGHT ASSEMBLY (See page IR-13)**

INSPECTION

1. **INSPECT NO. 1 ROOM LIGHT ASSEMBLY**
   (a) Measure the resistance according to the value(s) in the table below.
   Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2 1 - 3	Switch is OFF	10 kΩ or higher



   (b) Connect the battery positive (+) lead to terminal 1 and the battery negative (-) lead to terminal 2, nd then check that the light comes on when the switch is in the DOOR position.
   OK:
   Light comes on.
   (c) Connect the battery positive (+) lead to terminal 1 and the battery negative (-) lead to terminal 3, and then check that the light comes on when the switch is in the ON position.
   OK:
   Light comes on.

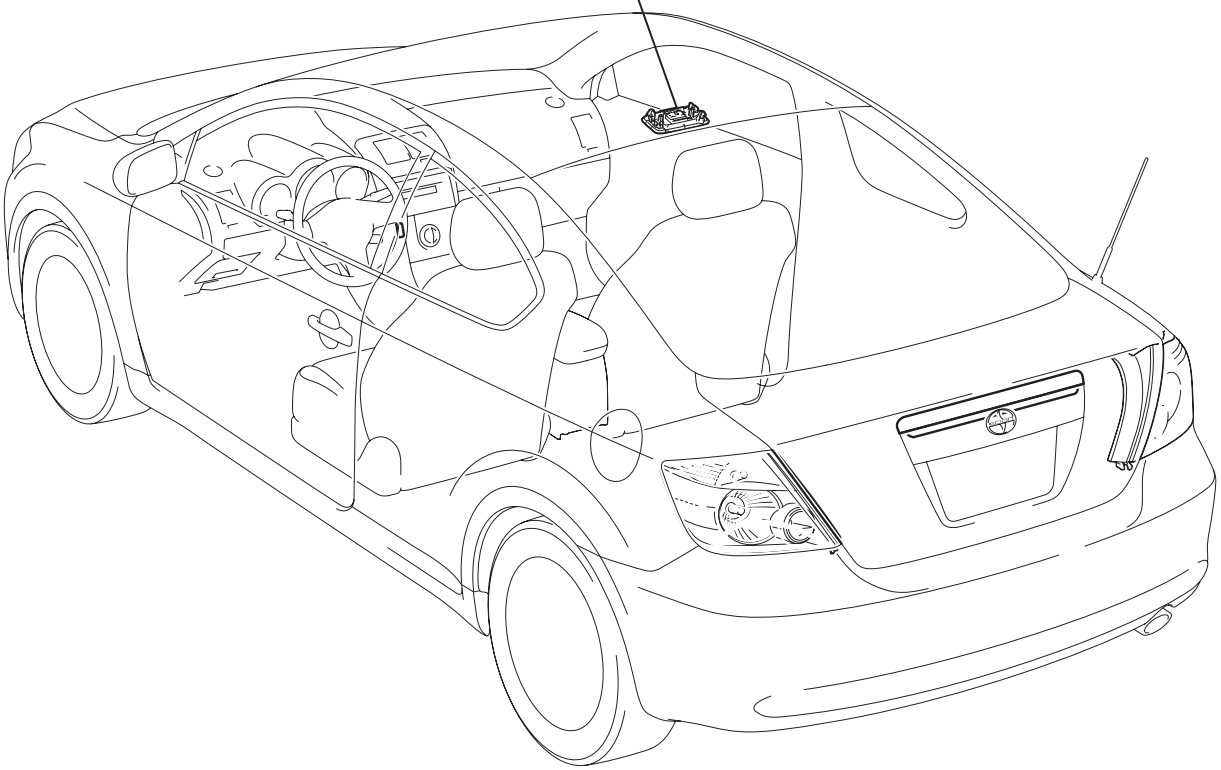
LI

INSTALLATION

1. **INSTALL NO. 1 ROOM LIGHT ASSEMBLY (See page IR-16)**
2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

REAR ROOM LIGHT ASSEMBLY

COMPONENTS



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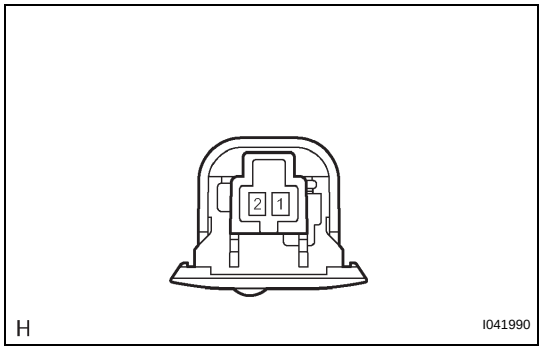
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   NOTICE:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE NO. 2 ROOM LIGHT ASSEMBLY (See page IR-13)**

INSPECTION

1. **INSPECT NO. 2 ROOM LIGHT ASSEMBLY**
   (a) Connect the battery positive (+) lead to terminal 2 and the battery negative (-) lead to terminal 1, and then check that the light comes on when the switch is in the ON position.
   OK:
   Light comes on.



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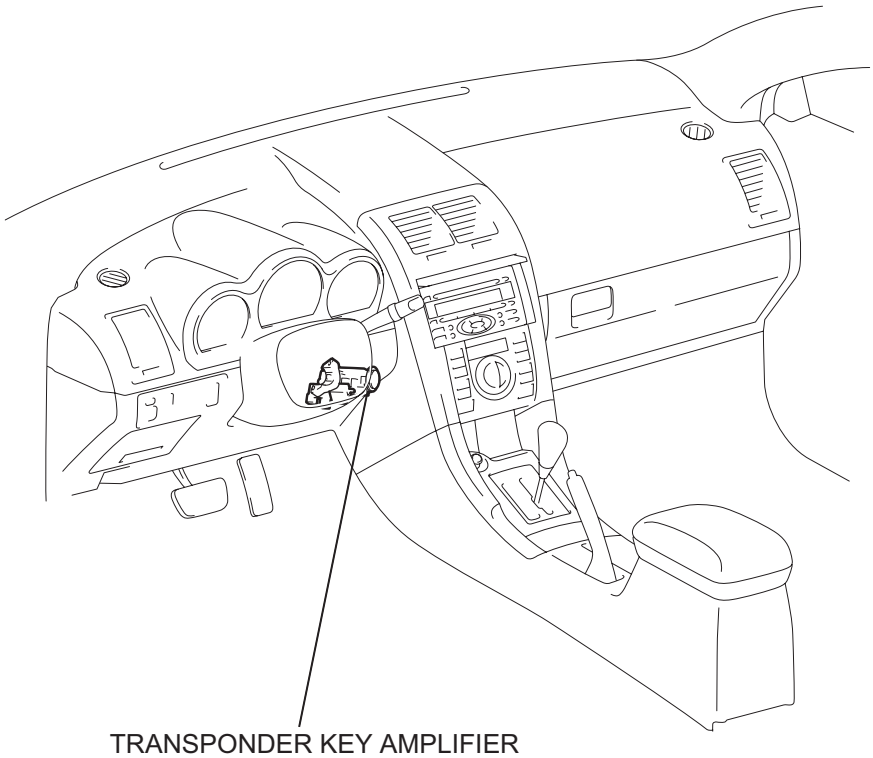
INSTALLATION

1. **INSTALL NO. 2 ROOM LIGHT ASSEMBLY (See page IR-16)**
2. **DISCONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

IGNITION KEY CYLINDER LIGHT

COMPONENTS



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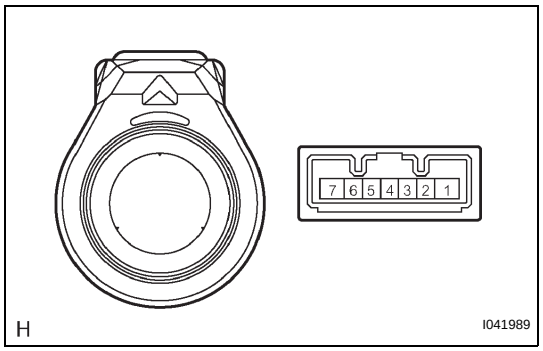
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE STEERING COLUMN COVER (See page SR-8)**
3. **REMOVE TRANSPONDER KEY AMPLIFIER (See page SR-9)**

INSPECTION



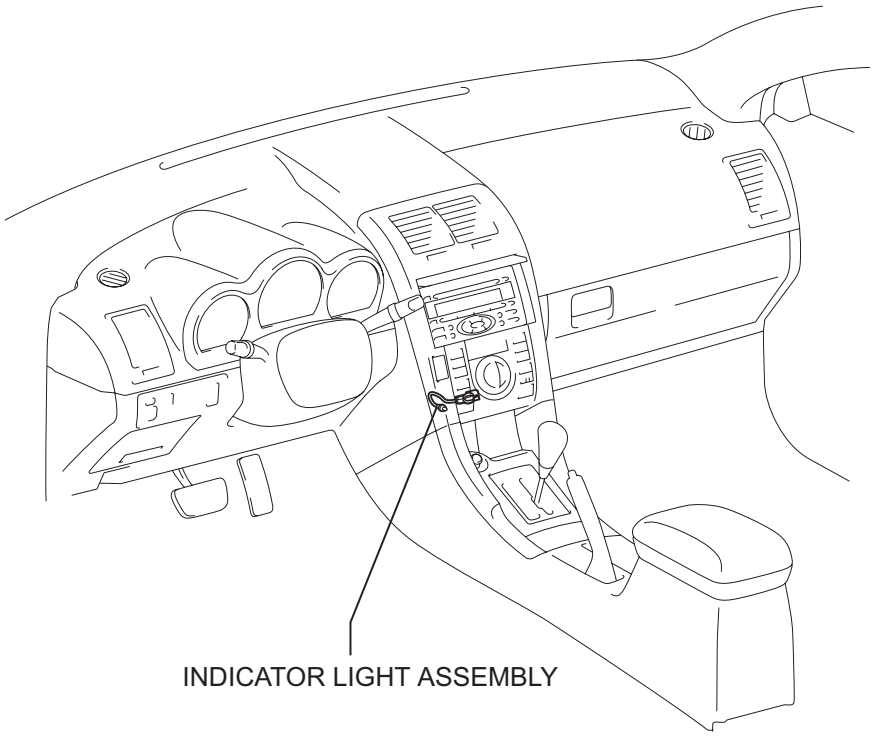
1. **INSPECT TRANSPONDER KEY AMPLIFIER**
   (a) Inspect the ignition key cylinder light operation.
      (1) Connect the battery positive (+) lead to terminal 2 and the battery negative (-) lead to terminal 6, and then check that the light comes on.
      OK:
      Light comes on.

INSTALLATION

1. **INSTALL STEERING COLUMN COVER (See page SR-8)**
2. **INSTALL TRANSPONDER KEY AMPLIFIER (See page SR-14)**
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
4. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

FRONT CONSOLE ILLUMINATION

COMPONENTS



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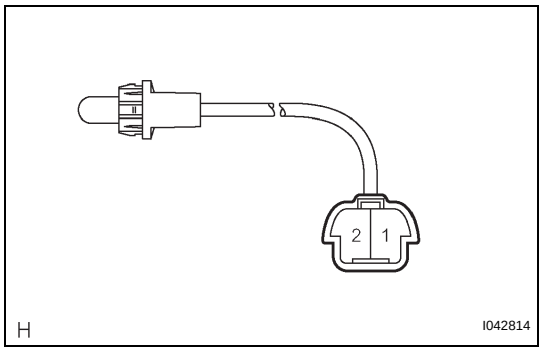
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY (See page AC-71)**
3. **REMOVE INDICATOR LIGHT ASSEMBLY**
   (a) Disconnect the connector.
   (b) Detach the clip and remove the light.



INSPECTION

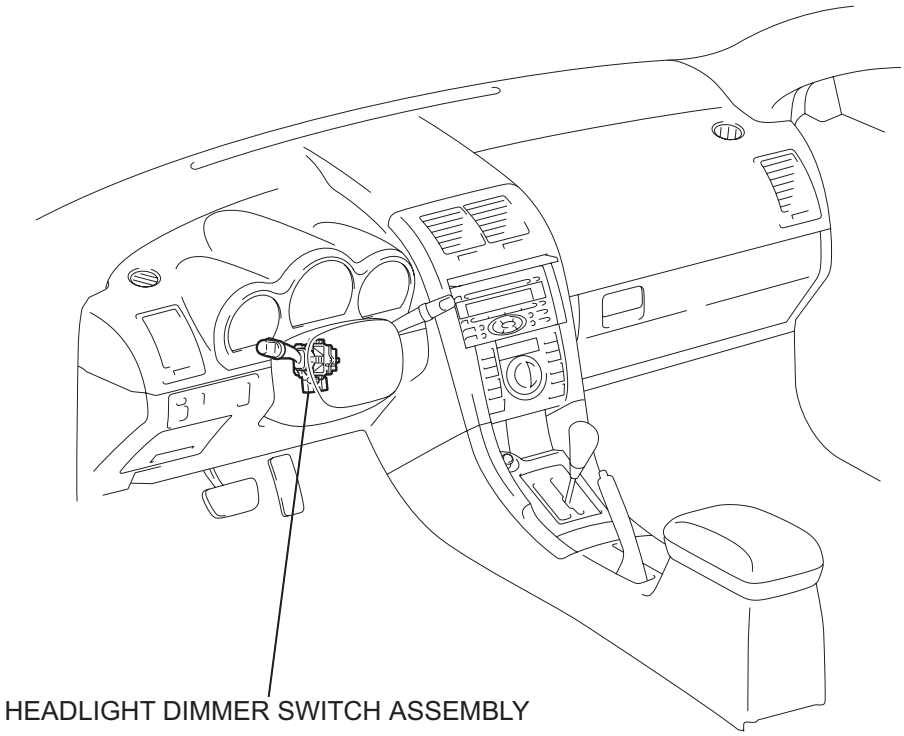
1. **INSPECT INDICATOR LIGHT**
   (a) Inspect front console illumination.
      (1) Connect the battery positive (+) lead to terminal 1 and the battery negative (-) lead to terminal 2, and then check that the light comes on.
      OK:
      light comes on.

INSTALLATION

1. **INSTALL INDICATOR LIGHT ASSEMBLY**
   (a) Attach the clip and install the light.
   (b) Connect the connector.
2. **INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY (See page AC-74)**
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
4. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

HEADLIGHT DIMMER SWITCH

COMPONENTS



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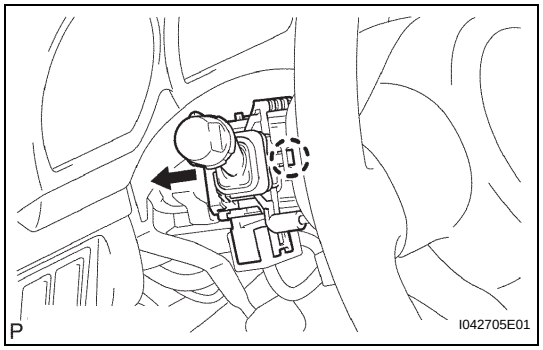
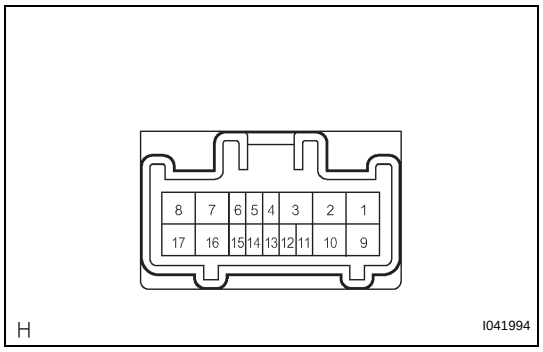
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE STEERING COLUMN COVER (See page SR-8)**
3. **REMOVE HEADLIGHT DIMMER SWITCH ASSEMBLY**
   (a) Disconnect the connector.
   (b) Detach the claw and remove the headlight dimmer switch.
   NOTICE:
   Do not push the claw strongly, otherwise it will be damaged.





INSPECTION

1. **INSPECT HEADLIGHT DIMMER SWITCH ASSEMBLY**
   (a) Inspect the light control switch.
   (1) Measure the resistance according to the value(s) in the table below.
   Standard resistance

Tester Connection	Condition	Specified Condition
13 - 16 14 - 16	OFF	10 kΩ or higher
14 - 16	TAIL	Below 1 Ω
13 - 16 14 - 16	HEAD	Below 1 Ω

   (b) Inspect the headlight dimmer switch.
   (1) Measure the resistance according to the value(s) in the table below.
   Standard resistance

Tester Connection	Condition	Specified Condition
8 - 16 7 - 8	FLASH	Below 1 Ω
16 - 17	LOW BEAM	Below 1 Ω
7 - 16	HIGH BEAM	Below 1 Ω

   (c) Inspect the turn signal switch.
   (1) Measure the resistance according to the value(s) in the table below.
   Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Left turn	Below 1 Ω
1 - 2 2 - 3	Neutral	10 kΩ or higher
2 - 3	Right turn	Below 1 Ω

INSTALLATION

1. INSTALL HEADLIGHT DIMMER SWITCH ASSEMBLY

(a) Attach the claw and install the headlight dimmer switch assembly.

(b) Connect the connector.

2. INSTALL STEERING COLUMN COVER

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

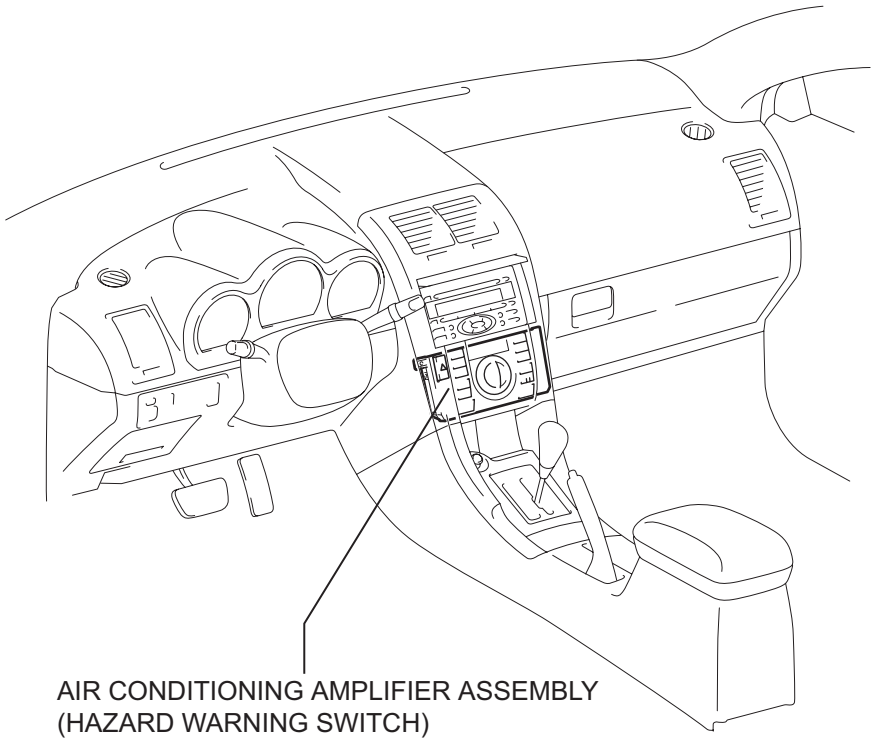
(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

HAZARD WARNING SWITCH

COMPONENTS



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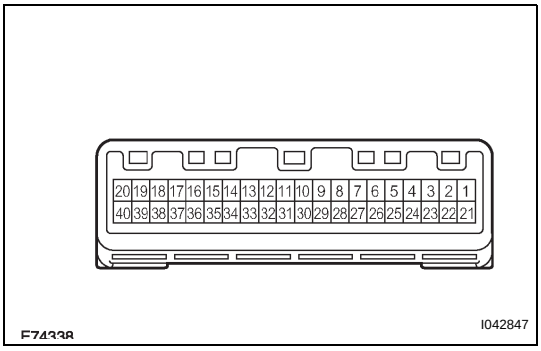
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-5)**
3. **REMOVE UPPER CONSOLE PANEL (See page IP-5)**
4. **REMOVE INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY (See page AC-71)**

INSPECTION



1. **INSPECT AIR CONDITIONING AMPLIFIER ASSEMBLY (HAZARD WARNING SWITCH)**
   (a) Inspect the hazard warning switch resistance.
   (1) Measure the resistance according to the value(s) in the table below.
   Standard resistance

Tester Connection	Condition	Specified Condition
9 - 25	OFF	10 kΩ or higher
9 - 25	ON	Below 1 Ω

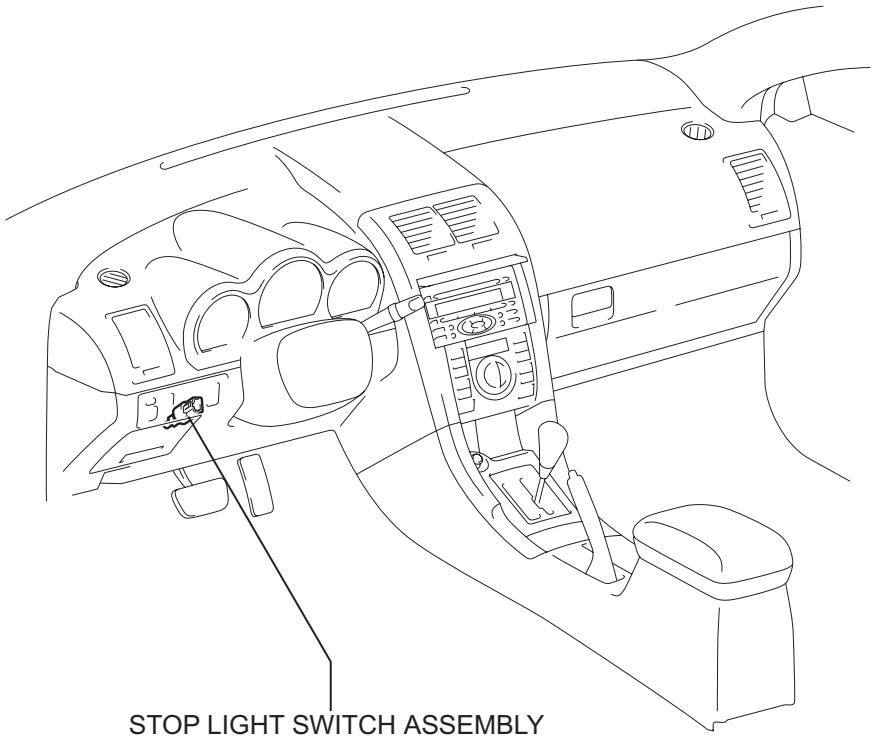
   (2) Connect the positive lead (+) from the battery to terminal 25 and the negative (-) lead to terminal 9, and then check that the light comes on.
   OK:
   Light comes on.

INSTALLATION

1. **INSTALL INSTRUMENT CLUSTER FINISH PANEL ASSEMBLY (See page AC-74)**
2. **INSTALL UPPER CONSOLE PANEL (See page IP-5)**
3. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (See page IP-5)**
4. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
5. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

STOP LIGHT SWITCH

COMPONENTS



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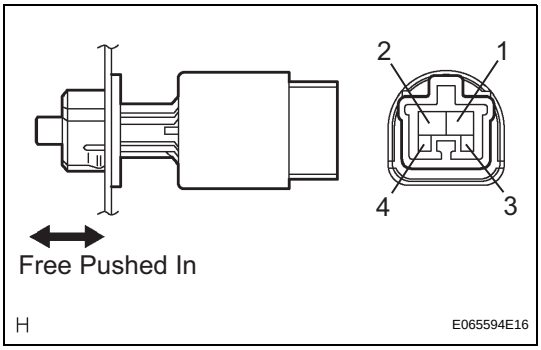
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE STOP LIGHT SWITCH ASSEMBLY (See page BR-6)**

INSPECTION



1. **INSPECT STOP LIGHT SWITCH ASSEMBLY**
   (a) Measure the resistance according to the value(s) in the table below.
   Standard resistance

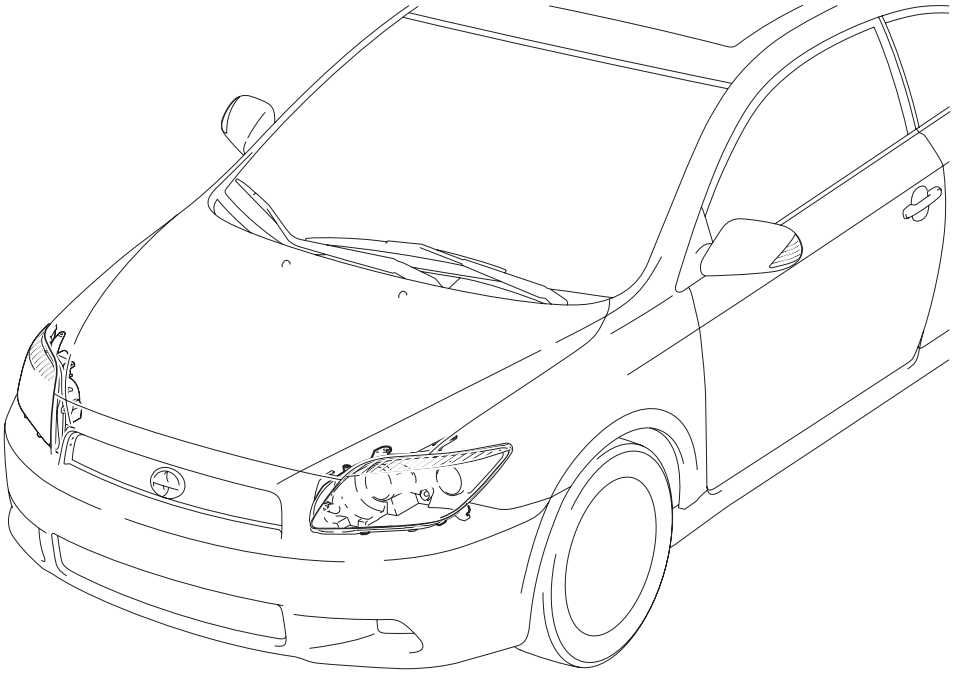
Tester Connection	Condition	Specified Condition
1 - 2	Switch pin free	Below 1 Ω
3 - 4	Switch pin free	10 kΩ or higher
1 - 2	Switch pin pushed in	10 kΩ or higher
3 - 4	Switch pin pushed in	Below 1 Ω

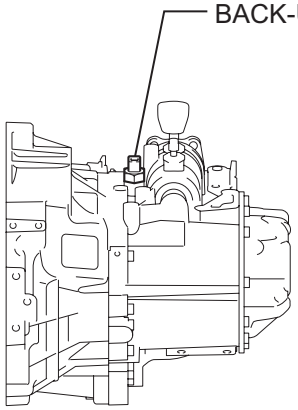
INSTALLATION

1. **INSTALL STOP LIGHT SWITCH ASSEMBLY (See page BR-9)**
2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

BACK-UP LIGHT SWITCH

COMPONENTS





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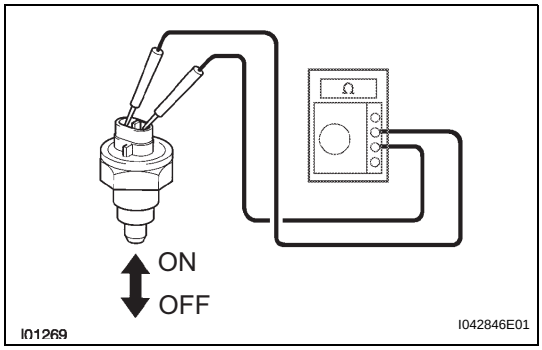


REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE BACK-UP LIGHT SWITCH ASSEMBLY (See page MX-34)**

INSPECTION

1. **INSPECT BACK-UP LIGHT SWITCH ASSEMBLY**
   (a) Measure the resistance according to the value(s) in the table below.
   Standard resistance

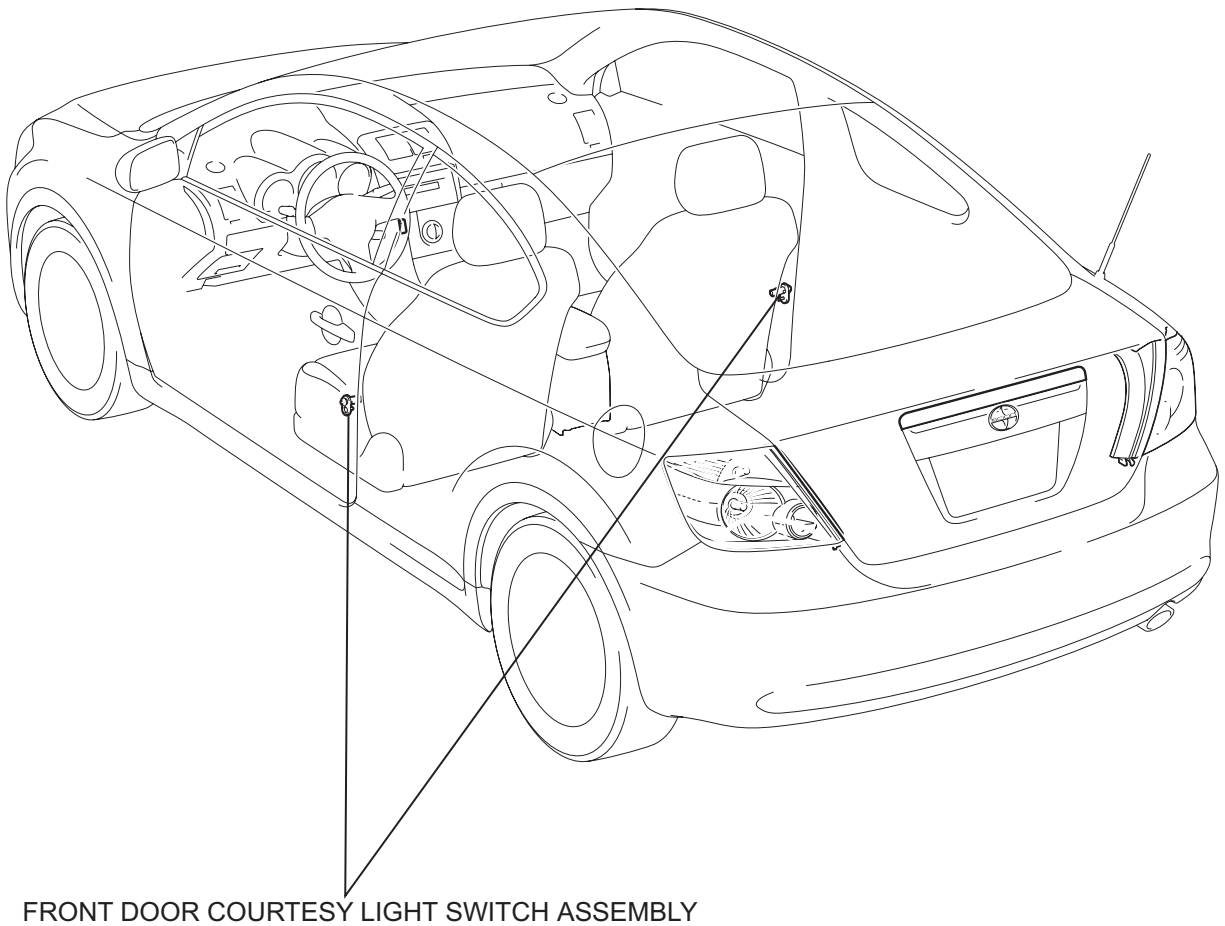
Tester Connection	Condition	Specified Condition
1 - 2	OFF	10 kΩ or higher
1 - 2	ON	Below 1 Ω

INSTALLATION

1. **INSTALL BACK-UP LIGHT SWITCH ASSEMBLY (See page MX-65)**
2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

FRONT DOOR COURTESY SWITCH

COMPONENTS



FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY

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REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY**
   (a) Remove the bolt and switch.
   (b) Disconnect the connector.

INSPECTION

1. INSPECT FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY

(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

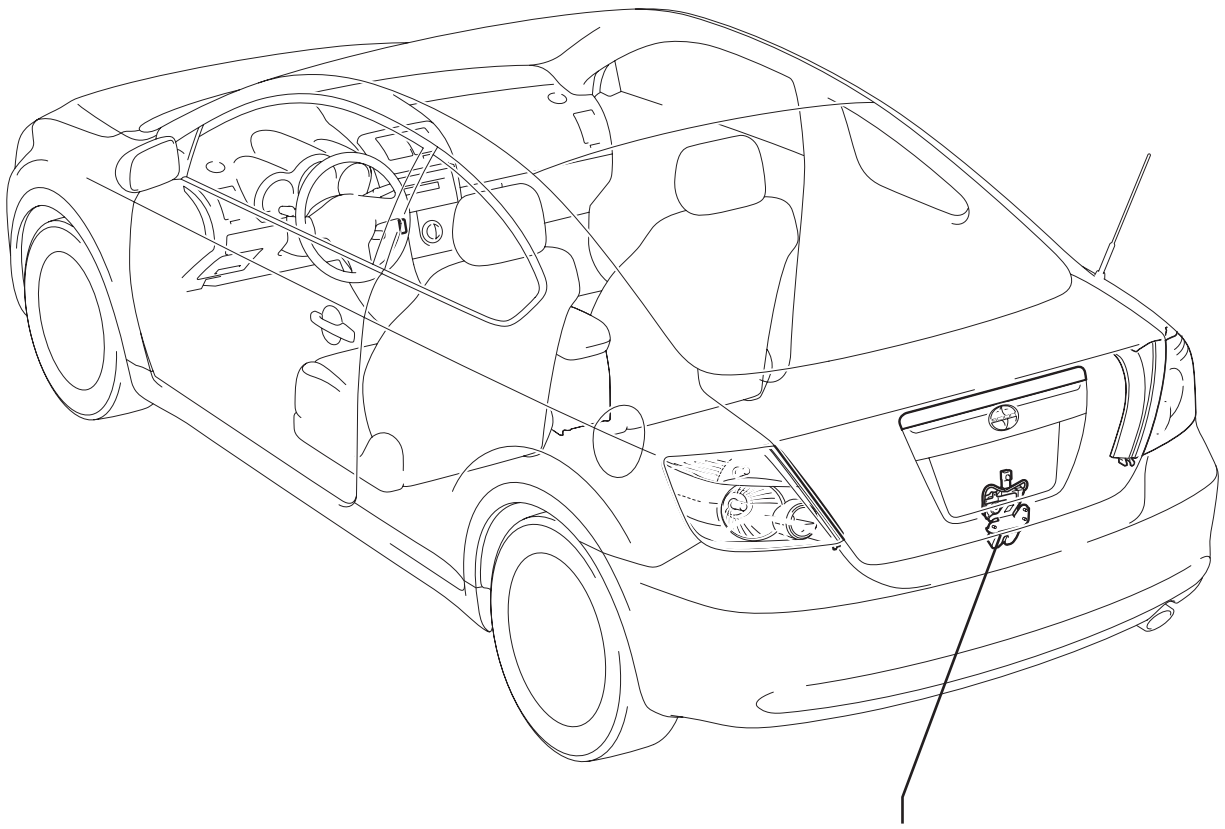
Tester Connection	Condition	Specified Condition
1 - Switch body	ON (When shaft is pressed)	10 kΩ or higher
1 - Switch body	OFF (When shaft is not pressed)	Below 1 Ω

INSTALLATION

1. **INSTALL FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY**
   (a) Connect the connector.
   (b) Install the switch with the bolt.
2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

BACK DOOR COURTESY SWITCH

COMPONENTS



BACK DOOR LOCK ASSEMBLY
- BACK DOOR COURTESY SWITCH

P

B117933E02

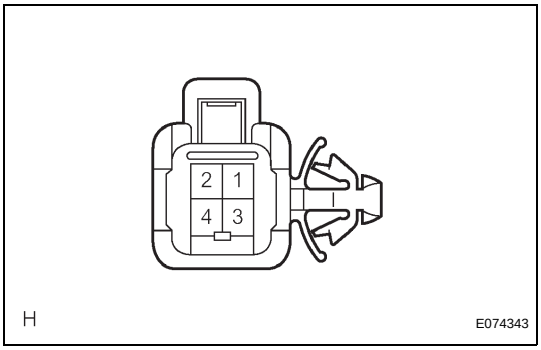
LI

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE BACK DOOR GARNISH CENTER (See page ED-24)**
3. **REMOVE BACK DOOR SIDE GARNISH LH (See page ED-24)**
4. **REMOVE BACK DOOR SIDE GARNISH RH (See page ED-24)**
5. **REMOVE BACK DOOR TRIM BOARD ASSEMBLY (See page ED-25)**
6. **REMOVE BACK DOOR LOCK ASSEMBLY (See page ED-26)**

INSPECTION

1. **INSPECT BACK DOOR LOCK ASSEMBLY**
   (a) Inspect the back door courtesy light switch.
   (1) Measure the resistance according to the value(s) in the table below.
   Standard



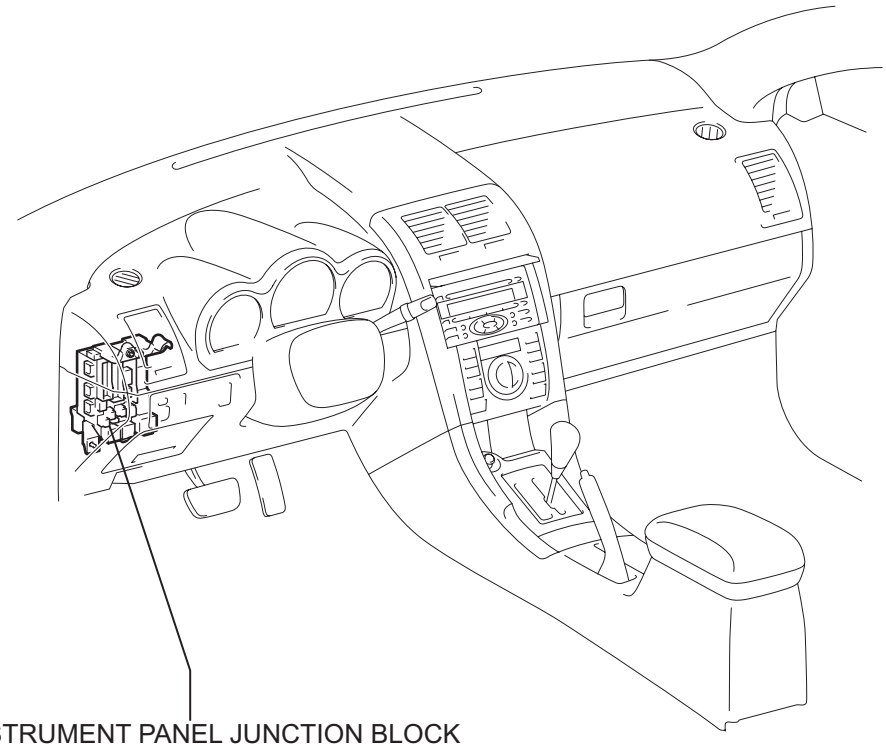
Tester Connection	Condition	Specified Condition
1 - 2	Back door is closed	10 kΩ or higher
1 - 2	Back door is opened	Below 1 Ω

INSTALLATION

1. **INSTALL BACK DOOR LOCK ASSEMBLY (See page ED-27)**
2. **INSTALL BACK DOOR TRIM BOARD ASSEMBLY (See page ED-28)**
3. **INSTALL BACK DOOR SIDE GARNISH RH (See page ED-28)**
4. **INSTALL BACK DOOR SIDE GARNISH LH (See page ED-28)**
5. **INSTALL BACK DOOR GARNISH CENTER (See page ED-28)**
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
7. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

TURN SIGNAL FLASHER ASSEMBLY

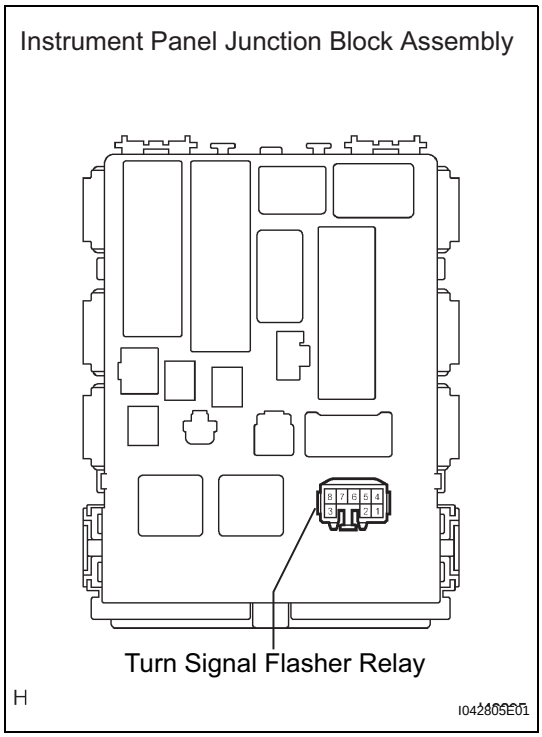
COMPONENTS



INSTRUMENT PANEL JUNCTION BLOCK
- TURN SIGNAL FLASHER RELAY

P

B118452E02



ON-VEHICLE INSPECTION

1. INSPECT TURN SIGNAL FLASHER OPERATION

(a) Inspect the power source circuit and ground circuit

(1) Remove the turn signal flasher relay from the instrument panel junction block assembly.

(2) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
1 - Body ground	Ignition switch OFF	Below 1 V
1 - Body ground	Ignition switch ON	10 to 14 V
4 - Body ground	Always	10 to 14 V

(3) Measure the resistance according to the value(s) in the table below.

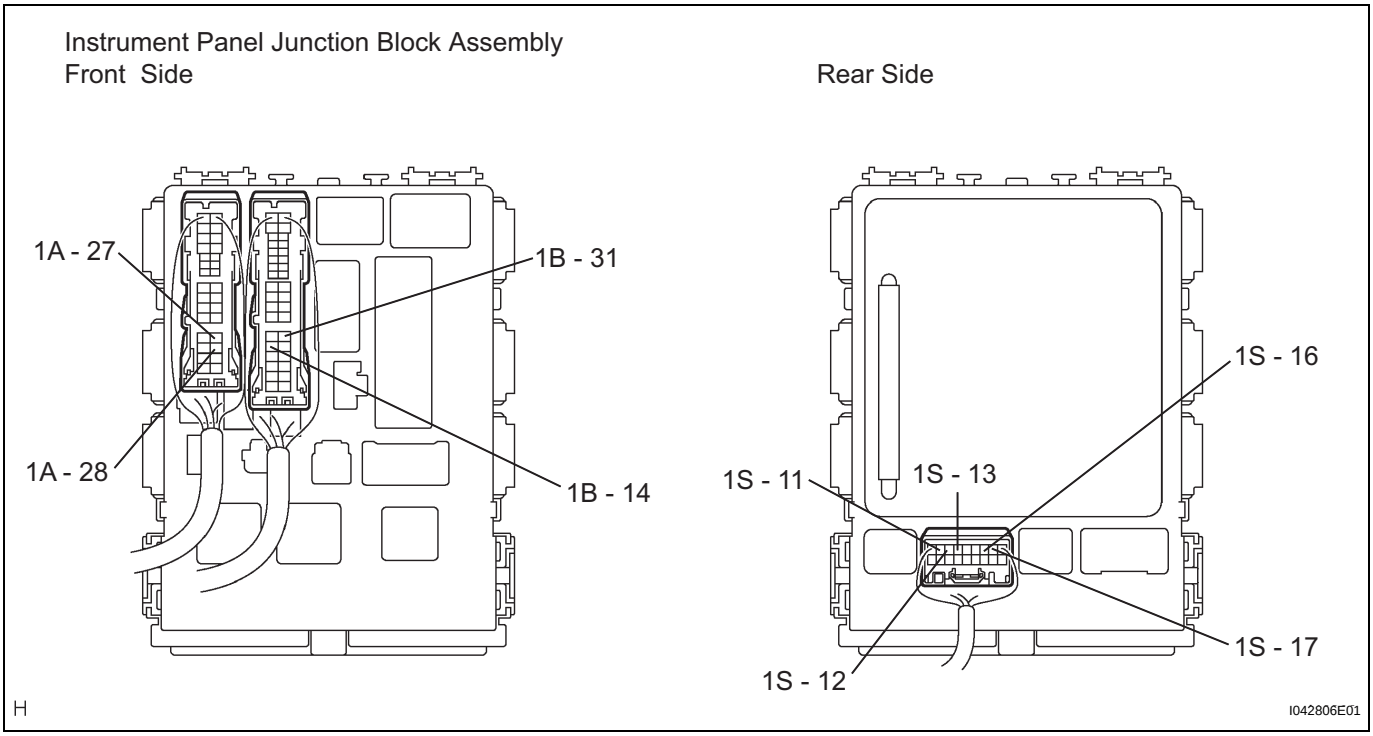
Standard resistance

Tester Connection	Condition	Specified Condition
7 - Body ground	Always	Below 1 Ω

(b) Inspect the output operation signal.

(1) Install the turn signal flasher relay to the instrument panel junction block assembly.

(2) Measure the voltage according to the value(s) in the table below.



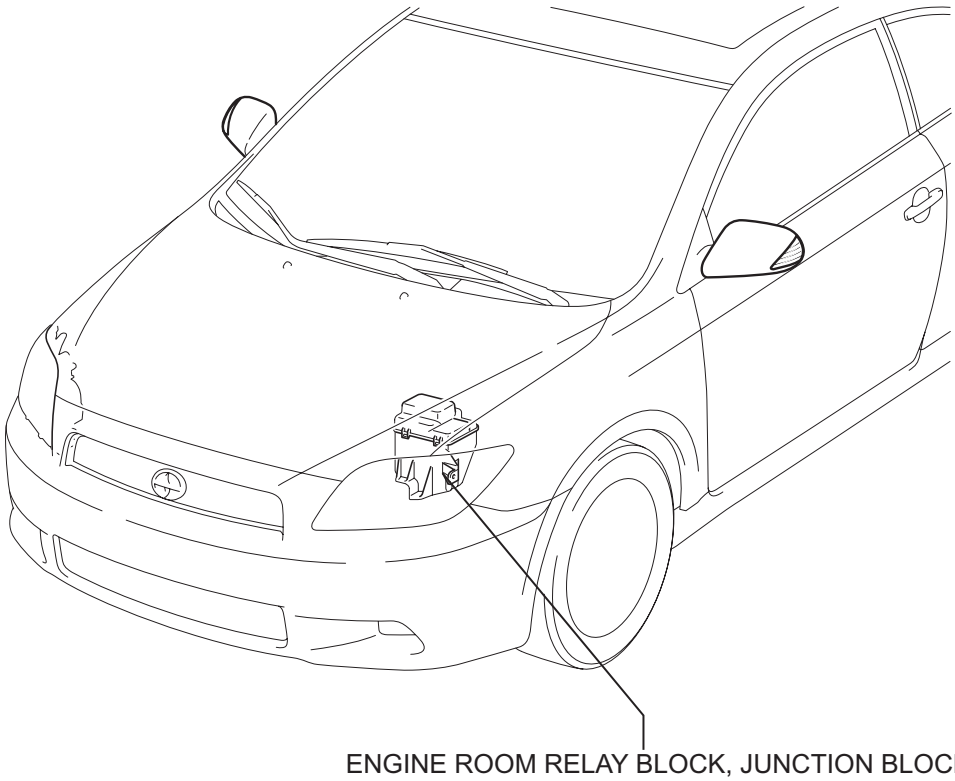
Standard voltage

Tester Connection	Condition	Specified Condition
1A-27 - Body ground	Hazard warning switch OFF	0 V
1A-27 - Body ground	Hazard warning switch ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1A-27 - Body ground	Turn signal switch (left turn) OFF	0 V
1A-27 - Body ground	Turn signal switch (left turn) ON	Alternating between 0 to 9 V (60 to 120 times per minute)

Tester Connection	Condition	Specified Condition
1A-28 - Body ground	Hazard warning switch OFF	0 V
1A-28 - Body ground	Hazard warning switch ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1A-28 - Body ground	Turn signal switch (right turn) OFF	0 V
1A-28 - Body ground	Turn signal switch (right turn) ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1B-14 - Body ground	Hazard warning signal OFF	0 V
1B-14 - Body ground	Hazard warning signal ON	0 above 9 V (60 to 120 times per minute)
1B-14 - Body ground	Turn signal switch (left turn) OFF	0 V
1B-14 - Body ground	Turn signal switch (left turn) ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1B-31 - Body ground	Hazard warning signal OFF	0 V
1B-31 - Body ground	Hazard warning signal ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1B-31 - Body ground	Turn signal switch (right turn) OFF	0 V
1B-31 - Body ground	Turn signal switch (right turn) ON	0 above 9 V (60 to 120 times per minute)
1S-11 - Body ground	Turn signal switch (left turn) OFF	Above 9 V
1S-11 - Body ground	Turn signal switch (left turn) ON	0 V
1S-12 - Body ground	Turn signal switch (right turn) OFF	Above 9 V
1S-12 - Body ground	Turn signal switch (right turn) ON	0 V
1S-13 - Body ground	Hazard warning signal OFF	0 V
1S-13 - Body ground	Hazard warning signal ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1S-13 - Body ground	Turn signal switch (left turn) OFF	0 V
1A-13 - Body ground	Turn signal switch (left turn) ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1S-16 - Body ground	Hazard warning switch OFF	0 V
1S-16 - Body ground	Hazard warning switch ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1S-16 - Body ground	Turn signal switch (right turn) OFF	0 V
1S-16 - Body ground	Turn signal switch (right turn) ON	Alternating between 0 to 9 V (60 to 120 times per minute)
1S-17 - Body ground	Hazard switch OFF	Above 9 V
1S-17 - Body ground	Hazard switch ON	0 V

HEADLIGHT RELAY

COMPONENTS



ENGINE ROOM RELAY BLOCK, JUNCTION BLOCK
- HEADLIGHT RELAY (Marking: H-LP)

P

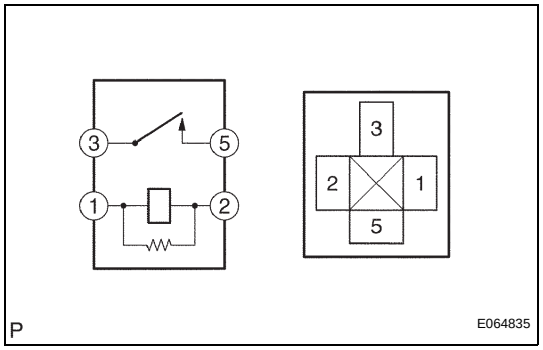
B119414E01

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE HEADLIGHT RELAY (Marking: H-LP)**

INSPECTION

1. **INSPECT HEADLIGHT RELAY**
   (a) Measure the resistance according to the value(s) in the table below.
   Standard resistance



Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (When battery voltage is applied to terminals 1 - 2)

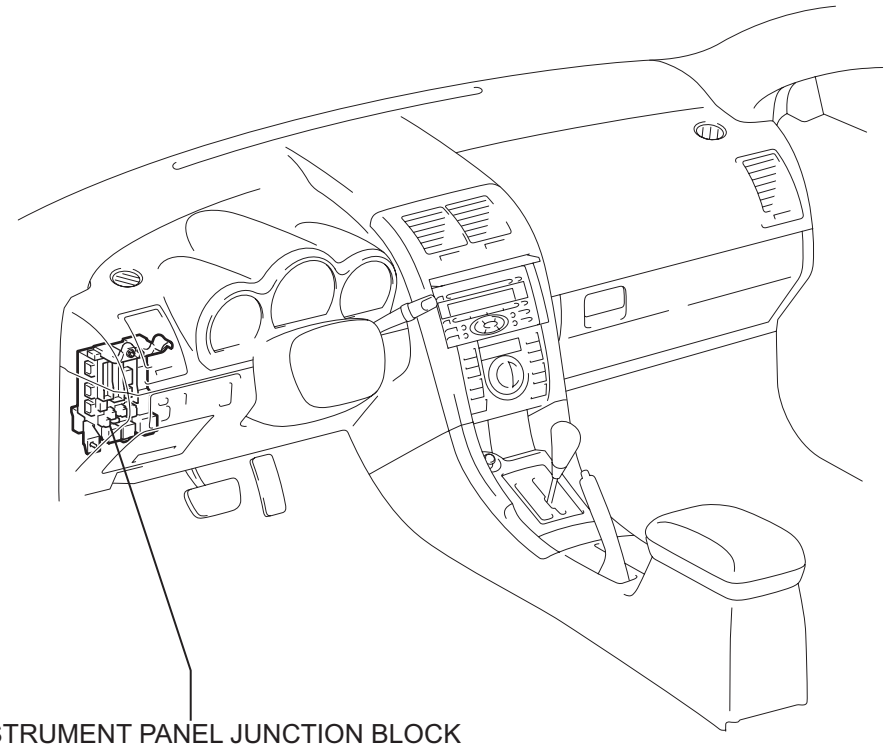
LI

INSTALLATION

1. **INSTALL HEADLIGHT RELAY**
2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

TAILLIGHT RELAY

COMPONENTS



INSTRUMENT PANEL JUNCTION BLOCK
- TAILLIGHT RELAY (Marking: T-LP)

P

B118452E01

REMOVAL

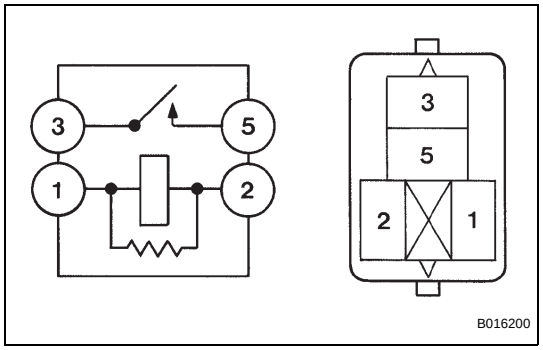
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE TAILLIGHT (Marking: T-LP)

INSPECTION



1. INSPECT TAILLIGHT RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω(when battery voltage is applied to terminals 1 - 2)

LI

INSTALLATION

1. **INSTALL TAILLIGHT RELAY**
2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

LUBRICATION SYSTEM

ON-VEHICLE INSPECTION

1. CHECK ENGINE OIL LEVEL

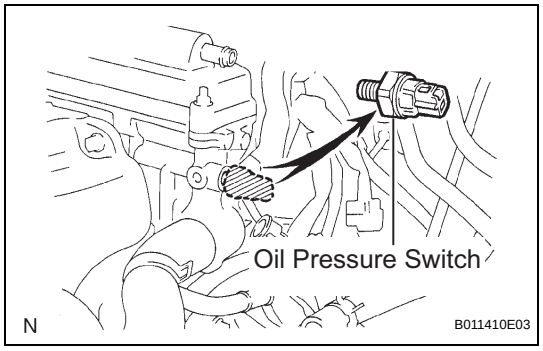
(a) Warm up the engine, stop the engine and wait for 5 minutes.

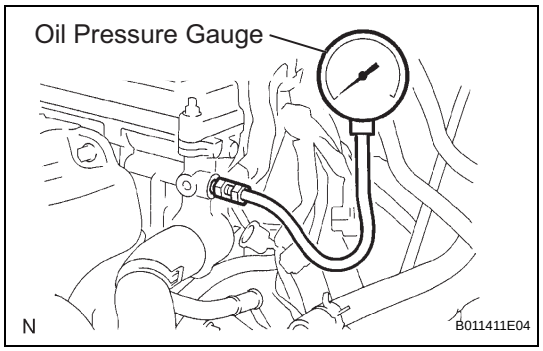
(b) Check that the engine oil level is between the L and F marks of the oil dipstick.
If low, check for leakage and add oil up to the F mark.
NOTICE:
Do not fill with engine oil above the F mark.

2. CHECK OIL PRESSURE

(a) Disconnect the oil pressure switch connector.

(b) Using a 24 mm deep socket wrench, remove the oil pressure switch.



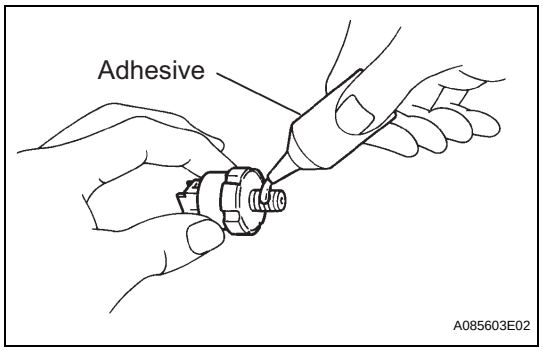


(c) Install the oil pressure gauge.

(d) Start and warm up the engine.

(e) Check the oil pressure. If the oil pressure is not specified, check the oil pump (See page LU-12)
Oil pressure

Condition	Specified Condition
When idling	29 kPa (0.3 kgf/cm^2, 4.3 psi) or more
At 3,000 rpm	245 to 539 kPa (2.5 to 5.5 kgf/cm^2, 36 to 78 psi)



(f) Apply adhesive to 2 or 3 threads of the oil pressure switch.
Adhesive:
Toyota Genuine Adhesive 1334, Three Bond 1344 or equivalent

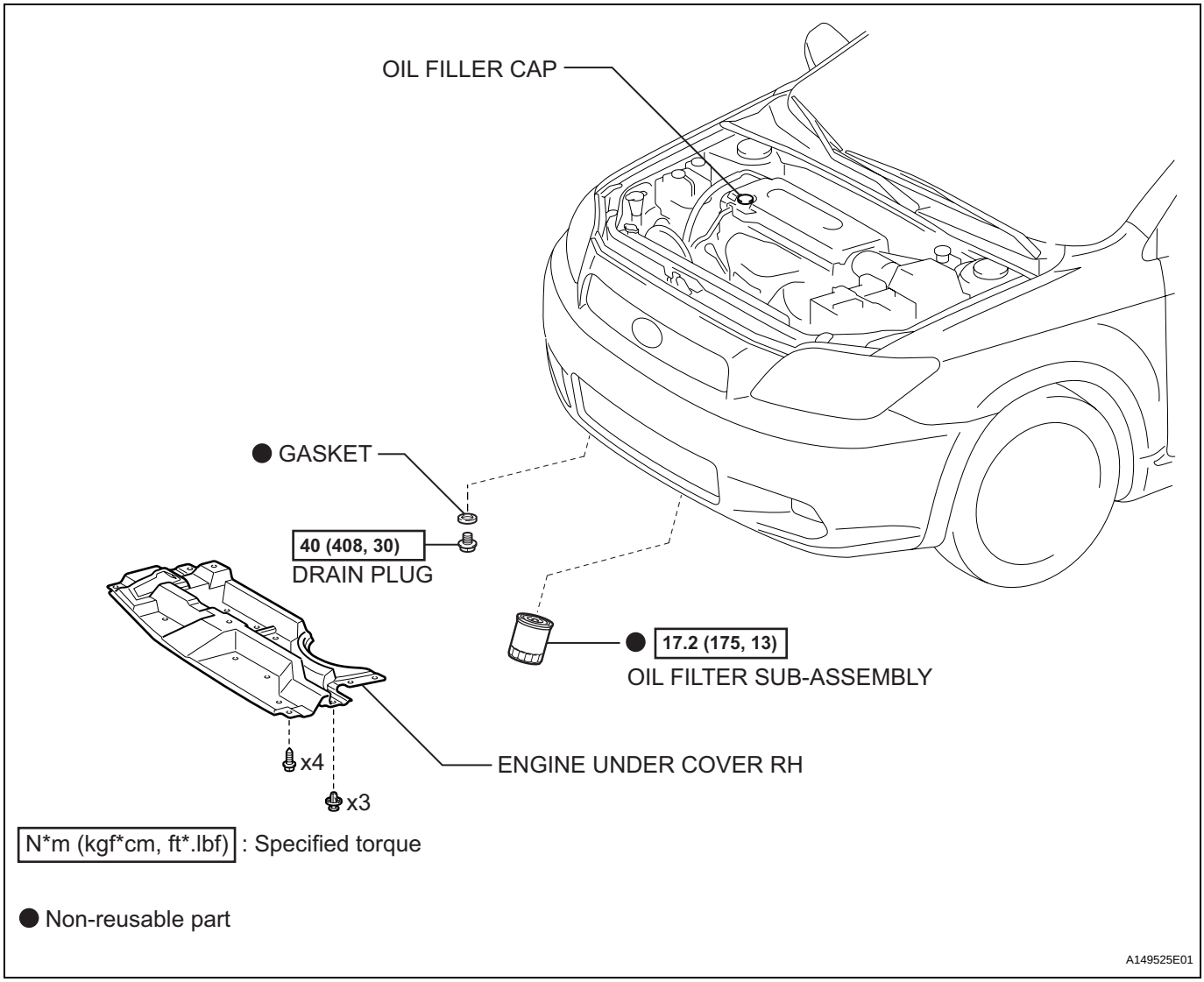
(g) Using a 24 mm deep socket wrench, install the oil pressure switch.
Torque: 15 N*m (153 kgf*cm, 11 ft.*lbf)
NOTICE:
Do not start the engine within 1 hour of installation.

(h) Connect the oil pressure switch connector.

(i) Check for engine oil leakage.

OIL AND OIL FILTER

COMPONENTS



REPLACEMENT

CAUTION:

- **Prolonged and repeated contact of mineral oil with the skin will deplete the skin's natural fats, leading to dryness, irritation and dermatitis. In addition, used engine oil contains harmful contaminants which may cause skin cancer.**
- **Wear protective clothing and gloves to minimize the length and frequency of contact between the skin and used oil. If contact does occur, wash your skin thoroughly with soap and water or waterless hand cleaner. Do not use gasoline, thinners or solvents to wash the skin.**
- **In order to preserve the environment, dispose of used oil and used oil filters only at designated disposal sites.**

1. REMOVE ENGINE UNDER COVER RH

2. DRAIN ENGINE OIL

(a) Remove the oil filler cap.
(b) Remove the oil drain plug, and drain the oil into a container.
(c) Clean the drain plug.
(d) Install the drain plug with a new gasket.
Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)

3. REMOVE OIL FILTER SUB-ASSEMBLY

(a) Using SST, remove the oil filter.
SST 09228-06501

4. INSTALL OIL FILTER SUB-ASSEMBLY

(a) Check and clean the oil filter installation surface.
(b) Apply clean engine oil to the gasket of a new oil filter.
(c) Lightly screw the oil filter into place by hand. Tighten it until the gasket contacts the seat.
(d) Using SST, tighten the oil filter.
SST 09228-06501
(1) Depending on the work space available, choose from the following.
1. If enough space is available, use a torque wrench to tighten the oil filter.
Torque: 17.2 N*m (175 kgf*cm, 13 ft.*lbf)
2. If enough space is not available to use a torque wrench, tighten the oil filter a 3/4 turn by hand or use a common wrench.

5. ADD ENGINE OIL

(a) Add clean engine oil and install the oil filler cap.

Engine oil:

Oil grade	Oil Viscosity (SAE)
ILSAC multigrade engine oil	. 0W-20 . 5W-20 (0W-20 is best choice for fuel economy and good staring in cold weather.)

Engine oil capacity:

Item	Capacity
Drain and refill with oil filter change	3.8 liters (4.0 US qts, 3.3 lmp. qts)
Drain and refill without oil filter change	3.6 liters (3.8 US qts, 3.2 lmp. qts)
Dry fill	4.5 liters (4.88 US qts, 4.0 lmp. qts)

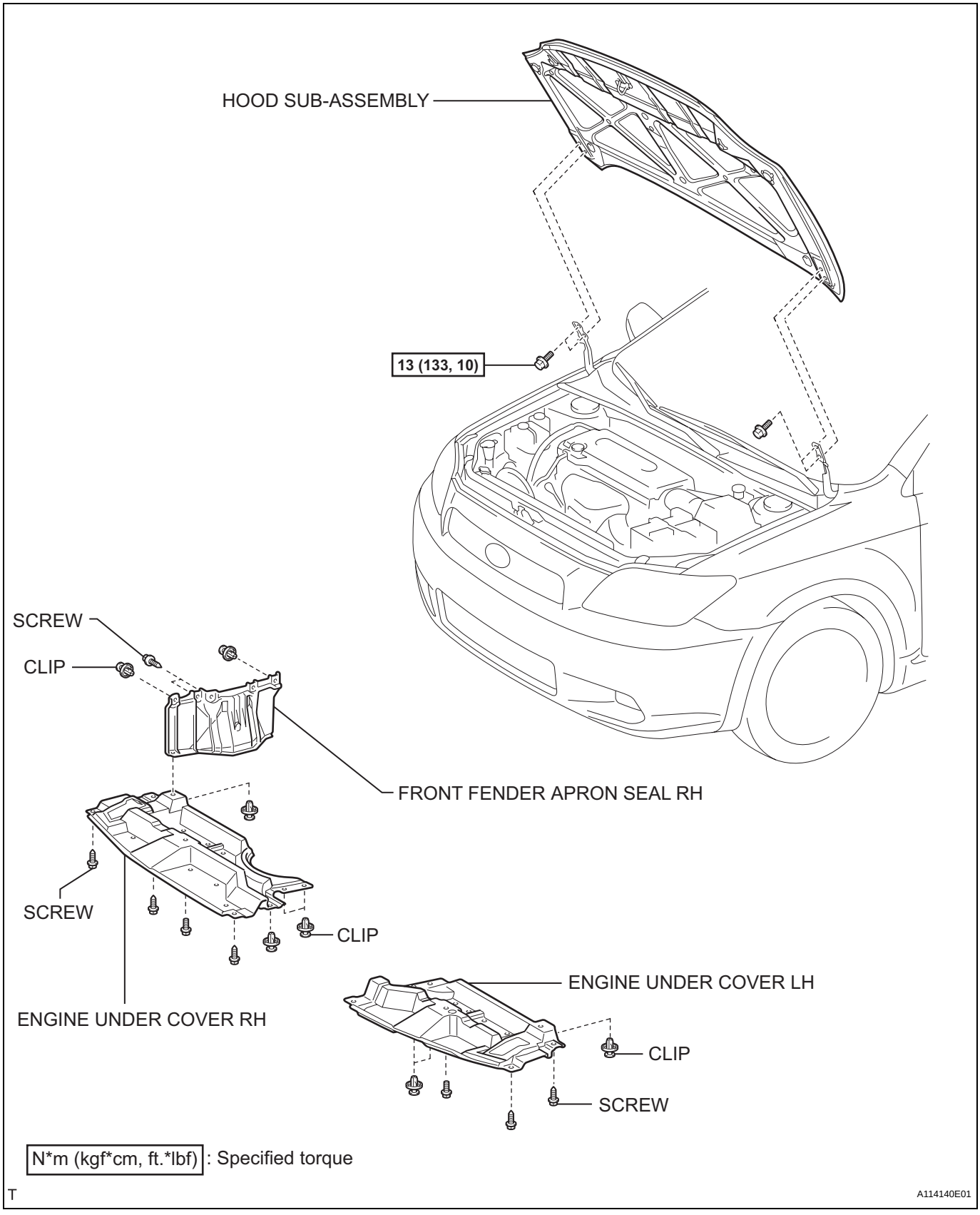
6. CHECK FOR ENGINE OIL LEAKS

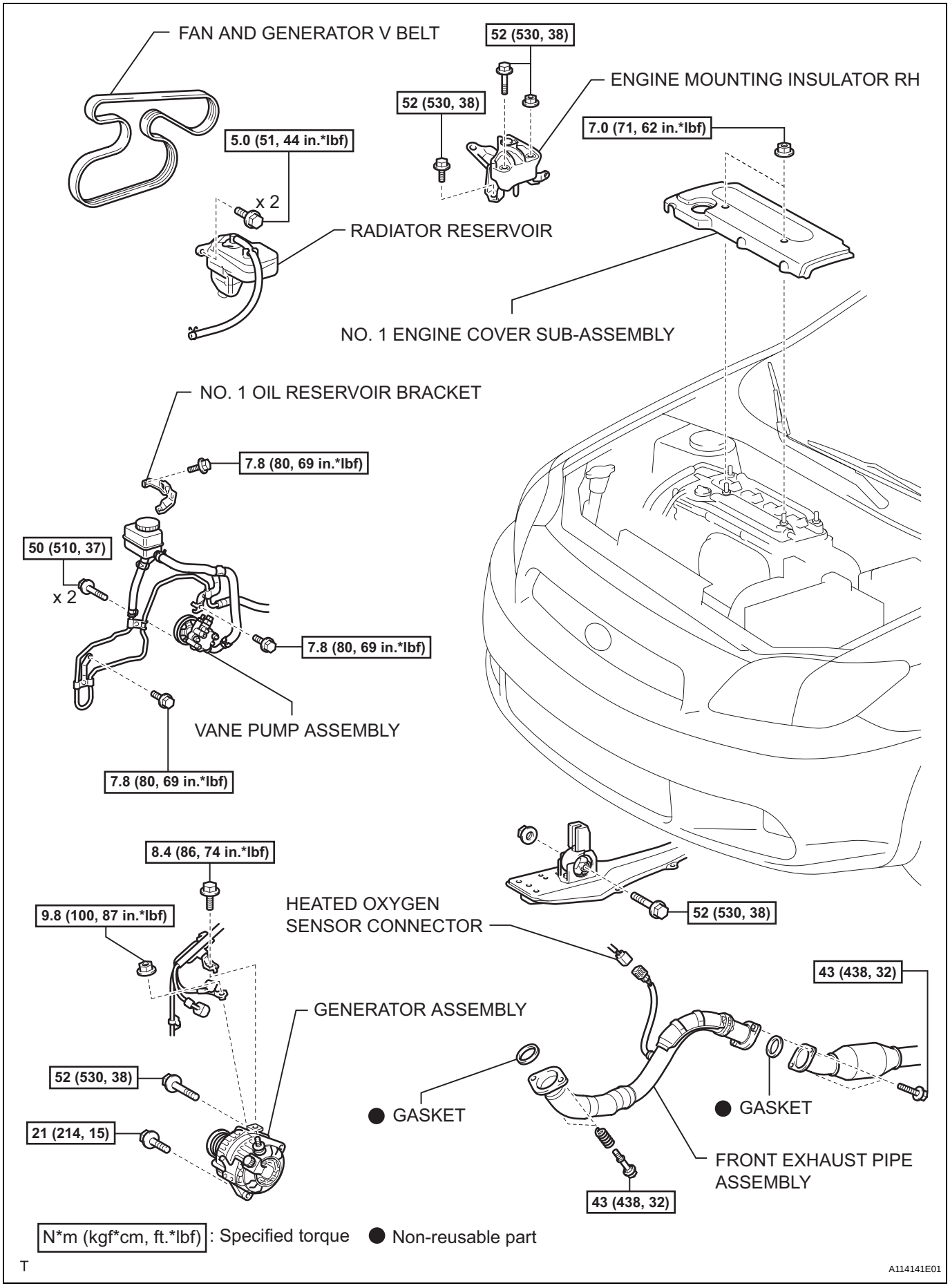
(a) Warm up the engine and check for engine oil leaks.

7. INSTALL ENGINE UNDER COVER RH

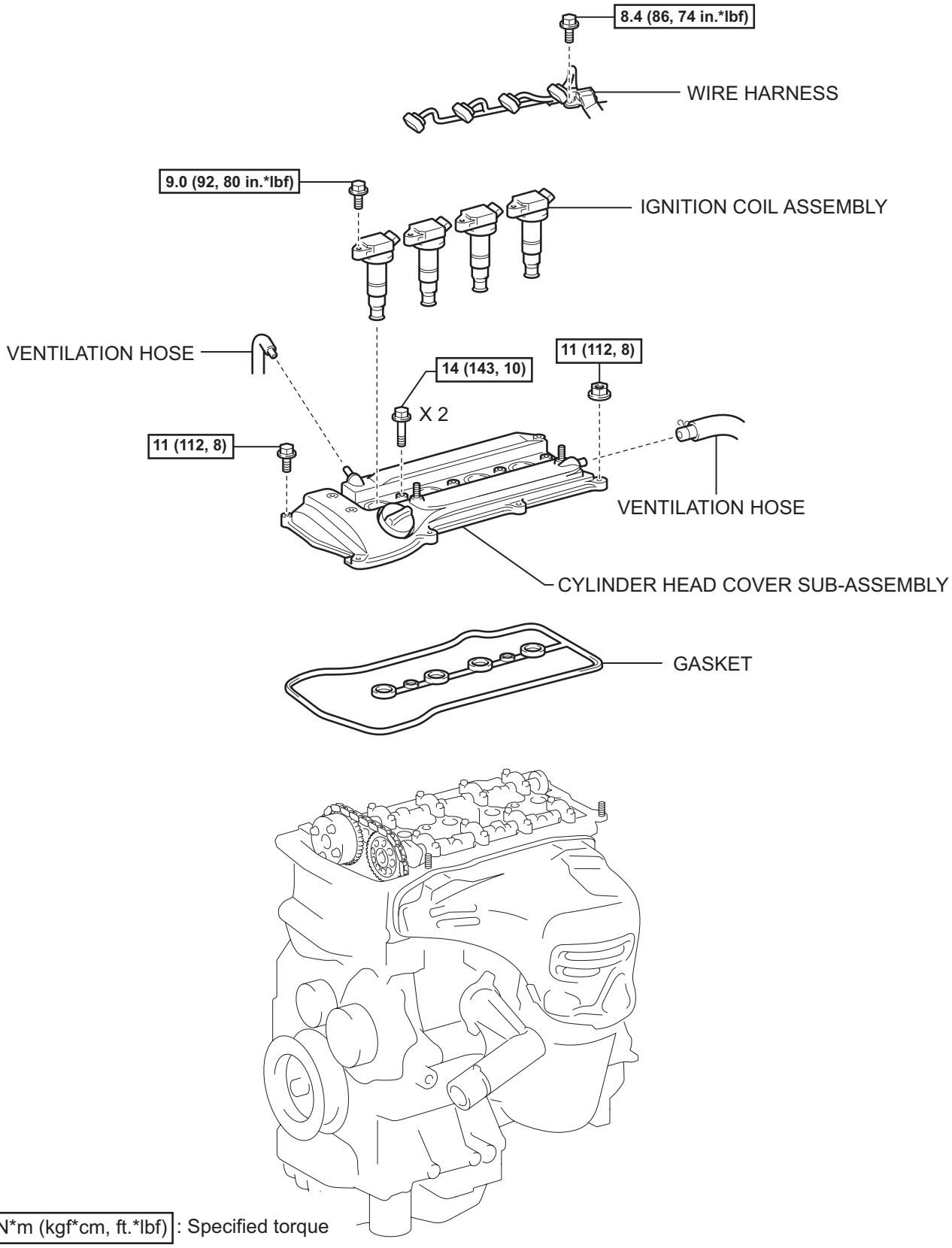
OIL PUMP

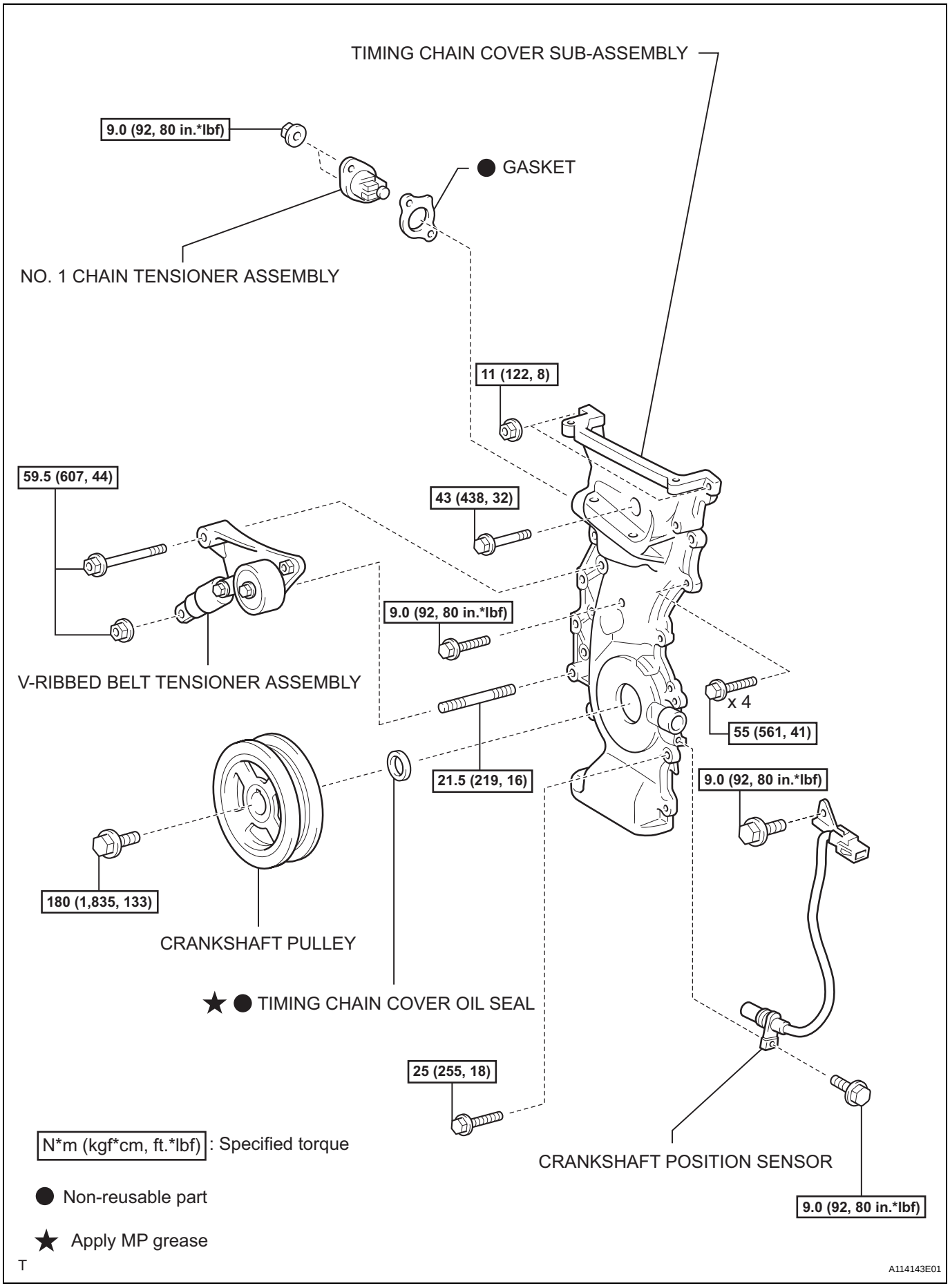
COMPONENTS



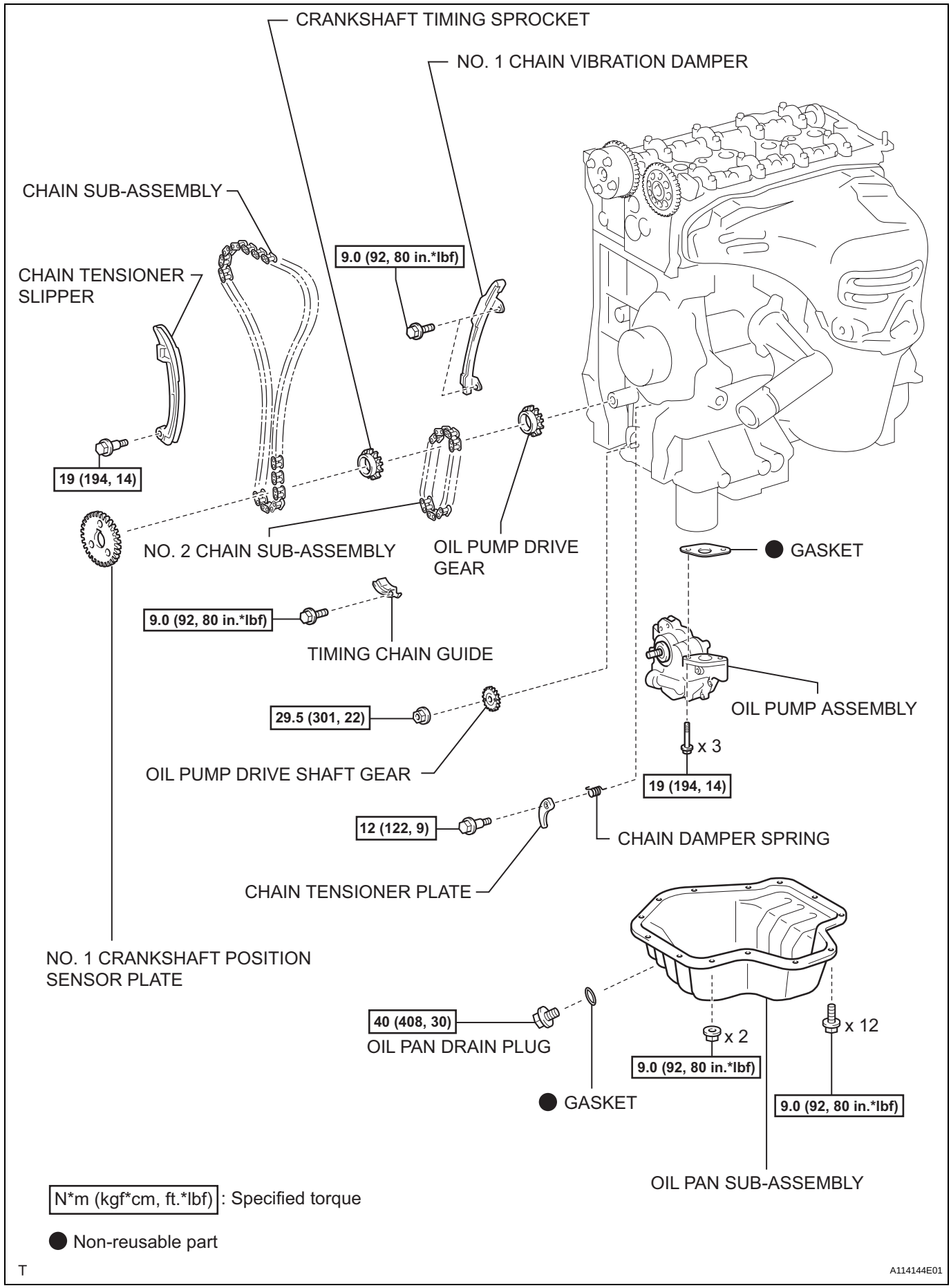

FAN AND GENERATOR V BELT
52 (530, 38)
ENGINE MOUNTING INSULATOR RH
52 (530, 38)
7.0 (71, 62 in.*lbf)
5.0 (51, 44 in.*lbf)
x 2
RADIATOR RESERVOIR
NO. 1 ENGINE COVER SUB-ASSEMBLY
NO. 1 OIL RESERVOIR BRACKET
7.8 (80, 69 in.*lbf)
50 (510, 37)
x 2
7.8 (80, 69 in.*lbf)
VANE PUMP ASSEMBLY
7.8 (80, 69 in.*lbf)
8.4 (86, 74 in.*lbf)
9.8 (100, 87 in.*lbf)
HEATED OXYGEN SENSOR CONNECTOR
52 (530, 38)
43 (438, 32)
GENERATOR ASSEMBLY
52 (530, 38)
21 (214, 15)
GASKET
GASKET
FRONT EXHAUST PIPE ASSEMBLY
43 (438, 32)
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
T
A114141E01

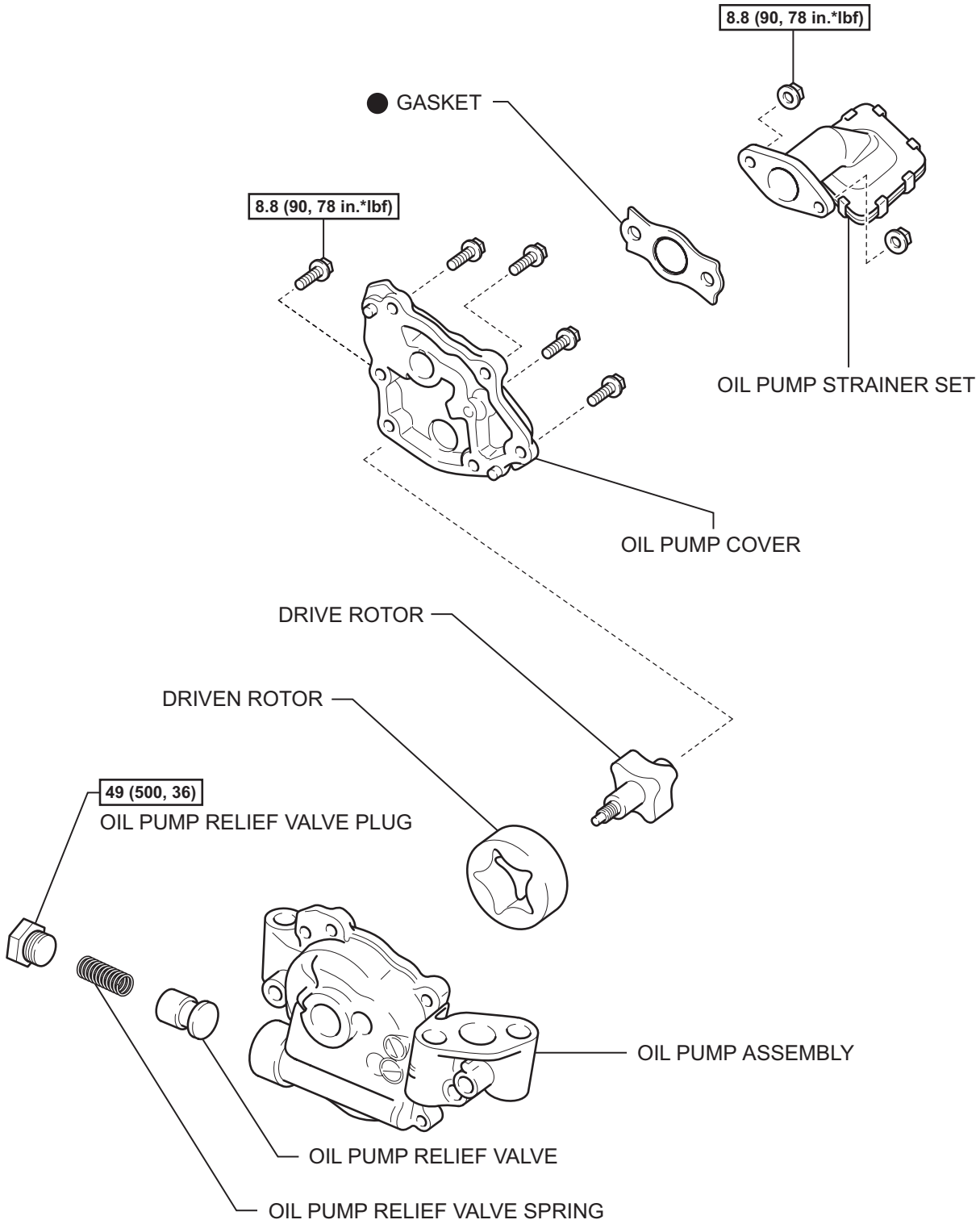
LU


8.4 (86, 74 in.*lbf)
WIRE HARNESS
9.0 (92, 80 in.*lbf)
IGNITION COIL ASSEMBLY
VENTILATION HOSE
14 (143, 10)
X 2
11 (112, 8)
11 (112, 8)
VENTILATION HOSE
CYLINDER HEAD COVER SUB-ASSEMBLY
GASKET
N*m (kgf*cm, ft.*lbf) : Specified torque
T
A114142E01


TIMING CHAIN COVER SUB-ASSEMBLY
9.0 (92, 80 in.*lbf)
GASKET
NO. 1 CHAIN TENSIONER ASSEMBLY
11 (122, 8)
59.5 (607, 44)
43 (438, 32)
9.0 (92, 80 in.*lbf)
V-RIBBED BELT TENSIONER ASSEMBLY
x 4
55 (561, 41)
21.5 (219, 16)
9.0 (92, 80 in.*lbf)
180 (1,835, 133)
CRANKSHAFT PULLEY
★ ● TIMING CHAIN COVER OIL SEAL
25 (255, 18)
CRANKSHAFT POSITION SENSOR
9.0 (92, 80 in.*lbf)
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
★ Apply MP grease
T
A114143E01

LU


CRANKSHAFT TIMING SPROCKET
NO. 1 CHAIN VIBRATION DAMPER
CHAIN SUB-ASSEMBLY
9.0 (92, 80 in.*lbf)
CHAIN TENSIONER SLIPPER
19 (194, 14)
NO. 2 CHAIN SUB-ASSEMBLY
OIL PUMP DRIVE GEAR
GASKET
9.0 (92, 80 in.*lbf)
TIMING CHAIN GUIDE
OIL PUMP ASSEMBLY
29.5 (301, 22)
x 3
OIL PUMP DRIVE SHAFT GEAR
19 (194, 14)
12 (122, 9)
CHAIN DAMPER SPRING
CHAIN TENSIONER PLATE
NO. 1 CRANKSHAFT POSITION SENSOR PLATE
40 (408, 30)
OIL PAN DRAIN PLUG
x 2
x 12
9.0 (92, 80 in.*lbf)
GASKET
9.0 (92, 80 in.*lbf)
OIL PAN SUB-ASSEMBLY
N*m (kgf*cm, ft.*lbf): Specified torque
Non-reusable part
T
A114144E01



N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

T

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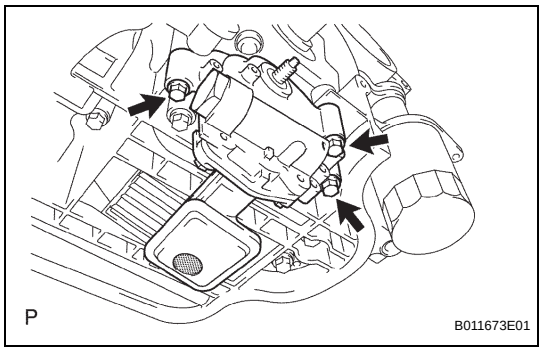
LU

REMOVAL

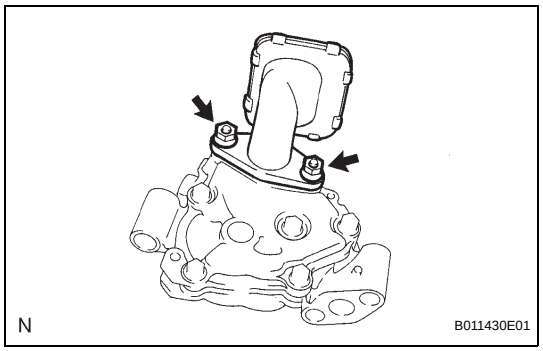
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. REMOVE HOOD SUB-ASSEMBLY
3. REMOVE FRONT WHEEL RH
4. REMOVE ENGINE UNDER COVER RH
5. REMOVE ENGINE UNDER COVER LH
6. REMOVE FRONT FENDER APRON SEAL RH
7. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY
8. DRAIN ENGINE OIL (See page LU-3)
9. REMOVE FRONT EXHAUST PIPE ASSEMBLY (See page EX-2)
10. REMOVE FAN AND GENERATOR V BELT (See page EM-6)
11. REMOVE GENERATOR ASSEMBLY (See page CH-10)
12. DISCONNECT VANE PUMP ASSEMBLY
13. REMOVE ENGINE MOUNTING INSULATOR RH (See page EM-22)
14. REMOVE IGNITION COIL ASSEMBLY (See page IG-9)
15. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-24)
16. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY (See page EM-25)
17. REMOVE CRANKSHAFT POSITION SENSOR (See page ES-375)
18. REMOVE OIL PAN SUB-ASSEMBLY (See page EM-25)
19. SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page EM-26)
20. REMOVE CRANKSHAFT PULLEY (See page EM-26)
21. REMOVE NO. 1 CHAIN TENSIONER ASSEMBLY (See page EM-27)
22. REMOVE TIMING CHAIN COVER SUB-ASSEMBLY (See page EM-27)
23. REPLACE TIMING CHAIN COVER OIL SEAL (See page EM-130)
24. REMOVE NO. 1 CRANKSHAFT POSITION SENSOR PLATE
25. REMOVE TIMING CHAIN GUIDE (See page EM-28)

26. **REMOVE CHAIN TENSIONER SLIPPER (See page EM-28)**
27. **REMOVE CHAIN SUB-ASSEMBLY**
28. **REMOVE NO. 1 CHAIN VIBRATION DAMPER (See page EM-28)**
29. **REMOVE CRANKSHAFT TIMING SPROCKET**
30. **REMOVE NO. 2 CHAIN SUB-ASSEMBLY (See page EM-28)**
31. **REMOVE OIL PUMP DRIVE GEAR**
32. **REMOVE OIL PUMP ASSEMBLY**
    (a) Remove the 3 bolts, oil pump and gasket.

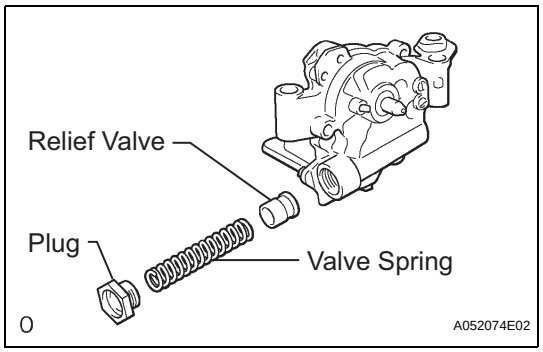


DISASSEMBLY

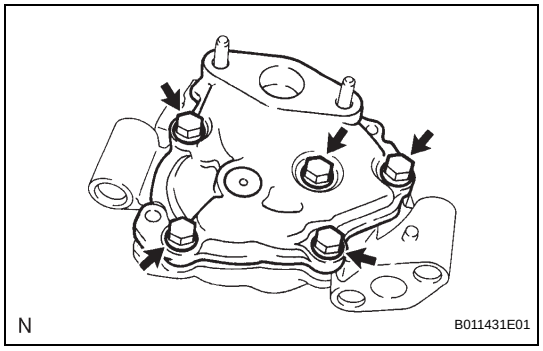
1. **REMOVE OIL PUMP STRAINER SET**
   (a) Remove the 2 nuts, oil pump strainer and gasket.

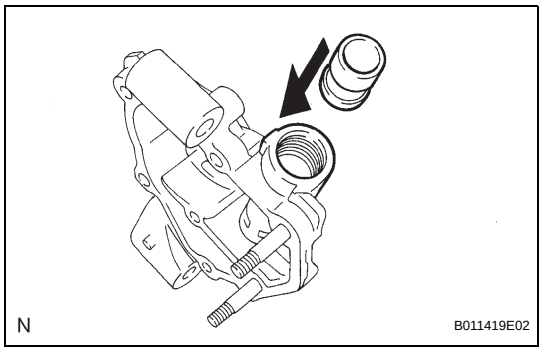


2. **REMOVE OIL PUMP RELIEF VALVE**
   (a) Using a 27 mm socket wrench, remove the plug.
   (b) Remove the valve spring and relief valve.



3. **REMOVE OIL PUMP COVER**
   (a) Remove the 5 bolts and oil pump cover.





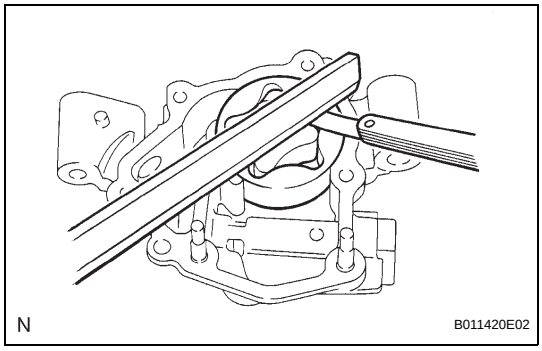
INSPECTION

1. INSPECT OIL PUMP RELIEF VALVE

(a) Check the relief valve.

(1) Coat the valve with engine oil, and then check that the valve falls smoothly into the valve hole by its own weight.

If it does not, replace the relief valve. If necessary, replace the oil pump assembly.



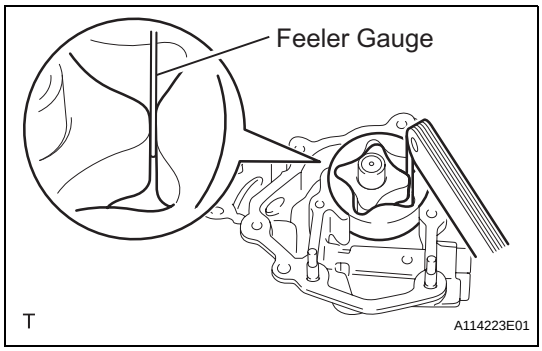
2. INSPECT OIL PUMP ROTOR

(a) Check the side clearance.

(1) Using a feeler gauge and precision straightedge, measure the clearance between the rotors and precision straightedge.

Standard clearance:
0.100 to 0.170 mm (0.0039 to 0.0067 in.)
Maximum clearance:
0.325 mm (0.0128 in.)

If the side clearance is greater than the maximum, replace the oil pump assembly.

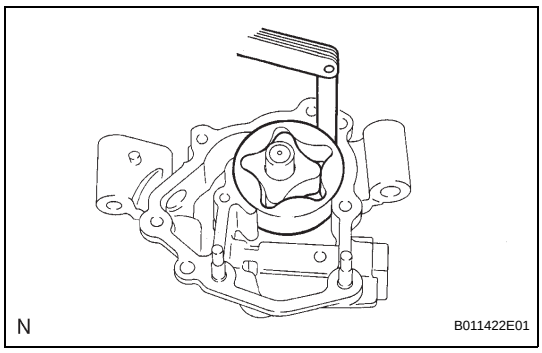


(b) Check the tip clearance.

(1) Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

Standard clearance:
0.080 to 0.160 mm (0.0031 to 0.0063 in.)
Maximum clearance:
0.35 mm (0.0138 in.)

If the tip clearance is greater than the maximum, replace the oil pump assembly.



(c) Check the body clearance.

(1) Using a feeler gauge, measure the clearance between the driven rotor and pump body.

Standard clearance:
0.100 to 0.170 mm (0.0039 to 0.0067 in.)
Maximum clearance:
0.325 mm (0.01128 in.)

If the body clearance is greater than the maximum, replace the oil pump assembly.

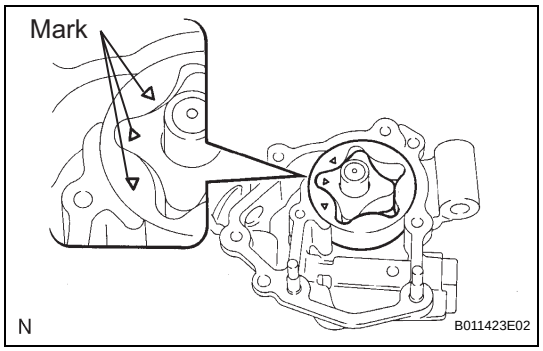
REASSEMBLY

1. INSTALL OIL PUMP ROTOR

(a) Remove the oil pump rotor.

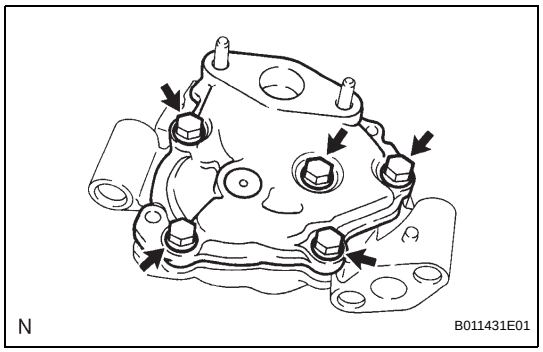
(b) Coat the drive rotor and driven rotor with engine oil.

(c) Place the drive and driven rotors into the oil pump with the marks facing the pump cover side.



2. INSTALL OIL PUMP COVER

(a) Install the oil pump cover with the 5 bolts.
Torque: 8.8 N*m (90 kgf*cm, 78 in.*lbf)

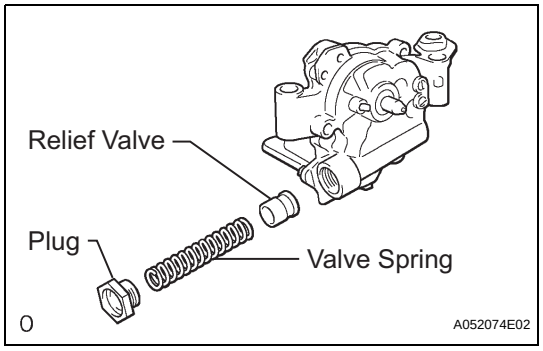


3. INSTALL OIL PUMP RELIEF VALVE

(a) Coat the relief valve with engine oil.

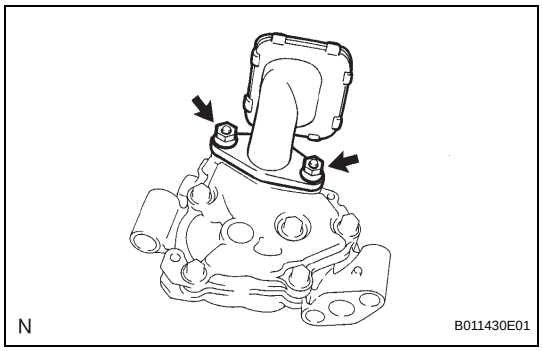
(b) Insert the relief valve and spring into the pump body hole.

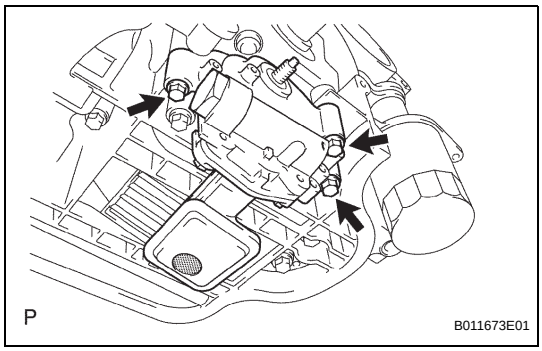
(c) Using a 27 mm socket wrench, install the plug.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)



4. INSTALL OIL PUMP STRAINER SET

(a) Install a new gasket and the oil strainer with the 2 nuts.
Torque: 8.8 N*m (90 kgf*cm, 78 in.*lbf)





INSTALLATION

1. **INSTALL OIL PUMP ASSEMBLY**
   (a) Install a new gasket and the oil pump with the 3 bolts.
   Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
2. **INSTALL OIL PUMP DRIVE GEAR**
3. **INSTALL NO. 2 CHAIN SUB-ASSEMBLY (See page EM-31)**
4. **INSTALL CRANKSHAFT TIMING SPROCKET**
5. **INSTALL NO. 1 CHAIN VIBRATION DAMPER (See page EM-32)**
6. **INSTALL CHAIN SUB-ASSEMBLY (See page EM-32)**
7. **INSTALL CHAIN TENSIONER SLIPPER (See page EM-33)**
8. **INSTALL TIMING CHAIN GUIDE (See page EM-33)**
9. **INSTALL NO. 1 CRANKSHAFT POSITION SENSOR PLATE (See page EM-34)**
10. **INSTALL TIMING CHAIN COVER OIL SEAL (See page EM-130)**
11. **INSTALL TIMING CHAIN COVER SUB-ASSEMBLY (See page EM-34)**
12. **INSTALL NO. 1 CHAIN TENSIONER ASSEMBLY (See page EM-36)**
13. **INSTALL CRANKSHAFT PULLEY (See page EM-37)**
14. **INSTALL CAMSHAFT TIMING GEAR ASSEMBLY (See page EM-77)**
15. **INSTALL OIL PAN SUB-ASSEMBLY (See page EM-38)**
16. **INSTALL CRANKSHAFT POSITION SENSOR (See page ES-375)**
17. **INSTALL V-RIBBED BELT TENSIONER ASSEMBLY (See page EM-39)**
18. **INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY (See page EM-39)**
19. **INSTALL IGNITION COIL ASSEMBLY (See page IG-9)**
20. **INSTALL ENGINE MOUNTING INSULATOR RH (See page EM-40)**
21. **INSTALL VANE PUMP ASSEMBLY**
22. **INSTALL GENERATOR ASSEMBLY (See page CH-17)**
23. **INSTALL FAN AND GENERATOR V BELT (See page EM-6)**
24. **INSTALL EXHAUST PIPE ASSEMBLY (See page EX-3)**
25. **ADD ENGINE OIL (See page LU-3)**

26. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

27. **CHECK FOR ENGINE OIL LEAKS**

28. **INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-42)**

29. **INSTALL FRONT FENDER APRON SEAL RH (See page CH-18)**

30. **INSTALL ENGINE UNDER COVER LH**

31. **INSTALL ENGINE UNDER COVER RH**

32. **INSTALL FRONT WHEEL RH (See page BR-29)**

33. **INSTALL HOOD SUB-ASSEMBLY (See page ED-1)**

34. **PERFORM INITIALIZATION**
    Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

OUTSIDE VEHICLE

GENERAL MAINTENANCE

Performing the following maintenance checks on the vehicle is the owner's responsibility. The owner may perform the maintenance or take the vehicle to a service center. Check the parts of the vehicle described below on a daily basis. In most cases, special tools are not required. It is recommended that the owner performs these checks. The procedures for general maintenance 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 months elapsed, whichever reaches the specification first.
- Maintain similar intervals between periodic maintenance, unless otherwise noted.
- 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 (See page TW-4)

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 gasoline fumes 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.

INSIDE VEHICLE

GENERAL MAINTENANCE

Performing the following maintenance checks on the vehicle is the owner's responsibility. The owner may perform the maintenance or take the vehicle to a service center. Check the parts of the vehicle described below on a daily basis. In most cases, special tools are not required. It is recommended that the owner performs these checks. The procedures for general maintenance 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 months elapsed, whichever reaches the specification first.
- Maintain similar intervals between periodic maintenance, unless otherwise 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 that the horn is working.

5. WINDSHIELD GLASS

(a) Check for scratches, pits or abrasions.

6. WINDSHIELD WIPERS AND WASHER

(a) Check that the windshield washers are aimed properly. Also, check that the center stream of washer fluid sprays on the windshield within the operating range of the wipers.

(b) Check if the wipers streak or not.

7. WINDSHIELD DEFROSTER

(a) When the heater or air conditioning is on the defroster setting, check if air comes out of the defroster outlet.

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, free play in the steering wheel and unusual noises.

11. SEATS

(a) Check that the seat adjusters, seatback recliner and other front seat controls operate smoothly.
(b) Check that all the latches lock securely in all positions.
(c) Check that the locks hold securely in all latched 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 system such as the buckles, retractors and anchors operate properly and smoothly.
(b) Check that the belt webbing is not cut, frayed, worn or damaged. Replace if necessary.

13. ACCELERATOR PEDAL

(a) Check that the accelerator pedal operates smoothly. In other words, check that the pedal does not have uneven pedal resistance or become stuck 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.
(c) Start the engine and check the brake booster function.

15. BRAKES

(a) In a safe place, check that the vehicle remains straight when applying the brakes.

16. PARKING BRAKE

(a) Check that the parking brake lever has the proper amount of travel (see page PB-1).
(b) On a safe incline, check that the vehicle is held securely with only the parking brake applied.

17. AUTOMATIC TRANSAXLE "PARK" MECHANISM

(a) Check the lock release button of the shift lever for proper and smooth operation.
(b) When the shift lever is in the P position and all brakes are released on a low incline, check that the vehicle is stable.

UNDER HOOD

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 elapsed, whichever reaches the specification first.
- Maintain similar intervals between periodic maintenance, unless otherwise noted.
- Failing to check each vehicle part 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 or bugs.

(b) Check the hoses for cracks, kinks, rot or loose connections.

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 levels are near the upper level lines on the see-through reservoirs.

7. ENGINE DRIVE BELT

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

8. ENGINE OIL LEVEL

(a) Check the level on the dipstick with the engine stopped.

9. AUTOMATIC TRANSMISSION FLUID (See page AX-104)

10. EXHAUST SYSTEM

(a) Check for unusual exhaust sounds or abnormal exhaust fumes. Inspect the cause and repair it.

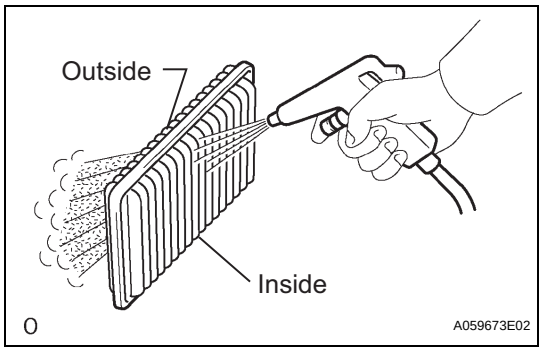
ENGINE

GENERAL MAINTENANCE

1. INSPECT DRIVE BELT

2. REPLACE SPARK PLUGS (See page IG-6)

3. INSPECT AIR CLEANER FILTER



(a) Remove the air filter.
(b) Visually check that the air filter is not excessively damaged or oily. If necessary, replace the air filter.
(c) Reinstall the air filter.
(d) Clean the filter with compressed air.
HINT:
First blow from the inside of the filter thoroughly then repeat from the outside.

4. REPLACE AIR CLEANER FILTER

(a) Replace the air filter with a new one.

5. REPLACE ENGINE OIL AND OIL FILTER (See page LU-1)

6. REPLACE ENGINE COOLANT (See page CO-1)

7. INSPECT GASKET IN FUEL TANK CAP (See page EC-17)

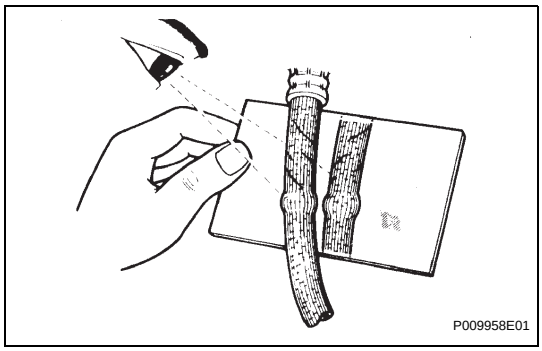
8. INSPECT FUEL LINES AND CONNECTIONS, FUEL TANK VAPOR VENT SYSTEM HOSES AND FUEL TANK BANDS

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

9. INSPECT EXHAUST PIPES AND MOUNTINGS

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

10. INSPECT VALVE CLEARANCE (See page EM-7)



MA

BRAKE

GENERAL MAINTENANCE

1. INSPECT BRAKE LINES 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
- Corrosion
- Leaks
- Bends
- Twists

(b) Check all the clamps for tightness and the 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 LININGS AND DRUMS

(a) Check the brake linings and drums. Also check the brake linings of parking brake.

3. INSPECT FRONT BRAKE

(a) Check the front brake pads and discs (see page BR-26).

4. INSPECT REAR BRAKE

(a) Check the rear brake pads and discs (see page BR-33).

CHASSIS

GENERAL MAINTENANCE

1. INSPECT STEERING LINKAGE AND GEAR HOUSING

(a) Check the steering wheel free play.

(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 housing is not damaged.

(5) Check that the connectors are properly connected to the steering gear housing.

2. INSPECT BALL JOINTS AND DUST COVERS

(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) Lower the vehicle until the front coil spring has about half its ordinary load. Place stands under the vehicle for safety.

(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 DRIVE SHAFT BOOTS

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

4. INSPECT AUTOMATIC TRANSAXLE FLUID (See page AX-104)

5. INSPECT MANUAL TRANSAXLE OIL (See page MX-2)

MA

BODY

GENERAL MAINTENANCE

1. TIGHTEN BOLTS AND NUTS

(a) Tighten the bolts and nuts on the chassis parts listed below, if necessary.
- Front axle and suspension
- Drive train
- Rear axle and suspension
- Brake system
- Engine mounting
- Other chassis parts

(b) Tighten the bolts and nuts on the body parts listed below, if necessary.
- Seat belt system
- Seats
- Doors and hood
- Body mountings
- Fuel tank
- Exhaust pipe system
- Other body parts

2. CLEAN AIR CONDITIONING FILTER

(a) Visually inspect the surface of the filter.

(b) If the filter is contaminated with foreign matter, clean or replace the filter.

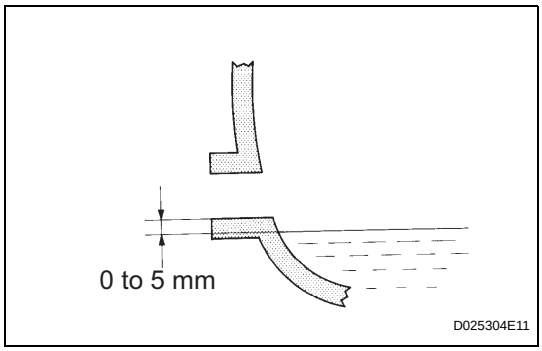
3. TIRE ROTATION (See page TW-4)

MANUAL TRANSAXLE SYSTEM

PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cause of the problem symptom. 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
Noise	Oil (Level Low)	MX-2
	Oil (Wrong)	MX-2
	Gear (Worn or damaged)	MX-18
	Bearing (Worn or damaged)	MX-18
Oil Leakage	Oil (Level too high)	MX-2
	Gasket (Damaged)	MX-18
	Oil seal (Worn or damaged)	MX-104
	O-Ring (Worn or damaged)	MX-18
Herd to shift or will not shift	Control cable (Faulty)	MX-9
	Synchronizer ring (Worn or damaged)	MX-76
	-	MX-87
	Shift key spring (damaged)	MX-32
	-	MX-69
	-	MX-80
Jumps out of gear	Locking ball spring (damaged)	MX-32
	Shift fork (worn)	MX-32
	-	MX-76
	-	MX-87
	Gear (worn or damaged)	MX-32
	-	MX-76
	-	MX-87
	Bearing (Worn or damaged)	MX-32
	-	MX-76
	-	MX-87



MANUAL TRANSAXLE OIL

ON-VEHICLE INSPECTION

1. CHECK MANUAL TRANSAXLE OIL

(a) Stop the vehicle on a level place.

(b) Remove the filler plug and gasket.

(c) Check that the oil surface is within 5 mm (0.02 in.) from the lowest position of the inner surface of the filler plug opening.

NOTICE:

- **An excessively large or small amount of oil may cause trouble.**
- **After replacing the oil, drive the vehicle and then check the oil level.**

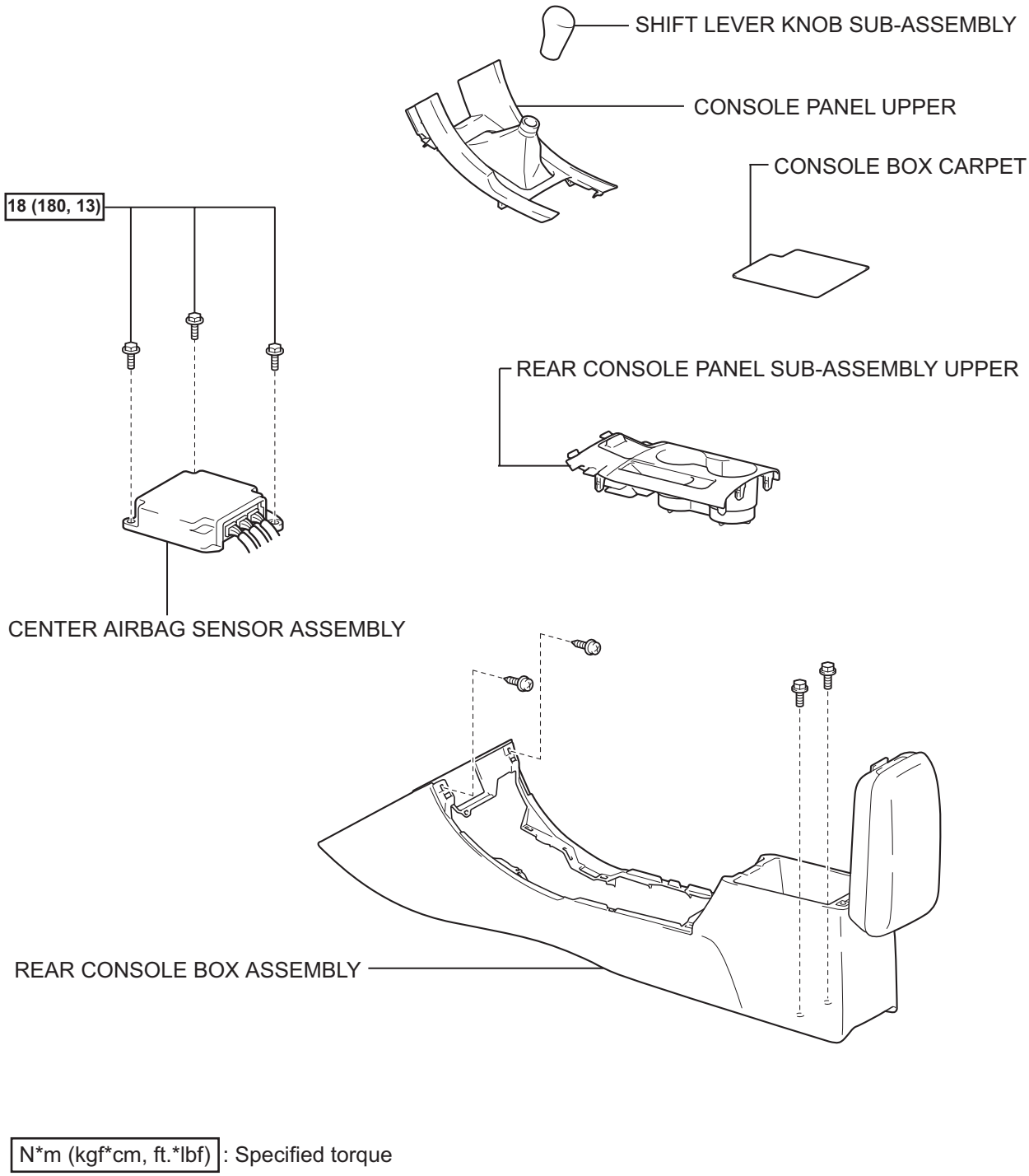
(d) Check for oil leakage when the oil level is low.

(e) Install the filler plug with a new gasket.

Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)

FLOOR SHIFT LEVER ASSEMBLY

COMPONENTS

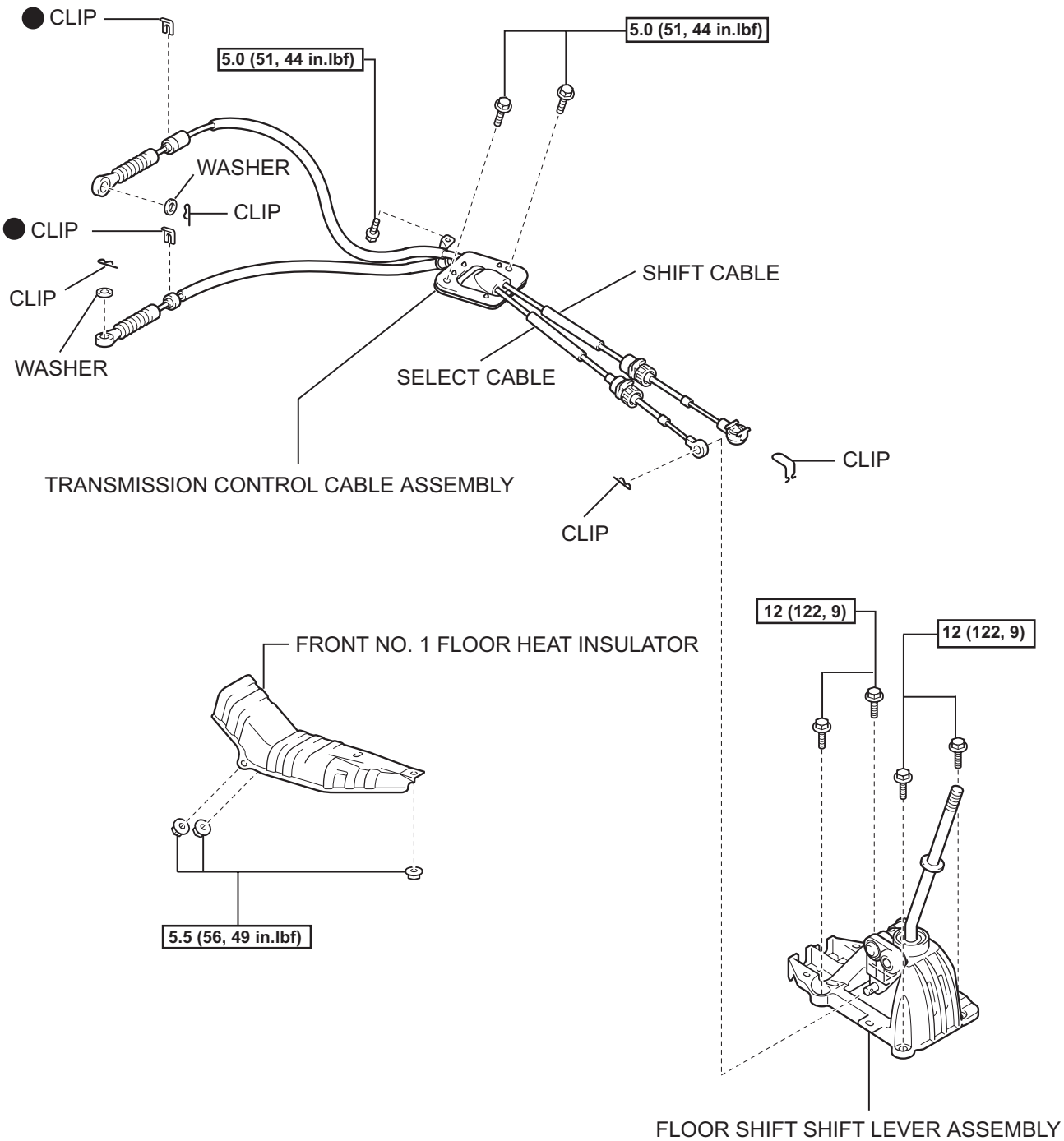


N*m (kgf*cm, ft.*lbf) : Specified torque

P

C113269E04

MX



MX

N*m (kgf*cm, ft.*lbf) : Specified torque

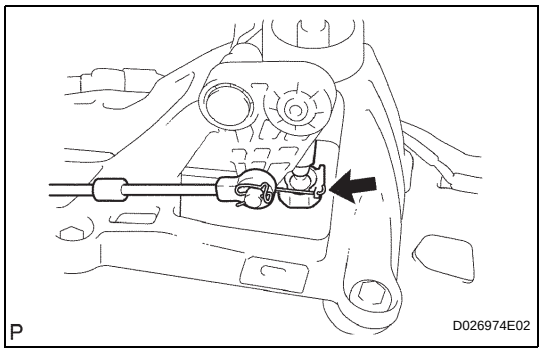
● Non-reusable part

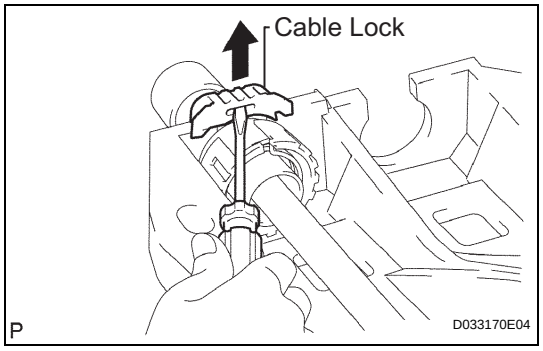
P

C113275E03

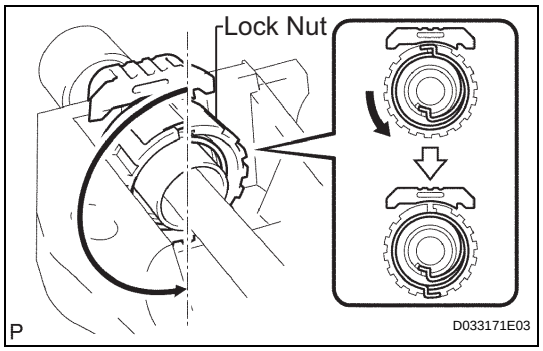
REMOVAL

1. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (See page IP-5)**
2. **REMOVE CONSOLE PANEL UPPER (See page IP-5)**
3. **REMOVE REAR CONSOLE PANEL SUB-ASSEMBLY UPPER (See page IP-18)**
4. **REMOVE REAR CONSOLE BOX ASSEMBLY (See page IP-18)**
5. **DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY**
   (a) Remove the 2 clips, and disconnect the cable ends of the control.



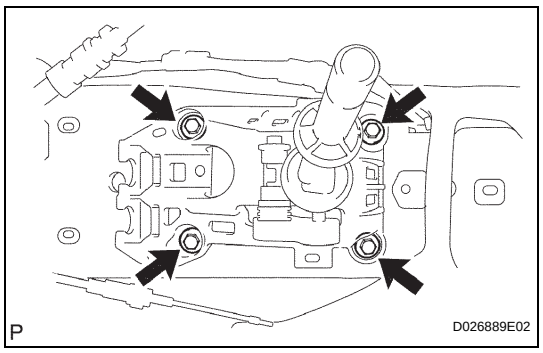


(b) Using a screwdriver, release the cable locks of the shift cable and select cable.

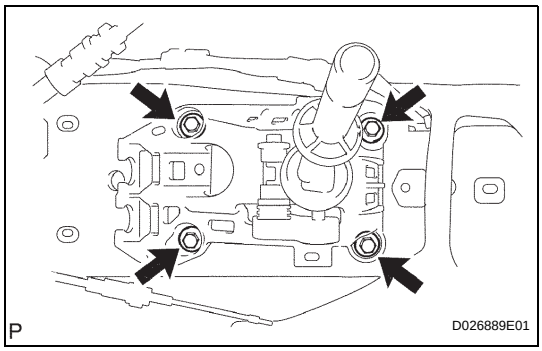


(c) Turn the lock nuts 180° counterclockwise, and hold them in that position to remove the shift cable and select cable.
NOTICE:
Do not push in the cable locks.

6. **REMOVE FLOOR SHIFT SHIFT LEVER ASSEMBLY**
   (a) Remove the 4 bolts and shift lever.



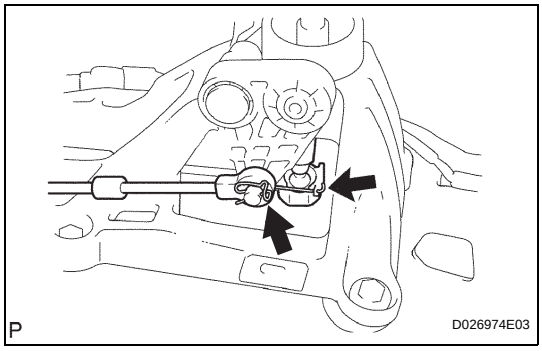
MX



INSTALLATION

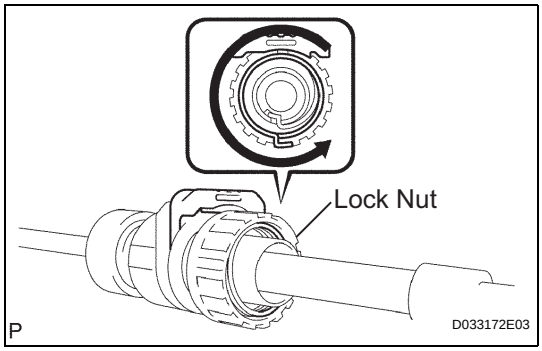
1. INSTALL FLOOR SHIFT SHIFT LEVER ASSEMBLY

(a) Install the shift lever with the 4 bolts.
Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)

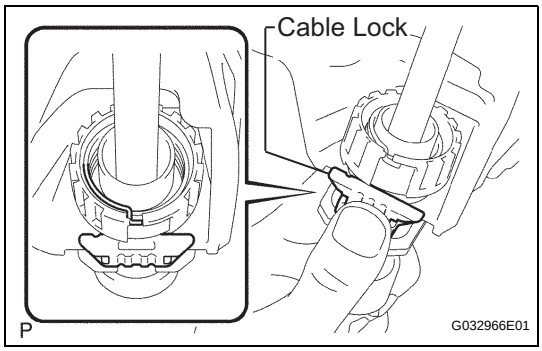


2. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Connect the ends of the control cable and install the 2 clips to the shift lever.



(b) Turn the lock nuts of the shift cable 270° counterclockwise, and hold them in that position.
(c) Install the shift cable and select cable while holding the lock nuts.
(d) Check that the cables are installed securely.



(e) Push in the cable locks of the shift cable and select cable.

3. INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-22)

4. INSTALL REAR CONSOLE PANEL SUB-ASSEMBLY UPPER (See page IP-22)

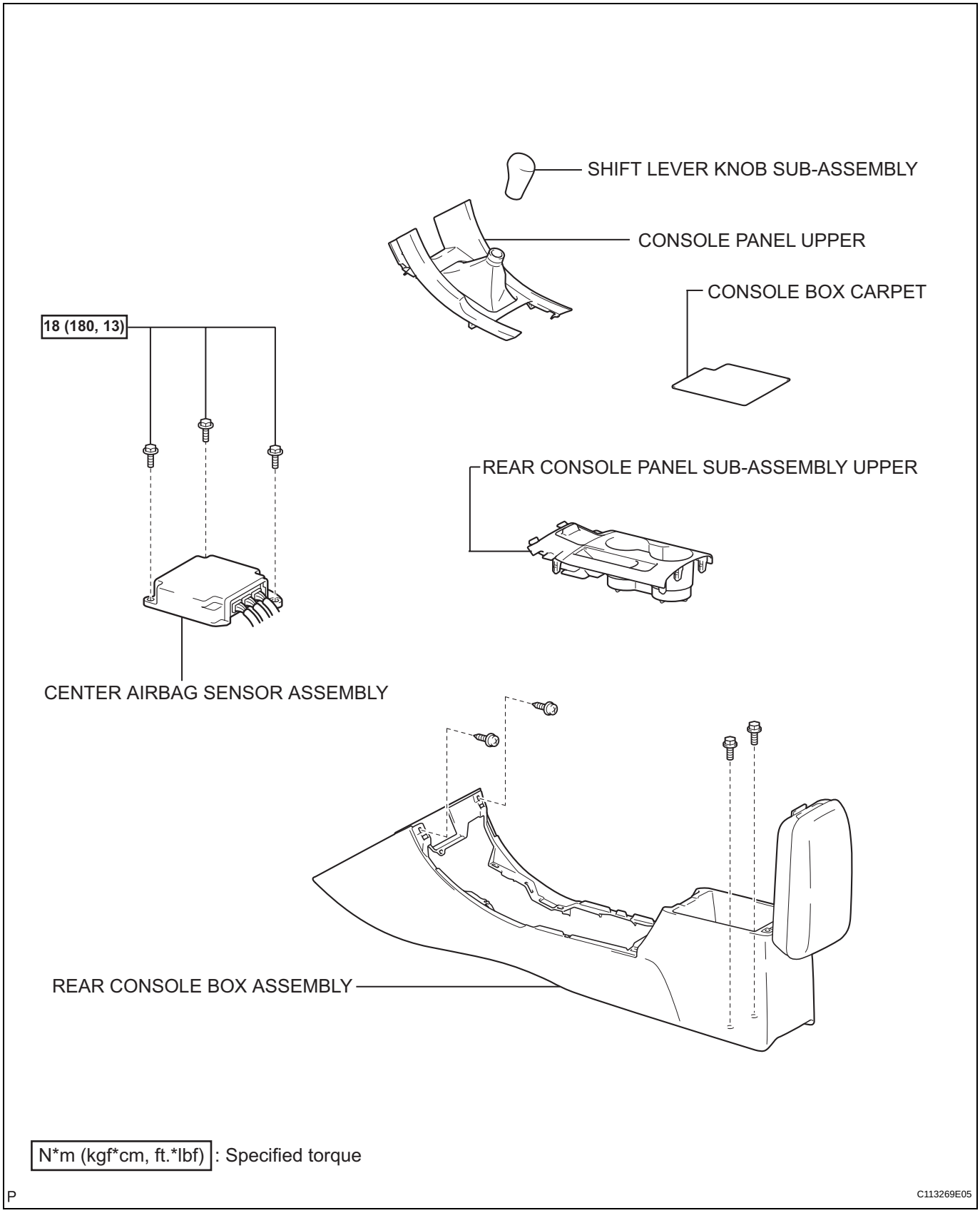
5. INSTALL CONSOLE PANEL UPPER (See page IP-11)

6. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (See page IP-12)

MX

TRANSMISSION CONTROL CABLE

COMPONENTS

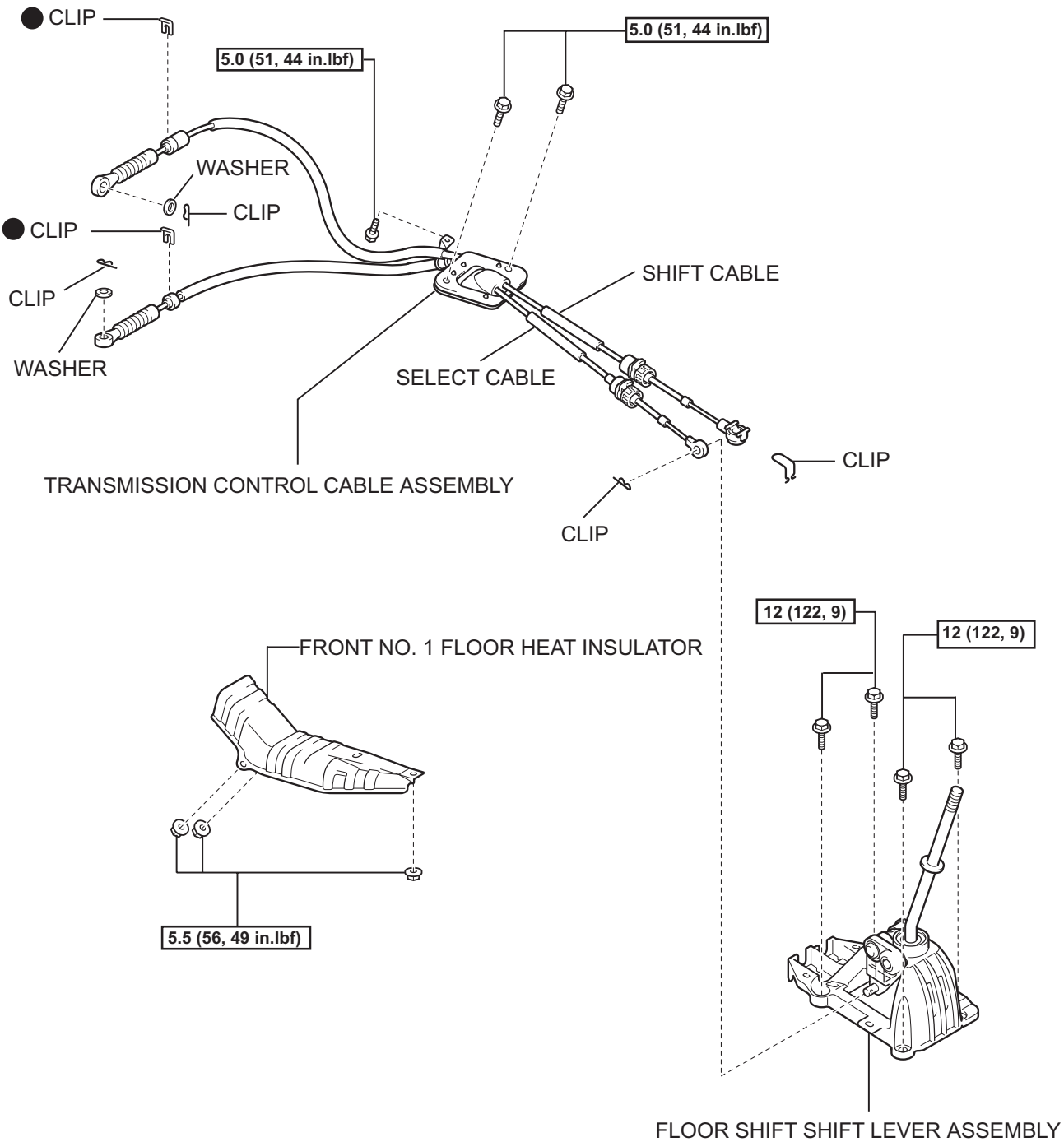


N*m (kgf*cm, ft.*lbf) : Specified torque

P

C113269E05

MX



MX

N*m (kgf*cm, ft.*lbf) : Specified torque

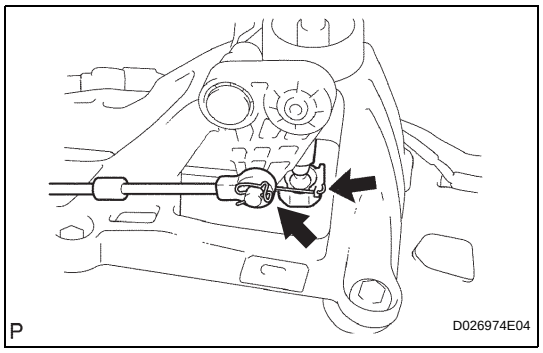
● Non-reusable part

P

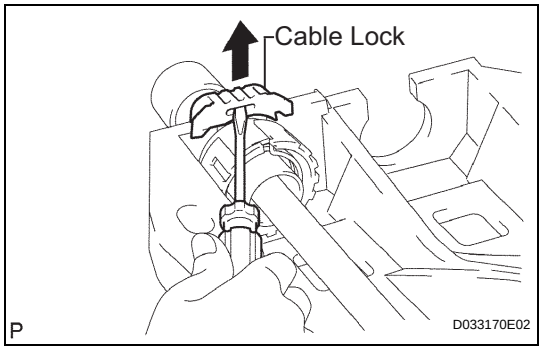
C113275E04

REMOVAL

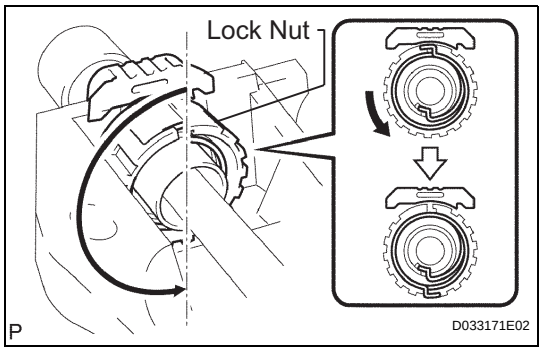
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (See page IP-5)**
3. **REMOVE CONSOLE PANEL UPPER (See page IP-5)**
4. **REMOVE REAR CONSOLE PANEL SUB-ASSEMBLY UPPER (See page IP-18)**
5. **REMOVE REAR CONSOLE BOX ASSEMBLY (See page IP-18)**
6. **REMOVE AIR CONDITIONING UNIT ASSEMBLY (See page AC-25)**
7. **REMOVE CENTER AIRBAG SENSOR ASSEMBLY**
8. **REMOVE EXHAUST PIPE ASSEMBLY (See page EX-2)**
9. **REMOVE FRONT NO. 1 FLOOR HEAT INSULATOR**
10. **DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY**
    (a) Remove the 2 clips and disconnect the cable ends of the control cable.



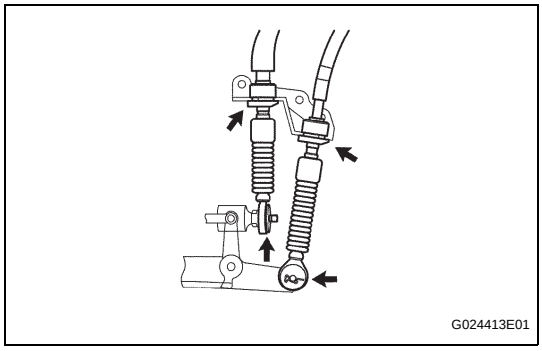
(b) Using a screwdriver, release the cable locks of the shift cable and select cable.



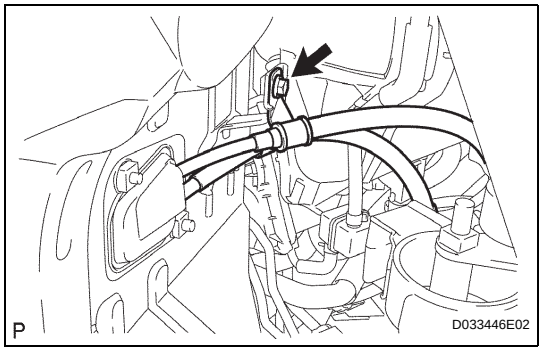
MX



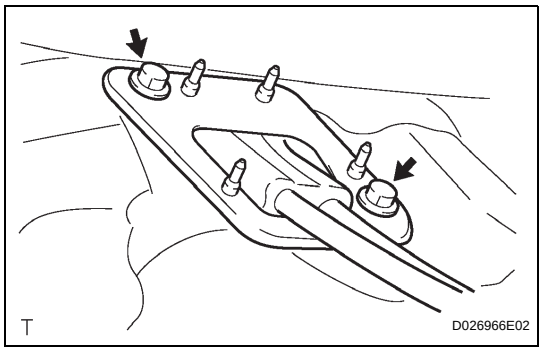
(c) Turn the lock nuts 180° counterclockwise, and hold them in that position to remove the shift cable and select cable.
(d) Remove the shift cable from the floor shift shift lever assembly while holding the lock nut.
(e) Repeat the above process for the select cable.
NOTICE:
Do not push in the cable locks.



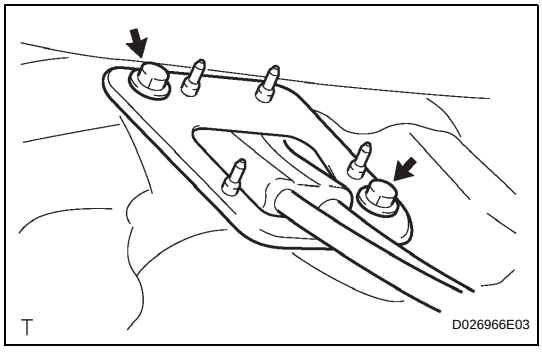
11. REMOVE TRANSMISSION CONTROL CABLE ASSEMBLY
(a) Remove the 2 clips and 2 washers, and disconnect the top ends of the control cable from the transaxle.
(b) Remove the 2 clips and disconnect the control cable bracket.



(c) Remove the 2 nuts and clamp from the body.
(d) Remove the clamp from the control cable.



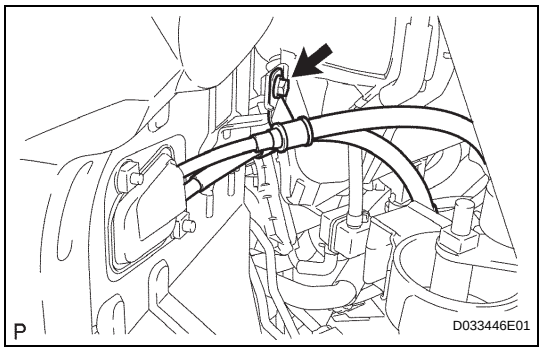
(e) Remove the 2 bolts from the retainer.
(f) Pull out the control cable from the floor.



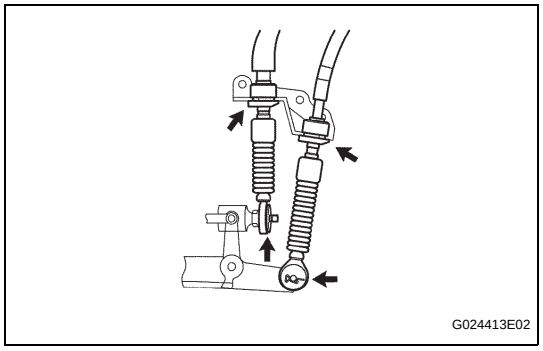
INSTALLATION

1. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY
(a) Install the control cable with the 2 bolts.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)

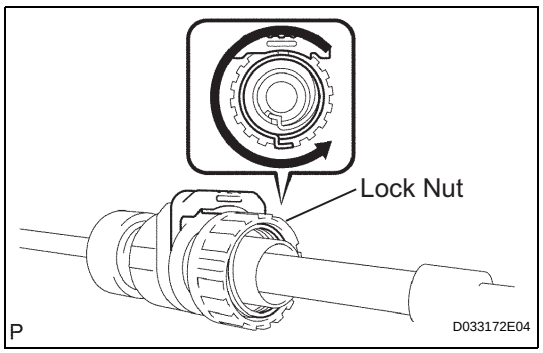
MX



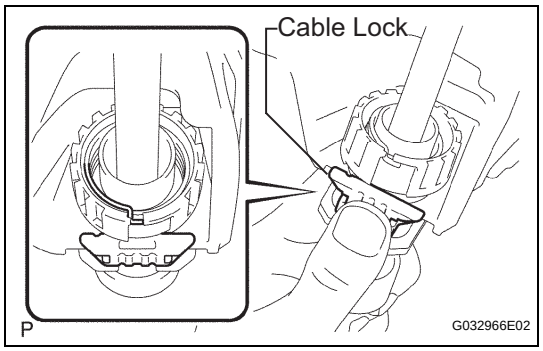
(b) Install the clamp to the control cable.
(c) Install the clamp to the body with the 2 nuts.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



(d) Connect the control cable to the control cable bracket, and install 2 new clips.
(e) Connect the control cable to the transaxle, and install the 2 washers and 2 clips.



2. CONNECT TRANSMISSION CONTROL CABLE ASSEMBLY
(a) Connect the ends of the control cable and install the 2 clips to the shift lever.
(b) Turn the lock nuts of the shift cable 270° counterclockwise, and hold them in that position.
(c) Install the shift cable while holding them.
(d) Check that the cable are installed securely.



(e) Push in the cable locks of the shift cable and select cable.

3. INSTALL FRONT NO. 1 FLOOR HEAT INSULATOR
Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)

4. INSTALL EXHAUST PIPE ASSEMBLY (See page EX-3)

5. INSTALL CENTER AIRBAG SENSOR ASSEMBLY

6. INSTALL AIR CONDITIONING UNIT ASSEMBLY (See page AC-32)

7. INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-22)

8. INSTALL REAR CONSOLE PANEL SUB-ASSEMBLY UPPER (See page IP-23)

9. INSTALL CONSOLE PANEL UPPER (See page IP-11)

10. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (See page IP-12)

11. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

12. PERFORM INITIALIZATION

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

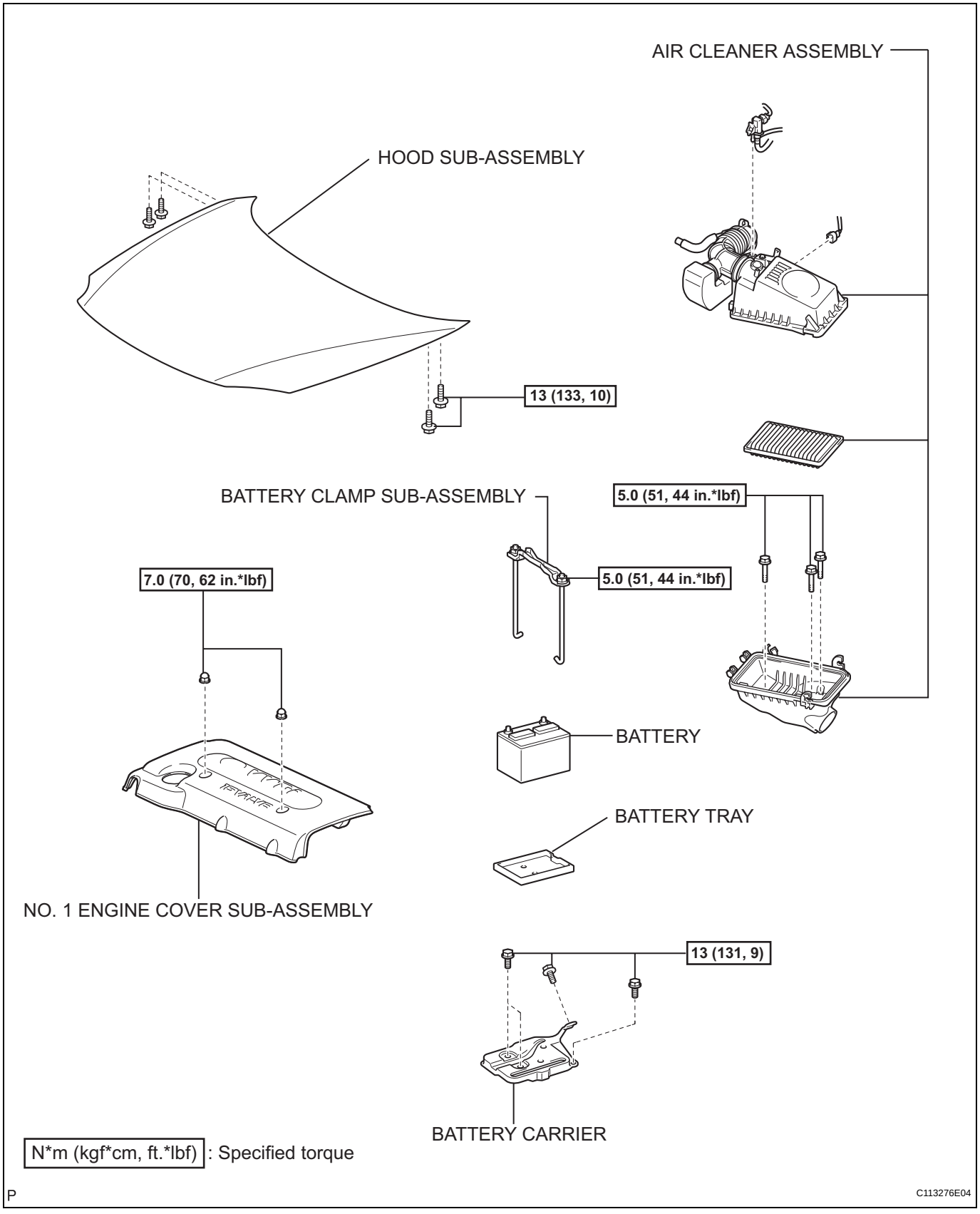
(a) Perform initialization (see page IN-23).

13. CHECK SRS WARNING LIGHT

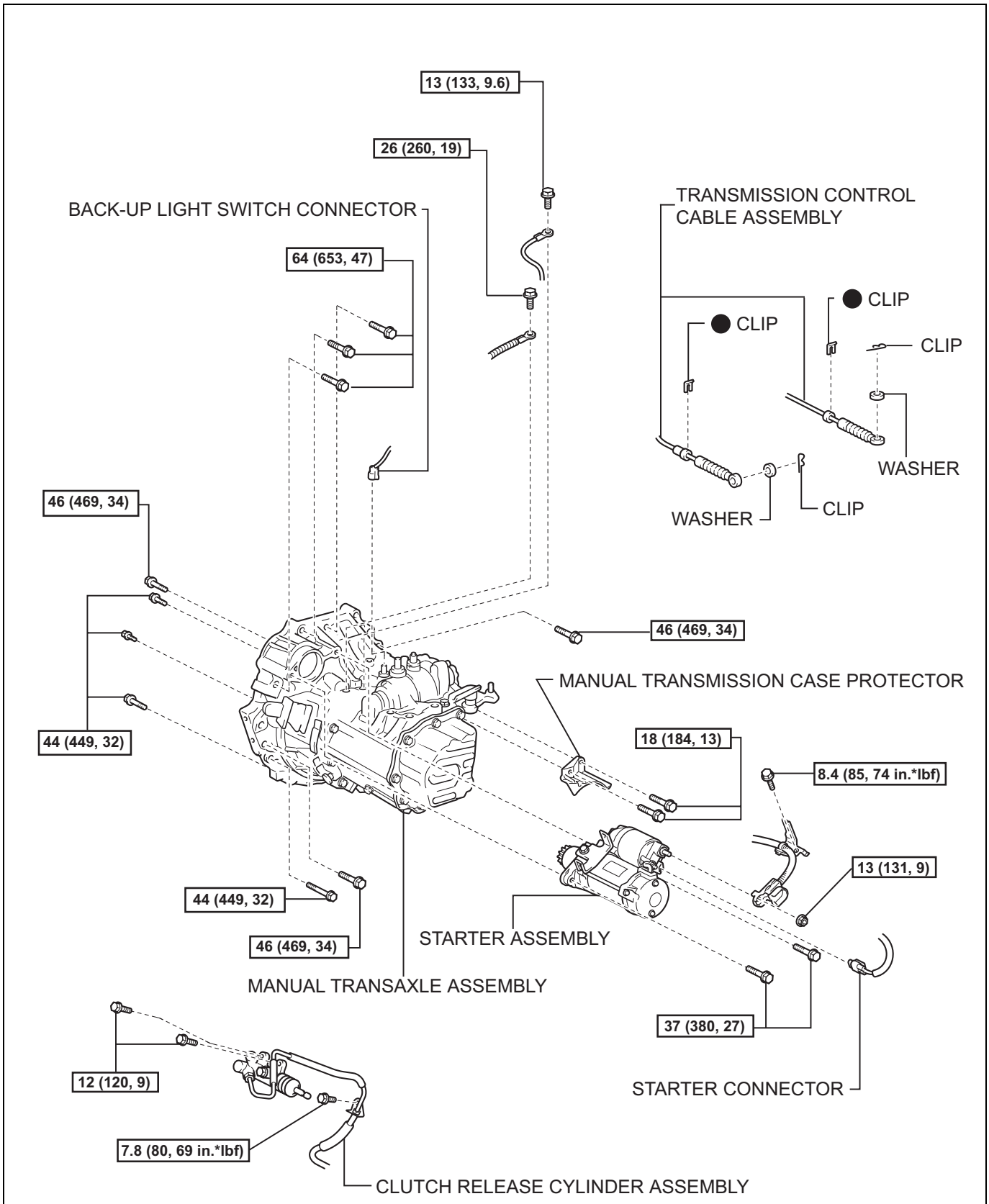
(a) Check the SRS warning light (see page RS-11).

MANUAL TRANSAXLE ASSEMBLY

COMPONENTS



MX



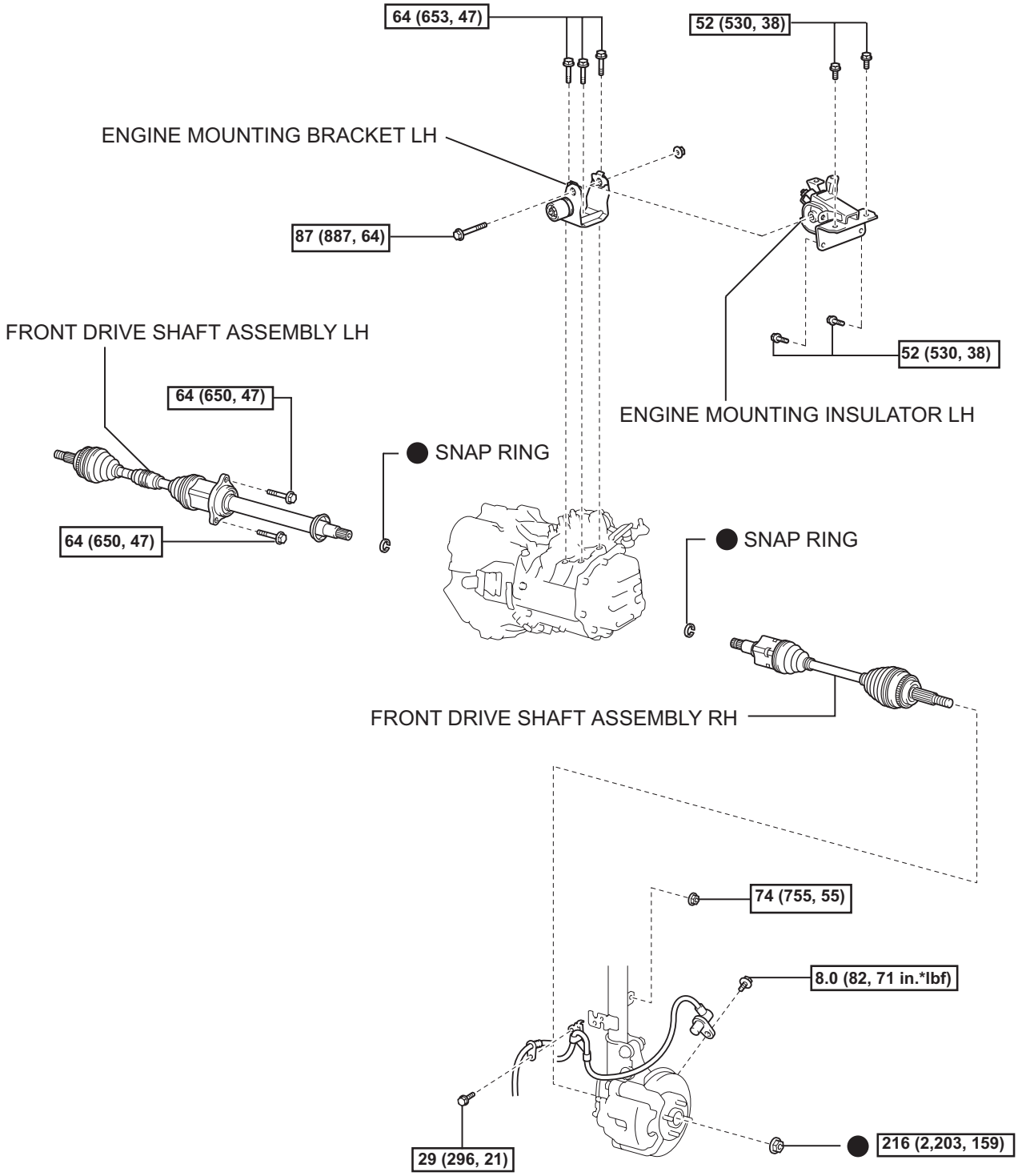
MX

N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

C113277E03



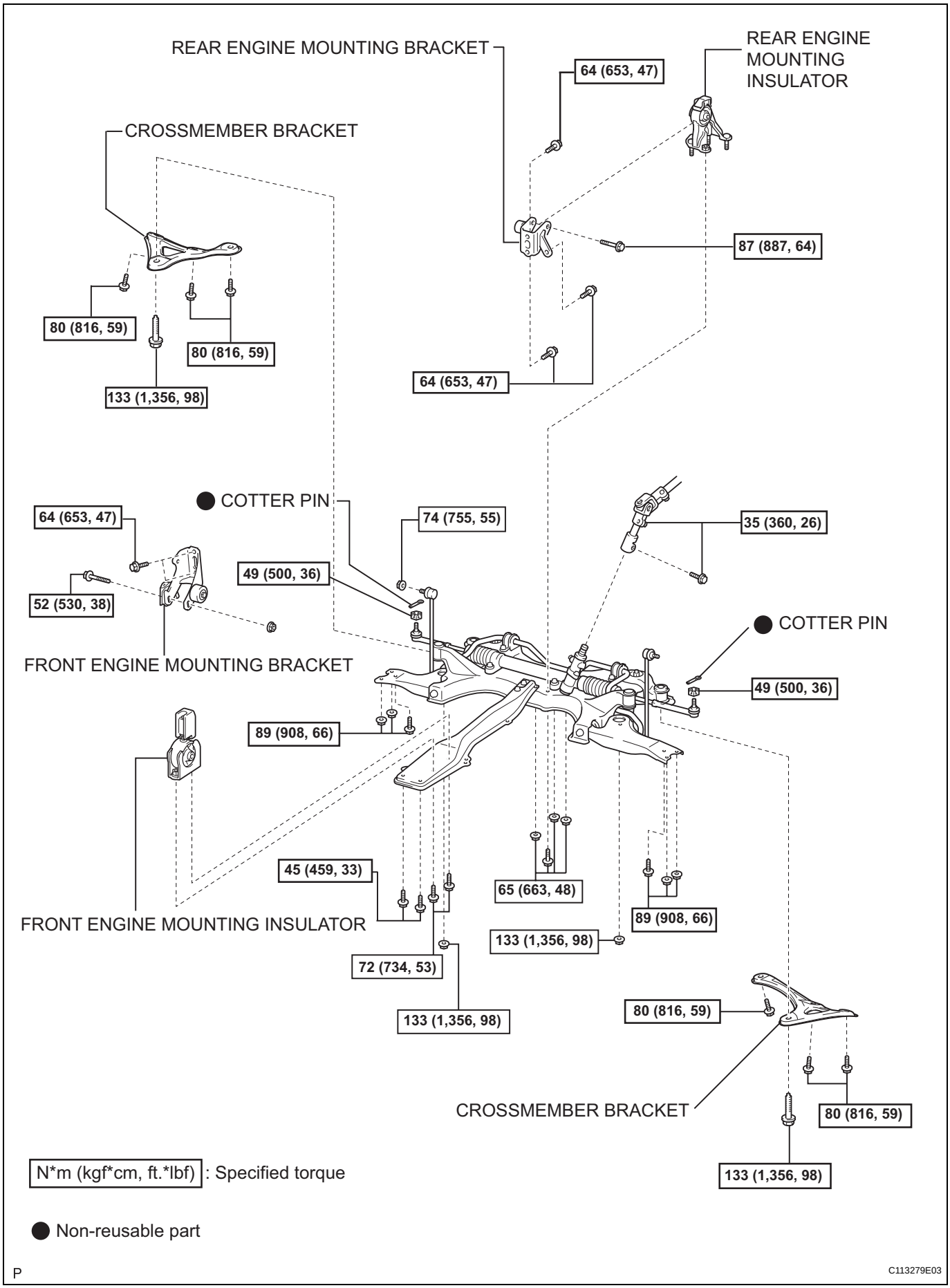
N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

C113278E04

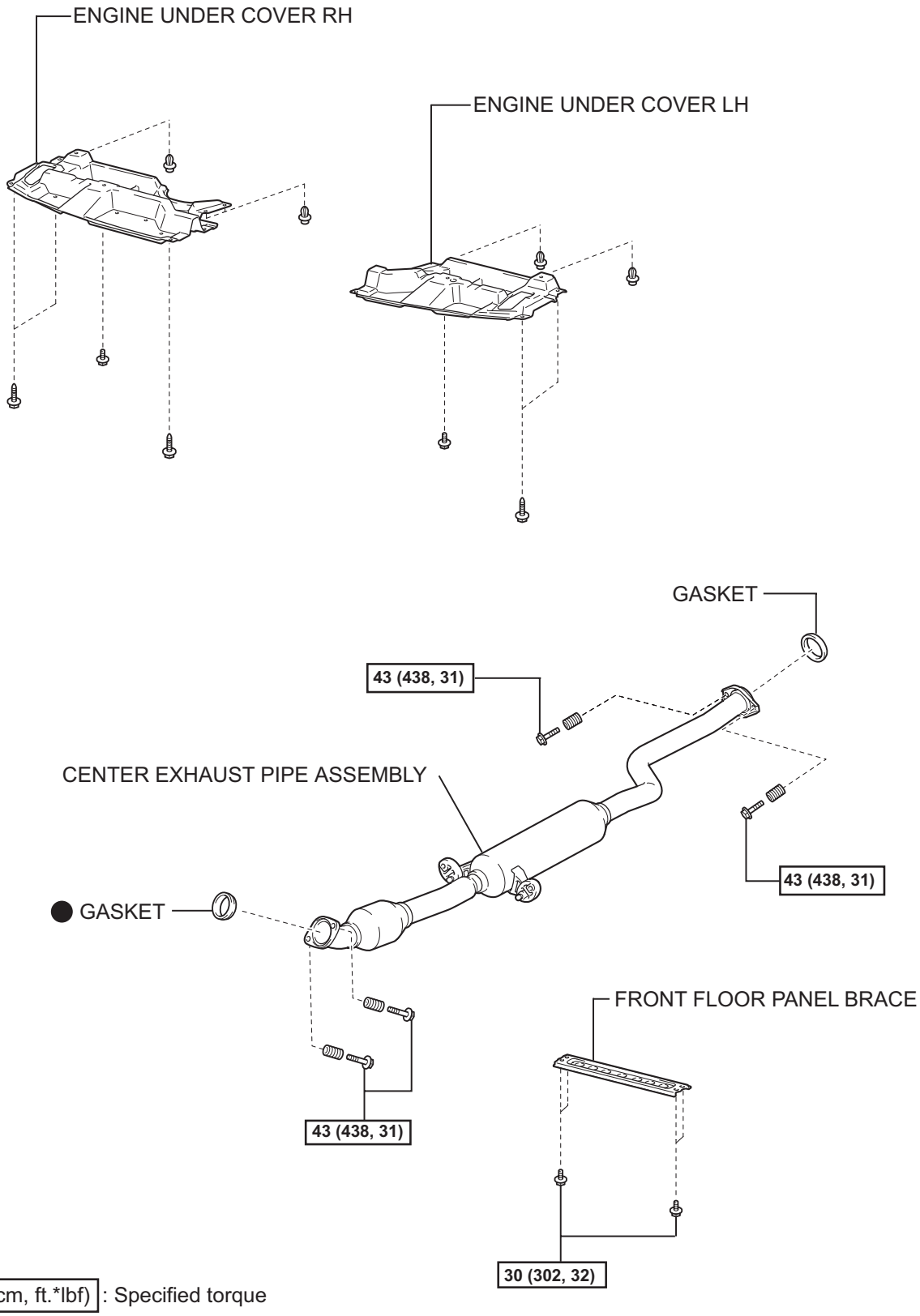
MX



MX

P

C113279E03



N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

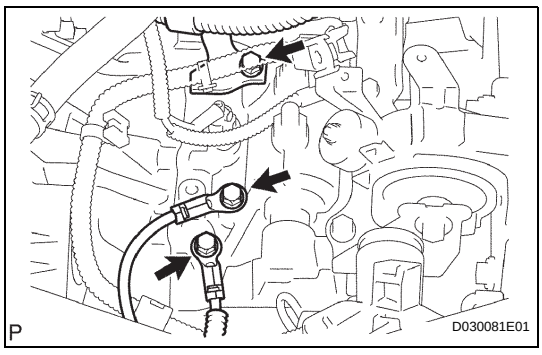
P

C113280E02

MX

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
3. **REMOVE COLUMN HOLE COVER SILENCER SHEET (See page SR-9)**
4. **DISCONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY (See page SR-9)**
5. **REMOVE NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY (See page SR-9)**
6. **REMOVE FRONT WHEEL**
7. **REMOVE ENGINE UNDER COVER LH**
8. **REMOVE ENGINE UNDER COVER RH**
9. **DRAIN TRANSAXLE OIL**
   (a) Remove the filler plug and gasket.
   (b) Remove the drain plug and gasket, and drain the oil.
   (c) Install a new gasket and the drain plug.
   Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)
10. **REMOVE CENTER EXHAUST PIPE ASSEMBLY (See page EX-2)**
11. **REMOVE HOOD SUB-ASSEMBLY**
12. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY**
13. **REMOVE AIR CLEANER ASSEMBLY**
14. **REMOVE BATTERY CLAMP SUB-ASSEMBLY**
15. **REMOVE BATTERY**
16. **REMOVE BATTERY TRAY**
17. **REMOVE BATTERY CARRIER**
    (a) Remove the 4 bolts and battery carrier.
18. **REMOVE STARTER ASSEMBLY (See page ST-6)**
19. **DISCONNECT WIRE HARNESS**
    (a) Remove the 3 bolts, and disconnect the 3 wire harnesses.



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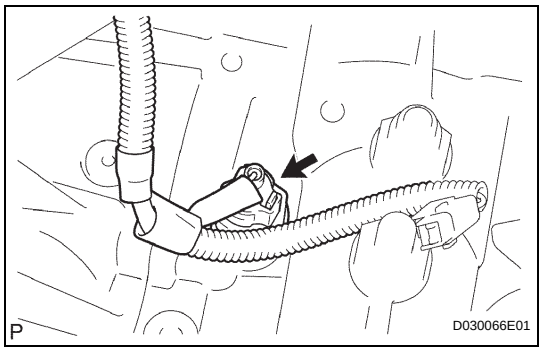
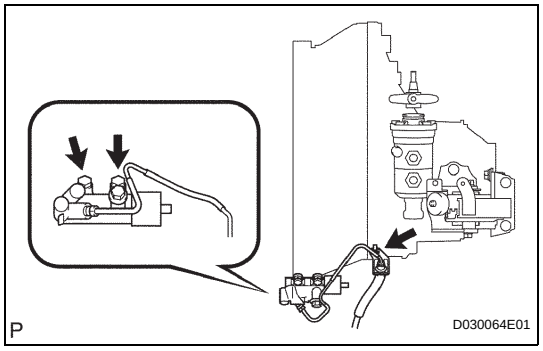
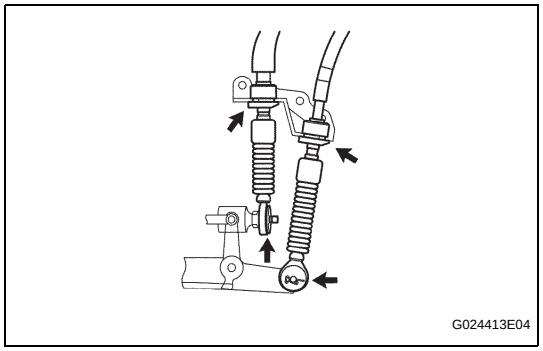


20. DISCONNECT BACK-UP LIGHT SWITCH



21. DISCONNECT CLUTCH RELEASE CYLINDER ASSEMBLY

(a) Remove the 3 bolts and disconnect the release cylinder.



22. DISCONNECT TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Remove the 2 clips and 2 washers, and disconnect the 2 cables from the transaxle.

(b) Remove the 2 clips, and disconnect the 2 cables from the bracket.

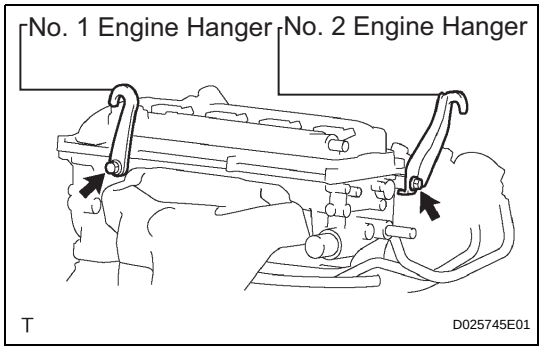
23. REMOVE FRONT DRIVE SHAFT ASSEMBLY LH

(a) Remove the drive shaft (see page DS-5).

24. REMOVE FRONT DRIVE SHAFT ASSEMBLY RH

(a) Remove the drive shaft (see page DS-5).

25. DISCONNECT PRESSURE FEED TUBE ASSEMBLY (See page PS-21)



26. SUSPEND ENGINE ASSEMBLY

(a) Install the No. 1 and No. 2 engine hangers in the correct direction.

Part Name	Parts No.
No. 1 engine hanger	12281-28010
No. 2 engine hanger	12282-28010
Bolt	91512-61020

Torque: 38 N*m (387 kgf*cm, 28 ft.*lbf)

(b) Attach the engine chain hoist to the engine hanger.

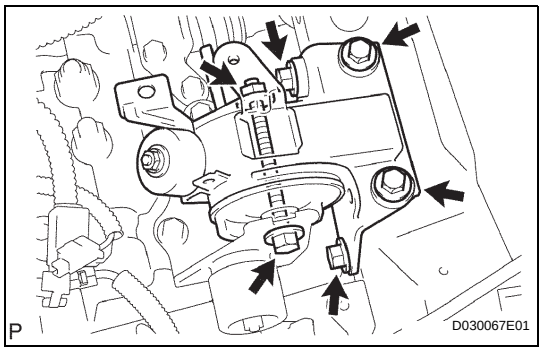
CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.

27. REMOVE FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY (See page PS-22)

28. SUPPORT MANUAL TRANSAXLE ASSEMBLY

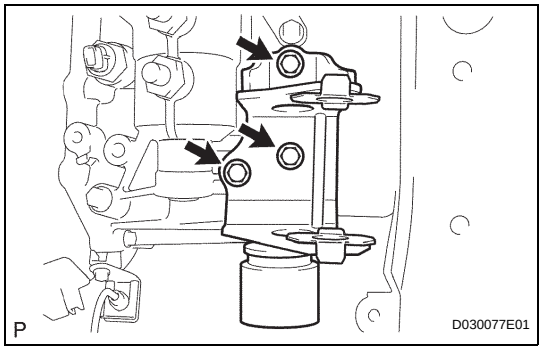
(a) Support the transaxle with a transmission jack.

MX



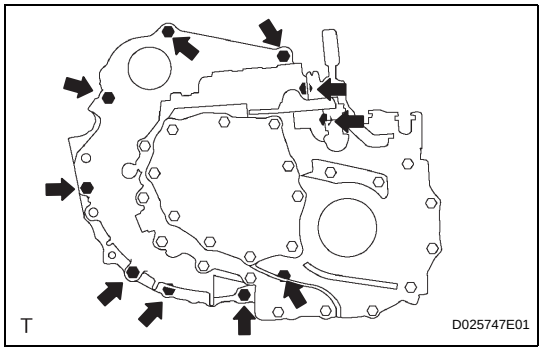
29. REMOVE ENGINE MOUNTING INSULATOR LH

(a) Remove the 5 bolts, nut and engine mounting insulator.



30. REMOVE ENGINE MOUNTING BRACKET LH

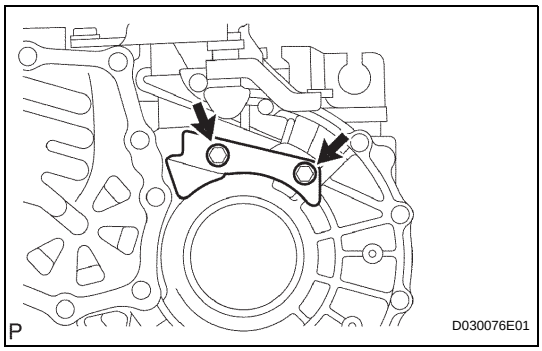
(a) Remove the 3 bolts and engine mounting bracket.



31. REMOVE MANUAL TRANSAXLE ASSEMBLY

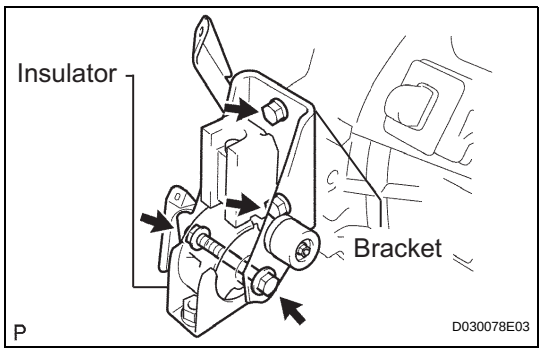
(a) Remove the 10 bolts.

(b) Separate and remove the transaxle from the engine.



32. REMOVE MANUAL TRANSMISSION CASE PROTECTOR

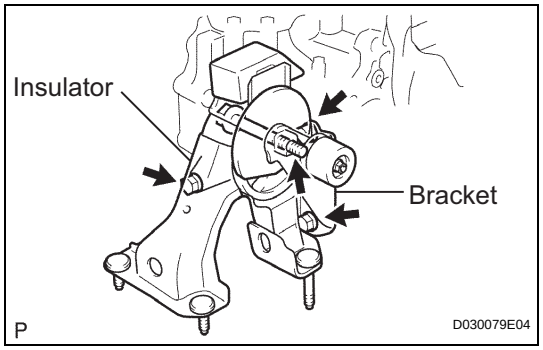
(a) Remove the 2 bolts and case protector.



33. REMOVE FRONT ENGINE MOUNTING BRACKET

(a) Remove the bolt, nut and front engine mounting insulator from the front engine mounting bracket.

(b) Remove the 2 bolts and front engine mounting bracket from the transaxle.

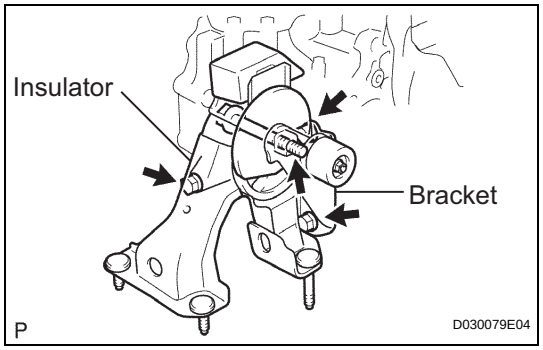


34. REMOVE REAR ENGINE MOUNTING BRACKET

(a) Remove the bolt and rear engine mounting insulator from the rear engine mounting bracket.

(b) Remove the 3 bolts and rear engine mounting bracket from the transaxle.

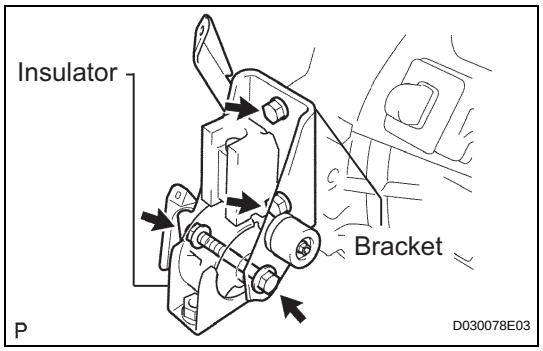
INSTALLATION



1. INSTALL REAR ENGINE MOUNTING BRACKET

(a) Install the rear engine mounting bracket to the transaxle with the 3 bolts.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)

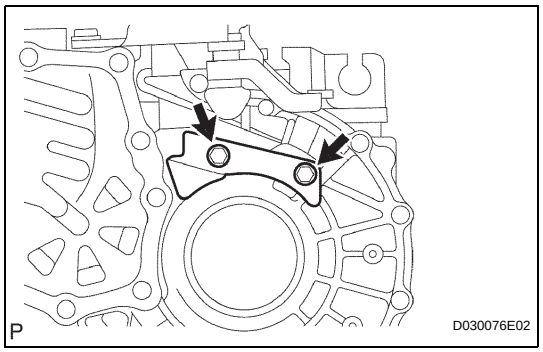
(b) Install the rear engine mounting insulator with the bolt to the rear engine mounting bracket.
Torque: 87 N*m (887 kgf*cm, 64 ft.*lbf)



2. INSTALL FRONT ENGINE MOUNTING BRACKET

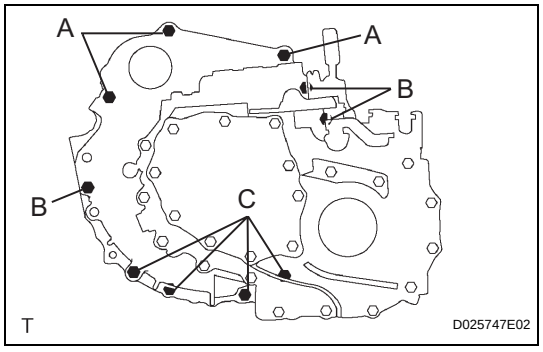
(a) Install the front engine mounting bracket and 2 bolts to the transaxle.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)

(b) Install the front engine mounting insulator, bolt and nut to the front engine mounting bracket.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)



3. INSTALL MANUAL TRANSMISSION CASE PROTECTOR

(a) Install the case protector with the 2 bolts.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)

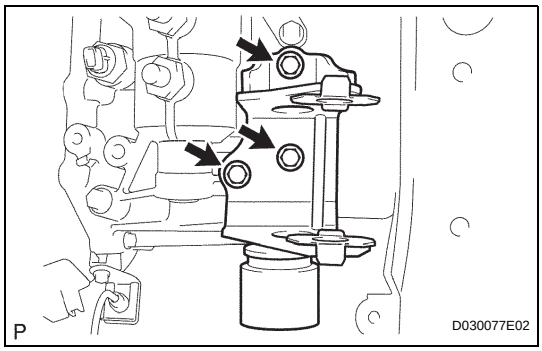


4. INSTALL MANUAL TRANSAXLE ASSEMBLY

(a) Align the input shaft with the clutch disc and install the transaxle to the engine.

(b) Install the 10 bolts.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf) for bolt A
46 N*m (469 kgf*cm, 34 ft.*lbf) for bolt B
44 N*m (449 kgf*cm, 32 ft.*lbf) for bolt C

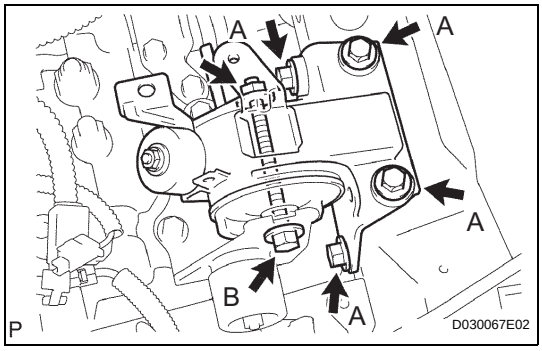
MX



5. INSTALL ENGINE MOUNTING BRACKET LH

(a) Install the engine mounting bracket to the transaxle with the 3 bolts.

Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)



6. INSTALL ENGINE MOUNTING INSULATOR LH

(a) Install the engine mounting insulator with the 5 bolts and nut.

Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf) for bolt A
87 N*m (887 kgf*cm, 64 ft.*lbf) for bolt B

7. INSTALL FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY (See page PS-37)

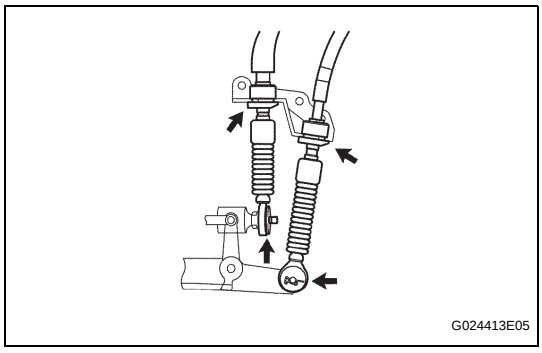
8. CONNECT PRESSURE FEED TUBE ASSEMBLY (See page PS-38)

9. INSTALL FRONT DRIVE SHAFT ASSEMBLY LH

(a) Install the drive shaft (see page DS-16).

10. INSTALL FRONT DRIVE SHAFT ASSEMBLY RH

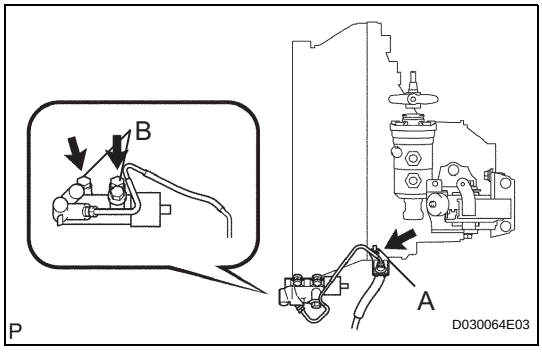
(a) Install the drive shaft (see page DS-16).



11. INSTALL TRANSMISSION CONTROL CABLE ASSEMBLY

(a) Connect the 2 cable ends with the 2 washers and 2 clips.

(b) Install 2 new clips to the control cable bracket.

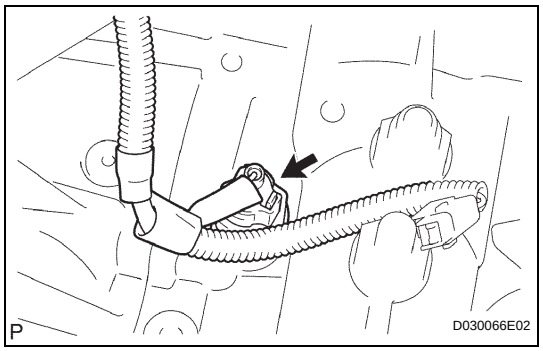


12. INSTALL CLUTCH RELEASE CYLINDER ASSEMBLY

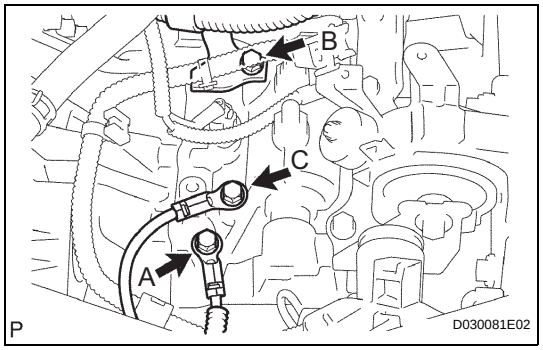
(a) Install the release cylinder with the 3 bolts.

Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf) for bolt A
12 N*m (120 kgf*cm, 9 ft.*lbf) for bolt B

MX



13. **CONNECT BACK-UP LIGHT SWITCH**



14. **CONNECT WIRE HARNESS**
    (a) Install the 3 wire harnesses with the 3 bolts.
    Torque: 26 N*m (260 kgf*cm, 19 ft.*lbf) for bolt A
    8.4 N*m (85 kgf*cm, 74 in.*lbf) for bolt B
    13 N*m (133 kgf*cm, 9.6 ft.*lbf) for bolt C
15. **INSTALL STARTER ASSEMBLY (See page ST-14)**
16. **INSTALL BATTERY CARRIER**
    (a) Install the battery carrier with the 3 bolts.
17. **INSTALL BATTERY TRAY**
18. **INSTALL BATTERY**
19. **INSTALL BATTERY CLAMP SUB-ASSEMBLY**
    Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
20. **INSTALL AIR CLEANER ASSEMBLY**
    Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
21. **INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY**
22. **INSTALL HOOD SUB-ASSEMBLY**
    Torque: 13 N*m (133 kgf*cm, 10 ft.*lbf)
23. **ADJUST HOOD SUB-ASSEMBLY**
    (a) Adjust the hood (see page ED-1).
24. **INSTALL CENTER EXHAUST PIPE ASSEMBLY (See page EX-4)**
25. **ADD TRANSAXLE OIL (See page MX-2)**
26. **INSPECT TRANSAXLE OIL (See page MX-2)**
27. **INSTALL FRONT WHEEL**
    Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
28. **INSTALL NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY**
29. **CONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY (See page PS-39)**
30. **INSTALL COLUMN HOLE COVER SILENCER SHEET**
31. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

32. **PERFORM INITIALIZATION**
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
(a) Perform initialization (see page IN-23).

33. **CHECK SRS WARNING LIGHT**
(a) Check the SRS warning light (see page RS-11).

34. **PLACE FRONT WHEEL FACING STRAIGHT AHEAD**

35. **INSPECT STEERING WHEEL CENTER POINT**

36. **ADD POWER STEERING FLUID**

37. **BLEED AIR FROM POWER STEERING FLUID (See page PS-3)**

38. **CHECK POWER STEERING FLUID LEVEL IN RESERVOIR (See page PS-4)**

39. **INSPECT FOR POWER STEERING FLUID LEAK**

40. **INSPECT FRONT WHEEL ALIGNMENT**
(a) Inspect wheel alignment (see page SP-2).

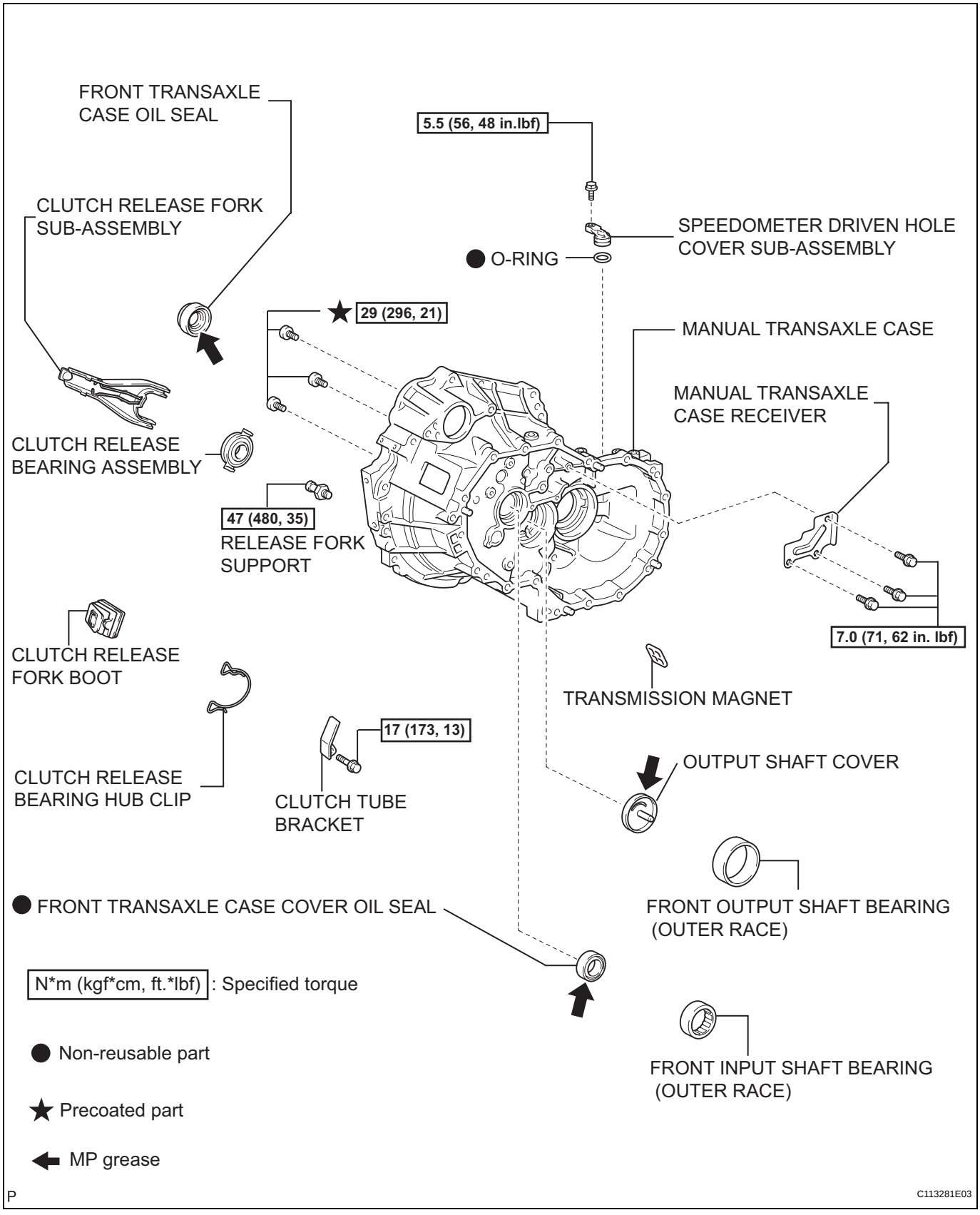
41. **INSTALL ENGINE UNDER COVER LH**

42. **INSTALL ENGINE UNDER COVER RH**

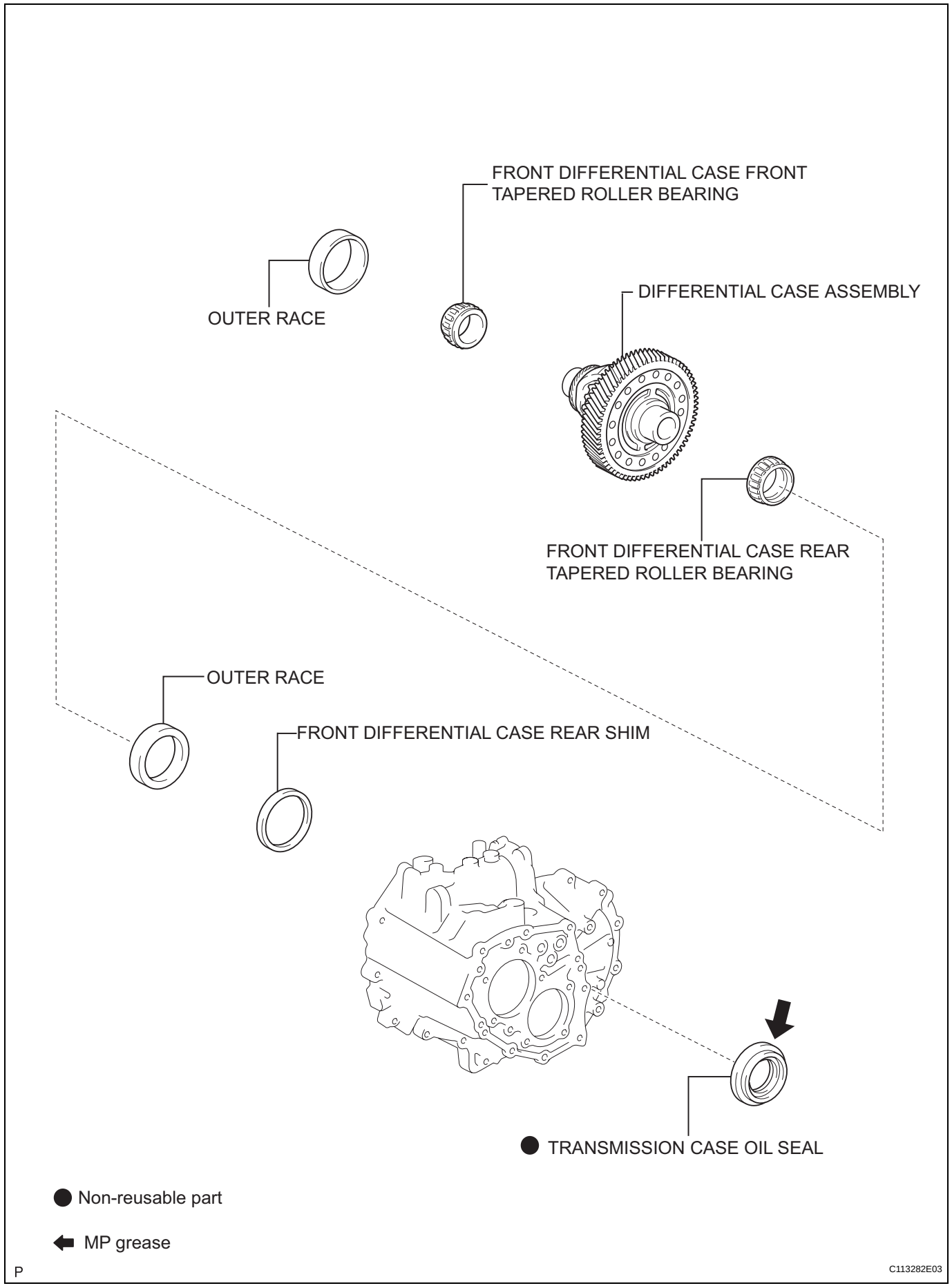
43. **CHECK ABS SPEED SENSOR SIGNAL**
(a) Check the sensor signal (see page BC-20).

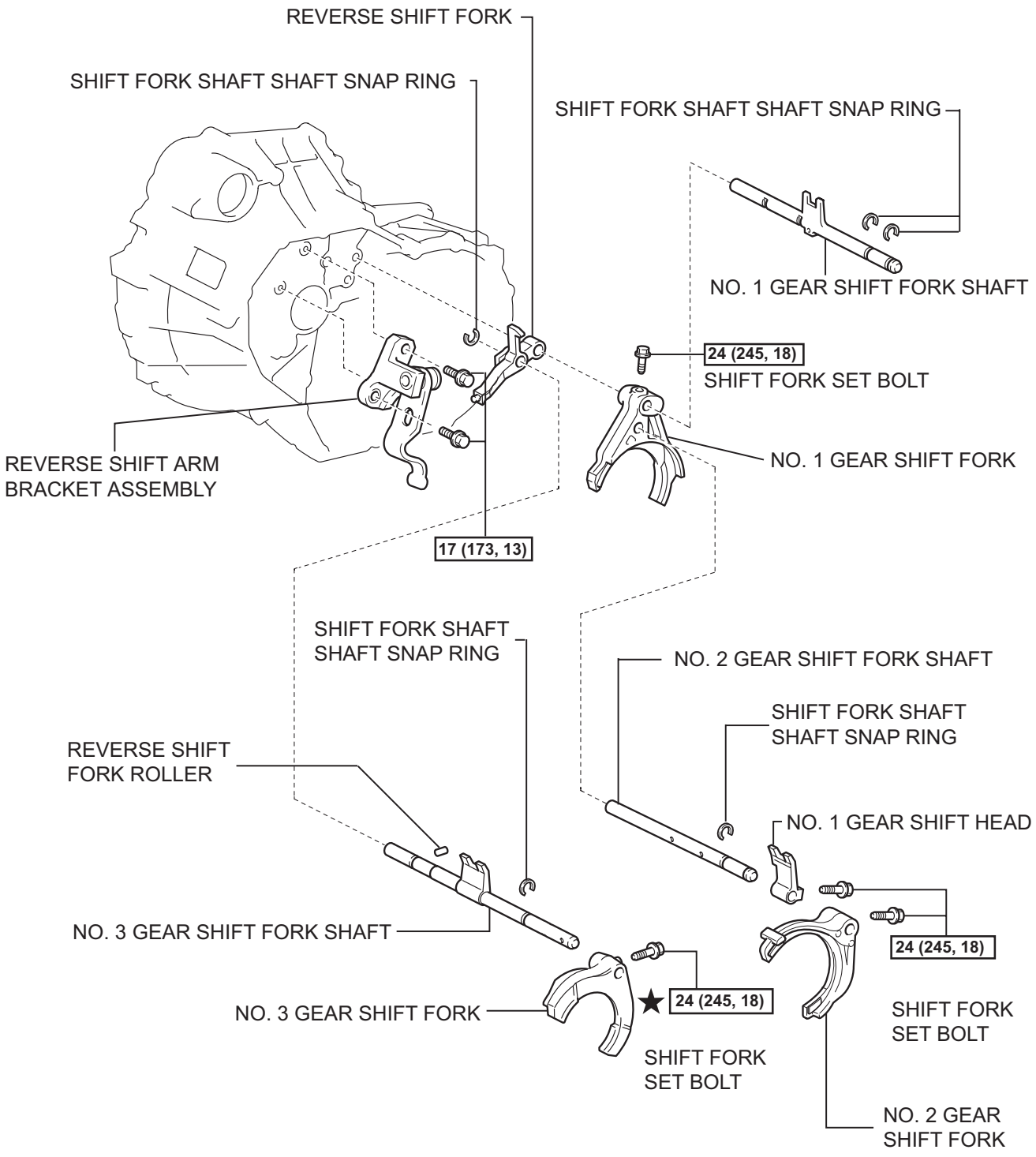
MANUAL TRANSAXLE UNIT

COMPONENTS



MX


FRONT DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING
OUTER RACE
DIFFERENTIAL CASE ASSEMBLY
FRONT DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING
OUTER RACE
FRONT DIFFERENTIAL CASE REAR SHIM
TRANSMISSION CASE OIL SEAL
Non-reusable part
MP grease
P
C113282E03



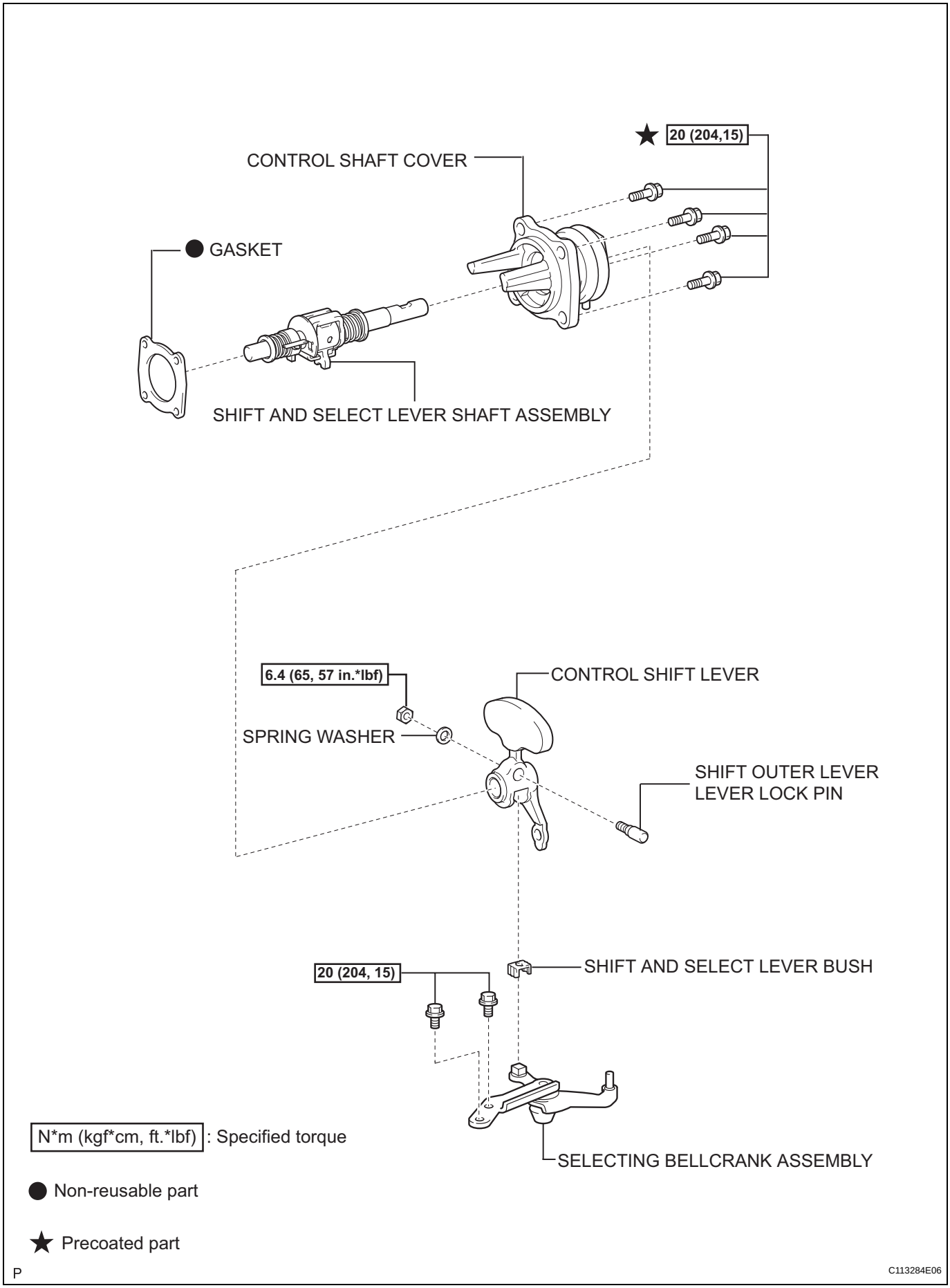
N*m (kgf*cm, ft.*lbf) : Specified torque

★ Precoated part

P

C113283E02

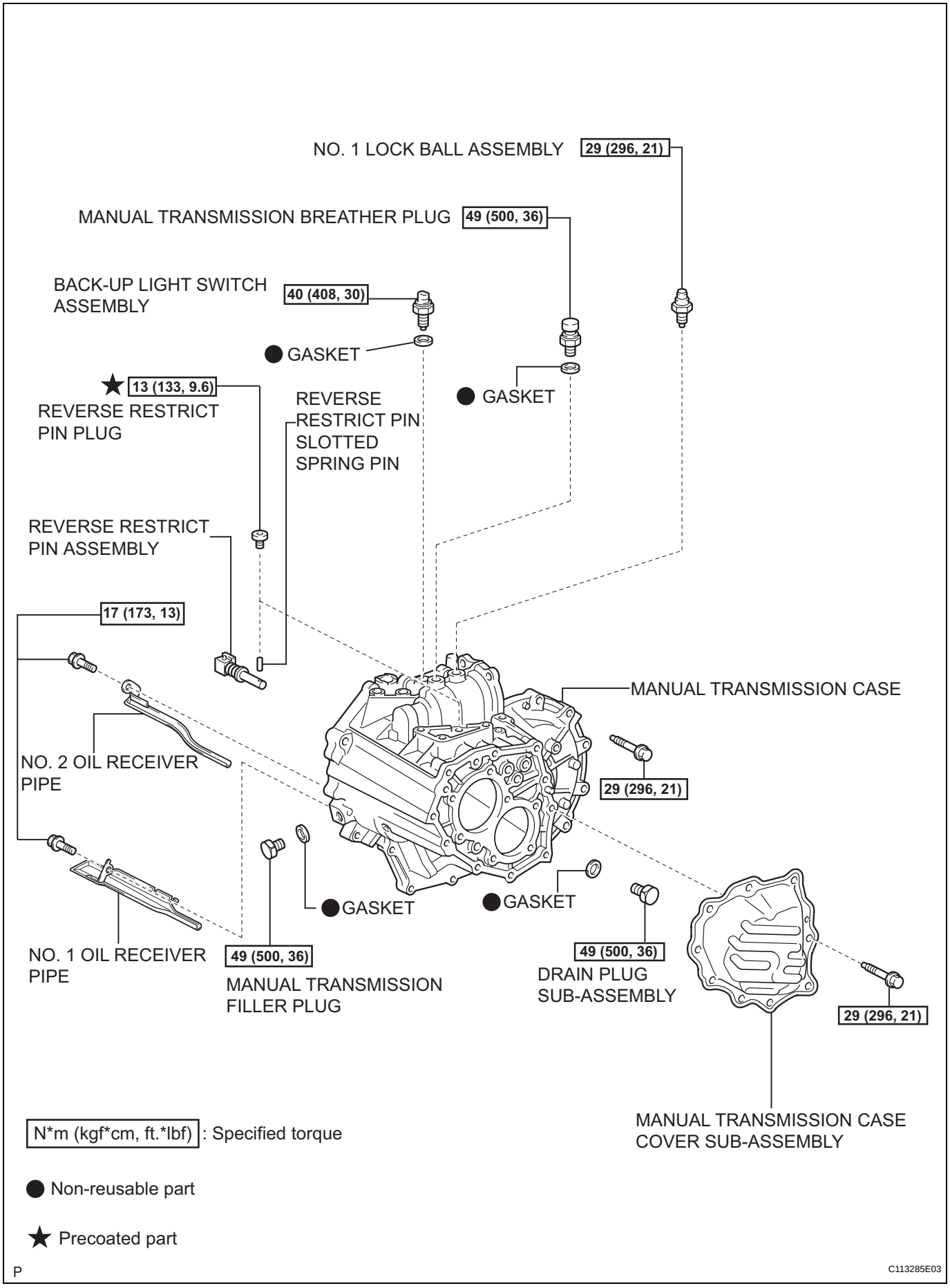
MX



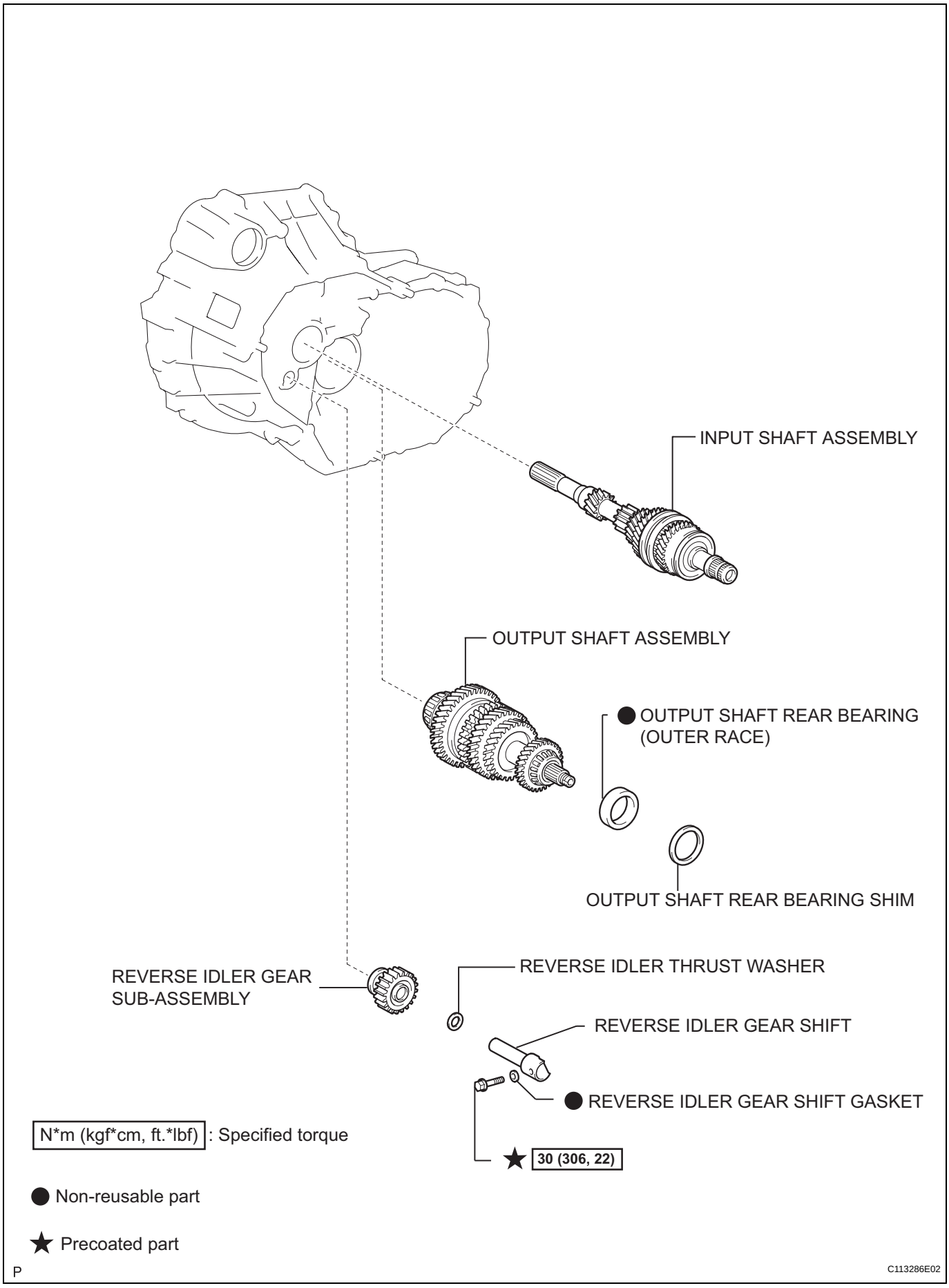
MX

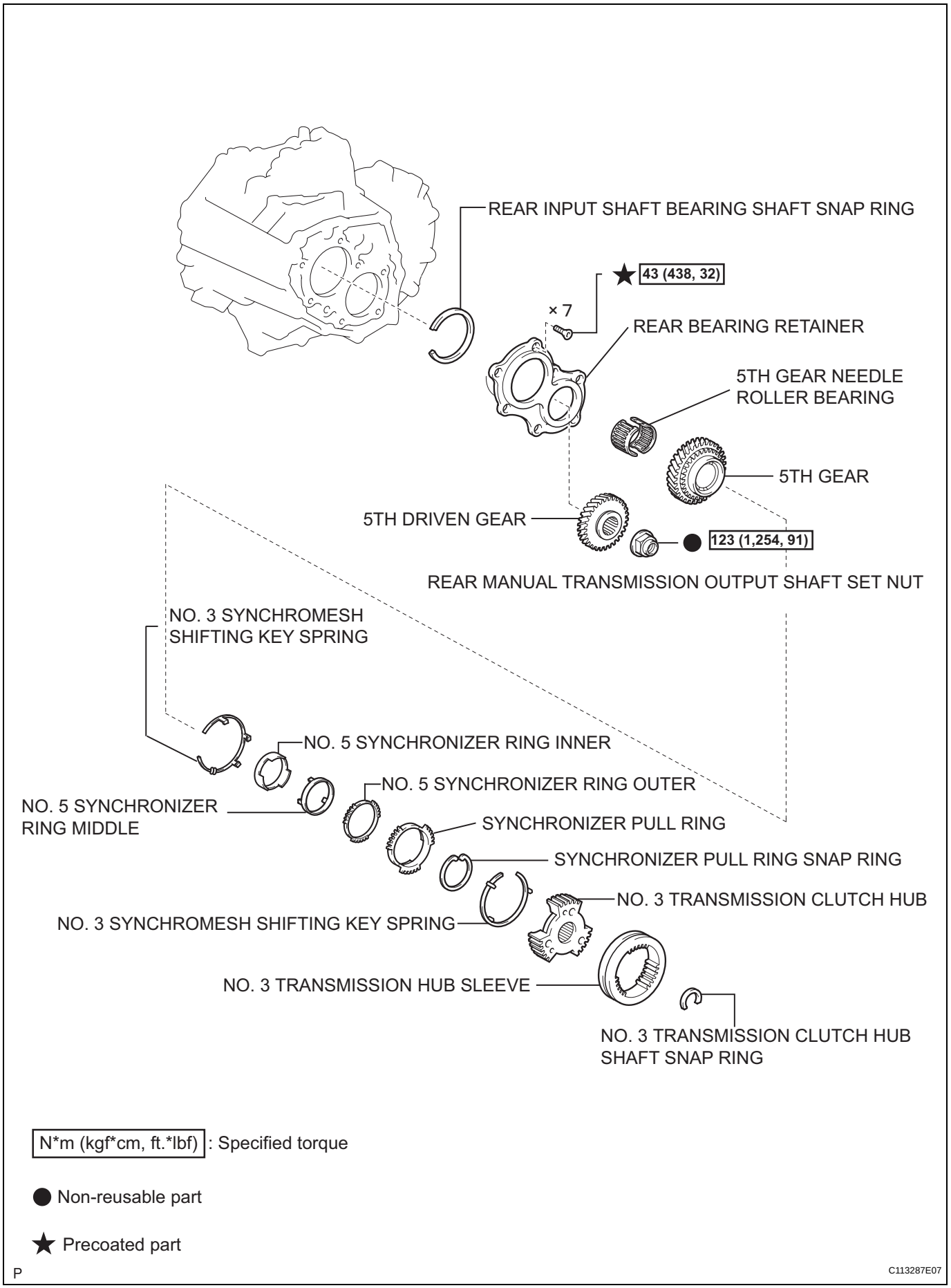
P

C113284E06

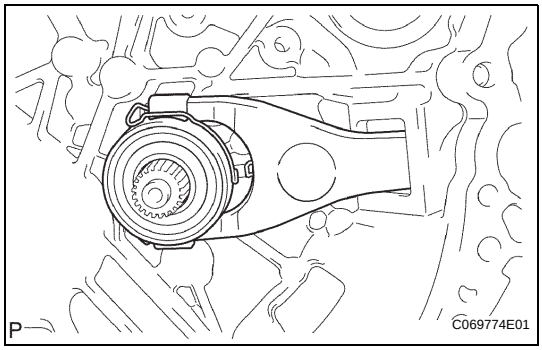

NO. 1 LOCK BALL ASSEMBLY
29 (296, 21)
MANUAL TRANSMISSION BREATHER PLUG
49 (500, 36)
BACK-UP LIGHT SWITCH ASSEMBLY
40 (408, 30)
GASKET
13 (133, 9.6)
REVERSE RESTRICT PIN PLUG
REVERSE RESTRICT PIN SLOTTED SPRING PIN
GASKET
REVERSE RESTRICT PIN ASSEMBLY
17 (173, 13)
MANUAL TRANSMISSION CASE
NO. 2 OIL RECEIVER PIPE
29 (296, 21)
GASKET
GASKET
NO. 1 OIL RECEIVER PIPE
49 (500, 36)
MANUAL TRANSMISSION FILLER PLUG
49 (500, 36)
DRAIN PLUG SUB-ASSEMBLY
29 (296, 21)
MANUAL TRANSMISSION CASE COVER SUB-ASSEMBLY
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
Precoated part
P
C113285E03

MX


INPUT SHAFT ASSEMBLY
OUTPUT SHAFT ASSEMBLY
● OUTPUT SHAFT REAR BEARING (OUTER RACE)
OUTPUT SHAFT REAR BEARING SHIM
REVERSE IDLER GEAR SUB-ASSEMBLY
REVERSE IDLER THRUST WASHER
REVERSE IDLER GEAR SHIFT
● REVERSE IDLER GEAR SHIFT GASKET
★ 30 (306, 22)
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
★ Precoated part
P
C113286E02


REAR INPUT SHAFT BEARING SHAFT SNAP RING
★ 43 (438, 32)
× 7
REAR BEARING RETAINER
5TH GEAR NEEDLE ROLLER BEARING
5TH GEAR
5TH DRIVEN GEAR
● 123 (1,254, 91)
REAR MANUAL TRANSMISSION OUTPUT SHAFT SET NUT
NO. 3 SYNCHROMESH SHIFTING KEY SPRING
NO. 5 SYNCHRONIZER RING INNER
NO. 5 SYNCHRONIZER RING OUTER
NO. 5 SYNCHRONIZER RING MIDDLE
SYNCHRONIZER PULL RING
SYNCHRONIZER PULL RING SNAP RING
NO. 3 TRANSMISSION CLUTCH HUB
NO. 3 SYNCHROMESH SHIFTING KEY SPRING
NO. 3 TRANSMISSION HUB SLEEVE
NO. 3 TRANSMISSION CLUTCH HUB SHAFT SNAP RING
N*m (kgf*cm, ft.*lbf) : Specified torque
● Non-reusable part
★ Precoated part
P
C113287E07

MX



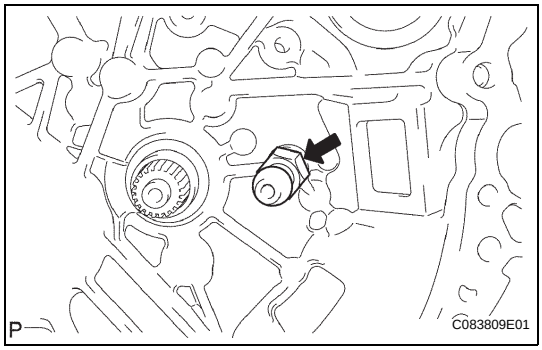
REMOVAL

1. REMOVE CLUTCH RELEASE FORK SUB-ASSEMBLY

(a) Remove the clutch release fork with the clutch release bearing from the transaxle case.

2. REMOVE CLUTCH RELEASE BEARING ASSEMBLY

(a) Remove the release bearing and clutch release bearing hub clip from the clutch release fork.



3. REMOVE CLUTCH RELEASE FORK SUPPORT

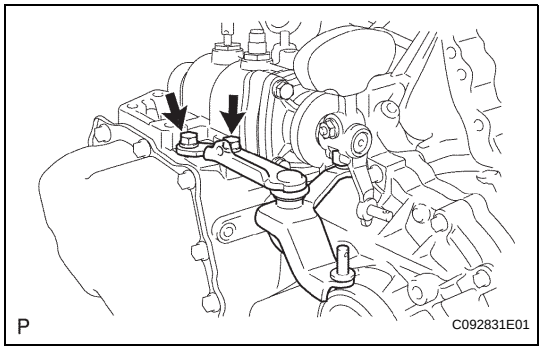
(a) Remove the clutch release fork support from the transaxle case.

4. REMOVE CLUTCH RELEASE FORK BOOT

(a) Remove the clutch release fork boot from the manual transaxle case.

5. REMOVE SPEEDOMETER DRIVEN HOLE COVER SUB-ASSEMBLY

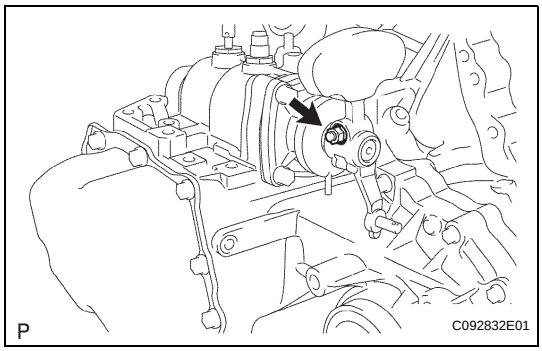
(a) Remove the bolt and hole cover.
(b) Remove the O-ring from the hole cover.



6. REMOVE SELECTING BELLCRANK ASSEMBLY

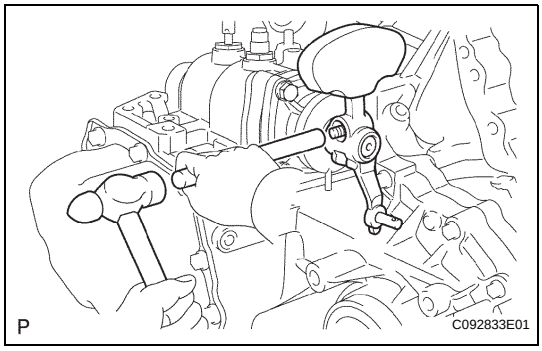
(a) Remove the 2 bolts and selecting bellcrank assembly from the transmission case.
(b) Remove the shift and select lever bush from the selecting bellcrank.

MX

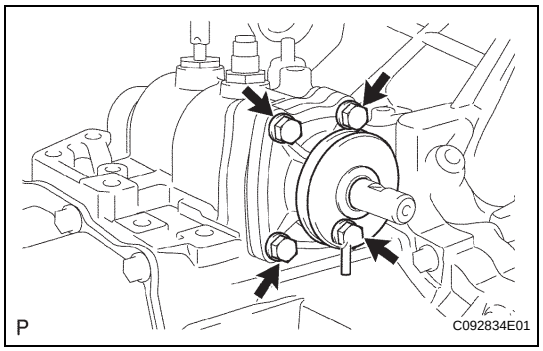


7. REMOVE CONTROL SHIFT LEVER

(a) Remove the nut and spring washer.

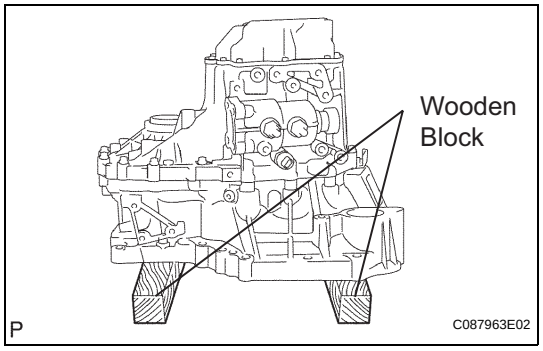


(b) Using a brass bar and hammer, remove the shift outer lever lever lock pin.
(c) Remove the control shift lever.



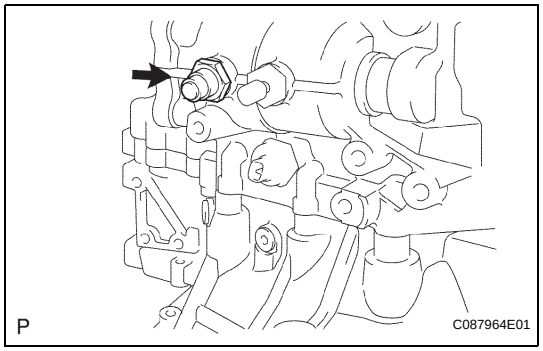
8. REMOVE CONTROL SHAFT COVER

(a) Remove the 4 bolts, control shift cover and gasket from the transmission case.



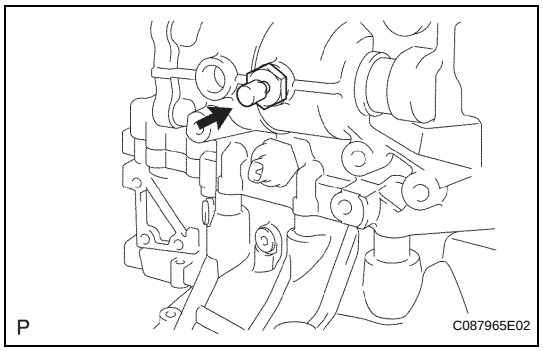
9. FIX MANUAL TRANSAXLE ASSEMBLY

(a) Place the transaxle on wooden blocks.



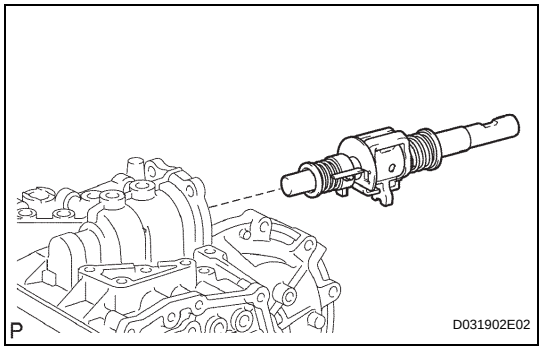
10. REMOVE NO. 1 LOCK BALL ASSEMBLY

(a) Remove the lock ball from the transmission case.



11. REMOVE MANUAL TRANSMISSION BREATHER PLUG

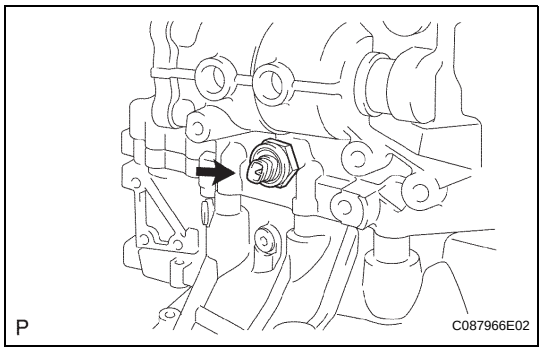
(a) Remove the breather plug and gasket.



12. REMOVE SHIFT AND SELECT LEVER SHAFT ASSEMBLY

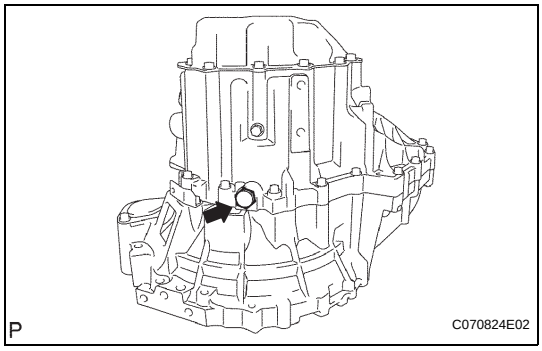
(a) Remove the shift and select lever shaft from the transmission case.

MX



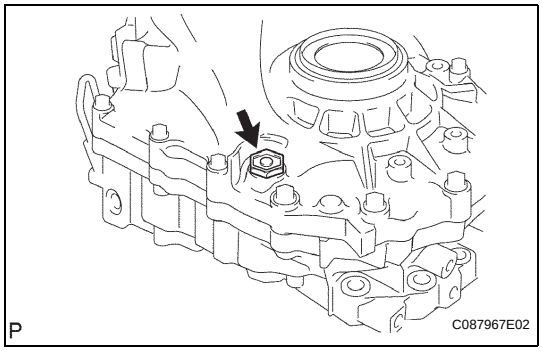
13. REMOVE BACK-UP LIGHT SWITCH ASSEMBLY

(a) Remove the back-up light switch and gasket from the transmission case.



14. REMOVE FILLER PLUG

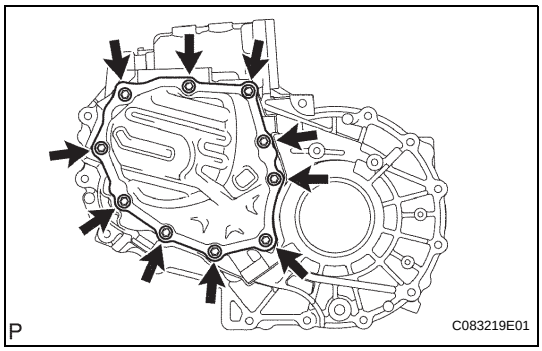
(a) Remove the filler plug and gasket from the transmission case.



15. REMOVE DRAIN PLUG SUB-ASSEMBLY

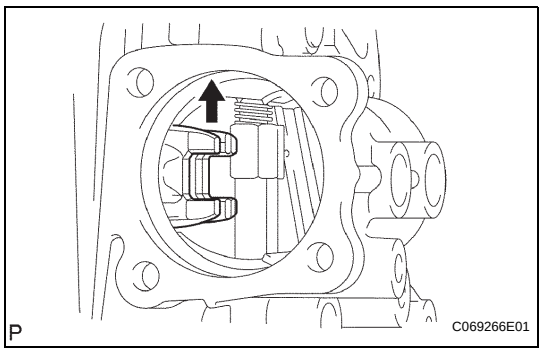
(a) Remove the drain plug and gasket from the transmission case.

MX



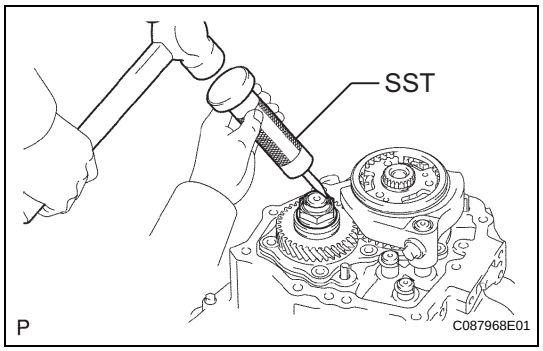
16. REMOVE MANUAL TRANSMISSION CASE COVER SUB-ASSEMBLY

(a) Remove the 10 bolts and transmission case cover from the transmission case.

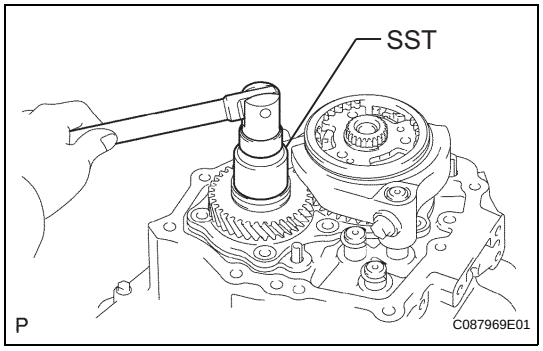


17. REMOVE REAR MANUAL TRANSMISSION OUTPUT SHAFT SET NUT

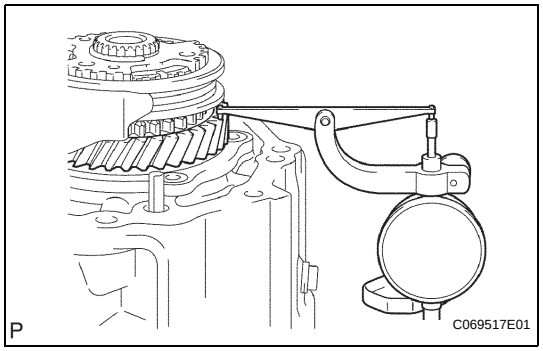
(a) Engage the 2 gears simultaneously to lock the transmission.



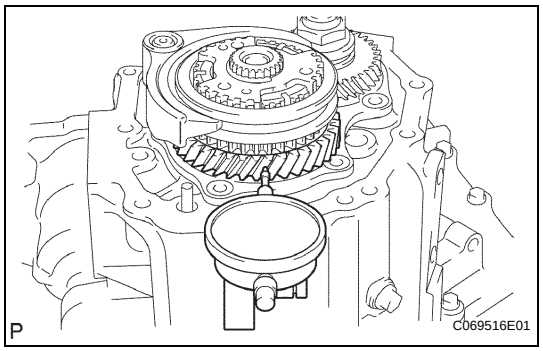
(b) Using SST and a hammer, unstake the rear set nut.
SST 09930-00010



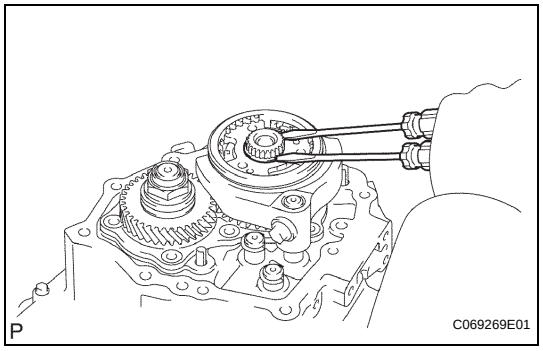
(c) Using SST, remove the shaft rear set nut from the output shaft.
SST 09229-55010
(d) Disengage the 2 gears.



18. INSPECT 5TH GEAR THRUST CLEARANCE
(a) Using a dial indicator, measure the thrust clearance.
Standard clearance:
0.10 to 0.65 mm (0.0039 to 0.0256 in.)
If the clearance is out of specification, replace the No. 3 transmission clutch hub, 5th gear or input shaft rear radial ball bearing.

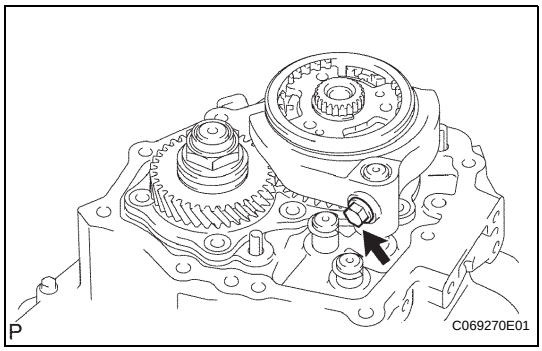


19. INSPECT 5TH GEAR RADIAL CLEARANCE
(a) Using a dial indicator, measure the radial clearance.
Standard clearance:
0.009 to 0.050 mm (0.0004 to 0.0020 in.)
If the clearance is out of specification, replace the 5th gear, 5th gear needle roller bearing or input shaft.

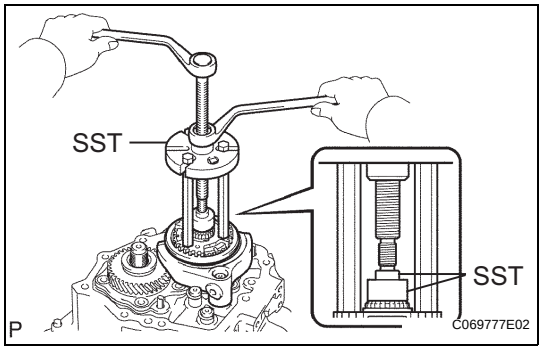


20. REMOVE NO. 3 TRANSMISSION CLUTCH HUB
(a) Using 2 screwdrivers and a hammer, remove the No. 3 transmission clutch hub shaft snap ring from the input shaft.
HINT:
Cover with a shop rag to keep the snap ring from flying off.

MX

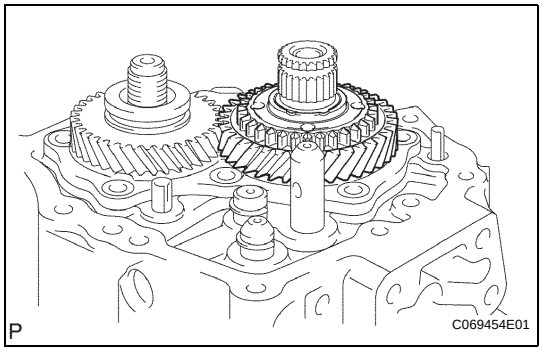


(b) Remove the shift fork set bolt from the No. 3 gear shift fork.



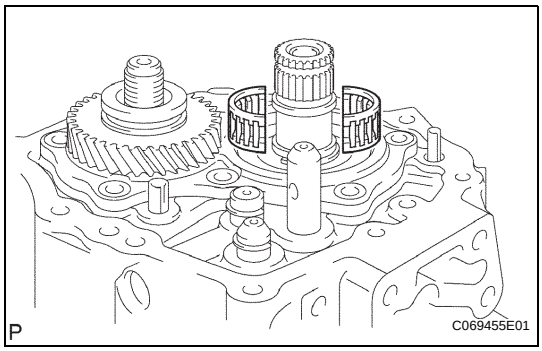
(c) Using SST, remove the No. 3 transmission clutch hub, No. 3 transmission hub sleeve and No. 3 gear shift fork from the input shift.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010), 09950-50013 (09957-04010), 09950-60010 (09951-00280)



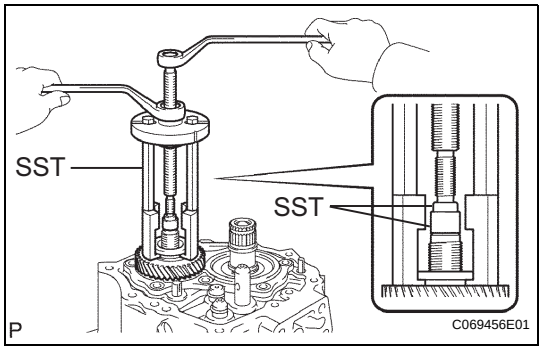
21. REMOVE 5TH GEAR

(a) Remove the 5th gear from the input shaft.



22. REMOVE 5TH GEAR NEEDLE ROLLER BEARING

(a) Remove the needle roller bearing from the input shaft.

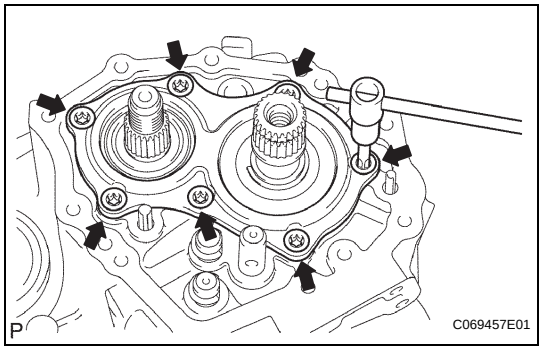


23. REMOVE 5TH DRIVEN GEAR

(a) Using SST, remove the 5th driven gear from the output shaft.

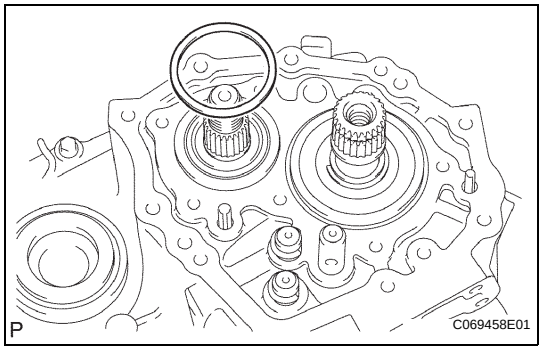
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09957-04010), 09950-60010 (09951-00180, 09955-03011), 09950-50013

MX



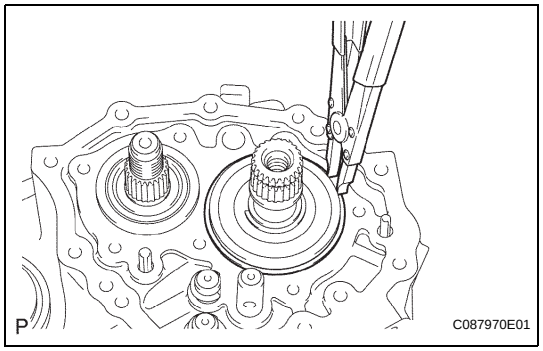
24. REMOVE REAR BEARING RETAINER

(a) Using a T45 "TORX" socket, remove the 7 "TORX" screws and bearing retainer from the transmission case.



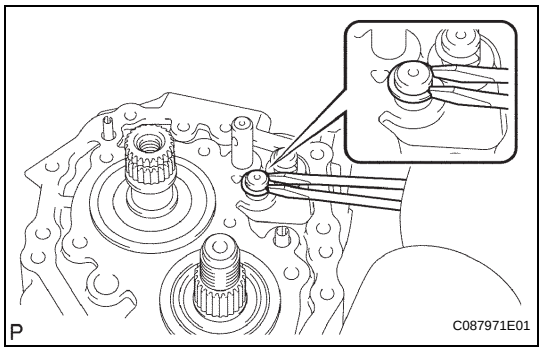
25. REMOVE OUTPUT SHAFT REAR BEARING SHIM

(a) Remove the rear bearing shim from the output shaft.



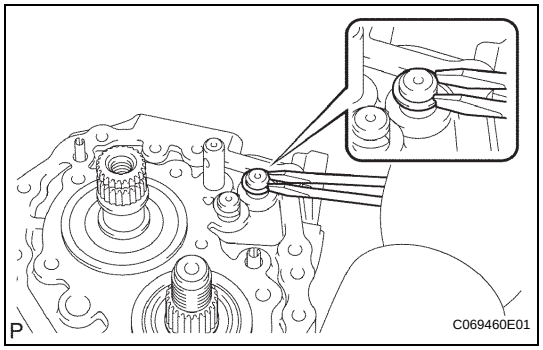
26. REMOVE INPUT SHAFT REAR BEARING SHAFT SNAP RING

(a) Using a snap ring expander, remove the shaft snap ring from the input shaft.



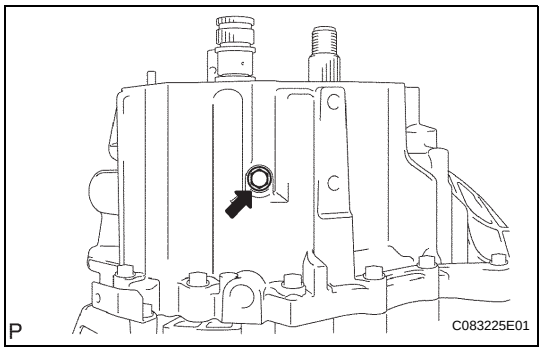
27. REMOVE SHIFT FORK SHAFT SHAFT SNAP RING

(a) Using 2 screwdrivers and a hammer, remove the shaft snap ring from the No. 1 gear shift fork shaft.
HINT:
Cover with a shop rag to keep the snap ring from flying off.



(b) Using 2 screwdrivers and a hammer, remove the shaft snap ring from the No. 2 gear shift fork shaft.
HINT:
Cover with a shop rag to keep the snap ring from flying off.

MX

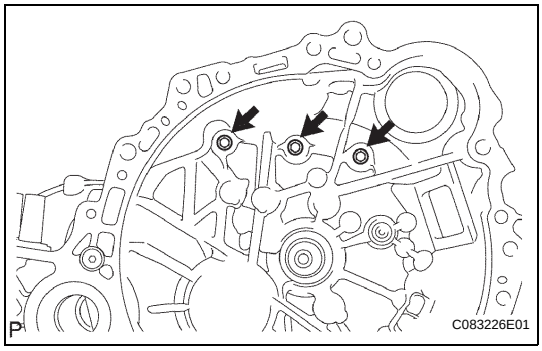


28. REMOVE REVERSE IDLER GEAR SHAFT BOLT

(a) Remove the reverse idler gear shaft bolt and gasket.

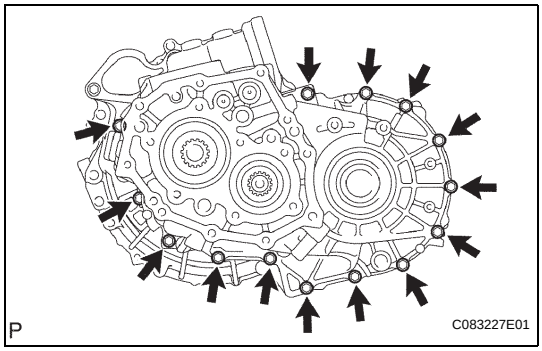
29. REMOVE CLUTCH TUBE BRACKET

(a) Remove the bolt and clutch tube bracket.



30. REMOVE MANUAL TRANSMISSION CASE

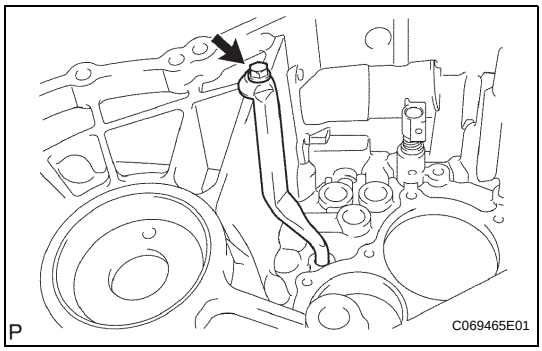
(a) Remove the 3 bolts from the transaxle case side.



(b) Remove the 14 bolts from the transmission case side.

(c) Tapping with a plastic-faced hammer, remove the transmission case.

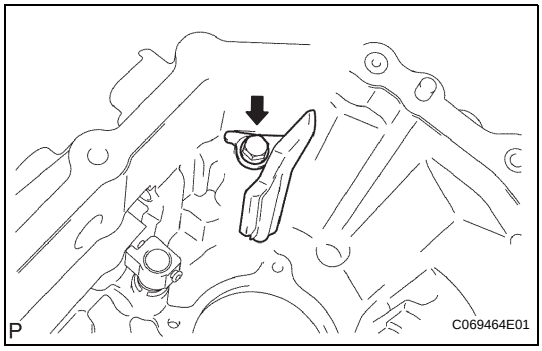
MX



31. REMOVE NO. 2 OIL RECEIVER PIPE

(a) Remove the bolt and No. 2 oil receiver pipe from the transmission case.

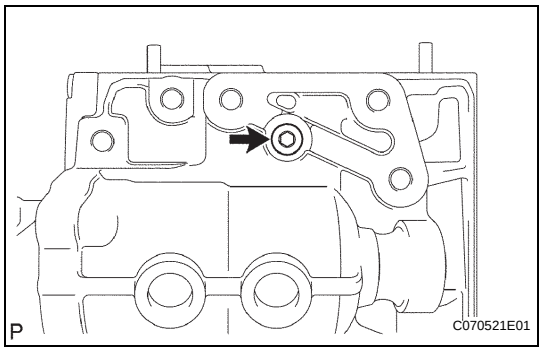
NOTICE:
Do not damage the pipe.



32. REMOVE NO. 1 OIL RECEIVER PIPE

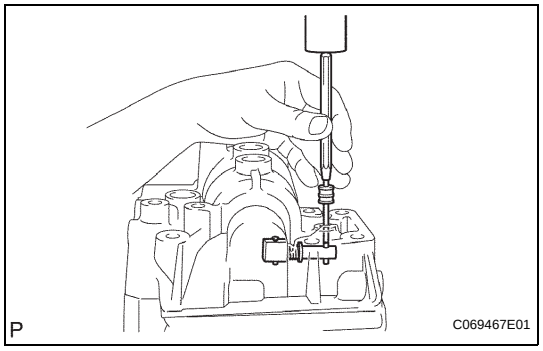
(a) Remove the bolt and oil receiver pipe from the transmission case.

NOTICE:
Do not damage the pipe.



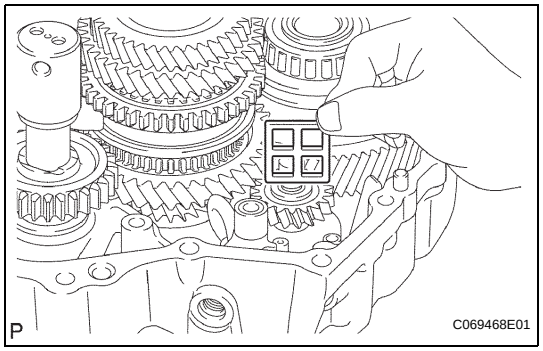
33. REMOVE REVERSE RESTRICT PIN ASSEMBLY

(a) Using a 6 mm hexagon wrench, remove the reverse restrict pin plug from the transmission case.



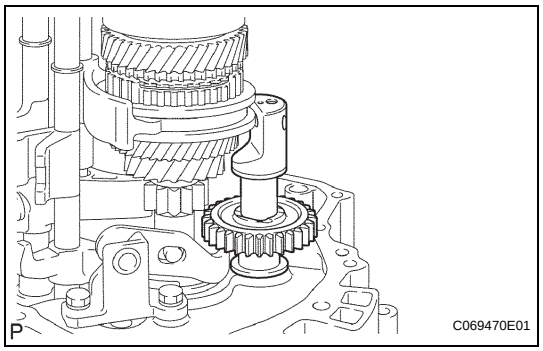
(b) Using a 5 mm pin punch, remove the slotted pin.

(c) Remove the reverse restrict pin.



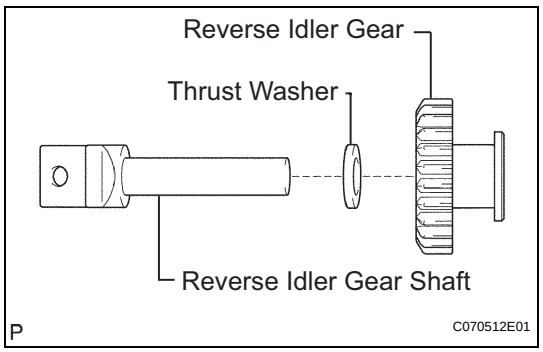
34. REMOVE TRANSMISSION MAGNET

(a) Remove the transmission magnet from the transaxle case.



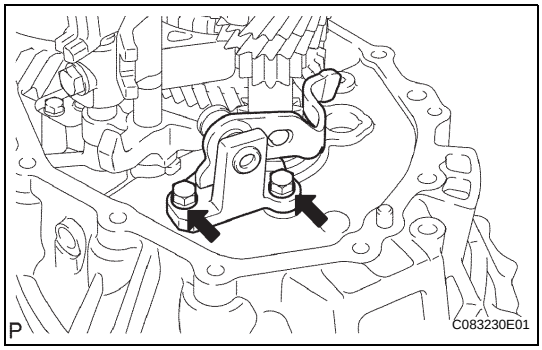
35. REMOVE REVERSE IDLER GEAR SUB-ASSEMBLY

(a) Remove the reverse idler gear with the reverse idler gear shaft from the transaxle case.



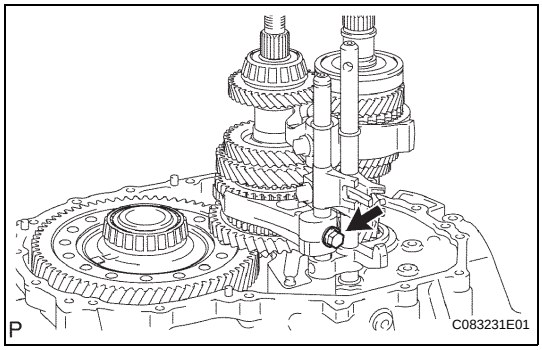
(b) Remove the reverse idler gear and reverse idler thrust washer from the gear shaft.

MX



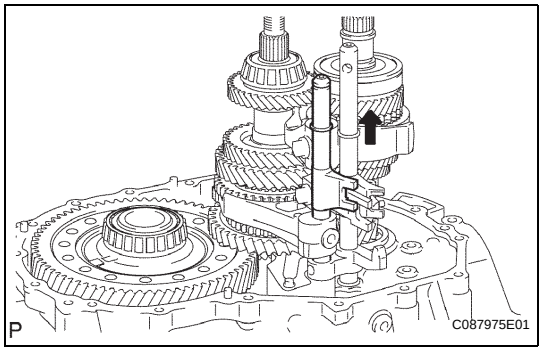
36. REMOVE REVERSE SHIFT ARM BRACKET ASSEMBLY

(a) Remove the 2 bolts and reverse shift arm bracket from the transaxle case.

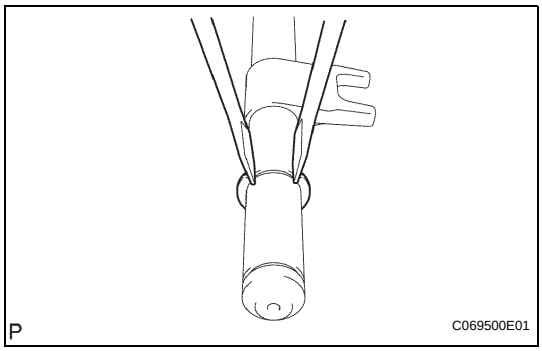


37. REMOVE NO. 1 GEAR SHIFT FORK SHAFT

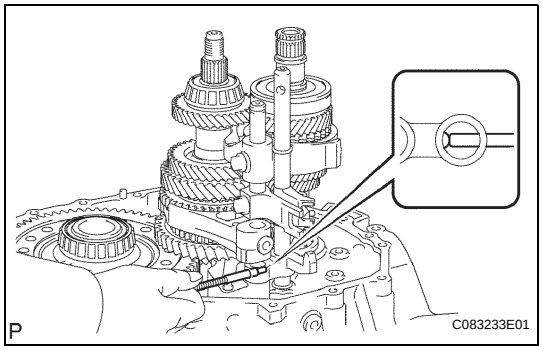
(a) Remove the shift fork set bolt from the No. 1 gear shift fork.



(b) Pull out the No. 1 gear shift fork shaft while the No. 3 gear shift fork shift is pulled up.



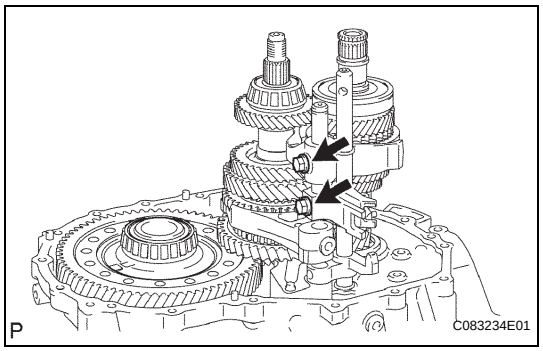
(c) Using 2 screwdrivers and a hammer, remove the shift fork shaft snap ring from the No. 1 gear shift fork shaft.
HINT:
Cover with a shop rag to keep the snap ring from flying off.



38. REMOVE REVERSE SHIFT FORK ROLLER

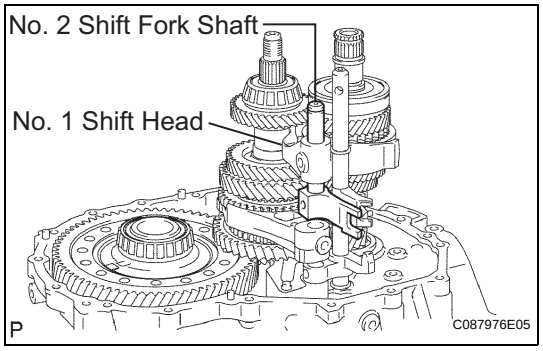
(a) Using a magnetic finger, remove the reverse shift fork roller from the reverse shift fork.

MX

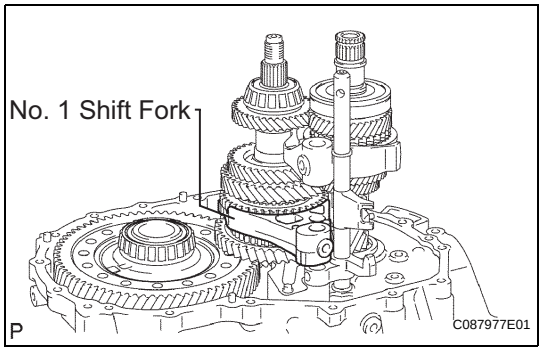


39. REMOVE NO. 2 GEAR SHIFT FORK SHAFT

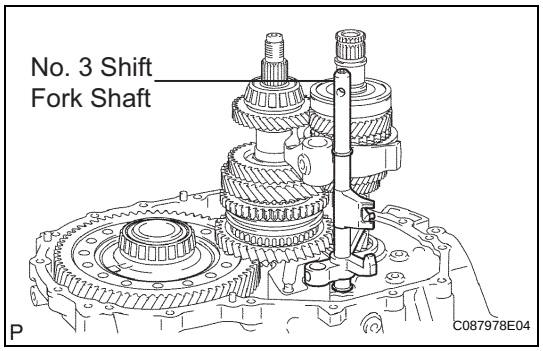
(a) Remove the shift fork set bolt and shift head set bolt from the No. 2 gear shift fork and No. 1 gear shift head.



(b) Remove the No. 2 gear shift fork shaft head and No. 1 gear shift head from the transaxle case.

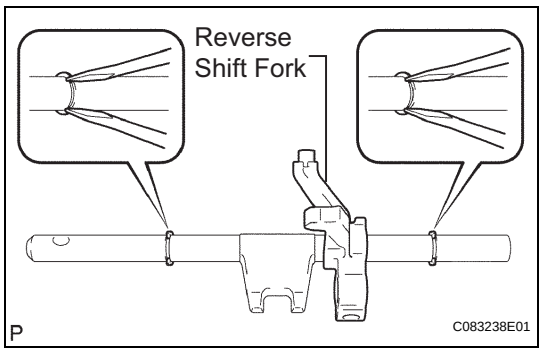


40. REMOVE NO. 1 GEAR SHIFT FORK



41. REMOVE NO. 3 GEAR SHIFT FORK SHAFT

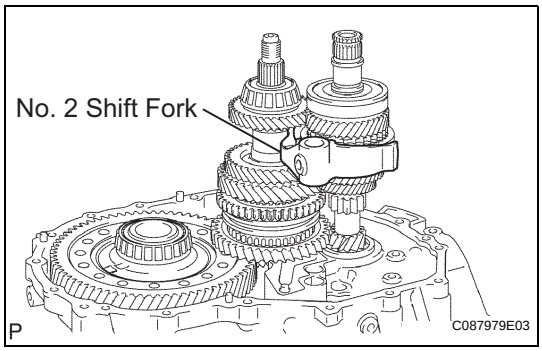
(a) Remove the No. 3 gear shift fork shaft from the transaxle case.



(b) Using 2 screwdrivers and a hammer, remove the 2 shift fork shaft snap rings from the No. 3 gear shift fork shaft.
HINT:
Cover with a shop rag to keep the snap ring from flying off.

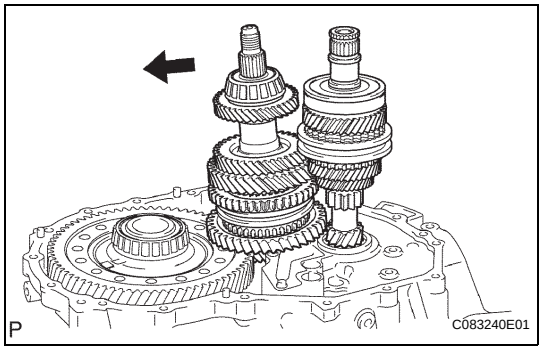
(c) Remove the reverse shift fork from the No. 3 gear shift fork shaft.

MX



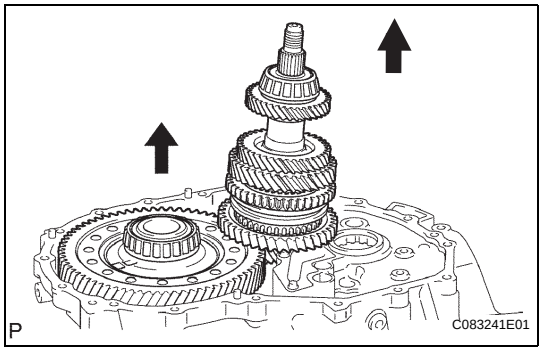
42. REMOVE NO. 2 GEAR SHIFT FORK

(a) Remove the No. 2 gear shift fork from the input shaft.



43. REMOVE INPUT SHAFT ASSEMBLY

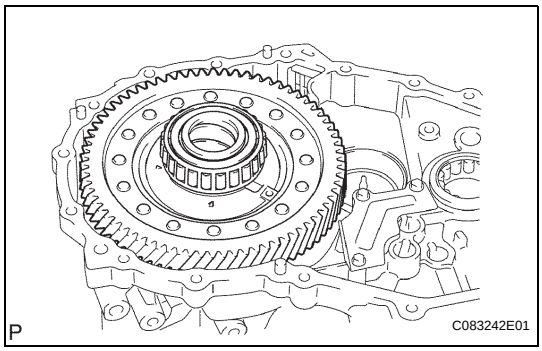
(a) Tilt the output shaft, then remove the input shaft from the transaxle case.



44. REMOVE OUTPUT SHAFT ASSEMBLY

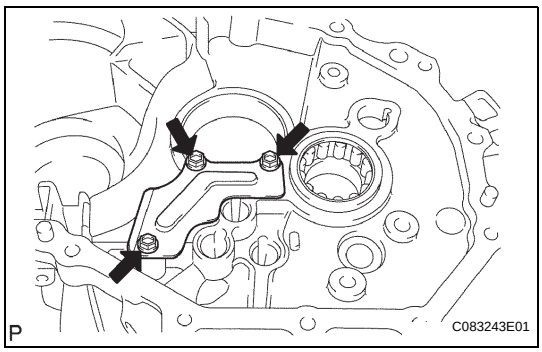
(a) Slightly lift up on the differential case with the output shaft at an angle.

(b) Remove the output shaft from the transaxle case.



45. REMOVE DIFFERENTIAL CASE ASSEMBLY

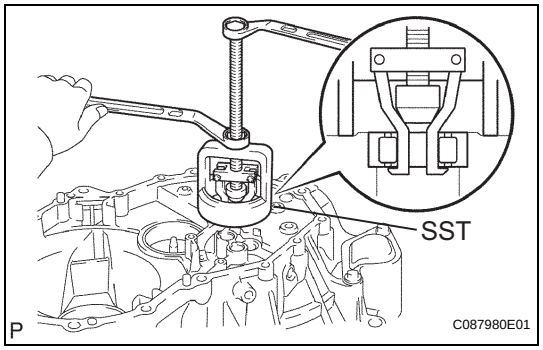
(a) Remove the differential case from the transaxle case.



46. REMOVE MANUAL TRANSAXLE CASE RECEIVER

(a) Remove the 3 bolts and transaxle case receiver from the transaxle case.

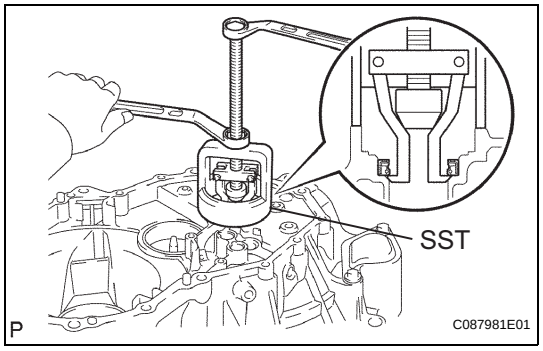
MX



47. REMOVE INPUT SHAFT FRONT BEARING

(a) Using SST, remove the input shaft front bearing (outer race) from the transaxle case.

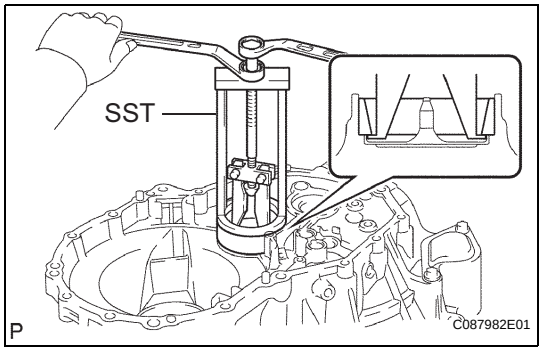
SST 09612-65014 (09612-01040, 09612-01050)



48. REMOVE FRONT TRANSAXLE CASE OIL SEAL

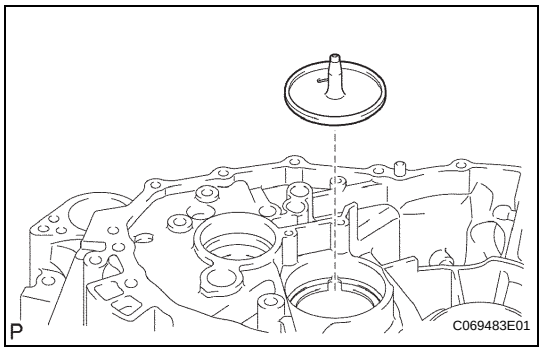
(a) Using SST, remove the oil seal from the transaxle case.

SST 09612-65014 (09612-01040, 09612-01050)



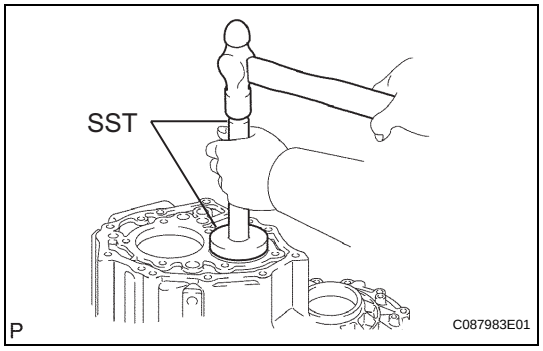
49. REMOVE FRONT OUTPUT SHAFT BEARING

(a) Using SST, remove the front bearing (outer race) from the transaxle case.



50. REMOVE OUTPUT SHAFT COVER

(a) Remove the output shaft cover from the transaxle case.

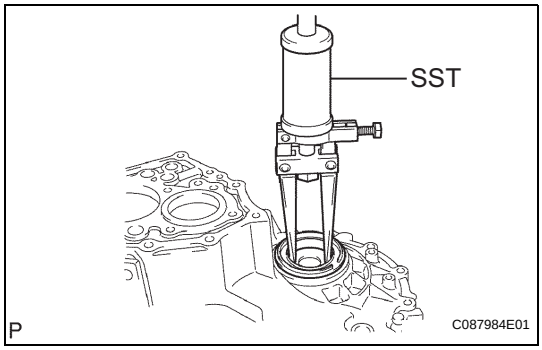


51. REMOVE REAR OUTPUT SHAFT BEARING

(a) Using SST, tap out the rear bearing from the transmission case (outer race).

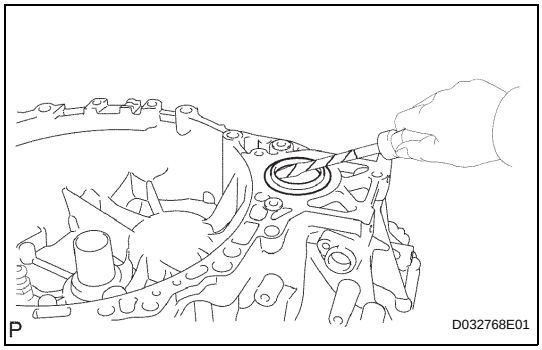
SST 09950-60010 (09951-00680), 09950-70010 (09951-07100)

MX



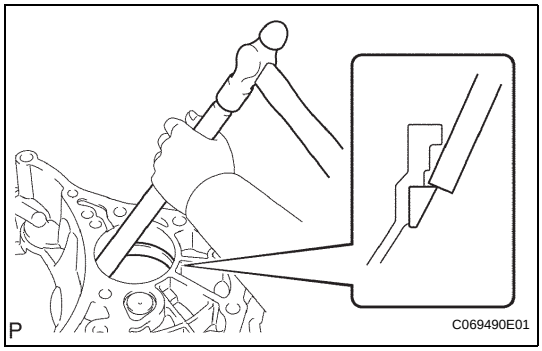
52. REMOVE TRANSMISSION CASE OIL SEAL

(a) Using SST, tap out the oil seal from the transmission case.
SST 09308-00010



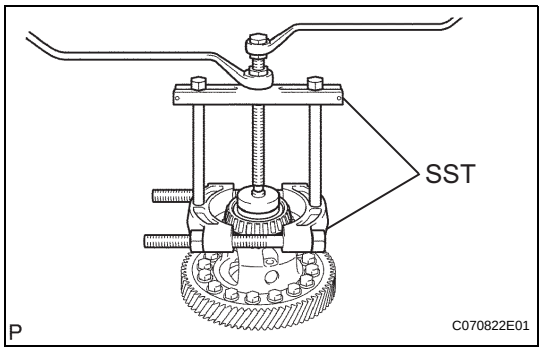
53. REMOVE FRONT TRANSAXLE CASE COVER OIL SEAL

(a) Using a screwdriver, pry out the cover oil seal.
HINT:
Tape the screwdriver tip before use to avoid damage.

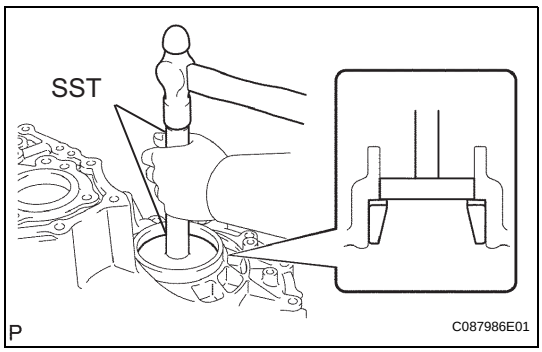


54. REMOVE FRONT DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

(a) Using a brass bar and hammer, tap out the front tapered roller bearing (outer race) from the transaxle case.



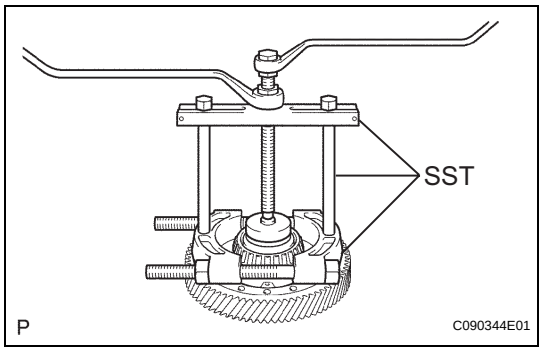
(b) Using SST, remove the case front tapered roller bearing from the front differential case.
SST 09950-00020, 09950-00030, 09950-40011 (09957-04010), 09950-60010 (09951-00560)



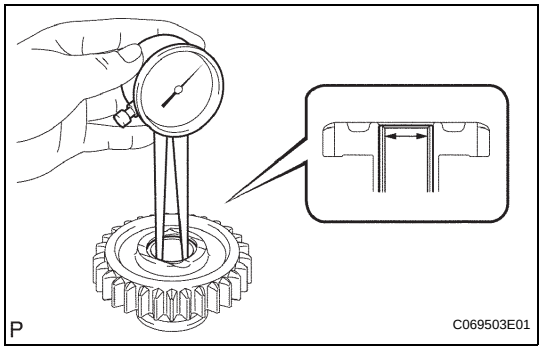
55. REMOVE FRONT DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

(a) Using SST and a hammer, tap out the rear tapered roller bearing (outer race) and rear shim from the transmission case.
SST 09950-60020 (09951-00790), 09950-70010 (09951-07100)

MX



(b) Using SST, remove the rear tapered roller bearing (inner race) from the front differential case.
SST 09950-00020, 09950-00030, 09950-40011 (09957-04010), 09950-60010 (09951-00490)

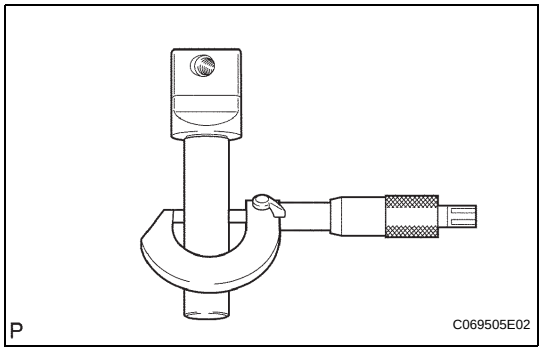


56. INSPECT REVERSE IDLER GEAR SUB-ASSEMBLY

(a) Using a caliper gauge, measure the inside diameter of the reverse idler gear.
Standard inside diameter

Standard Inside Diameter	Maximum Inside Diameter
20.056 to 20.074 mm (0.7896 to 0.7903 in.)	20.074 mm (0.7903 in.)

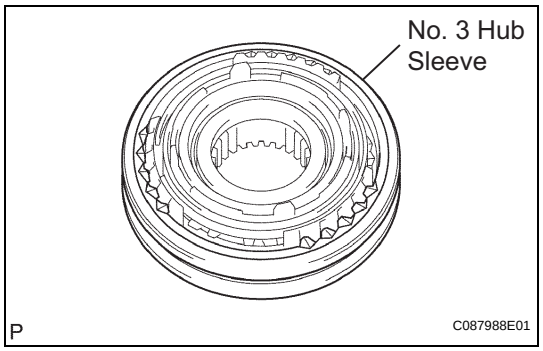
If the inside diameter is greater than the maximum, replace the reverse idler gear.



(b) Using a micrometer, measure the outside diameter of the reverse idler gear shaft.
Standard outside diameter

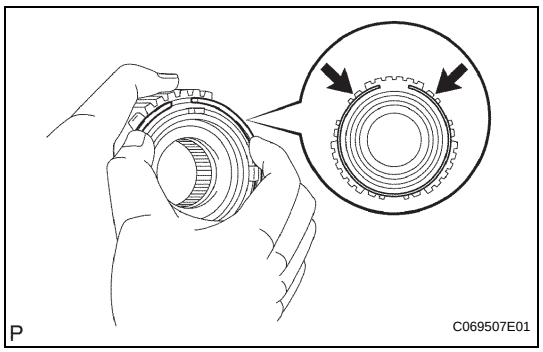
Standard Outside Diameter	Minimum Outside Diameter
19.984 to 20.000 mm (0.7868 to 0.7874 in.)	19.984 mm (0.7868 in.)

If the outside diameter is less than the minimum, replace the reverse idler gear shaft.



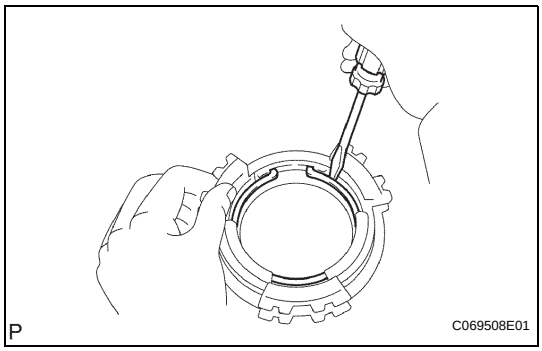
57. REMOVE NO. 3 TRANSMISSION HUB SLEEVE

(a) Remove the No. 3 transmission hub sleeve from the No. 3 transmission clutch hub.



58. REMOVE NO. 3 SYNCHROMESH SHIFTING KEY SPRING

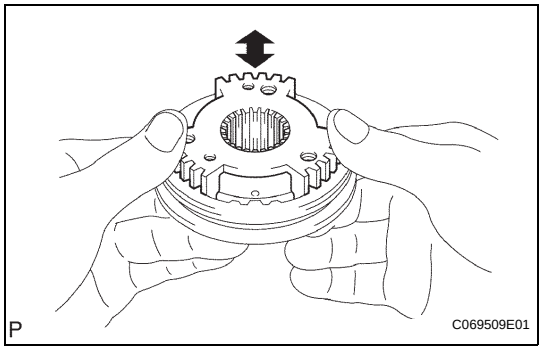
(a) Remove the 2 No. 3 synchromesh shifting key springs and synchronizer ring set from the No. 3 transmission clutch hub while pushing on the No. 3 synchromesh shifting key spring.



59. REMOVE SYNCHRONIZER PULL RING

(a) Using a screwdriver, remove the synchronizer pull ring snap ring.

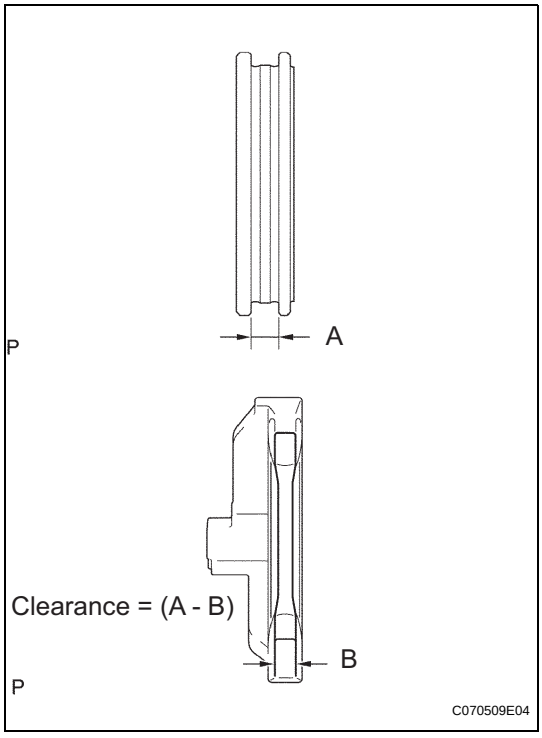
(b) Remove the synchronizer pull ring, No. 5 synchronizer ring outer, No. 5 synchronizer ring inner and No. 5 synchronizer ring middle.



60. INSPECT NO. 3 TRANSMISSION CLUTCH HUB

(a) Inspect the sliding condition between the No. 3 transmission clutch hub and the No. 3 transmission hub sleeve.

(b) Inspect the tip of the spline gear on the No. 3 transmission hub sleeve for wear.



61. INSPECT NO. 3 TRANSMISSION HUB SLEEVE

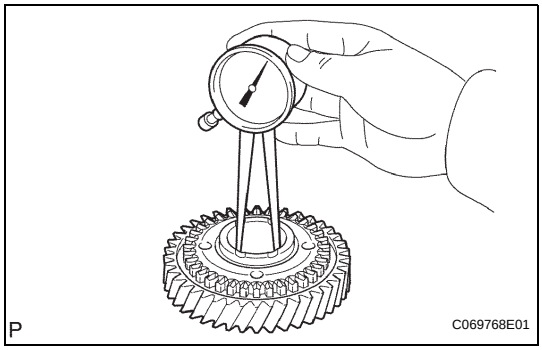
(a) Using vernier calipers, measure the width of the No. 3 transmission hub sleeve groove (A) and the thickness of the claw part on the No. 3 gear shift fork (B), and calculate the clearance.

Standard clearance:

A - B = 0.15 to 0.35 mm (0.0059 to 0.0138 in.)

If the clearance is out of specification, replace the No. 3 transmission hub sleeve and No. 3 gear shift fork with new ones.

MX



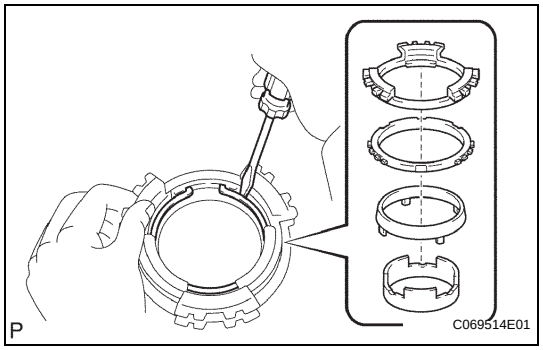
62. INSPECT 5TH GEAR

(a) Using a caliper gauge, measure the inside diameter of the 5th gear.

Standard inside diameter

Standard Inside Diameter	Maximum Inside Diameter
34.981 to 34.997 mm (1.3772 to 1.3778 in.)	34.997 mm (1.3778 in.)

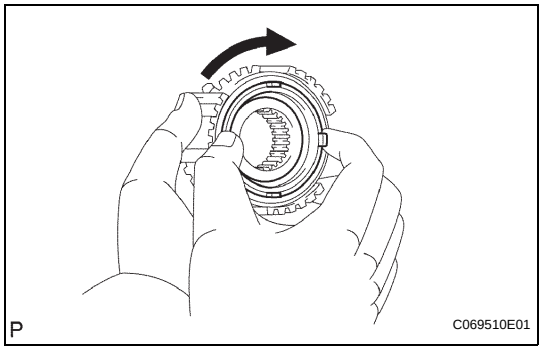
If the inside diameter is greater the maximum, replace the 5th gear.



INSTALLATION

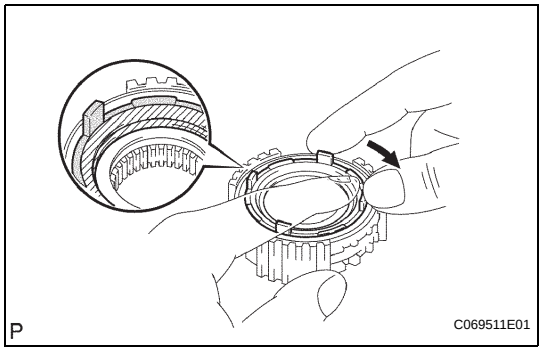
1. INSTALL SYNCHRONIZER PULL RING

(a) Install the No. 5 synchronizer ring middle, No. 5 synchronizer ring outer and synchronizer pull ring to the No. 5 synchronizer ring inner. Using a screwdriver, fix them in place with the synchronizer pull ring snap ring.

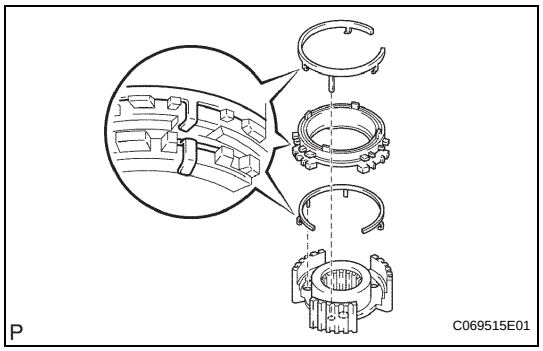


2. INSTALL NO. 5 SYNCHRONIZER RING MIDDLE

(a) Check that the No. 5 synchronizer ring middle rotates smoothly.



(b) Check that the No. 5 synchronizer ring middle does not rotate while being pushed against the No. 3 clutch hub.

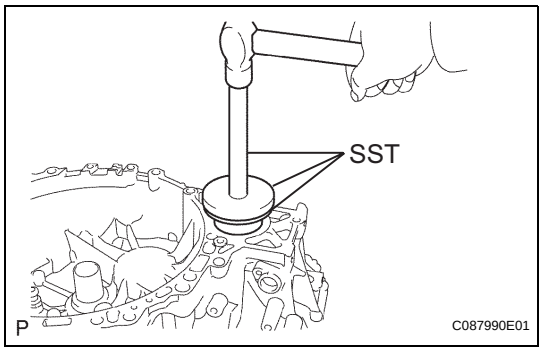


3. INSTALL NO. 3 SYNCHROMESH SHIFTING KEY SPRING

(a) Install the No. 3 synchromesh shifting key spring to the No. 3 transmission clutch hub.
NOTICE:
Align the projection of the shifting key spring with the hole of the No. 3 clutch hub and install it.

(b) Install the synchronizer ring set and No. 3 synchromesh shifting key spring to the No. 3 transmission clutch hub.
NOTICE:
- **Engage the shifting key spring claw to the center of the teeth of the synchronizer ring.**
- **Align the projection of the shifting key spring with the hole of the No. 3 clutch hub and install it.**

MX



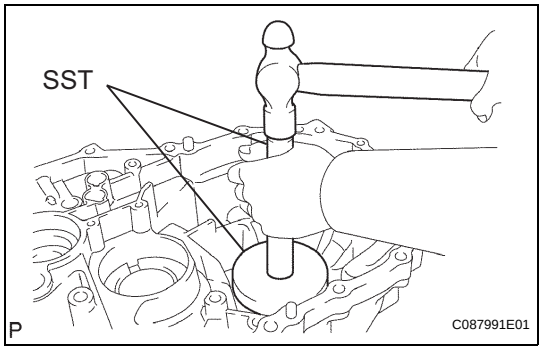
4. INSTALL FRONT TRANSAXLE CASE COVER OIL SEAL

(a) Using SST and a hammer, install a new front transaxle case cover oil seal.

SST 09316-20011, 09950-60020 (09951-00910), 09950-70010 (09951-07150)

Standard depth:
-0.5 to 0.5 mm (-0.020 to 0.020 in.)

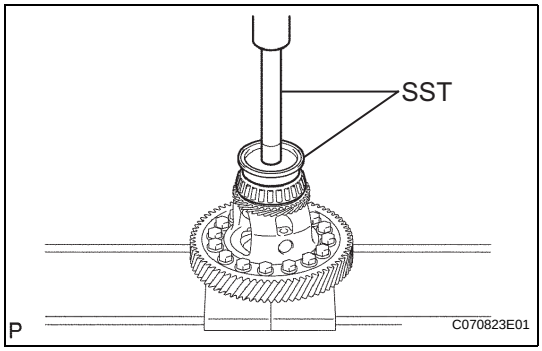
(b) Coat the lip of the oil seal with MP grease.



5. INSTALL FRONT DIFFERENTIAL CASE FRONT TAPERED ROLLER BEARING

(a) Using SST and a hammer, tap in the front tapered roller bearing (outer race) to the front transaxle case.

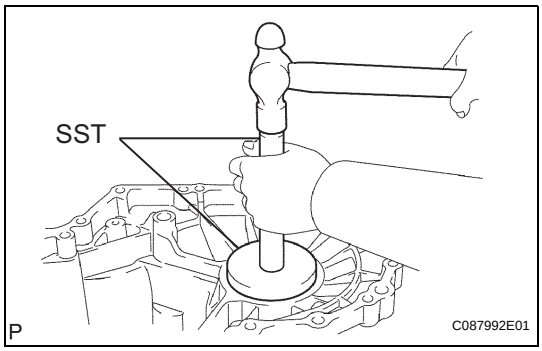
SST 09950-60020 (09951-00910), 09950-70010 (09951-07100, 09951-07150)



(b) Using SST and a press, press in the front tapered roller bearing (inner race) to the front differential case.

SST 09950-70010 (09951-07100, 09951-07150), 09608-10010

MX

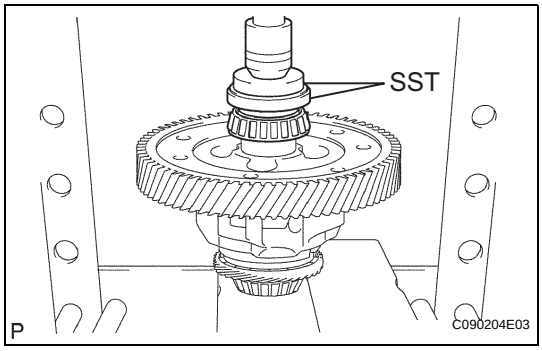


6. INSTALL FRONT DIFFERENTIAL CASE REAR TAPERED ROLLER BEARING

(a) Install the rear shim.

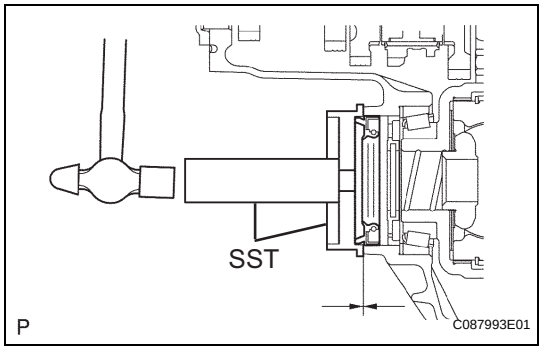
(b) Using SST and a hammer, tap in the rear tapered roller bearing (outer race).

SST 09950-60020 (09951-00890), 09950-70010 (09951-07100)



(c) Using SST and a press, press in the rear tapered roller bearing (inner race).

SST 09631-12090, 09950-60010 (09951-00600), 09950-70010 (09951-07100)



7. INSTALL TRANSMISSION CASE OIL SEAL

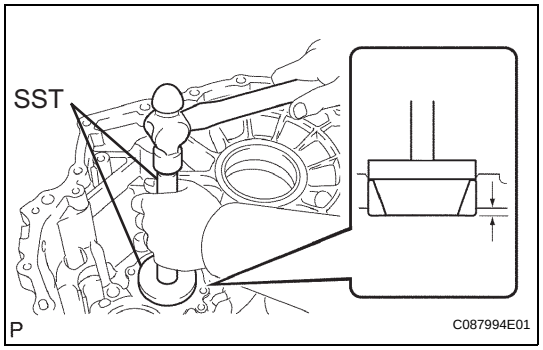
(a) Using SST and a hammer, tap in a new oil seal to the transmission case.

SST 09608-32010, 09950-70010 (09951-07150)

Standard depth:

3.0 to 4.0 mm (0.118 to 0.158 in.)

(b) Coat the oil seal lip with MP grease.



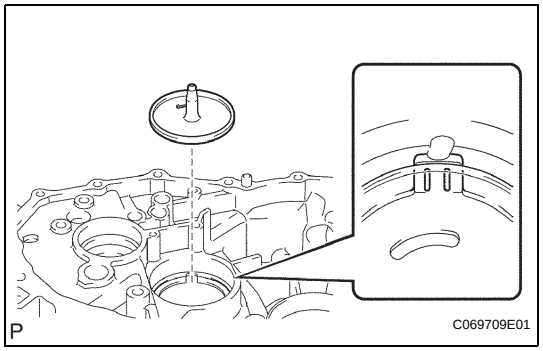
8. INSTALL REAR OUTPUT SHAFT BEARING

(a) Using SST and a hammer, tap in the rear bearing (outer race) to the transmission case.

SST 09950-60020 (09951-00680), 09950-70010 (09951-07100)

Standard clearance:

3.8 to 4.4 mm (0.150 to 0.173 in.)

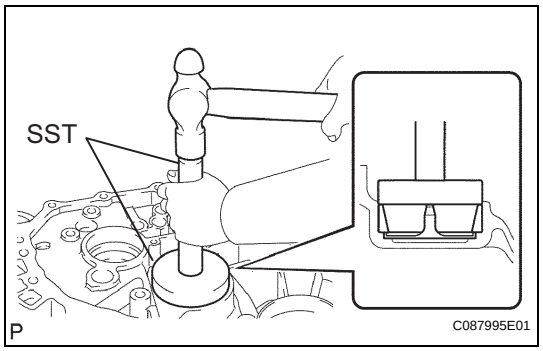


9. INSTALL OUTPUT SHAFT COVER

(a) Coat the shaft cover with MP grease, and install it to the transaxle case.

NOTICE:

Align the projection of the output shaft with the transaxle groove and install it.

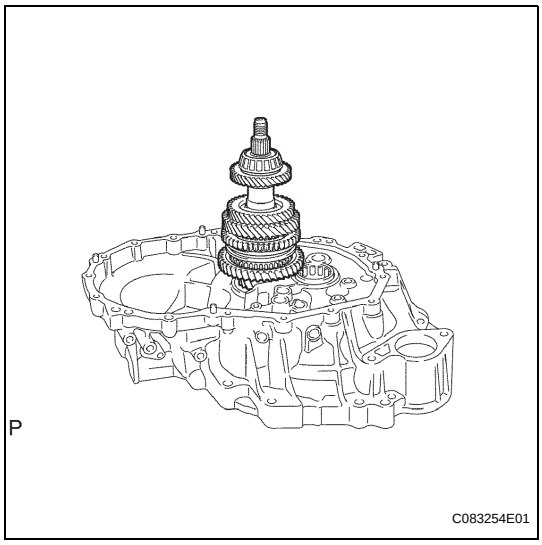


10. INSTALL FRONT OUTPUT SHAFT BEARING

(a) Using SST and a hammer, tap in the front bearing (outer race).

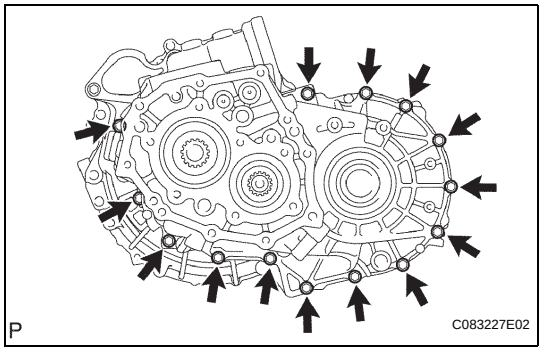
SST 09950-60020 (09951-00730), 09950-70010 (09951-07100)

MX

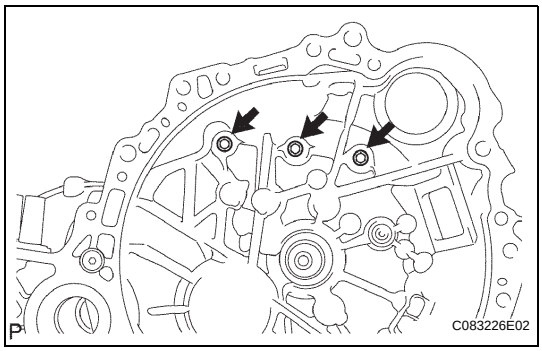


11. ADJUST OUTPUT SHAFT BEARING PRELOAD

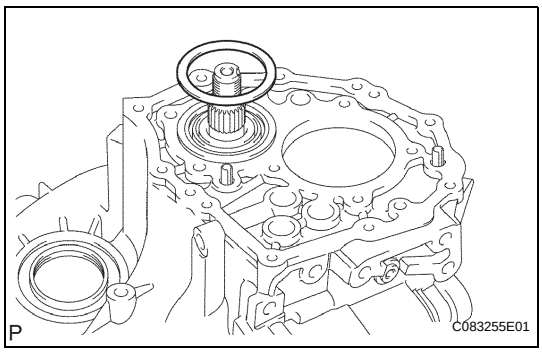
(a) Install the output shaft to the transaxle case.



(b) Install the transmission case to the transaxle case with the 14 bolts.
Torque: 29 N*m (296 kgf*cm, 21 ft.*lbf)

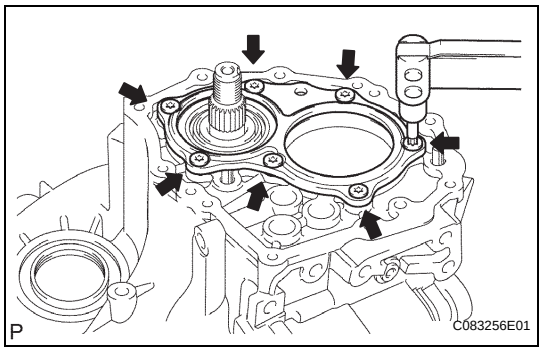


(c) Install the 3 bolts on the transaxle side.
Torque: 29 N*m (296 kgf*cm, 21 ft.*lbf)

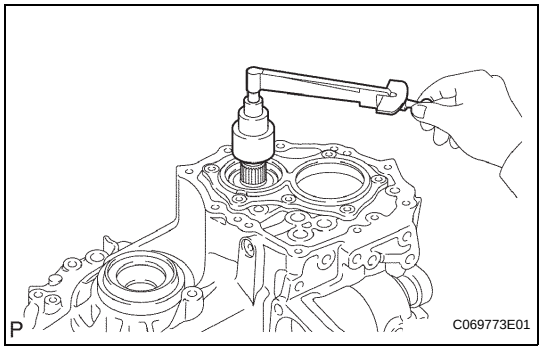


(d) Install the output shaft rear bearing shim to the output shaft.

MX



(e) Using a T45 "TORX" socket, install the rear bearing retainer with the 7 "TORX" screws to the transmission case.
Torque: 43 N*m (438 kgf*cm, 32 ft.*lbf)



(f) Turn the output shaft in both directions to make sure that it starts to turn smoothly.
(g) Temporarily install the output shaft rear set nut.
(h) Using a socket wrench and torque wrench, inspect the preload.
Standard preload

Bearing	Torque
New	0.8 to 1.6 N*m (8.16 to 16.32 kgf*cm 7.1 to 14.2 in.lbf)
Used	0.5 to 1.0 N*m (5.10 to 10.20 kgf*cm 4.4 to 8.9 in.lbf)

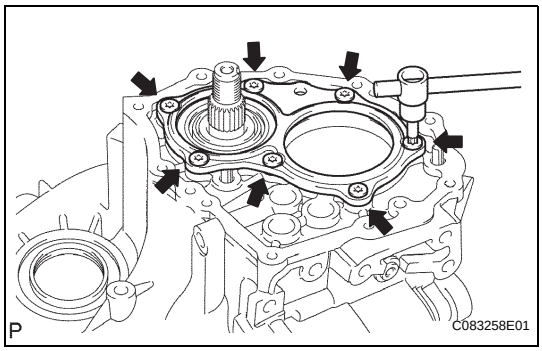
(i) If preload is out of specification, select a proper output shaft rear bearing shim and adjust it.
HINT:
The preload of all the output shaft rear bearing shims varies in torque from about 0.04 to 0.06 N*m (0.408 to 0.612 kgf*cm, 0.354 to 0.531 in.*lbf)
Standard shim thickness

Part No	Mark	Thickness
90564-59001	0	1.30 mm (0.0512 in.)
90564-59002	1	1.35 mm (0.0531 in.)
90564-59003	2	1.40 mm (0.0551 in.)
90564-59004	3	1.45 mm (0.0571 in.)
90564-59005	4	1.50 mm (0.0591 in.)
90564-59006	5	1.55 mm (0.0610 in.)
90564-59007	6	1.60 mm (0.0630 in.)
90564-59008	7	1.65 mm (0.0650 in.)
90564-59009	8	1.70 mm (0.0669 in.)
90564-59010	9	1.75 mm (0.0689 in.)
90564-59011	A	1.80 mm (0.0709 in.)
90564-59012	B	1.85 mm (0.0728 in.)
90564-59013	C	1.90 mm (0.0748 in.)
90564-59014	D	1.95 mm (0.0768 in.)
90564-59015	E	2.00 mm (0.0787 in.)
90564-59016	F	2.05 mm (0.0807 in.)
90564-59017	G	2.10 mm (0.0827 in.)
90564-59018	H	2.15 mm (0.0846 in.)
90564-59019	J	2.20 mm (0.0866 in.)
90564-59020	K	2.25 mm (0.0886 in.)
90564-59021	L	2.30 mm (0.0906 in.)
90564-59022	M	2.35 mm (0.0925 in.)

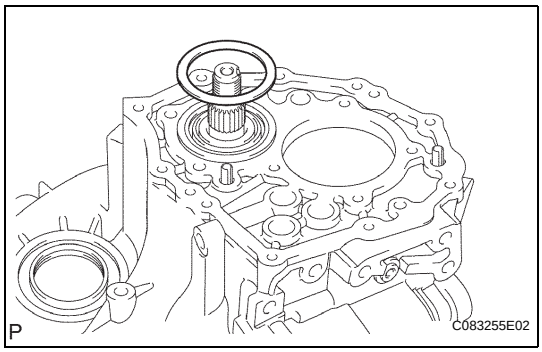
Part No	Mark	Thickness
90564-59023	N	2.40 mm (0.0945 in.)
90564-59024	O	2.45 mm (0.0965 in.)
90564-59025	P	2.50 mm (0.0984 in.)

(j) Remove the output shaft rear set nut from the output shaft.

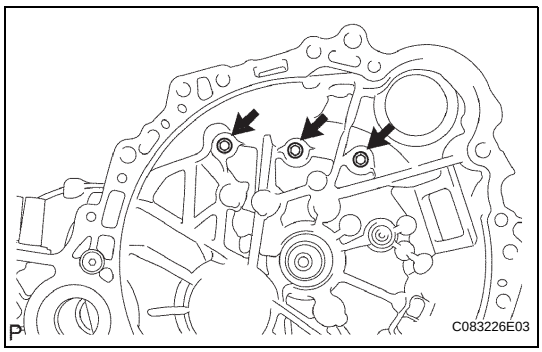
(k) Using a T45 "TORX" socket, remove the 7 "TORX" screws and rear bearing retainer from the manual transmission case.



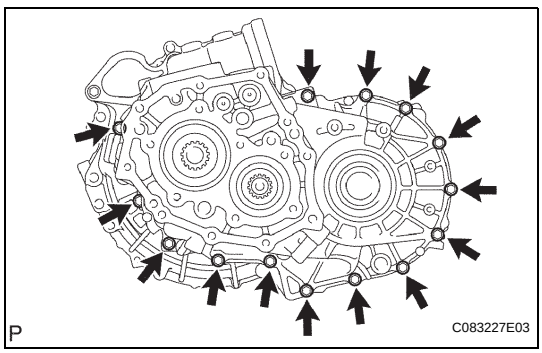
(l) Remove the output shaft rear bearing shim from the output shaft.



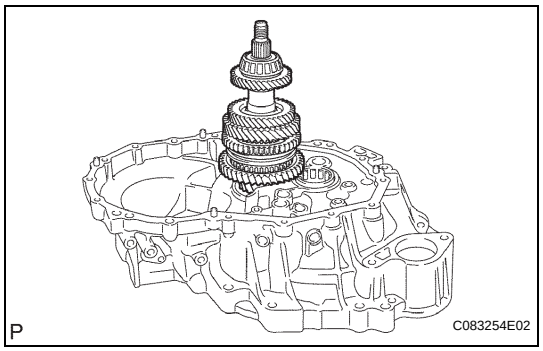
(m) Remove the 3 bolts.



(n) Remove the 14 bolts and transmission case from the transaxle case.



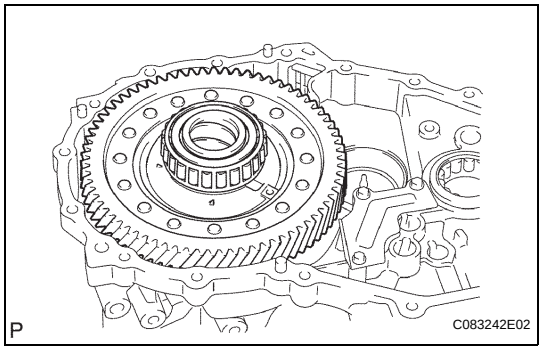
MX



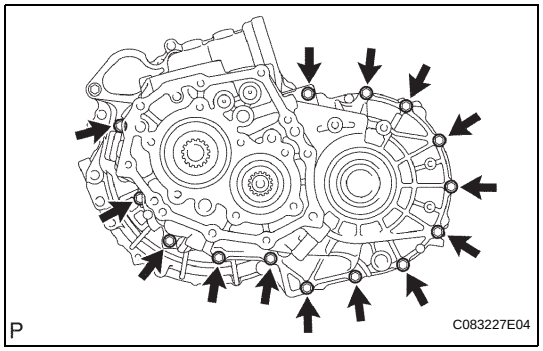
(o) Remove the output shaft assembly from the front transaxle case.

12. ADJUST TAPERED ROLLER BEARING PRELOAD

(a) Install the differential case assembly to the transaxle case.

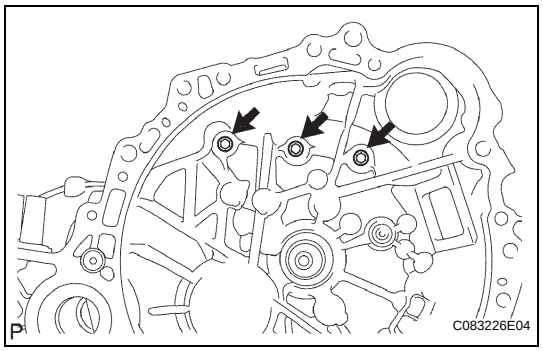


(b) Install the 14 bolts and transmission case to the transaxle case.
Torque: 29 N*m (296 kgf*cm, 21 ft.*lbf)

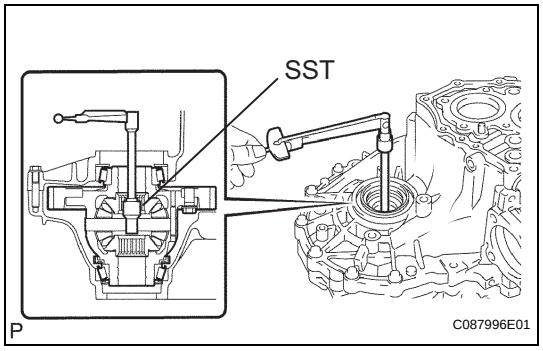


(c) Install the 3 bolts on the front transaxle case side.
Torque: 29 N*m (296 kgf*cm, 21 ft.*lbf)

(d) Turn the differential case in both directions to make sure that it starts to turn smoothly.



(e) Using SST and a torque wrench, measure the preload.
Standard preload



Bearing	Torque
New	0.8 to 1.6 N*m (8.16 to 16.32 kgf*cm, 7.1 to 14.2 in.*lbf)
Used	0.5 to 1.0 N*m (5.10 to 10.2 kgf*cm, 4.4 to 8.9 in.*lbf)

If the preload is out of specification, select a proper front differential case rear shim and adjust it.

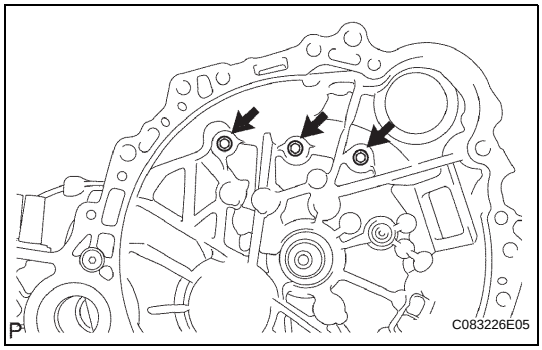
MX

HINT:
The preload of all the front differential case rear shims varies in torque from about 0.04 to 0.06 N*m (0.408 to 0.612 kgf*cm, 0.354 to 0.531 in.*lbf).

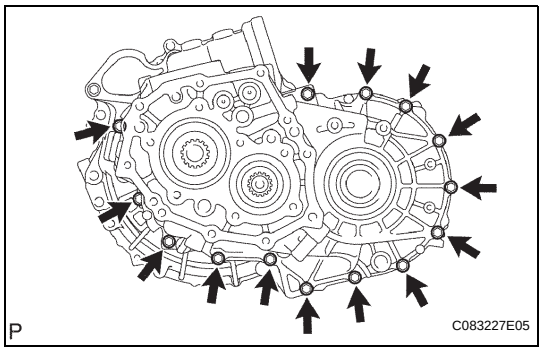
Standard shim thickness

Part No.	Mark	Thickness
90564-56055	0	2.00 mm (0.0787 in.)
90564-56056	1	2.05 mm (0.0807 in.)
90564-56057	2	2.10 mm (0.0827 in.)
90564-56058	3	2.15 mm (0.0846 in.)
90564-56059	4	2.20 mm (0.0866 in.)
90564-56060	5	2.25 mm (0.0886 in.)
90564-56061	6	2.30 mm (0.0906 in.)
90564-56062	7	2.35 mm (0.0925 in.)
90564-56063	8	2.40 mm (0.0945 in.)
90564-56064	9	2.45 mm (0.0965 in.)
90564-56065	A	2.50 mm (0.0984 in.)
90564-56066	B	2.55 mm (0.1004 in.)
90564-56067	C	2.60 mm (0.1024 in.)
90564-56068	D	2.65 mm (0.1043 in.)
90564-56069	E	2.70 mm (0.1063 in.)
90564-56070	F	2.75 mm (0.1083 in.)
90564-56071	G	2.80 mm (0.1102 in.)
90564-56072	H	2.85 mm (0.1122 in.)

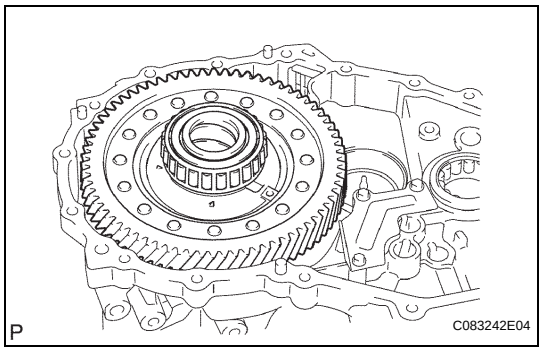
(f) Remove the 3 bolts.



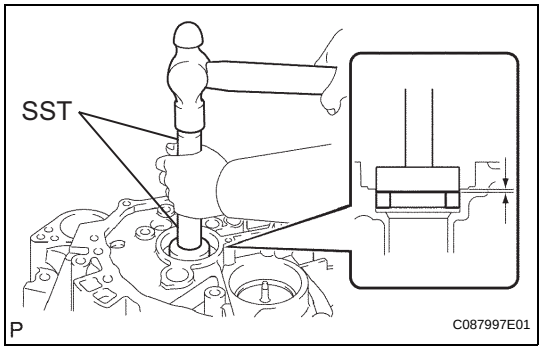
(g) Remove the 14 bolts and transmission case from the transaxle case.



MX



(h) Remove the differential case assembly from the transaxle case.



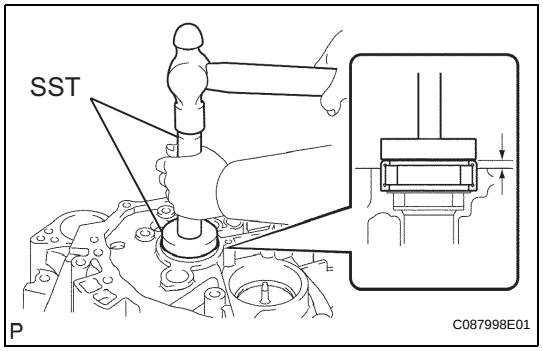
13. INSTALL FRONT TRANSAXLE CASE OIL SEAL

(a) Using SST and a hammer, tap in a new oil seal to the transaxle case.

SST 09950-60010 (09951-00420), 09950-70010 (09951-07150)

Standard distance:
1 to 2 mm (0.04 to 0.08 in.)

(b) Coat the lip of the oil seal with MP grease.

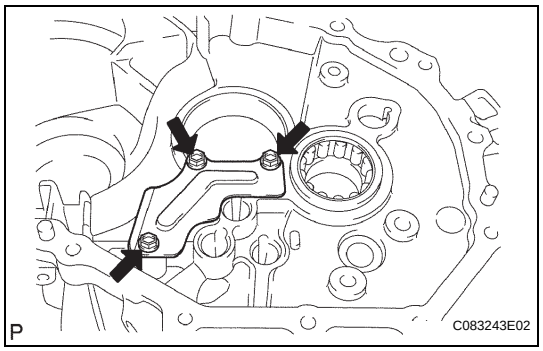


14. INSTALL FRONT INPUT SHAFT BEARING

(a) Coat the input shaft front bearing with gear oil, and using SST, install it to the transaxle case.

SST 09950-60010 (09951-00570), 09950-70010 (09951-07150)

Standard distance:
4.28 to 4.60 mm (0.1685 to 0.1811 in.)

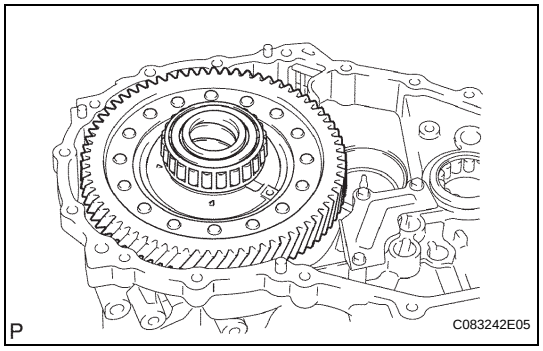


15. INSTALL MANUAL TRANSAXLE CASE RECEIVER

(a) Install the 3 bolts and the receiver to the transaxle case.

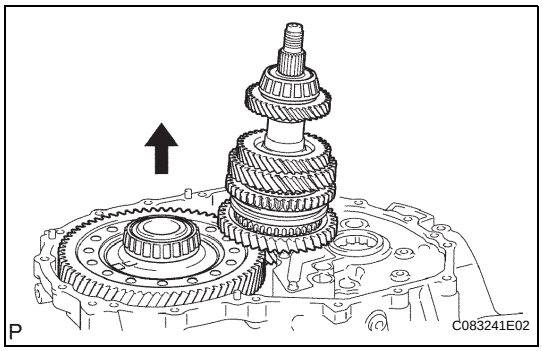
Torque: 7.0 N*m (71 kgf*cm, 62 in.*lbf)

MX



16. INSTALL DIFFERENTIAL CASE ASSEMBLY

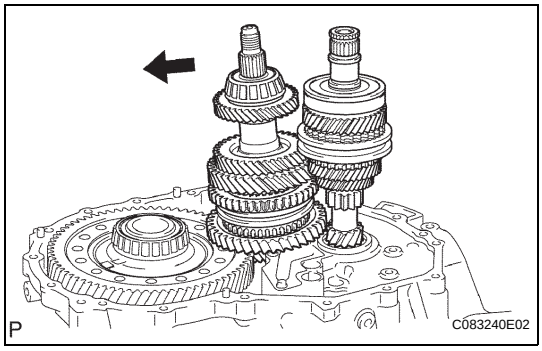
(a) Coat the differential case tapered roller bearing with gear oil, and install the differential case to the transaxle case.



17. INSTALL OUTPUT SHAFT ASSEMBLY

(a) Apply gear oil to each sliding part of the output shaft.

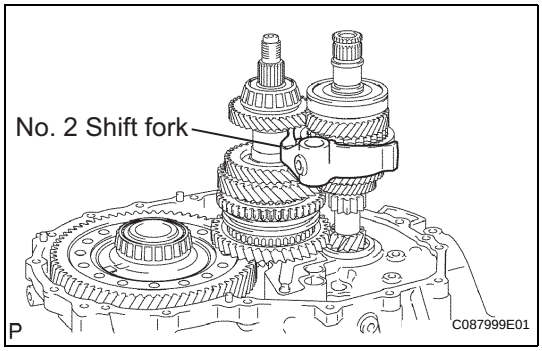
(b) Slightly lift up on the differential case at an angle, and install the output shaft to the transaxle case.



18. INSTALL INPUT SHAFT ASSEMBLY

(a) Apply gear oil to each sliding part of the input shaft.

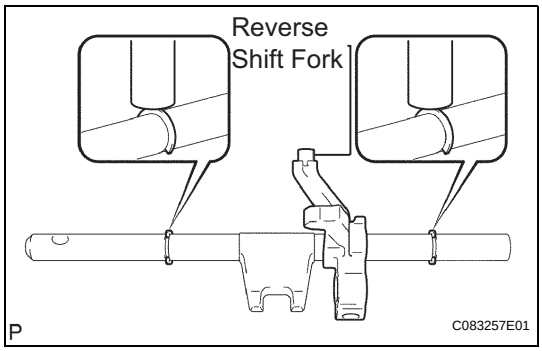
(b) Install the input shaft to the transaxle case while tilting the output shaft.



19. INSTALL NO. 2 GEAR SHIFT FORK

(a) Coat the No. 2 gear shift fork with gear oil, and install it to the input shaft assembly.

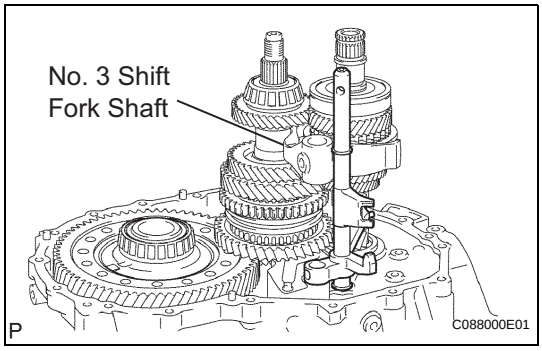
MX



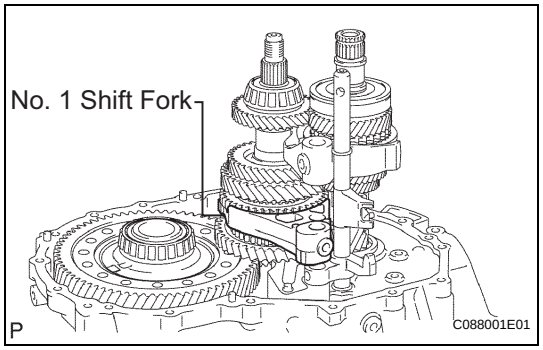
20. INSTALL NO. 3 GEAR SHIFT FORK

(a) Install the reverse shift fork to the No. 3 gear shift fork shaft.

(b) Using a brass bar and hammer, install the 2 shift fork shaft snap rings to the No. 3 gear shift fork shaft.

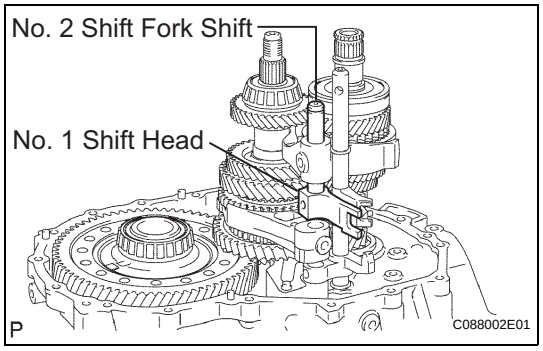


(c) Apply gear oil to each sliding part of the No. 3 gear shift fork shaft, and install it to the transaxle case.



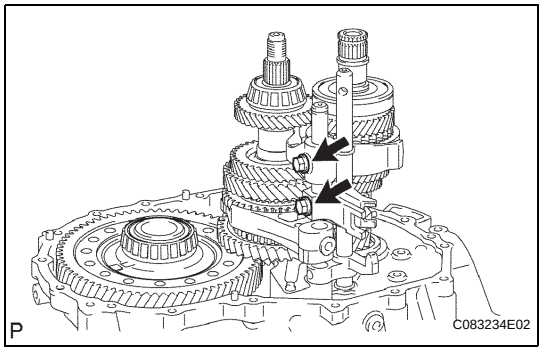
21. INSTALL NO. 1 GEAR SHIFT FORK

(a) Apply gear oil to each sliding part of the No. 1 gear shift fork, and install it to the output shaft assembly.

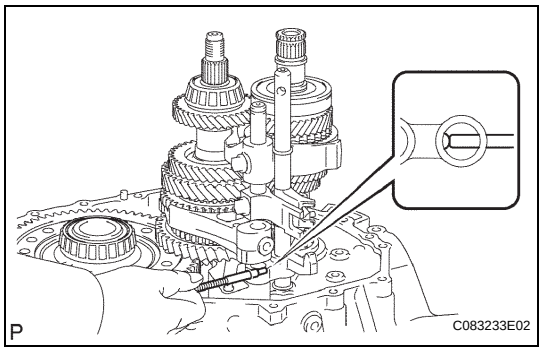


22. INSTALL NO. 2 GEAR SHIFT FORK

(a) Apply gear oil to each sliding part of the No. 2 gear shift fork shaft and No. 1 gear shift head, and install them to the transaxle case.

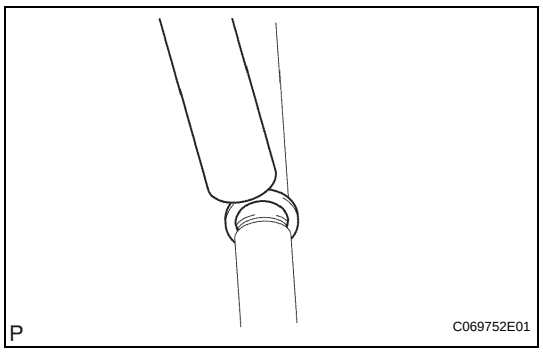


(b) Install the shift fork set bolt and shift head set bolt to the No. 1 gear shift head and No. 2 gear shift fork.



23. INSTALL REVERSE SHIFT FORK ROLLER

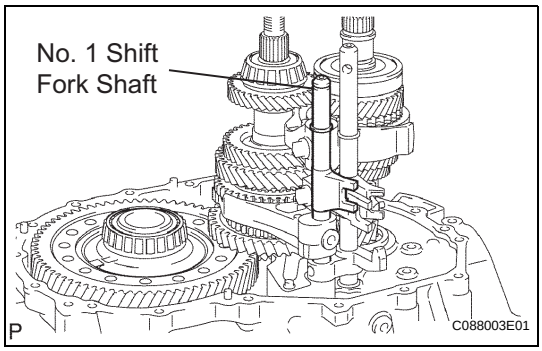
(a) Using a magnetic finger, install the reverse shift fork roller to the reverse shift fork.



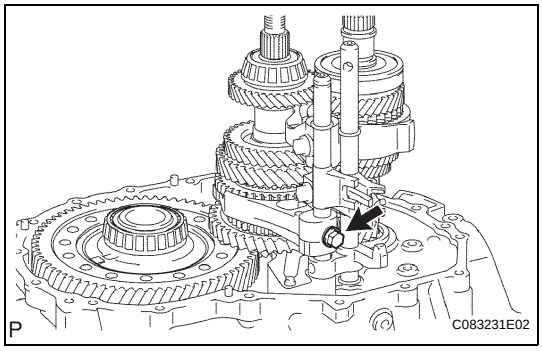
24. INSTALL NO. 1 GEAR SHIFT FORK SHAFT

(a) Using a brass bar and hammer, tap in the shaft snap ring to the No. 1 shift fork shaft.

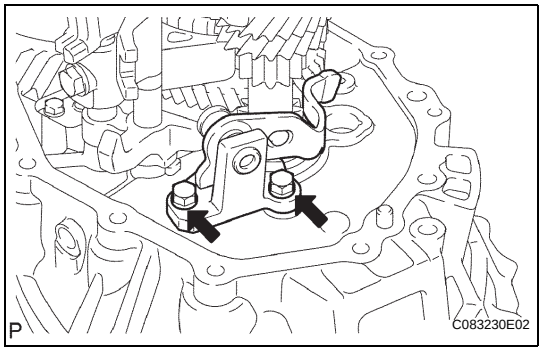
MX



(b) Install the No. 1 gear shift fork shaft to the transaxle case.



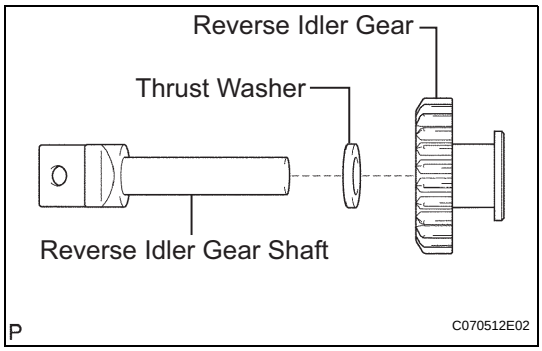
(c) Install the shift fork set bolt to the No. 1 gear shift fork.
Torque: 24 N*m (245 kgf*cm, 18 ft.*lbf)



25. INSTALL REVERSE SHIFT ARM BRACKET ASSEMBLY

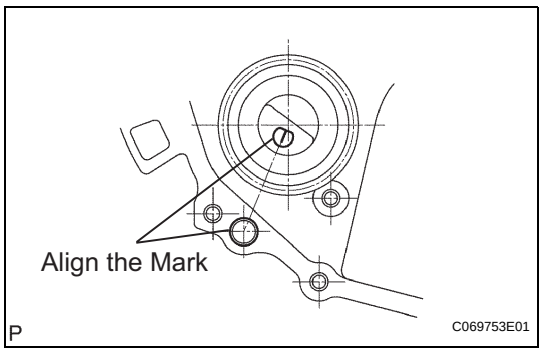
(a) Install the reverse shift arm bracket to the transaxle case with the 2 bolts.
Torque: 17 N*m (173 kgf*cm, 13 ft.*lbf)

MX

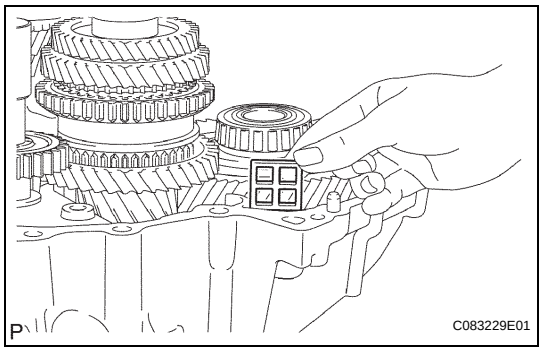


26. INSTALL REVERSE IDLER GEAR SUB-ASSEMBLY

(a) Coat the reverse idler gear and thrust washer with gear oil, and install them to the reverse idler gear shaft.

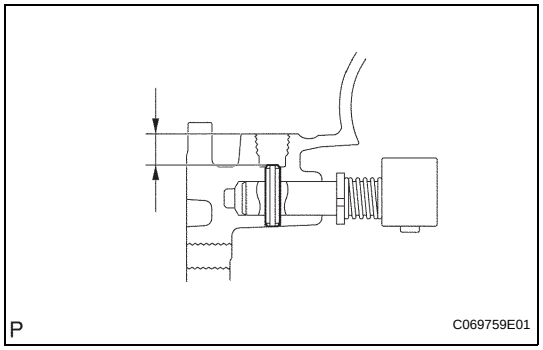


(b) Install the reverse idler gear with the reverse idler gear shaft to the transaxle case.
HINT:
Align the mark of the reverse idler gear shaft with the hole of the bolts.



27. INSTALL TRANSMISSION MAGNET

(a) Clean the transmission magnet, and install it to the transaxle case.

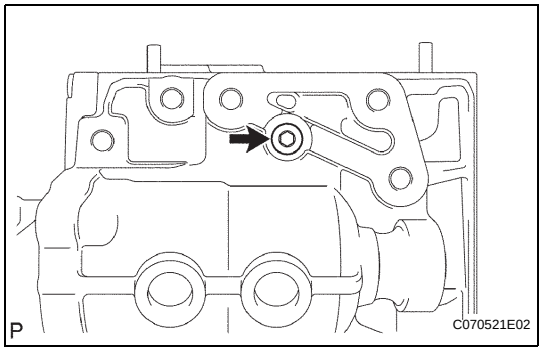


28. INSTALL REVERSE RESTRICT PIN ASSEMBLY

(a) Install the reverse restrict pin to the transaxle case.

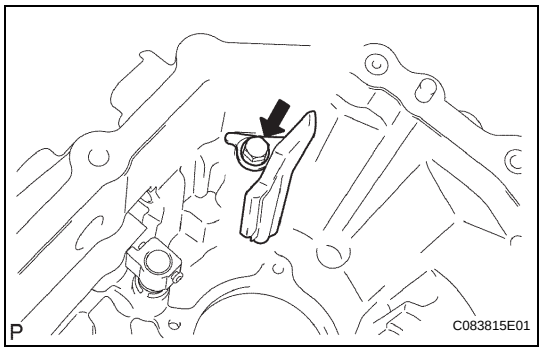
(b) Using a 5 mm pin punch, install the slotted spring pin.

Standard clearance:
12.5 to 13.5 mm (0.492 to 0.531 in.)



(c) Coat the reverse restrict pin plug with adhesive 1324, and using a 6 mm hexagon wrench, install it to the manual transmission case.

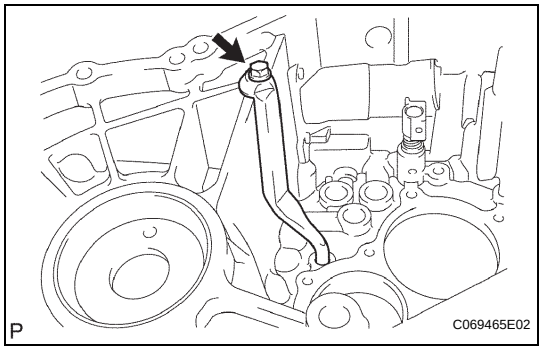
Torque: 13 N*m (133 kgf*cm, 9.6 ft.*lbf)



29. INSTALL NO. 1 OIL RECEIVER PIPE

(a) Install the oil receiver pipe to the transmission case with the bolt.

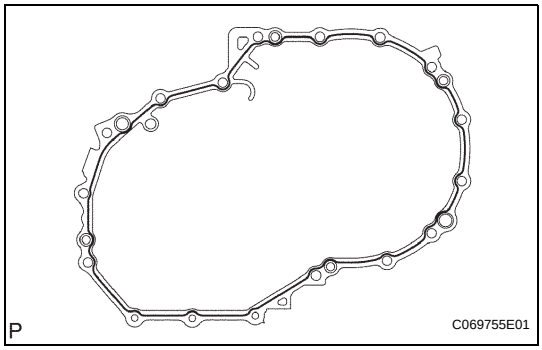
Torque: 17 N*m (173 kgf*cm, 13 ft.*lbf)
NOTICE:
Do not damage the pipe.



30. INSTALL NO. 2 OIL RECEIVER PIPE

(a) Install the oil receiver pipe to the transmission case with the bolt.

Torque: 17 N*m (173 kgf*cm, 13 ft.*lbf)
NOTICE:
Do not damage the pipe.



31. INSTALL MANUAL TRANSMISSION CASE

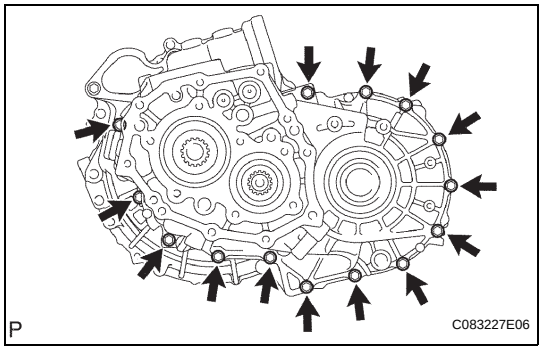
(a) Apply FIPG to the transmission case in a continuous line, as shown in the illustration.

FIPG:

Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent

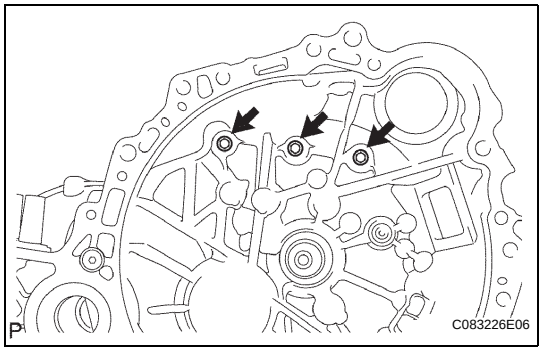
NOTICE:

Install the part within 10 minutes after applying the packing material (FIPG).



(b) Install the transmission case to the transaxle case with the 14 bolts.

Torque: 29 N*m (296 kgf*cm, 21 ft.*lbf)



(c) Coat the 3 bolts with adhesive, and install them on the transaxle case side.

Torque: 29 N*m (296 kgf*cm, 21 ft.*lbf)

Adhesive:

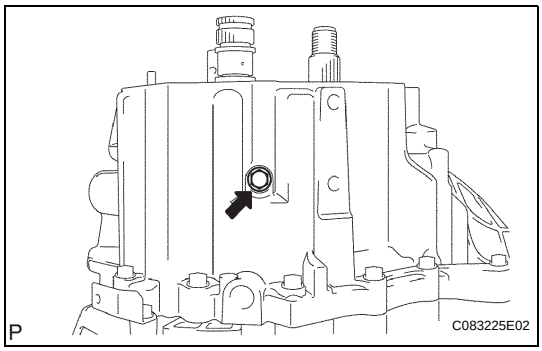
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

32. INSTALL CLUTCH TUBE BRACKET

(a) Install the clutch tube bracket with the bolt.

Torque: 17 N*m (173 kgf*cm, 13 ft.*lbf)

MX



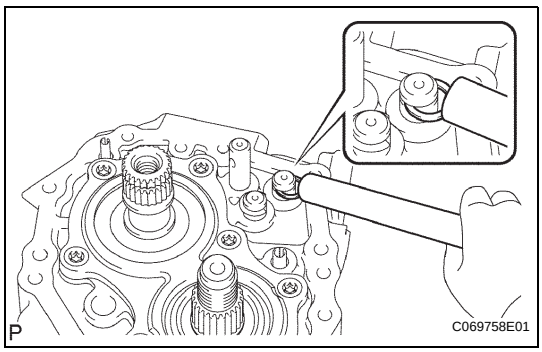
33. INSTALL REVERSE IDLER GEAR SHAFT BOLT

(a) Coat the reverse idler gear shaft bolt with adhesive, and install a new reverse idler gear shaft gasket and the reverse idler gear shaft bolt to the transmission case.

Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)

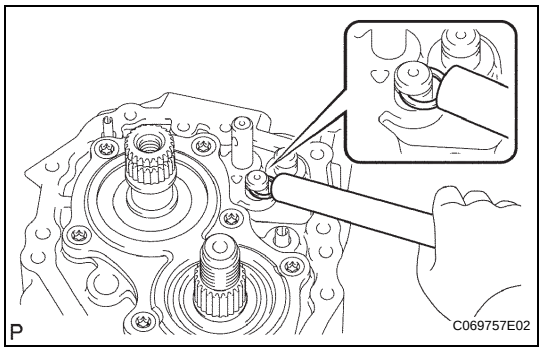
Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

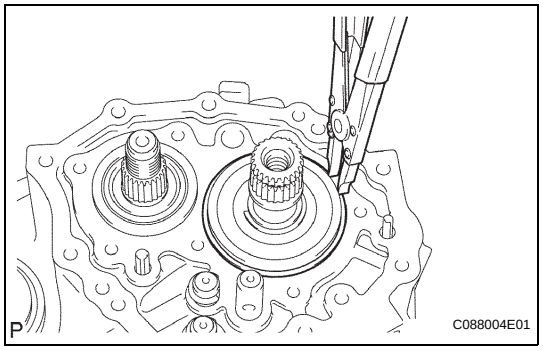


34. INSTALL SHIFT FORK SHAFT SHAFT SNAP RING

(a) Using a brass bar and hammer, tap in the shaft snap ring to the No. 1 gear shift fork shaft.

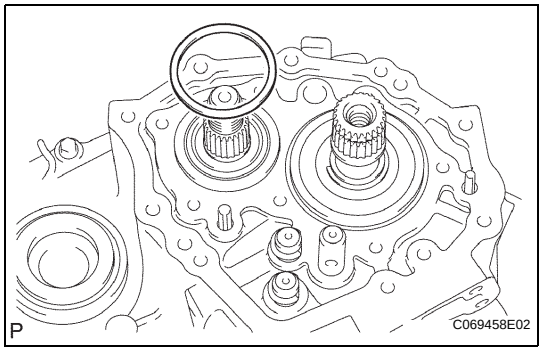


(b) Using a brass bar and hammer, tap in the shaft snap ring to the No. 2 gear shift fork shaft.



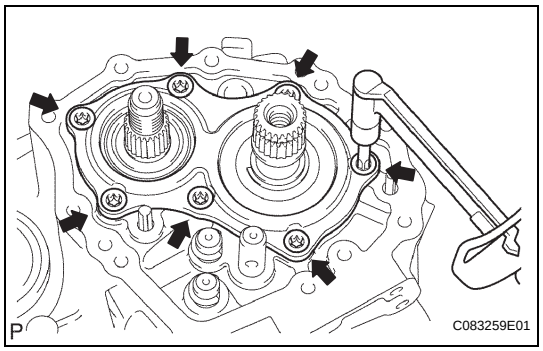
35. INSTALL INPUT SHAFT REAR BEARING SHAFT SNAP RING

(a) Using a snap ring expander, install the shaft snap ring.



36. INSTALL OUTPUT SHAFT REAR BEARING SHIM

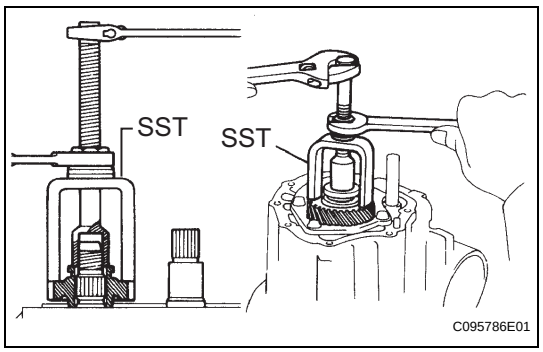
(a) Install the output shaft rear bearing shim to the output shaft.



37. INSTALL REAR BEARING RETAINER

(a) Coat the 7 bolts with adhesive, and using a T45 "TORX" socket, install the bearing retainer with the bolts.

Torque: 43 N*m (438 kgf*cm, 32 ft.*lbf)
Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

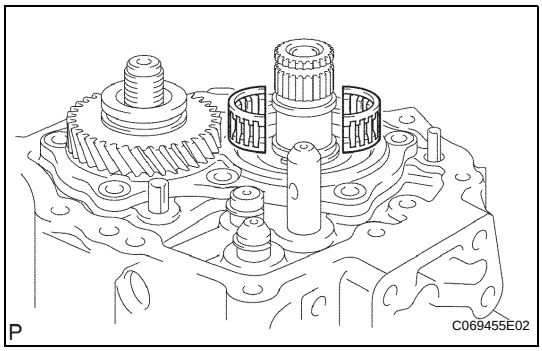


38. INSTALL 5TH DRIVEN GEAR

(a) Using SST, install the 5th driven gear to the output shaft.

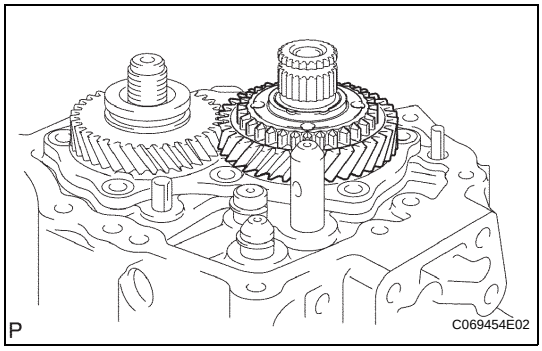
SST 09309-12020

MX



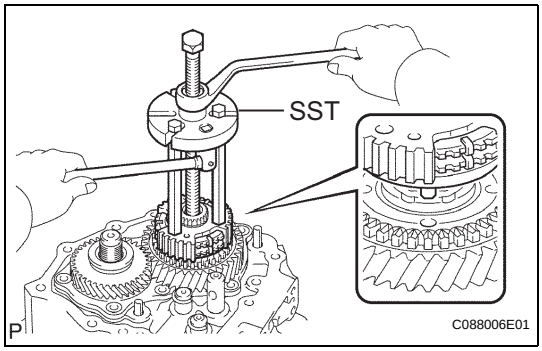
39. INSTALL 5TH GEAR NEEDLE ROLLER BEARING

(a) Coat the needle roller bearing with gear oil, and install it to the input shaft.



40. INSTALL 5TH GEAR

(a) Coat the 5th gear with gear oil, and install it to the input shaft.



41. INSTALL NO. 3 TRANSMISSION CLUTCH HUB

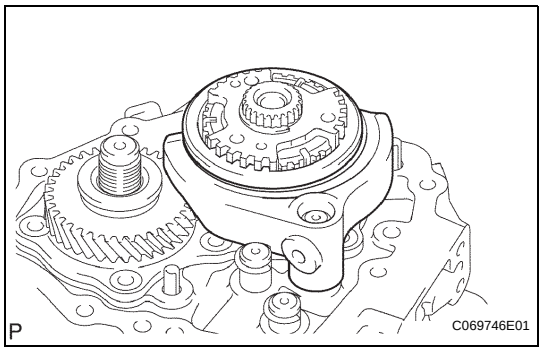
(a) Using SST, install the No. 3 transmission clutch hub to the input shaft.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010)

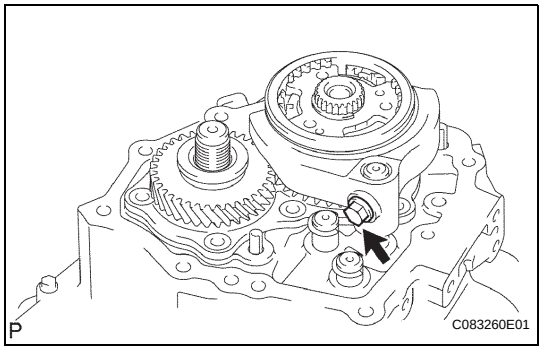
NOTICE:

Align the projection of the synchronizer ring with the hole of the 5th gear and install it.

MX



(b) Install the No. 3 transmission hub sleeve and No. 3 gear shift fork to the No. 3 transmission clutch hub.

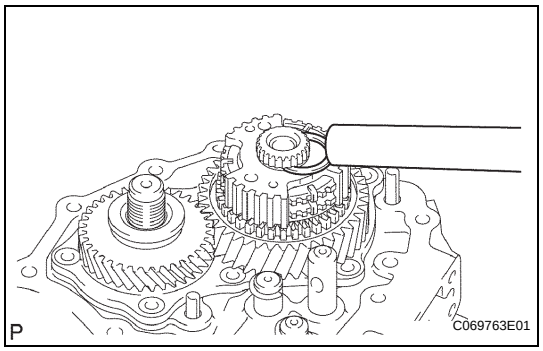


(c) Coat the shift fork set bolt with adhesive, and install it to the No. 3 gear shift fork.

Torque: 24 N*m (245 kgf*cm, 18 ft.*lbf)

Adhesive:

Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent

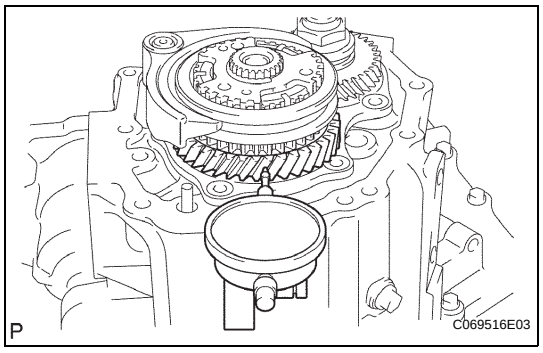


(d) Select the No. 3 transmission clutch hub shaft snap ring that allows the minimum amount of axial play. Using a brass bar and hammer, tap in the No. 3 transmission clutch hub shaft snap ring.

Standard clearance:
0.1 mm (0.004 in.) or less

Standard snap ring

Part No.	Mark	Thickness
90520-27061	a	1.75 to 1.80 mm (0.0689 to 0.0709 in.)
90520-27062	b	1.80 to 1.85 mm (0.0709 to 0.0728 in.)
90520-27063	c	1.85 to 1.90 mm (0.0728 to 0.0748 in.)
90520-27064	d	1.90 to 1.95 mm (0.0748 to 0.0768 in.)
90520-27065	e	1.95 to 2.00 mm (0.0768 to 0.0787 in.)
90520-27066	f	2.00 to 2.05 mm (0.0787 to 0.0807 in.)
90520-27067	g	2.05 to 2.10 mm (0.0807 to 0.0827 in.)
90520-27068	h	2.10 to 2.15 mm (0.0827 to 0.0846 in.)
90520-27069	j	2.15 to 2.20 mm (0.0846 to 0.0866 in.)

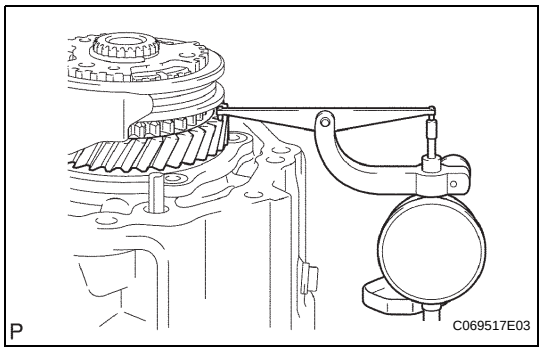


42. INSPECT 5TH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the 5th gear radial clearance.

Standard clearance:
0.009 to 0.050 mm (0.0004 to 0.0020 in.)

If the clearance is out of specification, replace the 5th gear, 5th gear needle roller bearing or input shaft.

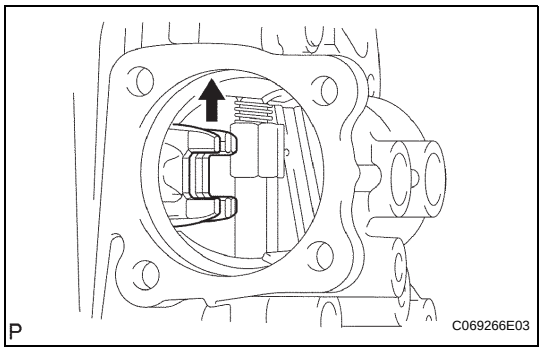


43. INSPECT 5TH GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the 5th gear thrust clearance.

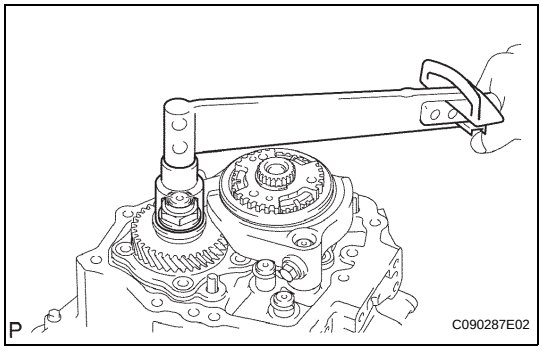
Standard clearance:
0.10 to 0.65 mm (0.0039 to 0.0260 in.)

If the clearance is out of specification, replace the No. 3 transmission clutch hub, 5th gear or input shaft rear radial ball bearing.

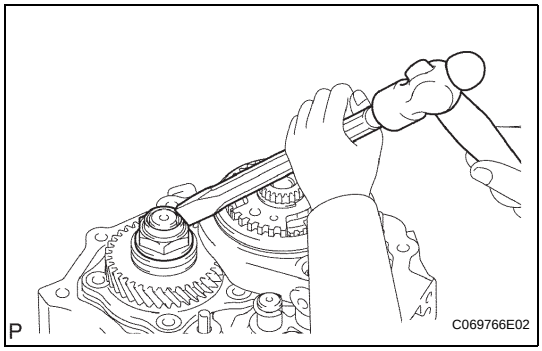


44. INSTALL MANUAL TRANSMISSION OUTPUT SHAFT REAR SET NUT

(a) Engage the 2 gears simultaneously to lock the transmission.

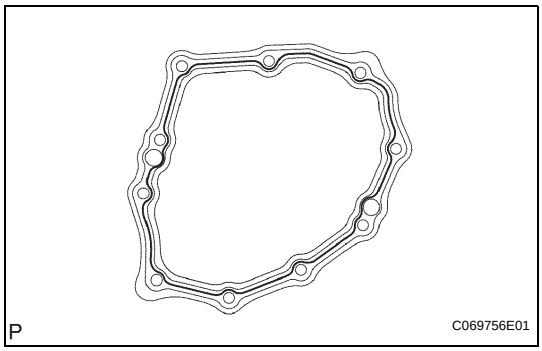


(b) Install a new transmission output shaft rear set nut.
Torque: 123 N*m (1,254 kgf*cm, 90 ft.*lbf)



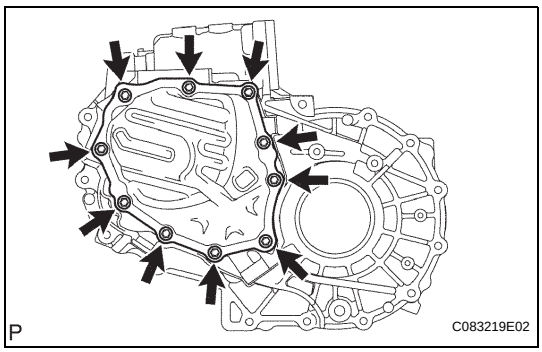
(c) Using a chisel and hammer, stake the rear set nut.
(d) Disengage the 2 gears.

MX

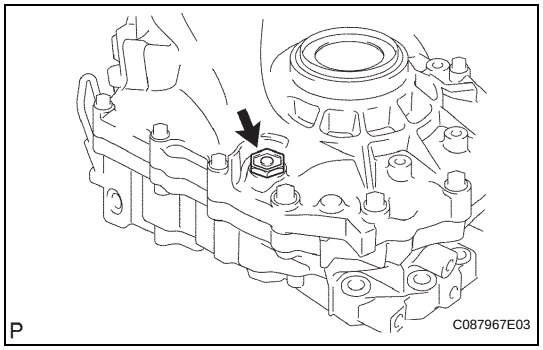


45. INSTALL MANUAL TRANSMISSION CASE COVER SUB-ASSEMBLY

(a) Apply FIPG to the transaxle case cover, as shown in the installation.
FIPG:
Toyota Genuine Seal Packing 1281, Three Bond 1281 or equivalent
NOTICE:
Install the part within 10 minutes after applying the packing material (FIPG).

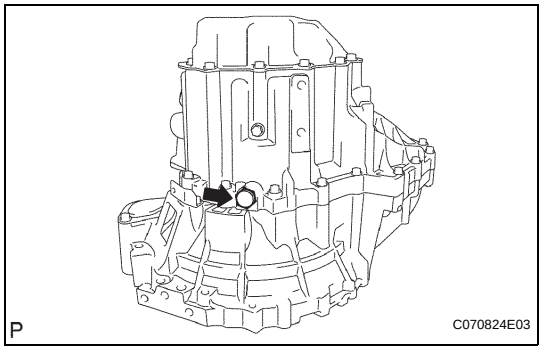


(b) Install the transmission case cover to the transaxle case with the 10 bolts.
Torque: 29 N*m (296 kgf*cm, 21 ft.*lbf)



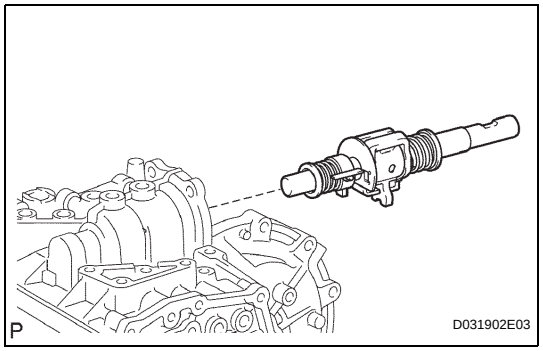
46. INSTALL DRAIN PLUG SUB-ASSEMBLY

(a) Install a new gasket and the drain plug to the transmission case.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)



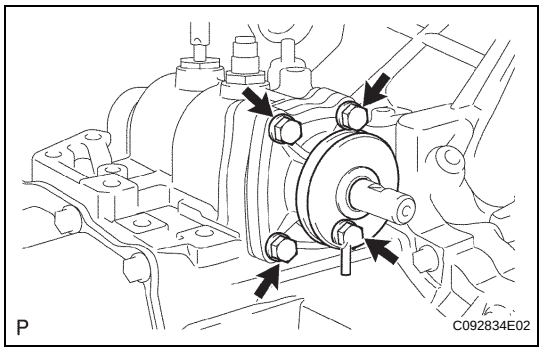
47. INSTALL MANUAL TRANSMISSION FILLER PLUG

(a) Install a new gasket and the filler plug to the transaxle case.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)



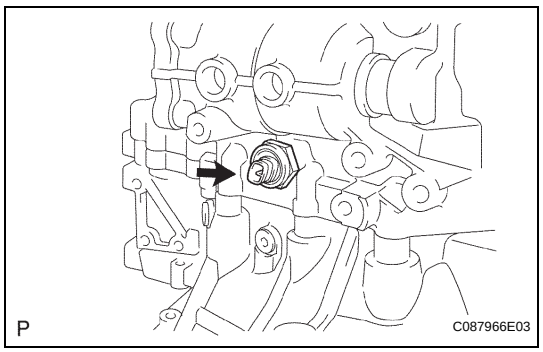
48. INSTALL SHIFT AND SELECT LEVER SHAFT ASSEMBLY

(a) Coat the shift and select lever shaft with gear oil, and install it to the transmission case.



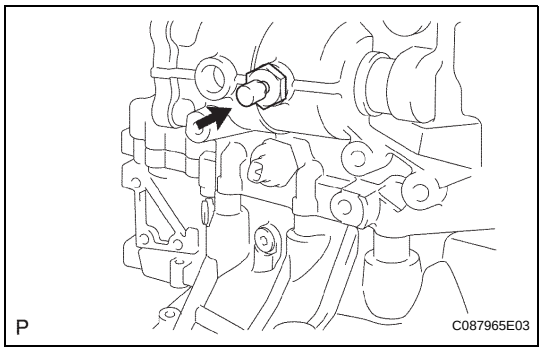
49. INSTALL CONTROL SHAFT COVER

(a) Coat the 4 bolts with adhesive, and install a new gasket and the control shaft cover with the 4 bolts.
Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)



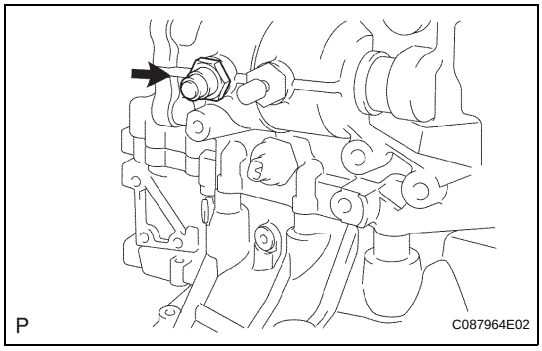
50. INSTALL BACK-UP LIGHT SWITCH ASSEMBLY

(a) Install a new gasket and the back-up light switch to the manual transmission case.
Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)



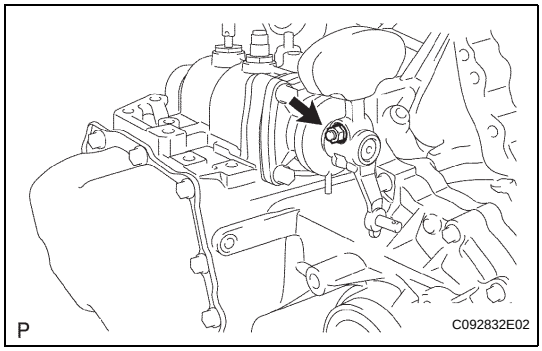
51. INSTALL MANUAL TRANSMISSION BREATHER PLUG

(a) Install a new gasket and the breather plug to the case.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)



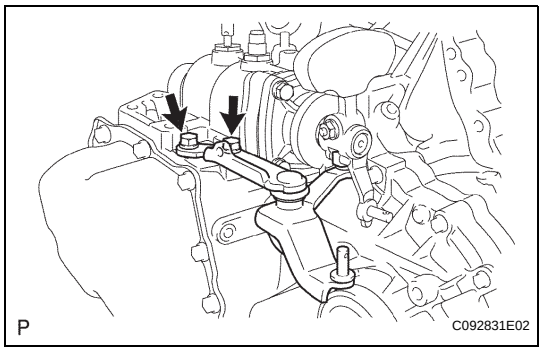
52. INSTALL NO. 1 LOCK BALL ASSEMBLY

(a) Install the No. 1 lock ball to the transmission case.
Torque: 29 N*m (296 kgf*cm, 21 ft.*lbf)



53. INSTALL CONTROL SHIFT LEVER

(a) Install the control shift lever with the shift outer lever lever lock pin to the shift and select lever shaft.
(b) Install the spring washer with the nut.
Torque: 6.4 N*m (65 kgf*cm, 57 in.*lbf)



MX

54. INSTALL SELECTING BELLCRANK ASSEMBLY

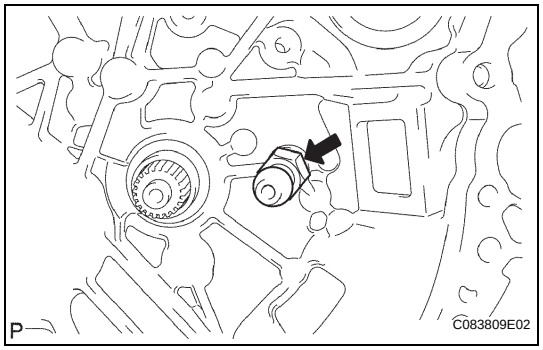
(a) Install the shift and select lever bush to the selecting bellcrank.
(b) Coat the 2 bolts with adhesive, and install the selecting bellcrank to the transmission case with the 2 bolts.
Adhesive:
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)

55. INSTALL SPEEDOMETER DRIVEN HOLE COVER SUB-ASSEMBLY

(a) Install a new O-ring to the hole cover.
(b) Install the hole cover to the transmission case with the bolt.
Torque: 5.5 N*m (56 kgf*cm, 48 ft.*lbf)

56. INSTALL CLUTCH RELEASE FORK BOOT

(a) Install the clutch release fork boot to the transaxle case.

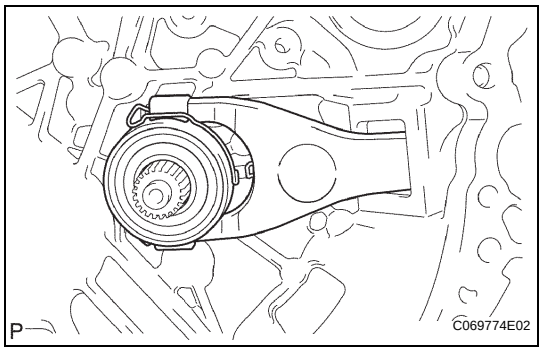


57. INSTALL RELEASE FORK SUPPORT

(a) Using a deep socket wrench, install the release fork support to the transaxle case.
Torque: 47 N*m (480 kgf*cm, 35 ft.*lbf)

58. INSTALL CLUTCH RELEASE BEARING ASSEMBLY

(a) Coat the clutch release bearing with release hub grease, and install it to the clutch release fork with the clutch release bearing clip.
Sealant:
Toyota Genuine Release Hub Grease or equivalent

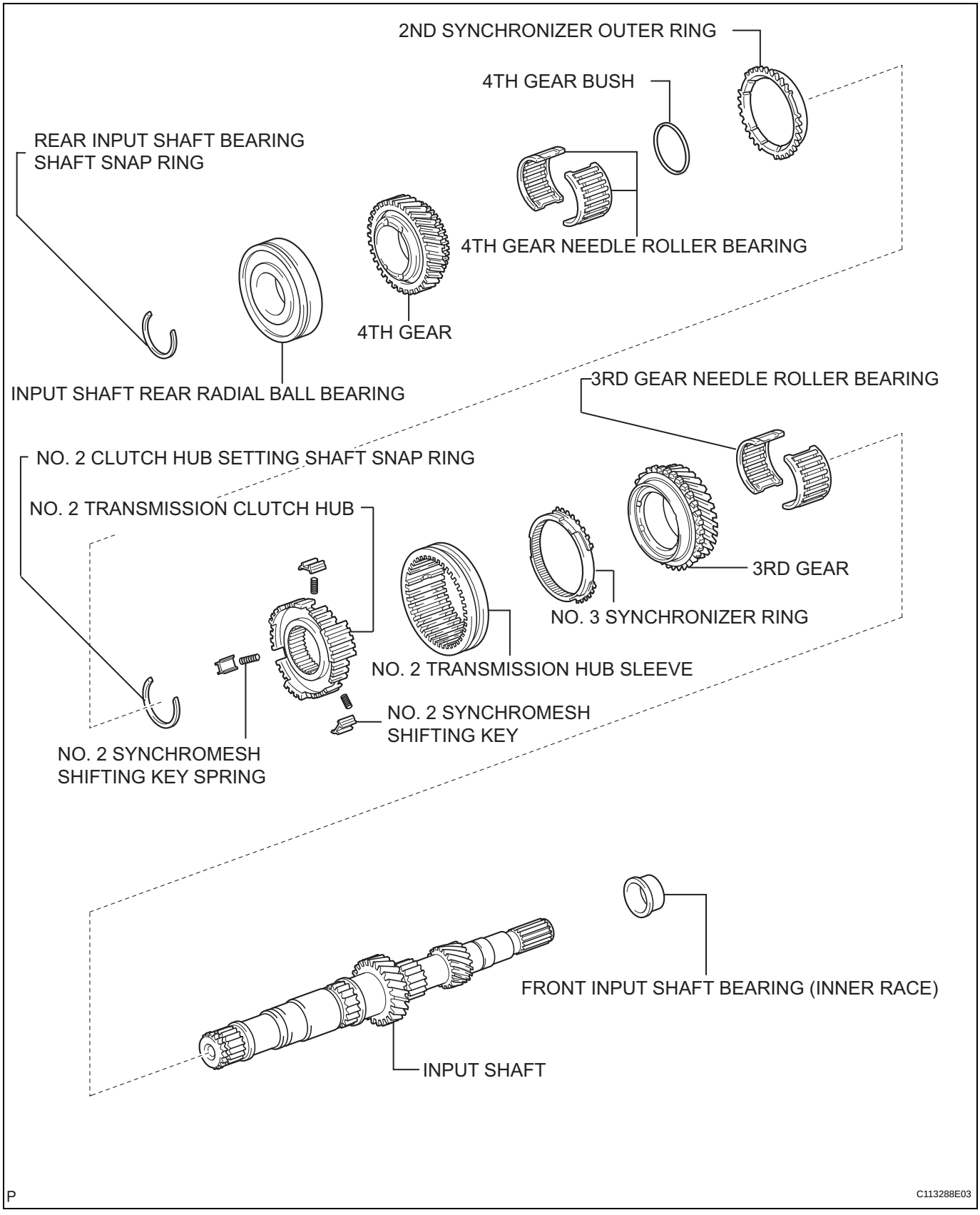


59. INSTALL CLUTCH RELEASE FORK SUB-ASSEMBLY

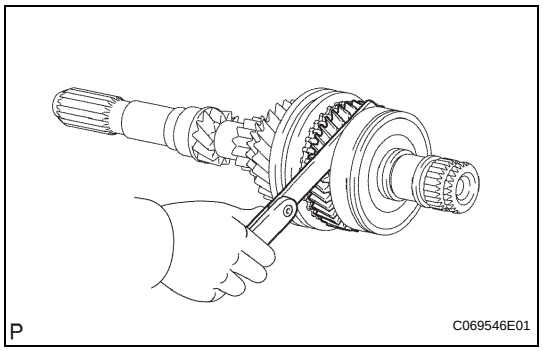
(a) Apply clutch spline grease to the input shaft spline.
(b) Install the clutch release fork to the input shaft.

INPUT SHAFT

COMPONENTS



MX



REMOVAL

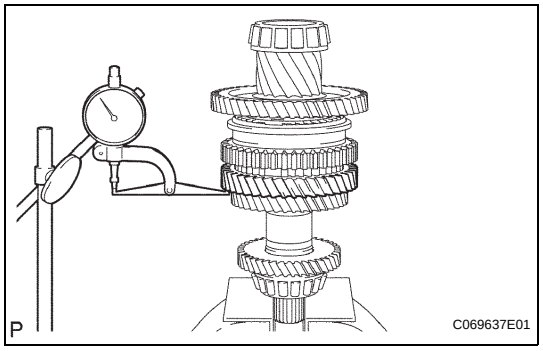
1. INSPECT 4TH GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the thrust clearance.

Standard clearance:

0.10 to 0.57 mm (0.0039 to 0.0224 in.)

If the clearance is out of specification, replace the No. 2 transmission clutch hub, 4th gear or input shaft rear radial ball bearing.



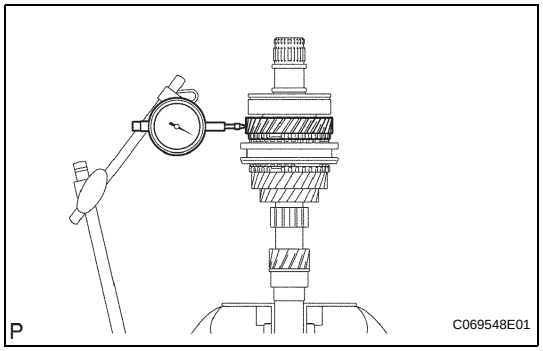
2. INSPECT 3RD GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance.

Standard clearance:

0.10 to 0.35 mm (0.0039 to 0.0138 in.)

If the clearance is out of specification, replace the No. 2 transmission clutch hub, 3rd gear or input shaft.



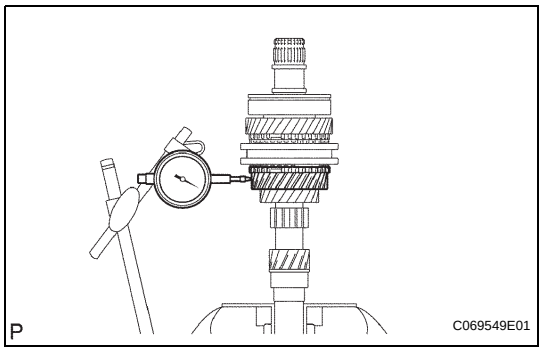
3. INSPECT 4TH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.

Standard clearance

Bearing	Standard Clearance
KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)

If the clearance is out of specification, replace the 4th gear, needle roller bearing or input shaft.



4. INSPECT 3RD GEAR RADIAL CLEARANCE

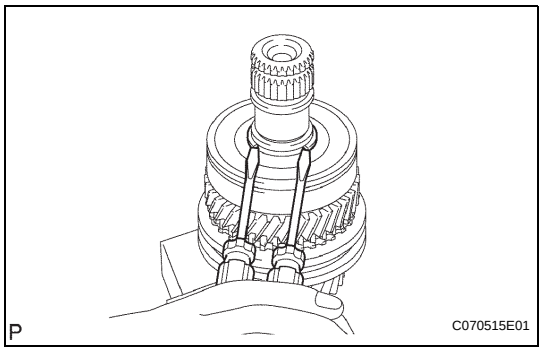
(a) Using a dial indicator, measure the gear radial clearance.

Standard clearance

Bearing	Standard Clearance
KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)

If the clearance is out of specification, replace the 3rd gear, needle roller bearing or input shaft.

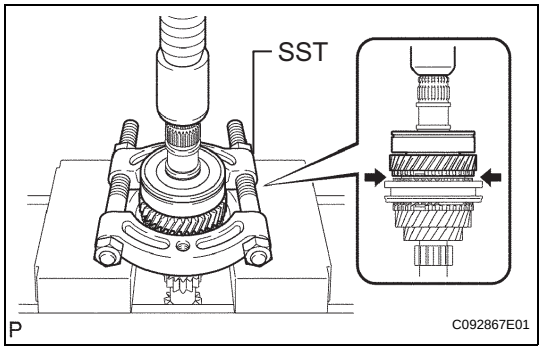
MX



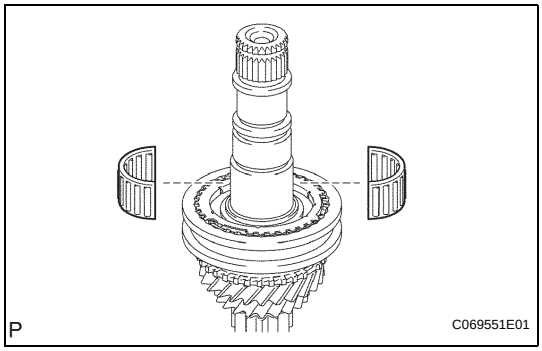
5. REMOVE 4TH GEAR

(a) Hold the input shaft assembly in a vise with soft jaws.

(b) Using 2 screwdrivers and a hammer, tap out the input shaft rear bearing shaft snap ring from the input shaft.
HINT:
Cover with a shop rag to keep the snap ring from flying off.



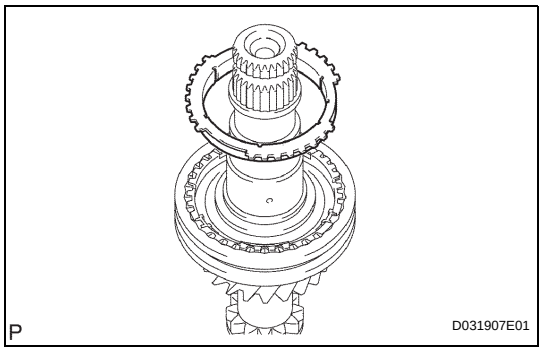
(c) Using SST and a press, press out the input shaft rear bearing and 4th gear.
SST 09950-00020
NOTICE:
Do not overtighten the SST.



6. REMOVE 4TH GEAR NEEDLE ROLLER BEARING

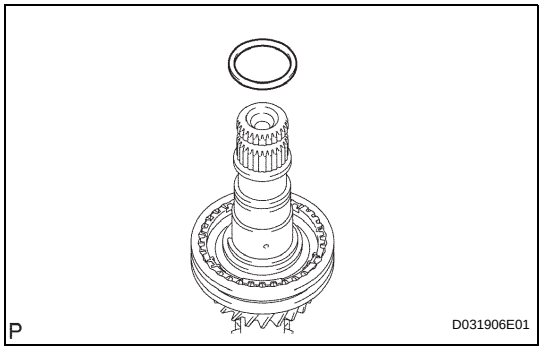
(a) Remove the needle roller bearing from the input shaft.

MX



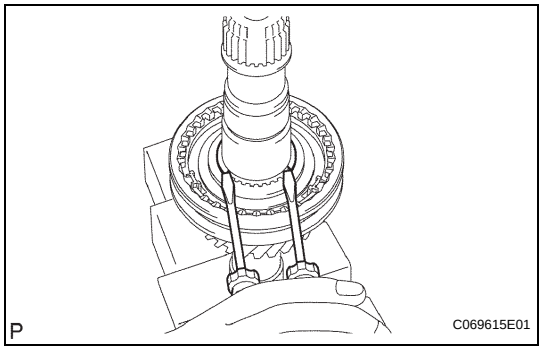
7. REMOVE 2ND SYNCHRONIZER OUTER RING

(a) Remove the 2nd synchronizer outer ring (No. 4 synchronizer ring) from the No. 2 transmission clutch hub.



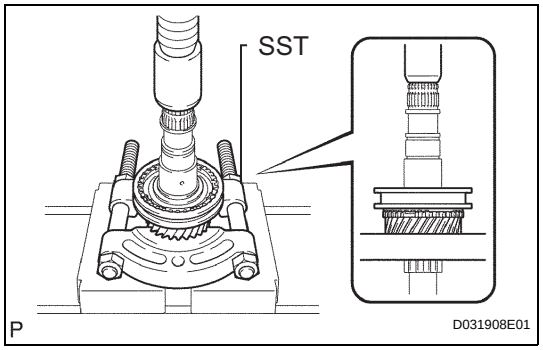
8. REMOVE 4TH GEAR BUSH

(a) Remove the 4th gear bush from the No. 2 transmission clutch hub.

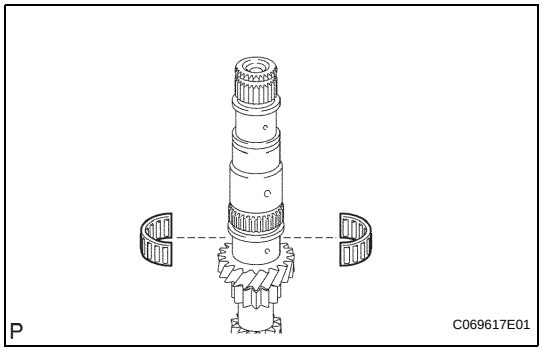


9. REMOVE 3RD GEAR

(a) Using 2 screwdrivers and a hammer, remove the No. 2 clutch hub setting shaft snap ring from the input shaft.
HINT:
Cover with a shop rag to keep the snap ring from flying off.

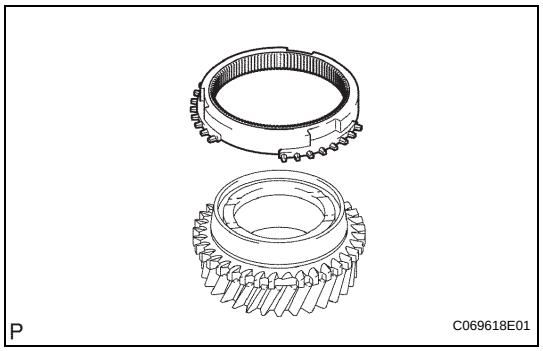


(b) Using SST and a press, remove the No. 2 transmission clutch hub and 3rd gear from the input shaft.
SST 09950-00020
NOTICE:
Do not overtighten the SST.



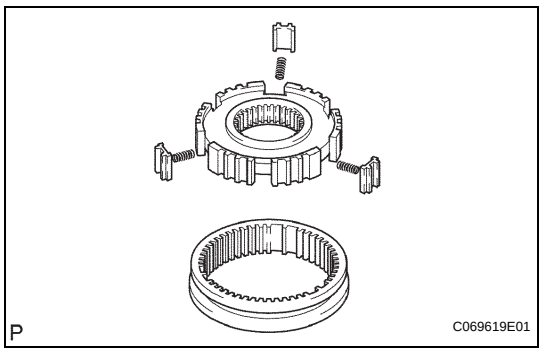
10. REMOVE 3RD GEAR NEEDLE ROLLER BEARING

(a) Remove the needle roller bearing from the input shaft.



11. REMOVE NO. 3 SYNCHRONIZER RING

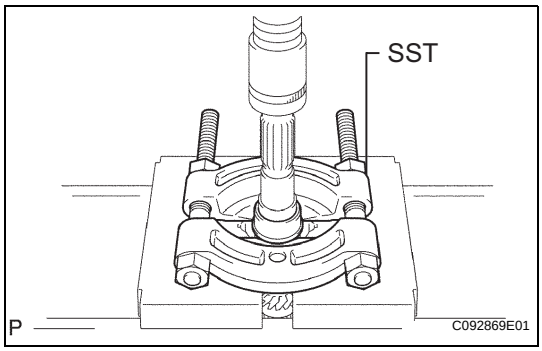
(a) Remove the No. 3 synchronizer ring from the 3rd gear.



12. REMOVE NO. 2 TRANSMISSION HUB SLEEVE

(a) Remove the No. 2 transmission hub sleeve, 3 No. 2 synchromesh shifting keys and 3 No. 2 synchromesh shifting key springs from the No. 2 transmission clutch hub.
HINT:
Cover with a shop rag to keep the shifting key and shifting key spring from flying off.

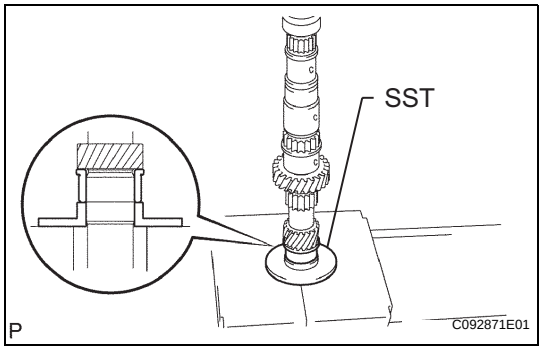
MX



13. REMOVE INPUT SHAFT FRONT BEARING

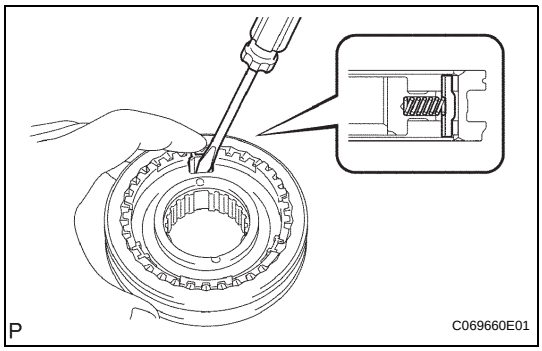
(a) Using SST and a press, press out the input shaft front bearing (inner race) from the input shaft.
NOTICE:
Do not overtighten the SST.

INSTALLATION



1. INSTALL FRONT INPUT SHAFT BEARING

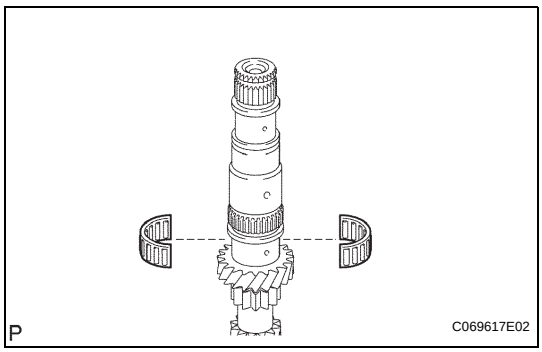
(a) Using SST and a press, press in the front bearing (inner race).
SST 09608-00071



2. INSTALL NO. 2 TRANSMISSION HUB SLEEVE

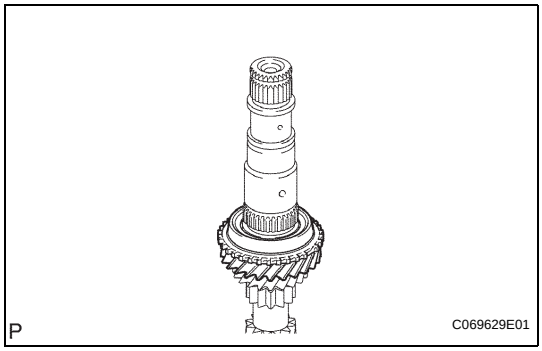
(a) Coat the No. 2 transmission hub sleeve with gear oil, and install it to the No. 2 transmission clutch hub.
NOTICE:
Set the No. 2 transmission clutch hub sleeve and the No. 2 transmission clutch hub in the correct orientation.

(b) Using a screwdriver, install the 3 synchromesh key springs with the 3 synchromesh shifting keys to the No. 2 transmission clutch hub.



3. INSTALL 3RD GEAR NEEDLE ROLLER BEARING

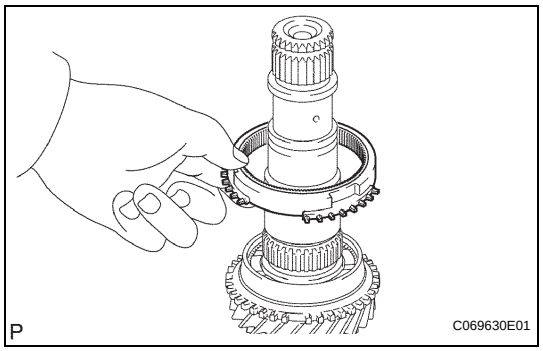
(a) Coat the 3rd gear bearing with gear oil, and install it to the input shaft.



4. INSTALL 3RD GEAR

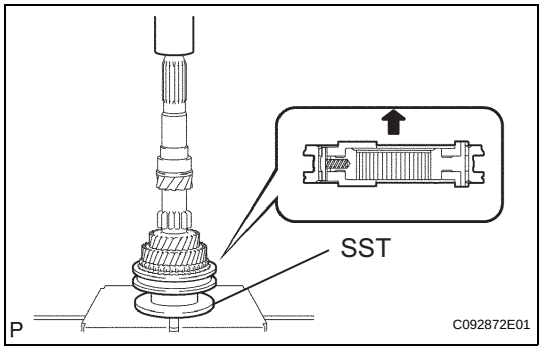
(a) Coat the 3rd gear with gear oil, and install it to the input shaft.

MX



5. INSTALL NO. 3 SYNCHRONIZER RING

(a) Coat the No. 3 synchronizer ring with gear oil, and install it to the 3rd gear.

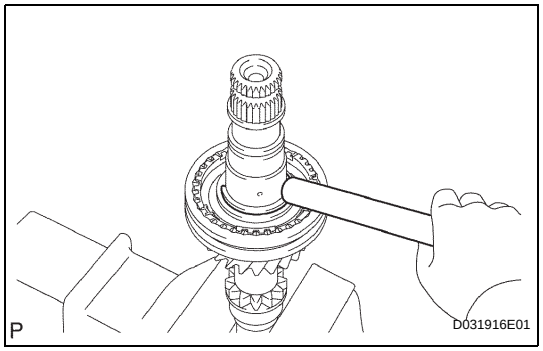


6. INSTALL NO. 2 TRANSMISSION CLUTCH HUB

(a) Using SST and a press, press in the No. 2 transmission clutch hub to the input shaft.

NOTICE:

- **Align the claw of the No. 2 clutch hub with the notch of the No. 3 synchronizer ring and install them.**
- **Make sure that the 3rd gear can rotate.**



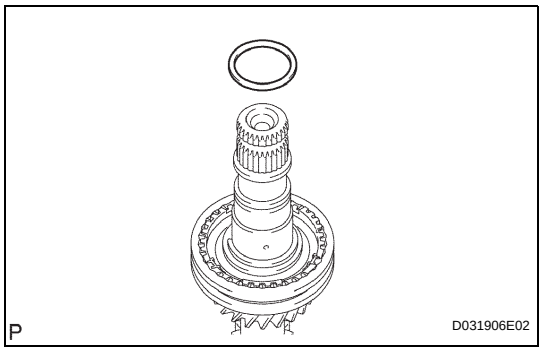
(b) Select a No. 2 clutch hub setting shaft snap ring so that the clearance between the No. 2 transmission clutch hub and the No. 2 clutch hub setting shaft snap ring will be within specification. Using a brass bar and hammer, install the No. 2 clutch hub setting shaft snap ring.

Standard clearance:

0.1 mm (0.004 in.) or less

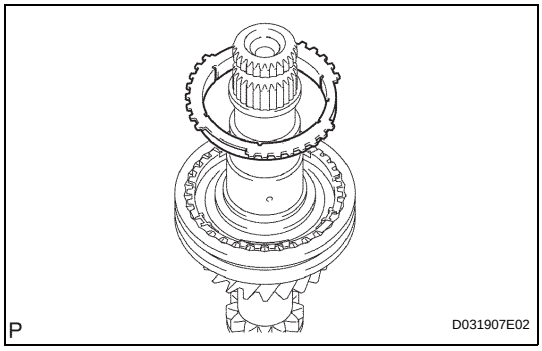
Standard snap ring thickness

Part No.	Mark	Thickness
90520-34003	H	2.30 to 2.35 mm (0.0906 to 0.0925 in.)
90520-34004	J	2.35 to 2.40 mm (0.0925 to 0.0945 in.)
90520-34005	K	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
90520-34006	L	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
90520-34007	M	2.50 to 2.55 mm (0.0984 to 0.1004 in.)
90520-34008	N	2.55 to 2.60 mm (0.1004 to 0.1024 in.)
90520-34009	P	2.60 to 2.65 mm (0.1024 to 0.1043 in.)



7. INSTALL 4TH GEAR BUSH

(a) Coat the 4th gear bush with gear oil, and install it to the input shaft.

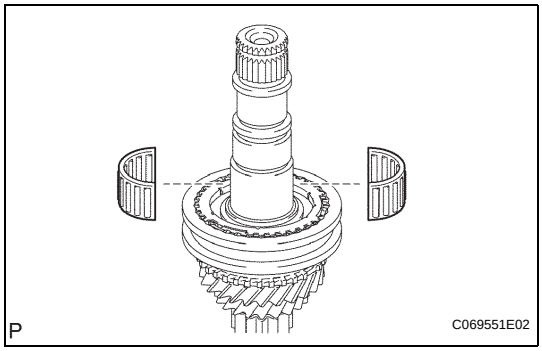


8. INSTALL 2ND SYNCHRONIZER OUTER RING

(a) Coat the 2nd synchronizer outer ring (No. 4 synchronizer ring) with gear oil, and install it to the No. 2 transmission clutch hub.

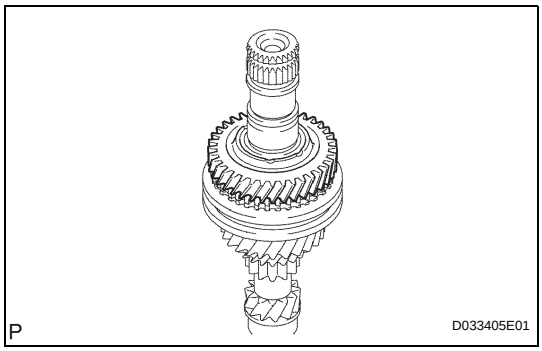
NOTICE:

Align the claw of the No. 2 clutch hub with the notch of the 2nd synchronizer outer ring (No. 4 synchronizer ring) and install it.



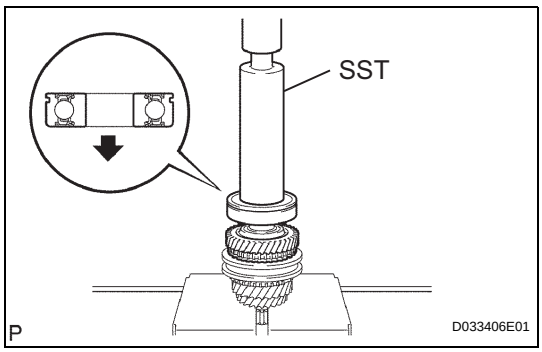
9. INSTALL 4TH GEAR NEEDLE ROLLER BEARING

(a) Coat the needle roller bearing with gear oil, and install it to the input shaft.



10. INSTALL 4TH GEAR

(a) Coat the 4th gear with gear oil, and install it to the input shaft.



11. INSTALL REAR INPUT SHAFT RADIAL BALL

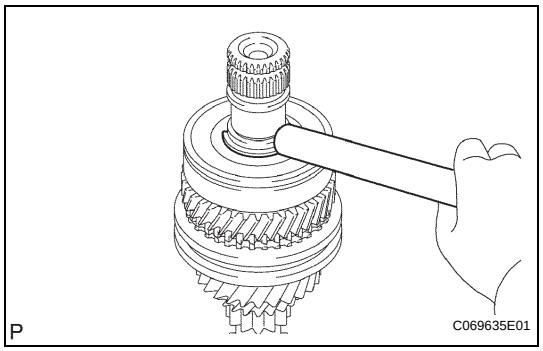
(a) Using SST and a press, press in the rear radial ball bearing to the input shaft.

SST 09608-06041

NOTICE:

- **Install the bearing with its groove for the snap ring facing upward.**
- **Make sure that the 3rd gear rotates.**

MX

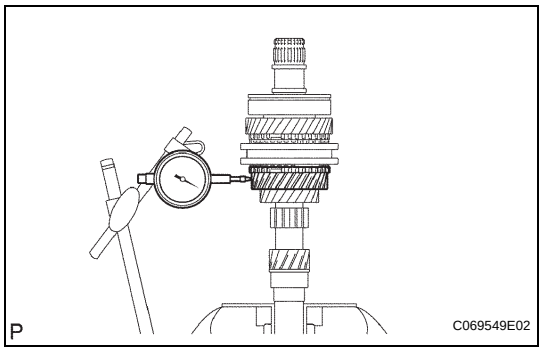


(b) Select a rear bearing shaft snap ring so that the clearance between the rear radial ball bearing and the rear bearing shaft snap ring will be within specification. Using a brass bar and hammer, install the rear bearing shaft snap ring.

Standard clearance:
0.1 mm (0.004 in.) or less

Standard snap ring thickness

Part No.	Mark	Thickness
90520-30008	1	2.35 to 2.40 mm (0.0925 to 0.0945 in.)
90520-30009	2	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
90520-30010	3	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
90520-30011	4	2.50 to 2.55 mm (0.0984 to 0.1004 in.)
90520-30012	5	2.55 to 2.60 mm (0.1004 to 0.1024 in.)
90520-30013	6	2.60 to 2.65 mm (0.1024 to 0.1043 in.)
90520-30021	7	2.65 to 2.70 mm (0.1043 to 0.1063 in.)
90520-30022	8	2.70 to 2.75 mm (0.1063 to 0.1083 in.)



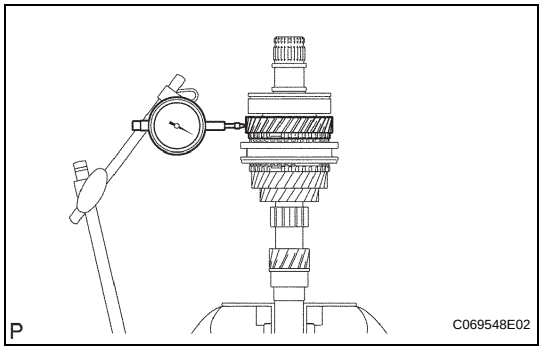
12. INSPECT 3RD GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.

Standard clearance

Bearing	Standard Clearance
KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)

If the clearance is out of specification, replace the 3rd gear, needle roller bearing or input shaft.



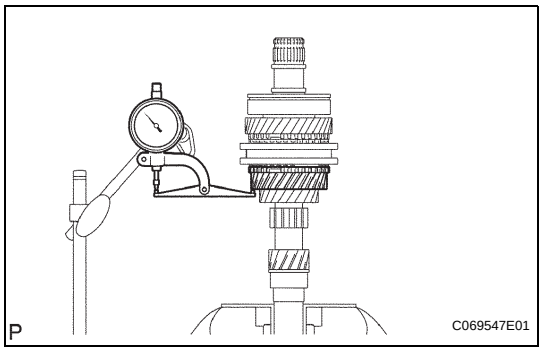
13. INSPECT 4TH GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.

Standard clearance

Bearing	Standard Clearance
KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)

If the clearance is out of specification, replace the 4th gear, needle roller bearing or input shaft.



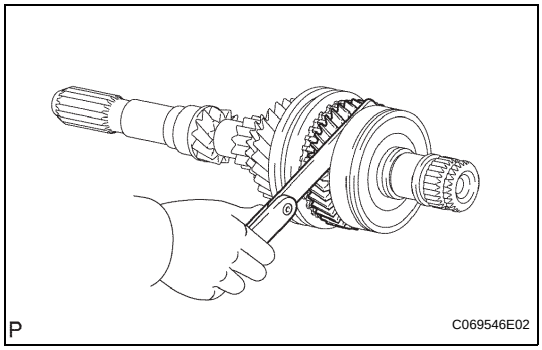
14. INSPECT 3RD GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance.

Standard clearance:

0.10 to 0.35 mm (0.0039 to 0.0138 in.)

If the clearance is out of specification, replace the No. 2 transmission clutch hub, 3rd gear or input shaft.



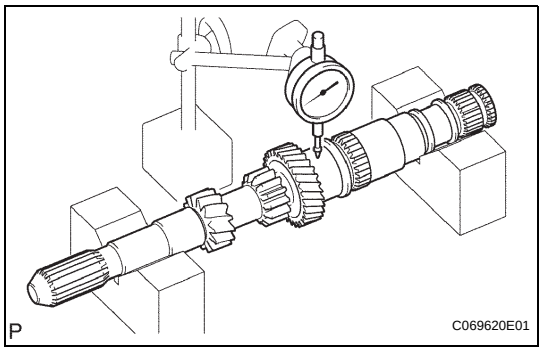
15. INSPECT 4TH GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the thrust clearance.

Standard clearance:

0.10 to 0.57 mm (0.0039 to 0.0224 in.)

If the clearance is out of specification, replace the No. 2 transmission clutch hub, 4th gear or input shaft rear radial ball bearing.



INSPECTION

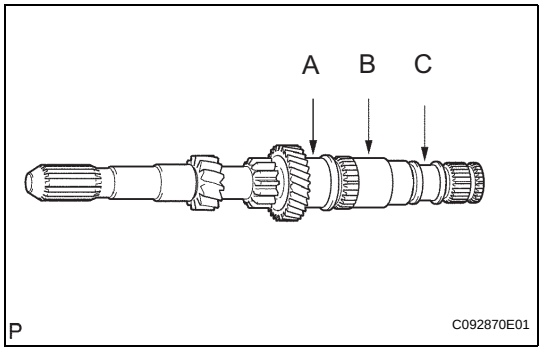
1. INSPECT INPUT SHAFT

(a) Using a V-block and dial indicator, measure the shaft for runout.

Maximum runout:

0.03 mm (0.0012 in.)

If the runout is greater than the maximum, replace the input shaft.



(b) Using a micrometer, measure the outside diameter of the input shaft journal surface.

Standard outside diameter

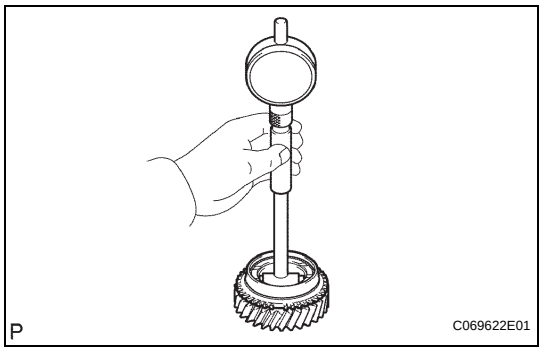
Journal Position	Outside Diameter
A	35.984 to 36.000 mm (1.4167 to 1.4173 in.)
B	35.984 to 36.000 mm (1.4167 to 1.4173 in.)
C	27.957 to 27.972 mm (1.1007 to 1.1013 in.)

Minimum outside diameter

Journal Position	Outside Diameter
A	35.984 mm (1.4167 in.)
B	35.984 mm (1.4167 in.)
C	27.957 mm (1.1007 in.)

If the outside diameter is less than the minimum, replace the input shaft.

MX

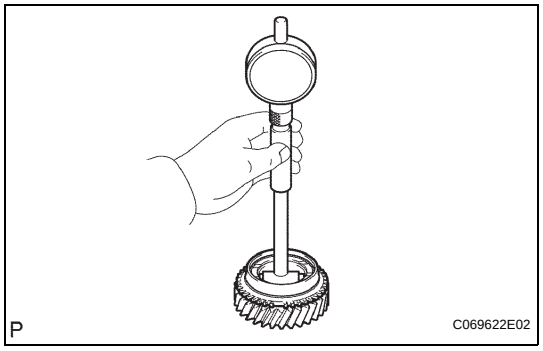


2. INSPECT 4TH GEAR

(a) Using a cylinder gauge, measure the inside diameter of the 4th gear.

Standard Inside Diameter:
42.009 to 42.025 mm (1.6539 to 1.6545 in.)
Maximum Inside Diameter:
42.025 mm (1.6545 in.)

If the inside diameter is greater than the maximum, replace the 4th gear.

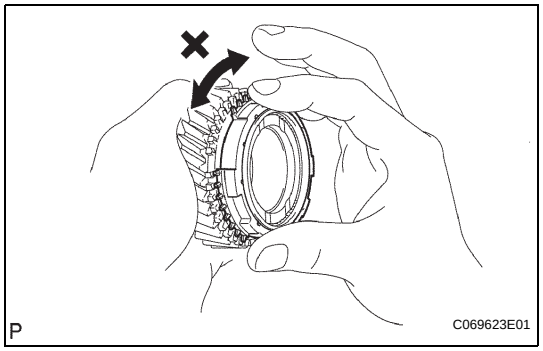


3. INSPECT 3RD GEAR

(a) Using a cylinder gauge, measure the inside diameter.

Standard inside diameter:
43.009 to 43.025 mm (1.6933 to 1.6939 in.)
Maximum inside diameter:
43.025 mm (1.6939 in.)

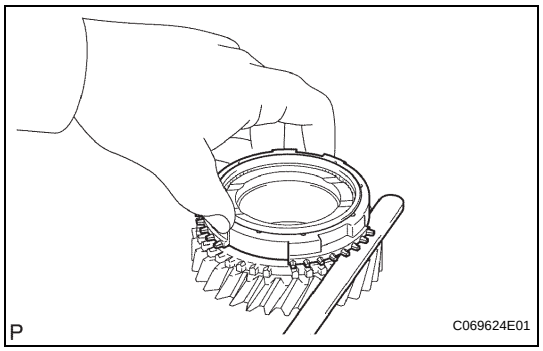
If the inside diameter is greater than the maximum, replace the 3rd gear.



4. INSPECT 2ND SYNCHRONIZER OUTER RING

(a) Coat the 4th gear cone with gear oil. Turn the 2nd synchronizer outer ring (synchronizer ring No. 4) in one direction while pushing it against the 4th gear cone. Check that the ring locks.

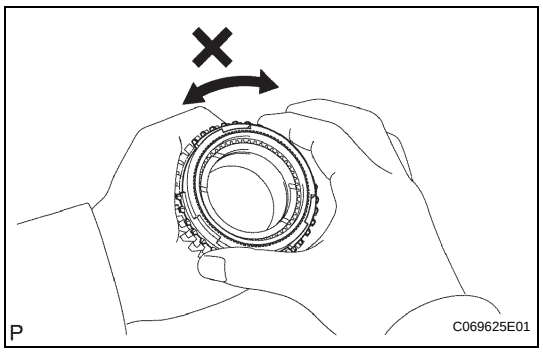
If the 2nd synchronizer outer ring does not lock, replace the ring or the 4th gear.



(b) Using a feeler gauge, measure the clearance between the 2nd synchronizer outer ring (No. 4 synchronizer ring) back and 4th gear spline end.

Standard clearance:
0.75 to 1.65 mm (0.0295 to 0.0650 in.)

If the clearance is out of specification, replace the 2nd synchronizer outer ring.

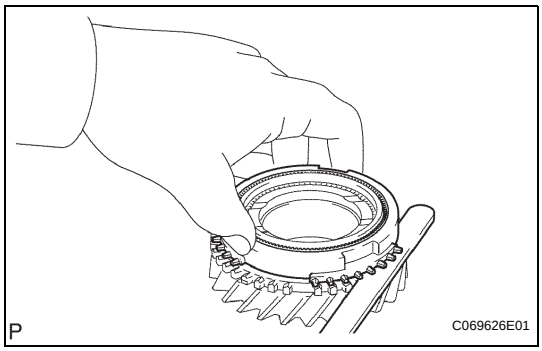


5. INSPECT NO. 3 SYNCHRONIZER RING

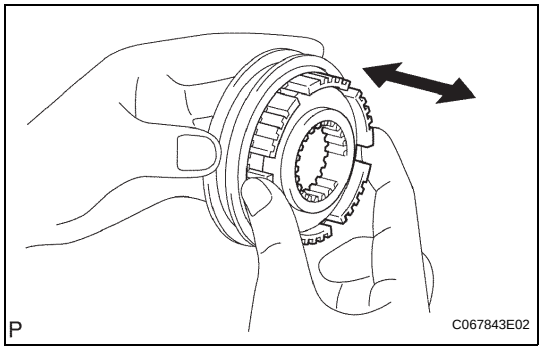
(a) Coat the 3rd gear cone with gear oil. Turn the No. 3 synchronizer ring in one direction while pushing it against the 3rd gear cone. Check that the ring locks.

If the No. 3 synchronizer ring does not lock, replace the ring or the 3rd gear.

MX



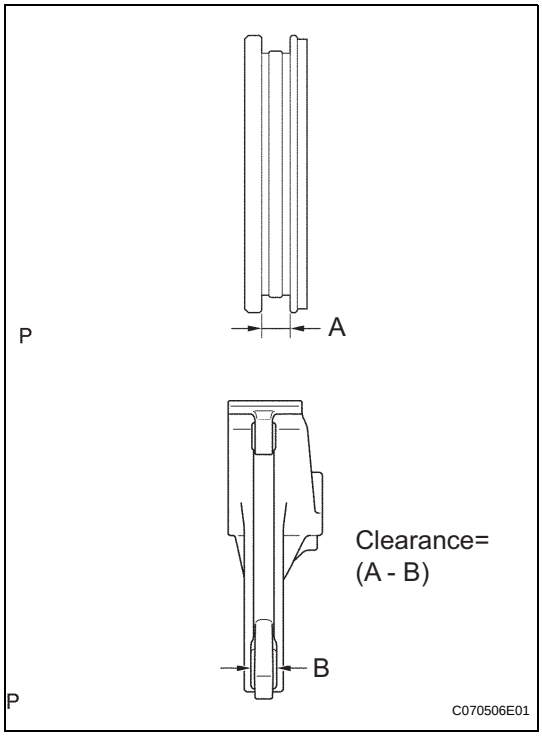
(b) Using a feeler gauge, measure the clearance between the No. 3 synchronizer ring back and 3rd gear spline end.
Standard clearance:
0.65 to 1.75 mm (0.0256 to 0.0689 in.)
If the clearance is out of specification, replace the No. 3 synchronizer ring.



6. INSPECT NO. 2 TRANSMISSION HUB SLEEVE

(a) Inspect the sliding condition between the No. 2 transmission hub sleeve and No. 2 transmission clutch hub.

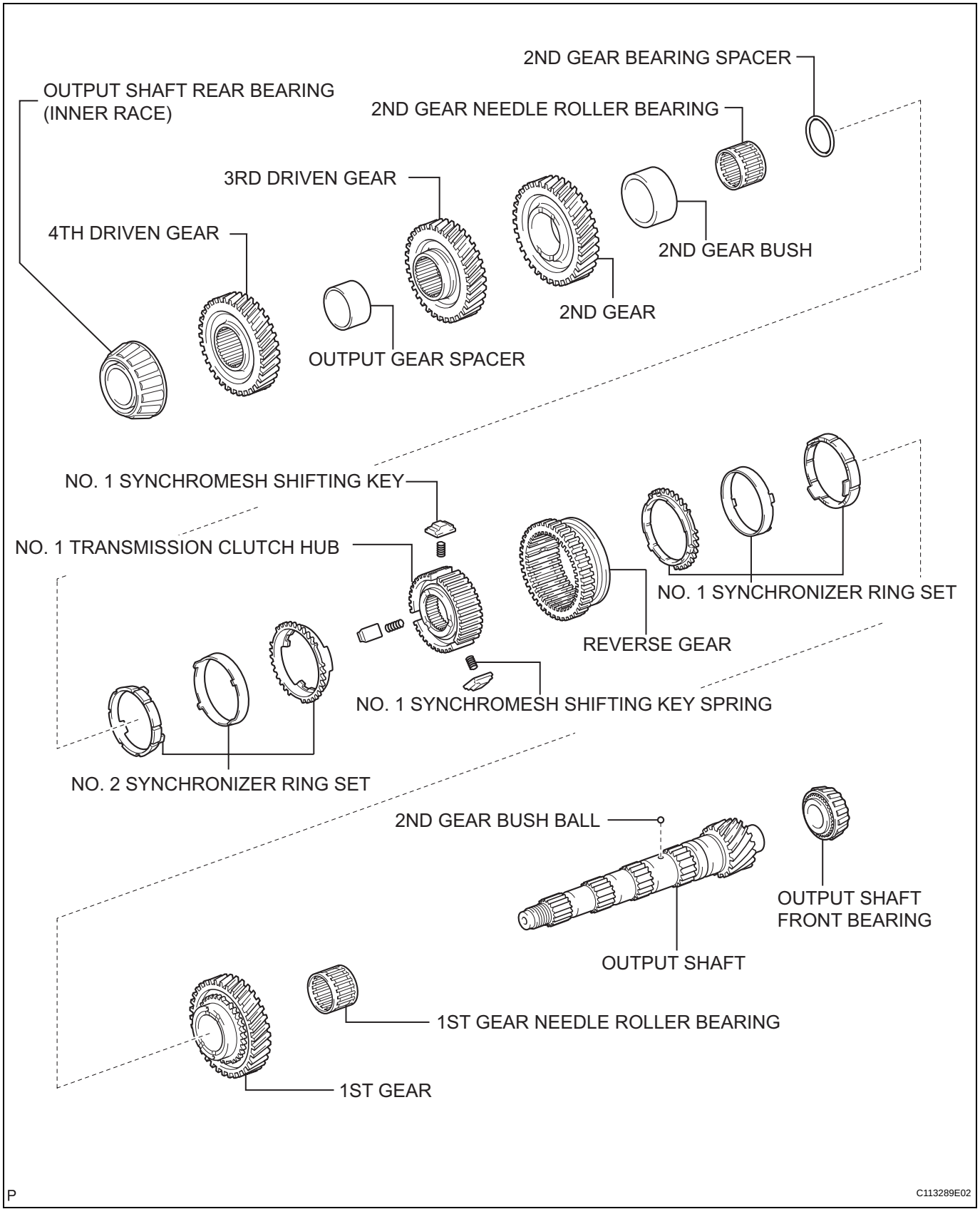
(b) Inspect the tip of the spline gear on the No. 2 transmission hub sleeve for wear.
If any defects are found, replace the transmission hub sleeve or the transmission clutch hub.



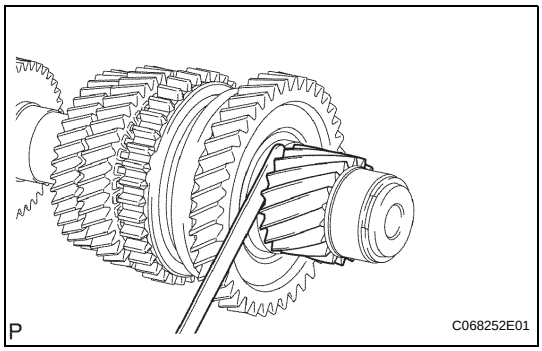
(c) Using vernier calipers, measure the width of the No. 2 transmission hub sleeve groove (A) and the thickness of the claw part on the No. 2 gear shift fork (B), and calculate the clearance.
Standard clearance:
A - B = 0.11 to 0.69 mm
If the clearance is out of specification, replace the No. 2 transmission hub sleeve and No. 2 gear shift fork with new ones.

OUTPUT SHAFT

COMPONENTS



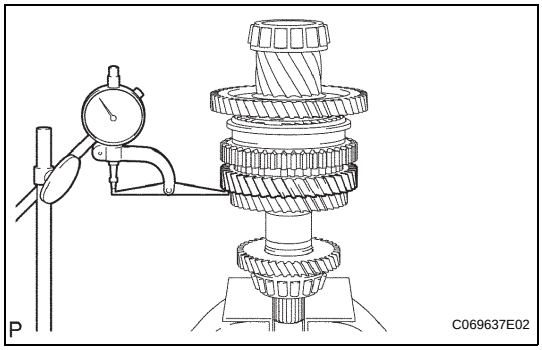
MX



REMOVAL

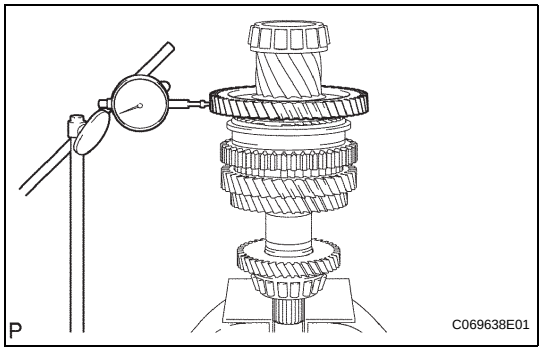
1. INSPECT 1ST GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the thrust clearance.
Standard clearance:
0.25 to 0.40 mm (0.0098 to 0.0157 in.)
If the clearance is out of specification, replace the 1st gear or No. 1 transmission clutch hub.



2. INSPECT 2ND GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance.
Standard clearance:
0.10 to 0.35 mm (0.0039 to 0.0138 in.)
If the clearance is out of specification, replace the No. 1 transmission clutch hub, 2nd gear or 3rd driven gear.

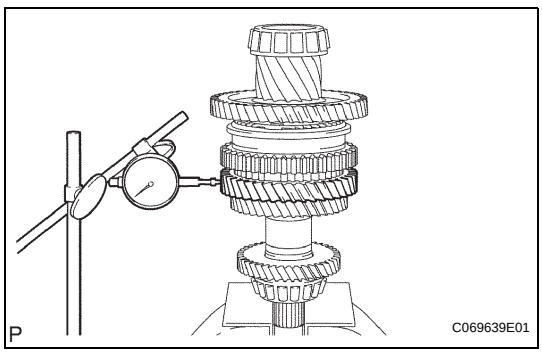


3. INSPECT 1ST GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.
Standard clearance

Bearing	Standard clearance
KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)

If the clearance is out of specification, replace the 1st gear and 1st gear needle roller bearing.



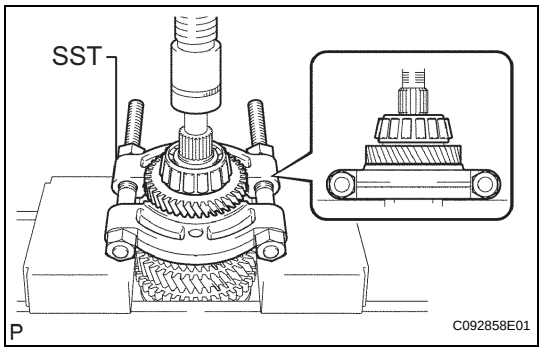
4. INSPECT 2ND GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.
Standard clearance

Bearing	Standard clearance
KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)

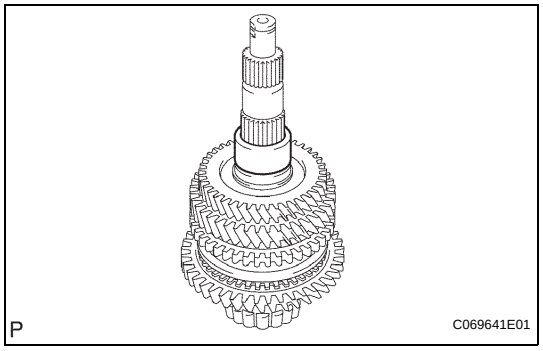
If the clearance is out of specification, replace the 2nd gear, 2nd gear bush and 2nd gear needle roller bearing.

MX



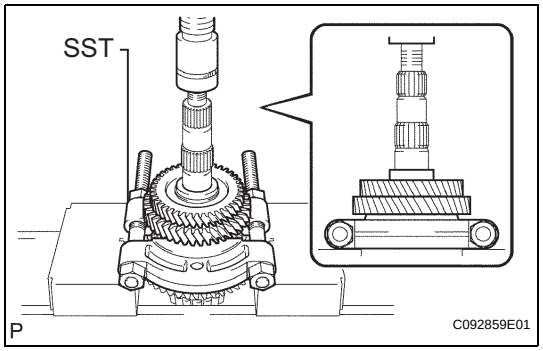
5. REMOVE 4TH DRIVEN GEAR

(a) Using SST and a press, press out the output shaft rear bearing (inner race) and 4th driven gear.
SST 09950-00020



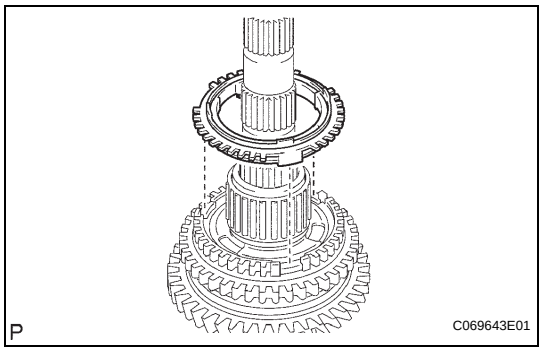
6. REMOVE OUTPUT GEAR SPACER

(a) Remove the output gear spacer from the output shaft.



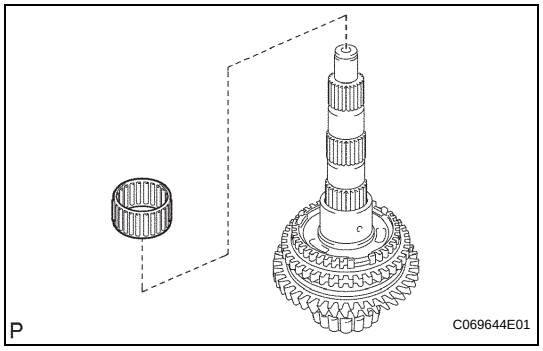
7. REMOVE 2ND GEAR

(a) Using SST and a press, press out the 3rd driven gear and 2nd gear from the output shaft.
SST 09950-00020



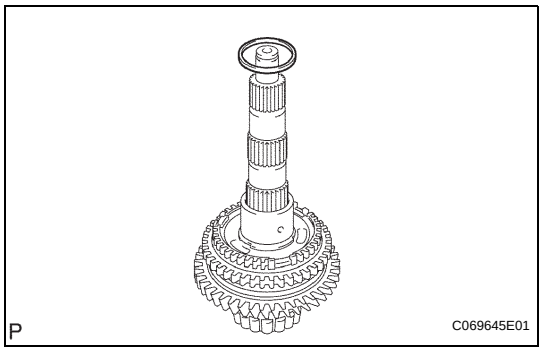
8. REMOVE NO. 2 SYNCHRONIZER RING SET

(a) Remove the No. 2 synchronizer ring set from the No. 1 transmission clutch hub.



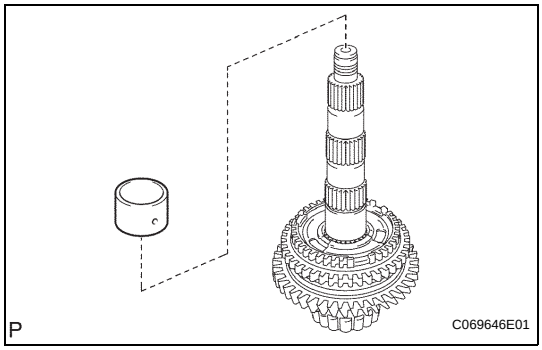
9. REMOVE 2ND GEAR NEEDLE ROLLER BEARING

(a) Remove the needle roller bearing from the output shaft.



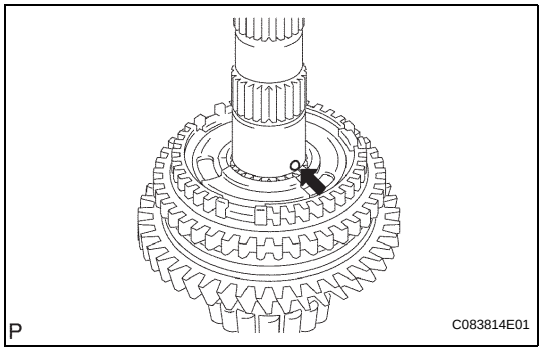
10. REMOVE 2ND GEAR BEARING SPACER

(a) Remove the bearing spacer from the output shaft.



11. REMOVE 2ND GEAR BUSH

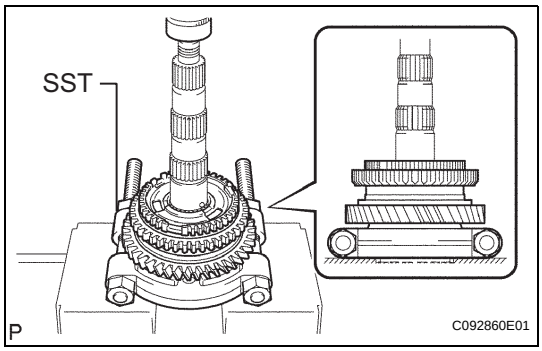
(a) Remove the bush from the output shaft.



12. REMOVE 2ND GEAR BUSH BALL

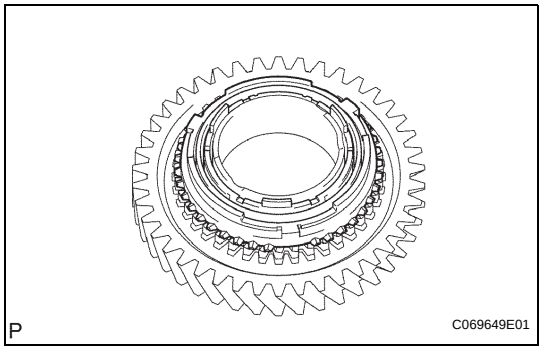
(a) Using a magnetic finger, remove the bush ball from the output shaft.

MX



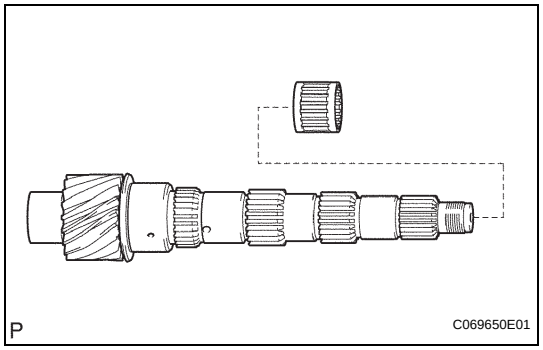
13. REMOVE 1ST GEAR

(a) Using SST and a press, remove the No. 1 transmission clutch hub and 1st gear from the output shaft.
SST 09950-00020



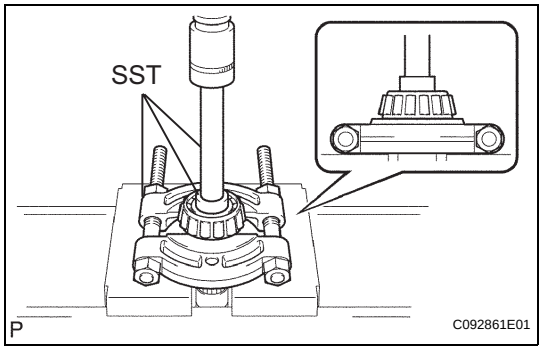
14. REMOVE NO. 1 SYNCHRONIZER RING SET

(a) Remove the No. 1 synchronizer ring set from the 1st gear.



15. REMOVE 1ST GEAR NEEDLE ROLLER BEARING

(a) Remove the needle roller bearing from the output shaft.



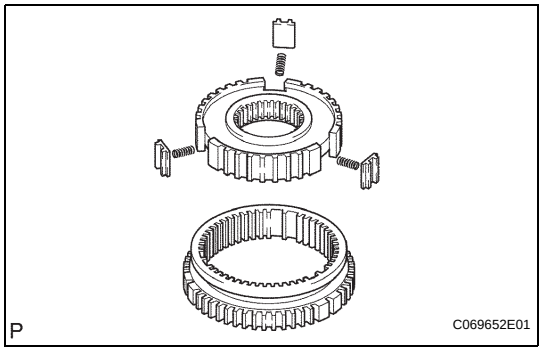
16. REMOVE FRONT OUTPUT SHAFT BEARING

(a) Using SST and a press, press out the front bearing (inner race) from the output shaft.

SST 09950-00020, 09950-60010 (09951-00320), 09950-70010 (09951-07150)

NOTICE:

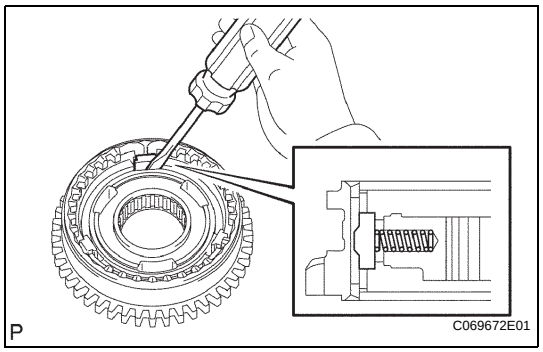
Do not overtighten the SST.



17. REMOVE REVERSE GEAR

(a) Remove the No. 1 transmission clutch hub, 3 No. 1 synchromesh shifting keys and 3 No. 1 synchromesh shifting key springs from the reverse gear.

INSTALLATION



1. INSTALL REVERSE GEAR

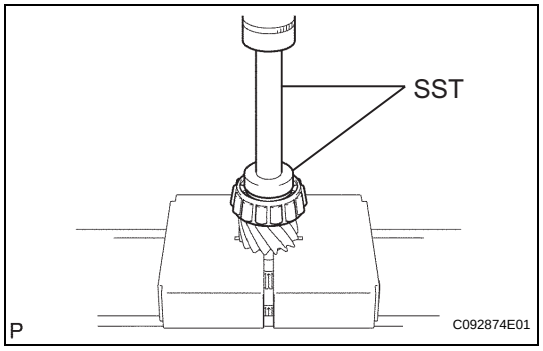
(a) Coat the reverse gear with gear oil.

(b) Install the 3 No. 1 synchromesh shifting key springs and No. 1 transmission clutch hub to the reverse gear.

NOTICE:

Assemble the reverse gear and the No. 1 transmission clutch hub in the correct direction.

(c) Using a screwdriver, install the 3 No. 1 synchromesh shifting keys to the reverse gear.

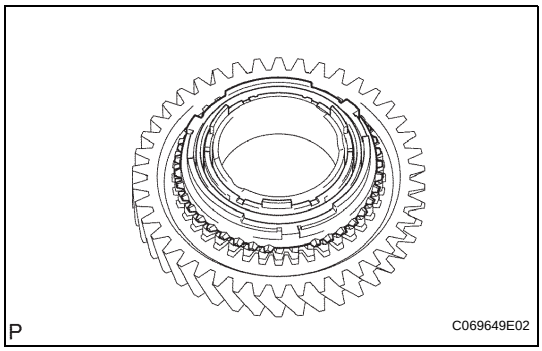


2. INSTALL FRONT OUTPUT SHAFT BEARING

(a) Using SST and a press, press in the front bearing (inner race) to the output shaft.

SST 09950-60010 (09951-00430), 09950-70010 (09951-07150)

MX

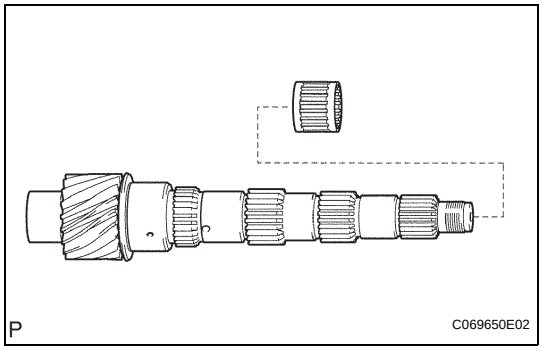


3. INSTALL NO. 1 SYNCHRONIZER RING SET

(a) Coat the No. 1 synchronizer ring set with gear oil, and install it to the 1st gear.

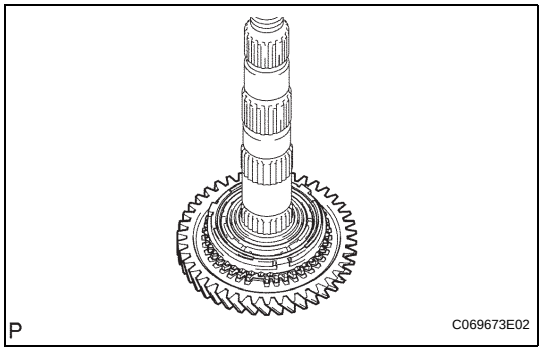
NOTICE:

Align the claw of the No. 1 synchronizer ring set (middle) with the hole of the 1st gear and install it.



4. INSTALL 1ST GEAR NEEDLE ROLLER BEARING

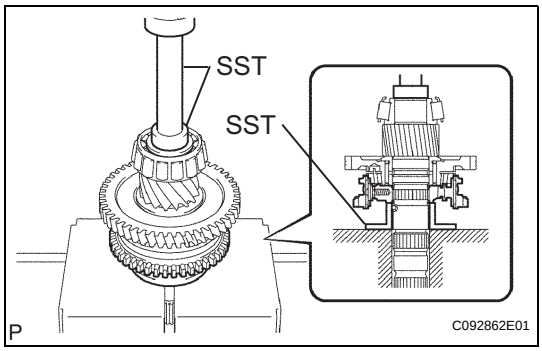
(a) Coat the needle roller bearing with gear oil, and install it to the output shaft.



5. INSTALL 1ST GEAR

(a) Coat the 1st gear with gear oil, and install it to the output shaft.

MX



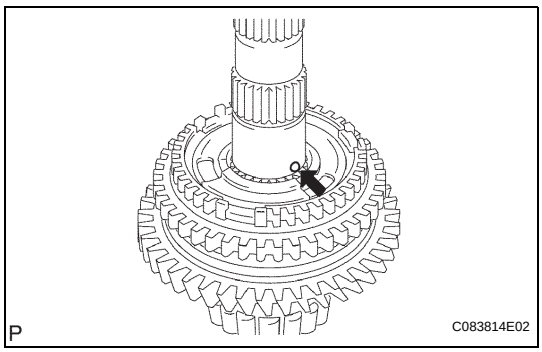
6. INSTALL NO. 1 TRANSMISSION CLUTCH HUB

(a) Using SST and a press, press in the No. 1 transmission clutch hub to the output shaft.

SST 09316-60011 (09316-00031), 09950-60010 (09951-00320), 09950-70010 (09951-07100)

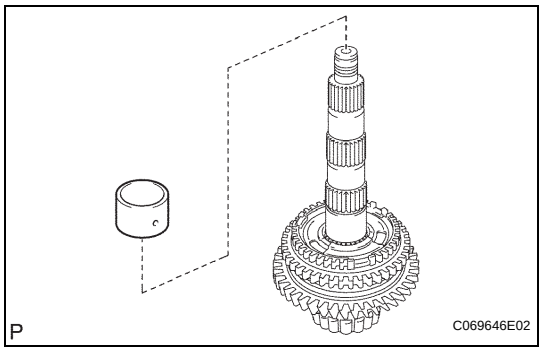
NOTICE:

- **Align the claw of the No. 1 synchronizer ring set (outer) with the hole of the No. 1 transmission clutch hub and install it.**
- **Make sure that the 1st gear rotates.**



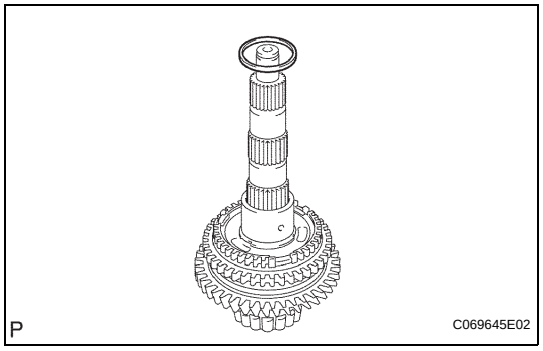
7. INSTALL 2ND GEAR BUSH BALL

(a) Coat the bush ball with MP grease, and install it to the output shaft.



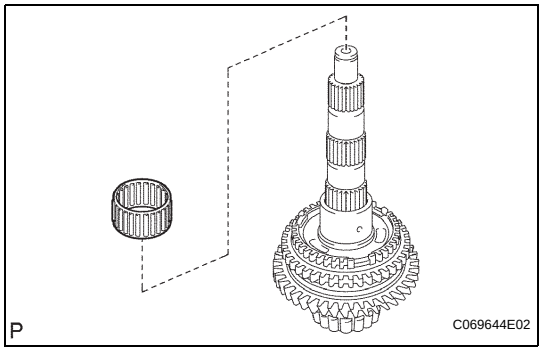
8. INSTALL 2ND GEAR BUSH

(a) Coat the bush with gear oil, and install it to the output shaft.



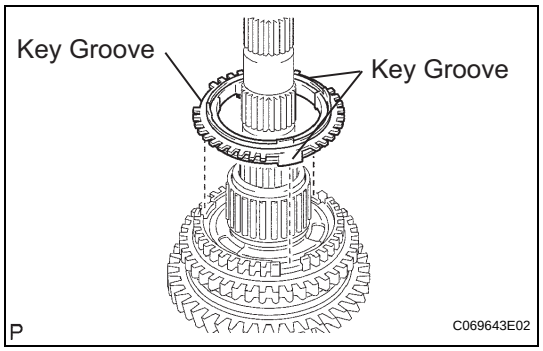
9. INSTALL 2ND GEAR BEARING SPACER

(a) Coat the bearing spacer with gear oil, and install it to the output shaft.



10. INSTALL 2ND GEAR NEEDLE ROLLER BEARING

(a) Coat the needle roller bearing with gear oil, and install it to the output shaft.

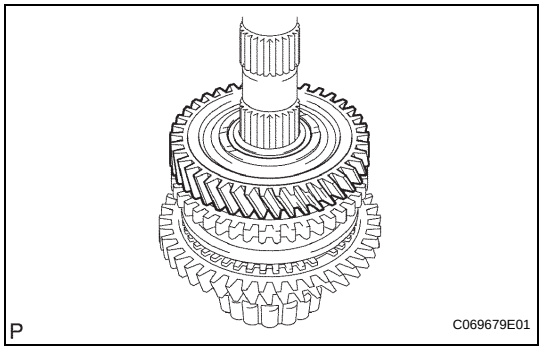


11. INSTALL NO. 2 SYNCHRONIZER RING SET

(a) Coat the No. 2 synchronizer ring set with gear oil, and install it to the No. 1 transmission clutch hub.

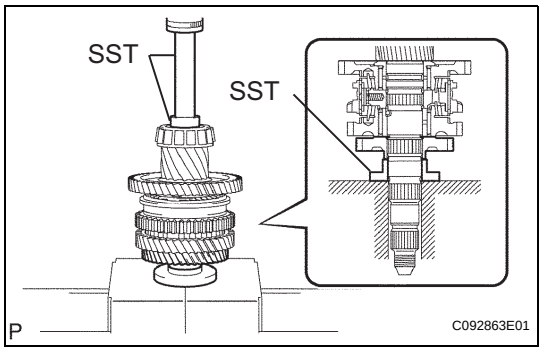
NOTICE:

Align the key groove on the No. 2 synchronizer ring set with the No. 1 synchromesh shifting key.



12. INSTALL 2ND GEAR

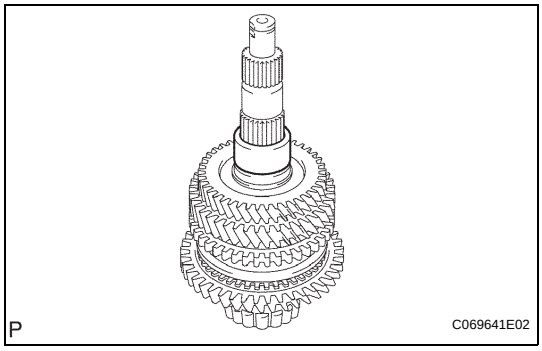
(a) Coat the 2nd gear with gear oil, and install it to the output shaft.



13. INSTALL 3RD DRIVEN GEAR

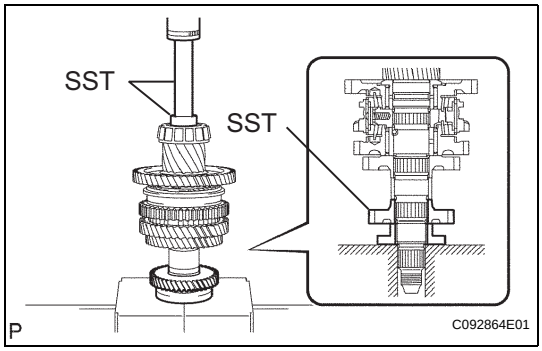
(a) Using SST and a press, press in the 3rd driven gear to the output shaft.

SST 09608-00071, 09950-60010 (09951-00320), 09950-70010 (09951-07100)



14. INSTALL OUTPUT GEAR SPACER

(a) Install the output gear spacer to the output shaft.

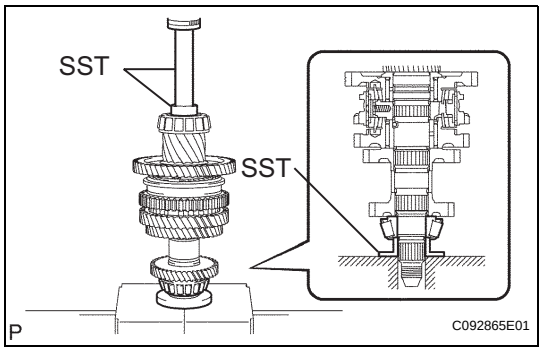


15. INSTALL 4TH DRIVEN GEAR

(a) Using SST and a press, press in the 4th driven gear to the output shaft.

SST 09608-00071, 09950-60010 (09951-00320), 09950-70010 (09951-07100)

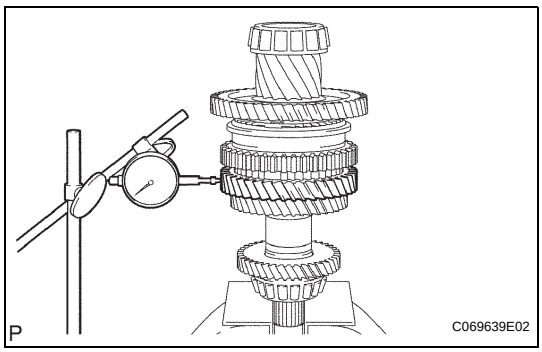
MX



16. INSTALL FRONT OUTPUT SHAFT BEARING

(a) Using SST and a press, press in the front bearing (inner race) to the output shaft.

SST 09506-30012, 09950-60010 (09951-00320), 09950-70010 (09951-07100)



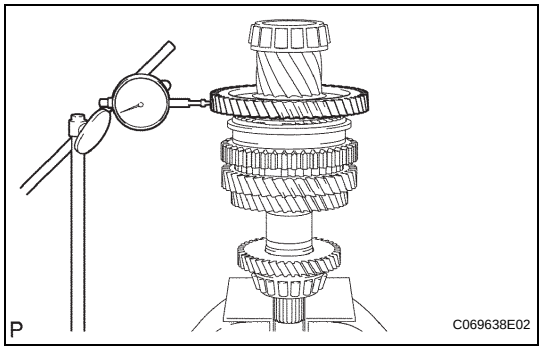
17. INSPECT 2ND GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.

Standard clearance

Bearing	Standard clearance
KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)

If the clearance is out of specification, replace the 2nd gear, 2nd gear bush and 2nd gear needle roller bearing.



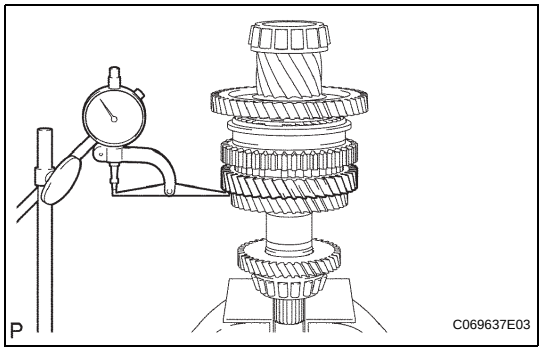
18. INSPECT 1ST GEAR RADIAL CLEARANCE

(a) Using a dial indicator, measure the radial clearance.

Standard clearance

Bearing	Standard clearance
KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)

If the clearance is out of specification, replace the 1st gear and 1st gear needle roller bearing..



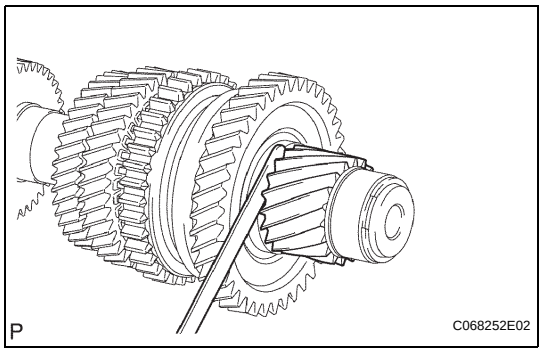
19. INSPECT 2ND GEAR THRUST CLEARANCE

(a) Using a dial indicator, measure the thrust clearance.

Standard clearance:

0.10 to 0.35 mm (0.0039 to 0.0138 in.)

If the clearance is out of specification, replace the No. 1 transmission clutch hub, 2nd gear or 3rd driven gear.



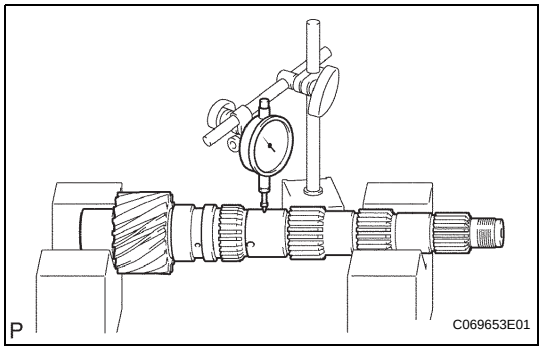
20. INSPECT 1ST GEAR THRUST CLEARANCE

(a) Using a feeler gauge, measure the thrust clearance.

Standard clearance:

0.25 to 0.40 mm (0.0098 to 0.0157 in.)

If the clearance is out of specification, replace the 1st gear or No. 1 transmission clutch hub.



INSPECTION

1. INSPECT OUTPUT SHAFT

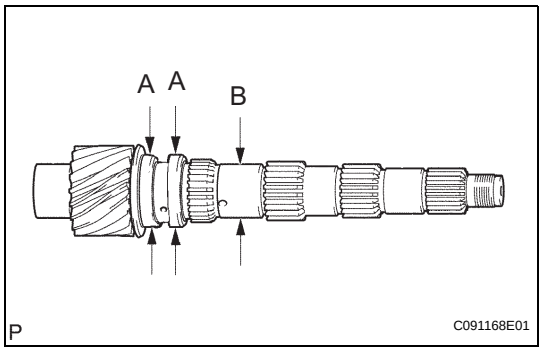
(a) Using a V-block and a dial indicator, inspect the shaft for runout.

Maximum runout:

0.03 mm (0.0012 in.)

If the runout is greater than the maximum, replace the output shaft.

MX



(b) Using a micrometer, measure the outside diameter of the output shaft journal surface.

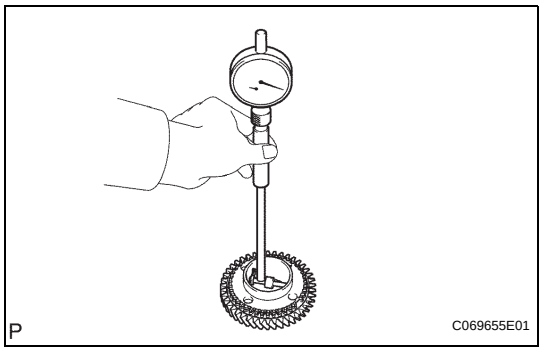
Standard outside diameter

Journal Position	Specified Condition
A	37.610 to 37.626 mm (1.4807 to 1.4813 in.)
B	34.502 to 34.512 mm (1.3583 to 1.3587 in.)

Minimum outside diameter

Journal Position	Specified Condition
A	37.610 mm (1.4807 in.)
B	34.502 mm (1.3583 in.)

If the outside diameter is less than the minimum, replace the output shaft.

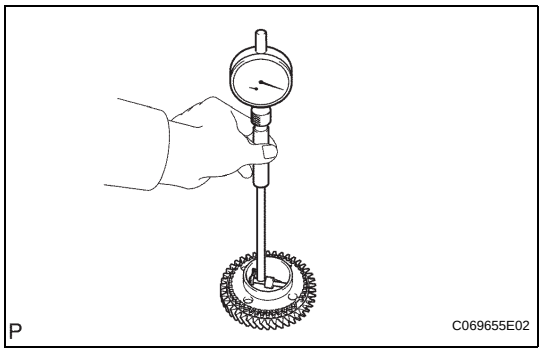


2. INSPECT 2ND GEAR

(a) Using a cylinder gauge, measure the inside diameter.

Standard inside diameter:
50.009 to 50.025 mm (1.9689 to 1.9695 in.)
Maximum inside diameter:
50.025 mm (1.9695 in.)

If the inside diameter is greater than the maximum, replace the 2nd gear.

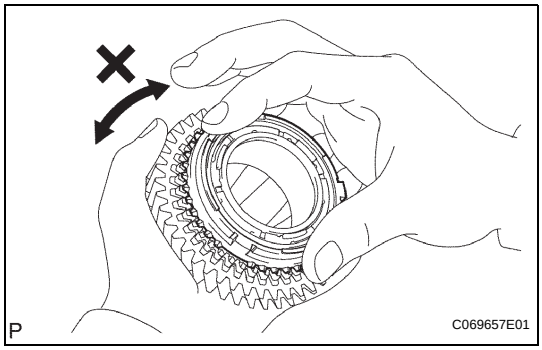


3. INSPECT 1ST GEAR

(a) Using a cylinder gauge, measure the inside diameter.

Standard inside diameter:
51.009 to 51.025 mm (2.0082 to 2.0089 in.)
Maximum inside diameter:
51.025 mm (2.0089 in.)

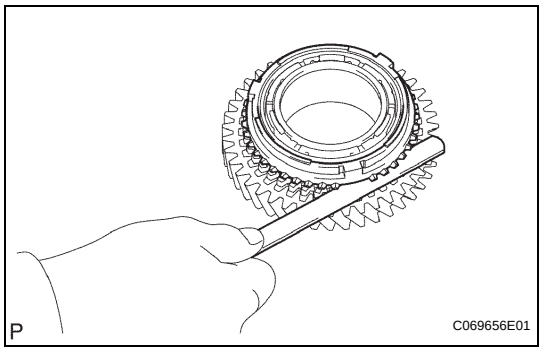
If the inside diameter is greater than the maximum, replace the 1st gear.



4. INSPECT NO. 2 SYNCHRONIZER RING SET

(a) Coat the 2nd gear cone with gear oil. Turn the No. 2 synchronizer ring set in one direction while pushing it against the No. 2 synchronizer ring set. Check that the ring locks.

If the No. 2 synchronizer ring set does not lock, replace the synchronizer ring or 2nd gear.

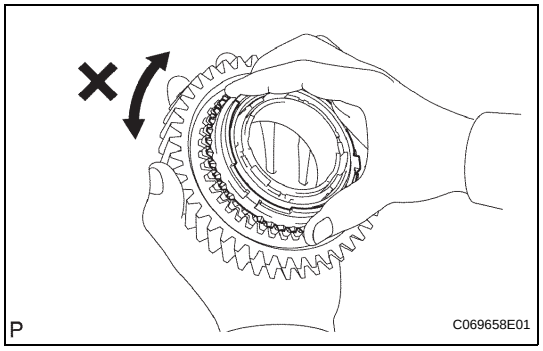


(b) Check the clearance between the No. 2 synchronizer ring set and 2nd gear while pushing the 2nd gear against the No. 2 synchronizer ring set.

Standard clearance:

0.70 to 1.45 mm (0.0276 to 0.0571 in.)

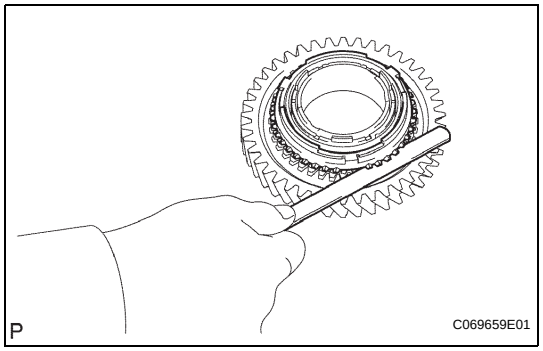
If the clearance is out of specification, replace the No. 2 synchronizer ring set with a new one.



5. INSPECT NO. 1 SYNCHRONIZER RING SET

(a) Coat the 1st gear cone with gear oil. Turn the No. 1 synchronizer ring set in one direction while pushing it against the 1st gear cone. Check that the ring locks.

If the No. 1 synchronizer ring set does not lock, replace it with a new one.

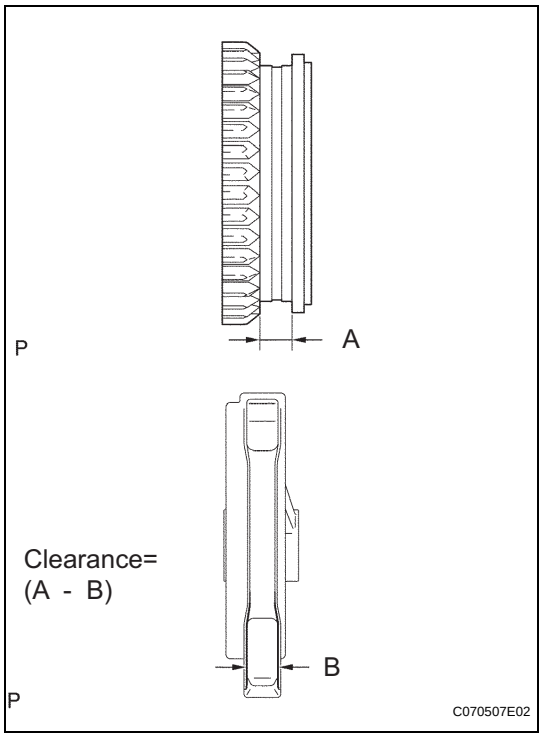


(b) Check the clearance between the No. 1 synchronizer ring set and 1st gear while pushing the 1st gear against the cone of the No. 1 synchronizer ring set.

Standard clearance:

0.70 to 1.45 mm (0.0276 to 0.0571 in.)

If the clearance is out of specification, replace the No. 1 synchronizer ring set with a new one.



6. INSPECT REVERSE GEAR

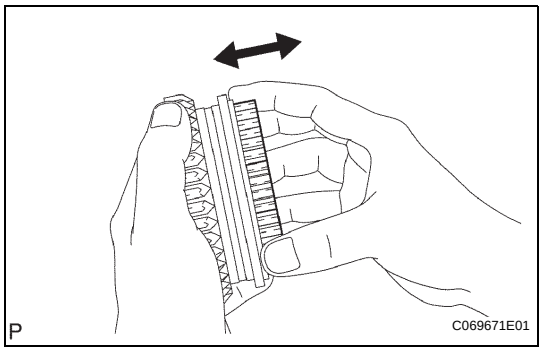
(a) Using vernier calipers, measure the width of the reverse gear groove (A) and thickness of the claw part on the No. 1 gear shift fork (B), and calculate the clearance.

Standard clearance:

A - B = 0.15 to 0.35 mm (0.0059 to 0.0138 in.)

If the clearance is out of specification, replace the reverse gear and No. 1 gear shift fork with new ones.

MX



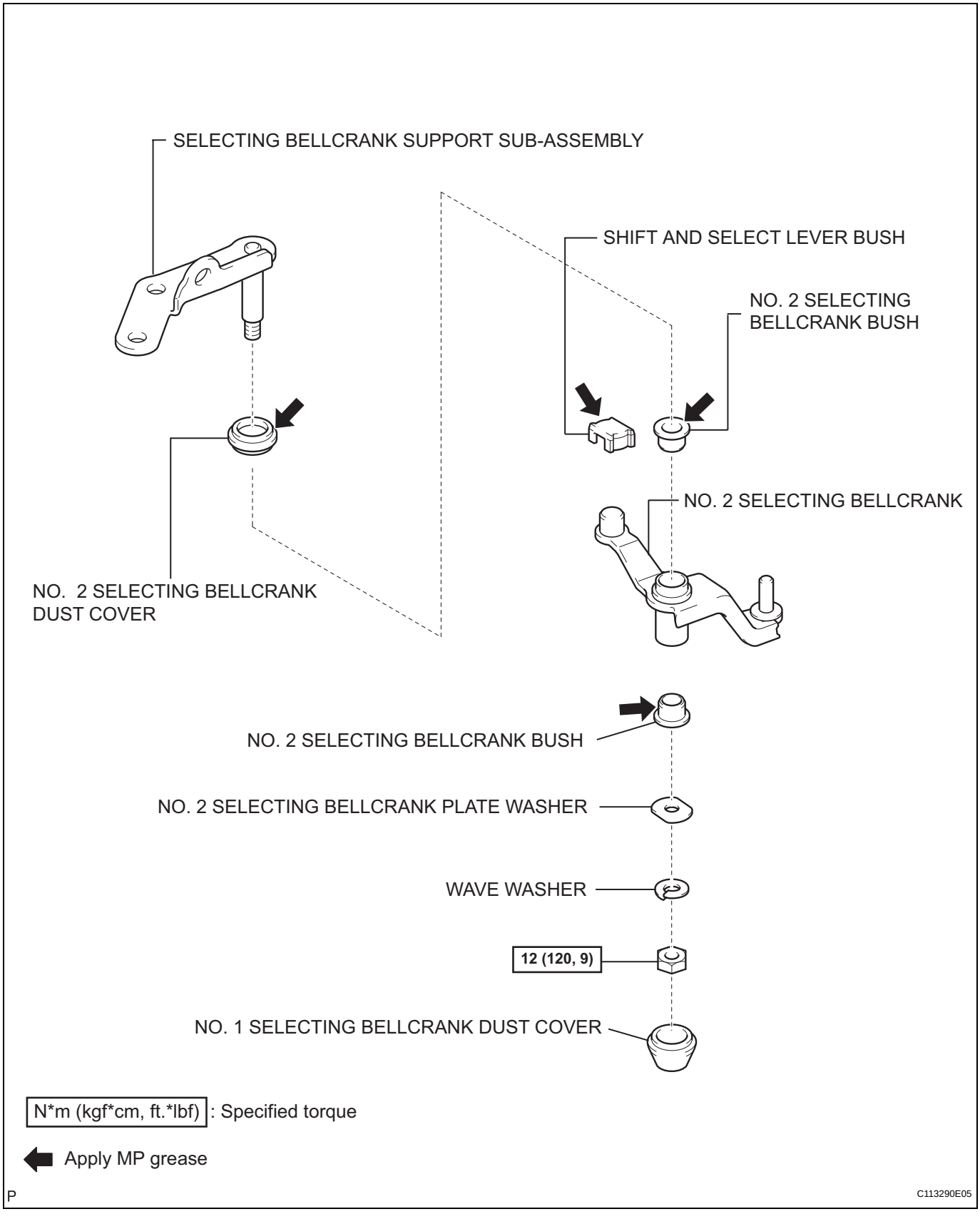
7. INSPECT NO. 1 TRANSMISSION CLUTCH HUB

(a) Check the sliding condition between the No. 1 transmission clutch hub and the reverse gear.

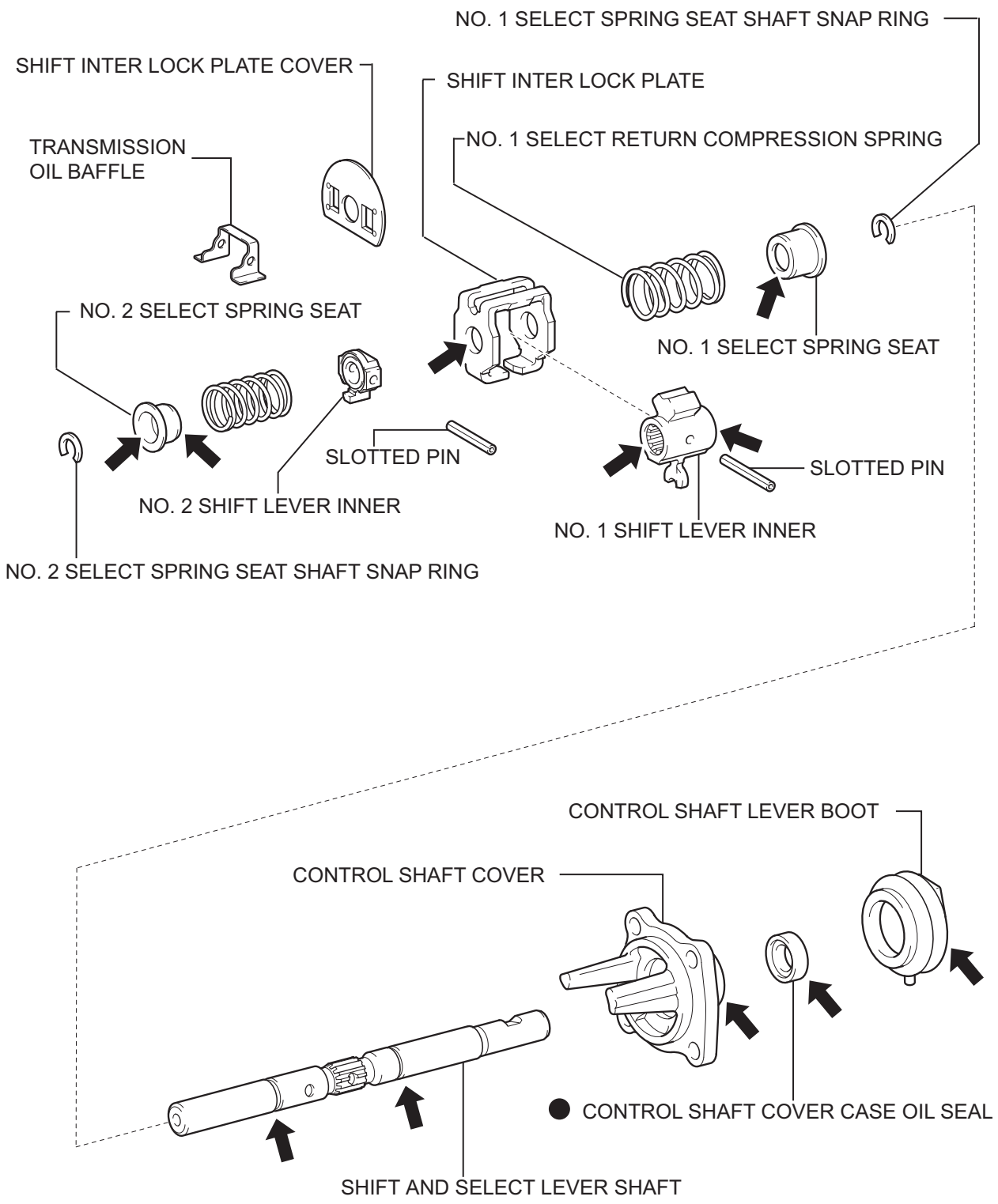
(b) Check the tip of the spline gear on the sleeve of the reverse gear for wear.
If any defects are found, replace the reverse gear or the No. 1 transmission clutch hub.

SHIFT AND SELECT LEVER SHAFT

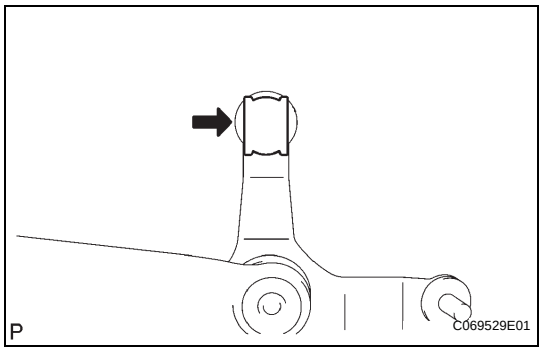
COMPONENTS



MX


NO. 1 SELECT SPRING SEAT SHAFT SNAP RING
SHIFT INTER LOCK PLATE COVER
SHIFT INTER LOCK PLATE
TRANSMISSION OIL BAFFLE
NO. 1 SELECT RETURN COMPRESSION SPRING
NO. 2 SELECT SPRING SEAT
NO. 1 SELECT SPRING SEAT
SLOTTED PIN
SLOTTED PIN
NO. 2 SHIFT LEVER INNER
NO. 1 SHIFT LEVER INNER
NO. 2 SELECT SPRING SEAT SHAFT SNAP RING
CONTROL SHAFT LEVER BOOT
CONTROL SHAFT COVER
CONTROL SHAFT COVER CASE OIL SEAL
SHIFT AND SELECT LEVER SHAFT
● Non-reusable part
Apply MP grease
P
C113291E03

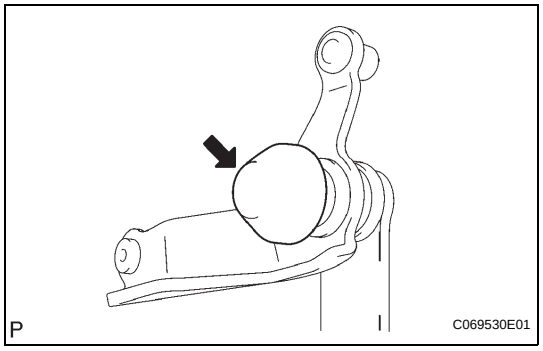
MX



REMOVAL

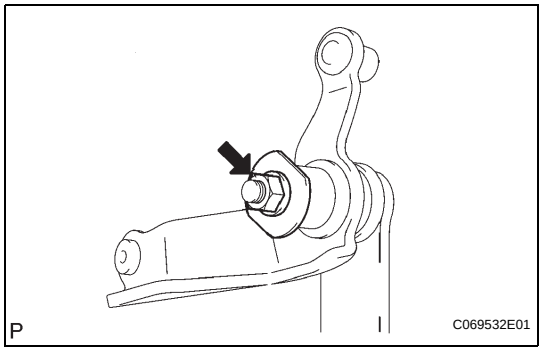
1. REMOVE SHIFT AND SELECT LEVER BUSH

(a) Remove the bush from the No. 2 selecting bellcrank.



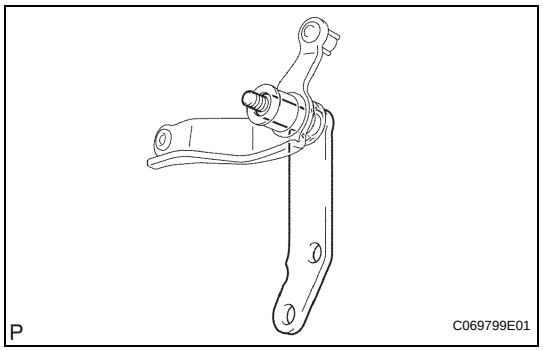
2. REMOVE NO. 1 SELECTING BELLCRANK DUST COVER

(a) Remove the dust cover from the No. 2 selecting bellcrank.

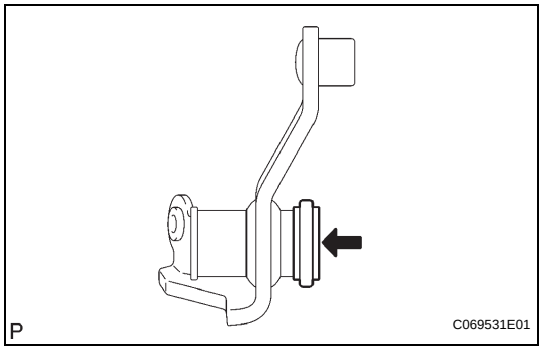


3. REMOVE SELECTING BELLCRANK SUPPORT SUB-ASSEMBLY

(a) Remove the nut, wave washer and No. 2 selecting bellcrank plate washer from the No. 2 selecting bellcrank.



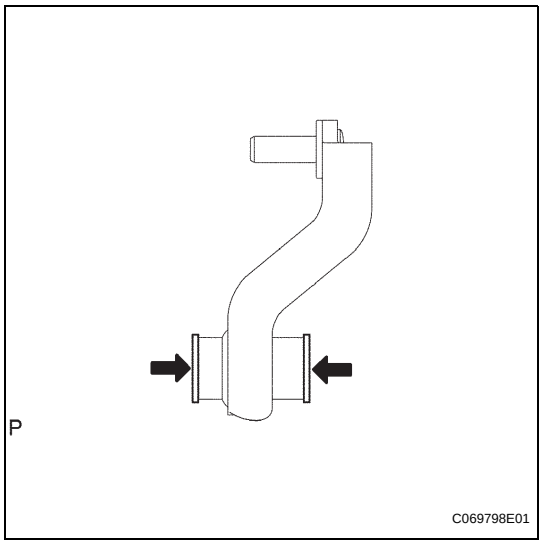
(b) Remove the selecting bellcrank support from the No. 2 selecting bellcrank.



4. REMOVE NO. 2 SELECTING BELLCRANK DUST COVER

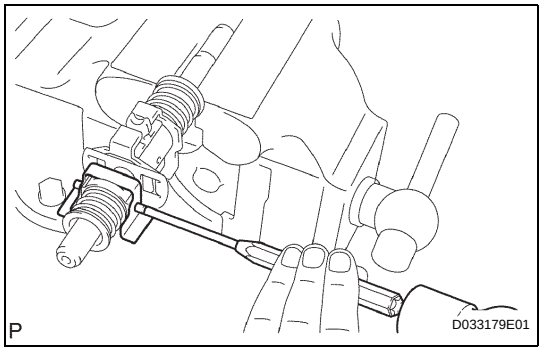
(a) Remove the dust cover from the No. 2 selecting bellcrank.

MX



5. REMOVE NO. 2 SELECTING BELLCRANK BUSH

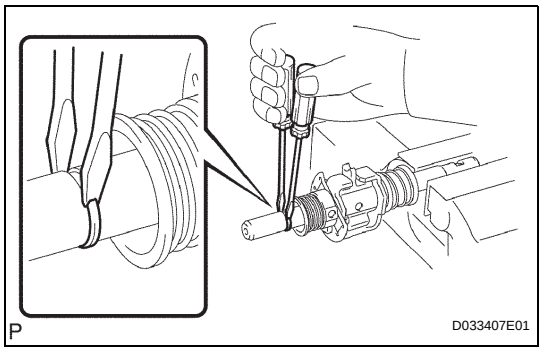
(a) Remove the bushes from the No. 2 selecting bellcrank.



6. REMOVE NO. 2 SHIFT LEVER INNER

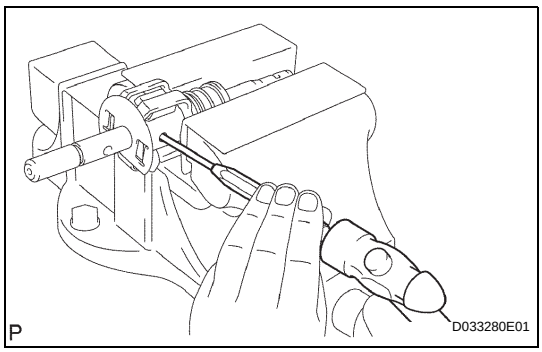
(a) Hold the shift and select lever shaft in a vise with soft jaws.
NOTICE:
Do do not damage the shift and select lever shaft.

(b) Using a 5 mm pin punch and a hammer, tap out the slotted pin and remove the transmission oil baffle.



(c) Apply force to the No. 2 select return compression spring, then using 2 screwdrivers and a hammer, tap out the No. 2 select spring seat shaft snap ring from the shift and select lever shaft.

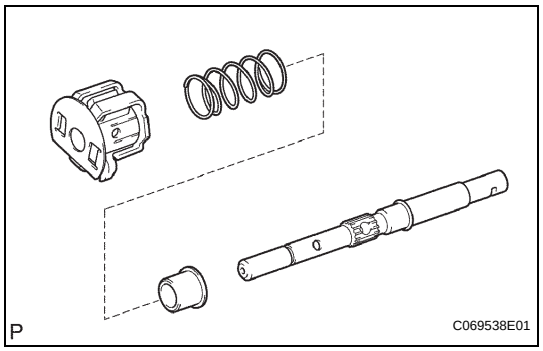
(d) Remove the No. 2 select spring seat, No. 2 select return compression spring and No. 2 shift lever inner.
NOTICE:
Use a cloth to prevent the snap ring from flying off.



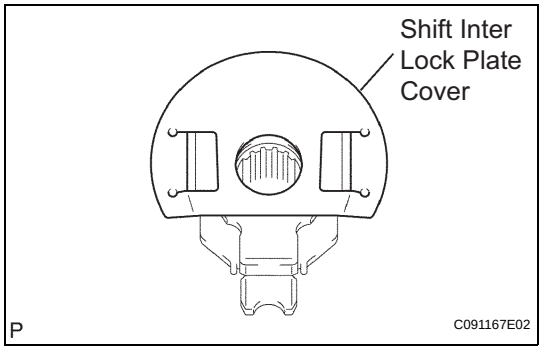
7. REMOVE NO. 1 SELECT SPRING SEAT

(a) Using a 5 mm pin punch and a hammer, remove the slotted pin from the shift and select lever shaft.

MX

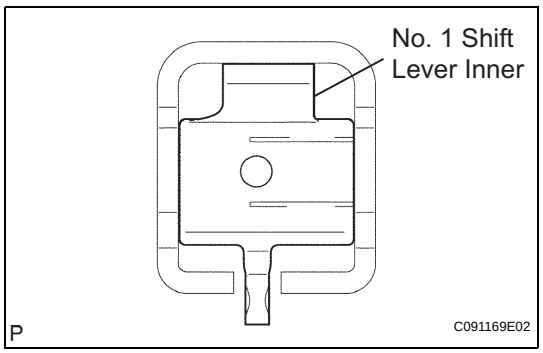


(b) Remove the shift inter lock plate assembly, shift lever assembly, No. 1 select return compression spring and No. 1 select spring seat from the shift and select lever shaft.



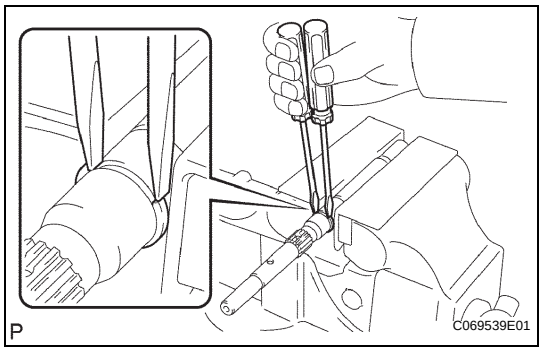
8. REMOVE SHIFT INTER LOCK PLATE COVER

(a) Remove the shift inter lock plate cover from the shift inter lock plate.



9. REMOVE NO. 1 SHIFT LEVER INNER

(a) Remove the No. 1 shift lever inner from the shift inter lock plate.

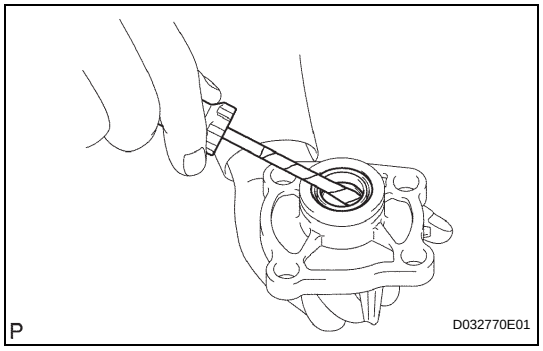


10. REMOVE NO. 1 SELECT SPRING SEAT SHAFT SNAP RING

(a) Using 2 screwdrivers and a hammer, tap out the snap ring.

11. REMOVE SHIFT AND SELECT LEVER SHAFT DUST BOOT

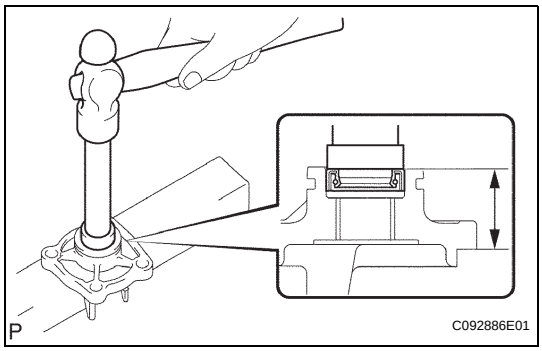
(a) Remove the dust boot from the control shaft cover.



12. REMOVE CONTROL SHAFT COVER OIL SEAL

(a) Using a screwdriver, remove the oil seal from the control shaft cover.
HINT:
Tape the screwdriver tip before use to avoid damage.

MX



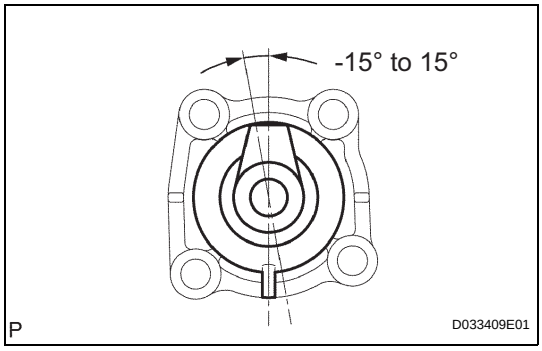
INSTALLATION

1. INSTALL CONTROL SHAFT COVER OIL SEAL

(a) Using SST and a hammer, tap in a new control shaft cover oil seal to the control shaft cover.

SST 09950-60010 (09951-00280), 09950-70010 (09951-07100)

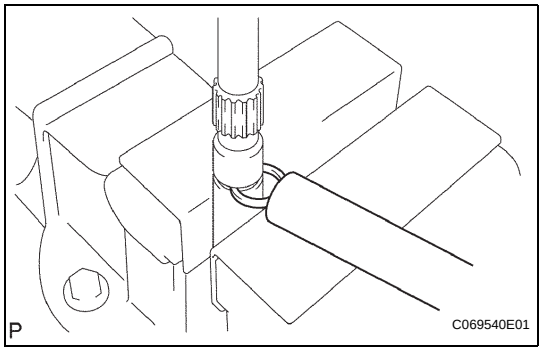
Standard oil seal drive in depth:
28.5 +- 0.50 mm (1.122 +- 0.020 in.)



2. INSTALL SHIFT AND SELECT LEVER SHAFT DUST BOOT

(a) Install the shift and select lever shaft dust boot to the control shaft cover.

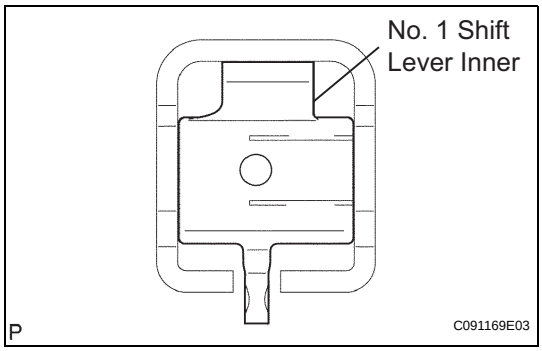
HINT:
It is acceptable for the dust boot to be tilted +15° to -15°.



3. INSTALL NO. 1 SELECT SPRING SEAT SHAFT SNAP RING

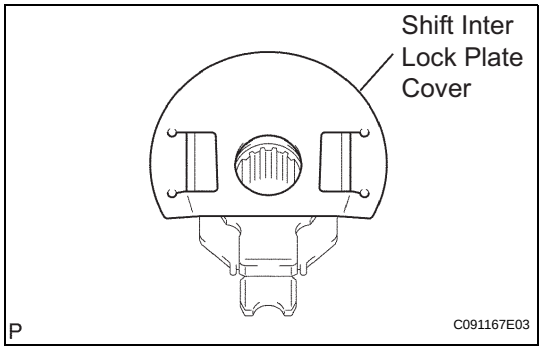
(a) Using a brass bar and hammer, tap in the shaft snap ring.

MX



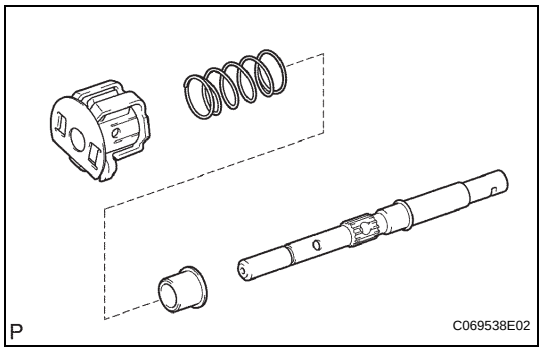
4. REMOVE NO. 1 SHIFT LEVER INNER

(a) Coat the No. 1 shift lever inner and shift inter lock plate with MP grease, and install them.



5. INSTALL SHIFT INTER LOCK PLATE COVER

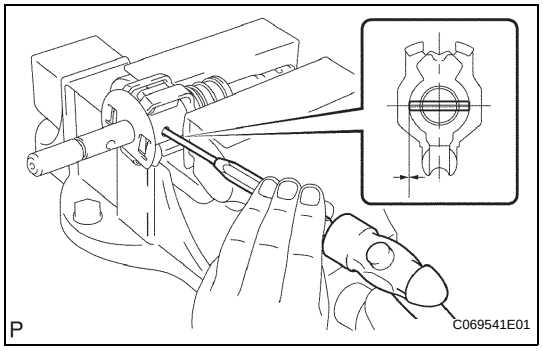
(a) Install the shift inter lock plate cover to the shift inter lock plate.



6. INSTALL NO. 1 SELECT SPRING SEAT

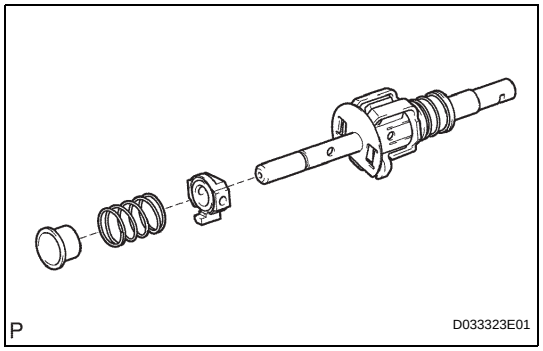
(a) Coat the No. 1 select spring seat with MP grease, and install it.

(b) Install the No. 1 select return compression spring and shift inter lock plate assembly to the shift and select lever shaft.



(c) Hold the shift and select lever shaft in a vise with soft jaws.

(d) Using a 5 mm pin punch, install the No. 1 shift lever inner slotted pin to the shift and select lever shaft.
Standard clearance:
-0.5 to 0.5 mm (-0.0197 to 0.0197 in.)

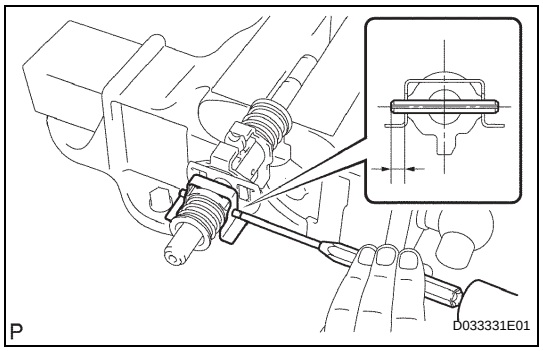


7. INSTALL NO. 2 SHIFT LEVER INNER

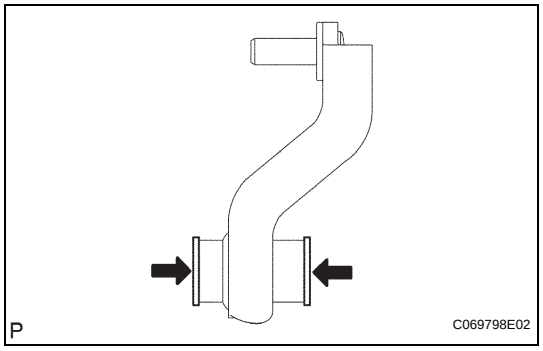
(a) Install the No. 2 shift lever inner and No. 2 select return compression spring to the shift and select lever shaft.

(b) Coat the select spring seat No. 2 with MP grease, and install it to the shift and select lever shaft.

(c) Using a brass bar and hammer, tap in the No. 2 select spring seat shaft snap ring to the shift and select lever shaft.

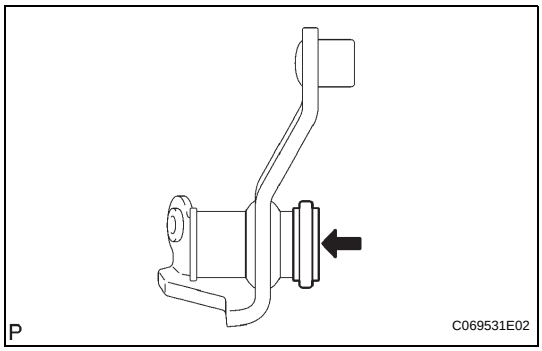


(d) Install the transmission oil baffle. Using a 5 mm pin punch and a hammer, tap in the No. 2 shift lever inner slotted pin to the shift and select lever shaft.
Standard clearance:
5.8 to 6.8 mm (0.2283 to 0.2677 in.)



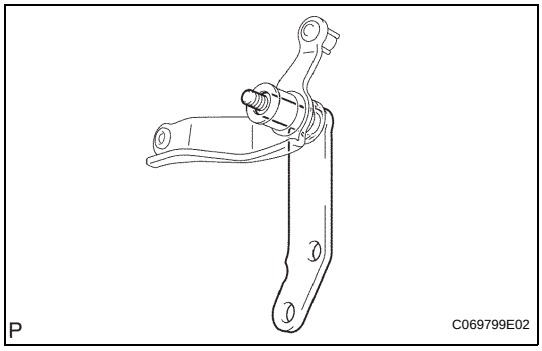
8. INSTALL NO. 2 SELECTING BELLCRANK BUSH

(a) Coat the bushes with MP grease, and install them to the No. 2 selecting bellcrank.



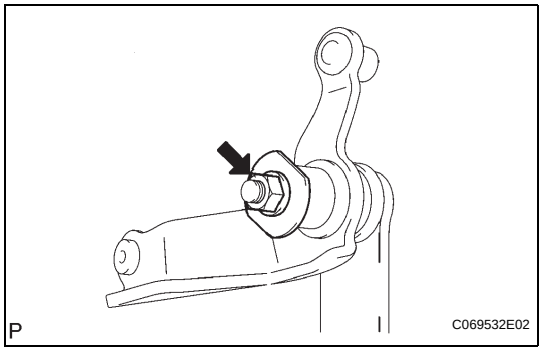
9. INSTALL NO. 2 SELECTING BELLCRANK DUST COVER

(a) Coat the dust cover with MP grease, and install it to the No. 2 selecting bellcrank.



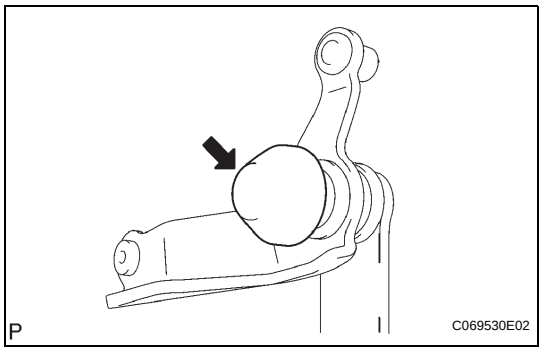
10. INSTALL SELECTING BELLCRANK SUPPORT SUB-ASSEMBLY

(a) Install the selecting bellcrank support to the No. 2 selecting bellcrank.



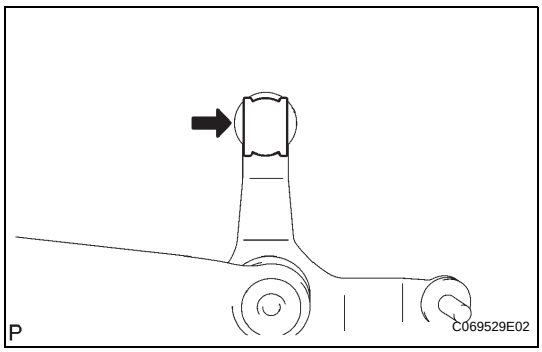
(b) Install the No. 2 selecting bellcrank plate washer, wave washer and nut.
Torque: 12 N*m (120 kgf*cm, 9 ft.*lbf)

MX



11. INSTALL NO. 1 SELECTING BELLCRANK DUST COVER

(a) Install the dust cover to the No. 2 selecting bellcrank.

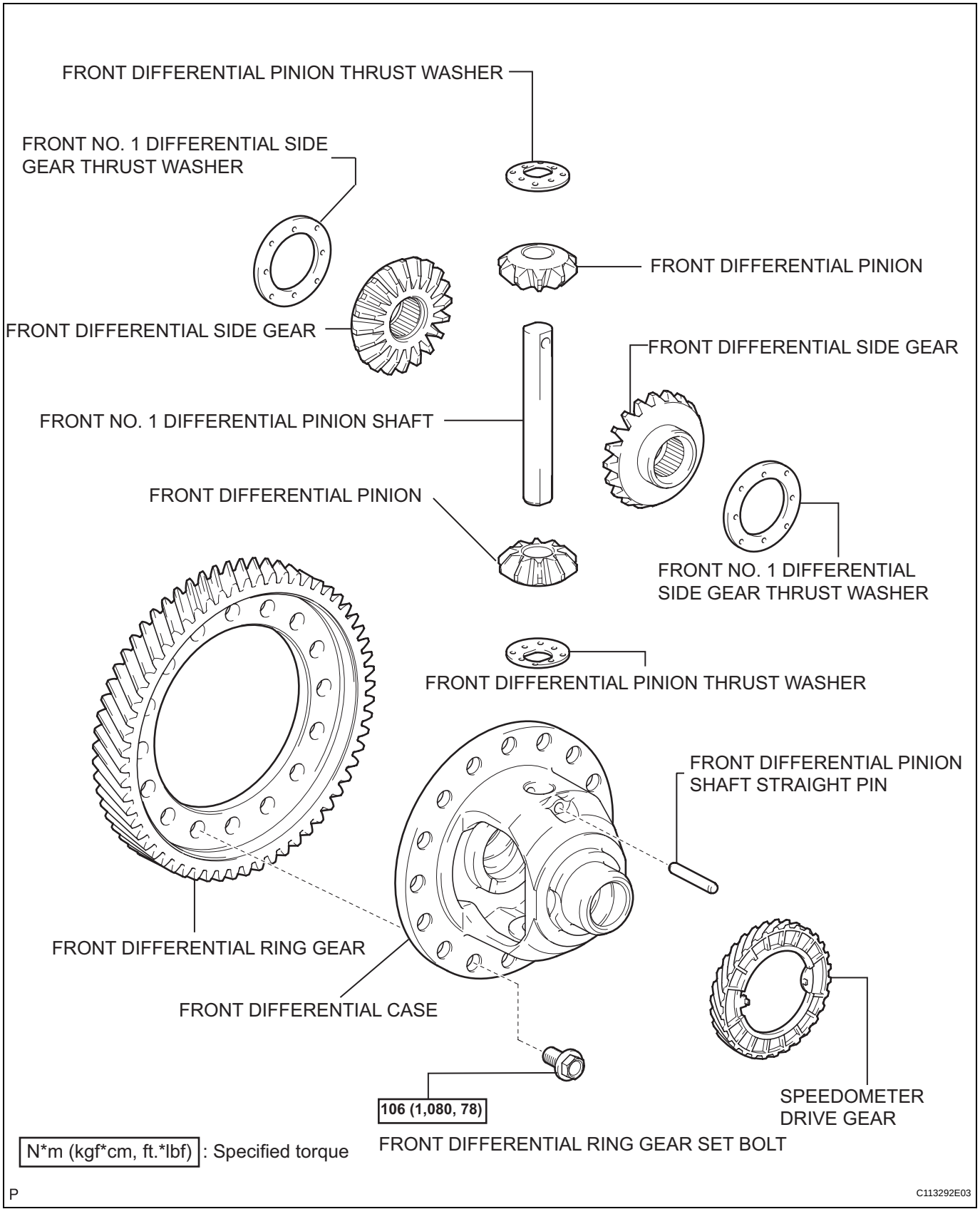


12. INSTALL SHIFT AND SELECT LEVER BUSH

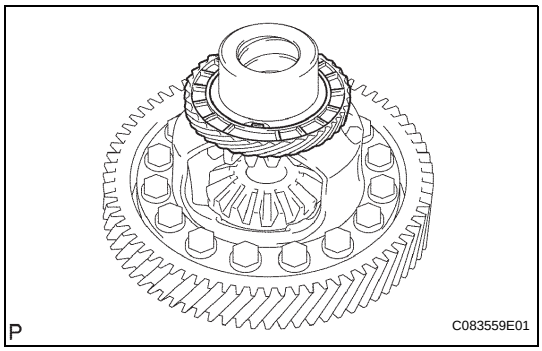
(a) Install the bush to the No. 2 selecting bellcrank.

DIFFERENTIAL CASE

COMPONENTS



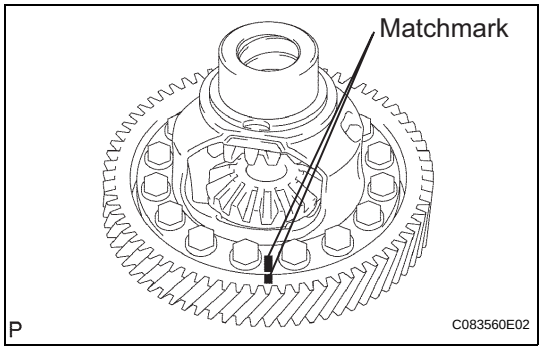
MX



REMOVAL

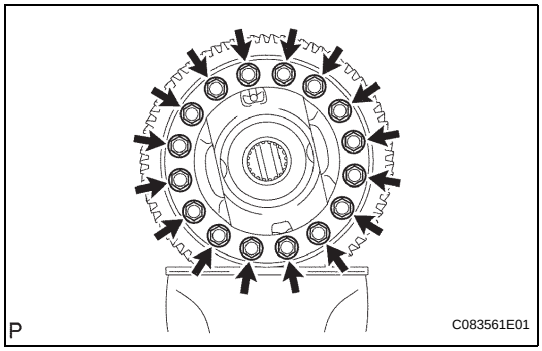
1. REMOVE SPEEDOMETER DRIVE GEAR

(a) Remove the drive gear from the front differential case.



2. REMOVE FRONT DIFFERENTIAL RING GEAR

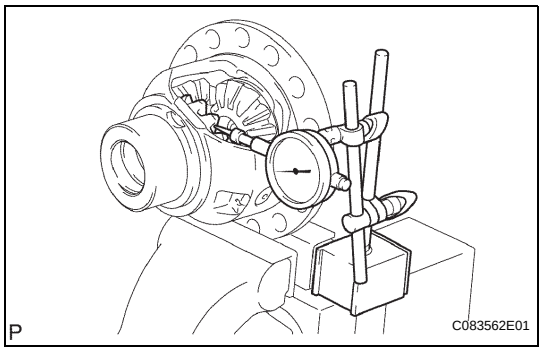
(a) Put matchmarks on the ring gear and the differential case.



(b) Remove the 16 bolts.

(c) Using a plastic-faced hammer, tap out the differential case.

MX



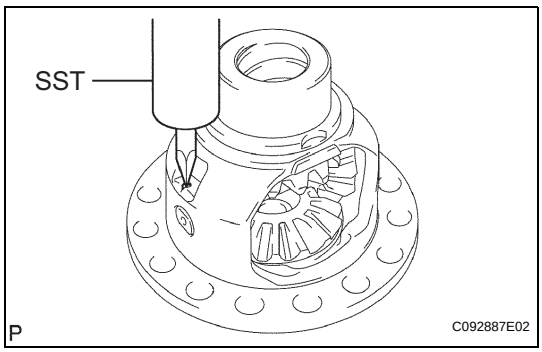
3. INSPECT FRONT DIFFERENTIAL SIDE GEAR BACKLASH

(a) Hold the differential pinion to the front differential case side. Using a dial indicator, measure the differential side gear backlash.

Standard backlash:

0.10 to 0.20 mm (0.0039 to 0.0079 in.)

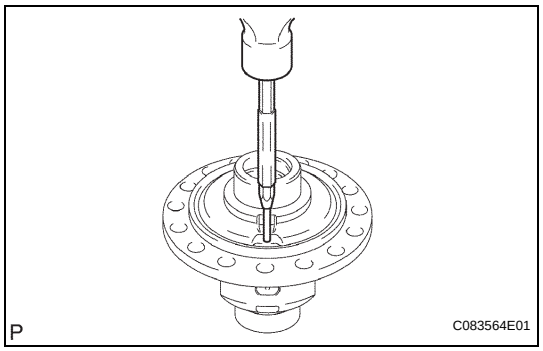
If the backlash is out of specification, install proper side gear thrust washers.



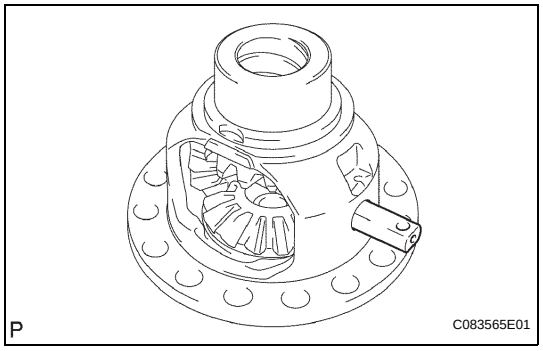
4. REMOVE FRONT DIFFERENTIAL PINION SHAFT STRAIGHT PIN

(a) Using SST and a hammer, unstake the staked part of the differential case.

SST 09930-00010

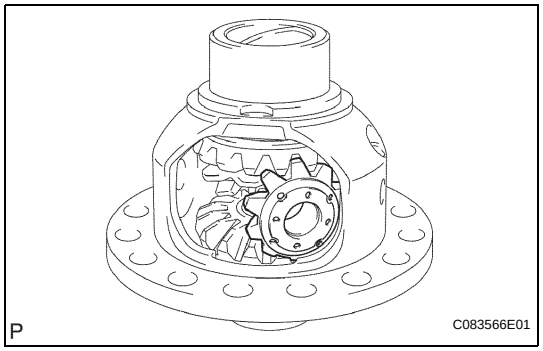


(b) Using a pin punch and a hammer, tap out the straight pin from the differential case.



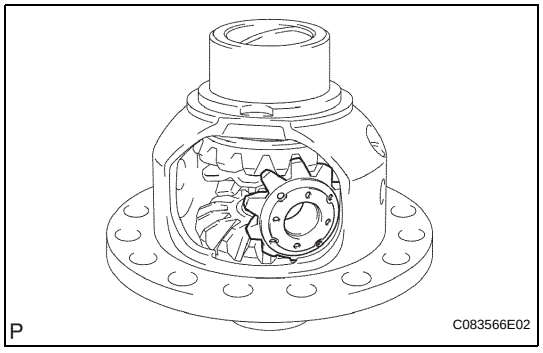
5. REMOVE FRONT NO. 1 DIFFERENTIAL PINION SHAFT

(a) Remove the No. 1 differential pinion shaft from the differential case.



6. REMOVE FRONT DIFFERENTIAL SIDE GEAR

(a) Remove the 2 differential pinions, 2 differential pinion thrust washers, 2 differential side gears and 2 No. 1 differential side gear thrust washers from the differential case.
HINT:
Remove the 2 pinion thrust washers and side gear thrust washers while turning the differential pinion.



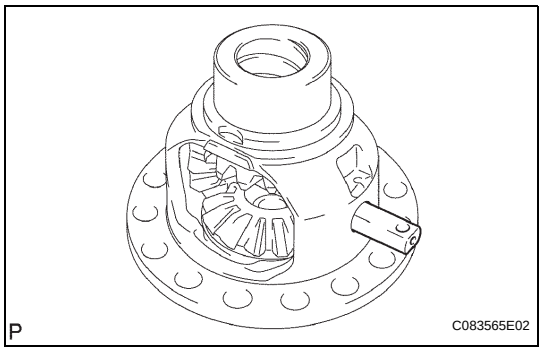
INSTALLATION

1. INSTALL FRONT DIFFERENTIAL SIDE GEAR

(a) Coat the rotating surfaces of the differential side gears with gear oil.

(b) Install the 2 differential side gear thrust washers to the 2 differential side gears.

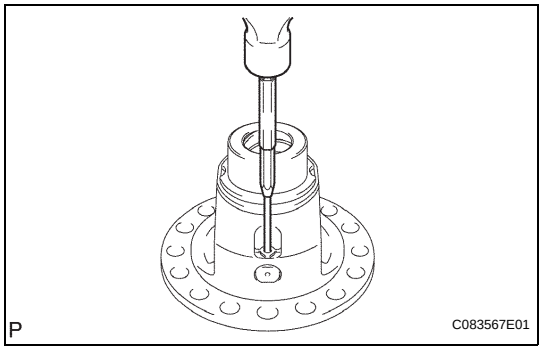
(c) Install the 2 differential side gears, 2 differential pinions and 2 differential side gear thrust washers to the differential case.
HINT:
Install the 2 differential pinions with the differential pinion thrust washers while turning the differential pinion.



2. INSTALL FRONT NO. 1 DIFFERENTIAL PINION SHAFT

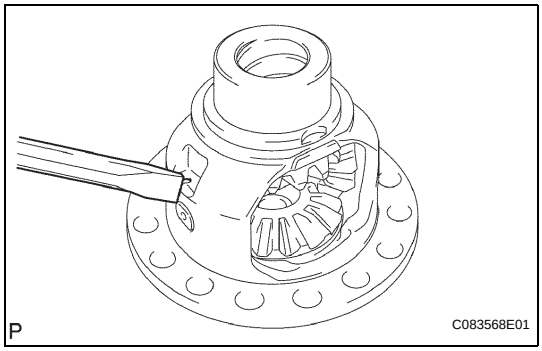
(a) Coat the rotating surface of the No. 1 differential pinion shaft with gear oil.

(b) Install the No. 1 differential pinion shaft to the differential case so that the hole for the differential pinion shaft straight pin is aligned with the hole in the differential case.

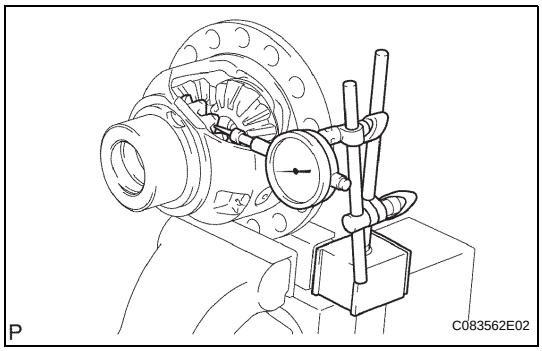


3. INSTALL FRONT DIFFERENTIAL PINION SHAFT STRAIGHT PIN

(a) Using a pin punch and a hammer, tap in the differential pinion shaft straight pin to the differential case.



(b) Using a chisel and hammer, stake the differential case hole.



4. ADJUST FRONT DIFFERENTIAL SIDE GEAR BACKLASH

(a) Hold the differential pinion to the differential case side. Using a dial indicator, measure the differential side gear backlash.

Standard backlash:

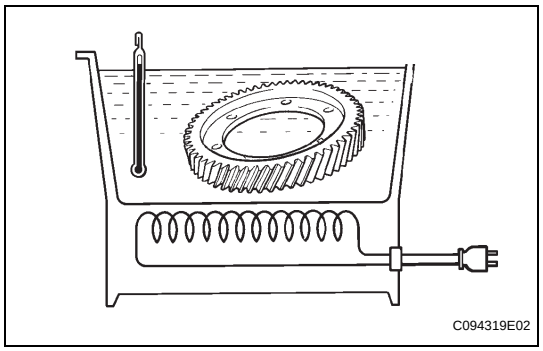
0.10 to 0.20 mm (0.0039 to 0.0079 in.)

If the backlash is out of specification, select another differential side gear thrust washer and adjust it.

Standard thrust washer thickness

Part No.	Mark	Thickness
41361-28230	1	1.00 mm (0.0394 in.)
41361-28240	2	1.10 mm (0.0433 in.)
41361-28250	3	1.20 mm (0.0472 in.)
41361-28260	4	1.30 mm (0.0512 in.)

MX

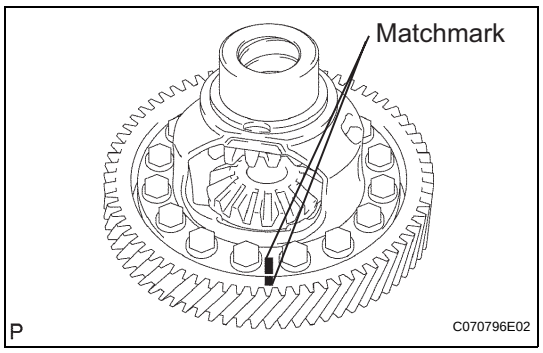

C094319E02

5. INSTALL FRONT DIFFERENTIAL RING GEAR

(a) Clean the contact surface of the differential case and differential ring gear.

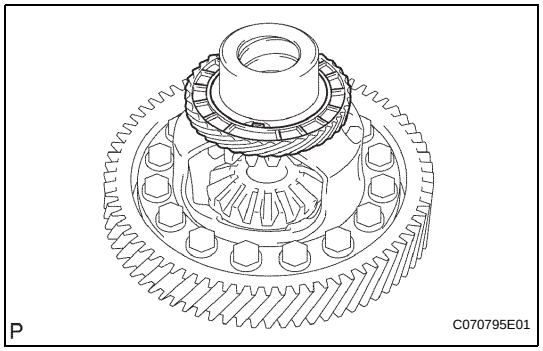
(b) Using a heater, heat the differential ring gear to 90 to 110°C (194 to 230°F).

(c) After the moisture on the ring gear has completely evaporated, quickly install the differential ring gear to the differential case.



(d) Aligning the matchmarks, quickly install the front differential ring gear to the differential case with the 16 bolts.

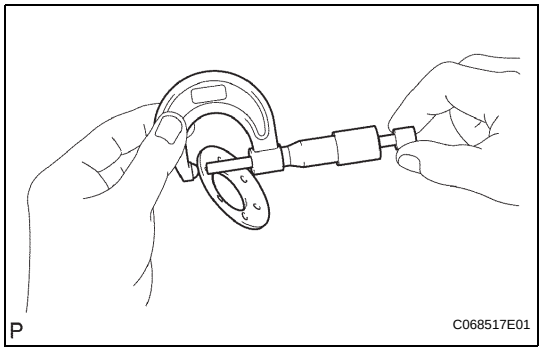
Torque: 106 N*m (1,080 kgf*cm, 78 ft.*lbf)



6. INSTALL SPEEDOMETER DRIVE GEAR

(a) Install the drive gear to the differential case.

INSPECTION

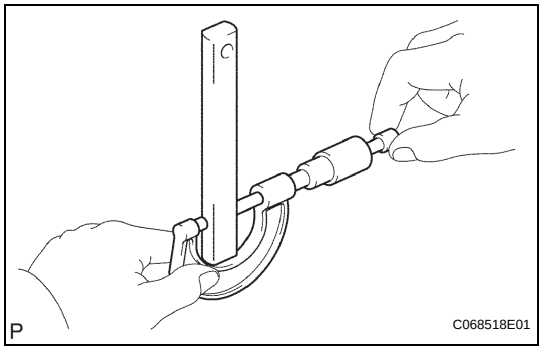


1. INSPECT FRONT DIFFERENTIAL PINION THRUST WASHER

(a) Using a micrometer, measure the thickness of the thrust washer.

Minimum thickness:
0.9 mm (0.035 in.)

If the thickness is less than the minimum, replace the thrust washer.



2. INSPECT FRONT NO. 1 DIFFERENTIAL PINION SHAFT

(a) Using a micrometer, measure the outside diameter.

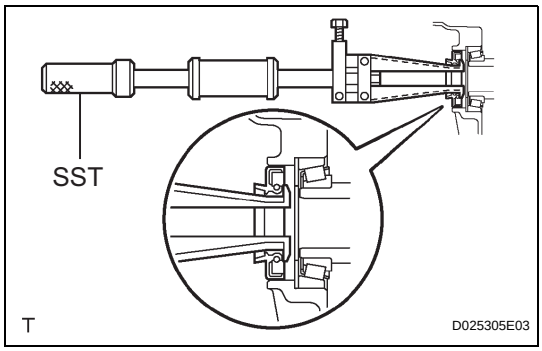
Minimum diameter:
17.975 mm (0.70768 in.)

If the outside diameter is less than the minimum, replace the No. 1 differential pinion shaft.

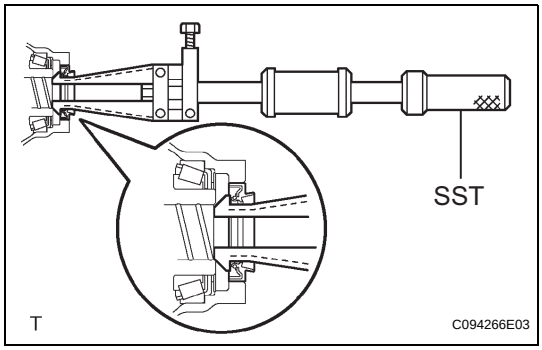
FRONT DIFFERENTIAL OIL SEAL

REMOVAL

1. **DRAIN MANUAL TRANSAXLE OIL**
   (a) Remove the filler plug and gasket.
   (b) Remove the drain plug and gasket, and drain the oil.
   (c) Install the drain plug.
2. **REMOVE FRONT WHEEL**
3. **REMOVE ENGINE UNDER COVER LH**
4. **REMOVE ENGINE UNDER COVER RH**
5. **REMOVE FRONT DRIVE SHAFT ASSEMBLY LH**
   (a) Remove the drive shaft (see page DS-5).
6. **REMOVE FRONT DRIVE SHAFT ASSEMBLY RH**
   (a) Remove the drive shaft (see page DS-5).
7. **REMOVE TRANSMISSION CASE OIL SEAL**
   (a) Using SST, tap out the oil seal.
   SST 09308-00010

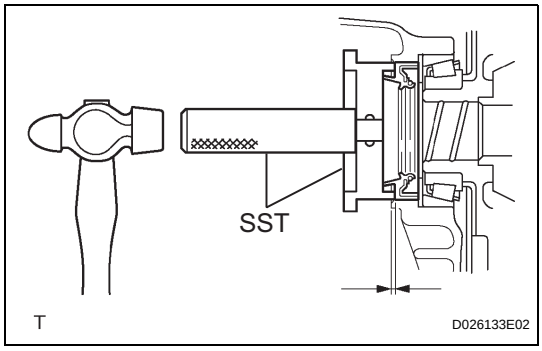


8. **REMOVE FRONT TRANSAXLE CASE COVER OIL SEAL**
   (a) Using SST, tap out the oil seal.
   SST 09308-00010

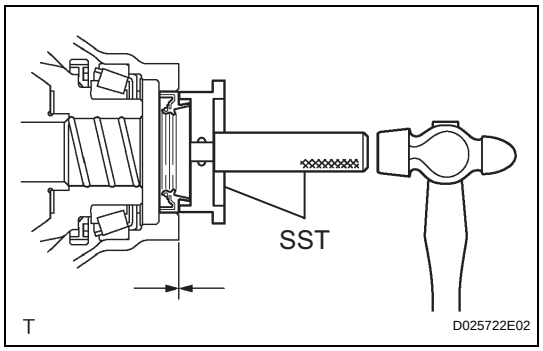


INSTALLATION

1. **INSTALL TRANSMISSION CASE OIL SEAL**
   (a) Coat the lip of a new oil seal with MP grease.
   (b) Using SST and a hammer, tap in the oil seal.
   SST 09608-32010, 09950-70010 (09951-07200)
   Standard depth:
   3.0 to 4.0 mm (0.118 to 0.158 in.)
   NOTICE:
   Be careful not to damage the lip of the oil seal.



MX



2. INSTALL FRONT TRANSAXLE CASE COVER OIL SEAL

(a) Coat the lip of a new oil seal with MP grease.

(b) Using SST and a hammer, tap in the oil seal.

SST 09608-10010, 09950-70010 (09951-07200)

Standard depth:

-0.5 to 0.5 mm (-0.020 to 0.020 in.)

NOTICE:

Be careful not to damage the lip of the oil seal.

3. INSTALL FRONT DRIVE SHAFT ASSEMBLY LH

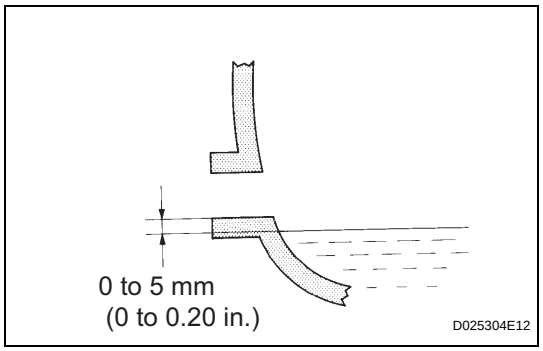
(a) Install drive shaft (see page DS-16).

4. INSTALL FRONT DRIVE SHAFT ASSEMBLY RH

(a) Install drive shaft (see page DS-16).

5. INSTALL FRONT WHEEL

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)



6. ADD MANUAL TRANSAXLE OIL

Oil grade:

API GL-4 or GL-5

Viscosity:

SAE 75W-90

Standard capacity:

2.5 liters (2.6 US qts, 2.2 Imp. qts)

7. INSPECT MANUAL TRANSAXLE OIL

(a) Inspect transaxle oil (see page MX-2).

8. INSPECT FRONT WHEEL ALIGNMENT

(a) Inspect wheel alignment (see page SP-2).

9. INSTALL ENGINE UNDER COVER LH

10. INSTALL ENGINE UNDER COVER RH

11. CHECK ABS SPEED SENSOR SIGNAL

(a) Check the speed sensor signal (see page BC-24).

METER / GAUGE SYSTEM

PRECAUTION

NOTICE:
When disconnecting the battery negative (-) terminal, initialize the following systems after the terminal is reconnected.

System name	See procedure
Power Window Control System (with Jam Protection Function)	IN-23
Sliding Roof System	

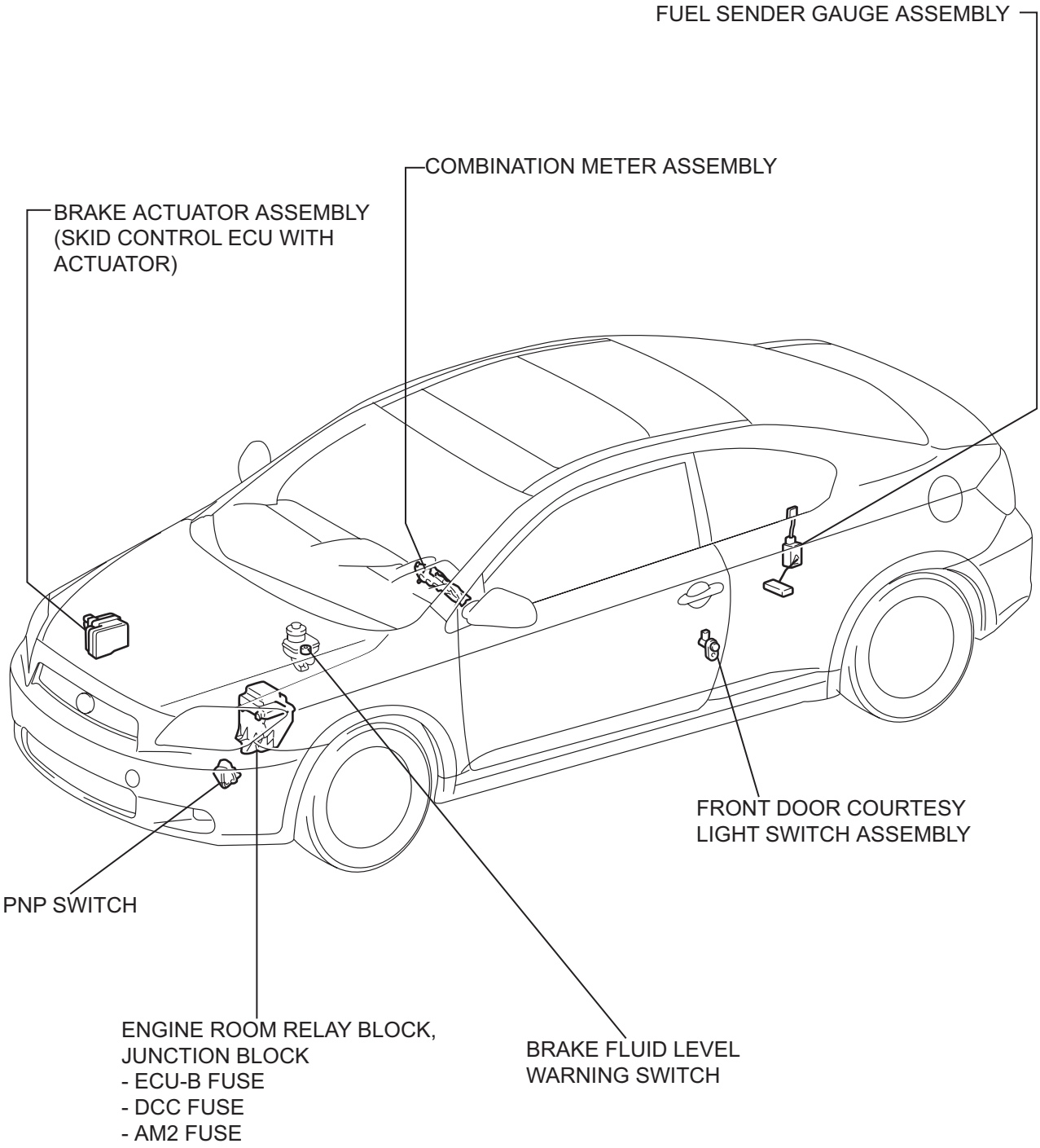
1. REMOVAL AND INSTALLATION OF BATTERY TERMINAL

(a) Before performing electronic work, disconnect the battery negative (-) terminal cable in order to prevent it from shorting and burning out.

(b) When disconnecting and reconnecting the battery cable, turn the ignition switch and lighting switch off and loosen the terminal nut completely. Perform operations without twisting or prying on the terminal.

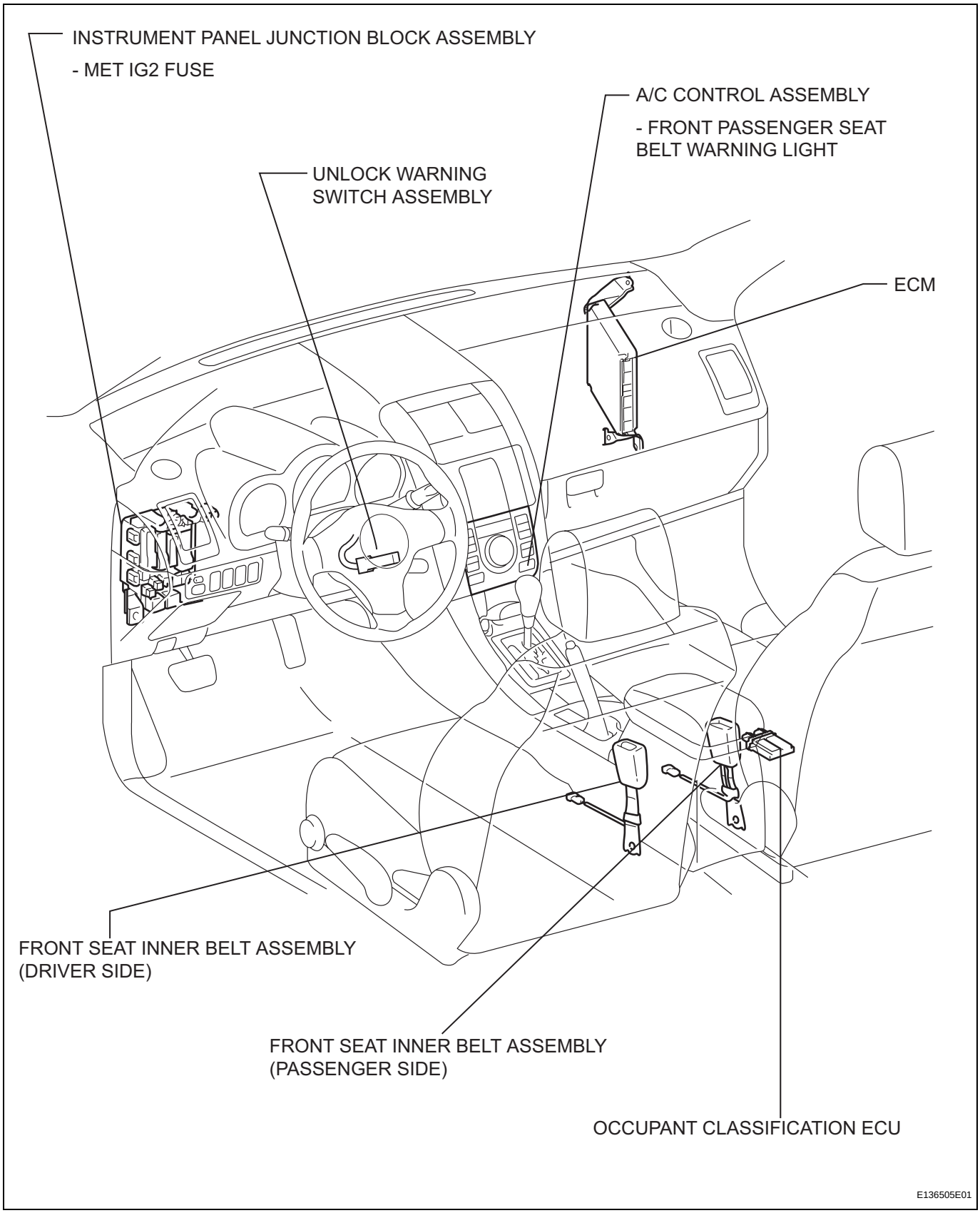
(c) When the battery terminal cable is removed, the memory of the clock, radio, DTCs, etc. are erased. So before removing it, check and make a note of them.

PARTS LOCATION

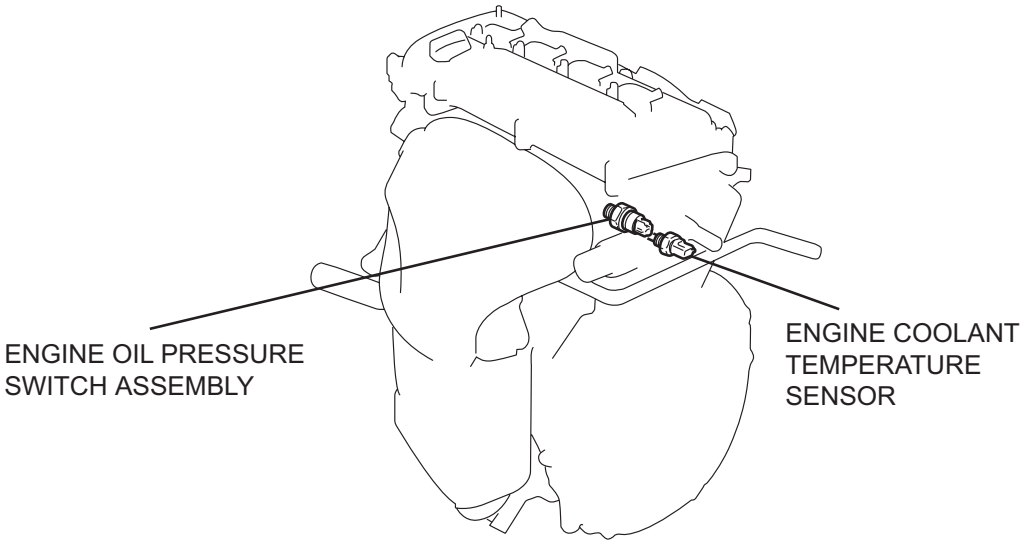


N

E110707E02


INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY
- MET IG2 FUSE
A/C CONTROL ASSEMBLY
- FRONT PASSENGER SEAT BELT WARNING LIGHT
UNLOCK WARNING SWITCH ASSEMBLY
ECM
FRONT SEAT INNER BELT ASSEMBLY (DRIVER SIDE)
FRONT SEAT INNER BELT ASSEMBLY (PASSENGER SIDE)
OCCUPANT CLASSIFICATION ECU
E136505E01

ME


ENGINE OIL PRESSURE
SWITCH ASSEMBLY
ENGINE COOLANT
TEMPERATURE
SENSOR

E112439E02

HOW TO PROCEED WITH TROUBLESHOOTING

1	**VEHICLE BROUGHT TO WORKSHOP**

NEXT

2	**PROBLEM SYSTEM CONFIRMATION**

NEXT

3	**CIRCUIT INSPECTION**

NEXT

4	**REPAIR OR REPLACE**

NEXT

5	**CONFIRMATION TEST**

NEXT

END

CUSTOMIZE PARAMETERS

1. SEAT BELT BUZZER ON/OFF SETTING

The buzzer ON/OFF setting, which is a setting of the buzzer function of the combination meter, can disable the driver and front passenger side seat belt buzzers.

NOTICE:

- **These buzzers should be on for safe driving. Perform these procedures only if it is necessary to set the buzzer off (disabled).**
- **When either the battery cable or the combination meter connector is disconnected, these buzzers are set on (enabled).**
- **Odometer returns to 0 after starting this procedure, although it is not displayed.**

HINT:

- "b-oFF" indicates that the buzzer is OFF. "b-on" indicates that the buzzer is ON. The buzzer ON/OFF setting will be finished (the odometer will display "ODO") if the ODO/TRIP switch is not operated for 10 seconds or more. In this case, perform step 11 to check that the buzzer ON/OFF setting is complete. If it is not complete, start from step 1 again.
- The legally required warning buzzer cannot be cancelled.
- The legally required warning buzzer is the buzzer that sounds when turn the ignition switch to the ON position and the driver seat belt is unfastened. The buzzer sounds in order to warn the driver regardless of the vehicle speed.

(a) Turn the ignition switch to the ON position.
(b) Press the ODO/TRIP switch until the odometer displays "ODO".
(c) Turn the ignition switch off.
(d) Turn the ignition switch to the ON position.
(e) Press the ODO/TRIP switch immediately (within 6 seconds) and hold it down for 10 seconds or more.
(f) Continue holding down the ODO/TRIP switch and fasten the driver side seat belt.
(g) Check that the odometer displays either "b-on" or "b-oFF".
(h) Press the ODO/TRIP switch to change the display to "b-oFF".
(i) Turn the ignition switch off.
(j) Engine switch off.
(k) Check that no buzzer sounds with the vehicle speed is 15 km/h or more and driver side seat belt is unfastened.

ME

PROBLEM SYMPTOMS TABLE

COMBINATION METER:

Symptom	Suspected Area	See page
Entire combination meter does not operate	Power Source Circuit	ME-20
Speedometer malfunction	Speedometer Circuit	ME-22
Tachometer malfunction	Tachometer Circuit	ME-25
Fuel receiver gauge malfunction	Fuel Receiver Gauge Circuit	ME-28
Engine coolant temperature receiver gauge malfunction	Engine Coolant Receiver Gauge Circuit	ME-31
Warning buzzer does not sound.	Warning Buzzer Circuit	ME-34
Driver seat belt warning light does not come on.	Driver Side Seat Belt Warning Light Circuit	ME-37
Front passenger seat belt warning light does not come on.	Front Passenger Side Seat Belt Warning Light Circuit	ME-39

WARNING LIGHTS:

Symptom	Suspected Area	See page
MIL does not come on.	1. MIL Circuit	ES-361
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
Charge warning light does not come on.	1. Alternator	-
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
Brake warning light does not come on.	1. Brake Fluid Level Switch	-
	2. Brake Warning Light Circuit	BC-60
	3. Wire Harness or Connector	-
	4. Combination Meter Assembly	ME-44
ABS warning light does not come on.	1. ABS Warning Light Circuit	BC-57
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
ABS warning light does not go off.	1. ABS Warning Light Circuit	BC-53
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
SRS warning light does not come on.	1. SRS Warning Light Circuit	RS-239
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
SRS warning light does not go off.	1. SRS Warning Light Circuit	RS-234
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
Open door warning light does not come on.	1. Door Courtesy Light Switch	-
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
Fuel level warning light does not come on.	1. Fuel Sender Gauge assembly	ME-31
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
Low oil pressure warning light does not come on.	1. Low Oil Pressure Warning Switch	-
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
TPWS indicator does not come on.	1. Tire Pressure Warning Light Circuit	TW-69
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44

INDICATOR LIGHTS:

Symptom	Suspected Area	See page
Turn indicator light does not come on.	1. Turn Signal Flasher Relay	LI-1
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
High beam indicator light does not come on.	1. Headlight Dimmer Switch	LI-1
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
Oil charge indicator light does not go off.	1. Combination Meter Assembly (Oil Maintenance Indicator Resetting Procedure Undone)	ME-19
	2. Combination Meter Assembly	ME-44
Cruise indicator light does not come on.	1. Cruise Main Indicator Light Circuit	CC-35
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44
O/D off indicator light does not come on.	1. Park/Neutral Position Switch Circuit	AX-21
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44

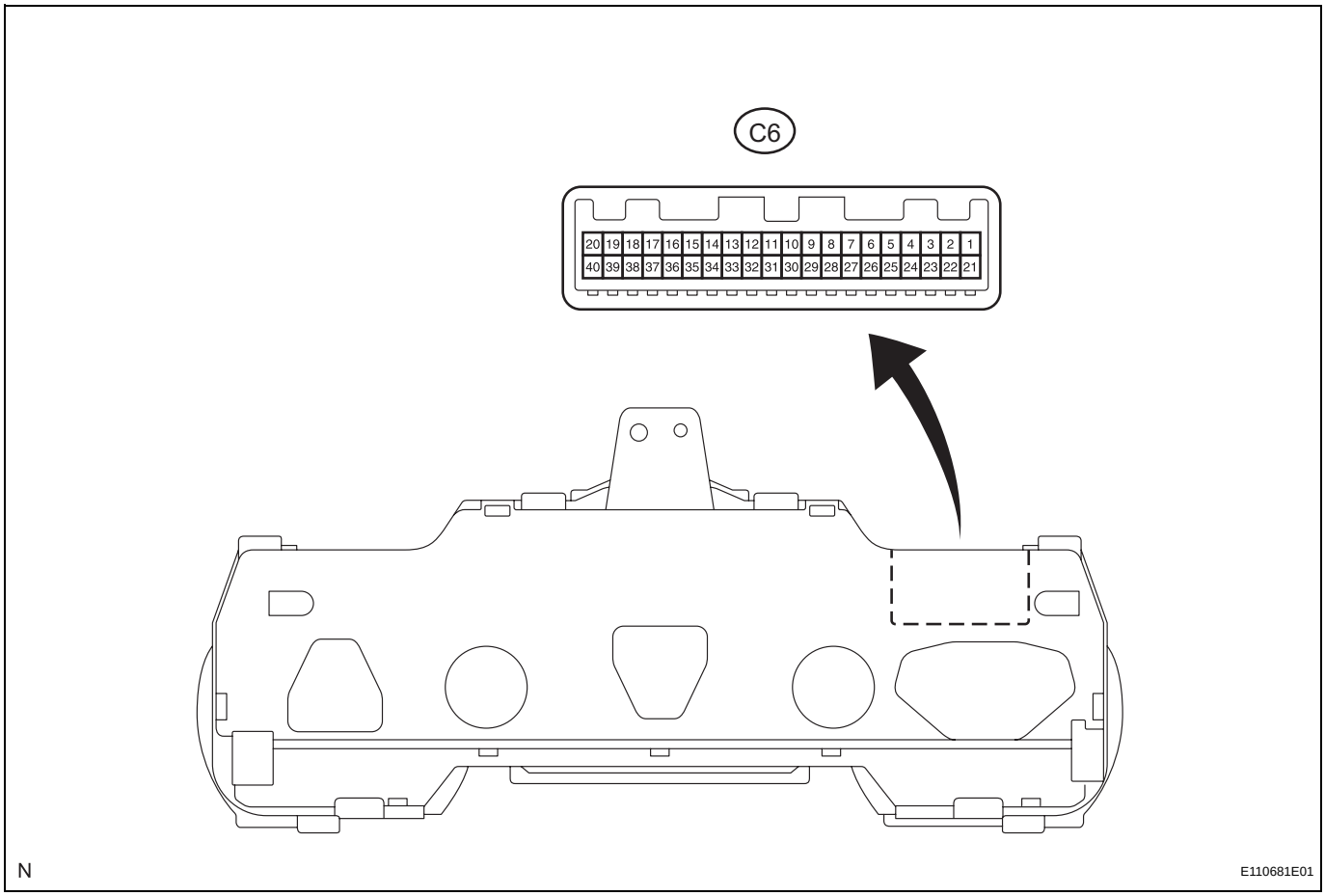
ME

BUZZER:

Symptom	Suspected Area	See page
Key reminder warning buzzer does not sound.	1. Warning Buzzer Circuit	ME-34
	2. Unlock Warning Switch Assembly	-
	3. Wire Harness or Connector	-
	4. Combination Meter Assembly	ME-44
Seat belt warning buzzer does not sound.	1. Seat Belt Buzzer Setting	ME-5
	2. Wire Harness or Connector	-
	3. Combination Meter Assembly	ME-44

TERMINALS OF ECU

1. CHECK COMBINATION METER ASSEMBLY

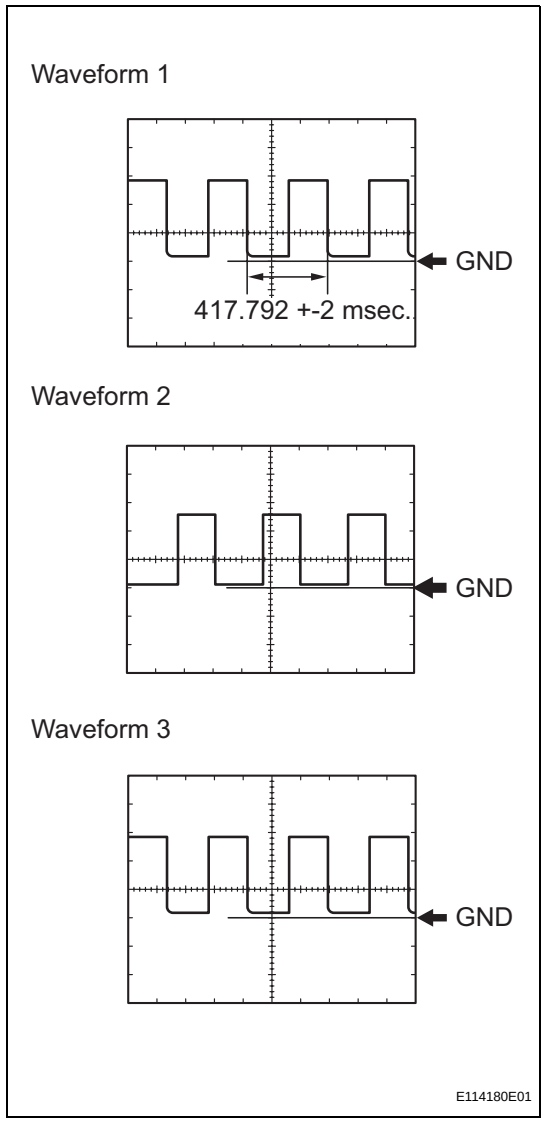


Terminal No.	Wiring Color	Terminal Description	Condition	Specified Condition
C6-1 - Body ground	BR - Body ground	Ground	Always	Below 1 Ω
C6-2 - Body ground	SB - Body ground	Ground	Always	Below 1 Ω
C6-3 - Body ground	V - Body ground	Battery	Always	11 to 14 V
C6-4 - Body ground	LG - Body ground	Ignition switch signal	Ignition switch ON	11 to 14 V
			Ignition switch OFF	Below 1 V
C6-5 - Body ground	L - Body ground	Seat belt condition signal	Driver seat belt indicator light is OFF	11 to 14 V
			Driver seat belt indicator light blinks	Below 1 V
C6-6 - Body ground	R - Body ground	Taillight signal	Light control switch ON	11 to 14 V
			Light control switch OFF	Below 1 V
C6-7 - Body ground	Y - Body ground	KEY switch signal	No ignition key inserted	11 to 14 V
			Ignition key inserted	Below 1 V
C6-8 - Body ground	BR - Body ground	Driver door condition signal	Driver door open	11 to 14 V
			Driver door closed	Below 1 V
C6-9 - Body ground	W - Body ground	Oil pressure signal	OIL/P warning light OFF	11 to 14 V
			OIL/P warning light ON	Below 1 V
C6-10 - Body ground	V - Body ground	Brake fluid level signal	Brake fluid level warning light ON	6.7 to 12 V
			Brake fluid level warning light OFF	Below 1 V

ME

Terminal No.	Wiring Color	Terminal Description	Condition	Specified Condition
C6-11 - Body ground	W - Body ground	Illumination signal	Ignition switch ON, rheostat is max	11 to 14 V
			Ignition switch OFF	Below 1 V
C6-12 - Body ground	B - Body ground	Brake fluid level signal	Brake fluid level warning light OFF	11 to 14 V
			Brake fluid level warning light ON	Below 1 V
C6-13 - Body ground	W - Body ground	ABS signal	Ignition switch ON, ABS warning light ON	6.7 to 12 V
			Ignition switch ON, ABS warning light OFF	Below 1 V
C6-14 - Body ground	L - Body ground	Door condition signal	Door open	11 to 14 V
			Door closed	Below 1 V
C6-15 - Body ground	Y - Body ground	Charge signal	Ignition switch ON	11 to 14 V
			Ignition switch OFF	Below 1 V
C6-16 - Body ground	B - Body ground	Transmission signal	P or N indicator light (A/T shift indicator) is ON	7.5 to 11.5 V
			P or N indicator light (A/T shift indicator) is ON	Below 1 V
C6-17 - Body ground	G - Body ground	MIL signal	MIL OFF	11 to 14 V
			MIL ON	Below 1 V
C6-18 - Body ground	L - Body ground	A/T shift condition signal (L)	A/T L indicator light ON	11 to 14 V
			A/T L indicator light OFF	Below 1 V
C6-19 - Body ground	GR - Body ground	A/T shift condition signal (2)	A/T 2 indicator light ON	11 to 14 V
			A/T 2 indicator light OFF	Below 1 V
C6-20 - Body ground	Y - Body ground	A/T shift condition signal (3)	A/T 3 indicator light ON	11 to 14 V
			A/T 3 indicator light OFF	Below 1 V
C6-21 - Body ground	R - Body ground	Coolant temperature signal	Ignition switch ON, coolant temperature is 90°C (194°F)	Pulse generation (See waveform 1)
C6-22 - Body ground	L - Body ground	Seat belt condition signal (passenger side)	Passenger seat belt indicator light blinks	11 to 14 V
			Passenger seat belt indicator light is OFF	Below 1 V
C6-23 - Body ground	G - Body ground	Fuel level signal	Ignition switch ON, fuel level is EMPTY	4 to 7 V
			Ignition switch ON, fuel level is FULL	Below 1 V
C6-24 - Body ground	P - Body ground	Passenger seat belt warning signal	Passenger seat belt indicator light blinks	11 to 14 V
			Passenger seat belt indicator light is OFF	Below 1 V
C6-25 - Body ground	O - Body ground	Speed signal (Input)	Ignition switch ON and turn wheel slowly	Pulse generation (See waveform 2)
C6-26 - Body ground	B - Body ground	Tachometer signal	Engine idle speed	Pulse generation (See waveform 3)
C6-27 - Body ground	L - Body ground	Speed signal (Output)	Ignition switch ON and turn wheel slowly	Pulse generation (See waveform 2)
C6-29 - Body ground	R - Body ground	AIR BAG signal	SRS warning light ON	8 to 14 V
			SRS warning light OFF	Below 1 V
C6-30 - Body ground	GR - Body ground	Hi-beam signal	Hi-beam ON	11 to 14 V
			Hi-beam OFF	Below 1 V
C6-31 - Body ground	R - Body ground	Hi-beam signal	Hi-beam ON	11 to 14 V
			Hi-beam OFF	Below 1 V

Terminal No.	Wiring Color	Terminal Description	Condition	Specified Condition
C6-32 - Body ground	Y - Body ground	Turn signal L	Ignition switch ON, turn signal LH indicator light ON	11 to 14 V
			Ignition switch ON, turn signal LH indicator light OFF	Below 1 V
C6-33 - Body ground	G - Body ground	Turn signal R	Ignition switch ON, turn signal RH indicator light ON	11 to 14 V
			Ignition switch ON, turn signal RH indicator light OFF	Below 1 V
C6-34 - Body ground	B - Body ground	CRUISE signal	Ignition switch ON and cruise indicator light ON	11 to 14 V
			Ignition switch ON and cruise indicator light OFF	Below 1 V
C6-36 - Body ground	LG - Body ground	TPMS signal	TPMS indicator light ON	11 to 14 V
			TPMS indicator light OFF	Below 1 V
C6-37 - Body ground	B - Body ground	A/T shift condition signal (P)	A/T P indicator light ON	11 to 14 V
			A/T P indicator light OFF	Below 1 V
C6-38 - Body ground	P - Body ground	A/T shift condition signal (R)	A/T R indicator light ON	11 to 14 V
			A/T R indicator light OFF	Below 1 V
C6-39 - Body ground	R - Body ground	A/T shift condition signal (N)	A/T N indicator light ON	11 to 14 V
			A/T N indicator light OFF	Below 1 V
C6-40 - Body ground	LG - Body ground	A/T shift condition signal (D)	A/T D indicator light ON	11 to 14 V
			A/T D indicator light OFF	Below 1 V



(a) Using an oscilloscope, check the signal waveform of the meter.

Waveform 1 (Reference)

Item	Condition
Tool setting	5 V/DIV., 10 ms./DIV.
Vehicle condition	Ignition switch ON

Waveform 2 (Reference)

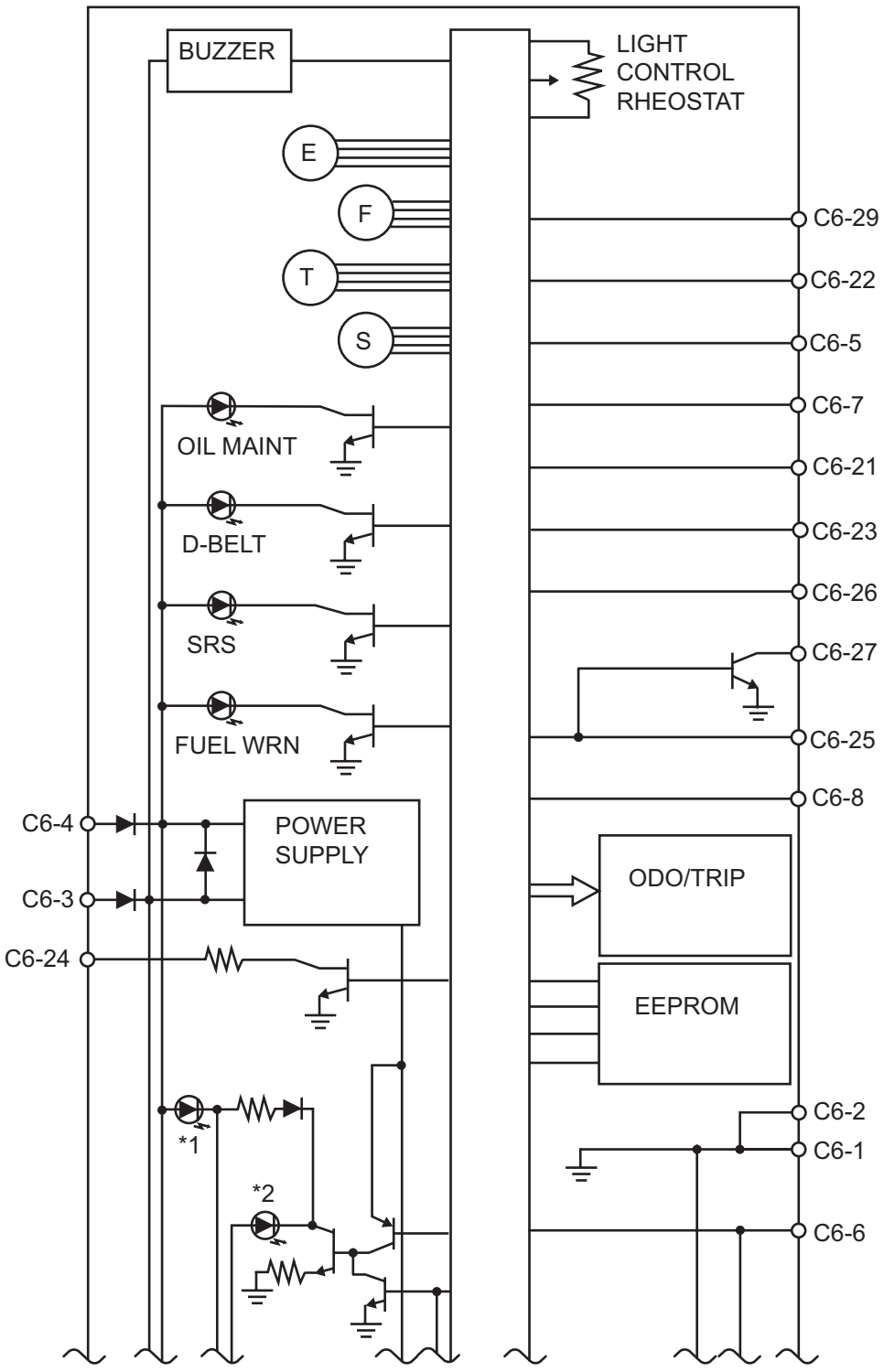
Item	Condition
Tool setting	5 V/DIV., 20 ms./DIV.
Vehicle condition	Driving at approx. 20 km/h (12.4 mph)

Waveform 3 (Reference)

Item	Condition
Tool setting	5 V/DIV., 10 ms./DIV.
Vehicle condition	Engine idle speed

HINT:
As vehicle speed increases, the cycle of the signal waveform narrows.

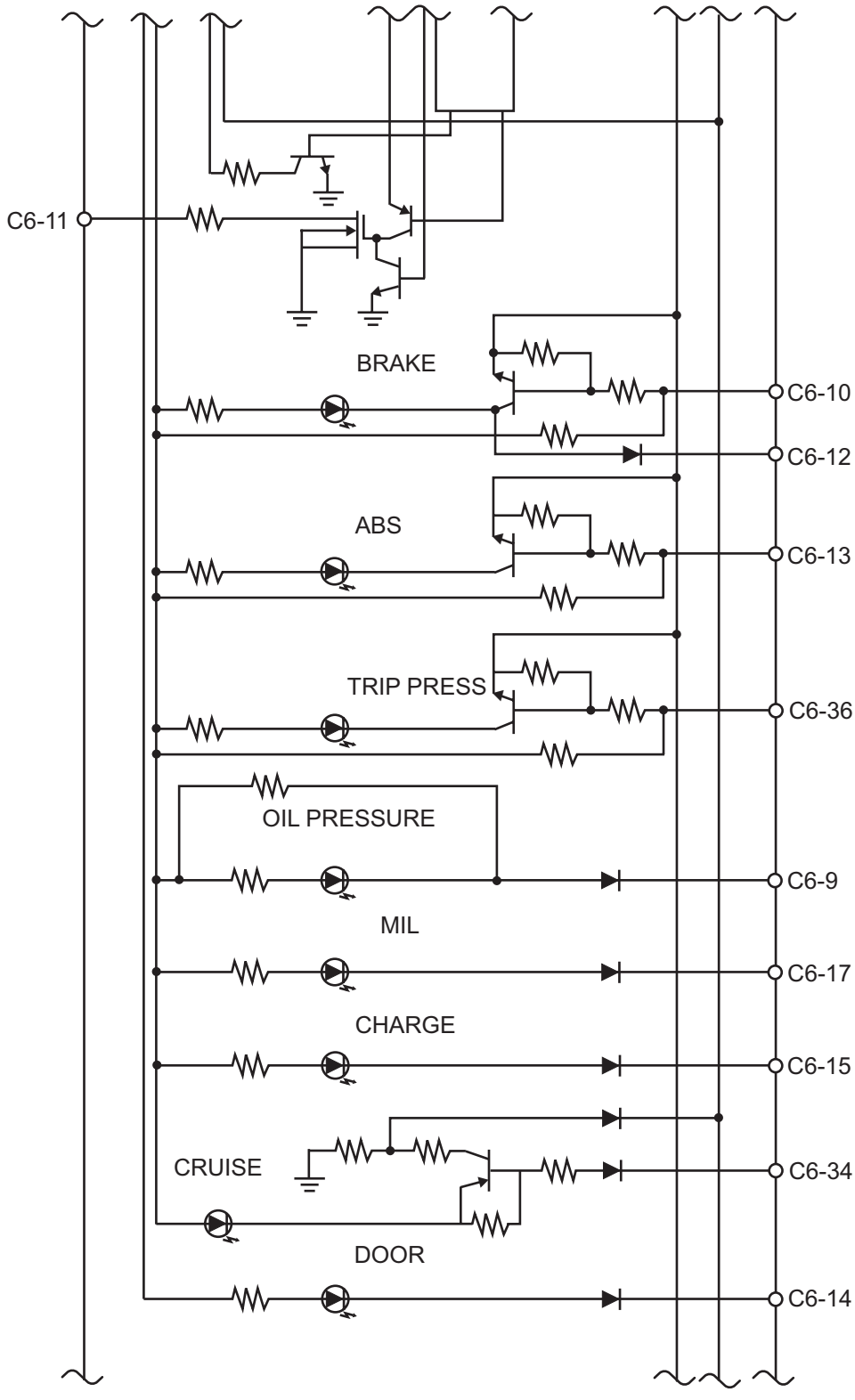
ME



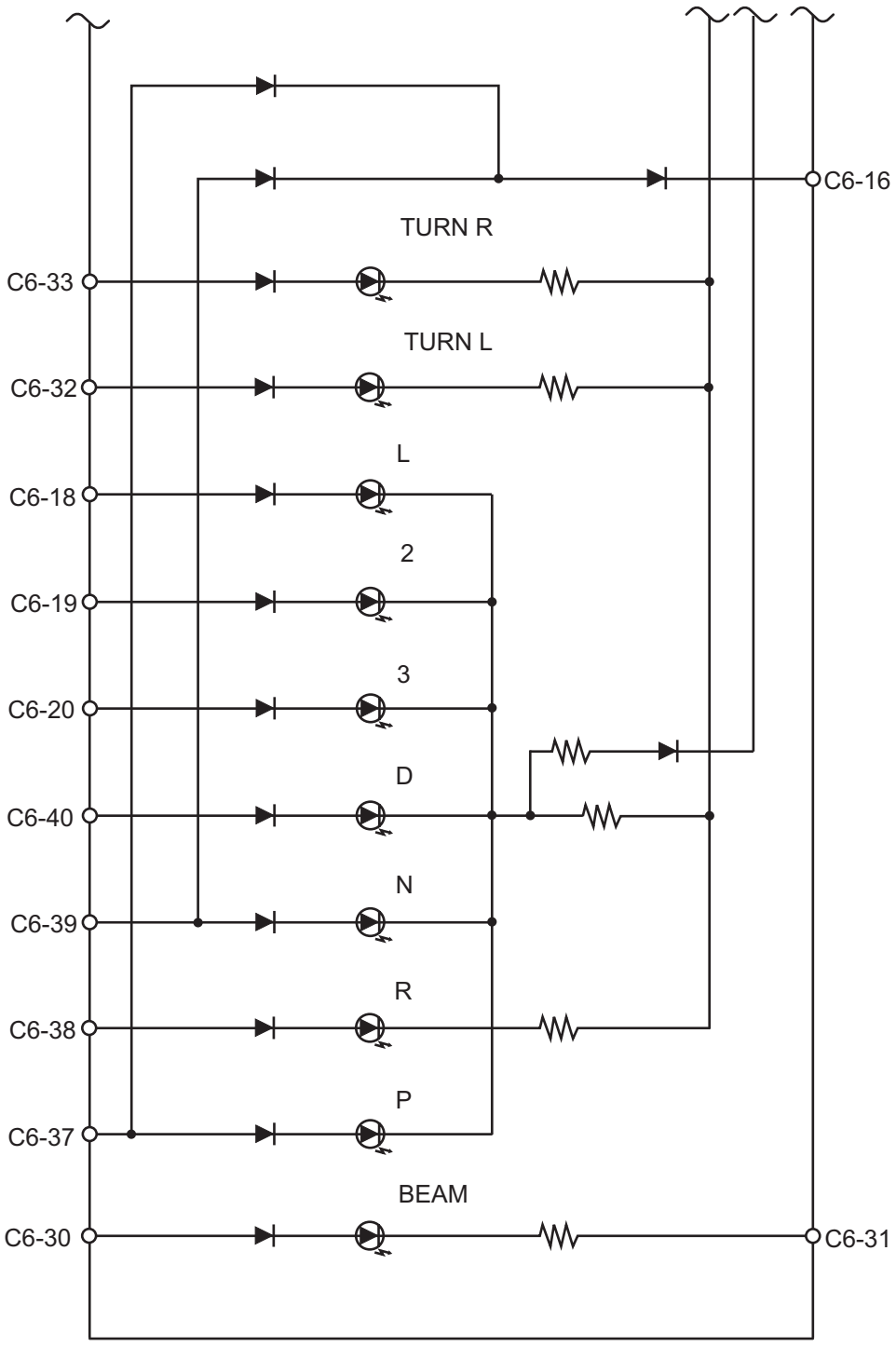
F: Fuel Gauge, T: Tachometer, S: Speedometer, E: Engine Coolant Temperature Gauge
*1: ODO/TRIP Illumination, *2: Except ODO/TRIP Illumination

E111774E01

ME


C6-11
BRAKE
C6-10
C6-12
ABS
C6-13
TRIP PRESS
C6-36
OIL PRESSURE
C6-9
MIL
C6-17
CHARGE
C6-15
CRUISE
C6-34
DOOR
C6-14
E111775E01

ME


C6-16
TURN R
C6-33
TURN L
C6-32
L
C6-18
2
C6-19
3
C6-20
D
C6-40
N
C6-39
R
C6-38
P
C6-37
BEAM
C6-30
C6-31

E111776E01

Table of Terminal Connection

Terminal No.		Wire harness side
C6	1	Ground
	2	Fuel Sender Gauge Assembly
	3	ECU-B Fuse
	4	MET IG2 Fuse
	5	Front Seat Inner Belt Assembly (Driver Side)
	6	Light Control Switch, Tail Relay
	7	Unlock Warning Switch Assembly
	8	Door Courtesy Light Switch Assembly
	9	Engine Oil Pressure Switch Assembly
	10	Brake Actuator Assembly
	11	Light Control Rheostat
	12	Brake Fluid Level Warning Switch
	13	Brake Actuator Assembly
	14	Integration Relay
	15	Generator
	16	Brake Actuator Assembly
	17	ECM
	18	PNP Switch
	19	PNP Switch
	20	Shift Lock Control ECU
	21	ECM
	22	Front Seat Inner Belt Assembly (Passenger Side)
	23	Fuel Sender Gauge Assembly
	24	Front Passenger Seat Belt Warning Light
	25	Brake Actuator Assembly
	26	ECM
	27	ECM, Integration Relay
	28	-
	29	Airbag Sensor Assembly Center
	30	Headlight Dimmer Relay
	31	Headlight Dimmer Switch
	32	Turn Signal Flasher
	33	Turn Signal Flasher
	34	ECM
	35	-
	36	Brake Actuator Assembly
	37	PNP Switch
	38	PNP Switch
	39	PNP Switch
	40	Shift Lock Control ECU

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

According to DATA LIST display by the intelligent tester, you can read the values of the switches, sensors, actuators and so on without parts removal. Reading the DATA LIST as the first step of troubleshooting is one method to shorten work time.

(a) Warm up the engine.
(b) Turn the ignition switch off.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch ON.
(e) Operate the intelligent tester according to the step on the display and select "DATA LIST".

ENGINE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
VEHICLE SPD	Vehicle speed/Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Almost the same as the actual vehicle speed (When driving)	-
ENGINE SPD	Engine speed/Min.: 0 rpm, Max.: 16,282 rpm	Almost the same as the actual engine speed (When engine is running)	-
COOLANT TEMP	Coolant temperature/Min.: -40°C (40°F), Max.: 140°C (284°F)	After warming up: 80 to 95°C (176 to 203°F)	If the value is "-40°C (-40°F)" or "140°C (284°F)", sensor circuit is open or shorted

ABS / TRAC / VSC:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
(FR/FL/RR/RL) WHEEL SPD	Vehicle speed/Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Almost the same as actual speed (When driving)	-

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 below.

Reference

Chassis Dynamometer Indication	Allowable Range
20 mph	19.0 to 21.5 mph
40 mph	38 to 41.0 mph
60 mph	57.5 to 61.0 mph
80 mph	77.5 to 81.5 mph
100 mph	97 to 102.0 mph
120 mph	116.5 to 122.0 mph

NOTICE:

Tire wear as well as over 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)

If the indication is not as specified, go to problem symptoms table (See page ME-6).

2. INSPECT OUTPUT SIGNAL OF VEHICLE SPEED

(a) Check the output signal waveform.

(1) Remove the combination meter, with the connector still connected.

(2) Using an oscilloscope, check the waveform of the combination meter.

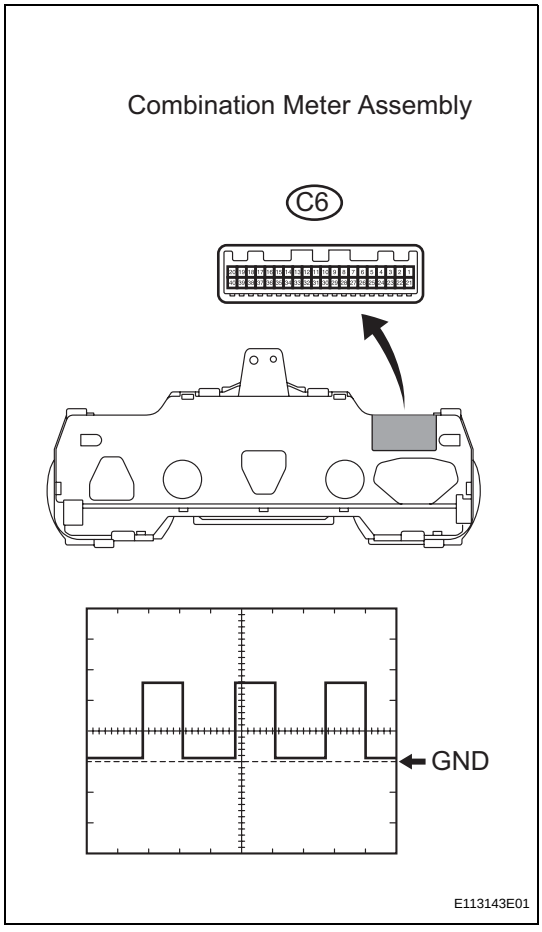
Tester Connection	Tool Setting	Vehicle Condition
C6-27 - Body ground	5 V/DIV., 20 ms./DIV.	Driving at approx. 20 km/h (12.4 mph)

OK:

Refer to the illustration.

HINT:

As vehicle speed increases, the cycle of the waveform narrows.



3. INSPECT TACHOMETER

(a) Check operation.

(1) Connect a tune-up test tachometer, and start the engine.

NOTICE:

- **Do not reverse the connections of the tachometer. This will damage its transistors and diodes.**
- **When removing or installing the tachometer, be careful not to drop or strike it.**

(2) Compare the test tachometer indications and vehicle tachometer indications under the following conditions:
- Vehicle battery voltage is 13.5 V
- Ambient temperature is 25°C (77°F)

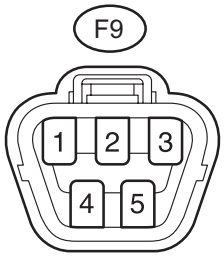
OK

Standard Indication (rpm)	Acceptable Range (rpm) Data in ( ) are for reference only
700	630 to 770
1,000	(900 to 1,100)
2,000	(1,850 to 2,150)
3,000	2,800 to 3,200
4,000	(3,800 to 4,200)
5,000	4,800 to 5,200
6,000	(5,750 to 6,250)
7,000	6,700 to 7,300

If the indication is not as specified, go to the problem symptoms table (See page ME-6).

ME

Wire Harness Side:



E114283E11

4. INSPECT FUEL SENDER GAUGE ASSEMBLY

(a) Disconnect the F9 gauge connector.

(b) Turn the ignition switch to the ON position, and then check the position of the receiver gauge needle.

OK:

Fuel receiver gauge indicates E

(c) Connect terminals 2 and 3 of the wire harness side connector.

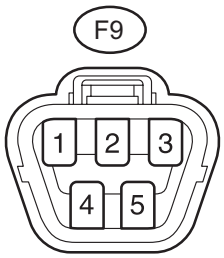
(d) Turn the ignition switch to the ON position, and then check the position of the receiver gauge needle.

OK:

Fuel receiver gauge indicates F

If the result is not as specified, the combination meter may have a malfunction.

Wire Harness Side:



E114283E11

5. INSPECT FUEL LEVEL WARNING LIGHT

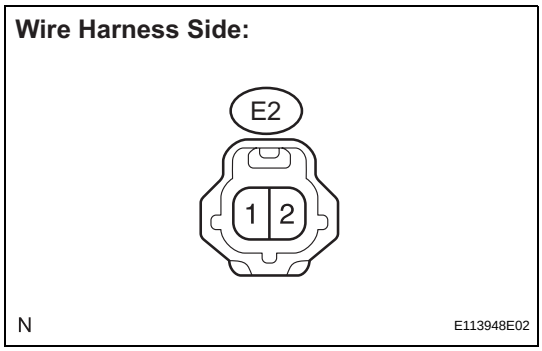
(a) Disconnect the F9 pump and gauge connector.

(b) Turn the ignition switch to the ON position, and then check that the fuel receiver gauge indicates E and that the fuel level warning light turns on.

OK:

Fuel level warning light turns on

If the result is not as specified, the combination meter may have a malfunction.



6. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE

(a) Disconnect the E2 gauge connector.

(b) Turn the ignition switch to the ON position, and check the position of the receiver gauge needle.

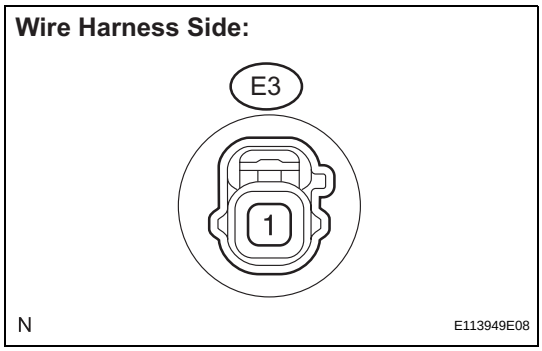
OK:

Needle position is on (COOL).

(c) Connect between terminals of the wire harness side connector, and then check the position of the receiver gauge needle.

OK:

Needle position is on (HOT).



7. INSPECT OIL PRESSURE WARNING LIGHT

(a) Disconnect the E3 switch connector.

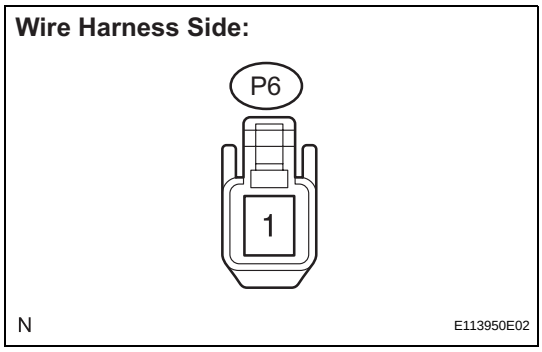
(b) Connect the E3-1 terminal of the wire harness side connector to the body ground.

(c) Turn the ignition switch to the ON position, and then check that the low oil pressure warning light turns on.

OK:

Low oil pressure warning light turns on

If the result is not as specified, the combination meter may have a malfunction.



8. INSPECT BRAKE WARNING LIGHT

(a) Check the parking brake warning light.

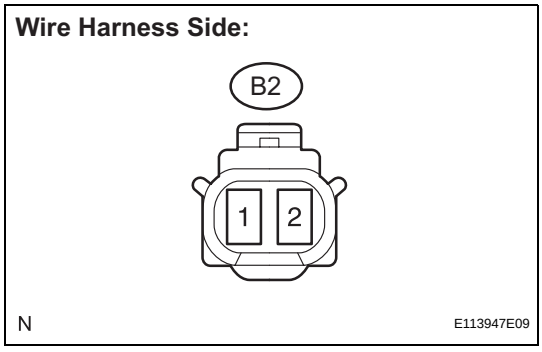
(1) Disconnect the P6 switch connector.

(2) Connect the P6-1 terminal of the wire harness side connector to the body ground.

(3) Turn the ignition switch to the ON position, and then check that the warning light turns on.

OK:

Warning light turns on.



(b) Check the brake fluid level warning light.

(1) Disconnect the B2 switch connector.

(2) Connect the B2-1 and B2-2 terminals of the wire harness side connector.

(3) Turn the ignition switch to the ON position, and then check that the warning light turns on.

OK:

Warning light turns on.

If the result is not as specified, the combination meter may have a malfunction.

9. OIL MAINTENANCE INDICATOR RESETTING PROCEDURE

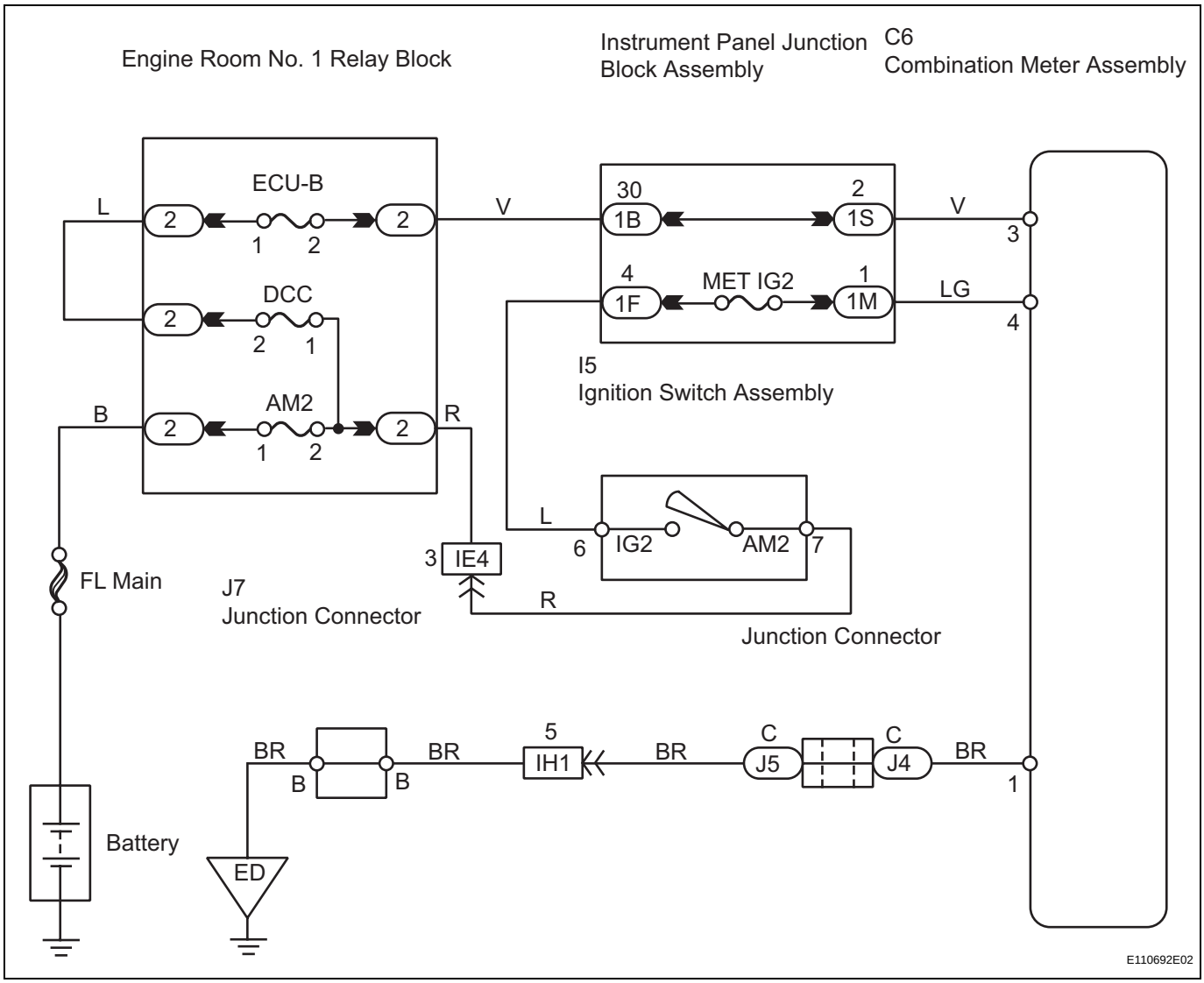
Indicator Condition:

State	Condition	Specified State
Blinking	The vehicle runs 4,500 miles after the previous setting	The indicator blinks for 15 seconds after the ignition switch is turned on (including 3 seconds for a valve check).
Continuously Illuminated	The vehicle runs 5,000 miles after the previous setting	The indicator is continuously illuminated after the ignition switch is turned on.

(a) Turn the ignition switch to the ON position.
(b) Set the display window to ODO.
(c) Turn the ignition switch off.
(d) Turn the ignition switch to the ON position while pressing and holding the reset knob for 5 seconds or more.
(e) Reset procedure is completed.
HINT:
- If the ignition switch is turned off during reset procedure, reset mode is canceled.
- If the reset knob is turned off during the reset procedure, reset mode is canceled and the display shows the condition prior to the reset procedure.

Entire Combination Meter does not Operate

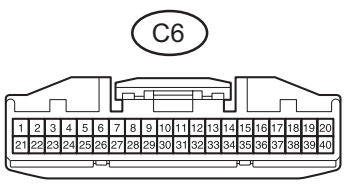
WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (COMBINATION METER - BATTERY AND BODY GROUND)

Wire Harness Side:



(a) Disconnect the C6 meter connector.
(b) Measure the resistance of the wire harness side connector.
Standard resistance

Tester Connection	Specified Condition
C6-1 - Body ground	Below 1 Ω

(c) Measure the voltage of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
C6-3 - Body ground	Always	11 to 14 V

Tester Connection	Condition	Specified Condition
C6-4 - Body ground	Ignition switch ON	11 to 14 V

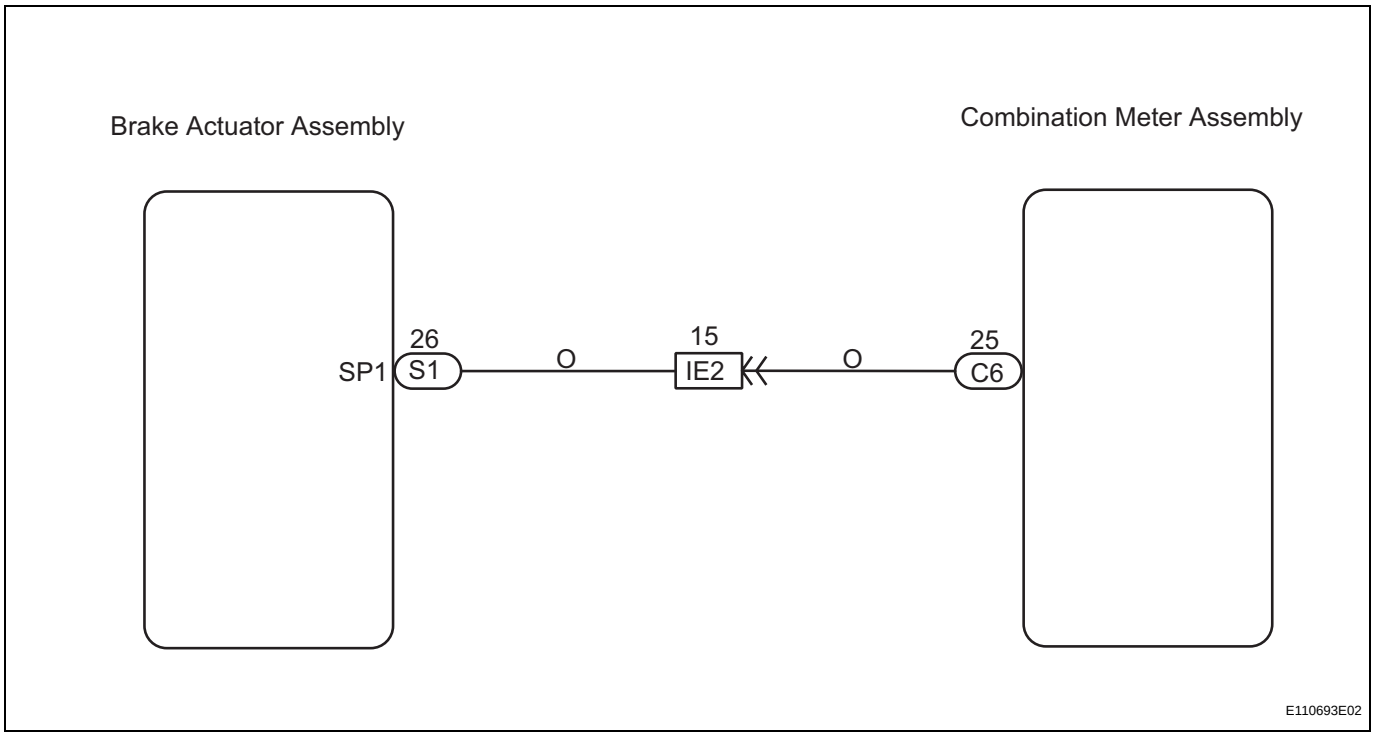
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE COMBINATION METER ASSEMBLY

Speedometer Malfunction

WIRING DIAGRAM



ME

INSPECTION PROCEDURE

1	READ VALUE OF INTELLIGENT TESTER (VEHICLE SPEED SIGNAL)

(a) Operate the intelligent tester according to the step on the display and select "DATA LIST".

ABS / TRAC / VSC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
(FR/FL/RR/RL) WHEEL SPD	Vehicle speed/Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Almost the same as actual speed (When driving)	-

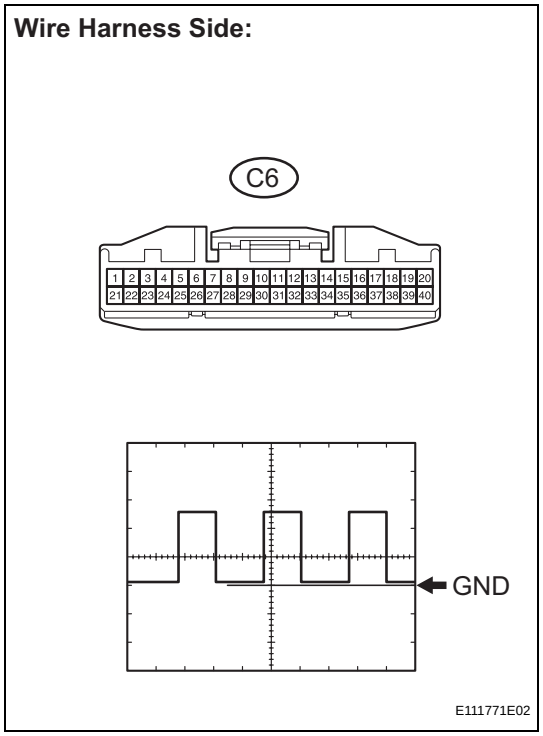
OK:
Vehicle speed display on the tester is almost the same as the actual vehicle speed.

NG → **GO TO BRAKE CONTROL SYSTEM**

OK

2	CHECK COMBINATION METER ASSEMBLY

Wire Harness Side:



(a) Disconnect the C6 meter connector.
(b) Using an oscilloscope, check the signal waveform of the meter.

Tester Connection	Tool setting	Vehicle condition
C6-25 - Body ground	5V/DIV., 20 ms./DIV.	Driving at approx. 20 km/h (12.4 mph)

OK:
As shown in the illustration.
HINT:
As vehicle speed increases, the cycle of the signal waveform narrows.

NG → **Go to step 3**

OK

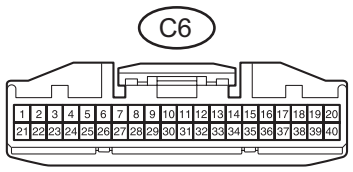
REPLACE COMBINATION METER ASSEMBLY

ME

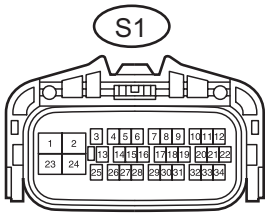
3 CHECK WIRE HARNESS (COMBINATION METER - BRAKE ACTUATOR)

Wire Harness Side:

Combination Meter Assembly



Brake Actuator Assembly



E110683E02

(a) Disconnect the C6 meter connector.
(b) Disconnect the S1 ECU connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

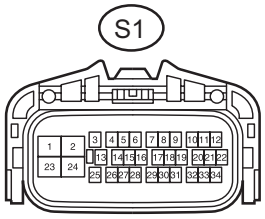
Tester Connection	Specified Condition
C6-25 - S1-26	Below 1 Ω
C6-25 - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4 INSPECT BRAKE ACTUATOR ASSEMBLY (SKID CONTROL ECU WITH ACTUATOR)

Wire Harness Side:



E110684E02

(a) Disconnect the S1 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
S1-26 - Body ground	Ignition switch ON	11 to 14 V

(c) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
S1-2 - Body ground	Below 1 Ω

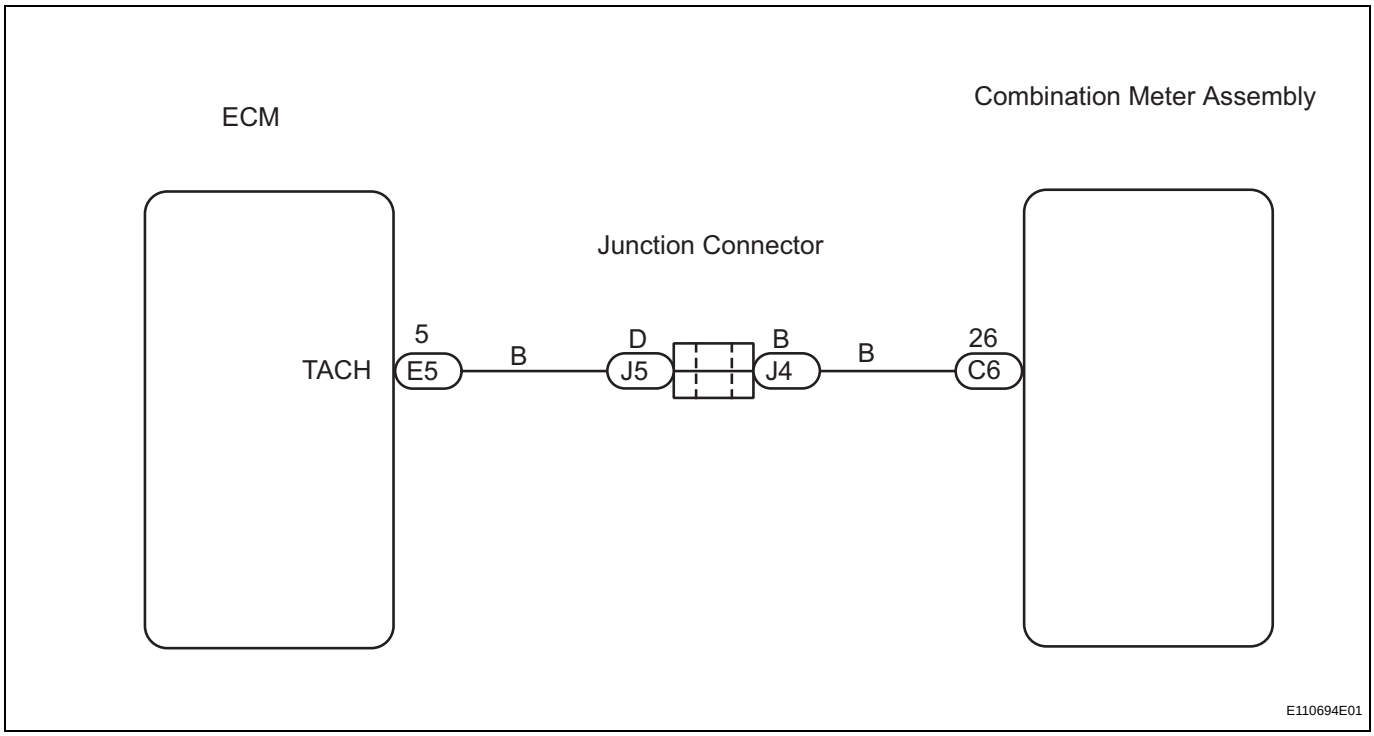
NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

REPLACE BRAKE ACTUATOR ASSEMBLY

Tachometer Malfunction

WIRING DIAGRAM



INSPECTION PROCEDURE

1	READ VALUE OF INTELLIGENT TESTER (ENGINE SPEED SIGNAL)

(a) Operate the intelligent tester according to the step on the display and select "DATA LIST".

ENGINE

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
ENGINE SPD	Engine speed/Min.: 0 rpm, Max.: 16,383 rpm	Almost the same as actual engine speed (When engine is running)	-

OK:

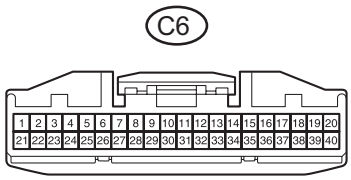
Engine speed display on the tester is almost the same as the actual engine speed.

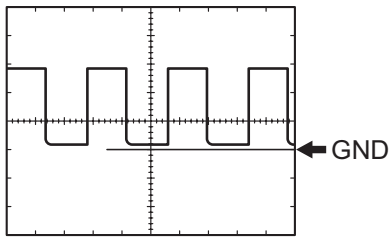
NG → **GO TO ENGINE CONTROL SYSTEM**

OK

2	CHECK COMBINATION METER ASSEMBLY

Wire Harness Side:





E111772E03

(a) Disconnect the C6 meter connector.
(b) Using an oscilloscope, check the signal waveform of the meter.

Tester Connection	Tool Setting	Vehicle Condition
C6-26 - Body ground	5V/DIV., 10 ms./DIV.	Engine idle speed

OK:
As shown in the illustration.

NG → **Go to step 3**

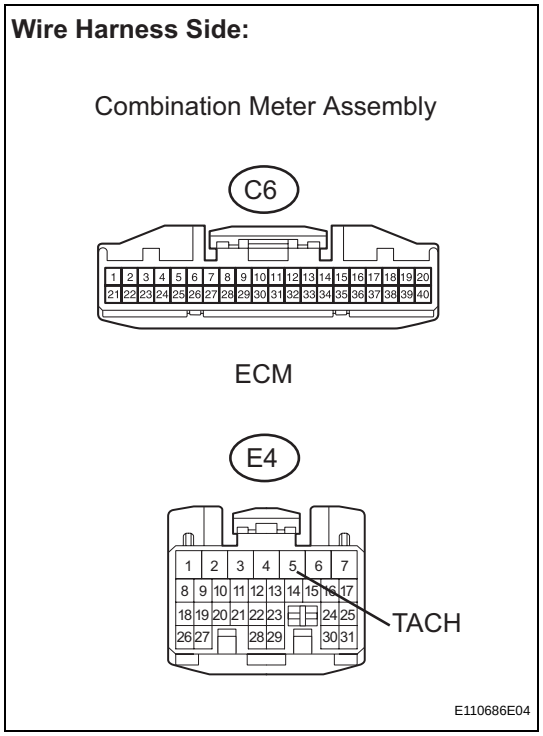
OK

REPLACE COMBINATION METER ASSEMBLY

ME

3	CHECK WIRE HARNESS (COMBINATION METER ASSEMBLY - ECM)

Wire Harness Side:



(a) Disconnect the C6 meter connector.
(b) Disconnect the E4 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C6-26 - E4-5	Below 1 Ω
C6-26 - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

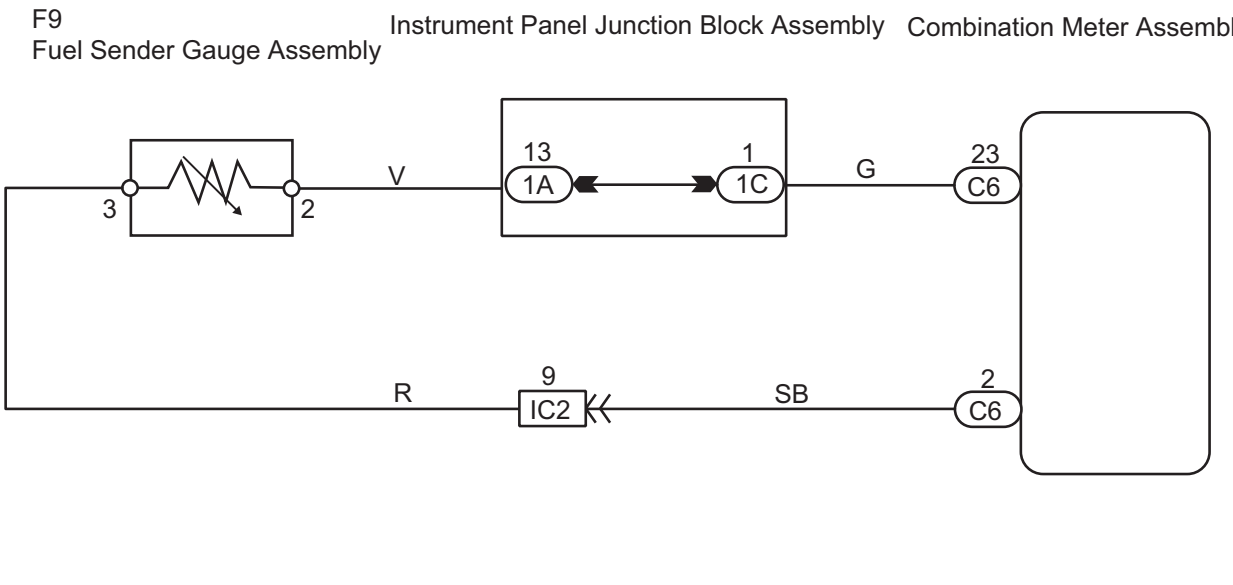
OK

REPLACE ECM

ME

Fuel Gauge Malfunction

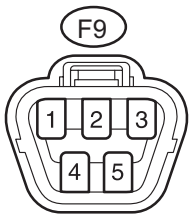
WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK COMBINATION METER ASSEMBLY

Wire Harness Side:



E110687E02

(a) Disconnect the F9 gauge connector.
(b) Check the meter indicator condition.
OK

Wire Connection	Condition	Specified Condition
2 - 3	Short circuit (Ignition switch ON)	Fuel gauge indicator "F" or more (combination meter)

(c) Measure the voltage of the wire harness side connector.
Standard voltage

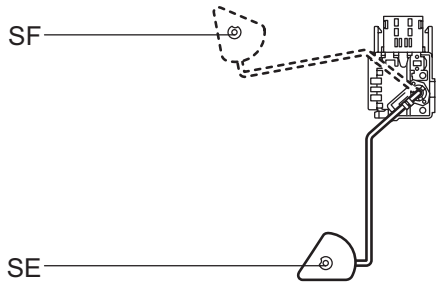
Tester Connection	Condition	Specified Condition
2 - Body ground	Ignition switch ON	11 to 14 V

NG → **Go to step 3**

OK

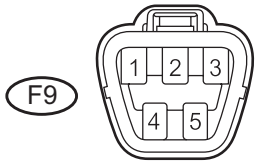
2	INSPECT FUEL SENDER GAUGE ASSEMBLY

Fuel Sender Gauge Assembly:



Wire Harness Side:

Fuel Sender Gauge:



H

E136504E01

(a) Remove the fuel sender gauge assembly.
(b) Check that the float moves smoothly between F and E.
(c) Measure the resistance between terminals 2 and 3 of the gauge.

Standard resistance

Float Level	Specified Condition
SF	3.0 to 5.0 Ω
Between E and F	3.0 to 111 Ω
SE	109 to 111 Ω

NG → **REPLACE FUEL SENDER GAUGE ASSEMBLY**

OK

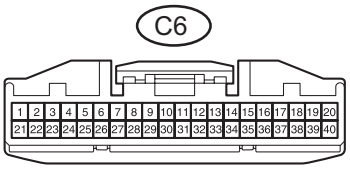
REPLACE COMBINATION METER ASSEMBLY

ME

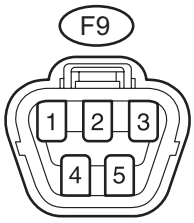
3	CHECK WIRE HARNESS (COMBINATION METER - FUEL SENDER GAUGE)

Wire Harness Side:

Combination Meter Assembly



Fuel Sender Gauge Assembly



E110688E02

(a) Disconnect the C6 meter connector.
(b) Disconnect the F9 gauge connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C6-23 - F9-2	Below 1 Ω
C6-2 - F9-3	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

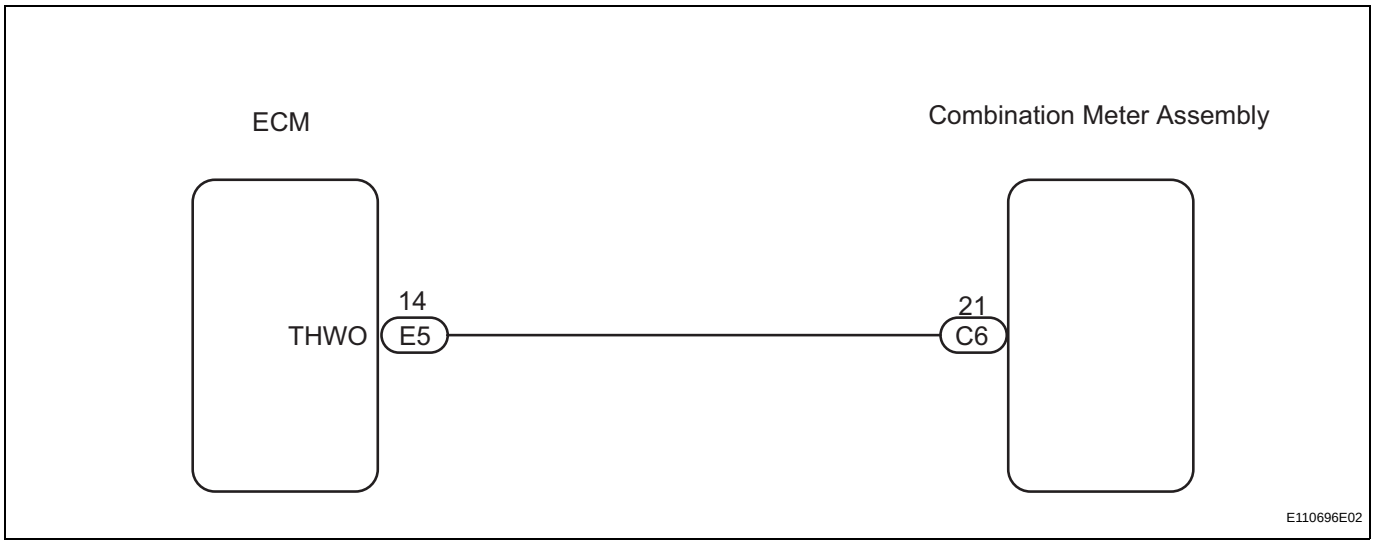
OK

REPLACE COMBINATION METER ASSEMBLY

ME

Engine Coolant Temperature Gauge Malfunction

WIRING DIAGRAM



ME

INSPECTION PROCEDURE

HINT:
If there is an open or short the engine coolant temperature sensor circuit, the ECM outputs DTCs (See page ES-47). Perform troubleshooting with the "SFI SYSTEM".

1	READ VALUE OF INTELLIGENT TESTER (ENGINE COOLANT TEMPERATURE SIGNAL)

(a) Operate the intelligent tester according to the steps on the display and select "DATA LIST".

ENGINE

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
COOLANT TEMP	Coolant temperature/Min.: -40°C (-40°F), Max.: 140°C (284°F)	After warming up: 80 to 95°C (176 to 203°F)	If the value is "-40°C (-40°F)" or "140 °C (284°F)", sensor circuit is open or shorted

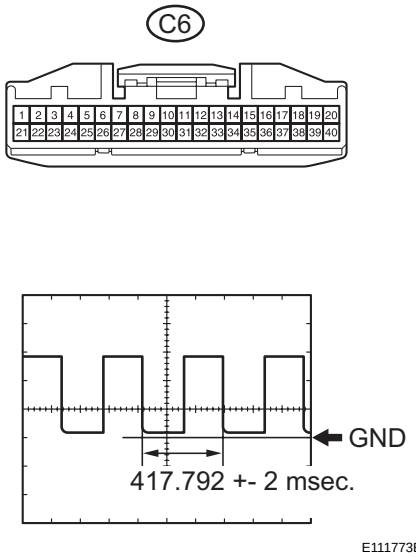
OK:
Coolant temperature display on the tester is between 80°C (176°F) and 95°C (203°F) after warming up.

NG → **GO TO ENGINE CONTROL SYSTEM**

OK

2	CHECK COMBINATION METER ASSEMBLY

Wire Harness Side:



(a) Disconnect the C6 meter connector.
(b) Using an oscilloscope, check the signal waveform of the meter.

Tester Connection	Tool Setting	Vehicle Condition
C6-21 - Body ground	5 V/DIV., 10 ms./DIV.	Ignition switch ON

OK:
Refer to the illustration.

NG → **Go to step 3**

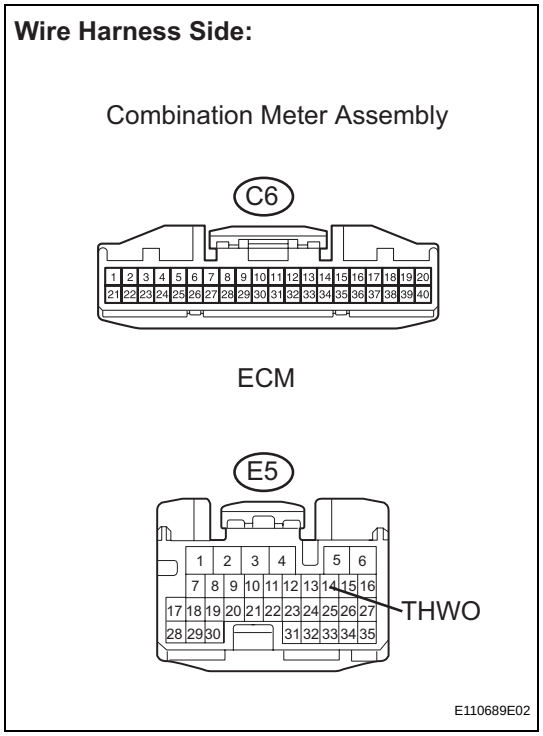
OK

REPLACE COMBINATION METER ASSEMBLY

ME

3	CHECK WIRE HARNESS (COMBINATION METER ASSEMBLY - ECM)

Wire Harness Side:



(a) Disconnect the C6 meter connector.
(b) Disconnect the E5 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
C6-21 - E5-14 (THWO)	Below 1 Ω
C6-21 - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

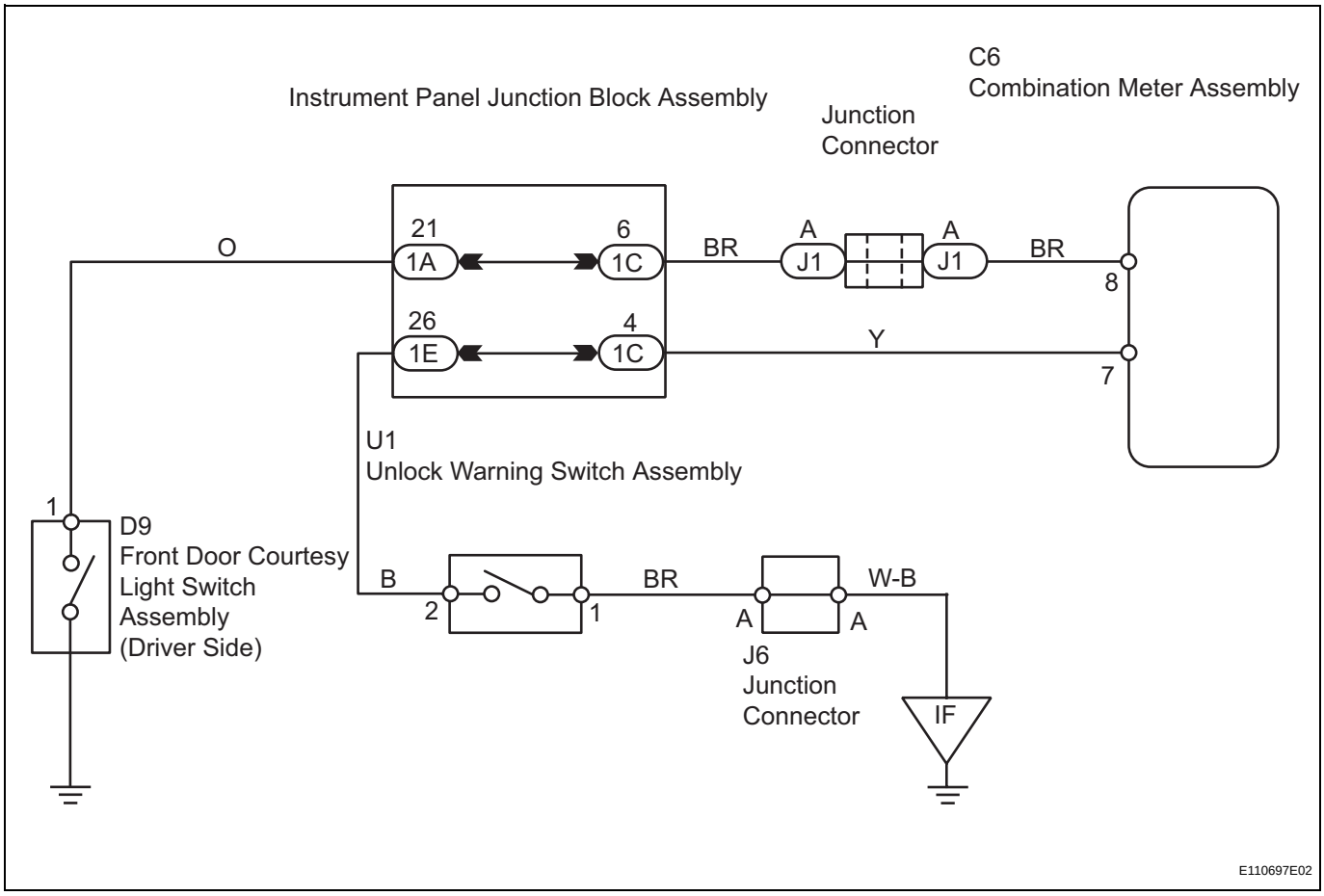
OK

GO TO ENGINE CONTROL SYSTEM

ME

Warning Buzzer does not Sound

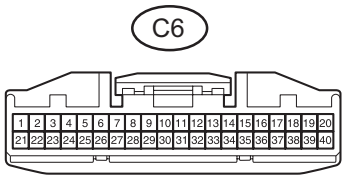
WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (COMBINATION METER ASSEMBLY - BODY GROUND)

Wire Harness Side:



E110685E05

(a) Disconnect the C6 meter connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

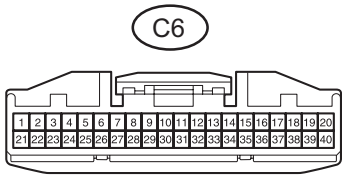
Tester Connection	Condition	Specified Condition
C6-7 - Body ground	Ignition key is inserted	Below 1 Ω
C6-7 - Body ground	Ignition key is not inserted	10 kΩ or higher

NG → **Go to step 3**

OK

2 CHECK WIRE HARNESS (COMBINATION METER ASSEMBLY - BODY GROUND)

Wire Harness Side:



E110685E06

(a) Disconnect the C6 meter connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Condition	Specified Condition
C6-8 - Body ground	Driver side door is open	Below 1 Ω
C6-8 - Body ground	Driver side door is closed	10 kΩ or higher

NG → **Go to step 4**

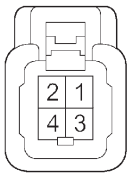
OK

REPLACE COMBINATION METER ASSEMBLY

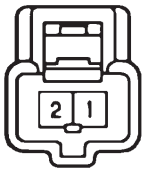
ME

3 INSPECT UNLOCK WARNING SWITCH ASSEMBLY

A/T:



M/T:



I043077E02

(a) Remove the unlock warning switch.
(b) Measure the resistance of the switch.

Standard resistance

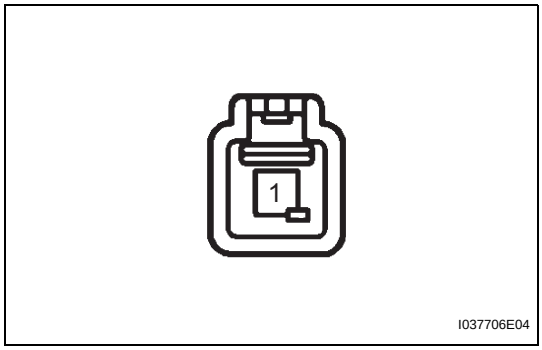
Tester Connection	Condition	Specified Condition
1 - 2	Driver side door is open	Below 1 Ω
1 - 2	Driver side door is closed	10 kΩ or higher

NG → **REPLACE UNLOCK WARNING SWITCH ASSEMBLY**

OK

REPAIR OR REPLACE HARNESS AND CONNECTOR (UNLOCK WARNING SWITCH CIRCUIT)

4	INSPECT FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY



(a) Disconnect the D9 switch connector.
(b) Measure the resistance of the switch.
Standard resistance

Tester Connection	Condition	Specified Condition
D9-1 - Body ground	Driver side door is open	Below 1 Ω
D9-1 - Body ground	Driver side door is closed	10 kΩ or higher

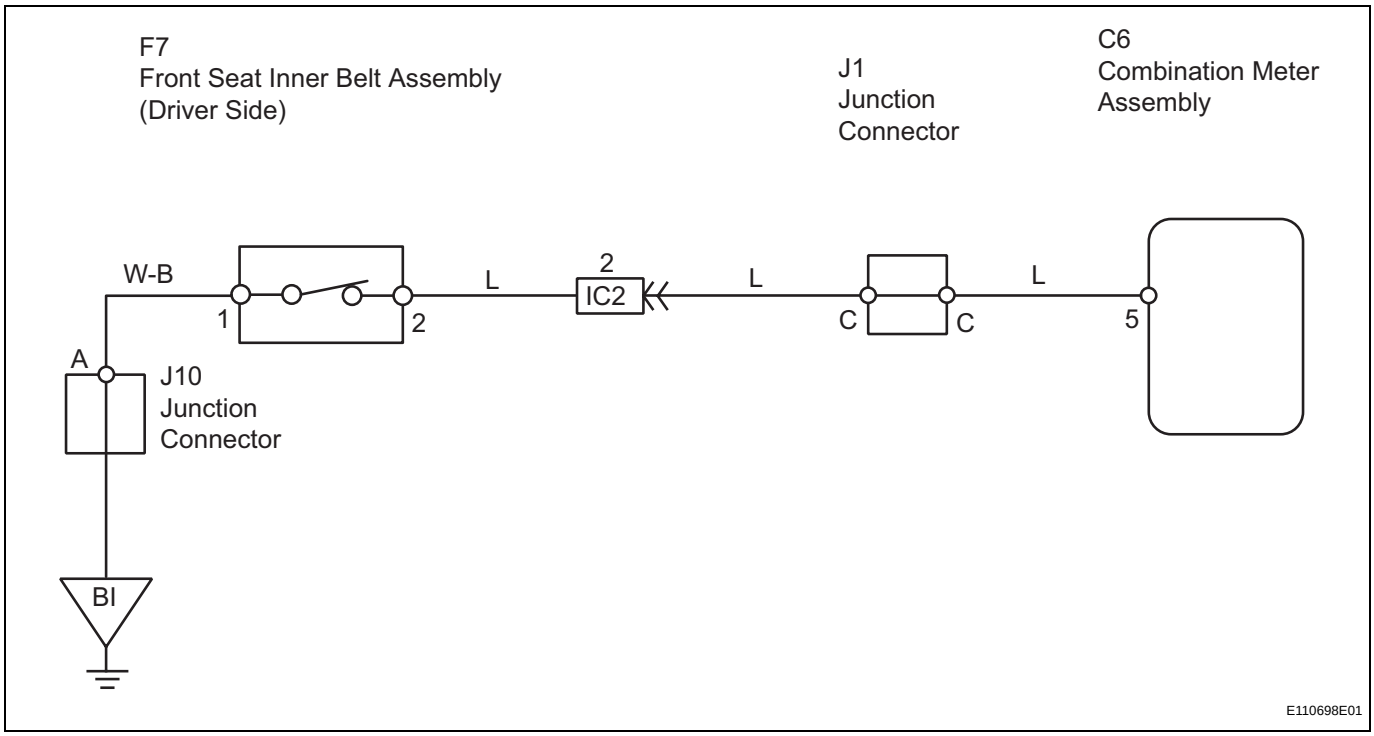
NG → **REPLACE FRONT DOOR COURTESY LIGHT SWITCH ASSEMBLY**

OK

ME **REPAIR OR REPLACE HARNESS AND CONNECTOR (FRONT DOOR COURTESY LIGHT SWITCH CIRCUIT)**

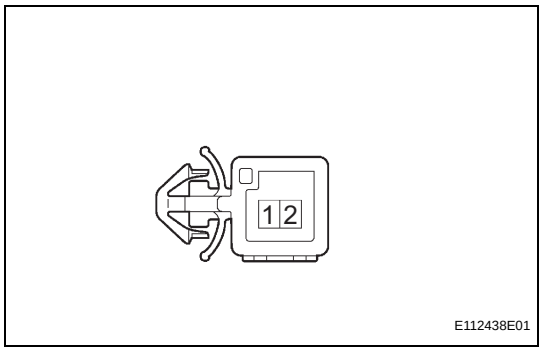
Driver Side Seat Belt Warning Light does not Operate

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT FRONT SEAT INNER BELT ASSEMBLY (DRIVER SIDE)



(a) Remove the front seat inner belt.
(b) Measure the resistance of the belt.
Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Seat belt is fastened	1 MΩ or higher
1 - 2	Seat belt is not fastened	Below 1 Ω

NG → **REPLACE FRONT SEAT INNER BELT ASSEMBLY (DRIVER SIDE)**

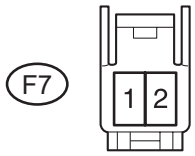
OK

ME

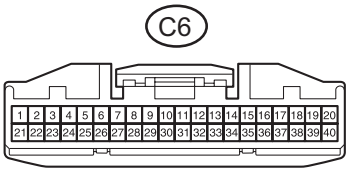
2	**CHECK WIRE HARNESS (FRONT SEAT INNER BELT - COMBINATION METER AND BODY GROUND)**

Wire Harness Side:

Front Seat Inner Belt Assembly
(Driver Side)



Combination Meter Assembly



E112437E02

(a) Disconnect the F7 belt connector.
(b) Disconnect the C6 meter connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
F7-1 - Body ground	Below 1 Ω
F7-2 - C6-5	Below 1 Ω
F7-2 - Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPAIR OR REPLACE COMBINATION METER ASSEMBLY

ME

Front Passenger Side Seat Belt Warning Light Malfunction

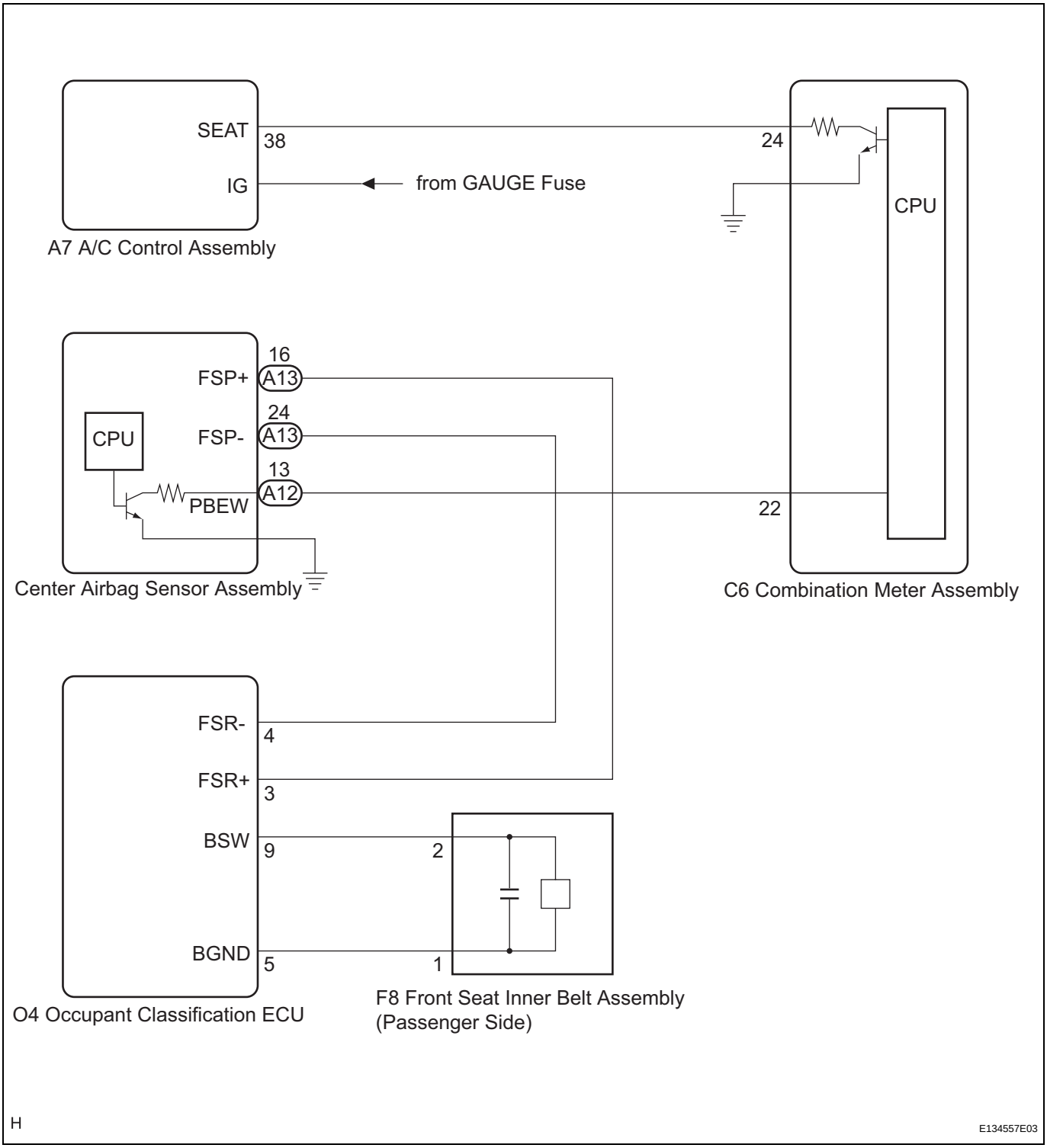
DESCRIPTION

The occupant classification ECU detects the state of the front seat inner belt assembly (passenger side) when the front passenger seat is occupied with the ignition switch ON. If the front passenger seat belt is not fastened, the front seat belt warning light on the A/C control assembly blinks. If the front passenger seat belt is fastened, the warning light goes off.

HINT:

The center airbag sensor assembly uses the front passenger buckle switch signal to control the airbag operation. If there is a communication error between the occupant classification ECU and center airbag sensor assembly, the airbag warning light comes on.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

If there is an open in the passenger side buckle switch circuit (front seat inner belt assembly circuit), the occupant classification ECU outputs DTCs. Perform troubleshooting with the "Occupant Classification System" (See page RS-260).

1	CHECK DTC

(a) Check for DTCs.

Result

Result	Proceed to
DTC B1771 is not output	A
DTC B1771 is output	B (See page RS-262)

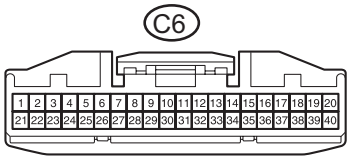
B → GO TO OCCUPANT CLASSIFICATION SYSTEM

A

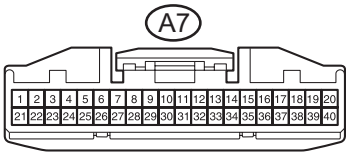
2	CHECK HARNESS AND CONNECTOR (COMBINATION METER - A/C CONTROL ASSEMBLY)

Wire Harness Side:

Combination Meter Assembly



A/C Control Assembly



E110701E02

(a) Disconnect the A7 and C6 connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
A7-38 (SEAT) - C6-24	Always	Below 1 Ω
C6-24 - Body ground	Always	10 kΩ or higher

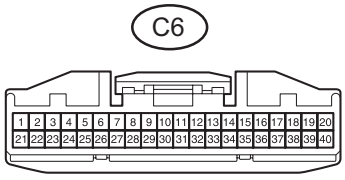
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

3	INSPECT A/C CONTROL ASSEMBLY

(a) Reconnect the A7 connector.

Wire Harness Side:



E110685E07

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
C6-24 - Body ground	Turn the ignition switch to the ON position	11 to 14 V

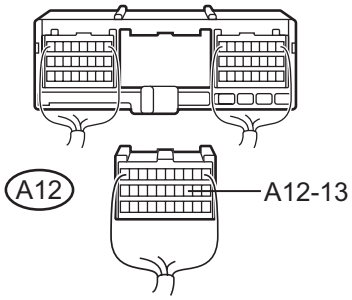
NG → **REPLACE A/C CONTROL ASSEMBLY**

OK

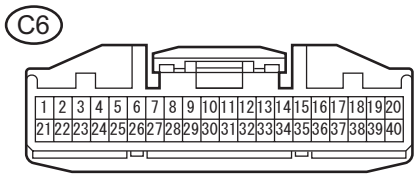
4 CHECK HARNESS AND CONNECTOR (COMBINATION METER - CENTER AIRBAG SENSOR ASSEMBLY)

Wire Harness Side:

Center Airbag Sensor Assembly



Combination Meter Assembly



H

E134558E03

(a) Disconnect the A12 connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
C6-22 - A12-13 (PBEW)	Always	Below 1 Ω
C6-22 - Body ground	Always	10 kΩ or higher

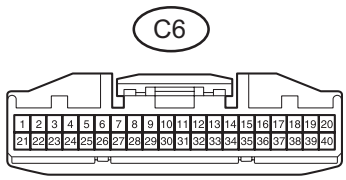
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

5 INSPECT COMBINATION METER ASSEMBLY

(a) Reconnect the C6 connector.

Wire Harness Side:



E110685E07

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

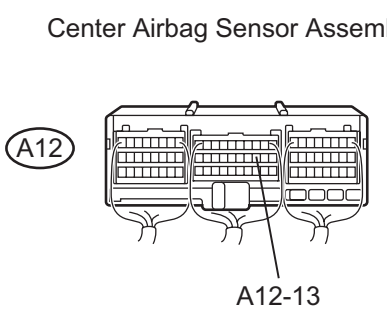
Tester Connection	Condition	Specified Condition
C6-22 - Body ground	Turn the ignition switch to the ON position	8 to 16 V

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

6 INSPECT CENTER AIRBAG SENSOR ASSEMBLY

Wire Harness Side:



E136508E01

(a) Reconnect the A12 connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
A12-13 (PBEW) - Body ground	Turn the ignition switch to the ON position, sit on the front passenger seat, and front passenger seat belt is unfastened	Below 1 V
A12-13 (PBEW) - Body ground	Turn the ignition switch to the ON position, sit on the front passenger seat, and front passenger seat belt is fastened	8 to 16 V

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

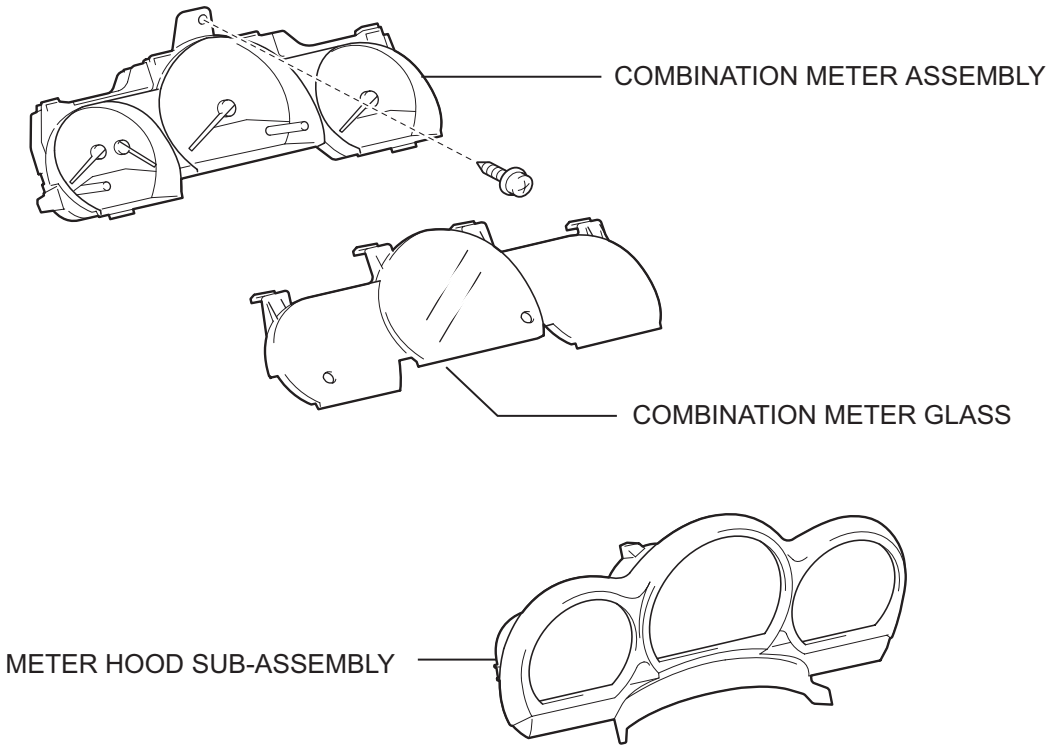
OK

REPLACE COMBINATION METER ASSEMBLY

ME

COMBINATION METER

COMPONENTS



B116236E02

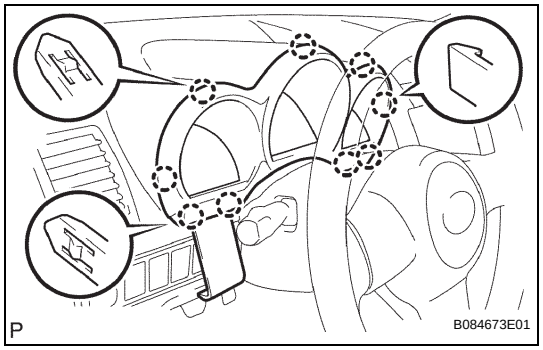
ME

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



2. REMOVE METER HOOD SUB-ASSEMBLY

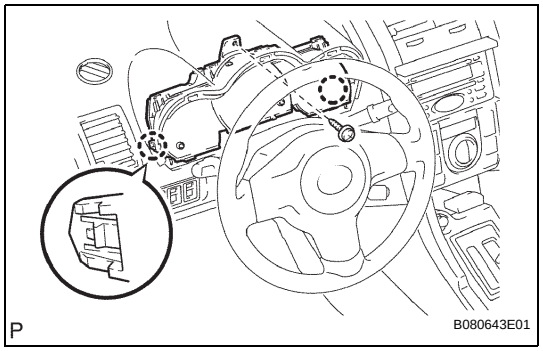
(a) Tilt the steering column assembly down as far as possible.

(b) Using a moulding remover, detach the 9 claws.

HINT:

Tape the moulding remover tip before use.

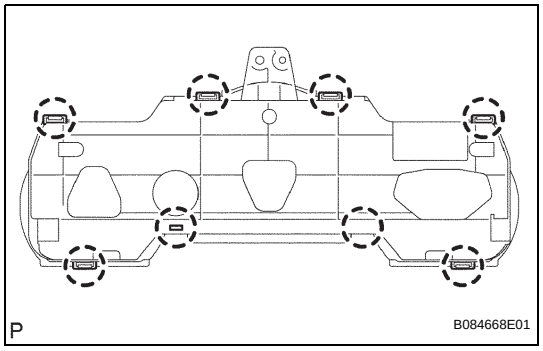
(c) Remove the meter hood.



3. REMOVE COMBINATION METER ASSEMBLY

(a) Remove the screw and detach the 2 claws.

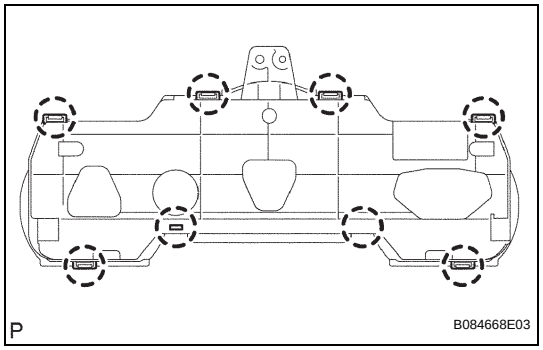
(b) Remove the combination meter and disconnect the connectors.



4. REMOVE COMBINATION METER GLASS

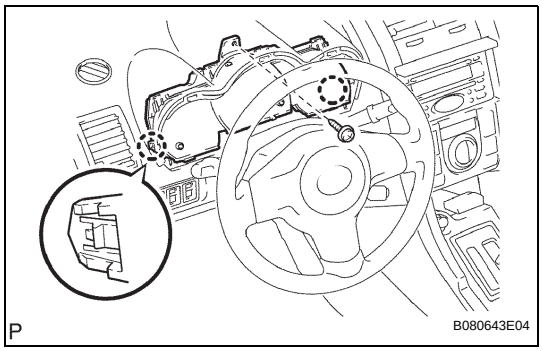
(a) Detach the 8 claws, and then remove the combination meter glass.

INSTALLATION



1. INSTALL COMBINATION METER GLASS

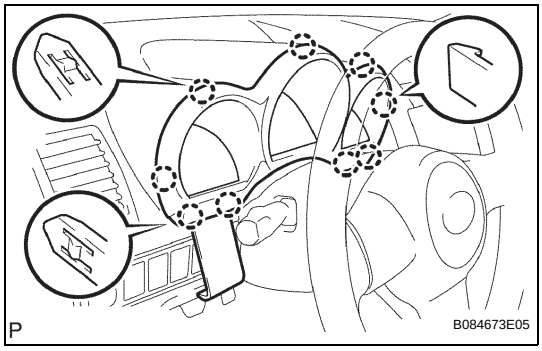
(a) Attach the 8 claws to install the combination meter glass.



2. INSTALL COMBINATION METER ASSEMBLY

(a) Connect the connector and install the combination meter.

(b) Attach the 2 claws to install the screw.



3. INSTALL METER HOOD SUB-ASSEMBLY

(a) Attach the 9 claws to install the meter hood.

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

5. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

6. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

ME

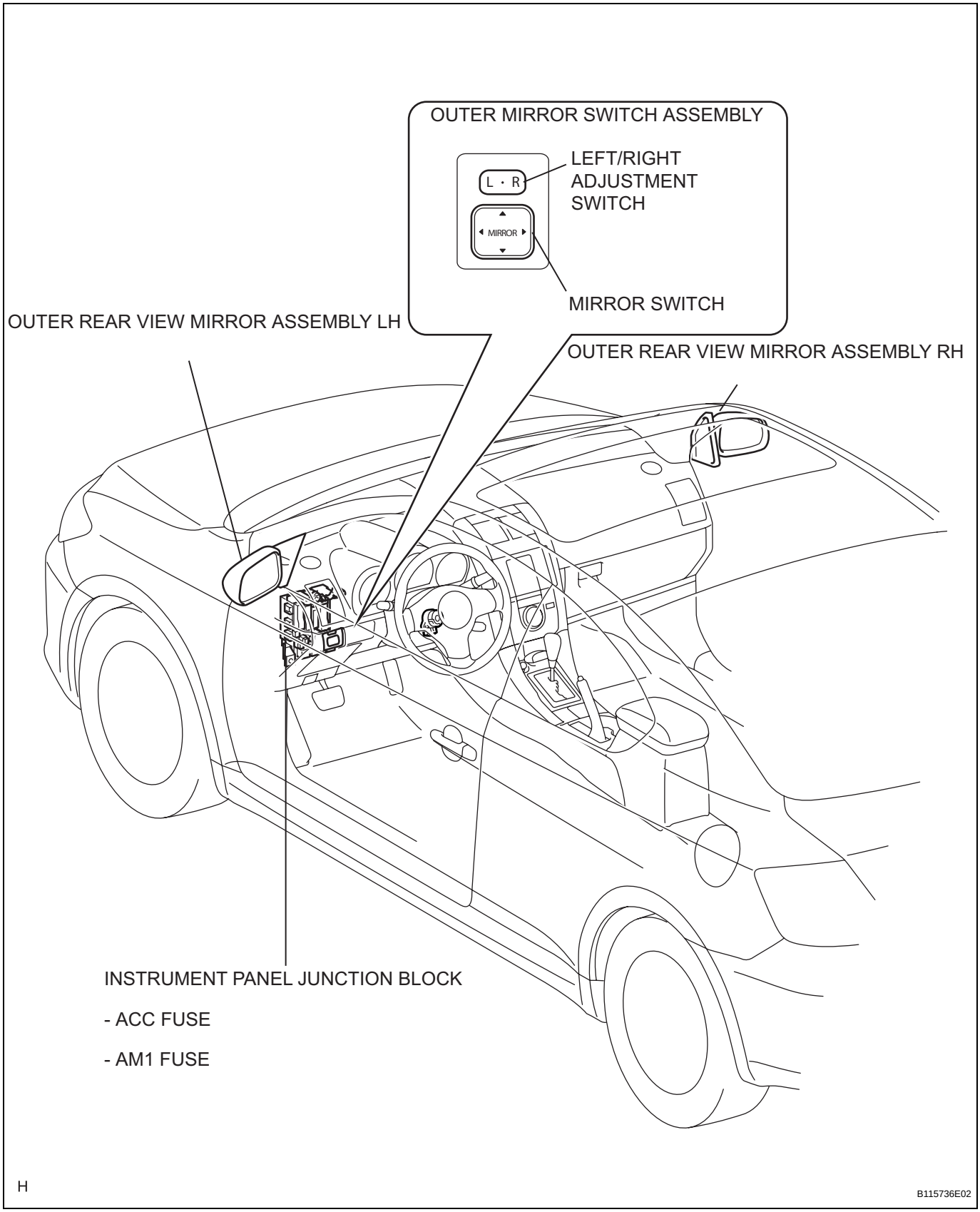
POWER MIRROR CONTROL SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

System Name	See Page
Power window control system (with Jam Protection Function)	IN-23
Sliding Roof System	

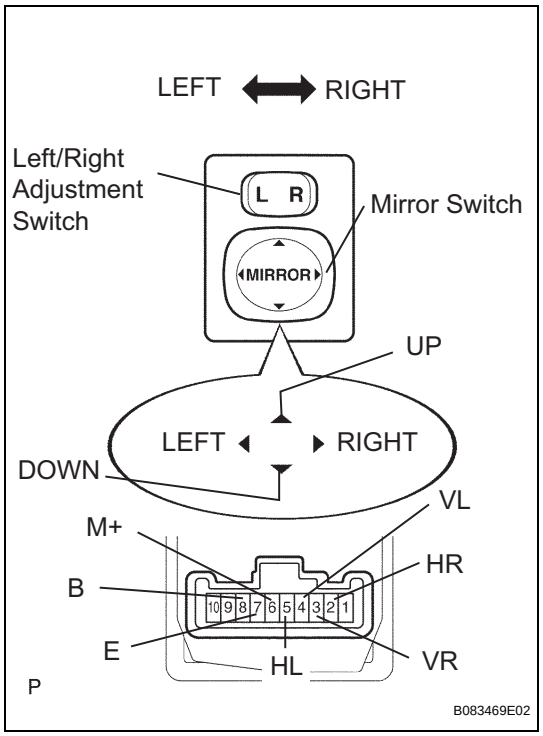
PARTS LOCATION



PROBLEM SYMPTOMS TABLE

Power mirror control system

Symptom	Suspected Area	See page
Mirror does not operate	1. AM1 fuse	MI-2
	2. ACC fuse	MI-2
	3. Outer mirror switch assembly	MI-3
	4. Outer rear view mirror assembly	MI-3
	5. Wire harness	-
Mirror operates abnormally	1. Outer mirror switch assembly	MI-3
	2. Outer rear view mirror assembly	MI-3
	3. Wire harness	-



INSPECTION

1. INSPECT OUTER MIRROR SWITCH ASSEMBLY

(a) Select L on the left/right adjustment switch:
Measure the resistance of the switch.
Standard resistance

Tester Connection	Switch Condition	Specified Condition
4 (VL) - 8 (B) 6 (M+) - 7 (E)	UP	Below 1 Ω
4 (VL) - 7 (E) 6 (M+) - 8 (B)	DOWN	Below 1 Ω
5 (HL) - 8 (B) 6 (M+) - 7 (E)	LEFT	Below 1 Ω
5 (HL) - 7 (E) 6 (M+) - 8 (B)	RIGHT	Below 1 Ω

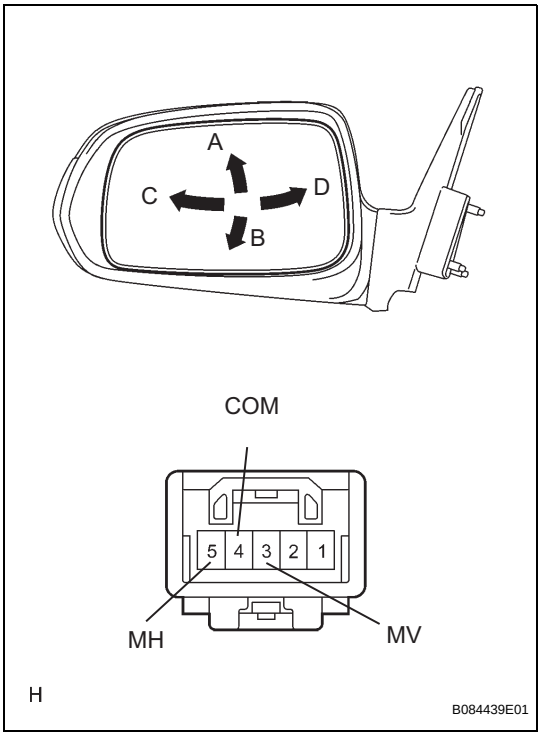
If the result is not as specified, replace the switch assembly.

(b) Select R on the left/right adjustment switch:
Measure the resistance of the switch.
Standard resistance

Tester Connection	Switch Condition	Specified Condition
3 (VR) - 8 (B) 6 (M+) - 7 (E)	UP	Below 1 Ω
3 (VR) - 7 (E) 6 (M+) - 8 (B)	DOWN	Below 1 Ω
2 (HR) - 8 (B) 6 (M+) - 7 (E)	LEFT	Below 1 Ω
2 (HR) - 7 (E) 6 (M+) - 8 (B)	RIGHT	Below 1 Ω

If the result is not as specified, replace the switch assembly.

MI



2. INSPECT OUTER REAR VIEW MIRROR ASSEMBLY LH

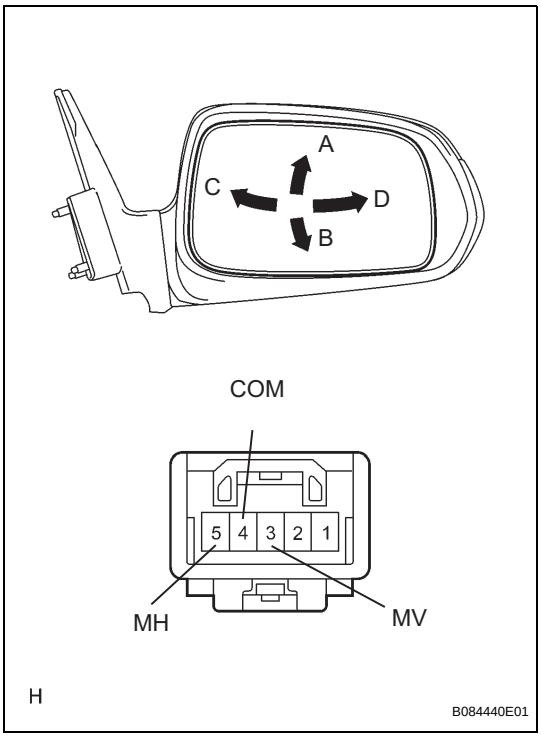
(a) Disconnect the mirror connector.

(b) Apply battery voltage to the mirror and check the operation of the mirror.

OK

Measurement Condition	Mirror Condition
Battery positive (+) → 3 (MV) Battery negative (-) → 4 (COM)	Turns upward (A)
Battery positive (+) → 4 (COM) Battery negative (-) → 3 (MV)	Turns downward (B)
Battery positive (+) → 5 (MH) Battery negative (-) → 4 (COM)	Turns left (C)
Battery positive (+) → 4 (COM) Battery negative (-) → 5 (MH)	Turns right (D)

If the result is not as specified, replace the mirror assembly.



3. INSPECT OUTER REAR VIEW MIRROR ASSEMBLY RH

(a) Disconnect the mirror connector.

(b) Apply battery voltage to the mirror and check the operation of the mirror.

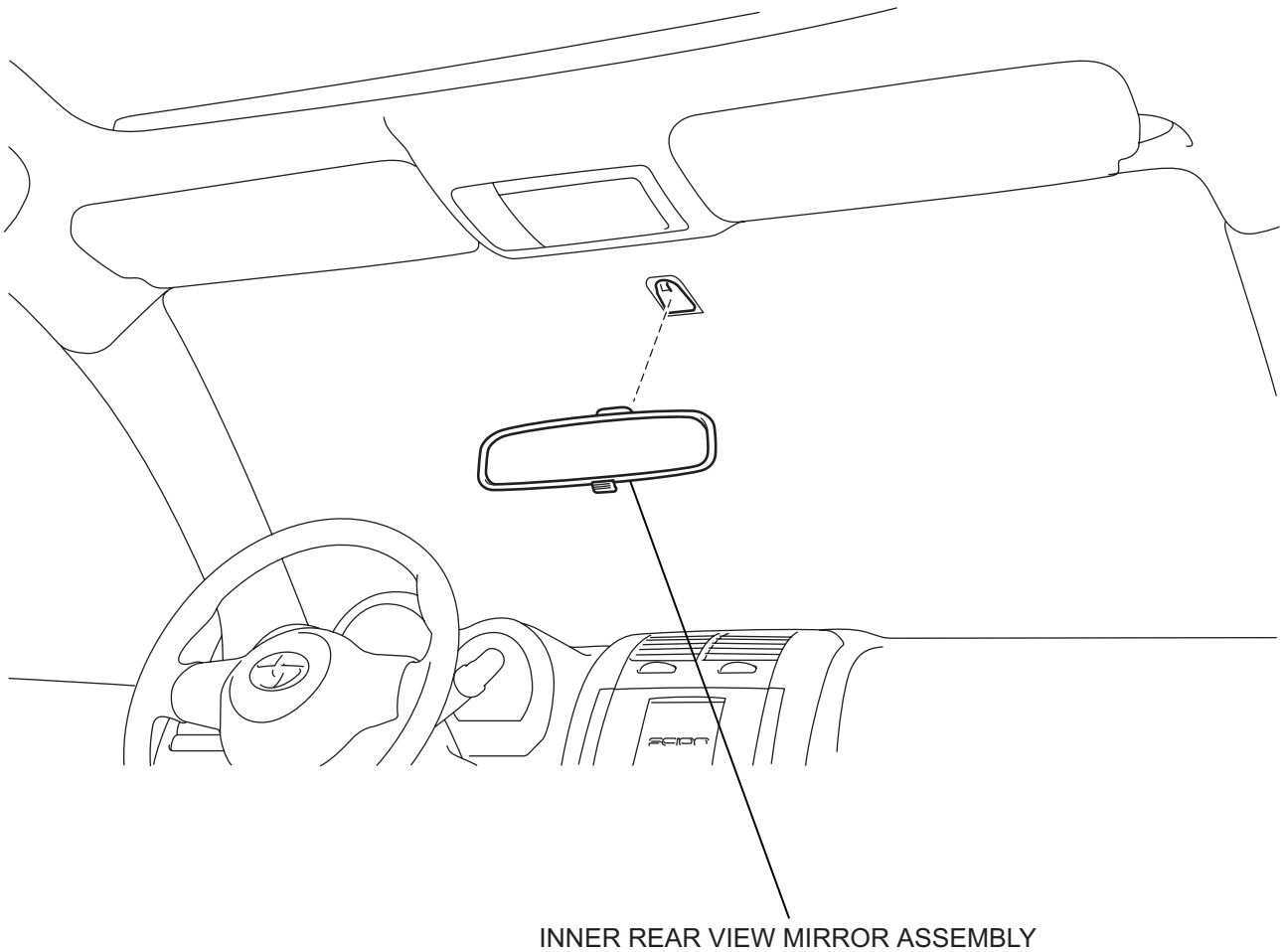
OK

Measurement Condition	Mirror Condition
Battery positive (+) → 3 (MV) Battery negative (-) → 4 (COM)	Turns upward (A)
Battery positive (+) → 4 (COM) Battery negative (-) → 3 (MV)	Turns downward (B)
Battery positive (+) → 5 (MH) Battery negative (-) → 4 (COM)	Turns left (C)
Battery positive (+) → 4 (COM) Battery negative (-) → 5 (MH)	Turns right (D)

If the result is not as specified, replace the mirror assembly.

INNER REAR VIEW MIRROR

COMPONENTS



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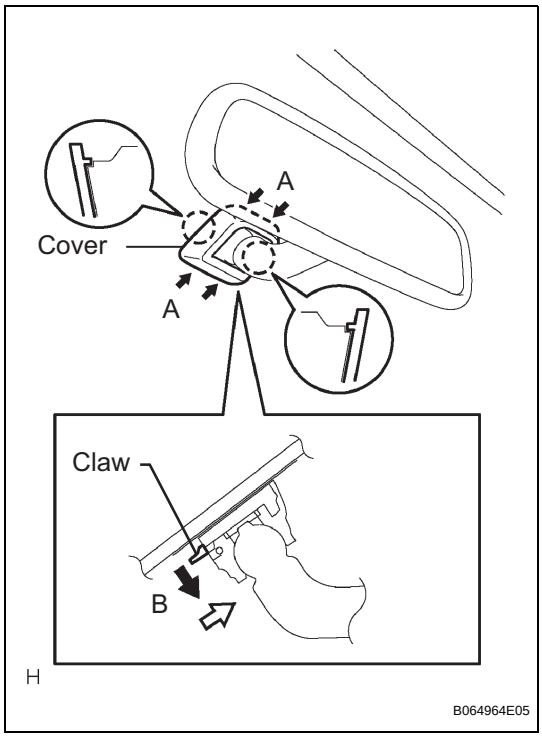
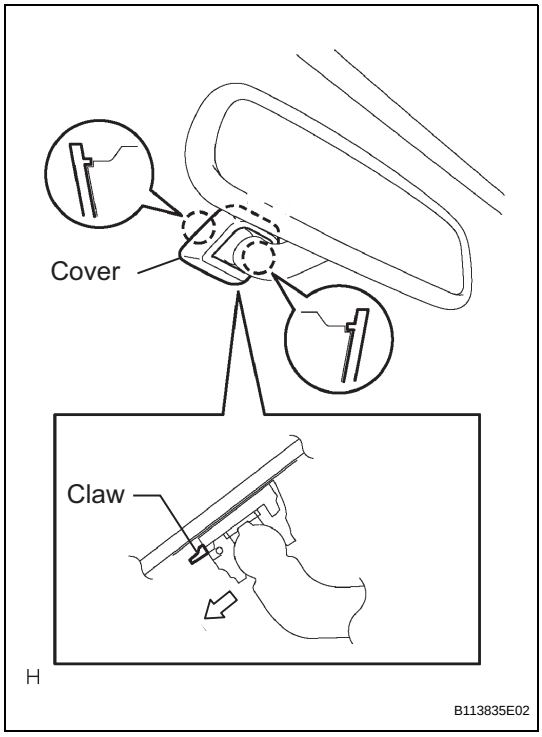


REMOVAL

1. REMOVE INNER REAR VIEW MIRROR ASSEMBLY

(a) Push the cover in the direction indicated by the arrows labeled A and remove it.

(b) While holding down the claw in the direction of the black arrow labeled B, slide the mirror in the direction of the white arrow and remove it.



INSTALLATION

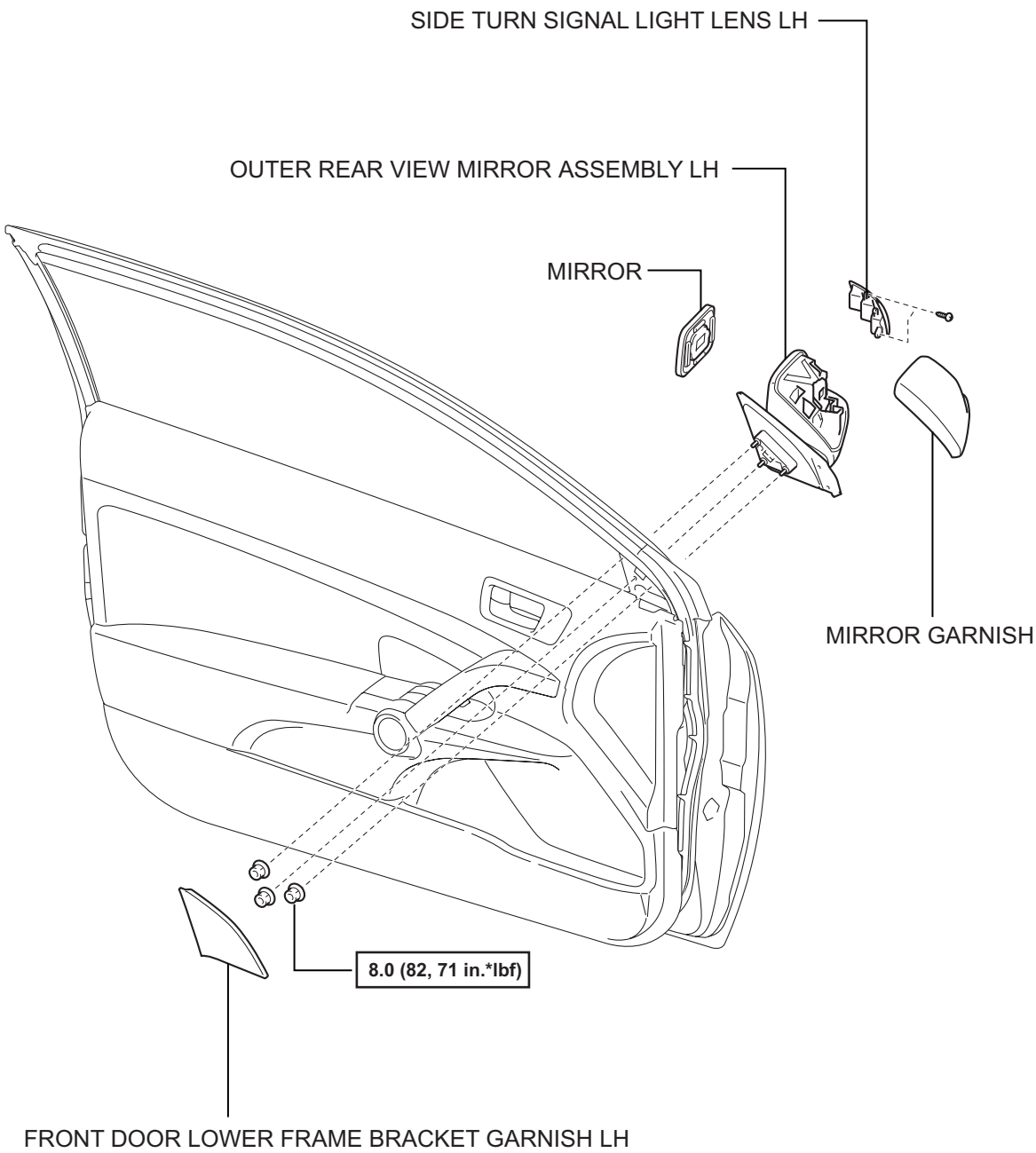
1. INSTALL INNER REAR VIEW MIRROR ASSEMBLY

(a) Install the mirror in the direction of the white arrow.

(b) Install the cover as shown in the illustration.

OUTER REAR VIEW MIRROR

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

H

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MI

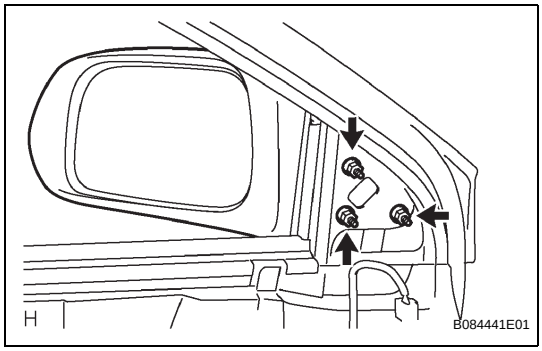
REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

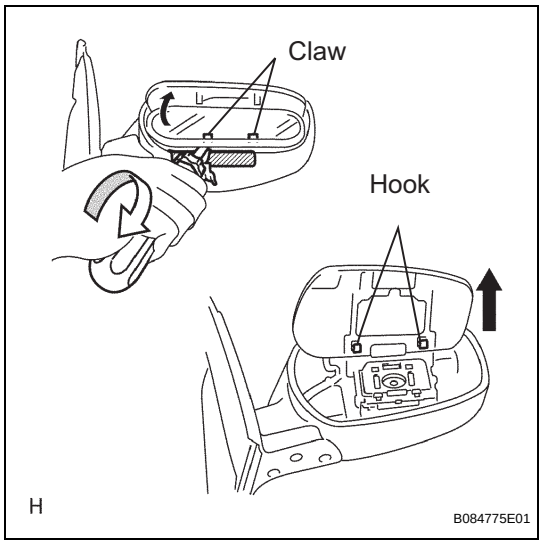
CAUTION:
If the mirror shatters during disassembly, flying debris may cause injuries. Be sure to wear protective clothing, gloves, glasses, etc. when performing these procedures.
NOTICE:
When replacing the mirror body, prevent damage to the mirror body by placing a protective cloth on the work area.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH**
3. **REMOVE OUTER REAR VIEW MIRROR ASSEMBLY LH**
   (a) Disconnect the connector.
   (b) Remove the 3 nuts and mirror.



DISASSEMBLY

CAUTION:
If the mirror shatters during removal, flying debris may cause injuries. Be sure to wear protective clothing, gloves, glasses, etc. when performing these procedures.
NOTICE:
When replacing the mirror body, prevent damage to the mirror body by placing a protective cloth on the work area.

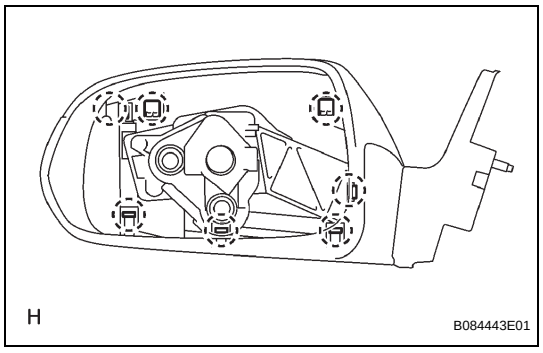


1. DISCONNECT MIRROR

(a) Face the mirror holder upward and look at the bottom of the mirror. Find the 2 grooves between the mirror holder and holder base. Insert a screwdriver into a groove and twist it to release the claw. Then repeat for the other groove.
HINT:
Tape the screwdriver tip before use.
CAUTION:
To prevent the mirror from shattering and causing flying debris, apply tape to the front of the mirror.
NOTICE:
To prevent damage to the vehicle, apply protective tape on the mirror holder base near the lower edge of the mirror. A piece of cloth can also be used.

(b) Lift up the lower part of the mirror holder and then release the 2 hooks on the top of the mirror.

(c) Remove the mirror holder.



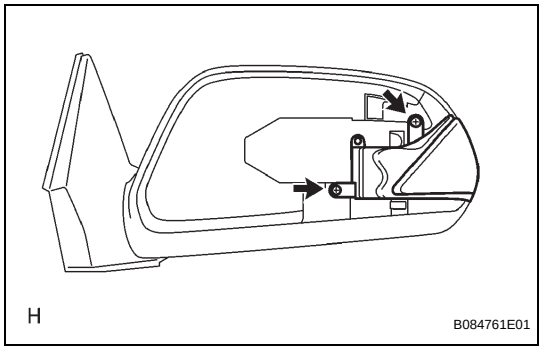
2. REMOVE MIRROR GARNISH

(a) Detach the 7 claws.

(b) Remove the garnish.

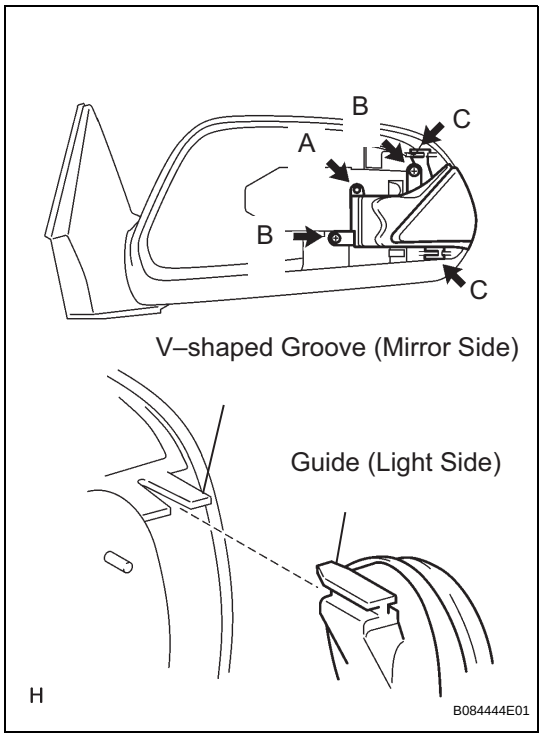
3. REMOVE SIDE TURN SIGNAL LIGHT LENS LH

(a) Disconnect the connector.



(b) Remove the 2 screws and lens.

MI

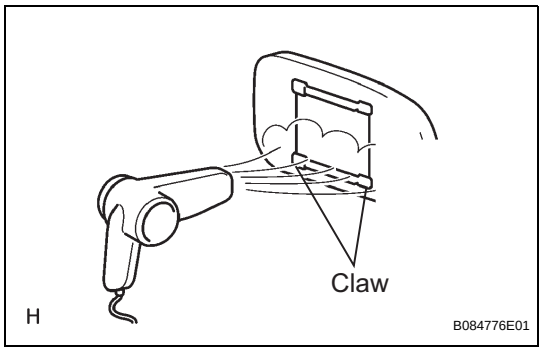


REASSEMBLY

1. INSTALL SIDE TURN SIGNAL LIGHT LENS LH

(a) First set the lens position by inserting the lens peg to the location labeled A in the illustration. Then insert the lens guide to the V-shaped groove as shown in C in the illustration.
(b) Install the lens with the 2 screws labeled B.
(c) Connect the connector.

2. INSTALL MIRROR GARNISH



3. CONNECT MIRROR

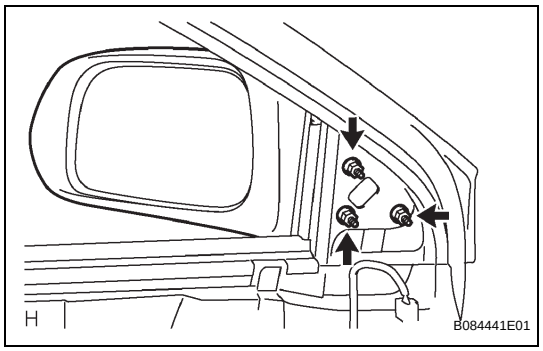
HINT:
Before connecting the mirror holder, use a dryer to sufficiently heat the backside of the mirror holder where the claws are located.

NOTICE:
If the ambient temperature is low and the claws are not heated before installing, the claws may be broken.

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. **INSTALL OUTER REAR VIEW MIRROR ASSEMBLY LH**
   (a) Install the mirror with the 3 nuts.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
   (b) Connect the connector.
2. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
3. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

PARKING BRAKE SYSTEM

PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cause of the problem symptom. 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.

Parking brake system

Symptom	Suspected Area	See page
Parking brake drags	1. Parking brake lever travel (adjustment necessary)	PB-1
	2. Parking brake wire (sticking)	PB-7
	3. Parking brake shoe clearance (adjustment necessary)	PB-19
	4. Parking brake shoe lining (cracked or distorted)	PB-15
	5. Tension or return spring (damaged)	PB-14

ADJUSTMENT

1. REMOVE REAR WHEEL

2. ADJUST PARKING BRAKE SHOE CLEARANCE

3. INSTALL REAR WHEEL
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

4. CHECK PARKING BRAKE LEVER TRAVEL

(a) Pull the lever upward with a force of approximately 196 N (20 kgf, 44.1 lbf) and count the number of clicks.
OK:
6 to 9 clicks

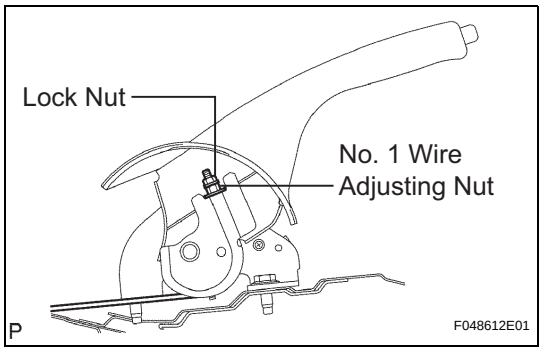
5. ADJUST PARKING BRAKE LEVER TRAVEL

(a) Remove the rear console box.

(b) Loosen the lock nut and turn the No. 1wire adjusting nut until the lever travel becomes correct.

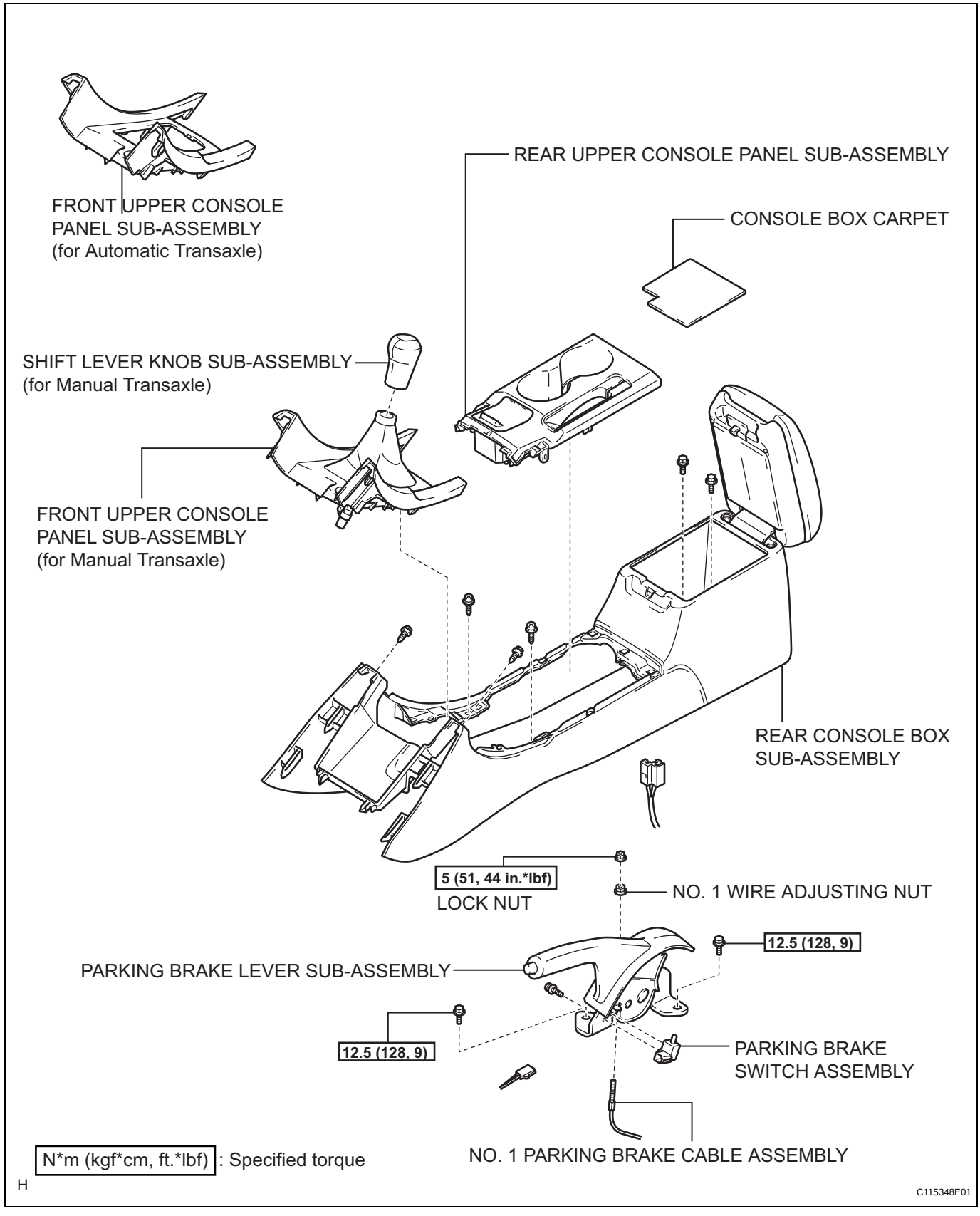
(c) Tighten the lock nut.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)

(d) Install the rear console box.



PARKING BRAKE LEVER

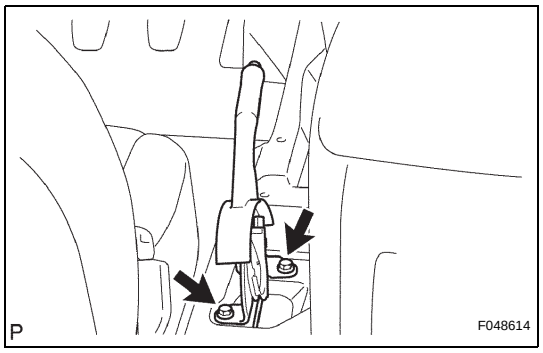
COMPONENTS

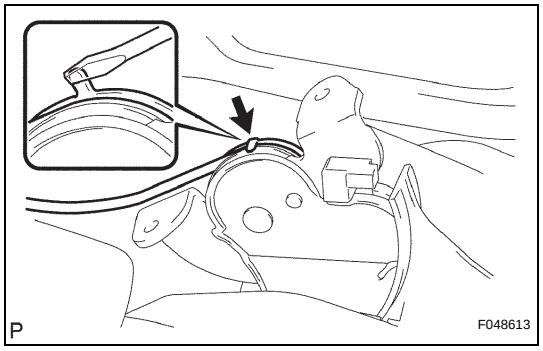


PB

REMOVAL

1. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-5)**
2. **REMOVE FRONT UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-5)**
3. **REMOVE REAR UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-18)**
4. **REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (See page IP-18)**
5. **REMOVE PARKING BRAKE LEVER SUB-ASSEMBLY**
   (a) Disconnect the parking brake switch connector from the parking brake switch.
   (b) Remove the lock nut and No. 1 wire adjusting nut from the No. 1 parking brake cable.
   (c) Remove the 2 bolts.





   (d) Using a screwdriver, raise the claw on the parking brake lever, and remove the No. 1 parking brake cable from the parking brake lever.
   (e) Remove the parking brake lever from the body.
6. **REMOVE PARKING BRAKE SWITCH ASSEMBLY**
   (a) Remove the screw and parking brake switch.

INSTALLATION

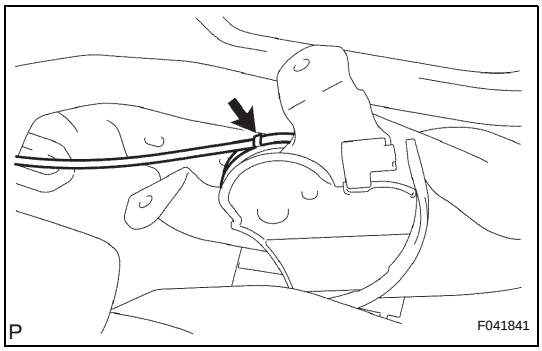
1. INSTALL PARKING BRAKE SWITCH ASSEMBLY

(a) Install the parking brake switch to the parking brake lever with the screw.

2. INSTALL PARKING BRAKE LEVER SUB-ASSEMBLY

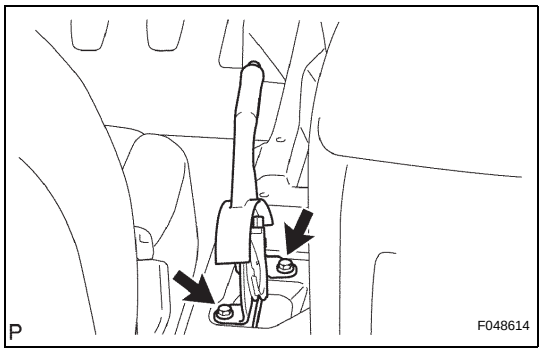
(a) Install the No. 1 parking brake cable to the parking brake lever, and temporarily tighten the No. 1 wire adjusting nut and lock nut.

(b) Using a screwdriver, fix the No. 1 parking brake cable to the claw.



(c) Install the parking brake lever with the 2 bolts.
Torque: 12.5 N*m (128 kgf*cm, 9 ft.*lbf)

(d) Connect the parking brake switch connector to the parking brake switch.



3. CHECK PARKING BRAKE LEVER TRAVEL (See page PB-1)

4. ADJUST PARKING BRAKE LEVER TRAVEL (See page PB-1)

5. INSTALL REAR CONSOLE BOX SUB-ASSEMBLY (See page IP-22)

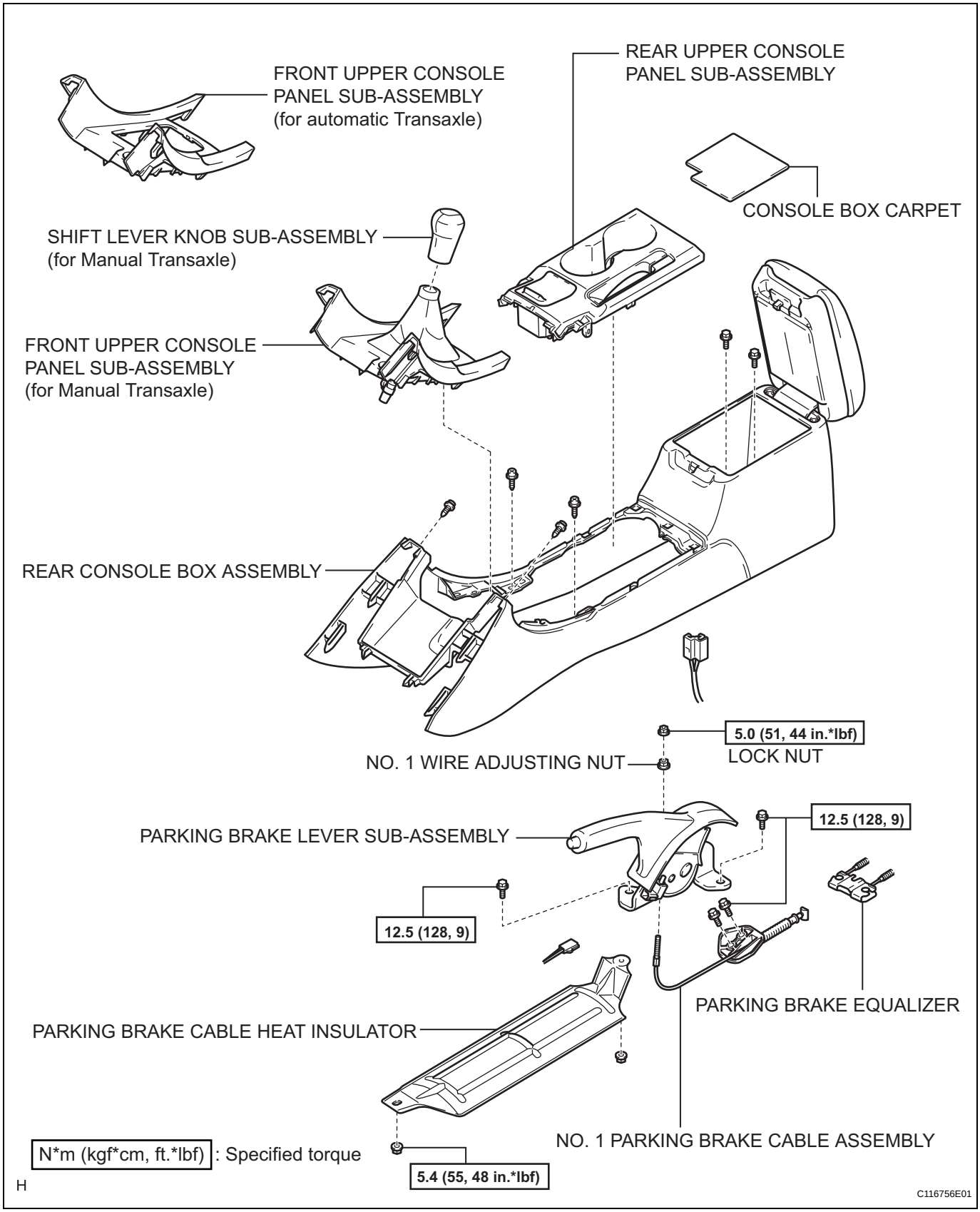
6. INSTALL REAR UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-23)

7. INSTALL FRONT UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-11)

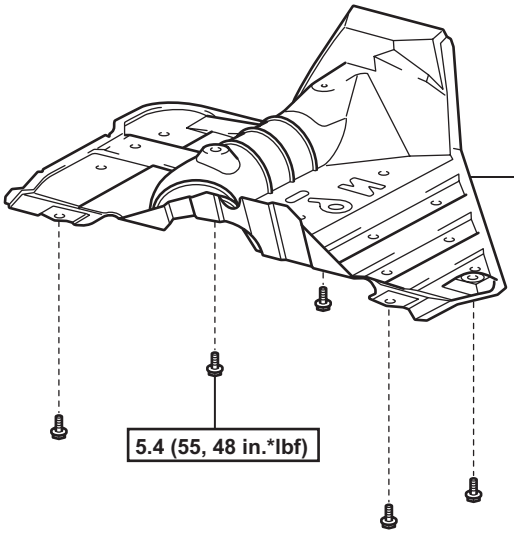
8. INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-12)

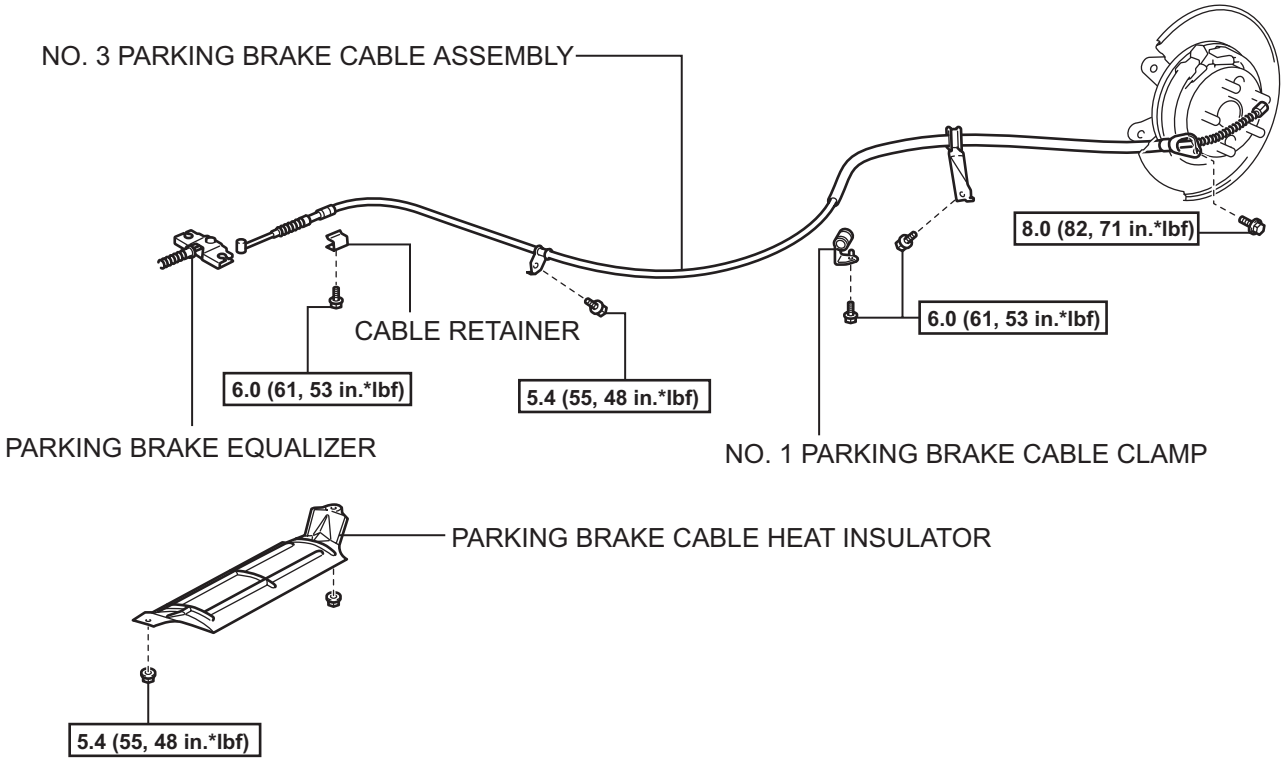
PARKING BRAKE CABLE

COMPONENTS



PB





PB

N*m (kgf*cm, ft.*lbf) : Specified torque

H

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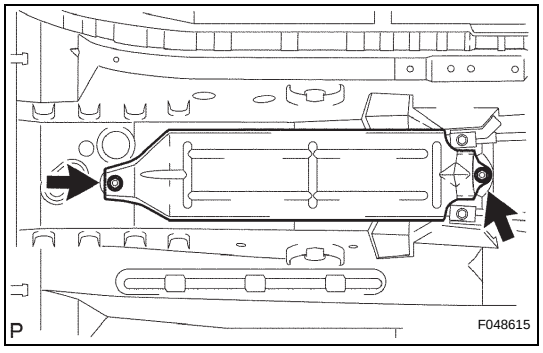
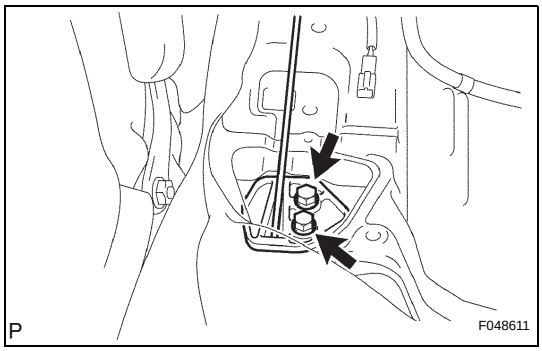
REMOVAL

HINT:
For the No. 2 parking brake cable, employ the same procedures as for the No. 3 parking brake cable.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-5)**
3. **REMOVE FRONT UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-5)**
4. **REMOVE REAR UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-18)**
5. **REMOVE REAR CONSOLE BOX SUB-ASSEMBLY (See page IP-18)**
6. **REMOVE PARKING BRAKE LEVER SUB-ASSEMBLY (See page PB-3)**
7. **REMOVE FRONT DOOR SCUFF PLATE RH (See page IP-19)**
8. **REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH (See page IP-19)**
9. **REMOVE FRONT SEAT ASSEMBLY RH**
   (a) Remove the front seat (see page SE-5).
10. **REMOVE CENTER EXHAUST PIPE ASSEMBLY (See page EX-2)**
11. **REMOVE PARKING BRAKE CABLE HEAT INSULATOR**
    (a) Remove the 2 nuts and heat insulator.
12. **REMOVE NO. 1 PARKING BRAKE CABLE ASSEMBLY**
    (a) Disconnect the parking brake cable from the parking brake equalizer.
    (b) Turn back the floor carpet.





(c) Remove the 2 bolts and parking brake cable.

13. REMOVE REAR WHEEL

14. REMOVE REAR DISC BRAKE CYLINDER MOUNTING LH WITH REAR DISC BRAKE CYLINDER ASSEMBLY LH

(a) Remove the brake cylinder mounting with brake cylinder (see page BR-31).

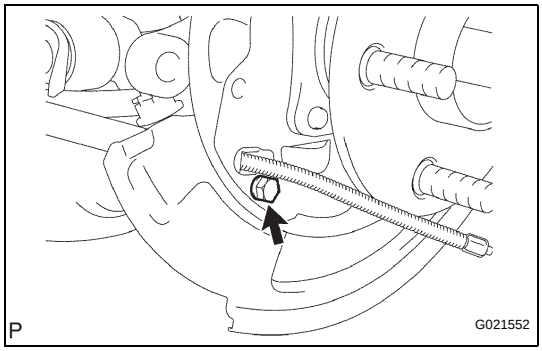
15. REMOVE REAR DISC (See page BR-32)

16. REMOVE PARKING BRAKE SHOE STRUT LH (See page PB-14)

17. REMOVE PARKING BRAKE SHOE ADJUSTING SCREW SET (See page PB-14)

18. REMOVE PARKING BRAKE SHOE ASSEMBLY LH (See page PB-15)

19. REMOVE PARKING BRAKE SHOE LEVER LH (See page PB-15)



20. DISCONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY

(a) Remove the bolt and disconnect the parking brake cable from the backing plate.

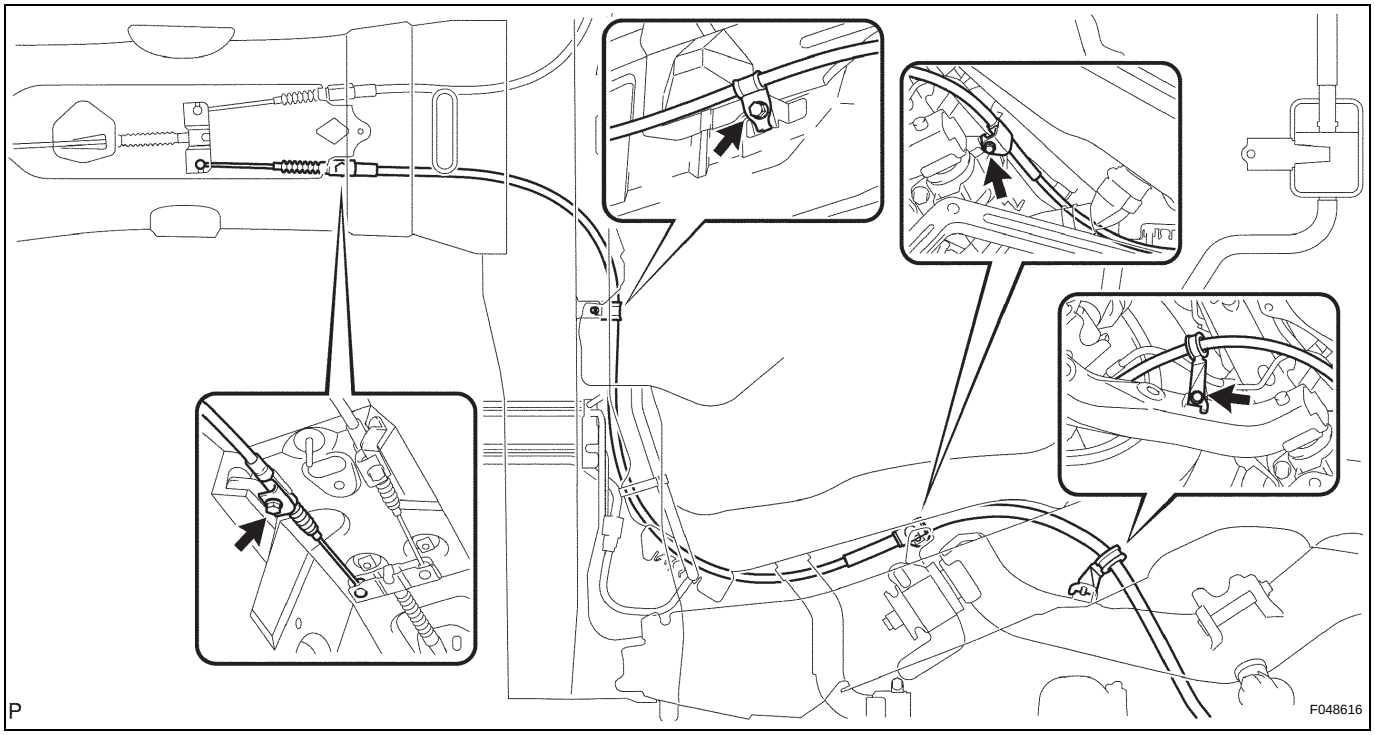
21. REMOVE NO. 1 FUEL TANK PROTECTOR

(a) Remove the 5 bolts and fuel tank protector.

22. REMOVE NO. 3 PARKING BRAKE CABLE ASSEMBLY

(a) Remove the 4 bolts and cable retainer from the body.

(b) Disconnect the parking brake cable from the parking brake equalizer, and remove the parking brake cable.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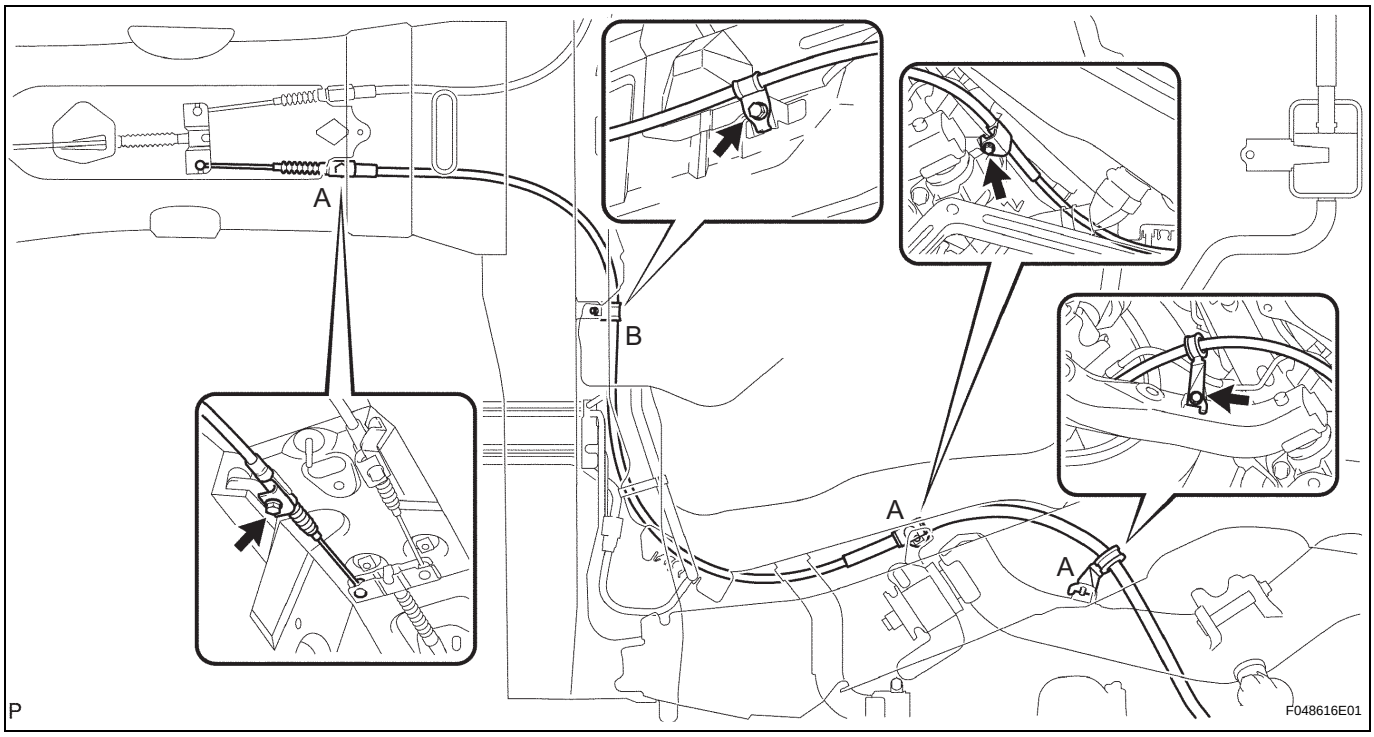
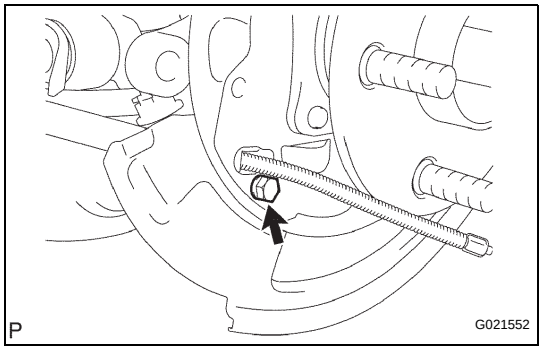
INSTALLATION

HINT:
For the No. 2 parking brake cable, employ the same procedures as for the No.3 parking brake cable.

1. **INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY**
   (a) Connect the parking brake cable to the parking brake cable equalizer.
   (b) Install the parking brake cable with the 4 bolts.
   Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf) for bolt A
   5.4 N*m (55 kgf*cm, 48 in.*lbf) for bolt B



2. **INSTALL NO. 1 FUEL TANK PROTECTOR**
   (a) Install the fuel tank protector with the 5 bolts.
   Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



3. **CONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY**
   (a) Connect the parking brake cable to the backing plate with the bolt.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)

4. **APPLY HIGH TEMPERATURE GREASE (See page PB-16)**

5. **INSTALL PARKING BRAKE SHOE LEVER LH (See page PB-16)**

6. **INSTALL PARKING BRAKE SHOE ASSEMBLY LH (See page PB-16)**

7. **INSTALL PARKING BRAKE SHOE ADJUSTING SCREW SET (See page PB-17)**

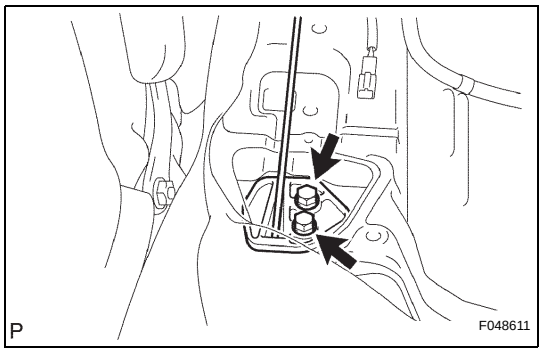
8. **INSTALL PARKING BRAKE SHOE STRUT LH (See page PB-17)**

9. **INSTALL REAR DISC (See page BR-35)**

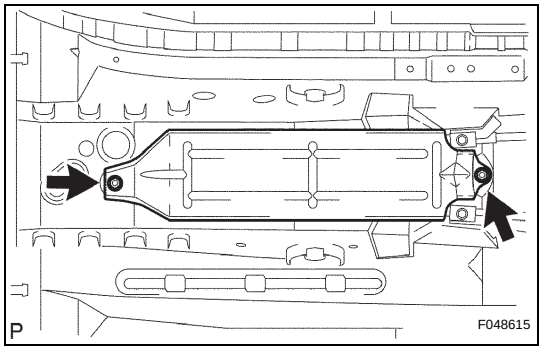
10. **INSTALL REAR DISC BRAKE CYLINDER MOUNTING LH WITH REAR DISC BRAKE CYLINDER ASSEMBLY LH**
    (a) Install the disc brake cylinder mounting with brake cylinder (see page BR-34).

11. **ADJUST PARKING BRAKE SHOE CLEARANCE (See page PB-19)**

12. **INSTALL REAR WHEEL**
    Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)



13. **INSTALL NO. 1 PARKING BRAKE CABLE ASSEMBLY**
    (a) Install the parking brake cable with the 2 bolts.
    Torque: 12.5 N*m (128 kgf*cm, 9 ft.*lbf)
    (b) Install the floor carpet.
    (c) Connect the parking brake cable to the parking brake equalizer and install the parking brake cable.



14. **INSTALL PARKING BRAKE CABLE HEAT INSULATOR**
    (a) Install he heat insulator with the 2 nuts.
    Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

15. **INSTALL CENTER EXHAUST PIPE ASSEMBLY (See page EX-4)**

16. **INSTALL PARKING BRAKE LEVER SUB-ASSEMBLY (See page PB-3)**

17. **INSTALL FRONT SEAT ASSEMBLY RH**
    (a) Install the front seat (see page SE-11).

18. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH (See page IP-22)**

19. **INSTALL FRONT DOOR SCUFF PLATE RH (See page IP-22)**

20. **INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-22)**

21. **INSTALL REAR UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-23)**

22. **INSTALL FRONT UPPER CONSOLE PANEL SUB-ASSEMBLY (See page IP-11)**

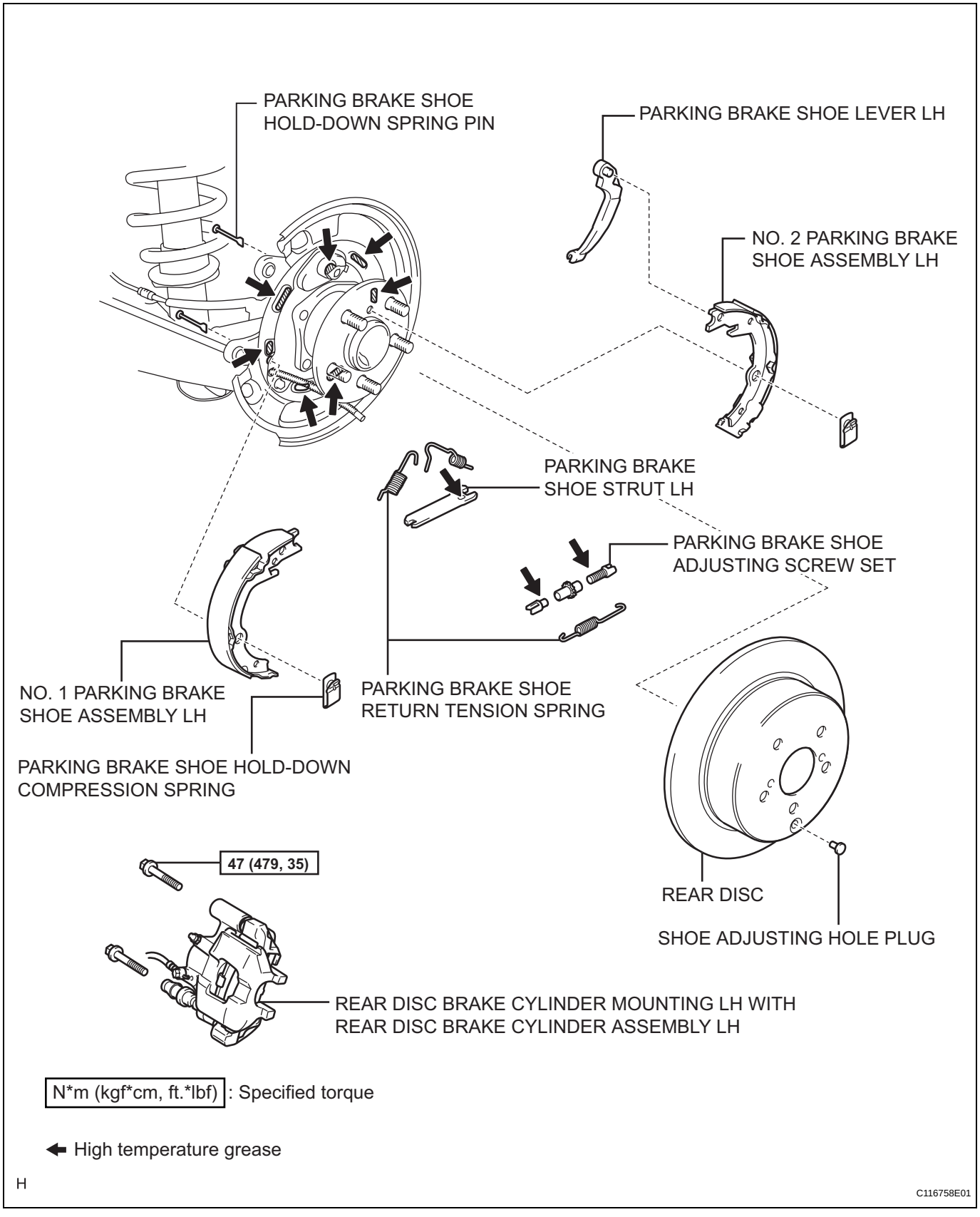
23. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (for Manual Transaxle) (See page IP-12)**

24. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

25. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
26. **CHECK ABS SENSOR SIGNAL CHECK**
    (a) Check the sensor signal check (see page BC-12).
27. **SETTLING PARKING BRAKE SHOE AND DISC (See page PB-19)**
28. **CHECK PARKING BRAKE LEVER TRAVEL (See page PB-1)**
29. **ADJUST PARKING BRAKE LEVER TRAVEL (See page PB-1)**
30. **INSPECT FOR EXHAUST GAS LEAK**

PARKING BRAKE ASSEMBLY

COMPONENTS



PB

REMOVAL

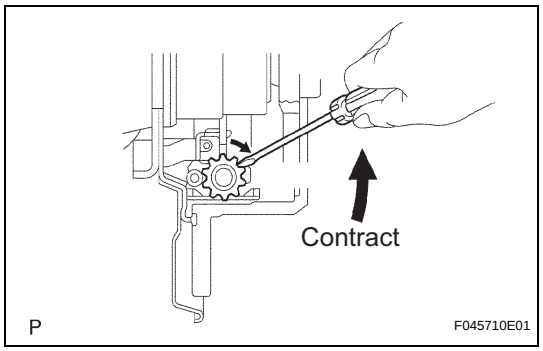
HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. **REMOVE REAR WHEEL**
2. **REMOVE REAR DISC BRAKE CYLINDER MOUNTING LH WITH REAR DISC BRAKE CYLINDER ASSEMBLY LH**
   (a) Remove the disc cylinder mounting with disc brake cylinder (see page BR-31).

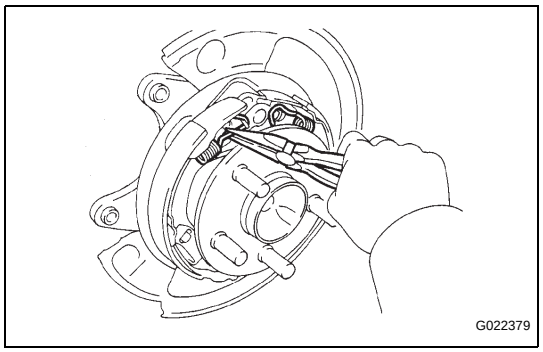
DISASSEMBLY

HINT:
- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



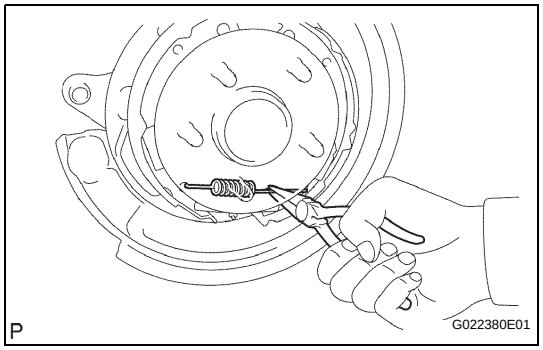
1. REMOVE REAR DISC

(a) Release the parking brake, and remove the rear disc.
HINT:
- Put matchmarks on the disc and axle hub.
- If the disc cannot be removed easily, turn the shoe adjuster until the disc turns freely.



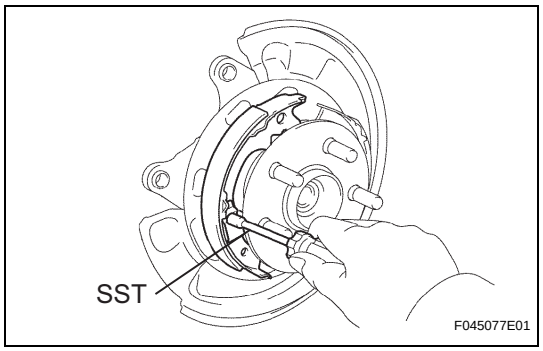
2. REMOVE PARKING BRAKE SHOE STRUT LH

(a) Using needle-nose pliers, remove the 2 parking brake shoe return tension springs on the upper side of the shoe.
(b) Remove the shoe strut.



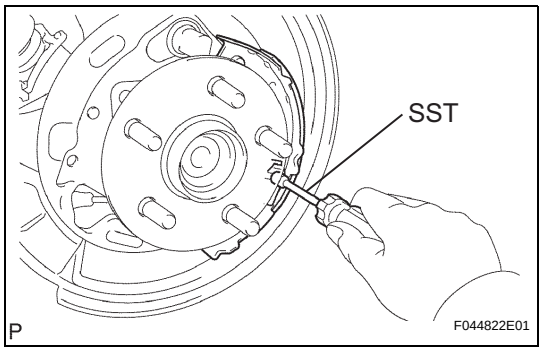
3. REMOVE PARKING BRAKE SHOE ADJUSTING SCREW SET

(a) Using needle-nose pliers, remove the anchor side parking brake shoe return tension spring.
(b) Remove the adjusting screw set.

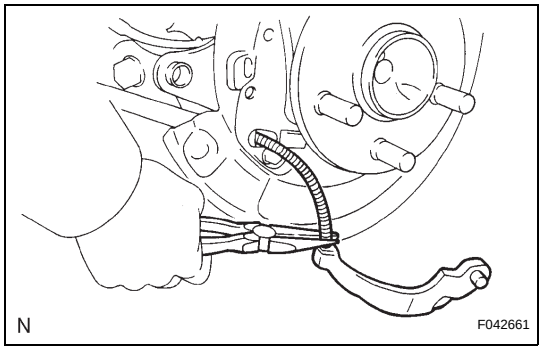


4. REMOVE PARKING BRAKE SHOE ASSEMBLY LH

(a) Using SST, remove the parking brake shoe hold-down compression spring, parking brake shoe hold-down spring pin and No. 1 parking brake shoe.
SST 09718-00010

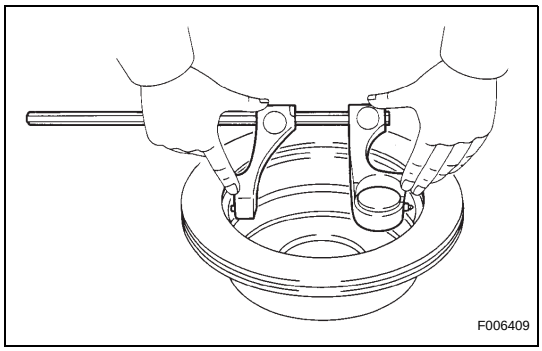


(b) Using SST, remove the parking brake shoe hold-down compression spring and parking brake shoe hold-down spring pin.
SST 09718-00010
(c) Disconnect the No. 2 parking brake shoe from the parking brake shoe lever, and remove the No. 2 parking brake shoe.

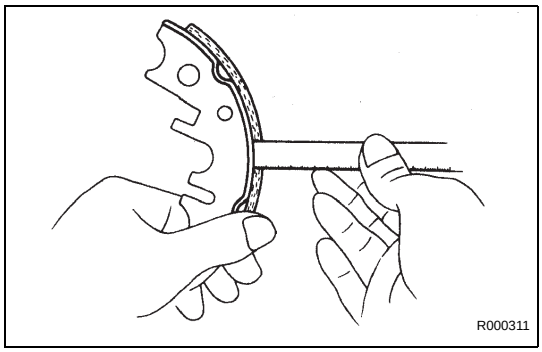


5. REMOVE PARKING BRAKE SHOE LEVER LH
(a) Using needle-nose pliers, disconnect the No. 3 parking brake cable and remove the parking brake shoe lever.

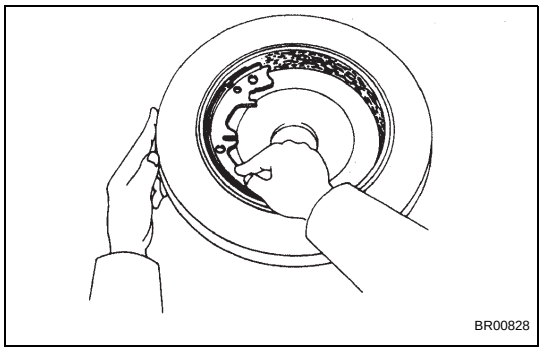
INSPECTION



1. CHECK BRAKE DISC INSIDE DIAMETER
(a) Using a brake drum gauge or equivalent, measure the inside diameter of the disc.
Standard inside diameter:
173 mm (6.81 in.)
Maximum inside diameter:
174 mm (6.85 in.)
If the inside diameter of the disc is greater than the maximum, replace the disc.



2. CHECK BRAKE SHOE LINING THICKNESS
(a) Using a ruler, measure the thickness of the shoe lining.
Standard thickness:
3.2 mm (0.126 in.)
Minimum thickness:
1.0 mm (0.039 in.)
If the lining thickness is equal to or less than the minimum, or if severe or uneven wear is present, replace the shoe.

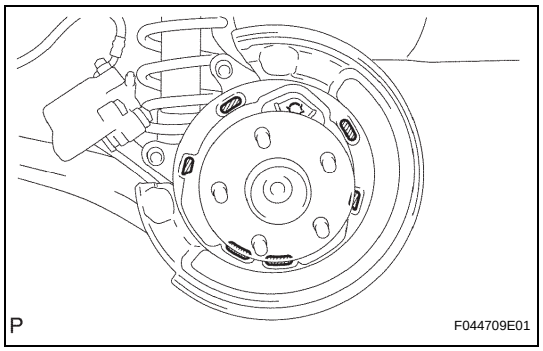


3. CHECK BRAKE DISC AND PARKING BRAKE SHOE LINING FOR PROPER CONTACT
(a) Apply chalk to the inside surface of the disc. Then grind the brake shoe lining on the disc inside full contact is achieved.
If the disc and brake shoe lining do not have full contact, use a brake shoe grinder or replace the brake shoe.
(b) Wipe chalk after inspection for the inside surface of the disc and lining surface.

REASSEMBLY

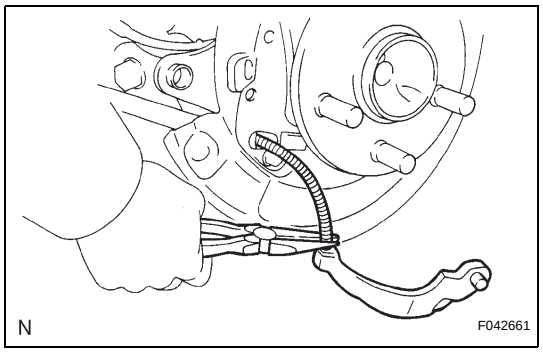
HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



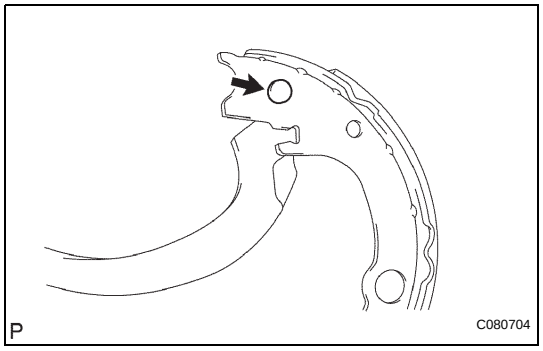
1. APPLY HIGH TEMPERATURE GREASE

(a) Apply high temperature grease to the shoe attaching surface of the backing plate.



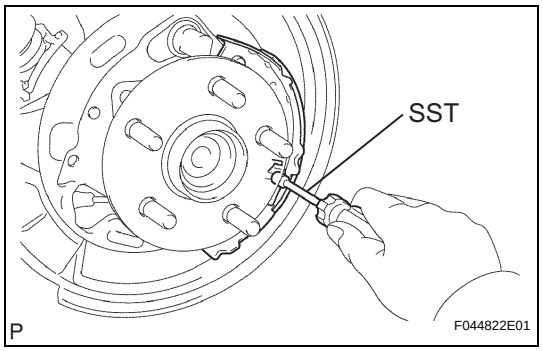
2. INSTALL PARKING BRAKE SHOE LEVER LH

(a) Using needle-nose pliers, connect the No. 3 parking brake cable to the parking brake shoe lever.

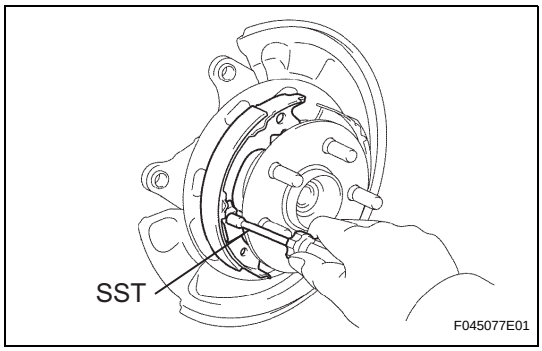


3. INSTALL PARKING BRAKE SHOE ASSEMBLY

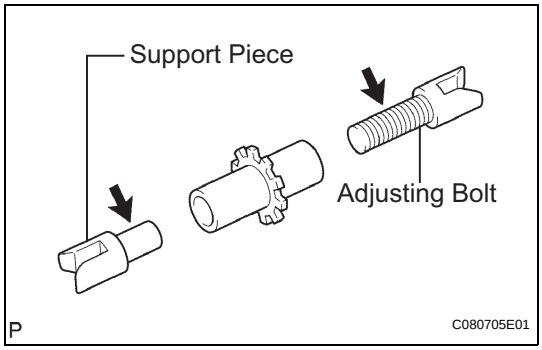
(a) Apply high temperature grease to the contact part of the No. 2 parking brake shoe and parking brake shoe lever.



(b) Using SST, install the No. 2 parking brake shoe with the parking brake shoe hold-down compression spring and parking brake shoe hold-down spring.
SST 09718-00010

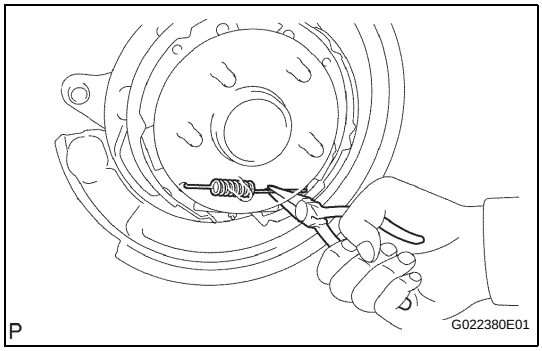


(c) Using SST, install the No. 1 parking brake shoe with the parking brake shoe hold-down compression spring and parking brake shoe hold-down spring pin.
SST 09718-00010

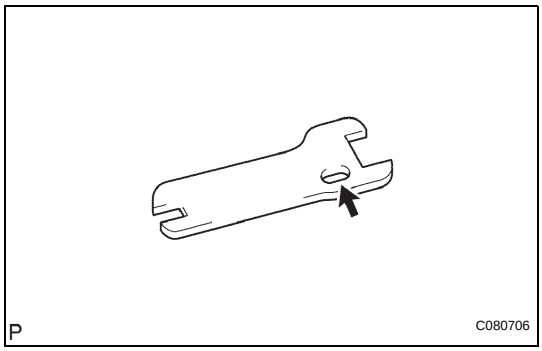


4. INSTALL PARKING BRAKE SHOE ADJUSTING SCREW SET

(a) Apply high temperature grease to the adjusting bolt and support piece.
(b) Install the adjusting screw set.



(c) Using needle-nose pliers, install the anchor side parking brake shoe return tension spring.

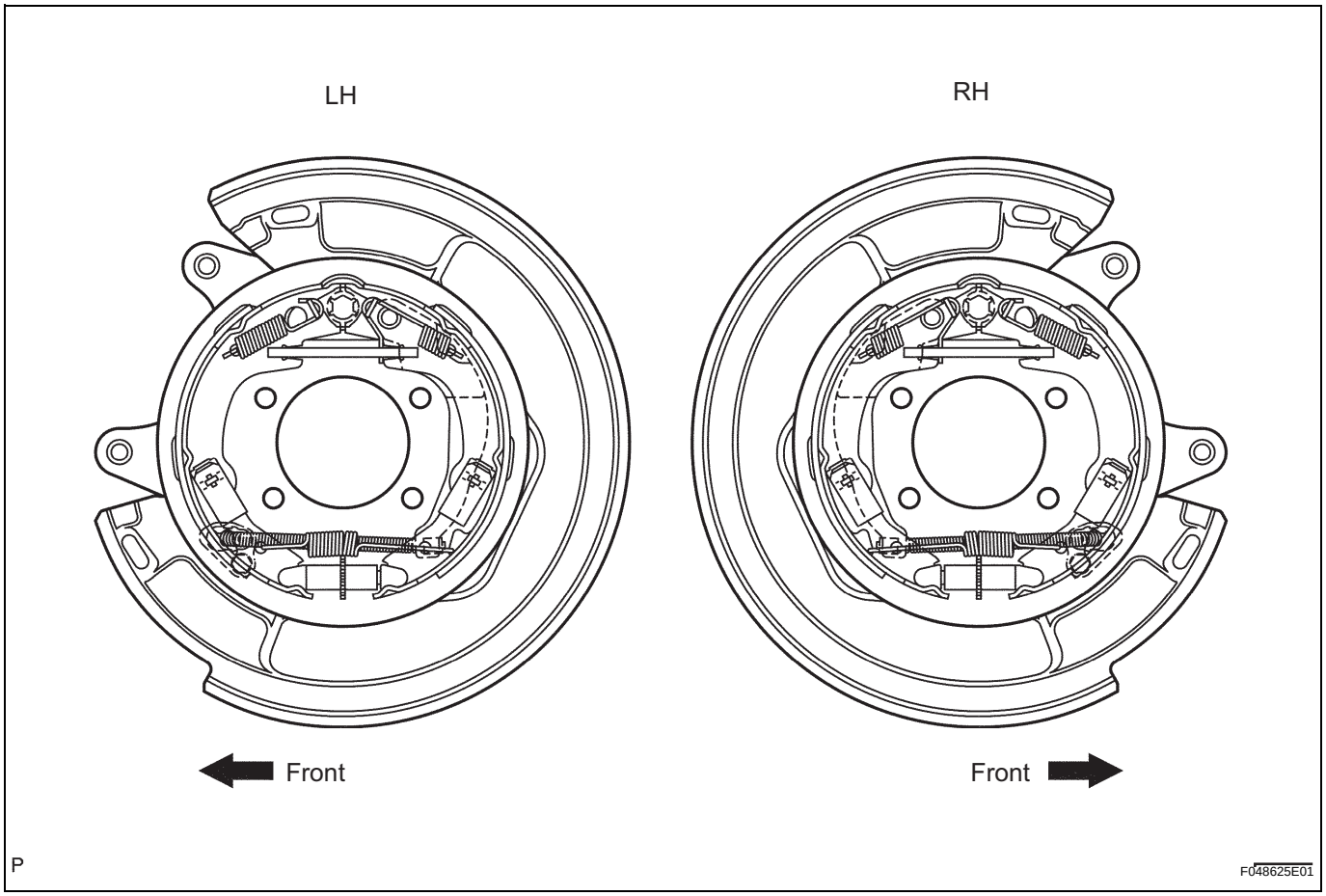


5. INSTALL PARKING BRAKE SHOE STRUT LH

(a) Apply high temperature grease to the contact part of the parking brake shoe strut and parking brake shoe return tension spring.
(b) Install the parking brake shoe strut.
(c) Using needle-nose pliers, install the 2 parking brake shoe return tension springs on the upper side of the shoe.
HINT:
Fit the parking brake shoe return tension springs securely into the grooves of the parking brake shoe strut.

6. CHECK PARKING BRAKE INSTALLATION

(a) Check that each part is installed properly.
NOTICE:
There should be no oil or grease on the friction surface of the shoe lining and disc.

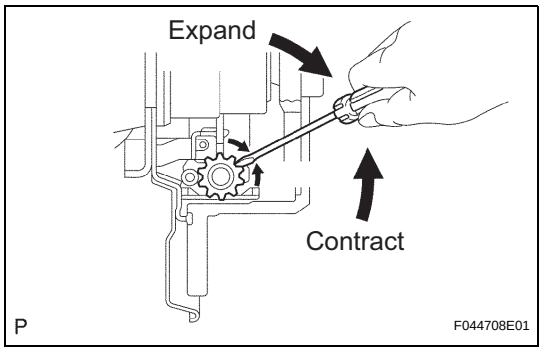


7. INSTALL REAR DISC

INSTALLATION

HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.



1. ADJUST PARKING BRAKE SHOE CLEARANCE

(a) Temporarily install the hub nuts.

(b) Remove the hole plug, and turn the adjuster to expand the shoes until the disc lock.

(c) Contract the shoe adjuster until the disc can rotate smoothly.

OK:

Return 8 notches

(d) Check that there is no brake drag.

(e) Install the hole plug.

(f) Remove the hub nuts.

2. INSTALL REAR DISC BRAKE CYLINDER MOUNTING LH WITH REAR DISC BRAKE CYLINDER ASSEMBLY LH

(a) Install the brake cylinder mounting with disc brake cylinder (see page BR-34).

3. INSTALL REAR WHEEL

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

4. SETTLING PARKING BRAKE SHOES AND DISC

(a) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.

(b) With the parking brake release button pushed in, pull the lever with 98 N (10 kgf, 22 lbf) of force.

(c) Drive the vehicle for about 400 m (0.25 mile) in this condition.

(d) Repeat this procedures 2 or 3 times.

5. CHECK PARKING BRAKE LEVER TRAVEL (See page PB-1)

6. ADJUST PARKING BRAKE LEVER TRAVEL (See page PB-1)

POWER STEERING SYSTEM

PRECAUTION

1. HANDLING PRECAUTIONS FOR STEERING SYSTEM

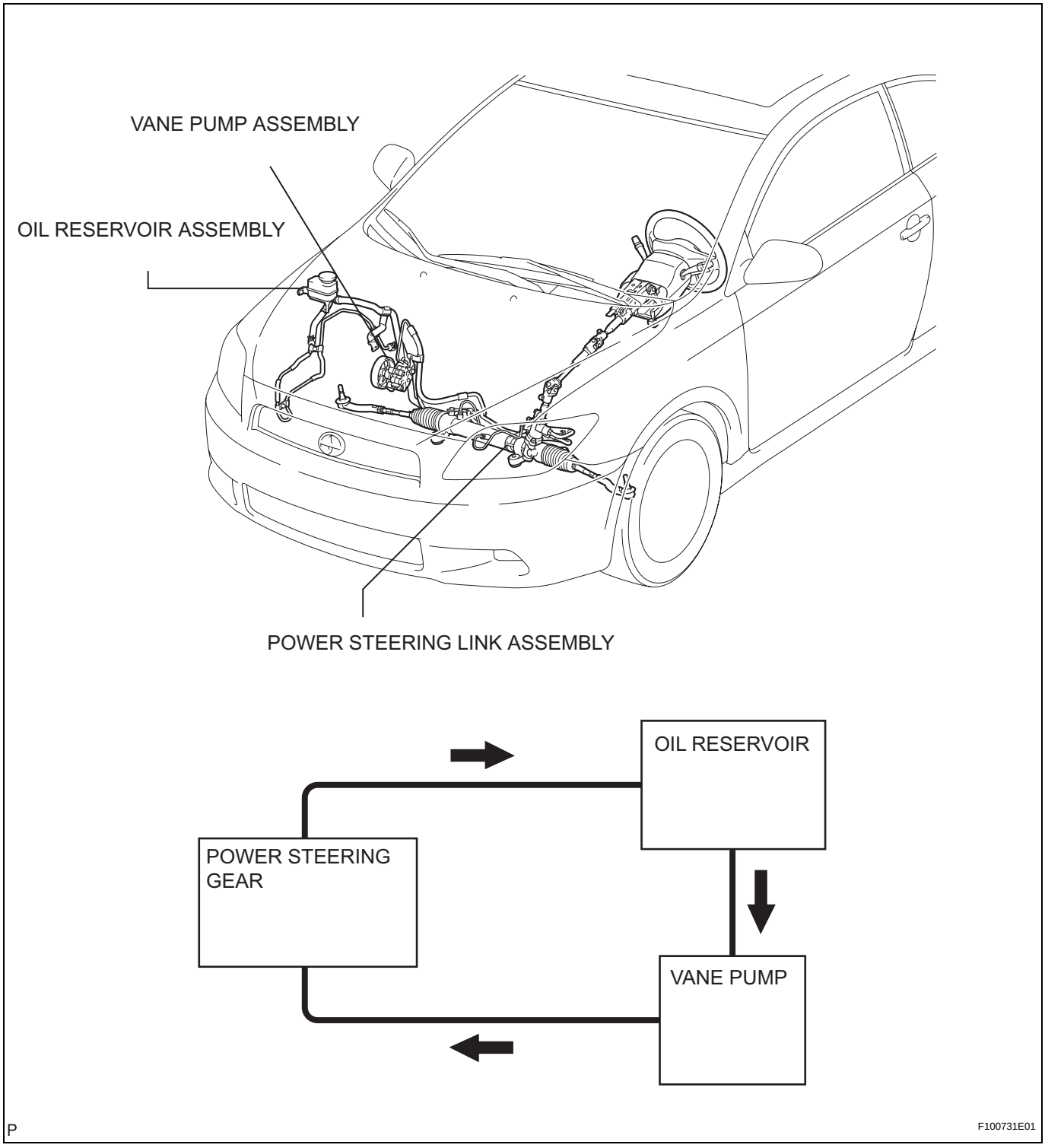
(a) Care must be taken when replacing parts. Incorrect replacement could affect the performance of the steering system and result in a driving hazard.

2. HANDLING PRECAUTIONS FOR SRS

(a) The vehicle is equipped with a Supplemental Restraint System (SRS) which includes a driver side airbag. Failure to carry out service procedures in the correct sequence may unexpectedly deploy the SRS and cause serious injuries. Furthermore, if a mistake is made in servicing the SRS, it may fail to operate when required. Before servicing (including installation, removal, inspection or replacement of parts), read the SRS section's " Precaution" (see page RS-11).

SYSTEM DESCRIPTION

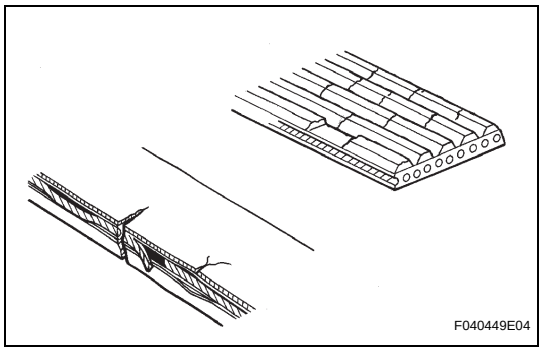
A rack and pinion type, engine revolution sensing power steering gear is used on all models.



PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cause of the problem symptom. 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
Hard steering	1. Tires (Improperly inflated)	TW-3
	2. Power steering fluid level (Low)	PS-4
	3. Drive belt (Loose)	-
	4. Front wheel alignment (Incorrect)	SP-2
	5. Steering system joints (Worn)	-
	6. Suspension arm ball joints (Worn)	SP-26
	7. Steering column (Binding)	-
	8. Power steering vane pump	PS-8
	9. Power steering gear	PS-21
Poor return	1. Tires (Improperly inflated)	TW-3
	2. Front wheel alignment (Incorrect)	SP-2
	3. Steering column (Binding)	-
	4. Power steering gear	PS-21
Excessive free play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	SP-26
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	AH-6
	5. Power steering gear	PS-21
Abnormal noise	1. Power steering fluid level (Low)	PS-4
	2. Steering system joints (Worn)	-
	3. Power steering vane pump	PS-8
	4. Power steering gear	PS-21



ON-VEHICLE INSPECTION

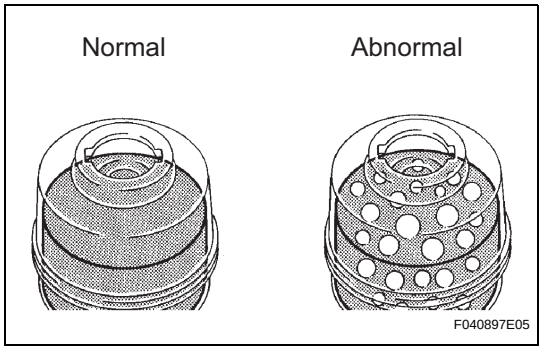
1. INSPECT DRIVE BELT

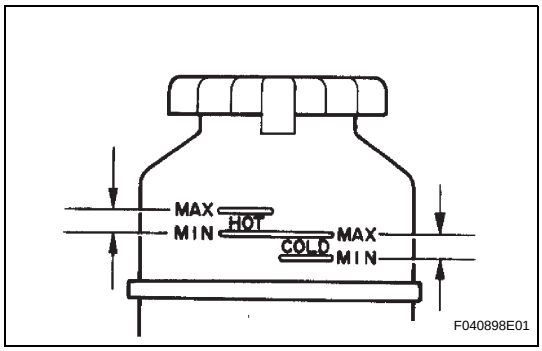
(a) Visually check the belt for excessive wear, frayed cords, etc.
If any defect is found, replace the drive belt.
HINT:
Cracks on the rib side of a belt are considered acceptable. Replace the belt if there are any missing ribs.

2. BLEED POWER STEERING SYSTEM

(a) Check the fluid level.
(b) Jack up the front of the vehicle and support it with stands.
(c) Turn the steering wheel.
  (1) With the engine stopped, turn the wheel slowly from lock to lock several times.
(d) Lower the vehicle.
(e) Start the engine.
  (1) Run the engine at idle for a few minutes.

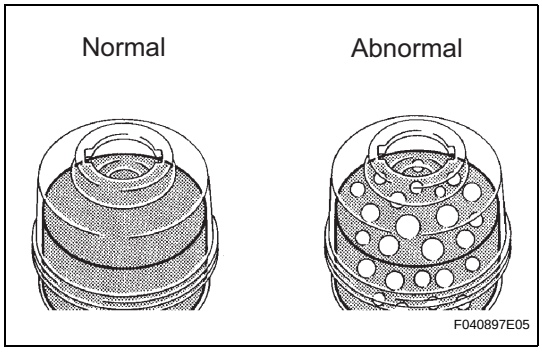
(f) Turn the steering wheel.
  (1) With the engine idling, turn the steering wheel to the left or right full lock position and keep it there for 2 to 3 seconds, and then turn the wheel to the opposite full lock position and keep it there for 2 to 3 seconds.
  (2) Repeat the step above several times.
(g) Stop the engine.
(h) Check for foaming or emulsification.
Especially, if the system has to be bled twice because of foaming or emulsification, check for fluid leaks in the system.
(i) Check the fluid level.

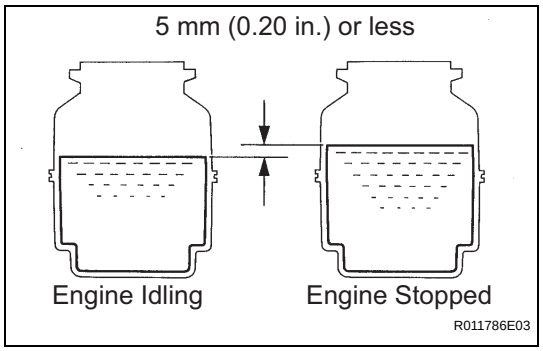




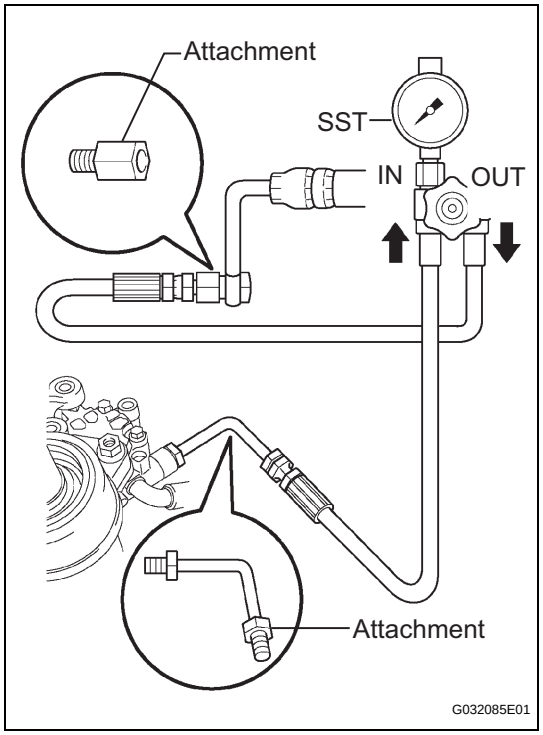
3. CHECK POWER STEERING FLUID LEVEL

(a) Keep the vehicle level.
(b) With the engine stopped, check the fluid level in the oil reservoir.
If necessary, add fluid.
Fluid:
ATF "DEXRON" II or III
HINT:
When hot, check that the fluid level is within the HOT range on the oil reservoir. If the fluid is cold, check that it is within the COLD range.
(c) Start the engine and run it at idle.
(d) Turn the steering wheel from lock to lock several times to raise fluid temperature.
Standard fluid temperature:
75 to 80°C (167 to 176°F)
(e) Check for foaming or emulsification.
If foaming or emulsification is identified, bleed the power steering system.



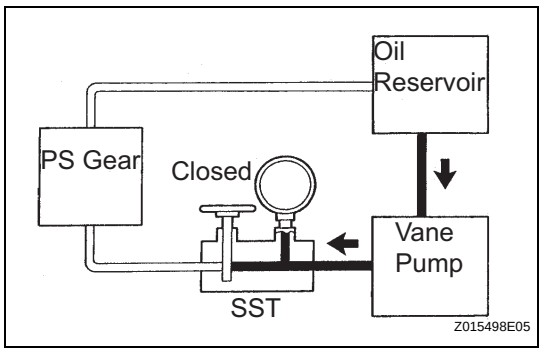


(f) With the engine idling, measure the fluid level in the oil reservoir.
(g) Stop the engine.
(h) Wait a few minutes and remeasure the fluid level in the oil reservoir.
Maximum fluid level rise:
5 mm (0.20 in.)
If a problem is found, bleed the power steering system.
(i) Check the fluid level.



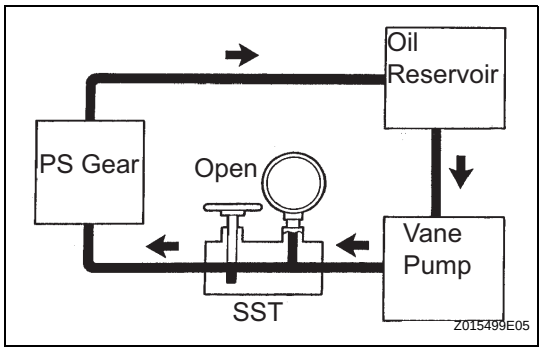
4. CHECK STEERING FLUID PRESSURE

(a) Disconnect the pressure feed tube (see page PS-8).
(b) Connect SST, as shown in the illustration.
SST 09640-10010 (09641-01010, 09641-01060, 09641-01030)
NOTICE:
Check that the valve of the SST is in the open position.
(c) Bleed the power steering system.
(d) Start the engine and run it at idle.
(e) Turn the steering wheel from lock to lock several times to raise fluid temperature.
Standard fluid temperature:
75 to 80°C (167 to 176°F)

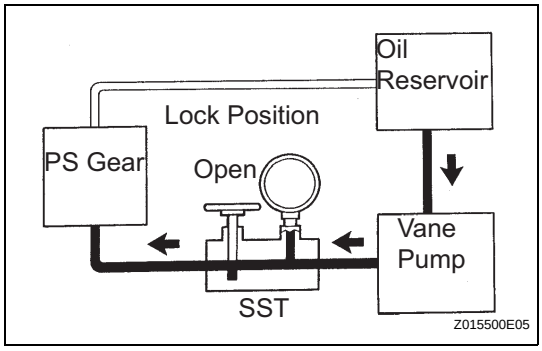


(f) With the engine idling, close the valve of the SST and observe the reading on the SST.
Standard fluid pressure:
7,800 to 8,300 kPa (80 to 85 kgf/cm^2, 1,131 to 1,204 psi)
NOTICE:
- **Do not keep the valve closed for more than 10 seconds.**
- **Do not allow the fluid temperature to become too high.**

If not within the specified range, check for fluid leaks and replace parts as necessary.

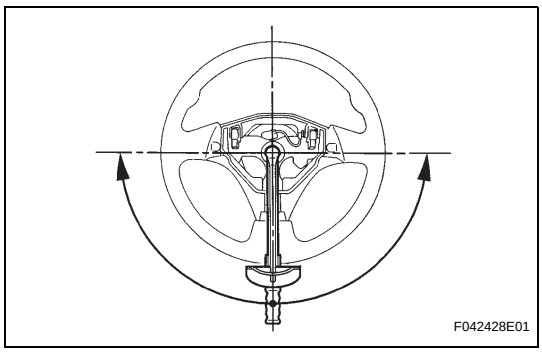


(g) With the engine idling, open the valve fully.
(h) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.
Standard difference in fluid pressure:
490 kPa (5 kgf/cm^2, 71 psi) or less
NOTICE:
Do not turn the steering wheel.
If not within the specified range, check for fluid leaks and replace parts as necessary.



(i) With the engine idling and the valve fully opened, turn the steering wheel to the left or right full lock position.
Standard fluid pressure:
7,800 to 8,300 kPa (80 to 85 kgf/cm^2, 1,131 to 1,204 psi)
NOTICE:
- **Do not keep the steering wheel in the full lock position for more than 10 seconds.**
- **Do not allow the fluid temperature to become too high.**

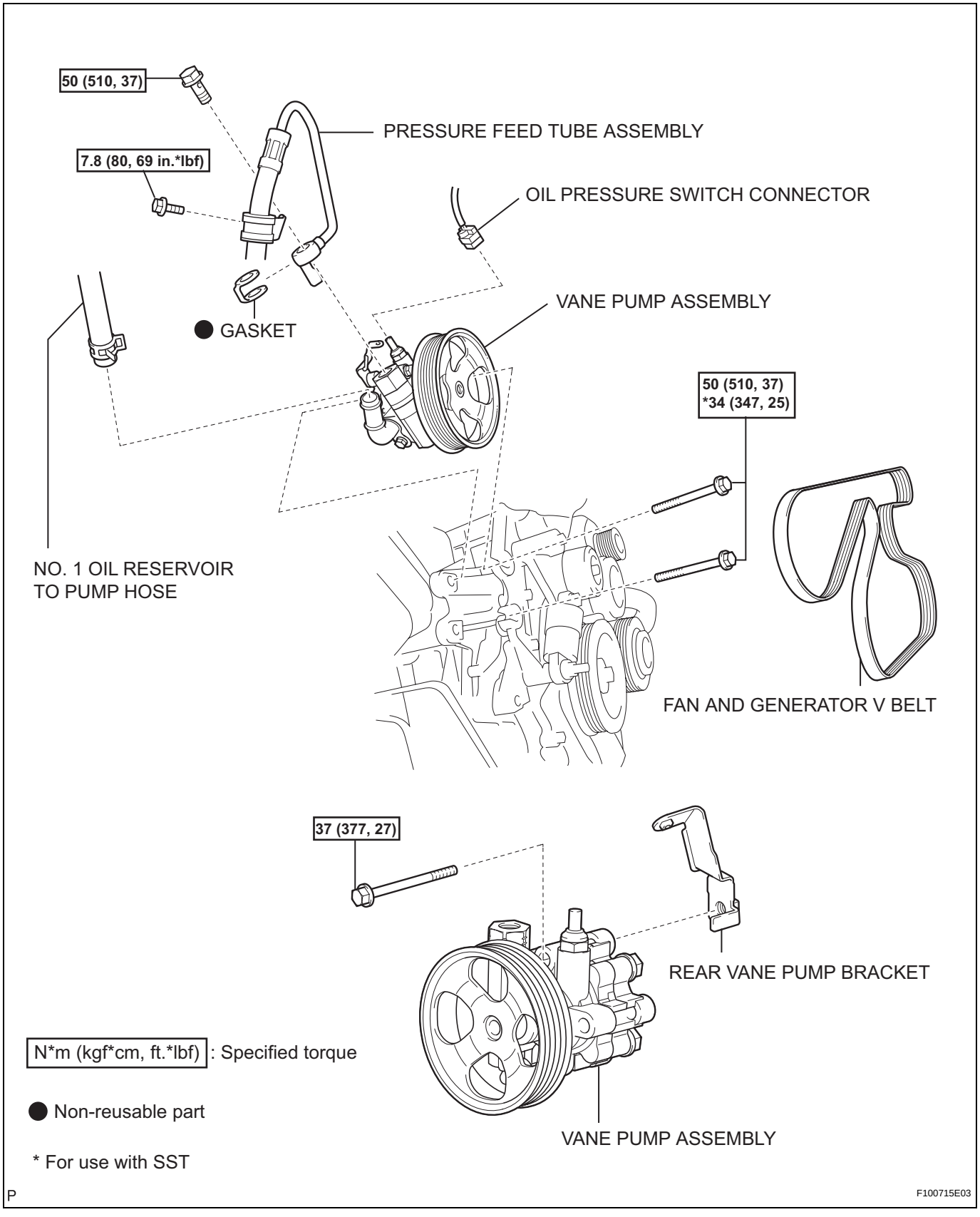
If not within the specified range, check for fluid leaks and replace parts as necessary.
(j) Disconnect the SST.
SST 09640-10010 (09641-01010, 09641-01060, 09641-01030)
Connect the pressure feed tube (see page PS-15).
(k) Bleed the power steering system.



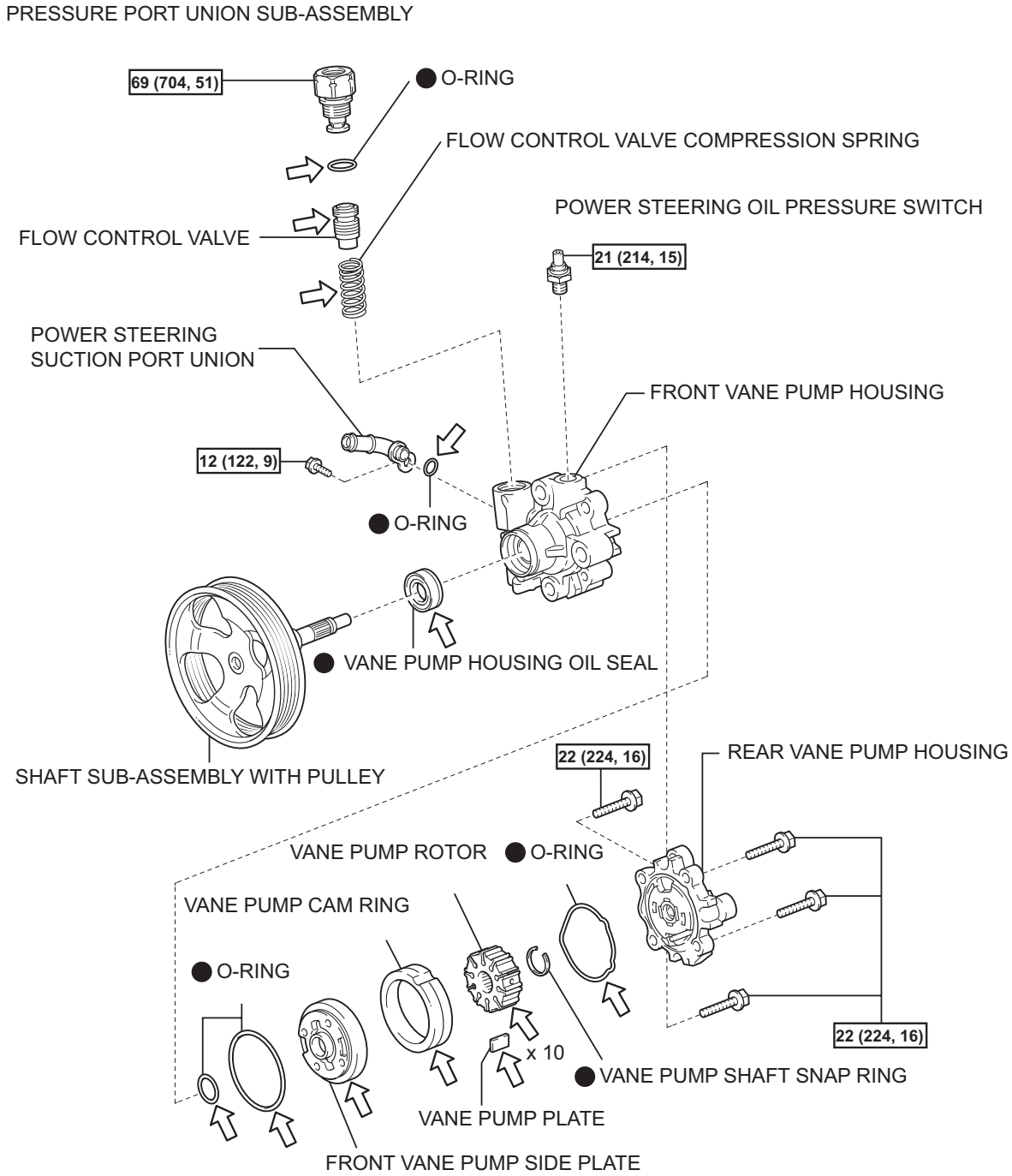
5. CHECK STEERING EFFORT
(a) Center the steering wheel.
(b) Remove the steering wheel pad (see page RS-344).
(c) Start the engine and run it at idle.
(d) Measure the steering effort in both directions.
Standard effort (Reference):
5.5 N*m (56 kgf*cm, 49 in.*lbf) or less
HINT:
Check tire type, pressure and road surface before making your diagnosis.
If not within the specified range, check the power steering system (see page PS-2).
(e) Torque the steering wheel set nut.
Torque: 50 N*m (510 kgf*cm, 37 ft.*lbf)
(f) Install the steering wheel pad (see page RS-346).

VANE PUMP

COMPONENTS

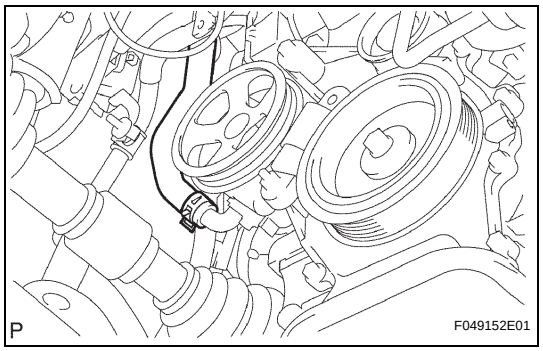


PS

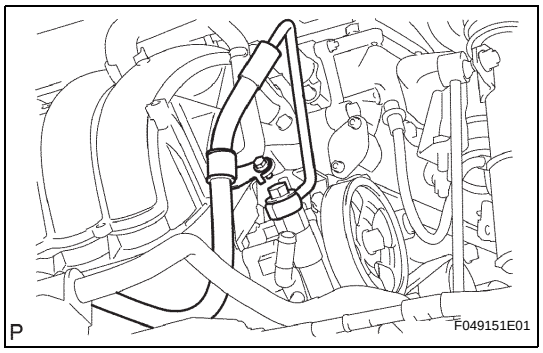

PRESSURE PORT UNION SUB-ASSEMBLY
69 (704, 51)
O-RING
FLOW CONTROL VALVE COMPRESSION SPRING
FLOW CONTROL VALVE
POWER STEERING OIL PRESSURE SWITCH
21 (214, 15)
POWER STEERING
SUCTION PORT UNION
FRONT VANE PUMP HOUSING
12 (122, 9)
O-RING
VANE PUMP HOUSING OIL SEAL
SHAFT SUB-ASSEMBLY WITH PULLEY
22 (224, 16)
REAR VANE PUMP HOUSING
VANE PUMP ROTOR
O-RING
VANE PUMP CAM RING
O-RING
x 10
VANE PUMP SHAFT SNAP RING
22 (224, 16)
VANE PUMP PLATE
FRONT VANE PUMP SIDE PLATE
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
Power steering fluid
P
F100716E04

REMOVAL

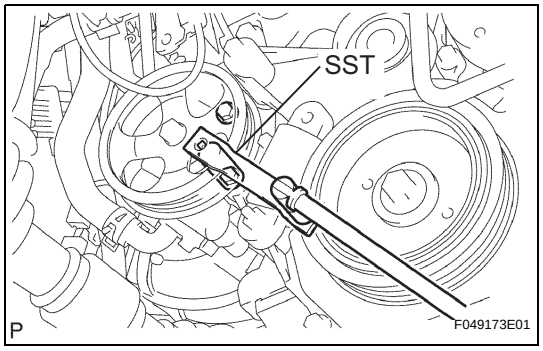
1. **REMOVE FRONT WHEEL RH**
2. **DRAIN POWER STEERING FLUID**
3. **REMOVE FRONT FENDER APRON SEAL RH (See page CH-10)**
4. **REMOVE FAN AND GENERATOR V BELT (See page EM-6)**



5. **DISCONNECT NO. 1 OIL RESERVOIR TO PUMP HOSE**
   (a) Remove the clip and disconnect the No. 1 oil reservoir to pump hose.
   NOTICE:
   Take care not to spill fluid on the V belt.



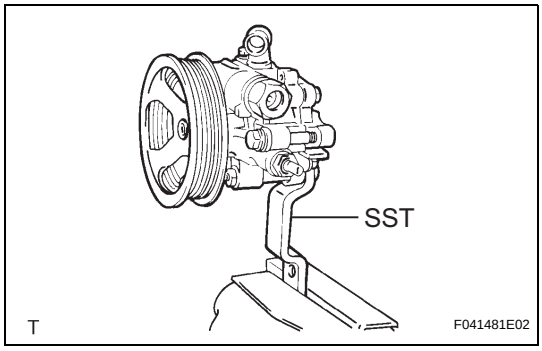
6. **DISCONNECT PRESSURE FEED TUBE ASSEMBLY**
   (a) Remove the bolt and disconnect the pressure feed tube from the pump bracket rear.
   (b) Using a 27 mm wrench to hold the pressure port union, remove the union bolt and gasket.



7. **REMOVE VANE PUMP ASSEMBLY**
   (a) Disconnect the connector from the oil pressure switch.
   (b) Using SST and a 14 mm deep socket, loosen the 2 bolts.
   SST 09249-63010
   (c) Remove the vane pump.

DISASSEMBLY

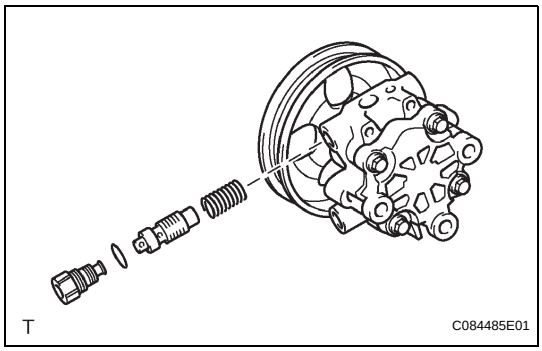
NOTICE:
Do not overtighten when using a vise.



1. FIX VANE PUMP ASSEMBLY
(a) Using SST, hold the vane pump in a vise.
SST 09630-00014 (09631-00132)

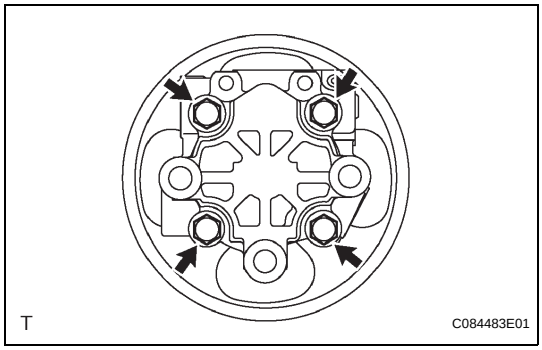
2. REMOVE REAR VANE PUMP BRACKET
(a) Remove the bolt and vane pump bracket.

3. REMOVE POWER STEERING SUCTION PORT UNION
(a) Remove the bolt and suction port union.
(b) Remove the O-ring from the suction port union.

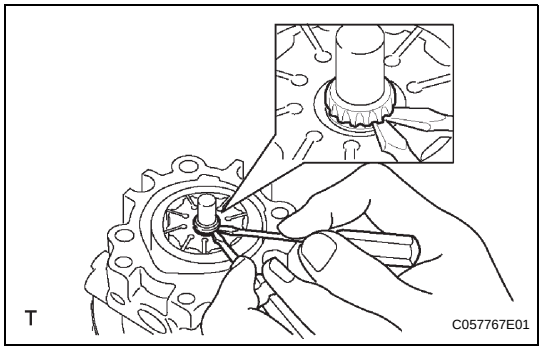


4. REMOVE FLOW CONTROL VALVE
(a) Remove the pressure port union.
(b) Remove the O-ring from the pressure port union.
(c) Remove the flow control valve and compression spring.

5. REMOVE POWER STEERING OIL PRESSURE SWITCH
NOTICE:
If the oil pressure switch is dropped or damaged, replace it with a new one.



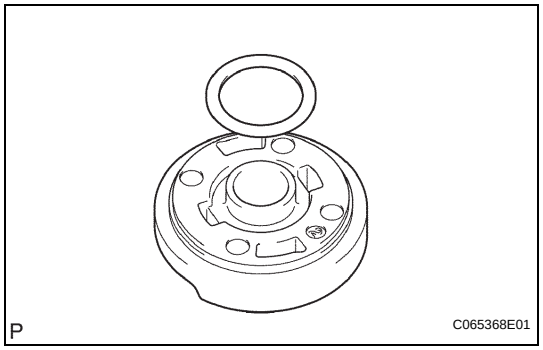
6. REMOVE REAR VANE PUMP HOUSING
(a) Remove the 4 bolts and rear housing from the font housing front.
(b) Remove the O-ring from the rear housing.



7. REMOVE SHAFT SUB-ASSEMBLY WITH PULLEY
(a) Using 2 screwdrivers, remove the snap ring from the shaft.
(b) Remove the shaft with pulley.

8. REMOVE VANE PUMP ROTOR
(a) Remove the 10 vane pump plates.
(b) Remove the vane pump rotor.

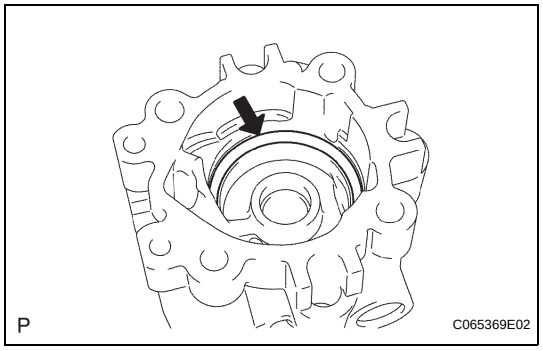
9. REMOVE VANE PUMP CAM RING



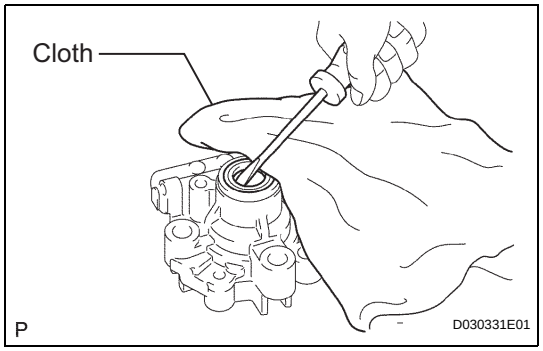
10. REMOVE FRONT VANE PUMP SIDE PLATE

(a) Remove the front side plate from the front housing.

(b) Remove the O-ring from the front side plate.



(c) Remove the O-ring from the front housing.



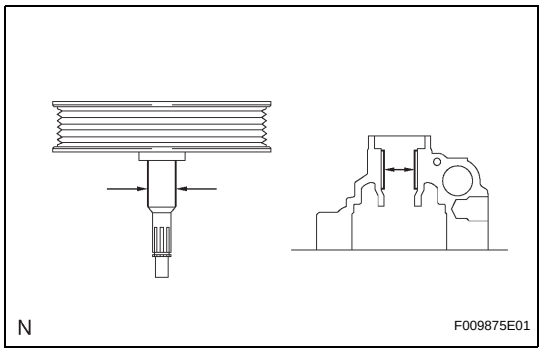
11. REMOVE VANE PUMP HOUSING OIL SEAL

(a) Using a screwdriver, remove the oil seal.

NOTICE:

Be careful not to damage the front housing.

INSPECTION



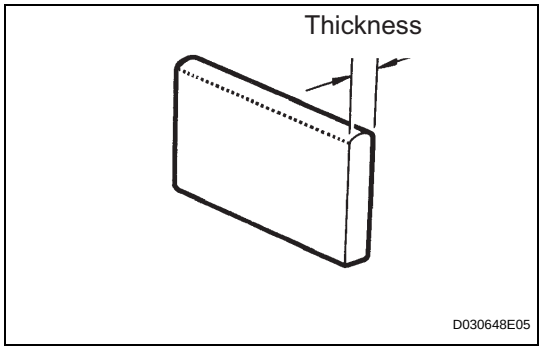
1. INSPECT VANE PUMP SHAFT AND BUSH IN HOUSING FRONT

(a) Using a micrometer and caliper gauge, measure the oil clearance.

Maximum oil clearance:

0.07 mm (0.0028 in.)

If the oil clearance exceeds the maximum, replace the vane pump assembly.

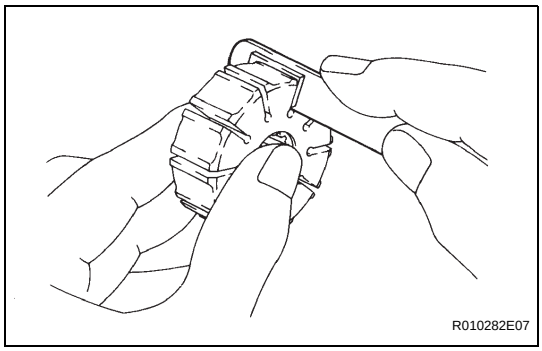


2. INSPECT VANE PUMP ROTOR AND VANE PUMP PLATES

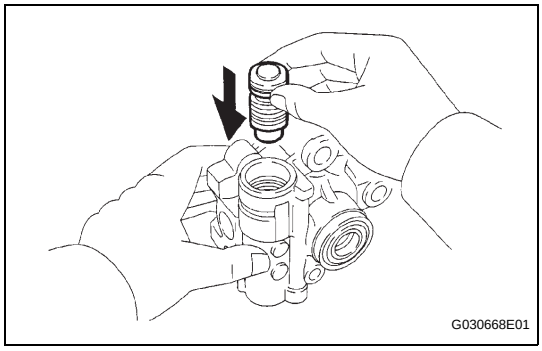
(a) Using a micrometer, measure the thickness of the vane pump plates.

Standard thickness:

1.405 to 1.411 mm (0.05531 to 0.05555 in.)

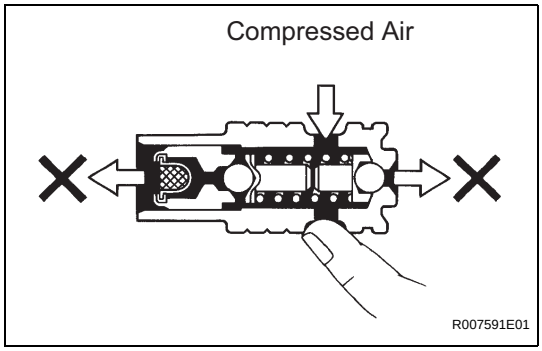


(b) Using a feeler gauge, measure the clearance between a side face of the vane pump rotor groove and the vane plates.
Maximum clearance:
0.03 mm (0.0012 in.)
If the clearance exceeds the maximum, replace the vane pump assembly.

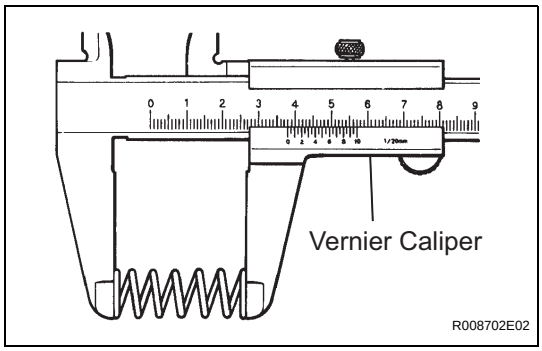


3. INSPECT FLOW CONTROL VALVE

(a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the flow control valve hole under its own weight.
If it lacks smoothness, replace the vane pump assembly.



(b) Check the flow control valve for leakage. Close one of the holes and apply compressed air, 392 to 490 kPa (4 to 5 kgf/cm^2, 57 to 71 psi), into the opposite side hole, and confirm that air does not come out from the end holes.
If air leaks, replace the vane pump assembly.



4. INSPECT FLOW CONTROL VALVE COMPRESSION SPRING

(a) Using a vernier caliper, measure the free length of the compression spring.
Minimum free length:
36.9 mm(1.453 in.)
If the length is less than the minimum, replace the vane pump assembly.

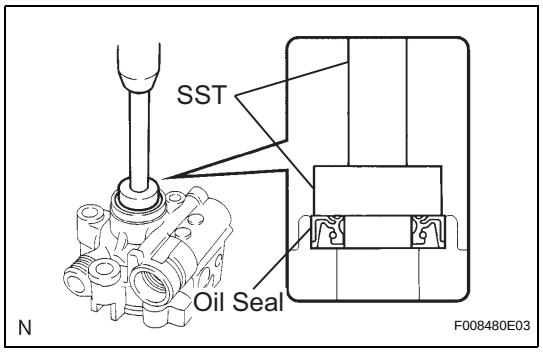
5. INSPECT PRESSURE PORT UNION

If the union seat in the pressure port union is severely damaged, it may cause fluid leakage. In that case, replace the vane pump assembly.

REASSEMBLY

NOTICE:

- **Do not overtighten when using a vise.**
- **When installing, coat the parts indicated by arrows with power steering fluid (see page PS-7).**



1. INSTALL VANE PUMP HOUSING OIL SEAL

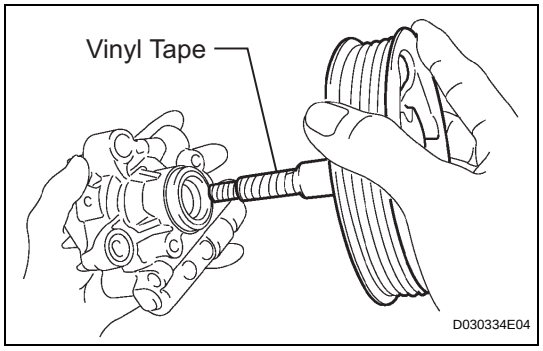
(a) Coat a new oil seal lip with power steering fluid.

(b) Using SST and a press, press in the oil seal.

SST 09950-60010 (09951-00280), 09950-70010 (09951-07100)

NOTICE:

Make sure that the oil seal is installed in the correct direction as shown in the illustration.



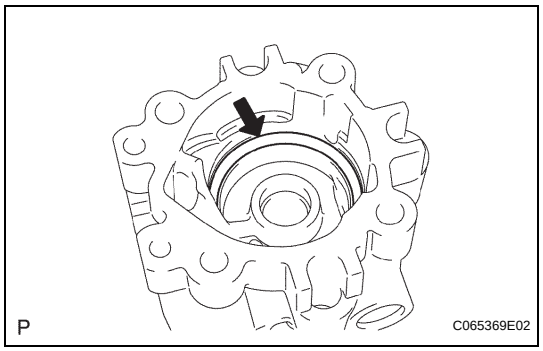
2. INSTALL SHAFT SUB-ASSEMBLY WITH PULLEY

(a) Coat the bush surface of the front housing with power steering fluid.

(b) Gradually insert the shaft with shaft from the pulley side.

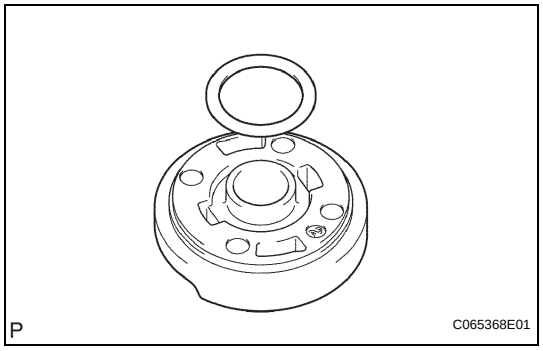
NOTICE:

Do not damage the oil seal lip in the front housing.

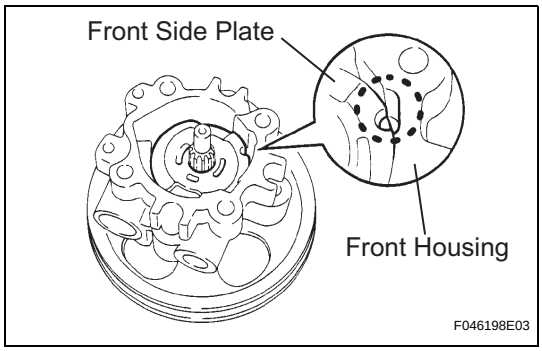


3. INSTALL FRONT VANE PUMP SIDE PLATE

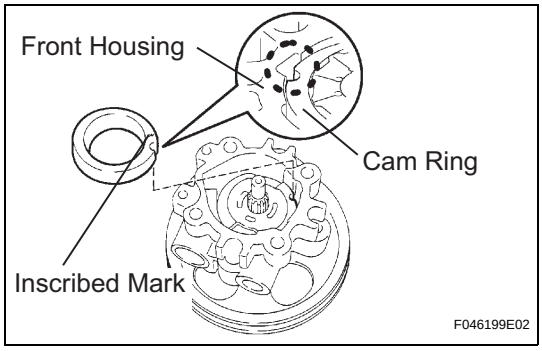
(a) Coat a new O-ring with power steering fluid and install it into the front housing.



(b) Coat a new O-ring with power steering fluid and install it onto the front side plate.

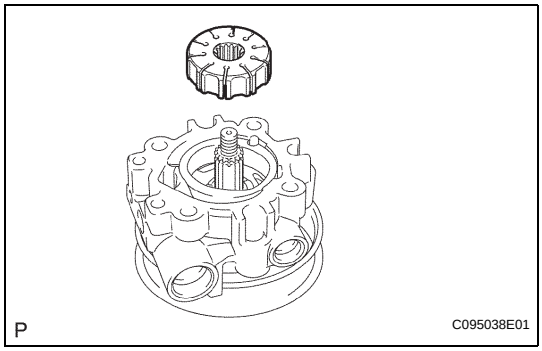


(c) Align the dent of the front side plate with that of the front housing, and install the front side plate.
NOTICE:
Make sure that the front side plate is installed in the correct direction as shown in the illustration.



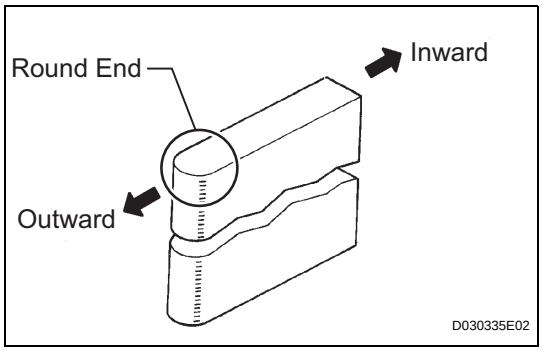
4. INSTALL VANE PUMP CAM RING

(a) Align the dent of the cam ring with that of the front side plate, and install the cam ring with the inscribed mark facing upward.
NOTICE:
Make sure that the cam ring is installed in the correct direction.

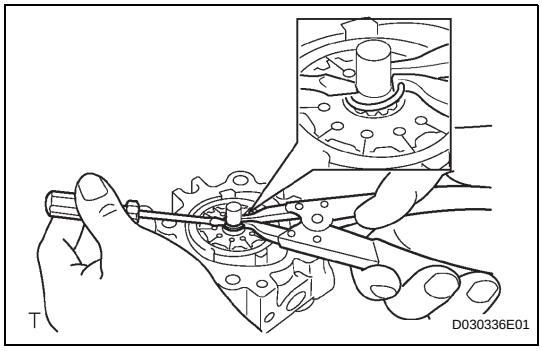


5. INSTALL VANE PUMP ROTOR

(a) Coat the vane pump rotor with power steering fluid.
(b) Install the vane pump rotor.
NOTICE:
Vane pump rotor has no specific direction.

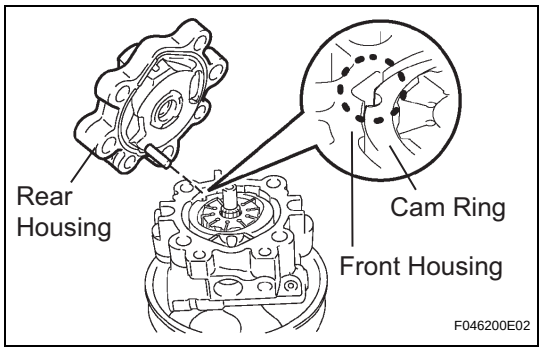


(c) Coat all 10 vane pump plates with power steering fluid.
(d) Install the vane pump plates with the round end facing outward.



6. INSTALL VANE PUMP SHAFT SNAP RING

(a) Using a screwdriver and snap ring expander, install a new snap ring to the shaft.

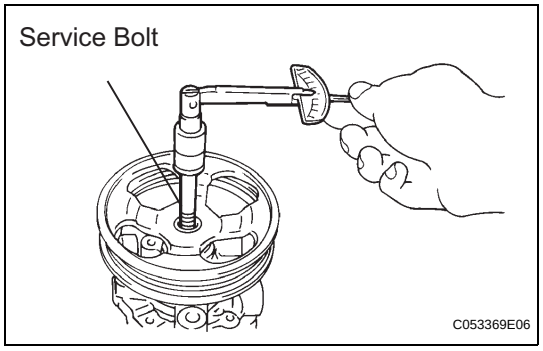


7. INSTALL REAR VANE PUMP HOUSING

(a) Coat a new O-ring with power steering fluid and install it onto the rear housing.

(b) Align the straight pin of the rear housing with the dents of the cam ring, front side plate and the front housing, and install the rear housing with the 4 bolts.

Torque: 22 N*m (224 kgf*cm, 16 ft.*lbf)



8. INSPECT PRELOAD

(a) Check that the pump rotates smoothly without abnormal noise.

(b) Temporarily install the service bolt.

Recommended service bolt:
Thread diameter:
10 mm (0.39 in.)
Thread pitch:
1.25 mm (0.0492 in.)
Bolt length:
50 mm (1.97 in.)

(c) Using a torque wrench, check the pulley rotating torque.

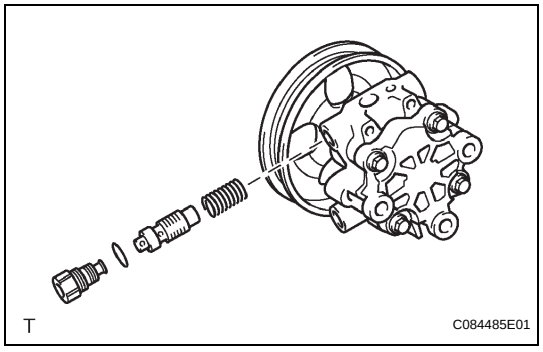
Standard rotating torque:
0.27 N*m (2.8 kgf*cm, 2.4 ft.*lbf) or less

If rotating torque is not as specified, check the installation condition of each part.

9. INSTALL POWER STEERING OIL PRESSURE SWITCH

(a) Install the oil pressure switch onto the vane pump assembly.

Torque: 21 N*m (214 kgf*cm, 15 ft.*lbf)



10. INSTALL FLOW CONTROL VALVE

(a) Coat the compression spring and flow control valve with power steering fluid.

(b) Install the compression spring and flow control valve.

(c) Coat a new O-ring with power steering fluid and install it onto the pressure port union.

(d) Install the pressure port union.

Torque: 69 N*m (704 kgf*cm, 51 ft.*lbf)

11. INSTALL REAR VANE PUMP BRACKET

(a) Install the rear vane pump bracket with the bolt.

Torque: 37 N*m (377 kgf*cm, 27 ft.*lbf)

HINT:

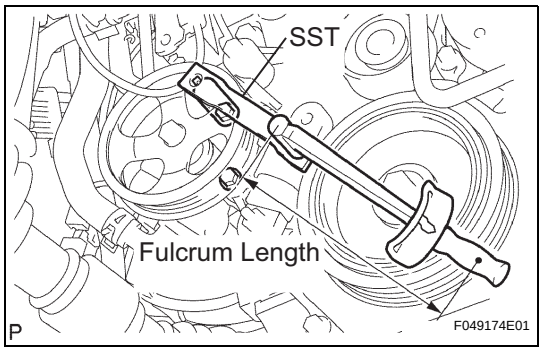
Make sure that the stopper of the bracket touches the vane pump body, and then torque the bolt.

12. INSTALL POWER STEERING SUCTION PORT UNION

(a) Coat a new O-ring with power steering fluid, and install it to the suction port union.

(b) Install the suction port union with the bolt.

Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)



INSTALLATION

1. INSTALL VANE PUMP ASSEMBLY

(a) Temporarily install the 2 bolts to the vane pump.

(b) Install the vane pump with the 2 bolts.

(c) Using SST and a 14 mm deep socket, fully tighten the bolts.

SST 09249-63010

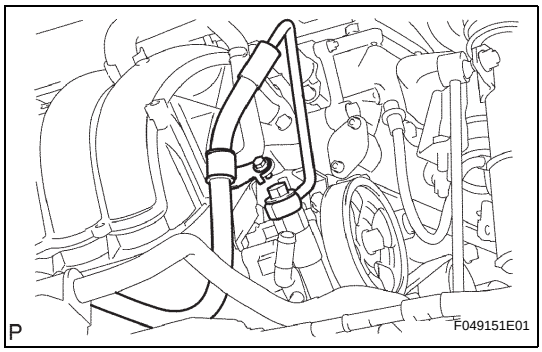
Torque: 34 N*m (347 kgf*cm, 25 ft.*lbf)

NOTICE:

Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

This torque valve is effective when SST is parallel to the torque wrench.

(d) Connect the connector to the oil pressure switch.



2. CONNECT PRESSURE FEED TUBE ASSEMBLY

(a) Install the pressure feed tube and a new gasket to the vane pump with the union bolt.

HINT:

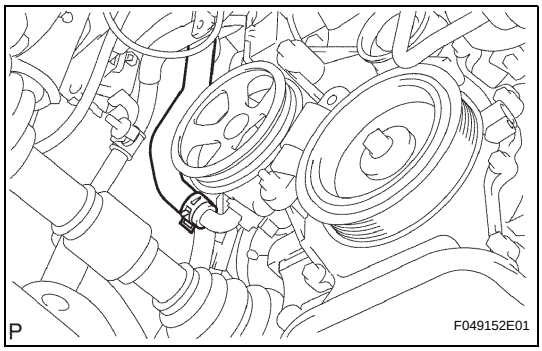
Make sure the stopper of the pressure feed tube touches the vane pump body.

(b) Using a 27 mm wrench to hold the pressure port union, torque the union bolt.

Torque: 50 N*m (510 kgf*cm, 37 ft.*lbf)

(c) Install the pressure feed tube with the bolt to the pump bracket rear.

Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)



3. CONNECT NO. 1 OIL RESERVOIR TO PUMP HOSE

(a) Connect the No. 1 oil reservoir to pump hose with the clip.

NOTICE:

Take care not to spill fluid on the V belt.

4. INSTALL FAN AND GENERATOR V BELT (See page EM-6)

5. INSTALL FRONT FENDER APRON SEAL RH

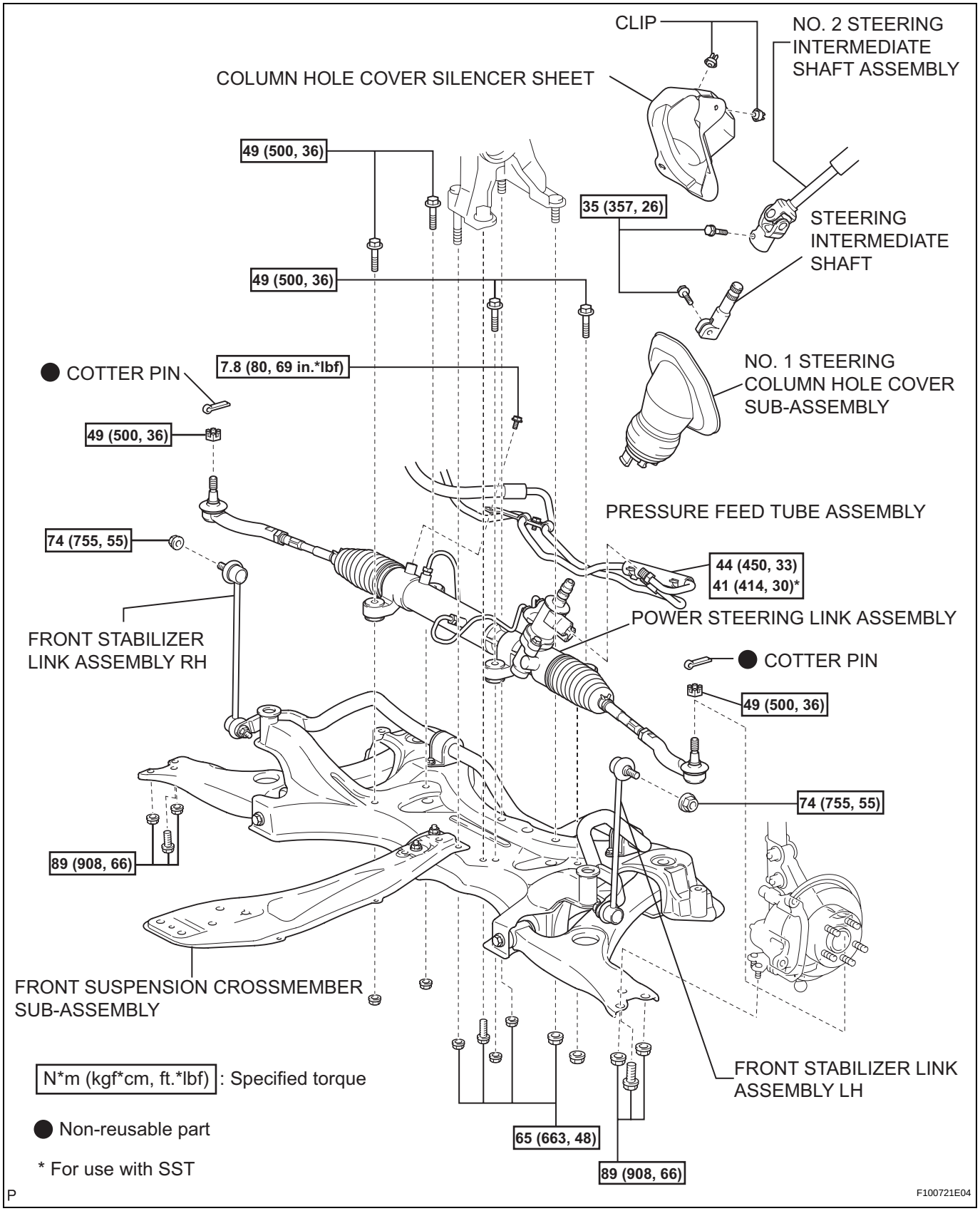
6. INSTALL FRONT WHEEL RH (See page CH-18)

7. BLEED POWER STEERING FLUID

8. INSPECT FOR FLUID LEAK

STEERING LINKAGE

COMPONENTS



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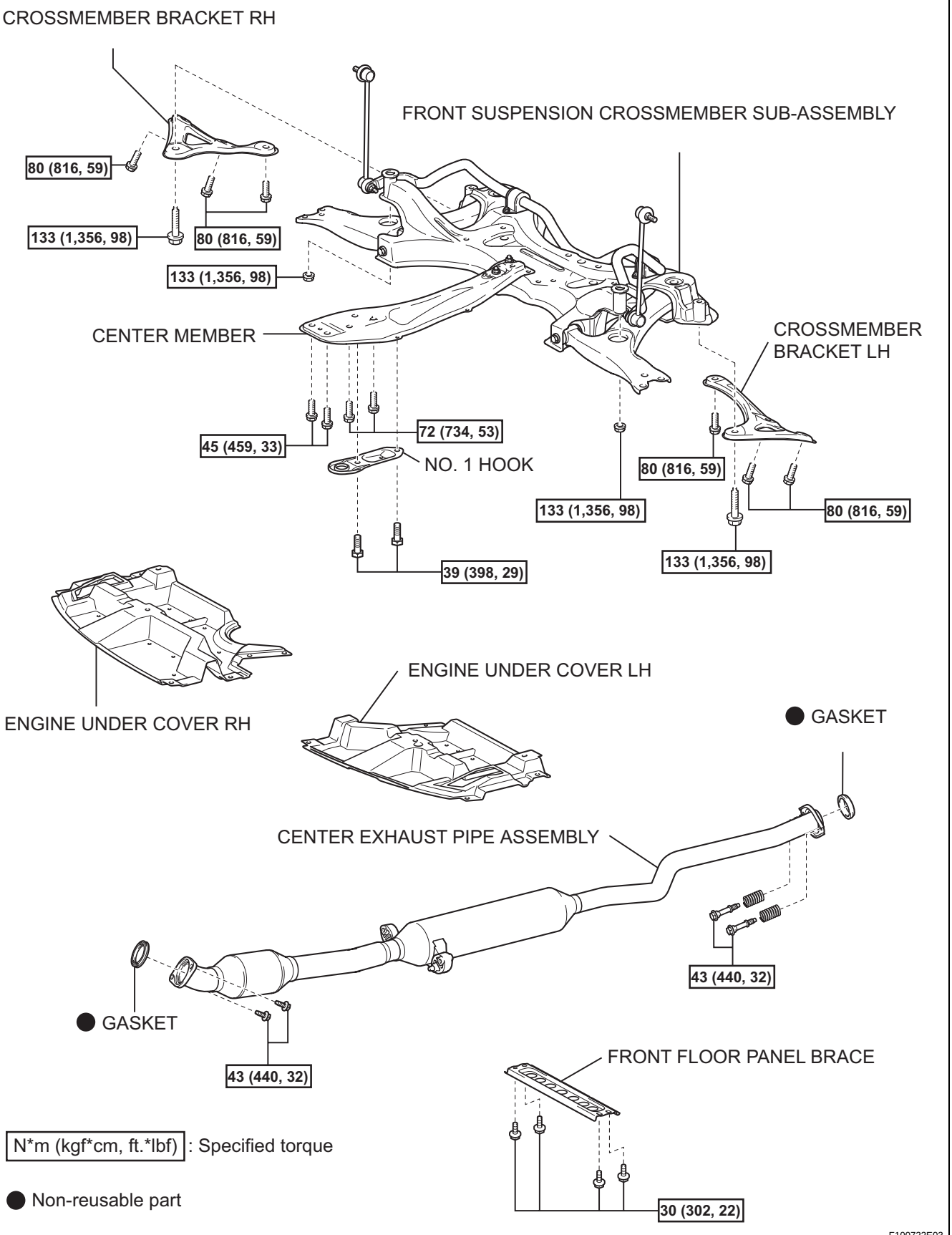
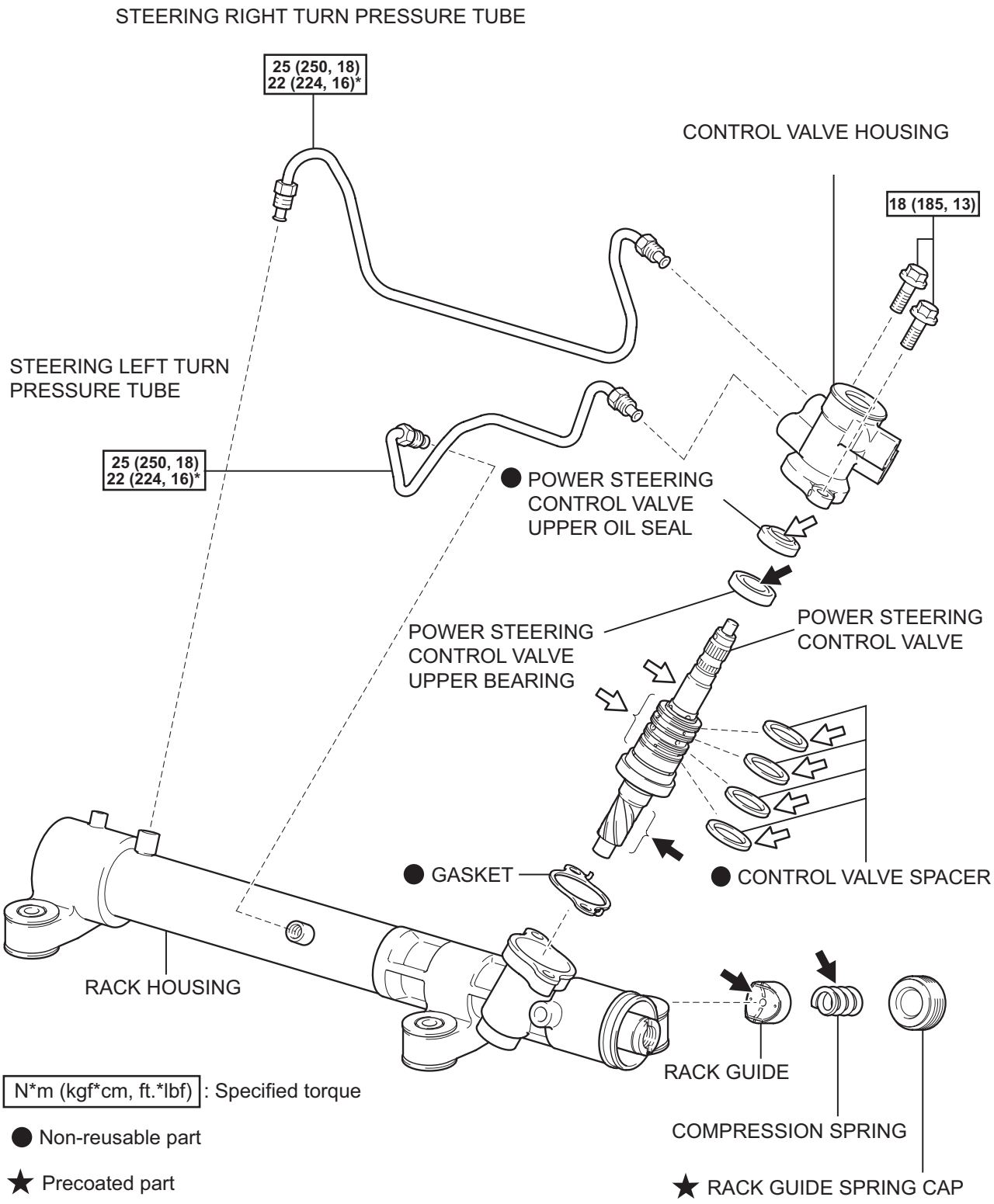

CROSSMEMBER BRACKET RH
FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY
80 (816, 59)
133 (1,356, 98)
80 (816, 59)
133 (1,356, 98)
CENTER MEMBER
CROSSMEMBER BRACKET LH
45 (459, 33)
72 (734, 53)
NO. 1 HOOK
80 (816, 59)
133 (1,356, 98)
80 (816, 59)
133 (1,356, 98)
39 (398, 29)
ENGINE UNDER COVER RH
ENGINE UNDER COVER LH
GASKET
CENTER EXHAUST PIPE ASSEMBLY
43 (440, 32)
GASKET
43 (440, 32)
FRONT FLOOR PANEL BRACE
30 (302, 22)
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
F100722E03

PS

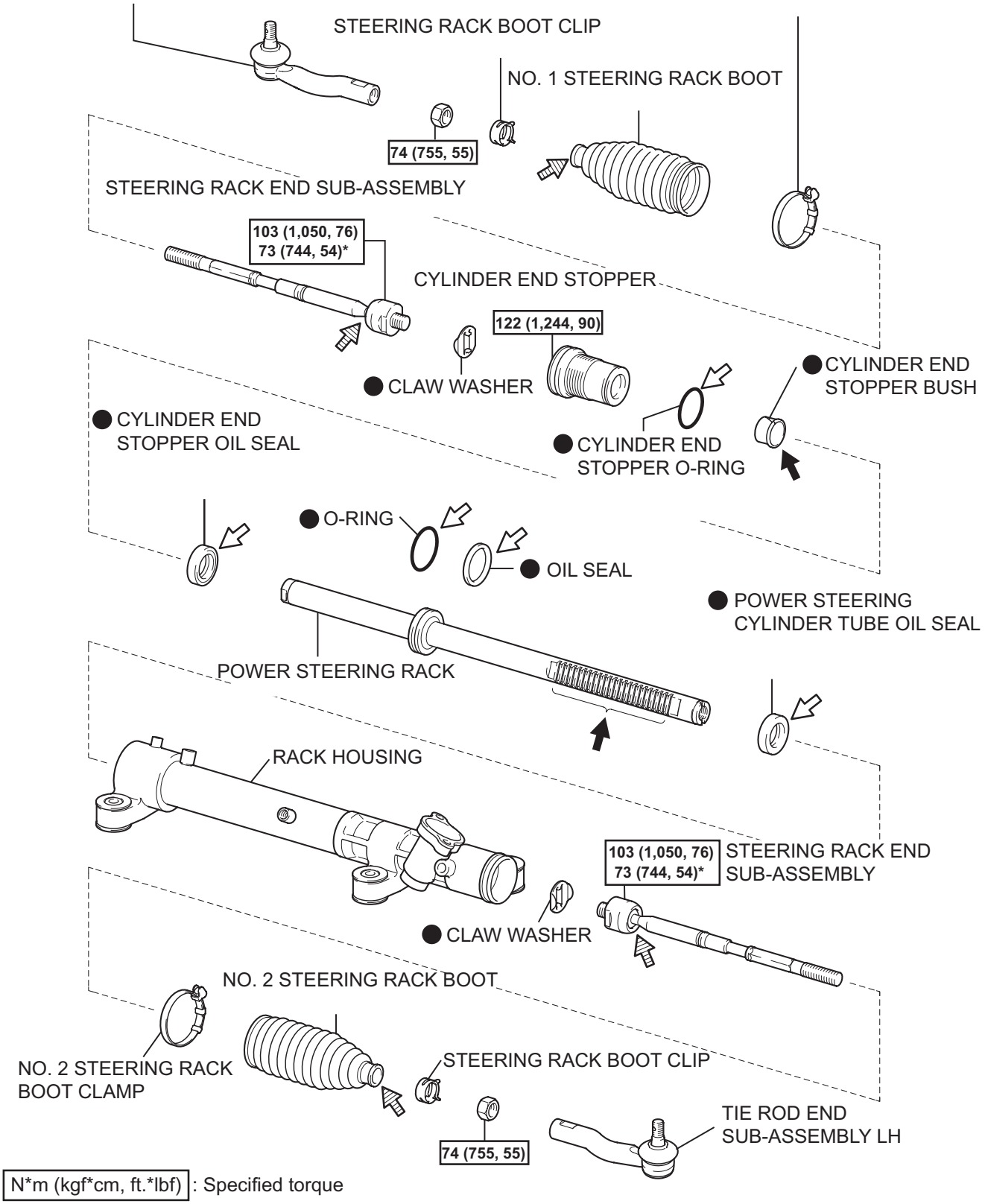
P



P

F100723E04

PS



N*m (kgf*cm, ft.*lbf) : Specified torque

PS

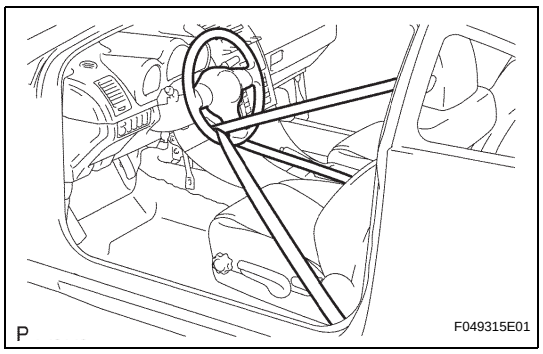
● Non-reusable part
⇦ Power steering fluid
⇚ Silicon grease
* For use with SST
⇚ MP grease
⬅ Molybdenum disulfide lithium base grease

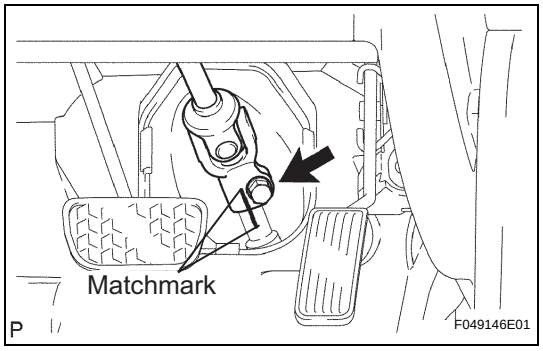
P

F100724E05

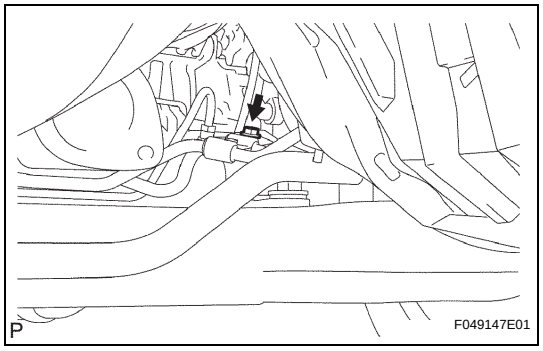
REMOVAL

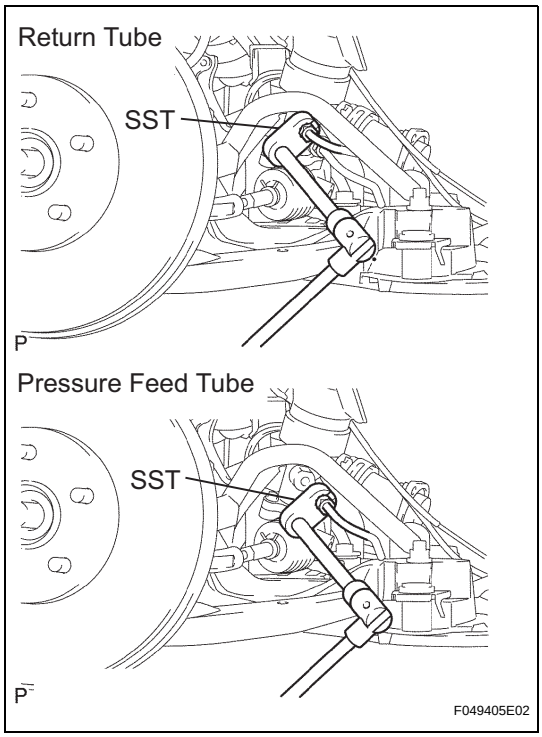
1. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
2. **DRAIN POWER STEERING FLUID**
3. **REMOVE COLUMN HOLE COVER SILENCER SHEET (See page SR-9)**
4. **DISCONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY**
   (a) Fix the steering wheel with the seat belt in order to prevent rotation.
   HINT:
   This operation is useful to prevent damage to the spiral cable.





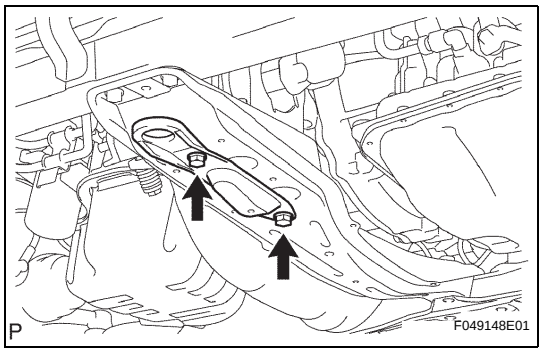
   (b) Put matchmarks on the No. 2 intermediate shaft assembly and the intermediate shaft.
   (c) Remove the bolt, and then disconnect the No. 2 intermediate shaft assembly from the intermediate shaft.
5. **DISCONNECT NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY**
6. **REMOVE FRONT WHEEL**
7. **REMOVE ENGINE UNDER COVER LH**
8. **REMOVE ENGINE UNDER COVER RH**
9. **SEPARATE TIE ROD END SUB-ASSEMBLY LH (See page DS-6)**
10. **SEPARATE TIE ROD END SUB-ASSEMBLY RH**
    HINT:
    Perform the same procedure as for the LH.
11. **DISCONNECT PRESSURE FEED TUBE ASSEMBLY**
    (a) Remove the bolt and disconnect the tube clamp from the power steering link.

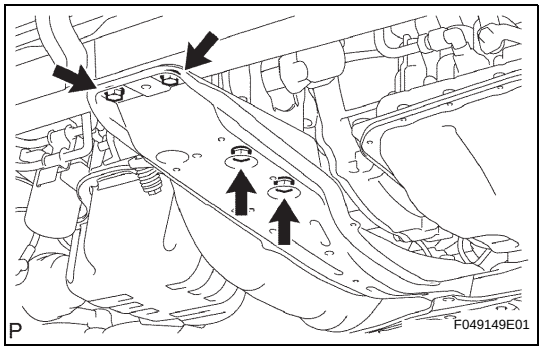




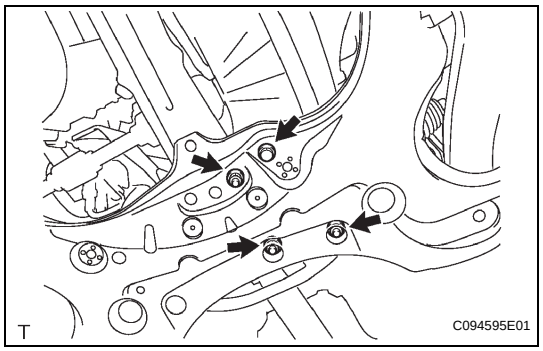
(b) Using SST, disconnect the pressure feed tube.
SST 09023-12701

12. **SEPARATE FRONT STABILIZER LINK ASSEMBLY LH (See page SP-29)**
13. **SEPARATE FRONT STABILIZER LINK ASSEMBLY RH**
HINT:
Perform the same procedure as for the LH.
14. **SEPARATE FRONT NO. 1 SUSPENSION ARM SUB-ASSEMBLY LH LOWER (See page SP-23)**
15. **SEPARATE FRONT NO. 1 SUSPENSION ARM SUB-ASSEMBLY RH LOWER**
HINT:
Perform the same procedure as for the LH.
16. **REMOVE FRONT FLOOR PANEL BRACE (See page EX-2)**
17. **REMOVE CENTER EXHAUST PIPE ASSEMBLY (See page EX-2)**
18. **REMOVE HOOD SUB-ASSEMBLY**
19. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-22)**
20. **SUSPEND ENGINE ASSEMBLY (See page AX-149)**
21. **REMOVE NO. 1 HOOK**
(a) Remove the 2 bolts and the hook.

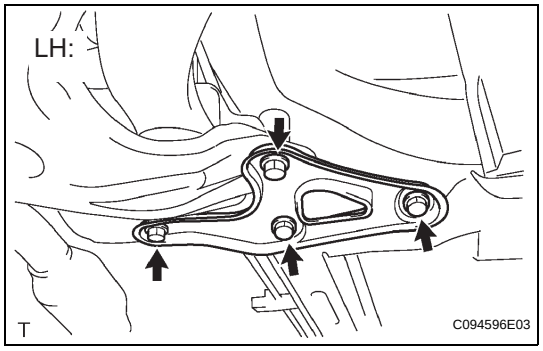




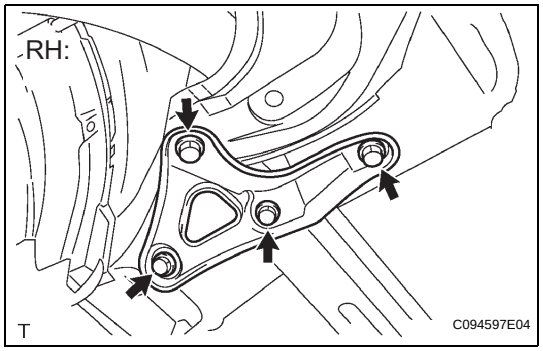
22. **REMOVE FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY**
(a) Remove the 4 bolts and separate the center member.



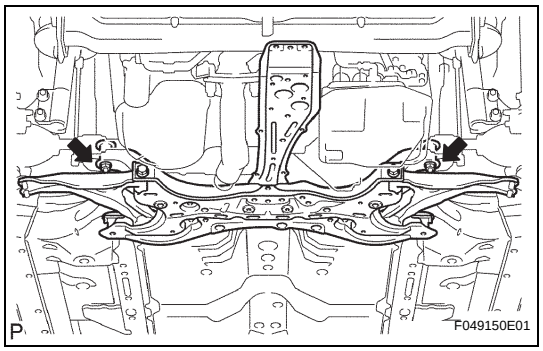
(b) Remove the bolt and 3 nuts and disconnect the engine mounting insulator rear from the crossmember.
(c) Using a transmission jack, support the crossmember.



(d) Remove the 4 bolts and crossmember bracket LH.

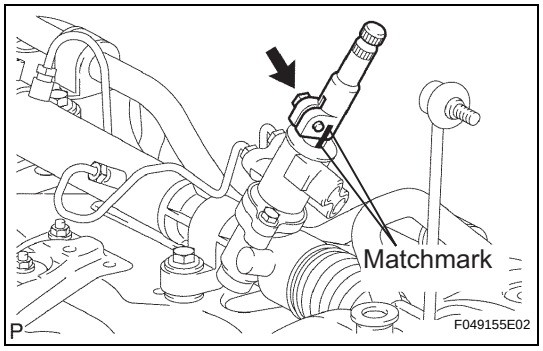


(e) Remove the 4 bolts and crossmember bracket RH.

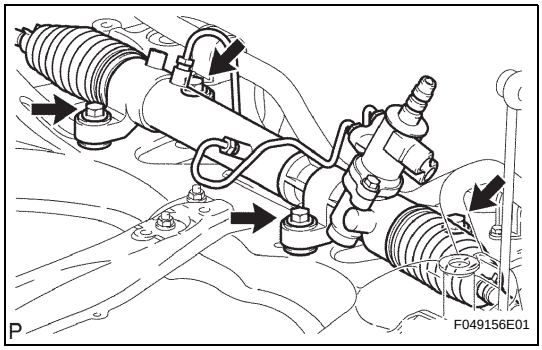


(f) Remove the 2 nuts and crossmember with power steering link.

23. REMOVE NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY



24. REMOVE STEERING INTERMEDIATE SHAFT
(a) Put matchmarks on the intermediate shaft and the pinion shaft.
(b) Remove the bolt and intermediate shaft.



25. REMOVE POWER STEERING LINK ASSEMBLY

(a) Remove the 4 bolts, 4 nuts and power steering link from the crossmember.

NOTICE:

Because the nut has its own stopper, do not turn the nut. Loosen the bolt with the nut fixed.

DISASSEMBLY

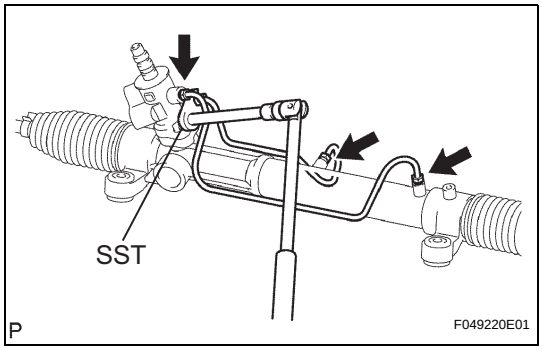
1. FIX POWER STEERING LINK ASSEMBLY

(a) Using SST, remove the left turn pressure tube.

SST 09023-38201

Using SST, remove the right turn pressure tube.

SST 09023-38201

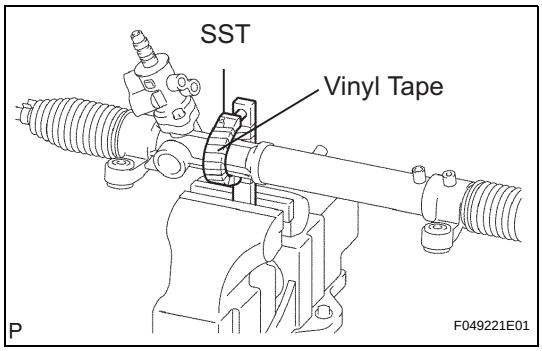


(b) Using SST, secure the power steering link assembly.

SST 09612-00012

HINT:

Tape the SST before use.



2. REMOVE TIE ROD END SUB-ASSEMBLY LH

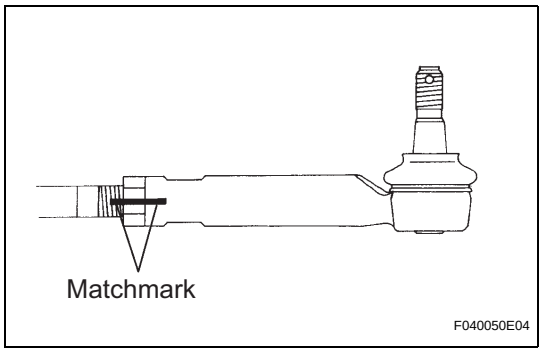
(a) Put matchmarks on the tie rod end and rack end.

(b) Loosen the lock nut, and remove the tie rod end and lock nut.

3. REMOVE TIE ROD END SUB-ASSEMBLY RH

HINT:

Perform the same procedure as for the LH.



4. INSPECT TIE ROD END SUB-ASSEMBLY LH

(a) Secure the tie rod end in a vise.

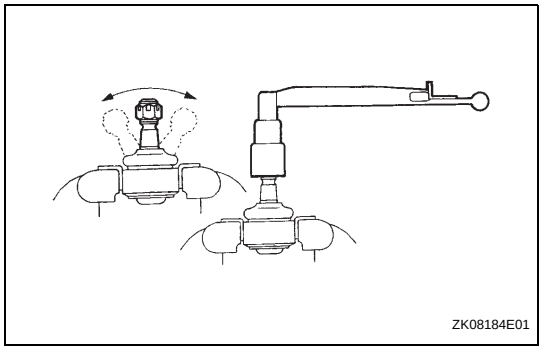
(b) Install the nut to the stud bolt.

(c) Flip the ball joint back and forth 5 times or more.

(d) Using a torque wrench, turn the nut continuously at a rate of 2 to 4 seconds per turn and take the torque reading on the 5th turn.

Torque: Turning torque

0.49 to 3.43 N*m (5.0 to 35 kgf*cm, 4.3 to 30.4 in.*lbf)



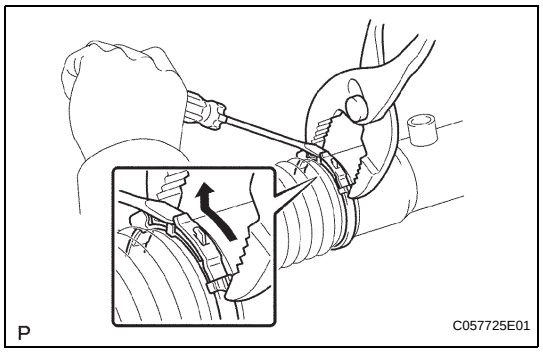
If not within the specified torque range, replace the tie rod end sub-assembly.

5. INSPECT TIE ROD END SUB-ASSEMBLY RH

HINT:
Perform the same procedure as for the LH.

6. REMOVE STEERING RACK BOOT CLIP

(a) Remove the 2 boot clips.



7. REMOVE NO. 2 STEERING RACK BOOT CLAMP

(a) Using pliers, loosen the clamp as shown in the illustration.

(b) Using a screwdriver, remove the clamp.

NOTICE:
Be careful not to damage the boot.

8. REMOVE NO. 1 STEERING RACK BOOT CLAMP

HINT:
Perform the same procedure as for the clamp.

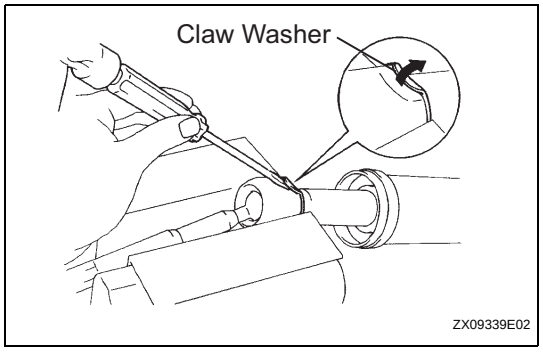
9. REMOVE NO. 2 STEERING RACK BOOT

10. REMOVE NO. 1 STEERING RACK BOOT

11. REMOVE STEERING RACK END SUB-ASSEMBLY

(a) Using a screwdriver and hammer, unstake the RH and LH claw washers.

NOTICE:
Avoid any impact to the steering rack.



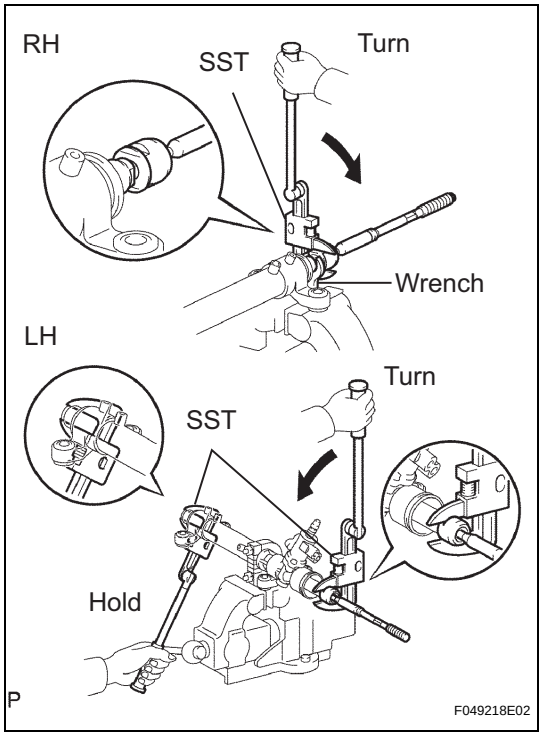
(b) Using a 22 mm wrench and a vise, hold the steering rack (RH side).

(c) Using SST, remove the rack end (RH side) and claw washer from the steering rack.

SST 09922-10010
NOTICE:
Use SST 09922-10010 in the direction shown in the illustration.

(d) Using 2 SST, remove the rack end (LH side) and claw washer from the steering rack.

SST 09922-10010
NOTICE:
Use SST 09922-10010 in the direction shown in the illustration.



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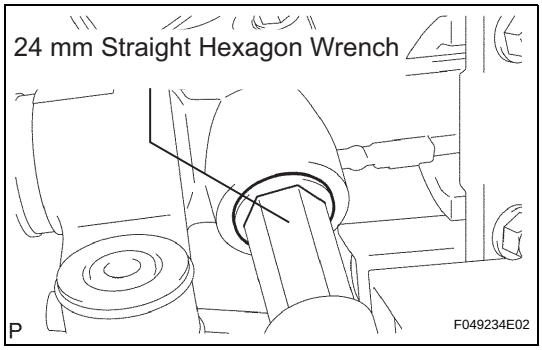
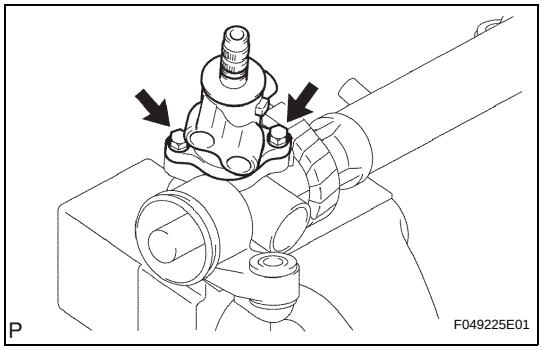


12. REMOVE RACK GUIDE

(a) Using a 24 mm straight hexagon wrench, remove the rack guide spring cap.

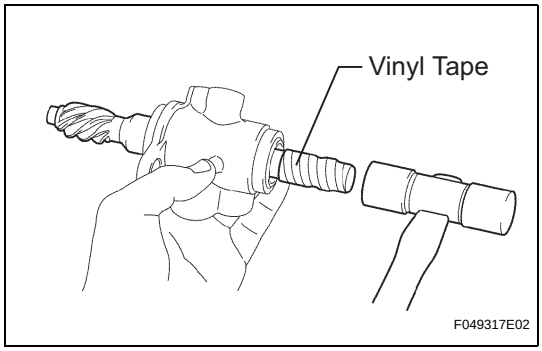
(b) Remove the compression spring and the rack guide.



13. REMOVE POWER STEERING CONTROL VALVE

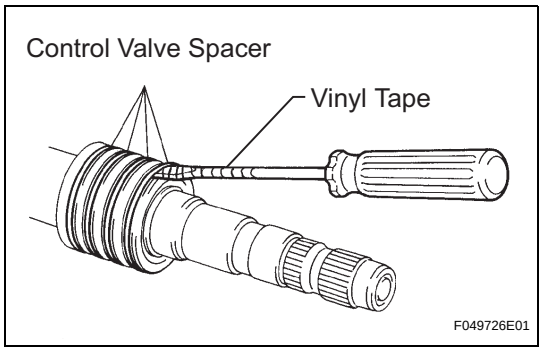
(a) Remove the 2 bolts and the control valve housing with the control valve.

(b) Remove the gasket.



(c) Wrap vinyl tape around the spline of the control valve in order to prevent damaging the oil seal.

(d) Using a plastic-faced hammer, tap out the control valve.



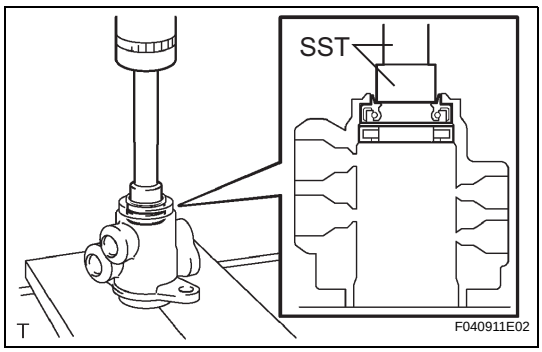
(e) Using a screwdriver, remove the 4 control valve spacers.

NOTICE:

Be careful not to damage the spacer grooves on the control valve.

HINT:

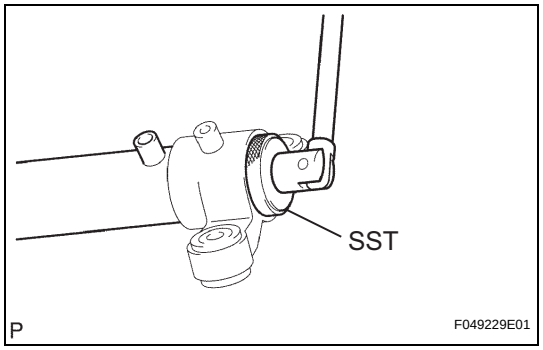
Tape the screwdriver tip before use.



14. REMOVE POWER STEERING CONTROL VALVE UPPER OIL SEAL

(a) Using SST and a press, press out the control valve upper bearing and the upper oil seal from the control valve housing.

SST 09950-70010 (09951-07100), 09950-60010 (09951-00240)

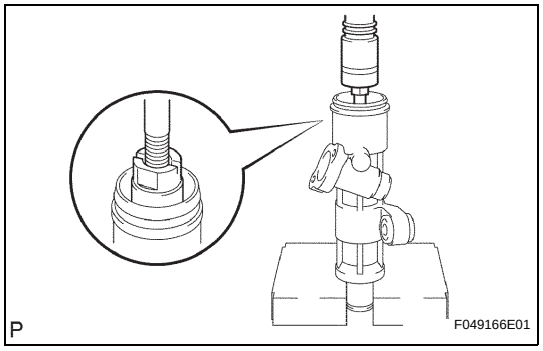


15. REMOVE CYLINDER END STOPPER

(a) Using SST, remove the cylinder end stopper from the rack housing.
SST 09631-20120

(b) Using a screwdriver, remove the cylinder end stopper O-ring from the cylinder end stopper.

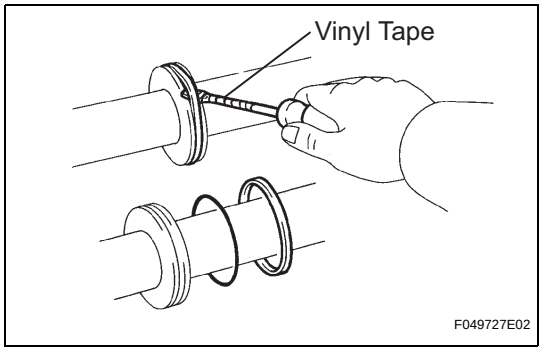
(c) Using a screwdriver, remove the cylinder end stopper bush from the cylinder end stopper.
NOTICE:
Do not damage the cylinder end stopper.



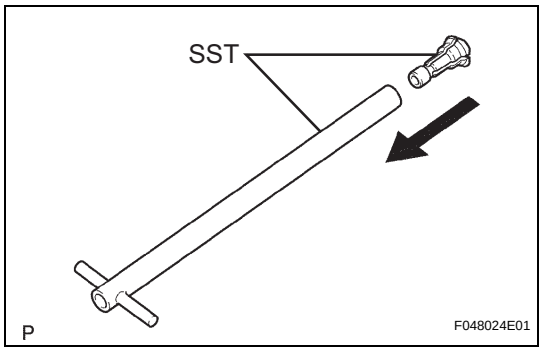
16. REMOVE POWER STEERING RACK

(a) Using a bolt (M14 x P1.5) and a press, press out the power steering rack with the cylinder end stopper oil seal.

(b) Remove the cylinder end stopper oil seal from the power steering rack.

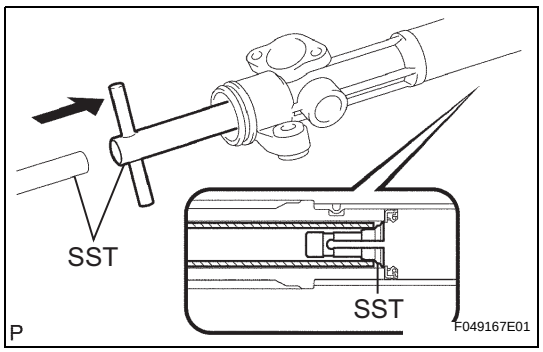


(c) Using a screwdriver, remove the oil seal and the O-ring .
NOTICE:
Be careful not to damage the oil seal groove on the power steering rack.
HINT:
Tape the screwdriver tip before use.



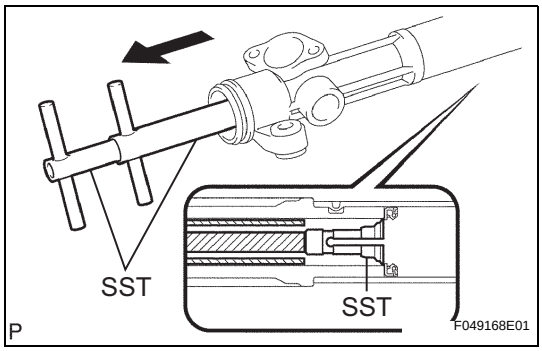
17. REMOVE POWER STEERING CYLINDER TUBE OIL SEAL

(a) Set the SST.
SST 09612-70100 (09612-07110, 09612-07210)
NOTICE:
- **Lightly apply MP grease to the tip of SST (09612-07230) and inside of SST (09612-07210 and 09612-07110) before use.**
- **Completely install SST (09612-07110) to SST (09612-07210) to prevent damage to the inside of the rack housing.**



(b) Insert SST (09612-07210) into the rack housing at a slant until it comes in contact with the power steering cylinder tube oil seal. Install SST (09612-07220) to SST (09612-07210).
SST 09612-70100 (09612-07110, 09612-07210, 09612-07220)
NOTICE:
Do not damage the inside of the power steering rack housing.

PS

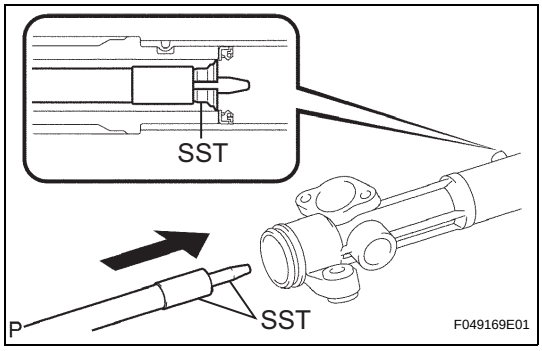


(c) Hold SST (09612-07220) and pull SST (09612-07210) to position SST (09612-07110) to the inside of the rack housing.

SST 09612-70100 (09612-07110, 09612-07210, 09612-07220)

HINT:

Ensure that SST (09612-07110) is positioned at the chamfered part between the power steering cylinder tube oil seal and the rack housing.



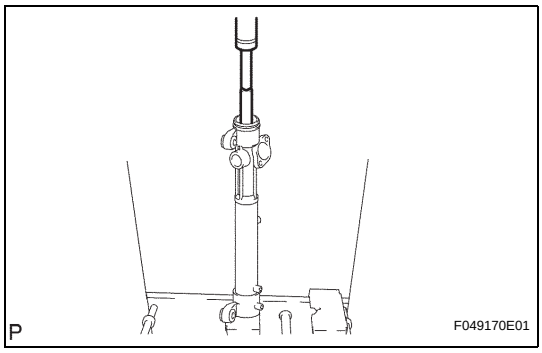
(d) Install SST (09612-07240) to SST (09612-07230). Insert the tip of SST (09612-07230) into the service hole of SST (09612-07110) in the rack housing.

SST 09612-70100 (09612-07110, 09612-07230, 09612-07240)

SST 09612-70100 (09612-07110, 09612-07230, 09612-07240)

NOTICE:

- **Ensure the SST (09612-07240) is installed to prevent damage to SST (09612-07110).**
- **Do not damage the inside of the rack housing.**



(e) Install SST (09951-07150) to SST (09612-07230). Using a press, remove the power steering cylinder tube oil seal.

SST 09612-70100 (09612-07110, 09612-07230, 09612-07240), 09950-70010 (09951-07150)

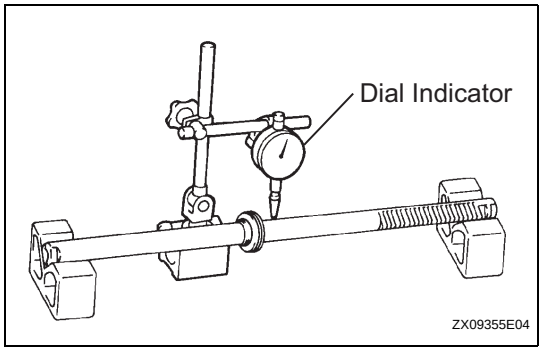
SST 09612-70100 (09612-07110, 09612-07230, 09612-07240), 09950-70010 (09951-07150)

NOTICE:

Do not damage the rack housing.

HINT:

Change SST (09951-07150) for another, from the set, with different length as needed.



INSPECTION

1. INSPECT POWER STEERING RACK

(a) Using a dial indicator, check for runout of the steering rack and teeth wear.

Maximum runout:

0.1 mm (0.004 in.)

If runout exceeds the maximum, replace the power steering rack.

NOTICE:

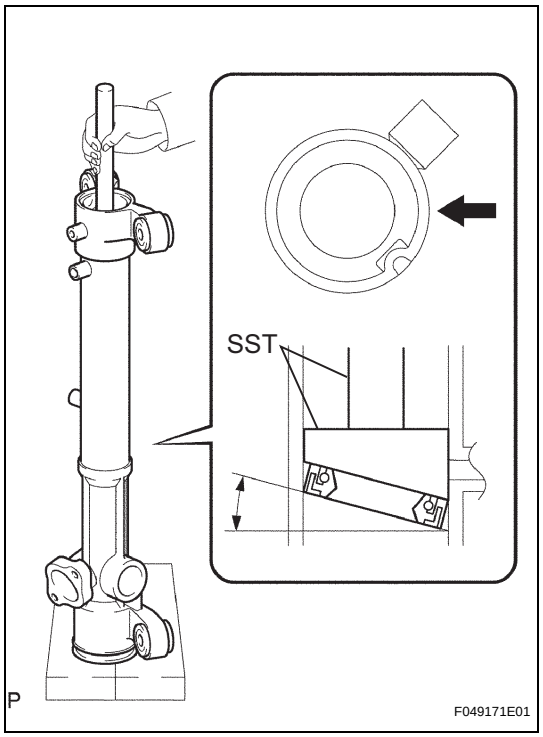
Make sure that the steering rack is placed horizontally.

(b) Check the rack surface for wear and damage.

If runout exceeds the maximum, replace the power steering link assembly.

REASSEMBLY

NOTICE:
When installing, coat the parts indicated by arrows with power steering fluid, molybdenum disulfide lithium base grease, MP grease or silicon grease (see page PS-17).



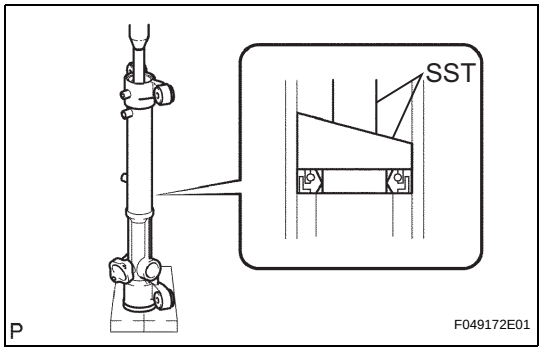
1. INSTALL POWER STEERING CYLINDER TUBE OIL SEAL

(a) Apply power steering fluid to the lip of a new power steering cylinder tube oil seal.

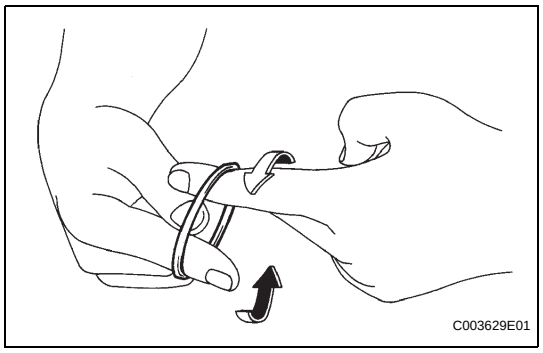
(b) Install the power steering cylinder tube oil seal to the rack housing at a slant.
NOTICE:
- **Ensure the power steering cylinder tube oil seal is installed in the correct direction as shown in the illustration.**
- **Install the power steering cylinder tube oil seal at an angle of approximately 15° so that the lowermost part comes to the point, indicated by the arrow in the illustration, to prevent damage to the side of the oil seal when it passes the 2 ports.**

(c) Using SST, insert the power steering cylinder tube oil seal by pushing the SST in by hand until the oil seal passes the 2 ports.
NOTICE:
Do not turn the SST when inserting the oil seal.

(d) Install SST (09631-00200) to SST (09951-07360) upside down.



(e) Using SST, level the power steering cylinder tube oil seal by pushing the SST in by hand. Using SST and a press, install the oil seal.
SST 09950-70010 (09951-07360), 09631-00200

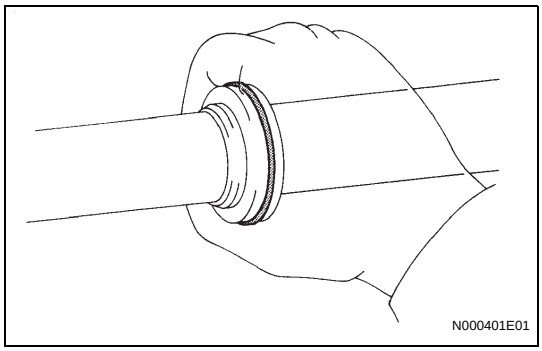


2. INSTALL POWER STEERING RACK

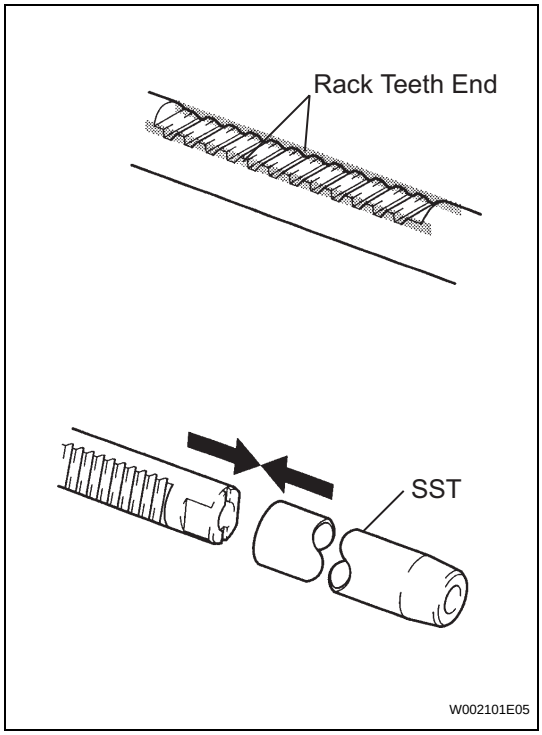
(a) Coat a new O-ring with power steering fluid and install it to the steering rack.

(b) Expand the new oil seal with your fingers.
NOTICE:
Be careful not to overly expand the oil seal.

(c) Coat the oil seal with power steering fluid.

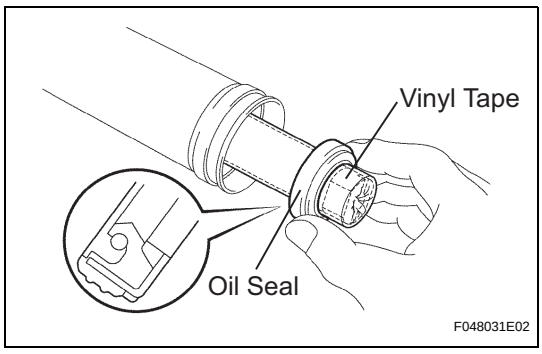

N000401E01

(d) Install the oil seal to the steering rack, and adjust with your fingers.



W002101E05

(e) Apply molybdenum disulfide lithium base grease to the rack teeth ends.
HINT:
If necessary, scrape the burrs off the rack teeth ends and burnish.
(f) Affix SST to the steering rack.
SST 09631-20102
Coat SST with power steering fluid.
(g) Install the steering rack to the rack housing.
(h) Remove SST.

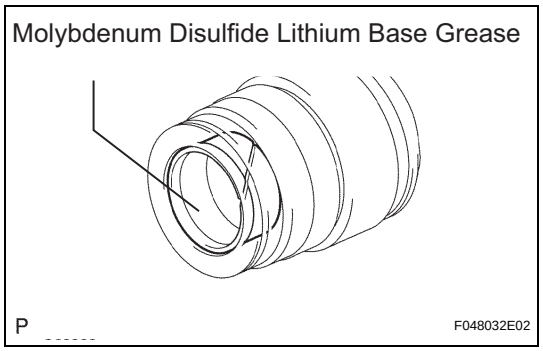


F048031E02

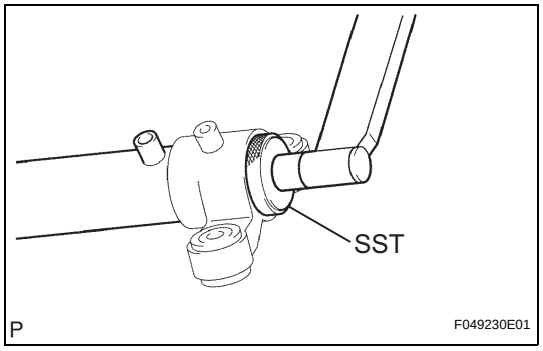
3. INSTALL CYLINDER END STOPPER

(a) Wrap vinyl tape around the RH side of the power steering rack and apply power steering fluid.
(b) Apply power steering fluid to the lip of a new cylinder end stopper oil seal.
(c) Install the cylinder end stopper oil seal to the RH side of the rack housing.
NOTICE:
- **Ensure that the cylinder end stopper oil seal is installed in the correct direction as shown in the illustration.**
- **Do not damage the cylinder end stopper oil seal.**

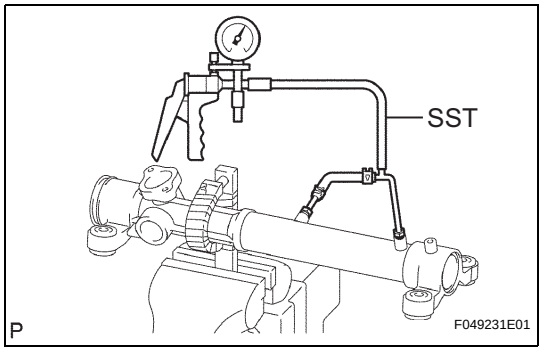
(d) Remove the vinyl tape from the power steering rack.
(e) Apply power steering fluid to a new cylinder end stopper O-ring.
(f) Install the cylinder end stopper O-ring to the cylinder end stopper.



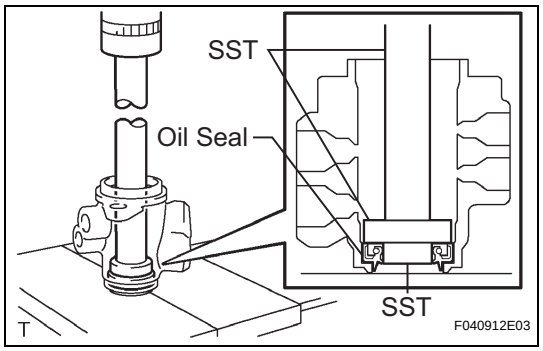
(g) Install a new cylinder end stopper bush to the cylinder end stopper.
(h) Apply molybdenum disulfide lithium base grease to the entire inner side of the cylinder end stopper bush.



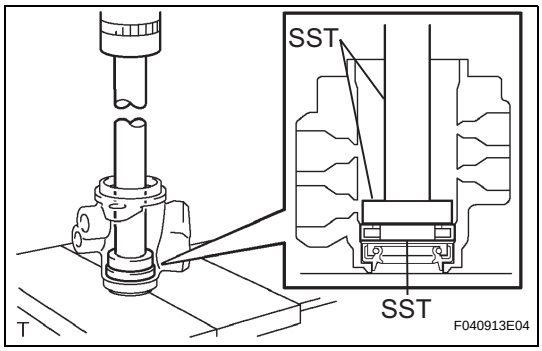
(i) Using SST, install the cylinder end stopper to the rack housing.
SST 09631-20120
Torque: 122 N*m (1,244 kgf*cm, 90 ft.*lbf)



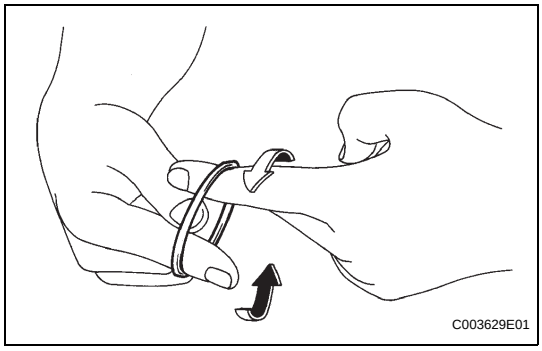
4. AIR TIGHTNESS TEST
(a) Install SST to the rack housing.
SST 09631-12071 (09633-00010)
(b) Apply a vacuum of 53 kPa (398 mmHg, 15.65 in.Hg) for approximately 30 seconds.
(c) Check that there is no change in the vacuum pressure.
If there is a change in the vacuum pressure, check the installation of the oil seals.



5. INSTALL POWER STEERING CONTROL VALVE UPPER OIL SEAL
(a) Coat the control valve upper bearing with molybdenum disulfide lithium base grease, and a new control valve upper oil seal lip with power steering fluid.
(b) Using SST and a press, press in the control valve upper oil seal.
SST 09950-70010 (09951-07150), 09950-60010 (09952-06010, 09951-00180, 09951-00300)
NOTICE:
Make sure that the oil seal is installed in the correct direction as shown in the illustration.



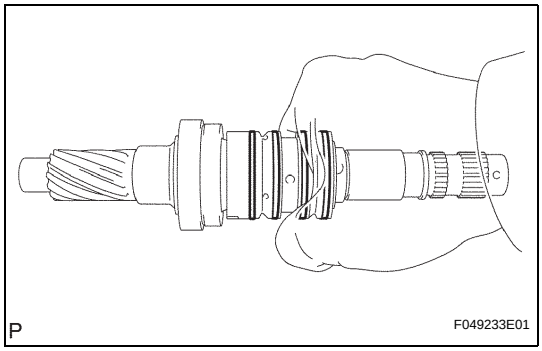
(c) Using SST and a press, press in the control valve upper bearing.
SST 09950-70010 (09951-07150), 09950-60010 (09952-06010, 09951-00180, 09951-00320)



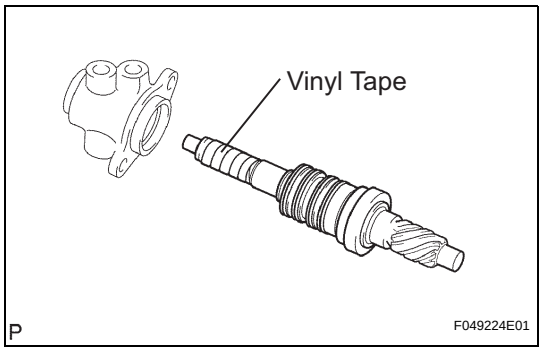
6. INSTALL POWER STEERING CONTROL VALVE

(a) Expand 4 new valve spacers with your fingers.
NOTICE:
Be careful not to overly expand the valve spacers.

(b) Coat the 4 valve spacers with power steering fluid.

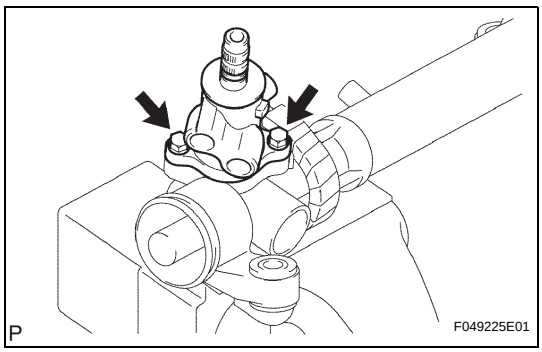


(c) Install the 4 valve spacers to the control valve, and adjust with your fingers.

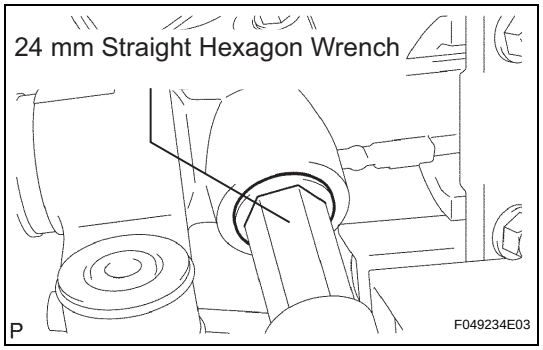


(d) Coat the control valve with power steering fluid.

(e) Install the control valve into the valve housing.
NOTICE:
Be careful not to damage the valve spacers and oil seal lip.
HINT:
Wrap vinyl tape around the end of the steering rack in order to prevent damaging the oil seal.



(f) Install the control valve housing with the control valve and a new gasket to the rack housing with the 2 bolts.
Torque: 18 N*m (185 kgf*cm, 13 ft.*lbf)



7. INSTALL RACK GUIDE

(a) Apply molybdenum disulfide lithium base grease to the compression spring and the contact surface of the rack guide and the power steering rack.

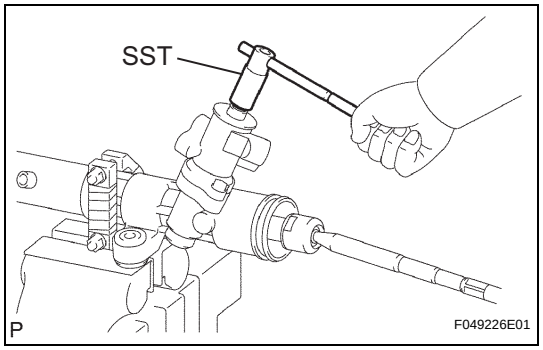
(b) Install the rack guide and the compression spring.

(c) Apply sealant to 2 or 3 threads of the rack guide spring cap.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(d) Using a 24 mm straight hexagon wrench, temporarily install the rack guide spring cap.



8. INSPECT TOTAL PRELOAD

(a) Using a 24 mm straight hexagon wrench, loosen and retighten the rack guide spring cap.

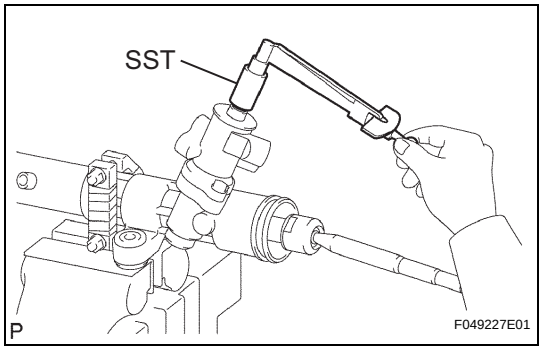
(b) Temporarily install the steering rack ends to the power steering rack.

NOTICE:

Do not fully turn the power steering rack without the steering rack end as it may damage the oil seal in the rack housing and the cylinder end stopper bush.

(c) Using SST, fully turn the power steering rack right and left 10 times to settle.

SST 09616-00011



(d) While turning the control valve using SST, loosen the rack guide spring cap in small amounts until the preload falls within the specified range.

SST 09616-00011

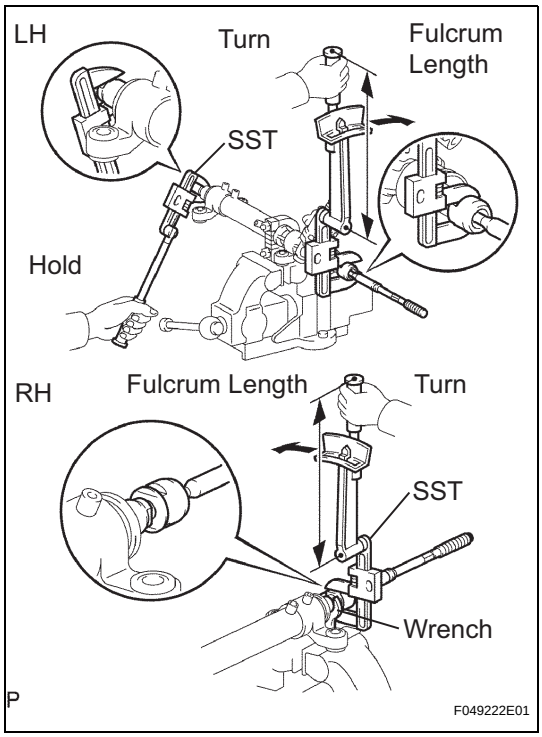
Standard preload (turning):

0.9 to 1.6 N*m (9.2 to 16.3 kgf*cm, 8.0 to 14.2 in.*lbf)

NOTICE:

Retighten and loosen the rack guide spring cap if preload falls below the specified range.

(e) Remove the steering rack ends from the power steering rack.



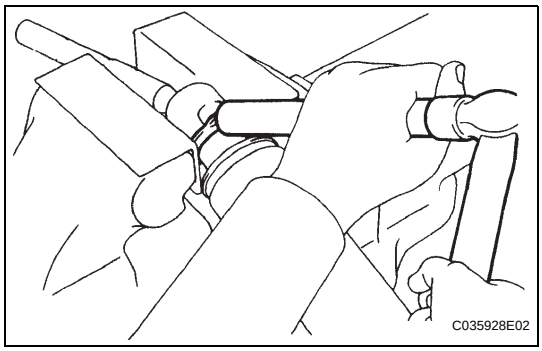
9. INSTALL STEERING RACK END SUB-ASSEMBLY

(a) Install 2 new claw washers, and temporarily install the rack ends.
HINT:
Align the claws of the claw washers with the steering rack grooves.

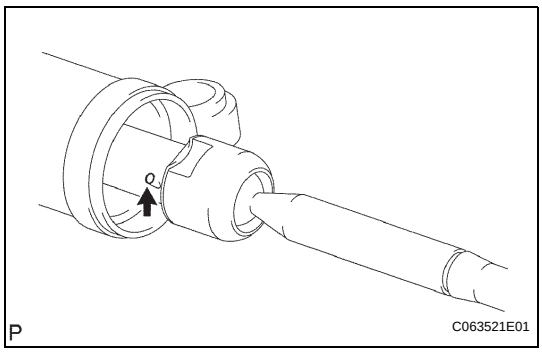
(b) Apply MP grease to the rack end ball joint.

(c) Using 2 SST, install the rack end sub-assembly (LH side).
SST 09922-10010
Torque: 73 N*m (744 kgf*cm, 54 ft.*lbf)
HINT:
- Use SST 09922-10010 in the direction shown in the illustration.
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- Using SST, hold the rack and install the rack end sub-assembly.

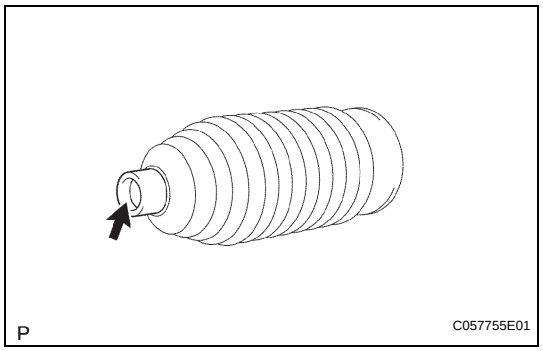
(d) Using SST and a 22 mm wrench, tighten the rack end sub-assembly (RH side).
SST 09922-10010
Torque: 73 N*m (744 kgf*cm, 54 ft.*lbf)
HINT:
- Use SST 09922-10010 in the direction shown in the illustration.
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- Using SST, hold the rack and install the rack end sub-assembly.



(e) Using a brass bar and hammer, stake the 2 claw washers.
NOTICE:
Avoid any impact to the steering rack.

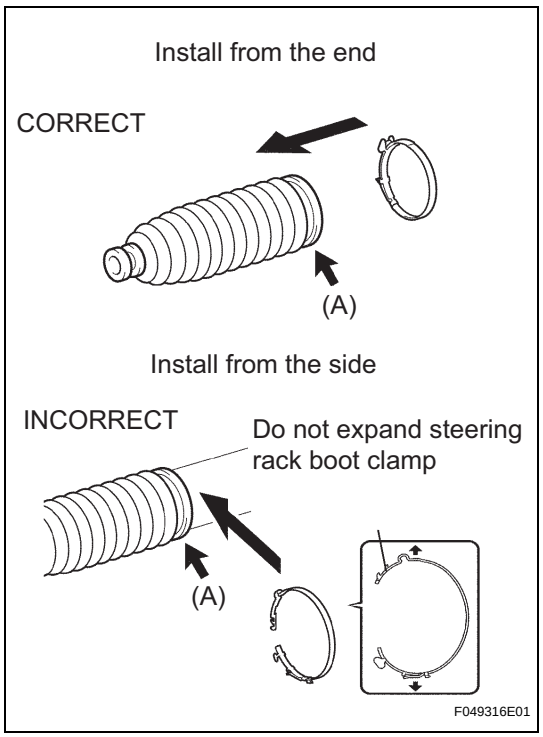


(f) Ensure that the steering rack hole is not clogged with grease.
HINT:
If the hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.



10. INSTALL NO. 2 STEERING RACK BOOT

(a) Apply silicon grease to the inside of the small opening of the No. 2 rack boot.



(b) Temporarily install a new steering rack boot clamp to the large opening of the steering rack boot at the position shown by arrow (A).

NOTICE:

- **Use a new steering rack boot clamp.**
- **Do not expand the steering rack boot clamp more than necessary to perform installation.**
- **Do not deform the steering rack boot clamp.**
- **Tightening force of the steering rack boot clamp becomes uneven if it is installed after being expanded as shown in the illustration. As a result, rust is caused by water entering from the clearance between the boot and rack housing, causing a malfunction.**
- **Use only the supply parts which are applicable to the vehicle to secure the boot.**

HINT:

After disengaging the claw of a new steering rack boot clamp, temporarily install it from the end without expanding the clamp diameter as much as possible.

(c) Install the rack boot to the groove on the rack housing.

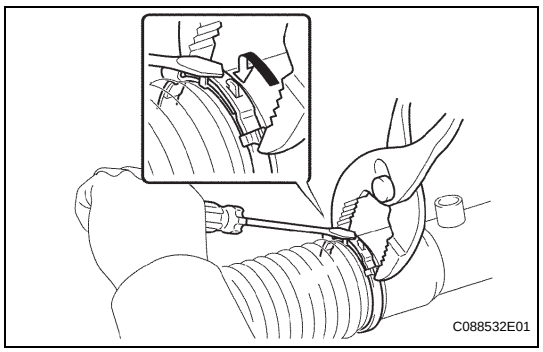
NOTICE:

- **Be careful not to damage or twist the boot.**
- **Do not damage the steering rack boot.**
- **Ensure that the steering rack boot clamp is installed before installing the steering rack boot to the rack housing.**

11. INSTALL NO. 1 STEERING RACK BOOT

HINT:

Perform the same procedure as for the No. 2 rack boot.



12. INSTALL NO. 2 STEERING RACK BOOT CLAMP

(a) Using pliers and a screwdriver, install a new rack boot clamp.

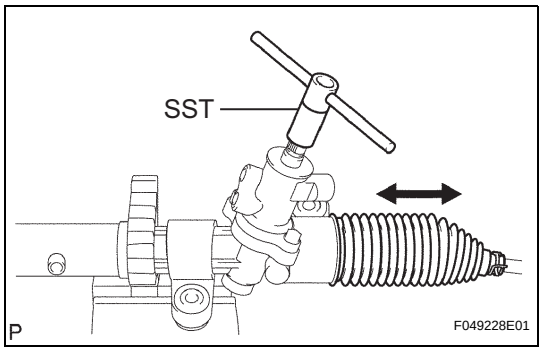
NOTICE:

- **Be careful not to damage or twist the rack boot.**
- **Do not twist the steering rack boot.**

13. INSTALL NO. 1 STEERING RACK BOOT CLAMP

HINT:

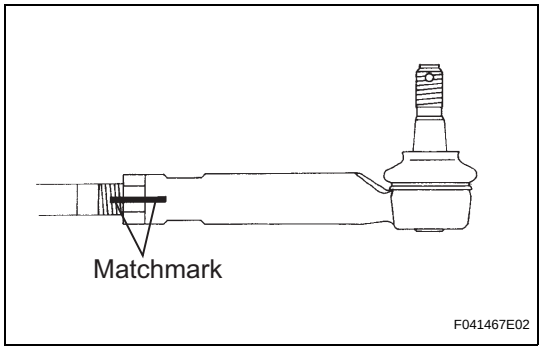
Perform the same procedure as for the clamp.



14. INSTALL STEERING RACK BOOT CLIP

(a) Using pliers, install the 2 boot clips.

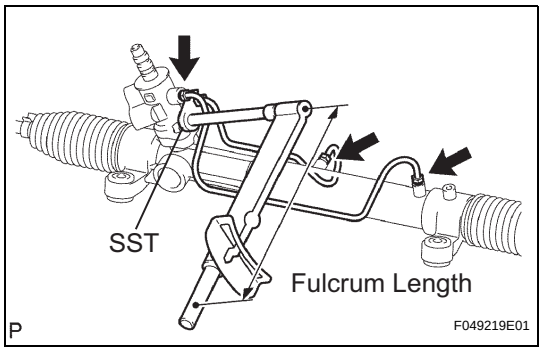
(b) Using SST, turn the control valve, and check that the rack boots expand and contract smoothly.
SST 09616-00011



15. INSTALL TIE ROD END SUB-ASSEMBLY LH

(a) Screw the lock nut and the tie rod end to the rack end until the matchmarks are aligned.
HINT:
After adjusting toe-in, torque the lock nut.

16. REMOVE TIE ROD END SUB-ASSEMBLY RH
HINT:
Perform the same procedure as for the LH.

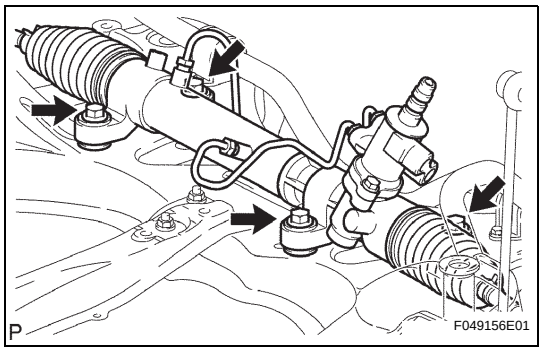


INSTALLATION

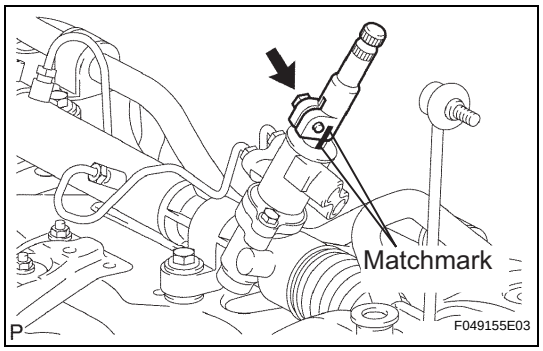
1. INSTALL POWER STEERING LINK ASSEMBLY

(a) Using SST, install the left turn pressure tube to the steering link assembly.
SST 09023-38201
Torque: 22 N*m (224 kgf*cm, 16 ft.*lbf)
HINT:
- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective when SST is parallel to the torque wrench.

(b) Using SST, install the right turn pressure tube to the steering link assembly.
SST 09023-38201
Torque: 22 N*m (224 kgf*cm, 16 ft.*lbf)
HINT:
- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective when SST is parallel to the torque wrench.



(c) Install the power steering link assembly with the 4 bolts and 4 nuts.
Torque: 49 N*m (500 kgf*cm, 36 ft.*lbf)
NOTICE:
Because the nut has its own stopper, do not turn the nut. Torque the bolt with the nut fixed.

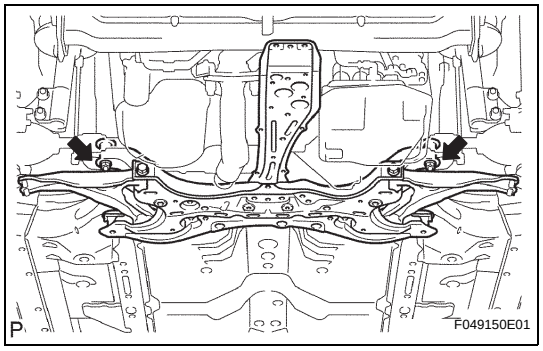


2. INSTALL STEERING INTERMEDIATE SHAFT

(a) Align the matchmarks on the intermediate shaft and the pinion shaft.

(b) Install the bolt.
Torque: 35 N*m (357 kgf*cm, 26 ft.*lbf)

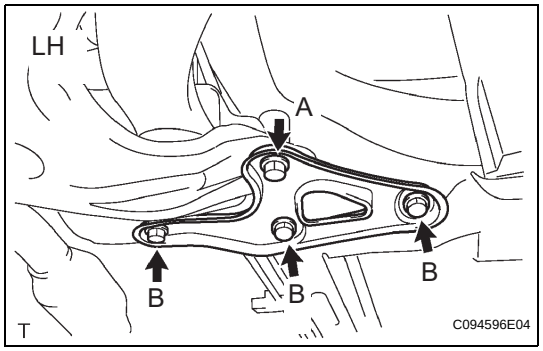
3. INSTALL NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY



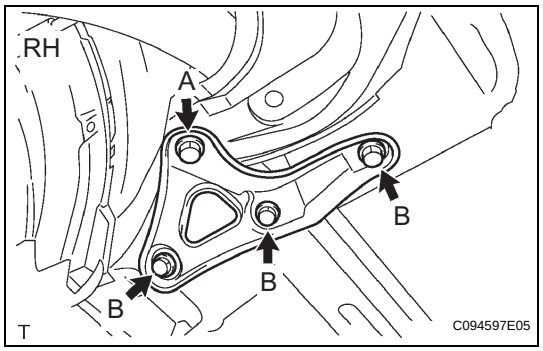
4. INSTALL FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY

(a) Using a transmission jack, support the crossmember with power steering link.

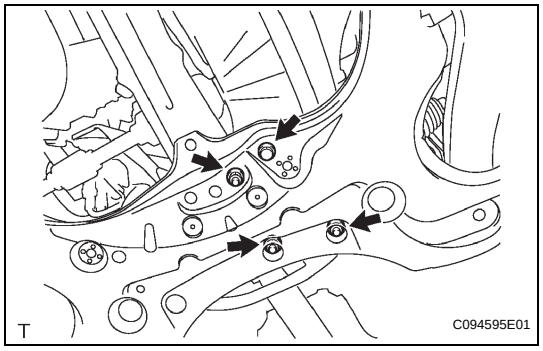
(b) Install the crossmember with the 2 nuts.
Torque: 133 N*m (1,356 kgf*cm, 98 ft.*lbf)



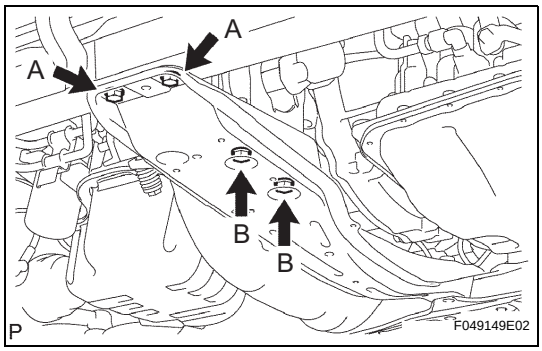
(c) Install the crossmember bracket LH with the 4 bolts.
Torque: Bolt A
133 N*m (1,356 kgf*cm, 98 ft.*lbf)
Bolt B
80 N*m (816 kgf*cm, 59 ft.*lbf)



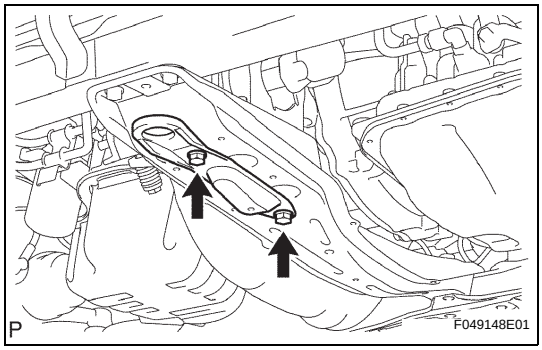
(d) Install the crossmember bracket RH with the 4 bolts.
Torque: Bolt A
133 N*m (1,356 kgf*cm, 98 ft.*lbf)
Bolt B
80 N*m (816 kgf*cm, 59 ft.*lbf)



(e) Install the engine mounting insulator rear to the crossmember with the bolt and the 3 nuts.
Torque: 65 N*m (663 kgf*cm, 48 ft.*lbf)



(f) Install the center member with the 4 bolts.
Torque: Bolt A
45 N*m (459 kgf*cm, 33 ft.*lbf)
Bolt B
72 N*m (734 kgf*cm, 53 ft.*lbf)



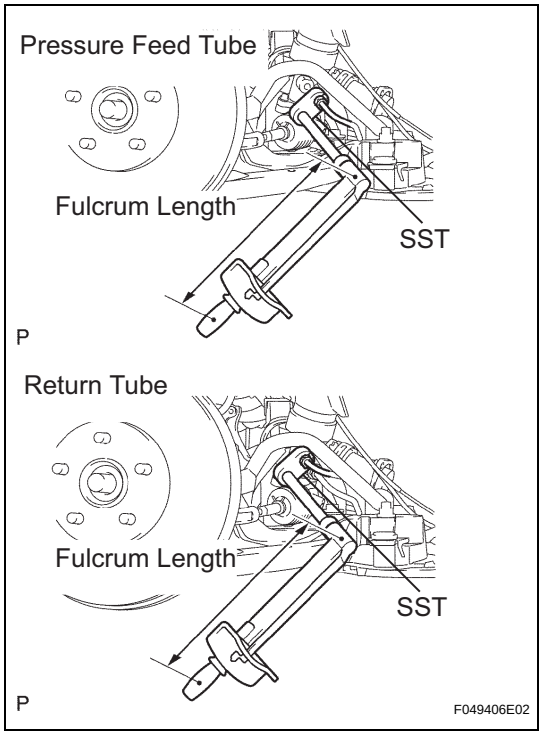
5. INSTALL NO. 1 HOOK
(a) Install the hook with the 2 bolts.
Torque: 39 N*m (398 kgf*cm, 29 ft.*lbf)

6. CONNECT FRONT NO. 1 SUSPENSION ARM SUB-ASSEMBLY LH LOWER (See page SP-23)

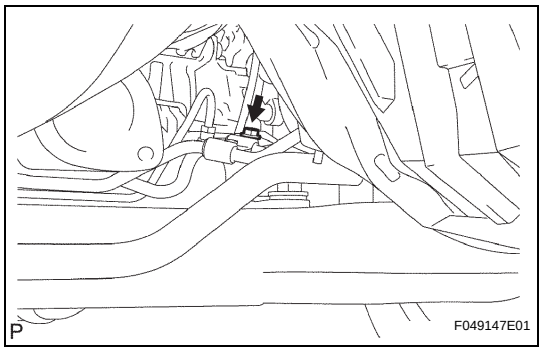
7. CONNECT FRONT NO. 1 SUSPENSION ARM SUB-ASSEMBLY RH LOWER
HINT:
Perform the same procedure as for the LH.

8. CONNECT FRONT STABILIZER LINK ASSEMBLY LH (See page SP-19)

9. CONNECT FRONT STABILIZER LINK ASSEMBLY RH
HINT:
Perform the same procedure as for the LH.

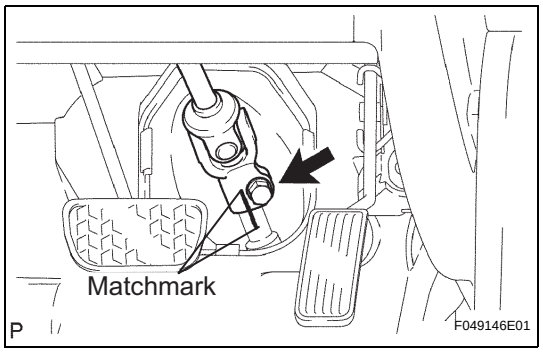


10. CONNECT PRESSURE FEED TUBE ASSEMBLY
(a) Using SST, connect the pressure feed tube assembly.
SST 09023-12701
Torque: 41 N*m (414 kgf*cm, 30 ft.*lbf)
HINT:
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective when SST is parallel to the torque wrench.



(b) Install the tube clamp with the bolt to the power steering link assembly.
Torque: 7.8 N*m (80 kgf*cm, 69 in.*lbf)

11. **CONNECT TIE ROD END SUB-ASSEMBLY LH (See page DS-17)**
12. **CONNECT TIE ROD END SUB-ASSEMBLY RH**
HINT:
Perform the same procedure as for the LH.
13. **INSTALL EXHAUST PIPE ASSEMBLY CENTER (See page EX-4)**
14. **INSTALL FRONT FLOOR PANEL BRACE (See page EX-5)**
15. **INSTALL FRONT WHEELS**
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
16. **CONNECT NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY**



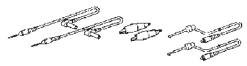
17. **CONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY**
(a) Align the matchmarks on the intermediate shaft assembly and the intermediate shaft.
(b) Install the bolt.
Torque: 35 N*m (357 kgf*cm, 26 ft.*lbf)
18. **INSTALL COLUMN HOLE COVER SILENCER SHEET (See page SR-15)**
19. **INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY (See page EM-42)**
20. **ADD POWER STEERING FLUID**
21. **BLEED POWER STEERING FLUID (See page PS-3)**
22. **CHECK POWER STEERING FLUID LEVEL IN RESERVOIR (See page PS-4)**
23. **CHECK FOR FLUID LEAKS**
24. **INSTALL HOOD SUB-ASSEMBLY (See page EM-81)**
25. **ADJUST HOOD SUB-ASSEMBLY (See page ED-1)**
26. **INSPECT AND ADJUST FRONT WHEEL ALIGNMENT**
(a) Inspect and adjust front wheel alignment (see page SP-2).
27. **INSTALL ENGINE UNDER COVER LH**
28. **INSTALL ENGINE UNDER COVER RH**

2AZ-FE ENGINE CONTROL SYSTEM

SST

	09817-33190	Sensor Socket Wrench	Engine coolant temperature sensor

RECOMMENDED TOOLS

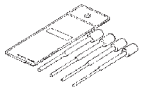
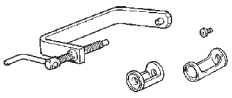
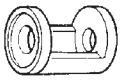
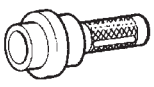
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

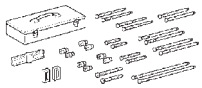
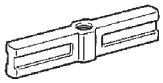
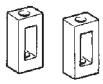
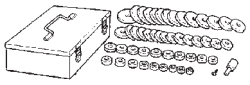
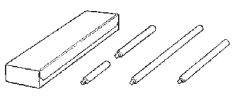
EQUIPMENT

Ohmmeter	-
Service wire	-
Torque wrench	-

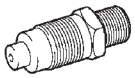
2AZ-FE ENGINE MECHANICAL

SST

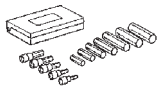
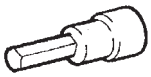
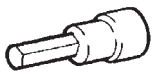
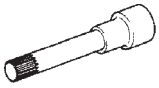
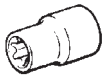
	09032-00100	Oil Pan Seal Cutter	-
	09201-10000	Valve Guide Bushing Remover & Replacer Set	-
	(09201-01050)	Valve Guide Bushing Remover & Replacer 5	-
	09202-70020	Valve Spring Compressor	-
	(09202-00010)	Attachment	-
	09213-54015	Crankshaft Pulley Holding Tool	-
	(91651-60855)	Bolt	-
	09223-15030	Oil Seal & Bearing Replacer	Crankshaft rear oil seat
	09223-22010	Crankshaft Front Oil Seal Replacer	-
	09249-63010	Torque Wrench Adaptor	-
	09309-37010	Transmission Bearing Replacer	Crankshaft front oil seal

	09330-00021	Companion Flange Holding Tool	-
	09843-18030	Tacho-pulse Pickup Wire No.2	-
	09843-18040	Diagnosis Check Wire No.2	-
	09950-50013	Puller C Set	-
	(09951-05010)	Hanger 150	-
	(09952-05010)	Slide Arm	-
	(09953-05020)	Center Bolt 150	-
	(09954-05021)	Claw No.2	-
	09950-60010	Replacer Set	-
	(09951-00200)	Replacer 20	-
	09950-70010	Handle Set	-
	(09951-07100)	Handle 100	-

PP

	09992-00500	Compression Gauge Attachment	-

RECOMMENDED TOOLS

	09011-12301	Socket Wrench 30 mm	-
	09040-00011	Hexagon Wrench Set	-
	(09043-20060)	Socket Hexagon Wrench 6	-
	(09043-20120)	Socket Hexagon Wrench 12	-
	09043-50100	Bi-hexagon Wrench 10 mm	-
	09044-00020	Torx Socket E10	-
	09090-04020	Engine Sling Device	-
	(09857-00031)	Spark Plug Gap Gauge	-

PP

EQUIPMENT

V-block	-
Piston ring compressor	-
Piston ring expander	-
Valve seat cutter	-
Feeler gauge	-
CO/HC meter	-
Connecting rod aligner	-
Cylinder gauge	-
Micrometer	-
Precision straight edge	-
Radiator cap tester	-
Steel square	-
Tachometer	-
Torque wrench	-
Vernier calipers	-
Dial indicator with magnetic base	-
Alignment tester	-
Toe-in gauge	-
Spring tension gauge	-
Slide calipers	-
Sandpaper (#400)	-
Piston heater	-
Wooden block	-
Plastigage	-
Angle gauge	-
Timing light	-

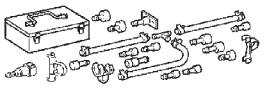
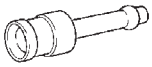
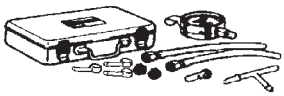
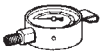
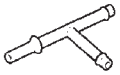
HINT:
Torx is registered trademark of Textron Inc.

SSM

Toyota Genuine Seal Packing Black, Three Bond 1207B or Equivalent
Toyota Genuine Adhesive 1324, Three Bond 1324 or Equivalent
Toyota Genuine Adhesive 1344, Three Bond 1344 or Equivalent

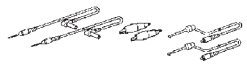
2AZ-FE FUEL

SST

	09268-21010	Fuel Hose Puller	
	09268-31011	Injection Measuring Tool Set	
	(09268-41110)	Adaptor	
	(09268-41300)	Clamp	
	(09268-41500)	Fuel Tube Connector	
	(90467-13001)	Clip	
	(95336-08070)	Hose	
	09268-45014	EFI Fuel Pressure Gauge	
	(09268-41200)	Gauge	
	(09268-41220)	Hose	
	(09268-41250)	T Joint	

	09842-30080	Wire H EFI Inspection	

RECOMMENDED TOOLS

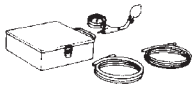
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

EQUIPMENT

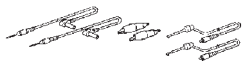
Clip	-
Cutter knife	-
Plastic bag	-
Torque wrench	-
Vernier caliper	-

2AZ-FE EMISSION CONTROL

SST

	09224-00010	O2 Sensor Wrench	-
	09992-00242	Turbocharger Pressure Gauge	-

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

EQUIPMENT

Intelligent tester	**-**
Torque wrench	**-**
Vacuum gauge	**-**
Hose clipper	-
Pressure gauge	-

SSM

	08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	-

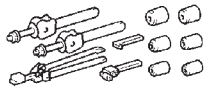
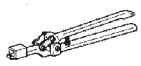
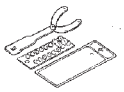
2AZ-FE EXHAUST

EQUIPMENT

Torque wrench	
Vernier caliper	

2AZ-FE COOLING

SST

	09230-01010	Radiator Service Tool Set	-
	(09231-01010)	Overhaul Handle	-
	(09231-01020)	Punch Assembly	-
	(09231-01030)	Claw	-
	09960-10010	Variable Pin Wrench Set	-
	(09962-01000)	Variable Pin Wrench Arm Assembly	-
	(09963-00700)	Pin 7	-

EQUIPMENT

Ohmmeter	-
Radiator cap tester	-
Thermometer	-
Torque wrench	-
Slide calipers	-
Heater	-

COOLANT

Item	Capacity	Classification
Engine coolant	M/T: 6.8 liters (7.2 US pts, 6.0 Imp. qts) A/T: 6.7 liters (7.1 US pts, 5.9 Imp. qts)	Use only "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology (coolant with long-life hybrid organic acid technology consists of a combination of low phosphates and organic acids)

SSM

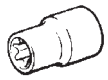
	08826-00080	Seal Packing Black or equivalent (FIPG)	-

2AZ-FE LUBRICATION

SST

	09228-06501	Oil Filter Wrench	-

RECOMMENDED TOOLS

	09044-00020	Torx Socket E10	-

EQUIPMENT

Feeler gauge	-
Precision straight edge	-
Torque wrench	-
Vernier calipers	-
Wooden block	-

LUBRICANT

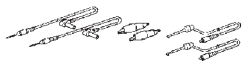
Item		Capacity	Classification
Oil grade		-	ILSAC multigrade engine oil
Drain and refill	w/ oil filter replacement	3.8 liters (4.0 US qts, 3.3 lmp. qts)	-
	w/o oil filter replacement	3.6 liters (3.8 US qts, 3.2 lmp. qts)	-
Dry fill		4.5 liters (4.8 US qts, 4.0 lmp. qts)	-

SSM

	08826-00080	Seal Packing Black or equivalent (FIPG)	-

2AZ-FE IGNITION

RECOMMENDED TOOLS

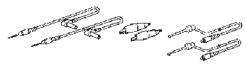
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

EQUIPMENT

Ohmmeter	-
Torque wrench	-
Voltmeter	-

2AZ-FE STARTING

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-
	09904-00010	Expander Set	-
	(09904-00050)	No. 4 Claw	-

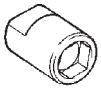
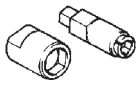
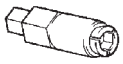
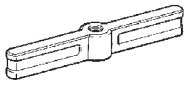
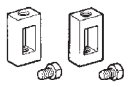
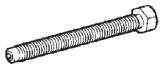
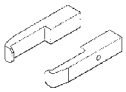
PP

EQUIPMENT

Ammeter	-
Ohmmeter	-
Service wire	-
Torque wrench	-
Vernier calipers	-

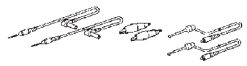
2AZ-FE CHARGING

SST

	09820-06021	Alternator Pulley Set Nut Wrench	-
	09820-63011	Alternator Pulley Set Nut Wrench Set	-
	(09820-06010)	Alternator Rotor Shaft Wrench	-
	09950-40011	Puller B Set	-
	(09951-04020)	Hanger 200	-
	(09952-04010)	Slide Arm	-
	(09953-04020)	Center Bolt 150	-
	(09954-04010)	Arm 25	-
	(09955-04071)	Claw No.7	-
	(09957-04010)	Attachment	-

PP

RECOMMENDED TOOLS

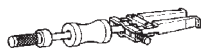
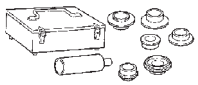
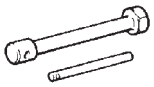
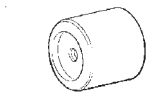
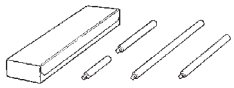
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

EQUIPMENT

Ammeter	-
Ohmmeter	-
Service wire	-
Torque wrench	-
Vernier calipers	-

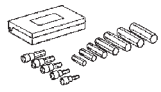
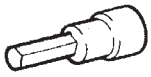
U241E AUTOMATIC TRANSAXLE

SST

	09308-00010	Oil Seal Puller	-
	09316-60011	Transmission & Transfer Bearing Replacer	-
	(09316-00011)	Replacer Pipe	-
	09350-32014	TOYOTA Automatic Transmission Tool Set	-
	(09351-32010)	One-way Clutch Test Tool	-
	(09351-32020)	Stator Stopper	-
	09649-17010	Steering Knuckle Tool	-
	09950-70010	Handle Set	-
	(09951-07150)	Handle 150	-
	(09951-07200)	Handle 200	-

PP

RECOMMENDED TOOLS

	09040-00011	Hexagon Wrench Set	-
	(09043-20100)	Socket Hexagon Wrench 10	-
	09090-04020	Engine Sling Device	-

EQUIPMENT

Chain block	
Dial indicator with magnetic base	
Slide calipers	
Straight edge	
Torque wrench	
Vernier calipers	

LUBRICANT

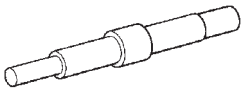
Automatic transaxle fluid: Dry fill	8.1 litter (8.6 US qts, 7.1 lmp.qts)	Toyota Genuine ATF WS
Automatic transaxle fluid: Drain and refill	3.5 litter (3.7 US qts, 3.1 lmp.qts)	Toyota Genuine ATF WS

SSM

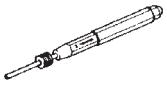
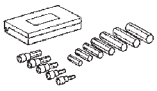
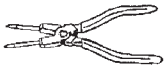
Toyota Genuine Adhesive 1344, Three Bond 1344 or equivalent	

CLUTCH

SST

	09023-00101	Union Nut Wrench 10 mm	-
	09301-00220	Clutch Guide Tool	-
	09333-00013	Universal Joint Bearing Remover & Replacer	-

RECOMMENDED TOOLS

	09031-00030	Pin Punch	-
	09040-00011	Hexagon Wrench Set	-
	09905-00013	Snap Ring Pliers	-

EQUIPMENT

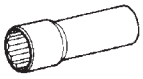
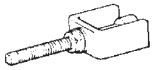
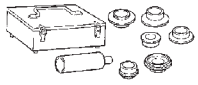
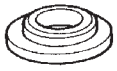
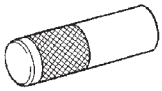
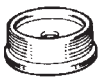
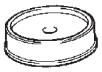
Torque wrench	
Vernier calipers	
Dial indicator with magnetic base	

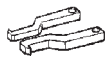
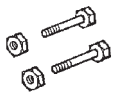
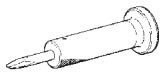
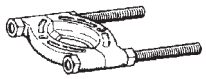
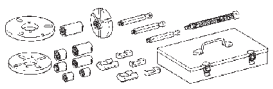
LUBRICANT

Item	Capacity	Classification
Brake fluid	-	SAE J1704 or FMVSS No. 116 DOT 4

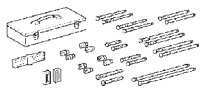
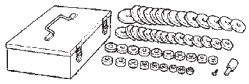
E350 MANUAL TRANSAXLE

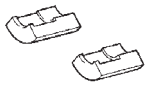
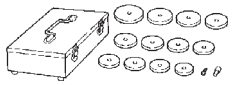
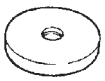
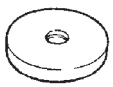
SST

	09229-55010	Oil Cooler Relief Valve Wrench	-
	09308-00010	Oil Seal Puller	-
	09309-12020	5th Driven Gear Replacer	-
	09316-20011	Transfer Bearing Replacer	-
	09316-60011	Transmission & Transfer Bearing Replacer	-
	(09316-00031)	Replacer B	-
	09506-30012	Differential Drive Pinion Rear Bearing Cone Replacer	-
	09608-00071	Drive Pinion Rear Bearing Cone Replacer	-
	09608-06041	Front Hub Inner Bearing Cone Replacer	-
	09608-10010	Steering Knuckle Oil Seal Replacer	-
	09608-32010	Steering Knuckle Oil Seal Replacer	-

	09612-65014	Steering Worm Bearing Puller	-
	(09612-01040)	Claw D	-
	(09612-01050)	Hanger Pin with Nut	-
	09631-12090	Seal Ring Tool	-
	09930-00010	Drive Shaft Nut Chisel	-
	09950-00020	Bearing Remover	-
	09950-00030	Bearing Remover Attachment	-
	09950-30012	Puller A Set	-
	(09951-03010)	Upper Plate	-
	(09953-03010)	Center Bolt	-
	(09954-03010)	Arm	-
	(09957-04010)	Attachment	-

PP

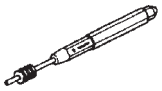
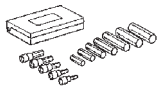
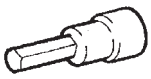
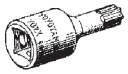
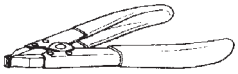
	09950-40011	Puller B Set	-
	(09957-04010)	Attachment	-
	09950-50013	Puller C Set	-
	(09957-04010)	Attachment	-
	09950-60010	Replacer Set	-
	(09951-00180)	Replacer 18	-
	(09951-00280)	Replacer 28	-
	(09951-00320)	Replacer 32	-
	(09951-00420)	Replacer 42	-
	(09951-00430)	Replacer 43	-
	(09951-00490)	Replacer 49	-
	(09951-00560)	Replacer 56	-

	(09951-00570)	Replacer 57	-
	(09951-00600)	Replacer 60	-
	(09951-00680)	Replacer 68	-
	(09955-03011)	Claw No.1	-
	09950-60020	Replacer Set No.2	-
	(09951-00680)	Replacer 68	-
	(09951-00730)	Replacer 73	-
	(09951-00790)	Replacer 79	-
	(09951-00890)	Replacer 89	-
	(09951-00910)	Replacer 91	-
	09950-70010	Handle Set	-
	(09951-07100)	Handle 100	-

PP

	(09951-07150)	Handle 150	-
	(09951-07200)	Handle 200	-

RECOMMENDED TOOLS

	09011-12301	Socket Wrench 30 mm	-
	09031-00040	Pin Punch .	-
	09040-00011	Hexagon Wrench Set	-
	(09043-20060)	Socket Hexagon Wrench 6	-
	09042-00050	Torx Socket T45	-
	09905-00012	Snap Ring No.1 Expander	-

PP

EQUIPMENT

Dial indicator with magnetic base	
Torque wrench	
Slide calipers	
V-block	
Micrometer	
Dial indicator	
Cylinder gauge	
Feeler gauge	
Precision straight edge	

LUBRICANT

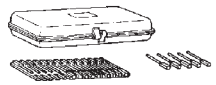
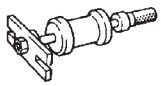
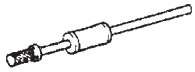
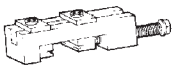
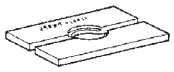
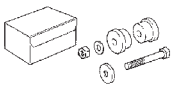
Item	Capacity	Classification
Manual transaxle oil (w/ Differential oil)	2.5 liters (2.6 US qts, 2.2 lmp. qts)	API GL-4 or GL-5 SAE 75W-90

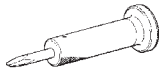
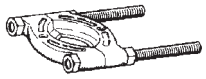
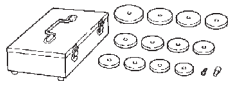
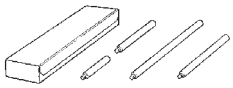
SSM

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

DRIVE SHAFT

SST

	09240-00020	Wire Gauge Set	-
	09520-01010	Drive Shaft Remover Attachment	-
	09520-24010	Differential Side Gear Shaft Puller	-
	(09520-32040)	Shocker Set	-
	09521-24010	Rear Axle Shaft Puller	-
	09527-10011	Rear Axle Shaft Bearing Remover	-
	09608-16042	Front Hub Bearing Adjusting Tool	-
	(09608-02021)	Bolt & Nut	-
	(09608-02041)	Retainer	-
	09628-00011	Ball Joint Puller	-
	09710-04081	Base	-

	09726-40010	Lower Control Shaft Bearing Replacer	-
	09930-00010	Drive Shaft Nut Chisel	-
	09950-00020	Bearing Remover	-
	09950-60020	Replacer Set No.2	-
	(09951-00710)	Replacer 71	-
	09950-70010	Handle Set	-
	(09951-07100)	Handle 100	-

PP

EQUIPMENT

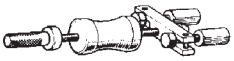
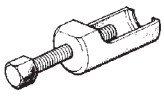
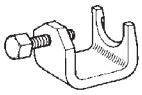
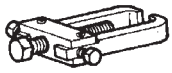
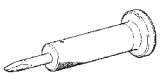
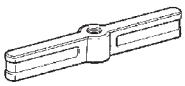
Torque wrench	-

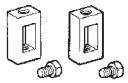
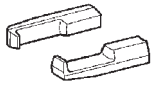
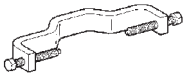
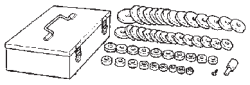
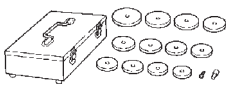
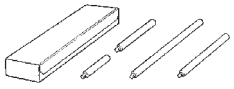
LUBRICANT

Item	Capacity
Front drive shaft outboard joint grease	190 to 200 g (6.7 to 7.1 oz.)
Front drive shaft inboard joint grease	175 to 185 g (6.2 to 6.5 oz.)

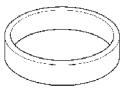
AXLE

SST

	09223-15020	Oil Seal & Bearing Replacer	-
	09520-00031	Rear Axle Shaft Puller	-
	09608-32010	Steering Knuckle Oil Seal Replacer	-
	09610-20012	Pitman Arm Puller	-
	09628-00011	Ball Joint Puller	-
	09628-10011	Ball Joint Puller	-
	09628-62011	Boll Joint Puller	-
	09718-00010	Shoe Hold Down Spring Driver	-
	09930-00010	Drive Shaft Nut Chisel	-
	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	-
	(09958-04010)	Holder (J)	-
	09950-60010	Replacer Set	-
	(09951-00370)	Replacer 37	-
	(09951-00600)	Replacer 60	-
	09950-60020	Replacer Set No.2	-
	(09951-00720)	Replacer 72	-
	09950-70010	Handle Set	-

PP

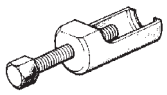
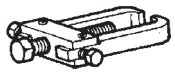
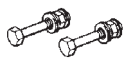
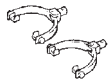
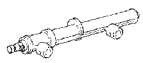
	(09387-02010)	Oil Seal Replacer	-
	(09951-07100)	Handle 100	-

EQUIPMENT

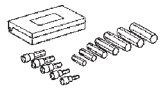
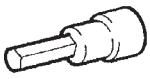
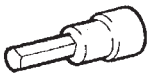
Torque wrench	-

SUSPENSION

SST

	09610-20012	Pitman Arm Puller	-
	09628-62011	Boll Joint Puller	-
	09727-30021	Coil Spring Compressor	-
	(09727-00010)	Bolt Set	-
	(09727-00021)	Arm Set	-
	(09727-00031)	Compressor	-

RECOMMENDED TOOLS

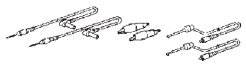
	09040-00011	Hexagon Wrench Set	-
	(09043-20050)	Socket Hexagon Wrench 5	-
	(09043-20060)	Socket Hexagon Wrench 6	-

EQUIPMENT

Alignment tester	
Angle gauge	
Camber-caster-kingpin gauge	
Chein block	
Dial indicator with magnetic base	
Drill	
Engine sling device	
Hexagon wrench set	
Socket wrench 30 mm	
Tire pressure gauge	
Toe-in gauge	
Torque wrench	
Wheel balancer	

TIRE AND WHEEL

RECOMMENDED TOOLS

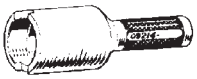
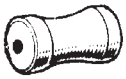
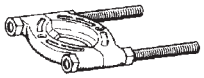
	09082-00040	TOYOTA Electrical Tester	
	(09083-00150)	Test Lead Set	

EQUIPMENT

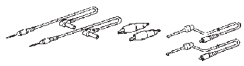
Dial indicator with magnetic base	
Tire pressure gauge	
Wheel balancer	
Torque wrench	

BRAKE CONTROL

SST

	09023-00101	Union Nut Wrench 10 mm	-
	09214-76011	Crankshaft Pulley Replacer	-
	09520-00031	Rear Axle Shaft Puller	-
	(09520-00040)	Shocker	-
	09521-00020	Drive Shaft Boot Clamping Tool	-
	09950-00020	Bearing Remover	-

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

EQUIPMENT

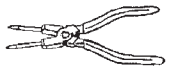
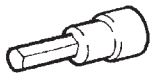
Torque wrench	-

BRAKE

SST

	09023-00101	Union Nut Wrench 10 mm	-
	09737-00013	Brake Booster Push Rod Gauge	-
	09737-00020	Brake Booster Push Rod Wrench	-

RECOMMENDED TOOLS

	09905-00013	Snap Ring Pliers	-
	(09043-20080)	Socket Hexagon Wrench 8	-

EQUIPMENT

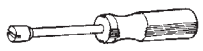
Dial indicator with magnetic base	-
Micrometer	-
Torque wrench	-

LUBRICANT

Item	Capacity	Classification
Brake fluid	-	SAE J1703 or FMVSS No. 116 DOT3

PARKING BRAKE

SST

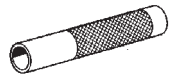
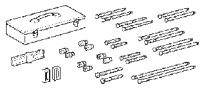
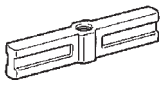
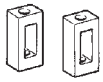
	09718-00010	Shoe Hold Down Spring Driver	-

EQUIPMENT

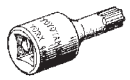
Slide calipers	-
Torque wrench	-

STEERING COLUMN

SST

	09612-22011	Tilt Handle Bearing Replacer	
	09950-50013	Puller C Set	
	(09951-05010)	Hanger 150	
	(09952-05010)	Slide Arm	
	(09953-05020)	Center Bolt 150	
	(09954-05021)	Claw No.2	

RECOMMENDED TOOLS

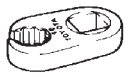
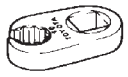
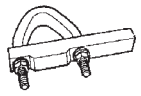
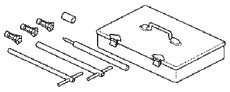
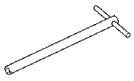
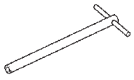
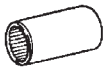
	09042-00010	Torx Socket T30	
	09904-00010	Expander Set	
	(09904-00020)	No. 1 Claw	

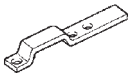
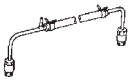
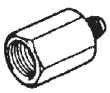
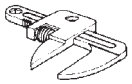
EQUIPMENT

Torque wrench	

POWER STEERING

SST

	09023-12701	Union Nut Wrench 17mm	
	09023-38201	Union Nut Wrench 12mm	
	09249-63010	Torque Wrench Adaptor	
	09612-00012	Rack & Pinion Steering Rack Housing Stand	
	09612-70100	Power Steering Oil Seal Remover Set	
	(09612-07110)	Collet No.1	
	(09612-07210)	Collet Setting Pipe No.1	
	(09612-07220)	Collet Setting Pipe No.2	
	(09612-07230)	Shaft	
	(09612-07240)	Collar	
	09616-00011	Steering Worm Bearing Adjusting Socket	

	09630-00014	Power Steering Gear Housing Overhaul Tool Set	
	(09631-00132)	Vane Pump Bracket	
	09631-00200	Rack Seal GuIde NO.2	
	09631-12071	Steering Rack Oil Seal Test Tool	
	(09633-00010)	Packing	
	09631-20102	Steering Rack Cover H	
	09631-20120	Cylinder End Stopper Nut Wrench	
	09640-10010	Power Steering Pressure Gauge Set	
	(09641-01010)	Gauge Assembly	
	(09641-01030)	Attachment B	
	(09641-01060)	Attachment E	
	09922-10010	Variable Open Wrench	

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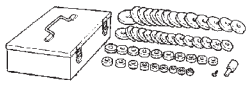
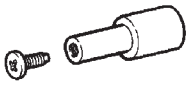
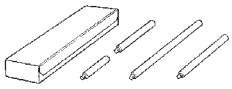
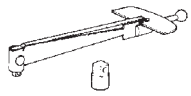
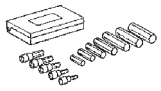
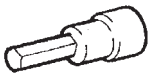
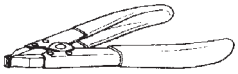
	09950-60010	Replacer Set	
	(09951-00180)	Replacer 18	
	(09951-00240)	Replacer 24	
	(09951-00280)	Replacer 28	
	(09951-00300)	Replacer 30	
	(09951-00320)	Replacer 32	
	(09952-06010)	Adapter	
	09950-70010	Handle Set	
	(09951-07100)	Handle 100	
	(09951-07150)	Handle 150	
	(09951-07360)	Handle 360	

RECOMMENDED TOOLS

	09025-00010	Torque Wrench (30 kgf-cm)	
	09040-00011	Hexagon Wrench Set	
	(09043-20060)	Socket Hexagon Wrench 6	
	(09043-30240)	Straight Hexagon Wrench 24	
	09090-04020	Engine Sling Device	
	09905-00012	Snap Ring No.1 Expander	

EQUIPMENT

Caliper gauge	
Belt tension gauge	
Vernier calipers	
Dial indicator	
Feeler gauge	
Micrometer	
Torque wrench	
Dial indicator with magnetic base	
Tire pressure gauge	
Alignment tester	
Toe-in gauge	
V-block	
Chain block	
Angle gauge	

LUBRICANT

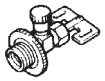
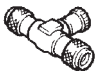
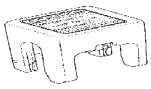
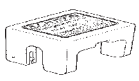
Item	Capacity	Classification
Power steering fluid (Total)	0.9 liters (1.0 US qts, 0.8 lmp.qts)	ATF "DEXRON" II or III

SSM

	08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	

AIR CONDITIONING

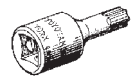
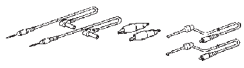
SST

	07110-58060	Air Conditioner Service Tool Set	-
	(07117-58060)	Refrigerant Drain Service Valve	-
	(07117-58070)	T-Joint	-
	(07117-58080)	Quick Disconnect Adapter	-
	(07117-58090)	Quick Disconnect Adapter	-
	(07117-78050)	Refrigerant Charging Gauge	-
	(07117-88060)	Refrigerant Charging Hose	-
	(07117-88070)	Refrigerant Charging Hose	-
	(07117-88080)	Refrigerant Charging Hose	-
	09870-00015	A/C Quick Joint Puller No.1	-
	09870-00025	A/C Quick Joint Puller No.2	-

PP

	95047-10400	Magnet Clutch Stopper (DENSO part No.)	-

RECOMMENDED TOOLS

	09042-00010	Torx Socket T30	-
	09070-20010	Moulding Remover	-
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-
	09904-00010	Expander Set	-
	(09904-00050)	No. 4 Claw	-
	95416-00140	Gas Leak Detector (Halogen Leak Detector) (DENSO Part No.)	-

HINT:
"Torx" is a registered trademark of Textron Inc.

PP

EQUIPMENT

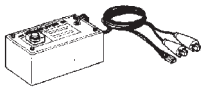
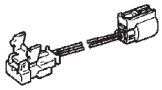
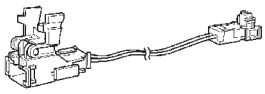
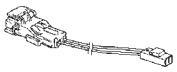
Dial indicator with magnetic base	
Hexagon wrench 4 mm	
Radiator cap tester	
Torque wrench	
Vinyl tape	

LUBRICANT

Item	Capacity	Classification
Compressor oil	-	ND-OIL 8 or equivalent

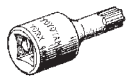
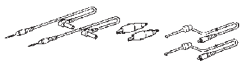
SUPPLEMENTAL RESTRAINT SYSTEM

SST

	09082-00700	SRS Airbag Deployment Tool	
	09082-00750	Airbag Deployment Wire Sub-harness No. 3	
	09082-00770	Airbag Deployment Wire Sub-harness No. 5	
	09082-00780	Airbag Deployment Wire Sub-harness No. 6	
	09082-00802	Airbag Deployment Wire Sub-Harness No. 8	
	(09082-10801)	Wire A	
	(09082-20801)	Wire B	
	(09082-30801)	Wire C	
	09843-18040	Diagnosis Check Wire No. 2	

PP

RECOMMENDED TOOLS

	09042-00010	Torx Socket T30	-
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

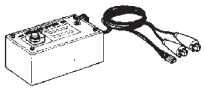
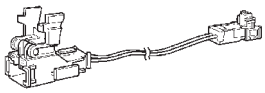
HINT:
Torx is a registered trademark of Textron Inc.

EQUIPMENT

Torque wrench	Airbag disposal
Feeler gauge	
Bolt Length: 35.0 mm (1.378 in.) Diameter: 6.0 mm (0.236 in.) Pitch: 1.0 mm (0.039 in.)	Airbag disposal
Tire Width: 185 mm (7.28 in.) Inner diameter: 360 mm (14.17 in.)	Airbag disposal
Tire with disc wheel Width: 185 mm (7.28 in.) Inner diameter: 360 mm (14.17 in.)	Airbag disposal
Plastic bag	Airbag disposal

SEAT BELT

SST

	09082-00700	SRS Airbag Deployment Tool	
	09082-00770	Airbag Deployment Wire Sub-harness No.5	

EQUIPMENT

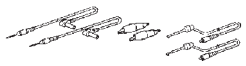
Torque wrench	

ENGINE IMMOBILISER

SST

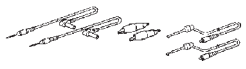
	09843-18040	Diagnosis Check Wire No. 2	

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

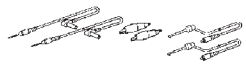
CRUISE CONTROL

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

LIGHTING

RECOMMENDED TOOLS

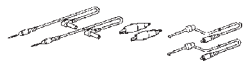
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

WIPER AND WASHER

SST

	09843-18040	Diagnosis Check Wire No.2	-

RECOMMENDED TOOLS

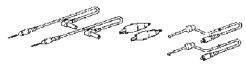
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

EQUIPMENT

Voltmeter	
Ohmmeter	
Vinyl tape	
Wire brush	
Torque wrench	

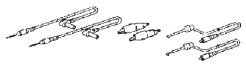
DOOR LOCK

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

METER

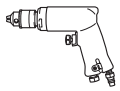
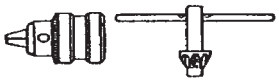
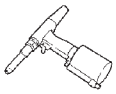
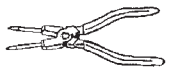
RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

AUDIO / VISUAL

RECOMMENDED TOOLS

PP

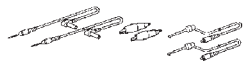
	09050-00032	Air Drill	
	(09050-00210)	Chuck Set	
	(09050-00220)	Handle	
	09050-20010	Air Riveter	
	(09050-02010)	Dust Cap	
	(09050-02020)	Nose Piece No.1	
	09060-60350	Revet Cutter	
	09082-00040	TOYOTA Electrical Tester	
	09904-00010	Expander Set	
	(09904-00060)	No. 5 Claw	
	09905-00013	Snap Ring Pliers	

EQUIPMENT

Torque wrench	
Tape	To avoid surface damage

HORN

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

EQUIPMENT

Torque wrench	

WINDSHIELD / WINDOWGLASS

RECOMMENDED TOOLS

	09070-20010	Moulding Remover	

EQUIPMENT

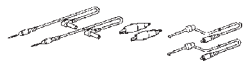
Knife	
Piano wire	
Plastic sheet	
Sealer gun	
Torque wrench	
Tape	
Wooden block or similar object	

SSM

	08833-00030	Three cement black or equivalent	
	08850-00801	Windshield Glass Adhesive Set or equivalent	

MIRROR

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester	
	(09083-00150)	Test Lead Set	

EQUIPMENT

Tape	To avoid surface damage
Torque wrench	

INSTRUMENT PANEL

RECOMMENDED TOOLS

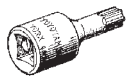
	09070-20010	Moulding Remover	-

EQUIPMENT

Torque wrench	
Tape	To avoid surface damage

SEAT

RECOMMENDED TOOLS

	09042-00010	Torx Socket T30	-

EQUIPMENT

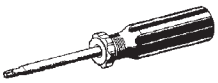
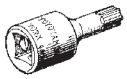
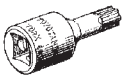
Clip remover	
Hog ring pliers	
Hog ring	
Protective Tape	to avoid surface damage
Torque wrench	

ENGINE HOOD / DOOR

SST

	09812-00010	Door Hinge Set Bolt Wrench	
	09812-00020	Door Hinge Set Bolt Wrench	

RECOMMENDED TOOLS

	09041-00020	Torx Driver T25	
	09042-00010	Torx Socket T30	
	09042-00020	Torx Socket T40	

EQUIPMENT

Clip remover	
Tape	To avoid surface damage
Torque wrench	

LUBRICANT

Item	Capacity	Classification
MP grease	-	-

SSM

	08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	

EXTERIOR

RECOMMENDED TOOLS

	09070-20010	Moulding Remover	-

EQUIPMENT

Clip remover	
Double-sided tape	
Heat light	
Protective Tape	to avoid surface damage
Piano wire	
Torque wrench	
Wooden block or similar object	For tying both piano wire ends

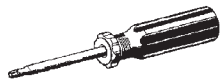
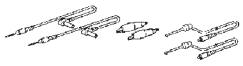
INTERIOR

EQUIPMENT

Clip remover	
Double-sided tape	
Protective Tape	to avoid surface damage

SLIDING ROOF

RECOMMENDED TOOLS

	09041-00020	Torx Driver T25	-
	09082-00040	TOYOTA Electrical Tester	-
	(09083-00150)	Test Lead Set	-

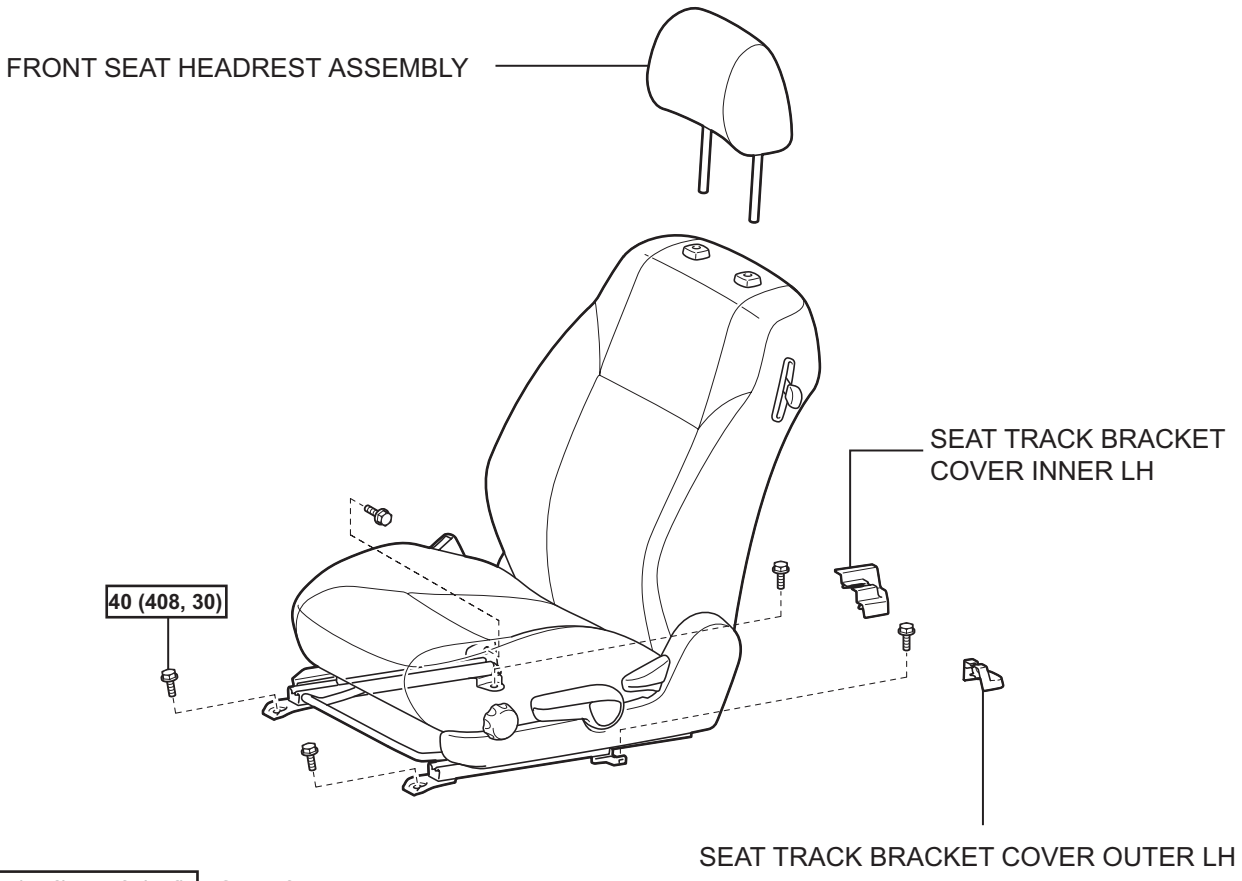
HINT:
Torx is a registered trademark of Textron Inc.

EQUIPMENT

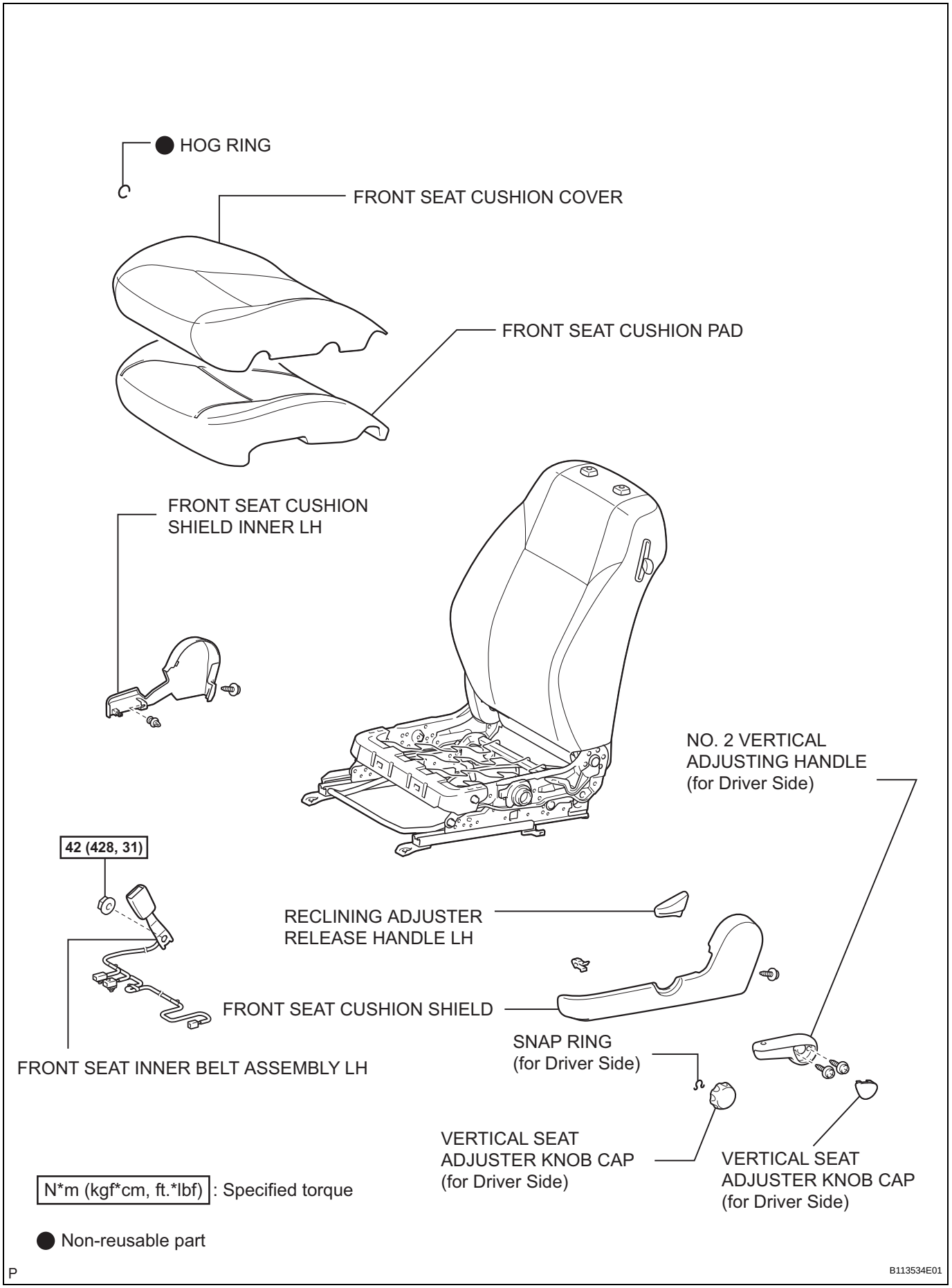
Torque wrench	

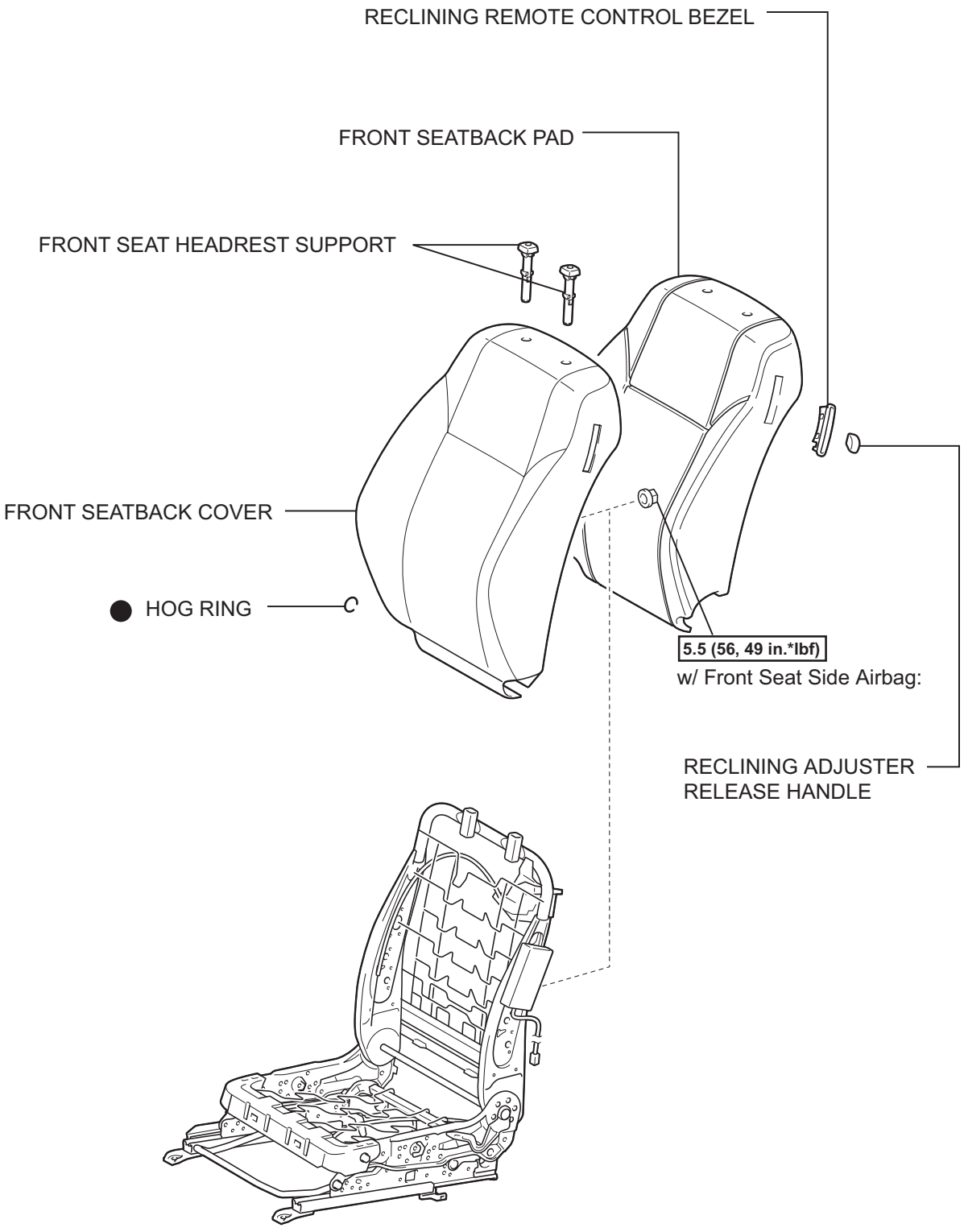
FRONT SEAT ASSEMBLY

COMPONENTS



SE


HOG RING
FRONT SEAT CUSHION COVER
FRONT SEAT CUSHION PAD
FRONT SEAT CUSHION SHIELD INNER LH
NO. 2 VERTICAL ADJUSTING HANDLE (for Driver Side)
42 (428, 31)
RECLINING ADJUSTER RELEASE HANDLE LH
FRONT SEAT CUSHION SHIELD
SNAP RING (for Driver Side)
FRONT SEAT INNER BELT ASSEMBLY LH
VERTICAL SEAT ADJUSTER KNOB CAP (for Driver Side)
VERTICAL SEAT ADJUSTER KNOB CAP (for Driver Side)
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
P
B113534E01



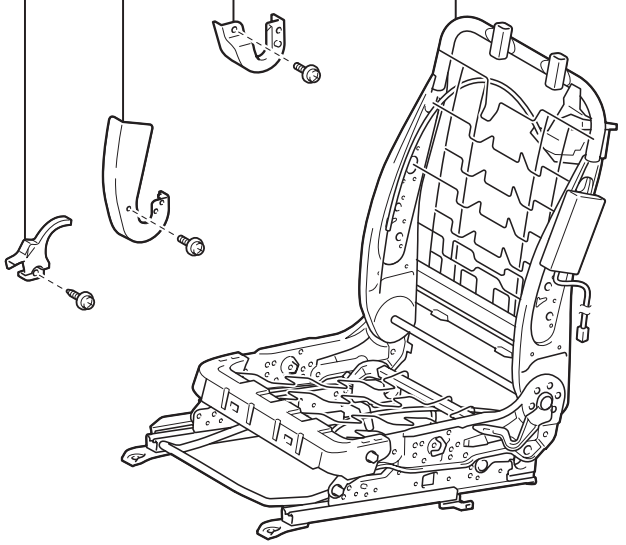
SE

N*m (kgf*cm, ft.*lbf) : Specified torque

● Non-reusable part

P

B113535E01



SE

N*m (kgf*cm, ft.*lbf) : Specified torque

P

B113536E02

REMOVAL

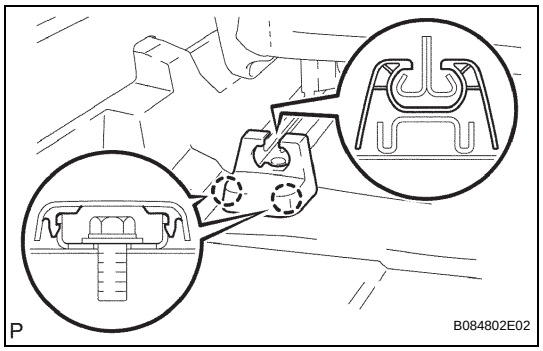
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

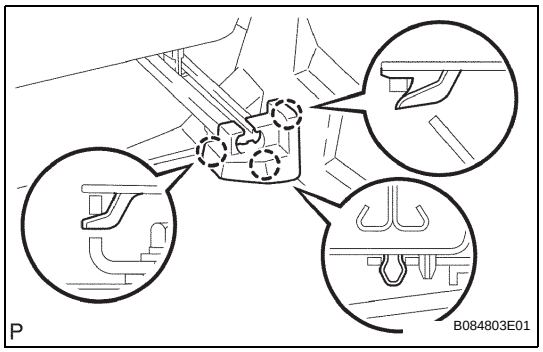


2. REMOVE SEAT TRACK BRACKET COVER OUTER LH

(a) Using a screwdriver, detach the 2 claws and remove the bracket cover.

HINT:

Tape the screwdriver tip before use.



3. REMOVE SEAT TRACK BRACKET COVER INNER LH

(a) Using a screwdriver, detach the 3 claws and remove the cover.

HINT:

Tape the screwdriver tip before use.

4. REMOVE FRONT SEAT HEADREST ASSEMBLY

5. REMOVE FRONT SEAT ASSEMBLY

(a) Lift up the seat track adjusting handle and move the seat to the rearmost position.

(b) Remove the 2 bolts on the front side of the seat.

(c) Lift up the seat track adjusting handle and move the seat to the foremost position.

(d) Remove the 3 bolts on the rear side of the seat.

(e) Lift up the seat track adjusting handle and move the seat to the center position. Also, operate the reclining adjuster release handle and move the seatback to the upright position.

(f) Disconnect the connectors under the seat. Then remove the front seat.

NOTICE:

Be careful not to damage the vehicle body.

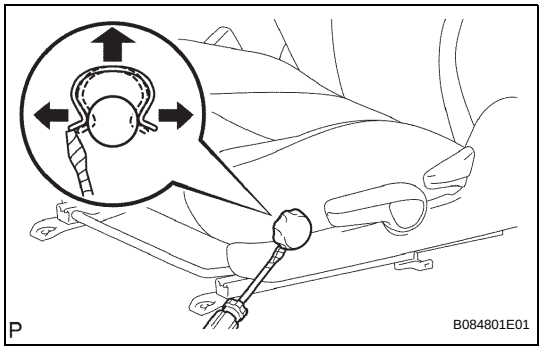
SE

DISASSEMBLY

CAUTION:
Wear protective gloves. Sharp areas on the seat adjuster frame may injure your hands.

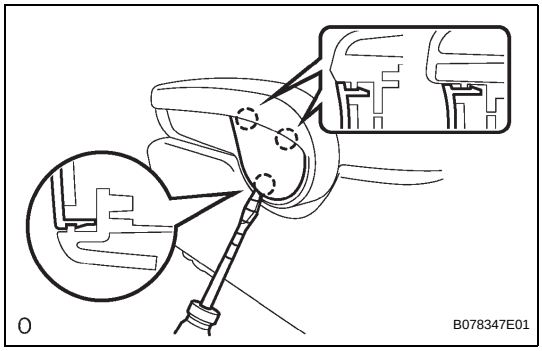
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. REMOVE VERTICAL SEAT ADJUSTER KNOB LH (for Driver Side)

(a) Using a screwdriver, remove the snap ring as shown in the illustration. Then remove the knob.
HINT:
Tape the screwdriver tip before use.

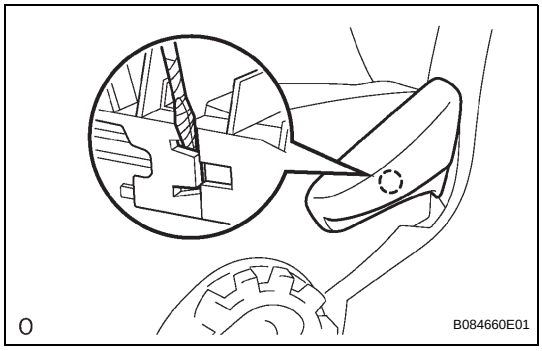


2. REMOVE NO. 2 VERTICAL ADJUSTING HANDLE (for Driver Side)

(a) Using a screwdriver, detach the 3 claws and remove the vertical seat adjuster knob cap.
HINT:
Tape the screwdriver tip before use.

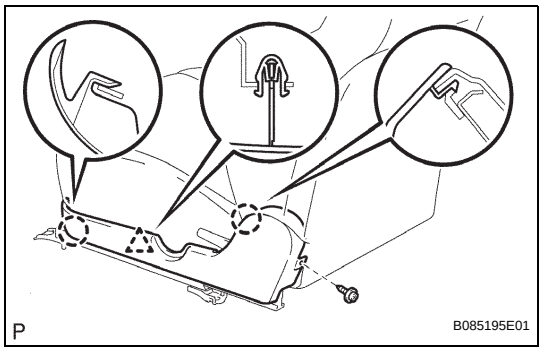
(b) Remove the 2 screws and vertical adjusting handle.

SE



3. REMOVE RECLINING ADJUSTER RELEASE HANDLE LH

(a) Raise the reclining adjuster release handle to reveal the claw. Using a screwdriver, detach the claw and remove the release handle.
HINT:
Tape the screwdriver tip before use.

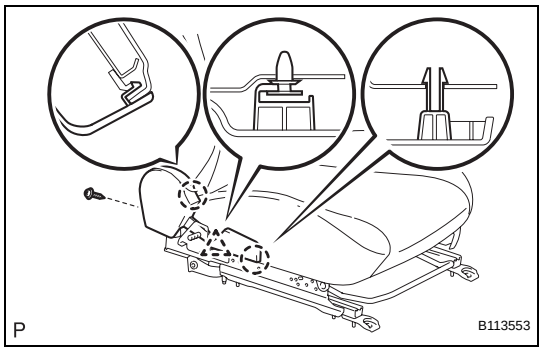


4. REMOVE FRONT SEAT CUSHION SHIELD

(a) Remove the screw.

(b) Using a screwdriver, detach the 2 claws and clip, and remove the cushion shield.
HINT:
Tape the screwdriver tip before use.

5. REMOVE FRONT SEAT INNER BELT ASSEMBLY LH (See page SB-5)



6. REMOVE FRONT SEAT CUSHION SHIELD INNER LH

(a) Remove the screw.

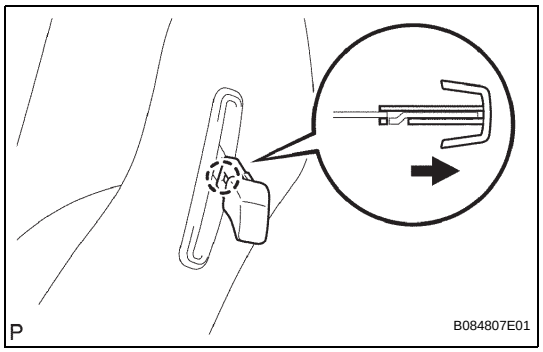
(b) Using a screwdriver, detach the 2 claws and clip. Then remove the cushion shield inner LH.
HINT:
Tape the screwdriver tip before use.

7. REMOVE FRONT SEAT CUSHION COVER

(a) Passenger side:
Disconnect the connector.

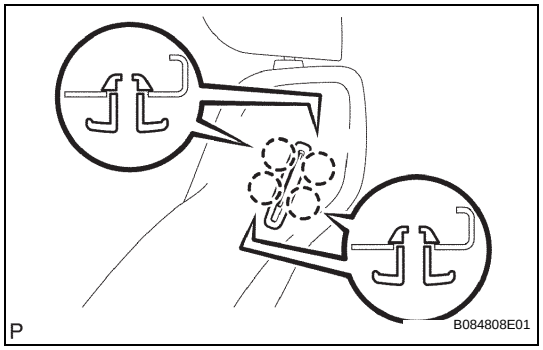
(b) Detach the hook and remove the hog rings and seat cushion cover (with pad) from the seat adjuster.

(c) Remove the hog rings and cushion cover from the seat cushion pad.

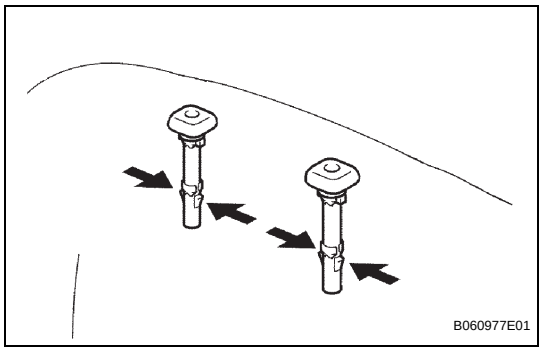


8. REMOVE RECLINING REMOTE CONTROL BEZEL

(a) Using a screwdriver, detach the claw and remove the reclining adjuster release handle.
HINT:
Tape the screwdriver tip before use.



(b) Using a screwdriver, detach the 4 claws and remove the bezel.
HINT:
Tape the screwdriver tip before use.



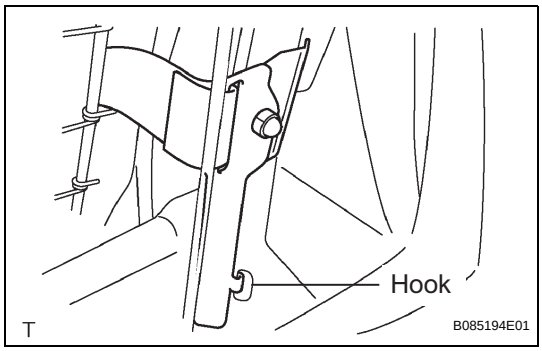
9. REMOVE FRONT SEATBACK COVER

(a) Remove the hog rings and hooks.

(b) Roll up the seatback cover.

(c) Detach the 4 claws and remove the 2 headrest supports.

SE



(d) w/ Front seat side airbag:
Remove the nut and detach the hook. Then remove the 2 seatback cover brackets.
(e) Remove the seatback cover (with pad) from the seat adjuster.
(f) Remove the hog rings and remove the seatback cover from the seatback pad.

10. REMOVE RECLINING ADJUSTER INSIDE COVER LH
(a) Upper side:
Remove the screw and inside cover.
(b) Lower side:
Detach the clamp.
Remove the screw and inside cover.

11. REMOVE RECLINING ADJUSTER INSIDE COVER RH
(a) Upper side:
Remove the screw and inside cover.
(b) Lower side:
Remove the screw and inside cover.

12. REMOVE FRONT SEAT CUSHION SHIELD LOWER LH (for Driver Side)
(a) Using a screwdriver, detach the claws and remove the cushion shield.
HINT:
Tape the screwdriver tip before use.

13. REMOVE FRONT SEAT CUSHION SHIELD LOWER RH (for Driver Side)
(a) Using a screwdriver, detach the claws and remove the cushion shield.
HINT:
Tape the screwdriver tip before use.

14. REMOVE VERTICAL ADJUSTER SPACER (for Driver Side)
(a) Using a screwdriver, detach the claws and remove the spacer.
HINT:
Tape the screwdriver tip before use.

15. REMOVE SEAT SLIDE POSITION SENSOR PROTECTOR (for Driver Side)

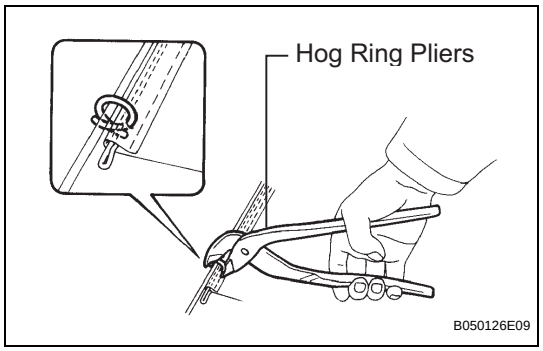
16. REMOVE SEAT POSITION AIRBAG SENSOR (for Driver Side) (See page RS-404)

SE

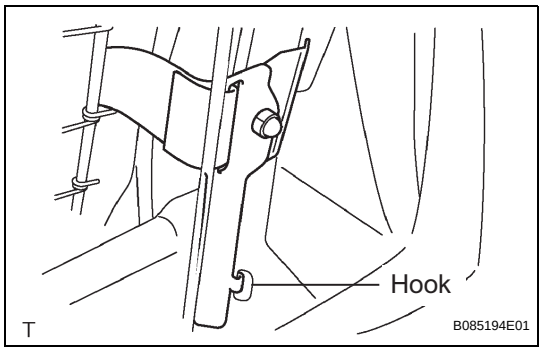
REASSEMBLY

CAUTION:
Wear protective gloves. Sharp areas on the seat adjuster frame may injure your hands.
HINT:
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **INSTALL SEAT POSITION AIRBAG SENSOR (for Driver Side) (See page RS-404)**
2. **INSTALL SEAT SLIDE POSITION SENSOR PROTECTOR (for Driver Side)**
3. **INSTALL VERTICAL ADJUSTER SPACER (for Driver Side)**
   (a) Attach the claws to install the spacer.
4. **INSTALL FRONT SEAT CUSHION SHIELD LOWER LH (for Driver Side)**
   (a) Attach the claws to install the cushion shield.
5. **INSTALL FRONT SEAT CUSHION SHIELD LOWER RH (for Driver Side)**
   (a) Attach the claws to install the cushion shield.
6. **INSTALL RECLINING ADJUSTER INSIDE COVER LH**
   (a) Upper side:
   Install the inside cover with the screw.
   (b) Lower side:
   Attach the clamp and install the inside cover with the screw.
7. **INSTALL RECLINING ADJUSTER INSIDE COVER RH**
   (a) Upper side:
   Install the inside cover with the screw.
   (b) Lower side:
   Install the inside cover with the screw.
8. **INSTALL FRONT SEATBACK COVER**
   NOTICE:
   - **Be careful not to damage the cover.**
   - **When installing the hog rings, avoid wrinkling the cover.**
   (a) Using hog ring pliers, install the seatback cover to the seatback pad with new hog rings.
   (b) Install the seatback cover (with pad) to the seat adjuster.
   (c) Install the 2 headrest supports.

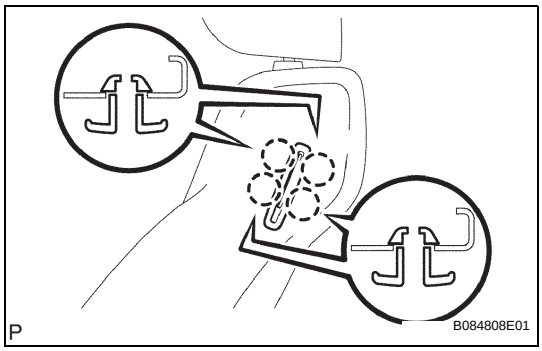


SE



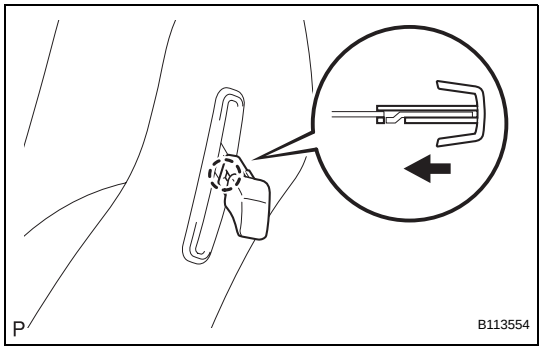
(d) w/ Front seat side airbag:
Fully cover the airbag with the 2 seatback cover brackets. Then attach the hook and tighten the nut.
Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)
NOTICE:
- **For vehicle with front seat side airbag, the seatback cover must be securely installed. Otherwise, the side airbag may not deploy properly.**
- **Make sure that the strap is not twisted after installing the bracket.**
- **Install the bracket securely.**

(e) Using hog ring pliers, install the seatback cover with new hog rings and attach the hooks.

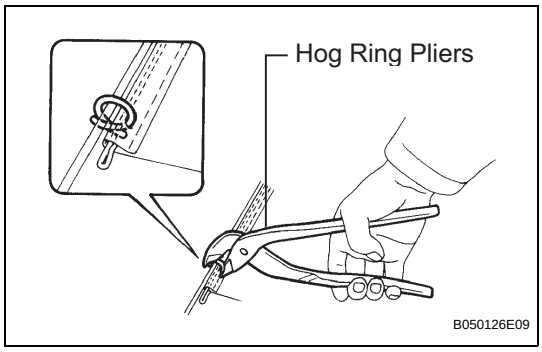


9. INSTALL RECLINING REMOTE CONTROL BEZEL

(a) Attach the 4 claws and install the bezel.



(b) Attach the claw to install the reclining adjuster release handle.



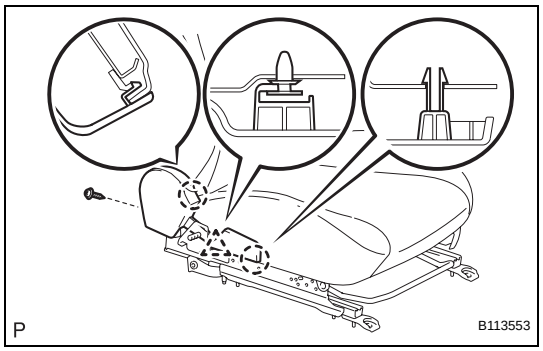
10. INSTALL FRONT SEAT CUSHION COVER
NOTICE:
- **Be careful not to damage the cover.**
- **When installing the hog rings, avoid wrinkling the cover.**

(a) Using hog ring pliers, install the seat cushion cover to the seat cushion pad with new hog rings.

(b) Using hog ring pliers, install the seat cushion cover (with pad) to the seat adjuster with new hog rings and hooks.

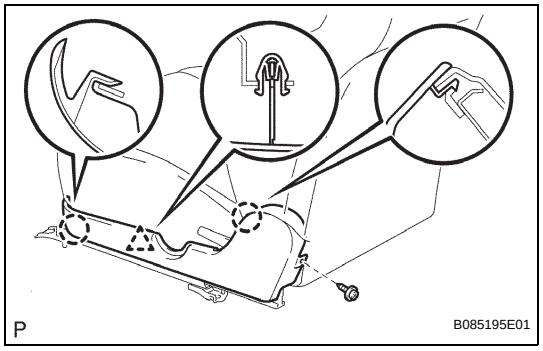
(c) Passenger side:
Connect the connector.

SE

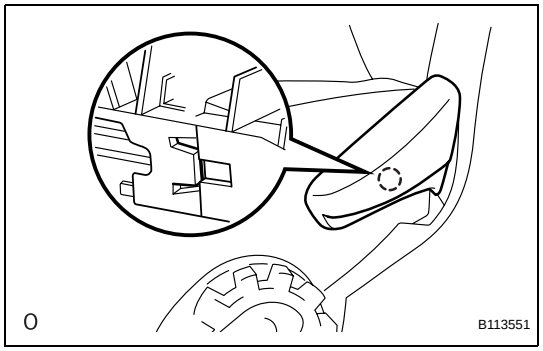


11. INSTALL FRONT SEAT CUSHION SHIELD INNER LH
(a) Attach the 2 claws and clip to install the cushion shield.
(b) Install the screw.

12. INSTALL FRONT SEAT INNER BELT ASSEMBLY LH (See page SB-6)

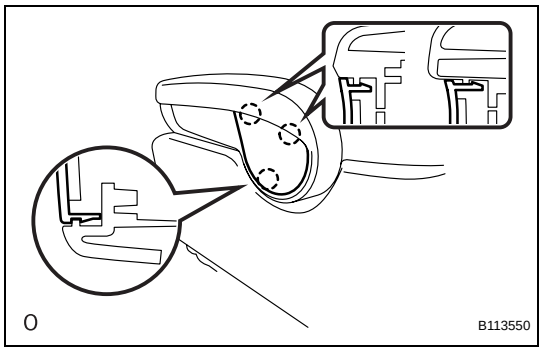


13. INSTALL FRONT SEAT CUSHION SHIELD LH
(a) Attach the 2 claws and clip to install the cushion shield.
(b) Install the screw.

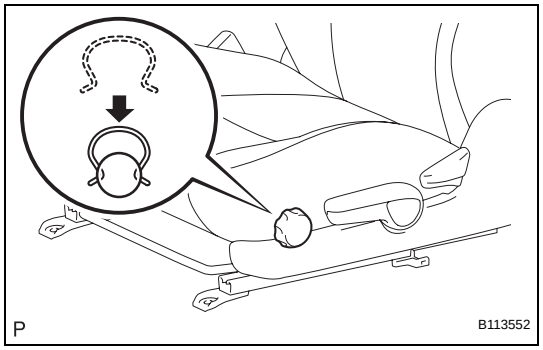


14. INSTALL RECLINING ADJUSTER RELEASE HANDLE LH
(a) Attach the claw to install the release handle.

15. INSTALL NO. 2 VERTICAL ADJUSTING HANDLE (for Driver Side)
(a) Install the vertical adjusting handle with the 2 screws.



(b) Attach the 3 claws to install the vertical seat adjuster knob cap.



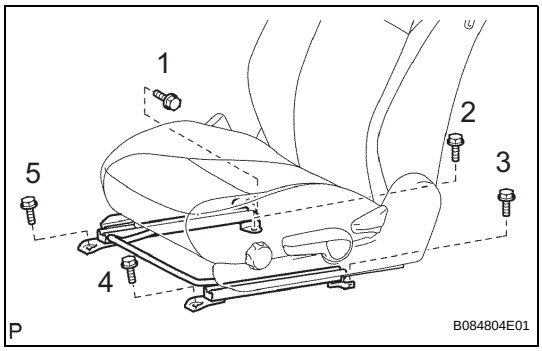
16. INSTALL VERTICAL SEAT ADJUSTER KNOB LH (for Driver Side)
(a) Install the knob with the snap ring.

SE

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.



1. INSTALL FRONT SEAT ASSEMBLY

(a) Place the seat in the cabin.

(b) Connect the connectors under the seat.

(c) Tighten the 5 bolts in the order indicated in the illustration.

Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)

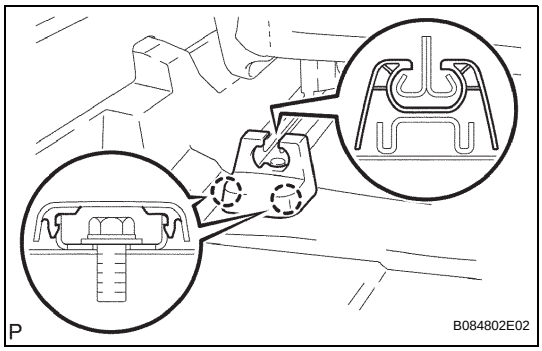
NOTICE:

Be careful not to damage the vehicle body.

2. INSPECT AND ADJUST SEAT SLIDE ADJUSTER LOCKS

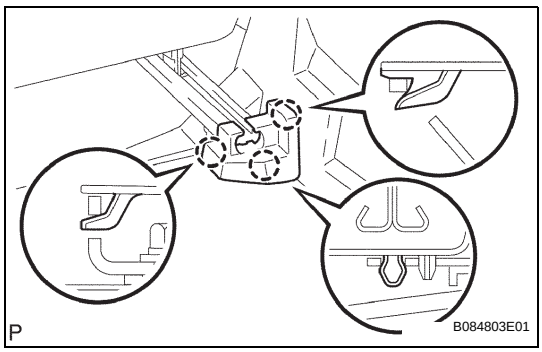
(a) Check that during sliding operation of the front seat, the left and right adjusters move together smoothly and lock simultaneously.

If the adjusters do not lock simultaneously, loosen the seat fixation bolts to adjust the adjuster's positions.



3. INSTALL SEAT TRACK BRACKET COVER OUTER LH

(a) Attach the 2 claws to install the bracket cover.



4. INSTALL SEAT TRACK BRACKET COVER INNER LH

(a) Attach the 3 claws to install the bracket cover.

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

6. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

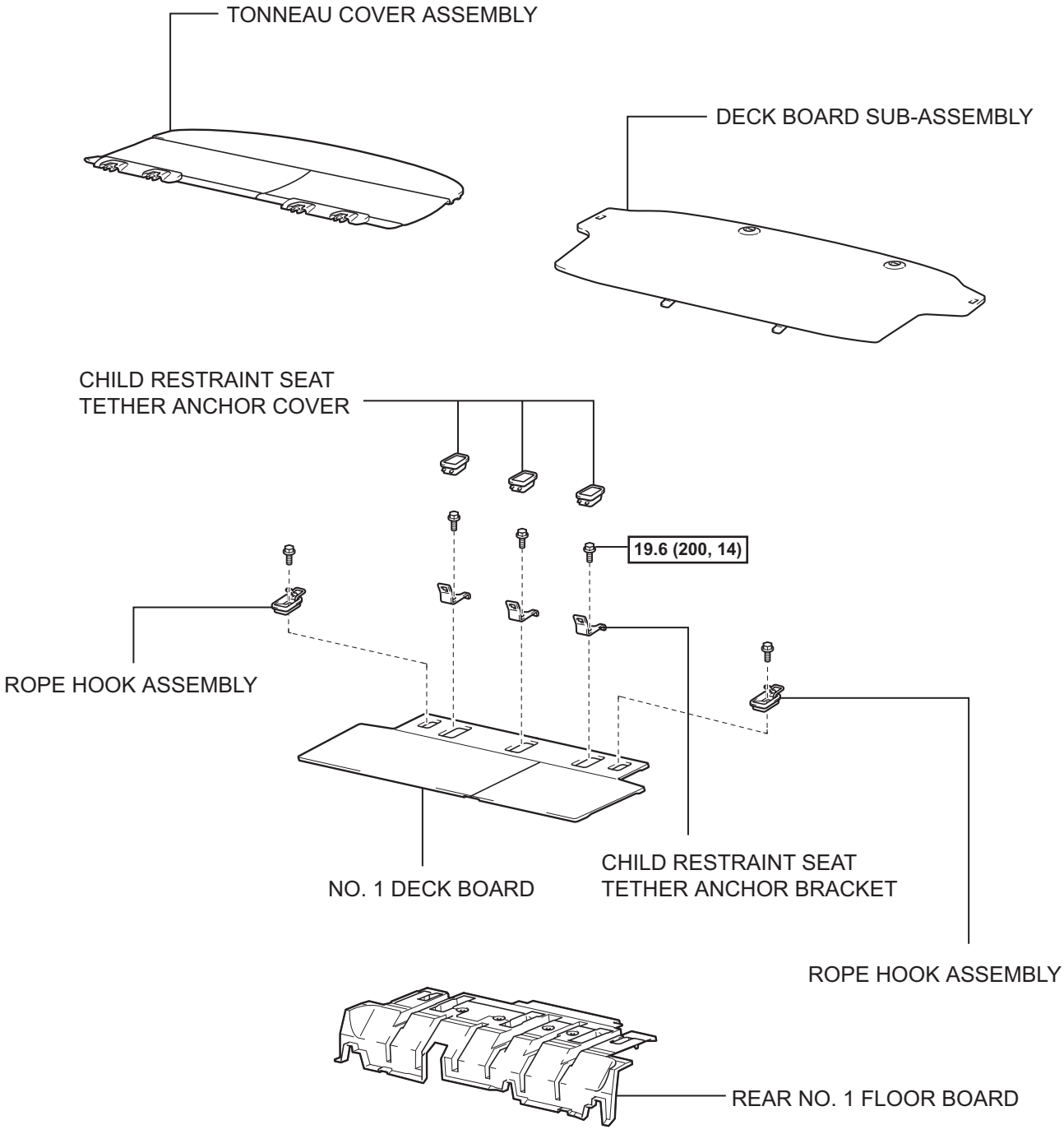
7. INSPECT SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

SE

REAR SEAT ASSEMBLY

COMPONENTS

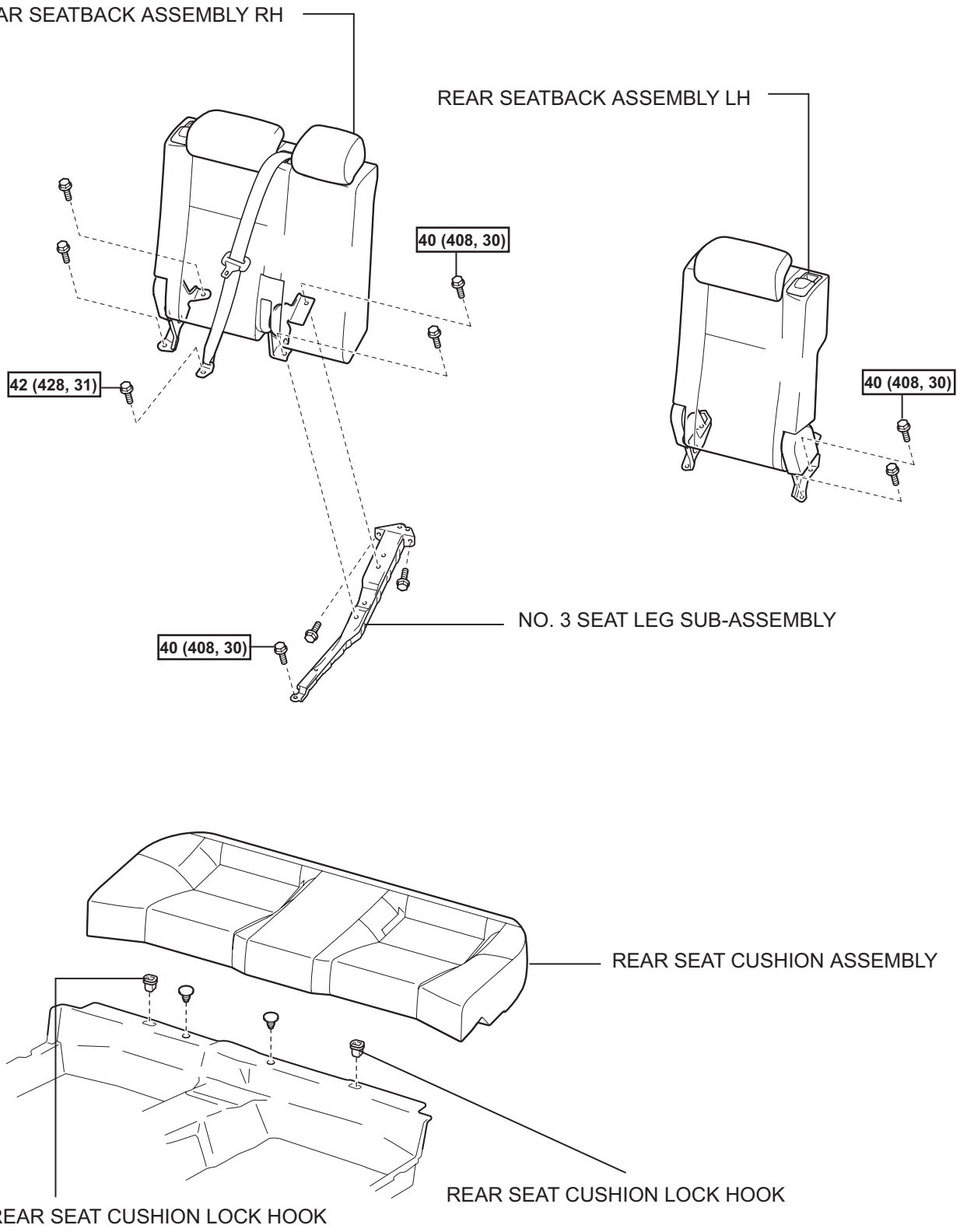


N*m (kgf*cm, ft.*lbf) : Specified torque

P

B116115E01

SE

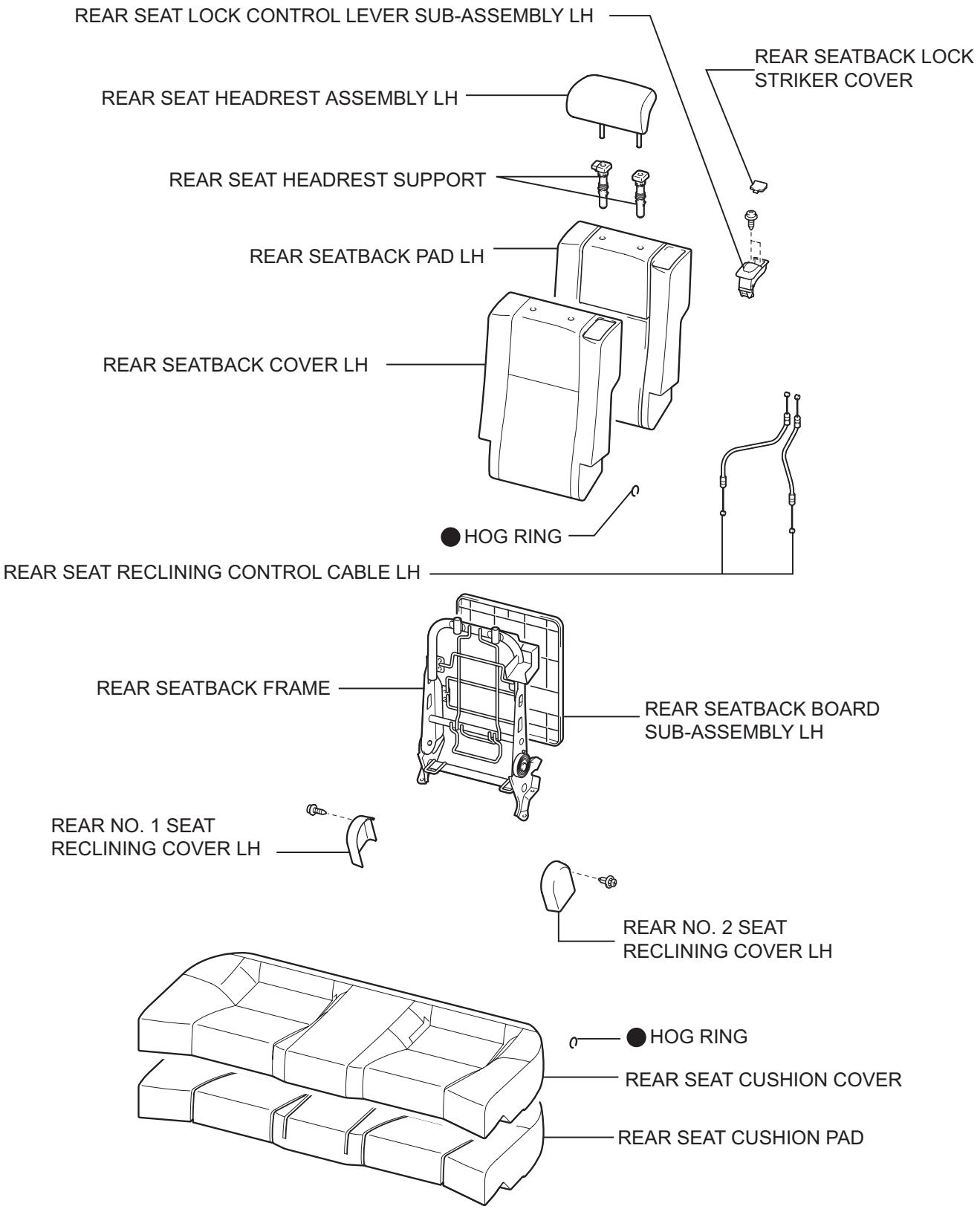


SE

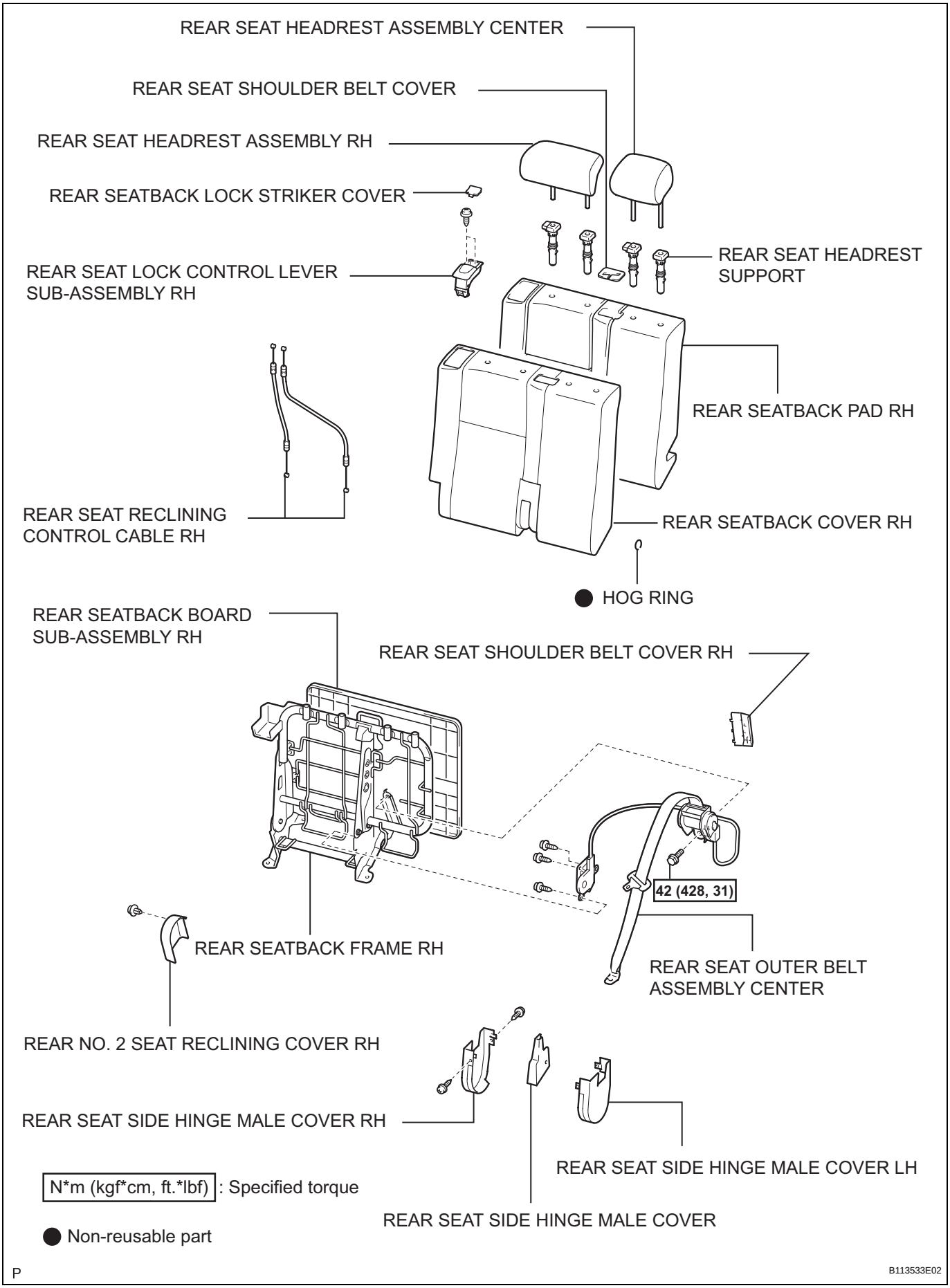
N*m (kgf*cm, ft.*lbf) : Specified torque

P

B114866E01


REAR SEAT LOCK CONTROL LEVER SUB-ASSEMBLY LH
REAR SEATBACK LOCK STRIKER COVER
REAR SEAT HEADREST ASSEMBLY LH
REAR SEAT HEADREST SUPPORT
REAR SEATBACK PAD LH
REAR SEATBACK COVER LH
● HOG RING
REAR SEAT RECLINING CONTROL CABLE LH
REAR SEATBACK FRAME
REAR SEATBACK BOARD SUB-ASSEMBLY LH
REAR NO. 1 SEAT RECLINING COVER LH
REAR NO. 2 SEAT RECLINING COVER LH
● HOG RING
REAR SEAT CUSHION COVER
REAR SEAT CUSHION PAD
● Non-reusable part
P
B113532E02

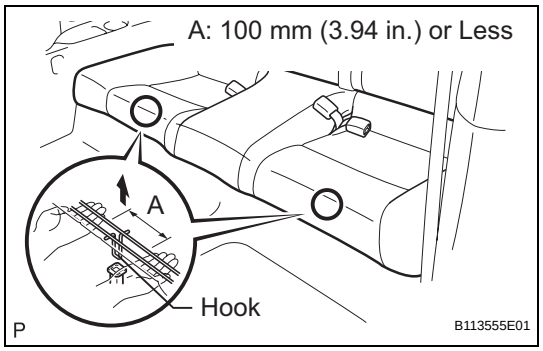
SE


REAR SEAT HEADREST ASSEMBLY CENTER
REAR SEAT SHOULDER BELT COVER
REAR SEAT HEADREST ASSEMBLY RH
REAR SEATBACK LOCK STRIKER COVER
REAR SEAT LOCK CONTROL LEVER SUB-ASSEMBLY RH
REAR SEAT HEADREST SUPPORT
REAR SEATBACK PAD RH
REAR SEAT RECLINING CONTROL CABLE RH
REAR SEATBACK COVER RH
HOG RING
REAR SEATBACK BOARD SUB-ASSEMBLY RH
REAR SEAT SHOULDER BELT COVER RH
42 (428, 31)
REAR SEATBACK FRAME RH
REAR SEAT OUTER BELT ASSEMBLY CENTER
REAR NO. 2 SEAT RECLINING COVER RH
REAR SEAT SIDE HINGE MALE COVER RH
REAR SEAT SIDE HINGE MALE COVER LH
N*m (kgf*cm, ft.*lbf) : Specified torque
REAR SEAT SIDE HINGE MALE COVER
Non-reusable part
P
B113533E02

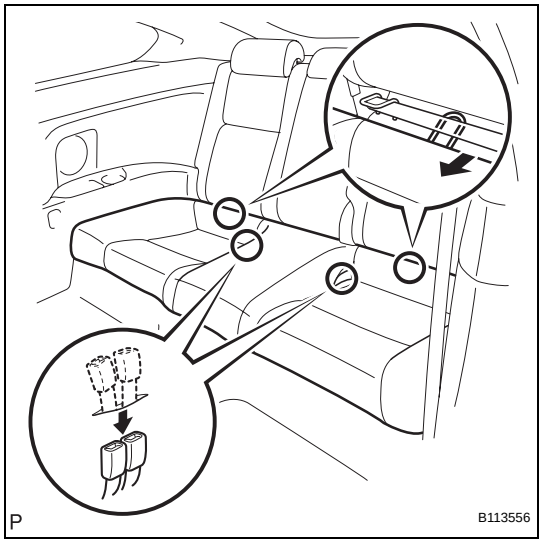
SE

REMOVAL

1. **REMOVE TONNEAU COVER ASSEMBLY**
2. **REMOVE DECK BOARD SUB-ASSEMBLY**
3. **REMOVE REAR SEAT CUSHION ASSEMBLY**
   (a) Detach the seat cushion's 2 front hooks from the vehicle body.
   NOTICE:
   Follow the instructions below carefully as the cushion frame deforms easily.
      (1) Choose a hook to detach first. Place your hands near the hook as shown in the illustration. Then lift the seat cushion to detach the hook.
      (2) Repeat for the other hook.

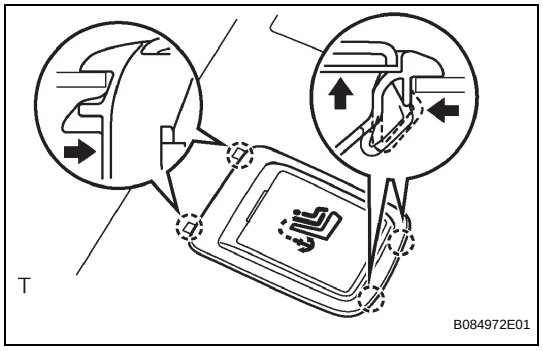


   (b) Remove the inner belts through the slits on the seat cushion.
   (c) Detach the seat cushion's 2 rear hooks from the seatback. Then remove the seat cushion.

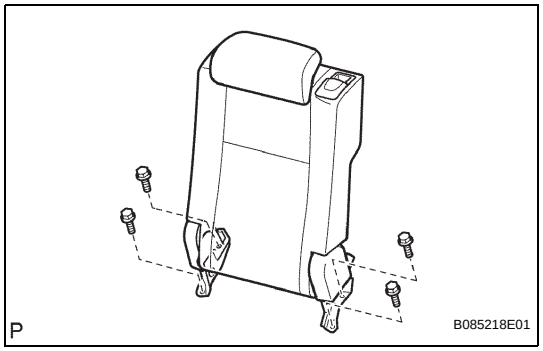


4. **REMOVE NO. 1 DECK BOARD (See page IR-8)**

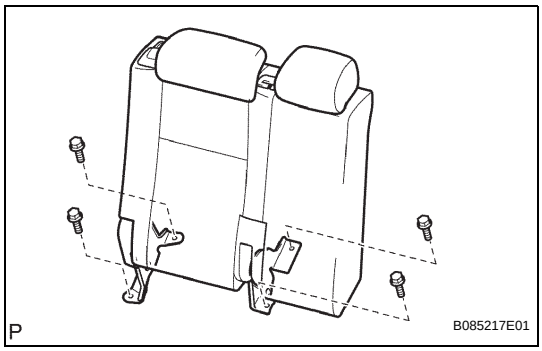
5. **REMOVE CHILD RESTRAINT SEAT TETHER ANCHOR COVER**
   (a) Detach the 12 claws and remove the 3 anchor covers as shown in the illustration.



6. **REMOVE CHILD RESTRAINT SEAT TETHER ANCHOR BRACKET**
   (a) Remove the 3 bolts and 3 anchor brackets.
7. **REMOVE REAR NO. 1 FLOOR BOARD (See page IR-9)**
8. **REMOVE REAR SEATBACK ASSEMBLY LH**
   (a) Fully fold the seatback forward.
   (b) Remove the 2 bolts on the rear side of the seatback.
   (c) Return the seatback to the upright position.
   (d) Remove the 2 bolts on the front side of the seatback. Then remove the seatback.
   NOTICE:
   Be careful not to damage the vehicle body.



SE



9. REMOVE REAR SEATBACK ASSEMBLY RH

(a) Remove the bolt and rear seat outer belt floor anchor.
(b) Fully fold the seatback forward.
(c) Remove the 2 bolts on the rear side of the seatback.
(d) Return the seatback to the upright position.
(e) Remove the 2 bolts on the front side of the seatback. Then remove the seatback.

NOTICE:
Be careful not to damage the vehicle body.

10. REMOVE REAR SEAT CUSHION LOCK HOOK

(a) Using a screwdriver, detach the claws and remove the 2 lock hooks.

HINT:
Tape the screwdriver tip before use.

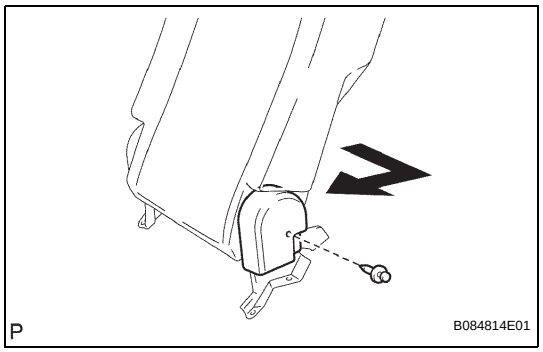
11. REMOVE NO. 3 SEAT LEG SUB-ASSEMBLY

(a) Using a clip remover, remove the 2 clips.
(b) Partially remove the floor carpet, and remove the 4 bolts and seat leg.

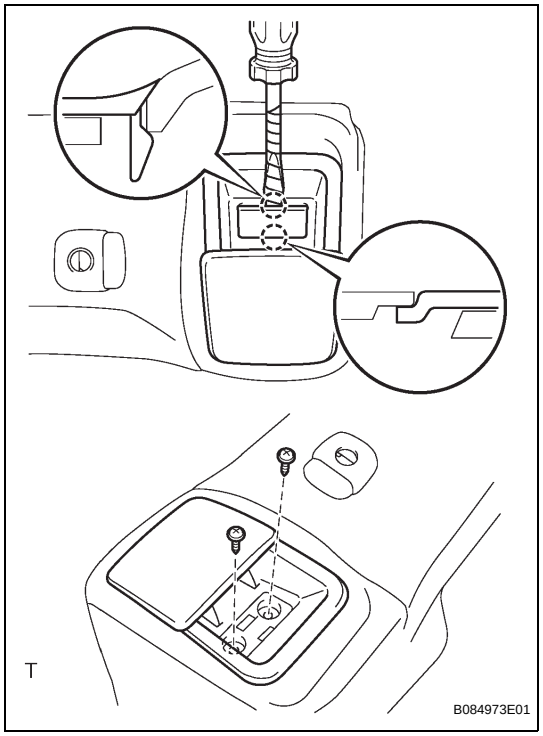
DISASSEMBLY

CAUTION:
Wear protective gloves. Sharp areas on the seatback frame may injure your hands.

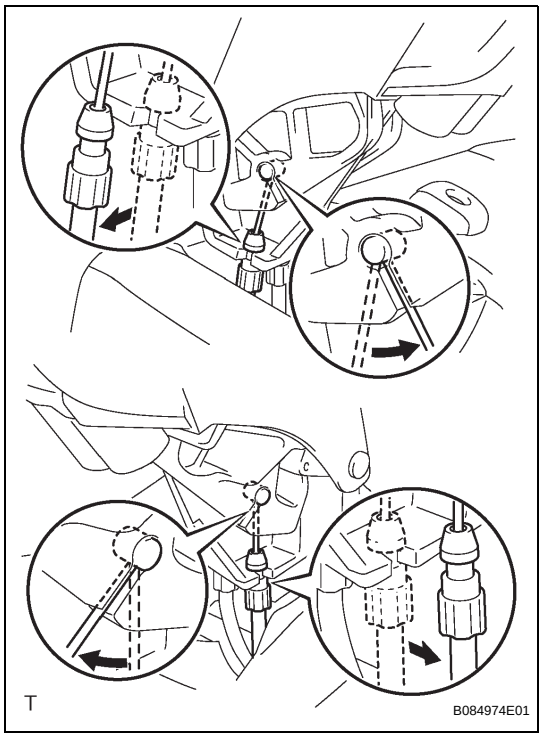
1. **REMOVE REAR SEAT HEADREST ASSEMBLY LH**
2. **REMOVE REAR SEAT HEADREST ASSEMBLY RH**
3. **REMOVE REAR SEAT HEADREST ASSEMBLY CENTER**
4. **REMOVE REAR SEAT CUSHION COVER**
   (a) Remove the hog rings and seat cushion cover from the seat cushion pad.
5. **REMOVE REAR NO. 2 SEAT RECLINING COVER LH**
   (a) Remove the clip and reclining cover in the direction indicated by the arrow in the illustration.



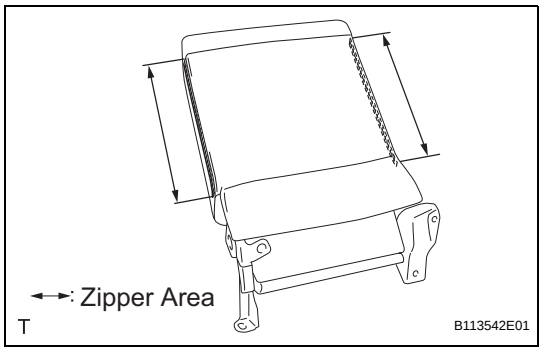
6. **REMOVE REAR NO. 1 SEAT RECLINING COVER LH**
   HINT:
   Use the same procedures described for the rear No. 2 reclining cover LH.
7. **REMOVE REAR NO. 2 SEAT RECLINING COVER RH**
   HINT:
   Use the same procedures described for the LH side.
8. **REMOVE REAR SEAT LOCK CONTROL LEVER SUB-ASSEMBLY LH**
   (a) Using a screwdriver, detach the 2 claws and remove the rear seatback lock striker cover.
   HINT:
   Tape the screwdriver tip before use.
   (b) Remove the 2 screws.



SE



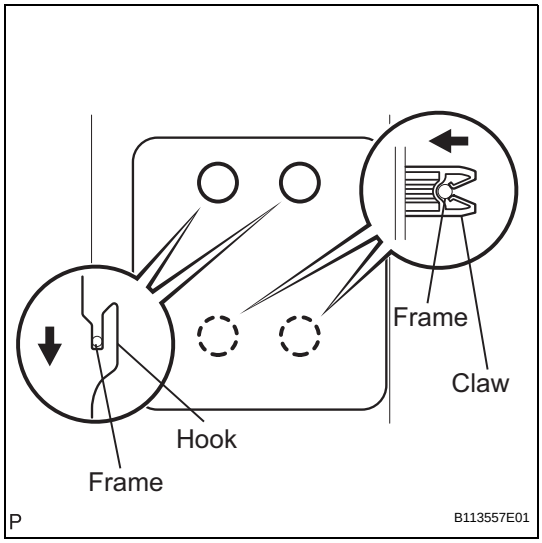
(c) Remove the 2 reclining control cables as shown in the illustration. Then remove the control lever.



9. REMOVE REAR SEATBACK COVER LH

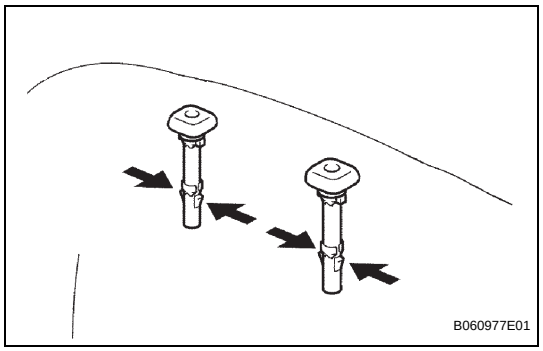
(a) Remove the hog rings. Open the lower part of the seatback cover.

(b) Open the zipper.

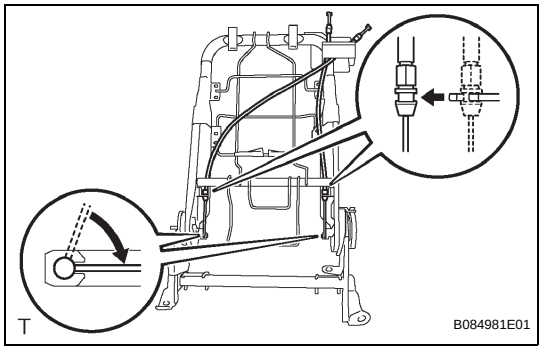


(c) Pull the seatback board in the direction indicated by the arrow in the illustration to detach the 2 claws.

(d) Pull the seatback board in the direction indicated by the arrow in the illustration to detach the 2 hooks. Then, remove the seatback board.



(e) Detach the 4 claws and remove the 2 headrest supports.
(f) Remove the seatback cover (with pad) from the seatback frame.
(g) Remove the hog rings and seatback cover from the seatback pad.

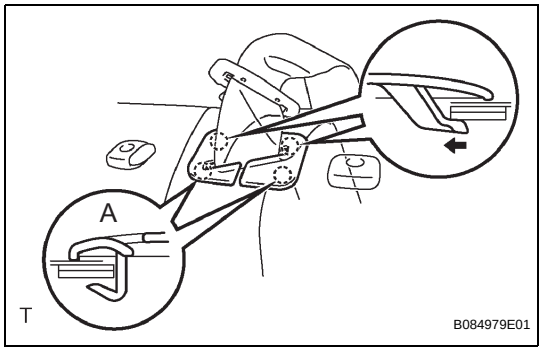


10. REMOVE REAR SEAT RECLINING CONTROL CABLE LH

(a) Remove the 2 control cables as shown in the illustration.

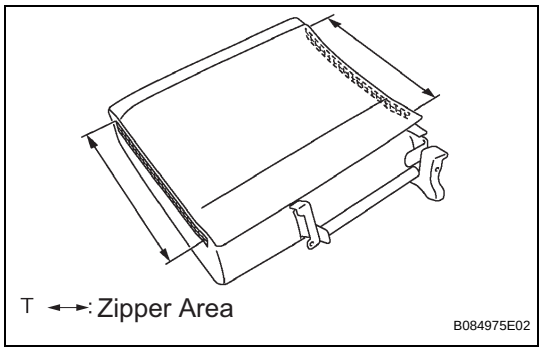
11. REMOVE REAR SEAT LOCK CONTROL LEVER SUB-ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.



12. REMOVE REAR SEAT SHOULDER BELT GUIDE CENTER

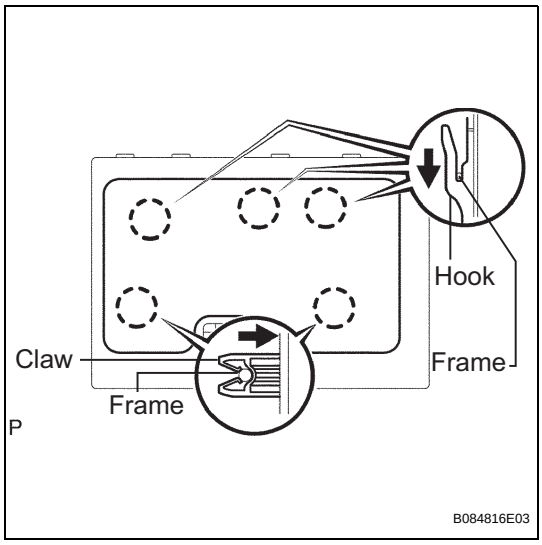
(a) Using a screwdriver, detach the 2 claws labeled A.
HINT:
Tape the screwdriver tip before use.
(b) Pull the inside cover in the direction indicated by the arrow in the illustration to detach the claw. Then, remove the shoulder belt guide.



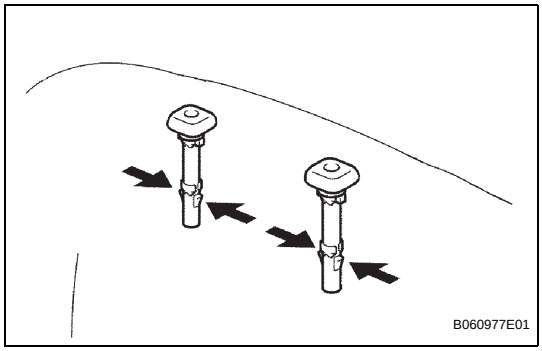
13. REMOVE REAR SEATBACK COVER RH

(a) Remove the hog rings. Open the lower part of the seatback cover.
(b) Open the zipper.

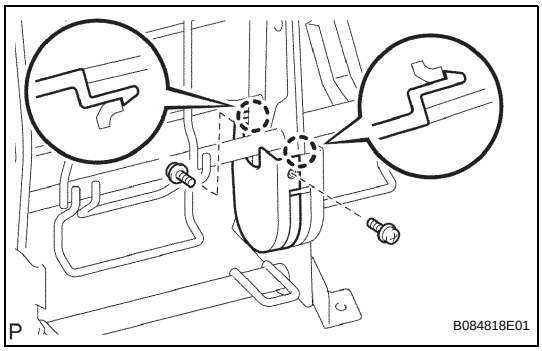
SE



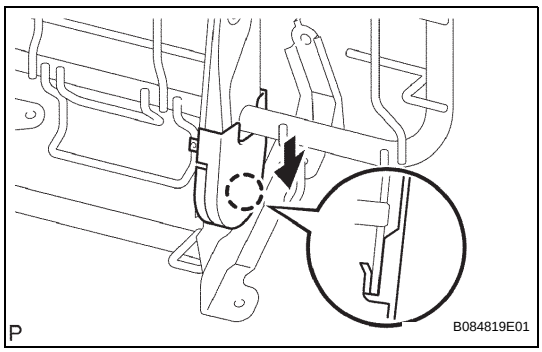
(c) Pull the seatback board in the direction indicated by the arrow in the illustration to detach the 2 claws.
(d) Pull the seatback board in the direction indicated by the arrow in the illustration to detach the 3 hooks. Then remove the seatback board.



(e) Detach the 8 claws and remove the 4 headrest supports.
(f) Remove the seatback cover (with pad) from the seatback frame.
(g) Remove the hog rings and seatback cover from the seatback pad.



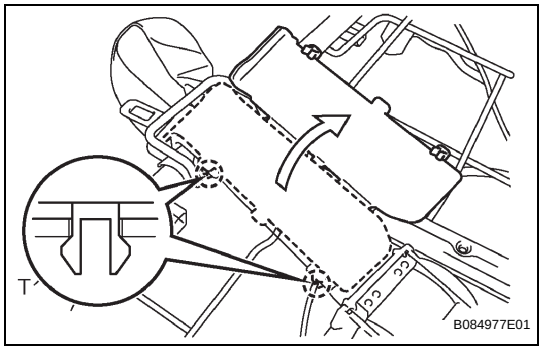
14. REMOVE REAR SEAT SIDE HINGE MALE COVER RH
(a) Remove the 2 screws.
(b) Using a screwdriver, detach the 2 claws and remove the male cover.
HINT:
Tape the screwdriver tip before use.



15. REMOVE REAR SEAT SIDE HINGE MALE COVER LH
(a) Remove the male cover in the direction indicated by the arrow in the illustration.

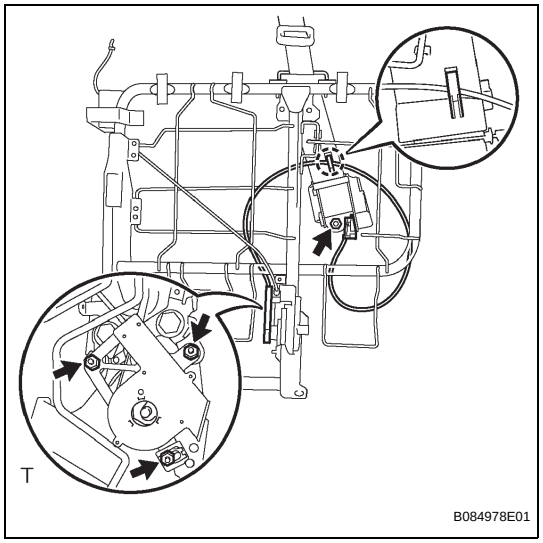
16. REMOVE REAR SEAT SIDE HINGE MALE COVER
(a) Using a screwdriver, detach the claws and remove the male cover.
HINT:
Tape the screwdriver tip before use.

SE



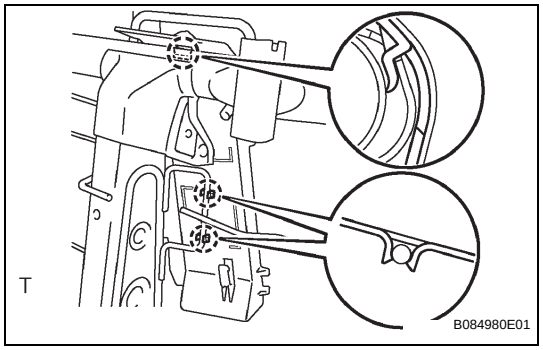
17. REMOVE REAR SEAT OUTER BELT ASSEMBLY CENTER

(a) Detach the 2 claws and open the shoulder belt cover.



(b) Detach the hook.

(c) Remove the 4 nuts and belt.



18. REMOVE REAR SEAT SHOULDER BELT COVER RH

(a) Detach the 3 claws and remove the belt cover.

19. REMOVE REAR SEAT RECLINING CONTROL CABLE RH

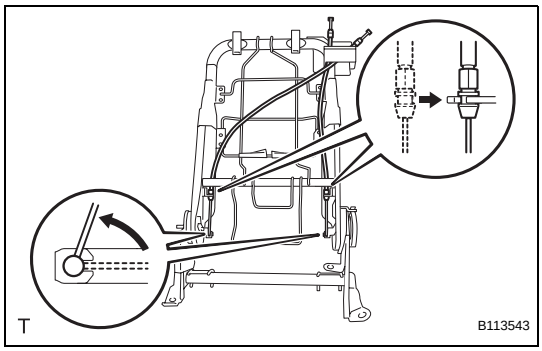
HINT:

Use the same procedures described for the LH side.

SE

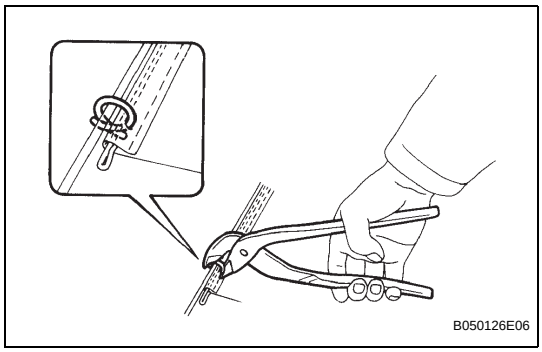
REASSEMBLY

CAUTION:
Wear protective gloves. Sharp areas on the seatback frame may injure your hands.



1. INSTALL REAR SEAT RECLINING CONTROL CABLE LH

(a) Install the 2 control cables as shown in the illustration.



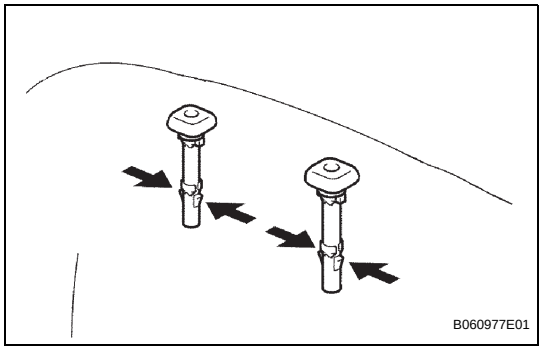
2. INSTALL REAR SEATBACK COVER LH

NOTICE:

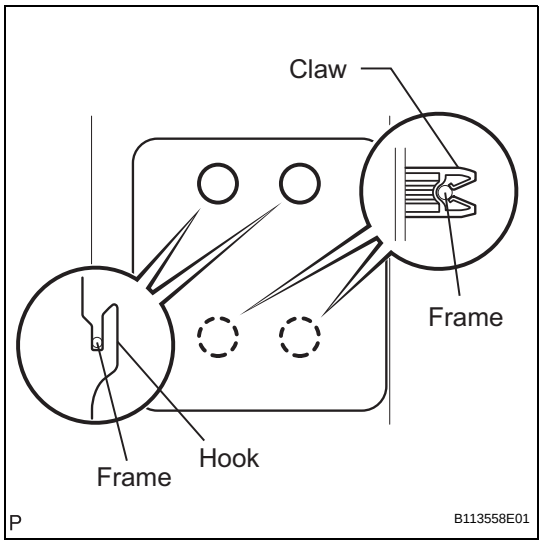
- **Be careful not to damage the cover.**
- **When installing the hog rings, avoid wrinkling the cover.**

(a) Using hog ring pliers, install the seatback cover to the seatback pad with new hog rings.

(b) Install the seatback cover (with pad) to the seatback frame.

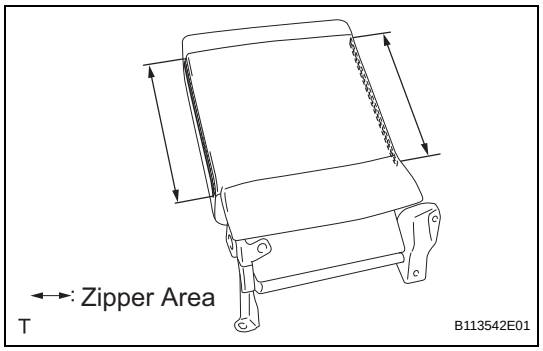


(c) Attach the 4 claws to install the 2 headrest supports.

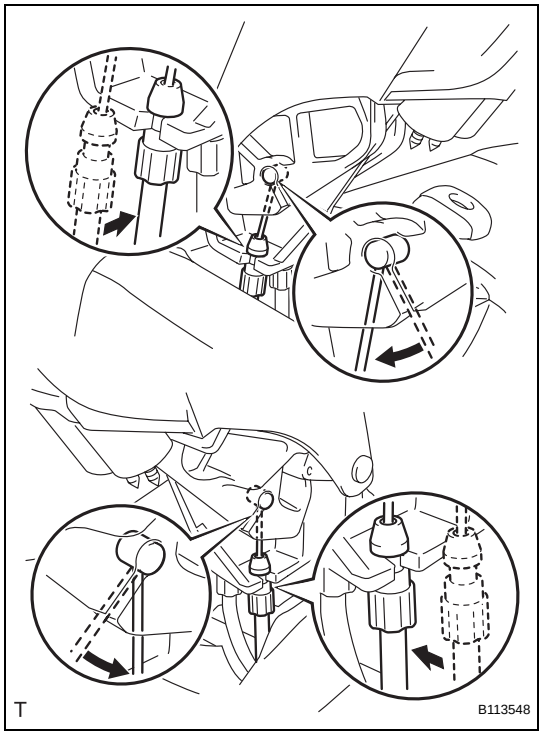


(d) Attach the 2 hooks and 2 claws, and install the seatback board to the seatback frame.

SE

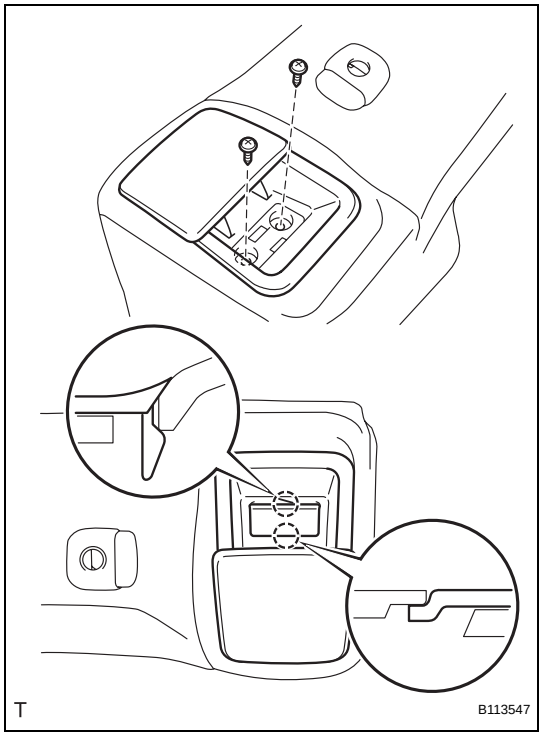


(e) Close the zipper.
(f) Using hog ring pliers, install the seatback cover (with pad) with new hog rings.



3. INSTALL REAR SEAT LOCK CONTROL LEVER SUB-ASSEMBLY LH

(a) Install the 2 reclining control cables as shown in the illustration.

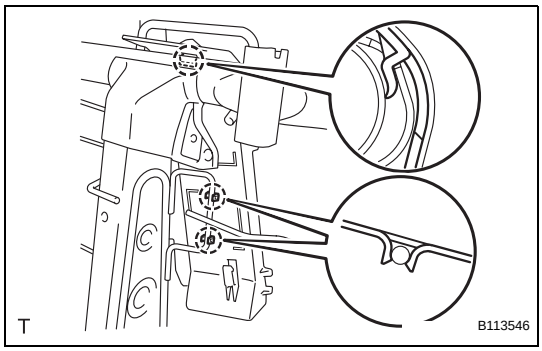


(b) Install the control lever to the seatback with the 2 screws.
(c) Attach the 2 claws to install the rear seatback lock striker cover.

4. INSTALL REAR SEAT RECLINING CONTROL CABLE RH

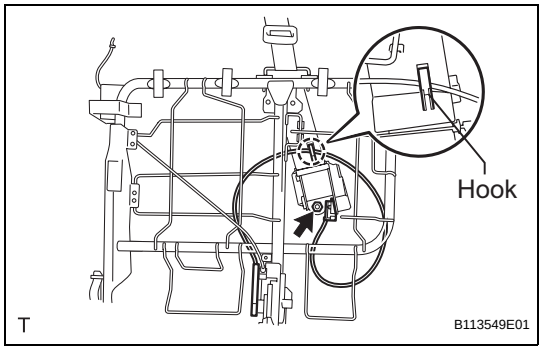
HINT:
Use the same procedures described for the LH side.

SE



5. INSTALL REAR SEAT SHOULDER BELT COVER RH

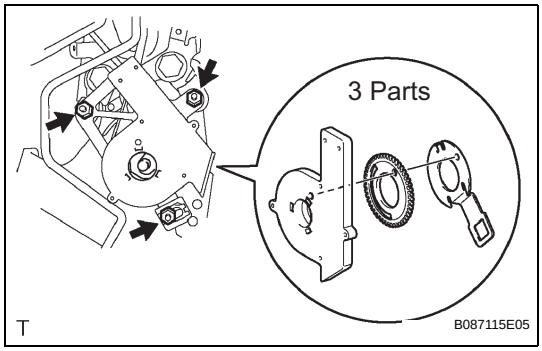
(a) Attach the 3 claws to install the belt cover.



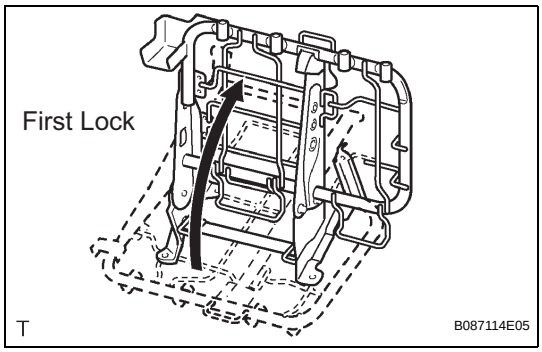
6. INSTALL REAR SEAT OUTER BELT ASSEMBLY CENTER

(a) Install the belt with the nut as shown in the illustration.
Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)

(b) Attach the hook.

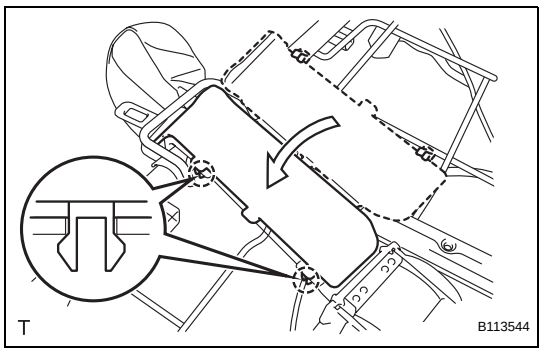


(c) Align the holes of the 3 parts shown in the illustration, and then install the 3 nuts.



HINT:
Before tightening the nuts, raise the seatback to the upright position and make sure the seatback stops in the first lock position of the frame.

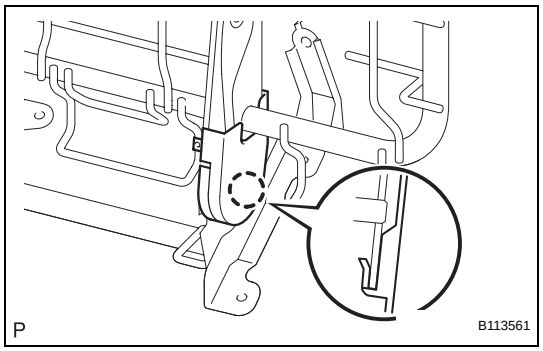
(d) Attach the 2 claws to close the shoulder belt cover.



7. INSTALL REAR SEAT SIDE HINGE MALE COVER

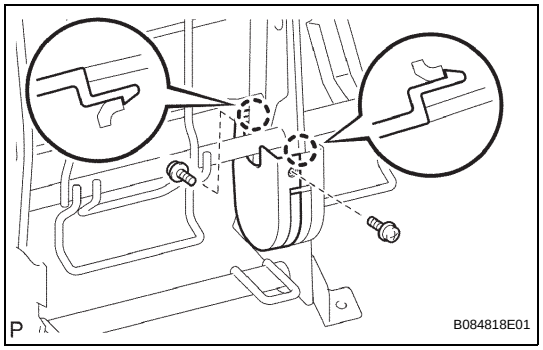
(a) Attach the 2 claws to install the male cover.

SE



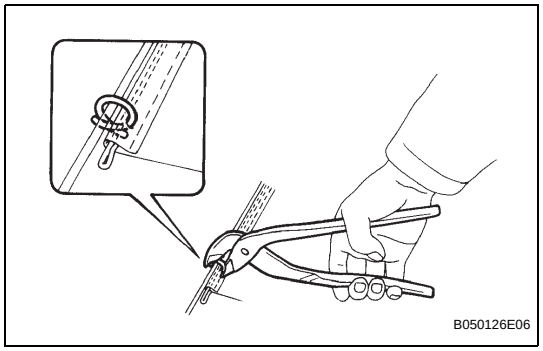
8. INSTALL REAR SEAT SIDE HINGE MALE COVER LH

(a) Attach the claw to install the male cover.



9. INSTALL REAR SEAT SIDE HINGE MALE COVER RH

(a) Attach the 2 claws and install the male cover with the screws.



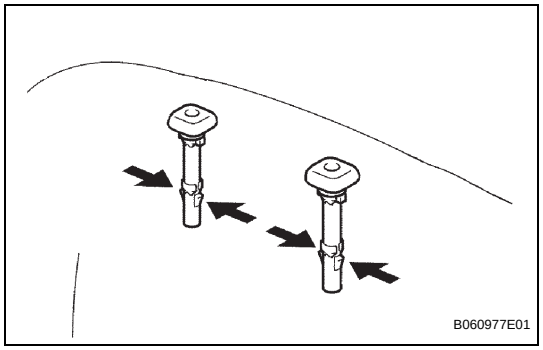
10. INSTALL REAR SEATBACK COVER RH

NOTICE:

- **Be careful not to damage the cover.**
- **When installing the hog rings, avoid wrinkling the cover.**

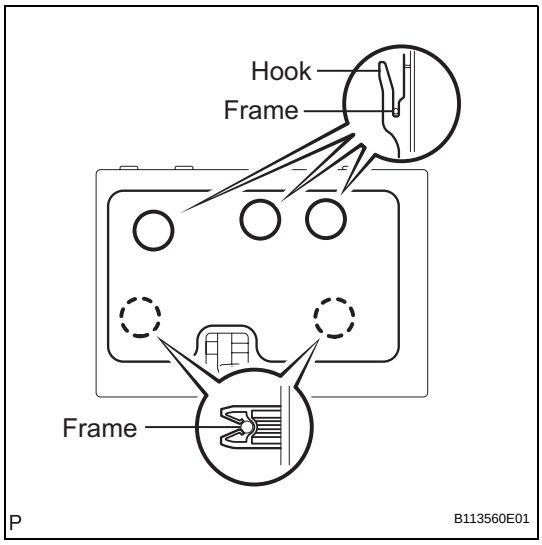
(a) Using hog ring pliers, install the seatback cover to the seatback pad with new hog rings.

(b) Install the seatback cover (with pad) to the seatback frame.

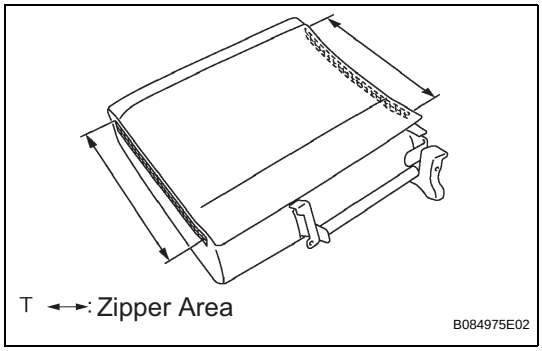


(c) Attach the 4 claws to install the 2 headrest supports.

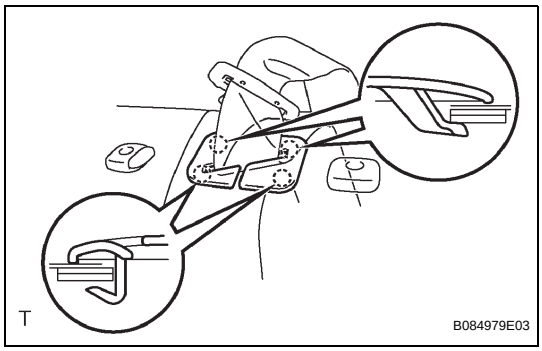
SE



(d) Install the seatback board to the seatback frame.

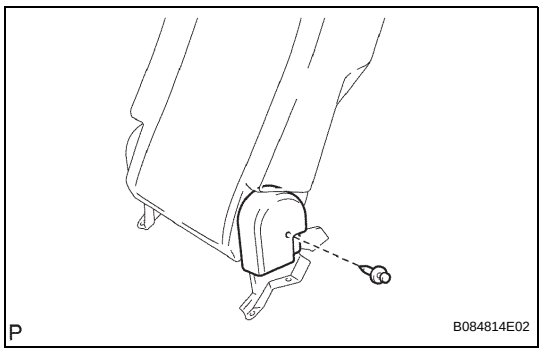


(e) Close the zipper.
(f) Using hog ring pliers, install the seatback cover (with pad) with new hog rings.



11. INSTALL REAR SEAT SHOULDER BELT GUIDE CENTER
(a) Attach the 4 claws to install the belt guide.

12. INSTALL REAR SEAT LOCK CONTROL LEVER SUB-ASSEMBLY RH
HINT:
Use the same procedures described for the LH side

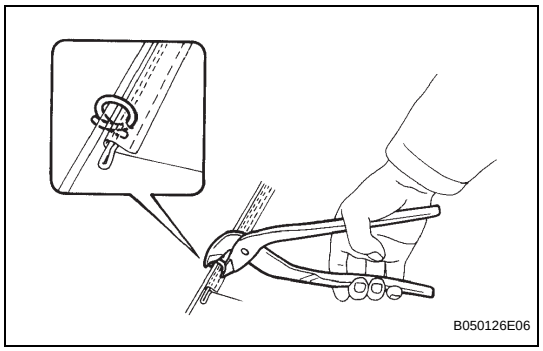


13. INSTALL REAR NO. 2 SEAT RECLINING COVER LH
(a) Install the reclining cover with the clip.

14. INSTALL REAR NO. 1 SEAT RECLINING COVER LH
HINT:
Use the same procedures described for the rear No. 2 seat reclining cover LH .

15. INSTALL REAR NO. 2 SEAT RECLINING COVER RH
HINT:
Use the same procedures described for the LH side.

SE



16. INSTALL REAR SEAT CUSHION COVER

(a) Using hog ring pliers, install the seat cushion cover to the seat cushion pad with new hog rings.

NOTICE:

- **Be careful not to damage the cover.**
- **When installing the hog rings, avoid wrinkling the cover.**

17. INSTALL REAR SEAT HEADREST ASSEMBLY LH

18. INSTALL REAR SEAT HEADREST ASSEMBLY RH

19. INSTALL REAR SEAT HEADREST ASSEMBLY CENTER

INSTALLATION

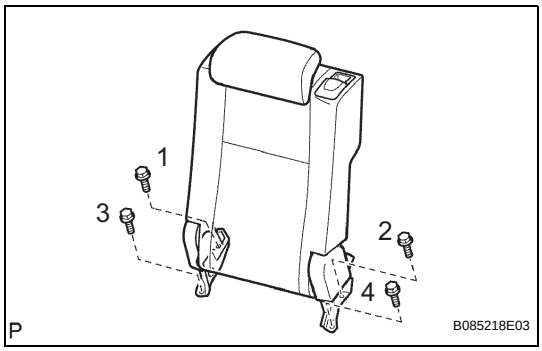
1. INSTALL NO. 3 SEAT LEG SUB-ASSEMBLY

(a) Install the seat leg with the 4 bolts.
Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)

(b) Install the floor carpet with the 2 clips.

2. INSTALL REAR SEAT CUSHION LOCK HOOK

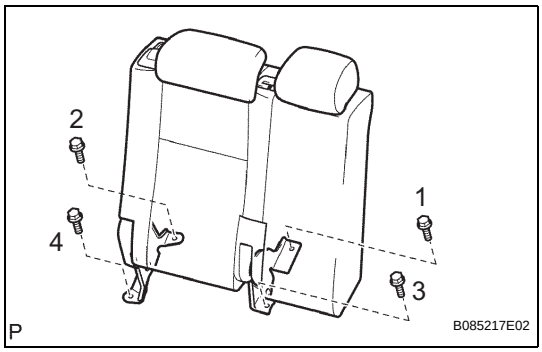
(a) Attach the claws to install the 2 lock hooks.



3. INSTALL REAR SEATBACK ASSEMBLY LH

(a) Place the seat in the cabin.
NOTICE:
Be careful not to damage the vehicle body.

(b) Tighten the 4 bolts in the order indicated in the illustration.
Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)



4. INSTALL REAR SEATBACK ASSEMBLY RH

(a) Place the seat in the cabin.
NOTICE:
Be careful not to damage the vehicle body.

(b) Tighten the 4 bolts in the order indicated in the illustration.
Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)

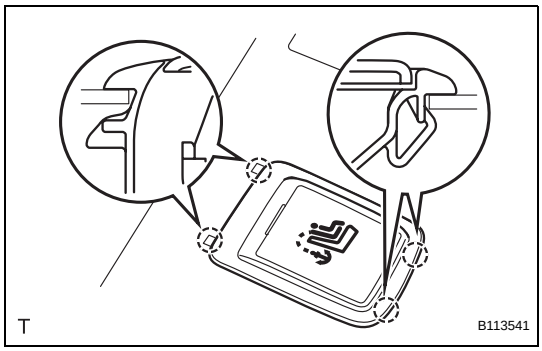
(c) Install the rear seat outer belt floor anchor with the bolt.
Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)

SE

5. INSTALL REAR NO. 1 FLOOR BOARD (See page IR-20)

6. INSTALL CHILD RESTRAINT SEAT TETHER ANCHOR BRACKET

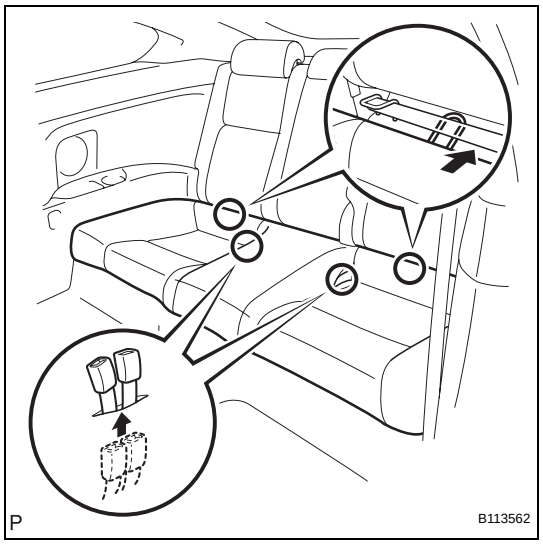
(a) Install the 3 brackets with the 3 bolts.
Torque: 19.6 N*m (200 kgf*cm, 14 ft.*lbf)



7. INSTALL CHILD RESTRAINT SEAT TETHER ANCHOR COVER

(a) Attach the 12 claws to install the 3 anchor covers.

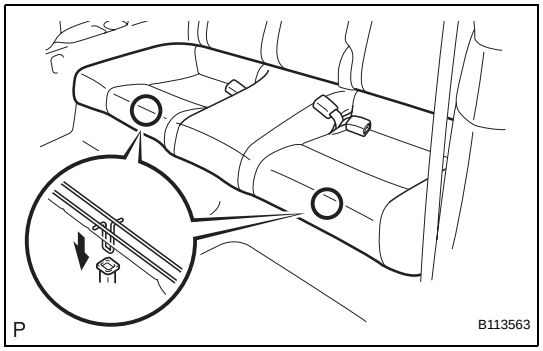
8. INSTALL NO. 1 DECK BOARD (See page IR-20)



9. INSTALL REAR SEAT CUSHION ASSEMBLY

(a) Attach the 2 seat cushion's rear hooks to the seatback frame.

(b) Insert the inner belts through the slits on the seat cushion.



(c) Attach the 2 seat cushion's front hooks to the rear seat cushion lock hooks.

(d) Confirm that the seat cushion is firmly installed.

10. INSTALL DECK BOARD SUB-ASSEMBLY

11. INSTALL TONNEAU COVER ASSEMBLY

SEAT BELT WARNING SYSTEM

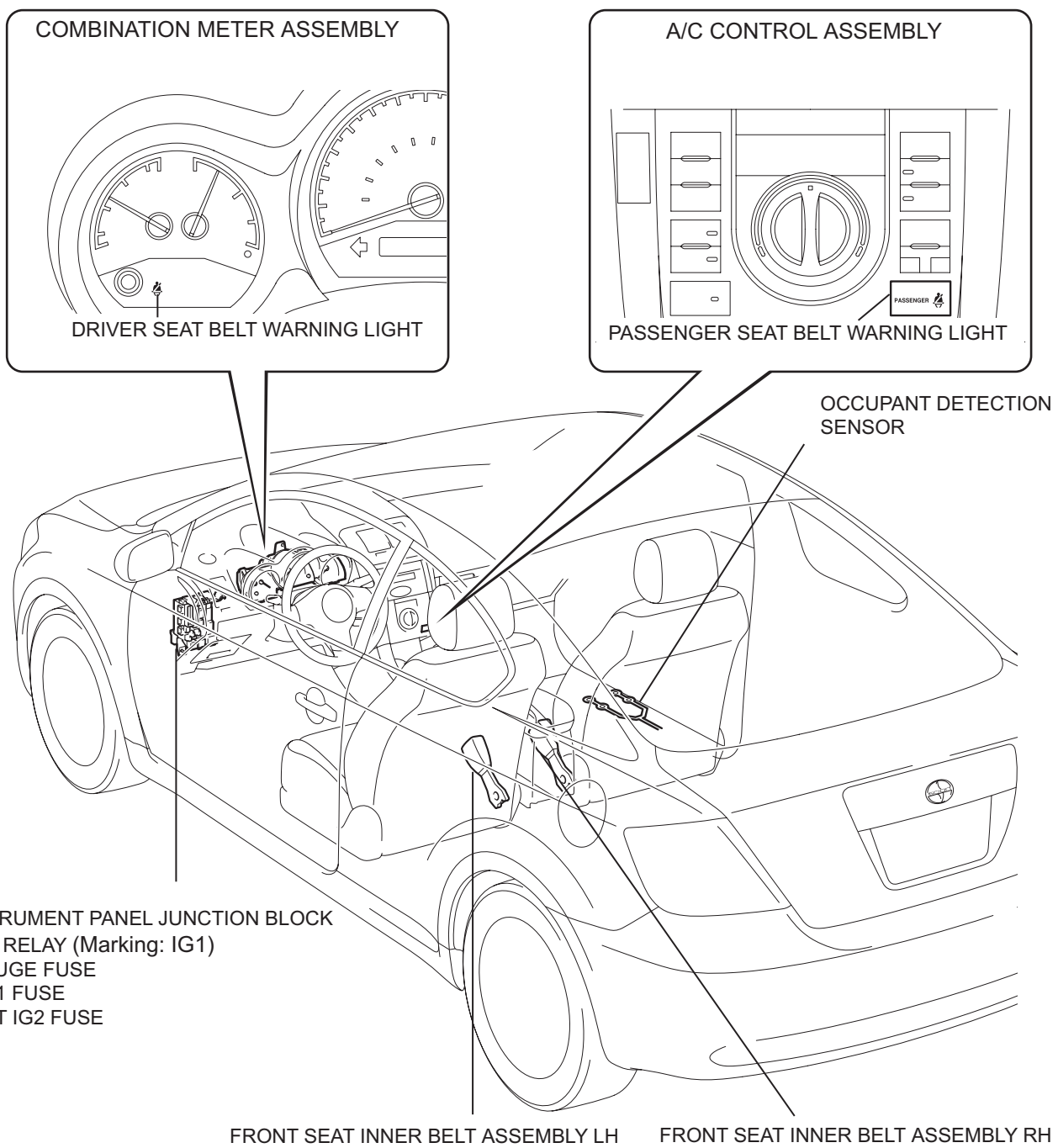
PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

System Name	See Page
Power window control system (with Jam Protection Function)	IN-23
Sliding Roof System	

PARTS LOCATION

SB



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PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cause of the problem symptom. 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.

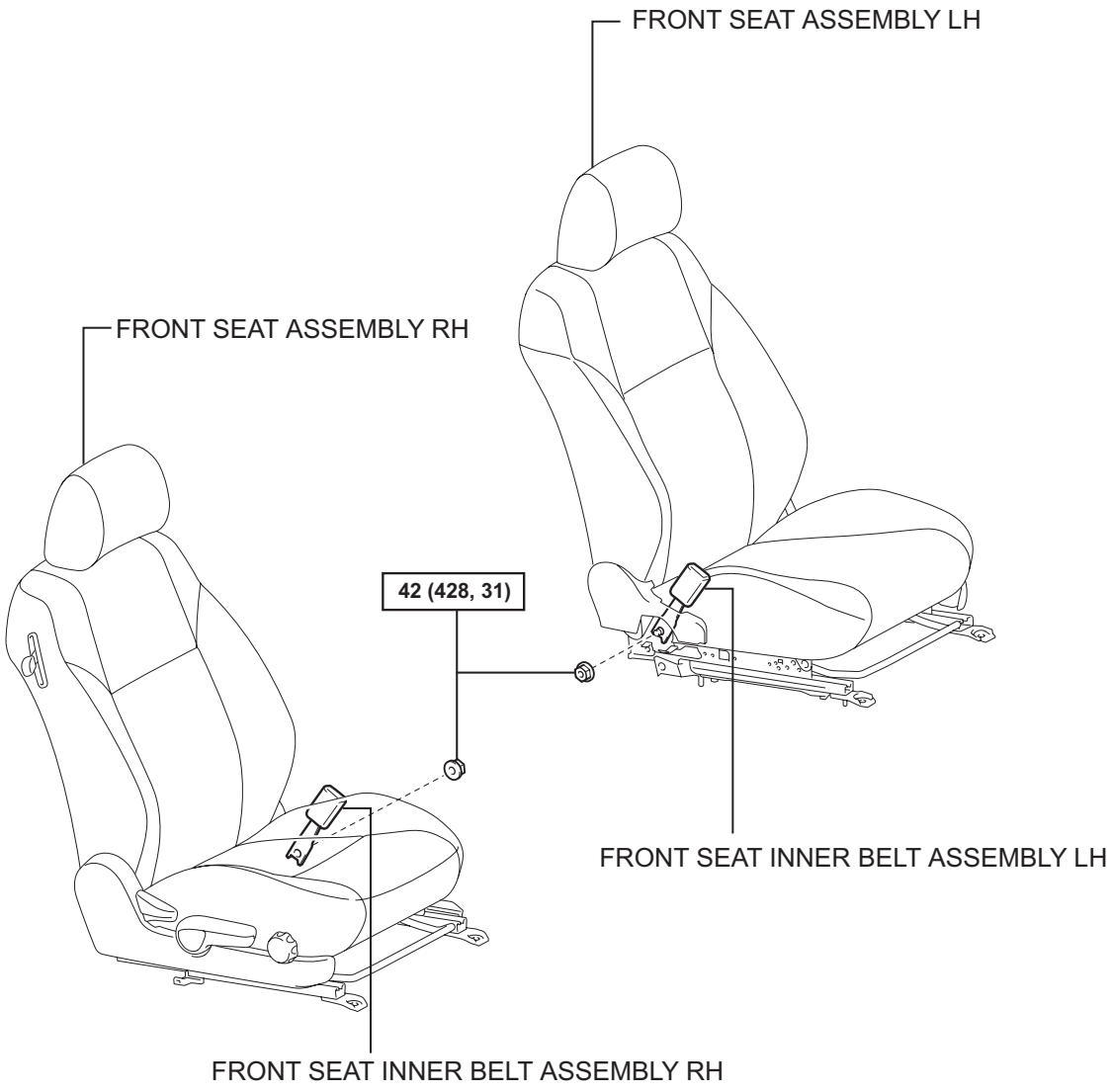
Seat belt warning system

Symptom	Suspected Area	See page
Driver seat belt warning light does not blink	1. MET IG2 fuse	SB-2
	2. Combination meter assembly	ME-37
	3. Front seat inner belt assembly LH	SB-5
	4. Wire harness	-
Passenger seat belt warning light does not blink	1. GAUGE fuse	SB-2
	2. AM1 fuse	SB-2
	3. IG1 relay	SB-2
	4. A/C control assembly	SB-5
	5. Combination meter assembly	ME-39
	6. Occupant deletion sensor	RS-244
	7. Front seat inner belt assembly RH	SB-5
	8. Wire harness	-

FRONT SEAT INNER BELT ASSEMBLY

COMPONENTS

SB



N*m (kgf*cm, ft.*lbf) : Specified torque

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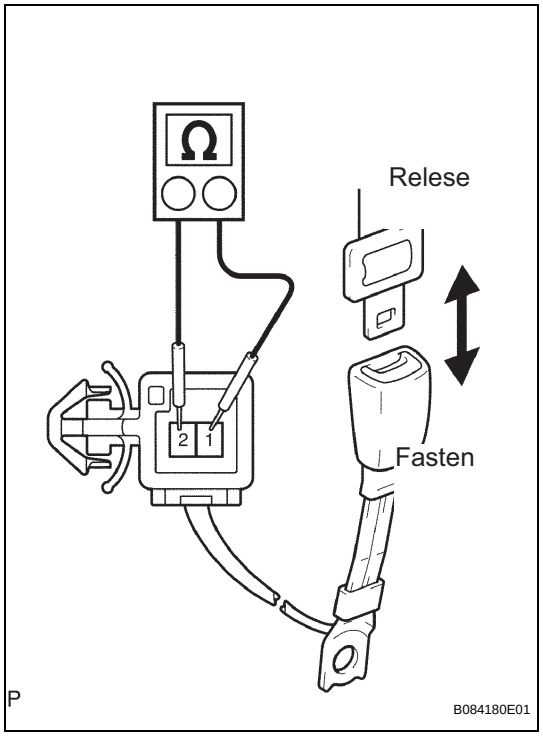
REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT SEAT ASSEMBLY LH (See page SE-5)**
3. **REMOVE FRONT SEAT INNER BELT ASSEMBLY LH**
   (a) Disconnect the 3 connectors and then detach the 5 claws.
   (b) Remove the nut and inner belt.



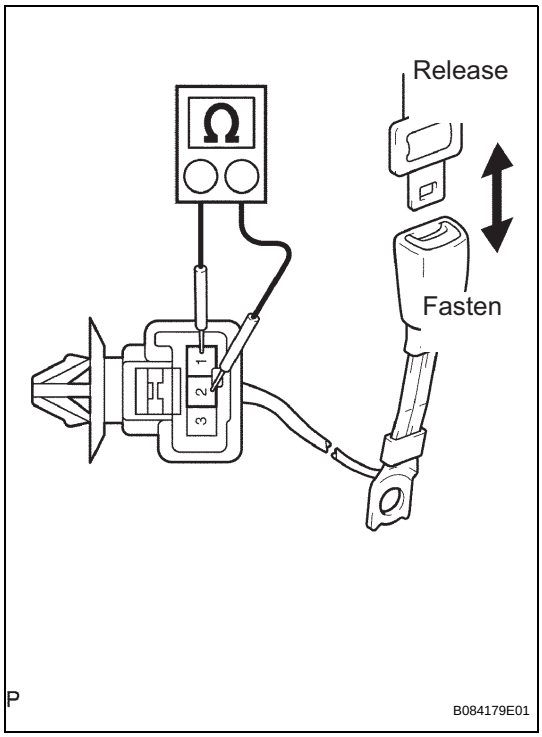
INSPECTION

1. **INSPECT FRONT SEAT INNER BELT ASSEMBLY LH (for Driver Side)**
   (a) Measure the resistance of the buckle switch.
   Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Fasten seat belt	1 MΩ or higher
1 - 2	Release seat belt	Below 1 Ω

If the result is not as specified, replace the inner belt assembly.

SB



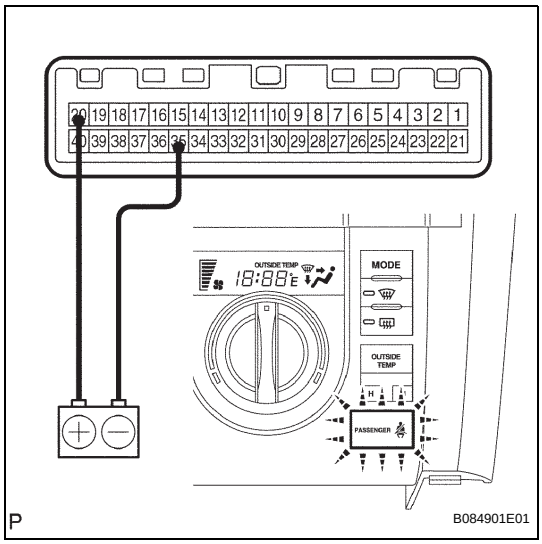
2. INSPECT FRONT SEAT INNER BELT ASSEMBLY RH (for Front Passenger Side)

(a) Measure the resistance of the buckle switch.

Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Fasten seat belt	1 MΩ or higher
1 - 2	Release seat belt	Below 1 Ω

If the result is not as specified, replace the inner belt assembly.



3. INSPECT PASSENGER SEAT BELT WARNING LIGHT ASSEMBLY

(a) Remove the A/C control (see page AC-71).

(b) Apply battery voltage to the warning lamp terminals and check warning lamp operation as shown in the table and illustration.

OK

Measurement Condition	Specified Condition
Battery positive (+) → Terminal 20 Battery negative (-) → Terminal 35	Illuminates

NOTICE:

- **Apply protective tape to the battery leads to avoid contact with other terminals.**
- **Disconnect the battery's negative (-) terminal cable immediately after the light illuminates.**

If the result is not as specified, replace the A/C control assembly.

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

1. INSTALL FRONT SEAT INNER BELT ASSEMBLY LH

(a) Install the inner belt with the nut.
Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)

(b) Attach the 5 claws.

(c) Connect the 3 connectors.

2. INSTALL FRONT SEAT ASSEMBLY LH (See page SE-11)

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

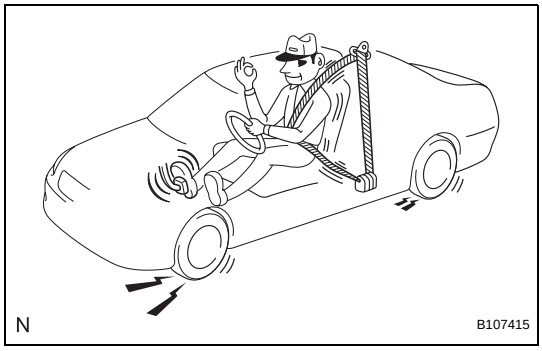
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

SB

FRONT SEAT OUTER BELT ASSEMBLY

PRECAUTION

CAUTION:
Replace the faulty parts of the seat belt systems (outer belt, inner belt, bolts, nuts, adjustable shoulder anchor, tether anchor hardware and other related parts).
When inspecting a vehicle that was recently 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.



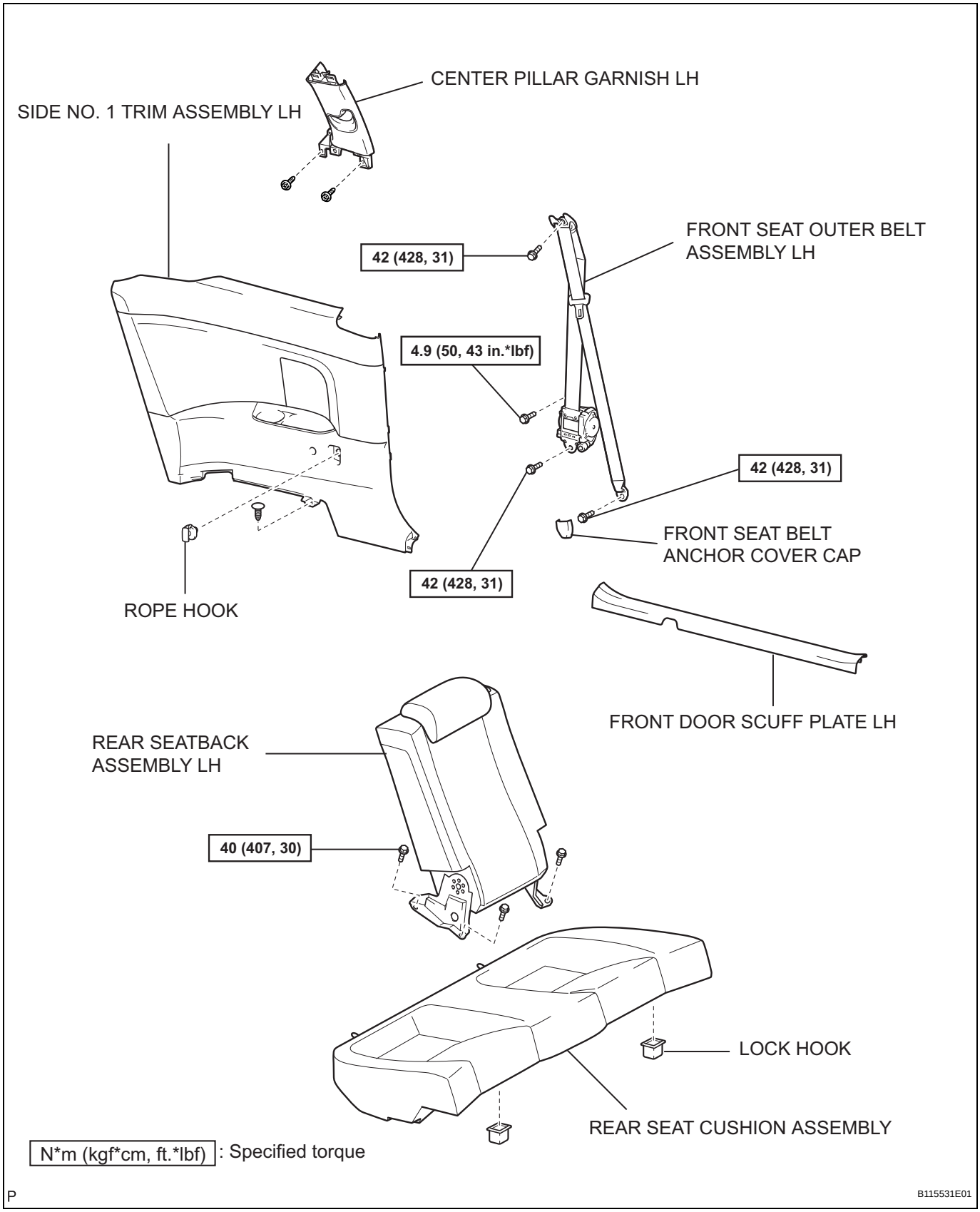
1. RUNNING TEST (IN SAFE AREA)

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 brakes. Check that the belts lock and cannot be extended at this time.
If a belt does not lock, replace the seat belt assembly (see page SB-10).
HINT:
Inspect a seat belt assembly before installing it (see page SB-11).

COMPONENTS


CENTER PILLAR GARNISH LH
SIDE NO. 1 TRIM ASSEMBLY LH
42 (428, 31)
FRONT SEAT OUTER BELT ASSEMBLY LH
4.9 (50, 43 in.*lbf)
42 (428, 31)
FRONT SEAT BELT ANCHOR COVER CAP
42 (428, 31)
ROPE HOOK
FRONT DOOR SCUFF PLATE LH
REAR SEATBACK ASSEMBLY LH
40 (407, 30)
LOCK HOOK
REAR SEAT CUSHION ASSEMBLY
N*m (kgf*cm, ft.*lbf) : Specified torque
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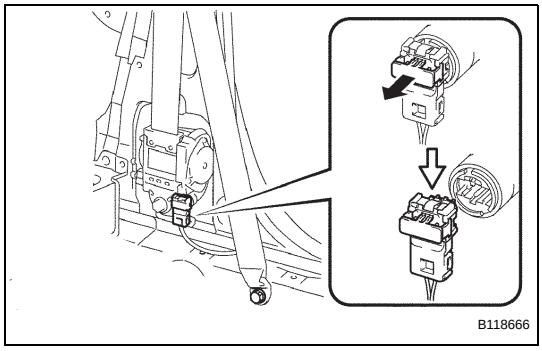
SB

REMOVAL

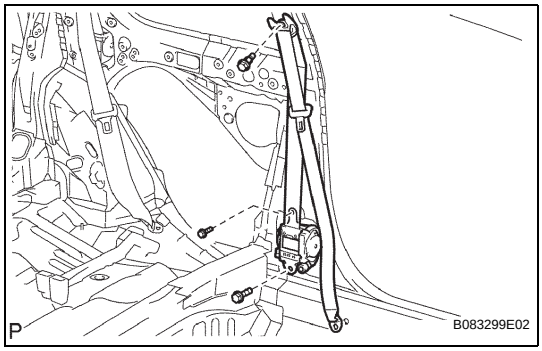
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

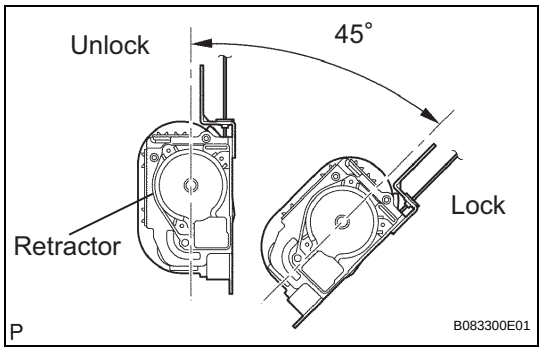
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   NOTICE:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
3. **REMOVE REAR SEATBACK ASSEMBLY LH (See page SE-17)**
4. **REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-9)**
5. **REMOVE SIDE NO. 1 TRIM ASSEMBLY LH (See page IR-10)**
6. **REMOVE CENTER PILLAR GARNISH LH (See page IR-10)**
7. **REMOVE FRONT SEAT OUTER BELT ASSEMBLY LH**
   CAUTION:
   Carefully read the notices for the pretensioner in the SRS airbag system section and the front seat outer belt section (see page RS-1).



(a) Disconnect the pretensioner connector as shown in the illustration.
(b) Remove the bolt and floor anchor.



(c) Remove the 3 bolts and outer belt.



INSPECTION

1. INSPECT FRONT SEAT OUTER BELT ASSEMBLY

NOTICE:

Do not disassemble the retractor.

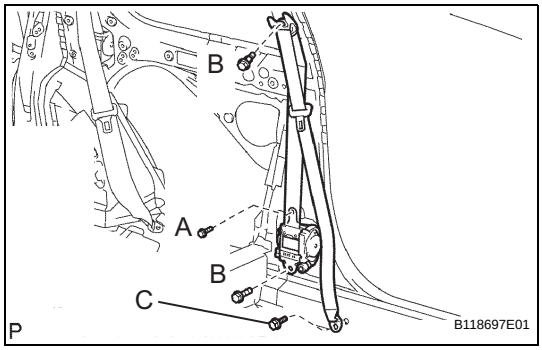
(a) When the inclination of the retractor is 15°or less, check that the belt can be pulled from the retractor. When the inclination of the retractor is over 45°, check that the belt locks.

SB

INSTALLATION

HINT:

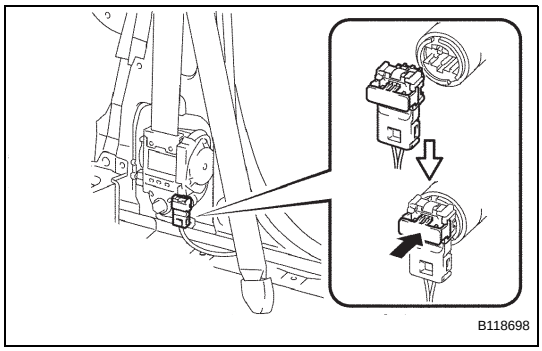
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.
- A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).



1. INSTALL FRONT SEAT OUTER BELT ASSEMBLY LH

(a) Install the outer belt with the 3 bolts.
Torque: 4.9 N*m (50 kgf*cm, 43 in.*lbf) for bolt A
42 N*m (428 kgf*cm, 31 ft.*lbf) for bolt B

(b) Install the floor anchor with the bolt.
Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf) for bolt C



(c) Connect the pretensioner connector as shown in the illustration.

(d) With the belt installed, check that the belt locks when it is pulled out quickly.
NOTICE:
The check should be performed with the outer belt assembly installed.
If the operation is not as specified, replace the outer belt.

(e) Check the fastening function of the child restraint system.
NOTICE:
The check should be performed with the outer belt installed.
(1) When the belt is pulled out fully, the belt should automatically try to retract.
(2) After the belt has fully retracted, the belt should be able to be pulled out and retracted again.
If the operation is not as specified, replace the belt.

2. INSTALL CENTER PILLAR GARNISH LH (See page IR-19)

3. INSTALL SIDE NO. 1 TRIM ASSEMBLY LH (See page IR-19)

4. INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-20)

5. INSTALL REAR SEATBACK ASSEMBLY LH (See page SE-28)

6. INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)

7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

8. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

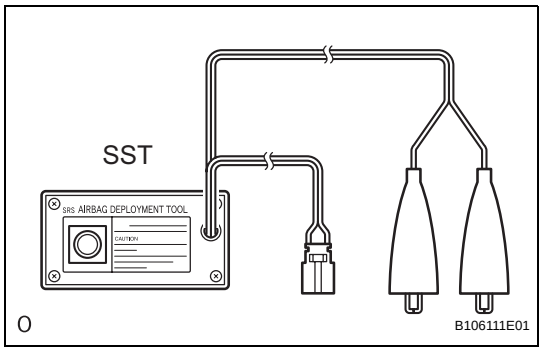
SB

DISPOSAL

HINT:
When scrapping vehicles equipped with a seat belt pretensioner or disposing of a front seat outer belt (with seat belt pretensioner), always first activate the seat belt pretensioner in accordance with the procedures described below. If any abnormality occurs during activation of the seat belt pretensioner, contact the SERVICE DEPARTMENT of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

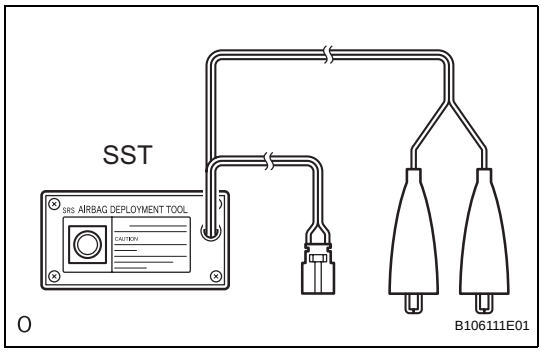
- **Never dispose of a front seat outer belt that has a non-activated pretensioner.**
- **The seat belt pretensioner produces a loud, exploding sound when it activates. Perform the operation where it will not be a nuisance to nearby people.**
- **When activating a front seat outer belt (with seat belt pretensioner), stand at least 10 m (33 ft.) away from the front seat outer belt.**
- **Use gloves and safety glasses when handling a front seat outer belt with an activated pretensioner.**
- **Always wash your hands with water after completing the disposal.**
- **Do not apply water to a front seat outer belt that has an activated pretensioner.**
- **Perform procedures in a place away from electrical interference.**
- **When activating the seat belt pretensioner, always use the specified SST (SRS airbag deployment tool).**

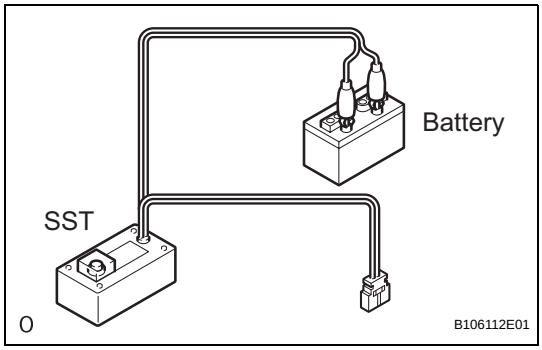


1. DISPOSE OF FRONT SEAT OUTER BELT ASSEMBLY (WHEN INSTALLED IN VEHICLE)

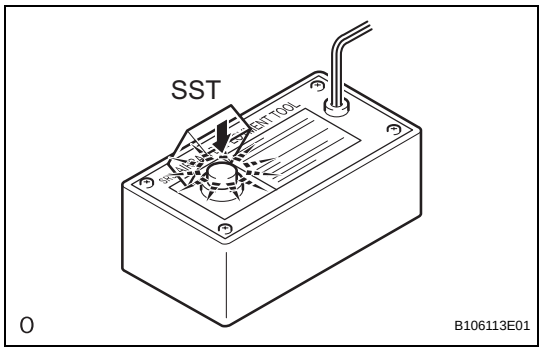
HINT:
Prepare a battery to activate the seat belt pretensioner.

(a) Check if SST is functioning properly.
SST 09082-00770
NOTICE:
When activating the seat belt pretensioner, always use the specified SST.





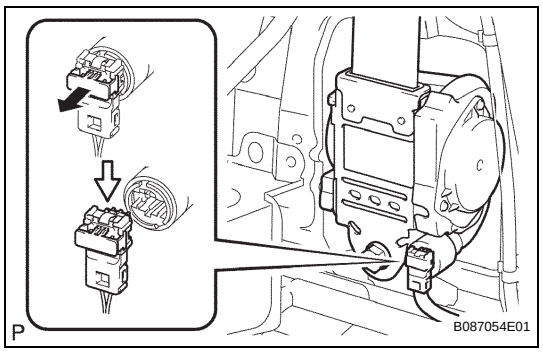
(1) Connect the SST red clip to the battery's positive (+) terminal and the black clip to the battery's negative (-) terminal.
HINT:
Do not connect the yellow connector. The yellow connector is used to connect to the seat belt pretensioner.



(2) Press the SST activation switch and check that the LED of the SST activation switch illuminates.
NOTICE:
If the LED illuminates when the activation switch is not being pressed, SST may be malfunctioning. Replace SST with a new one.

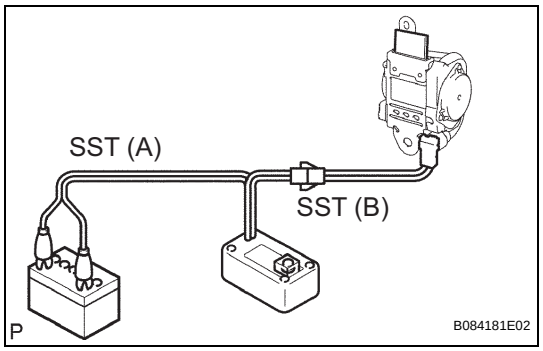
(b) Disconnect SST from the battery.

(c) Disconnect the pretensioner connector.
(1) Disconnect the cable from the negative (-) battery terminal.
(2) Remove the rear seat cushion (see page SE-17).
(3) Remove the rear seatback (see page SE-17).
(4) Remove the front door scuff plate (see page IR-9).
(5) Remove the No. 1 side trim (see page IR-10).
(6) Remove the center pillar garnish (see page IR-10).

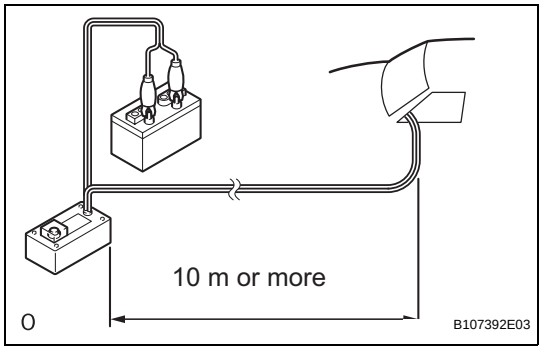


(7) Disconnect the pretensioner connector as shown in the illustration.

(d) Prepare SST for activation of the seat belt pretensioner.
(1) Install the floor anchor of the seat belt.



(2) Connect SST (A) to SST (B). Then connect SST (B)'s connector to the seat belt pretensioner.
SST 09082-00700, 09082-00770
NOTICE:
To avoid damaging SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move SST at least 10 m (33 ft.) away from the front of the vehicle.

(4) Close all the doors and windows of the vehicle.
HINT:
Leave a gap in one of the windows for inserting SST wire harness.
NOTICE:
Take care not to damage SST wire harness.

(5) Connect the SST red clip to the battery's positive (+) terminal and the black clip to the negative (-) terminal.

SB

SB

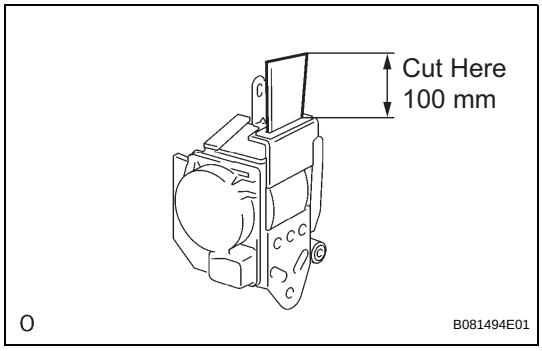
(e) Activate the seat belt pretensioner.
  (1) Confirm that no one is inside the vehicle or within 10 m (33 ft.) of the vehicle.
  (2) Press the SST activation switch to activate the seat belt pretensioner.
  HINT:
  The seat belt pretensioner operates at the same time the SST activation switch's LED illuminates.

(f) Dispose of the front seat outer belt (with the seat belt pretensioner).
  CAUTION:
  - **Do not touch the front seat outer belt for at least 30 minutes after the seat belt pretensioner has been activated. It is very hot.**
  - **Use gloves and safety glasses when handling a front seat outer belt whose pretensioner has been activated.**
  - **Always wash your hands with water after completing the disposal.**
  - **Do not apply water to a front seat outer belt that has an activated pretensioner.**

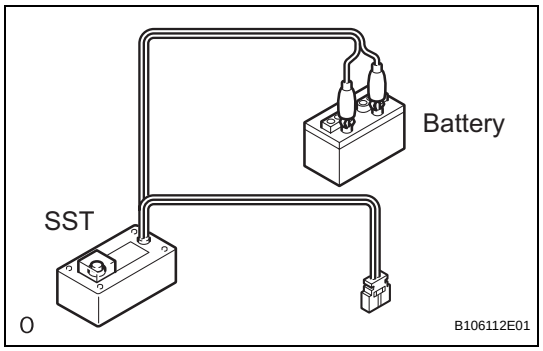
  HINT:
  When scrapping a vehicle, activate the seat belt pretensioner, and then scrap the vehicle with the activated front seat outer belt installed.

2. DISPOSE OF FRONT SEAT OUTER BELT ASSEMBLY (WHEN NOT INSTALLED IN VEHICLE)

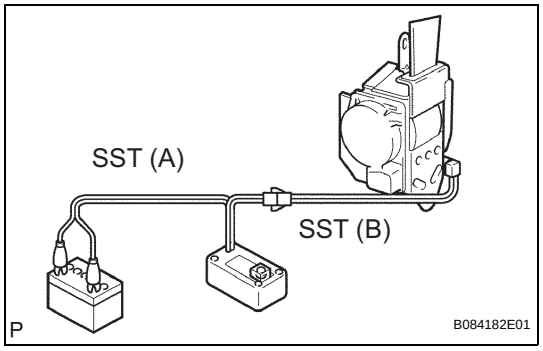
NOTICE:
- **When only disposing of the front seat outer belt (with the seat belt pretensioner), never use the customer's vehicle to activate the seat belt pretensioner.**
- **Be sure to follow the procedures listed below when activating the seat belt pretensioner.**



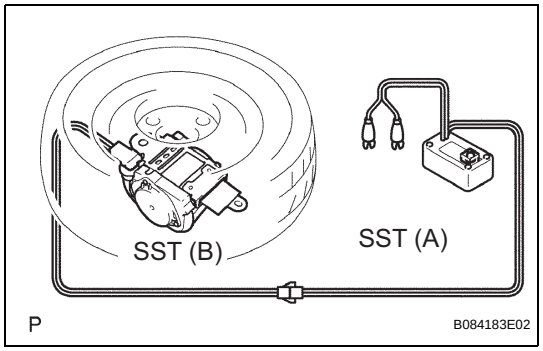
(a) Remove the front seat outer belt.
  (1) Wind the seat belt with the retractor.
  (2) When the seat belt is sufficiently wound, cut the seat belt approximately 100 mm (0.39 in.) from the retractor, as shown in the illustration.
  HINT:
  The seat belt is designed so that winding the seat belt before pretensioner activation will decrease the pulling power of the seat belt during pretensioner activation.



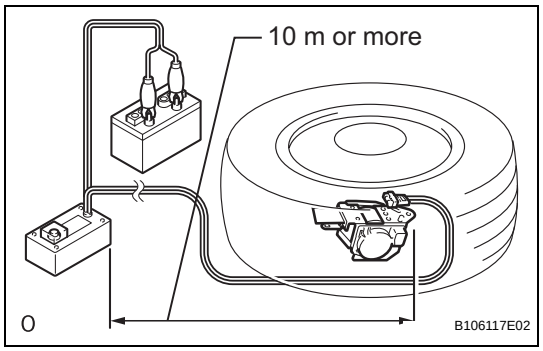
(b) Check if SST is functioning properly.
SST 09082-00700, 09082-00770
CAUTION:
When activating a seat belt pretensioner, always use the specified SST.



(c) Prepare SST for activation of the seat belt pretensioner.
(1) Connect SST (A) to SST (B). Then connect SST (B)'s connector to the seat belt pretensioner.
NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(2) Place the front seat outer belt on the ground and cover it with a tire (with wheel).
NOTICE:
Set up the front seat outer belt as shown in the illustration.



(3) Move SST at least 10 m (33 ft.) away from the wheel.
NOTICE:
Take care not to damage the SST wire harness.

(d) Activate the seat belt pretensioner.
(1) Connect the SST red clip to the battery's positive (+) terminal and the black clip to the battery's negative (-) terminal.
(2) Check that no one is within 10 m (33 ft.) of the wheel.
(3) Press the SST activation switch to activate the seat belt pretensioner.
HINT:
The seat belt pretensioner operates at the same time the SST activation switch's LED illuminates.

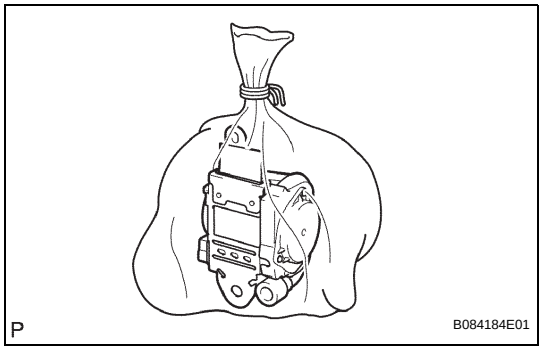
(e) Dispose of the front seat outer belt (with the seat belt pretensioner).

CAUTION:

- **Do not touch the front seat outer belt for at least 30 minutes after the seat belt pretensioner has been activated. It is very hot.**
- **Use gloves and safety glasses when handling a front seat outer belt whose pretensioner has been activated.**
- **Always wash your hands with water after completing the disposal.**
- **Do not apply water to a front seat outer belt that has an activated pretensioner.**

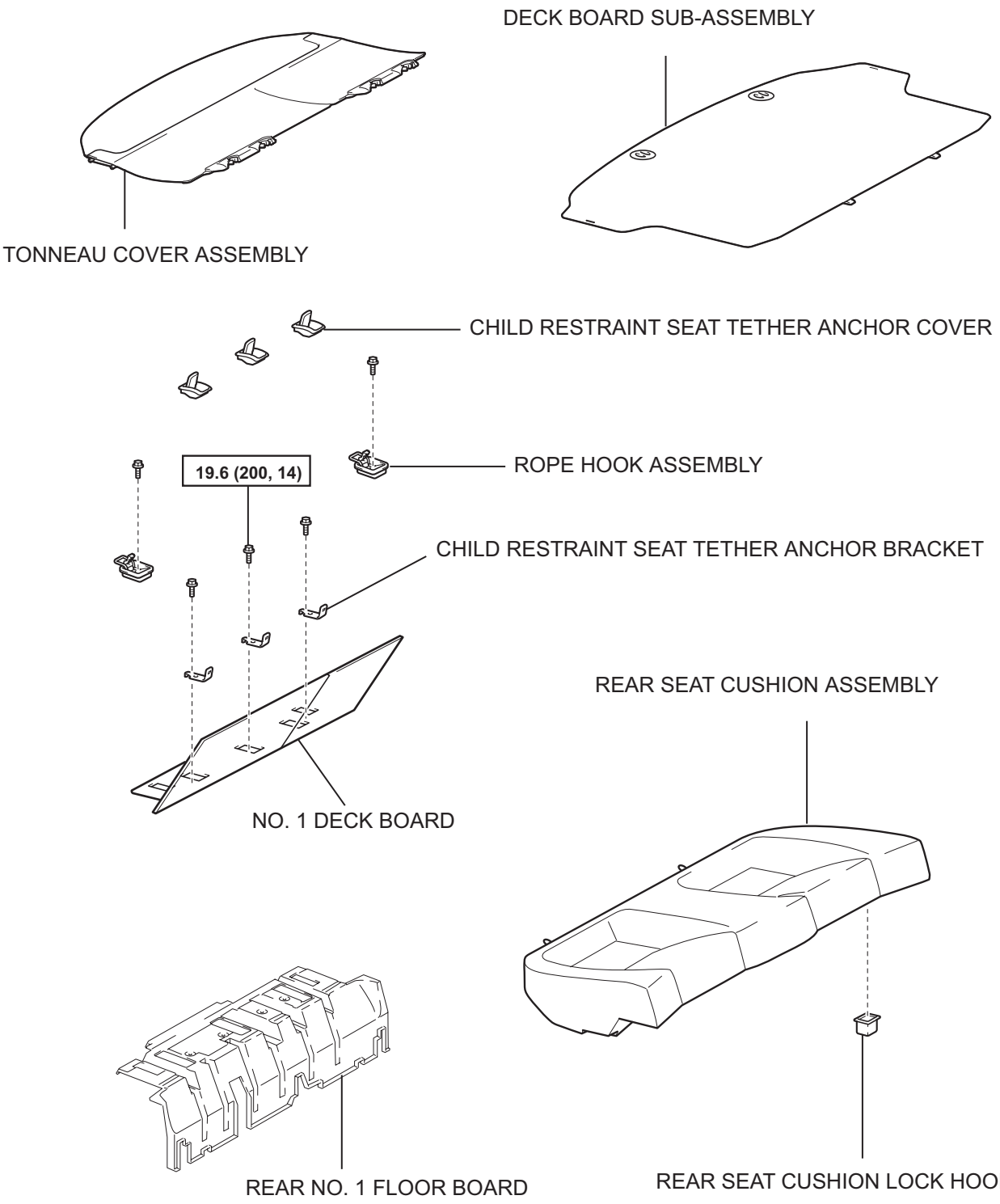
(1) Remove the tire (with wheel) and SST.

(2) Place the front seat outer belt in a plastic bag, tie the end tightly, and dispose of it in the same way as other general parts.



REAR SEAT INNER BELT ASSEMBLY

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

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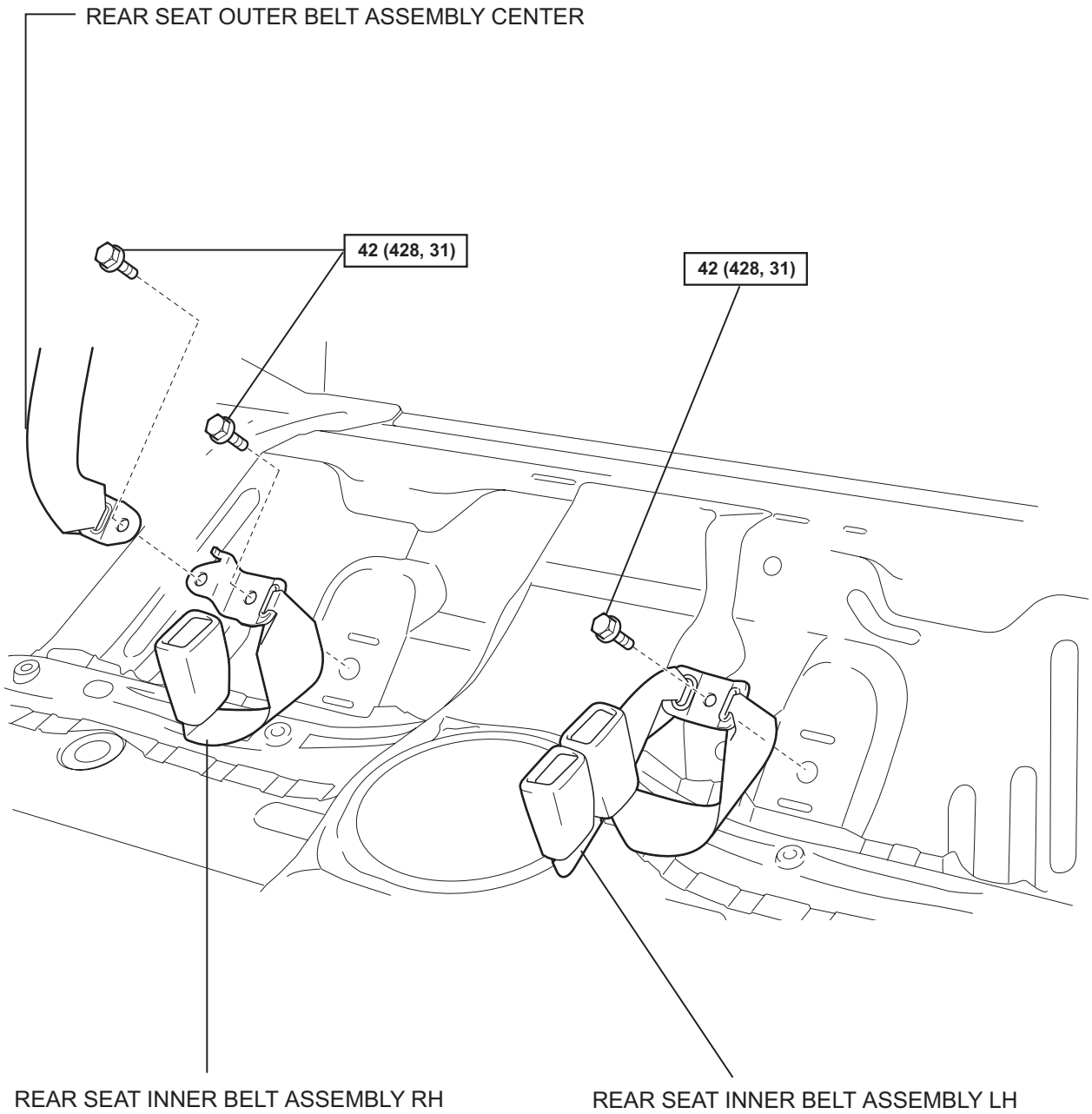

N*m (kgf*cm, ft.*lbf) : Specified torque

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REMOVAL

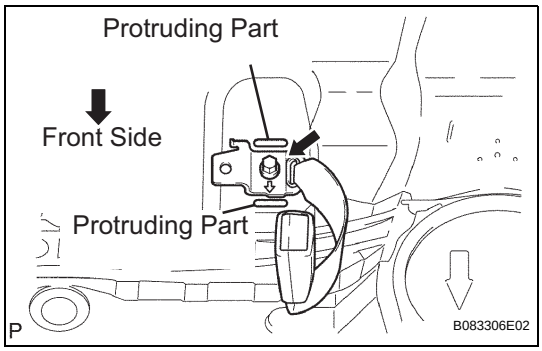
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE TONNEAU COVER ASSEMBLY**
3. **REMOVE DECK BOARD SUB-ASSEMBLY**
4. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
5. **REMOVE REAR SEAT INNER BELT ASSEMBLY LH**
   (a) Remove the bolt and inner belt.
6. **REMOVE REAR SEAT OUTER BELT ASSEMBLY CENTER**
   (a) Remove the bolt and anchor part of the outer belt assembly center.
7. **REMOVE REAR SEAT INNER BELT ASSEMBLY RH**
   (a) Remove the bolt and inner belt.
8. **REMOVE CHILD RESTRAINT SEAT TETHER ANCHOR COVER (See page SE-17)**
9. **REMOVE CHILD RESTRAINT SEAT TETHER ANCHOR BRACKET**
   (a) Remove the 2 bolts and 2 rope hooks.
   (b) Remove the No. 1 deck board.
   (c) Remove the rear No. 1 floor board.
   (d) Remove the 3 bolts and 3 anchor brackets.

SB

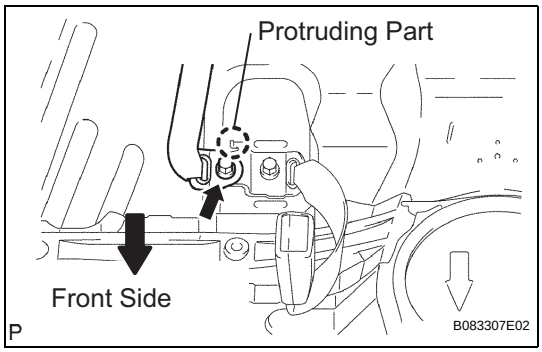
INSTALLATION

HINT:
A bolt without a torque specification is shown in the standard bolt chart (see page SS-2).

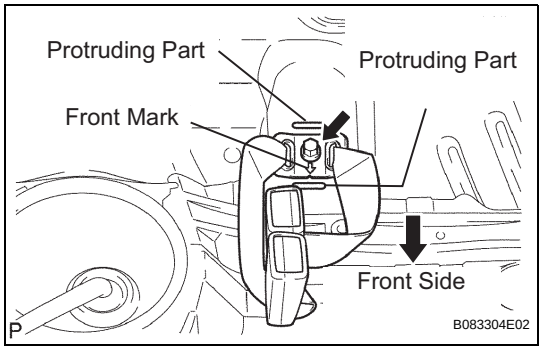
1. **INSTALL CHILD RESTRAINT SEAT TETHER ANCHOR BRACKET**
   (a) Install the 3 anchor brackets with the 3 bolts.
   Torque: 19.6 N*m (200 kgf*cm, 14 ft.*lbf)
   (b) Install the rear No. 1 floor board.
   (c) Install the No. 1 deck board.
   (d) Install the 2 rope hooks with the 2 bolts.
2. **INSTALL CHILD RESTRAINT SEAT TETHER ANCHOR COVER (See page SE-29)**
3. **INSTALL REAR SEAT INNER BELT ASSEMBLY RH**
   (a) Install the inner belt with the bolt.
   Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)
   NOTICE:
   Do not allow the anchor part to overlap onto the protruding part of the floor panel.



4. **INSTALL REAR SEAT OUTER BELT ASSEMBLY CENTER**
   (a) Install the anchor part of the outer belt with the bolt.
   Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)
   NOTICE:
   Do not allow the anchor part to overlap onto the protruding part of the inner belt RH.



5. **INSTALL REAR SEAT INNER BELT ASSEMBLY LH**
   (a) Install the inner belt with the bolt.
   Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)
   NOTICE:
   Do not allow the anchor part to overlap onto the protruding part of the floor panel.
6. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**
7. **INSTALL DECK BOARD SUB-ASSEMBLY**
8. **INSTALL TONNEAU COVER ASSEMBLY**
9. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**



10. PERFORM INITIALIZATION

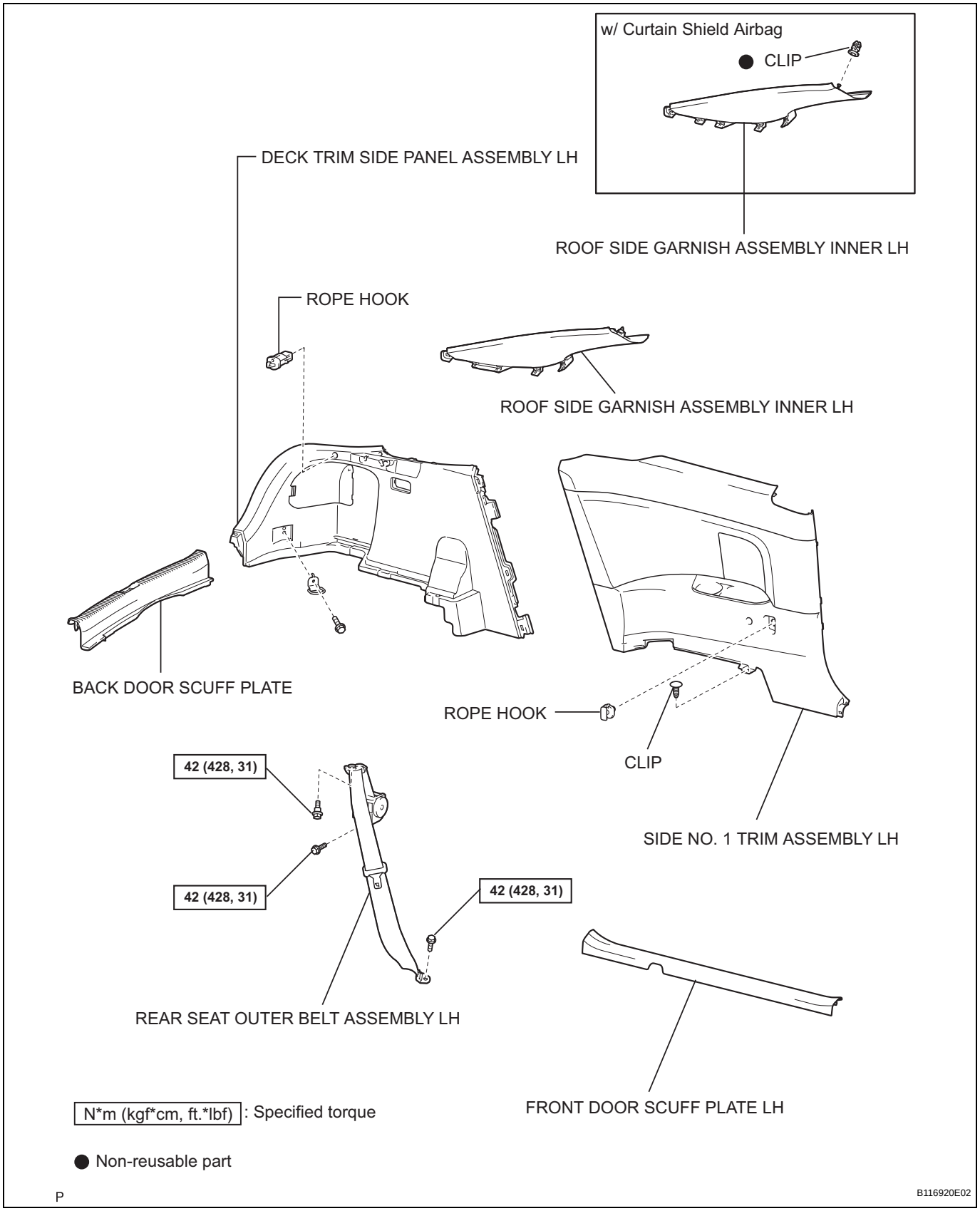
(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

REAR SEAT OUTER BELT ASSEMBLY

COMPONENTS



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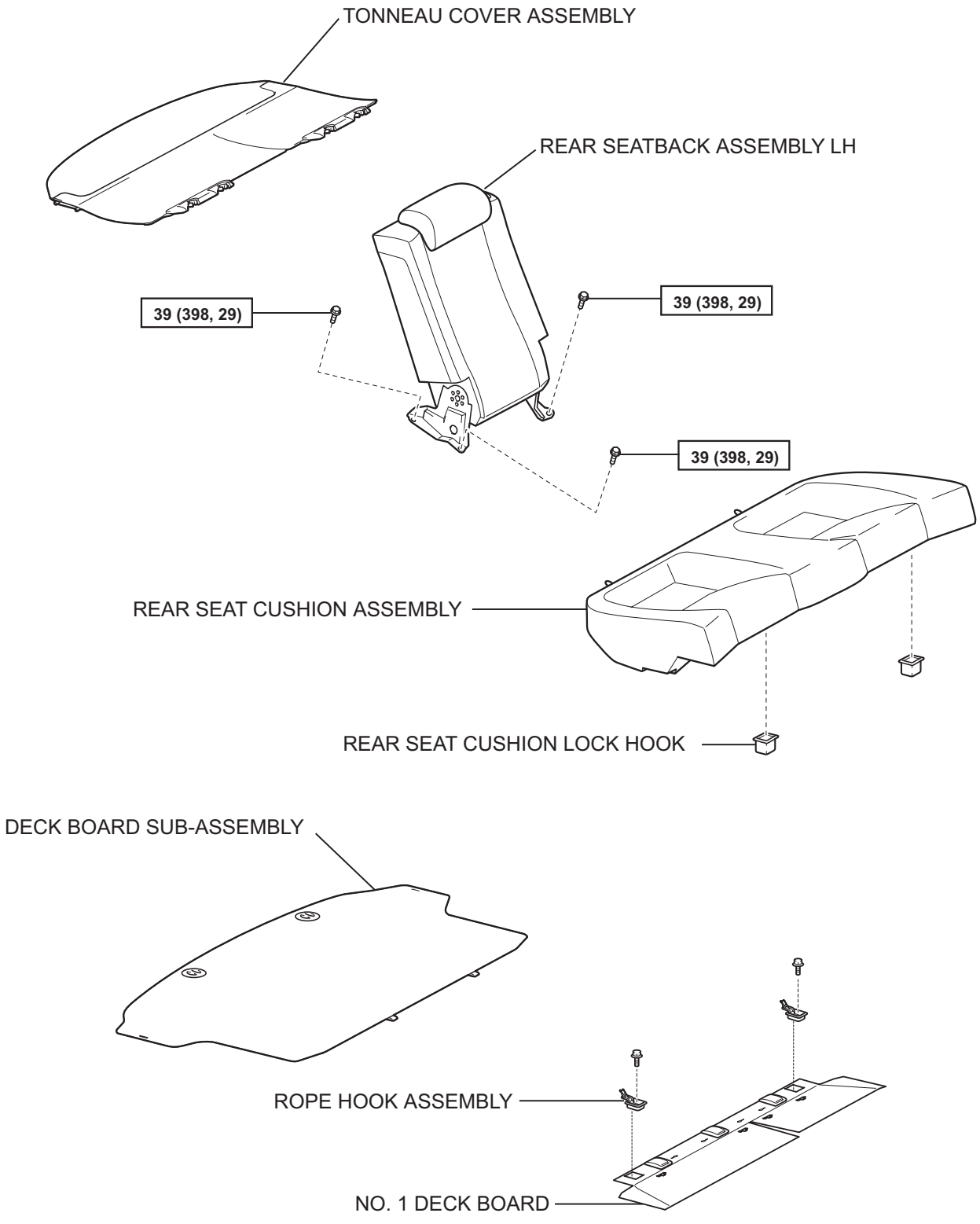

N*m (kgf*cm, ft.*lbf) : Specified torque

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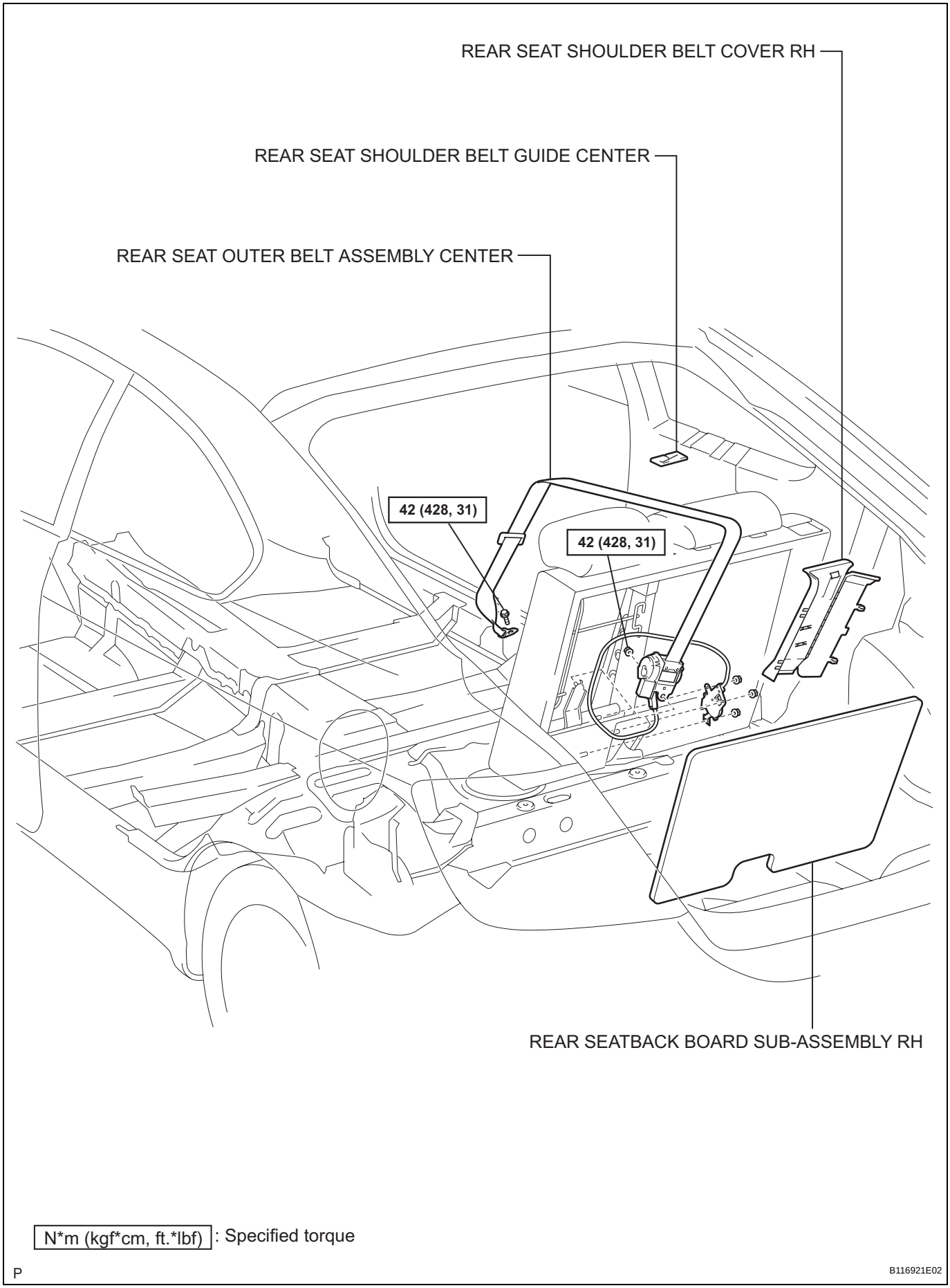

N*m (kgf*cm, ft.*lbf) : Specified torque

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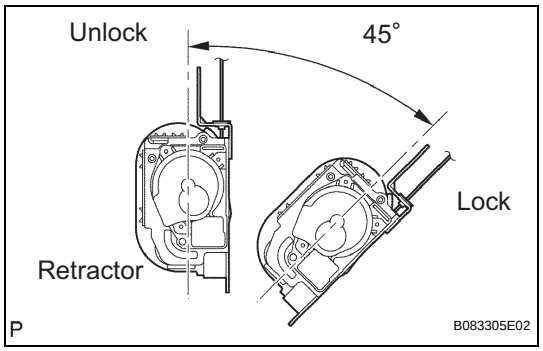
SB

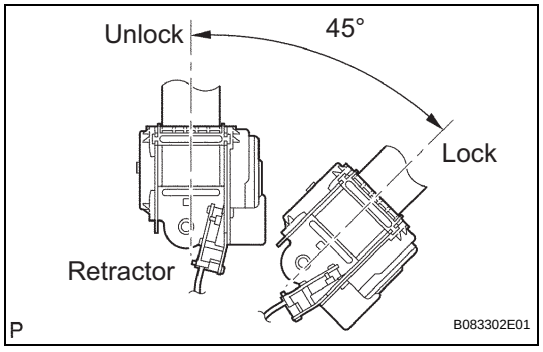
REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE TONNEAU COVER ASSEMBLY**
3. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
4. **REMOVE REAR SEATBACK ASSEMBLY LH (See page SE-17)**
5. **REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-9)**
6. **REMOVE SIDE NO. 1 TRIM ASSEMBLY LH (See page IR-10)**
7. **REMOVE BACK DOOR SCUFF PLATE (See page IR-8)**
8. **REMOVE DECK TRIM SIDE PANEL ASSEMBLY LH (See page IR-11)**
9. **REMOVE ROOF SIDE GARNISH ASSEMBLY INNER LH (See page IR-11)**
10. **REMOVE REAR SEAT OUTER BELT ASSEMBLY LH**
    (a) Remove the 3 bolts and outer belt.
11. **REMOVE DECK BOARD SUB-ASSEMBLY**
12. **REMOVE NO. 1 DECK BOARD**
    (a) Remove the 2 bolts and 2 rope hooks.
    (b) Remove the No. 1 deck board.
13. **REMOVE REAR SEAT OUTER BELT ASSEMBLY CENTER**
    (a) Remove the bolt and anchor part of the outer belt.
    (b) Remove the rear seat shoulder belt guide center (see page SE-20).
    (c) Remove the rear seatback board sub-assembly RH (see page SE-21).
    (d) Remove the rear seat shoulder belt cover RH (see page SE-22).
    (e) Remove the 4 nuts and outer belt (see page SE-22).





INSPECTION

1. INSPECT REAR SEAT OUTER BELT ASSEMBLY

NOTICE:

Do not disassemble the retractor.

(a) When the inclination of the retractor is 15°or less, check that the belt can be pulled from the retractor. When the inclination of the retractor is over 45°, check that the belt locks.
If the operation is not as specified, replace the belt.

2. INSPECT REAR SEAT OUTER BELT ASSEMBLY CENTER

NOTICE:

Do not disassemble the retractor.

(a) When the inclination of the retractor is 15°or less, check that the belt can be pulled from the retractor. When the inclination of the retractor is over 45°, check that the belt locks.
If the operation is not as specified, replace the belt.

SB

SB

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

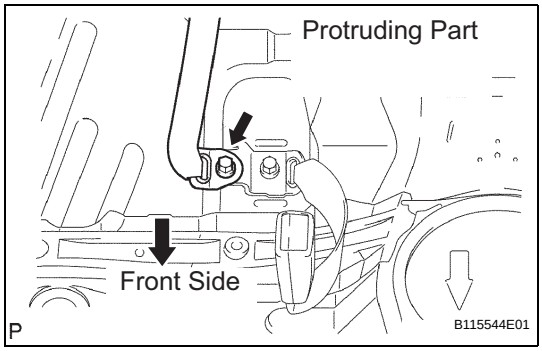
1. INSTALL REAR SEAT OUTER BELT ASSEMBLY LH

(a) Install the outer belt with the 4 nuts (see page SE-25).
Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)

(b) Install the rear seat shoulder belt cover RH (see page SE-25).

(c) Install the rear seatback board sub-assembly RH (see page SE-26).

(d) Install the rear seat shoulder belt guide center (see page SE-27).



(e) Install the anchor part of the outer belt with the bolt.
Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)
NOTICE:
Do not allow the anchor part to overlap onto the protruding part of the inner belt RH.

(f) With the belt installed, check that the belt locks when it is pulled out quickly.
NOTICE:
The check should be performed with the outer belt installed.
If the operation is not as specified, replace the belt.

(g) Check the fastening function of the child restraint system.
NOTICE:
The check should be performed with the outer belt installed.

(1) When the belt is pulled out fully, the belt should automatically try to retract.

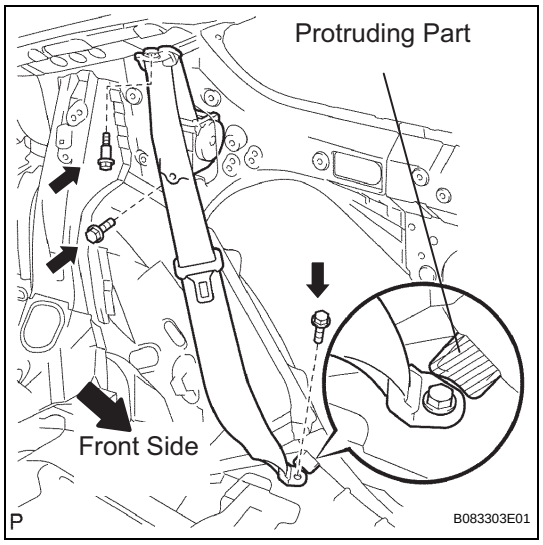
(2) After the belt has fully retracted, the belt should be able to be pulled out and retracted again.
If the operation is not as specified, replace the belt.

2. INSTALL NO. 1 DECK BOARD

(a) Install the No. 1 deck board.

(b) Install the 2 rope hooks with the 2 bolts.

3. INSTALL DECK BOARD SUB-ASSEMBLY



4. INSTALL REAR SEAT OUTER BELT ASSEMBLY LH

(a) Install the outer belt with the 3 bolts.
Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)
NOTICE:
Do not allow the anchor part to overlap onto the protruding part of the floor panel.

(b) With the belt installed, check that the belt locks when it is pulled out quickly.
NOTICE:
The check should be performed with the outer belt assembly installed.
If operation is not as specified, replace the belt.

(c) Check the fastening function of the child restraint system.
NOTICE:
The check should be performed with the outer belt assembly installed.
(1) When the belt is pulled out fully, the belt should automatically try to retract.
(2) After the belt has fully retracted, the belt should be able to be pulled out and retracted again.
If the operation is not as specified, replace the belt.

5. INSTALL ROOF SIDE GARNISH ASSEMBLY INNER LH (See page IR-17)

6. INSTALL DECK TRIM SIDE PANEL ASSEMBLY LH (See page IR-18)

7. INSTALL BACK DOOR SCUFF PLATE (See page IR-21)

8. INSTALL SIDE NO. 1 TRIM ASSEMBLY LH (See page IR-19)

9. INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-20)

10. INSTALL REAR SEATBACK ASSEMBLY LH (See page SE-28)

11. INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)

12. INSTALL TONNEAU COVER ASSEMBLY

13. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

14. PERFORM INITIALIZATION

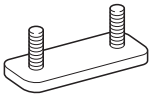
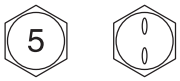
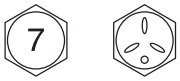
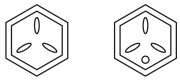
(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

SB

STANDARD BOLT

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	No Mark		4T
					5T
	w/ Washer	w/ Washer			6T
					7T
					8T
					9T
					10T
					11T

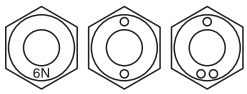
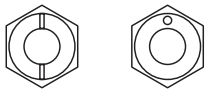
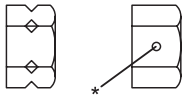
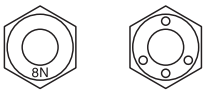
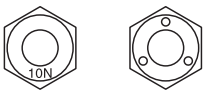
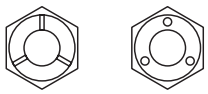
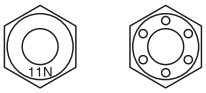
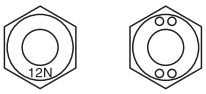
SS

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter (mm)	Pitch (mm)	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N*m	kgf*cm	ft.*lbf	N*m	kgf*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

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 greater) as the bolt strength classification number when tightening parts with a bolt and nut.

Example:

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

2AZ-FE ENGINE CONTROL SYSTEM

SERVICE DATA

Mass air flow meter : Standard resistance (4 (THA) - 5 (E2))	13.6 to 18.4 kΩ at -20 °C (-4°F) 2.21 to 2.69 kΩ at 20 °C (68°F) 0.493 to 0.667 kΩ at 60°C (140°F)
Camshaft timing oil control valve : Standard resistance (1 (+B) - 2 (GND))	6.9 to 7.9 kΩ at 20 °C (68°F)
Camshaft position sensor : Standard resistance (1 (G+) - 2 (G-))	835 to 1,400 Ω at cold 1,060 to 1,645 Ω at hot
Crankshaft position sensor : Standard resistance (1 (Ne+) - 2 (Ne-))	985 to 1,600 Ω at cold 1,265 to 1,890 Ω at hot
Engine coolant temperature sensor : Standard resistance (1 (E2) - 2 (THW))	2.32 to 2.59 kΩ at 20 °C (68°F) 0.310 to 0.326 kΩ at 80°C (176°F)
Throttle body : Standard resistance (1 (M-) - 2 (M+)	0.3 to 100 kΩ at 20 °C (68°F)
Knock sensor : Standard resistance (1 (Ground) - 2 (Output)	120 to 280 kΩ at 20 °C (68°F)
Accelerator pedal (ACCEL POS #1) : Standard voltage	0.5 to 1.1 V (accelerator pedal released) 2.5 to 4.5 V (accelerator pedal depressed)
Accelerator pedal (ACCEL POS #2) : Standard voltage	1.2 to 2.0 V (accelerator pedal released) 3.4 to 5.0 V (accelerator pedal depressed)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Camshaft timing oil control valve x Timing chain cover	9.0	92	80 in.*lbf
Engine coolant temperature sensor x Cylinder head	19.6	200	14
Camshaft position sensor x Cylinder head	9.0	92	80 in.*lbf
Crankshaft position sensor x Timing chain cover	9.0	92	80 in.*lbf
Throttle body x Intake manifold	30	305	22
Engine cover x Cylinder head cover	7.0	71	62 in.*lbf
Knock sensor x Cylinder block	20	205	15
Intake manifold x Cylinder head	30	305	22
Cowl top panel outer x Body	13	135	10
No. 2 ECM bracket x ECM	3.0	30	27 in.*lbf
No. 1 ECM bracket x ECM	3.0	30	27 in.*lbf
No. 1 ECM bracket x Heater case	3.0	30	27 in.*lbf
No. 2 ECM bracket x Instrument panel reinforcement	5.0	50	44 in.*lbf
Accelerator pedal x Body	5.4	55	48 in.*lbf

2AZ-FE ENGINE MECHANICAL

SERVICE DATA

Standard ignition timing				5 to 15° BTDC at idle
Standard idle speed			A/T	610 to 710 rpm
			M/T	650 to 750 rpm
Compression			Standard pressure	1,300 kPa (13.3 kgf/cm^2, 189 psi)
			Minimum pressure	1,000 kPa (10.2 kgf/cm^2, 145 psi)
			Difference between each cylinder	100 kPa (1.0 kgf/cm^2, 14 psi)
Valve clearance (cold condition)	No. 1 cylinder TDC/ Compression	Intake	-	0.19 to 0.29 mm (0.0075 to 0.0114 in.)
		Exhaust	-	0.30 to 0.40 mm (0.0118 to 0.0158 in.)
	No. 4 cylinder TDC/ Compression	Intake	-	0.19 to 0.29 mm (0.0075 to 0.0114 in.)
		Exhaust	-	0.30 to 0.40 mm (0.0118 to 0.0158 in.)
Chain sub-assembly	Chain elongation		Minimum chain elongation	122.6 mm (4.827 in.)
Chain tensioner slipper	Wear		Minimum	1.0 mm (0.039 in.)
No. 1 chain vibration damper	Wear		Minimum	1.0 mm (0.039 in.)
Crankshaft timing sprocket	Minimum gear diameter (with chain)		Minimum	51.6 mm (2.031 in)
Oil pump drive gear	Gear diameter (with chain)		Minimum	48.2 mm (1.898 in)
Oil pump drive shaft gear	Gear diameter (with chain)		Minimum	48.2 mm (1.898 in)
Cylinder head	Warpage		Maximum	0.08 mm (0.0032 in.)
No. 1 camshaft (intake)	Circle runout		Maximum	0.03 mm (0.0012 in.)
	Cam lobes height		Standard	46.495 to 46.595 mm (1.8305 to 1.8345 in.)
			Minimum	46.385 mm (1.8262 in.)
	Camshaft journal diameter	No. 1 journal	-	35.971 to 35.985 mm (1.4162 to 1.4167 in.)
		Other journal	-	22.959 to 22.975 mm (0.9039 to 0.9045 in.)
	Thrust clearance		Standard	0.040 to 0.095 mm (0.0016 to 0.0037 in.)
			Maximum	0.11 mm (0.0043 in.)
	Oil clearance	No. 1 journal	Standard	0.007 to 0.038 mm (0.0003 to 0.0015 in.)
			Maximum	0.07 mm (0.0028 in.)
		Other journal	Standard	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
			Maximum	0.10 mm (0.0039 in.)

No. 2 camshaft (exhaust)	Circle runout		Maximum	0.03 mm (0.0012 in.)
	Cam lobes		Standard	45.983 to 46.083 mm (1.8104 to 1.8143 in.)
			Minimum	45.873 mm (1.8060 in.)
	Camshaft journal diameter	No. 1 journal	-	5.971 to 35.985 mm (1.4162 to 1.4167 in.)
		Other journal	-	22.959 to 22.975 mm (0.9039 to 0.9045 in.)
	Thrust clearance		Standard	0.080 to 0.135 mm (0.0032 to 0.0053 in.)
			Maximum	0.15 mm (0.0059 in.)
	Oil clearance	No. 1 journal	Standard	.040 to 0.079 mm (0.0016 to 0.0031 in.)
			Maximum	0.10 mm (0.0039 in.)
		Other journal	Standard	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
			Maximum	0.10 mm (0.0039 in.)
Valve lifter	Diameter			30.966 to 30.976 mm (1.2191 to 1.2195 in.)
	Bore diameter (cylinder head)			31.009 to 31.025 mm (1.2208 to 1.2215 in.)
	Oil clearance		Standard	0.033 to 0.059 mm (0.0013 to 0.0023 in.)
			Maximum	0.079 mm (0.0031 in.)
Inner compression spring	Free length			4.7 mm (1.799 in.)
	Deviation		Maximum	1.6 mm (0.063 in.)
	Angle (reference)		Maximum	2°
Intake valve	Overall length		Standard	101.71 mm (4.0043 in.)
			Minimum	101.21 mm (3.9846 in.)
	Valve stem diameter			5.470 to 5.485 mm (0.2154 to 0.2159 in.)
	Valve head margin thickness		Standard	1.0 mm (0.039 in.)
			Minimum	0.50 mm (0.0197 in.)
Exhaust valve	Overall length		Standard	101.15 mm (3.9823 in.)
			Minimum	100.70 mm (3.9646 in.)
	Valve stem diameter			5.465 to 5.480 mm (0.2152 to 0.2158 in.)
	Valve head margin thickness		Standard	1.0 mm (0.039 in.)
			Minimum	0.50 mm (0.0197 in.)
Intake valve guide bush	Bush inside diameter			5.510 to 5.530 mm (0.2169 to 0.2177 in.)
	Oil clearance		Standard	0.025 to 0.060 mm (0.0010 to 0.0024 in.)
			Maximum	0.08 mm (0.0032 in.)
Exhaust valve guide bush	Bush inside diameter			5.510 to 5.530 mm (0.2169 to 0.2177 in.)
	Oil clearance		Standard	0.030 to 0.065 mm (0.0012 to 0.0026 in.)
			Maximum	0.10 mm (0.0039 in.)
Cylinder head set bolt	Bolt length		Standard	161.3 to 162.7 mm (6.350 to 6.406 in.)
			Maximum	164.2 mm (6.465 in.)

Intake valve guide bush	Bush bore diameter (cylinder head)		Standard	10.285 to 10.306 mm (0.4049 to 0.4058 in.)
	Protrusion height		Standard	9.6 to 10 mm (0.3780 to 0.3937 in.)
	Oil clearance		Standard	0.025 to 0.060 mm (0.0010 to 0.0024 in.)
Exhaust valve guide bush	Bush bore diameter (cylinder head)		Standard	10.285 to 10.306 mm (0.4049 to 0.4058 in.)
	Protrusion height		Standard	9.6 to 10.0 mm (0.3780 to 0.3937 in.)
	Oil clearance		Standard	0.030 to 0.065 mm (0.3780 to 0.3937 in.)
Ring pin	Protrusion height			3.0 mm (0.12 in.)
Balanceshaft	Thrust clearance		Standard	0.05 to 0.09 mm (0.0020 to 0.0035 in.)
			Maximum	0.09 mm (0.0035 in.)
	Oil clearance		Standard	0.004 to 0.049 mm (0.0002 to 0.0019 in.)
			Maximum	0.049 mm (0.0019 in.)
Connecting rod	Thrust clearance		Standard	0.160 to 0.362 mm (0.0063 to 0.0143 in.)
			Maximum	0.362 mm (0.0143 in.)
	Oil clearance		Standard	0.024 to 0.048 mm (0.0009 to 0.0019 in.)
			Maximum	0.08 mm (0.0032 in.)
	Large end bore diameter	Mark 1	-	51.000 to 51.007 mm (2.0079 to2.0082 in.)
		Mark 2	-	51.008 to 51.013 mm (2.0082 to 2.0084 in.)
		Mark 3	-	51.014 to 51.020 mm (2.0084 to 2.0087 in.)
	Bearing thickness	Mark 1	-	1.485 to 1.488 mm (0.0585 to 0.0586 in.)
		Mark 2	-	1.489 to 1.419 mm (0.0586 to 0.0587 in.)
		Mark 3	-	1.492 to 1.494 mm (0.0587 to 0.0588 in.)
Crankshaft	Thrust clearance		Standard	0.04 to 0.24 mm (0.0016 to 0.0095 in.)
			Maximum	0.30 mm (0.0118 in.)
Cylinder block	Warpage		Maximum	0.05 mm (0.0020 in.)
	Bore diameter		Standard	88.500 to 88.513 mm (3.4843 to3.4848 in.)
			Maximum	8.633 mm (3.4895 in.)
Piston	Diameter		Standard	88.439 to 88.449 mm (3.4819 to 3.4822 in.)
	Oil clearance		Standard	0.051 to 0.074 mm (0.0020 to 0.0029 in.)
			Maximum	0.10 mm (0.0039 in.)

SS

Piston ring	Groove clearance	No. 1 ring	-	0.17 to 0.22 mm (0.0067 to 0.0087 in.)
		No. 2 ring	-	0.17 to 0.21 mm (0.0067 to 0.0083 in.)
		Oil ring	-	0.21 to 0.29 mm (0.0083 to 0.0114 in.)
	End gap	No. 1 ring	Standard	0.22 to 0.32 mm (0.0087 to 0.0126 in.)
		No. 2 ring		0.50 to 0.60 mm (0.0197 to 0.0236 in.)
		Oil ring		0.10 to 0.35 mm (0.0039 to 0.0138 in.)
		No. 1 ring	Maximum	0.89 mm (0.0350 in.)
		No. 2 ring		1.35 mm (0.0531 in.)
		Oil ring		0.73 mm (0.0287 in.)
Piston pin	Bore diameter		Standard	22.001 to 22.010 mm (0.8662 to 0.8665 in.)
	Piston pin diameter		Standard	21.997 to 22.006 mm 0.8660 to 0.8664 in.)
	Connecting rod small end diameter		Standard	22.005 to 22.014 mm (0.8663 to 0.8667 in.)
Connecting rod	Bend		Maximum	0.05 mm (0.0020 in.) per 100 mm (3.94 in.)
	Twist		Maximum	0.15 mm (0.0059 in.) per 100 mm (3.94 in.)
Connecting rod bolt	Tension portion diameter		Standard	7.2 to 7.3 mm (0.283 to 0.287 in.)
			Maximum	7.0 mm (0.276 in.)
Crankshaft	Diameter (main journal)		Standard	54.998 to 55.000 mm (2.1649 to 2.1654 in.)
	Taper and distortion (main journal)		Maximum	0.003 mm (0.0001 in.)
	Diameter (crank pin)		Standard	47.990 to 48.000 mm (1.8894 to 1.8898 in.)
	Taper and distortion (crank pin)		Maximum	0.003 mm (0.0001 in.)
	Oil clearance		Standard	0.017 to 0.040 mm (0.0007 to 0.0016 in.)
			Maximum	0.050 mm (0.0020 in.)
Crankshaft bearing cap set bolt	Tension portion diameter		Standard	7.5 to 7.6 mm (0.295 to 0.299 in.)
			Maximum	7.5 mm (0.295 in.)

TORQUE SPECIFICATIONS

Valve clearance

Part Tightened	N*m	kgf*cm	ft.*lbf
No. 1 camshaft bearing cap x Cylinder head sub-assembly	29.5	301	22
No. 2 camshaft bearing cap x Cylinder head sub-assembly	29.5	301	22
No. 3 camshaft bearing cap x Cylinder head sub-assembly	9.0	92	80 in.*lbf
No. 2 camshaft timing sprocket x No. 2 camshaft	54	551	40
No. 1 chain tensioner assembly x Timing chain cover sub-assembly	9.0	92	80 in.*lbf

Timing chain

Part Tightened		N*m	kgf*cm	ft.*lbf
No. 1 and No. 2 engine hanger x Cylinder head sub-assembly		38	387	28
Chain tensioner plate x Cylinder block		12	122	9
Oil pump drive shaft gear x Cylinder block		29.5	301	22
No.1 chain vibration damper x Cylinder block		9.0	92	80 in.*lbf
Chain tensioner slipper x Cylinder block		19	194	14
Timing chain guide x Cylinder block		9.0	92	80 in.*lbf
Timing chain cover sub-assembly x Cylinder block	Bolt A = 10 mm head	9.0	92	80 in.*lbf
	Bolt B= 12 mm head	25	255	18
	Bolt C= 14 mm head, 40 mm (1.57 in.) underhead length	55	561	41
	Nut	11	122	8
Stud bolt (for V-ribbed belt) x Cylinder block		21.5	219	16
No. 1 chain tensioner x Timing chain tensioner sub-assembly		9.0	92	80 in.*lbf
Crankshaft pulley x Crankshaft		80	1,835	133
Oil pan sub-assembly x		9.0	92	80 in.*lbf
V-ribbed belt tensioner assembly x Cylinder block		59.5	607	44
Cylinder head cover sub-assembly x Cylinder head	Bolt A	11	112	8
	Bolt = B (ignition coil side)	14	143	10
	Nut	11	112	8
Engine mounting insulator RH X Cylinder head, Body panel		52	530	38
Front engine mounting insulator x Front engine mounting bracket		52	530	38
No. 1 oil reservoir bracket x Body panel		7.8	80	69 in.*lbf
Radiator reservoir x Body panel		5.0	51	44 in.*lbf
No. 1 engine cover sub-assembly x Cylinder head cover sub-assembly		7.0	71	62 in.*lbf

Cylinder head

Part Tightened		N*m	kgf*cm	ft.*lbf
Stud bolt x Cylinder head	Front side Bolt A = 33.3 mm (1.31 in.) length	5.0	51	44 in.*lbf
	Upper side Bolt B = 46.5 mm (1.95 in.) length	5.0	51	44 in.*lbf
	Intake side Bolt C =49.5 in.) mm (1.9.5 in.) length	9.5	97	84 in.*lbf
	Exhaust side Bolt D = 37.5 mm (1.48in.) length	9.5	97	84 in.*lbf
Cylinder head x Cylinder block	1 st	78.5	800	58
	2 nd	Turn 90°	Turn 90°	Turn 90°
Camshaft timing gear assembly x Camshaft		54	551	40
No. 2 camshaft timing sprocket x No. 2 camshaft		54	551	40
No. 1 and No. 2 camshaft bearing cap x Cylinder head		29.5	301	22
No. 1 camshaft bearing cap x Cylinder head		9.0	92	80 in.*lbf
Exhaust manifold converter sub-assembly x Cylinder head		37	377	27
No. 1 exhaust manifold heat insulator x Exhaust manifold converter sub-assembly		12	122	9
No. 2 manifold stay x Exhaust manifold converter sub-assembly, Cylinder block		44	449	32
Manifold stay x Exhaust manifold converter sub-assembly, Cylinder block		44	449	32
Oil dipstick guide x No. 1 water by-pass pipe		9.0	92	80 in.*lbf

Engine assembly

Part Tightened		N*m	kgf*cm	ft.*lbf
Radio setting condenser x Cylinder head		10	102	7
No. 1 water by-pass pipe x Cylinder block		9.0	92	80 in.*lbf
Drive shaft bearing bracket x Cylinder block		64	653	47
Flywheel sub-assembly x Crankshaft		130	1,326	96
Drive plate sub-assembly x Crankshaft		98	1,000	72
Rear engine mounting insulator x Rear engine mounting bracket		87	887	64
Front engine mounting insulator x Front engine mounting bracket		52	530	38
Engine mounting insulator LH x Engine mounting bracket LH		87	887	64
Engine mounting insulator RH x Cylinder head		52	530	38
Engine mounting insulator RH x Engine mounting bracket RH		113	1,152	83
Center member x Body		45	459	33
Front suspension crossmember sub-assembly x Body		133	1,356	98
Front suspension member brace rear RH and LH x Body	Bolt A	133	1,356	98
	Bolt B	80	816	59
Battery carrier X Body		12.8	131	9
Air cleaner case sub-assembly x Body		5.0	51	44 in.*lbf

Engine unit

Part Tightened		N*m	kgf*cm	ft.*lbf
Connecting rod cap x Connecting rod		24.5	250	18
Crankshaft bearing cap x Cylinder block		40	408	30
Stud bolt x Cylinder block	Bolt A (Bolt length = 84 mm (3.31 in.)	5.0	51	44 in.*lbf
	Bolt B (Bolt length = 33.3 mm (1.31 in.)	21.5	219	16
	Bolt C (Bolt length = 52.5 mm (2.07 in.)	5.0	51	44 in.*lbf
	Bolt D (Bolt length = 27.5 mm (1.08 in.)	9.5	97	84 in.*lbf
Crankshaft bearing cap x Cylinder block		40	408	30
Baranceshaft housing x Stiffening crankcase assembly		21.6	224	16
Stiffening crankcase assembly x Cylinder block		32.5	331	24
No. 1 taper screw plug x Cylinder block		26	265	19
Plug (oil control valve filter) x Cylinder block		30	306	22
Water drain cock plug x Cylinder block		25	255	18
Cylinder head sub-assembly x Cylinder block	1 st	78.5	800	58
	2 nd	Turn 90°	Turn 90°	Turn 90°
Camshaft timing oil control valve assembly x Cylinder head		9.0	92	80 in.*lbf
Oil drain plug x Oil pan sub-assembly		40	408	30
Oil filer union x Stiffening crankcase assembly		29.5	301	22
Cylinder head cover sub-assembly x Cylinder head	Bolt A	11	112	8
	Bolt B (ignition coil side)	14	143	10
Ventilation valve sub-assembly x Cylinder head cover sub-assembly		19	194	14
Oil filer cap sub-assembly x Cylinder head cover sub-assembly		19	194	14

2AZ-FE FUEL

SERVICE DATA

Fuel pressure			304 to 343 kPa (3.1 to 3.5 kgf/cm^2, 44 to 50 psi
Fuel injector	Resistance	at 20°C (68°F)	11.6 to 12.4 Ω
	Injection volume		76 to 92 cm^3 (4.6 to 5.6 cu in.) per 15 seconds
	Difference between each cylinder		16 cm^3 (1.0 cu in.) or less
	Fuel leakage		1 drop or less per 12 minutes
Fuel pump	Resistance	at 20°C (68°F)	0.2 to 3.0 Ω

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Fuel delivery pipe x Cylinder head	20	205	15
Fuel pressure pulsation damper x Fuel delivery pipe	9.0	90	80 kgf*cm
Fuel tank vent tube set plate x Fuel tank assembly	6.0	60	53 kgf*cm
Fuel tank protector x Fuel tank assembly	6.0	60	53 kgf*cm
No. 4 fuel tube clamp x Fuel tank assembly	6.0	60	53 kgf*cm
Fuel tank band x Body	39	400	29
Rear suspension brace lower RH x Body	63.5	645	47
Rear suspension brace lower LH x Body	63.5	645	47
No. 1 fuel tank protector x Body	5.4	55	48 in.*lbf

2AZ-FE EMISSION CONTROL

SERVICE DATA

Purge VSV

Tester Connection	Specified Condition
1 - 2	30 to 34Ω at 20°C (68°F)
1 - Body ground 2 - Body ground	10 MΩ or higher

Air fuel ratio sensor

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	1.8 to 3.4 Ω at 20°C (68°F)
1 (HT) - 4 (AF-)	10 kΩ or higher

Heated oxygen sensor

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
1 (HT) - 4 (E)	10 kΩ or higher

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Canister assembly x Body	19	194	14
No. 1 fuel tank protector x Fuel tank	5.4	55	48 in.*lbf
Center exhaust pipe assembly x Front exhaust pipe assembly	43	440	32
Center exhaust pipe assembly x Rear exhaust pipe assembly	43	440	32
Front floor panel brace x Body	29.6	300	22
Canister filter sub-assembly x Body	8.0	82	71 in.*lbf
No. 1 engine cover sub-assembly x Engine	7.0	70	62 in.*lbf
Ventilation valve sub-assembly x Cylinder head	19	194	14
Air fuel ratio sensor (for bank 1 sensor 1) x Exhaust manifold : for use with SST	40	408	30
Air fuel ratio sensor (for bank 1 sensor 1) x Exhaust manifold : for use without SST	44	449	32
Heated oxygen sensor (for bank 1 sensor 2) x Exhaust manifold : for use with SST	40	408	30
Heated oxygen sensor (for bank 1 sensor 2) x Exhaust manifold : for use without SST	44	449	32

2AZ-FE EXHAUST

SERVICE DATA

Compression spring	
Front exhaust pipe side	40 mm (1.57 in.)
Center exhaust pipe side	38.5 mm (1.516 in.)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Front exhaust pipe assembly x Exhaust manifold	43	440	32
Center exhaust pipe assembly x Front exhaust pipe assembly	43	440	32
Tailpipe assembly x Center exhaust pipe assembly	43	440	32
Front floor panel brace x Body	29.6	300	22

2AZ-FE COOLING

SERVICE DATA

Thermostat	Valve opening temperature		80 to 84°C (176 to 183°F)
	Valve lift	at 95°C (203°F)	10 mm (0.39 in.) or more
Radiator cap	Standard opening pressure		74 to 103 kPa (0.75 to 1.05 kgf*cm^2, 10.7 to 14.9 psi)
	Minimum opening pressure		59 kPa (0.6 kgf*cm^2, 8.6 psi)
Fan	Standard amperage	at 20°C (68°F)	5.2 to 8.2 A
No. 2 fan	Standard amperage	at 20°C (68°F)	5.2 to 8.2 A
No. 1 Cooling fan relay	Resistance	3 - 5	10 kΩ or higher
		3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)
No. 2 cooling fan relay	Resistance	3 - 4	Below 1 Ω
		3 - 5	10 kΩ or higher
		3 - 4	10 kΩ or higher (when battery voltage is applied to terminals 1 and 2)
		3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Cylinder block water drain cock plug x Cylinder block water drain cock	12.7	129	9
Water pump x Cylinder block	9.0	92	80 in.*lbf
Water pump pulley x Water pump	26	265	19
Water inlet x Cylinder block	9.0	92	80 in.*lbf
Fan shroud x Radiator	5.0	51	44 in.*lbf
Radiator support upper x body	19	194	14

2AZ-FE LUBRICATION

SERVICE DATA

Oil pressure	Idling		29 kPa (0.3 kgf/cm^2, 4.3 psi) or more
	At 3,000 rpm		245 to 539 kPa (2.5 to 5.5 kgf/cm^2, 36 to 78 psi)
Add new oil	Standard capacity	Drain and refill with oil filter change	3.8 liters (4.0 US qts, 3.3 lmp. qts)
		Drain and refill without oil filter change	3.6 liters (3.8 US qts, 3.2 lmp. qts)
		Dry fill	4.5 liters (4.88 US qts, 4.0 lmp. qts)
Oil pump rotor	Side clearance	Standard	0.100 to 0.170 mm (0.0039 to 0.0067 in.)
		Maximum	0.325 mm (0.0128 in.)
	Tip clearance	Standard	0.080 to 0.160 mm (0.0031 to 0.0063 in.)
		Maximum	0.35 mm (0.0138 in.)
	Body clearance	Standard	0.100 to 0.170 mm (0.0039 to 0.0067 in.)
		Maximum	0.325 mm (0.01128 in.)

TORQUE SPECIFICATIONS

Lubrication system

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil pressure switch x Cylinder head	15	153	11

Oil filter

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil filter x Stiffening crankcase	17.2	175	13
Oil pan drain plug x Oil pan	40	408	30

Oil pump

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil pump cover x Oil pump	8.8	90	78 in.*lbf
Oil pump relief valve x Oil pump	49	500	36
Oil pump strainer set x Oil pump	8.8	90	78 in.*lbf
Oil pump x Stiffening crankcase	19	194	14

2AZ-FE IGNITION

SERVICE DATA

Spark plug	Standard electrode gap	1.0 to 1.1 mm (0.039 to 0.043 in.) for new spark plug
	Maximum electrode gap	1.3 mm (0.051 in.) for used spark plug

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Spark plug x Cylinder head sub-assembly	19	195	14
Ignition coil assembly x Cylinder head cover	9.0	92	80 in.*lbf

2AZ-FE STARTING

SERVICE DATA

Starter assembly	Standard current		90 A or less at 11.5 V
Starter relay	Standard resistance	3 - 5	10 kΩ or higher
		3 - 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)
Ignition switch	Standard resistance	-	10 kΩ or higher
		2 (AM1) - 3 (ACC)	Below 1 Ω at ACC
		2 (AM1) - 3 (ACC)	Below 1 Ω at ON
		3 (ACC) - 4 (IG1)	Below 1 Ω at ON
		7 (AM2) - 6 (IG2)	Below 1 Ω at ON
		2 (AM1) - 4 (IG1)	Below 1 Ω at START
		4 (IG1) - 1 (ST1)	Below 1 Ω at START
		7 (AM2) - 6 (IG2) - 8 (ST2)	Below 1 Ω at START
Starter magnetic switch assembly	Standard resistance	50 - C	Below 1 Ω
		50 - Body	Below 2 Ω
Starter armature assembly	Standard resistance	Segment	Below 1 Ω
		Segment - Coil core	10 kΩ or higher
Starter armature assembly	Commutator depth	Standard	3.1 mm (0.354 in.)
		Maximum	3.8 mm (0.150 in.)
Starter commutator end frame	Brush length	Standard length	9.0 mm (0.354 in.)
		Maximum length	4.0 mm (0.158 in.)
	Standard resistance	Positive (+) - Negative (-)	10 kΩ or higher
Snap ring	Maximum length		4.0 mm (0.158 in.)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Lead wire x Terminal C	10	100	7
Starter assembly x Cylinder block sub-assembly	37	380	27
Starter wire x Starter assembly x Engine mounting bracket LH	9.8	100	7
Starter commutator end frame x Starter drive housing assembly	6.0	60	53 in.*lbf
Starter magnetic switch assembly x Starter drive housing assembly	7.5	76	66 in.*lbf

2AZ-FE CHARGING

SERVICE DATA

Battery	Standard voltage		12.5 to 12.9 V at 20°C (68°F)
Charging circuit without load	Standard amperage		10 A or less at 2,000 rpm
	Standard voltage		13.2 to 14.8 V at 2,000 rpm
Charging circuit with load	Standard amperage		30 A or more
Generator brush holder assembly	Brush length	Standard length	9.5 to 11.5 mm (0.374 to 0.453 in.)
		Minimum length	4.5 mm (0.177 in.)
Generator rotor assembly	Standard resistance	Slip ring	2.3 to 2.7 Ω at 20°C (68°F)
		Slip ring - Rotor core	10 kΩ or higher
	Slip ring diameter	Standard diameter	14.2 to 14.4 mm (0.559 to 0.567 in.)
		Minimum diameter	14.0 mm (0.551 in.)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Wire harness clamp bracket x Generator assembly	8.4	85	74 in.*lbf
Generator wire x Generator assembly : for bolt A	21	215	16
Generator wire x Generator assembly : for bolt B	52	530	38
Generator wire x Generator assembly	9.8	100	7
Generator rectifier end frame x Generator drive end frame	5.8	60	51 in.*lbf
Cord clip x Generator rectifier end frame	4.56	45	40 in.*lbf
Generator brush holder assembly x Generator rectifier end frame	1.76	15	16 in.*lbf
Generator rear end cover x Generator rectifier end frame	4.6	45	41 in.*lbf
Generator pulley x Generator rotor assembly	110.3	1,125	82

U241E AUTOMATIC TRANSAXLE

SERVICE DATA

Line pressure Engine idling	D position	372 to 412 kPa (3.8 to 4.2 kgf*cm^2, 54 to 60 psi)
	R position	672 to 742 kPa (6.9 to 7.6 kgf*cm^2, 97 to 108 psi)
Line pressure AT stall (Throttle valve fully opened)	D position	931 to 1031 kPa (9.5 to 10.5 kgf*cm^2, 135 to 150 psi)
	R position	1768 to 1968 kPa (18.0 to 20.1 kgf*cm^2, 256 to 285 psi)
Engine stall revolution	D and R positions	2420 to 2720 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 700 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch runout	Max.	0.30 mm (0.0118 in.)
Differential oil seal drive in depth	LH side	- 0.5 to 0.5 mm (- 0.020 to 0.020 in.)
	RH side	- 0.5 to 0.5 mm (- 0.020 to 0.020 in.)
Shift schedule		
D position		
(Throttle valve fully opened)	1 → 2	58 to 65 km/h (36 to 40 mph)
	2 → 3	108 to 115 km/h (67 to 71 mph)
	3 → 4	173 to 185 km/h (108 to 115 mph)
	4 → 3	165 to 176 km/h (103 to 109 mph)
	3 → 2	99 to 106 km/h (62 to 66 mph)
	2 → 1	48 to 54 km/h (30 to 34 mph)
(Throttle valve fully closed)	3 → 4	39 to 45 km/h (24 to 28 mph)
	4 → 3	17 to 23 km/h (11 to 14 mph)
2 position		
(Throttle valve fully opened)	1 → 2	58 to 65 km/h (36 to 40 mph)
	3 → 2	108 to 114 km/h (67 to 71 mph)
	2 → 1	48 to 54 km/h (30 to 34 mph)
L position		
(Throttle valve fully opened)	3 → 2	108 to 114 km/h (67 to 71 mph)
	2 → 1	54 to 59 km/h (34 to 37 mph)
Lock-up point Throttle valve opening 5%		
D position	Lock-up ON 3 → 3L	189 to 201 km/h (117 to 125 mph)
	Lock-up ON 4 → 4L	63 to 69 km/h (39 to 43 mph)
	Lock-up OFF 4L → 4	61 to 67 km/h (38 to 42 mph)
	Lock-up OFF 3L → 3	180 to 192 km/h (112 to 119 mph)
Flex lock-up point Throttle valve opening 5%		

D position	Lock-up ON 3 → 3L	33 to 39 km/h (21 to 24 mph)
	Lock-up ON 4 → 4L	46 to 52 km/h (29 to 32 mph)
	Lock-up OFF 4L → 4	39 to 45 km/h (24 to 28 mph)
	Lock-up OFF 3L → 3	32 to 37 km/h (20 to 23 mph)

TORQUE SPECIFICATIONS

Part tightened		N*m	kgf*cm	ft.*lbf
Park/Neutral position switch x Transaxle	Bolt	5.4	55	48 in.*lbf
	Nut	6.9	70	61 in.*lbf
Control shaft lever x Park/Neutral position switch		13	132	10
Engine hanger x Engine		38	387	28
Drain plug x Oil pan		49	500	36
Transaxle x Engine	Bolt A:	64	653	47
	Bolt B:	46	469	34
	Bolt C:	44	449	32
Torque converter clutch x Drive plate		41	418	30
Engine mounting bracket RR x Transaxle		64	653	47
Engine mounting bracket FR x Transaxle		64	653	47
Center member x Body	Bolt A:	45	459	33
Center member x Suspension member	Bolt B:	65	663	48
Engine mounting insulator RR x Engine mounting bracket RR		87	887	64
Engine mounting insulator RR x Suspension member		65	663	48
Engine mounting insulator FR x Engine mounting bracket FR		52	530	38
Engine mounting bracket LH x Transaxle		64	653	47
Engine mounting insulator LH x Body	Bolt A:	52	530	38
	Nut B:	87	887	64
Starter x Transaxle		64	653	47
Starter wire x Starter		9.8	100	87 in.*lbf
Oil filter tube x Transaxle		5.5	56	49 in.*lbf
Oil cooler tube clamp x Transaxle	Bolt A:	5.5	56	49 in.*lbf
	Bolt B:	12	122	9
Oil cooler outlet tube x Transaxle		34	347	25
Oil cooler inlet tube x Transaxle		34	347	25
Wire harness x Transaxle	Bolt A:	5.0	51	44 in.*lbf
	Bolt B:	8.4	86	74 in.*lbf
No. 1 control cable bracket x Transaxle		12	122	9
Control cable clamp x Transaxle		12	122	9
Air cleaner assembly x Body		5.0	51	44 in.*lbf
No. 1 engine cover sub-assembly x Engine		7.0	71	62 in.*lbf
Transmission wire x Transaxle		5.4	55	48 in.*lbf
Solenoid valve x Valve body	Bolt A:	6.6	67	58 in.*lbf
	Bolt B:	11	112	8
Valve body x Transaxle		11	110	8
Temperature sensor lock plate x Valve body		6.6	67	58 in.*lbf
Oil strainer x Valve body		11	112	8
Oil pan x Transaxle		7.8	80	69 in.*lbf
Shift lever assembly x Body		12	122	9
Control cable x Control shaft lever		12	122	9
Control cable x Body	Bolt:	5.0	51	44 in.*lbf
Speed sensor (NC sensor) x Transaxle		11	112	8
Speed sensor (NT sensor) x Transaxle		11	112	8

CLUTCH

SERVICE DATA

Pedal height from dash panel		137.6 to 147.6 mm (5.417 to 5.811 in.)
Clutch pedal free play		5.0 - 15.0 mm (0.197 - 0591 in.)
Clutch pedal push rod play at pedal top		1.0 - 5.0 mm (0.039 - 0.197 in.)
Slotted spring pin protrusion	Maximum	1.5 - 3.5 mm (0.059 - 0.138 in.)
Clutch disc rivet head depth	Maximum	0.3 mm (0.012 in.)
Clutch disc assy runout	Minimum	0.8 mm (0.031 in.)
Diaphragm spring finger wear	Maximum depth	0.5 mm (0.020 in.)
	Maximum width	6.0 mm (0.236 in.)
Flywheel sub-assy runout	Maximum	0.1 mm (0.004 in.)
Diaphragm spring tip non-alignment	Maximum depth	0.5 mm (0.020 in.)
Clutch release point from pedal full stroke end position		25 mm (0.98 in.) or more

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Clutch pedal sub-assembly x Clutch pedal support	37	375	27
Clutch pedal support set bolt x Body	24	241	17
Cylinder push rod clevis lock nut	12	120	9
Clutch master cylinder assembly x Clutch pedal support	12	120	9
Clutch master cylinder assembly x Flexible hose tube	15	155	11
Release cylinder bleeder plug	8.4	85	74 in.*lbf
Clutch release cylinder assembly x Transaxle housing	12	120	9
Clutch line clamp x Clutch release cylinder assembly	18	184	13
Clutch release cylinder assembly x Flexible hose tube	15	155	11
Clutch cover assembly x Flywheel sub-assembly	19	195	14
Release fork support x Transaxle assembly	47	480	35
Clutch switch assembly set nut	16	160	12
Clutch start switch assembly set nut	16	160	12

E350 MANUAL TRANSAXLE

SERVICE DATA

Transmission case oil seal driven in depth		3.0 to 0.5 mm (0.118 to 0.020 in.)
Front transaxle case cover oil seal drive in depth		-0.5 to 0.5 mm (-0.020 to 0.020 in.)
Manual transaxle assembly		
5th gear thrust clearance	Standard clearance	0.10 to 0.65 mm (0.0039 to 0.0256 in.)
5th gear radial clearance	Standard clearance	0.009 to 0.050 mm (0.0004 to 0.0020 in.)
Reverse idler gear sub-assembly inside diameter	Standard inside diameter	20.056 to 20.074 mm (0.7896 to 0.7903 in.)
	Maximum inside diameter	20.074 mm (0.7903 in.)
Reverse idler gear shaft outside diameter	Standard outside diameter	19.984 to 20.000 mm (0.7868 to 0.7874 in.)
	Minimum outside diameter	19.984 mm (0.7868 in.)
No. 3 transmission hub sleeve groove - thickness of the claw part on No. 3 gear shift fork	Standard clearance	0.15 to 0.35 mm (0.0059 to 0.0138 in.)
5th gear inside diameter	Standard inside diameter	34.981 to 34.997 mm (1.3772 to 1.3778 in.)
	Maximum inside diameter	34.997 mm (1.3778 in.)
Front transaxle case cover oil seal driven in depth		-0.5 to 0.5 mm (-0.020 to 0.020 in.)
Transmission case oil seal driven in depth		3.0 to 0.5 mm (0.118 to 0.020 in.)
Output shaft rear bearing clearance		3.8 to 4.4 mm (0.150 to 0.173 in.)
Output shaft bearing preload	New bearing	0.8 to 1.6 NVm (8.16 to 16.32 kgfVcm, 7.1 to 14.2 in.Vlbf)
	Used bearing	0.5 to 1.0 NVm (5.10 to 10.20 kgfVcm, 4.4 to 8.9 in.Vlbf)
Output shaft rear bearing shim thickness	0	1.30 mm (0.0512 in.)
	1	1.35 mm (0.0531 in.)
	2	1.40 mm (0.0551 in.)
	3	1.45 mm (0.0571 in.)
	4	1.50 mm (0.0591 in.)
	5	1.55 mm (0.0610 in.)
	6	1.60 mm (0.0630 in.)
	7	1.65 mm (0.0650 in.)
	8	1.70 mm (0.0669 in.)
	9	1.75 mm (0.0689 in.)
	A	1.80 mm (0.0709 in.)
	B	1.85 mm (0.0728 in.)
	C	1.90 mm (0.0748 in.)
	D	1.95 mm (0.0768 in.)
	E	2.00 mm (0.0787 in.)
	F	2.05 mm (0.0807 in.)
	G	2.10 mm (0.0827 in.)
	H	2.15 mm (0.0846 in.)
	J	2.20 mm (0.0866 in.)
	K	2.25 mm (0.0886 in.)
	L	2.30 mm (0.0906 in.)
	M	2.35 mm (0.0925 in.)
	N	2.40 mm (0.0945 in.)
	P	2.45 mm (0.0965 in.)
	Q	2.50 mm (0.0984 in.)

Front differential case tapered roller bearing preload	New bearing	0.8 to 1.6 NVm (8.16 to 16.32 kgfVcm, 7.1 to 14.2 in.Vlbf)
	Used bearing	0.5 to 1.0 NVm (5.10 to 10.20 kgfVcm, 4.4 to 8.9 in.Vlbf)
Front differential case shim REAR thickness	0	2.00 mm (0.0787 in.)
	1	2.05 mm (0.0807 in.)
	2	2.10 mm (0.0827 in.)
	3	2.15 mm (0.0846 in.)
	4	2.20 mm (0.0866 in.)
	5	2.25 mm (0.0886 in.)
	6	2.30 mm (0.0906 in.)
	7	2.35 mm (0.0925 in.)
	8	2.40 mm (0.0945 in.)
	9	2.45 mm (0.0965 in.)
	A	2.50 mm (0.0984 in.)
	B	2.55 mm (0.1004 in.)
	C	2.60 mm (0.1024 in.)
	D	2.65 mm (0.1043 in.)
	E	2.70 mm (0.1063 in.)
	F	2.75 mm (0.1083 in.)
	G	2.80 mm (0.1102 in.)
	H	2.85 mm (0.1122 in.)
Front differential case oil seal clearance		1 to 2 mm (0.0394 to 0.0787 in.)
Input shaft front bearing clearance		4.28 to 4.60 mm (0.1685 to 0.1811 in.)
Reverse restrict pin clearance		12.5 to 13.5 mm (0.492 to 0.531 in.)
No. 3 transmission clutch hub snap ring clearance		0.1 mm or less (0.0039 in. or less)
No. 3 transmission clutch hub snap ring thickness	a	1.75 to 1.80 mm (0.0689 to 0.0709 in.)
	b	1.80 to 1.85 mm (0.0709 to 0.0728 in.)
	c	1.85 to 1.90 mm (0.0728 to 0.0748 in.)
	d	1.90 to 1.95 mm (0.0748 to 0.0768 in.)
	e	1.95 to 2.00 mm (0.0768 to 0.0787 in.)
	f	2.00 to 2.05 mm (0.0787 to 0.0807 in.)
	g	2.05 to 2.10 mm (0.0807 to 0.0827 in.)
	h	2.10 to 2.15 mm (0.0827 to 0.0846 in.)
	j	2.15 to 2.20 mm (0.0846 to 0.0866 in.)
5th gear radial clearance	Standard clearance	0.009 to 0.050 mm (0.0004 to 0.0020 in.)
5th gear thrust clearance	Standard clearance	0.10 to 0.65 mm (0.0039 to 0.0260 in.)
Input shaft assembly		
4th gear thrust clearance	Standard clearance	0.10 to 0.57 mm (0.0039 to 0.0224 in.)
3rd gear thrust clearance	Standard clearance	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
4th gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
3rd gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
Input shaft run out	Maximum run out	0.03 mm (0.0012 in.)
Input shaft standard outside diameter	A	35.984 to 36.000 mm (1.4167 to 1.4173 in.)
	B	35.984 to 36.000 mm (1.4167 to 1.4173 in.)
	C	27.957 to 27.972 mm (1.1007 to 1.1013 in.)
Input shaft minimum outside diameter	A	35.984 mm (1.4167 in.)
	B	35.984 mm (1.4167 in.)
	C	27.957 mm (1.1007 in.)

4th gear inside diameter	Standard inside diameter	42.009 to 42.025 mm (1.6539 to 1.6545 in.)
	Maximum inside diameter	42.025 mm (1.6545 in.)
3rd gear inside diameter	Standard inside diameter	43.009 to 43.025 mm (1.6933 to 1.6939 in.)
	Maximum inside diameter	43.025 mm (1.6939 in.)
Between the 4th gear spline end and synchronizer outer ring back clearance		0.75 to 1.65 mm (0.0295 to 0.0650 in.)
Between the 3rd gear spline end and synchronizer outer ring back clearance		0.65 to 1.75 mm (0.0256 to 0.0689 in.)
No. 2 transmission hub sleeve groove - thickness of the claw part on No. 2 gear shift fork	Standard clearance	0.11 to 0.69 mm (0.0043 to 0.0272 in.)
No . 2 transmission clutch hub snap ring clearance	Standard clearance	0.1 mm or less (0.0039 in. or less)
Transmission clutch hub No.2 snap ring thickness	H	2.30 to 2.35 mm (0.0906 to 0.0925 in.)
	J	2.35 to 2.40 mm (0.0925 to 0.0945 in.)
	K	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
	L	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
	M	2.50 to 2.55 mm (0.0984 to 0.1004 in.)
	N	2.55 to 2.60 mm (0.1004 to 0.1024 in.)
	P	2.60 to 2.65 mm (0.1024 to 0.1043 in.)
Input shaft rear radial ball bearing snap ring clearance	Standard clearance	0.1 mm or less (0.0039 in. or less)
Input shaft rear radial ball bearing snap ring thickness	1	2.35 to 2.40 mm (0.0925 to 0.0945 in.)
	2	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
	3	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
	4	2.50 to 2.55 mm (0.0984 to 0.1004 in.)
	5	2.55 to 2.60 mm (0.1004 to 0.1024 in.)
	6	2.60 to 2.65 mm (0.1024 to 0.1043 in.)
	7	2.65 to 2.70 mm (0.1043 to 0.1063 in.)
	8	2.70 to 2.75 mm (0.1063 to 0.1083 in.)
3rd gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
4th gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
3rd gear thrust clearance	Standard clearance	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
4rd gear thrust clearance	Standard clearance	0.10 to 0.57 mm (0.0039 to 0.0224 in.)
Output shaft assembly		
1st gear thrust clearance	Standard clearance	0.25 to 0.40 mm (0.0098 to 0.0157 in.)
2nd gear thrust clearance	Standard clearance	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
1st gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
2nd gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
Output shaft run out	Maximum run out	0.03 mm (0.0012 in.)
Output shaft standard outside diameter	A	37.610 to 37.626 mm (1.4807 to 1.4813 in.)
	B	34.502 to 34.512 mm (1.3583 to 1.3587 in.)
Output shaft minimum outside diameter	A	37.610 mm (1.4807 in.)
	B	34.502 mm (1.3583 in.)
2nd gear inside diameter	Standard inside diameter	50.009 to 50.025 mm (1.9689 to 1.9695 in.)
	Maximum inside diameter	50.025 mm (1.9695 in.)
1st gear inside diameter	Standard inside diameter	51.009 to 51.025 (2.0082 to 2.0089 in.)
	Maximum inside diameter	51.025 mm (2.0089 in.)
Between the 2nd gear and No. 2 synchronizer ring back clearance		0.70 to 1.45 mm (0.0276 to 0.0571 in.)
Between the 1st gear and No. 1 synchronizer ring set back clearance		0.70 to 1.45 mm (0.0276 to 0.0571 in.)

Reverse gear groove - thickness of the claw part on No. 1 gear shift fork clearance	Standard clearance	clearance Standard clearance 0.15 to 0.35 mm (0.0059 to 0.0138 in.)
2nd gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
1st gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
2nd gear thrust clearance	Standard clearance	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
1st gear thrust clearance	Standard clearance	0.25 to 0.40 mm (0.0098 to 0.0157 in.)
Shift & select lever shaft assembly		
Control shaft cover oil seal drive in depth		28.5 +- 0.50 mm (1.122 +- 0. 020 in.)
Shift lever slotted pin clearance to the No. 1 shift lever inner		-0.5 to 0.5 mm (- 0.0197 to 0.0197 in.)
Shift lever slotted pin clearance to the No. 2 shift lever inner		5.8 to 6.8 mm (0.228 to 0.268 in.)
Differential case assembly		
Front differential side gear backlash	Standard backlash	0.10 to 0.20 mm (0.0039 to 0.0079 in.)
Front differential pinion thrust washer thickness	Minimum thickness	0.9 mm (0.035 in.)
Front differential pinion No. 1 shaft thickness	Minimum diameter	17.975 mm (0.70768 in.)
Front differential side gear backlash	Standard backlash	0.05 to 0.20 mm (0.0020 to 0.0079 in.)
Front differential side gear thrust washer thickness	1	1.00 mm (0.0394 in.)
	2	1.10 mm (0.0433 in.)
	3	1.20 mm (0.0472 in.)
	4	1.30 mm (0.0512 in.)

TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Floor shift shift lever assembly x Body		12	122	9
Transmission control cable assembly x Body		5.0	51	44 in.*lbf
Control cable clamp x Body		5.0	51	44 in.*lbf
Engine hanger set bolt		38	387	28
Engine mounting bracket REAR x Transaxle		64	653	47
Engine mounting bracket REAR x Engine mounting insulator REAR		87	887	64
Engine mounting bracket FRONT x Transaxle		64	653	47
Engine mounting bracket FRONT x Engine mounting insulator FRONT		52	530	38
Manual transmission case protector x Manual transaxle		18	184	13
Manual transaxle x Engine	Bolt A	64	653	47
	Bolt B	46	469	34
	Bolt C	44	449	32
Engine mounting bracket LH x Transaxle		64	653	47
Engine mounting insulator LH set bolt	Bolt A	52	530	38
	Bolt B	87	887	64
Clutch release cylinder assembly x Transaxle	Bolt A	7.8	80	69 in.*lbf
	Bolt B	12	120	9
Manual transaxle assembly x Wire harness clamp	Bolt A	26	260	19
	Bolt B	8.4	85	74 in.*lbf
	Bolt C	13	133	9.6
Clutch tube bracket set bolt		17	173	13
Reverse idler gear shaft bolt		30	306	22
No. 3 Gear shift fork shift fork bolt		24	244	17
Manual transmission output shaft rear set nut		123	1,250	90
Control shaft cover set bolt		20	204	15
Control shift lever x Shift & select lever shaft		6.4	65	57 in.*lbf
Selecting ballcrank assembly x Manual transmission case		20	200	14
Release fork support x Manual transaxle case		47	480	35
Transmission case x Manual transaxle case		29	296	21
Manual transaxle case x Transmission case		29	296	21
Bearing retainer REAR x Transmission case		43	438	32
Manual transaxle case receiver x Manual transaxle case		7	71	62 in.*lbf
No. 1 gear shift head x No. 2 gear shift fork shaft		24	245	18
No. 1 gear shift fork x No. 1 gear shift fork shaft		24	245	18
Reverse shift arm bracket x Manual transaxle case		17	173	13
Reverse restrict pin plug x Transmission case		13	133	9.6
No. 1 oil receiver pipe x Transmission case		17	173	13
No. 2 oil receiver pipe x Transmission case		17	173	13
Clutch tube bracket x Transmission case		17	173	13
Reverse idler gear shaft bolt x Transmission case		30	306	22
No. 3 transmission clutch hub gear shift fork shaft x input shaft		24	245	18
Manual transmission output rear set nut x Output shaft		123	1,254	91
Drain plug sub-assembly x Transmission case		49	500	36
Manual transmission filler plug x Transmission case		49	500	36

Part Tightened	N*m	kgf*cm	ft.*lbf
Back up lamp switch assembly x Transmission case	40	408	30
Manual transmission breather plug x Transmission case	49	500	36
No. 1 lock ball assembly x Transmission case	29	296	21
Speedometer driven hole cover sub-assembly set bolt	5.5	56	48 in.*lbf
Selecting bellcrank support x No .2 selecting bellcrank plate washer	12	122	9
Front differential ring gear x Front differential case	106	1,081	78

DRIVE SHAFT

SERVICE DATA

Front drive shaft standard length	RH	873.0 to 883.0 mm (34.370 to 34.764 in.)
	LH	556.2 to 566.2 mm (21.898 to 22.291 in.)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Front wheel	103	1,050	76
front suspension lower arm x lower ball joint.	89	908	66
Tie rod end x Steering knuckle	49	500	36
Front axle hub nut	216	2,200	159
Drive shaft bearing case mounting bolt	64	650	47
Front speed sensor set bolt	8.0	82	71 in.*lbf
Front stabilizer Link assembly x Shock absorber	74	755	55
Flexible hose and speed sensor wire harness x Shock absorber	19	194	14

AXLE

SERVICE DATA

Front axle hub bearing axle backlash.	Maximum: 0.05 mm (0.0020 in.)
Front axle hub bearing deviation	Maximum: 0.05 mm (0.0020 in.)
Rear axle hub bearing backlash.	Maximum: 0.05 mm (0.0020 in.)
Rear axle hub bearing deviation	Maximum: 0.07 mm (0.0028 in.)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Front wheel	103	1,050	76
front suspension lower arm x lower ball joint.	89	908	66
Lower ball joint assembly front x Steering knuckle	103	1,050	76
Tie rod end x Steering knuckle	49	500	36
Front axle hub nut	216	2,200	159
Front disc brake cylinder assembly x Steering knuckle	107	1,090	79
Drive shaft bearing case mounting bolt	64	650	47
Front speed sensor set bolt	8.0	82	71 in.*lbf
Front stabilizer Link assembly x Shock absorber	74	755	55
Shock absorber x Steering knuckle	240	2,447	177
Disc brake dust cover front x Steering knuckle	8.3	85	73 in.*lbf
Flexible hose and speed sensor wire harness x Shock absorber	19	194	14
Rear wheel	103	1,050	76
Skid control sensor wire bracket x No. 1 rear suspension arm assembly	5.0	51	44 in.*lbf
Parking No 3 brake cable assembly set bolt	8.0	82	71 in.*lbf
No. 1 rear suspension arm assembly x Rear axle carrier	74	755	55
Upper control arm x Rear axle carrier	74	755	55
Lower control arm x Rear axle carrier	105	1,071	77
No. 1 rear suspension arm assembly (ball joint side) x Rear axle carrier	105	1,071	77
Rear axle carrier sub-assembly x Rear disc brake cylinder	47	475	35
Rear axle carrier sub-assembly x Rear axle hub & bearing assembly Bolt:	56	571	41
Rear axle carrier sub-assembly x Rear axle hub & bearing assembly Nut:	140	1,428	103

SUSPENSION

SERVICE DATA

Front suspension

Front wheel alignment	Vehicle height	A - B: D - C:	92 mm (3.62 in.) 63 mm (2.48 in.)
	Toe-in (total) Rack end length difference		0°+- 12' (0°+- 0.2°), 0 +- 2 mm (0 +- 0.08 in.) 1.5 mm (0.0059 in.) or less
	Wheel angle	Inside wheel	38°12' (36°12' to 40°12') 38.20° (36.20° to 40.20°)
		Outside wheel: Reference	32°49' 32.82°
	Camber Right-left error		-0°31' +- 45' (-0.52° +- 0.75°) 45' (0.75°) or less
	Caster Right-left error		3°02' +- 45' (3.03° +- 0.75°) 45' (0.75°) or less
	Steering axis inclination Right-left error		12°31' +- 45' (12.52° +- 0.75°) 45' (0.75°) or less
Front suspension	Lower ball joint turning torque		5.0 N*m (51 kgf*cm, 44 in.*lbf) or less
	Front stabilizer link turning torque		1.0 N*m (10 kgf*cm, 8.9 in.*lbf) or less

A:
Ground clearance of front wheel center
B:
Ground clearance of lower suspension arm front bolt center
C:
Ground clearance of tire rod set bolt center
D:
Ground of rear wheel center

Rear suspension

Rear wheel alignment	**Toe-in (total)**	**0°18' +- 12' (0.3°+- 0.2°), 3.0 +- 2.0 mm (0.12 +- 0.08 in.)**
	Camber Right-left error	**-0°56' +- 45' (-0.90° +- 0.75°) 30' (0.5°) or less**

TORQUE SPECIFICATIONS

Front suspension

Part Tightened		N*m	kgf*cm	ft.*lbf
Tie rod end lock nut		74	755	55
Steering knuckle x Shock absorber		240	2,450	177
Hub nut		103	1,050	76
Suspension support x Piston rod		47	480	35
Suspension support x Body		52	530	38
Suspension crossmember sub-assembly x Body		133	1,360	98
Suspension crossmember sub-assembly x Engine mounting insulator		65	663	48
Crossmember member bracket x Body	Bolt A:	80	816	59
	Bolt B:	133	1,356	98
peed sensor wire harness bracket set bolt		19	194	14
No. 1 stabilizer bracket x Suspension crossmember		19	194	14
Stabilizer bar link set nut		74	755	55
Lower suspension arm x Lower ball joint		89	908	66
Lower ball joint x Steering knuckle		103	1,050	76
Lower suspension arm x Suspension crossmember		137	1,400	101

Rear suspension

Part Tightened	N*m	kgf*cm	ft.*lbf
Hub nut	103	1,050	76
Piston rod set nut	56	571	41
Shock absorber x Body	80	816	59
Shock absorber x Rear suspension arm	140	1,430	103
Parking brake cable set bolt	6.0	61	53 in.*lbf
Skid control sensor wire harness bracket set bolt	5.0	51	44 in.*lbf
Rear suspension arm bracket x Body	65	663	48
Rear suspension arm x Rear suspension member	115	1,170	85
Rear suspension arm bracket x Rear suspension arm	110	1,120	81
Rear suspension lower brace x Body	64	653	47
Rear axle carrier (front side) x Rear suspension arm	105	1,070	77
Rear axle carrier (rear side) x Rear suspension arm	74	755	55
Upper control arm x Rear axle carrier	74	755	55
Upper control arm x Suspension member	74	755	55
Lower control arm x Rear axle carrier	105	1,070	77
Lower control arm x Suspension member	115	1,170	85
Stabilizer bar x Stabilizer link	44	449	32
Stabilizer x Suspension arm	44	449	32
Stabilizer bar bracket x Suspension member	35	357	26

TIRE AND WHEEL

SERVICE DATA

Cold tire inflation pressure	215/45ZR 17	Front:	220 kPa (2.2 kgf/cm^2, 32 psi)
		Rear:	200 kPa (2.0 kgf/cm^2, 29 psi)
	205/55R 16	Front:	220 kPa (2.2 kgf/cm^2, 32 psi)
		Rear:	200 kPa (2.0 kgf/cm^2, 29 psi)

Tire runout		1.4 mm (0.055 in.) or less
Imbalance after adjustment	Steel wheel	8.0 g (0.018 lb) or less
	non-steel wheel	8.0 g (0.018 lb) or less

TORQUE SPECIFICATIONS

TIRE PRESSURE WARNING RECEIVER

Part tightened	N*m	kgf*cm	ft.*lbf
Tire pressure warning receiver set bolt	8.0	82	71 in.*lbf

TIRE PRESSURE WARNING VALVE AND TRANSMITTER

Part tightened	N*m	kgf*cm	ft.*lbf
Tire pressure warning valve and transmitter set nut	4.0	41	35 in.*lbf
Front wheel set nuts	103	1,050	76
Rear wheel set nuts	103	1,050	76

TIRE PRESSURE WARNING ECU

Part tightened	N*m	kgf*cm	ft.*lbf
Tire pressure warning ECU set nut	4.5	46	40 in.*lbf

BRAKE CONTROL

TORQUE SPECIFICATIONS

Brake actuator

Part tightened	N*m	kgf*cm	ft.*lbf
Brake actuator assembly x Bracket	5.4	55	48 in.*lbf
Brake actuator assembly with bracket	19	194	14
Brake tube x Brake actuator assembly (without SST)	15	155	11
Brake tube x Brake actuator assembly (with SST)	14	143	10

Front speed sensor

Part tightened	N*m	kgf*cm	ft.*lbf
Front speed sensor LH x Steering knuckle	9.0	92	80 in.*lbf
Front speed sensor x Body (for bolt A)	9.0	92	80 in.*lbf
Front speed sensor LH x Body (for bolt B)	29	296	21

Skid control sensor

Part tightened	N*m	kgf*cm	ft.*lbf
Skid control sensor wire	5.0	51	44 in.*lbf

BRAKE

SERVICE DATA

Brake pedal height from asphalt sheet	M/T	146.1 to 156.1 mm (5.752 to 6.146 in.)
	A/T	146.9 to 156.9 mm (5.784 to 6.177 in.)
Stop light switch clearance	Standard	1.5 to 2.5 mm (0.059 to 0.098 in.)
Pedal free play	Standard	1.0 to 6.0 mm (0.039 to .236 in.)
Pedal reserve distance from asphalt sheet	Standard	More than 90 mm (3.54 in.)
Brake booster push rod to piston clearance (w/ SST)	Standard	0 mm (0 in.)
Front disc brake pad thickness	Standard	11.5 mm (0.453 in.)
	Minimum	1.0 mm (0.039 in.)
Front disc thickness	Standard	25.0 mm (0.984 in.)
	Minimum	23.0 mm (0.906 in.)
Front disc runout	Maximum	0.05 mm (0.0020 in.)
Rear disc brake pad thickness	Standard	10.0 mm (0.394 in.)
	Minimum	1.0 mm (0.039 in.)
Rear disc thickness	Standard	9.0 mm (0.354 in.)
	Minimum	7.5 mm (0.295 in.)
Rear disc runout	Maximum	0.15 mm (0.0059 in.)

TORQUE SPECIFICATIONS

Brake fluid

Part tightened	N*m	kgf*cm	ft.*lbf
Brake line x Brake master cylinder (without SST)	15	155	11
Brake line x Brake master cylinder (with SST)	14	143	10
Bleeder plug	8.3	85	74 in.*lbf

Brake pedal

Part tightened	N*m	kgf*cm	ft.*lbf
Clevis lock nut	26	265	19
Stop light switch assembly x Stop light switch mounting adjuster	1.5	15	13 in.*lbf
Brake pedal sub-assembly x Brake pedal support sub-assembly	37	375	27
Brake pedal support sub-assembly	12.7	130	9
Brake pedal support sub-assembly	24	241	17

Brake master cylinder

Part tightened	N*m	kgf*cm	ft.*lbf
Brake master cylinder sub-assembly x Brake booster assembly	12.5	127	9
Brake tube x No. 1 way (without SST)	15	155	11
Brake tube x No. 1 way (with SST)	14	143	10
Brake tube x Brake master cylinder sub-assembly (without SST)	15	155	11
Brake tube x Brake master cylinder sub-assembly (with SST)	14	143	10
Lower cowl body mounting bracket LH	13	133	10
Outer cowl top panel sub-assembly	13	133	10

Brake booster

Part tightened	N*m	kgf*cm	ft.*lbf
Brake booster assembly	12.7	130	9
No. 5 front brake tube (without SST)	15	155	11
No. 5 front brake tube (with SST)	14	143	10

Front brake

Part tightened	N*m	kgf*cm	ft.*lbf
Front disc brake cylinder mounting LH x Steering knuckle	107	1,090	79

Part tightened	N*m	kgf*cm	ft.*lbf
Front disc brake cylinder assembly LH x Front disc brake cylinder mounting LH	34	350	25
Front flexible hose LH x Front disc brake cylinder assembly LH	30	310	22

Rear brake

Part tightened	N*m	kgf*cm	ft.*lbf
Rear disc brake cylinder mounting LH	47	475	34
Rear disc brake cylinder slide pin (upper) x Rear disc brake cylinder mounting LH	39	400	29
Rear disc brake cylinder slide pin (lower) x Rear disc brake cylinder mounting LH	34	350	25
Rear flexible hose LH x Rear disc brake cylinder assembly LH	30	310	22

PARKING BRAKE

SERVICE DATA

Paring brake lever travel at 196 N (20 kgf, 44.1 lbf)	Standard	6 to 9 clicks
Rear disc inside diameter	Standard	173 mm (6.81 in.)
	Maximum	174 mm (6.85 in.)
Parking brake shoe lining thickness	Standard	3.2 mm (0.126 in.)
	Minimum	1.0 mm (0.039 in.)

TORQUE SPECIFICATIONS

Parking brake system

Part tightened	N*m	kgf*cm	ft.*lbf
Lock nut	5.	51	44 in.*lbf

Parking brake lever

Part tightened	N*m	kgf*cm	ft.*lbf
Parking brake lever sub-assembly	12.5	128	9

Parking brake cable

Part tightened	N*m	kgf*cm	ft.*lbf
No. 3 parking brake cable assembly x Body (for bolt A)	6.0	61	53 in.*lbf
No. 3 parking brake cable assembly x Body (for bolt B)	5.4	55	48 in.*lbf
No. 1 fuel tank protector	5.4	55	48 in.*lbf
No. 3 parking brake cable assembly x Backing plate	8.0	82	71
No. 1 parking brake cable assembly	12.5	128	9
Parking brake cable heat insulator	5.4	55	48

STEERING COLUMN

SERVICE DATA

Steering wheel freeplay	Maximum	30 mm (1.18 in.)

TORQUE SPECIFICATIONS

Part tightened	N*m	kgf*cm	in.*lbf
Tie rod x Rack end	74	750	54
Steering column assembly set bolt	21	214	15
Steering Intermediate shaft assembly No. 2 x Steering main shaft assembly	35	360	26
Steering Intermediate shaft assembly No. 2 x Steering Intermediate shaft	35	360	26
Steering wheel set nut	50	510	37
Steering wheel pad set screw ("Torx" screw)	8.8	90	78 in.*lbf

POWER STEERING

SERVICE DATA

POWER STEERING FLUID		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed		7,800 to 8,300 kPa (80 to 85 kgf/cm^2, 1,131 to 1,204 psi)
STEERING WHEEL		
Steering effort at idle speed	Reference	5.5 N*m (56 kgf*cm, 49 in.*lbf)
VANE PUMP ASSEMBLY		
Vane pump rotating torque		0.27 N*m (2.8 kgf*cm, 2.4 in.*lbf) or less
Vane pump shaft and vane pump housing oil clearance	Maximum	0.07 mm (0.0028 in)
Vane plate thickness	Standard	1.405 to 1.411 mm (0.05531 to 0.05555 in.)
Clearance between the rotor groove and plate	Maximum	0.03 mm (0.0012 in.)
Spring free length	Minimum	36.9 mm (1.453 in.)
POWER STEERING LINK ASSEMBLY		
Steering rack runout	Maximum	0.1 mm (0.004 in.)
Tie rod assembly stad bolt torque	Turning	0.49 to 3.43 N*m (5.0 to 35.0 kgf*cm, 4.3 to 30.4 in.*lbf) or less
Total preload (Control vale rotating torque)	Turning	0.9 to 1.6 N*m (9.2 to 16.3 kgf*cm, 8.0 to 14.2 in.*lbf) or less

TORQUE SPECIFICATIONS

Part tightened		N*m	kgf*cm	in.*lbf
VANE PUMP ASSEMBLY				
Vane pump housing rear x Vane pump housing front		22	224	16
Power steering oil pressure switch		21	214	15
Pressure port union sub-assembly		69	704	51
Power steering suction port union set bolt		12	122	9
Vane pump assembly x Pump bracket rear		37	377	27
Vane pump assembly set bolt		34 (50)	347 (510)	25 (37)
Pressure feed tube assembly x Vane pump assembly		50	510	37
Pressure feed tube assembly clamp set bolt		7.8	80	69 in.*lbf
POWER STEERING LINK ASSEMBLY				
Control valve housing set bolt		18	185	13
Rack x Rack end sub-assembly		73 (103)	744 (1,050)	54 (76)
Tie rod assembly lock nut		74	750	54
Cylinder end stopper x Rack housing		122	1,244	90
Turn pressure tube union nut		22 (25)	224 (250)	16 (18)
Steering link assembly set bolt		49	500	36
Pressure feed tube assembly union nut		41 (44)	414 (450)	30 (33)
Pressure feed tube clamp set bolt		7.8	80	69 in.*lbf
Steering intermediate shaft x Steering link assembly		35	357	26
Tie rod end sub-assembly lock nut		74	755	55
Front suspension crossmember sub-assembly x Frame		133	1,356	98
Crossmember bracket x Frame	Bolt A:	133	1,356	98
	Bolt B:	80	816	59
Crossmember x Engine mounting insulator rear		65	663	48
Center member x Frame		45	459	33
No. 1 hook x Center member		39	398	29
Center member x Engine mounting insulator front		72	734	53
Front suspension arm sub-assembly lower No. 1 x Lower ball joint		89	908	66
Front stabilizer link assembly set nut		74	755	55
Tie rod sub-assembly x Steering knuckle		49	500	36
Steering intermediate shaft assembly No.2 x Steering intermediate shaft		35	357	26
Front wheel set nut		103	1,050	76

( ): For use without SST

AIR CONDITIONING

SERVICE DATA

Refrigerant charge volume	Standard: 430 +- 30 g (15.2 +- 1.1 oz.)
Magnetic clutch clearance	0.35 to 0.60 mm (0.014 to 0.023 in.)

TORQUE SPECIFICATIONS

REFRIGERANT LINE

Part Tightened		N*m	kgf*cm	ft.*lbf
No. 1 cooler refrigerant discharge hose x Cooler condenser assembly		5.4	55	48 in.*lbf
Cooler refrigerant liquid pipe x Cooler condenser assembly		5.4	55	48 in.*lbf
Cooler refrigerant liquid pipe x vehicle body		9.8	100	7
No. 1 cooler refrigerant suction hose x Cooler compressor assembly		9.8	100	7
No. 1 cooler refrigerant suction hose x vehicle body	Bolt	9.8	100	7
	Nut	9.8	100	7
No. 1 cooler refrigerant discharge hose x Cooler compressor assembly		9.8	100	7

AIR CONDITIONING UNIT

Part Tightened		N*m	kgf*cm	ft.*lbf
Air conditioner unit assembly x vehicle body	Bolt	9.8	100	7
	Nut	9.8	100	7
Air conditioning tube assembly x Evaporator sub-assembly		3.5	35	30 in.*lbf

BLOWER UNIT

Part Tightened	N*m	kgf*cm	ft.*lbf
Blower assembly x vehicle body	9.8	100	7

COMPRESSOR AND MAGNETIC CLUTCH

Part Tightened	N*m	kgf*cm	ft.*lbf
Magnet clutch hub x Cooler compressor assembly	18	184	13
Cooler compressor assembly x Engine	25	255	18
No. 1 cooler refrigerant discharge hose x Cooler compressor assembly	9.8	100	7
No. 1 cooler refrigerant suction hose x Cooler compressor assembly	9.8	100	7

CONDENSER

Part Tightened	N*m	kgf*cm	ft.*lbf
Radiator support upper x Cooler condenser assembly	9.8	100	7
Radiator support upper bracket x Radiator support upper	19	194	14
Cooler refrigerant liquid pipe x Cooler condenser assembly	5.4	55	48 in.*lbf
No. 1 cooler refrigerant discharge hose x Cooler condenser assembly	5.4	55	48 in.*lbf

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Steering pad assembly x Steering wheel assembly	8.8	90	78 in.*lbf
Front passenger airbag assembly x Instrument panel reinforcement	18	184	13
Driver side knee airbag assembly x Instrument panel reinforcement	18	184	13
Curtain shield airbag assembly set bolt	9.8	100	7
Center airbag sensor x Body	17.5	179	13
Front airbag sensor x Body	9.0	92	82 in.*lbf
Side airbag sensor x Body	9.0	92	82 in.*lbf
Rear airbag sensor x Body	8.0	82	71 in.*lbf
Seat position sensor x Front seat assembly	8.0	82	71 in.*lbf

SEAT BELT

TORQUE SPECIFICATIONS

FRONT SEAT BELT

Part Tightened	N*m	kgf*cm	ft.*lbf
Front seat inner belt assembly x Front seat	42	428	31
Front seat outer belt assembly (Upper part of retractor) x Body	4.9	50	43
Front seat outer belt assembly (Lower part of retractor) x Body	42	428	31
Front seat outer belt assembly (shoulder anchor) x Body	42	428	31
Front seat outer belt assembly (floor anchor) x Body	42	428	31

REAR SEAT BELT

Part Tightened	N*m	kgf*cm	ft.*lbf
Child restraint seat tether anchor bracket x Body	19.6	200	14
Rear seat inner belt assembly RH x Body	42	428	31
Rear seat outer belt assembly center (floor anchor) x Body	42	428	31
Rear seat inner belt assembly LH x Body	42	428	31
Rear seat outer belt assembly center (retractor) x Body	42	428	31
Rear seat outer belt assembly (retractor) x Body	42	428	31
Rear seat outer belt assembly (shoulder anchor) x Body	42	428	31
Rear seat outer belt assembly (floor anchor) x Body	42	428	31

WIPER AND WASHER

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft*lbf
Windshield wiper link assembly X Windshield wiper motor assembly	5.4	55	47 in.*lbf
Windshield wiper motor & link assembly X Body	5.4	55	47 in.*lbf
FR Wiper arm & blade assembly LH X Windshield wiper link assembly	34.3	350	25
FR Wiper arm & blade assembly RH X Windshield wiper link assembly	34.3	350	25

HORN

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Low pitched horn x Body	20	204	15
High pitched horn x Body	20	204	15

WINDSHIELD / WINDOWGLASS

TORQUE SPECIFICATIONS

WINDSHIELD / WINDOWGLASS

Part Tightened	N*m	kgf*cm	ft.*lbf
Roof window fix glass x Body	5.4	55	48 in.*lbf

MIRROR

TORQUE SPECIFICATIONS

MIRROR

Part Tightened	N*m	kgf*cm	ft.*lbf
Outer rear view mirror assembly x Door panel	8.0	82	71 in.*lbf

INSTRUMENT PANEL

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Front passenger airbag assembly x Instrument panel reinforcement	18	184	13

SEAT

TORQUE SPECIFICATIONS

FRONT SEAT

Part Tightened	N*m	kgf*cm	ft.*lbf
Seat position airbag sensor x Seat adjuster	8.0	82	71 in.*lbf9
Inner belt x Seat adjuster	42	428	31
Seatback cover bracket x Seat adjuster (w/ front seat side airbag)	5.5	56	49 in.*lbf
Seat x Body	40	408	30

REAR SEAT

Part Tightened	N*m	kgf*cm	ft.*lbf
Tether anchor bracket x Body	19.6	200	14
Seat leg x Body	40	408	30
Outer belt center (floor anchor) x Body	42	428	31
Outer belt center (floor anchor) x Body	42	428	31
Seatback x Body	40	408	30

ENGINE HOOD / DOOR

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	in.*lbf
HOOD			
Hood x Hood hinge	13	133	10
Hood lock x Body panel	7.0	71	62 in.*lbf
FRONT DOOR			
Door check x Body	30	306	22
Door check x Door panel	5.5	56	49 in.*lbf
Door frame sub-assembly rear lower x Door panel	8.5	87	75 in.*lbf
Door glass x Front door regulator sub-assembly	5.5	56	49 in.*lbf
Door hinge x Body	26	265	19
Door hinge x Door panel	26	265	19
Door lock x Door panel	5.0	51	44 in.*lbf
Door lock striker x Body	23	235	17
Door outside handle cover x Door panel	4.0	41	35 in.*lbf
Door outside handle frame x Door panel	4.0	41	35 in.*lbf
Power window regulator motor x Window regulator	5.4	55	48 in.*lbf
Window regulator x Door panel	8.0	82	71 in.*lbf
BACK DOOR			
Back door hinge x Door panel	19.5	199	14
Back door lock x Door panel	8.0	82	71 in.*lbf
Back door lock striker x Door panel	23	234	17 in.*lbf
Back door stay bolt x Body	27	275	20 in.*lbf
Back door stay bracket x Body	7.5	77	66 in.*lbf
Back Door Weight x Back Door	8.0	82	71 in.*lbf

EXTERIOR

TORQUE SPECIFICATIONS

FRONT BUMPER

Part Tightened	N*m	kgf*cm	ft.*lbf
Front bumper x Body (for bolt)	12	122	9
Front bumper x Body (for screw)	6.0	61	53 in.*lbf
Front bumper x Fender liner	6.0	61	53 in.*lbf
Front bumper side support x Body (for bolt)	12	122	9
Front bumper side support x Body (for screw)	6.0	61	53 in.*lbf

REAR BUMPER

Part Tightened	N*m	kgf*cm	ft.*lbf
Rear bumper x Body	6.0	61	53 in.*lbf
Rear bumper side retainer x Body	6.0	61	53 in.*lbf

SLIDING ROOF

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Sliding roof housing sub-assembly x Drive gear	5.4	55	48 in.*lbf
Sliding roof housing sub-assembly x Sunshade x Trim	5.4	55	48 in.*lbf

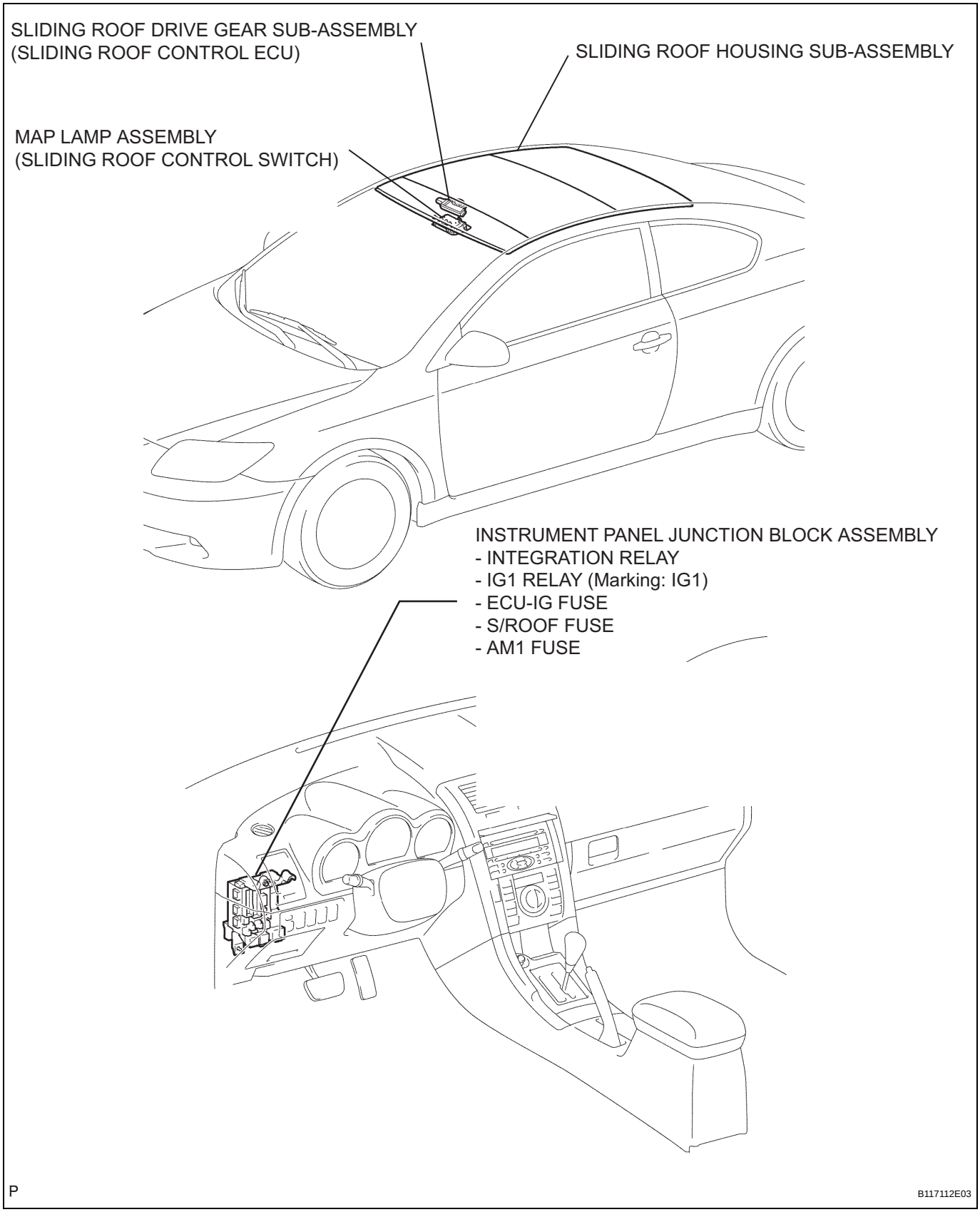
SLIDING ROOF SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

System Name	See procedure
Power Window Control System (with Jam Protection Function)	IN-23
Sliding Roof System	

PARTS LOCATION



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INITIALIZATION

1. RESET SLIDING ROOF DRIVE GEAR (MOTOR)

NOTICE:

The drive gear (motor) must be reset (pulse sensor's location must be set) when one of the following occurs: 1) the battery cable has been disconnected from the negative (-) battery terminal, 2) the drive gear connector is connected /disconnected, or 3) the sliding roof is replaced or installed / removed. If the drive gear is not reset, the AUTO function will not operate.

(a) The sliding roof AUTO operation and the jam protection function may not operate normally if the battery cable is disconnected / reconnected, the battery replaced or recharged. Initialize the sliding roof system using the method below.

(1) Turn the ignition switch ON.

(2) Press the CLOSE switch to activate the close operation. Fully close the roof and continue to press the CLOSE switch for approximately 2 seconds. When the sliding roof control ECU initialization is finished, the roof will automatically open and stop a few millimeters from the fully open position.

HINT:

If the battery cable is disconnected, the sliding roof control ECU may not detect the position of the roof glass. If the sliding roof AUTO operation is still disabled even after the drive gear has been initialized, the Hall IC may be malfunctioning. The Hall IC is built into the drive gear and detects the roof glass position.

If the result is not as specified, replace the drive gear assembly (sliding roof control ECU).

2. INSPECT SLIDING ROOF FUNCTION (See page RF-4)

HINT:

- If the jam protection function is not operating, reset the drive gear.
- If the AUTO operation function and jam protection function do not operate after the drive gear has been reset, replace the drive gear assembly (sliding roof control ECU).

PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the cause of the problem symptom. The potential cause 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.

Sliding Roof System

Symptom	Suspected Area	See page
Sliding roof does not operate	1. ECU-IG fuse	-
	2. S/ROOF fuse	-
	3. AM1 fuse	-
	4. IG1 relay	-
	5. Sliding roof control switch	RF-19
	6. Sliding roof drive gear sub-assembly	RF-4
	7. Wire harness	-
	8. Faulty sliding of sliding roof	-
Sliding roof operation is abnormal	1. Sliding roof control switch	RF-19
	2. Sliding roof drive gear sub-assembly	RF-4
	3. Wire harness	-
Sliding roof system stops operation halfway even when no foreign object is in motor	1. Sliding roof control switch	RF-19
	2. Sliding roof drive gear sub-assembly	RF-4
	3. Wire harness	-
	4. Sliding roof drive gear sub-assembly (must be reset)	RF-4
Sliding roof does not operate after turning ignition switch OFF	1. Instrument panel J/B assembly integration relay	RF-4
	2. Wire harness	-
AUTO function is inoperative	1. Sliding roof drive gear sub-assembly (must be reset)	RF-4
	2. Sliding roof drive gear sub-assembly (sliding roof control ECU)	RF-4
Jam protection function is inoperative	1. Sliding roof drive gear sub-assembly (must be reset)	RF-4
	2. Sliding roof drive gear sub-assembly (sliding roof sontrol ECU)	RF-4

ON-VEHICLE INSPECTION

NOTICE:
The drive gear (motor) must be reset (pulse sensor's location must be set) when: one of the following occurs: 1) the battery cable has been disconnected from the negative (-) battery terminal, 2) the drive gear connector is connected / disconnected, or 3) the sliding roof is replaced or installed / removed.
If the drive gear is not reset, the AUTO function will not operate.

1. CHECK AUTO SLIDE-OPEN FUNCTION

(a) Turn the ignition switch ON.
(b) Press the sliding roof control OPEN switch for 0.3 seconds or more. Check the OPEN operation of the No. 1 and No. 2 roof glasses.
  (1) When the switch is pressed, check that: 1) the No. 2 glass tilts upward, 2) the No. 1 glass tilts upward at the same time the No. 2 glass slides open, and 3) the No. 2 glass stops 50 mm (1.97 in.) from the fully open position.
  (2) When the switch is pressed again, check that the No. 2 glass slides to the fully open position.

2. CHECK MANUAL CLOSE FUNCTION

(a) Check the CLOSE operation of the No. 1 and No. 2 roof glass.
  (1) Turn the ignition switch ON.
  (2) While pressing and holding down the sliding roof control CLOSE switch, check that the No. 2 glass slides to just before the fully closed position.
  (3) When the switch is pressed again, check that the No. 1 glass tilts downward at the same time the No. 2 glass slides to the fully closed position.

3. CHECK SLIDING ROOF OPERATION FUNCTION AFTER IGNITION SWITCH IS TURN OFF

(a) Turn the ignition switch from ON to OFF.
(b) The sliding roof's AUTO operation function should be available for 43 seconds. However, if one of the front doors is opened during AUTO operation, the sliding roof should stop its operation immediately.
(c) Wait for 43 seconds after the ignition switch is turned OFF. Then, both the AUTO and manual operation functions should not be available anymore.
(d) With one of the front doors open, turn the ignition switch OFF. If an object is caught between the sliding roof and vehicle body and the sliding roof's jam protection function is triggered, the sliding roof should reverse its movement and stop at the fully open position.

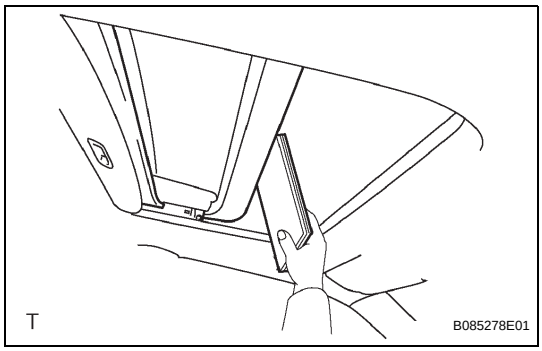
4. CHECK JAM PROTECTION FUNCTION

HINT:

When the sliding roof AUTO CLOSE and MANUAL CLOSE operation is being used (ignition switch ON or within 43 seconds of turning ignition switch OFF), the jam protection function helps prevent objects from being caught between the vehicle body and the roof glass.

CAUTION:

- **Do not use a part of your body, for example your hand, or any object to check the jam protection function. Do not allow anything to become caught in the sliding roof during this procedure.**
- **The jam protection function may not operate with an object that is less than 5 mm (0.20 in.) in width.**



(a) When the sliding roof CLOSE operation is being performed and an object is caught between the vehicle body and the roof glass, the roof glass should open a distance of 200 mm (7.87 in.) from the point of contact with the object, or open fully if 200 mm (7.87 in.) of opening distance is not available.

5. CHECK FAIL-SAFE FUNCTION

(a) If the sliding roof's jam protection function is triggered and, afterward, the sliding roof cannot be fully closed due to a malfunctioning sliding roof or a malfunctioning actuator, press and hold the CLOSE switch for at least 10 seconds. This will disable the jam protection function and the sliding roof can then be closed.

CAUTION:

Be careful when closing the sliding roof glass No. 1 and No. 2 at this time.

HINT:

- Before checking the fail-safe function, make sure that there is nothing that is triggering the jam protection function.
- Pressing the CLOSE switch for 10 seconds will clear the sliding roof control ECU memory of the sliding roof's fully closed position, which disables the jam protection function.

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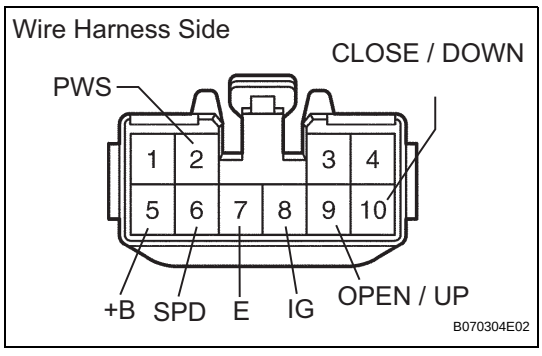


6. CHECK SLIDING ROOF DRIVE GEAR SUB-ASSEMBLY

(a) Disconnect the drive gear wire harness connector.

(1) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
5 (+B) - 7 (E)	Always	10 to 14 V
2 (PWS) - 7 (E)	Ignition switch OFF	0 V
2 (PWS) - 7 (E)	Ignition switch ON	10 to 14 V
8 (IG) - 7 (E)	Ignition switch OFF	0 V
8 (IG) - 7 (E)	Ignition switch ON	10 to 14 V

(2) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Condition	Specified Condition
9 (OPEN / UP) - 7 (E)	Sliding roof control switch ON	Below 1 Ω
10 (CLOSE / DOWN) - 7 (E)	Sliding roof control switch ON	Below 1 Ω

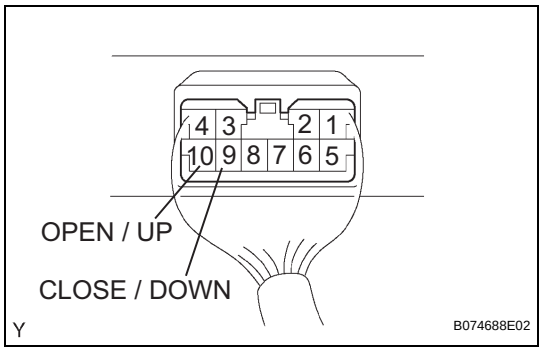
If the result is not as specified, there may be a malfunction on the wire harness side.

(b) Reconnect the drive gear wire harness connector.

(c) Initialize the drive gear assembly (See page RF-3).

(d) Measure the voltage of the connector.

Standard voltage



Tester Connection	Condition	Specified Condition
9 (OPEN / UP) - Body ground	Ignition switch ON and OPEN switch OFF	10 to 14 V
9 (OPEN / UP) - Body ground	Ignition switch ON and OPEN switch ON	0 V
10 (CLOSE / DOWN) - Body ground	Ignition switch ON and CLOSE switch OFF	10 to 14 V
10 (CLOSE / DOWN) - Body ground	Ignition switch ON and CLOSE switch ON	0 V

If the result is not as specified, replace the drive gear sub-assembly (sliding roof control ECU).

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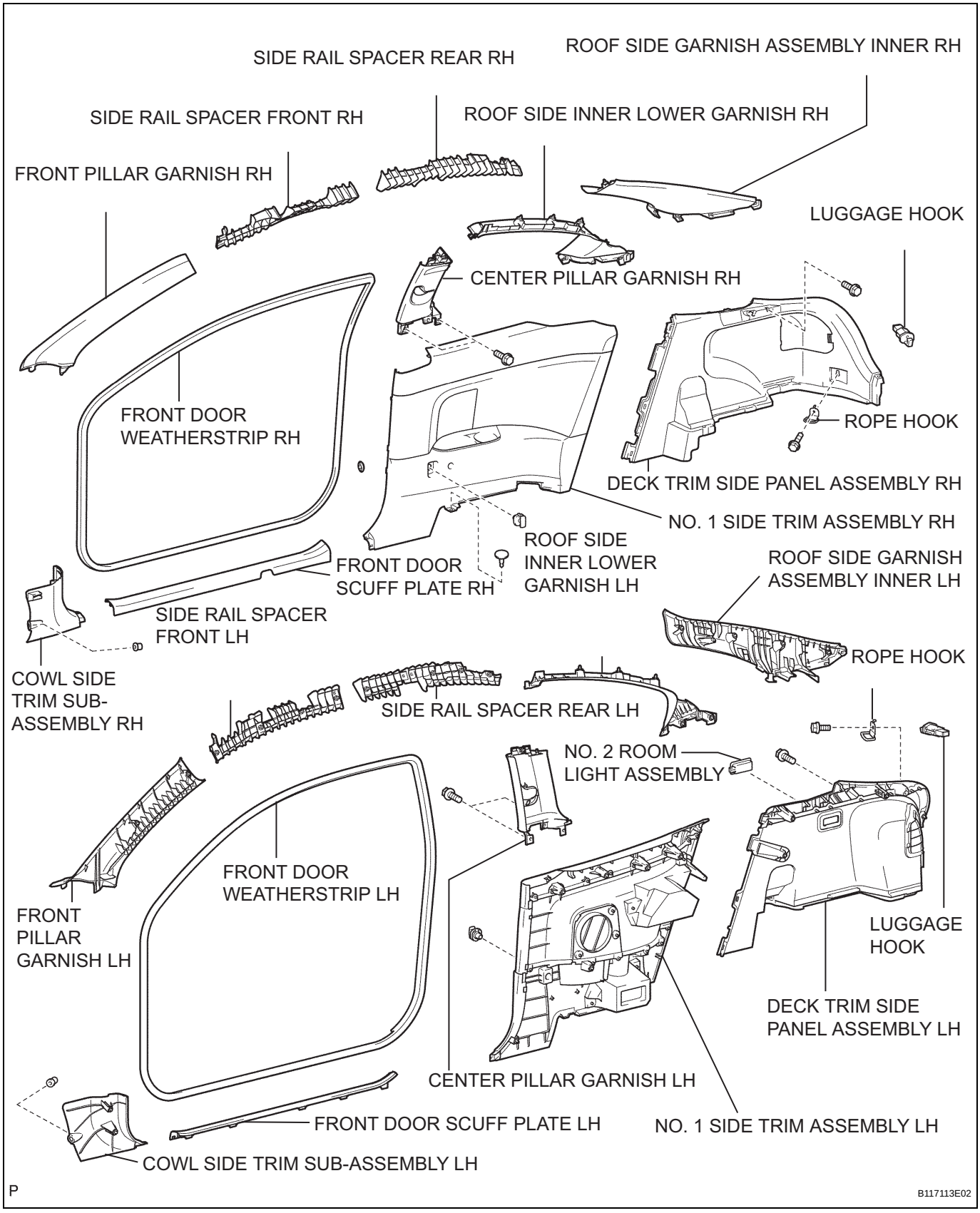
SLIDING ROOF HOUSING

COMPONENTS



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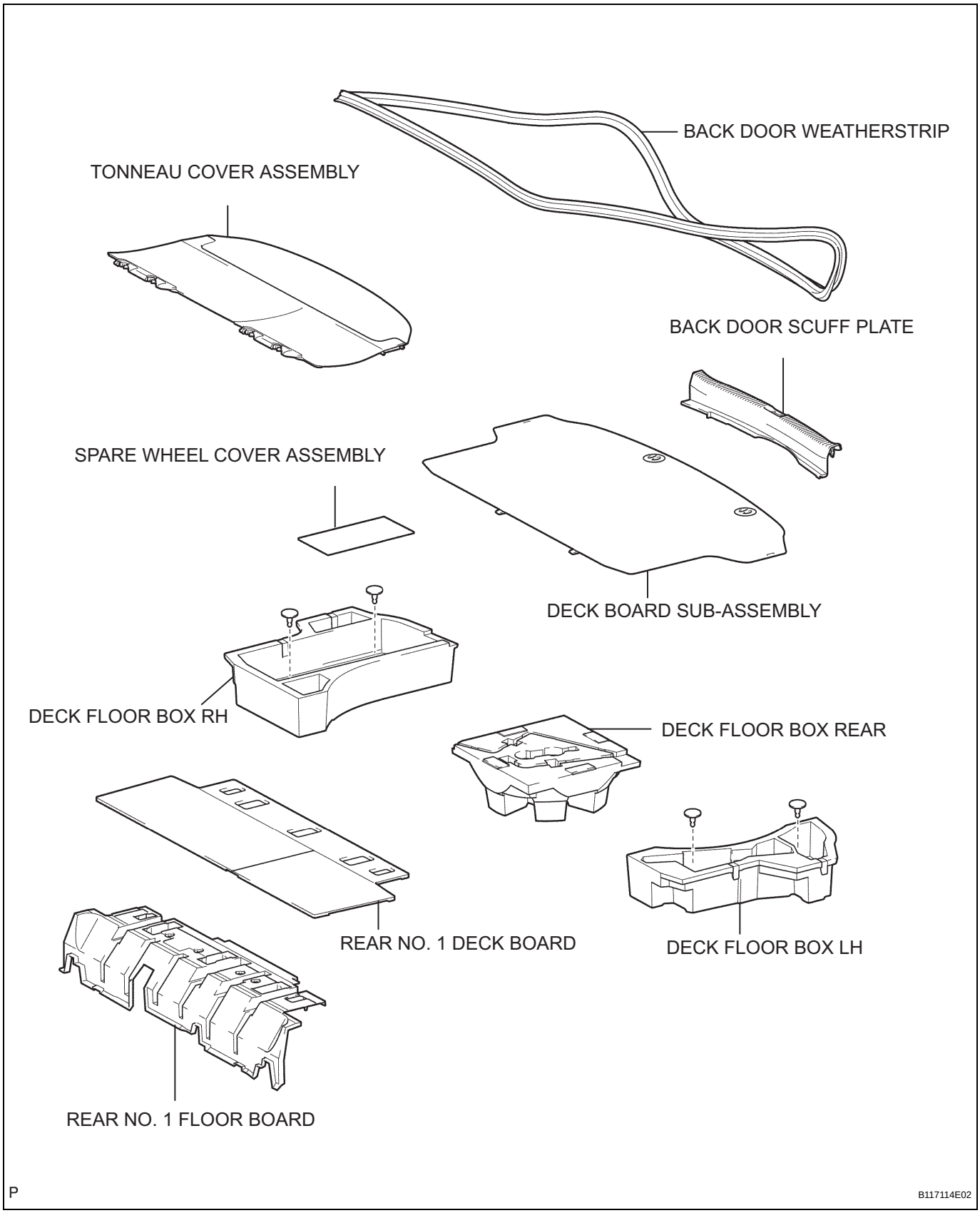
BACK DOOR WEATHERSTRIP
TONNEAU COVER ASSEMBLY
BACK DOOR SCUFF PLATE
SPARE WHEEL COVER ASSEMBLY
DECK BOARD SUB-ASSEMBLY
DECK FLOOR BOX RH
DECK FLOOR BOX REAR
REAR NO. 1 DECK BOARD
DECK FLOOR BOX LH
REAR NO. 1 FLOOR BOARD
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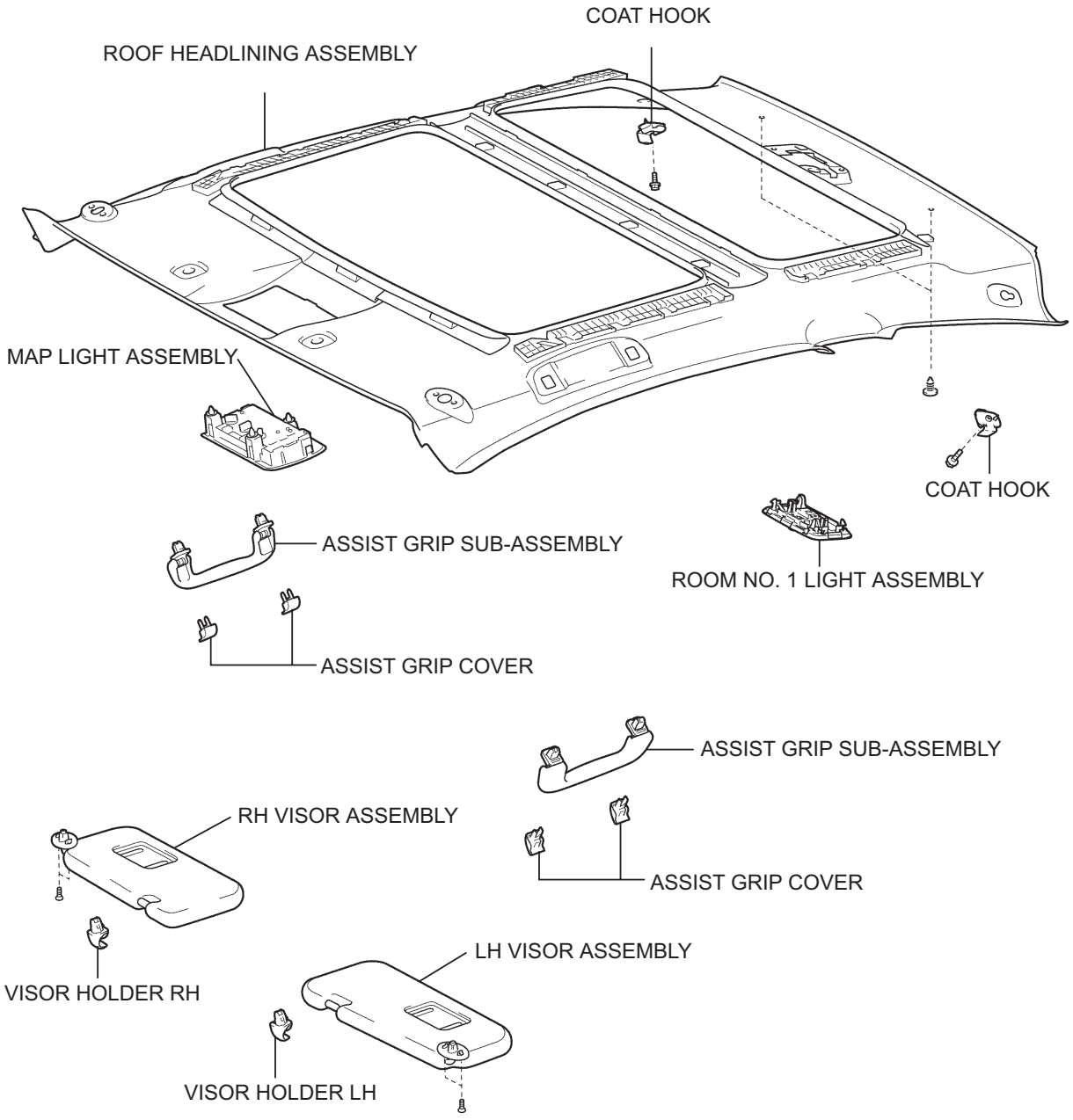

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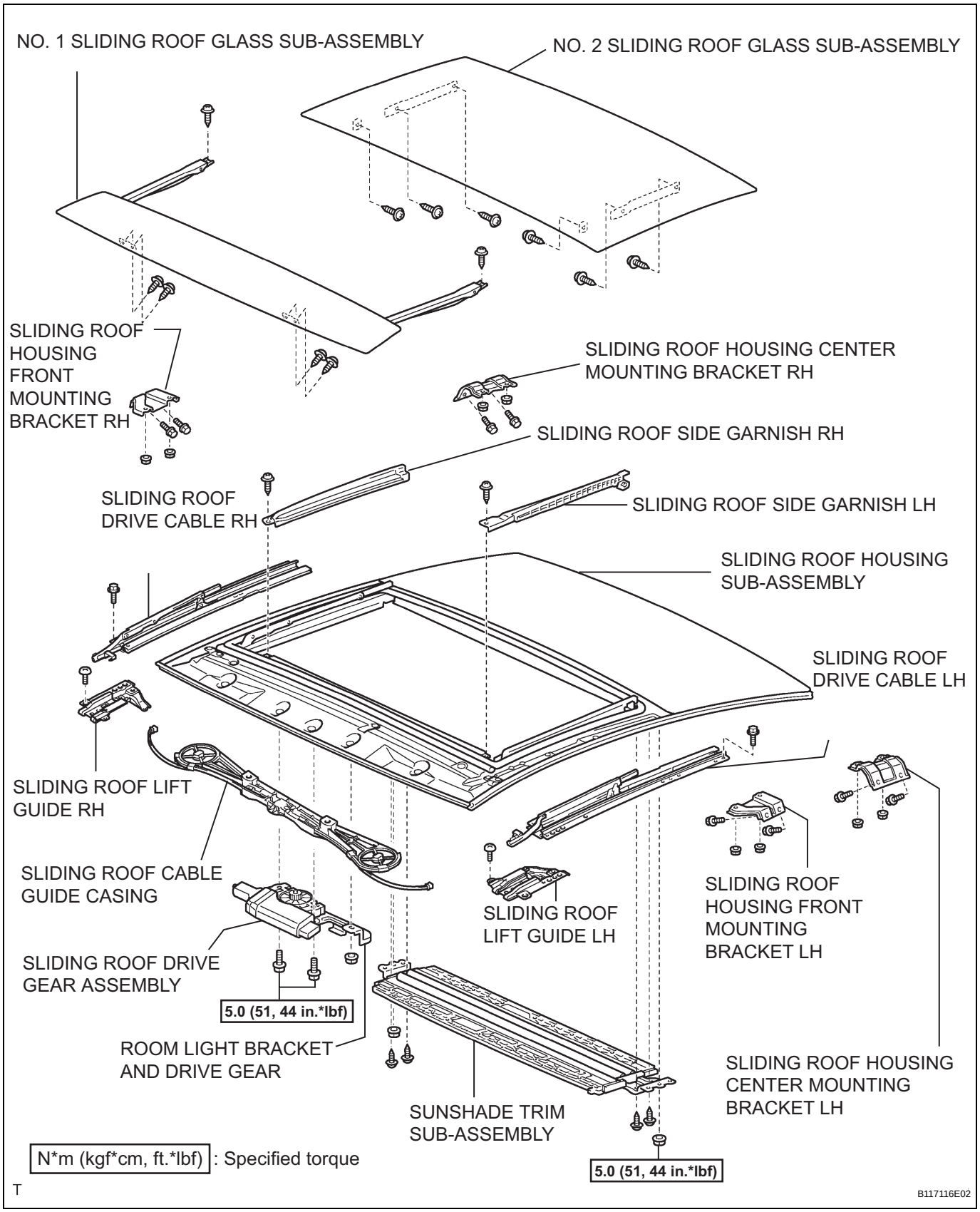
NO. 1 SLIDING ROOF GLASS SUB-ASSEMBLY
NO. 2 SLIDING ROOF GLASS SUB-ASSEMBLY
SLIDING ROOF HOUSING FRONT MOUNTING BRACKET RH
SLIDING ROOF HOUSING CENTER MOUNTING BRACKET RH
SLIDING ROOF SIDE GARNISH RH
SLIDING ROOF DRIVE CABLE RH
SLIDING ROOF SIDE GARNISH LH
SLIDING ROOF HOUSING SUB-ASSEMBLY
SLIDING ROOF DRIVE CABLE LH
SLIDING ROOF LIFT GUIDE RH
SLIDING ROOF CABLE GUIDE CASING
SLIDING ROOF LIFT GUIDE LH
SLIDING ROOF HOUSING FRONT MOUNTING BRACKET LH
SLIDING ROOF DRIVE GEAR ASSEMBLY
5.0 (51, 44 in.*lbf)
ROOM LIGHT BRACKET AND DRIVE GEAR
SUNSHADE TRIM SUB-ASSEMBLY
SLIDING ROOF HOUSING CENTER MOUNTING BRACKET LH
N*m (kgf*cm, ft.*lbf) : Specified torque
5.0 (51, 44 in.*lbf)
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REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

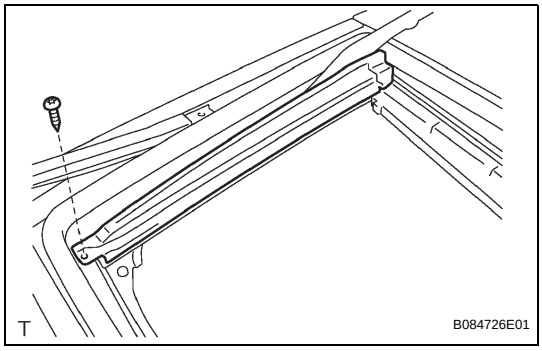
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE ROOF HEADLINING ASSEMBLY

(a) Remove the roof headlining (see page IR-8).

HINT:

After removing the roof headlining, connect the battery and sliding roof control switch.



3. REMOVE SLIDING ROOF SIDE GARNISH LH

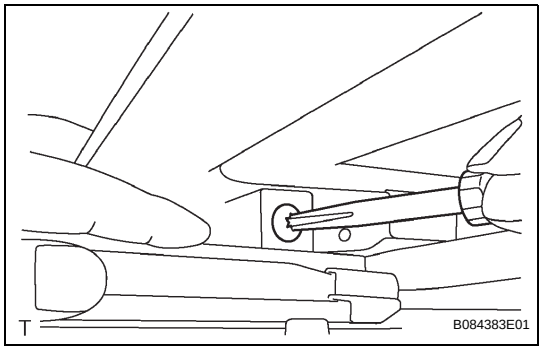
(a) Fully open the roof glass.

(b) Using a T25 "torx" driver, remove the screw and garnish.

4. REMOVE SLIDING ROOF SIDE GARNISH RH

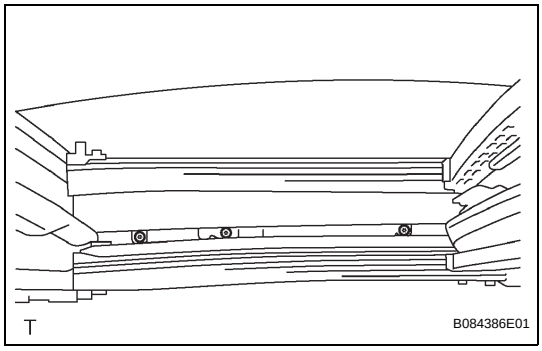
HINT:

Use the same procedures described for the LH side.



5. REMOVE NO. 2 SLIDING ROOF GLASS SUB-ASSEMBLY

(a) Remove the 2 screws.



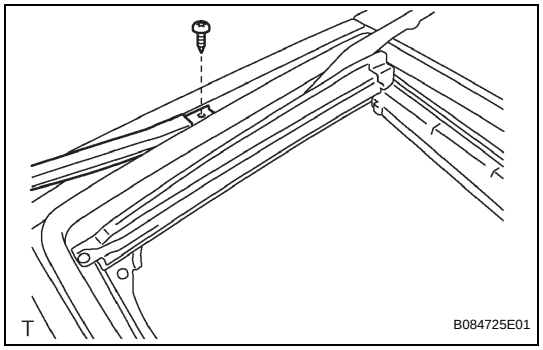
(b) Fully close the roof glass and remove the 4 screws on the center and rear side of the glass. Then remove the roof glass.

(c) After removing the roof glass, disconnect the cable from the negative (-) battery terminal and the sliding roof control switch.

CAUTION:

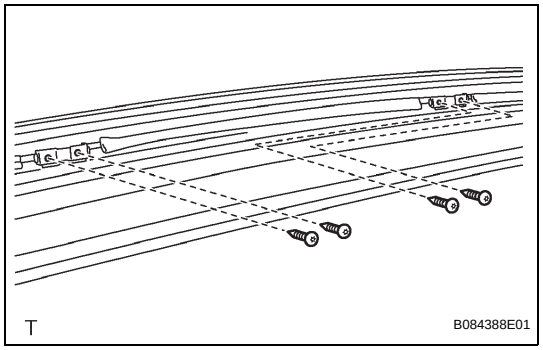
If the battery cable and sliding roof control switch are connected and the jam protection function has not been initialized, be careful whenever performing work between the roof glass and frame.

RF

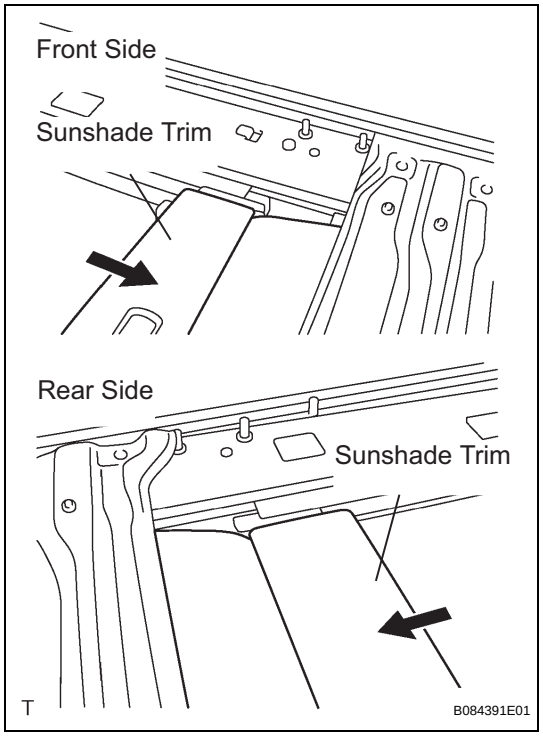


6. REMOVE NO. 1 SLIDING ROOF GLASS SUB-ASSEMBLY

(a) Using a T25 "torx" driver, remove the 2 screws.



(b) Remove the 4 screws and glass.



7. REMOVE SUNSHADE TRIM SUB-ASSEMBLY

(a) Remove the 2 nuts.
(b) Using a T25 "torx" driver, remove the 4 screws.
(c) Slide the front side sunshade trim backward and remove it.
(d) Slide the rear side sunshade trim forward and remove it.

8. REMOVE SLIDING ROOF HOUSING FRONT MOUNTING BRACKET LH

(a) Remove the 2 bolts, 2 nuts and bracket.

9. REMOVE SLIDING ROOF HOUSING FRONT MOUNTING BRACKET RH

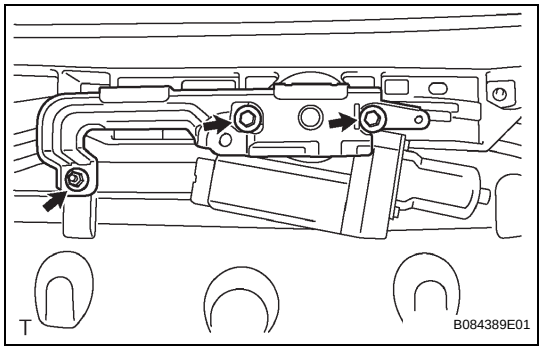
(a) Remove the 2 bolts, 2 nuts and bracket.

10. REMOVE SLIDING ROOF HOUSING CENTER MOUNTING BRACKET LH

(a) Remove the 2 bolts, 2 nuts and bracket.

11. REMOVE SLIDING ROOF HOUSING CENTER MOUNTING BRACKET RH

(a) Remove the 2 bolts, 2 nuts and bracket.



12. REMOVE ROOM LIGHT SWITCH BASE

(a) Remove the 2 bolts, nut and bracket from the drive gear.

13. REMOVE SLIDING ROOF DRIVE GEAR ASSEMBLY

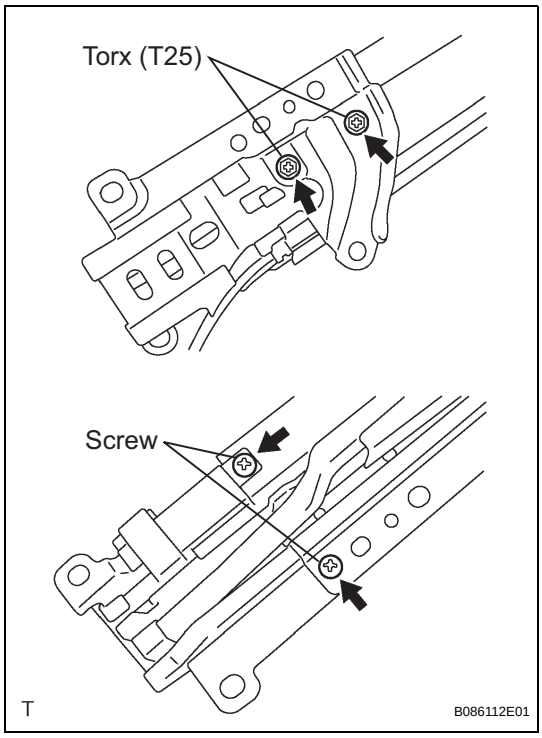
RF

14. REMOVE DRIVE CABLE AND DRIVE CABLE GUIDE CASING

(a) Remove the 12 nuts and the drive cable and guide casing.

NOTICE:

Be careful not to twist or damage the drive cable and guide casing during removal.



15. REMOVE SLIDING ROOF DRIVE CABLE LH

(a) Using a T25 "torx" driver, remove the 2 screws.

(b) Remove the 2 screws.

(c) Disconnect the drive cable from the lift guide. Slide the drive cable toward the rear of the vehicle and remove it.

NOTICE:

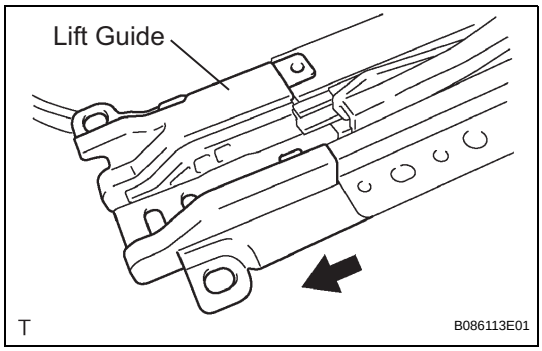
When removing the drive cable, be careful not to damage the side airbag, wire harness and other nearby parts.

16. REMOVE SLIDING ROOF DRIVE CABLE RH

HINT:

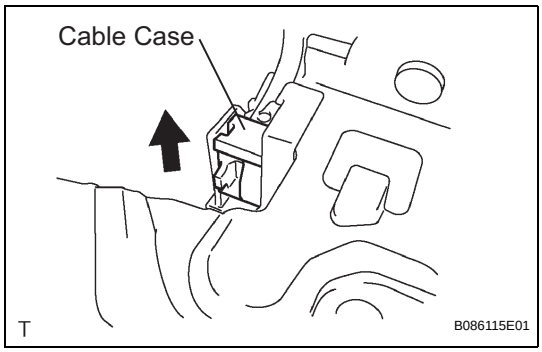
Use the same procedures described for the LH side.

17. REMOVE SLIDING ROOF CABLE GUIDE CASING



18. REMOVE SLIDING ROOF LIFT GUIDE LH

(a) Slide the lift guide forward and remove it.



(b) Disconnect the cable case's connector from the lift guide as shown in the illustration.

19. REMOVE SLIDING ROOF LIFT GUIDE RH

HINT:

Use the same procedures described for the LH side.

20. REMOVE WINDSHIELD MOULDING OUTSIDE

HINT:

- The roof panel cannot be removed / replaced by itself because the windshield glass and roof panel are built into the moulding. First, the moulding must be removed. Then the roof panel can be replaced.
- Refer to the windshield glass section for more detailed instructions (See page WS-56).

RF

21. REMOVE SLIDING ROOF HOUSING SUB-ASSEMBLY

(a) Remove the 16 nuts and panel.

NOTICE:

- **When removing the panel, be careful not to damage the vehicle.**
- **Perform this step with 2 or more persons.**

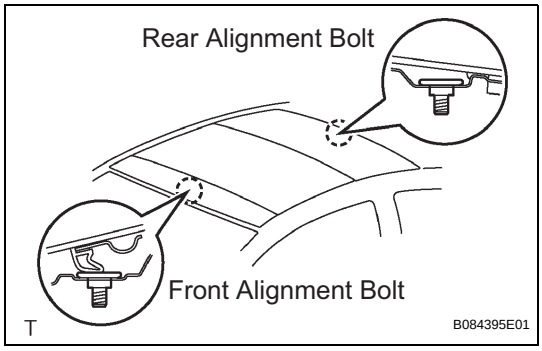
INSTALLATION

HINT:

- The installation procedures are the removal procedures in reverse order. However, only installation procedures requiring additional information are included.
- A bolt without a torque specification is shown in the standard bolt chart (See page WS-58).

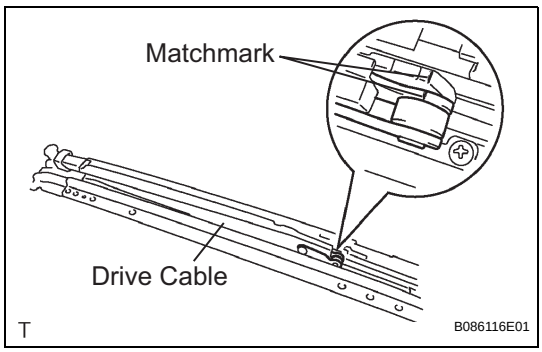
1. INSTALL DRIVE CABLE AND DRIVE CABLE GUIDE CASING

(a) Install the drive cable and guide casing to the roof panel with the 12 nuts.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)



2. INSTALL SLIDING ROOF HOUSING SUB-ASSEMBLY

(a) Install the housing with the 16 nuts.
(b) When installing the panel to the vehicle, first install the panel's center front and center rear alignment bolts to the vehicle's front and rear alignment bolt installation points, as shown in the illustration.
(c) Check that the alignment bolts are firmly installed.
NOTICE:
When bolts are not firmly installed, water leaks and malfunctions will occur.
(d) Install the panel with the 16 nuts.



3. ADJUST FULLY CLOSED POSITION

(a) Using a screwdriver, slide the sliding roof drive cable to align the matchmarks.
HINT:
Tape the screwdriver tip before use.

4. INSTALL ROOM LIGHT BRACKET AND DRIVE GEAR

(a) Install the drive gear and bracket with the 2 bolts and nut.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

5. INSTALL SUNSHADE TRIM SUB-ASSEMBLY

(a) Install the trim with the 2 nuts and 4 screws.
Torque: 5.4 N*m (55 kgf*cm, 48 in.*lbf)

6. INSTALL SLIDING ROOF HOUSING FRONT MOUNTING BRACKET LH

7. INSTALL SLIDING ROOF HOUSING FRONT MOUNTING BRACKET RH

8. INSTALL SLIDING ROOF HOUSING CENTER MOUNTING BRACKET LH

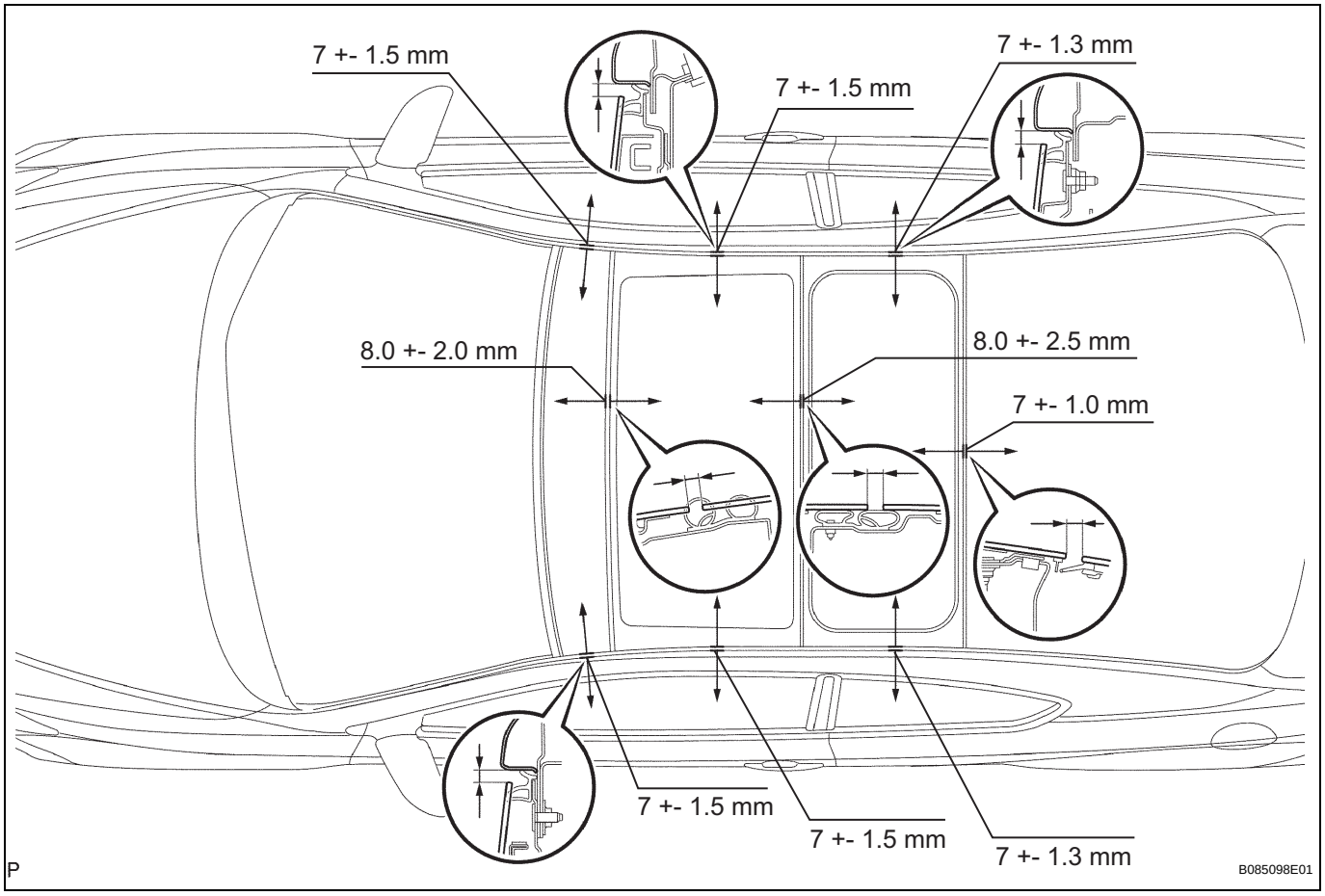
9. INSTALL SLIDING ROOF HOUSING CENTER MOUNTING BRACKET RH

10. INSTALL SLIDING ROOF GLASS SUB-ASSEMBLY (NO. 1, NO. 2)

(a) Install the No. 1 roof glass.
(1) Using a "torx" driver, install the roof glass with the 6 screws.

(b) Install the No. 2 roof glass.
(1) Using a "torx" driver, install the 4 screws.
(2) Connect the battery and sliding roof control switch. Fully open the glass and install the 2 screws on the front side of the glass.

11. ADJUST SLIDING ROOF GLASS SUB-ASSEMBLY (NO. 1, NO. 2, HOUSING PANEL)



(a) Adjust the No. 3 housing panel.
(1) The housing panel does not have adjusting screws. Instead, change the position of the housing panel assembly so that the position of the housing panel is within the standard values shown in the illustration.

Standard measurement

Item	Specified Condition
Front end	**8.0 +- 2.5 mm (0.314 +- 0.098 in.)**
Rear end	**7.0 +- 1.0 mm (0.276 +- 0.039 in.)**
Side end	**7.0 +- 1.3 mm (0.276 +- 0.051 in.)**

(2) When finished adjusting the roof housing, install the roof housing's 16 nuts and the mount bracket's 8 bolts and 8 nuts.

(b) Adjust the No. 1 roof glass.

(1) Adjust the position of the roof glass so that it is within the standard values shown in the illustration.

Standard measurement

Item	Specified Condition
Rear end	8.0 +- 2.0 mm (0.314 +- 0.079 in.)
Side end	7.0 +- 1.5 mm (0.276 +- 0.059 in.)

(2) When finished adjusting the roof glass, install the 4 screws on the front side of the glass.

(3) Using a "torx" driver, install the 2 screws.

(c) Adjust the No. 2 roof glass.

(1) Adjust the position of the roof glass so that it is within the standard values shown in the illustration.

Standard measurement

Item	Specified Condition
Front end	8.0 +- 2.0 mm (0.314 +- 0.079 in.)
Rear end	8.0 +- 2.5mm (0.314 +- 0.098 in.)
Side end	7.0 +- 1.5 mm (0.276 +- 0.059 in.)

(2) When finished adjusting roof glass, using a "torx" driver, install the 4 screws.

(3) Connect the cable to the negative (-) battery terminal and connect the sliding roof control switch. Fully open the glass and install the 2 screws on the front side of the glass.

NOTICE:

- **When the roof glass is fully open, disconnect the battery cable and sliding roof control switch.**
- **If the battery cable and sliding roof control switch are connected and the jam protection function has not been initialized, be careful whenever preforming work between the roof glass and frame.**

12. CHECK FOR WATER LEAKS

If a leak is found, readjust the sliding roof.

13. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

14. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

15. CHECK SRS WARNING LIGHT

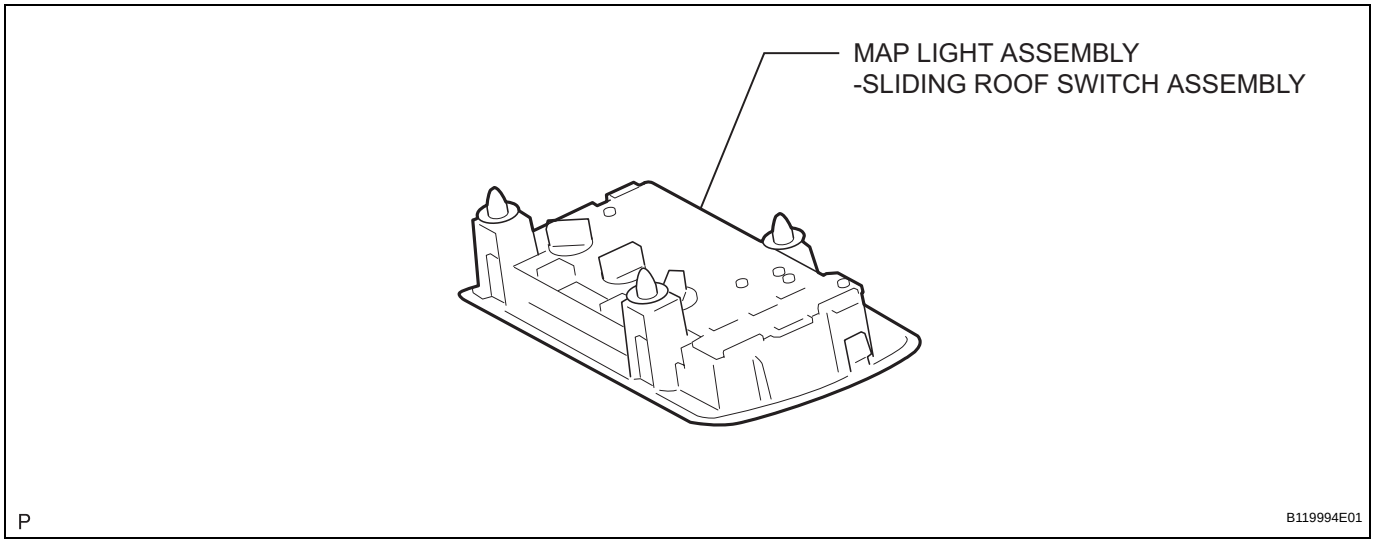
(a) Check the SRS warning light (see page RS-11).

16. INITIALIZE SLIDING ROOF GEAR

(a) Initialize sliding roof gear (see page RF-3).

SLIDING ROOF SWITCH ASSEMBLY

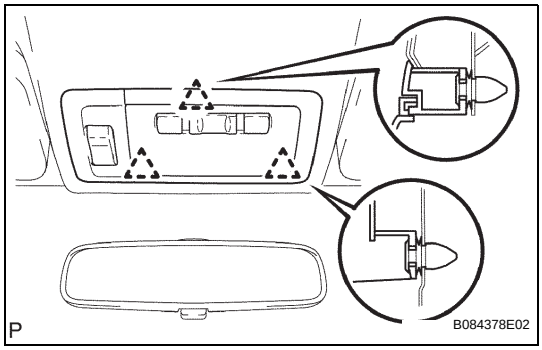
COMPONENTS



REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



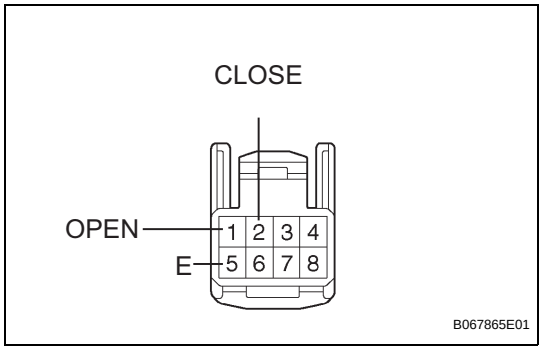
2. REMOVE MAP LIGHT ASSEMBLY

(a) Using a clip remover, detach the 3 clips and remove the light.
(b) Disconnect the map light connector.

INSPECTION

1. INSPECT MAP LIGHT ASSEMBLY

(a) Measure the resistance of the switch.
Standard resistance



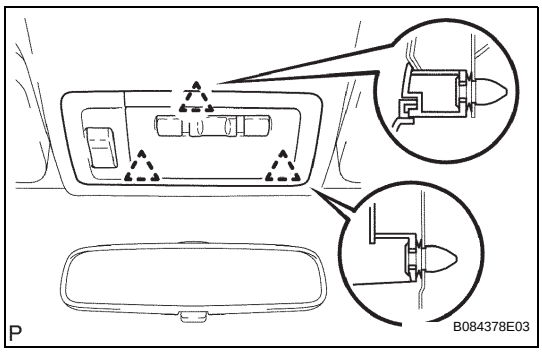
Tester Connection	Switch Condition	Specified Condition
1 (OPE) - 5 (E)	OPEN	Below 1 Ω
2 (CLOSE) - 5 (E)	CLOSE	Below 1 Ω
1 (OPEN) - 5 (E)	OFF	10 kΩ or higher
2 (CLOSE) - 5 (E)	OFF	10 kΩ or higher

If the result is not as specified, replace the map light assembly.

INSTALLATION

1. INSTALL MAP LIGHT ASSEMBLY

(a) Connect the map light connector.
(b) Attach the 3 clips to install the light.



2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

4. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

AIRBAG SYSTEM

PRECAUTION

NOTICE:
When disconnecting the negative (-) battery terminal, initialize the following systems after the terminal is reconnected.

System Name	See Procedure
Power Window Control System (with Jam Protection Function)	WS-5
Sliding Roof System	

1. HANDLING PRECAUTIONS FOR AIRBAG SENSOR

HINT:
In this section, the center airbag sensor, front airbag sensor LH, front airbag sensor RH, side airbag sensor LH, side airbag sensor RH, rear airbag sensor LH, rear airbag sensor RH and seat position airbag sensor are collectively referred to as the airbag sensor.

(a) Before starting the following operations, wait at least 90 seconds after disconnecting the cable from the battery negative (-) terminal.
  (1) Replacement of the airbag sensor
  (2) Adjustment of the front doors of the vehicle equipped with the side airbag and curtain shield airbag (fitting adjustment)

(b) When connecting or disconnecting the airbag sensor connector, ensure that all of the sensors are installed in the vehicle.

(c) Do not use an airbag sensor which has been dropped during the operation or transportation.

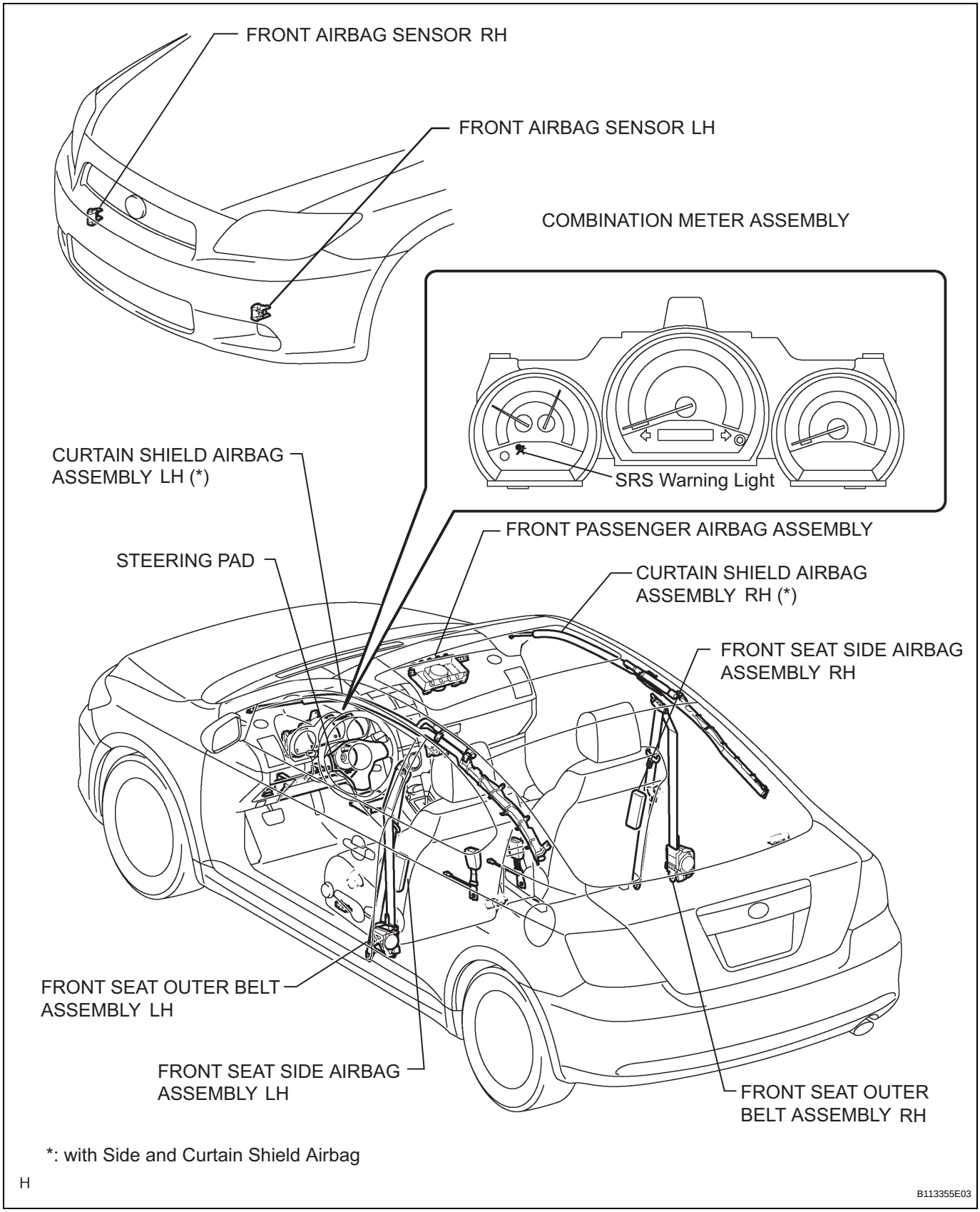
(d) Do not disassemble the airbag sensor.

2. INSPECTION PROCEDURE FOR VEHICLE INVOLVED IN ACCIDENT

(a) When the airbag has not deployed, confirm the DTC by checking the SRS warning light. If there is any malfunction in the SRS airbag system, perform troubleshooting.

(b) When any of the airbag have deployed, replace the airbag sensor and check the installation condition.

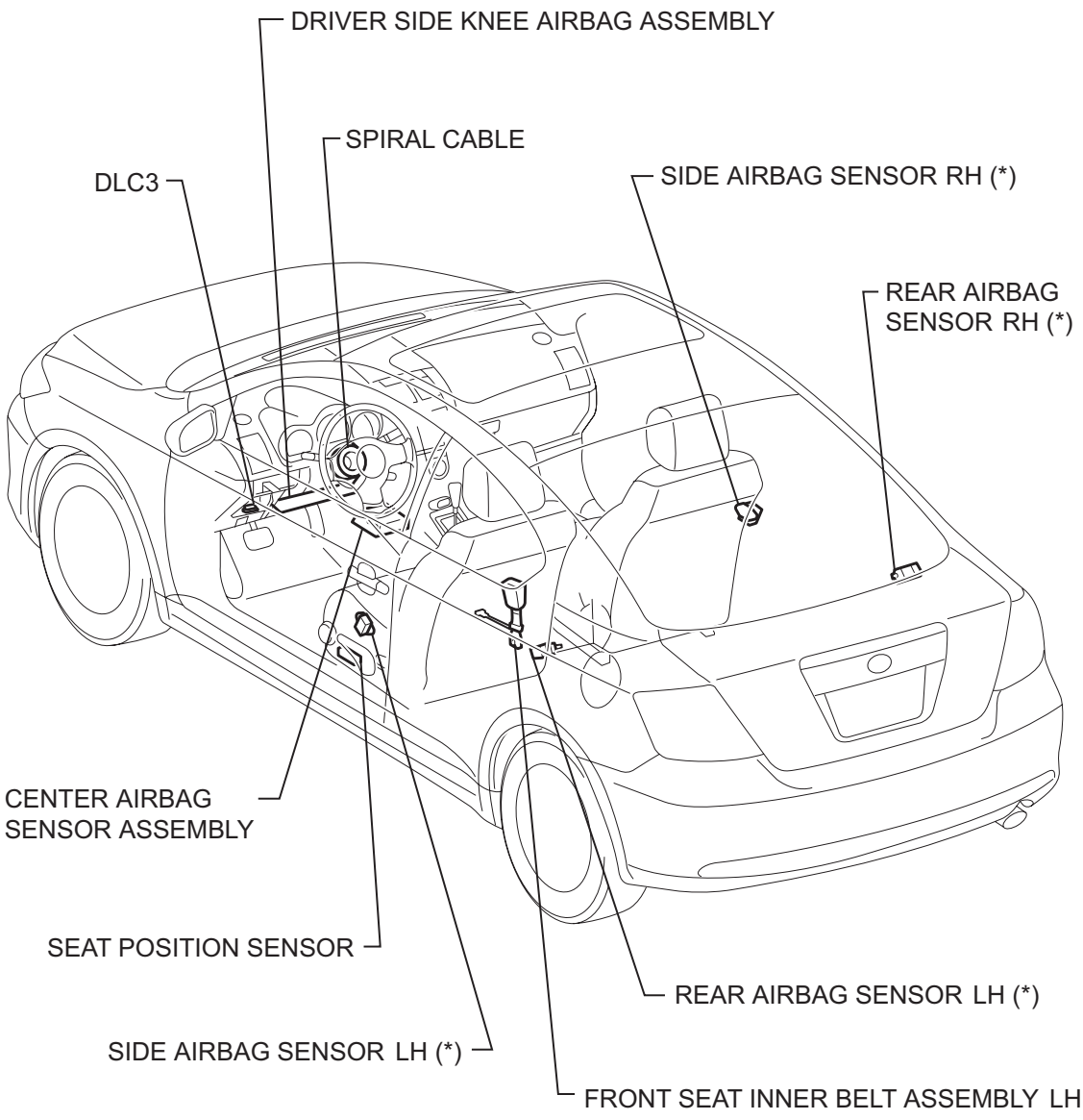
PARTS LOCATION



*: with Side and Curtain Shield Airbag

B113355E03

RS



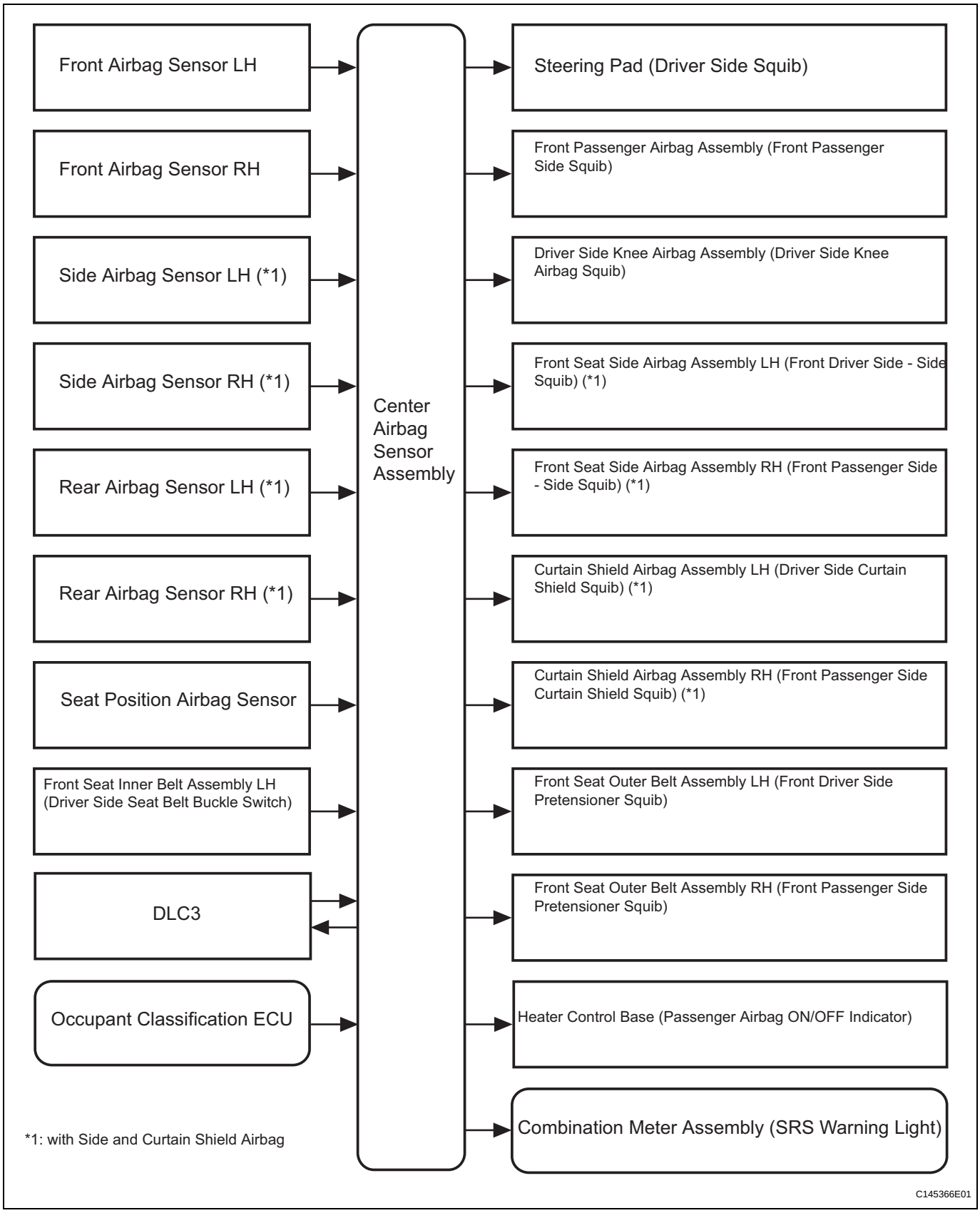
*: with Side and Curtain Shield Airbag

T

C145382E01

RS

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

1. DESCRIPTION OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

(a) General description

(1) In this system, the center airbag sensor installed on the floor under the A/C unit determines whether or not to activate the SRS airbags and seat belt pretensioners by receiving the collision signal from the airbag sensors (excluding the center airbag sensor). When there is trouble in the system, the center airbag sensor turns on the SRS warning light on the combination meter to inform the driver.

(b) Description of the dual stage control

(1) The center airbag sensor controls the dual stage deployment of the driver airbag in the horn button and the passenger airbag on the instrument panel. The center airbag sensor controls the dual stage deployment of the driver airbag according to the collision impact, seat position and seat belt ON/OFF state. It also controls the dual stage deployment of the passenger airbag according to the collision impact.

(c) Description of check mode (signal check)

(1) This center airbag sensor can be operated using the check mode of the intelligent tester function. Check mode can detect and output DTC by using the intelligent tester to switch the center airbag sensor to the check mode.
A simulation method should be used if the malfunction cannot be reproduced during troubleshooting (the malfunction is temporarily solved, etc.). In this case, joggling each connector, or driving on a city or rough road with the center airbag sensor in check mode makes it possible to obtain a more accurate malfunction condition.

2. IGNITION JUDGMENT AND CONDITIONS

(a) Operation in case of front collision

(1) When the vehicle collides in the hatched area (Fig. 1) and shock is larger than a predetermined level, the airbags (driver and front passenger) are activated automatically. The deceleration sensor of the center airbag sensor determines the need for ignition in response to collisions within the hatched area based on the signal from the deceleration sensor of the front airbag sensor.

(2) Safing sensor of the center airbag sensor is designed to activate at a lower deceleration rate than the deceleration sensor. As illustrated in Fig. 2 below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.

RS

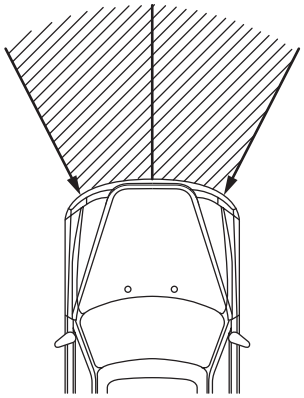


Fig. 1

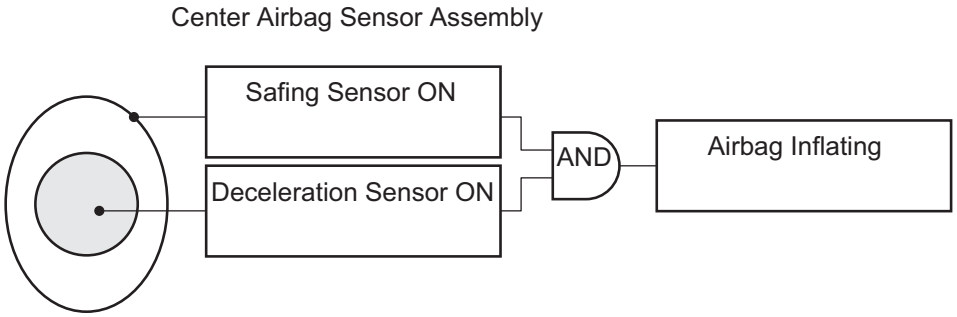
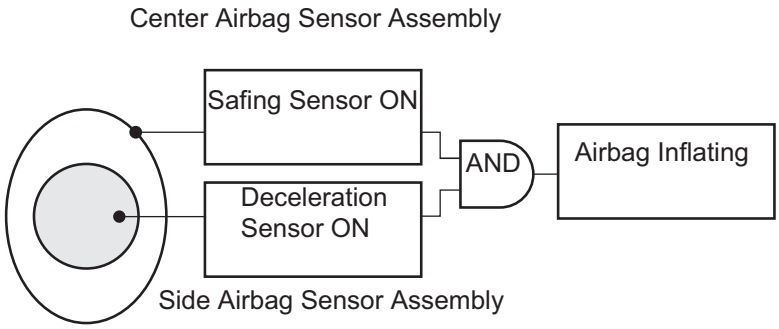


Fig. 2

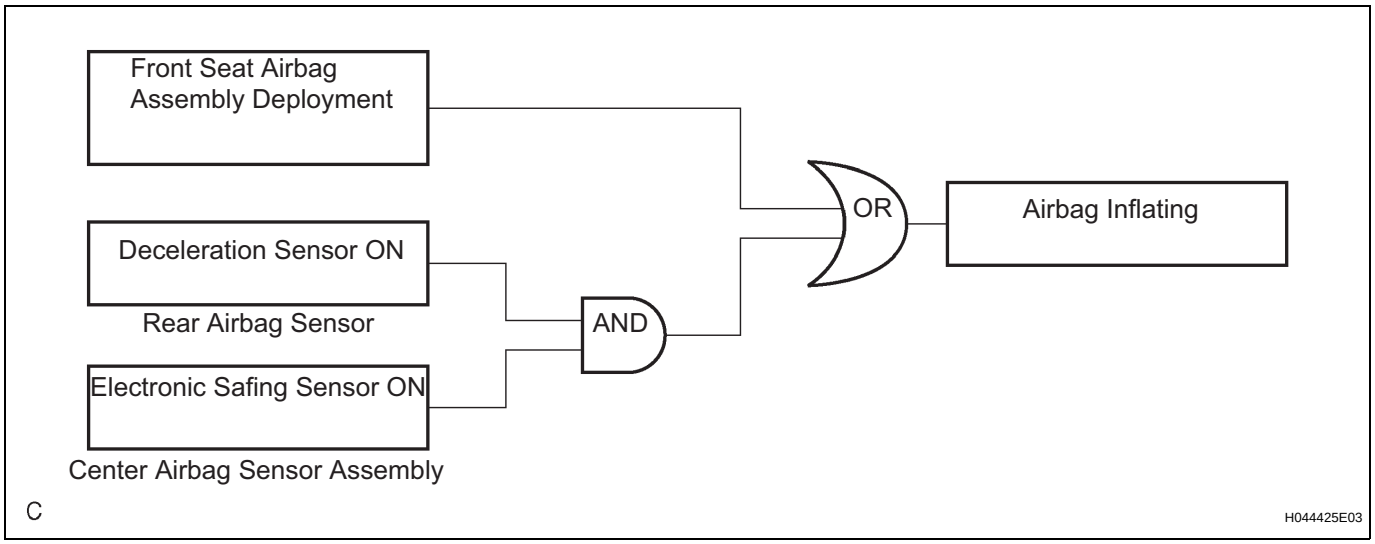
B113360E01

(b) With side curtain shield airbag:
Operation in case of front side collision
(1) Electronic safing sensor of the side airbag sensor is designed to activate at a lower deceleration rate than the deceleration sensor of the side airbag sensor. As illustrated below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.



B113358E01

(c) With side and curtain shield airbag:
Operation in case of rear side collision
(1) Electronic safing sensor of the center airbag sensor is designed to activate at a lower deceleration rate than the deceleration sensor of the rear airbag sensor. As illustrated below, when both the safing sensor and deceleration sensor go on simultaneously, current flows to the squib and ignition occurs.



HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
*: Use the intelligent tester.

RS

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	CUSTOMER PROBLEM ANALYSIS

(a) Confirm problem symptoms (See page IN-26).

NEXT

3	SRS WARNING LIGHT CHECK

NEXT

4	CHECK DTC (Present and Past DTCs)*

(a) Check for DTC outputs.

Result

Result	Proceed to
DTC is output.	A
DTC is not output.	B

B → PROBLEM SYMPTOMS TABLE

A

5	DTC CHART

NEXT

6	CIRCUIT INSPECTION*

NEXT

7	REPAIR

NEXT

8	CLEAR DTC (Present and Past DTCs)*

NEXT

9	CHECK DTC (Present and Past DTCs)*

(a) Check for DTC outputs.

Result

Result	Proceed to
DTC is not output.	A
DTC is output.	B

B → Go to step 5

A

10	CONFIRMATION TEST

NEXT

END

PROBLEM SYMPTOMS TABLE

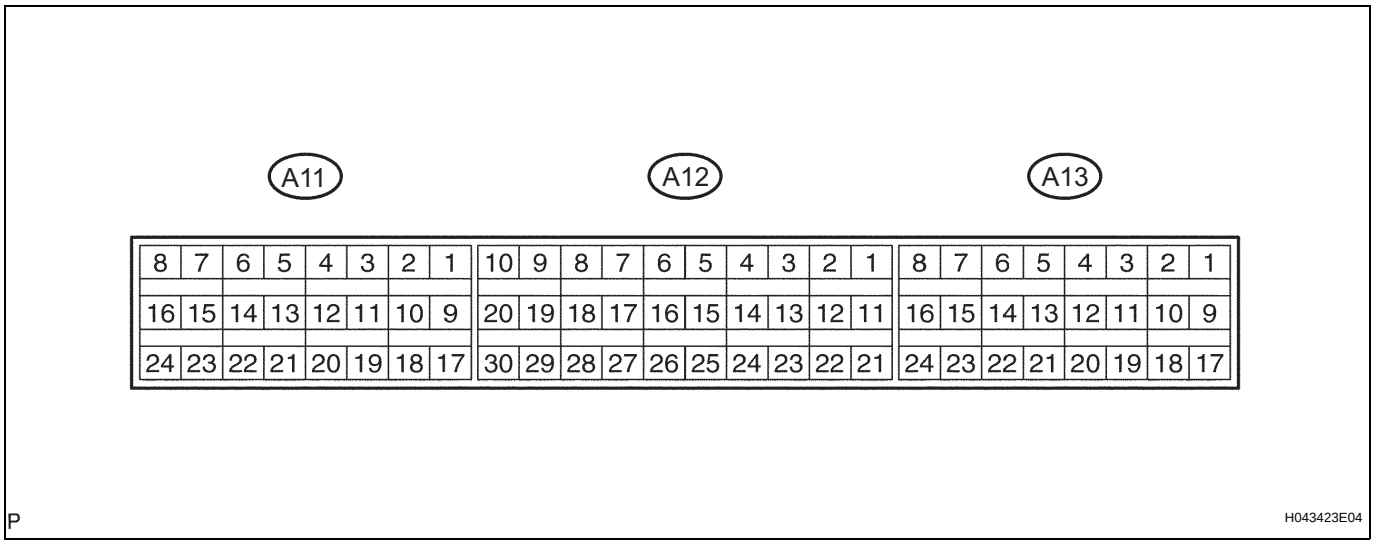
HINT:
Proceed to the troubleshooting for each circuit in the table below.

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	RS-234
With the ignition switch to the ON position, the SRS warning light sometimes comes on after approximately 6 seconds.	SRS Warning Light Remains ON	RS-234
The SRS warning light always comes on even when DTC is not output.	SRS Warning Light Remains ON	RS-234
With the ignition switch to the ON position, the SRS warning light does not come on.	SRS Warning Light does not Come ON	RS-239
Although an SRS warning light operates normally, DTC or a normal system code is not displayed.	TC and CG terminal circuit	RS-241
Although terminals TC and CG of DLC3 are not connected, DTC or a normal system code is displayed.	TC and CG terminal circuit	RS-241

TERMINALS OF ECU

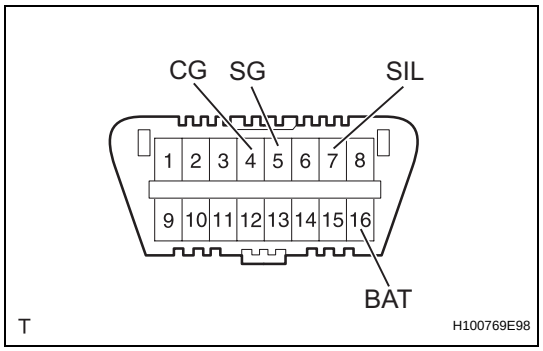
1. CENTER AIRBAG SENSOR ASSEMBLY



Terminal No.	Terminal Symbol	Terminal Name
A11-1 (*1)	SFD+	Side airbag assembly LH (Side squib LH)
A11-2 (*1)	SFD-	Side airbag assembly LH (Side squib LH)
A11-3 (*1)	ICD-	Curtain shield airbag assembly LH (Curtain shield squib LH)
A11-4 (*1)	ICD+	Curtain shield airbag assembly LH (Curtain shield squib LH)
A11-5	PD+	Front seat outer belt assembly LH (Pretensioner squib LH)
A11-6	PD-	Front seat outer belt assembly LH (Pretensioner squib LH)
A11-9	DSP+	Seat position airbag sensor
A11-10	DBE+	Front seat inner belt assembly LH
A11-17	DSP-	Seat position airbag sensor
A11-18	DBE-	Front seat inner belt assembly LH
A11-19 (*1)	VUPD	Side airbag sensor assembly
A11-20 (*1)	VUCD	Rear airbag sensor LH
A11-21 (*1)	ESD	Side airbag sensor assembly
A11-22 (*1)	ESCD	Rear airbag sensor LH
A12-1	P2+	Front passenger airbag assembly (Passenger squib, Dual stage - 2nd step)
A12-2	P2-	Front passenger airbag assembly (Passenger squib, Dual stage - 2nd step)
A12-3	P-	Front passenger airbag assembly (Passenger squib)
A12-4	P+	Front passenger airbag assembly (Passenger squib)
A12-5	D+	Horn button assembly (Driver squib)
A12-6	D-	Horn button assembly (Driver squib)
A12-7	D2-	Horn button assembly (Driver squib, Dual stage - 2nd step)

Terminal No.	Terminal Symbol	Terminal Name
A12-8	D2+	Horn button assembly (Driver squib, Dual stage - 2nd step)
A12-9	DK+	No. 1 instrument panel airbag assembly lower (Knee airbag squib)
A12-10	DK-	No. 1 instrument panel airbag assembly lower (Knee airbag squib)
A12-13	PBEW	Passenger seat belt warning light
A12-14	LA	Combination meter assembly (SRS warning light)
A12-15	TC	DLC3
A12-16	SIL	DLC3
A12-17	P-AB	Heater control base (Passenger airbag ON/OFF indicator)
A12-21	IG2	IG2 fuse (Power source)
A12-22	GSW2	ECM
A12-23	PAON	Heater control base (Passenger airbag ON/OFF indicator)
A12-25	E1	Ground
A12-26	E2	Ground
A12-27	-SR	Front airbag sensor RH
A12-28	-SL	Front airbag sensor LH
A12-29	+SR	Front airbag sensor RH
A12-30	+SL	Front airbag sensor LH
A13-3	PP-	Front seat outer belt assembly RH (Pretensioner squib RH)
A13-4	PP+	Front seat outer belt assembly RH (Pretensioner squib RH)
A13-5 (*1)	ICP+	Curtain shield airbag assembly RH (Curtain shield squib RH)
A13-6 (*1)	ICP-	Curtain shield airbag assembly RH (Curtain shield squib RH)
A13-7 (*1)	SFP-	Front seat airbag assembly RH (Side squib RH)
A13-8 (*1)	SFP+	Front seat airbag assembly RH (Side squib RH)
A13-16	FSP+	Occupant classification ECU
A13-19 (*1)	ESCP	Rear airbag sensor RH
A13-20 (*1)	ESP	Side airbag sensor assembly RH
A13-21 (*1)	VUCP	Rear airbag sensor RH
A13-22 (*1)	VUPP	Side airbag sensor assembly RH
A13-24	FSP-	Occupant classification ECU

*1: with Side and Curtain Shield Airbag



DIAGNOSIS SYSTEM

1. CHECK DLC3

(a) The ECU uses ISO 15765-4 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

RS

Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	During transmission	During Transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive Always	Always	10 to 14 V

HINT:

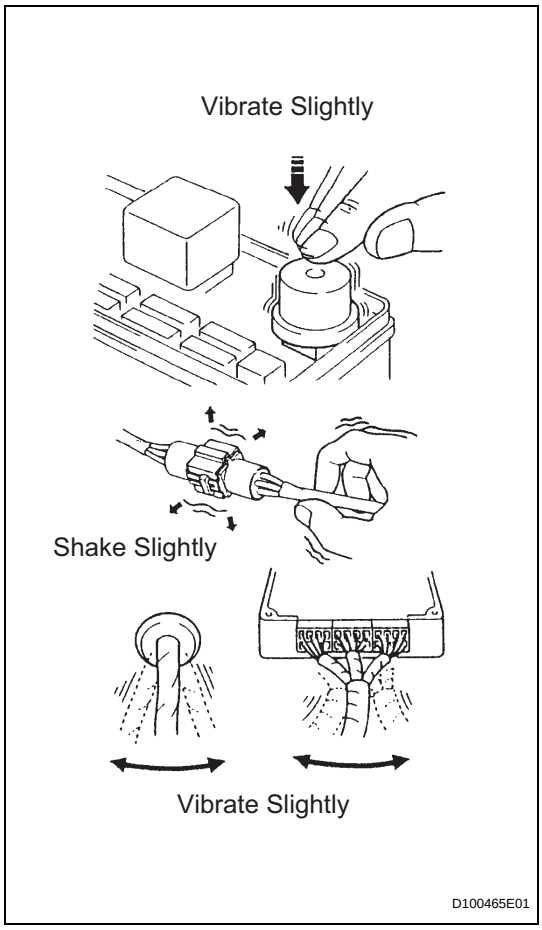
If the display shows UNABLE TO CONNECT TO VEHICLE when you connect the cable of the intelligent tester to the DLC3, turn the ignition switch to the ON position and operate the intelligent tester, there is a problem on the vehicle side or tester side.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself. Consult the Service Department listed in the tester's instruction manual.

2. SYMPTOM SIMULATION

HINT:

The most difficult case in troubleshooting is when no symptoms occur. In such cases, a thorough customer problem analysis must be carried out. Then the same or similar conditions and environment in which the problem occurred in the customer's vehicle should be simulated. No matter how experienced or skilled a technician may be, if he proceeds to troubleshooting without confirming the problem symptoms, he will likely overlook something important and make a wrong guess at some points in the repair operation. This leads to a standstill in troubleshooting.



(a) Vibration method: When vibration seems to be the major cause.
HINT:
Perform the simulation method only during the primary check period (for approximately 6 seconds after the ignition switch is turned to the ON position).
(1) Slightly vibrate the part of the sensor considered to be the problem cause with your fingers and check whether the malfunction occurs.
HINT:
Shaking the relays too strongly may result in open relays.
(2) Slightly shake the connector vertically and horizontally.
(3) Slightly shake the wire harness vertically and horizontally.
The connector joint and fulcrum of the vibration are the major areas to be checked thoroughly.

3. FUNCTION OF SRS WARNING LIGHT

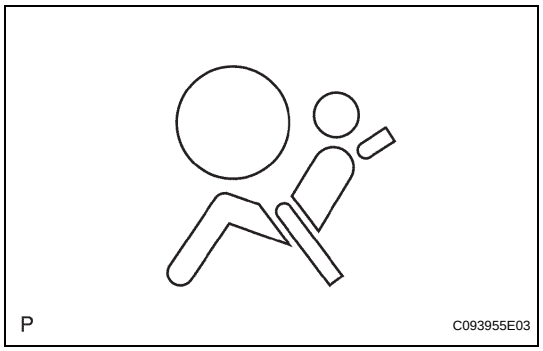
(a) Primary check
(1) Turn the ignition switch to the LOCK position. Wait for at least 2 seconds, and then turn the ignition switch to the ON position. The SRS warning light comes on for approximately 6 seconds and the SRS airbag system diagnosis (including the seat belt pretensioner and occupant classification system) is performed.
HINT:
If trouble is detected during the primary check, the SRS warning light remains on even after the primary check period (for approximately 6 seconds) has elapsed.

(b) Constant check
(1) After the primary check, the center airbag sensor constantly monitors the SRS airbag system for trouble.
HINT:
If trouble is detected during the constant check, the center airbag sensor functions as follows:
- The SRS warning light comes on.
- The SRS warning light go off, and then comes on. This blinking pattern indicates the 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 (for approximately 6 seconds after the ignition switch is turned to the ON position).
(2) When the airbag system has trouble:
- The SRS warning light remains on even after the primary check period has elapsed.

- 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 the LOCK to ON position.

HINT:
The center airbag sensor keeps the SRS warning light on if the airbag has been deployed.



4. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to the ON position, 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 the ON position (constant check).
HINT:
When any of the following symptoms occur, refer to "Problem Symptoms Table" (See page RS-9).
- The SRS warning light comes on occasionally after the primary check period has elapsed.
- The SRS warning light comes on, but DTC is not output.
- The ignition switch is turned from the LOCK to ON position, but the SRS warning light does not come on.

5. FUNCTION OF PASSENGER AIRBAG ON/OFF INDICATOR

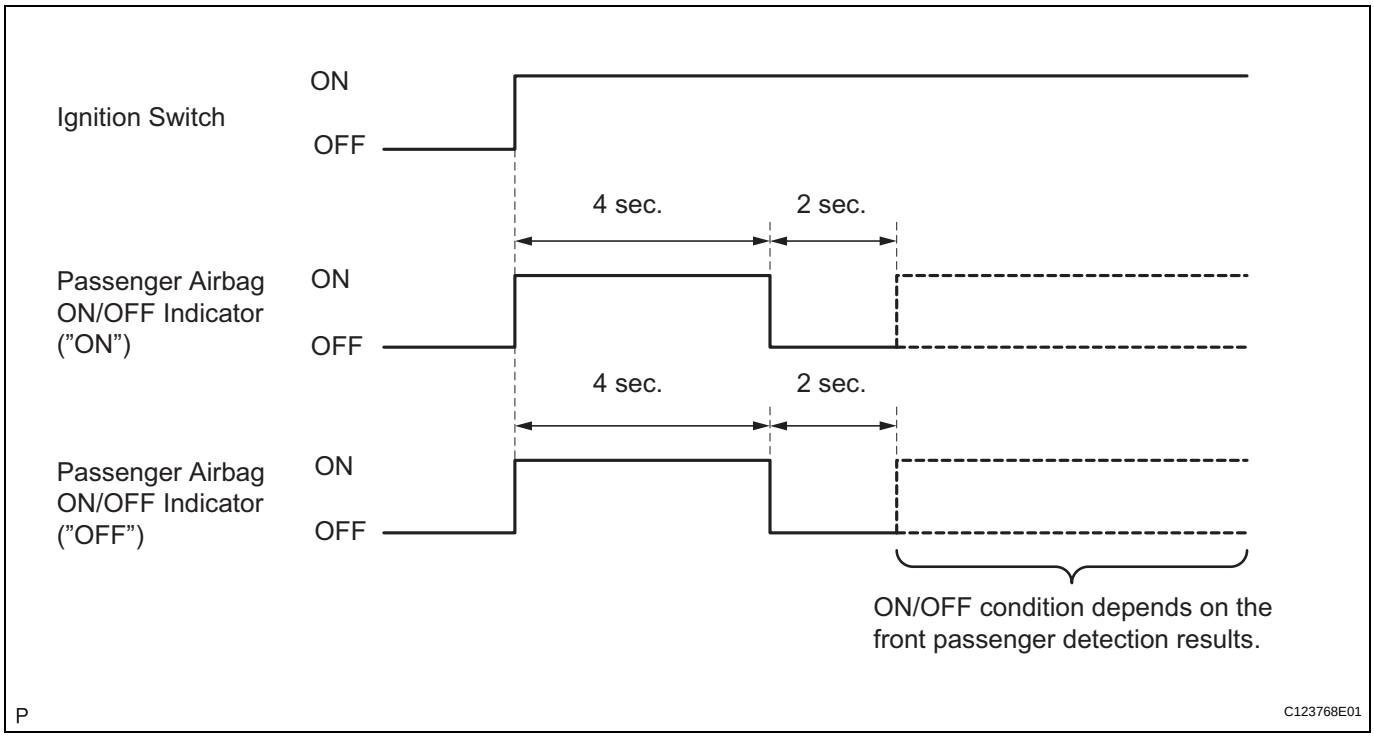
(a) Initial check
(1) Turn the ignition switch to the ON position.
(2) The passenger airbag ON/OFF indicator comes on for approximately 4 seconds, then goes off for approximately 2 seconds.
(3) Approximately 6 seconds after the ignition switch is turned ON, the passenger airbag ON/OFF indicator will be ON or OFF depending on the conditions listed below.

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 set.	OFF	ON	OFF
Front passenger occupant classification failure	OFF	ON	ON

HINT:
- The passenger airbag ON/OFF indicator is based on the timing chart below in order to check the indicator light circuit.

RS

- When the front passenger occupant classification system has trouble, both the SRS warning light and the passenger airbag ON/OFF indicator ("OFF") come on. In this case, check the DTCs in "AIRBAG SYSTEM" first. Then troubleshoot the occupant classification system if DTC B1650/32 is detected, and troubleshoot the passenger airbag ON/OFF indicator if DTC B1660/43 is detected.



6. PASSENGER AIRBAG ON/OFF INDICATOR CHECK

(a) Turn the ignition switch to the ON position.

(b) Check that the passenger airbag ON/OFF indicator ("ON" and "OFF") comes on for approximately 4 seconds, then goes off for approximately 2 seconds.
HINT:
Refer to the table in the previous step regarding the passenger airbag ON/OFF indicator when the ignition switch is turned to the ON position and approximately 6 seconds pass.

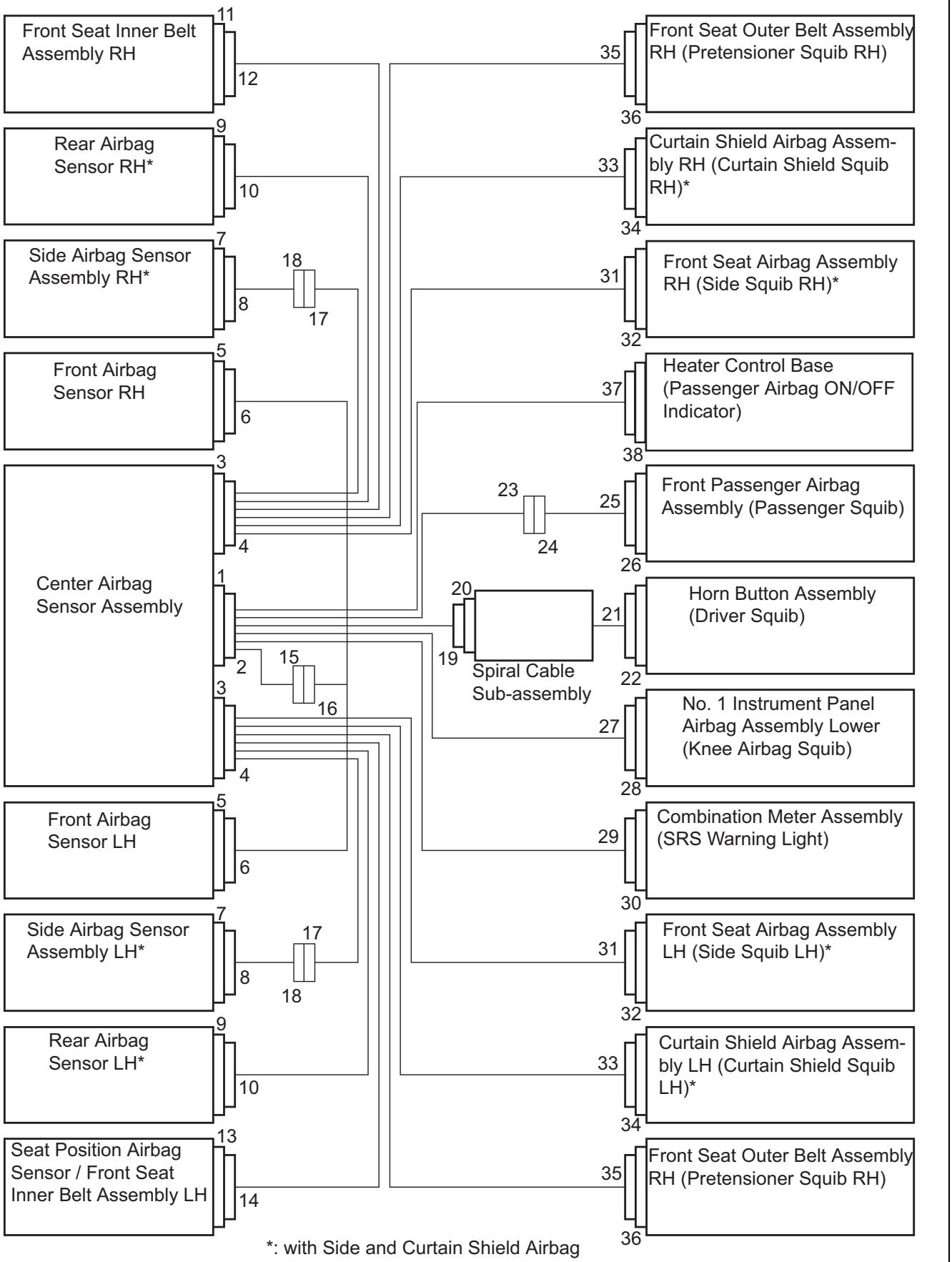
7. RELEASE METHOD OF ACTIVATION PREVENTION MECHANISM

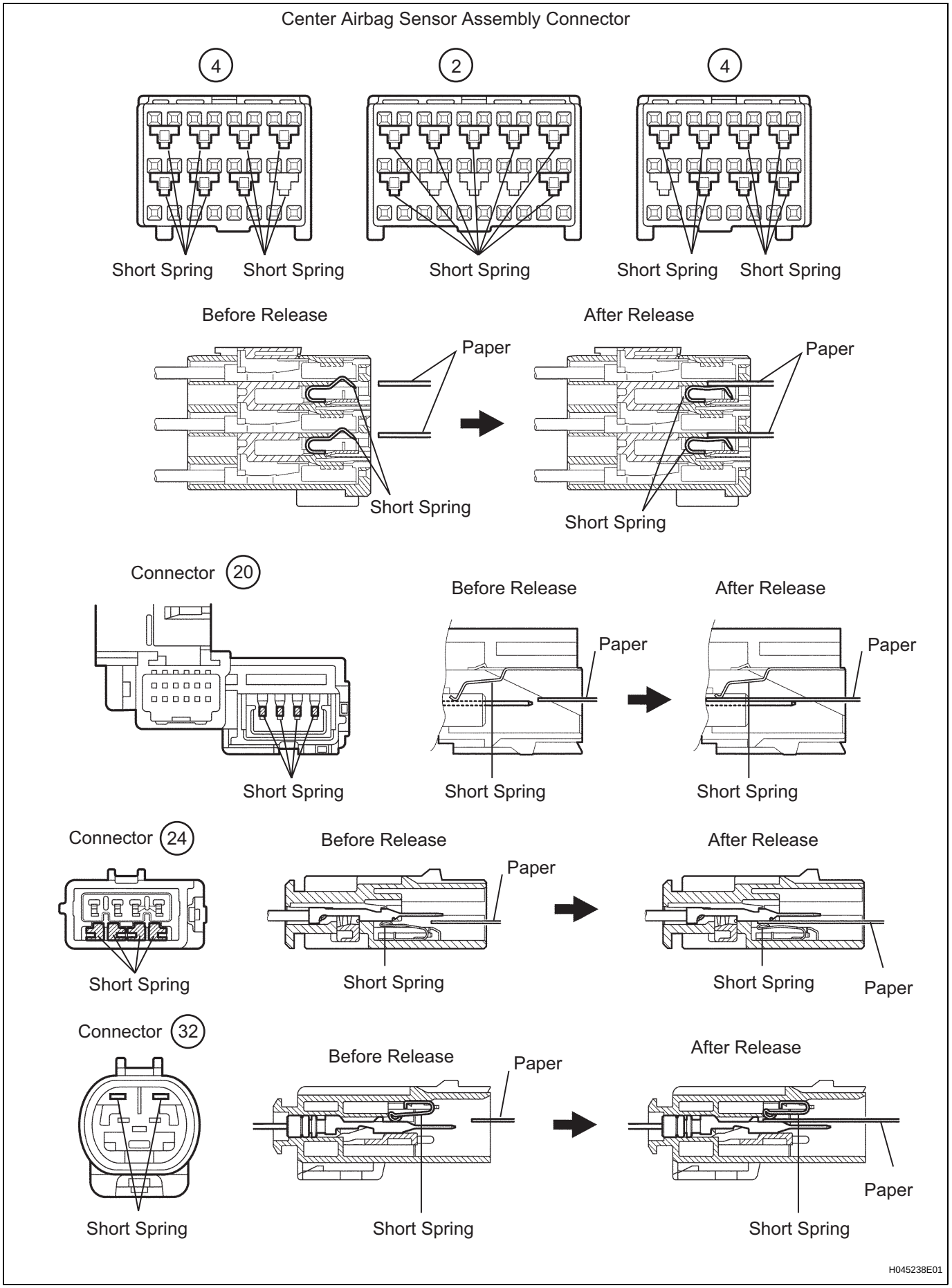
(a) The activation prevention mechanism is built into the connector for the squib circuit of the SRS.
As explained in the troubleshooting section, insert a piece of paper that is the same thickness as the male terminal between the terminal and the short spring to release it (Refer to the illustration below).
CAUTION:
Never release the activation prevention mechanism on the squib connector even when inspection with the squib disconnected.

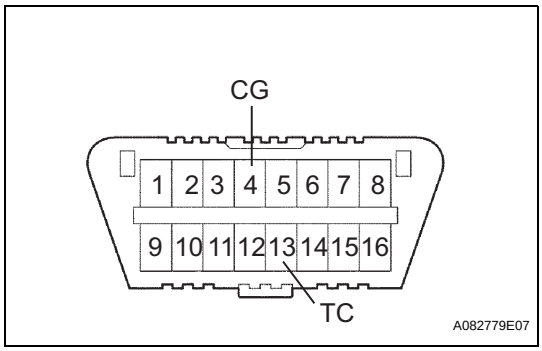
NOTICE:

- **Do not release the activation prevention mechanism unless specially directed by the troubleshooting procedure.**
- **To prevent the terminal and the short spring from being damaged, always use a piece of paper that is the same thickness as the male terminal.**

RS


Front Seat Inner Belt Assembly RH
11
12
Rear Airbag Sensor RH*
9
10
Side Airbag Sensor Assembly RH*
7
8
18
17
Front Airbag Sensor RH
5
6
Center Airbag Sensor Assembly
3
4
1
2
15
16
3
4
Front Airbag Sensor LH
5
6
Side Airbag Sensor Assembly LH*
7
8
17
18
Rear Airbag Sensor LH*
9
10
Seat Position Airbag Sensor / Front Seat Inner Belt Assembly LH
13
14
Front Seat Outer Belt Assembly RH (Pretensioner Squib RH)
35
36
Curtain Shield Airbag Assembly RH (Curtain Shield Squib RH)*
33
34
Front Seat Airbag Assembly RH (Side Squib RH)*
31
32
Heater Control Base (Passenger Airbag ON/OFF Indicator)
37
38
Front Passenger Airbag Assembly (Passenger Squib)
23
24
25
26
Horn Button Assembly (Driver Squib)
20
19
21
22
Spiral Cable Sub-assembly
No. 1 Instrument Panel Airbag Assembly Lower (Knee Airbag Squib)
27
28
Combination Meter Assembly (SRS Warning Light)
29
30
Front Seat Airbag Assembly LH (Side Squib LH)*
31
32
Curtain Shield Airbag Assembly LH (Curtain Shield Squib LH)*
33
34
Front Seat Outer Belt Assembly RH (Pretensioner Squib RH)
35
36
*: with Side and Curtain Shield Airbag
C145367E01


Center Airbag Sensor Assembly Connector
4
2
4
Short Spring
Short Spring
Short Spring
Short Spring
Short Spring
Before Release
After Release
Paper
Paper
Short Spring
Short Spring
Connector 20
Before Release
After Release
Paper
Paper
Short Spring
Short Spring
Short Spring
Connector 24
Before Release
After Release
Paper
Short Spring
Short Spring
Short Spring
Paper
Connector 32
Before Release
After Release
Paper
Paper
Short Spring
Short Spring
Short Spring
H045238E01



DTC CHECK / CLEAR

1. DTC CHECK (USING SST CHECK WIRE)

(a) Check the DTCs (Present trouble code).

(1) Turn the ignition switch to the ON position, and wait for approximately 60 seconds.

(2) Using SST, connect terminals TC and CG of the DLC3.

SST 09843-18040

NOTICE:

Connect the terminals to the correct positions to avoid a malfunction.

(b) Check the DTCs (Past trouble code).

(1) Using SST, connect terminals TC and CG of the DLC3.

SST 09843-18040

NOTICE:

Connect the terminals to the correct positions to avoid a malfunction.

(2) Turn the ignition switch to the ON position, and wait for approximately 60 seconds.

(c) Read the DTCs.

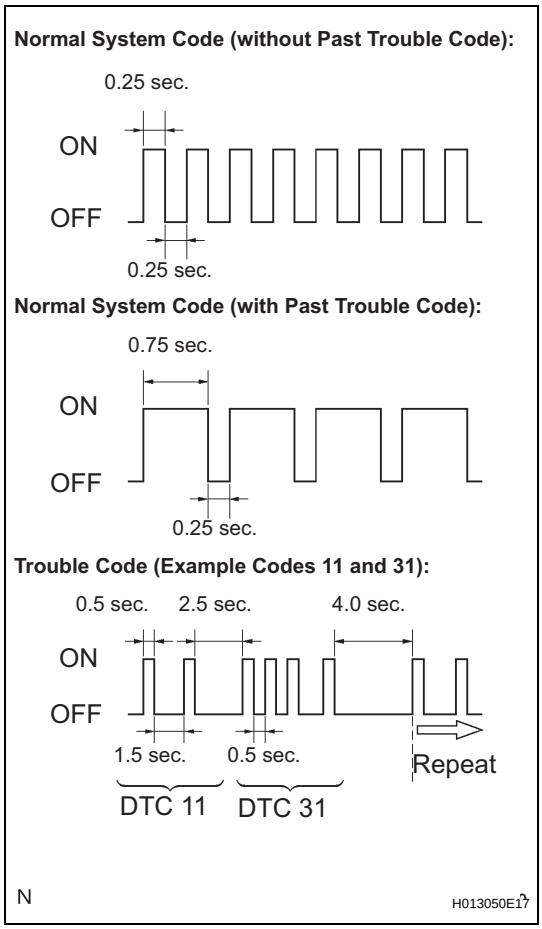
(1) Read the blinking patterns of the DTCs. As examples, the blinking patterns for the normal system code and trouble codes 11 and 31 are shown in the illustration.

- Normal system code indication (without past trouble code)
  The light blinks twice per second.
- Normal system code indication (with past trouble code)
  When the past trouble code is stored in the center airbag sensor assembly, the light blinks only once per second.
- Trouble code indication
  The first blinks indicates the first DTC. The second blinks occurs after a 1.5-second pause.

If there are more than 1 code, there will be a 2.5-second pause between each code. After all codes are shown, there will be a 4.0-second pause, and then they will all be repeated.

HINT:

- If 2 or more malfunctions are found, the indication begins with the smaller numbered code.
- If DTCs are indicated without connecting the terminals, proceed to "TC and CG Terminal Circuit" (See page RS-241).



2. DTC CLEAR (USING SST CHECK WIRE)

(a) Clear the DTCs.

(1) When the ignition switch is turned off, the DTCs are cleared.
HINT:
Depending on the DTC, the code may not be cleared by turning off the ignition switch. In this case, proceed to the next procedure.

(2) Using SST, connect terminals TC and CG of the DLC3, and then turn the ignition switch to the ON position.
SST 09843-18040

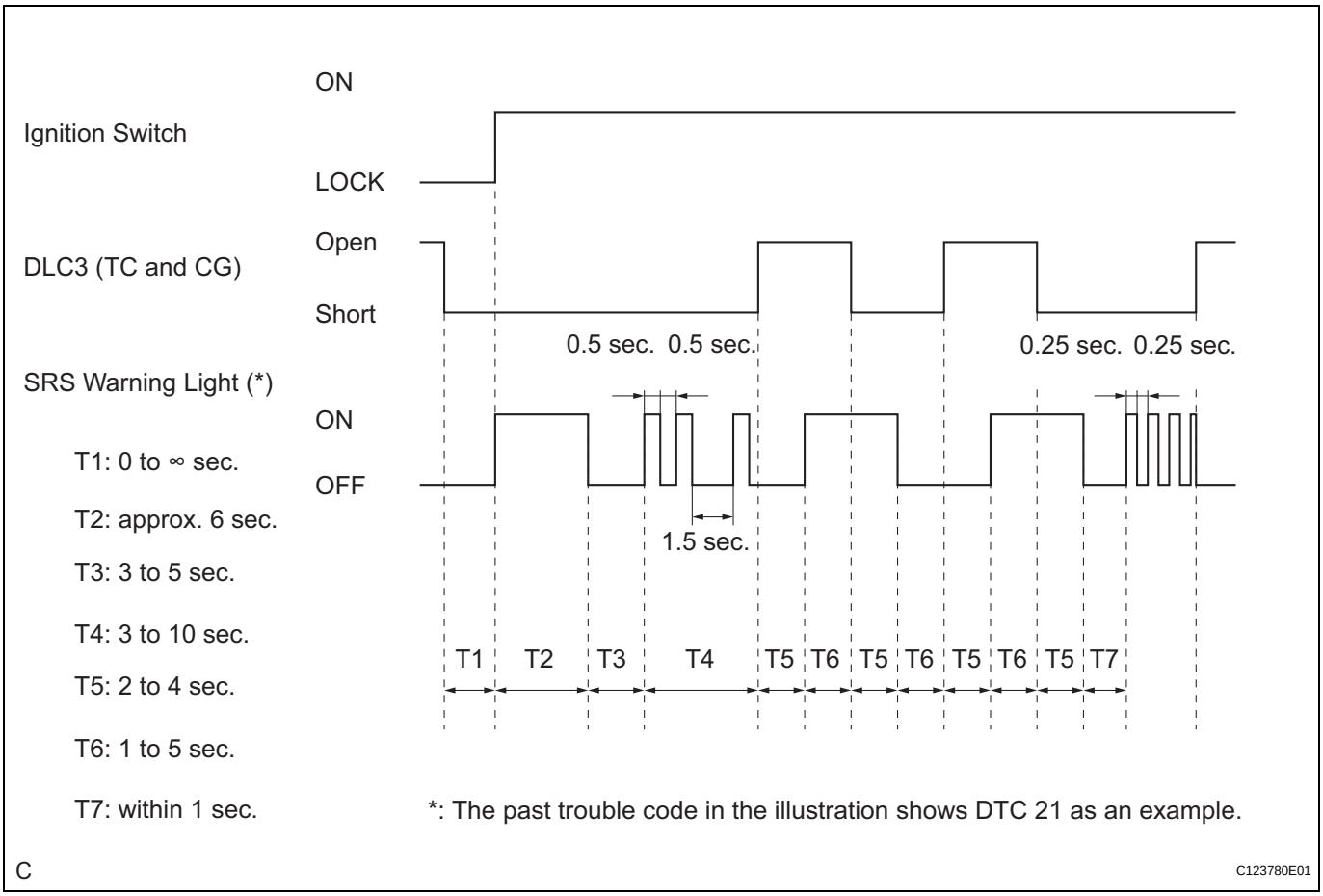
(3) Disconnect terminal TC of the DLC3 within 3 to 10 seconds after the DTCs are output, and check if the SRS warning light comes on after 3 seconds.

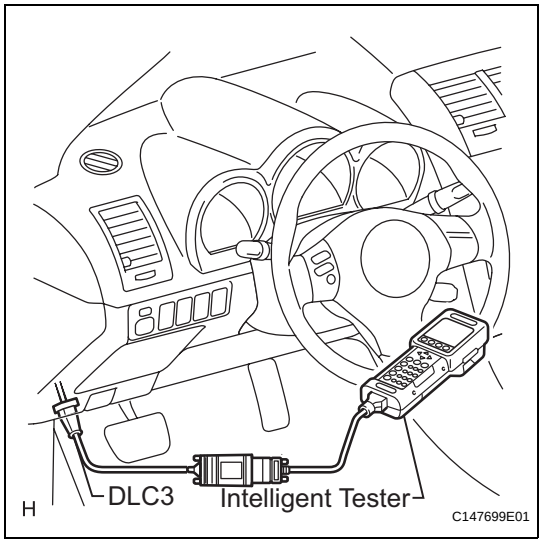
(4) Within 2 to 4 seconds after the SRS warning light comes on, connect terminals TC and CG of the DLC3.

(5) The SRS warning light should go off within 2 to 4 seconds after connecting terminals TC and CG of the DLC3. Then, disconnect terminal TC within 2 to 4 seconds after the SRS warning light goes off.

(6) The SRS warning light comes on again within 2 to 4 seconds after disconnecting terminal TC. Then, reconnect terminals TC and CG within 2 to 4 seconds after the SRS warning light comes on.

(7) Check if the SRS warning light goes off within 2 to 4 seconds after connecting terminals TC and CG of the DLC3. Also check if the normal system code is output within 1 second after the SRS warning light goes off.
If DTCs are not cleared, repeat this procedure until the codes are cleared.

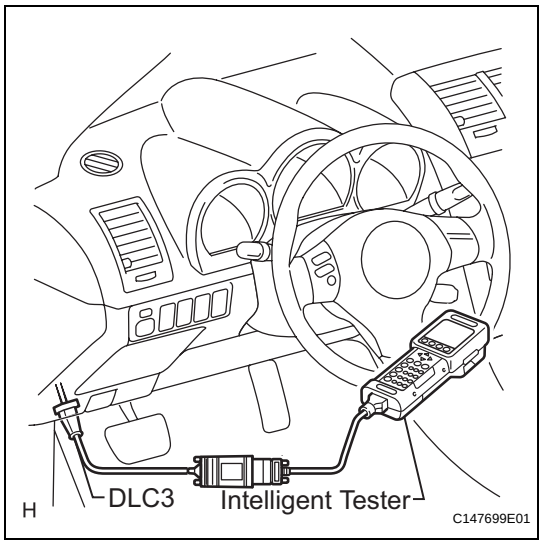




3. DTC CHECK

(a) Check the DTCs.
(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Check the DTCs by following the prompts on the tester screen.
HINT:
Refer to the intelligent tester operator's manual for further details.

(b) Clear the DTCs.
(1) Connect the intelligent tester to the DLC3.
(2) Turn the ignition switch to the ON position.
(3) Clear the DTCs by following the prompts on the tester screen.
HINT:
Refer to the intelligent tester operator's manual for further details.



CHECK MODE PROCEDURE

1. CHECK MODE (SIGNAL CHECK): DTC CHECK

(a) Connect the intelligent tester to the DLC3.

(b) Turn the ignition switch to the ON position.

(c) Select "SIGNAL CHECK", and proceed with checking using the intelligent tester.

NOTICE:

Select "SIGNAL CHECK" from the "DTC CHECK" screen displayed on the intelligent tester to clear the output DTCs (both present and past).

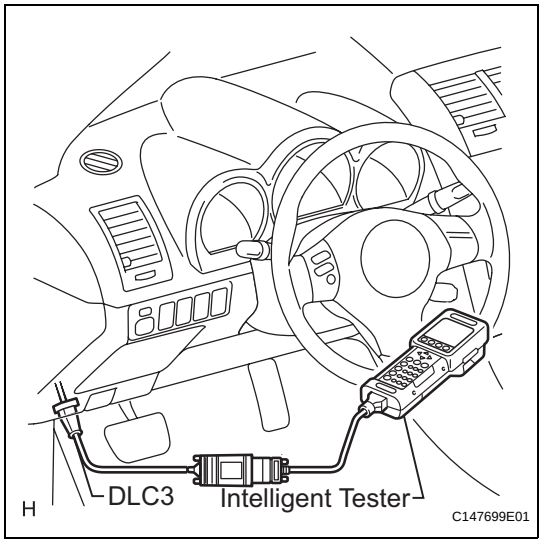
HINT:

- DTCs can be detected more sensitively in check mode than in normal diagnosis mode.
- Perform check mode inspection when a malfunction in each squib circuit is suspected even after the normal system code is output through normal diagnosis mode inspection.

RS

DATA LIST / ACTIVE TEST

HINT:
By accessing the DATA LIST displayed on the intelligent tester, you can perform such functions as reading the values of switches and sensors without removing any parts. Reading the DATA LIST as the first step in troubleshooting is one method to save labor time.



1. DATA LIST FOR CENTER AIRBAG SENSOR ASSEMBLY

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / OBD/ MOBD / SRS AIRBAG / DATA LIST.
(e) Check the values by referring to the table below.

DATA LIST:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
D SEAT POSITION	Driver Seat Position/ FORWARD: Seat position is forward BKWARD: Seat position is backward FAIL: Failure detected	FORWARD/BKWARD	-
PASSENGER CLASS	Passenger Classification/ NG: Data is not determined OFF: Vacant CHILD: Child (less than 36 kg (79.37 lb)) is seated AF05: Adult (36 to 54 kg (79.37 to 119.05 lb) is seated AM50: Adult (more than 54 kg (119.05 lb)) is seated FAIL: A failure is detected	OFF/CHILD/AF05/AM50	-
D 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	-
P BUCKLE SW	Passenger Buckle SW/ UNSET: The seat belt is not fastened SET: The seat belt is fastened NG: Data is not determined	UNSET/SET	-
PAST CODES	Number of Past DTC/ Min.: 0, Max.: 255	0	-

TYPE INFO:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
DISPLAY TYPE	Display Type Information/ LR: The display is indicated by LH/RH DP: The display is indicated by Driver/Passenger	DP	-

RS

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 (refer to the appropriate page).

HINT:

- When the SRS warning light remains on and the DTC output is the normal system code, a voltage source drop is likely occurring. This malfunction is not stored in the memory by the center airbag sensor 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 center airbag sensor assembly may have failed.
- In the case of any malfunction concerning an open circuit, short to ground, short to B+, or squib malfunction, other trouble codes may not be detected. In this case, repair the malfunction currently indicated and then reinspect the system.
- Mark in the check mode column:
  *1: DTC is not corresponding to the check mode.
  *2: DTC is corresponding to the check mode.
- DTC which has the mark of the *3 is output only the equipped car of side and curtain shield airbag.

AIRBAG SYSTEM

DTC Code	Detection Item	Trouble Area	Check Mode	See page
B1000/31	Center Airbag Sensor Assembly Malfunction	Center airbag sensor assembly	*1	RS-27
B1610/13	Front Airbag Sensor RH Circuit Malfunction	1. Front airbag sensor RH 2. Center airbag sensor assembly 3. Instrument panel wire 4. Engine room main wire	*1	RS-28
B1615/14	Front Airbag Sensor LH Circuit Malfunction	1. Front airbag sensor LH 2. Center airbag sensor assembly 3. Instrument panel wire 4. Engine room main wire	*1	RS-37
B1620/21 (*3)	Side Airbag Sensor RH Circuit Malfunction	1. Side airbag sensor assembly RH (door side airbag sensor RH) 2. Center airbag sensor assembly 3. No. 2 floor wire 4. Front door wire RH	*1	RS-46
B1625/22 (*3)	Side Airbag Sensor LH Circuit Malfunction	1. Side airbag sensor assembly RH (door side airbag sensor RH) 2. Center airbag sensor assembly 3. Floor wire 4. Front door wire LH	*1	RS-53
B1630/23 (*3)	Driver Side Rear Airbag Sensor Circuit Malfunction	1. Rear airbag sensor LH 2. Center airbag sensor assembly 3. Floor wire	*1	RS-60

DTC Code	Detection Item	Trouble Area	Check Mode	See page
B1635/24 (*3)	Front Passenger Side Rear Airbag Sensor Circuit Malfunction	1. Rear airbag sensor RH 2. Center airbag sensor assembly 3. Floor wire No. 2	*1	RS-65
B1650/32	Occupant Classification System Malfunction	1. Floor wire No. 2 2. Occupant classification system 3. Center airbag sensor assembly	*1	RS-70
B1653/35	Seat Position Airbag Sensor Circuit Malfunction	1. Floor wire 2. Front seat inner belt assembly LH 3. Seat position airbag sensor 4. Center airbag sensor assembly	*1	RS-76
B1655/37	Driver Side Seat Belt Buckle Switch Circuit Malfunction	1. Front seat inner belt assembly LH (seat belt buckle switch (driver side)) 2. Center airbag sensor assembly 3. Floor wire	*1	RS-86
B1660/43	Passenger Airbag ON / OFF Indicator Circuit Malfunction	1. Instrument panel wire 2. Heater control base (Passenger airbag ON/ OFF indicator) 3. Center airbag sensor assembly	*1	RS-92
B1800/51	Short in Driver Side Squib Circuit	1. Horn button assembly (driver side squib) 2. Spiral cable sub-assembly 3. Center airbag sensor assembly 4. Instrument panel wire	*2	RS-104
B1801/51	Open in Driver Side Squib Circuit	Same as DTC B1800/51	*2	RS-104
B1802/51	Short to GND in Driver Side Squib Circuit	Same as DTC B1800/51	*2	RS-104
B1803/51	Short to B+ in Driver Side Squib Circuit	Same as DTC B1800/51	*2	RS-104
B1805/52	Short in Front Passenger Side Squib Circuit	1. Instrument panel wire 2. Instrument panel wire assembly 3. Front passenger airbag assembly (front passenger side squib) 4. Center airbag sensor assembly	*2	RS-118
B1806/52	Open in Front Passenger Side Squib Circuit	Same as DTC B1805/52	*2	RS-118
B1807/52	Short to GND in Front Passenger Side Squib Circuit	Same as DTC B1805/52	*2	RS-118
B1808/52	Short to B+ in Front Passenger Side Squib Circuit	Same as DTC B1805/52	*2	RS-118

DTC Code	Detection Item	Trouble Area	Check Mode	See page
B1810/53	Short in Driver Side Squib 2nd Step Circuit	1. Horn button assembly (driver side squib, dual stage - 2nd step) 2. Spiral cable sub-assembly 3. Center airbag sensor assembly 4. Instrument panel wire	*2	RS-132
B1811/53	Open in Driver Side Squib 2nd Step Circuit	Same as DTC B1810/53	*2	RS-132
B1812/53	Short to GND in Driver Side Squib 2nd Step Circuit	Same as DTC B1810/53	*2	RS-132
B1813/53	Short to B+ in Driver Side Squib 2nd Step Circuit	Same as DTC B1810/53	*2	RS-132
B1815/54	Short in Front Passenger Side Squib 2nd Step Circuit	1. Front passenger airbag assembly (driver side squib, dual stage - 2nd step) 2. Center airbag sensor assembly 3. Instrument panel wire 4. Instrument panel wire assembly	*2	RS-148
B1816/54	Open in Front Passenger Side Squib 2nd Step Circuit	Same as DTC B1815/54	*2	RS-148
B1817/54	Short to GND in Front Passenger Side Squib 2nd Step Circuit	Same as DTC B1815/54	*2	RS-148
B1818/54	Short to B+ in Front Passenger Side Squib 2nd Step Circuit	Same as DTC B1815/54	*2	RS-148
B1820/55 (*3)	Short in Front Driver Side - Side Squib Circuit	1. Front seat with adjuster frame assembly LH (side squib (driver side)) 2. Center airbag sensor assembly 3. Floor wire	*2	RS-165
B1821/55 (*3)	Open in Front Driver Side - Side Squib Circuit	Same as DTC B1820/55	*2	RS-165
B1822/55 (*3)	Short to GND in Front Driver Side - Side Squib Circuit	Same as DTC B1820/55	*2	RS-165
B1823/55 (*3)	Short to B+ in Front Driver Side - Side Squib Circuit	Same as DTC B1820/55	*2	RS-165
B1825/56 (*3)	Short in Front Passenger Side - Side Squib Circuit	1. Front seat with adjuster frame assembly RH (side squib (front passenger side)) 2. Center airbag sensor assembly 3. No. 2 floor wire	*2	RS-175
B1826/56 (*3)	Open in Front Passenger Side - Side Squib Circuit	Same as DTC B1825/56	*2	RS-175
B1827/56 (*3)	Short to GND in Front Passenger Side - Side Squib Circuit	Same as DTC B1825/56	*2	RS-175
B1828/56 (*3)	Short to B+ in Front Passenger Side - Side Squib Circuit	Same as DTC B1825/56	*2	RS-175

DTC Code	Detection Item	Trouble Area	Check Mode	See page
B1830/57 (*3)	Short in Driver Side Curtain Shield Squib Circuit	1. Curtain shield airbag assembly LH (curtain shield airbag (driver side) squib) 2. Center airbag sensor assembly 3. Floor wire	*2	RS-185
B1831/57 (*3)	Open in Driver Side Curtain Shield Squib Circuit	Same as DTC B1830/57	*2	RS-185
B1832/57 (*3)	Short to GND in Driver Side Curtain Shield Squib Circuit	Same as DTC B1830/57	*2	RS-185
B1833/57 (*3)	Short to B+ in Driver Side Curtain Shield Squib Circuit	Same as DTC B1830/57	*2	RS-185
B1835/58 (*3)	Short in Front Passenger Side Curtain Shield Squib Circuit	1. Curtain shield airbag assembly RH (curtain shield airbag (front passenger side) squib) 2. Center airbag sensor assembly 3. No. 2 floor wire	*2	RS-195
B1836/58 (*3)	Open in Front Passenger Side Curtain Shield Squib Circuit	Same as DTC B1835/58	*2	RS-195
B1837/58 (*3)	Short to GND in Front Passenger Side Curtain Shield Squib Circuit	Same as DTC B1835/58	*2	RS-195
B1838/58 (*3)	Short to B+ in Front Passenger Side Curtain Shield Squib Circuit	Same as DTC B1835/58	*2	RS-195
B1860/64	Short in Driver Side Knee Airbag Squib Circuit	1. Instrument panel wire 2. No. 1 instrument panel airbag assembly lower (knee airbag squib) 3. Center airbag sensor assembly	*2	RS-204
B1861/64	Open in Driver Side Knee Airbag Squib Circuit	Same as DTC B1860/64	*2	RS-204
B1862/64	Short to GND in Driver Side Knee Airbag Squib Circuit	Same as DTC B1860/64	*2	RS-204
B1863/64	Short to B+ in Driver Side Knee Airbag Squib Circuit	Same as DTC B1860/64	*2	RS-204
B1900/73	Short in Front Driver Side Pretensioner Squib Circuit	1. Front seat outer belt assembly LH (pretensioner squib (driver side)) 2. Center airbag sensor assembly 3. Floor wire	*2	RS-213
B1901/73	Open in Front Driver Side Pretensioner Squib Circuit	Same as DTC B1900/73	*2	RS-213
B1902/73	Short to GND in Front Driver Side Pretensioner Squib Circuit	Same as DTC B1900/73	*2	RS-213
B1903/73	Short to B+ in Front Driver Side Pretensioner Squib Circuit	Same as DTC B1900/73	*2	RS-213

DTC Code	Detection Item	Trouble Area	Check Mode	See page
B1905/74	Short in Front Passenger Side Pretensioner Squib Circuit	1. Front seat outer belt assembly RH (pretensioner squib (front passenger side)) 2. Center airbag sensor assembly 3. No. 2 floor wire	*2	RS-222
B1906/74	Open in Front Passenger Side Pretensioner Squib Circuit	Same as DTC B1905/74	*2	RS-222
B1907/74	Short to GND in Front Passenger Side Pretensioner Squib Circuit	Same as DTC B1905/74	*2	RS-222
B1908/74	Short to B+ in Front Passenger Side Front Pretensioner Squib Circuit	Same as DTC B1905/74	*2	RS-222

DTC	B1000/31	Center Airbag Sensor Assembly Malfunction

DESCRIPTION

The center airbag sensor consists of the airbag sensor, the safing sensor, the drive circuit, the diagnostic circuit, the ignition control, etc.
If the center airbag sensor receives signals from the airbag sensor, it determines whether or not the SRS should be activated.
B1000/31 is recorded when a malfunction is detected in the center airbag sensor.

DTC No.	DTC Detection Condition	Trouble Area
B1000/31	• Center airbag sensor assembly malfunction	• Center airbag sensor assembly

HINT:
When a DTC is displayed simultaneously with B1000/31, repair the malfunction indicated by this code (except B1000/31) first.

INSPECTION PROCEDURE

1 CHECK FOR DTC

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page RS-18).
OK:
DTC B1000/31 is not output.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

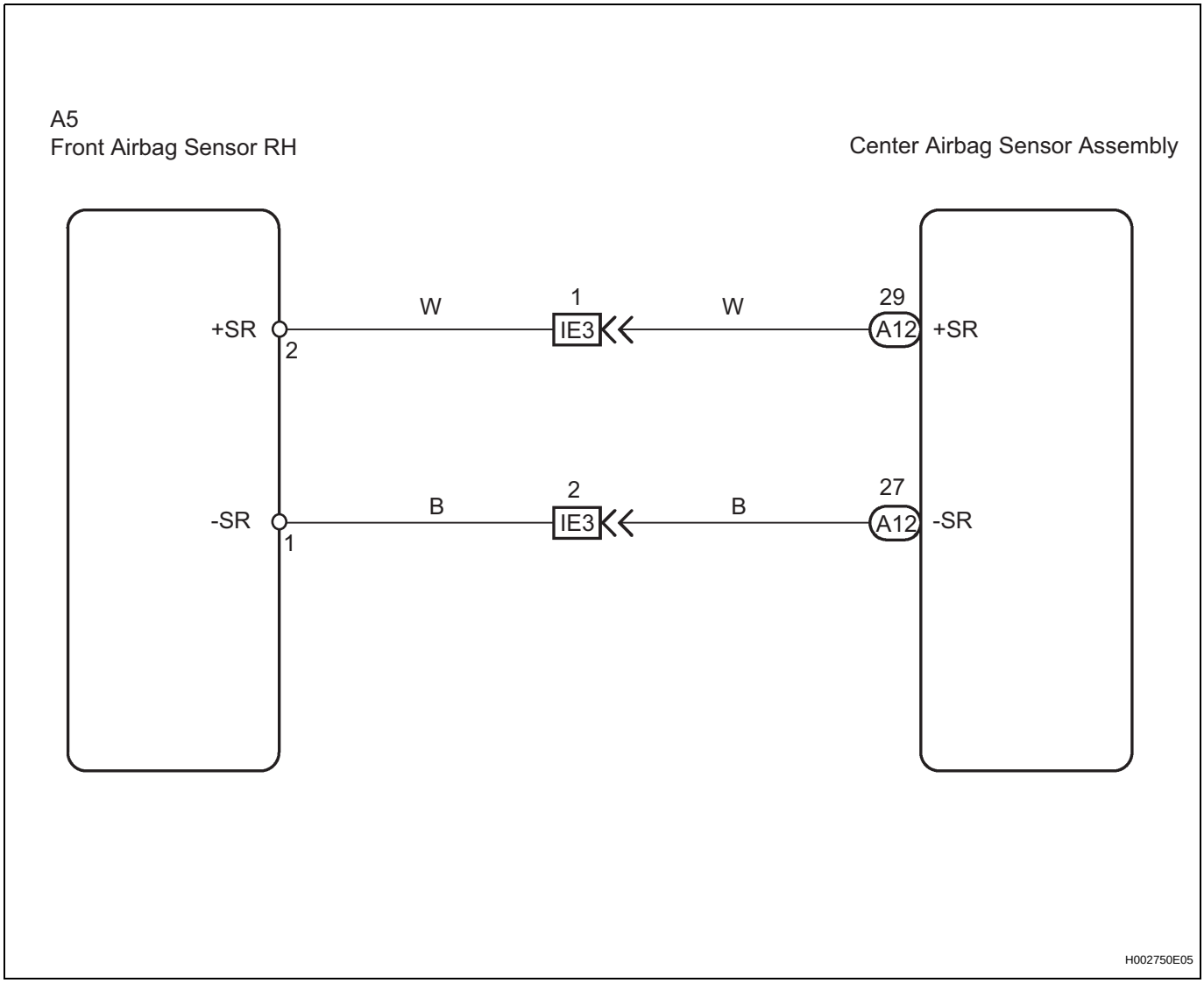
DTC	B1610/13	Front Airbag Sensor RH Circuit Malfunction

DESCRIPTION

The front airbag sensor RH consists of the diagnostic circuit, the frontal deceleration sensor, etc.
If the center airbag sensor receives signals from the frontal deceleration sensor, it determines whether or not the SRS should be activated.
DTC B1610/13 is recorded when a malfunction is detected in the front airbag sensor RH circuit.

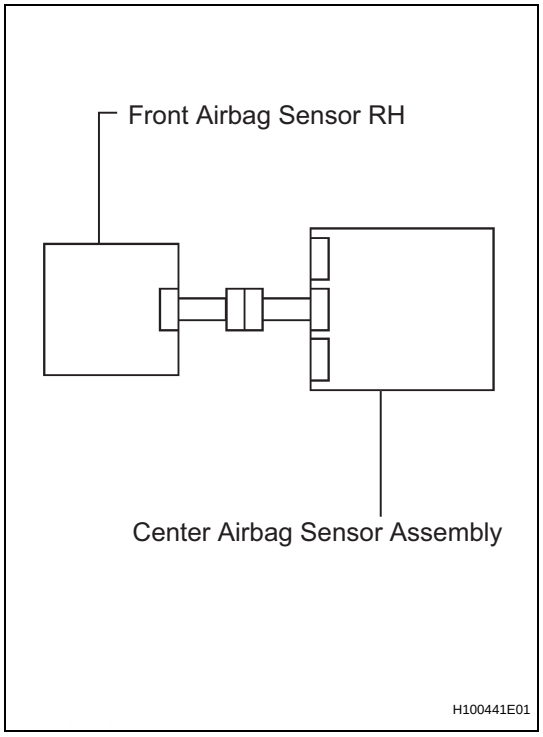
DTC No,	DTC Detection Condition	Trouble Area
B1610/13	• The center airbag sensor assembly receives a line short signal, open signal, short to ground signal or B+ short signal in the front airbag sensor RH circuit for 2 seconds. • Front airbag sensor RH malfunction • Center airbag sensor assembly malfunction	• Front airbag sensor RH • Center airbag sensor assembly • Instrument panel wire • Engine room main wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in memory (See page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check for DTCs (See page RS-18).

OK:

DTC B1610/13 is not output.

HINT:

Codes other than code B1610/13 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

PERFORM SYMPTOM SIMULATION

2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor and the front airbag sensor RH.

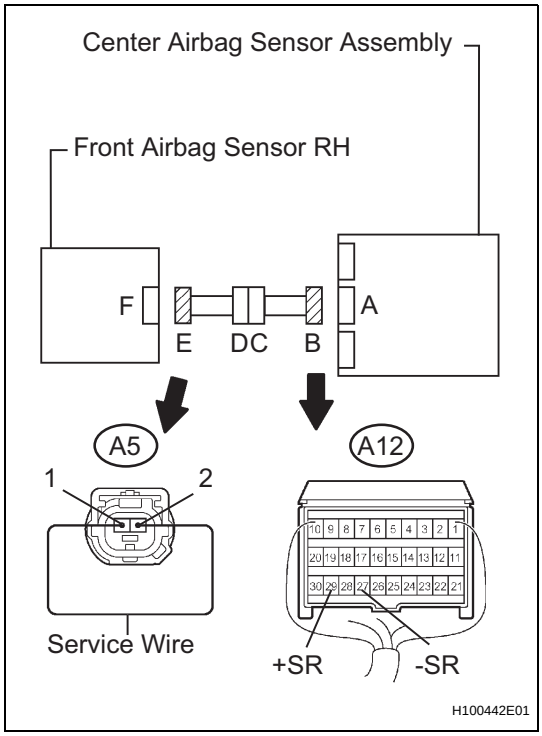
OK:

The connectors are connected.

NG → **CONNECT CONNECTORS**

OK

3	CHECK FRONT AIRBAG SENSOR RH CIRCUIT (OPEN)



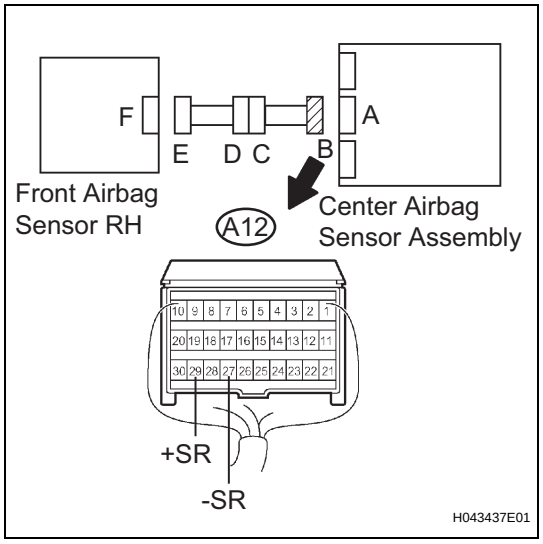
(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connectors from the horn button.
(c) Disconnect the connectors from the front passenger airbag.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower.
(e) w/ Side and curtain shield airbag:
Disconnect the connector from the front seat airbag LH.
(f) w/ Side and curtain shield airbag:
Disconnect the connector from the front seat airbag RH.
(g) w/ Side and curtain shield airbag:
Disconnect the connector from the curtain shield airbag LH.
(h) w/ Side and curtain shield airbag:
Disconnect the connector from the curtain shield airbag RH.
(i) Disconnect the connector from the front seat outer belt LH.
(j) Disconnect the connector from the front seat outer belt RH.
(k) Using a service wire, connect A5-2 and A5-1 of connector "E".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(l) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
A12-29 (+SR) - A12-27 (-SR)	Below 1 Ω

NG → **Go to step 8**

OK

4 CHECK FRONT 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.

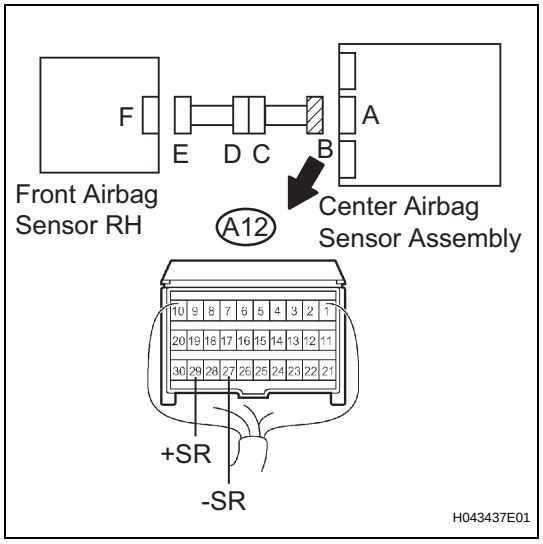
Standard resistance

Tester Connection	Specified Condition
A12-29 (+SR) - A12-27 (-SR)	1 MΩ or higher

NG → **Go to step 9**

OK

5 CHECK FRONT AIRBAG SENSOR RH CIRCUIT (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

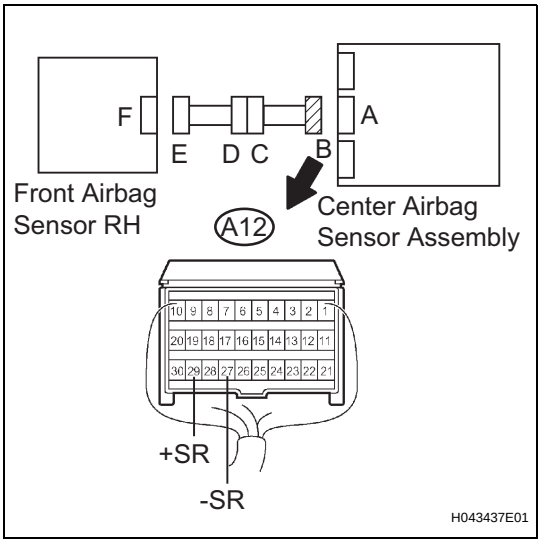
Tester Connection	Specified Condition
A12-29 (+SR) - Body ground	Below 1 V
A12-27 (-SR) - Body ground	Below 1 V

NG → **Go to step 10**

OK

RS

6 CHECK FRONT AIRBAG SENSOR RH CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

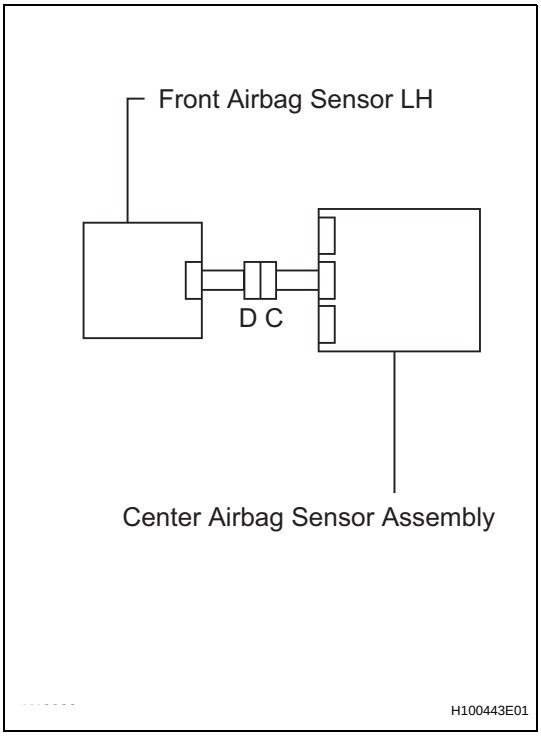
Standard resistance

Tester Connection	Specified Condition
A12-29 (+SR) - Body ground	1 MΩ or higher
A12-27 (-SR) - Body ground	1 MΩ or higher

NG → **Go to step 11**

OK

7 CHECK FRONT AIRBAG SENSOR RH



(a) Connect the connectors to the center airbag sensor.
(b) Interchange the front airbag sensor RH with LH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (See page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (See page RS-18).

Result

Result	Proceed to
DTC B1610/13 is output.	A
DTC B1615/14 is output.	B
DTC B1610/13 and B1615/14 are not output.	C

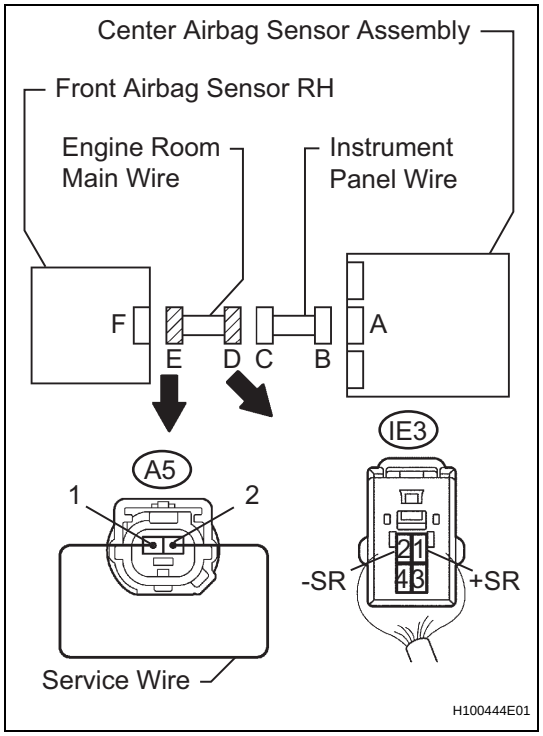
A → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

B → **REPLACE FRONT AIRBAG SENSOR RH**

C

PERFORM SYMPTOM SIMULATION

8	CHECK ENGINE ROOM MAIN WIRE (OPEN)



(a) Disconnect the engine room main wire connector from the instrument panel wire.
HINT:
Connector "E" has already been inserted into the service wire.

(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
IE3-1 (+SR) - IE3-2 (-SR)	Below 1 Ω

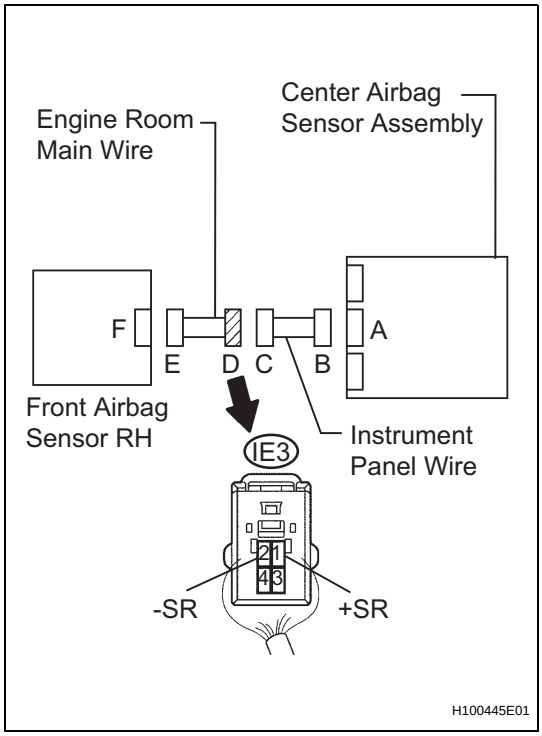
NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

9	CHECK ENGINE ROOM MAIN WIRE (SHORT)

RS



(a) Disconnect the engine room main wire connector from the instrument panel wire.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

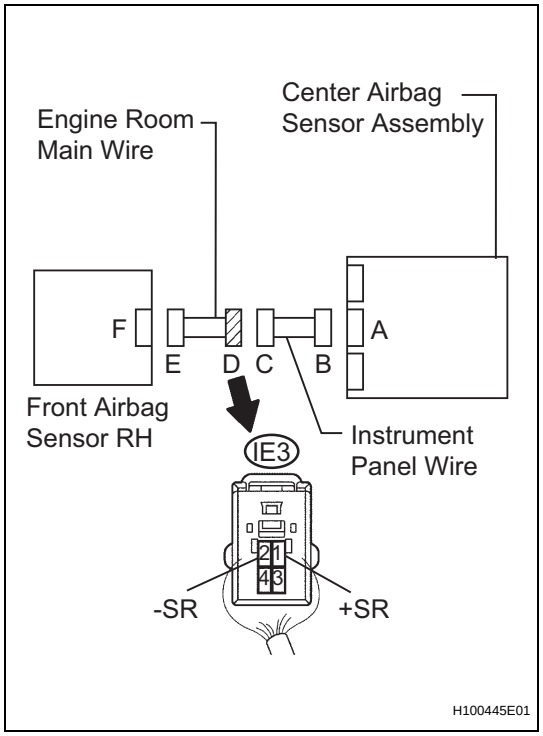
Tester Connection	Specified Condition
IE3-1 (+SR) - IE3-2 (-SR)	1 MΩ or higher

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

10	CHECK ENGINE ROOM MAIN WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the engine room main wire connector from the instrument panel wire.
(d) Disconnect the negative (-) terminal cable from the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
IE3-1 (+SR) - Body ground	Below 1 V
IE3-2 (-SR) - Body ground	Below 1 V

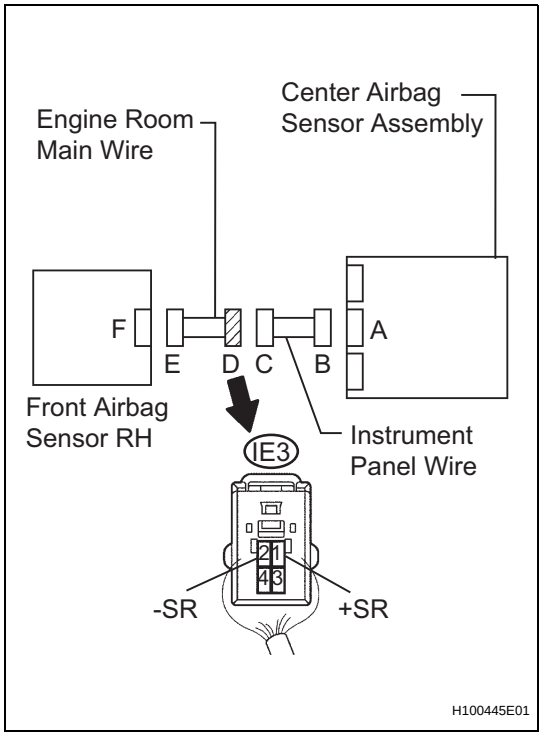
NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

11	CHECK ENGINE ROOM MAIN WIRE (TO GROUND)

RS



(a) Disconnect the engine room main wire connector from the instrument panel wire.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
IE3-1 (+SR) - Body ground	1 MΩ or higher
IE3-2 (-SR) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

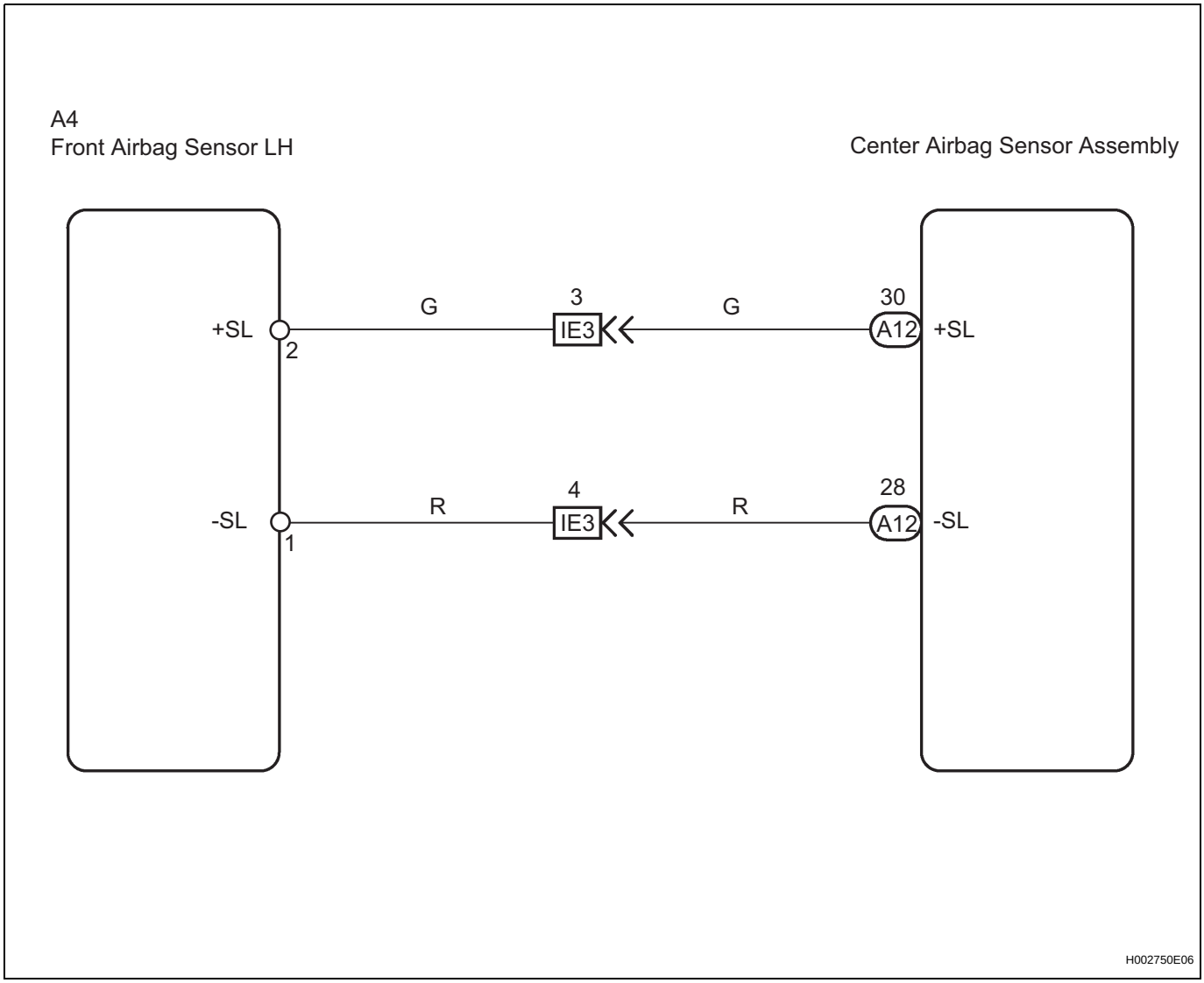
DTC	B1615/14	Front Airbag Sensor LH Circuit Malfunction

DESCRIPTION

The front airbag sensor LH consists of the diagnostic circuit, the frontal deceleration sensor, etc.
If the center airbag sensor receives signals from the frontal deceleration sensor, it determines whether or not the SRS should be activated.
DTC B1615/14 is recorded when a malfunction is detected in the front airbag sensor LH circuit.

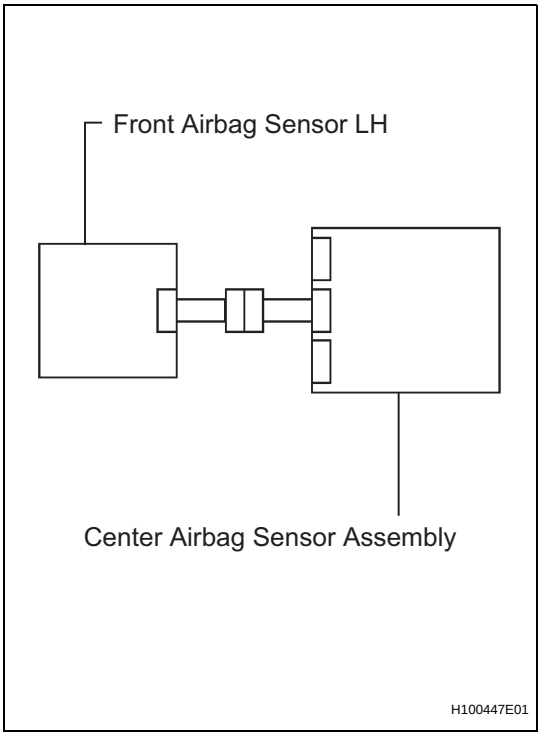
DTC No.	DTC Detection Condition	Trouble Area
B1615/14	• The center airbag sensor assembly receives a line short signal, open signal, short to ground signal or B+ short signal in the front airbag sensor LH circuit for 2 seconds. • Front airbag sensor LH malfunction • Center airbag sensor assembly malfunction	• Front airbag sensor LH • Center airbag sensor assembly • Instrument panel wire • Engine room main wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in memory (See page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check for DTCs (See page RS-18).

OK:

DTC B1615/14 is not output.

HINT:

Codes other than code B1615/14 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

PERFORM SYMPTOM SIMULATION

2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor and the front airbag sensor LH.

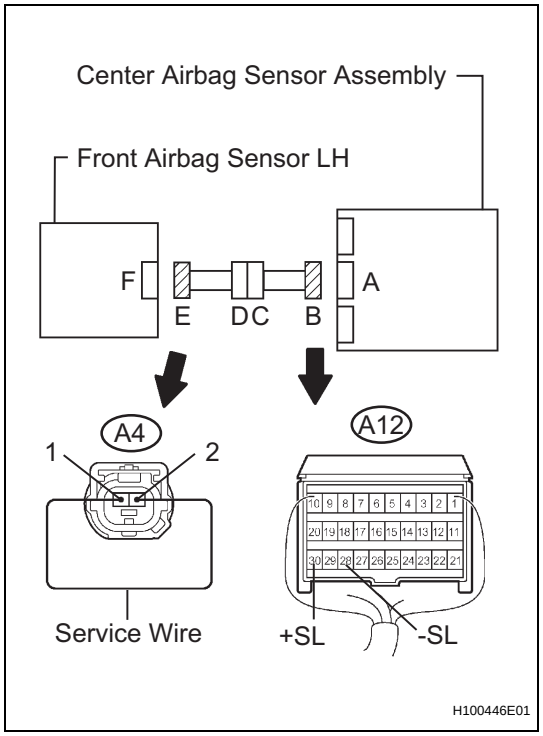
OK:

The connectors are connected.

NG → **CONNECT CONNECTORS**

OK

3	CHECK FRONT AIRBAG SENSOR LH CIRCUIT (OPEN)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connectors from the horn button.
(c) Disconnect the connectors from the front passenger airbag.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower.
(e) w/ Side and curtain shield airbag:
Disconnect the connector from the front seat airbag LH.
(f) w/ Side and curtain shield airbag:
Disconnect the connector from the front seat airbag RH.
(g) w/ Side and curtain shield airbag:
Disconnect the connector from the curtain shield airbag LH.
(h) w/ Side and curtain shield airbag:
Disconnect the connector from the curtain shield airbag RH.
(i) Disconnect the connector from the front seat outer belt LH.
(j) Disconnect the connector from the front seat outer belt RH.
(k) Using a service wire, connect A4-2 and A4-1 of connector "E".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(l) Measure the resistance according to the value(s) in the table below.
Standard resistance

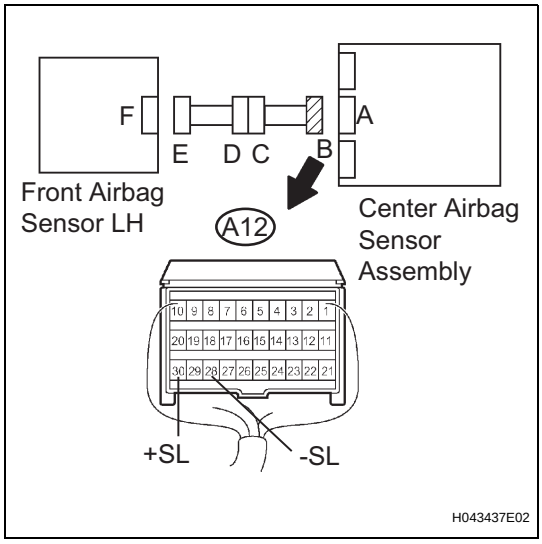
Tester Connection	Specified Condition
A12-30 (+SL) - A12-28 (-SL)	Below 1 Ω

NG → **Go to step 8**

OK

RS

4 CHECK FRONT AIRBAG SENSOR LH CIRCUIT (SHORT)



(a) Disconnect the service wire from connector "E".
(b) Measure the resistance according to the value(s) in the table below.

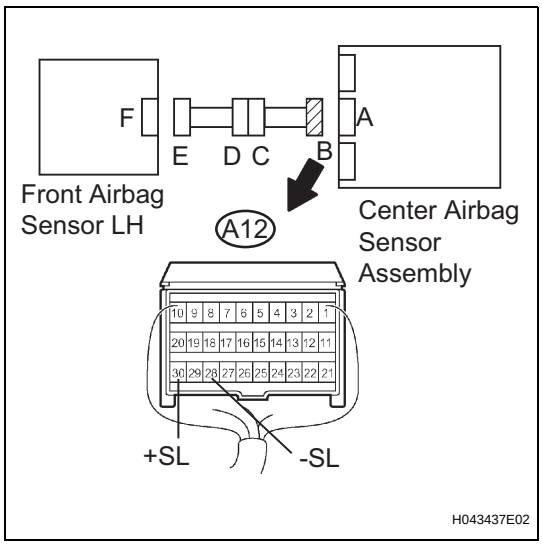
Standard resistance

Tester Connection	Specified Condition
A12-30 (+SL) - A12-28 (-SL)	1 MΩ or higher

NG → **Go to step 9**

OK

5 CHECK FRONT AIRBAG SENSOR LH CIRCUIT (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

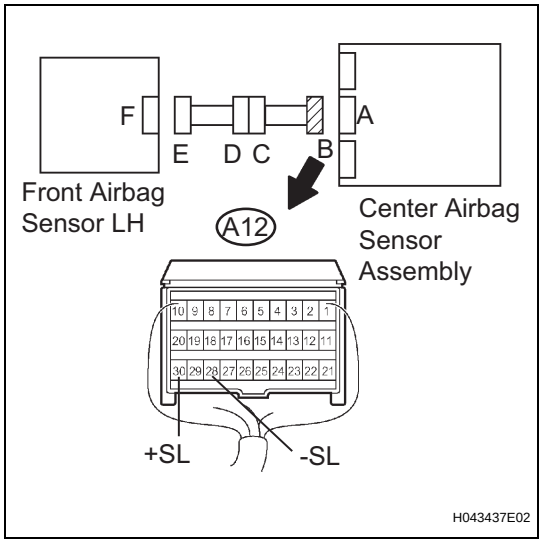
Standard voltage

Tester Connection	Specified Condition
A12-30 (+SL) - Body ground	Below 1 V
A12-28 (-SL) - Body ground	Below 1 V

NG → **Go to step 10**

OK

6 CHECK FRONT AIRBAG SENSOR LH CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

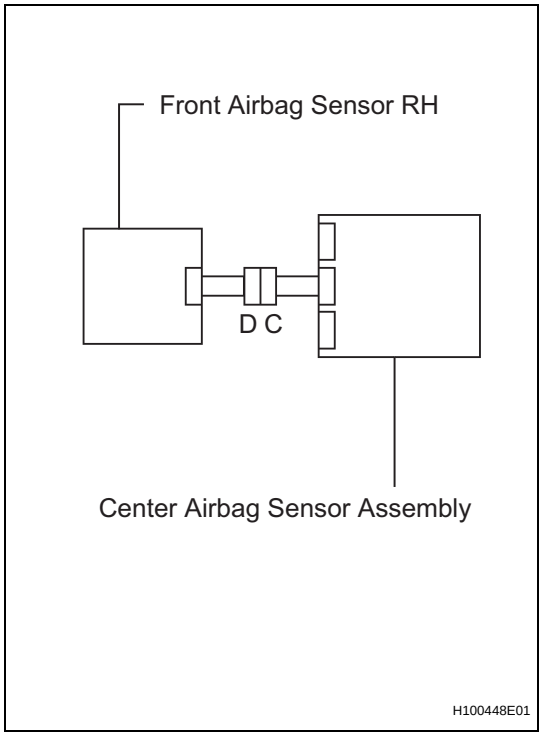
Standard resistance

Tester Connection	Specified Condition
A12-30 (+SL) - Body ground	1 MΩ or higher
A12-28 (-SL) - Body ground	1 MΩ or higher

NG → **Go to step 11**

OK

7 CHECK FRONT AIRBAG SENSOR LH



(a) Connect the connectors to the center airbag sensor.
(b) Interchange the front airbag sensor LH with RH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (See page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (See page RS-18).

Result

Result	Proceed to
DTC B1615/14 is output.	A
DTC B1610/13 is output.	B
DTC B1610/13 and B 1615/14 are not output.	C

A → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

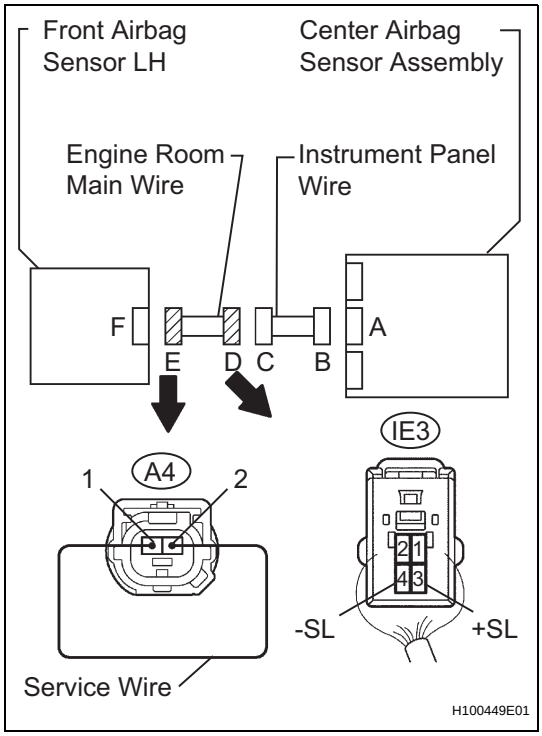
B → **REPLACE FRONT AIRBAG SENSOR LH**

C

PERFORM SYMPTOM SIMULATION

RS

8	CHECK ENGINE ROOM MAIN WIRE (OPEN)



(a) Disconnect the engine room main wire connector from the instrument panel wire.
HINT:
Connector "E" has already been inserted into the service wire.

(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

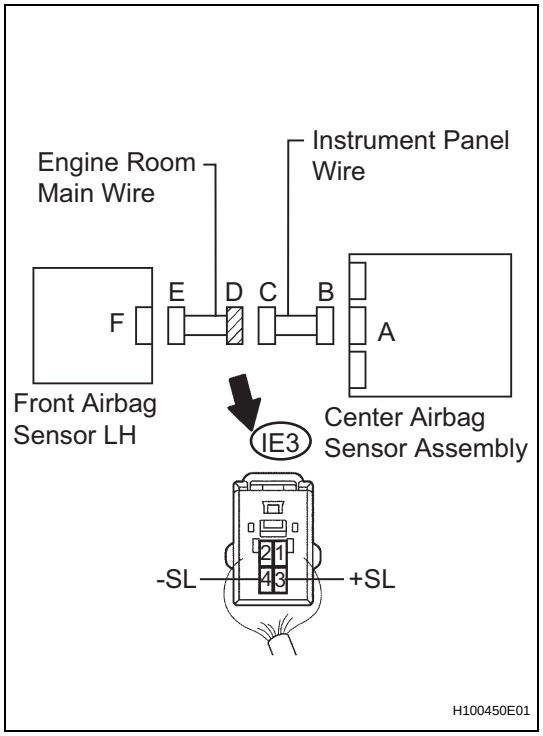
Tester Connection	Specified Condition
IE3-3 (+SL) - IE3-4 (-SL)	Below 1 Ω

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

9	CHECK ENGINE ROOM MAIN WIRE



(a) Disconnect the engine room main wire connector from the instrument panel wire.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
IE3-3 (+SL) - IE3-4 (-SL)	1 MΩ or higher

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

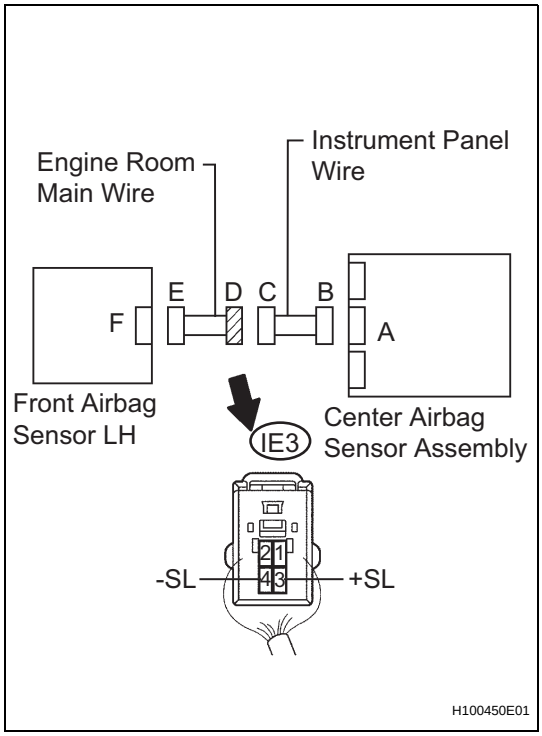
OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

RS

10	CHECK ENGINE ROOM MAIN WIRE (TO B+)

RS



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the engine room main wire connector from the instrument panel wire.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

Standard voltage

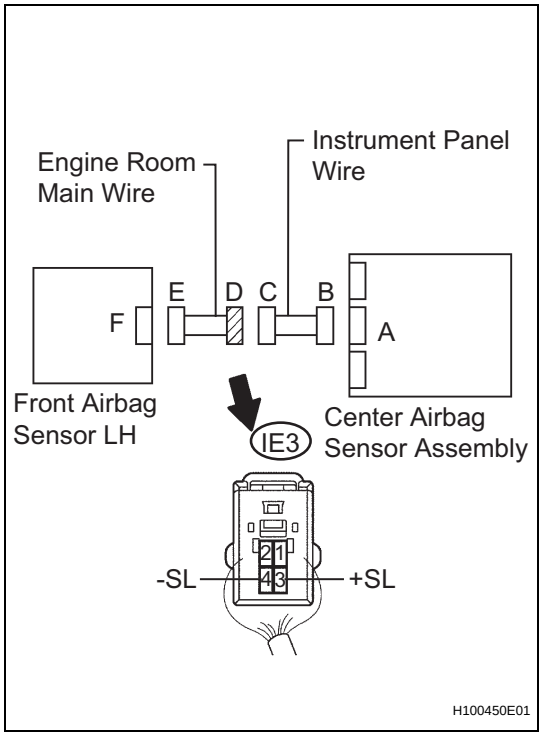
Tester Connection	Specified Condition
IE3-3 (+SL) - Body ground	Below 1 V
IE3-4 (-SL) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

11	CHECK ENGINE ROOM MAIN WIRE (TO GROUND)



(a) Disconnect the engine room main wire connector from the instrument panel wire.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
IE3-3 (+SL) - Body ground	1 MΩ or higher
IE3-4 (-SL) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE ENGINE ROOM MAIN WIRE**

OK

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

RS

DTC	B1620/21	Side Airbag Sensor RH Circuit Malfunction

DESCRIPTION

The side airbag sensor RH consists of the safing sensor, the diagnostic circuit, the lateral deceleration sensor, etc.

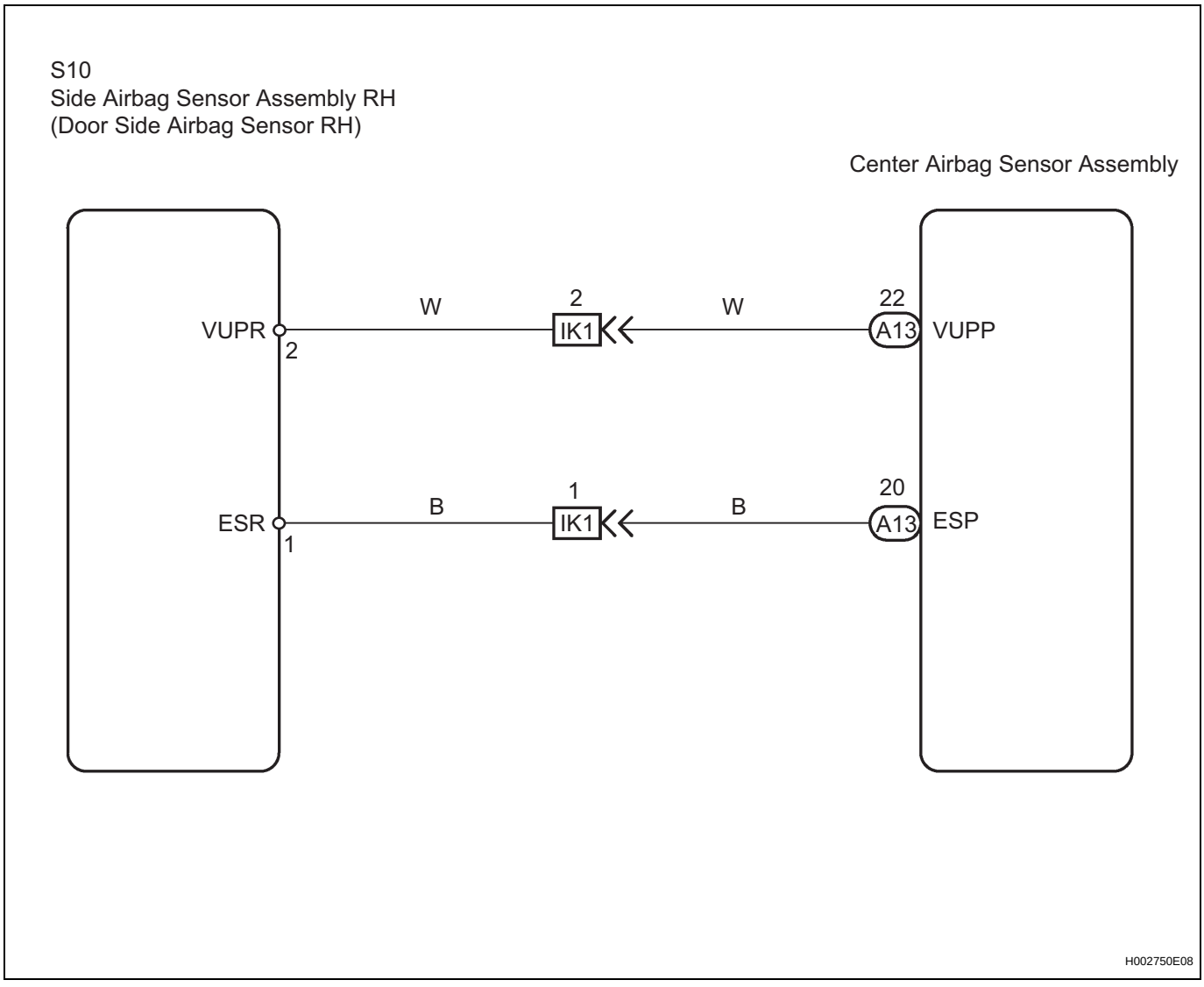
RS

If the center airbag sensor receives signals from the lateral deceleration sensor, it determines whether or not the SRS should be activated.

DTC B1625/22 is recorded when a malfunction is detected in the side airbag sensor RH circuit.

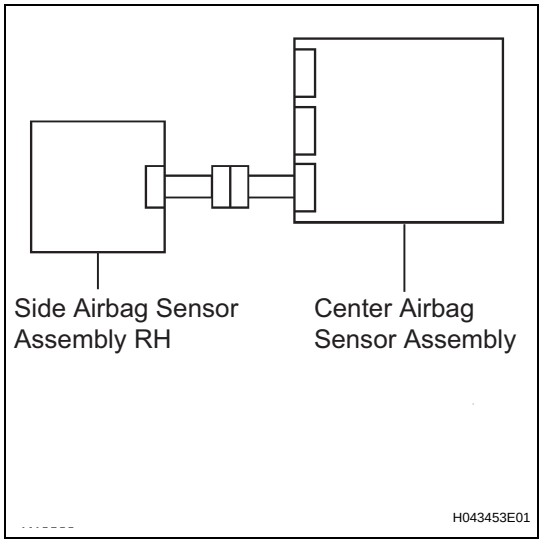
DTC No.	DTC Detection Condition	Trouble Area
B1625/22	• The center airbag sensor assembly receives a line short signal, open signal, short to ground signal or B+ short signal in the side airbag sensor assembly RH circuit for 2 seconds. • Side airbag sensor assembly RH malfunction • Center airbag sensor assembly malfunction	• Side airbag sensor assembly RH (door side airbag sensor RH) • Center airbag sensor assembly • No. 2 floor wire • Front door wire RH

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in memory (see page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check for DTCs (see page RS-18).

OK:

DTC B1625/22 is output.

HINT:

Codes other than code B1625/22 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

PERFORM SYMPTOM SIMULATION

2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor and the side airbag sensor RH.

OK:

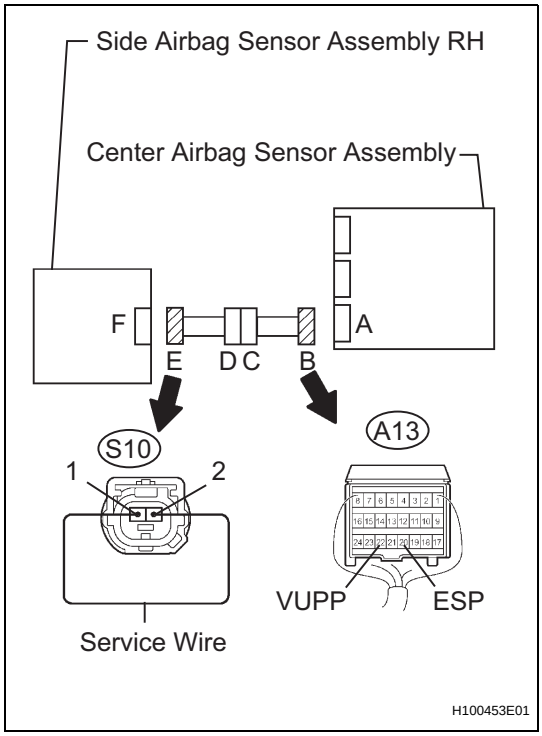
The connectors are connected.

NG → **CONNECT CONNECTORS**

OK

RS

3 CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (OPEN)



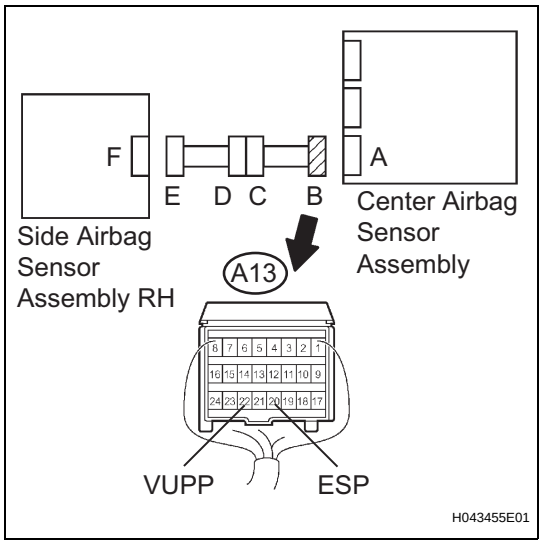
(a) Disconnect the connector from the center airbag sensor.
(b) Disconnect the connector from the horn button.
(c) Disconnect the connector from the front passenger airbag.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower.
(e) Disconnect the connector from the front seat airbag LH.
(f) Disconnect the connector from the front seat airbag RH.
(g) Disconnect the connector from the curtain shield airbag LH.
(h) Disconnect the connector from the curtain shield airbag RH.
(i) Disconnect the connector from the front seat outer belt LH.
(j) Disconnect the connector from the front seat outer belt RH.
(k) Using a service wire, connect S10-2 and S10-1 of connector "E".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(l) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
A13-22 (VUPP) - A13-20 (ESP)	Below 1 Ω

NG → **Go to step 8**

OK

4 CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (SHORT)



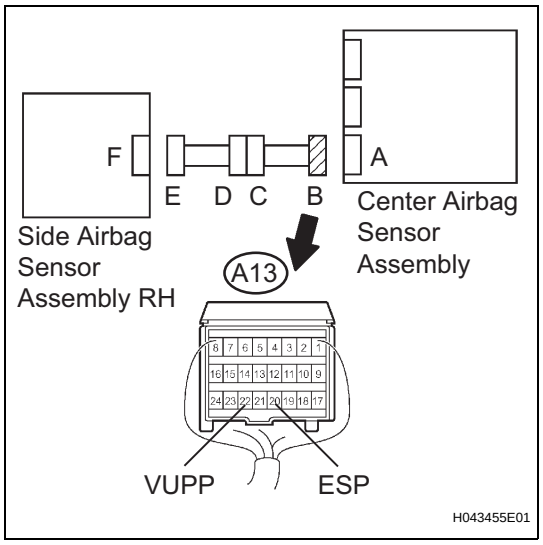
(a) Disconnect the service wire from connector "E".
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
A13-22 (VUPP) - A13-20 (ESP)	1 MΩ or higher

NG → **Go to step 9**

OK

5 CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

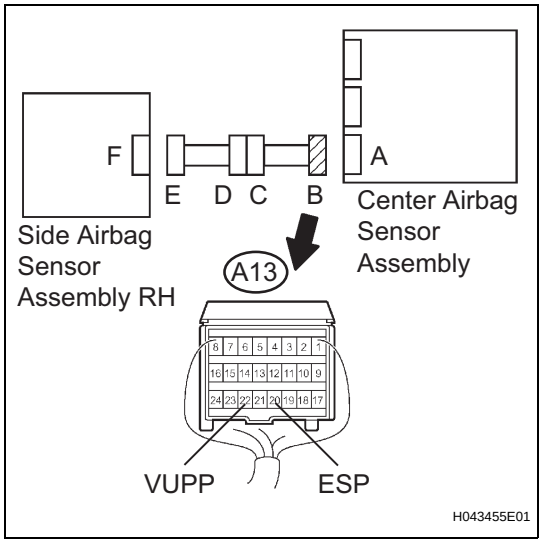
Standard voltage

Tester Connection	Specified Condition
A13-22 (VUPP) - Body ground	Below 1 V
A13-20 (ESP) - Body ground	Below 1 V

NG → **Go to step 10**

OK

6 CHECK SIDE AIRBAG SENSOR ASSEMBLY LH CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

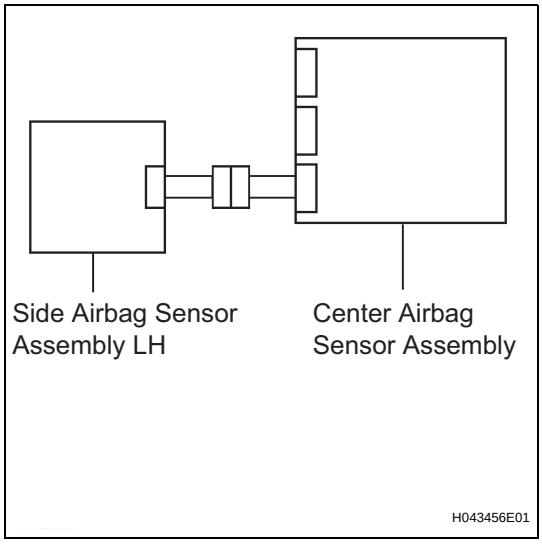
Tester Connection	Specified Condition
A13-22 (VUPP) - Body ground	1 MΩ or higher
A13-20 (ESP) - Body ground	1 MΩ or higher

NG → **Go to step 11**

OK

RS

7	CHECK SIDE AIRBAG SENSOR ASSEMBLY LH



(a) Connect the connectors to the center airbag sensor.
(b) Interchange the side airbag sensor RH with LH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).

Result

Result	Proceed to
DTC B1625/22 is output.	A
DTC B1620/21 is output.	B
DTC B1625/22 and B1620/21 are not output.	C

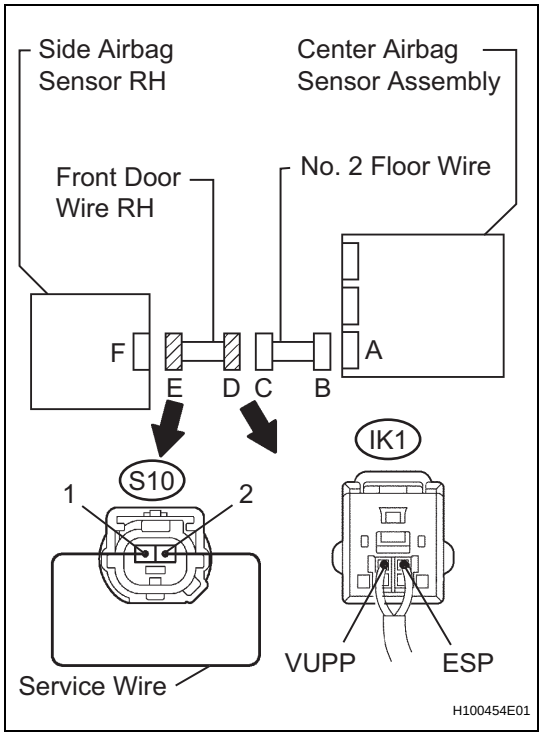
A → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

B → **REPLACE SIDE AIRBAG SENSOR ASSEMBLY LH**

C

PERFORM SYMPTOM SIMULATION

8 CHECK FRONT DOOR WIRE LH (OPEN)



(a) Disconnect the front door wire RH connector from the No. 2 floor wire.
HINT:
Connector "E" has already been inserted into the service wire.

(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

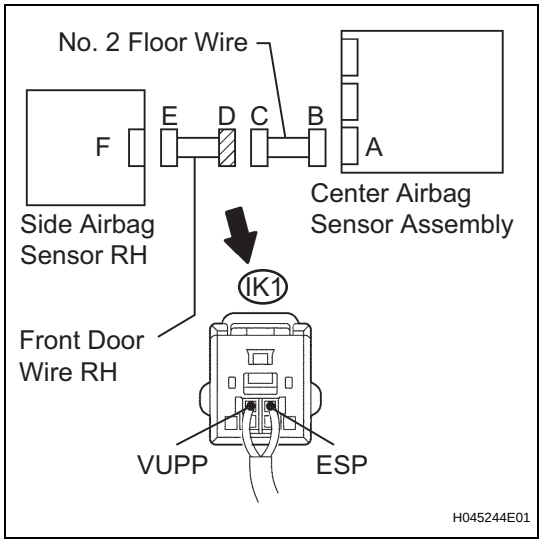
Tester Connection	Specified Condition
IK1-2 (VUPP) - IK1-1 (ESP)	Below 1 Ω

NG → **REPAIR OR REPLACE FRONT DOOR WIRE LH**

OK

REPAIR OR REPLACE FLOOR WIRE

9 CHECK FRONT DOOR WIRE LH (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	Specified Condition
IK1-2 (VUPP) - IK1-1 (ESP)	1 MΩ or higher

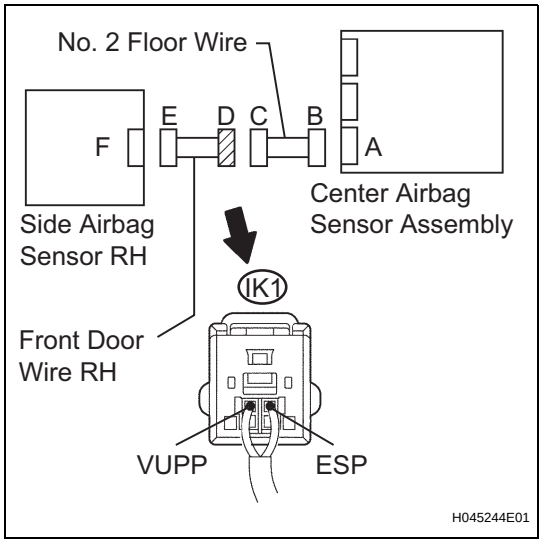
NG → **REPAIR OR REPLACE FRONT DOOR WIRE LH**

OK

REPAIR OR REPLACE FLOOR WIRE

RS

10	CHECK FRONT DOOR WIRE LH (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the front door wire RH connector from the No. 2 floor wire.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

Standard voltage

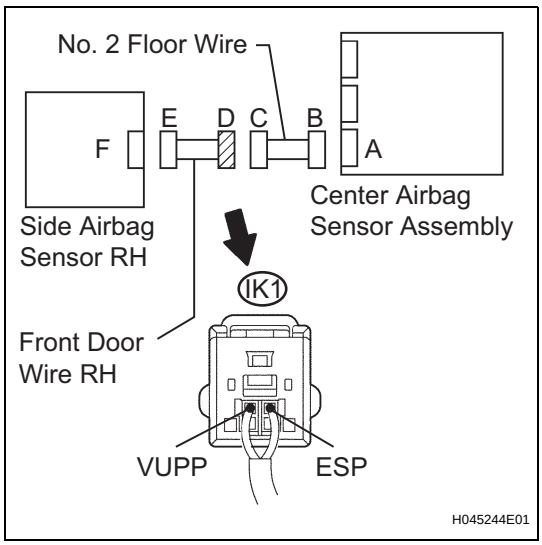
Tester Connection	Specified Condition
IK1-2 (VUPP) - Body ground	Below 1 V
IK1-1 (ESP) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE FRONT DOOR WIRE LH**

OK

REPAIR OR REPLACE FLOOR WIRE

11	CHECK FRONT DOOR WIRE LH (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	Specified Condition
IK1-2 (VUPP) - Body ground	1 MΩ or higher
IK1-1 (ESP) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE FRONT DOOR WIRE LH**

OK

REPAIR OR REPLACE FLOOR WIRE

DTC	B1625/22	Side Airbag Sensor LH Circuit Malfunction

DESCRIPTION

The side airbag sensor LH consists of the safing sensor, the diagnostic circuit, the lateral deceleration sensor, etc.

If the center airbag sensor receives signals from the lateral deceleration sensor, it determines whether or not the SRS should be activated.

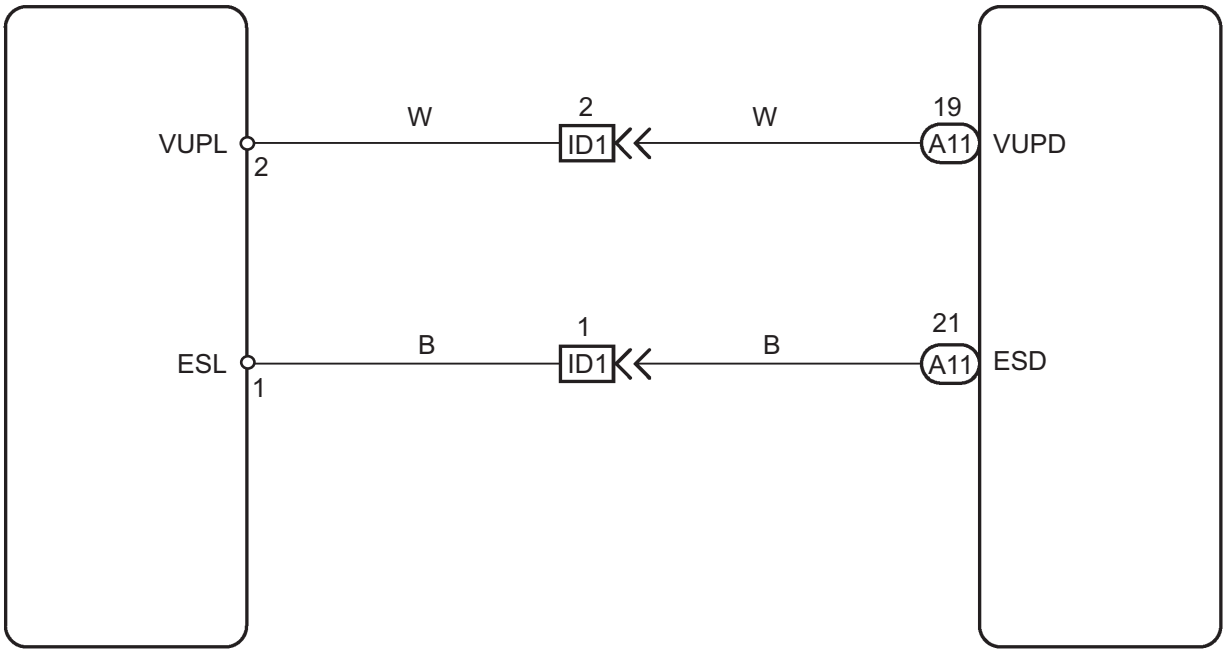
DTC B1620/21 is recorded when a malfunction is detected in the side airbag sensor LH circuit.

DTC No.	DTC Detection Condition	Trouble Area
B1620/21	• The center airbag sensor assembly receives a line short signal, open signal, short to ground signal or B+ short signal in the side airbag sensor assembly LH circuit for 2 seconds. • Side airbag sensor assembly LH malfunction • Center airbag sensor assembly malfunction	• Side airbag sensor assembly LH (door side airbag sensor LH) • Center airbag sensor assembly • Floor wire • Front door wire LH

WIRING DIAGRAM

S9
Side Airbag Sensor Assembly LH
(Door Side Airbag Sensor LH)

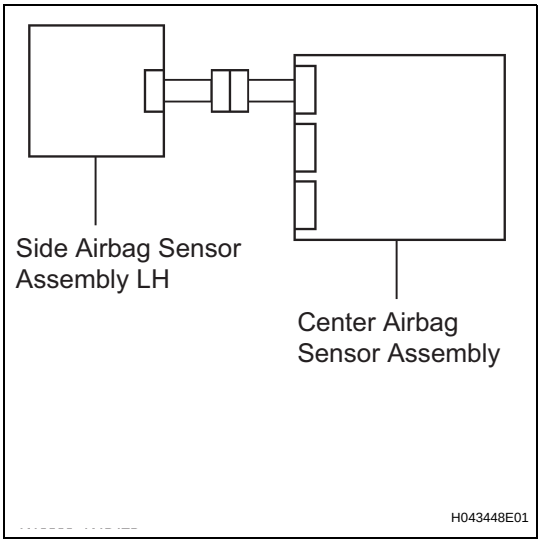
Center Airbag Sensor Assembly



H002750E07

INSPECTION PROCEDURE

1	CHECK FOR DTC



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in memory (see page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check for DTCs (see page RS-18).

OK:

DTC B1620/21 is not output.

HINT:

Codes other than code B1620/21 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

PERFORM SYMPTOM SIMULATION

2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor and the side airbag sensor LH.

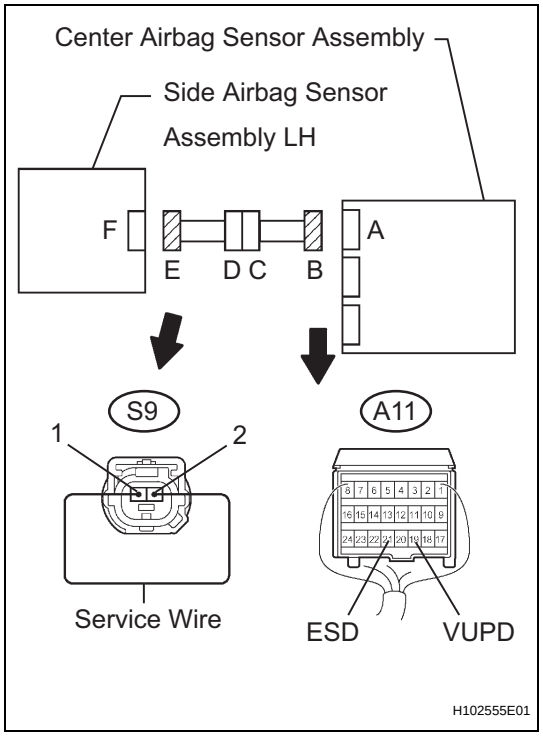
OK:

The connectors are connected.

NG → **CONNECT CONNECTORS**

OK

3 CHECK SIDE AIRBAG SENSOR ASSEMBLY RH CIRCUIT (OPEN)



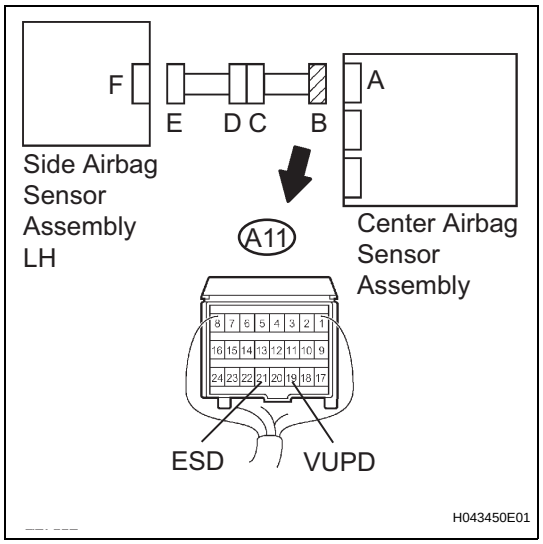
(a) Disconnect the connector from the center airbag sensor.
(b) Disconnect the connector from the horn button.
(c) Disconnect the connector from the front passenger airbag.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower.
(e) Disconnect the connector from the front seat airbag LH.
(f) Disconnect the connector from the front seat airbag RH.
(g) Disconnect the connector from the curtain shield airbag LH.
(h) Disconnect the connector from the curtain shield airbag RH.
(i) Disconnect the connector from the front seat outer belt LH.
(j) Disconnect the connector from the front seat outer belt RH.
(k) Using a service wire, connect S9-2 and S9-1 of connector "E".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(l) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
A11-19 (VUPD) - A11-21 (ESD)	Below 1 Ω

NG → **Go to step 8**

OK

4 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

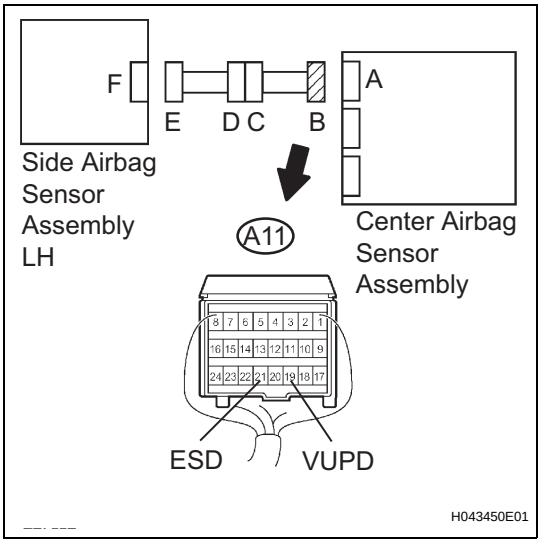
Tester Connection	Specified Condition
A11-19 (VUPD) - A11-21 (ESD)	1 MΩ or higher

NG → **Go to step 9**

OK

5 CHECK SIDE AIRBAG SENSOR ASSEMBLY RH CIRCUIT (TO B+)

RS



(a) Connect the negative (-) terminal cable to the battery and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

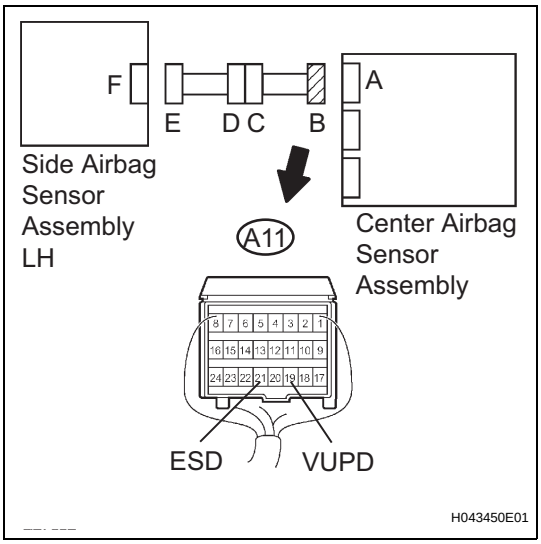
Standard voltage

Tester Connection	Specified Condition
A11-19 (VUPD) - Body ground	Below 1 V
A11-21 (ESD) - Body ground	Below 1 V

NG → **Go to step 10**

OK

6 CHECK SIDE AIRBAG SENSOR ASSEMBLY RH CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

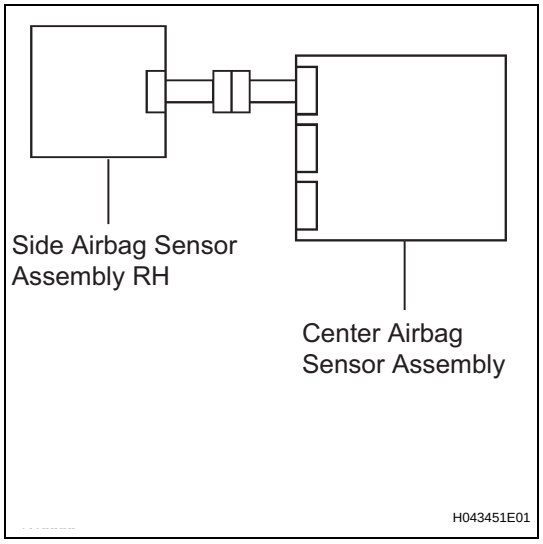
Standard resistance

Tester Connection	Specified Condition
A11-19 (VUPD) - Body ground	1 MΩ or higher
A11-21 (ESD) - Body ground	1 MΩ or higher

NG → **Go to step 11**

OK

7	CHECK SIDE AIRBAG SENSOR ASSEMBLY RH



(a) Connect the connectors to the center airbag sensor.
(b) Interchange the side airbag sensor RH with LH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).

Result

Result	Proceed to
DTC B1620/21 is output.	A
DTC B1625/22 is output.	B
DTC B1620/21 and B1625/22 are not output.	C

A → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

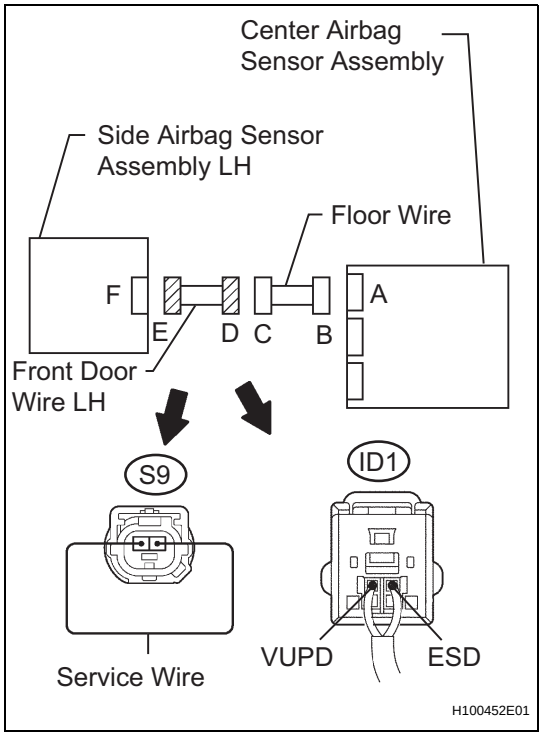
B → **REPLACE SIDE AIRBAG SENSOR ASSEMBLY RH**

C

PERFORM SYMPTOM SIMULATION

RS

8	CHECK FRONT DOOR WIRE RH (OPEN)



(a) Disconnect the front door wire LH connector from the floor wire.
HINT:
Connector "E" has already been inserted into the service wire.

(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

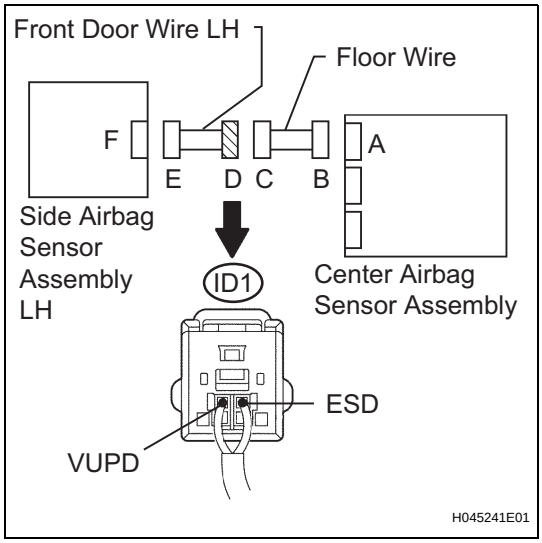
Tester Connection	Specified Condition
ID1-2 (VUPD) - ID1-1 (ESD)	Below 1 Ω

NG → **REPAIR OR REPLACE FRONT DOOR WIRE RH**

OK

REPAIR OR REPLACE NO. 2 FLOOR WIRE

9	CHECK FRONT DOOR WIRE RH (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	Specified Condition
ID1-2 (VUPD) - ID1-1 (ESD)	1 MΩ or higher

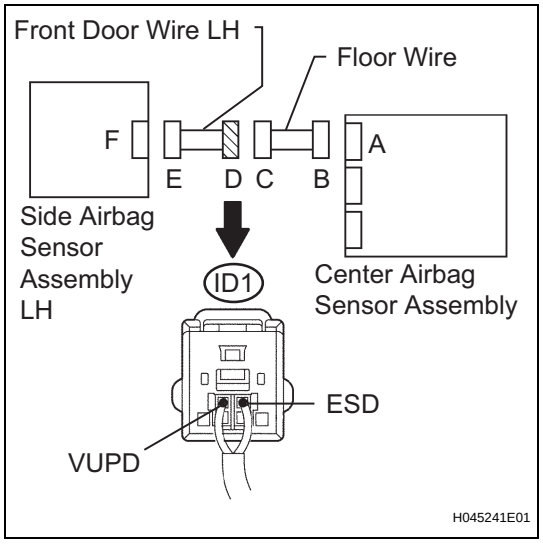
NG → **REPAIR OR REPLACE FRONT DOOR WIRE RH**

OK

REPAIR OR REPLACE NO. 2 FLOOR WIRE

RS

10 CHECK FRONT DOOR WIRE RH (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the front door wire LH connector from the floor wire.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

Standard voltage

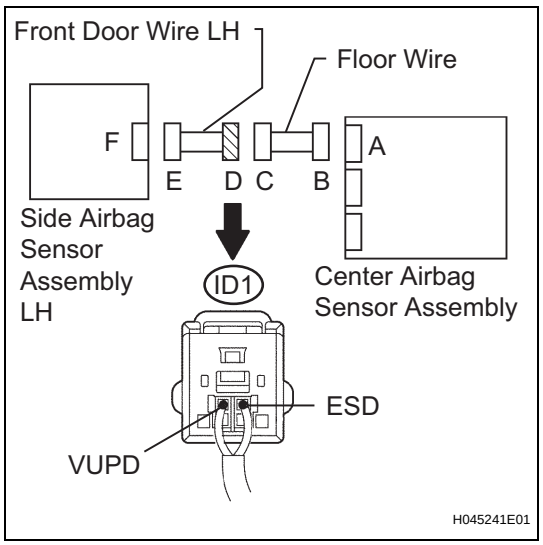
Tester Connection	Specified Condition
ID1-2 (VUPD) - Body ground	Below 1 V
ID1-1 (ESD) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE FRONT DOOR WIRE RH**

OK

REPAIR OR REPLACE NO. 2 FLOOR WIRE

11 CHECK FRONT DOOR WIRE RH (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	Specified Condition
ID1-2 (VUPD) - Body ground	1 MΩ or higher
ID1-1 (ESD) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE FRONT DOOR WIRE RH**

OK

REPAIR OR REPLACE NO. 2 FLOOR WIRE

DTC	B1630/23	Driver Side Rear Airbag Sensor Circuit Malfunction

DESCRIPTION

RS

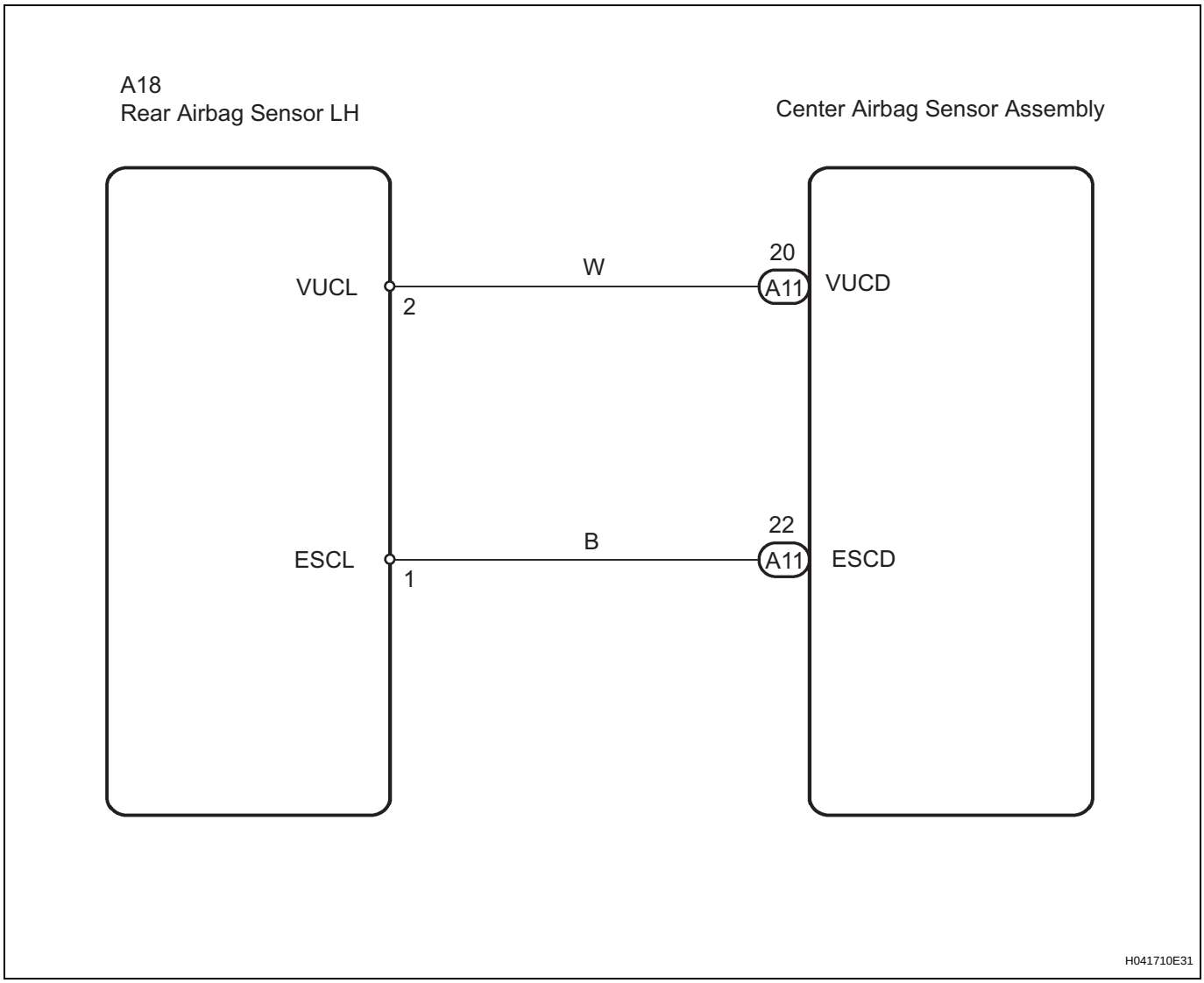
The rear airbag sensor LH consists of the safing sensor, the diagnostic circuit, the lateral deceleration sensor, etc.

If the center airbag sensor receives signals from the lateral deceleration sensor, it determines whether or not the SRS should be activated.

DTC B1630/23 is recorded when a malfunction is detected in the rear airbag sensor LH circuit.

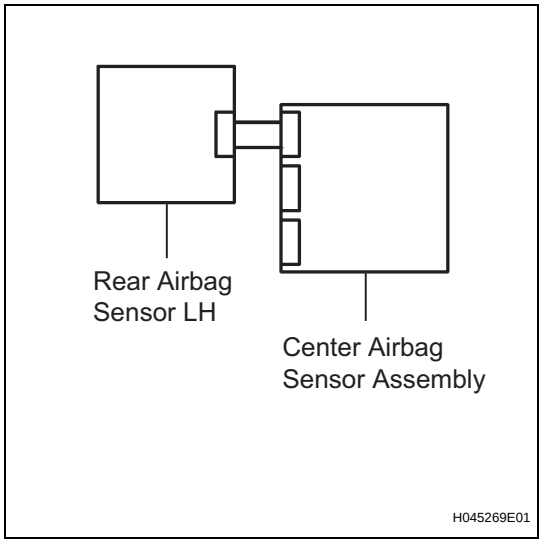
DTC No.	DTC Detection Condition	Trouble Area
B1630/23	• The center airbag sensor assembly receives a line short signal, open signal, short to ground signal or B+ short signal in the rear airbag sensor LH circuit for 2 seconds. • Rear airbag sensor LH malfunction • Center airbag sensor assembly malfunction	• Rear airbag sensor LH • Center airbag sensor assembly • Floor wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in memory (see page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check for DTCs (see page RS-18).

OK:

DTC B1630/23 is not output.

HINT:

Codes other than code B1630/23 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

PERFORM SYMPTOM SIMULATION

2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor and the rear airbag sensor LH.

OK:

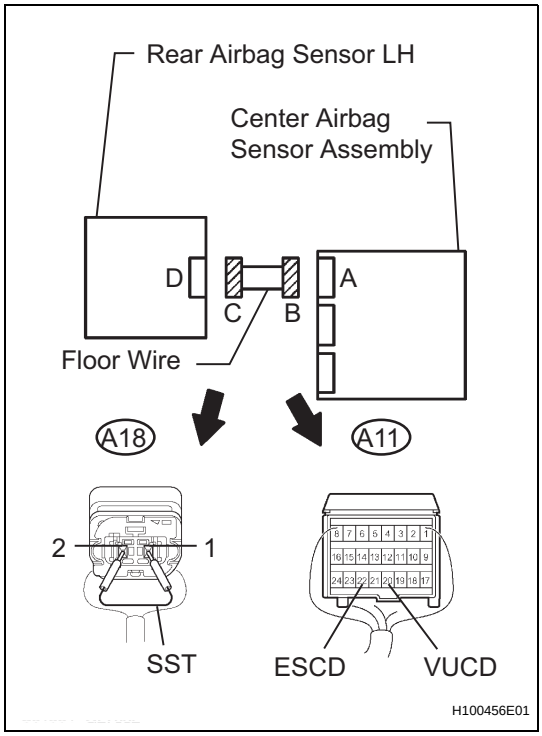
The connectors are connected.

NG → **CONNECT CONNECTORS**

OK

RS

3 CHECK FLOOR WIRE (OPEN)



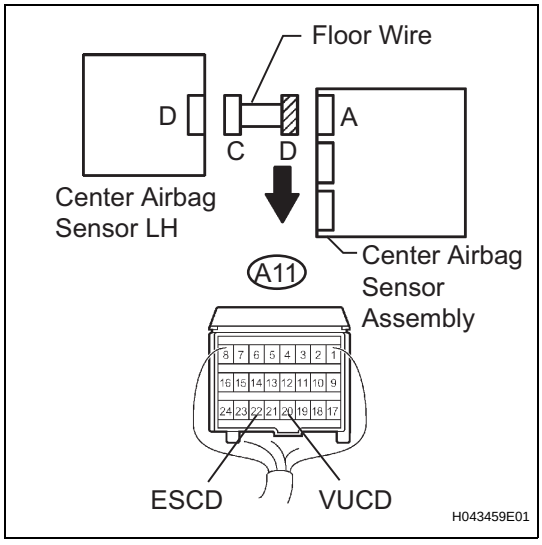
(a) Disconnect the connector from the center airbag sensor.
(b) Disconnect the connector from the horn button.
(c) Disconnect the connector from the front passenger airbag.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower.
(e) Disconnect the connector from the front seat airbag LH.
(f) Disconnect the connector from the front seat airbag RH.
(g) Disconnect the connector from the curtain shield airbag LH.
(h) Disconnect the connector from the curtain shield airbag RH.
(i) Disconnect the connector from the front seat outer belt LH.
(j) Disconnect the connector from the front seat outer belt RH.
(k) Using SST, connect A18-2 and A18-1 of connector "C".
SST 09843-18040
(l) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
A11-20 (VUCD) - A11-22 (ESCD)	Below 1 Ω

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

4 CHECK FLOOR WIRE (SHORT)



(a) Disconnect the SST from connector "C".
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

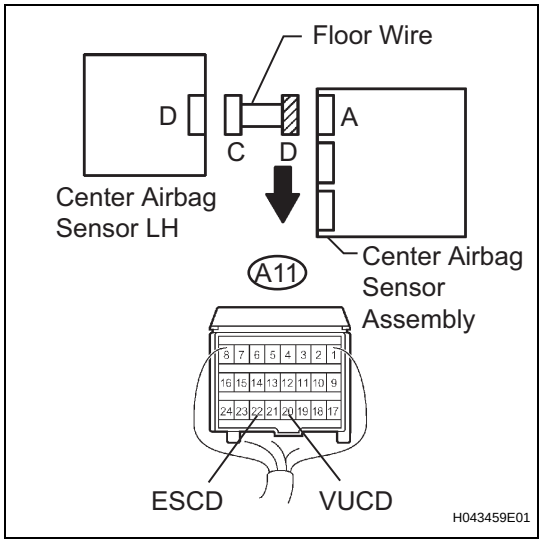
Tester Connection	Specified Condition
A11-20 (VUCD) - A11-22 (ESCD)	1 MΩ or higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

RS

5 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

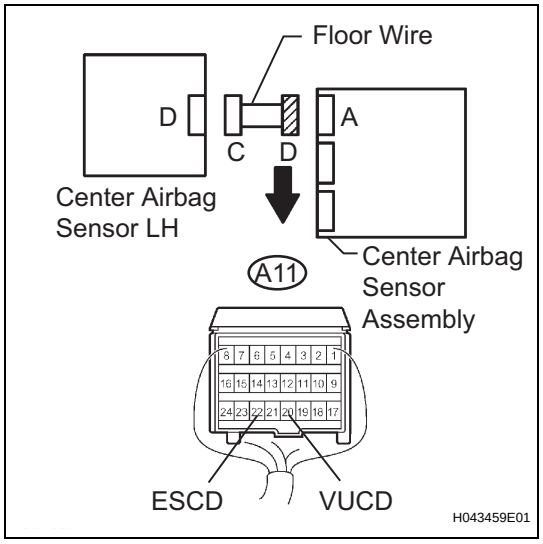
Standard voltage

Tester Connection	Specified Condition
A11-20 (VUCD) - Body ground	Below 1 V
A11-22 (ESCD) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

6 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

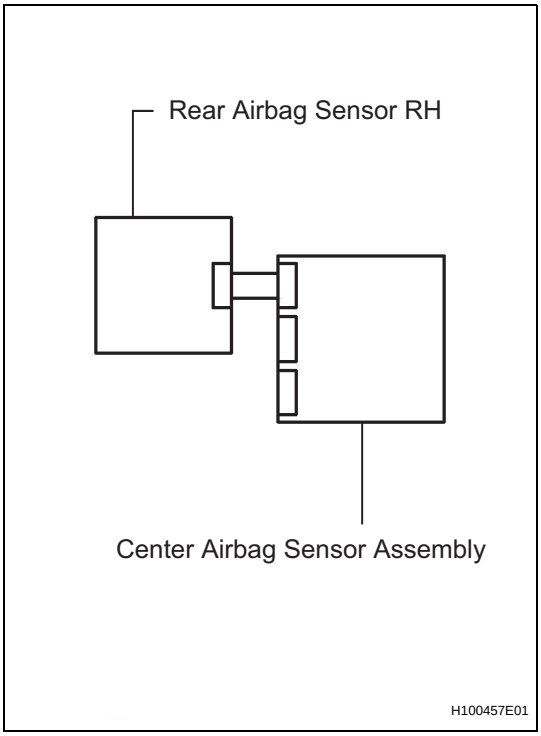
Standard resistance

Tester Connection	Specified Condition
A11-20 (VUCD) - Body ground	1 MΩ or higher
A11-22 (ESCD) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

7	CHECK REAR AIRBAG SENSOR LH



(a) Connect the connectors to the center airbag sensor.
(b) Interchange the rear airbag sensor LH with RH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page RS-18).

Result

Result	Proceed to
DTC B1630/23 is output.	A
DTC B1635/24 is output.	B
DTC B1630/23 and B1635/24 are not output.	C

A → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

B → **REPLACE REAR AIRBAG SENSOR LH**

C

PERFORM SYMPTOM SIMULATION

DTC	B1635/24	Front Passenger Side Rear Airbag Sensor Circuit Malfunction

DESCRIPTION

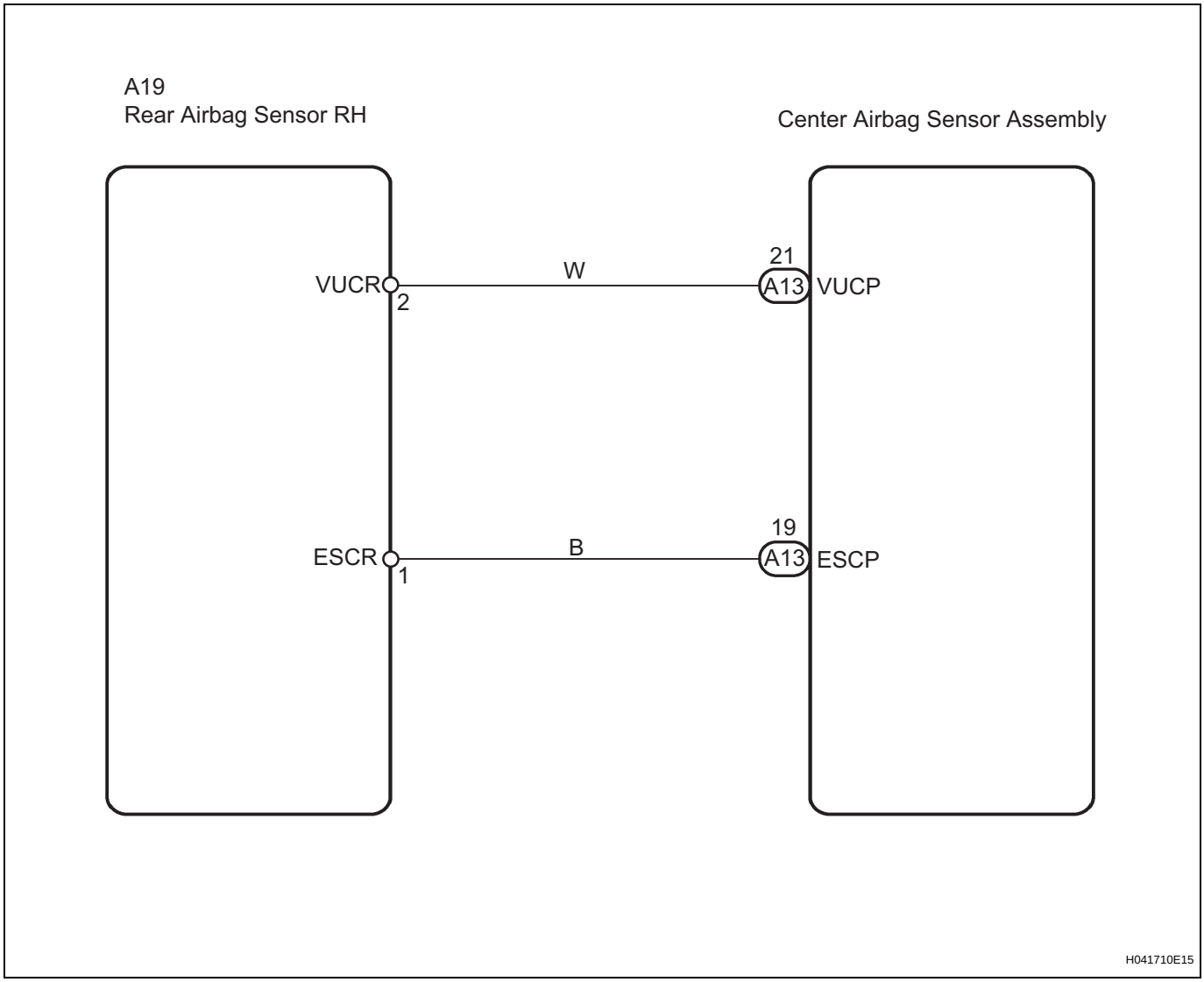
The rear airbag sensor RH consists of the safing sensor, the diagnostic circuit, the lateral deceleration sensor, etc.

If the center airbag sensor receives signals from the lateral deceleration sensor, it determines whether or not the SRS should be activated.

DTC B1635/24 is recorded when a malfunction is detected in the rear airbag sensor RH circuit.

DTC No.	DTC Detection Condition	Trouble Area
B1635/24	• The center airbag sensor assembly receives a line short signal, open signal, short to ground signal or B+ short signal in the rear airbag sensor RH circuit for 2 seconds. • Rear airbag sensor RH malfunction • Center airbag sensor assembly malfunction	• Rear airbag sensor RH • Center airbag sensor assembly • No. 2 floor wire

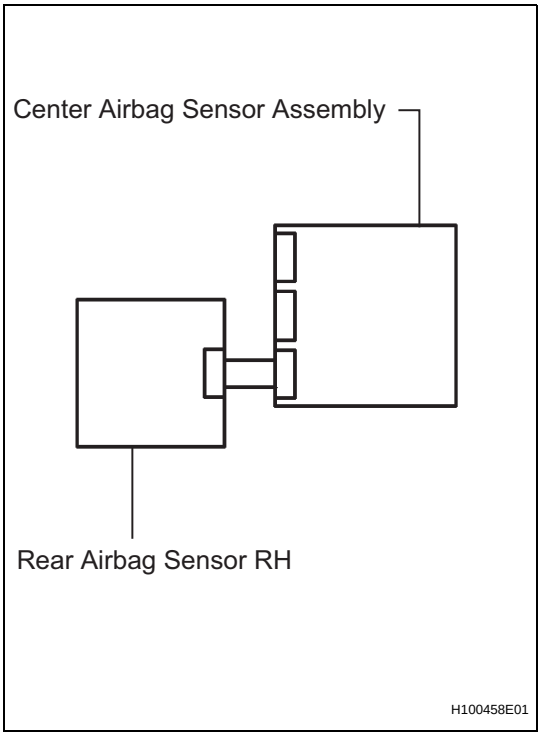
WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC

RS



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in memory (see page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check for DTCs (see page RS-18).

OK:

DTC B1635/24 is not output.

HINT:

Codes other than code B1635/24 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

PERFORM SYMPTOM SIMULATION

2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor and the rear airbag sensor RH.

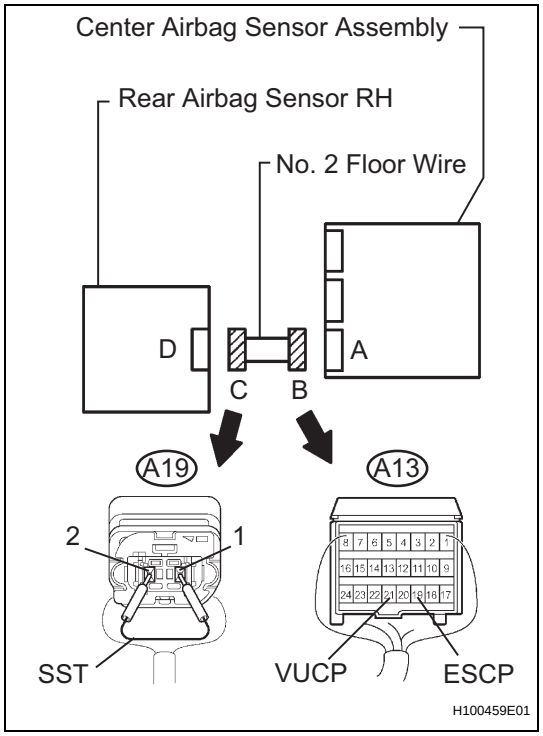
OK:

The connectors are connected.

NG → **CONNECT CONNECTORS**

OK

3 CHECK NO. 2 FLOOR WIRE (OPEN)



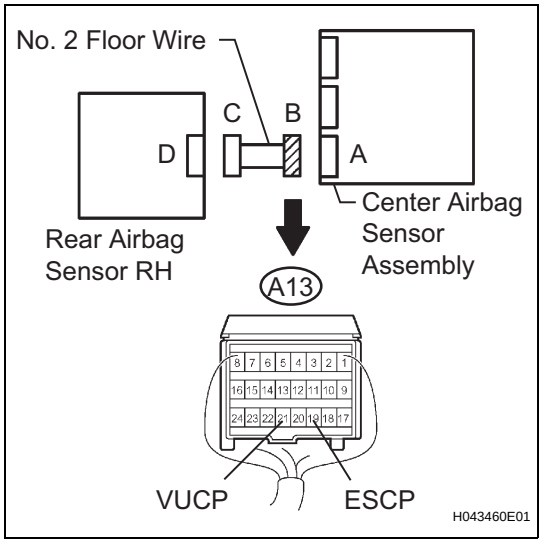
(a) Disconnect the connector from the center airbag sensor.
(b) Disconnect the connector from the horn button.
(c) Disconnect the connector from the front passenger airbag.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower.
(e) Disconnect the connector from the front seat airbag LH.
(f) Disconnect the connector from the front seat airbag RH.
(g) Disconnect the connector from the curtain shield airbag LH.
(h) Disconnect the connector from the curtain shield airbag RH.
(i) Disconnect the connector from the front seat outer belt LH.
(j) Disconnect the connector from the front seat outer belt RH.
(k) Using SST, connect A19-2 and A19-1 of connector "C".
SST 09843-18040
(l) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
A13-21 (VUCP) - A13-19 (ESCP)	Below 1 Ω

NG → **REPAIR OR REPLACE NO. 2 FLOOR WIRE**

OK

4 CHECK NO. 2 FLOOR WIRE (SHORT)



(a) Disconnect the SST from connector "C".
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

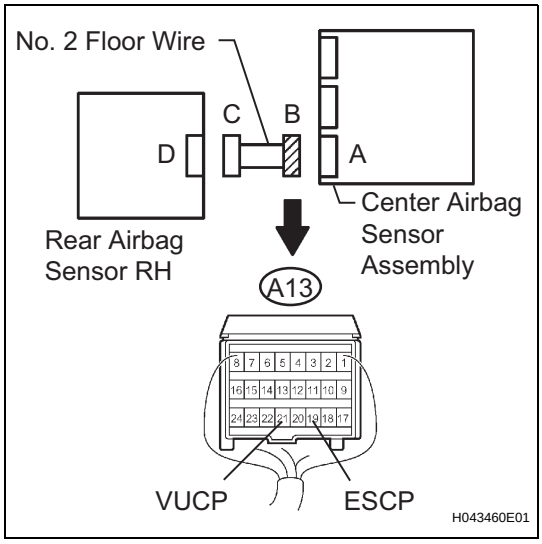
Tester Connection	Specified Condition
A13-21 (VUCP) - A13-19 (ESCP)	1 MΩ or higher

NG → **REPAIR OR REPLACE NO. 2 FLOOR WIRE**

OK

RS

5	CHECK NO. 2 FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

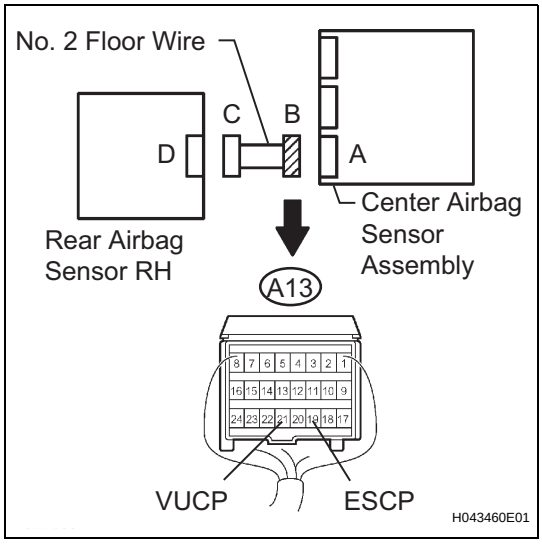
Standard voltage

Tester Connection	Specified Condition
A13-21 (VUCP) - Body ground	Below 1 V
A13-19 (ESCP) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE NO. 2 FLOOR WIRE**

OK

6	CHECK NO. 2 FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

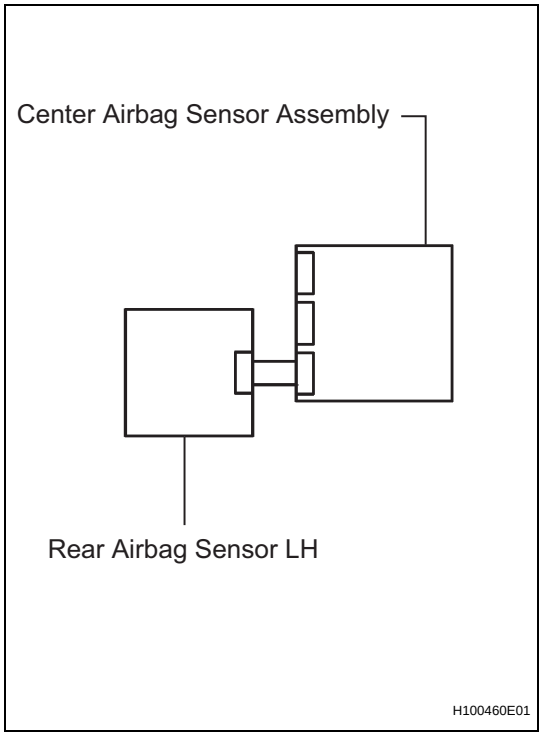
Standard resistance

Tester Connection	Specified Condition
A13-21 (VUCP) - Body ground	1 MΩ or higher
A13-19 (ESCP) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE NO. 2 FLOOR WIRE**

OK

7	CHECK REAR AIRBAG SENSOR RH



(a) Connect the connectors to the center airbag sensor.
(b) Interchange the rear airbag sensor LH with RH and connect the connectors to them.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page RS-18).

Result

Result	Proceed to
DTC B1635/24 is output.	A
DTC B1630/23 is output	B
DTC B1630/23 and B1635/24 are not output.	C

A	REPLACE CENTER AIRBAG SENSOR ASSEMBLY
B	REPLACE REAR AIRBAG SENSOR RH

C

PERFORM SYMPTOM SIMULATION

DTC	B1650/32	Occupant Classification System Malfunction

DESCRIPTION

The occupant classification system circuit consists of the center airbag sensor assembly and the occupant classification system.

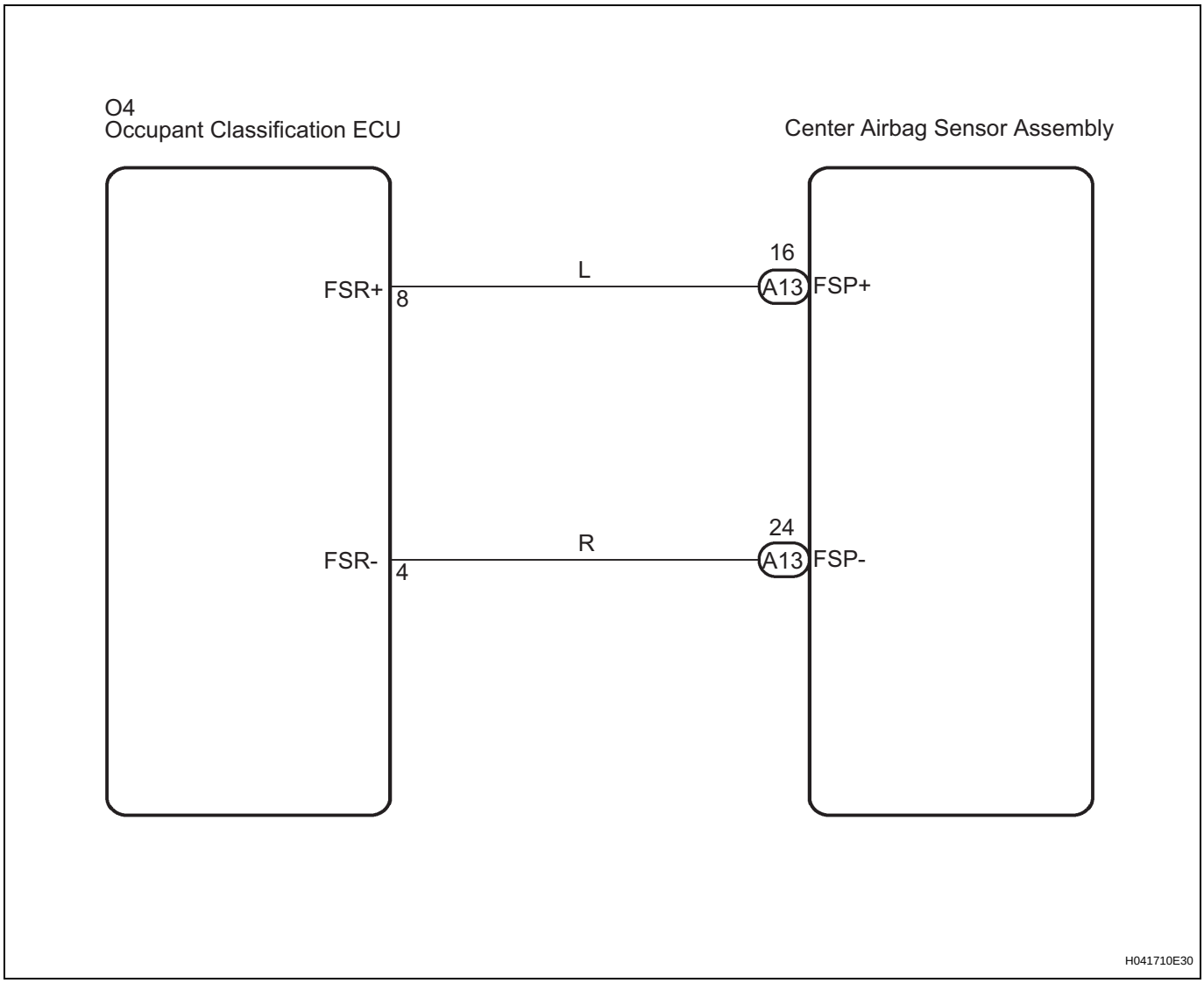
RS

If the center airbag sensor assembly receives signals from the occupant classification ECU, it determines whether or not the front passenger airbag assembly and the front seat side airbag assembly RH should be operated.

DTC B1650/32 is recorded when a malfunction is detected in the occupant classification system circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1650/32	• Occupant classification system malfunction • The center airbag sensor 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 for 2 seconds. • Center airbag sensor assembly malfunction	• Floor wire No. 2 • Occupant classification system • Center airbag sensor assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

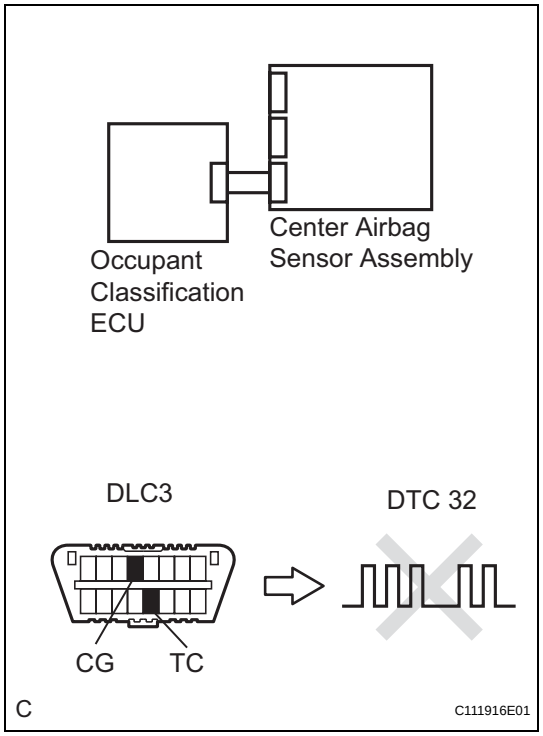
1	CHECK DTC (OCCUPANT CLASSIFICATION ECU)

(a) Turn the ignition switch to the ON position, and wait for at least 10 seconds.
(b) Using the intelligent tester, check the DTCs of the occupant classification ECU (See page RS-257).
OK:
DTC is not output.

NG → **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS**

OK

2	CHECK DTC (CENTER AIRBAG SENSOR ASSEMBLY)



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in memory (See page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check the DTCs (See page RS-18).
OK:
DTC B1650/32 is not output.
HINT:
Codes other than DTC B1650/32 may be output at this time, but they are not related to this check.

OK → **USE SIMULATION METHOD TO CHECK**

NG

3	CHECK CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor assembly and occupant classification ECU.
OK:
The connectors are properly connected.

HINT:
If the connectors are not connected securely, reconnect the connectors and proceed to the next inspection.

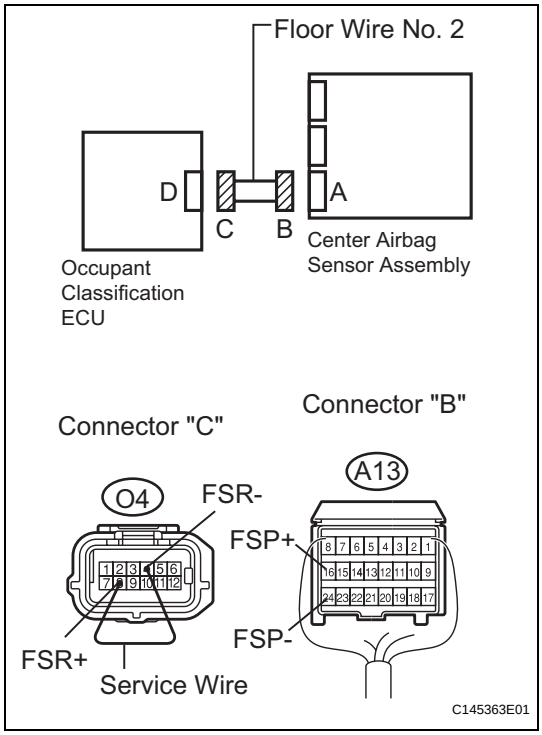
(d) Disconnect the connectors from the center airbag sensor assembly and occupant classification ECU.

(e) Check that the connectors are not damaged.
OK:
The connectors are connected.

NG → **REPAIR OR REPLACE FLOOR WIRE NO. 2**

OK

4 CHECK FLOOR WIRE NO. 2 (OPEN)



(a) Disconnect the connectors from the steering pad.

(b) Disconnect the connectors from the front passenger airbag assembly.

(c) Disconnect the connector from the driver side knee airbag assembly.

(d) with Side and Curtain Shield Airbag:
Disconnect the connector from the front seat side airbag assembly LH.

(e) with Side and Curtain Shield Airbag:
Disconnect the connector from the front seat side airbag assembly RH.

(f) with Side and Curtain Shield Airbag:
Disconnect the connector from the curtain shield airbag assembly LH.

(g) with Side and Curtain Shield Airbag:
Disconnect the connector from the curtain shield airbag assembly RH.

(h) Disconnect the connector from the front seat outer belt assembly LH.

(i) Disconnect the connector from the front seat outer belt assembly RH.

(j) Using a service wire, connect terminals O4-8 (FSR+) and O4-4 (FSR-) of connector "C".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

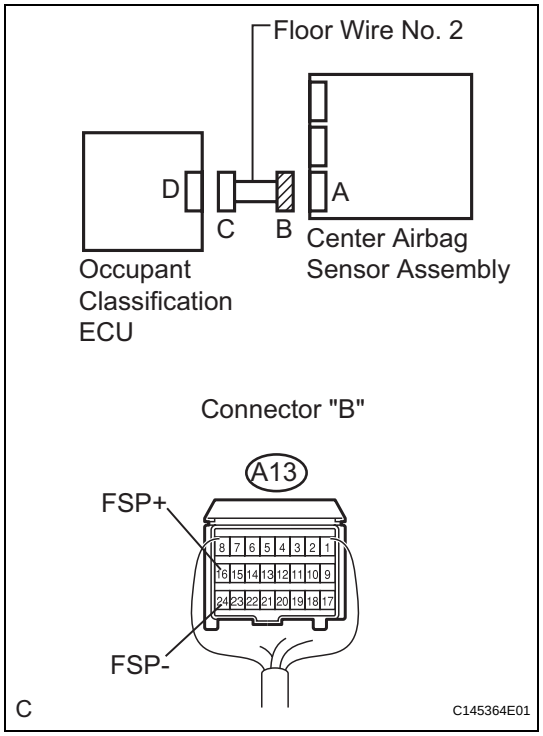
(k) Measure the resistance according to the value(s) in the table below.
Standard resistance

Terminal Connection	Condition	Specified Condition
A13-16 (FSP+) - A13-23 (FSP-)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE FLOOR WIRE NO. 2**

OK

5 CHECK FLOOR WIRE NO. 2 (SHORT)



(a) Disconnect the service wire from connector "B".
(b) Measure the resistance according to the value(s) in the table below.

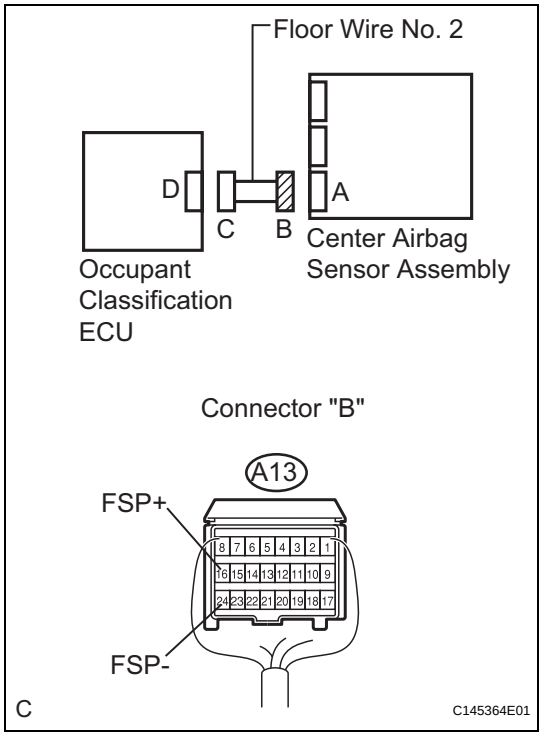
Standard resistance

Terminal Connection	Condition	Specified Condition
A13-16 (FSP+) - A13-23 (FSP-)	Always	1 MΩ or higher

NG → **REPAIR OR REPLACE FLOOR WIRE NO. 2**

OK

6 CHECK FLOOR WIRE NO. 2 (SHORT TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

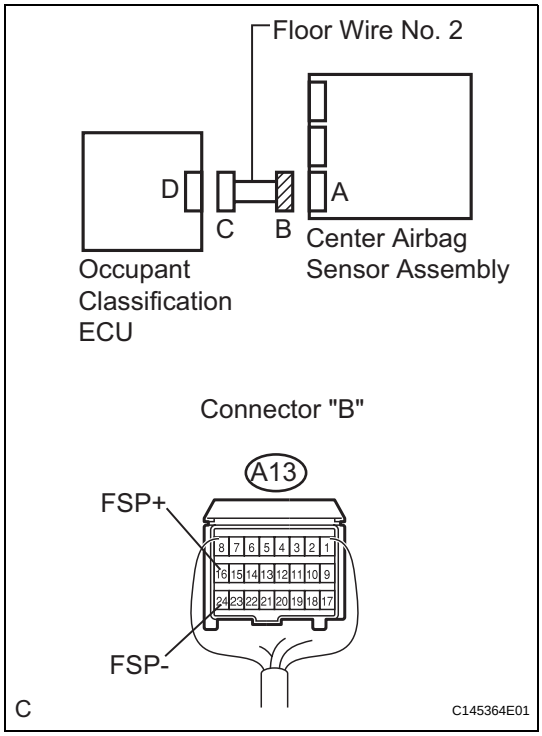
Tester Connection	Condition	Specified Condition
A13-16 (FSP+) - Body ground	Ignition switch ON	Below 1 V
A13-23 (FSP-) Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE FLOOR WIRE NO. 2**

OK

RS

7 CHECK FLOOR WIRE NO. 2 (SHORT TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

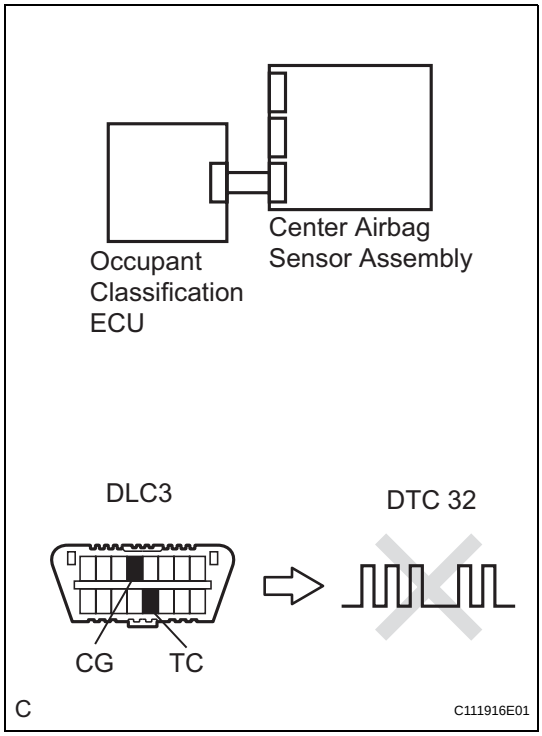
Standard resistance

Tester Connection	Condition	Specified Condition
A13-16 (FSP+) - Body ground	Always	1 MΩ or higher
A13-23 (FSP-) Body ground	Always	1 MΩ or higher

NG → **REPAIR OR REPLACE FLOOR WIRE NO. 2**

OK

8 CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Connect the connectors to the center airbag sensor assembly and occupant classification ECU.
(b) Connect the negative (-) terminal cable to the battery and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in the memory (See page RS-18).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check for DTCs (See page RS-18).

OK:

DTC B1650/32 is not output.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

9	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

10	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

11	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).

NEXT

END

DTC	B1653/35	Seat Position Airbag Sensor Circuit Malfunction

DESCRIPTION

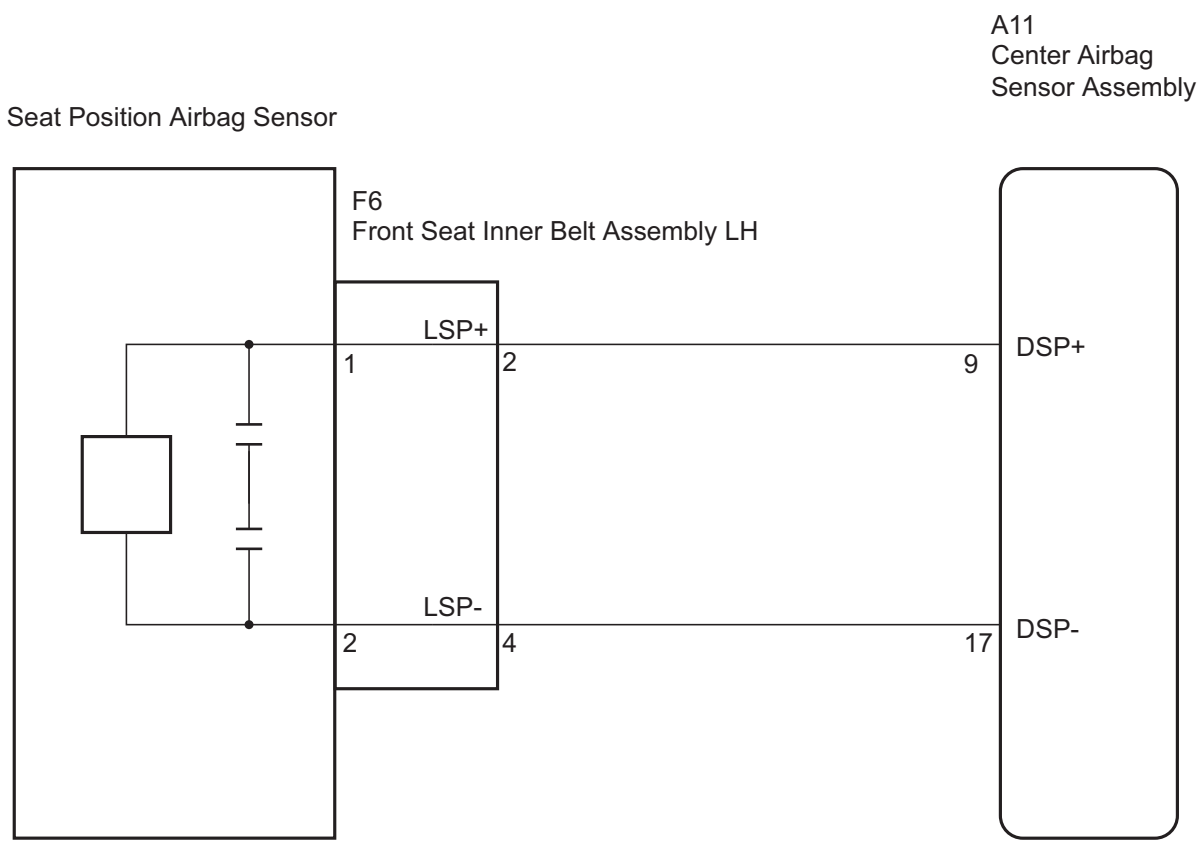
RS

The seat position airbag sensor circuit consists of the center airbag sensor assembly and the seat position airbag sensor.

DTC B1653/35 is recorded when a malfunction is detected in the seat position airbag sensor circuit.

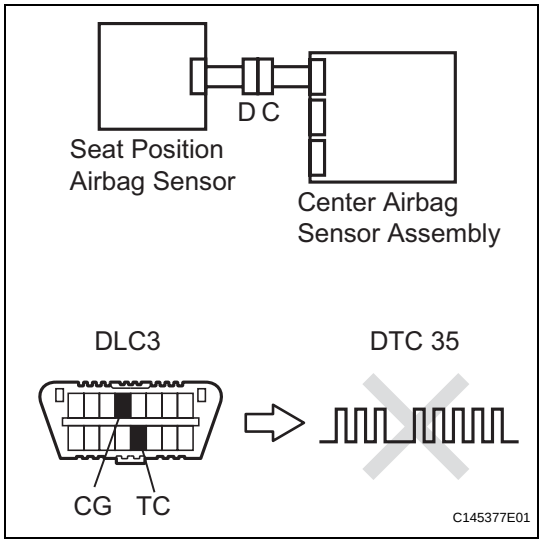
DTC No.	DTC Detecting Condition	Trouble Area
B1653/35	• The center airbag sensor assembly receives a line short circuit signal, an open circuit signal, a short circuit to ground signal or a short circuit to B+ signal in the seat position airbag sensor circuit for 2 seconds. • Seat position airbag sensor malfunction • Center airbag sensor assembly malfunction	• Floor wire • Front seat inner belt assembly LH • Seat position airbag sensor • Center airbag sensor assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK DTC



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in the memory (See page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check for DTCs (See page RS-18).

OK:

DTC B1653/35 is not output.

HINT:

Codes other than DTC B1653/35 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

USE SIMULATION METHOD TO CHECK

2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor assembly and the seat position airbag sensor.

OK:

The connectors are properly connected.

NG → **CONNECT CONNECTORS, THEN GO TO STEP 1**

OK

3	CHECK CONNECTORS

(a) Disconnect the connectors from the center airbag sensor assembly and the seat position airbag sensor.
(b) Check that the connectors are not damaged.

OK:

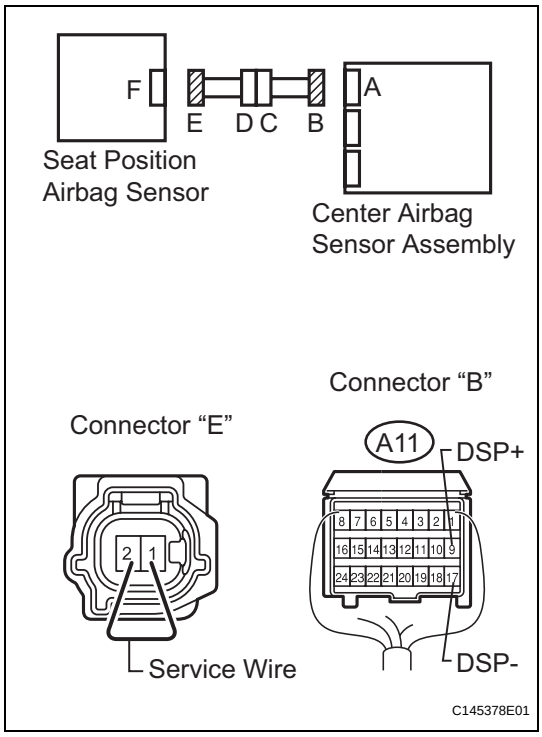
The connectors are not deformed or damaged.

NG → **REPAIR OR REPLACE WIRE HARNESS**

OK

4	CHECK SEAT POSITION AIRBAG SENSOR CIRCUIT (OPEN)

RS



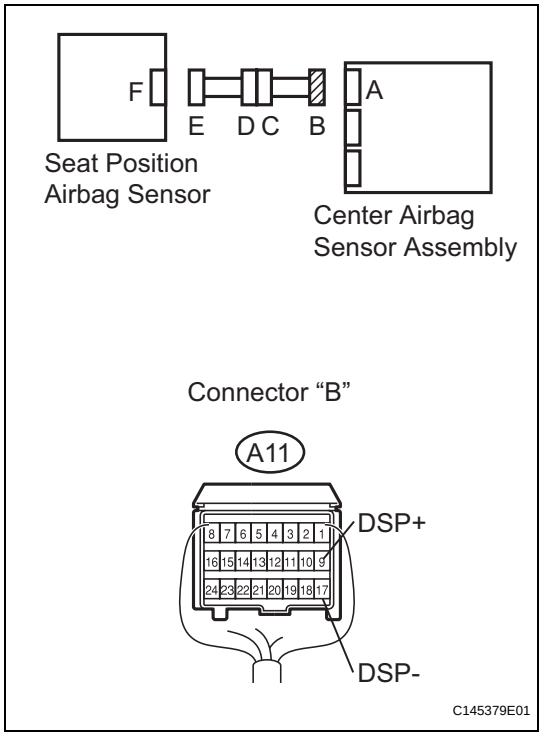
(a) Disconnect the connectors from the steering pad.
(b) Disconnect the connectors from the front passenger airbag assembly.
(c) Disconnect the connector from the driver side knee airbag assembly.
(d) with Side and Curtain Shield Airbag:
Disconnect the connector from the front seat side airbag assembly LH.
(e) with Side and Curtain Shield Airbag:
Disconnect the connector from the front seat side airbag assembly RH.
(f) with Side and Curtain Shield Airbag:
Disconnect the connector from the curtain shield airbag assembly LH.
(g) with Side and Curtain Shield Airbag:
Disconnect the connector from the curtain shield airbag assembly RH.
(h) Disconnect the connector from the front seat outer belt assembly LH.
(i) Disconnect the connector from the front seat outer belt assembly RH.
(j) Using a service wire, connect terminals 1 and 2 of connector "E".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(k) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
A11-9 (DSP+) - A11-17 (DSP-)	Always	Below 1 Ω

NG → **Go to step 11**

OK

5 CHECK SEAT POSITION AIRBAG SENSOR CIRCUIT (SHORT)



(a) Disconnect the service wire from connector E.
(b) Measure the resistance between the terminals of connector E according to the value(s) in the table below.

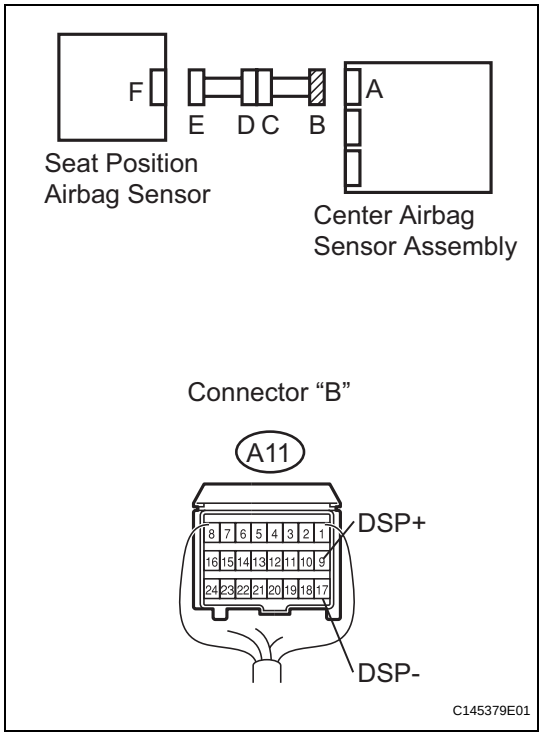
Standard resistance

Tester Connection	Condition	Specified Condition
A11-9 (DSP+) - A11-17 (DSP-)	Always	1 MΩ or higher

NG → **Go to step 12**

OK

6 CHECK SEAT POSITION AIRBAG SENSOR CIRCUIT (SHORT TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

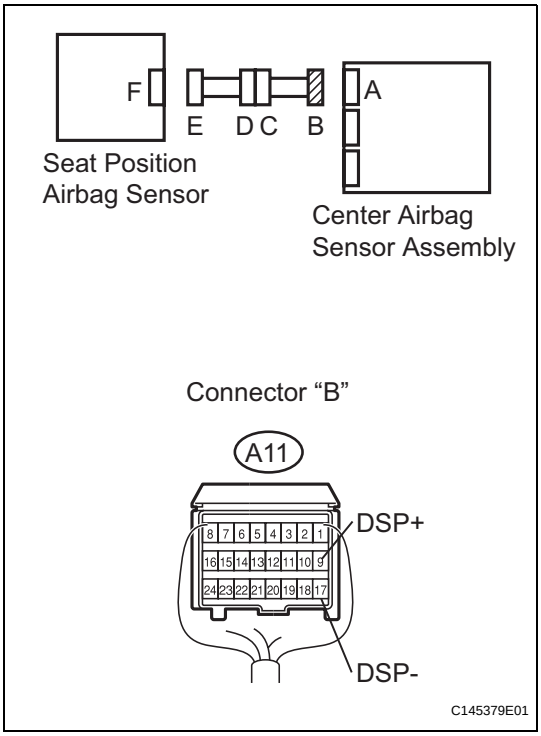
Tester Connection	Condition	Specified Condition
A11-9 (DSP+) - Body ground	Ignition switch ON	Below 1 V
A11-17 (DSP-) - Body ground	Ignition switch ON	Below 1 V

NG → **Go to step 13**

OK

RS

7 CHECK SEAT POSITION AIRBAG SENSOR CIRCUIT (SHORT TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

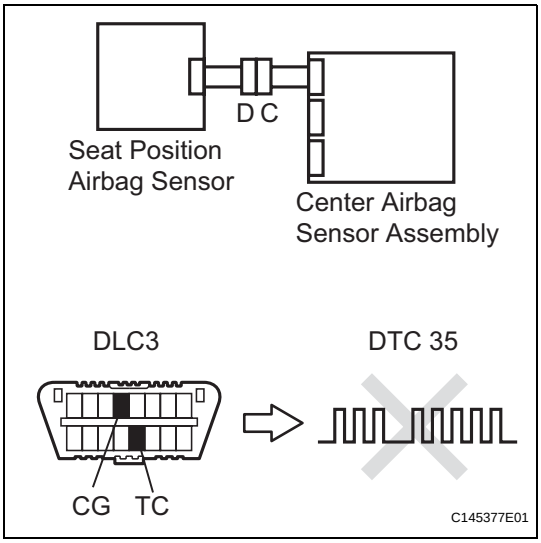
Standard resistance

Tester Connection	Condition	Specified Condition
A11-9 (DSP+) - Body ground	Always	1 MΩ or higher
A11-17 (DSP-) - Body ground	Always	1 MΩ or higher

NG → **Go to step 14**

OK

8 CHECK SEAT POSITION AIRBAG SENSOR



(a) Connect the connectors to the center airbag sensor assembly and the seat position airbag sensor.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in the memory (See page RS-18).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check for DTCs (See page RS-18).

OK:

DTC B1653/35 is not output.

HINT:

Codes other than DTC B1653/35 may be output at this time, but they are not related to this check.

NG → **Go to step 9**

OK

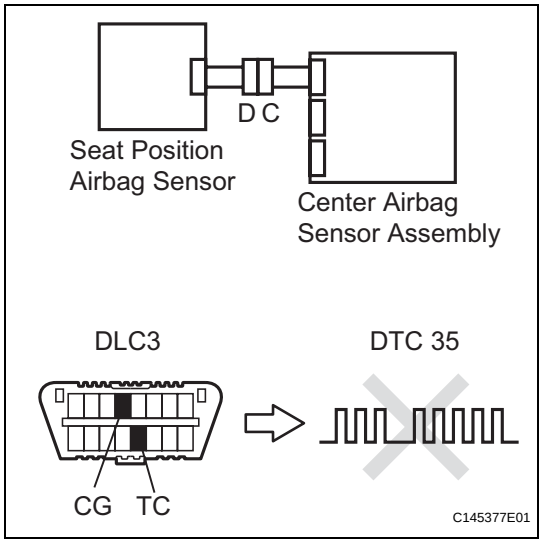
USE SIMULATION METHOD TO CHECK

9	REPLACE SEAT POSITION AIRBAG SENSOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Replace the seat position airbag sensor (See page RS-404).
HINT:
Perform inspection using parts from a normal vehicle if possible.

NEXT

10	CHECK CENTER AIRBAG SENSOR ASSEMBLY



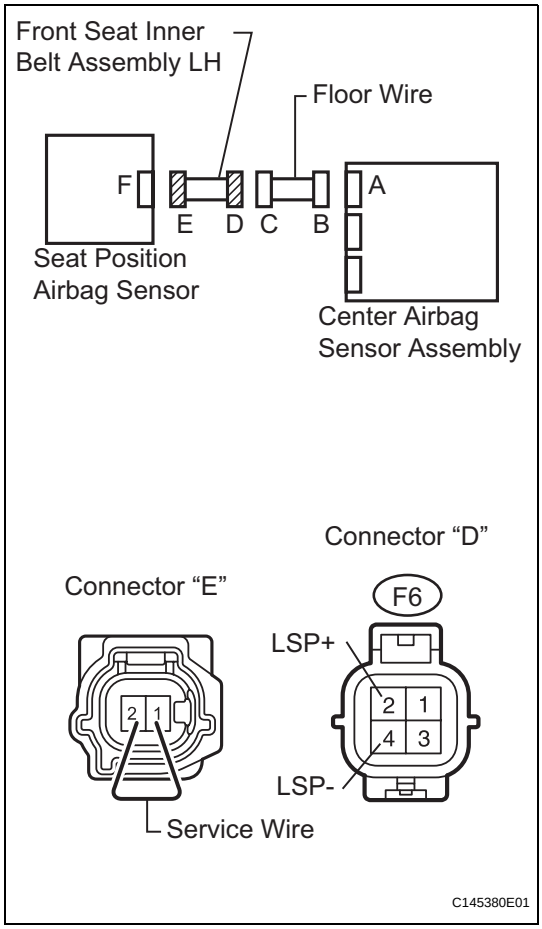
(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(c) Clear the DTCs stored in the memory (See page RS-18).
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Check for DTCs (See page RS-18).
OK:
DTC B1653/35 is not output.
HINT:
Codes other than DTC B1653/35 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

11	CHECK FRONT SEAT INNER BELT ASSEMBLY LH (OPEN)



(a) Disconnect the floor wire connector from the front seat inner belt assembly LH.
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

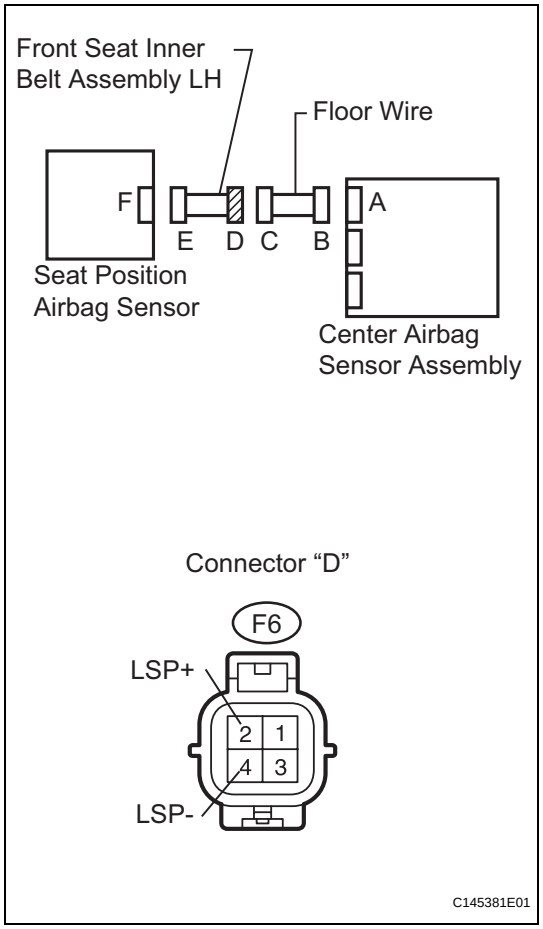
Tester Connection	Condition	Specified Condition
F6-2 (LSP+) - F6-4 (LSP-)	Always	Below 1 Ω

NG → **REPLACE FRONT SEAT INNER BELT ASSEMBLY LH**

OK

REPAIR OR REPLACE FLOOR WIRE

12	CHECK FRONT SEAT INNER BELT ASSEMBLY LH (SHORT)



(a) Disconnect the floor wire connector from the front seat inner belt assembly LH.

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
F6-2 (LSP+) - F6-4 (LSP-)	Always	1 MΩ or higher

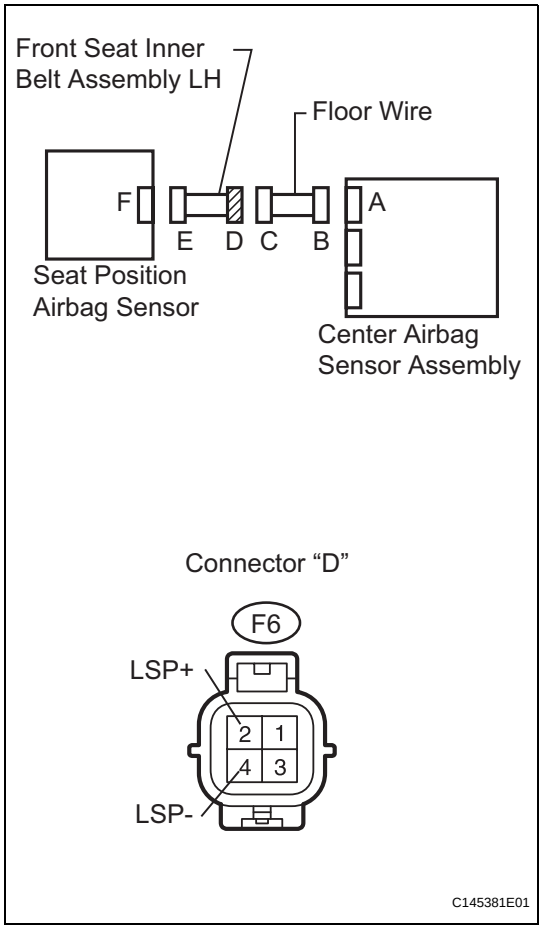
NG → **REPLACE FRONT SEAT INNER BELT ASSEMBLY LH**

OK

REPAIR OR REPLACE FLOOR WIRE

RS

13	CHECK FRONT SEAT INNER BELT ASSEMBLY LH (SHORT TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative(-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the floor wire connector from the front seat inner belt assembly LH.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

Standard voltage

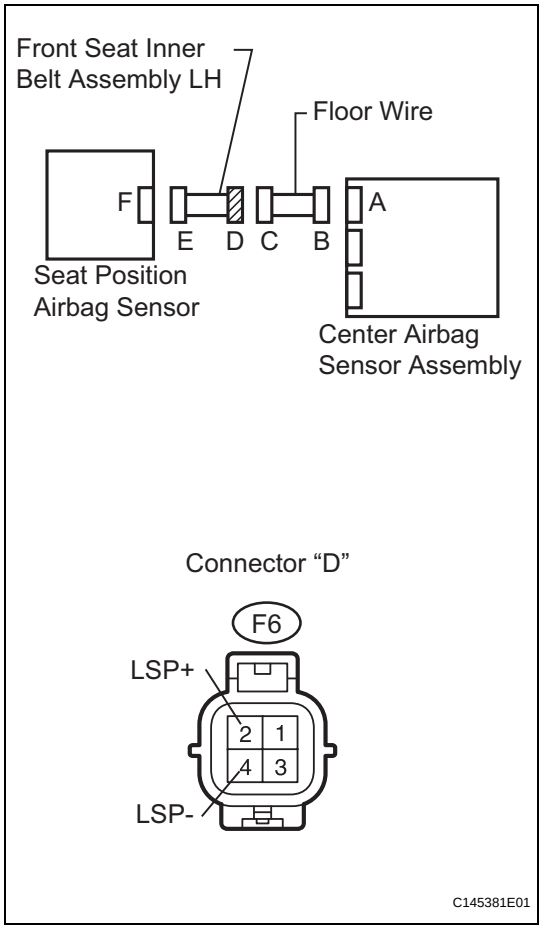
Tester Connection	Condition	Specified Condition
F6-2 (LSP+) - Body ground	Ignition switch ON	Below 1 V
F6-4 (LSP-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT INNER BELT ASSEMBLY LH**

OK

REPAIR OR REPLACE FLOOR WIRE

14	CHECK FRONT SEAT INNER BELT ASSEMBLY LH (SHORT TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the floor wire connector from the front seat inner belt assembly LH.
(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
F6-2 (LSP+) - Body ground	Always	1 MΩ or higher
F6-4 (LSP-) - Body ground	Always	1 MΩ or higher

NG → **REPLACE FRONT SEAT INNER BELT ASSEMBLY LH**

OK

REPAIR OR REPLACE FLOOR WIRE

RS

DTC	B1655/37	Driver Side Seat Belt Buckle Switch Circuit Malfunction

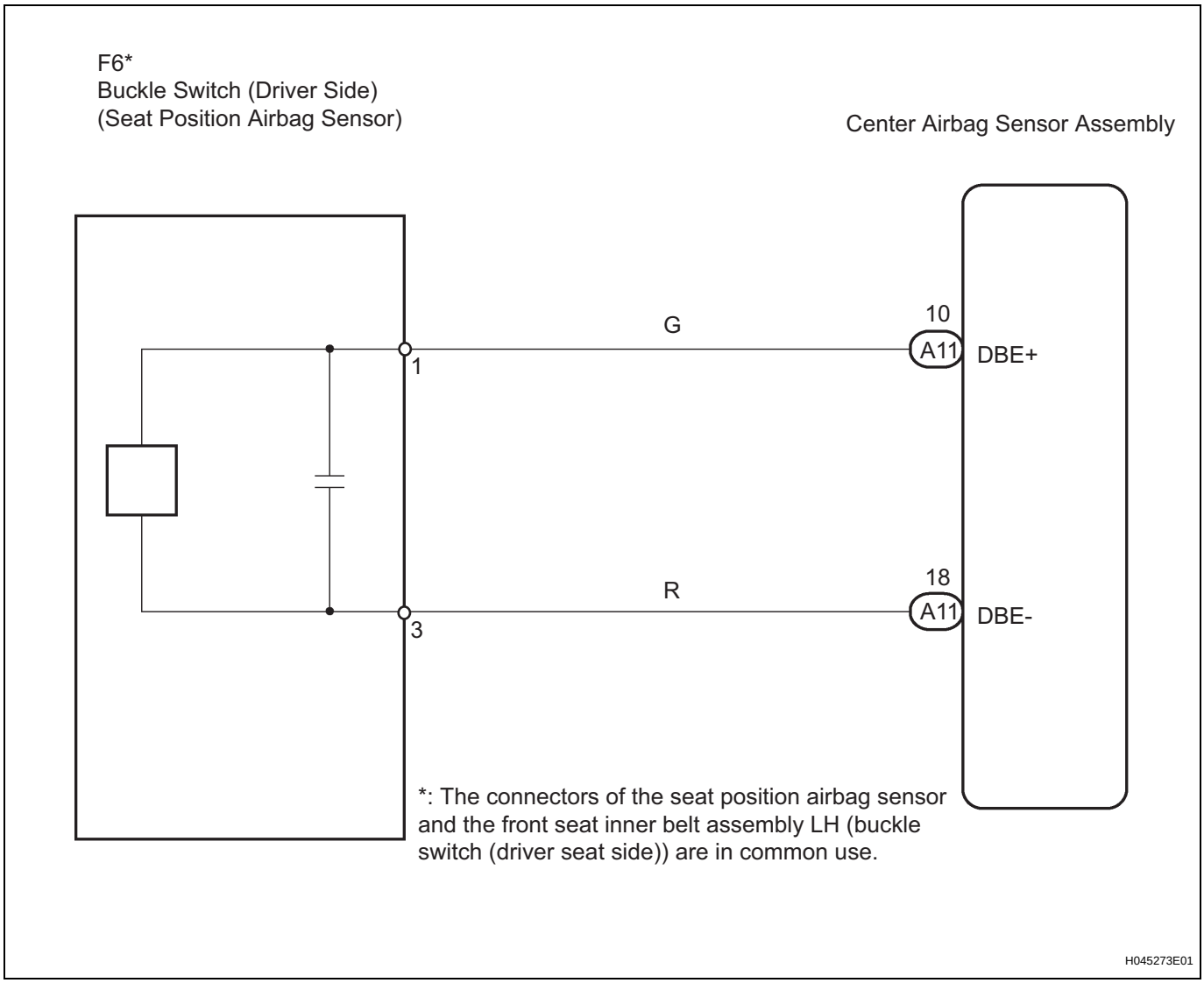
DESCRIPTION

RS

The seat belt buckle switch (driver side) circuit consists of the center airbag sensor and the front seat inner belt LH (seat belt buckle switch (driver side)).
DTC B1655/37 is recorded when a malfunction is detected in the seat belt buckle switch (driver side) circuit.

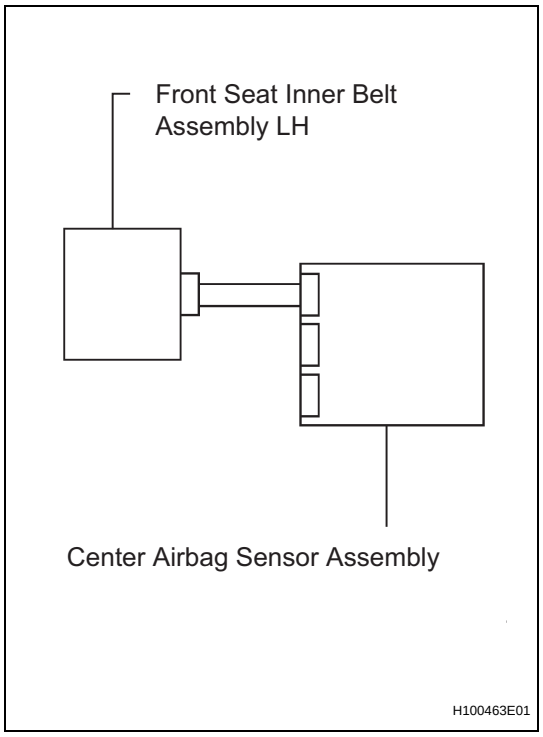
DTC No.	DTC Detection Condition	Trouble Area
B1655/37	• The center airbag sensor assembly receives a line short signal, open signal, short to ground signal or B+ short signal in the seat belt buckle switch (driver side) circuit for 2 seconds. • Front seat inner belt assembly LH (seat belt buckle switch (driver side)) malfunction • Center airbag sensor assembly malfunction	• Front seat inner belt assembly LH (seat belt buckle switch (driver side)) • Center airbag sensor assembly • Floor wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK FOR DTC



(a) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(b) Clear the DTCs stored in memory (see page RS-18).
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Check for DTCs (see page RS-18).

OK:

DTC B1655/37 is not output.

HINT:

Codes other than code B1655/37 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

PERFORM SYMPTOM SIMULATION

2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor and the front seat inner belt LH.

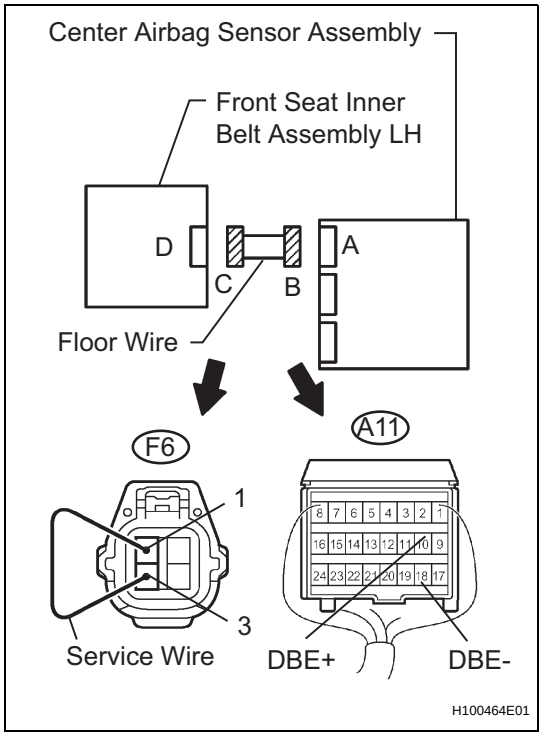
OK:

The connectors are connected.

NG → **CONNECT CONNECTORS**

OK

3	CHECK FLOOR WIRE (OPEN)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connectors from the horn button.
(c) Disconnect the connectors from the front passenger airbag.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower.
(e) w/ Side and curtain shield airbag:
Disconnect the connector from the front seat airbag LH.
(f) w/ Side and curtain shield airbag:
Disconnect the connector from the front seat airbag RH.
(g) w/ Side and curtain shield airbag:
Disconnect the connector from the curtain shield airbag LH.
(h) w/ Side and curtain shield airbag:
Disconnect the connector from the curtain shield airbag RH.
(i) Disconnect the connector from the front seat outer belt LH.
(j) Disconnect the connector from the front seat outer belt RH.
(k) Using a service wire, connect F6-1 and F6-3 of connector "C".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(l) Measure the resistance according to the value(s) in the table below.
Standard resistance

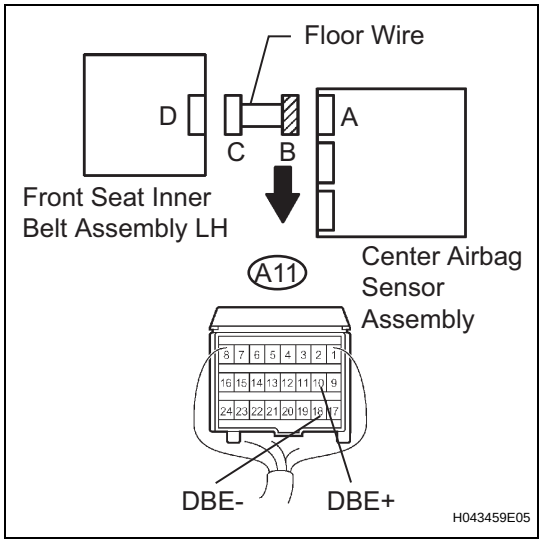
Tester Connection	Specified Condition
A11-10 (DBE+) - A11-18 (DBE-)	Below 1 Ω

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

RS

4 CHECK FLOOR WIRE (SHORT)



(a) Disconnect the service wire from connector "C".
(b) Measure the resistance according to the value(s) in the table below.

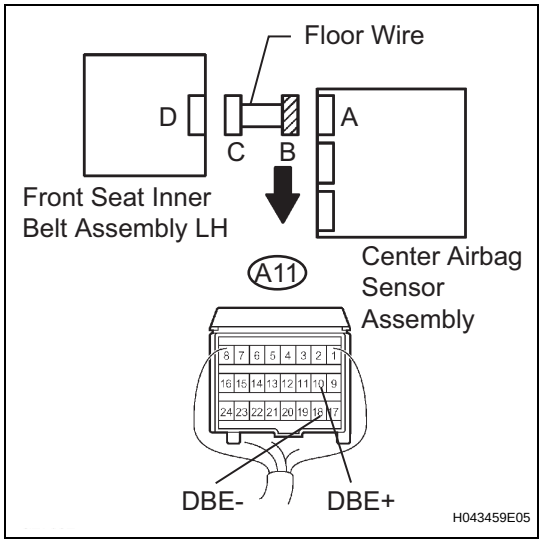
Standard resistance

Tester Connection	Specified Condition
A11-10 (DBE+) - A11-18 (DBE-)	1 MΩ or higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

5 CHECK FLOOR WIRE (TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

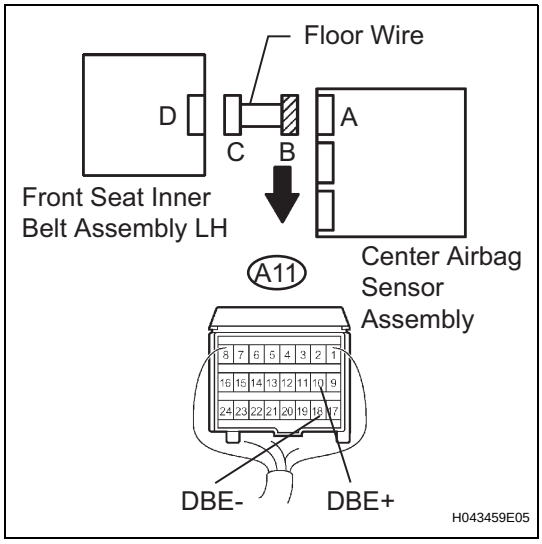
Tester Connection	Specified Condition
A11-10 (DBE+) - Body ground	Below 1 V
A11-18 (DBE-) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

RS

6 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

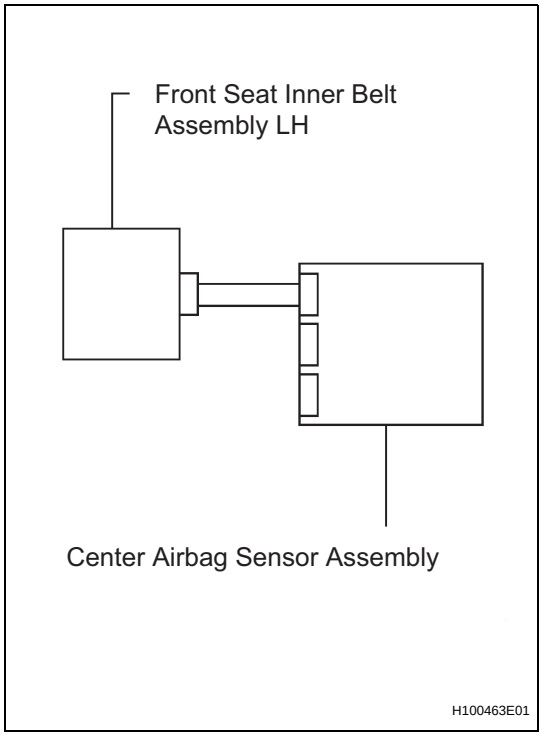
Standard resistance

Tester Connection	Specified Condition
A11-10 (DBE+) - Body ground	1 MΩ or higher
A11-18 (DBE-) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

7 CHECK FRONT SEAT INNER BELT ASSEMBLY LH



(a) Connect the connectors to the center airbag sensor.
(b) Connect the connector to the front seat inner belt LH.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check the DTCs (see page RS-18).

OK:

DTC B1655/37 is not output.

HINT:

Codes other than code B1655/37 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

PERFORM SYMPTOM SIMULATION

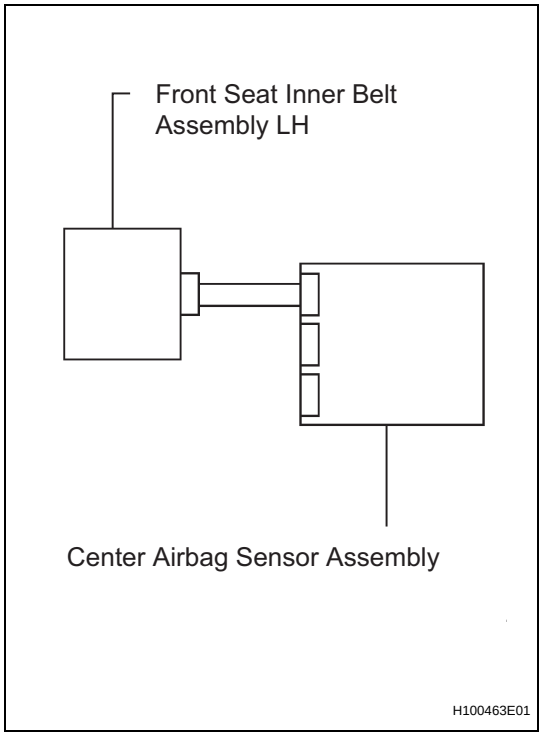
8	REPLACE FRONT SEAT INNER BELT ASSEMBLY LH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Replace the front seat inner belt LH and connect the connector (see page SB-5).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

RS

NEXT

9	CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(c) Clear the DTCs stored in memory (see page RS-18).
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Check the DTCs (see page RS-18).
OK:
DTC B1655/37 is not output.
HINT:
Codes other than code B1655/37 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

DTC	B1660/43	Passenger Airbag ON / OFF Indicator Circuit Malfunction

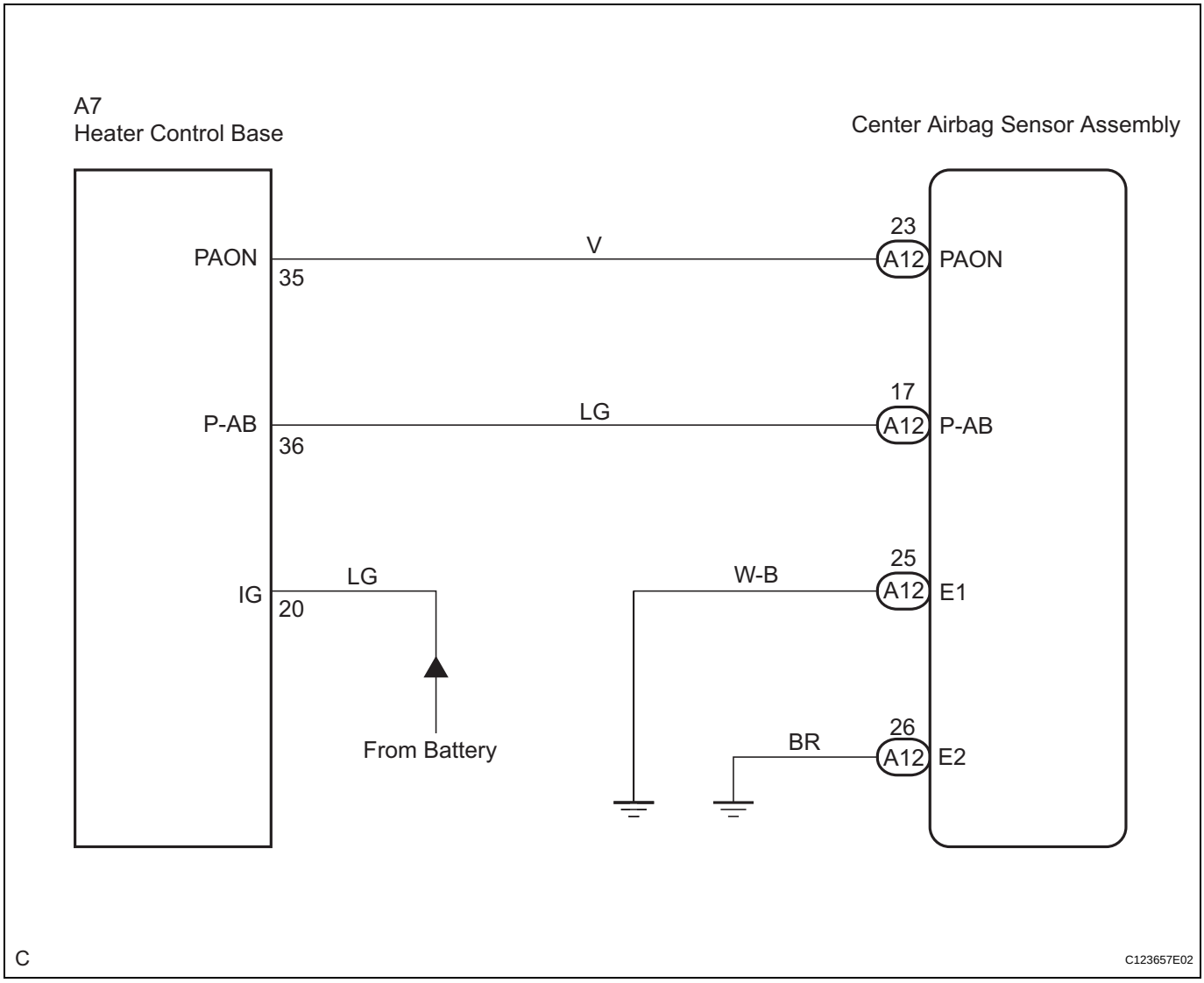
DESCRIPTION

RS

The passenger airbag ON/OFF indicator circuit consists of the center airbag sensor assembly and the heater control base.
The passenger airbag ON/OFF indicator indicates the operation condition of the front passenger airbag assembly and the front seat side airbag assembly RH.
DTC B1660/43 is recorded when a malfunction is detected in the passenger airbag ON/OFF indicator circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1660/43	• The center airbag sensor 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 for 2 seconds. • Heater control base malfunction • Center airbag sensor assembly malfunction	• Instrument panel wire • Heater control base (Passenger airbag ON/OFF indicator) • Center airbag sensor assembly

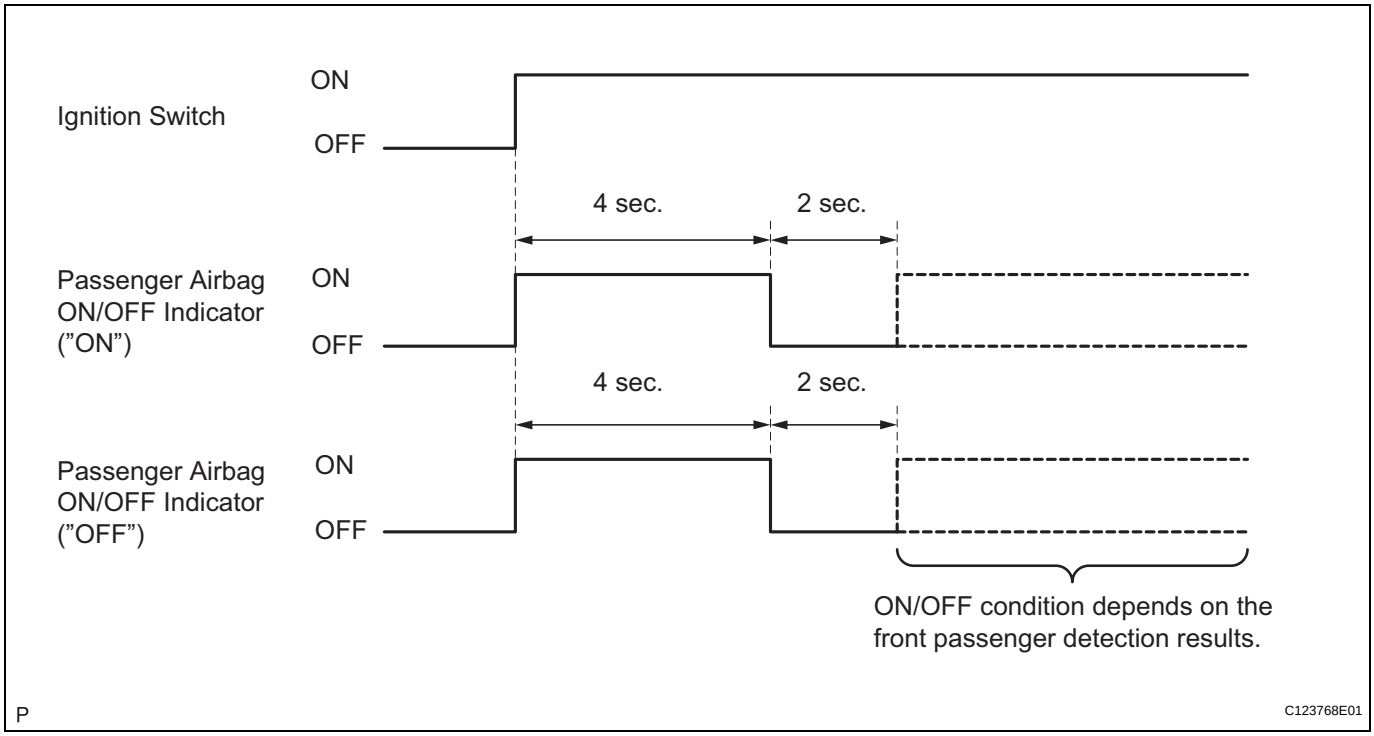
WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK PASSENGER AIRBAG ON/OFF INDICATOR CONDITION

(a) Turn the ignition switch to the ON position.
(b) Check the passenger airbag ON/OFF indicator operation.
HINT:
Refer to the normal condition of the passenger airbag ON/OFF indicator (See page RS-11).



Result

ON/OFF Indicator Illumination	Proceed to
Always ON	A
OFF	B

B → **Go to step 10**

A

2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor assembly and the heater control base.
OK:
The connectors are properly connected.

NG → CONNECT CONNECTORS PROPERLY, THEN GO TO STEP 1

OK

RS

3	CHECK CONNECTORS

(a) Disconnect the connectors from the center airbag sensor assembly and the heater control base.
(b) Check that the connectors (on the center airbag sensor assembly side and heater control base side) are not damaged.
OK:
The connectors are not deformed or damaged.

NG → REPAIR OR REPLACE INSTRUMENT PANEL WIRE

OK

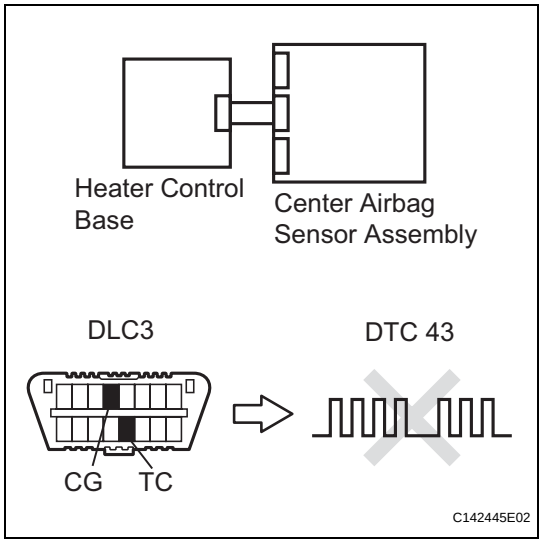
4	CHECK PASSENGER AIRBAG ON/OFF INDICATOR

(a) Connect the connector to the heater control base.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position.
(d) Check the passenger airbag ON/OFF indicator operation.
OK:
The passenger airbag ON/OFF indicator does not come on.

NG → Go to step 6

OK

5 CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Connect the connector to the center airbag sensor assembly.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Clear the DTCs stored in the memory (See page RS-18).
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check for DTCs (See page RS-18).

OK:

DTC B1660/43 is not output.

HINT:

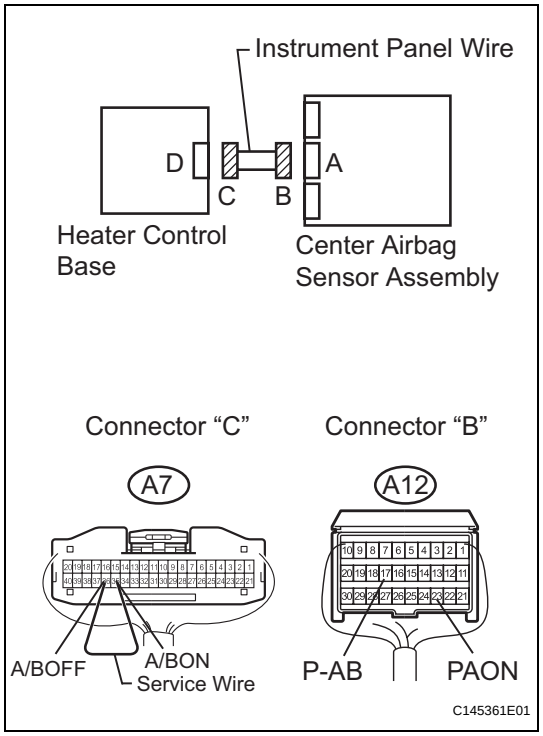
Codes other than DTC B1660/43 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

USE SIMULATION METHOD TO CHECK

6 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connector from the heater control base.
(d) Disconnect the connectors from the steering pad.
(e) Disconnect the connectors from the front passenger airbag assembly.
(f) Disconnect the connector from the driver side knee airbag assembly.
(g) with Side and Curtain Shield Airbag:
Disconnect the connector from the front seat side airbag assembly LH.
(h) with Side and Curtain Shield Airbag:
Disconnect the connector from the front seat side airbag assembly RH.
(i) with Side and Curtain Shield Airbag:
Disconnect the connector from the curtain shield airbag assembly LH.
(j) with Side and Curtain Shield Airbag:
Disconnect the connector from the curtain shield airbag assembly RH.
(k) Disconnect the connector from the front seat outer belt assembly LH.

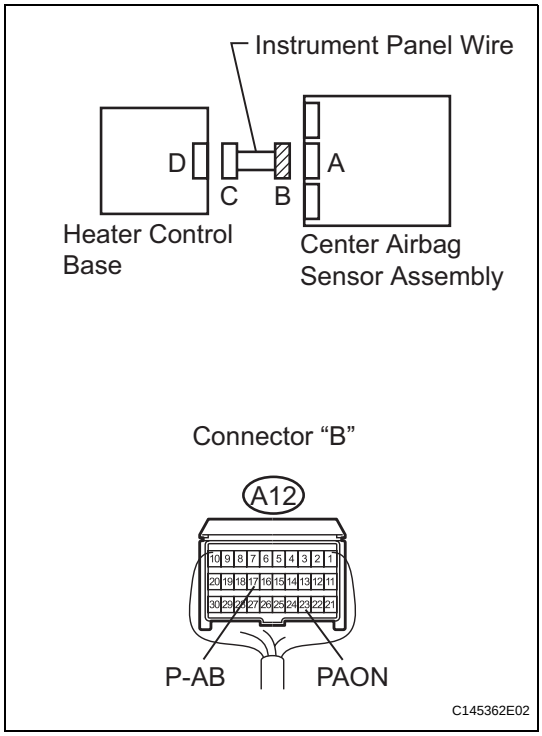
(l) Disconnect the connector from the front seat outer belt assembly RH.
(m) Using a service wire, connect A7-35 (A/BON) and A7-36 (A/BOFF) of connector "B".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(n) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
A12-23 (PAON) - A12-17 (P-AB)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

7 CHECK INSTRUMENT PANEL WIRE (SHORT)



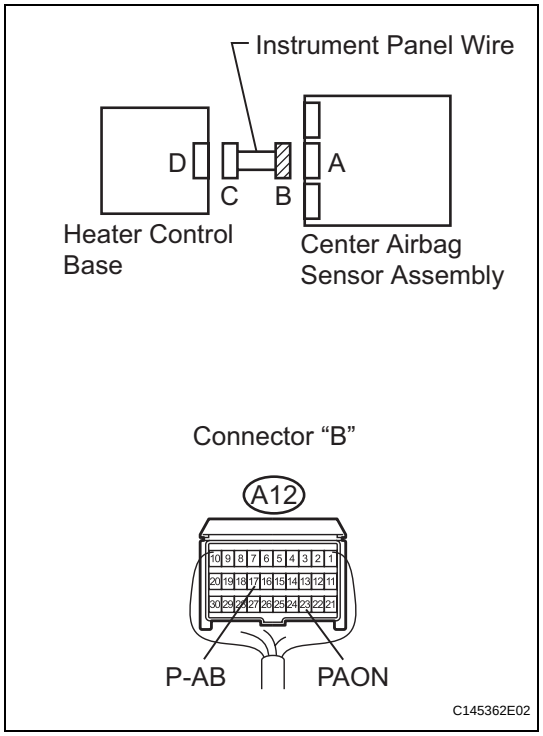
(a) Disconnect the service wire from connector "B".
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
A12-23 (PAON) - A12-17 (P-AB)	Always	1 MΩ or higher

NG → **REPAIR OR 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.

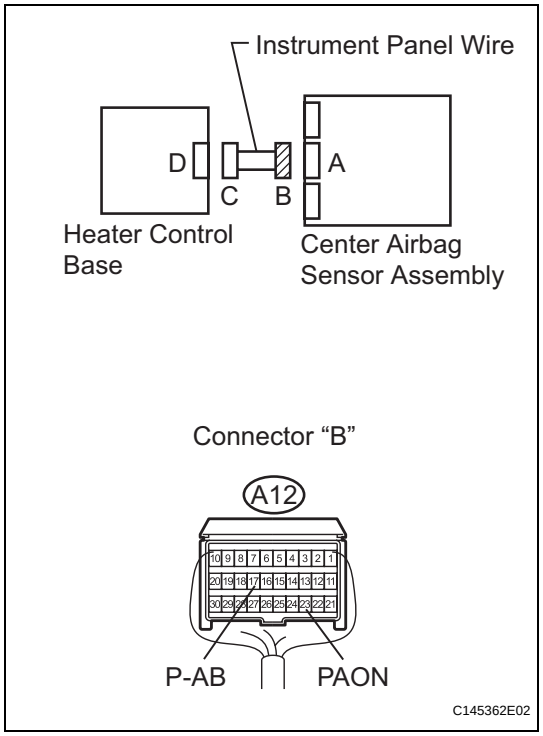
Standard resistance

Tester Connection	Condition	Specified Condition
A12-23 (PAON) - Body ground	Always	1 MΩ or higher
A12-17 (P-AB) - Body ground	Always	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

9 CHECK INSTRUMENT PANEL WIRE (SHORT TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
A12-23 (PAON) - Body ground	Ignition switch ON	Below 1 V
A12-17 (P-AB) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

REPLACE HEATER CONTROL BASE

RS

10	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the center airbag sensor assembly and the heater control base.
OK:
The connectors are properly connected.

NG → **CONNECT CONNECTORS PROPERLY**

OK

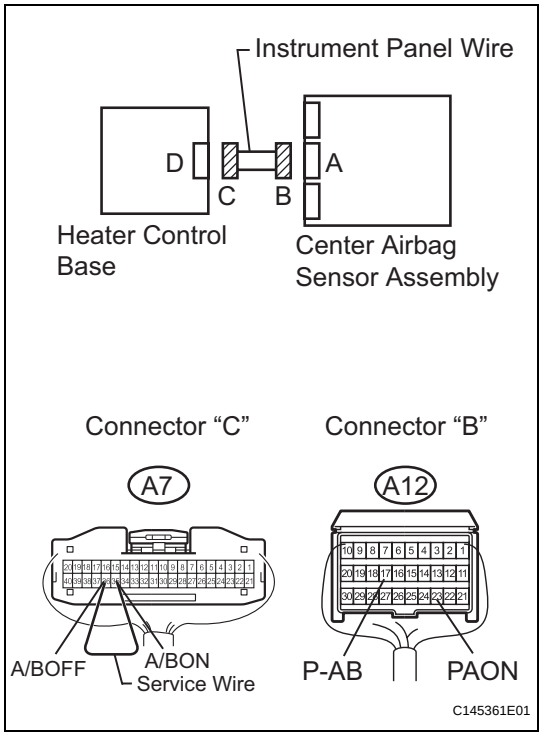
11	CHECK CONNECTORS

(a) Disconnect the connectors from the center airbag sensor assembly and the heater control base.
(b) Check that the connectors (on the center airbag sensor assembly side and heater control base side) are not damaged.
OK:
The connectors are not deformed or damaged.

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

12	CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Disconnect the connectors from the steering pad.
(b) Disconnect the connectors from the front passenger airbag assembly.
(c) Disconnect the connector from the driver side knee airbag assembly.
(d) with Side and Curtain Shield Airbag:
Disconnect the connector from the front seat side airbag assembly LH.
(e) with Side and Curtain Shield Airbag:
Disconnect the connector from the front seat side airbag assembly RH.
(f) with Side and Curtain Shield Airbag:
Disconnect the connector from the curtain shield airbag assembly LH.
(g) with Side and Curtain Shield Airbag:
Disconnect the connector from the curtain shield airbag assembly RH.
(h) Disconnect the connector from the front seat outer belt assembly LH.
(i) Disconnect the connector from the front seat outer belt assembly RH.
(j) Using a service wire, connect A7-35 (A/BON) and A7-36 (A/BOFF) of connector "B".
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(k) Measure the resistance according to the value(s) in the table below.
Standard resistance

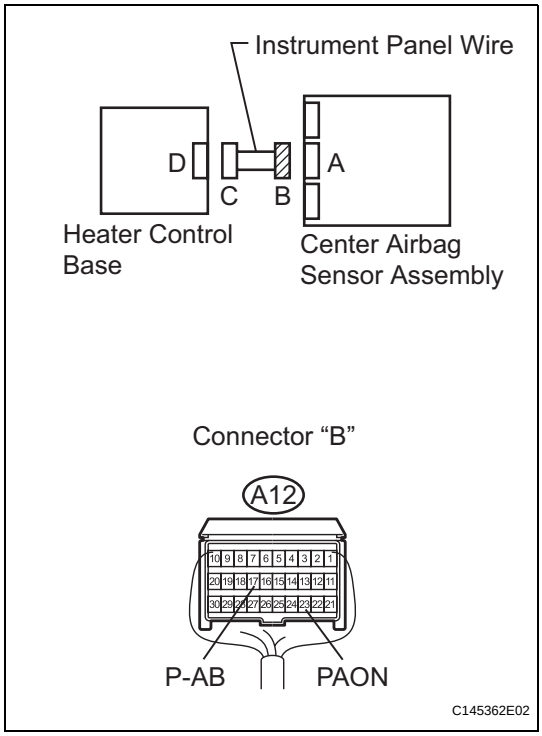
Tester Connection	Condition	Specified Condition
A12-23 (PAON) - A12-17 (P-AB)	Always	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

RS

13 CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the service wire from connector "B".
(b) Measure the resistance according to the value(s) in the table below.

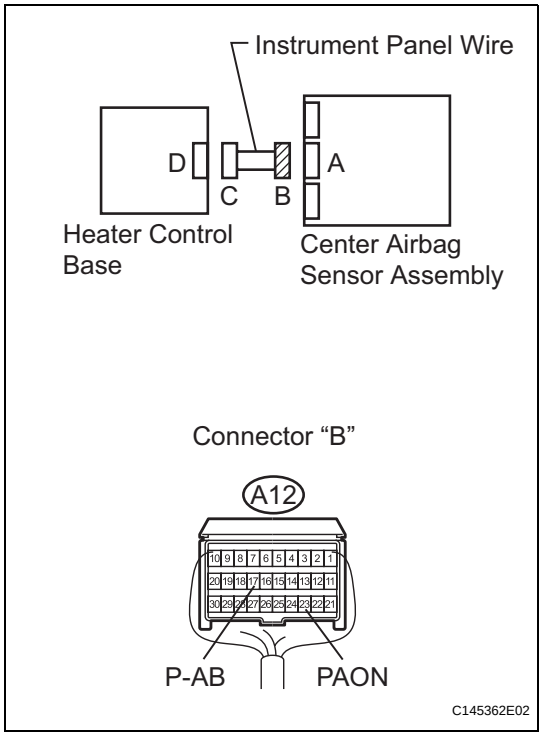
Standard resistance

Tester Connection	Condition	Specified Condition
A12-23 (PAON) - A12-17 (P-AB)	Always	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

14 CHECK INSTRUMENT PANEL WIRE (SHORT TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

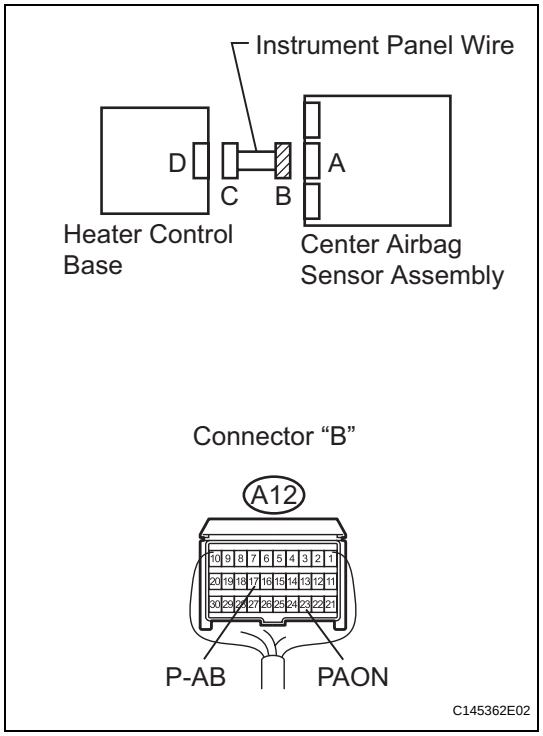
Standard resistance

Tester Connection	Condition	Specified Condition
A12-23 (PAON) - Body ground	Always	1 MΩ or higher
A12-17 (P-AB) - Body ground	Always	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

15 CHECK INSTRUMENT PANEL WIRE (SHORT TO B+)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

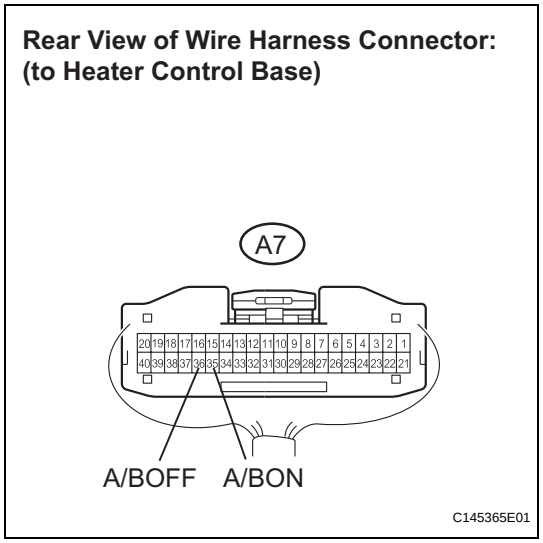
Standard voltage

Tester Connection	Condition	Specified Condition
A12-23 (PAON) - Body ground	Ignition switch ON	Below 1 V
A12-17 (P-AB) - Body ground	Ignition switch ON	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

16 CHECK WIRE HARNESS (HEATER CONTROL BASE - BATTERY)



(a) Connect the connectors to the center airbag sensor assembly.
(b) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

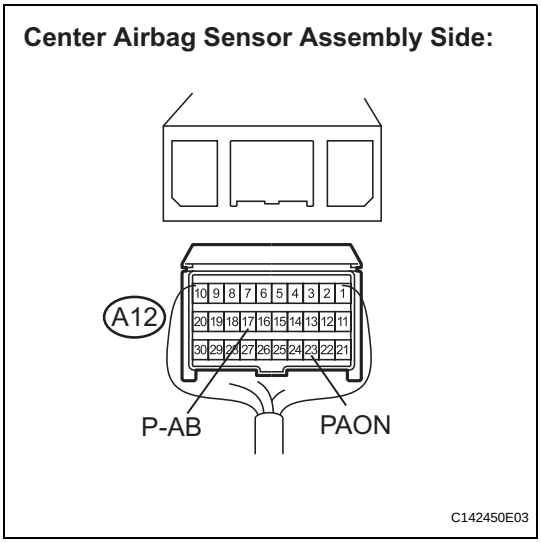
Standard voltage

Tester Connection	Condition	Specified Condition
A7-20 (IG) -Body ground	Ignition switch ON	10 to 14 V

NG → **REPAIR OR REPLACE WIRE HARNESS (HEATER CONTROL BASE - BATTERY)**

OK

17 CHECK PASSENGER AIRBAG ON / OFF INDICATOR



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connector to the heater control base.
(d) Disconnect the connectors from the center airbag sensor assembly.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position.
(g) Check the indicator according to the conditions in the table below.

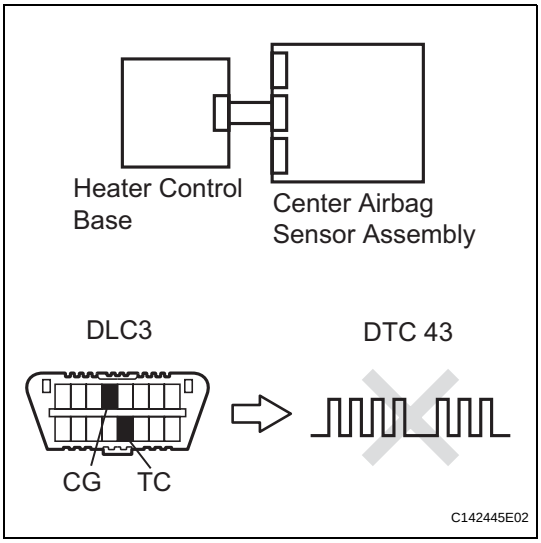
Result

Tester Connection	Condition	Passenger airbag ON/ OFF indicator
A12-23 (PAON) - Body ground	Ignition switch ON	"ON" comes on
A12-17 (P-AB) - Body ground	Ignition switch ON	"OFF" comes on

NG → **REPLACE HEATER CONTROL BASE**

OK

18 CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connectors to the center airbag sensor assembly.
(d) Connect the negative (-) terminal cable to the battery and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in the memory (See page RS-18).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check for DTCs (See page RS-18).

OK:

DTC B1660/43 is not output.

HINT:

Codes other than DTC B1660/43 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

USE SIMULATION METHOD TO CHECK

DTC	B1800/51	Short in Driver Side Squib Circuit

DTC	B1801/51	Open in Driver Side Squib Circuit

RS

DTC	B1802/51	Short to GND in Driver Side Squib Circuit

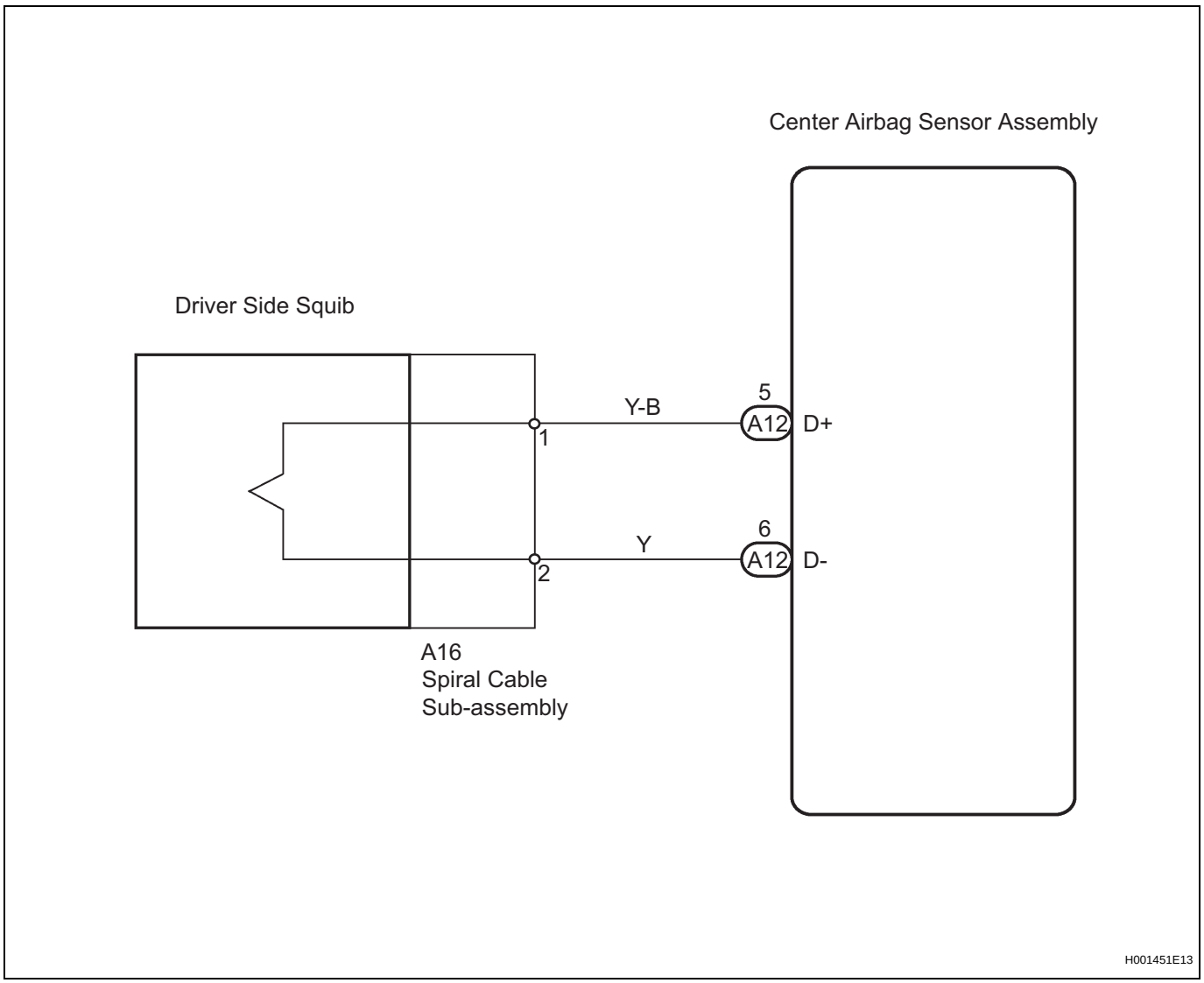
DTC	B1803/51	Short to B+ in Driver Side Squib Circuit

DESCRIPTION

The driver side squib circuit consists of the center airbag sensor, the spiral cable and the horn button. The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the driver side squib circuit.

DTC No.	DTC Detection Condition	Trouble Area
B1800/51	• The center airbag sensor assembly receives a line short circuit signal 5 times in the driver side squib circuit during primary check.	• Horn button assembly (driver side squib) • Spiral cable sub-assembly • Center airbag sensor assembly • Instrument panel wire
B1801/51	• The center airbag sensor assembly receives an open circuit signal in the driver side squib circuit for 2 seconds.	• Horn button assembly (driver side squib) • Spiral cable sub-assembly • Center airbag sensor assembly • Instrument panel wire
B1802/51	• The center airbag sensor assembly receives a short circuit to ground signal in the driver side squib circuit for 0.5 seconds.	• Horn button assembly (driver side squib) • Spiral cable sub-assembly • Center airbag sensor assembly • Instrument panel wire
B1803/51	• The center airbag sensor assembly receives a B+ short circuit signal in the driver side squib circuit for 0.5 seconds.	• Horn button assembly (driver side squib) • Spiral cable sub-assembly • Center airbag sensor assembly • Instrument panel wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester (read the 5-digit of DTC):
Using the intelligent tester, check for DTCs (see page RS-18).
Result

Result	Proceed to
DTC B1800 is output.	A
DTC B1801 is output.	B
DTC B1802 is output.	C
DTC B1803 is output.	D

(2) If not using the intelligent tester (read the 2-digit of DTC):

Check for DTCs (see page RS-18).

Result

Result	Proceed to
DTC 51 is output.	E

RS

B	Go to step 4
C	Go to step 5
D	Go to step 6
E	Go to step 7

A

2 CHECK CONNECTOR

(a) Check that the spiral cable connectors (on the horn button side) are not damaged.

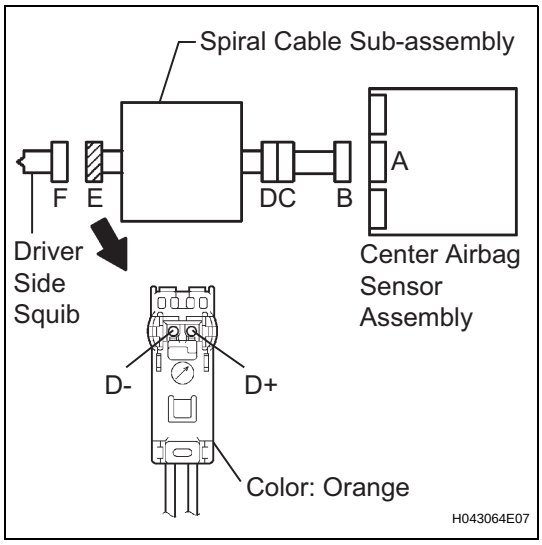
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG	REPLACE SPIRAL CABLE SUB-ASSEMBLY

OK

3 CHECK DRIVER SIDE SQUIB CIRCUIT (SHORT)



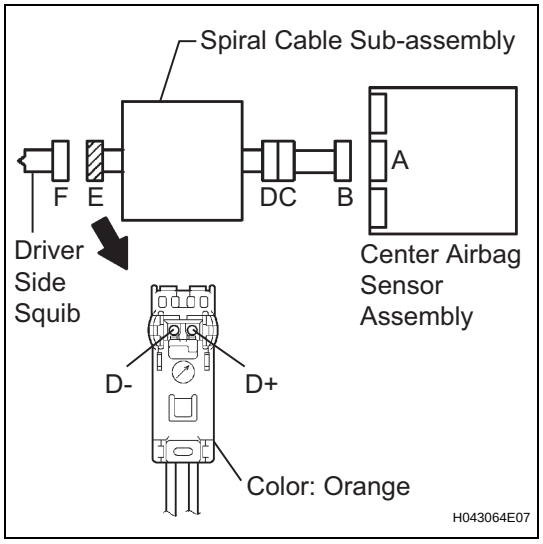
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the horn button.
(e) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D+ - D-	1 MΩ or higher

OK	Go to step 10
NG	Go to step 13

4 CHECK DRIVER SIDE SQUIB CIRCUIT (OPEN)



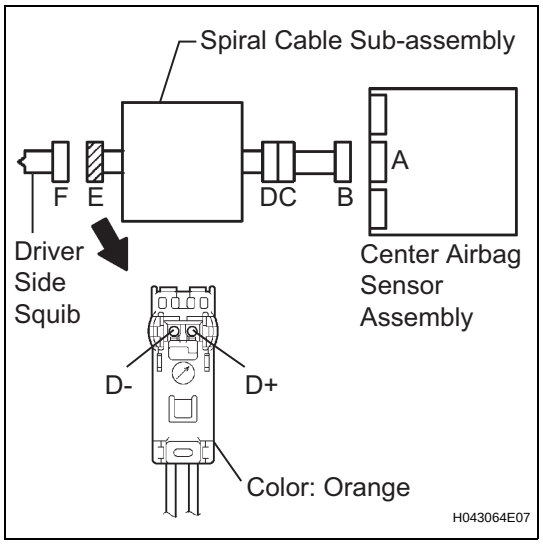
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the horn button.
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D+ - D-	Below 1 Ω

OK	Go to step 11
NG	Go to step 15

5 CHECK DRIVER SIDE SQUIB CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the horn button.
(e) Measure the resistance according to the value(s) in the table below.

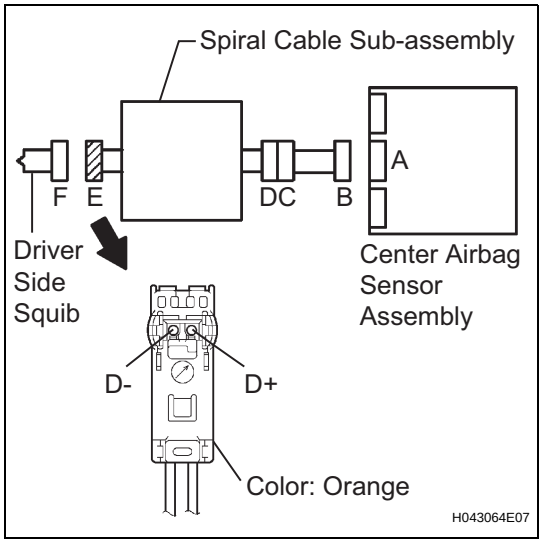
Standard resistance

Tester Connection	Specified Condition
D+ - Body ground	1 MΩ or higher
D- - Body ground	1 MΩ or higher

OK	Go to step 11
NG	Go to step 17

RS

6	CHECK DRIVER SIDE SQUIB CIRCUIT (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the horn button.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position.
(g) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
D+ - Body ground	Below 1 V
D- - Body ground	Below 1 V

(h) Before proceeding to the next step, perform the following procedures.
(1) Turn the ignition switch to the LOCK position.
(2) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

OK	Go to step 11
NG	Go to step 19

7	CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the spiral cable connectors (on the horn button side) are not damaged.

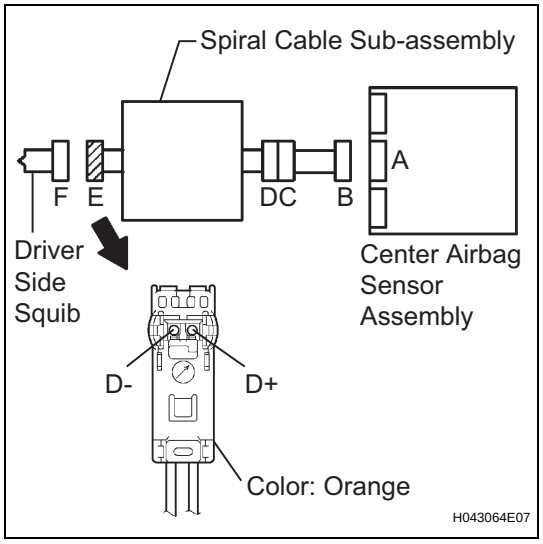
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG	REPLACE SPIRAL CABLE SUB-ASSEMBLY

OK

8	CHECK DRIVER SIDE SQUIB CIRCUIT



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connectors from the horn button.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
D+ - Body ground	Below 1 V
D- - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D+ - D-	Below 1 Ω
D+ - Body ground	1 MΩ or higher
D- - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

Standard resistance

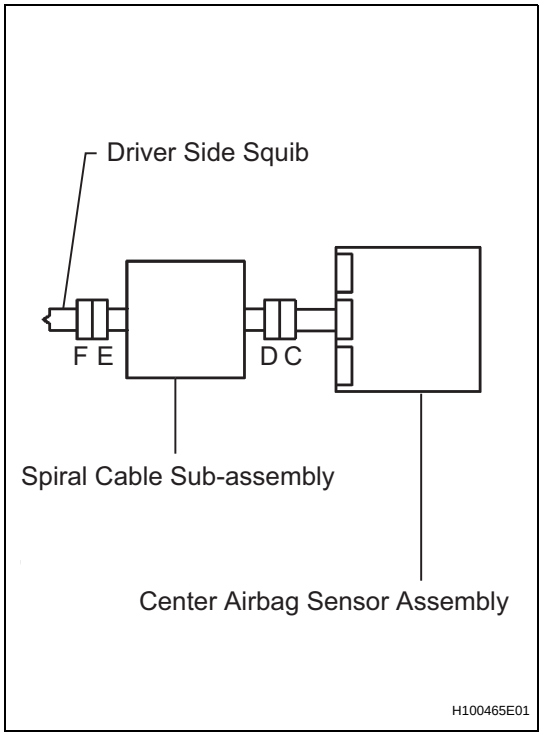
Tester Connection	Specified Condition
D+ - D-	1 MΩ or higher

NG → **Go to step 21**

OK

RS

9	REPLACE HORN BUTTON ASSEMBLY (DRIVER SIDE SQUIB)



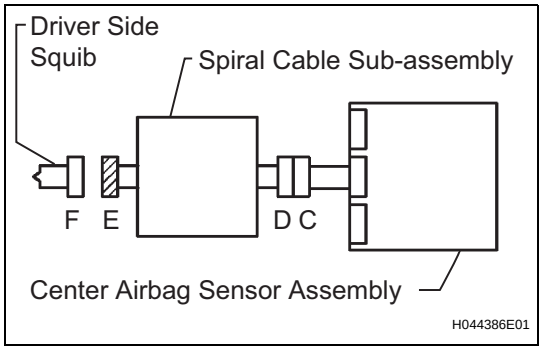
(a) Replace the horn button and connect the connectors.
HINT:
Perform the inspection using parts from a normal vehicle if possible.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC 51 is not output
HINT:
Codes other than code 51 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

10	CHECK CENTER AIRBAG SENSOR ASSEMBLY

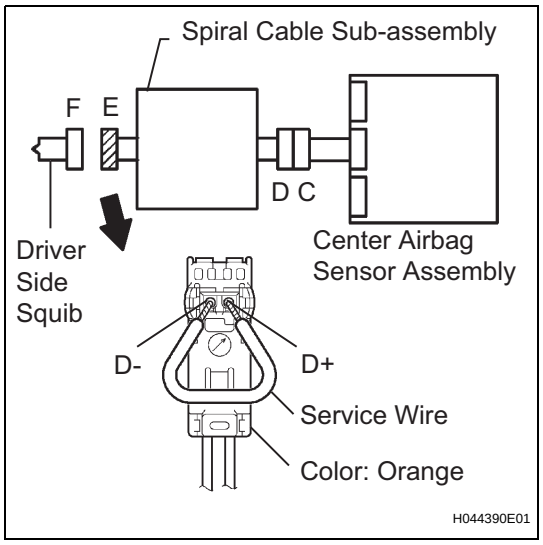


(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1800 is not output.
HINT:
Codes other than code B1800 may be output at this time, but they are not related to this check.

OK → **Go to step 12**

NG → REPLACE CENTER AIRBAG SENSOR ASSEMBLY

11 CHECK CENTER AIRBAG SENSOR ASSEMBLY



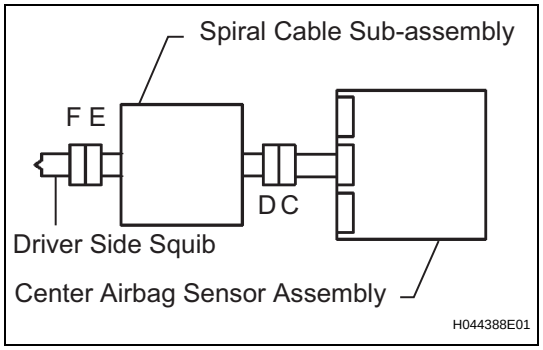
(a) Connect the connectors to the center airbag sensor.
(b) Using a service wire, connect D+ and D- of connector "E".
NOTICE:
- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch on the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1801, B1802 or B1803 is not output.
HINT:
Codes other than code B1801, B1802 or B1803 may be output at this time, but they are not related to this check.
(i) Before proceeding to the next step, perform the following procedures.
(1) Disconnect the service wire from connector "E".

NG → REPLACE CENTER AIRBAG SENSOR ASSEMBLY

OK

12 CHECK HORN BUTTON ASSEMBLY (DRIVER SIDE SQUIB)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connectors to the horn button.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page RS-18).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check for DTCs (see page RS-18).
OK:
DTC B1800, B1801, B1802 or B1803 is not output.

HINT:
Codes other than code B1800, B1801, B1802 or B1803 may be output at this time, but they are not related to this check.

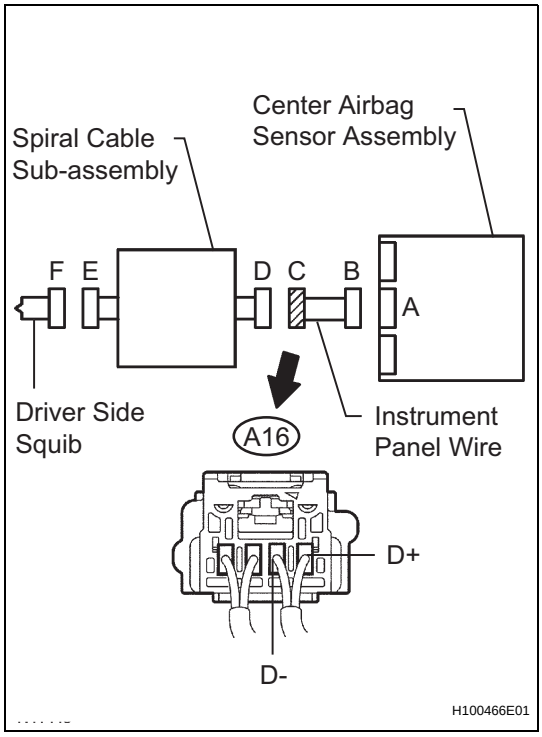
NG → **REPLACE HORN BUTTON ASSEMBLY**

RS

OK

PERFORM SYMPTOM SIMULATION

13 CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the instrument panel wire connector from the spiral cable.
HINT:
The activation prevention mechanism of connector "B" has already been released.

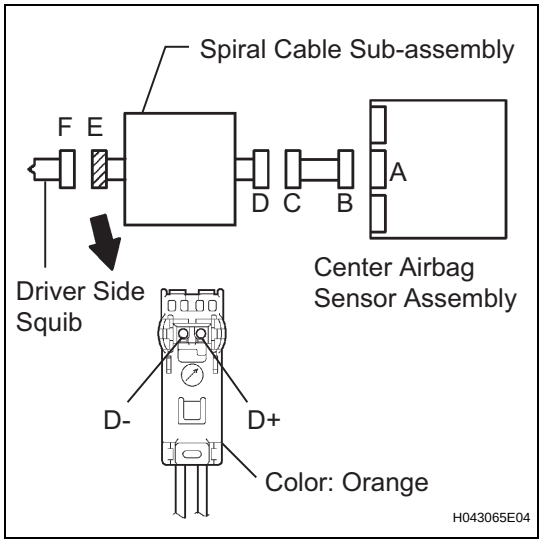
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
A16-1 (D+) - A16-2 (D-)	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

14 CHECK SPIRAL CABLE SUB-ASSEMBLY (SHORT)



(a) Release the activation prevention mechanism built into connector "D" (see page RS-11).
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

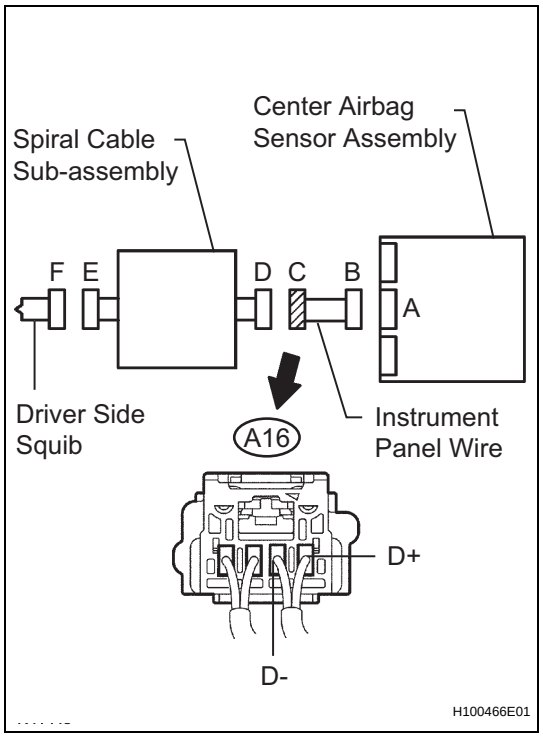
Tester Connection	Specified Condition
D+ - D-	1 MΩ or higher

NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

15 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Disconnect the instrument panel wire connector from the spiral cable.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

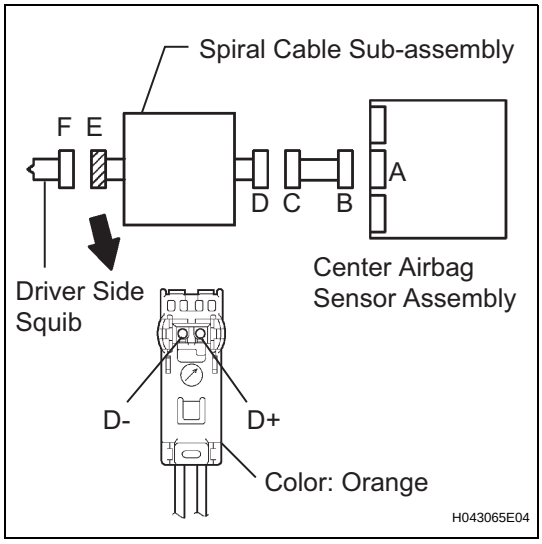
Tester Connection	Specified Condition
A16-1 (D+) - A16-2 (D-)	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

RS

16	CHECK SPIRAL CABLE SUB-ASSEMBLY (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

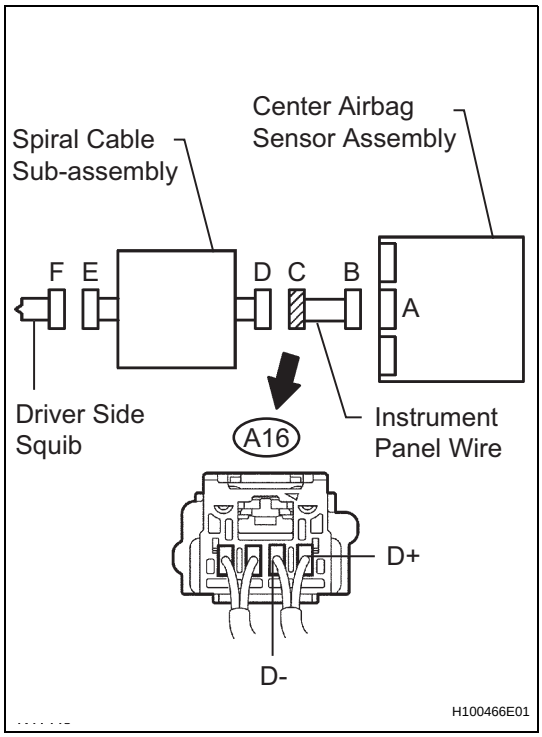
Tester Connection	Specified Condition
D+ - D-	Below 1 Ω

NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

17	CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Disconnect the instrument panel wire connector from the spiral cable.

(b) Measure the resistance according to the value(s) in the table below.

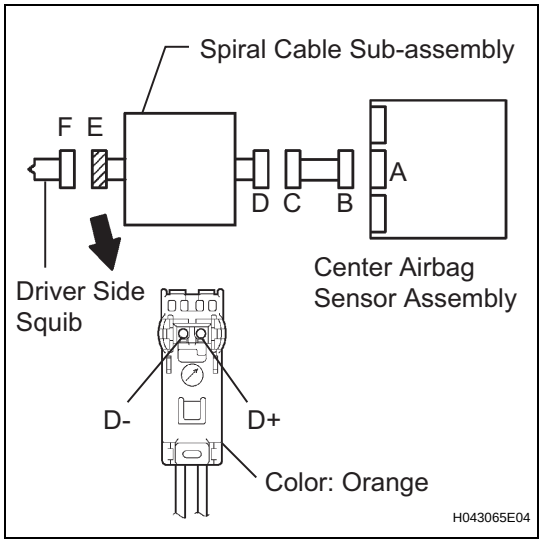
Standard resistance

Tester Connection	Specified Condition
A16-1 (D+) - Body ground	1 MΩ or higher
A16-2 (D-) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

18 CHECK SPIRAL CABLE SUB-ASSEMBLY (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

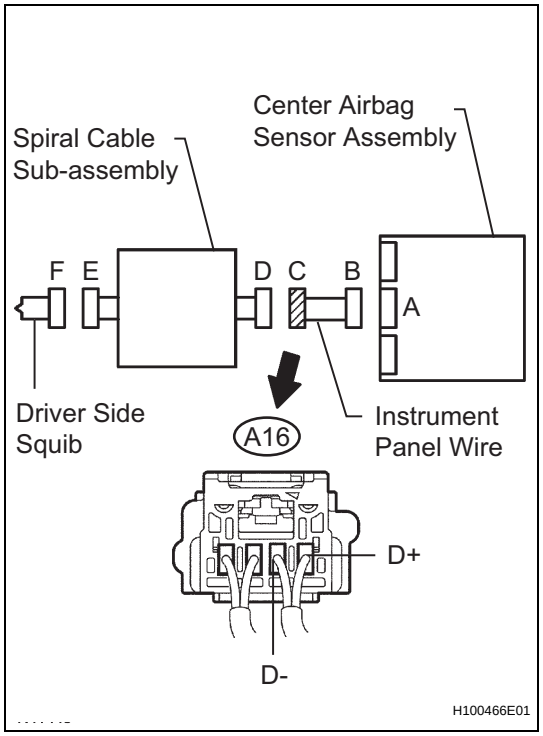
Tester Connection	Specified Condition
D+ - Body ground	1 MΩ or higher
D- - Body ground	1 MΩ or higher

NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

19 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the instrument panel wire connector from the spiral cable.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

Standard voltage

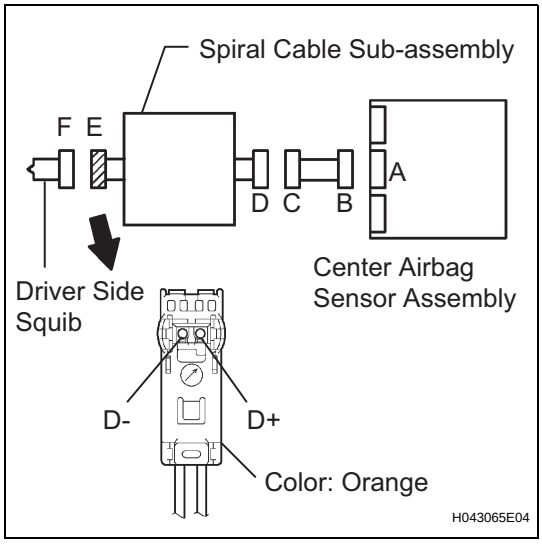
Tester Connection	Specified Condition
A16-1 (D+) - Body ground	Below 1 V
A16-2 (D-) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

RS

20 CHECK SPIRAL CABLE SUB-ASSEMBLY (TO B+)



(a) Measure the resistance according to the value(s) in the table below.

Standard voltage

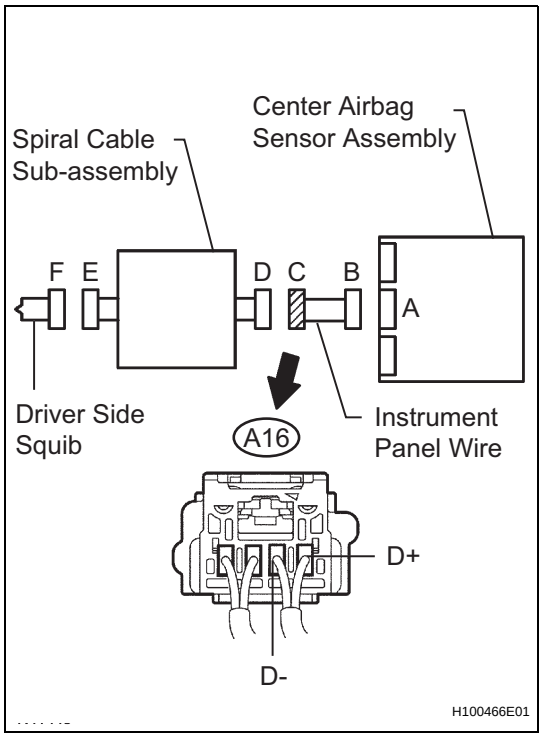
Tester Connection	Specified Condition
D+ - Body ground	Below 1 V
D- - Body ground	Below 1 V

NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

21 CHECK INSTRUMENT PANEL WIRE



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Disconnect the instrument panel wire connector from the spiral cable.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
A16-1 (D+) - Body ground	Below 1 V
A16-2 (D-) - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A16-1 (D+) - A16-2 (D-)	Below 1 Ω
A16-1 (D+) - Body ground	1 MΩ or higher
A16-2 (D-) - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

Standard resistance

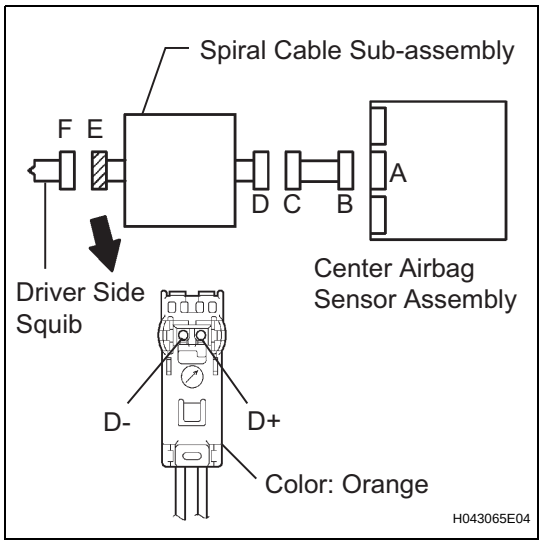
Tester Connection	Specified Condition
A16-1 (D+) - A16-2 (D-)	1 MΩ or higher

RS

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

22 CHECK SPIRAL CABLE SUB-ASSEMBLY



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
D+ - Body ground	Below 1 V
D- - Body ground	Below 1 V

(d) Turn the ignition switch to the LOCK position.
(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D+ - D-	Below 1 Ω
D+ - Body ground	1 MΩ or higher
D- - Body ground	1 MΩ or higher

(g) Release the activation prevention mechanism built into connector "D" (see page RS-11).
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D+ - D-	1 MΩ or higher

NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

DTC	B1805/52	Short in Front Passenger Side Squib Circuit

DTC	B1806/52	Open in Front Passenger Side Squib Circuit

RS

DTC	B1807/52	Short to GND in Front Passenger Side Squib Circuit

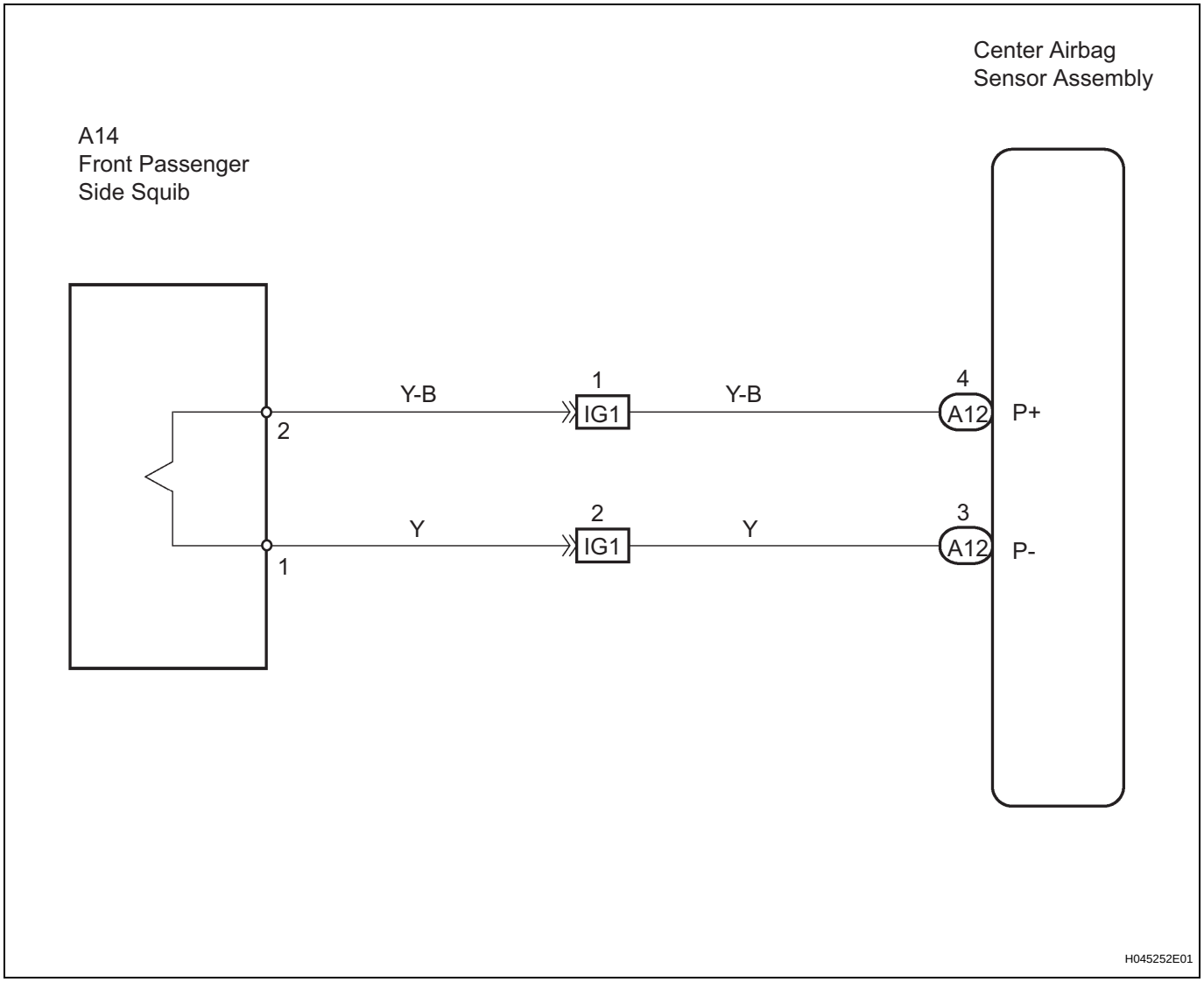
DTC	B1808/52	Short to B+ in Front Passenger Side Squib Circuit

DESCRIPTION

The front passenger side squib circuit consists of the center airbag sensor and the front passenger airbag. The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the front passenger side squib circuit.

DTC No.	DTC Detection Condition	Trouble Area
B1805/52	• The center airbag sensor assembly receives a line short circuit signal 5 times in the front passenger side squib circuit during primary check.	• Instrument panel wire • Instrument panel wire assembly • Front passenger airbag assembly (front passenger side squib) • Center airbag sensor assembly
B1806/52	• The center airbag sensor assembly receives an open circuit signal in the front passenger side squib circuit for 2 seconds.	• Instrument panel wire • Instrument panel wire assembly • Front passenger airbag assembly (front passenger side squib) • Center airbag sensor assembly
B1807/52	• The center airbag sensor assembly receives a short circuit to ground signal in the front passenger side squib circuit for 0.5 seconds.	• Instrument panel wire • Instrument panel wire assembly • Front passenger airbag assembly (front passenger side squib) • Center airbag sensor assembly
B1808/52	• The center airbag sensor assembly receives a B+ short circuit signal in the front passenger side squib circuit for 0.5 seconds.	• Instrument panel wire • Instrument panel wire assembly • Front passenger airbag assembly (front passenger side squib) • Center airbag sensor assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester (read the 5-digit of DTC):
Using the intelligent tester, check for DTCs (see page RS-18).
Result

Result	Proceed to
DTC B1805 is output.	A
DTC B1806 is output.	B
DTC B1807 is output.	C
DTC B1808 is output.	D

(2) If not using the intelligent tester (read the 2-digit of DTC):

Check for DTCs (see page RS-18).

Result

Result	Proceed to
DTC 52 is output.	E

RS

B	**Go to step 4**
C	**Go to step 5**
D	**Go to step 6**
E	**Go to step 7**

A

2 CHECK CONNECTOR

(a) Check that the instrument panel wire connectors (on the front passenger airbag side) are not damaged.

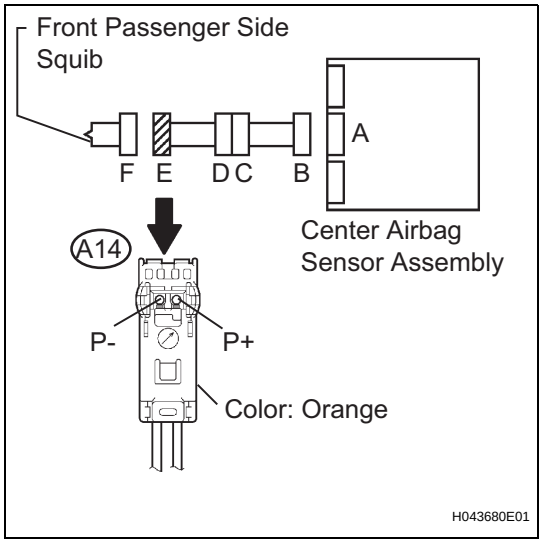
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG	**REPAIR OR REPLACE INSTRUMENT PANEL WIRE ASSEMBLY**

OK

3 CHECK FRONT PASSENGER SIDE SQUIB CIRCUIT (SHORT)



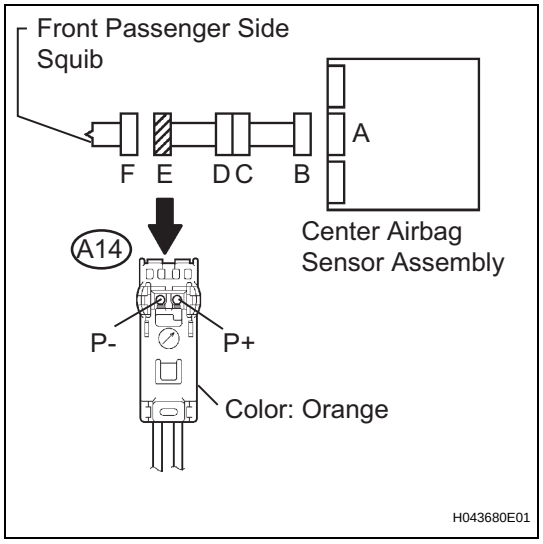
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the front passenger airbag.
(e) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A14-2 (P+) - A14-1 (P-)	1 MΩ or higher

OK	**Go to step 10**
NG	**Go to step 13**

4 CHECK FRONT PASSENGER SIDE SQUIB CIRCUIT (OPEN)



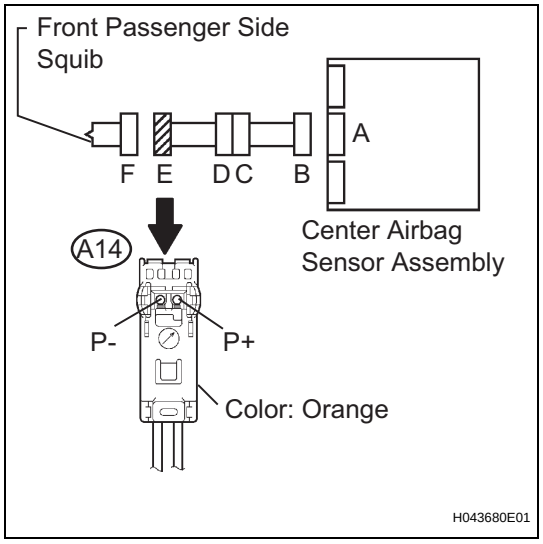
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the front passenger airbag.
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A14-2 (P+) - A14-1 (P-)	Below 1 Ω

OK	Go to step 11
NG	Go to step 15

5 CHECK FRONT PASSENGER SIDE SQUIB CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the front passenger airbag.
(e) Measure the resistance according to the value(s) in the table below.

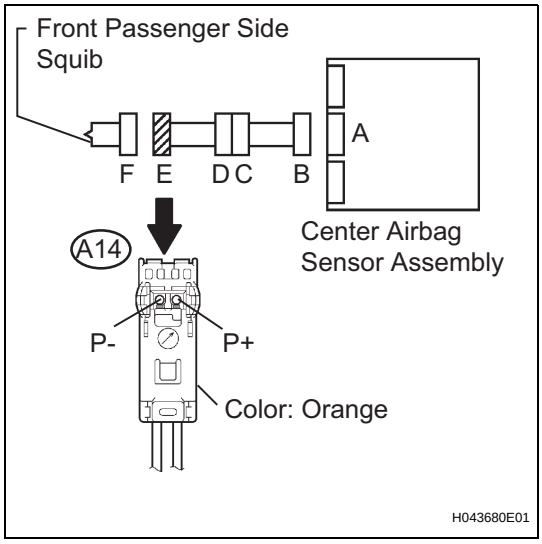
Standard resistance

Tester Connection	Specified Condition
A14-2 (P+) - Body ground	1 MΩ or higher
A14-1 (P-) - Body ground	1 MΩ or higher

OK	Go to step 11
NG	Go to step 17

RS

6	CHECK FRONT PASSENGER SIDE SQUIB CIRCUIT (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the front passenger airbag.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position.
(g) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
A14-2 (P+) - Body ground	Below 1 V
A14-1 (P-) - Body ground	Below 1 V

(h) Before proceeding to the next step, perform the following procedures.
(1) Turn the ignition switch to the LOCK position.
(2) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

OK	Go to step 11
NG	Go to step 19

7	CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the instrument panel wire connectors (on the front passenger airbag side) are not damaged.

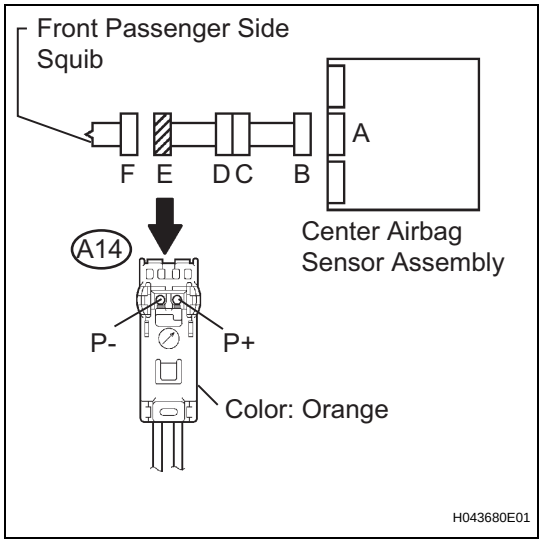
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG	REPAIR OR REPLACE INSTRUMENT PANEL WIRE ASSEMBLY

OK

8 CHECK FRONT PASSENGER SIDE SQUIB CIRCUIT



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connectors from the front passenger airbag.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
A14-2 (P+) - Body ground	Below 1 V
A14-1 (P-) - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A14-2 (P+) -A14-1 (P-)	Below 1 Ω
A14-2 (P+) - Body ground	1 MΩ or higher
A14-1 (P-) - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

Standard resistance

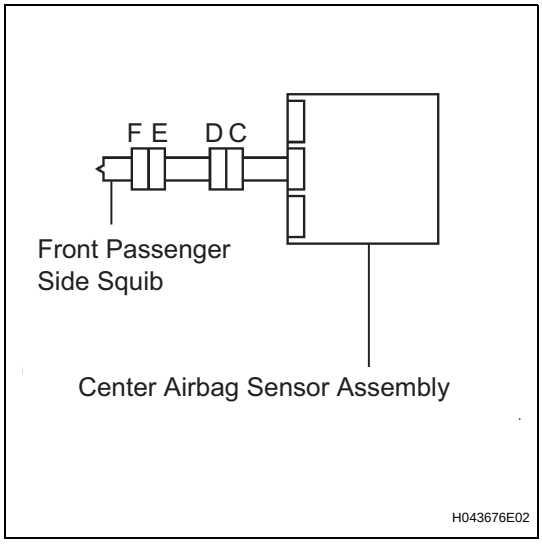
Tester Connection	Specified Condition
A14-2 (P+) - A14-1 (P-)	1 MΩ or higher

NG → **Go to step 21**

OK

RS

9	REPLACE FRONT PASSENGER AIRBAG ASSEMBLY (FRONT PASSENGER SIDE SQUIB)



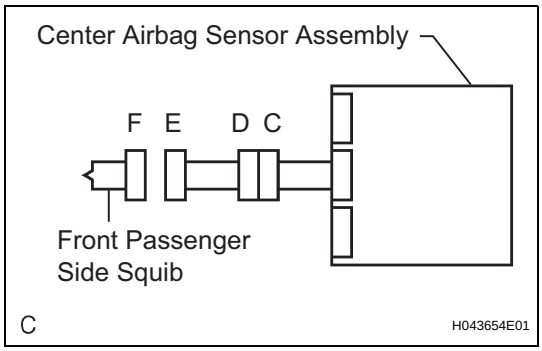
(a) Replace the front passenger airbag and connect the connectors.
HINT:
Perform the inspection using parts from a normal vehicle if possible.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC 52 is not output.
HINT:
Codes other than code 52 may be output at this time, but they are not related to this check.

NG → **REPAIR OR REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

10	CHECK CENTER AIRBAG SENSOR ASSEMBLY

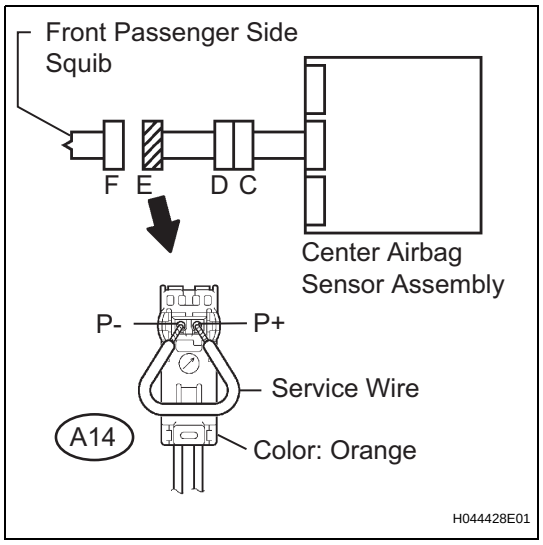


(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1805 is not output.
HINT:
Codes other than code B1805 may be output at this time, but they are not related to this check.

OK → **Go to step 12**

NG → REPLACE CENTER AIRBAG SENSOR ASSEMBLY

11 CHECK CENTER AIRBAG SENSOR ASSEMBLY



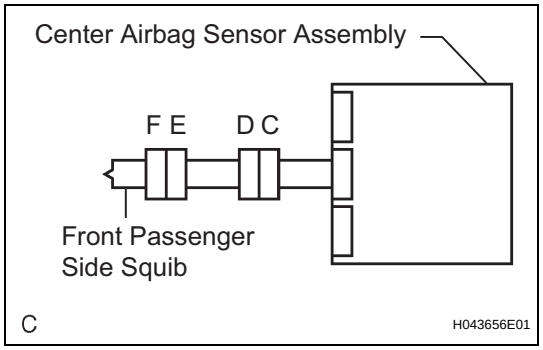
(a) Connect the connectors to the center airbag sensor.
(b) Using a service wire, connect A14-2 (P+) and A14-1 (P-) of connector "E".
NOTICE:
- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch on the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1806, B1807 or B1808 is not output.
HINT:
Codes other than code B1806, B1807 or B1808 may be output at this time, but they are not related to this check.
(i) Before proceeding to the next step, perform the following procedures.
(1) Disconnect the service wire from connector "E".

NG → REPLACE CENTER AIRBAG SENSOR ASSEMBLY

OK

12 CHECK FRONT PASSENGER AIRBAG ASSEMBLY (FRONT PASSENGER SIDE SQUIB)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connector to the front passenger airbag.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page RS-18).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check for DTCs (see page RS-18).
OK:
DTC B1805, B1806, B1807 or B1808 is not output.

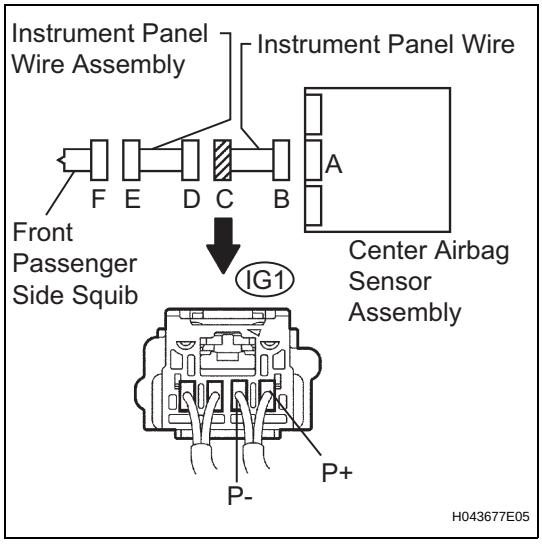
HINT:
Codes other than code B1805, B1806, B1807 or B1808 may be output at this time, but they are not related to this check.

NG → **REPLACE FRONT PASSENGER AIRBAG ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

13 CHECK INSTRUMENT PANEL WIRE (SHORT)



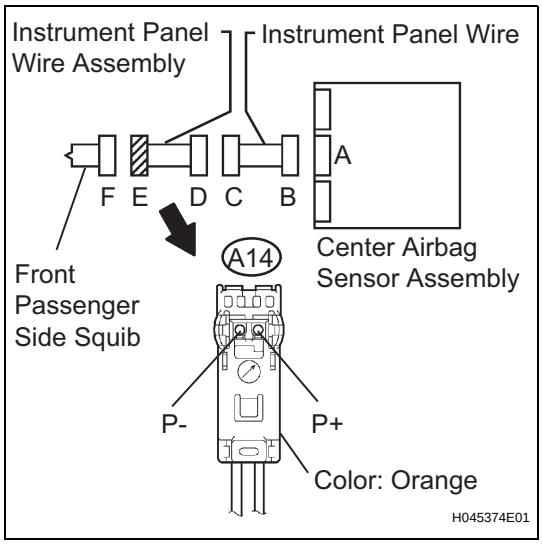
(a) Disconnect the instrument panel wire connector from the instrument panel wire assembly.
HINT:
The activation prevention mechanism of connector "B" has already been released.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
IG1-1 (P+) - IG1-2 (P-)	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

14 CHECK INSTRUMENT PANEL WIRE ASSEMBLY (SHORT)



(a) Release the activation prevention mechanism built into connector "D" (see page RS-11).
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
A14-2 (P+) - A14-1 (P-)	1 MΩ or higher

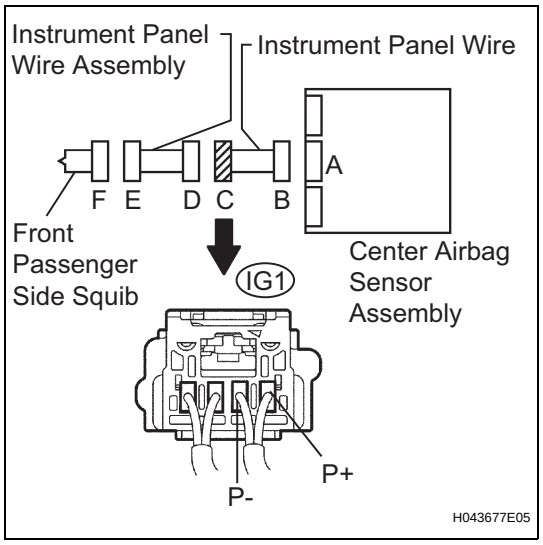
NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

RS

15 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Disconnect the instrument panel wire connector from the instrument panel wire assembly.
(b) Measure the resistance according to the value(s) in the table below.

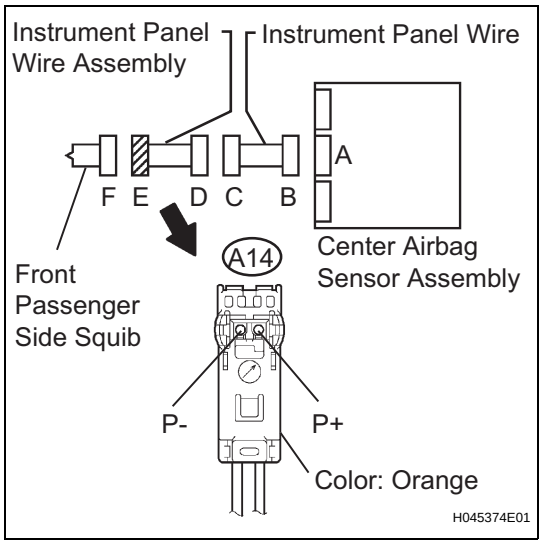
Standard resistance

Tester Connection	Specified Condition
IG1-1 (P+) - IG1-2 (P-)	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

16 CHECK INSTRUMENT PANEL WIRE ASSEMBLY (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A14-2 (P+) - A14-1 (P-)	Below 1 Ω

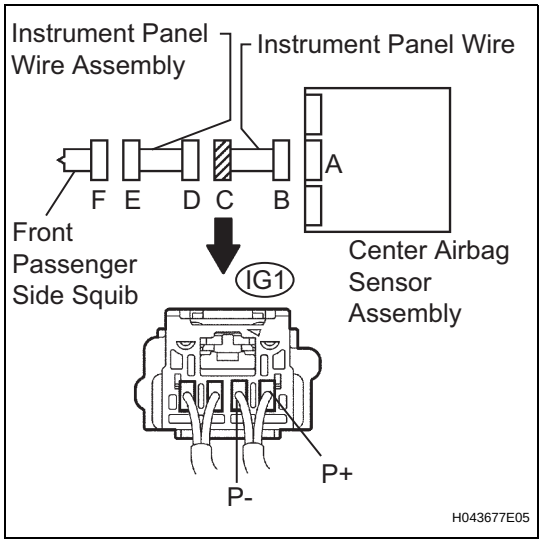
NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

RS

17	CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Disconnect the instrument panel wire connector from the instrument panel wire assembly.
(b) Measure the resistance according to the value(s) in the table below.

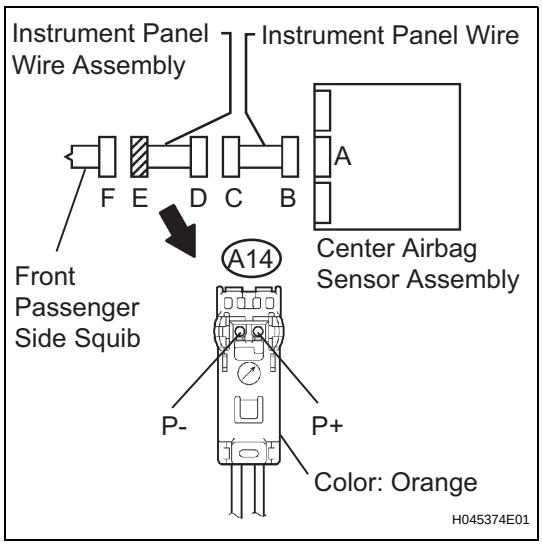
Standard resistance

Tester Connection	Specified Condition
IG1-1 (P+) - Body ground	1 MΩ or higher
IG1-2 (P-) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

18	CHECK INSTRUMENT PANEL WIRE ASSEMBLY (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

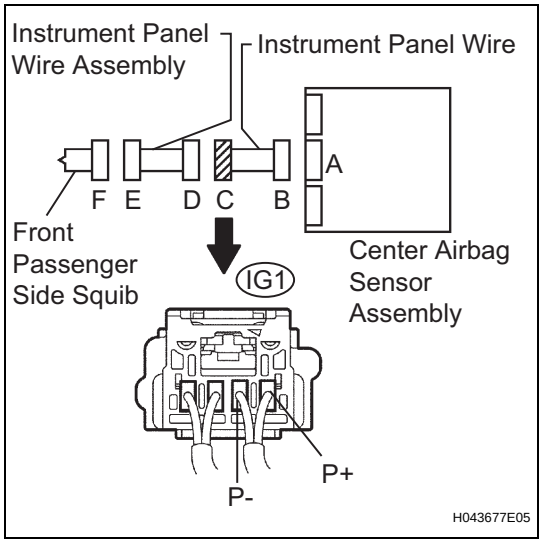
Tester Connection	Specified Condition
A14-2 (P+) - Body ground	1 MΩ or higher
A14-1 (P-) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

19 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the instrument panel wire connector from the instrument panel wire assembly.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

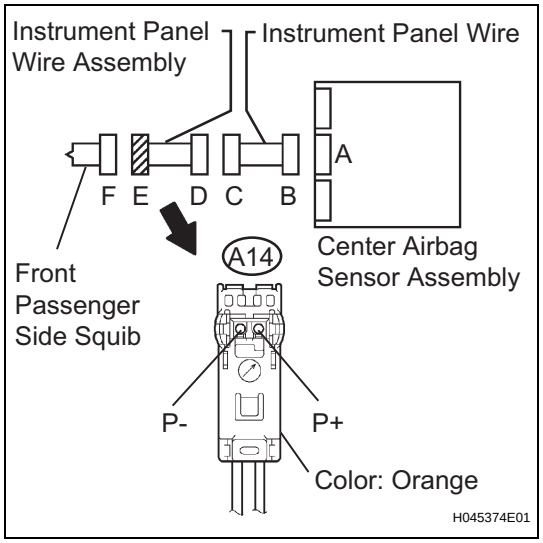
Standard voltage

Tester Connection	Specified Condition
IG1-1 (P+) - Body ground	Below 1 V
IG1-2 (P-) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

20 CHECK INSTRUMENT PANEL WIRE ASSEMBLY (TO B+)



(a) Measure the voltage according to the value(s) in the table below when the ignition switch is in the ON position.

Standard voltage

Tester Connection	Specified Condition
A14-2 (P+) - Body ground	Below 1 V
A14-1 (P-) - Body ground	Below 1 V

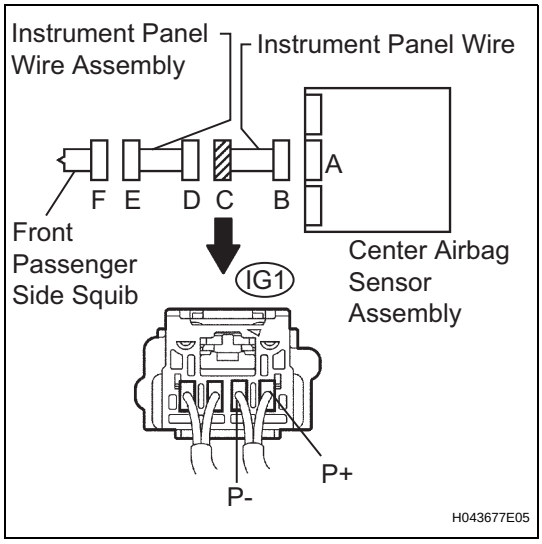
NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

RS

21 CHECK INSTRUMENT PANEL WIRE



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Disconnect the instrument panel wire connector from the instrument panel wire assembly.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
IG1-1 (P+) - Body ground	Below 1 V
IG1-2 (P-) - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
IG1-1 (P+) - IG1-2 (P-)	Below 1 Ω
IG1-1 (P+) - Body ground	1 MΩ or higher
IG1-2 (P-) - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

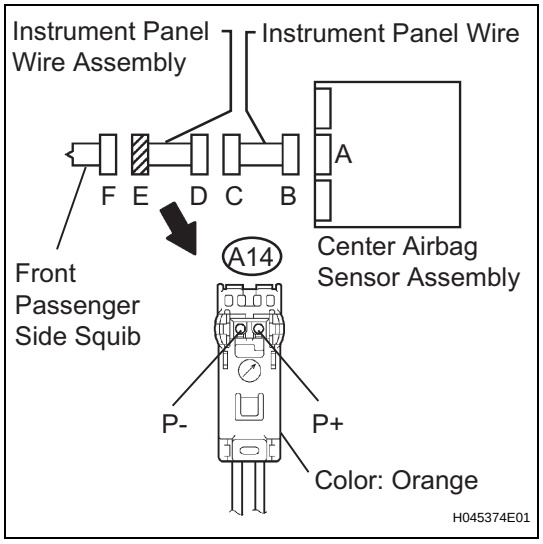
Standard resistance

Tester Connection	Specified Condition
IG1-1 (P+) - IG1-2 (P-)	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

22 CHECK INSTRUMENT PANEL WIRE ASSEMBLY



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
A14-2 (P+) - Body ground	Below 1 V
A14-1 (P-) - Body ground	Below 1 V

(d) Turn the ignition switch to the LOCK position.
(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A14-2 (P+) - A14-1 (P-)	Below 1 Ω
A14-2 (P+) - Body ground	1 MΩor higher
A14-1 (P-) - Body ground	1 MΩor higher

(g) Release the activation prevention mechanism built into connector "D" (see page RS-11).
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A14-2 (P+) - A14-1 (P-)	1 MΩor higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

DTC	B1810/53	Short in Driver Side Squib 2nd Step Circuit

DTC	B1811/53	Open in Driver Side Squib 2nd Step Circuit

DTC	B1812/53	Short to GND in Driver Side Squib 2nd Step Circuit

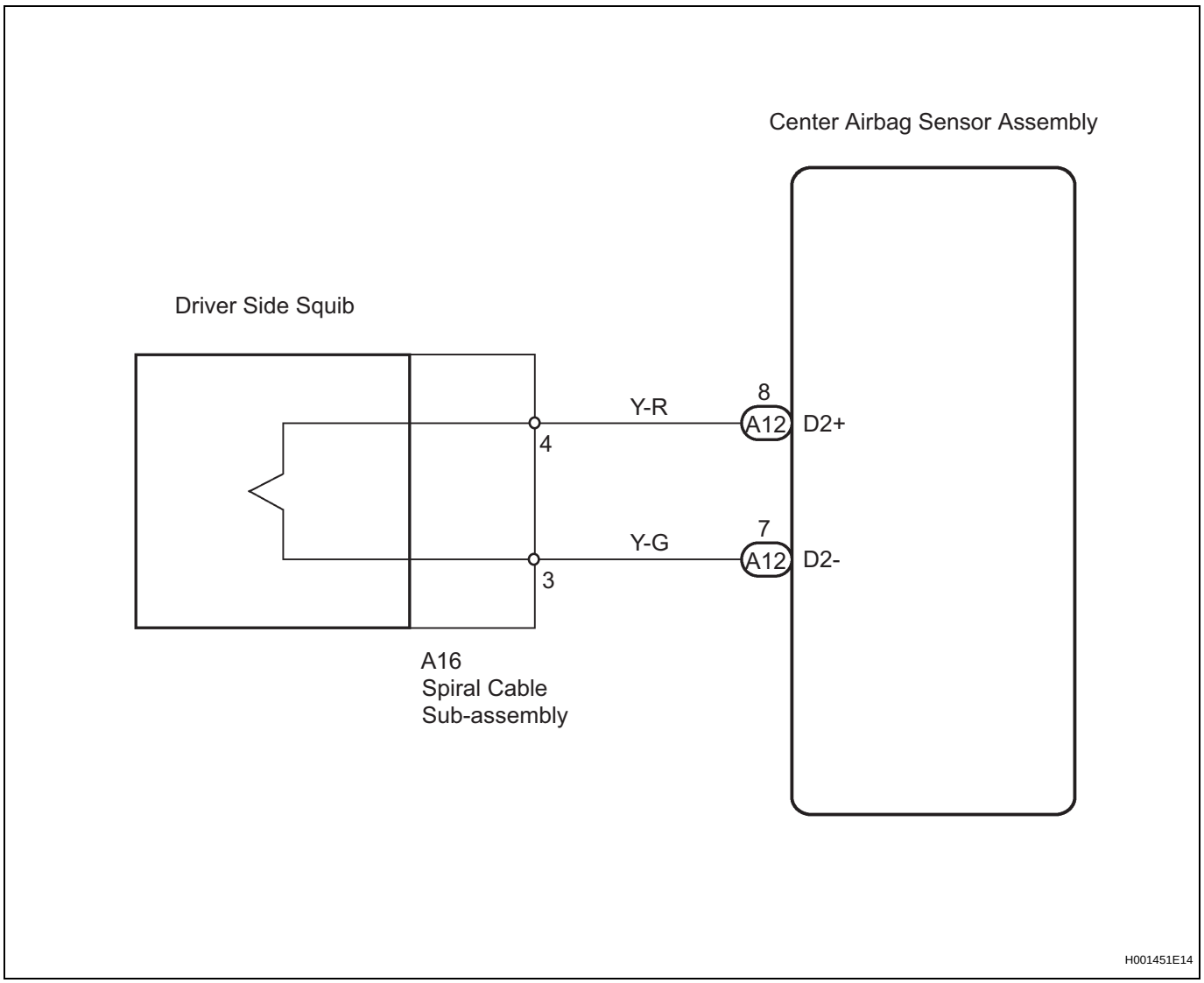
DTC	B1813/53	Short to B+ in Driver Side Squib 2nd Step Circuit

DESCRIPTION

The driver side squib (dual stage - 2nd step) circuit consists of the center airbag sensor, the spiral cable and the horn button.
The circuit instructs the SRS to deploy when deployment conditions are met.
These DTCs are recorded when a malfunction is detected in the driver side squib (dual stage - 2nd step) circuit.

DTC No.	DTC Detection Condition	Trouble Area
B1810/53	• The center airbag sensor assembly receives a line short circuit signal 5 times in the driver side squib (dual stage - 2nd step) circuit during primary check.	• Horn button assembly (driver side squib, dual stage - 2nd step) • Spiral cable sub-assembly • Center airbag sensor assembly • Instrument panel wire
B1811/53	• The center airbag sensor assembly receives an open circuit signal in the driver side squib (dual stage - 2nd step) circuit for 2 seconds.	• Horn button assembly (driver side squib, dual stage - 2nd step) • Spiral cable sub-assembly • Center airbag sensor assembly • Instrument panel wire
B1812/53	• The center airbag sensor assembly receives a short circuit to ground signal in the driver side squib (dual stage - 2nd step) circuit for 0.5 seconds.	• Horn button assembly (driver side squib, dual stage - 2nd step) • Spiral cable sub-assembly • Center airbag sensor assembly • Instrument panel wire
B1813/53	• The center airbag sensor assembly receives a B+ short circuit signal in the driver side squib (dual stage - 2nd step) circuit for 0.5 seconds.	• Horn button assembly (driver side squib, dual stage - 2nd step) • Spiral cable sub-assembly • Center airbag sensor assembly • Instrument panel wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester (read the 5-digit of DTC):
Using the intelligent tester, check for DTCs (see page RS-18).
Result

Result	Proceed to
DTC B1810 is output.	A
DTC B1811 is output.	B
DTC B1812 is output.	C
DTC B1813 is output.	D

(2) If not using the intelligent tester (read the 2-digit of DTC):

Check for DTCs (see page RS-18).

Result

Result	Proceed to
DTC 53 is output.	E

RS

B	Go to step 4
C	Go to step 5
D	Go to step 6
E	Go to step 7

A

2 CHECK CONNECTOR

(a) Check that the instrument panel wire connectors (on the front passenger airbag side) are not damaged.

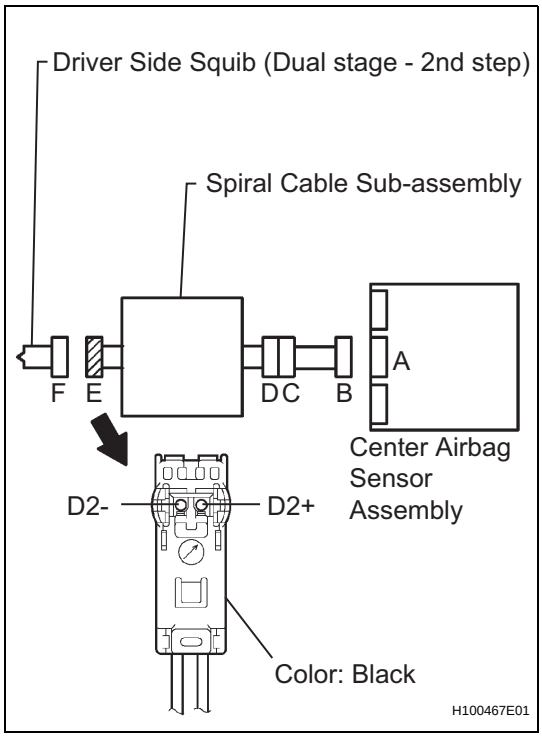
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG	REPLACE SPIRAL CABLE SUB-ASSEMBLY

OK

3 CHECK DRIVER SIDE SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (SHORT)



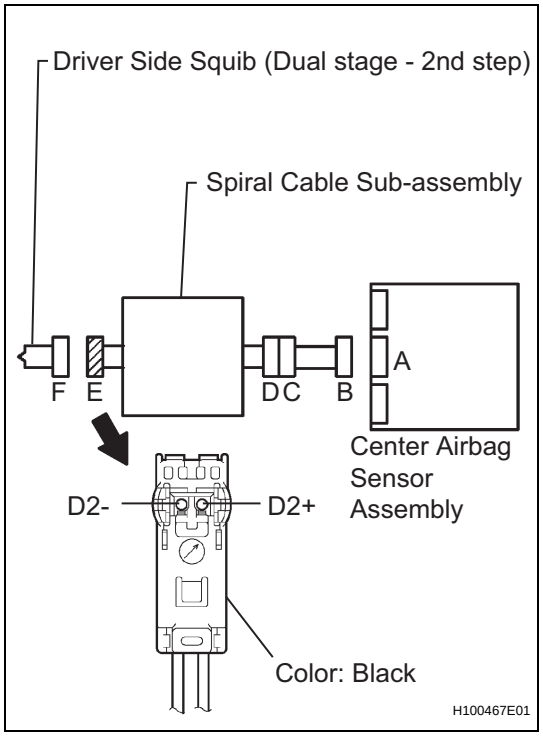
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the horn button.
(e) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D2+ - D2-	1 MΩ or higher

OK	Go to step 10
NG	Go to step 13

4 CHECK DRIVER SIDE SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (OPEN)



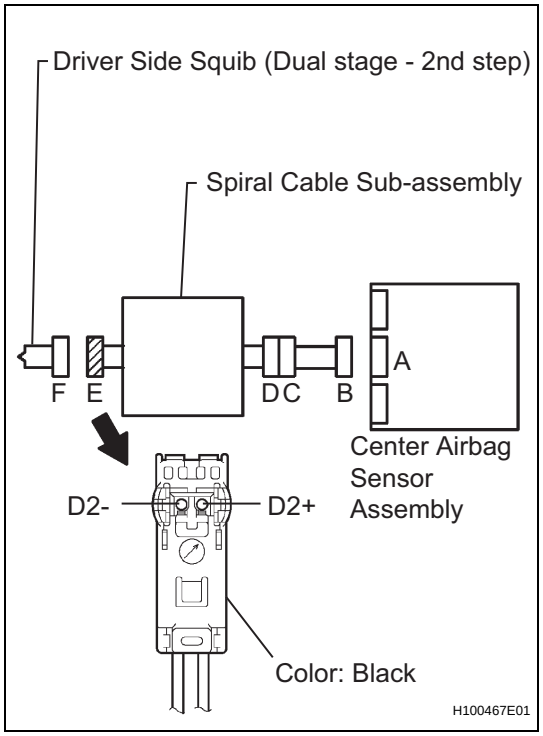
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the horn button.
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D2+ - D2-	Below 1 Ω

OK	Go to step 11
NG	Go to step 15

5 CHECK DRIVER SIDE SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the horn button.
(e) Measure the resistance according to the value(s) in the table below.

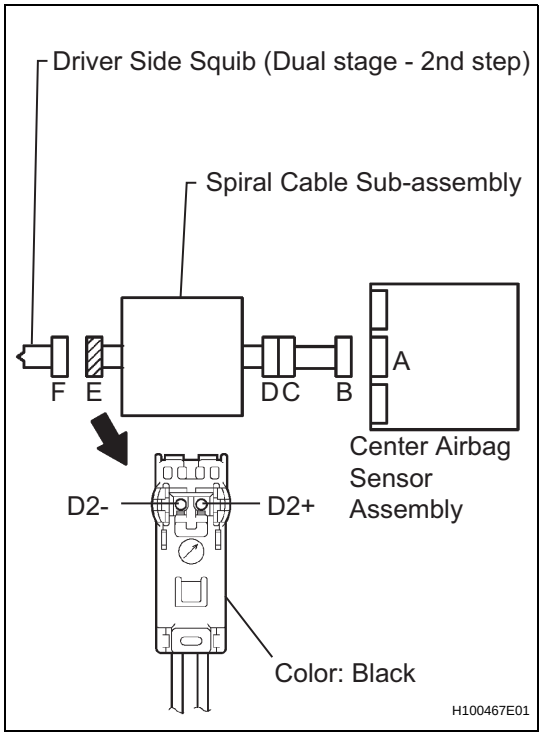
Standard resistance

Tester Connection	Specified Condition
D2+ - Body ground	1 MΩ or higher
D2- - Body ground	1 MΩ or higher

OK	Go to step 11
NG	Go to step 17

RS

6	CHECK DRIVER SIDE SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT (TO BE+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connectors from the horn button.
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position.
(g) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
D2+ - Body ground	Below 1 V
D2- - Body ground	Below 1 V

(h) Before proceeding to the next step, perform the following procedures.
(1) Turn the ignition switch to the LOCK position.
(2) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

OK	Go to step 11
NG	Go to step 19

7	CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the spiral cable connectors (on the horn button side) are not damaged.

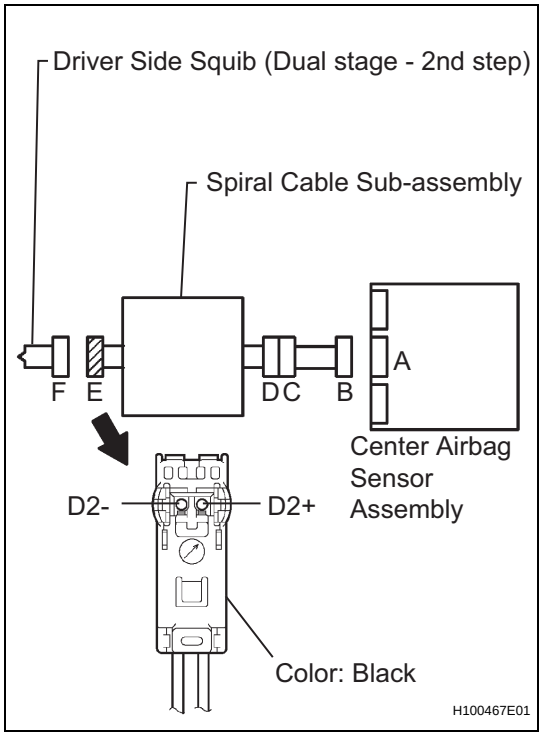
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG	REPLACE SPIRAL CABLE SUB-ASSEMBLY

OK

8	CHECK DRIVER SIDE SQUIB (DUAL STAGE - 2ND STEP) CIRCUIT



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connectors from the horn button.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
D2+ - Body ground	Below 1 V
D2- - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D2+ - D2-	Below 1 Ω
D2+ - Body ground	1 MΩ or higher
D2- - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

Standard resistance

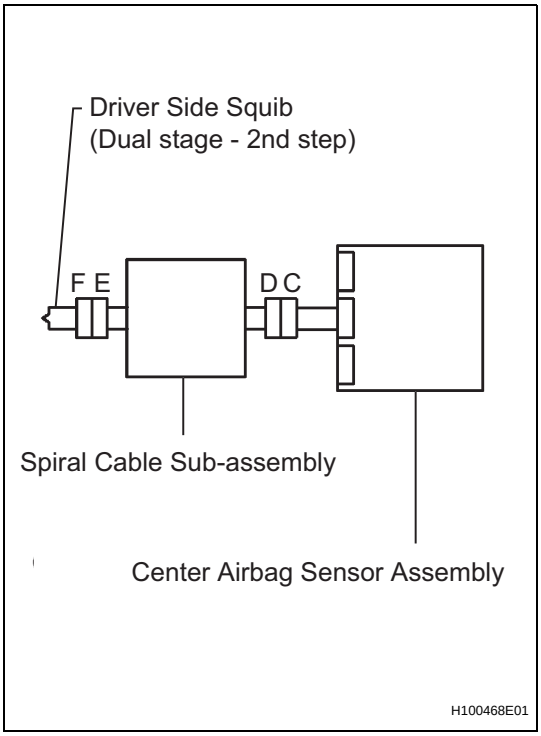
Tester Connection	Specified Condition
D2+ - D2-	1 MΩ or higher

NG → **Go to step 21**

OK

RS

9	REPLACE HORN BUTTON ASSEMBLY (DRIVER SIDE SQUIB, DUAL STAGE - 2ND STEP)



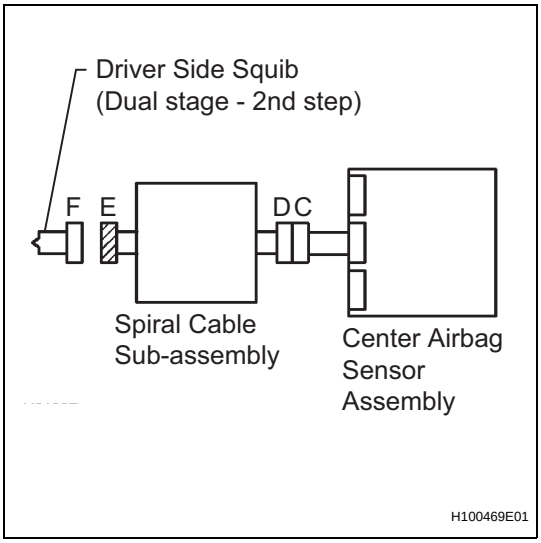
(a) Replace the horn button and connect the connectors (see page RS-11).
HINT:
Perform the inspection using parts from a normal vehicle if possible.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC 53 is not output.
HINT:
Codes other than code 53 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

10	CHECK CENTER AIRBAG SENSOR ASSEMBLY

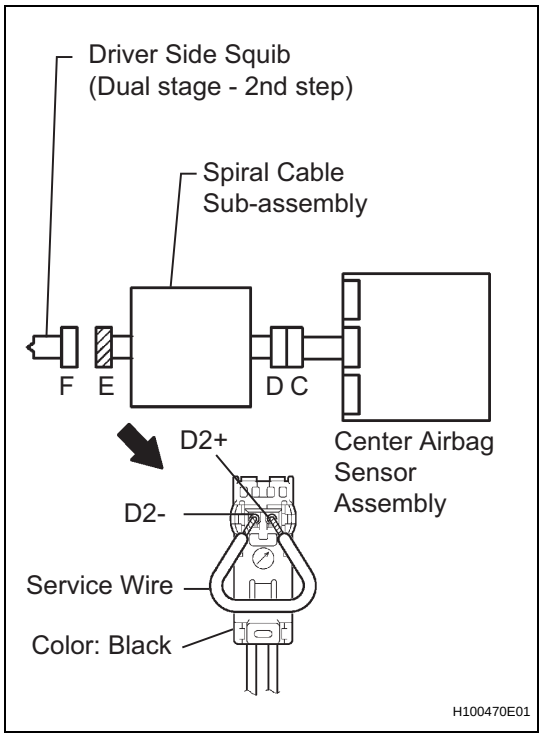


(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1810 is not output.
HINT:
Codes other than code B1810 may be output at this time, but they are not related to this check.

OK → **Go to step 12**

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

11 CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Connect the connectors to the center airbag sensor.
(b) Using a service wire, connect D2+ and D2- of connector "E".
NOTICE:
- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

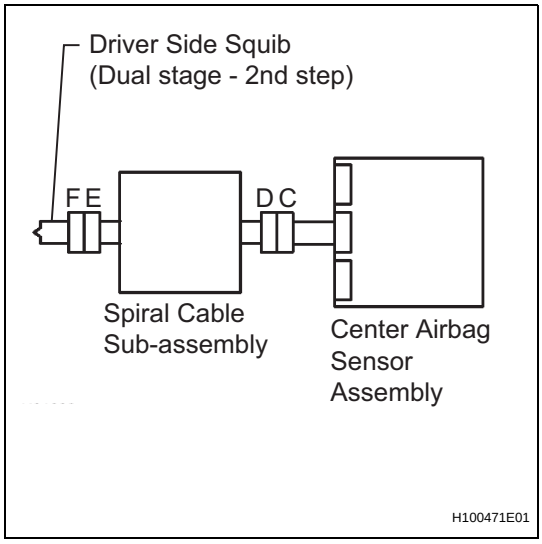
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch on the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1811, B1812 or B1813 is not output.
HINT:
Codes other than code B1811, B1812 or B1813 may be output at this time, but they are not related to this check.
(i) Before proceeding to the next step, perform the following procedures.
(1) Disconnect the service wire from connector "E".

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

RS

12 CHECK HORN BUTTON ASSEMBLY (DRIVER SIDE SQUIB, DUAL STAGE - 2ND STEP)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connectors to the horn button.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page RS-18).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check for DTCs (see page RS-18).

OK:

DTC B1810, B1811, B1812 or B1813 is not output.

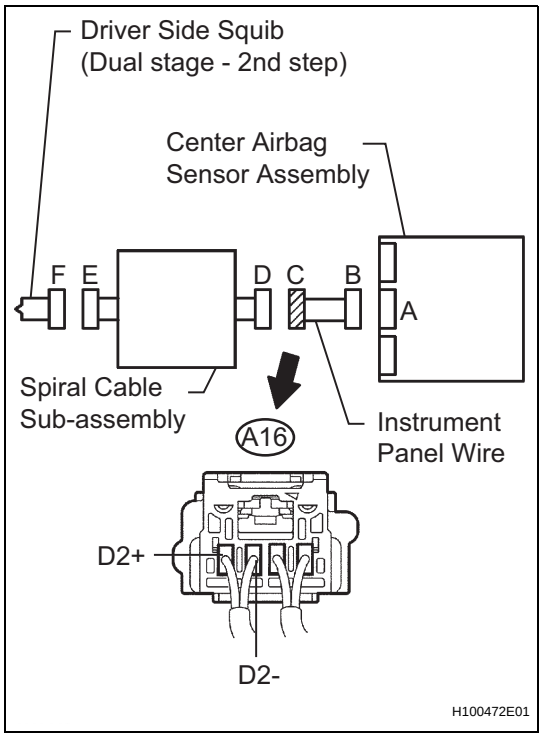
HINT:
Codes other than code B1810, B1811, B1812 or B1813 may be output at this time, but they are not related to this check.

NG → **REPLACE HORN BUTTON ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

13 CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the instrument panel wire connector from the spiral cable.
HINT:
The activation prevention mechanism of connector "B" has already been released.
(b) Measure the resistance according to the value(s) in the table below.

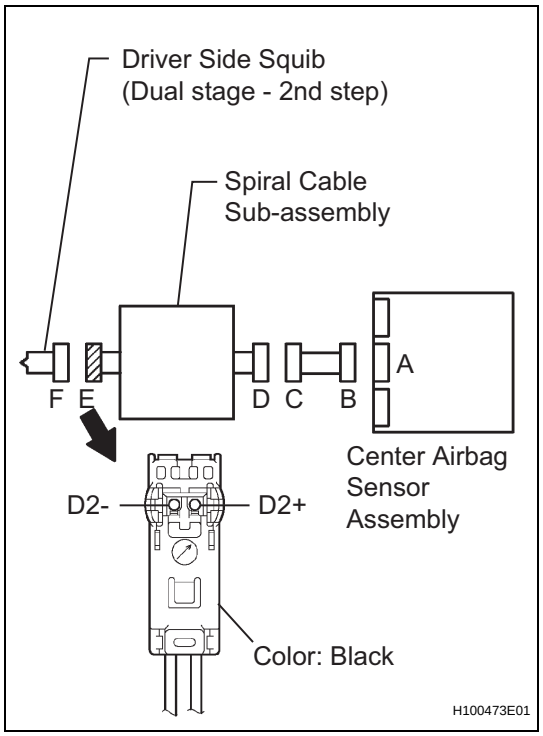
Standard resistance

Tester Connection	Specified Condition
A16-4 (D2+) - A16-3 (D2-)	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

14	CHECK SPIRAL CABLE SUB-ASSEMBLY (SHORT)



(a) Release the activation prevention mechanism built into connector "D" (see page RS-11).

(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D2+ - D2-	1 MΩ or higher

NG → REPLACE SPIRAL CABLE SUB-ASSEMBLY

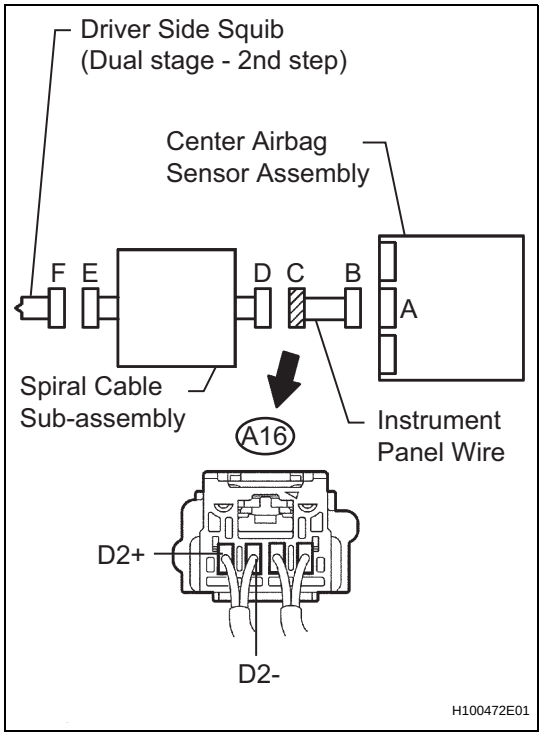
OK

PERFORM SYMPTOM SIMULATION

RS

RS

15 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Disconnect the instrument panel wire connector from the spiral cable.
(b) Measure the resistance according to the value(s) in the table below.

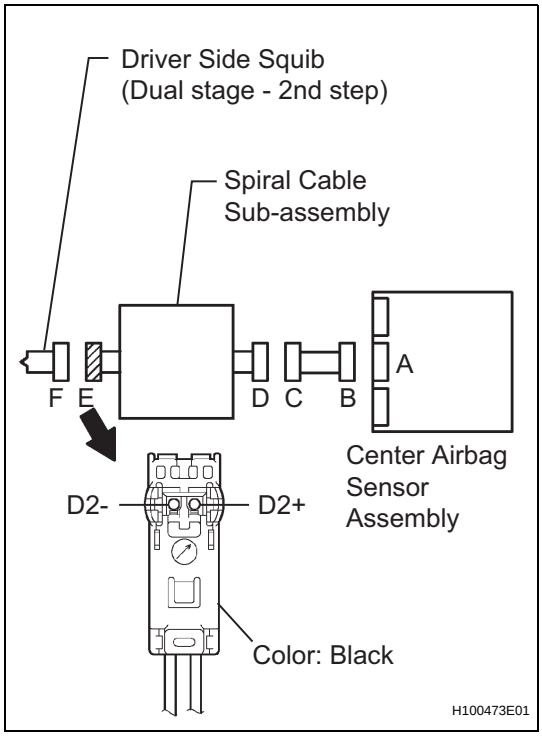
Standard resistance

Tester Connection	Specified Condition
A16-4 (D2+) - A16-3 (D2-)	Below 1 Ω

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

16 CHECK SPIRAL CABLE SUB-ASSEMBLY (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D2+ - D2-	Below 1 Ω

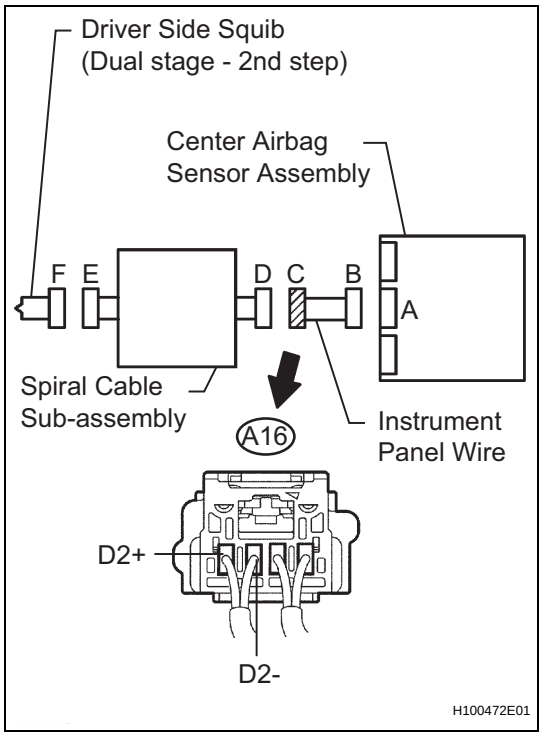
NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

RS

17 CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Disconnect the instrument panel wire connector from the spiral cable.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

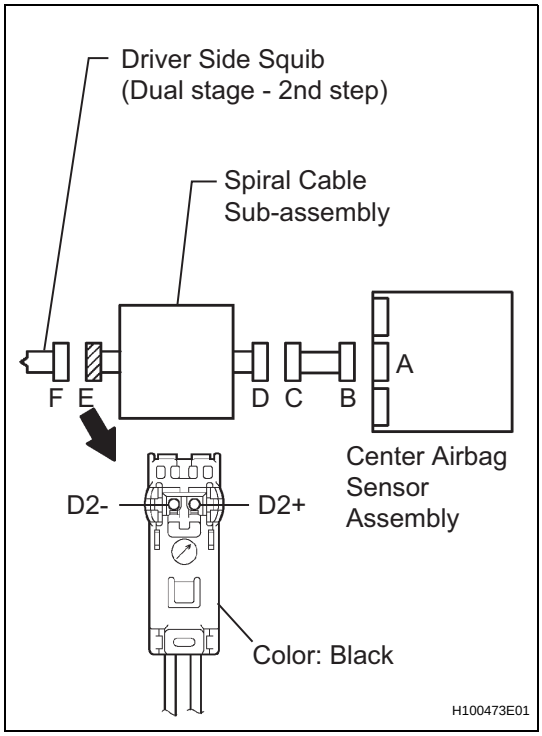
Tester Connection	Specified Condition
A16-4 (D2+) - Body ground	1 MΩ or higher
A16-3 (D2-) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

RS

18	CHECK SPIRAL CABLE SUB-ASSEMBLY (TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

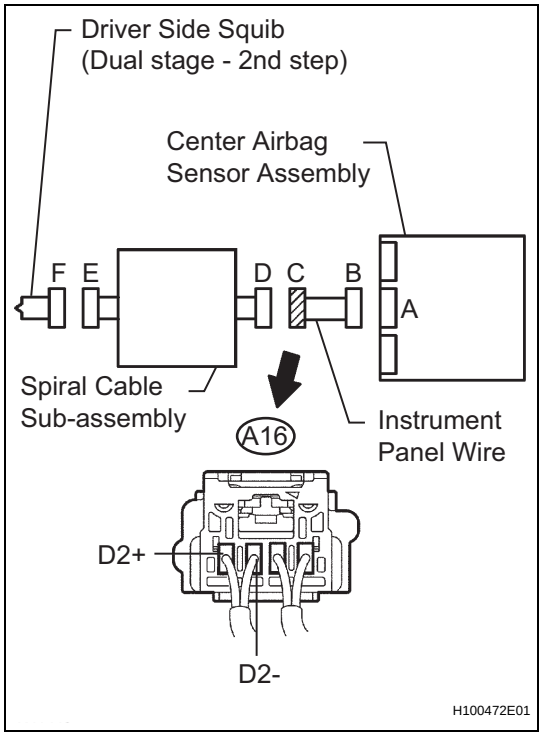
Tester Connection	Specified Condition
D2+ - Body ground	1 MΩ or higher
D2- - Body ground	1 MΩ or higher

NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

19 CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the instrument panel wire connector from the spiral cable.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.

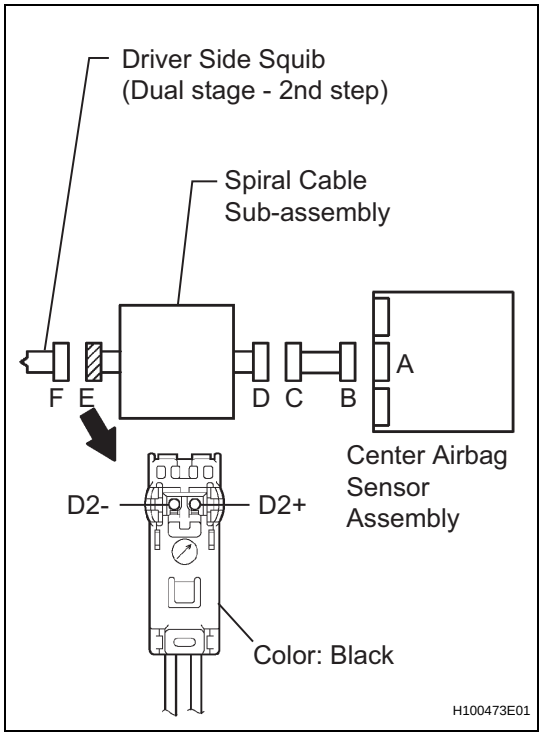
Standard voltage

Tester Connection	Specified Condition
A16-4 (D2+) - Body ground	Below 1 V
A16-3 (D2-) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

20 CHECK SPIRAL CABLE SUB-ASSEMBLY (TO B+)



(a) Measure the voltage according to the value(s) in the table below when the ignition switch is in the ON position.

Standard voltage

Tester Connection	Condition	Specified Condition
D2+ - Body ground	Ignition switch ON	Below 1 V
D2- - Body ground	Ignition switch ON	Below 1 V

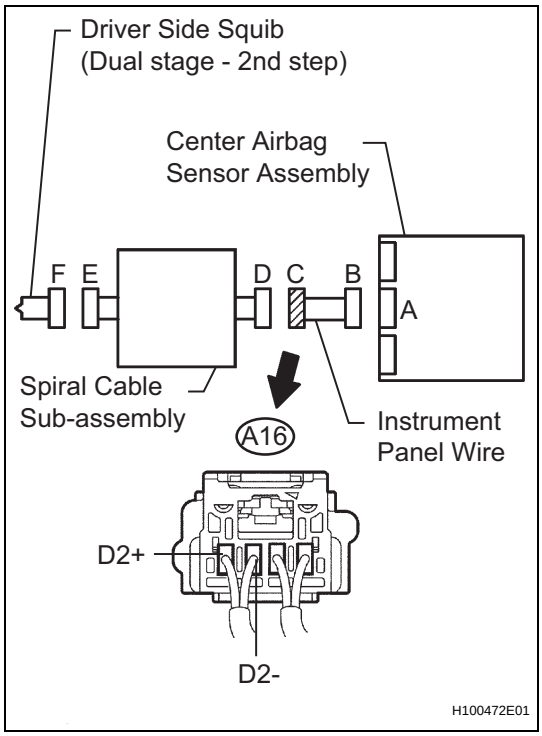
NG → **REPLACE SPIRAL CABLE SUB-ASSEMBLY**

OK

PERFORM SYMPTOM SIMULATION

RS

21 CHECK INSTRUMENT PANEL WIRE



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Disconnect the instrument panel wire connector from the spiral cable.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
A16-4 (D2+) - Body ground	Below 1 V
A16-3 (D2-) - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A16-4 (D2+) - A16-3 (D2-)	Below 1 Ω
A16-4 (D2+) - Body ground	1 MΩ or higher
A16-3 (D2-) - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

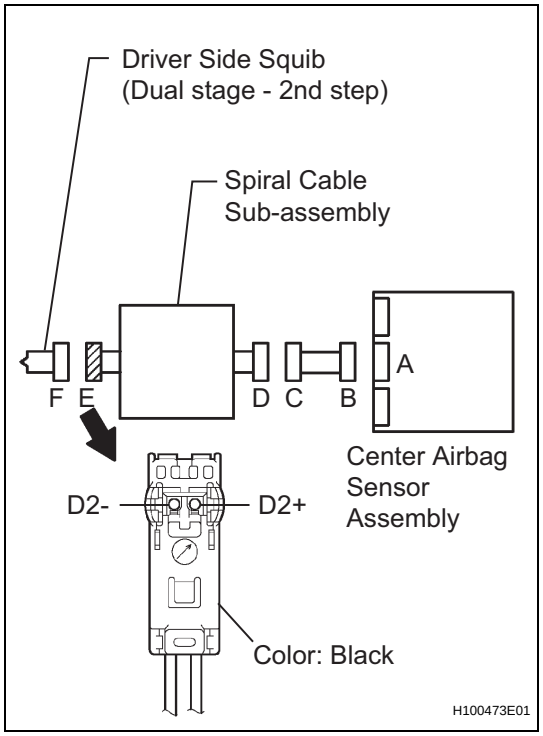
Standard resistance

Tester Connection	Specified Condition
A16-4 (D2+) - A16-3 (D2-)	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

22	CHECK SPIRAL CABLE SUB-ASSEMBLY



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
D2+ - Body ground	Below 1 V
D2- - Body ground	Below 1 V

(d) Turn the ignition switch to the LOCK position.
(e) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(f) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D2+ - D2-	Below 1 Ω
D2+ - Body ground	1 MΩ or higher
D2- - Body ground	1 MΩ or higher

(g) Release the activation prevention mechanism built into connector "D" (see page RS-11).
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
D2+ - D2-	1 MΩ or higher

NG → REPLACE SPIRAL CABLE SUB-ASSEMBLY

OK

PERFORM SYMPTOM SIMULATION

DTC	B1830/57	Short in Driver Side Curtain Shield Squib Circuit

DTC	B1831/57	Open in Driver Side Curtain Shield Squib Circuit

DTC	B1832/57	Short to GND in Driver Side Curtain Shield Squib Circuit

DTC	B1833/57	Short to B+ in Driver Side Curtain Shield Squib Circuit

DESCRIPTION

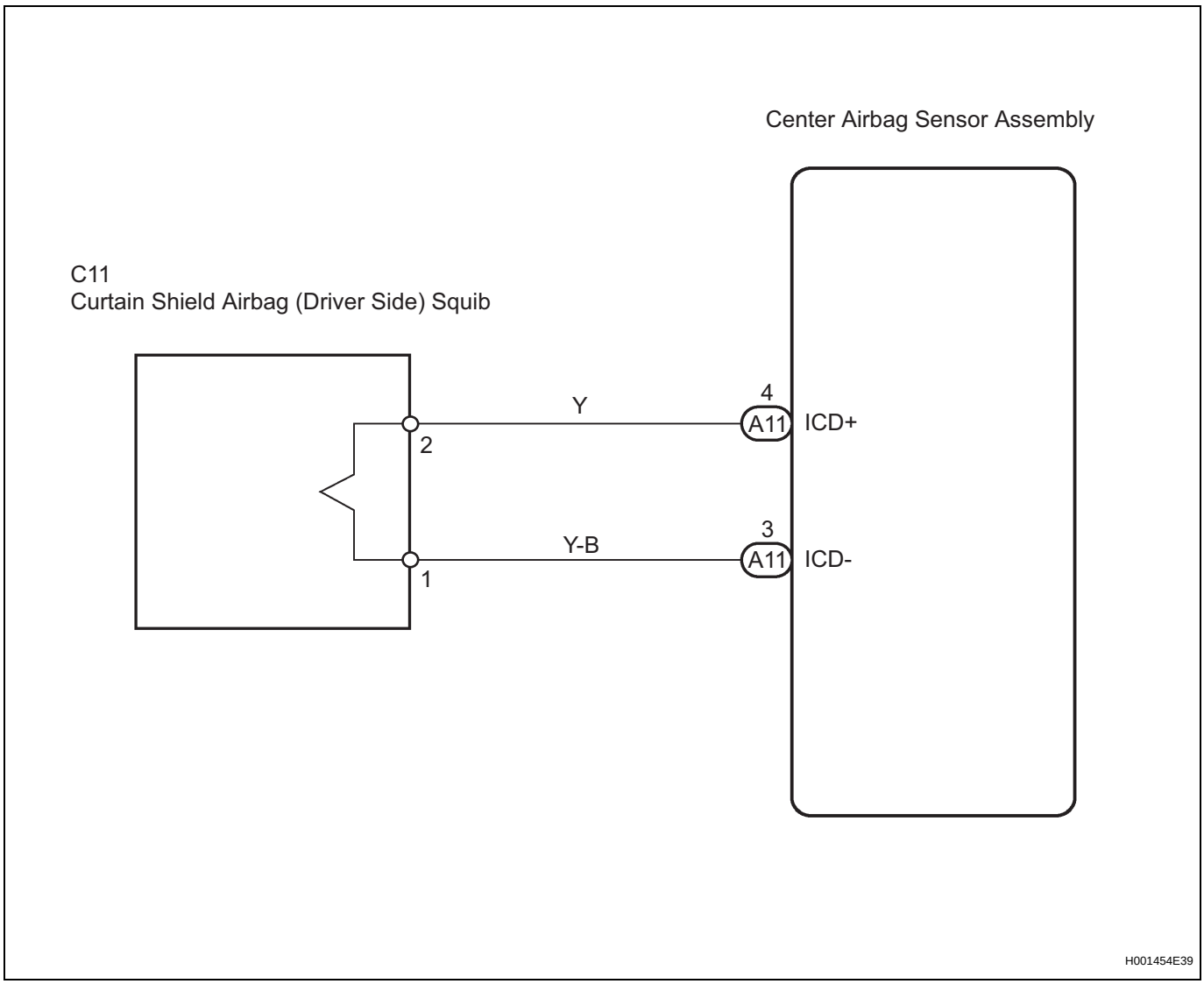
The curtain shield airbag (driver side) squib circuit consists of the center airbag sensor and the curtain shield airbag LH.

This circuit instructs the SRS to deploy when deployment conditions are met.

These DTCs are recorded when a malfunction is detected in the curtain shield airbag (driver side) squib circuit.

DTC No.	DTC Detection Condition	Trouble Area
B1830/57	• The center airbag sensor assembly receives a line short circuit signal 5 times in the curtain shield airbag (driver side) squib circuit during primary check.	• Curtain shield airbag assembly LH (curtain shield airbag (driver side) squib) • Center airbag sensor assembly • Floor wire
B1831/57	• The center airbag sensor assembly receives an open circuit signal in the curtain shield airbag (driver side) squib circuit for 2 seconds.	• Curtain shield airbag assembly LH (curtain shield airbag (driver side) squib) • Center airbag sensor assembly • Floor wire
B1832/57	• The center airbag sensor assembly receives a short circuit to ground signal in the curtain shield airbag (driver side) squib circuit for 0.5 seconds.	• Curtain shield airbag assembly LH (curtain shield airbag (driver side) squib) • Center airbag sensor assembly • Floor wire
B1833/57	• The center airbag sensor assembly receives a B+ short circuit signal in the curtain shield airbag (driver side) squib circuit for 0.5 seconds.	• Curtain shield airbag assembly LH (curtain shield airbag (driver side) squib) • Center airbag sensor assembly • Floor wire

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Proceed to each step according to DTC readings.

(1) If using the intelligent tester (read the 5-digit of DTC):
Using the intelligent tester, check for DTCs (see page RS-18).

Result

Result	Proceed to
DTC B1830 is output.	A
DTC B1831 is output.	B
DTC B1832 is output.	C
DTC B1833 is output.	D

(2) If not using the intelligent tester (read the 2-digit of DTC):

Check for DTCs (see page RS-18).

Result

Result	Proceed to
DTC 57 is output.	E

B	Go to step 4
C	Go to step 5
D	Go to step 6
E	Go to step 7

RS

A

2 CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the floor wire connector (on the curtain shield airbag LH side) is not damaged.

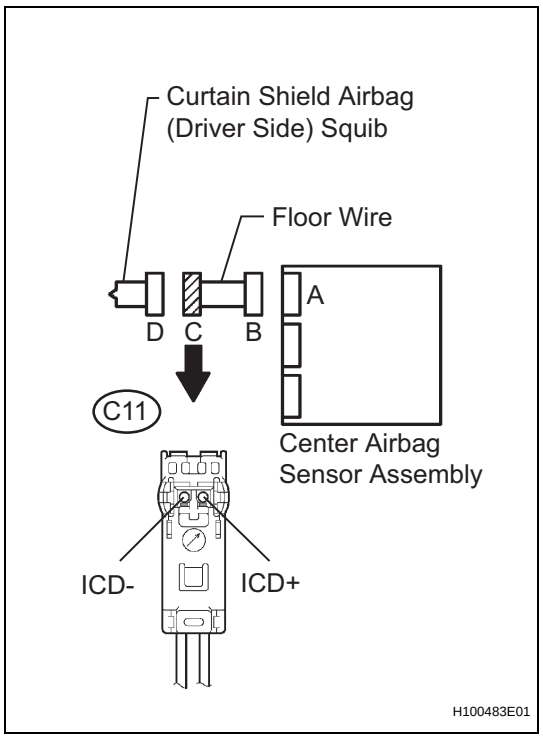
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG	REPAIR OR REPLACE FLOOR WIRE

OK

3 CHECK FLOOR WIRE (SHORT)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connector from the curtain shield airbag LH (driver side squib).
(c) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
C11-2 (ICD+) - C11-1 (ICD-)	1 MΩ or higher

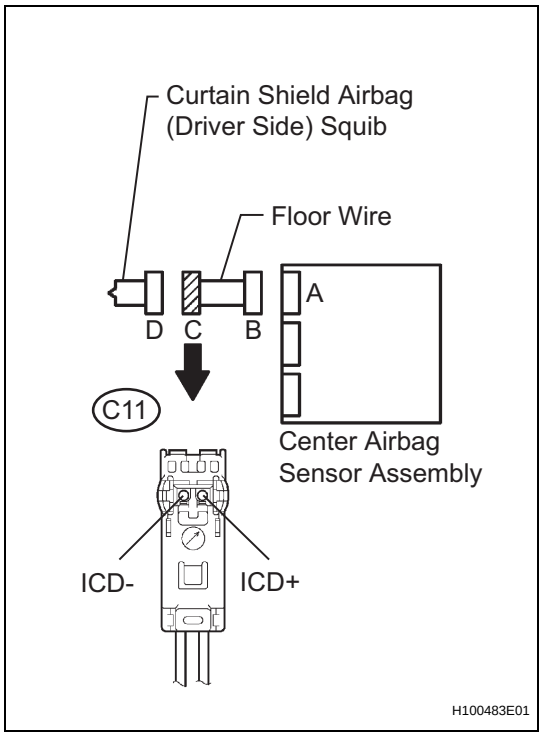
OK	Go to step 10

NG

REPAIR OR REPLACE FLOOR WIRE

RS

4	CHECK FLOOR WIRE (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the curtain shield airbag LH (driver side squib).
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

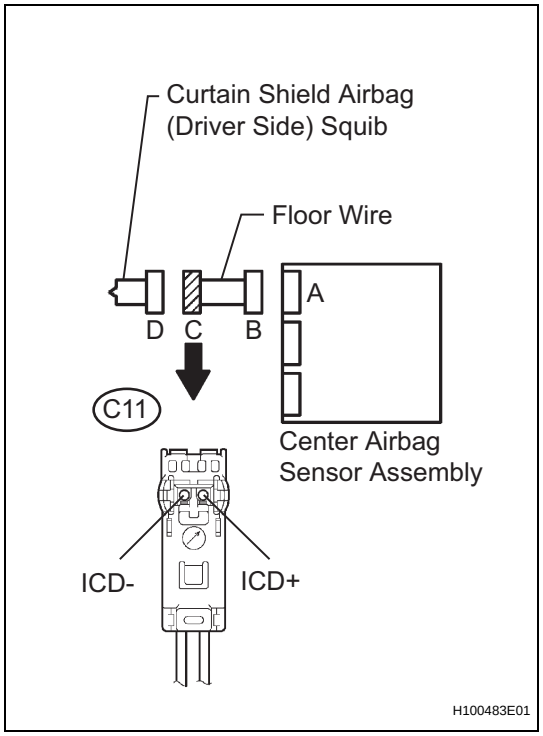
Tester Connection	Specified Condition
C11-2 (ICD+) - C11-1 (ICD-)	Below 1 Ω

OK → **Go to step 11**

NG

REPAIR OR REPLACE FLOOR WIRE

5	CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the curtain shield airbag LH (driver side squib).
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
C11-2 (ICD+) - Body ground	1 MΩ or higher
C11-1 (ICD-) - Body ground	1 MΩ or higher

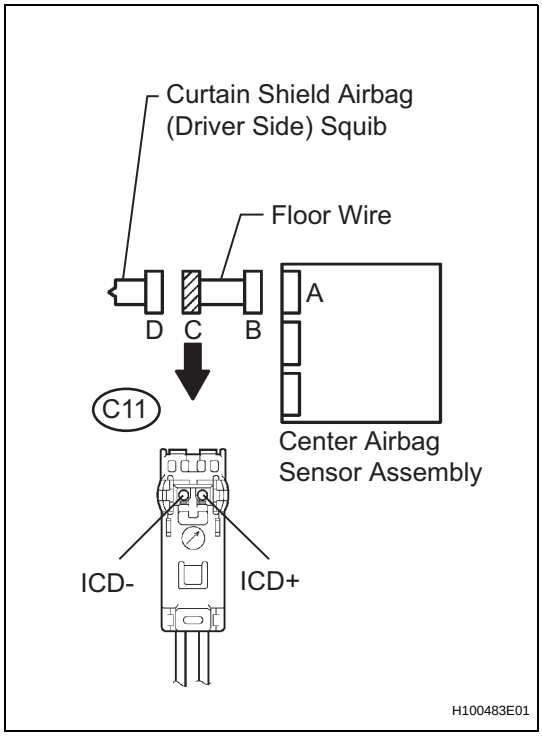
OK → **Go to step 11**

NG

REPAIR OR REPLACE FLOOR WIRE

RS

6	CHECK FLOOR WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the curtain shield airbag LH (driver side squib).
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position.
(g) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
C11-2 (ICD+) - Body ground	Below 1 V
C11-1 (ICD-) - Body ground	Below 1 V

(h) Before proceeding to the next step, perform the following procedures.
(1) Turn the ignition switch to the LOCK position.
(2) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

OK → **Go to step 11**

NG

REPAIR OR REPLACE FLOOR WIRE

7	CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the floor wire connector (on the curtain shield airbag LH side) is not damaged.

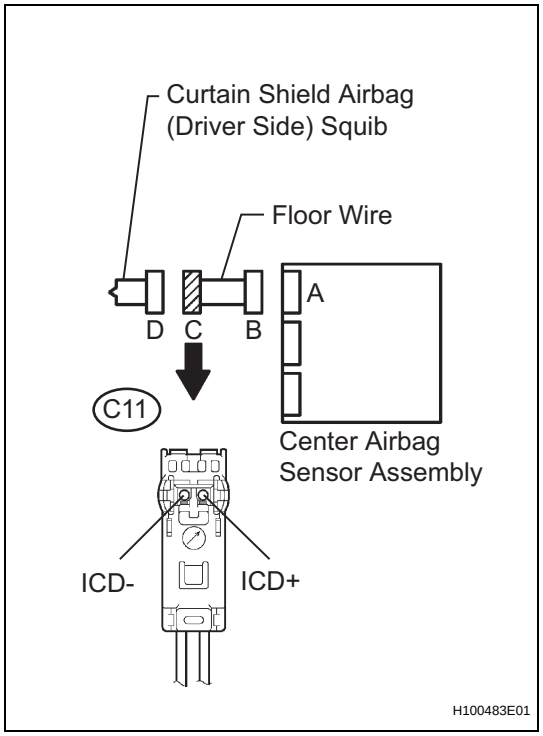
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

8	CHECK FLOOR WIRE (CURTAIN SHIELD AIRBAG (DRIVER SIDE) SQUIB CIRCUIT)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connector from the curtain shield airbag LH (driver side squib).
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
C11-2 (ICD+) - Body ground	Below 1 V
C11-1 (ICD-) - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
C11-2 (ICD+) - C11-1 (ICD-)	Below 1 Ω
C11-2 (ICD+) - Body ground	1 MΩ or higher
C11-1 (ICD-) - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

Standard resistance

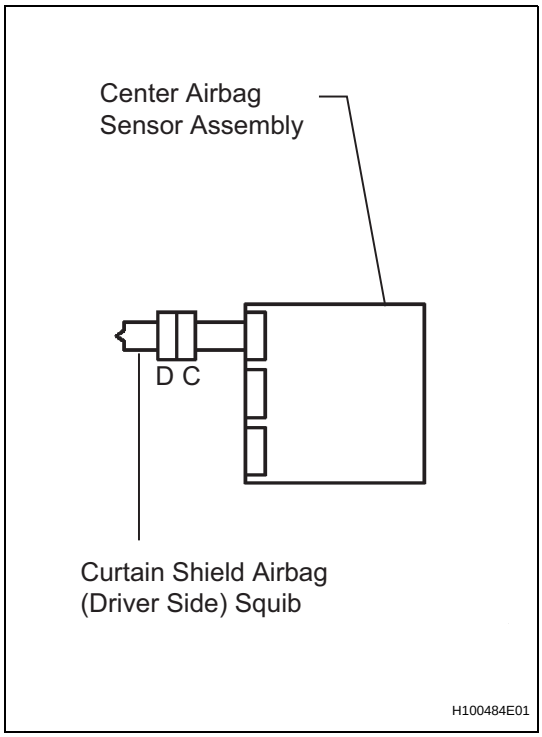
Tester Connection	Specified Condition
C11-2 (ICD+) - C11-1 (ICD-)	1 MΩ or higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

9	REPLACE CURTAIN SHIELD AIRBAG ASSEMBLY LH (CURTAIN SHIELD AIRBAG (DRIVER SIDE) SQUIB)

RS



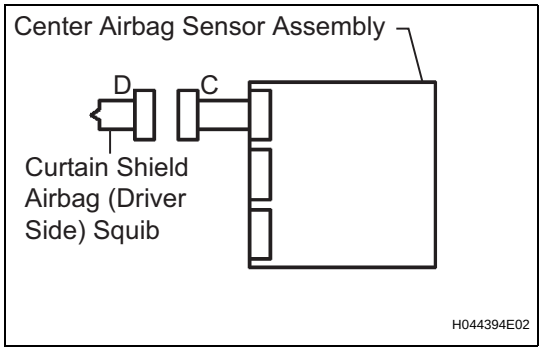
(a) Replace the curtain shield airbag LH and connect the connector.
HINT:
Perform the inspection using parts from a normal vehicle if possible.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC 57 is not output.
HINT:
Codes other than code 57 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

10	CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1830 is not output.
HINT:
Codes other than code B1830 may be output at this time, but they are not related to this check.

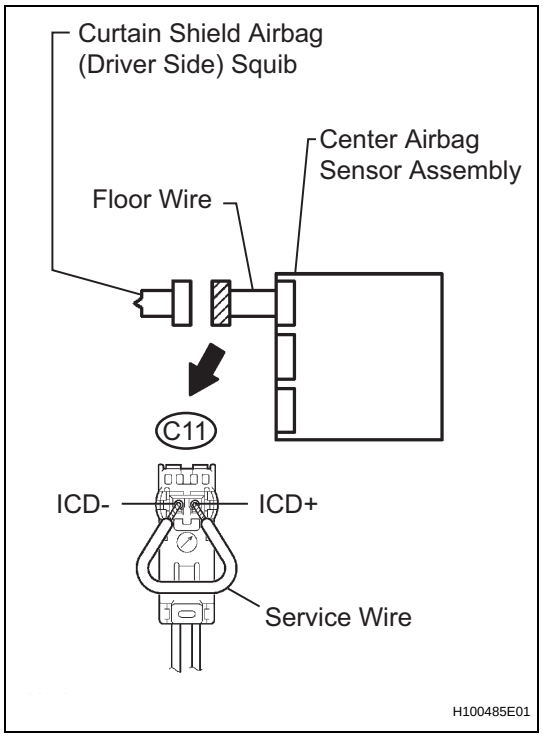
OK → Go to step 12

NG

REPLACE CENTER AIRBAG SENSOR ASSEMBLY

RS

11 CHECK CENTER AIRBAG SENSOR ASSEMBLY

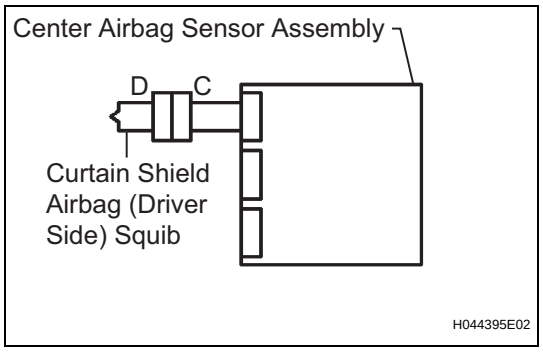


(a) Connect the connectors to the center airbag sensor.
(b) Using a service wire, connect C11-2 (ICD+) and C11-1 (ICD-) of connector "C".
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1831, B1832 or B1833 is not output.
HINT:
Codes other than code B1831, B1832 or B1833 may be output at this time, but they are not related to this check.
(i) Before proceeding to the next step, perform the following procedures.
(1) Disconnect the service wire from connector "C".

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

12 CHECK CURTAIN SHIELD AIRBAG ASSEMBLY LH (CURTAIN SHIELD AIRBAG (DRIVER SIDE) SQUIB)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connector to the curtain shield airbag LH.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page RS-18).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check for DTCs (see page RS-18).
OK:
DTC B1830, B1831, B1832 or B1833 is not output.

HINT:
Codes other than code B1830, B1831, B1832 or B1833 may be output at this time, but they are not related to this check.

NG → **REPLACE CURTAIN SHIELD AIRBAG ASSEMBLY LH**

RS

OK

PERFORM SYMPTOM SIMULATION

DTC	B1860/64	Short in Driver Side Knee Airbag Squib Circuit

DTC	B1861/64	Open in Driver Side Knee Airbag Squib Circuit

DTC	B1862/64	Short to GND in Driver Side Knee Airbag Squib Circuit

DTC	B1863/64	Short to B+ in Driver Side Knee Airbag Squib Circuit

DESCRIPTION

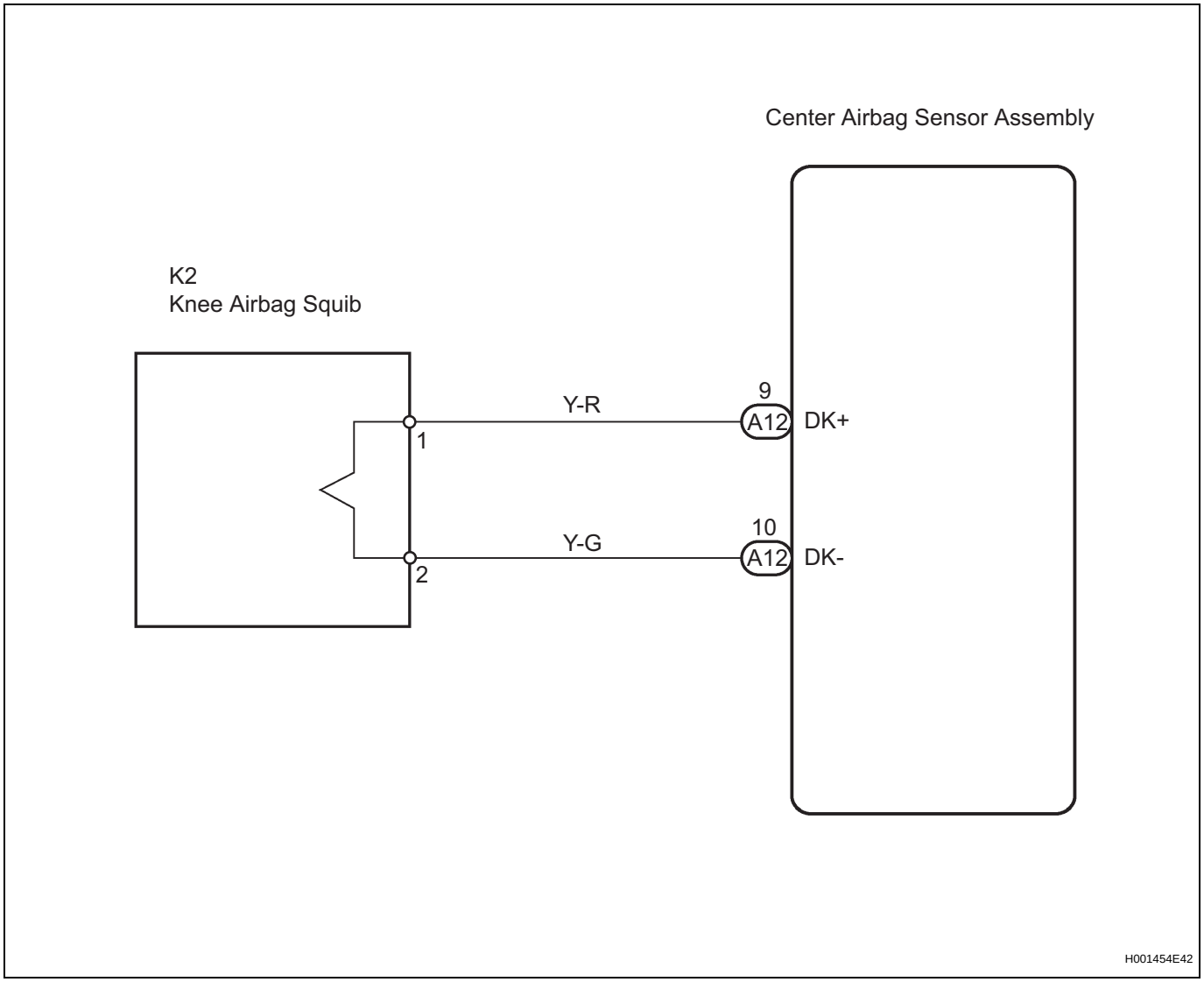
The knee airbag squib circuit consists of the center airbag sensor and the No. 1 instrument panel airbag lower.

The circuit instructs the SRS to deploy when deployment conditions are met.

DTC B1860 is recorded when a short circuit is detected in the knee airbag squib circuit.

DTC No.	DTC Detection Condition	Trouble Area
B1860/64	• The center airbag sensor assembly receives a line short signal 5 times in the knee airbag squib circuit during primary check. • Knee airbag squib malfunction • Center airbag sensor assembly malfunction	• Instrument panel wire • No. 1 instrument panel airbag assembly lower (knee airbag squib) • Center airbag sensor assembly
B1861/64	• The center airbag sensor assembly receives an open signal in the knee airbag squib circuit for 2 seconds. • Knee airbag squib malfunction • Center airbag sensor assembly malfunction.	• Instrument panel wire • No. 1 instrument panel airbag assembly lower (knee airbag squib) • Center airbag sensor assembly
B1862/64	• The center airbag sensor assembly receives a short to ground signal in the knee airbag squib circuit or 0.5 seconds. • Knee airbag squib malfunction • Center airbag sensor assembly malfunction.	• Instrument panel wire • No. 1 instrument panel airbag assembly lower (knee airbag squib) • Center airbag sensor assembly
B1863/64	• The center airbag sensor assembly receives a B+ short signal in the knee airbag squib circuit for 0.5 seconds. • Knee airbag squib malfunction • Center airbag sensor assembly malfunction.	• Instrument panel wire • No. 1 instrument panel airbag assembly lower (knee airbag squib) • Center airbag sensor assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK FOR DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester (read the 5-digit of DTC):
Using the intelligent tester, check for DTCs (see page RS-18).
Result

Result	Proceed to
DTC B1860 is output.	A
DTC B1861 is output.	B
DTC B1862 is output.	C
DTC B1863 is output.	D

(2) If not using the intelligent tester (read the 2-digit of DTC):

Check for DTC (see page RS-18).

Result

Result	Proceed to
DTC B1860 is output.	E

RS

B	Go to step 4
C	Go to step 5
D	Go to step 6
E	Go to step 7

A

2 CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the instrument panel wire connector (on the No. 1 instrument panel airbag lower side) is not damaged.

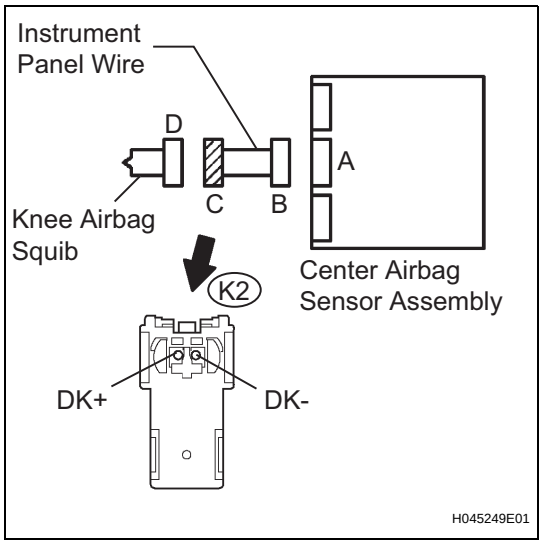
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG	REPAIR OR REPLACE INSTRUMENT PANEL WIRE

OK

3 CHECK INSTRUMENT PANEL WIRE (SHORT)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connector from the No. 1 instrument panel airbag lower (knee airbag squib).
(c) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
K2-1 (DK+) - K2-2 (DK-)	1 MΩ or higher

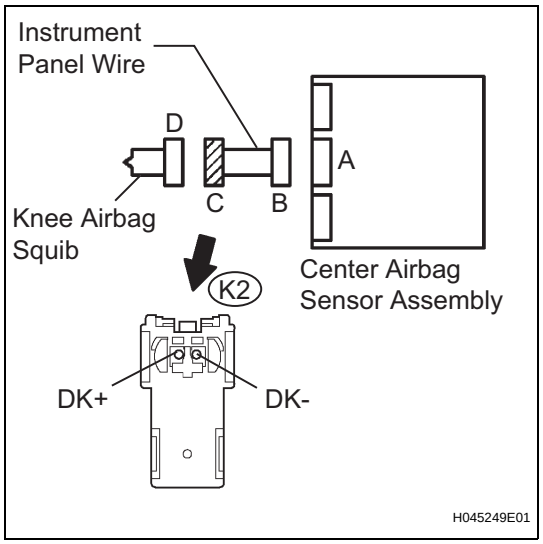
OK	Go to step 10

NG

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

RS

4 CHECK INSTRUMENT PANEL WIRE (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower (knee airbag squib).
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

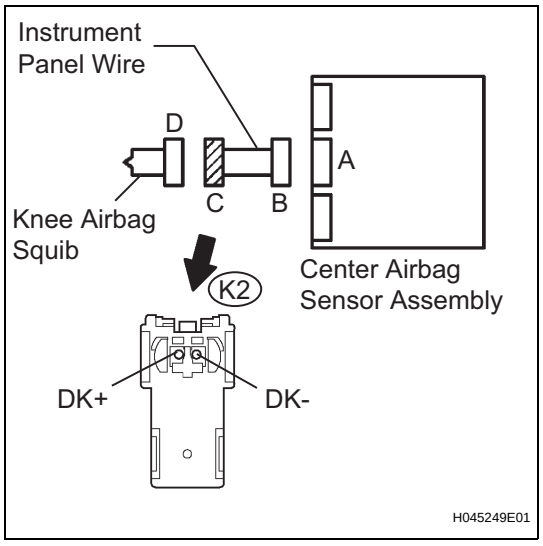
Tester Connection	Specified Condition
K2-1 (DK+) - K2-2 (DK-)	Below 1 Ω

OK → **Go to step 11**

NG

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

5 CHECK INSTRUMENT PANEL WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower (knee airbag squib).
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
K2-1 (DK+) - K2-2 (DK-)	1 MΩ or higher

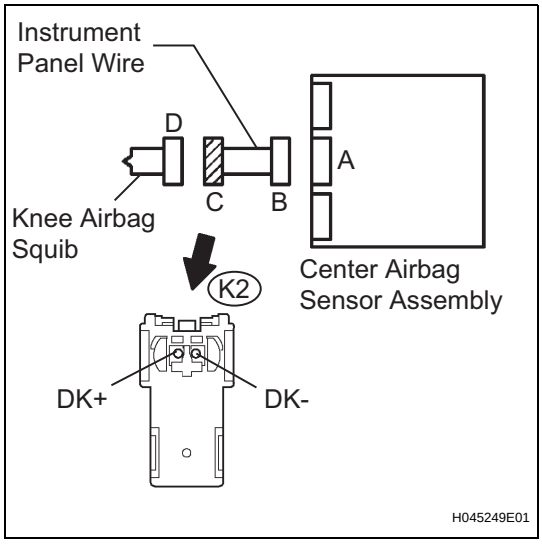
OK → **Go to step 11**

NG

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

RS

6	CHECK INSTRUMENT PANEL WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the No. 1 instrument panel airbag lower (knee airbag squib).
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position.
(g) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
K2-1 (DK+) - Body ground	Below 1 V
K2-2 (DK-) - Body ground	Below 1 V

(h) Before proceeding to the next step, perform the following procedures.
(1) Turn the ignition switch to the LOCK position.
(2) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

OK → **Go to step 11**

NG

REPAIR OR REPLACE INSTRUMENT PANEL WIRE

7	CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the instrument panel wire connector (on the No. 1 instrument panel airbag assembly lower side) is not damaged.

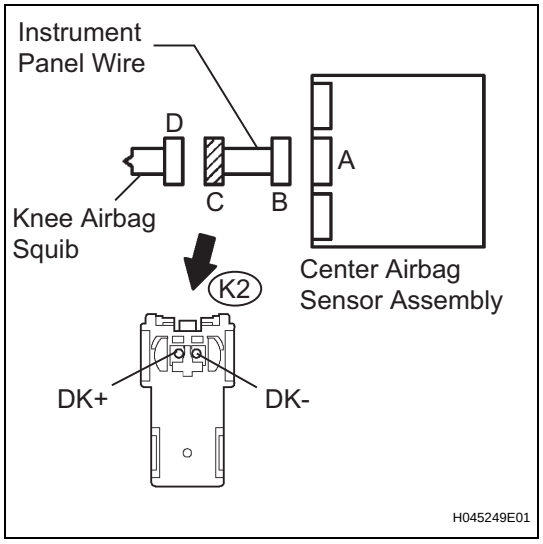
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

8 CHECK INSTRUMENT PANEL WIRE (KNEE AIRBAG SQUIB CIRCUIT)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connector from the No. 1 instrument panel airbag lower (knee airbag squib).
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
K2-1 (DK+) - Body ground	Below 1 V
K2-2 (DK-) - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
K2-1 (DK+) - K2-2 (DK-)	Below 1 Ω
K2-1 (DK+) - Body ground	1 MΩ or higher
K2-2 (DK-) - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

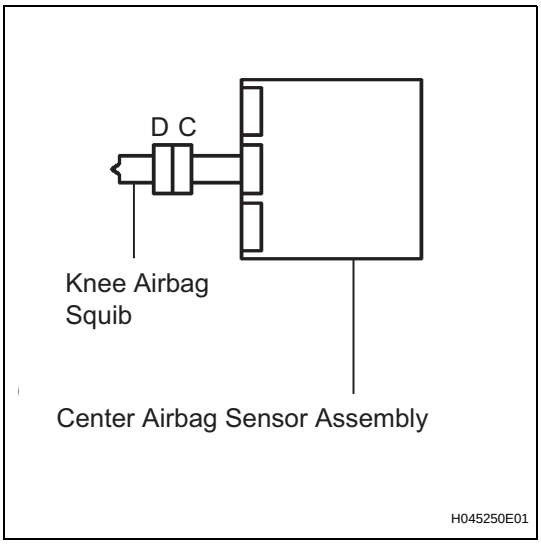
Standard resistance

Tester Connection	Specified Condition
K2-1 (DK+) - K2-2 (DK-)	1 MΩ or higher

NG → **REPAIR OR REPLACE INSTRUMENT PANEL WIRE**

OK

9	REPLACE NO. 1 INSTRUMENT PANEL AIRBAG ASSEMBLY LOWER (KNEE AIRBAG SQUIB)



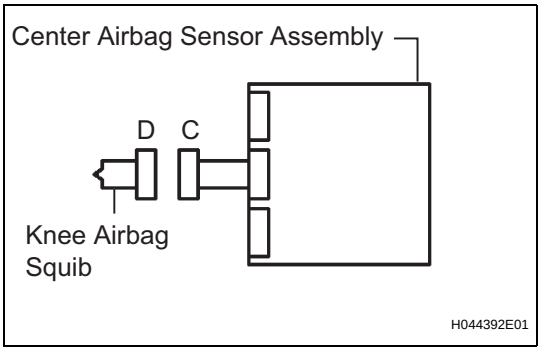
(a) Replace the No. 1 instrument panel airbag lower (knee airbag squib) and connect the connector.
HINT:
Perform the inspection using parts from a normal vehicle if possible.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC 64 is not output.
HINT:
Codes other than code 64 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

10	CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1860 is not output.
HINT:
Codes other than code B1860 may be output at this time, but they are not related to this check.

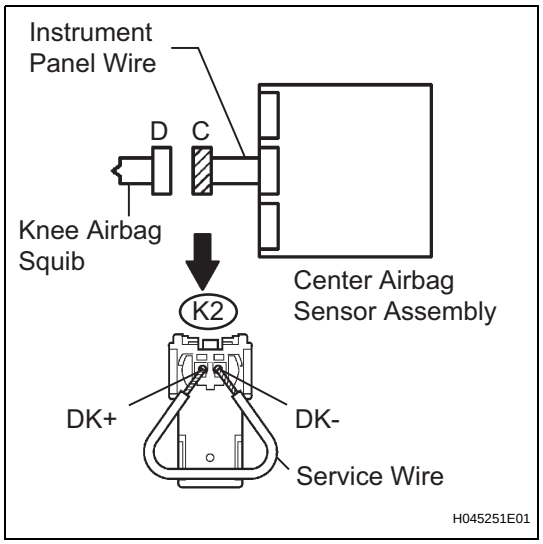
OK → Go to step 12

NG

REPLACE CENTER AIRBAG SENSOR ASSEMBLY

RS

11 CHECK CENTER AIRBAG SENSOR ASSEMBLY



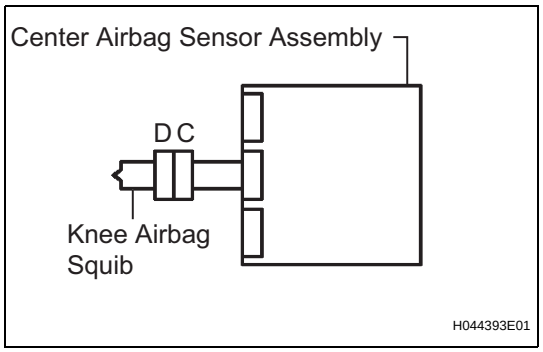
(a) Connect the connectors to the center airbag sensor.
(b) Using a service wire, connect K2-1 (DK+) and K2-2 (DK-) of connector "C".
NOTICE:
- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1861, B1862 or B1863 is not output.
HINT:
Codes other than code B1861, B1862 or B1863 may be output at this time, but they are not related to this check.
(i) Before proceeding to the next step, perform the following procedures.
(1) Disconnect the service wire from connector "C".

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

12 CHECK NO. 1 INSTRUMENT PANEL AIRBAG ASSEMBLY LOWER (KNEE AIRBAG SQUIB)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connector to the No. 1 instrument panel airbag lower.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page RS-18).
(g) Turn the ignition switch to the LOCK position.

(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

(i) Check for DTCs (see page RS-18).

OK:

DTC B1860, B1861, B1862 or B1863 may be output at this time, but they are not related to this check.

HINT:

Codes other than code B1860, B1861, B1862 or B1863 may be output at this time, but they are not related to this check.

NG → **REPLACE NO. 1 INSTRUMENT PANEL AIRBAG ASSEMBLY LOWER**

OK

PERFORM SYMPTOM SIMULATION

DTC	B1900/73	Short in Front Driver Side Pretensioner Squib Circuit

DTC	B1901/73	Open in Front Driver Side Pretensioner Squib Circuit

DTC	B1902/73	Short to GND in Front Driver Side Pretensioner Squib Circuit

DTC	B1903/73	Short to B+ in Front Driver Side Pretensioner Squib Circuit

DESCRIPTION

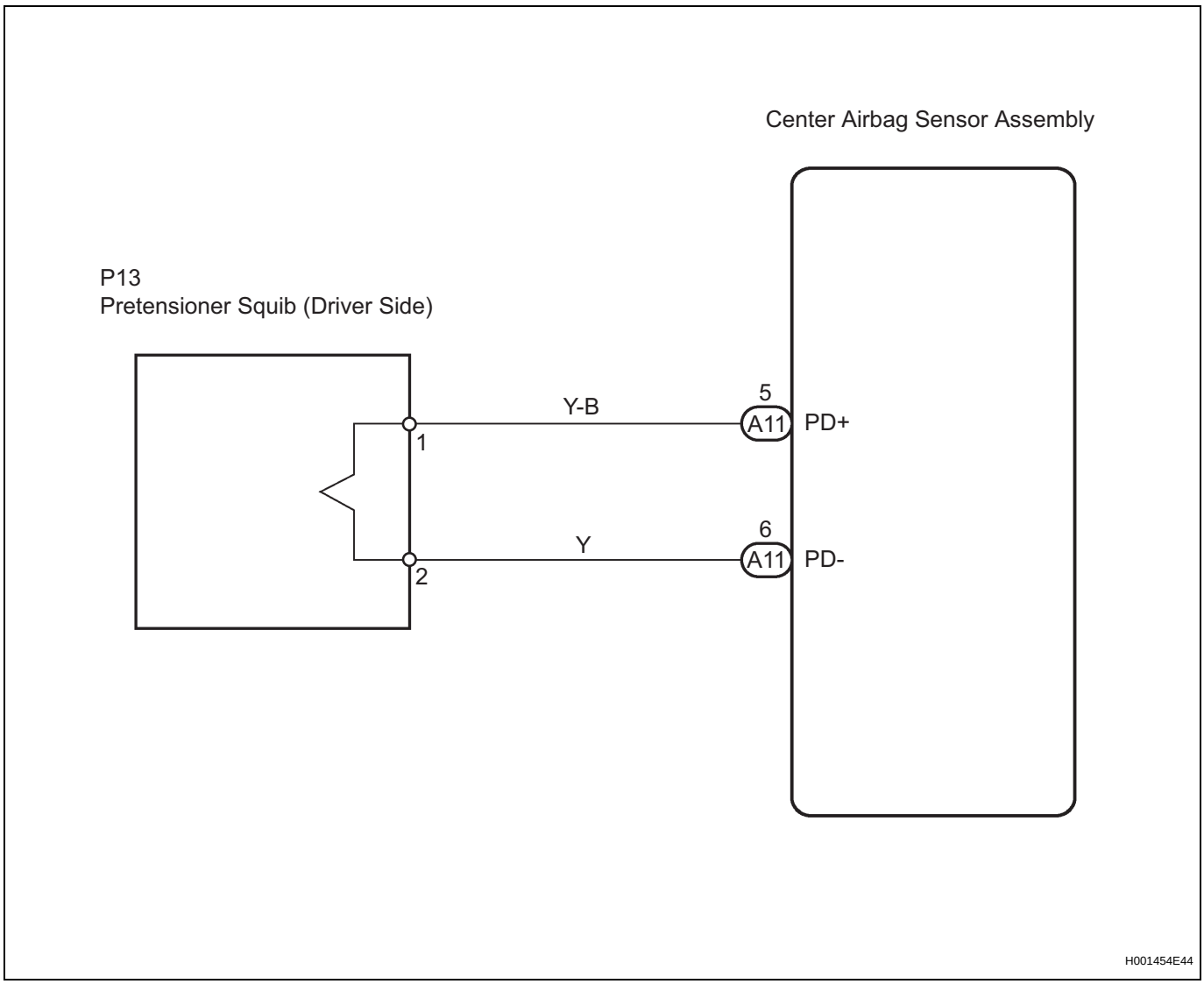
The pretensioner squib (driver side) circuit consists of the center airbag sensor and the front seat outer belt LH.

This circuit instructs the SRS to deploy when deployment conditions are met.

These DTCs are recorded when a malfunction is detected in the pretensioner squib (driver side) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1900/73	• The center airbag sensor assembly receives a line short circuit signal 5 times in the pretensioner squib (driver side) circuit during primary check.	• Front seat outer belt assembly LH (pretensioner squib (driver side)) • Center airbag sensor assembly • Floor wire
B1901/73	• The center airbag sensor assembly receives an open circuit signal in the pretensioner squib (driver side) circuit for 2 seconds.	• Front seat outer belt assembly LH (pretensioner squib (driver side)) • Center airbag sensor assembly • Floor wire
B1902/73	• The center airbag sensor assembly receives a short circuit to ground signal in the pretensioner squib (driver side) circuit for 0.5 seconds.	• Front seat outer belt assembly LH (pretensioner squib (driver side)) • Center airbag sensor assembly • Floor wire
B1903/73	• The center airbag sensor assembly receives a B+ short circuit signal in the pretensioner squib (driver side) circuit for 0.5 seconds.	• Front seat outer belt assembly LH (pretensioner squib (driver side)) • Center airbag sensor assembly • Floor wire

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

1. Disconnect the connectors from the horn button.
2. Disconnect the connectors from the front passenger airbag.
3. Disconnect the connector from the No. 1 instrument panel airbag lower.
4. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag LH.
5. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag RH.
6. w/ Side and curtain shield airbag:
   Disconnect the connector from the curtain shield airbag LH.
7. w/ Side and curtain shield airbag:
   Disconnect the connector from the curtain shield airbag RH.
8. Disconnect the connector from the front seat outer belt RH.

1	CHECK FOR DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester (read the 5-digit of DTC):
Using the intelligent tester, check for DTCs (see page RS-18).
Result

Result	Proceed to
DTC B1900 is output.	A
DTC B1901 is output.	B
DTC B1902 is output.	C
DTC B1903 is output.	D

(2) If not using the intelligent tester (read the 2-digit of DTC):
Check for DTCs (see page RS-18).
Result

Result	Proceed to
DTC 73 is output.	E

B → **Go to step 4**

C → **Go to step 5**

D → **Go to step 6**

E → **Go to step 7**

A

2	CHECK CONNECTOR

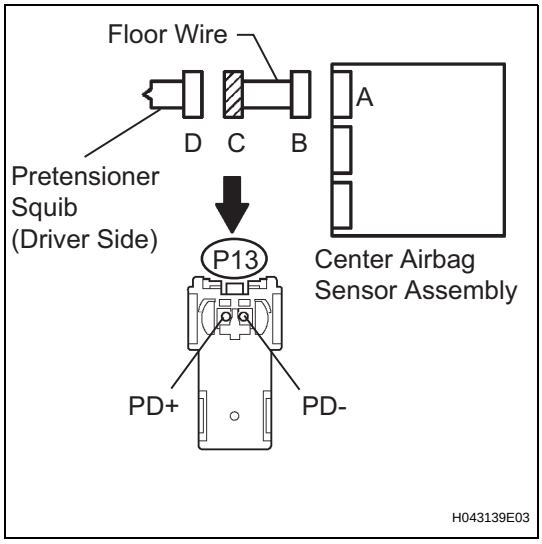
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the floor wire connector (on the front seat outer belt LH side) is not damaged.
OK:
The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

RS

3	CHECK FLOOR WIRE (SHORT)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connector from the front seat outer belt LH (pretensioner squib (driver side)).
(c) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

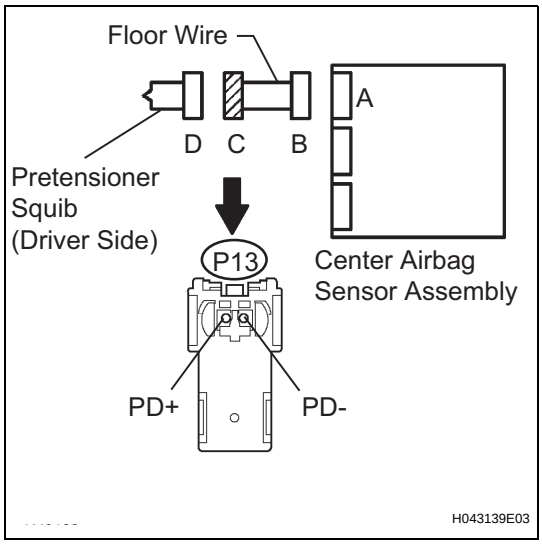
Tester Connection	Specified Condition
P13-1 (PD+) - P13-2 (PD-)	1 MΩ or higher

OK → **Go to step 10**

NG

REPAIR OR REPLACE FLOOR WIRE

4	CHECK FLOOR WIRE (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the front seat outer belt LH (pretensioner squib (driver side)).
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

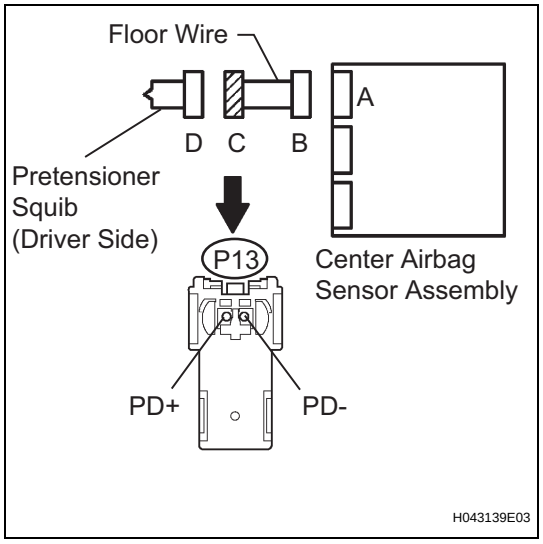
Tester Connection	Specified Condition
P13-1 (PD+) - P13-2 (PD-)	Below 1 Ω

OK → **Go to step 11**

NG

REPAIR OR REPLACE FLOOR WIRE

5 CHECK FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the front seat outer belt LH (pretensioner squib (driver side)).
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

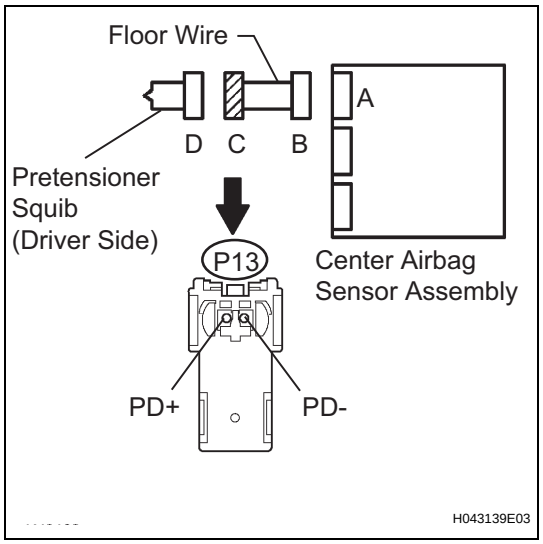
Tester Connection	Specified Condition
P13-1 (PD+) - Body ground	1 MΩ or higher
P13-2 (PD-) - Body ground	1 MΩ or higher

OK → **Go to step 11**

NG

REPAIR OR REPLACE FLOOR WIRE

6 CHECK FLOOR WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the front seat outer belt LH (pretensioner squib (driver side)).
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position.
(g) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
P13-1 (PD+) - Body ground	Below 1 V
P13-2 (PD-) - Body ground	Below 1 V

(h) Before proceeding to the next step, perform the following procedures.
  (1) Turn the ignition switch to the LOCK position.
  (2) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

OK → **Go to step 11**

NG

REPAIR OR REPLACE FLOOR WIRE

RS

7 CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the floor wire connector (on the front seat outer belt LH side) is not damaged.

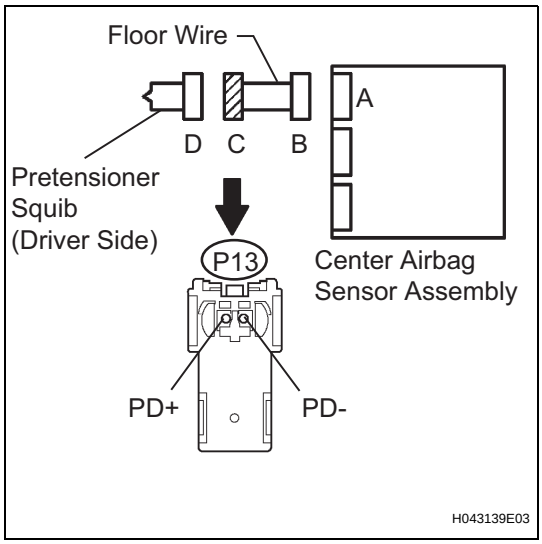
OK:

The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

8 CHECK FLOOR WIRE (PRETENSIONER SQUIB (DRIVER SIDE) CIRCUIT)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connector from the front seat outer belt LH (pretensioner squib (driver side)).
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
P13-1 (PD+) - Body ground	Below 1 V
P13-2 (PD-) - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
P13-1 (PD+) - P13-2 (PD-)	Below 1 Ω
P13-1 (PD+) - Body ground	1 MΩ or higher
P13-2 (PD-) - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

Standard resistance

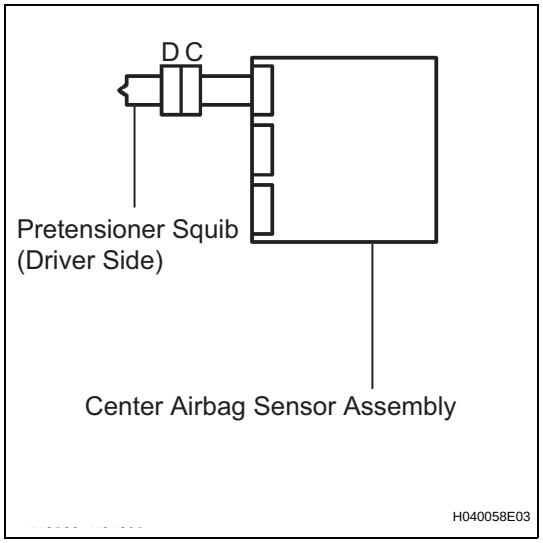
Tester Connection	Specified Condition
P13-1 (PD+) - P13-2 (PD-)	1 MΩ or higher

NG → **REPAIR OR REPLACE FLOOR WIRE**

OK

RS

9	REPLACE FRONT SEAT OUTER BELT ASSEMBLY LH (PRETENSIONER SQUIB (DRIVER SIDE))



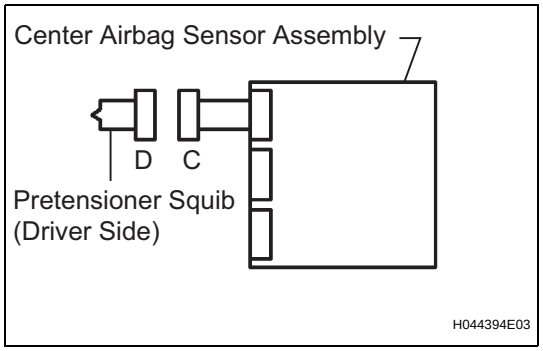
(a) Replace the front seat outer belt LH and connect the connector.
HINT:
Perform the inspection using parts from a normal vehicle if possible.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC 73 is not output.
HINT:
Codes other than code 73 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

10	CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

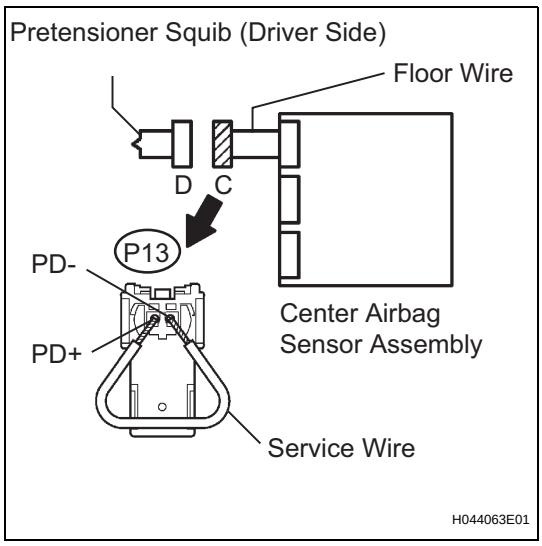
(h) Check for DTCs (see page RS-18).
OK:
DTC B1900 is not output.
HINT:
Codes other than code B1900 may be output at this time, but they are not related to this check.

OK	Go to step 12

NG

REPLACE CENTER AIRBAG SENSOR ASSEMBLY

11 CHECK CENTER AIRBAG SENSOR ASSEMBLY



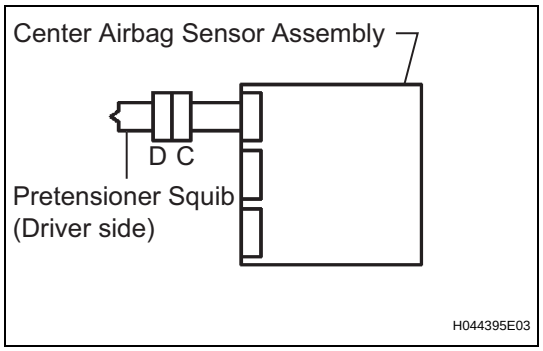
(a) Connect the connectors to the center airbag sensor.
(b) Using a service wire, connect P13-1 (PD+) and P13-2 (PD-) of connector "C".
NOTICE:
- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch on the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1901, B1902 or B1903 is not output.
HINT:
Codes other than code B1901, B1902 or B1903 may be output at this time, but they are not related to this check.
(i) Before proceeding to the next step, perform the following procedures.
(1) Disconnect the service wire from connector "C".

NG	REPLACE CENTER AIRBAG SENSOR ASSEMBLY

OK

12	CHECK FRONT SEAT OUTER BELT ASSEMBLY LH (PRETENSIONER SQUIB (DRIVER SIDE))



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connector to the front seat outer belt LH.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page RS-18).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check for DTCs (see page RS-18).

OK:

DTC B1900, B1901, B1902 or B1903 is not output.

HINT:

Codes other than code B1900, B1901, B1902 or B1903 may be output at this time, but they are not related to this check.

NG → **REPLACE FRONT SEAT OUTER BELT ASSEMBLY LH**

OK

PERFORM SYMPTOM SIMULATION

RS

DTC	B1905/74	Short in Front Passenger Side Pretensioner Squib Circuit

DTC	B1906/74	Open in Front Passenger Side Pretensioner Squib Circuit

DTC	B1907/74	Short to GND in Front Passenger Side Pretensioner Squib Circuit

DTC	B1908/74	Short to B+ in Front Passenger Side Front Pretensioner Squib Circuit

DESCRIPTION

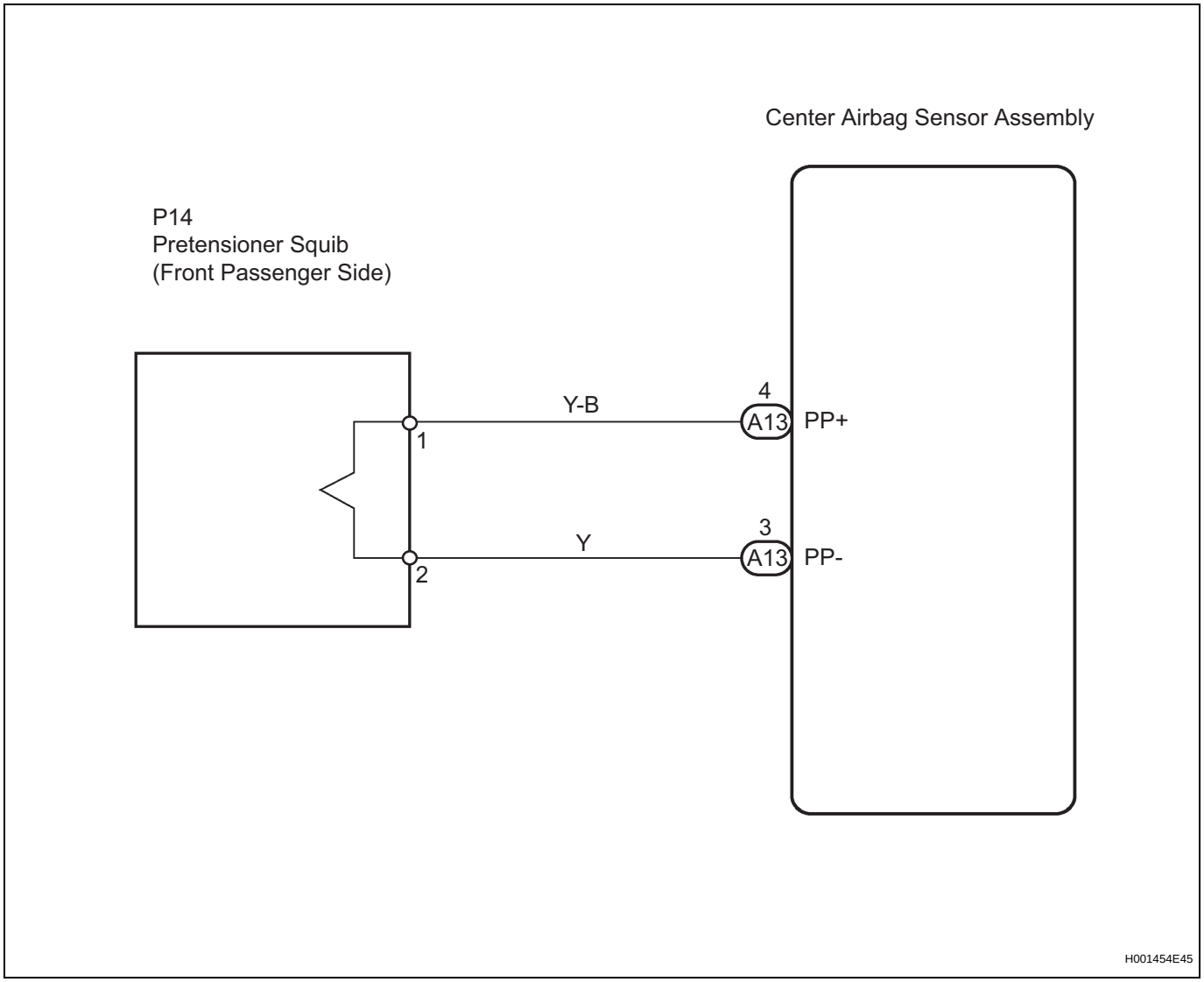
The pretensioner squib (front passenger side) circuit consists of the center airbag sensor and the front seat outer belt RH.

This circuit instructs the SRS to deploy when deployment conditions are met.

These DTCs are recorded when a malfunction is detected in the pretensioner squib (front passenger side) circuit.

DTC No.	DTC Detection Condition	Trouble Area
B1905/74	• The center airbag sensor assembly receives a line short circuit signal 5 times in the pretensioner squib (front passenger side) circuit during primary check.	• Front seat outer belt assembly RH (pretensioner squib (front passenger side)) • Center airbag sensor assembly • No. 2 floor wire
B1906/74	• The center airbag sensor assembly receives an open circuit signal in the pretensioner squib (front passenger side) circuit for 2 seconds.	• Front seat outer belt assembly RH (pretensioner squib (front passenger side)) • Center airbag sensor assembly • No. 2 floor wire
B1907/74	• The center airbag sensor assembly receives a short circuit to ground signal in the pretensioner squib (front passenger side) circuit for 0.5 seconds.	• Front seat outer belt assembly RH (pretensioner squib (front passenger side)) • Center airbag sensor assembly • No. 2 floor wire
B1908/74	• The center airbag sensor assembly receives a B+ short circuit signal in the pretensioner squib (front passenger side) circuit for 0.5 seconds.	• Front seat outer belt assembly RH (pretensioner squib (front passenger side)) • Center airbag sensor assembly • No. 2 floor wire

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

1. Disconnect the connectors from the horn button.
2. Disconnect the connectors from the front passenger airbag.
3. Disconnect the connector from the No. 1 instrument panel airbag lower.
4. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag LH.
5. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag RH.
6. w/ Side and curtain shield airbag:
   Disconnect the connector from the curtain shield airbag LH.
7. w/ Side and curtain shield airbag:
   Disconnect the connector from the curtain shield airbag RH.
8. Disconnect the connector from the front seat outer belt LH.

RS

1	CHECK FOR DTC

(a) Proceed to each step according to DTC readings.
(1) If using the intelligent tester (read the 5-digit of DTC):
Using the intelligent tester, check for DTCs (see page RS-18).
Result

Result	Proceed to
DTC B1905 is output.	A
DTC B1906 is output.	B
DTC B1907 is output.	C
DTC B1908 is output.	D

(2) If not using the intelligent tester (read the 2-digit of DTC):
Check for DTCs (see page RS-18).
Result

Result	Proceed to
DTC 74 is output.	E

B → **Go to step 4**

C → **Go to step 5**

D → **Go to step 6**

E → **Go to step 7**

A

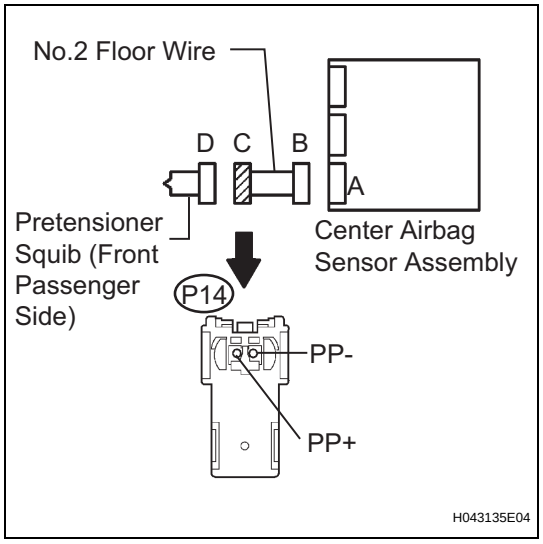
2	CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the No. 2 floor wire connector (on the front seat outer belt RH side) is not damaged.
OK:
The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE NO. 2 FLOOR WIRE**

OK

3 CHECK NO. 2 FLOOR WIRE (SHORT)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connector from the front seat outer belt RH (pretensioner squib (front passenger side)).
(c) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

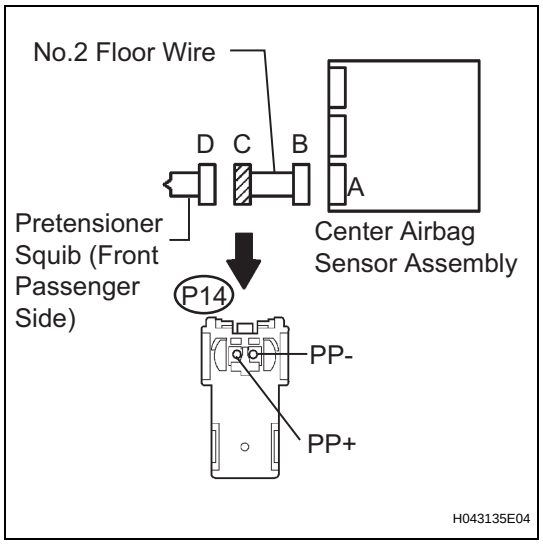
Tester Connection	Specified Condition
P14-1 (PP+) - P14-2 (PP-)	1 MΩ or higher

OK → **Go to step 10**

NG

REPAIR OR REPLACE NO. 2 FLOOR WIRE

4 CHECK NO. 2 FLOOR WIRE (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the front seat outer belt RH (pretensioner squib (front passenger side)).
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
P14-1 (PP+) - P14-2 (PP-)	Below 1 Ω

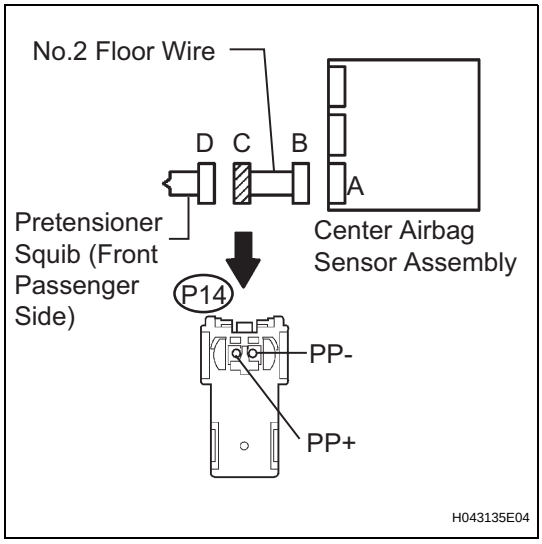
OK → **Go to step 11**

NG

REPAIR OR REPLACE NO. 2 FLOOR WIRE

RS

5	CHECK NO. 2 FLOOR WIRE (TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the front seat outer belt RH (pretensioner squib (front passenger side)).
(e) Measure the resistance according to the value(s) in the table below.

Standard resistance

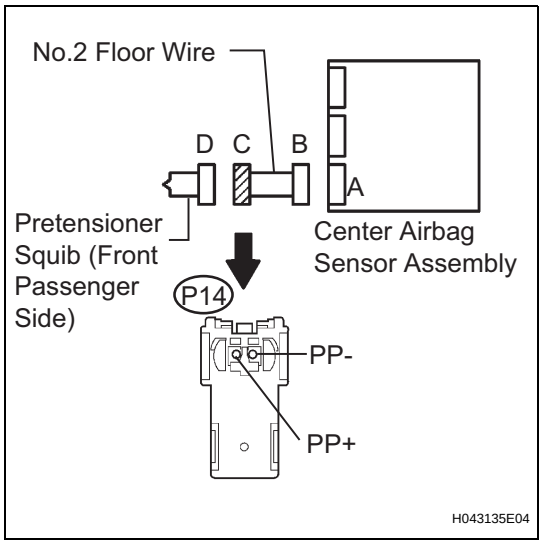
Tester Connection	Specified Condition
P14-1 (PP+) - Body ground	1 MΩ or higher
P14-2 (PP-) - Body ground	1 MΩ or higher

OK → **Go to step 11**

NG

REPAIR OR REPLACE NO. 2 FLOOR WIRE

6	CHECK NO. 2 FLOOR WIRE (TO B+)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connectors from the center airbag sensor.
(d) Disconnect the connector from the front seat outer belt RH (pretensioner squib (front passenger side)).
(e) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(f) Turn the ignition switch to the ON position.
(g) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
P14-1 (PP+) - Body ground	Below 1 V
P14-2 (PP-) - Body ground	Below 1 V

(h) Before proceeding to the next step, perform the following procedures.
  (1) Turn the ignition switch to the LOCK position.
  (2) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.

OK → **Go to step 11**

NG

REPAIR OR REPLACE NO. 2 FLOOR WIRE

RS

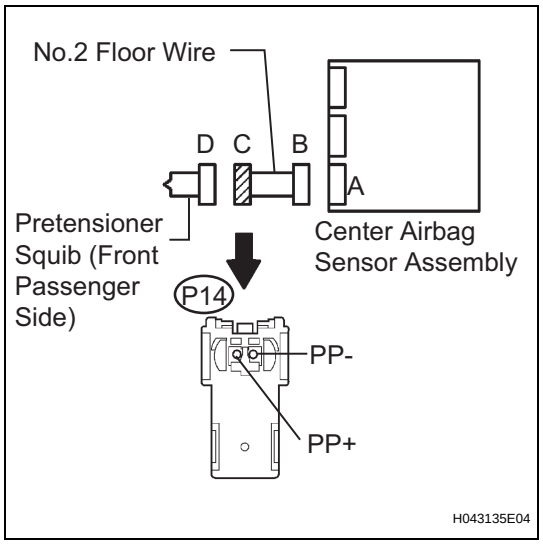
7	CHECK CONNECTOR

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the No. 2 floor wire connector (on the front seat outer belt RH side) is not damaged.
OK:
The lock button is not disengaged, or the claw of the lock is not deformed or damaged.

NG → **REPAIR OR REPLACE NO. 2 FLOOR WIRE**

OK

8	CHECK NO. 2 FLOOR WIRE (PRETENSIONER SQUIB (FRONT PASSENGER SIDE) CIRCUIT)



(a) Disconnect the connectors from the center airbag sensor.
(b) Disconnect the connector from the front seat outer belt RH (pretensioner squib (front passenger side)).
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.
Standard voltage

Tester Connection	Specified Condition
P14-1 (PP+) - Body ground	Below 1 V
P14-2 (PP-) - Body ground	Below 1 V

(f) Turn the ignition switch to the LOCK position.
(g) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(h) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
P14-1 (PP+) - P14-2 (PP-)	Below 1 Ω
P14-1 (PP+) - Body ground	1 MΩ or higher
P14-2 (PP-) - Body ground	1 MΩ or higher

(i) Release the activation prevention mechanism built into connector "B" (see page RS-11).
(j) Measure the resistance according to the value(s) in the table below.

Standard resistance

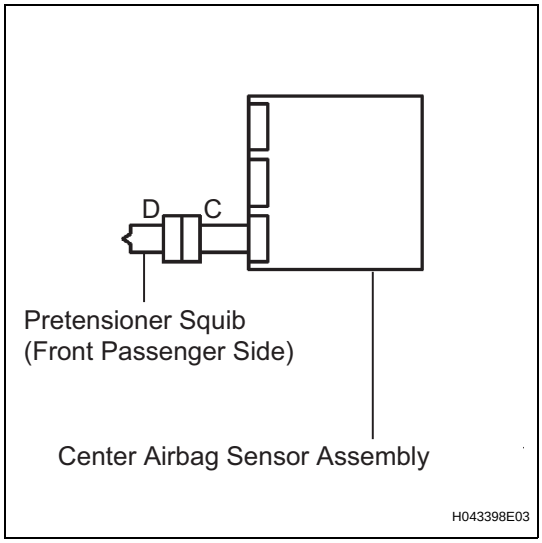
Tester Connection	Specified Condition
P14-1 (PP+) - P14-2 (PP-)	1 MΩ or higher

NG → **REPAIR OR REPLACE NO. 2 FLOOR WIRE**

RS

OK

9	REPLACE FRONT SEAT OUTER BELT ASSEMBLY RH (PRETENSIONER SQUIB (FRONT PASSENGER SIDE))



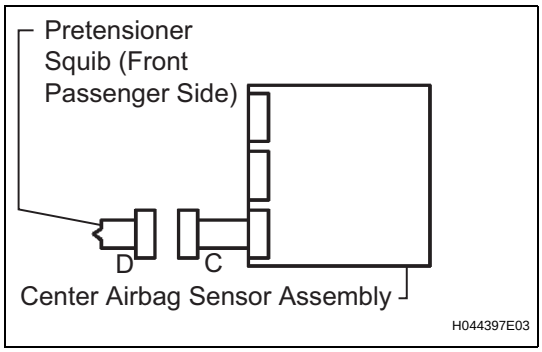
(a) Replace the front seat outer belt RH and connect the connector.
HINT:
Perform the inspection using parts from a normal vehicle if possible.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC 74 is not output.
HINT:
Codes other than code 74 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

10	CHECK CENTER AIRBAG SENSOR ASSEMBLY



(a) Restore the released activation prevention mechanism of connector "B" to the original condition.
(b) Connect the connectors to the center airbag sensor.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.

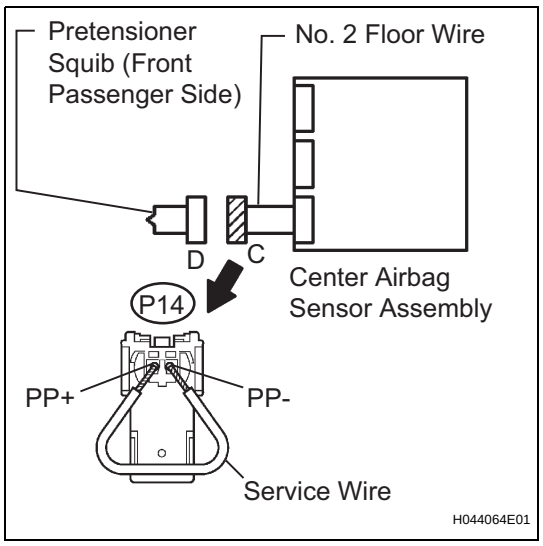
(h) Check for DTCs (see page RS-18).
OK:
DTC B1905 is not output.
HINT:
Codes other than code B1905 may be output at this time, but they are not related to this check.

OK	**Go to step 12**

NG

REPLACE CENTER AIRBAG SENSOR ASSEMBLY

11 CHECK CENTER AIRBAG SENSOR ASSEMBLY



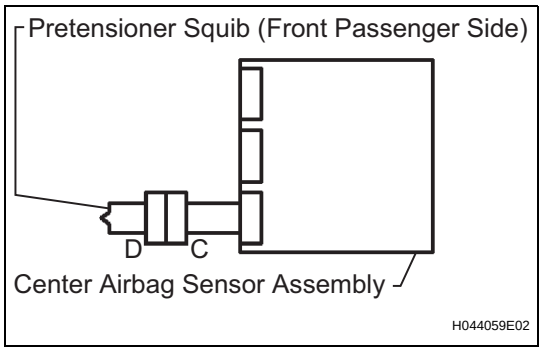
(a) Connect the connectors to the center airbag sensor.
(b) Using a service wire, connect P14-1 (PP+) and P14-2 (PP-) of connector "C".
NOTICE:
- **Twist the end of the service wire in order to insert it into the connector.**
- **Do not forcibly insert the twisted service wire into the terminals of the connector when connecting.**

(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(e) Clear the DTCs stored in memory (see page RS-18).
(f) Turn the ignition switch to the LOCK position.
(g) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(h) Check for DTCs (see page RS-18).
OK:
DTC B1906, B1907 or B1908 is not output.
HINT:
Codes other than code B1906, B1907 or B1908 may be output at this time, but they are not related to this check.
(i) Before proceeding to the next step, perform the following procedures.
(1) Disconnect the service wire from connector "C".

NG	**REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

12	CHECK FRONT SEAT OUTER BELT ASSEMBLY RH (PRETENSIONER SQUIB (FRONT PASSENGER SIDE))



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Connect the connector to the front seat outer belt RH.
(d) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(e) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(f) Clear the DTCs stored in memory (see page RS-18).
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(i) Check for DTCs (see page RS-18).

OK:

DTC B1905, B1906, B1907 or B1908 is not output.

HINT:

Codes other than code B1905, B1906, B1907 or B1908 may be output at this time, but they are not related to this check.

NG → **REPLACE FRONT SEAT OUTER BELT ASSEMBLY RH**

OK

PERFORM SYMPTOM SIMULATION

Source Voltage Drop

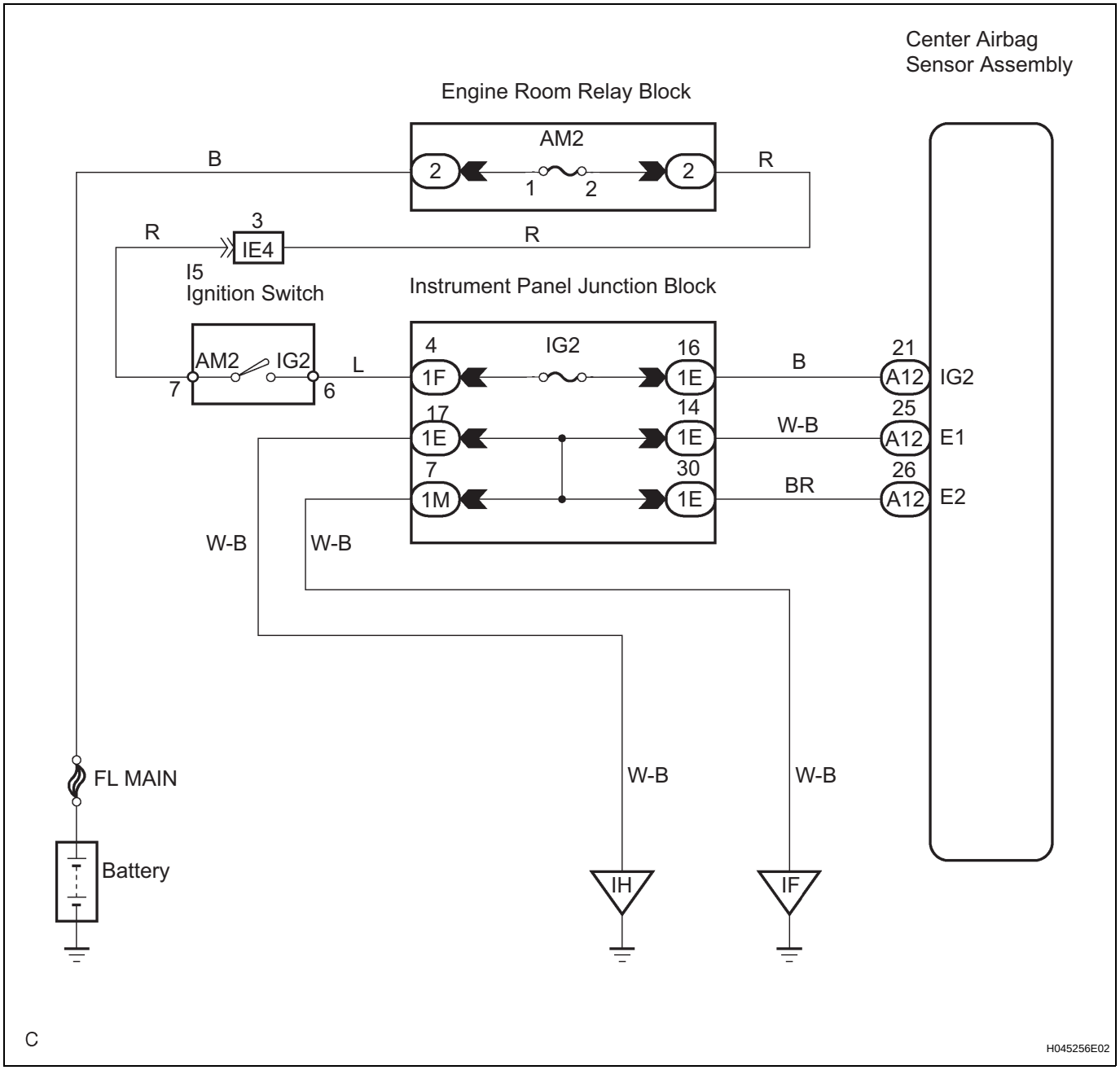
DESCRIPTION

The SRS is equipped with a voltage-increase circuit (DC-DC converter) in the center airbag sensor. When the source 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 displayed differently from other codes. The source voltage drop is indicated when the SRS warning light comes on without showing any DTCs.

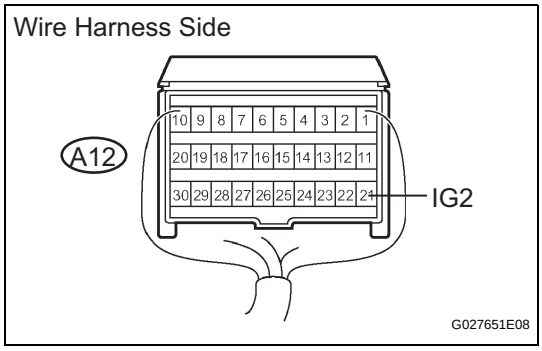
A malfunction in this circuit is not recorded in the center airbag sensor. The SRS warning light automatically goes off when the source voltage returns to normal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (POWER SOURCE)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

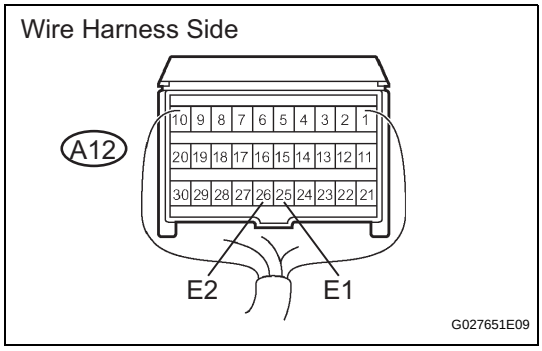
Standard voltage

Tester Connection	Specified Condition
A12-21 (IG2) - Body ground	10 to 14 V

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR (BATTERY - CENTER AIRBAG SENSOR ASSEMBLY)**

OK

2	CHECK WIRE HARNESS (CENTER AIRBAG SENSOR ASSEMBLY - BODY GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A12-25 (E1) - Body ground	Below 1 Ω
A12-26 (E2) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR (CENTER AIRBAG SENSOR ASSEMBLY - BODY GROUND)**

OK

3	CHECK SRS WARNING LIGHT

(a) Connect the A12 connector to the center airbag sensor.
(b) Connect the A12 connector to the horn button.
(c) Connect the A12 connector to the front passenger airbag.
(d) Connect the A12 connector to the No. 1 instrument panel airbag lower.
(e) w/ Side and curtain shield airbag:
Connect the connector to the front seat airbag LH.
(f) w/ Side and curtain shield airbag:
Connect the connector to the front seat airbag RH.
(g) w/ Side and curtain shield airbag:
Connect the connector to the curtain shield airbag LH.

(h) w/ Side and curtain shield airbag:
Connect the connector to the curtain shield airbag RH.
(i) Connect the connector to the front seat outer belt LH.
(j) Connect the connector to the front seat outer belt RH.
(k) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(l) Turn the ignition switch to the ON position, and wait for at least 6 seconds.
(m) Operate all components of the electrical system (defogger, wiper, headlight, heater blower, etc.) and check the SRS warning light operation.
OK:
The SRS warning light does not come on.

RS

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

SRS Warning Light Remains ON

DESCRIPTION

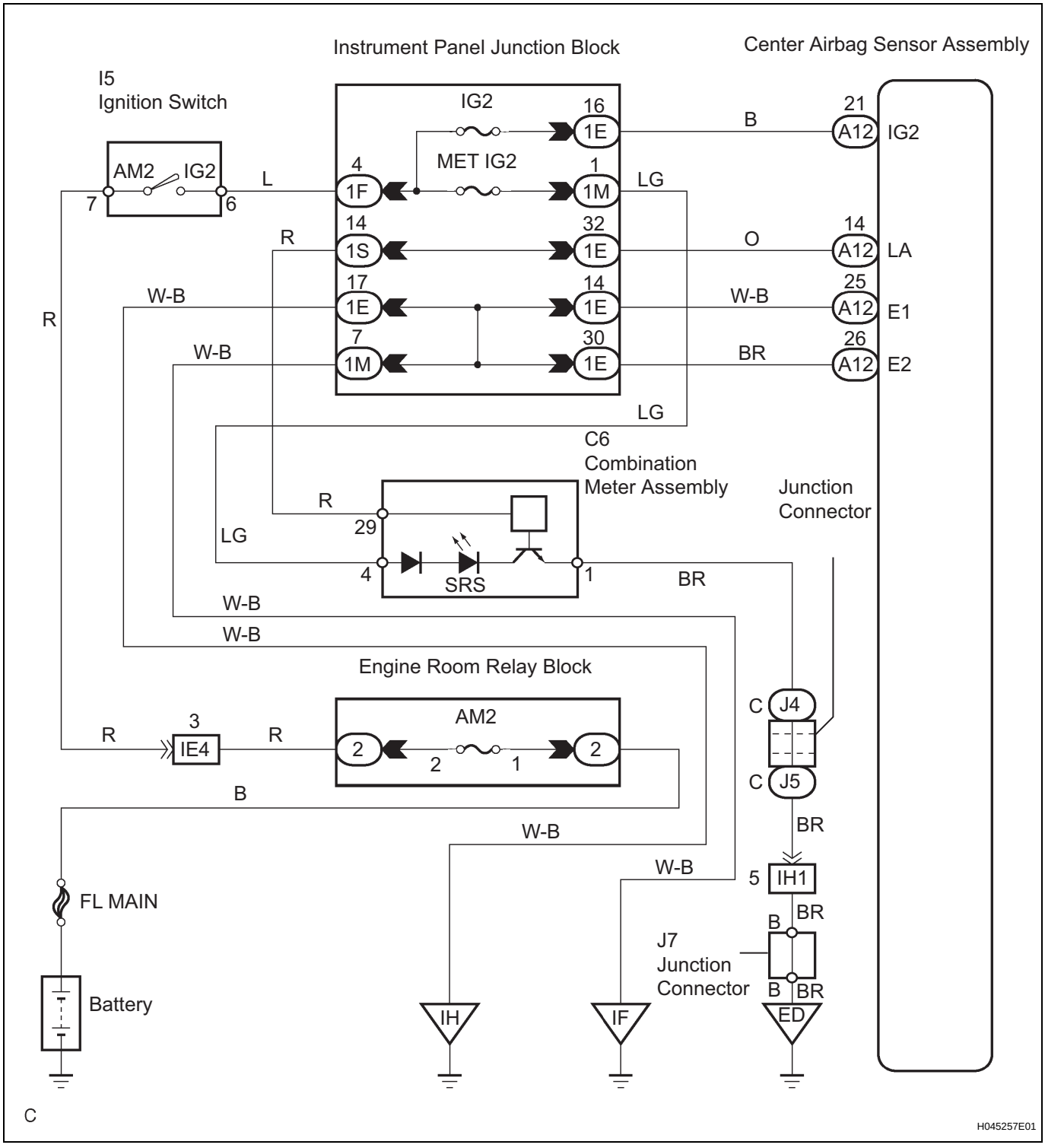
The SRS warning light is located on the combination meter.

When the SRS is normal, the SRS warning light comes on for approximately 6 seconds after the ignition switch is turned from the LOCK position to the ON position, 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.

When terminals TC and CG of the DLC3 are connected, the DTCs are displayed by blinking the SRS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

CAUTION:

Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
3. Disconnect the connectors from the center airbag sensor.
4. Disconnect the connectors from the horn button.

5. Disconnect the connectors from the front passenger airbag.
6. Disconnect the connector from the No. 1 instrument panel airbag lower.
7. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag LH.
8. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag RH.
9. w/ Side and curtain shield airbag:
   Disconnect the connector from the curtain shield airbag LH.
10. w/ Side and curtain shield airbag:
    Disconnect the connector from the curtain shield airbag RH.
11. Disconnect the connector from the front seat outer belt LH.
12. Disconnect the connector from the front seat outer belt RH.

1	CHECK CONNECTION OF CONNECTORS

(a) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(b) Check that the connectors are properly connected to the center airbag sensor.
OK:
The connectors are connected.

NG → **CONNECT CONNECTORS**

OK ↓

2	CHECK FOR DTC

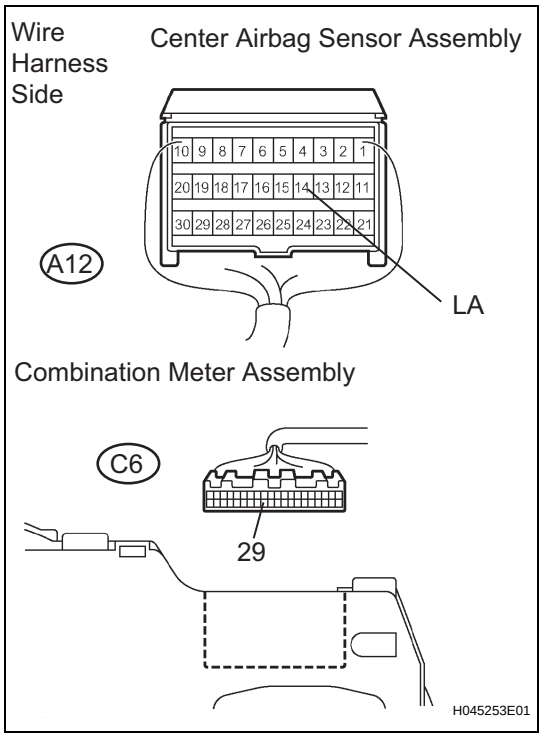
(a) Connect the negative (-) terminal cable to the battery, and wait for at least 90 seconds.
(b) Check for DTCs (see page RS-18).
OK:
Normal system code is output.

NG → **REPAIR CIRCUIT INDICATED BY OUTPUT DTC**

OK ↓

RS

3	CHECK WIRE HARNESS (CENTER AIRBAG SENSOR ASSEMBLY - COMBINATION METER ASSEMBLY)



(a) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(b) Disconnect connector from the combination meter.
(c) Disconnect the A12 connector from the center airbag sensor.
(d) Measure the resistance according to the value(s) in the table below.

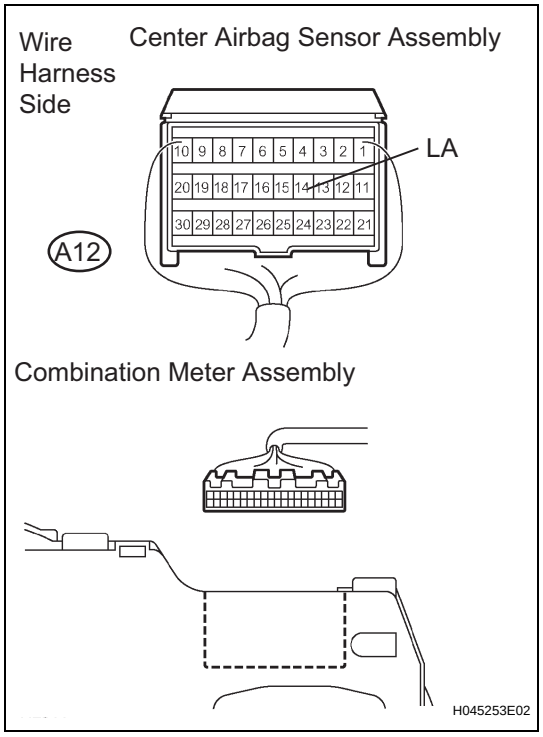
Standard resistance

Tester Connection	Specified Condition
A12-14 (LA) - C6-29	Below 1 Ω
A12-14 (LA) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE WIRE HARNESS (CENTER AIRBAG SENSOR ASSEMBLY - COMBINATION METER ASSEMBLY)**

OK

4	CHECK WIRE HARNESS (CENTER AIRBAG SENSOR ASSEMBLY - COMBINATION METER ASSEMBLY)



(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

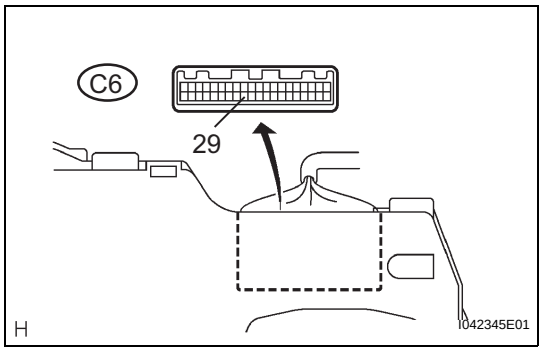
Tester Connection	Specified Condition
A12-14 (LA) - Body ground	Below 1 V

NG → **REPAIR OR REPLACE WIRE HARNESS (CENTER AIRBAG SENSOR ASSEMBLY - COMBINATION METER ASSEMBLY)**

OK

5	CHECK COMBINATION METER ASSEMBLY

RS



(a) Turn the ignition switch to the LOCK position.
(b) Connect the C6 connector to the combination meter.
(c) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(d) Turn the ignition switch to the ON position.
(e) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
C6-29 - Body ground	7 to 14 V

NG → **REPLACE COMBINATION METER ASSEMBLY**

OK

6	CHECK SRS WARNING LIGHT

(a) Turn the ignition switch to the LOCK position, and wait for at least 60 seconds.
(b) Turn the ignition switch to the ON position.
(c) Check the SRS warning light.

Result

Result	Proceed to
Comes on simultaneously with ignition switch on	A
Comes on 10 sec. after ignition switch on	B

A → **REPLACE COMBINATION METER ASSEMBLY**

B

REPLACE CENTER AIRBAG SENSOR ASSEMBLY

SRS Warning Light does not Come ON

DESCRIPTION

The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light comes on for approximately 6 seconds after the ignition switch is turned from the LOCK position to the ON position, 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.
When terminals TC and CG of the DLC3 are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

Refer to SRS Warning Light Remains ON (see page RS-235).

INSPECTION PROCEDURE

CAUTION:
Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
3. Disconnect the connectors from the center airbag senor.
4. Disconnect the connectors from the horn button.
5. Disconnect the connectors from the front passenger airbag.
6. Disconnect the connector from the No. 1 instrument panel airbag lower.
7. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag LH.
8. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag RH.
9. w/ Side and curtain shield airbag:
   Disconnect the connector from the curtain shield airbag LH.
10. w/ Side and curtain shield airbag:
    Disconnect the connector from the curtain shield airbag RH.
11. Disconnect the connector from the front seat outer belt LH.
12. Disconnect the connector from the front seat outer belt RH.

1	CHECK COMBINATION METER ASSEMBLY

(a) Connect the negative (-) terminal cable to the battery, and wait for at least 2 seconds.
(b) Turn the ignition switch to the ON position, and wait for at least 10 seconds.
(c) Check the SRS warning light.

Result

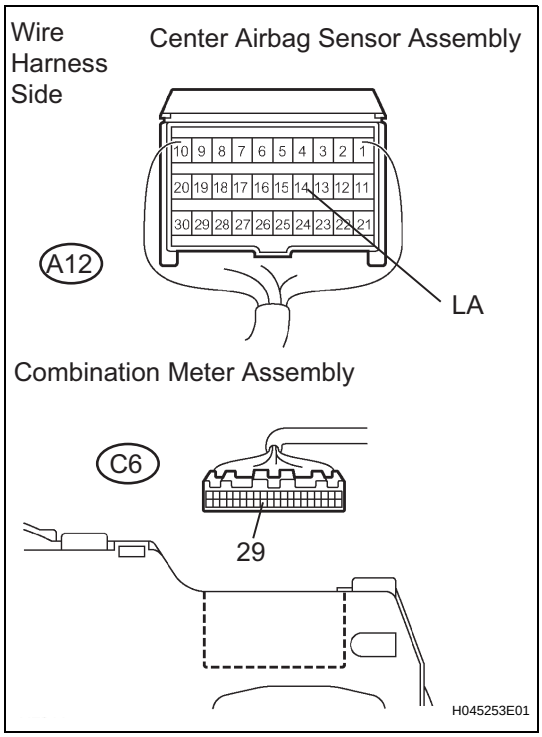
Result	Proceed to
Does not come on	A
Comes on	B

A → **REPLACE COMBINATION METER ASSEMBLY**

B

2	CHECK WIRE HARNESS (CENTER AIRBAG SENSOR ASSEMBLY - COMBINATION METER)

RS



(a) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(b) Disconnect the center airbag sensor connector.
(c) Disconnect the combination meter connector.
(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A12-14 (LA) - C6-29	Below 1 Ω
A12-14 (LA) - Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE CENTER AIRBAG SENSOR ASSEMBLY

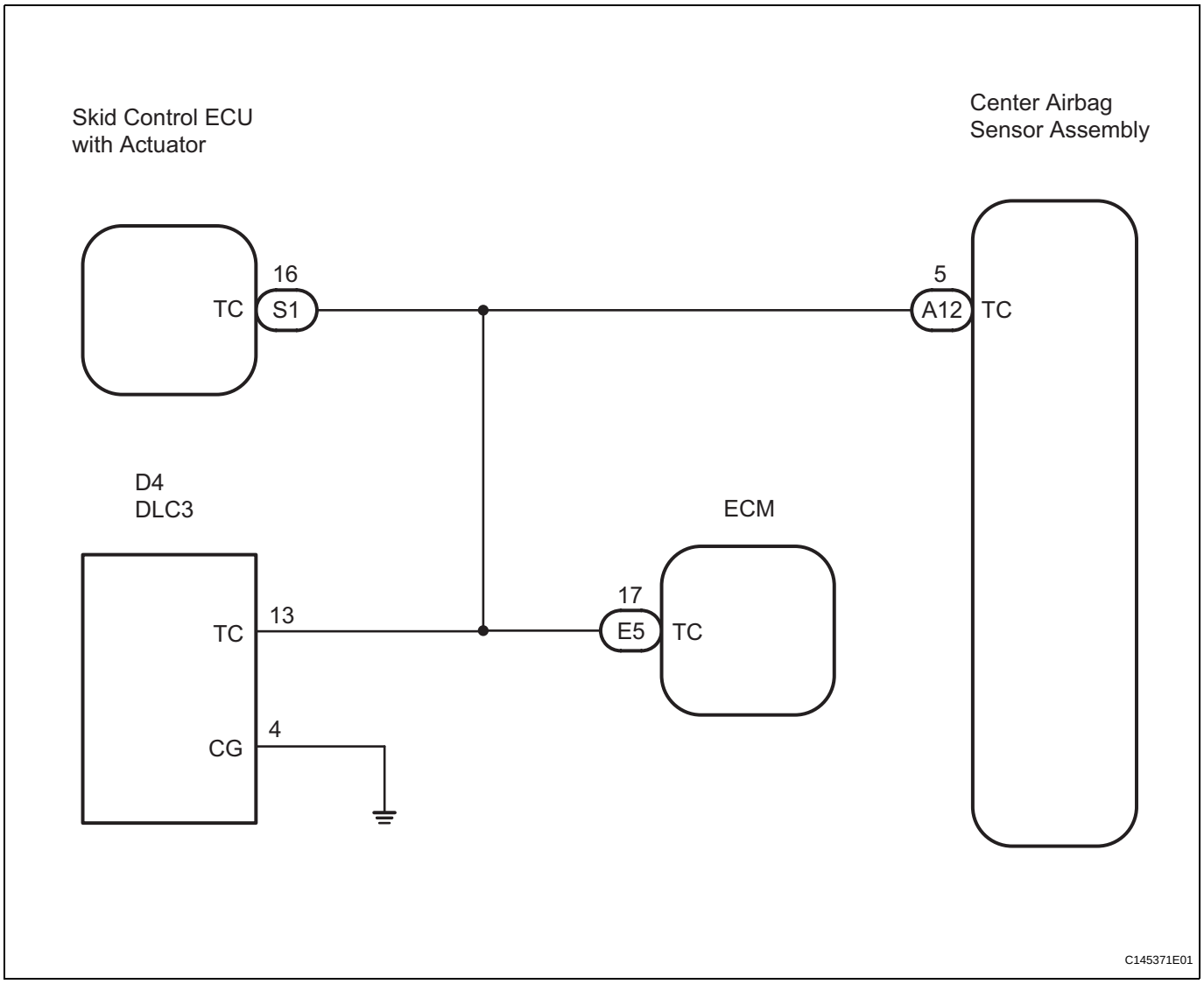
TC and CG Terminal Circuit

DESCRIPTION

DTC output mode is set by connecting terminals TC and CG of the DLC3.
The DTCs are displayed by blinking the SRS warning light.

RS

WIRING DIAGRAM



HINT:
When each warning light keeps blinking, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in each ECU is suspected.

INSPECTION PROCEDURE

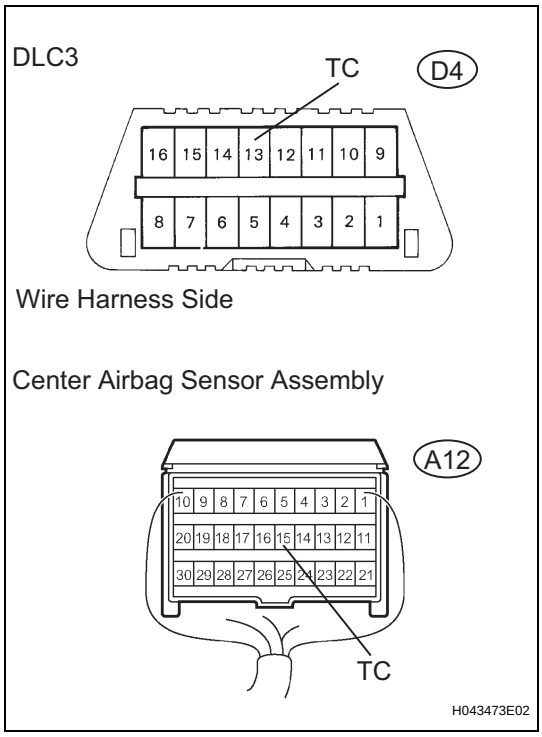
CAUTION:
Be sure to perform the following procedures before troubleshooting to avoid unexpected airbag deployment.

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
3. Disconnect the connectors from the center airbag sensor.
4. Disconnect the connectors from the horn button.
5. Disconnect the connectors from the front passenger airbag.

6. Disconnect the connector from the No. 1 instrument panel airbag lower.
7. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag LH.
8. w/ Side and curtain shield airbag:
   Disconnect the connector from the front seat airbag RH.
9. w/ Side and curtain shield airbag:
   Disconnect the connector from the curtain shield airbag LH.
10. w/ Side and curtain shield airbag:
    Disconnect the connector from the curtain shield airbag RH.
11. Disconnect the connector from the front seat outer belt LH.
12. Disconnect the connector from the front seat outer belt RH.

RS

1	CHECK WIRE HARNESS (TC OF DLC3 - TC OF CENTER AIRBAG SENSOR ASSEMBLY)



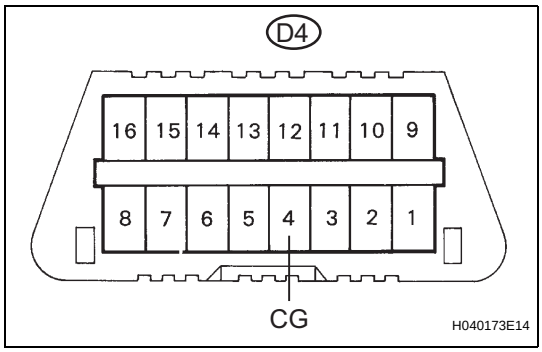
(a) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
D4-13 (TC)- A12-15 (TC)	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR (TC OF DLC3 - TC OF CENTER AIRBAG SENSOR ASSEMBLY)**

OK

2	CHECK WIRE HARNESS (CG OF DLC3 - BODY GROUND)



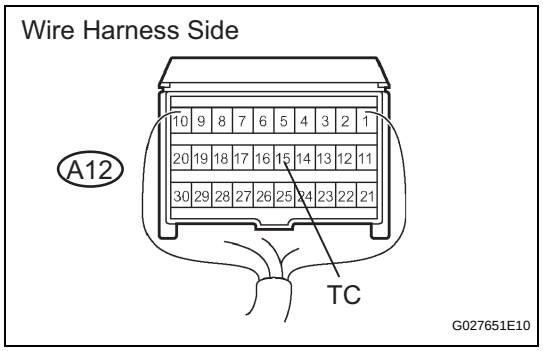
(a) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Specified Condition
D4-4 (CG) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR (CG OF DLC3 - BODY GROUND)**

OK

3	CHECK WIRE HARNESS (TC OF CENTER AIRBAG SENSOR ASSEMBLY - BODY GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Specified Condition
A12-15 (TC)- Body ground	1 MΩ or higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR OR REPLACE EACH ECU**

OK

REPLACE CENTER AIRBAG SENSOR ASSEMBLY

RS

OCCUPANT CLASSIFICATION SYSTEM

PRECAUTION

RS

NOTICE:
When disconnecting the negative (-) battery cable, initialize the following systems after the cable is reconnected:

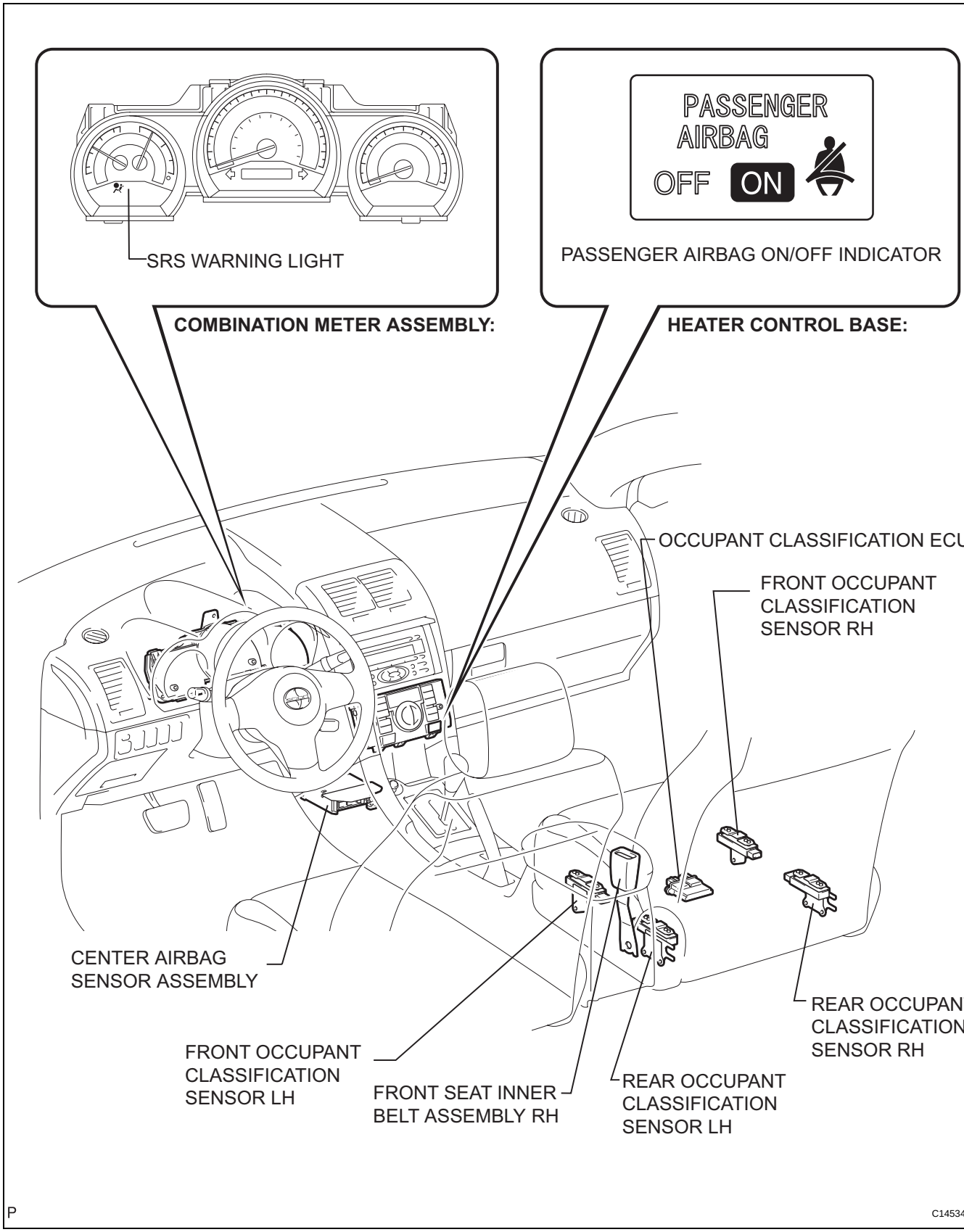
System Name	See procedure
Power Window Control System (w/ Jam Protection Function)	IN-23
Sliding Roof System	

1. INSPECTION PROCEDURE FOR VEHICLE INVOLVED IN ACCIDENT

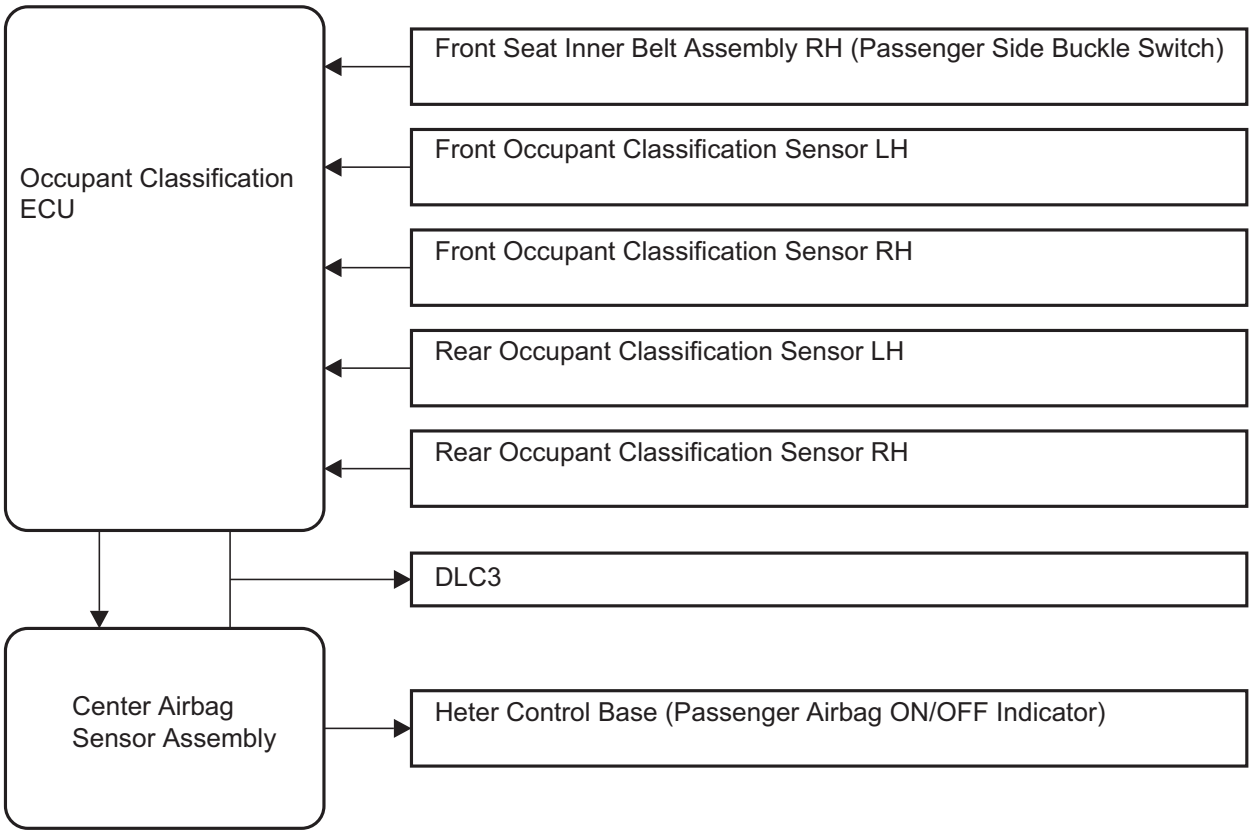
(a) Perform zero point calibration and sensitivity check if any of the following conditions occur:
- The occupant classification ECU is replaced.
- Accessories (seatback tray and seat cover, etc.) are installed.
- The front passenger seat is removed from the vehicle.
- The passenger airbag ON/OFF indicator ("OFF") comes on when the front passenger seat is not occupied.
- The vehicle is brought to the workshop for repair due to an accident or a collision.

NOTICE:
When an accident vehicle is brought into the workshop for repair, check the flatness of the body side that is equipped with the passenger seat. If the flatness is not within +- 3.0 mm (0.118 in.), adjust it to the specified range.

PARTS LOCATION



SYSTEM DIAGRAM



C

C110375E18

SYSTEM DESCRIPTION

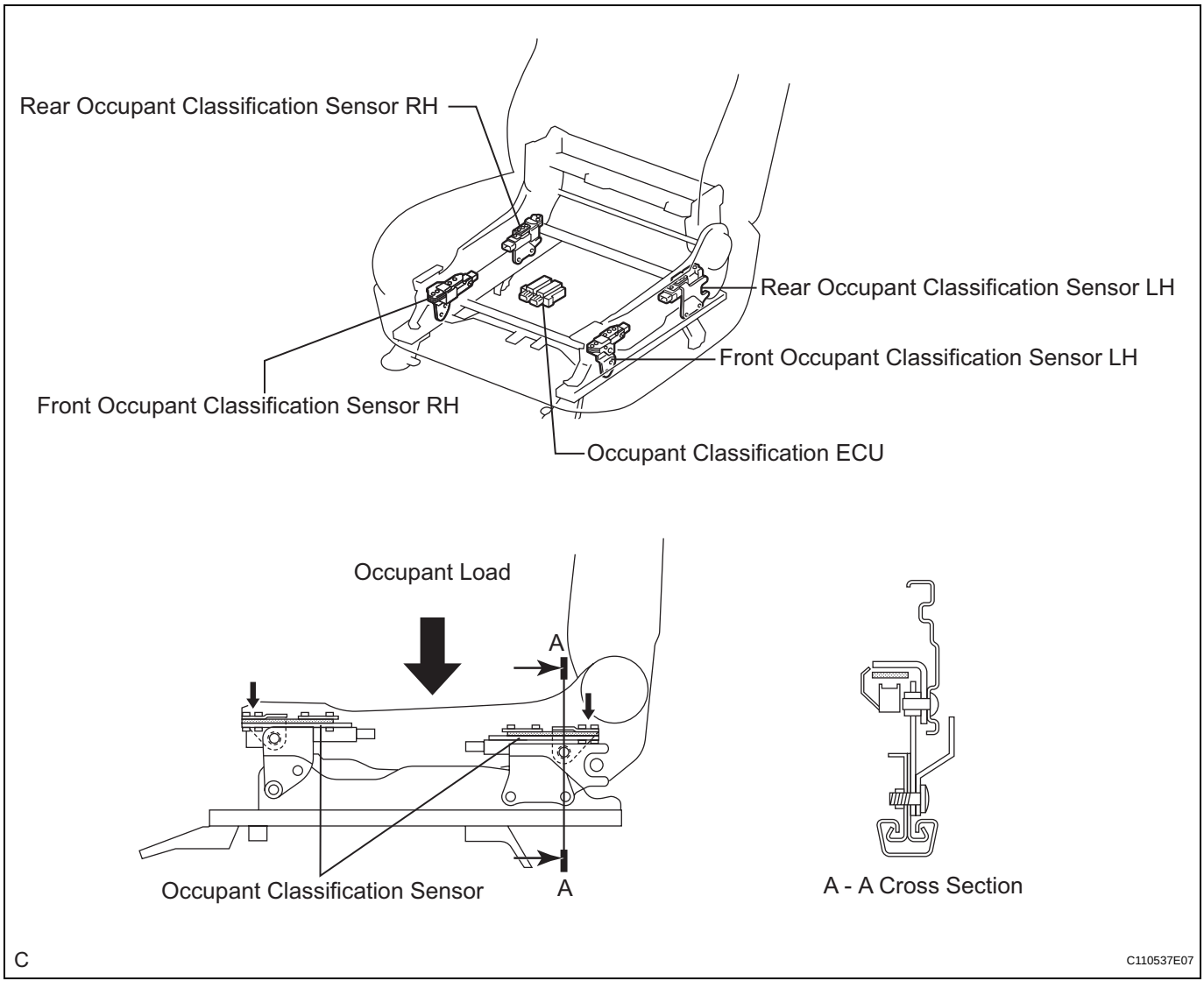
1. DESCRIPTION OF OCCUPANT CLASSIFICATION SYSTEM

(a) GENERAL DESCRIPTION

(1) In the occupant classification system, the occupant classification ECU calculates the weight of the occupant based on a signal from the occupant classification sensors. This system recognizes the occupant as a child if it detects a weight of less than 36 kg (79.37 lb), and disables the front passenger airbag and front passenger side - side airbag.

(2) This system is mainly comprised of 4 occupant classification sensors that detect the load on the front passenger seat. The occupant classification ECU controls the system, and the passenger airbag ON/OFF indicator indicates the ON/OFF condition of the front passenger airbag and front passenger side - side airbag.

(b) OCCUPANT CLASSIFICATION SENSOR



RS

(1) The occupant classification sensors are installed on the 4 brackets connecting the seat rail and seat frame. Accordingly, when load is applied to the front passenger seat by an occupant sitting in it, the occupant classification sensors register a distortion.

(c) DESCRIPTION FOR PASSENGER AIRBAG ON/OFF INDICATOR

(1) The passenger airbag ON/OFF indicator is installed on the heater control base. This indicator informs the driver whether the occupant classification ECU puts the front passenger airbag and front passenger side - side airbag into an active state or inactive state.

(2) If a malfunction occurs in the occupant classification system, "OFF" indication of the passenger airbag ON/OFF indicator and the SRS warning light come on.

HOW TO PROCEED WITH TROUBLESHOOTING

The intelligent tester can be used in steps 4, 6, 8, and 9.

1 VEHICLE BROUGHT TO WORKSHOP

NEXT

2 CUSTOMER PROBLEM ANALYSIS

(a) Confirm problem symptoms (See page IN-26).

NEXT

3 PASSENGER AIRBAG ON/OFF INDICATOR CHECK

NEXT

4 CHECK DTCs (Present and Past DTCs)

(a) Check for DTCs.
Result

Result	Proceed to
DTC is output.	A
DTC is not output.	B

B → GO TO PROBLEM SYMPTOMS TABLE

A

5 DTCs CHART

NEXT

6 CIRCUIT INSPECTION

NEXT

7 REPAIR

NEXT

8	CLEAR DTCs (Present and Past DTCs)

(a) Clear DTCs.

NEXT

RS

9	CHECK DTCs (Present and Past DTCs)

(a) Check for DTCs.
Result

Result	Proceed to
DTC is not output.	A
DTC is output.	B

B → Go to step 5

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 step 5

A

11	CONFIRMATION TEST

NEXT

END

INITIALIZATION

1. ZERO POINT CALIBRATION

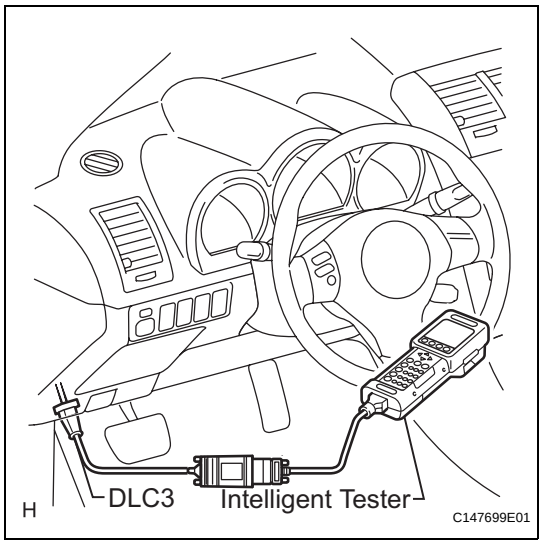
NOTICE:

Make sure that the front passenger seat is not occupied before performing the operation.

HINT:

Perform zero point calibration and sensitivity check if any of the following conditions occur:

- The occupant classification ECU is replaced.
- Accessories (seatback tray and seat cover, etc.) are installed.
- The front passenger seat is removed from the vehicle.
- The passenger airbag ON/OFF indicator ("OFF") comes on when the front passenger seat is not occupied.
- The vehicle is brought to a workshop for repair due to an accident or a collision.



(a) Zero point calibration and sensitivity check procedures.

HINT:

Make sure that zero point calibration has finished normally, and then perform the sensitivity check.

(1) Adjust the seat position according to the table below.

Adjustment Component	Position
Slide Direction	Rearmost position
Reclining Angle	Upright position
Headrest Height	Lowest position
Lifter Height	Lowest position

(2) Connect the intelligent tester to the DLC3.

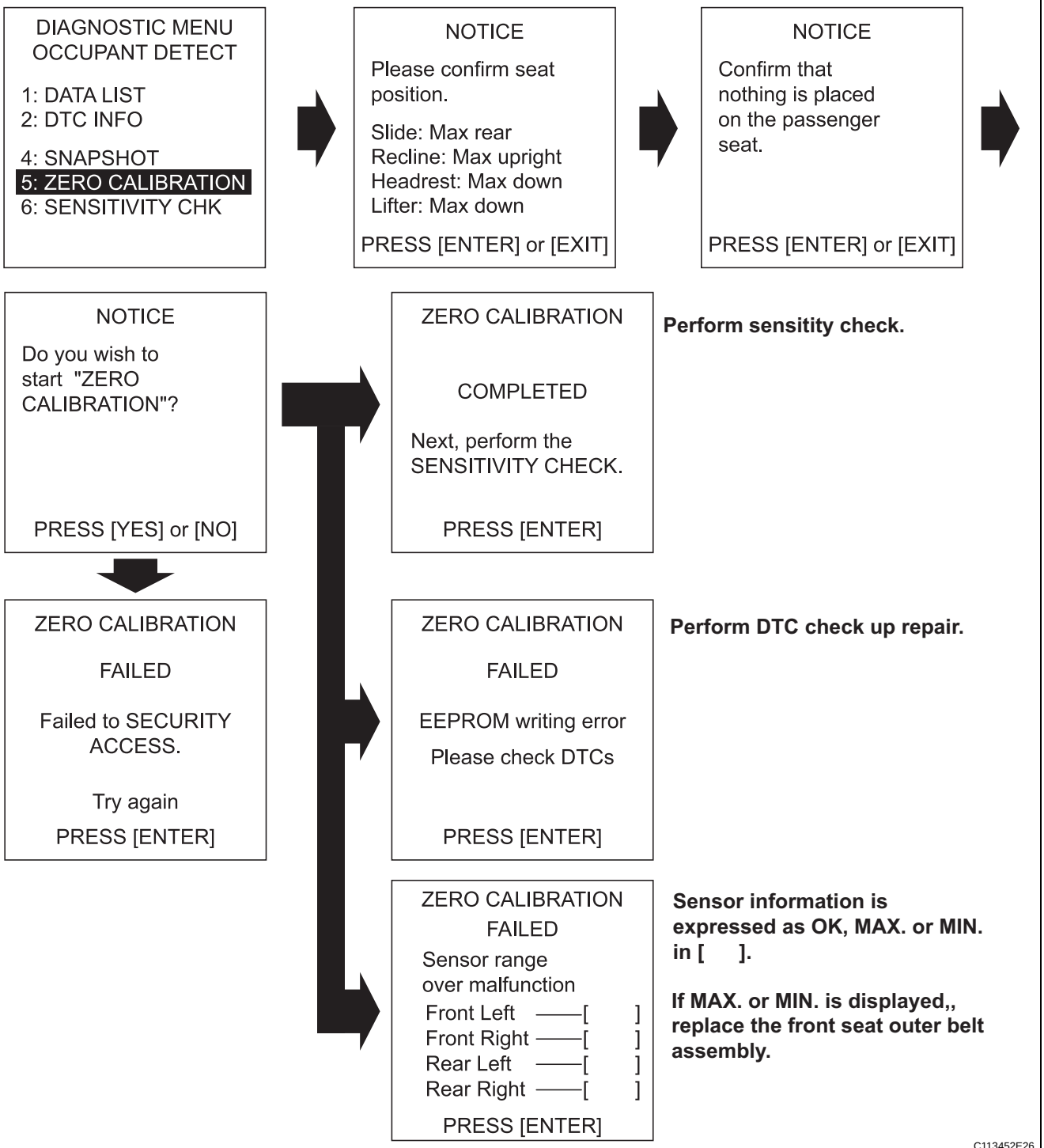
(3) Turn the ignition switch to the ON position.

(4) Perform zero point calibration by following the prompts on the tester screen.

ZERO POINT CALIBRATION PROCEDURE

"1: DIAGNOSIS" - "1: OBD/MOBD" - "MODEL YEAR" - "MODEL SELECTION" - "9: OCCUPANT DETECT"

Refer to the following screen flow.



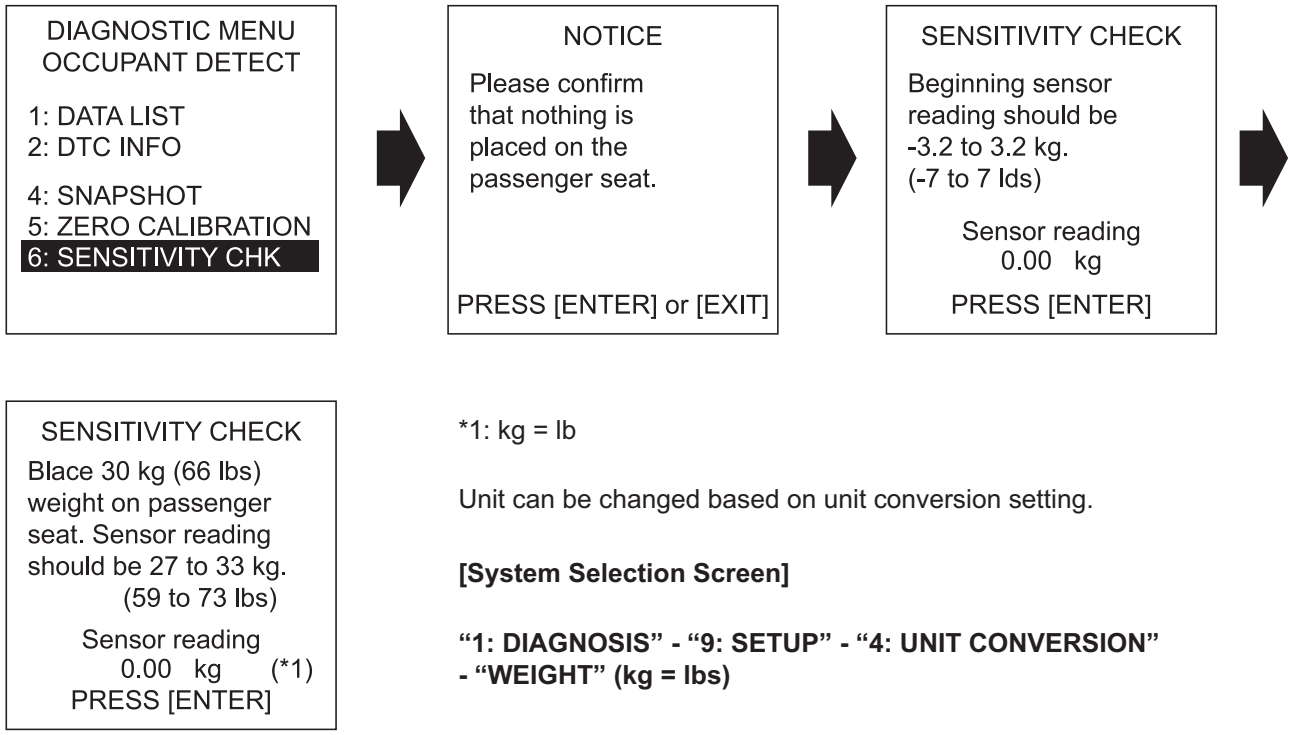
HINT:
Refer to the intelligent tester operator's manual for further details.

OK:
"COMPLETE" is displayed.

(5) Perform sensitivity check by following the prompts on the tester screen.
(6) Confirm that the beginning sensor reading is within the standard range.
Standard values:
-3.2 to 3.2 kg (-7 to 7 lb)
(7) Place a 30 kg (66.14 lb) weight (eg. a 30 kg (66.14 lb) of lead mass) onto the front passenger seat.
(8) Confirm that the sensitivity is within the standard range.

SENSITIVITY CHECK PROCEDURE

"1: DIAGNOSIS" - "1: OBD/MOBD" - "MODEL YEAR" - "MODEL SELECTION - "9: OCCUPANT DETECT" - Refer to the following screen flow.



Standard values:
27 to 33 kg (59.52 to 72.75 lb)

HINT:

- When performing sensitivity check, use a solid metal weight (the check result may not appear properly if a liquid weight is used).

- If the sensitivity deviates from the standard range, retighten the bolts of the front passenger seat without deforming the seat rail. After performing this procedure, if the sensitivity is not within the standard range, replace the front seat assembly RH.
- If zero point calibration has not finished normally, replace the front seat assembly RH.

PROBLEM SYMPTOMS TABLE

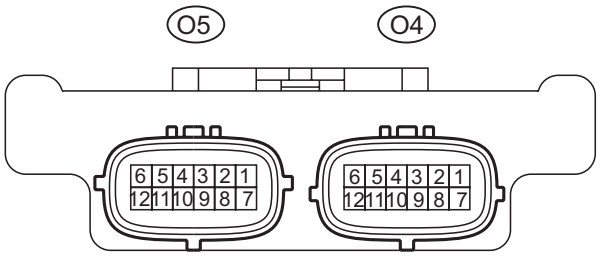
HINT:
Proceed to the troubleshooting for each circuit in the table below.

OCCUPANT CLASSIFICATION SYSTEM:

Symptom	Suspected Area	See page
The front passenger seat condition differs from the indication of the passenger airbag ON/OFF indicator (DTC is not output).	Trouble in Passenger Airbag ON/OFF Indicator	RS-336

TERMINALS OF ECU

1. OCCUPANT CLASSIFICATION ECU



C

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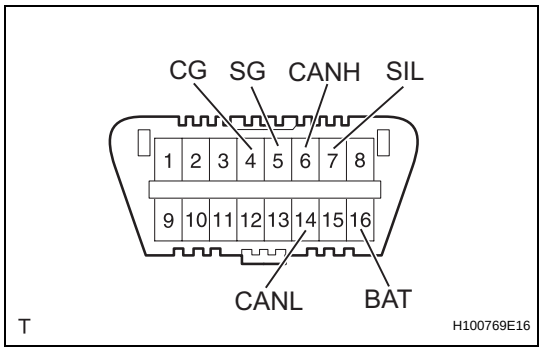
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specification
+B (O4-1) - GND (O4-3)	G - W-B	Power source (ECU-B Fuse)	Always	10 to 14 V
DIA (O4-2) - GND (O4-3)	W - W-B	Diagnosis (DLC3)	IG switch ON	Pulse generation
GND (O4-3) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
FSR- (O4-4) - GND (O4-3)	R - W-B	Center airbag sensor assembly communication line (-)	Always	Below 1 Ω
BGND (O4-5) - GND (O4-3)	GR - W-B	Passenger side buckle switch ground line	Always	Below 1 Ω
IG (O4-7) - GND (O4-3)	LG - W-B	Power source (IG2 Fuse)	IG switch ON	10 to 14 V
FSR+ (O4-8) - FSR- (O4-4)	L - B	Center airbag sensor assembly communication line	IG switch ON	Pulse generation
BSW (O4-9) - BGND (O4-5)	B - GR	Passenger side buckle switch line	Buckle switch ON Buckle switch OFF	Pulse generation
SGD1 (O5-1) - GND (O4-3)	G - W-B	Occupant classification sensor front LH ground line	Always	Below 1 Ω
SGD2 (O5-2) - GND (O4-3)	O - W-B	Occupant classification sensor front RH ground line	Always	Below 1 Ω
SGD3 (O5-3) - GND (O4-3)	W - W-B	Occupant classification sensor rear LH ground line	Always	Below 1 Ω
SGD4 (O5-4) - GND (O4-3)	BR - W-B	Occupant classification sensor rear RH ground line	Always	Below 1 Ω
SVC3 (O5-5) - SGD3 (O5-3)	GR - W	Occupant classification sensor rear LH power supply line	IG switch ON, a load is applied to occupant classification sensor rear LH	4.5 to 5.1 V
SVC4 (O5-6) - SGD4 (O5-4)	V - BR	Occupant classification sensor rear RH power supply line	IG switch ON, a load is applied to occupant classification sensor rear RH	4.5 to 5.1 V
SIG1 (O5-7) - SGD1 (O5-1)	SB - G	Occupant classification sensor front LH signal line	IG switch ON, a load is applied to occupant classification sensor front LH	0.2 to 4.7 V
SIG2 (O5-8) - SGD2 (O5-2)	L - O	Occupant classification sensor front RH signal line	IG switch ON, a load is applied to occupant classification sensor front RH	0.2 to 4.7 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specification
SIG3 (O5-9) - SGD3 (O5-3)	Y - W	Occupant classification sensor rear LH signal line	IG switch ON, a load is applied to occupant classification sensor rear LH	0.2 to 4.7 V
SIG4 (O5-10) - SGD4 (O5-4)	B - BR	Occupant classification sensor rear RH signal line	IG switch ON, a load is applied to occupant classification sensor rear RH	0.2 to 4.7 V
SVC1 (O5-11) - SGD1 (O5-1)	R - G	Occupant classification sensor front LH power supply line	IG switch ON, a load is applied to occupant classification sensor front LH	4.5 to 5.1 V
SVC2 (O5-12) - SGD2 (O5-2)	W - O	Occupant classification sensor front RH power supply line	IG switch ON, a load is applied to occupant classification sensor front RH	4.5 to 5.1 V

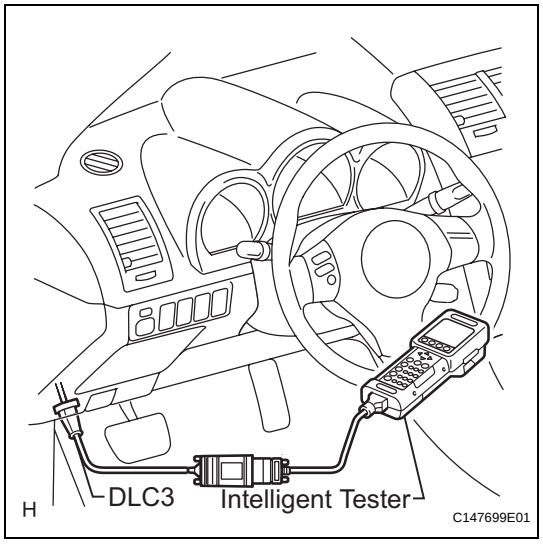


DIAGNOSIS SYSTEM

1. CHECK DLC3

(a) The ECM uses ISO 15765-4 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.

Symbols (Terminal No.)	Terminal Description	Condition	Pulse Condition
SIL (7) - SG (5)	Bus "+" Line	During transmission	Pulse generation
CG (4) - Body ground	Chassis Ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	10 to 14 V



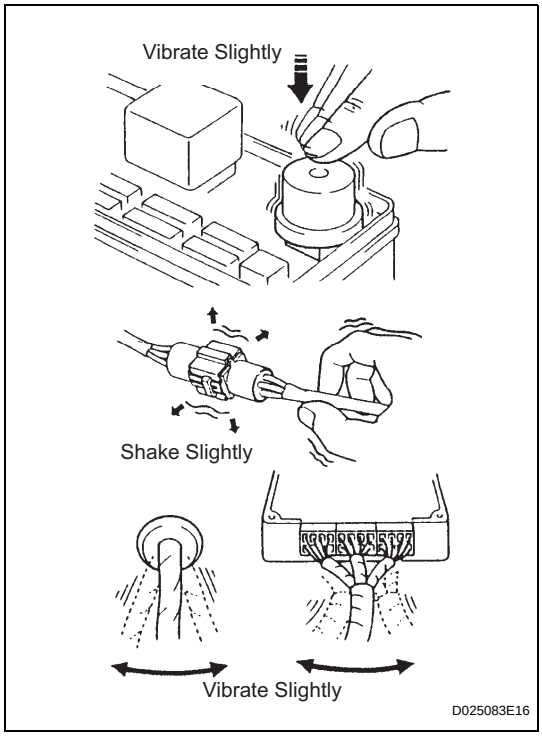
If the result is not as specified, the DLC3 may have a malfunction. Repair or replace the harness and connector.

HINT:

If the display shows a communication error message when connecting the cable of the intelligent tester to the DLC3, turning the ignition switch to the ON position and operating the intelligent tester, there is a problem on the vehicle side or tester side.

- If communication is normal when the tester is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself. Consult the Service Department listed in the tester's instruction manual.

RS



2. SYMPTOM SIMULATION

HINT:

The most difficult case in troubleshooting is when no symptoms occur. In such cases, a thorough customer problem analysis must be carried out. Then the same or similar conditions and environment in which the problem occurred in the customer's vehicle should be simulated. No matter how experienced or skilled a technician may be, if he proceeds to troubleshooting without confirming the problem symptoms, he will likely overlook something important and make a wrong guess at some points in the repair operation.

This leads to a standstill in troubleshooting.

(a) Vibration method: When vibration seems to be the major cause.

HINT:

Perform the simulation method only during the primary check period (for approximately 6 seconds after the ignition switch is turned to the ON position.

(1) Slightly vibrate the part of the sensor considered to be the problem cause with your fingers and check whether the malfunction occurs.

HINT:

Shaking the relays too strongly may result in open relays.

(2) Slightly shake the connector vertically and horizontally.

(3) Slightly shake the wire harness vertically and horizontally.

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

(b) Simulation method for DTC B1794:

Turn the ignition switch from the LOCK to the ON position, hold it for 10 seconds, and back to off again 50 times in a row.

HINT:

DTC B1794 is output if the occupant classification ECU receives the ignition switch LOCK-ON-LOCK signal 50 times in a row when a malfunction occurs in the power circuit for the occupant classification system.

3. FUNCTION OF PASSENGER AIRBAG ON/OFF INDICATOR

(a) Initial check

(1) Turn the ignition switch to the ON position.

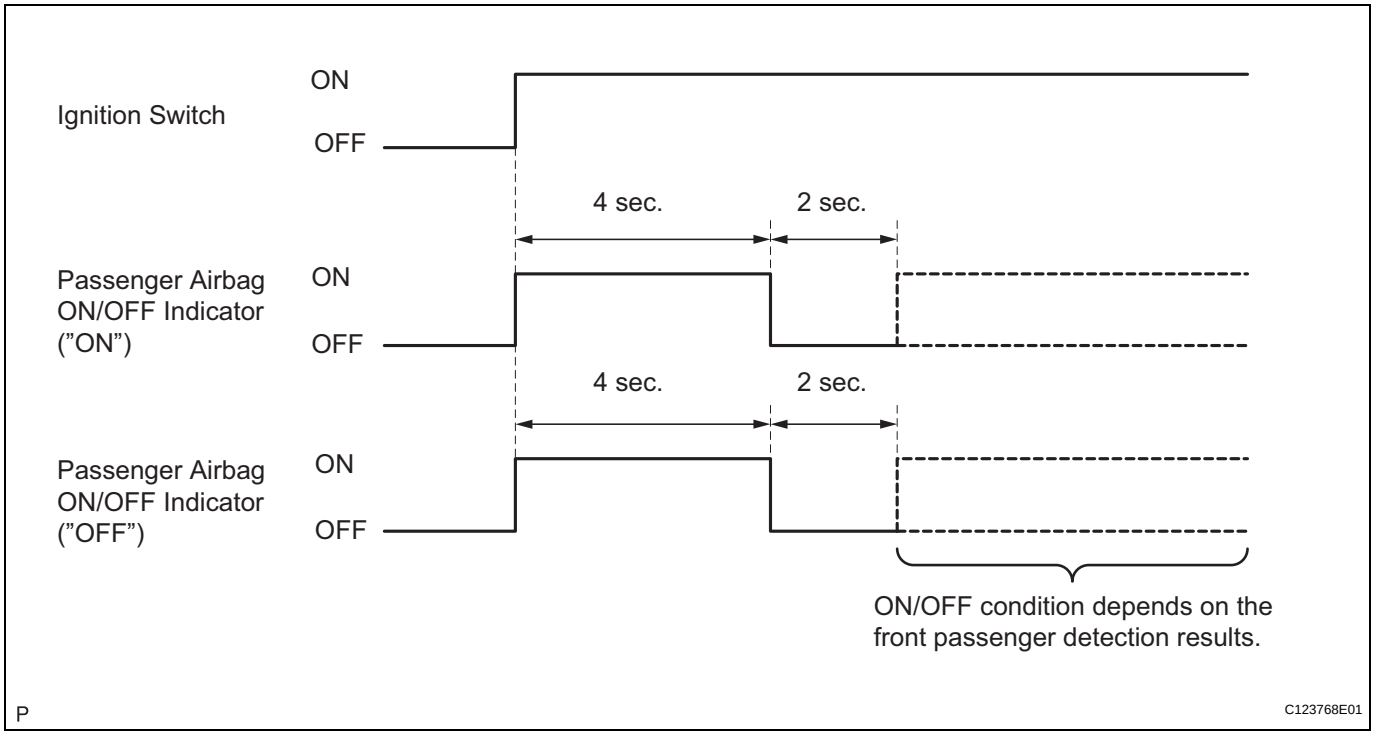
(2) The passenger airbag ON/OFF indicator ("ON" and "OFF") comes on for approximately 4 seconds, then goes off for approximately 2 seconds.

(3) Approximately 6 seconds after the ignition switch is turned to the ON position, the passenger airbag ON/OFF indicator will show ON or OFF depending on the conditions listed below.

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 set.	OFF	ON	OFF
Front passenger occupant classification system failure	OFF	ON	ON

HINT:

- The passenger airbag ON/OFF indicator is 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 the passenger airbag ON/OFF indicator ("OFF") come on. In this case, check for DTCs in "AIRBAG SYSTEM" first.



4. CHECK PASSENGER AIRBAG ON/OFF INDICATOR

(a) Turn the ignition switch to the ON position.

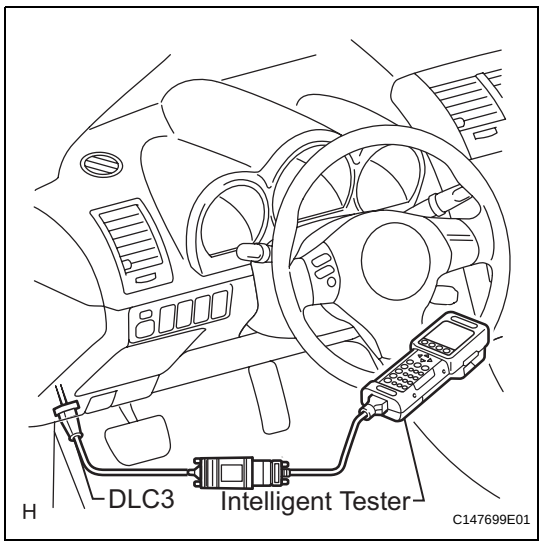
(b) Check that the passenger airbag ON/OFF indicator ("ON" and "OFF") comes on for approximately 4 seconds, then goes off for approximately 2 seconds.
HINT:
Refer to the table in the previous step regarding the passenger airbag ON/OFF indicator when the ignition switch is turned to the ON position and approximately 6 seconds pass.

DTC CHECK / CLEAR

1. DTC CHECK

HINT:

- When DTC B1650/32 is detected as a result of troubleshooting for AIRBAG SYSTEM, perform troubleshooting for OCCUPANT CLASSIFICATION SYSTEM.
- Use the intelligent tester to read and clear DTCs, otherwise the DTCs cannot be read and cleared.



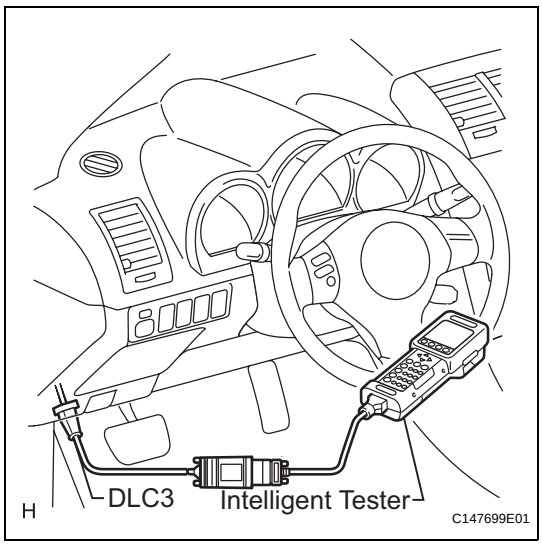
(a) Check for DTCs.
  (1) Connect the intelligent tester to the DLC3.
  (2) Turn the ignition switch to the ON position.
  (3) Check the DTCs by following the prompts on the tester screen.
  HINT:
  Refer to the intelligent tester operator's manual for further details.

(b) Clear the DTCs.
  (1) Connect the intelligent tester to the DLC3.
  (2) Turn the ignition switch to the ON position.
  (3) Clear the DTCs by following the prompts on the tester screen.
  HINT:
  Refer to the intelligent tester operator's manual for further details.

RS

DATA LIST / ACTIVE TEST

HINT:
By accessing the DATA LIST displayed on the intelligent tester, you can perform such functions as reading the values of switches and sensors without removing any parts. Reading the DATA LIST as the first step in troubleshooting is one method to save labor time.



1. DATA LIST FOR OCCUPANT CLASSIFICATION ECU

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Turn the tester on.
(d) Enter the following menus: DIAGNOSIS / OBD/ MOBD / OCCUPANT DETECT / DATA LIST.
(e) Check the values by referring to the table below.

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
IG SW	Ignition switch condition/ ON: Ignition switch ON OFF: Ignition switch OFF	ON/OFF	-
PASSENGER CLASS	Passenger classification/ AM50: Adult (more than 54 kg (119.05 lb)) is seated AF05: Adult (36 to 54 kg (79.37 to 119.05 lb)) is seated CHILD: Child (less than 36 kg (79.37 lb)) is seated CRS: Child restraint system (less than 7 kg (15.43 lb)) and passenger side buckle switch is ON, then 7 to 36 kg (15.43 to 79.37 lb) of weight is applied OFF: Vacant	AM50/AF05/CHILD/CRS/OFF	-
SENS RANGE INF	Sensor range information/ OK: The value of a sensor is within the range NG: The value of a sensor is over the range	OK	-
FL SENS RANGE	Front left sensor range information/ OK: Sensor range is -17 to 27 kg (-37.48 to 59.52 lb) Min.: Less than -17 kg (-37.48 lb) Max.: More than 27 kg (59.52 lb)	OK	-
FR SENS RANGE	Front right sensor range information/ OK: Sensor range is -17 to 27 kg (-37.48 to 59.52 lb) Min.: Less than -17 kg (-37.48 lb) Max.: More than 27 kg (59.52 lb)	OK	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RL SENS RANGE	Rear left sensor range information/ OK: Sensor range is -17 to 37 kg (-37.48 to 81.57 lb) Min.: Less than -17 kg (-37.48 lb) Max.: More than 37 kg (81.57 lb)	OK	-
RR SENS RANGE	Rear right sensor range information/ OK: Sensor range is -17 to 37 kg (-37.48 to 81.57 lb) Min.: Less than -17 kg (-37.48 lb) Max.: More than 37 kg (81.57 lb)	OK	-
P BUCKLE SW	Buckle switch (Passenger side)/ UNSET: Unfasten the passenger side seat belt SET: Fasten the passenger side seat belt NG: Passenger side seat belt has trouble	UNSET/SET	-
FL SENS VOL	Front left sensor voltage/ Min.: 0 V Max.: 19.8 V	0 to 4.7 V	-
FR SENS VOL	Front right sensor voltage/ Min.: 0 V Max.: 19.8 V	0 to 4.7 V	-
RL SENS VOL	Rear left sensor voltage/ Min.: 0 V Max.: 19.8 V	0 to 4.7 V	-
RR SENS VOL	Rear right sensor voltage/ Min.: 0 V Max.: 19.8 V	0 to 4.7 V	-
FL SENS WEIGHT	Front left sensor weight information/ Min.: -17 kg (-37.48 lb) Max.: 27 kg (59.52 lb)	-17 to 27 kg (-37.48 to 59.52 lb)	-
FR SENS WEIGHT	Front right sensor weight information/ Min.: -17 kg (-37.48 lb) Max.: 27 kg (59.52 lb)	-17 to 27 kg (-37.48 to 59.52 lb)	-
RL SENS WEIGHT	Rear left sensor weight information/ Min.: -17 kg (-37.48 lb) Max.: 37 kg (81.57 lb)	-17 to 37 kg (-37.48 to 81.57 lb)	-
RR SENS WEIGHT	Rear right sensor weight information/ Min.: -17 kg (-37.48 lb) Max.: 37 kg (81.57 lb)	-17 to 37 kg (-37.48 to 81.57 lb)	-
TOTAL WEIGHT	Total weight information/ Min.: -68 kg (-149.91 lb) Max.: 128 kg (282.19 lb)	-68 to 128 kg (-149.91 to 282.19 lb)	-
#PRESENT CODES	Number of present DTC recorded/ Min.: 0, Max.: 255	0	-
#PAST CODES	Number of past DTC recorded/ Min.: 0, Max.: 255	0	-

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 circuit).

OCCUPANT CLASSIFICATION SYSTEM:

RS

DTC Code	Detection Item	Trouble Area	Passenger airbag ON/ OFF Indicator (OFF Indicator)	See page
B1771	Passenger Side Buckle Switch Circuit Malfunction	1. Front seat inner belt assembly RH (Passenger side buckle switch) 2. Occupant classification ECU 3. Front seat wire RH	ON	RS-262
B1780	Front Occupant Classification Sensor LH Circuit Malfunction	1. Front seat assembly RH (Front occupant classification sensor LH) 2. Occupant classification ECU 3. Front seat wire RH	ON	RS-269
B1781	Front Occupant Classification Sensor RH Circuit Malfunction	1. Front seat assembly RH (Front occupant classification sensor RH) 2. Occupant classification ECU 3. Front seat wire RH	ON	RS-276
B1782	Rear Occupant Classification Sensor LH Circuit Malfunction	1. Front seat assembly RH (Rear occupant classification sensor LH) 2. Occupant classification ECU 3. Front seat wire RH	ON	RS-283
B1783	Rear Occupant Classification Sensor RH Circuit Malfunction	1. Front seat assembly RH (Rear occupant classification sensor RH) 2. Occupant classification ECU 3. Front seat wire RH	ON	RS-290
B1785	Front Occupant Classification Sensor LH Collision Detection	1. Front seat assembly RH (Front occupant classification sensor LH) 2. Occupant classification ECU	ON	RS-297
B1786	Front Occupant Classification Sensor RH Collision Detection	1. Front seat assembly RH (Front occupant classification sensor RH) 2. Occupant classification ECU	ON	RS-301
B1787	Rear Occupant Classification Sensor LH Collision Detection	1. Front seat assembly RH (Rear occupant classification sensor LH) 2. Occupant classification ECU	ON	RS-305
B1788	Rear Occupant Classification Sensor RH Collision Detection	1. Front seat assembly RH (Rear occupant classification sensor RH) 2. Occupant classification ECU	ON	RS-309
B1790	Center Airbag Sensor Assembly Communication Circuit Malfunction	1. Occupant classification ECU 2. Center airbag sensor assembly 3. Floor wire No. 2	ON	RS-313
B1793	Occupant Classification Sensor Power Supply Circuit Malfunction	1. Front seat assembly RH (Occupant classification sensors) 2. Occupant classification ECU 3. Front seat wire RH	ON	RS-320
B1794	Open in Occupant Classification ECU Battery Positive Line	1. Battery 2. ECU-B Fuse 3. Floor wire No. 2 4. Occupant classification ECU	ON	RS-327
B1795	Occupant Classification ECU Malfunction	1. Battery 2. ECU-B Fuse 3. Floor wire No. 2 4. Front seat inner belt assembly RH (Passenger side buckle switch) 5. Occupant classification ECU	ON	RS-331
B1796	Sleep Operation Failure of Occupant Classification ECU	Occupant classification ECU	ON	RS-334

DTC	B1771	Passenger Side Buckle Switch Circuit Malfunction

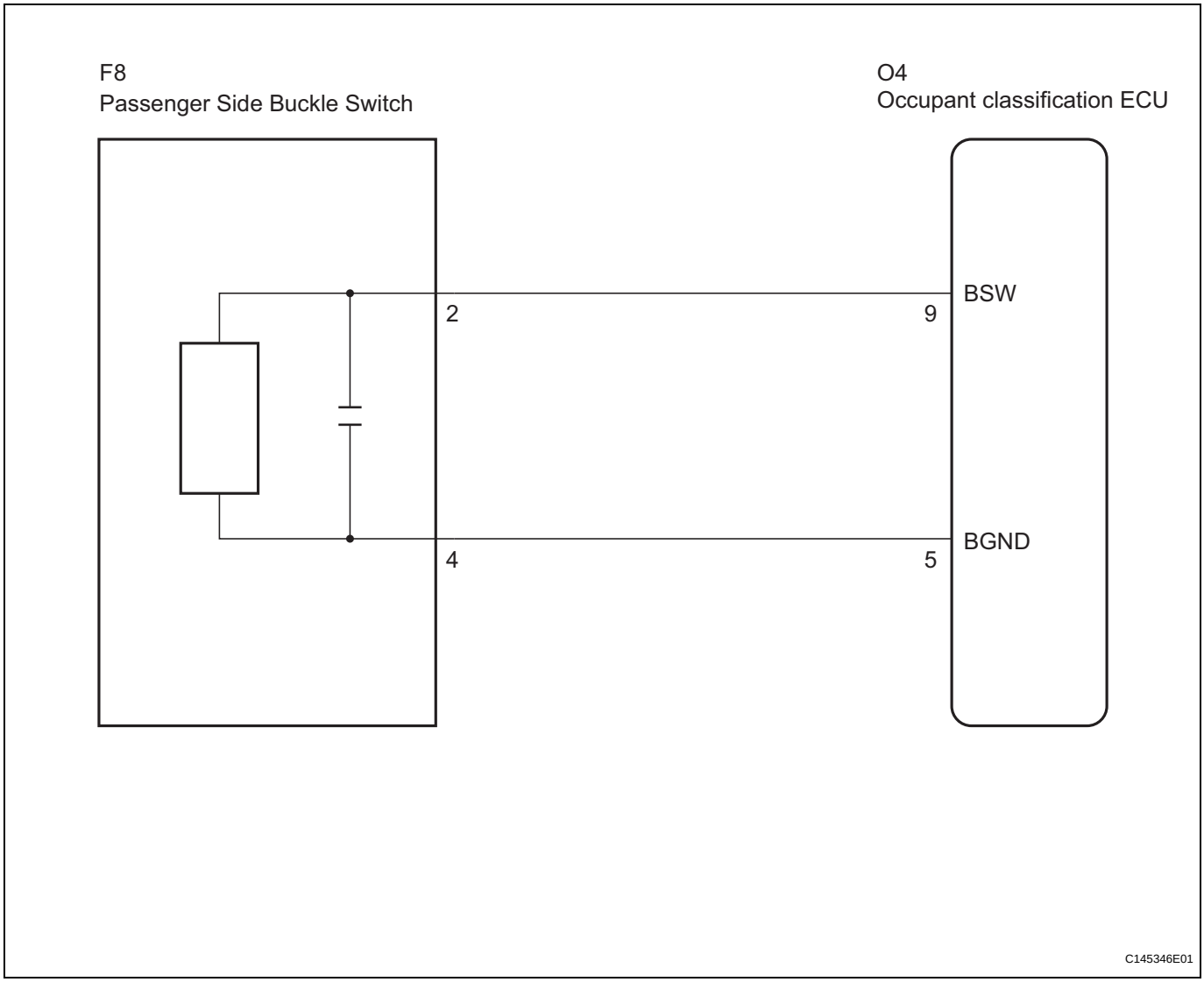
DESCRIPTION

The passenger side buckle switch circuit consists of the occupant classification ECU and the front seat inner belt assembly RH.
DTC B1771 is recorded when a malfunction is detected in the passenger side buckle switch circuit.
Troubleshoot DTC B1771 first when DTCs B1771 and B1795 are output simultaneously.

DTC No.	DTC Detecting Condition	Trouble Area
B1771	• The occupant classification 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 for 2 seconds. • Passenger side buckle switch malfunction • Occupant classification ECU malfunction	• Front seat inner belt assembly RH • Occupant classification ECU • Front seat wire RH

HINT:
When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1771 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front passenger seat installation bolts to see the under surface of the seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).

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 → **Go to step 2**

RS

OK

USE SIMULATION METHOD TO CHECK

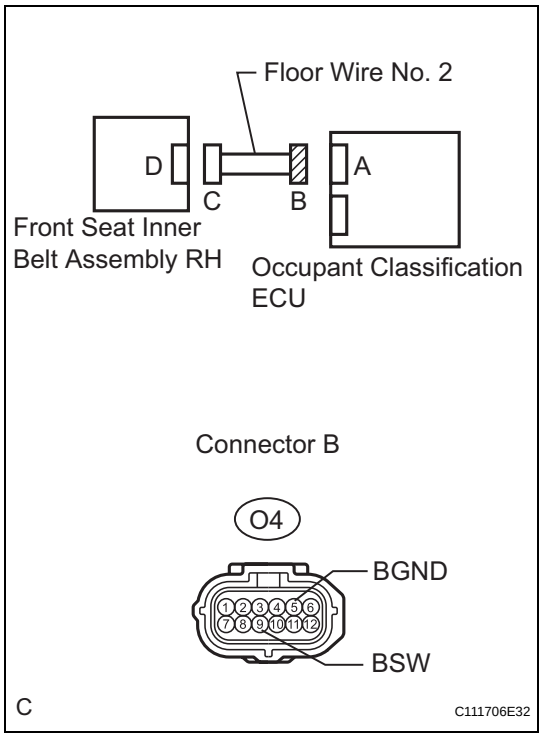
2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Check that the connectors are properly connected to the occupant classification ECU and the front seat inner belt assembly RH.
OK:
The connectors are properly connected.

NG → **CONNECT CONNECTORS PROPERLY, THEN GO TO STEP 1**

OK

3 CHECK FLOOR WIRE NO. 2 (SHORT TO B+)



(a) Disconnect the connectors from the occupant classification ECU and the front seat inner belt assembly RH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.
Standard voltage

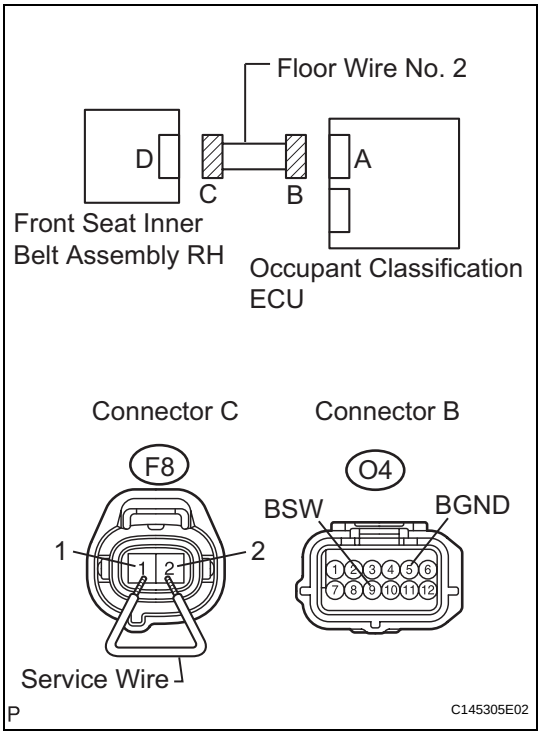
Tester Connection	Condition	Specified Condition
O4-9 (BSW) - Body ground	Ignition switch ON	Below 1 V
O4-5 (BGND) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FLOOR WIRE NO. 2**

OK

4	CHECK FLOOR WIRE NO. 2 (OPEN)

RS



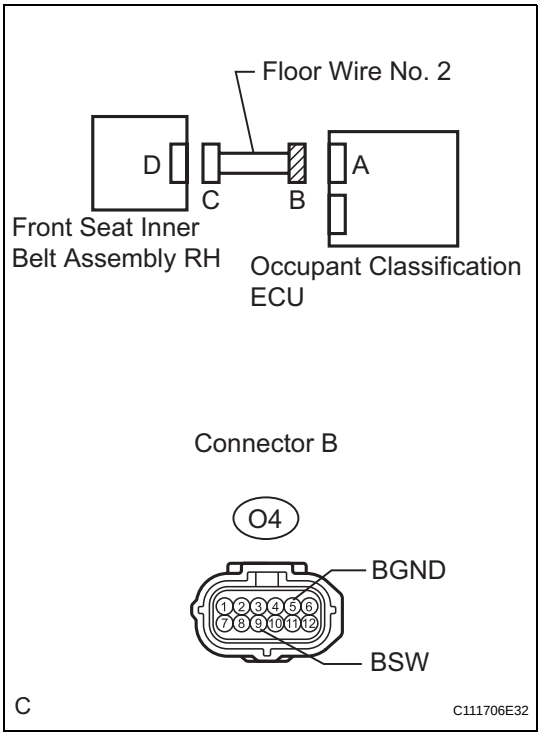
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Using a service wire, connect terminals 2 and 1 of connector C.
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(d) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
O4-9 (BSW) - O4-5 (BGND)	Always	Below 1 Ω

NG → REPLACE FLOOR WIRE NO. 2

OK

5	CHECK FLOOR WIRE NO. 2 (SHORT)



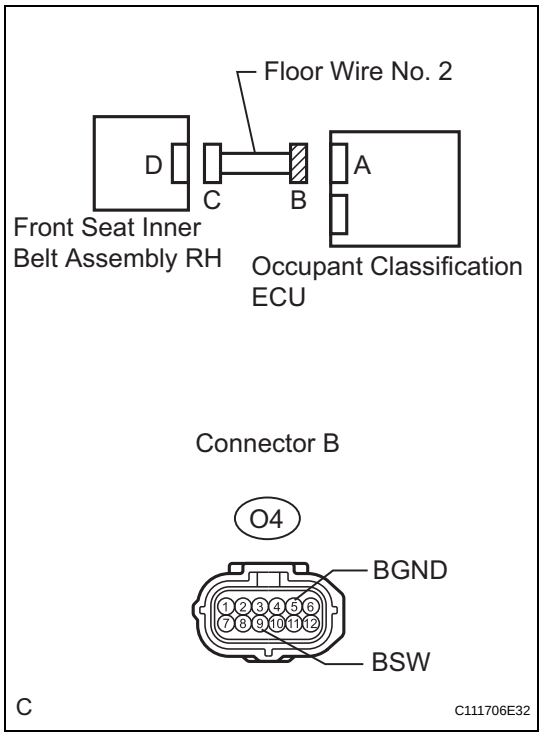
(a) Disconnect the service wire from connector C.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
O4-9 (BSW) - O4-5 (BGND)	Always	1 MΩ or higher

NG → REPLACE FLOOR WIRE NO. 2

OK

6 CHECK FLOOR WIRE NO. 2 (SHORT TO GROUND)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
O4-9 (BSW) - Body ground	Always	1 MΩ or higher
O4-5 (BGND) - Body ground	Always	1 MΩ or higher

NG → **REPLACE FLOOR WIRE NO. 2**

OK

7 CHECK DTC

(a) Connect the connectors to the occupant classification ECU and the front seat inner belt assembly RH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position.
(g) Check the DTCs (See page RS-257).
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 → **Go to step 8**

OK

USE SIMULATION METHOD TO CHECK

RS

8	REPLACE FRONT SEAT INNER BELT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat inner belt assembly RH (See page SB-5).
HINT:
Perform the inspection using parts from a normal vehicle if possible.
(d) Connect the negative (-) terminal cable to the battery.
(e) Turn the ignition switch to the ON position.
(f) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(g) Turn the ignition switch to the LOCK position.
(h) Turn the ignition switch to the ON position.
(i) Check the DTCs (See page RS-257).
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 → **Go to step 9**

OK

END

9	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

10	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.

(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

11	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1780	Front Occupant Classification Sensor LH Circuit Malfunction

DESCRIPTION

RS

The front occupant classification sensor LH circuit consists of the occupant classification ECU and the front occupant classification sensor LH.

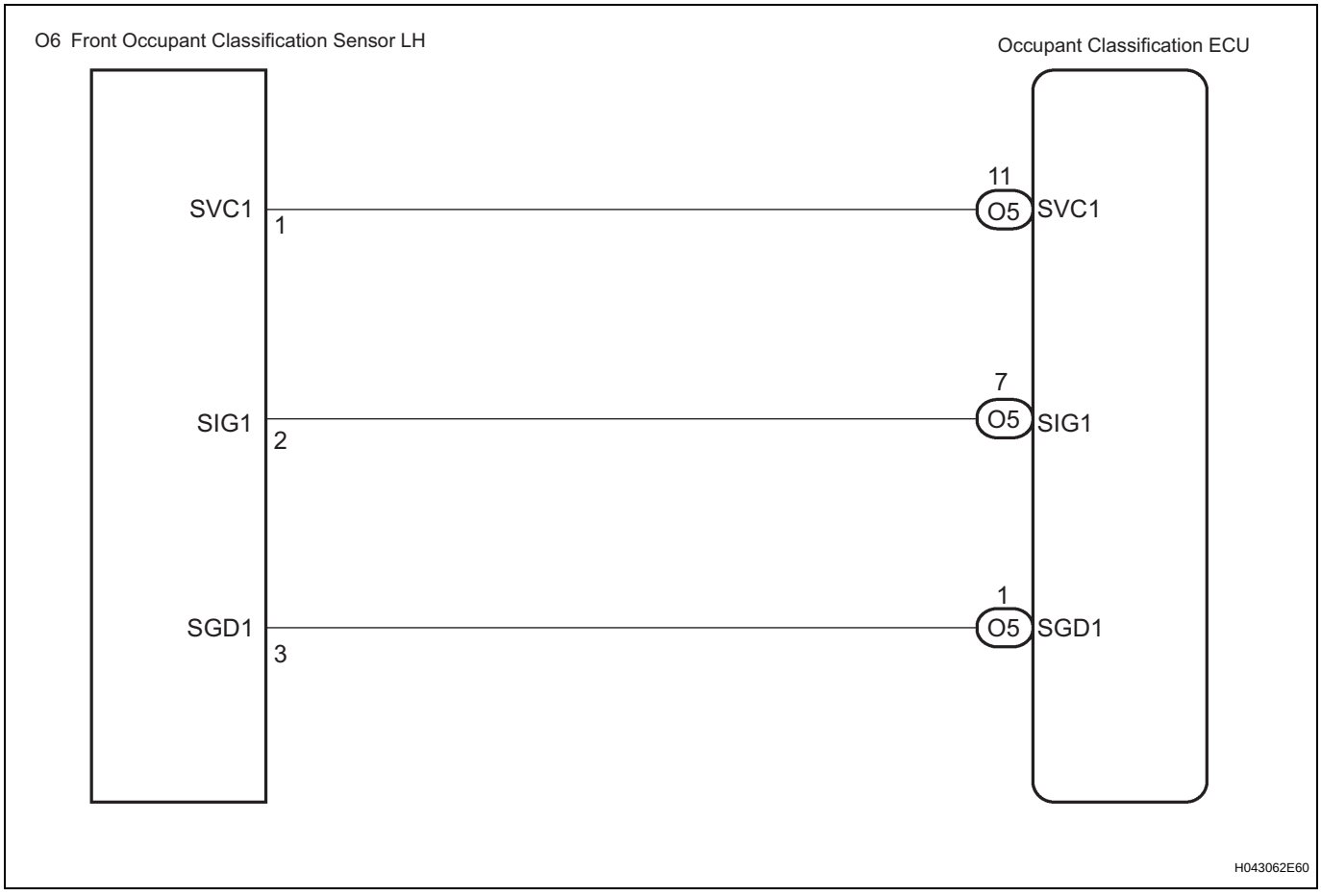
DTC B1780 is recorded when a malfunction is detected in the front occupant classification sensor LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1780	• The occupant classification 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 front occupant classification sensor LH circuit for 2 seconds. • Front occupant classification sensor LH malfunction • Occupant classification ECU malfunction	• Front seat assembly RH (Front occupant classification sensor LH) • Occupant classification ECU • Front seat wire RH

HINT:

When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1780 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front passenger seat installation bolts to see the under surface of the seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1780 is not output.
HINT:
Codes other than DTC B1780 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK ↓

USE SIMULATION METHOD TO CHECK

2	CHECK CONNECTION OF CONNECTORS

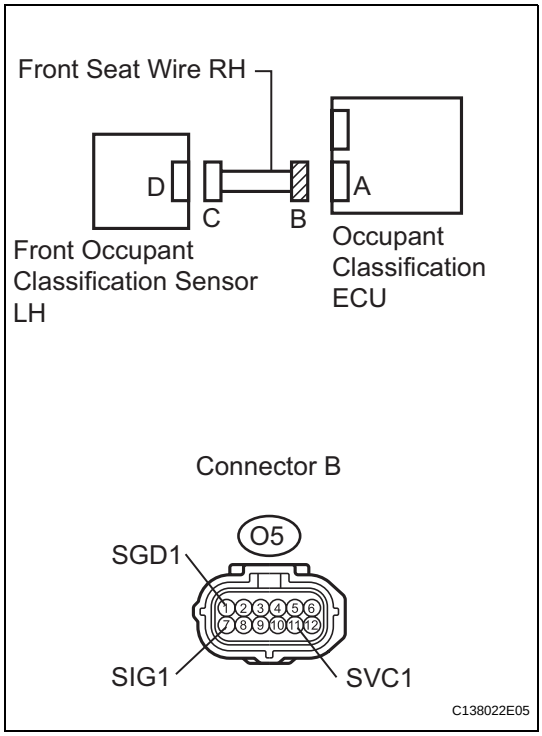
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Check that the connectors are properly connected to the occupant classification ECU and the front occupant classification sensor LH.
OK:
The connectors are properly connected.

NG → **CONNECT CONNECTOR PROPERLY, THEN GO TO STEP 1**

OK ↓

RS

3 CHECK FRONT SEAT WIRE RH (SHORT TO B+)



(a) Disconnect the connectors from the occupant classification ECU and the front occupant classification sensor LH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

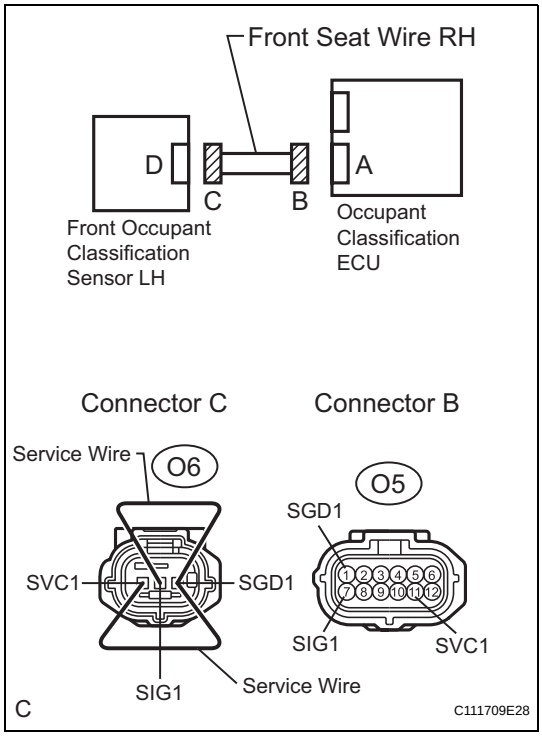
Standard voltage

Tester Connection	Condition	Specified Condition
O5-1 (SGD1) - Body ground	Ignition switch ON	Below 1 V
O5-7 (SIG1) - Body ground	Ignition switch ON	Below 1 V
O5-11 (SVC1) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT WIRE RH**

OK

4 CHECK FRONT SEAT WIRE RH (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Using a service wire, connect terminals 1 (SVC1) and 3 (SGD1), and connect terminals 2 (SIG1) and 3 (SGD1) of connector C.

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

(d) Measure the resistance according to the value(s) in the table below.

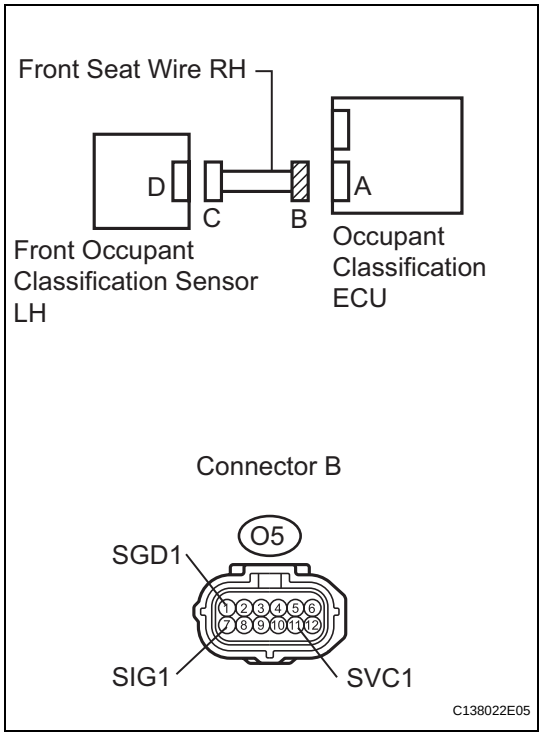
Standard resistance

Tester Connection	Condition	Specified Condition
O5-7 (SIG1) - O5-1 (SGD1)	Always	Below 1 Ω
O5-11 (SVC1) - O5-1 (SGD1)	Always	Below 1 Ω

NG → **REPLACE FRONT SEAT WIRE RH**

OK

5 CHECK FRONT SEAT WIRE RH (SHORT)



(a) Disconnect the service wire from connector C.
(b) Measure the resistance according to the value(s) in the table below.

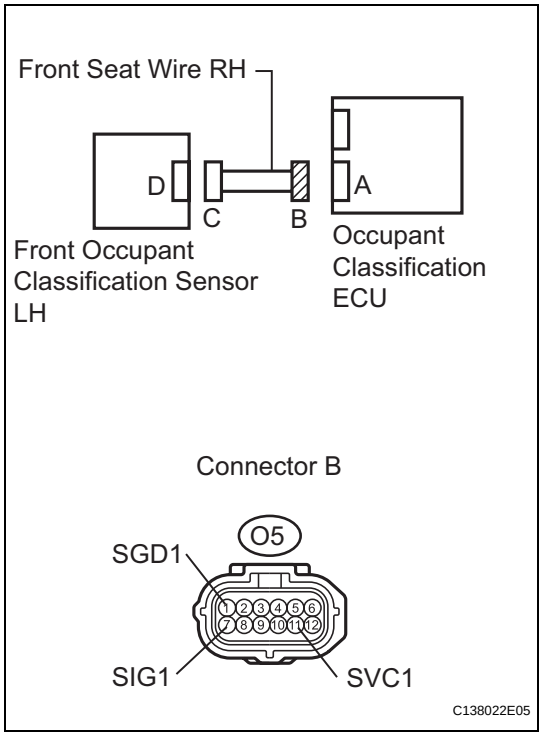
Standard resistance

Tester Connection	Condition	Specified Condition
O5-7 (SIG1) - O5-1 (SGD1)	Always	1 MΩ or higher
O5-11 (SVC1) - O5-1 (SGD1)	Always	1 MΩ or higher
O5-7 (SIG1) - O5-11 (SVC1)	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE 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
O5-1 (SGD1) - Body ground	Always	1 MΩ or higher
O5-7 (SIG1) - Body ground	Always	1 MΩ or higher
O5-11 (SVC1) - Body ground	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE RH

OK

RS

7	CHECK DTC

(a) Connect the connectors to the occupant classification ECU and the front occupant classification sensor LH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position.
(g) Check the DTCs (See page RS-257).
OK:
DTC B1780 is not output.
HINT:
Codes other than DTC B1780 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

USE SIMULATION METHOD TO CHECK

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 12**

OK

10	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 12**

OK

11	CHECK DTC

(a) Connect the negative (-) terminal cable to the battery.
(b) Turn the ignition switch to the ON position.
(c) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position.
(f) Check the DTCs (See page RS-257).
OK:
DTC B1780 is not output.
HINT:
Codes other than DTC B1780 may be output at this time, but they are not related to this check.

NG → **Go to step 12**

OK

END

12	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).

NEXT

13	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.

(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

RS

14	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1781	Front Occupant Classification Sensor RH Circuit Malfunction

DESCRIPTION

The front occupant classification sensor RH circuit consists of the occupant classification ECU and the front occupant classification sensor RH.

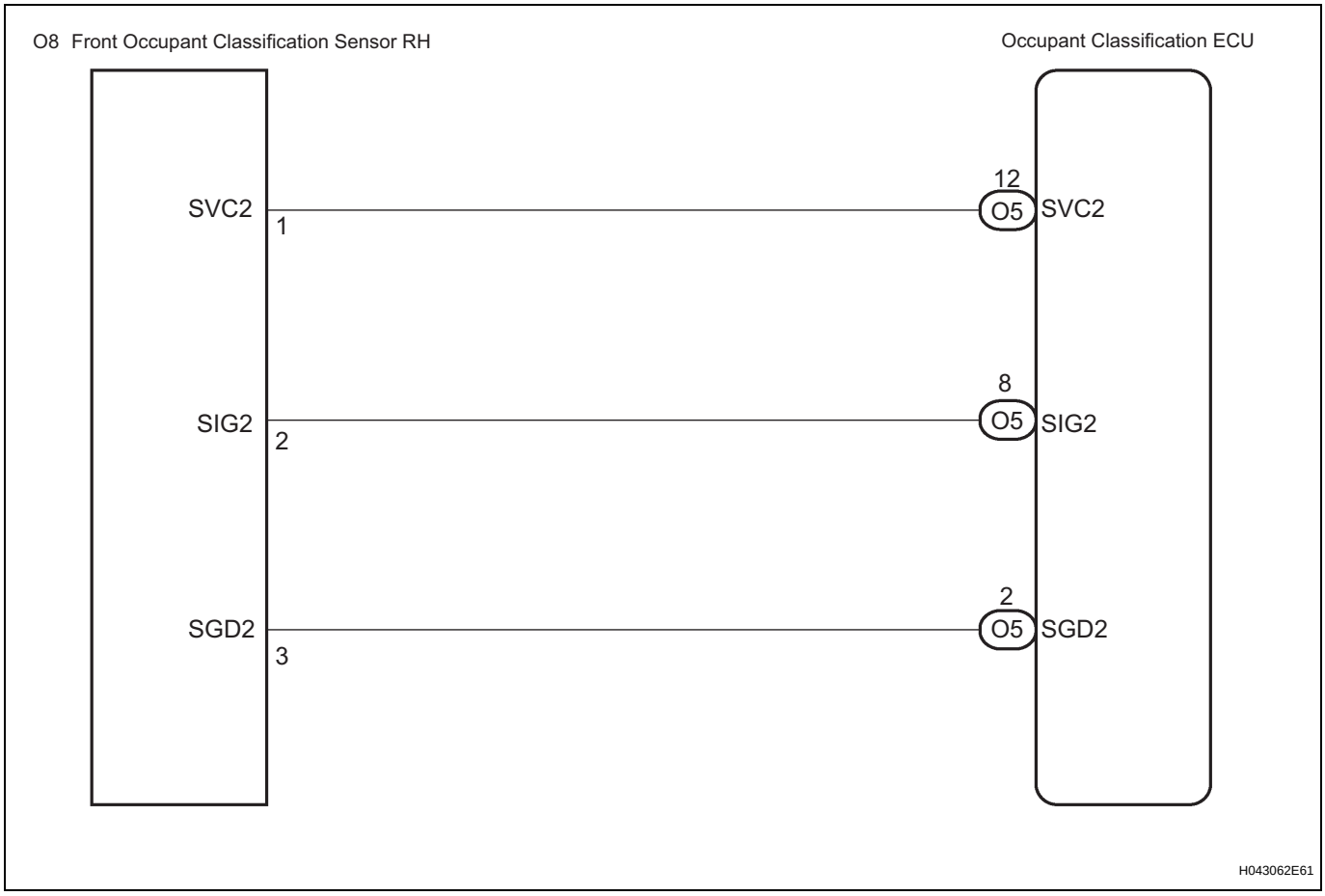
DTC B1781 is recorded when a malfunction is detected in the front occupant classification sensor RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1781	• The occupant classification 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 front occupant classification sensor RH circuit for 2 seconds. • Front occupant classification sensor RH malfunction • Occupant classification ECU malfunction	• Front seat assembly RH (Front occupant classification sensor RH) • Occupant classification ECU • Front seat wire RH

HINT:

When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1781 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front passenger seat installation bolts to see the under surface of the seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

RS

1	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1781 is not output.
HINT:
Codes other than DTC B1781 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK ↓

USE SIMULATION METHOD TO CHECK

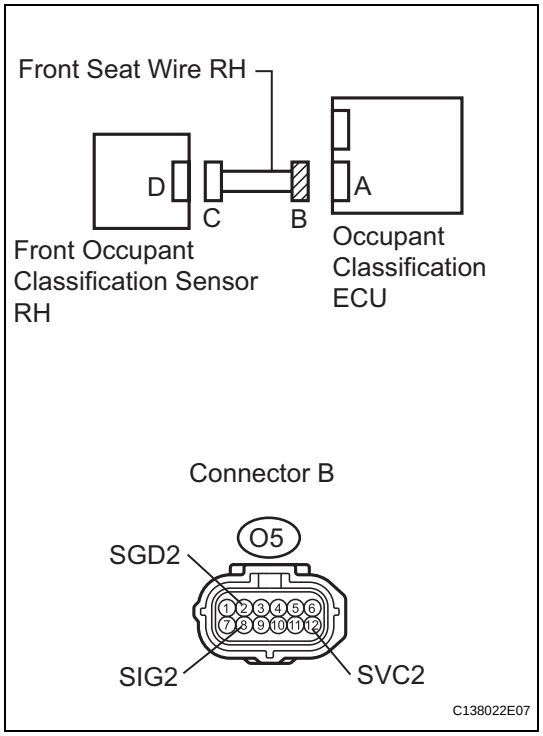
2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Check that the connectors are properly connected to the occupant classification ECU and the front occupant classification sensor RH.
OK:
The connectors are properly connected.

NG → **CONNECT CONNECTORS PROPERLY, THEN GO TO STEP 1**

OK ↓

3 CHECK FRONT SEAT WIRE RH (SHORT TO B+)



(a) Disconnect the connectors from the occupant classification ECU and the front occupant classification sensor RH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

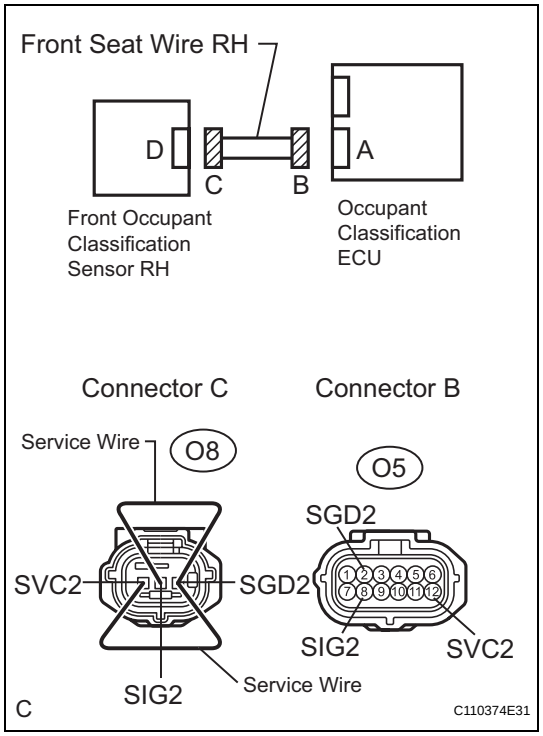
Standard voltage

Tester Connection	Condition	Specified Condition
O5-2 (SGD2) - Body ground	Ignition switch ON	Below 1 V
O5-8 (SIG2) - Body ground	Ignition switch ON	Below 1 V
O5-12 (SVC2) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT WIRE RH**

OK

4 CHECK FRONT SEAT WIRE RH (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Using a service wire, connect terminals 1 (SVC2) and 3 (SGD2), and connect terminals 2 (SIG2) and 3 (SGD2) of connector C.

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

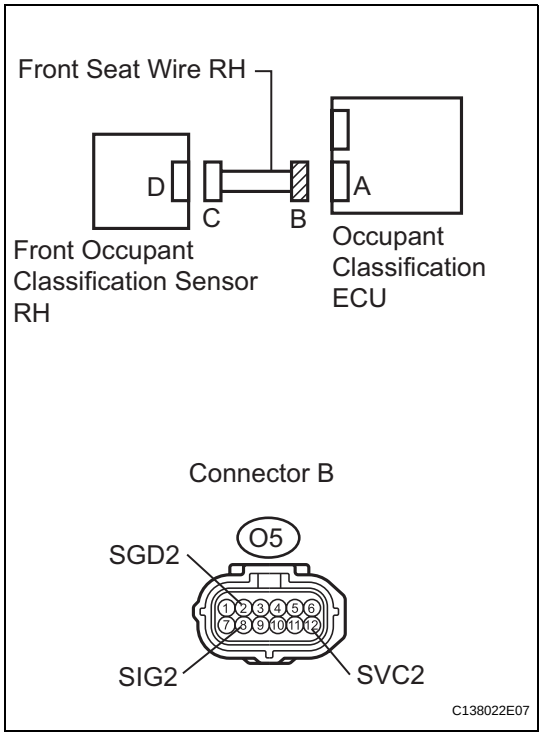
Tester Connection	Condition	Specified Condition
O5-8 (SIG2) - O5-2 (SGD2)	Always	Below 1 Ω
O5-12 (SVC2) - O5-2 (SGD2)	Always	Below 1 Ω

NG → **REPLACE FRONT SEAT WIRE RH**

OK

RS

5 CHECK FRONT SEAT WIRE RH (SHORT)



(a) Disconnect the service wire from connector C.
(b) Measure the resistance according to the value(s) in the table below.

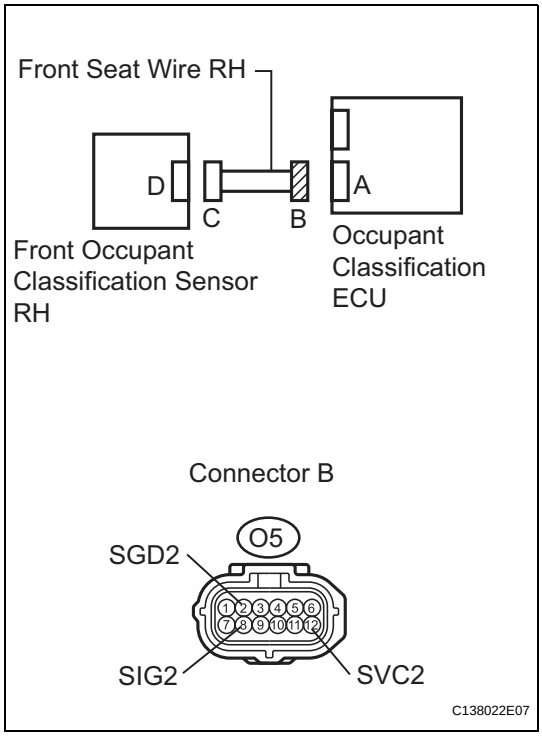
Standard resistance

Tester Connection	Condition	Specified Condition
O5-8 (SIG2) - O5-2 (SGD2)	Always	1 MΩ or higher
O5-12 (SVC2) - O5-2 (SGD2)	Always	1 MΩ or higher
O5-8 (SIG2) - O5-12 (SVC2)	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE 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
O5-2 (SGD2) - Body ground	Always	1 MΩ or higher
O5-8 (SIG2) - Body ground	Always	1 MΩ or higher
O5-12 (SVC2) - Body ground	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE RH

OK

7	CHECK DTC

(a) Connect the connectors to the occupant classification ECU and the front occupant classification sensor RH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position.
(g) Check the DTCs (See page RS-257).
OK:
DTC B1781 is not output.
HINT:
Codes other than DTC B1781 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK ↓

USE SIMULATION METHOD TO CHECK

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT ↓

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 12**

OK

10	PERFORM SENSITIVITY CHECK

RS

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 12**

OK

11	CHECK DTC

(a) Connect the negative (-) terminal cable to the battery.
(b) Turn the ignition switch to the ON position.
(c) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position.
(f) Check the DTCs (See page RS-257).
OK:
DTC B1781 is not output.
HINT:
Codes other than DTC B1781 may be output at this time, but they are not related to this check.

NG → **Go to step 12**

OK

END

12	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).

NEXT

13	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.

(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

14	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1782	Rear Occupant Classification Sensor LH Circuit Malfunction

DESCRIPTION

RS

The rear occupant classification sensor LH circuit consists of the occupant classification ECU and the rear occupant classification sensor LH.

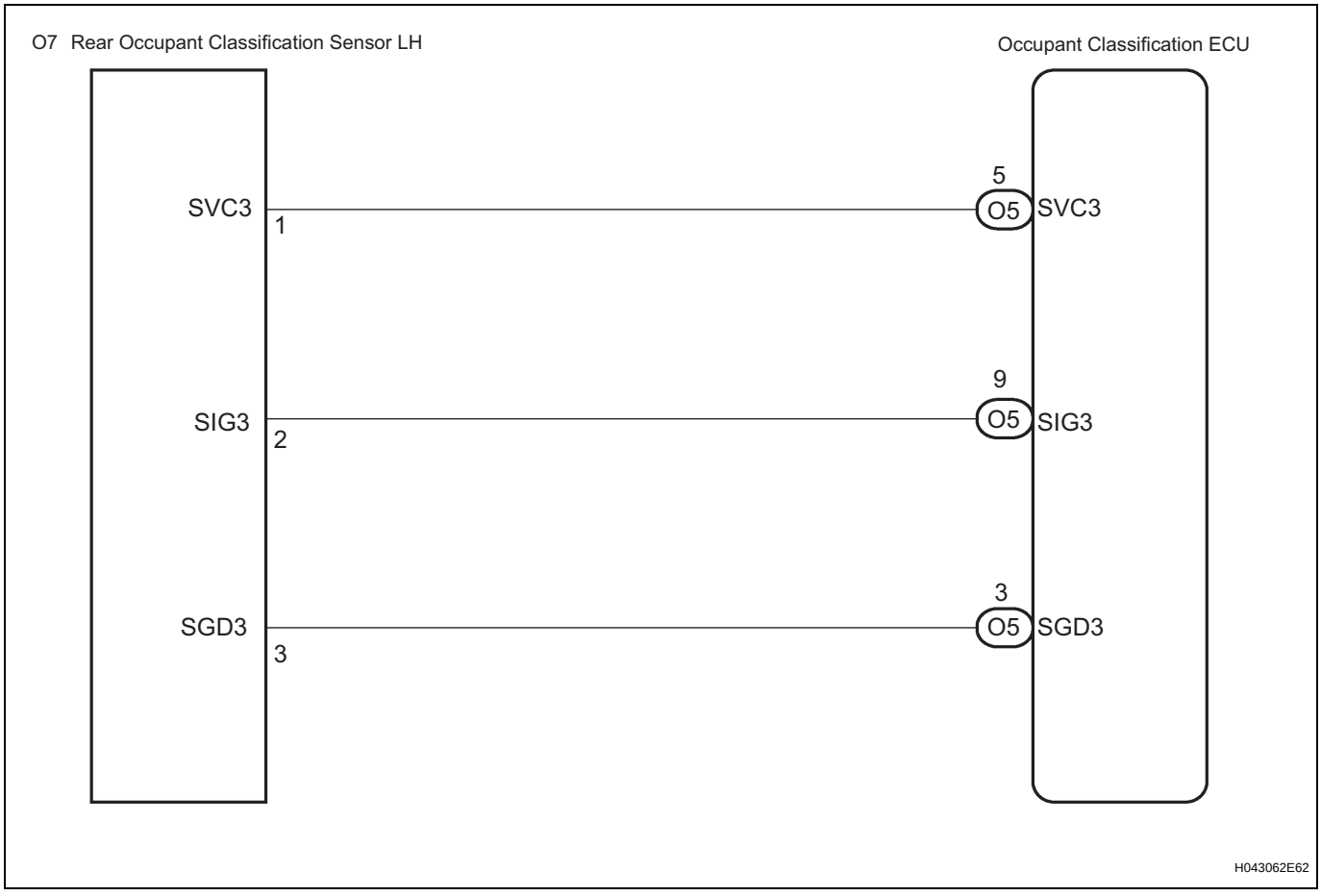
DTC B1782 is recorded when a malfunction is detected in the rear occupant classification sensor LH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1782	• The occupant classification 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 rear occupant classification sensor LH circuit for 2 seconds. • Rear occupant classification sensor LH malfunction • Occupant classification ECU malfunction	• Front seat assembly RH (Rear occupant classification sensor LH) • Occupant classification ECU • Front seat wire RH

HINT:

When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1782 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front passenger seat installation bolts to see the under surface of the seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1782 is not output.
HINT:
Codes other than DTC B1782 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK ↓

USE SIMULATION METHOD TO CHECK

2	CHECK CONNECTION OF CONNECTORS

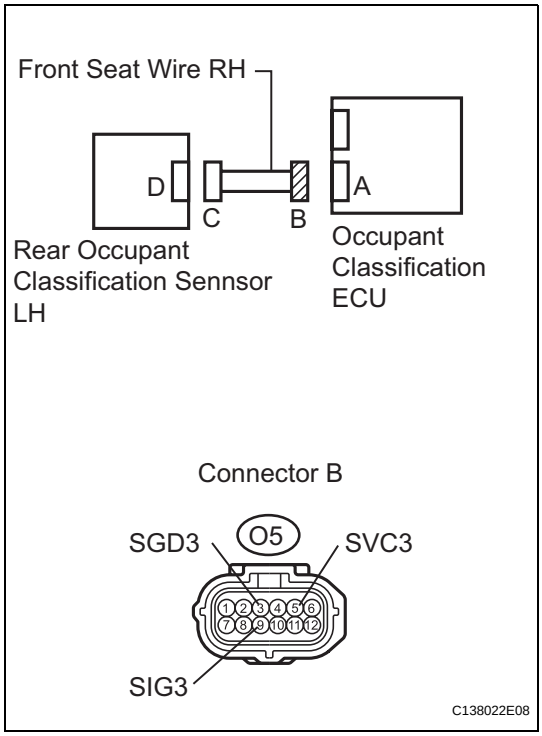
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Check that the connectors are properly connected to the occupant classification ECU and the rear occupant classification sensor LH.
OK:
The connectors are properly connected.

NG → **CONNECT CONNECTORS PROPERLY, THEN GO TO STEP 1**

OK ↓

RS

3 CHECK FRONT SEAT WIRE RH (SHORT TO B+)



(a) Disconnect the connectors from the occupant classification ECU and the rear occupant classification sensor LH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

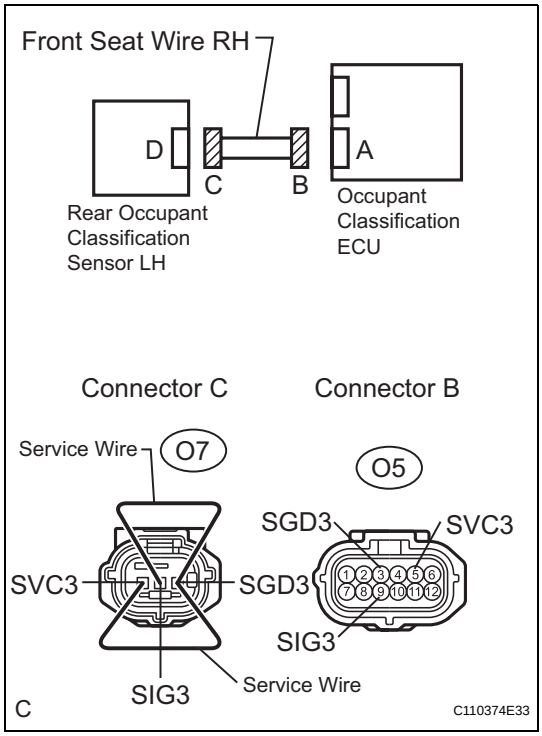
Standard voltage

Tester Connection	Condition	Specified Condition
O5-3 (SGD3) - Body ground	Ignition switch ON	Below 1 V
O5-5 (SVC3) - Body ground	Ignition switch ON	Below 1 V
O5-9 (SIG3) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT WIRE RH**

OK

4 CHECK FRONT SEAT WIRE RH (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Using a service wire, connect terminals 1 (SVC3) and 3 (SGD3), and connect terminals 2 (SIG3) and 3 (SGD3) of connector C.

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

(d) Measure the resistance according to the value(s) in the table below.

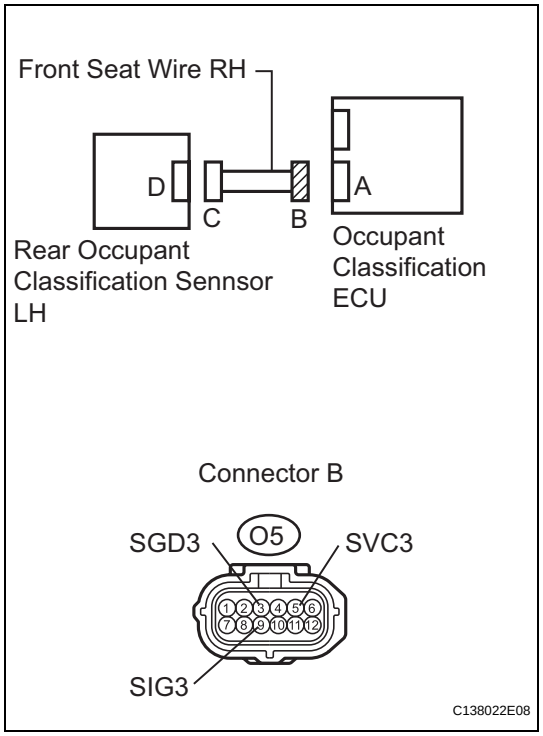
Standard resistance

Tester Connection	Condition	Specified Condition
O5-5 (SVC3) - O5-3 (SGD3)	Always	Below 1 Ω
O5-9 (SIG3) - O5-3 (SGD3)	Always	Below 1 Ω

NG → **REPLACE FRONT SEAT WIRE RH**

OK

5 CHECK FRONT SEAT WIRE RH (SHORT)



(a) Disconnect the service wire from connector C.
(b) Measure the resistance according to the value(s) in the table below.

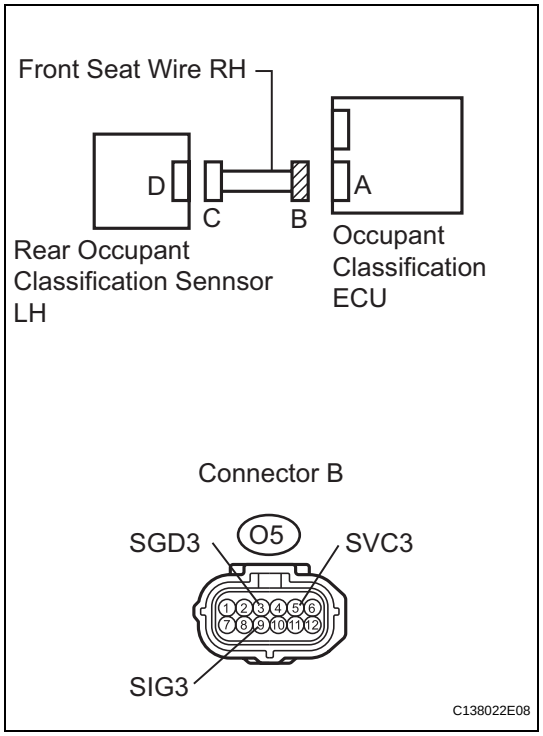
Standard resistance

Tester Connection	Condition	Specified Condition
O5-5 (SVC3) - O5-3 (SGD3)	Always	1 MΩ or higher
O5-9 (SIG3) - O5-3 (SGD3)	Always	1 MΩ or higher
O5-5 (SVC3) - O5-9 (SIG3)	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE RH

OK

6 CHECK FRONT SEAT WIRE RH (SHORT TO GROUND)



(a) Measure the resistance according to value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
O5-3 (SGD3) - Body ground	Always	1 MΩ or higher
O5-5 (SVC3) - Body ground	Always	1 MΩ or higher
O5-9 (SIG3) - Body ground	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE RH

OK

RS

7	CHECK DTC

(a) Connect the connectors to the occupant classification ECU and the rear occupant classification sensor LH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position.
(g) Check the DTCs (See page RS-257).
OK:
DTC B1782 is not output.
HINT:
Codes other than DTC B1782 may be output at this time, but they are not related to this check.

OK	Go to step 8

OK

USE SIMULATION METHOD TO CHECK

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG	Go to step 12

OK

10	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 12**

OK

11	CHECK DTC

(a) Connect the negative (-) terminal cable to the battery.
(b) Turn the ignition switch to the ON position.
(c) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clearthe DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position.
(f) Check the DTCs (See page RS-257).
OK:
DTC B1782 is not output.
HINT:
Codes other than DTC B1782 may be output at this time, but they are not related to this check.

NG → **Go to step 12**

OK

END

12	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).

NEXT

13	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.

(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

RS

14	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1783	Rear Occupant Classification Sensor RH Circuit Malfunction

DESCRIPTION

The rear occupant classification sensor RH circuit consists of the occupant classification ECU and the rear occupant classification sensor RH.

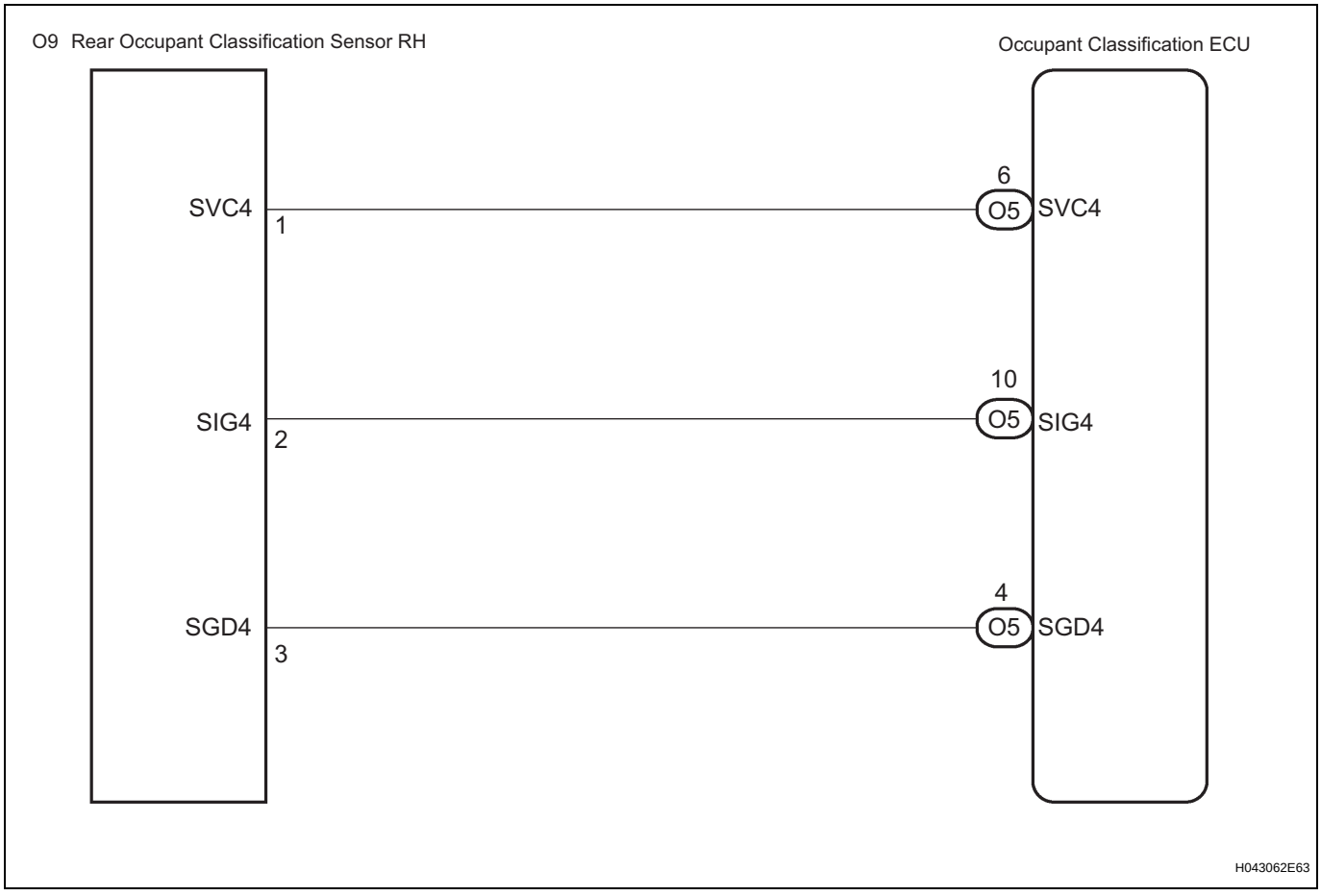
DTC B1783 is recorded when a malfunction is detected in the rear occupant classification sensor RH circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1783	• The occupant classification 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 rear occupant classification sensor RH circuit for 2 seconds. • Rear occupant classification sensor RH malfunction • Occupant classification ECU malfunction	• Front seat assembly RH (Rear occupant classification sensor RH) • Occupant classification ECU • Front seat wire RH

HINT:

When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1783 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front passenger seat installation bolts to see the under surface of the seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

RS

1	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1783 is not output.
HINT:
Codes other than DTC B1783 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK ↓

USE SIMULATION METHOD TO CHECK

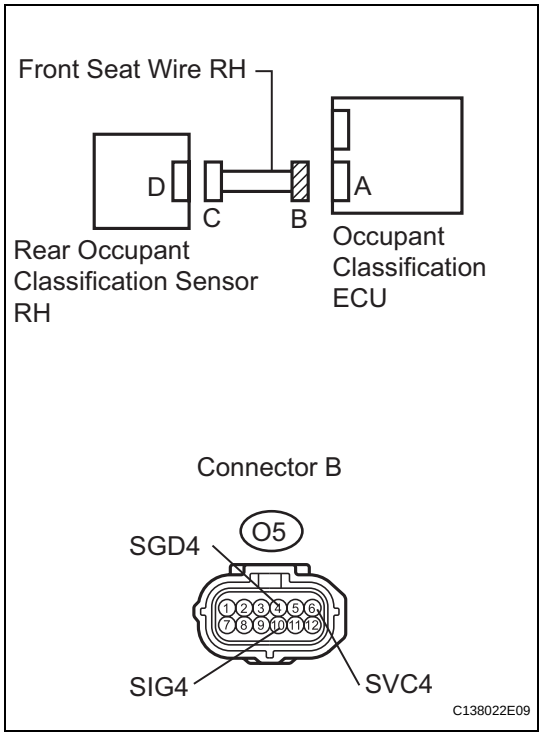
2	CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Check that the connectors are properly connected to the occupant classification ECU and the rear occupant classification sensor RH.
OK:
The connectors are properly connected.

NG → **CONNECT CONNECTORS PROPERLY, THEN GO TO STEP 1**

OK ↓

3 CHECK FRONT SEAT WIRE RH (SHORT TO B+)



(a) Disconnect the connectors from the occupant classification ECU and the rear occupant classification sensor RH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

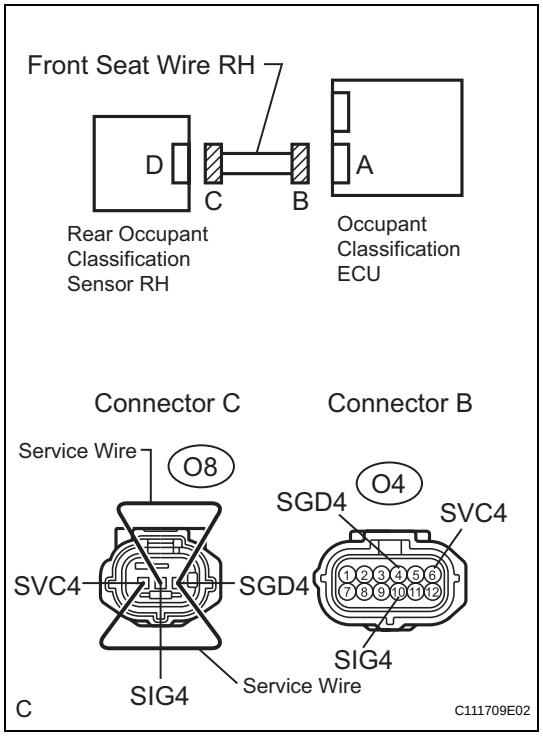
Standard voltage

Tester Connection	Condition	Specified Condition
O5-4 (SGD4) - Body ground	Ignition switch ON	Below 1 V
O5-6 (SVC4) - Body ground	Ignition switch ON	Below 1 V
O5-10 (SIG4) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT WIRE RH**

OK

4 CHECK FRONT SEAT WIRE RH (OPEN)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Using a service wire, connect terminals 1 (SVC4) and 3 (SGD4), and connect terminals 2 (SIG4) and 3 (SGD4) of connector C.

NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.

(d) Measure the resistance according to the value(s) in the table below.

Standard resistance

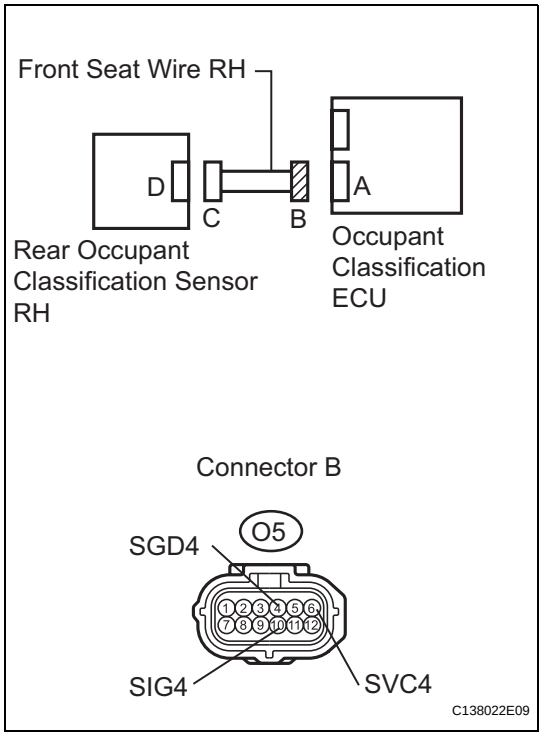
Tester Connection	Condition	Specified Condition
O5-6 (SVC4) - O5-4 (SGD4)	Always	Below 1 Ω
O5-10 (SIG4) - O5-4 (SGD4)	Always	Below 1 Ω

NG → **REPLACE FRONT SEAT WIRE RH**

OK

RS

5 CHECK FRONT SEAT WIRE RH (SHORT)



(a) Disconnect the service wire from connector C.
(b) Measure the resistance according to the value(s) in the table below.

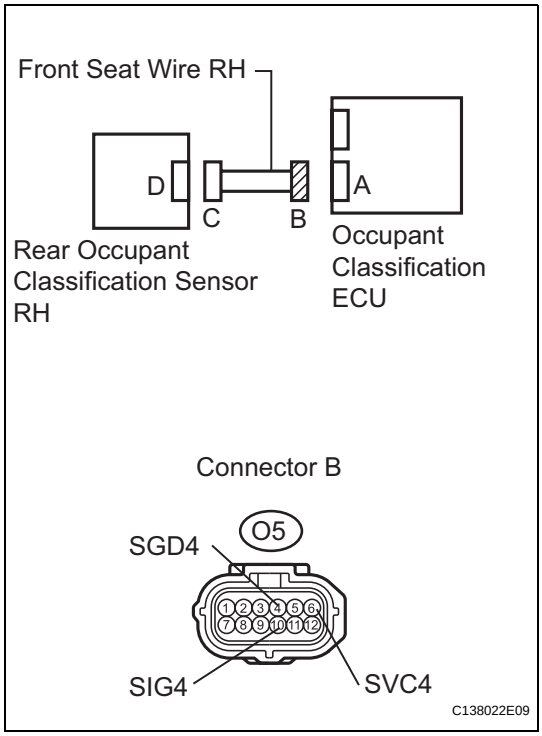
Standard resistance

Tester Connection	Condition	Specified Condition
O5-6 (SVC4) - O5-4 (SGD4)	Always	1 MΩ or higher
O5-10 (SIG4) - O5-4 (SGD4)	Always	1 MΩ or higher
O5-6 (SVC4) - O5-10 (SIG4)	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE 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
O5-4 (SGD4) - Body ground	Always	1 MΩ or higher
O5-6 (SVC4) - Body ground	Always	1 MΩ or higher
O5-10 (SIG4) - Body ground	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE RH

OK

7	CHECK DTC

(a) Connect the connectors to the occupant classification ECU and the rear occupant classification sensor RH.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position.
(g) Check the DTCs (See page RS-257).
OK:
DTC B1783 is not output.
HINT:
Codes other than DTC B1783 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK ↓

USE SIMULATION METHOD TO CHECK

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT ↓

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 12**

OK

10	PERFORM SENSITIVITY CHECK

RS

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 12**

OK

11	CHECK DTC

(a) Connect the negative (-) terminal cable to the battery.
(b) Turn the ignition switch to the ON position.
(c) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position.
(f) Check the DTCs (See page RS-257).
OK:
DTC B1783 is not output.
HINT:
Codes other than DTC B1783 may be output at this time, but they are not related to this check.

NG → **Go to step 12**

OK

END

12	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).

NEXT

13	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.

(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

14	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1785	Front Occupant Classification Sensor LH Collision Detection

DESCRIPTION

RS

DTC B1785 is output when the occupant classification ECU receives a collision detection signal sent by the front occupant classification sensor LH if an accident occurs.
DTC B1785 is also output when the front seat adjuster frame assembly RH is subjected to a strong impact, even if an actual accident does not occur.
However, when the occupant classification ECU outputs a collision detection signal, even if the vehicle is not in a collision, DTC B1785 can be cleared by "zero point calibration" and "sensitivity check".
Therefore, if DTC B1785 is output, first perform "zero point calibration" and "sensitivity check".

DTC No.	DTC Detecting Condition	Trouble Area
B1785	• Front seat assembly RH malfunction • Occupant classification ECU malfunction • Front occupant classification sensor LH sensed large load	• Occupant classification ECU • Front seat assembly RH (Front occupant classification sensor LH)

HINT:
When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1785 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM

See page RS-269.

INSPECTION PROCEDURE

1 PERFORM ZERO POINT CALIBRATION

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 4**

OK

2 PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 4**

OK

3	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1785 is not output.
HINT:
Codes other than DTC B1785 may be output at this time, but they are not related to this check.

NG → **Go to step 4**

OK

END

4	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

5	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 8**

OK

RS

6	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 8**

OK

7	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1785 is not output.
HINT:
Codes other than DTC B1785 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

END

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).

OK:
"COMPLETED" is displayed.

NEXT

10	PERFORM SENSITIVITY CHECK

RS

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1786	Front Occupant Classification Sensor RH Collision Detection

DESCRIPTION

RS

DTC B1786 is output when the occupant classification ECU receives a collision detection signal sent by the front occupant classification sensor RH if an accident occurs.
DTC B1786 is also output when the front seat adjuster frame assembly RH is subjected to a strong impact, even if an actual accident does not occur.
However, when the occupant classification ECU outputs a collision detection signal, even if the vehicle is not in a collision, DTC B1786 can be cleared by "zero point calibration" and "sensitivity check".
Therefore, if DTC B1786 is output, first perform "zero point calibration" and "sensitivity check".

DTC No.	DTC Detection Condition	Trouble Area
B1786	• Front seat assembly RH malfunction • Occupant classification ECU malfunction • Front occupant classification sensor RH sensed large load	• Occupant classification ECU • Front seat assembly RH (Front occupant classification sensor RH)

HINT:
When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1786 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM

See page RS-276.

INSPECTION PROCEDURE

1 PERFORM ZERO POINT CALIBRATION

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 4**

OK

2 PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 4**

OK

3	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1786 is not output.
HINT:
Codes other than DTC B1786 may be output at this time, but they are not related to this check.

NG → **Go to step 4**

OK

END

4	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

5	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 8**

OK

RS

6	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 8**

OK

7	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1786 is not output.
HINT:
Codes other than DTC B1786 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

END

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).

OK:
"COMPLETED" is displayed.

NEXT

10	PERFORM SENSITIVITY CHECK

RS

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1787	Rear Occupant Classification Sensor LH Collision Detection

DESCRIPTION

RS

DTC B1787 is output when the occupant classification ECU receives a collision detection signal sent by the rear occupant classification sensor LH if an accident occurs.
DTC B1787 is also output when the front seat adjuster frame assembly RH is subjected to a strong impact, even if an actual accident does not occur.
However, when the occupant classification ECU outputs a collision detection signal, even if the vehicle is not in a collision, DTC B1787 can be cleared by "zero point calibration" and "sensitivity check".
Therefore, if DTC B1787 is output, first perform "zero point calibration" and "sensitivity check".

DTC No.	DTC Detecting Condition	Trouble Area
B1787	• Front seat assembly RH malfunction • Occupant classification ECU malfunction • Rear occupant classification sensor LH sensed large load	• Occupant classification ECU • Front seat assembly RH (Rear occupant classification sensor LH)

HINT:
When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1787 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM

See page RS-283.

INSPECTION PROCEDURE

1 PERFORM ZERO POINT CALIBRATION

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 4**

OK

2 PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 4**

OK

3	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1787 is not output.
HINT:
Codes other than DTC B1787 may be output at this time, but they are not related to this check.

NG → **Go to step 4**

OK

END

4	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

5	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 8**

OK

RS

6	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 8**

OK

7	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1787 is not output.
HINT:
Codes other than DTC B1787 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

END

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).

OK:
"COMPLETED" is displayed.

NEXT

10	PERFORM SENSITIVITY CHECK

RS

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1788	Rear Occupant Classification Sensor RH Collision Detection

DESCRIPTION

RS

DTC B1788 is output when the occupant classification ECU receives a collision detection signal sent by the rear occupant classification sensor RH if an accident occurs.
DTC B1788 is also output when the front seat adjuster frame assembly RH is subjected to a strong impact, even if an actual accident does not occur.
However, when the occupant classification ECU outputs a collision detection signal, even if the vehicle is not in a collision, DTC B1788 can be cleared by "zero point calibration" and "sensitivity check".
Therefore, if DTC B1788 is output, first perform "zero point calibration" and "sensitivity check".

DTC No.	DTC Detection Condition	Trouble Area
B1788	• Front seat assembly RH malfunction • Occupant classification ECU malfunction • Rear occupant classification sensor RH sensed large load	• Occupant classification ECU • Front seat assembly RH (Rear occupant classification sensor RH)

HINT:
When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1788 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM

See page RS-290.

INSPECTION PROCEDURE

1	PERFORM ZERO POINT CALIBRATION

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 4**

OK

2	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 4**

OK

3	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1788 is not output.
HINT:
Codes other than DTC B1788 may be output at this time, but they are not related to this check.

NG → **Go to step 4**

OK

END

4	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

5	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 8**

OK

RS

6	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 8**

OK

7	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1788 is not output.
HINT:
Codes other than DTC B1788 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

END

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).

OK:
"COMPLETED" is displayed.

NEXT

10	PERFORM SENSITIVITY CHECK

RS

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1790	Center Airbag Sensor Assembly Communication Circuit Malfunction

DESCRIPTION

The center airbag sensor assembly communication circuit consists of the occupant classification ECU and the center airbag sensor assembly.

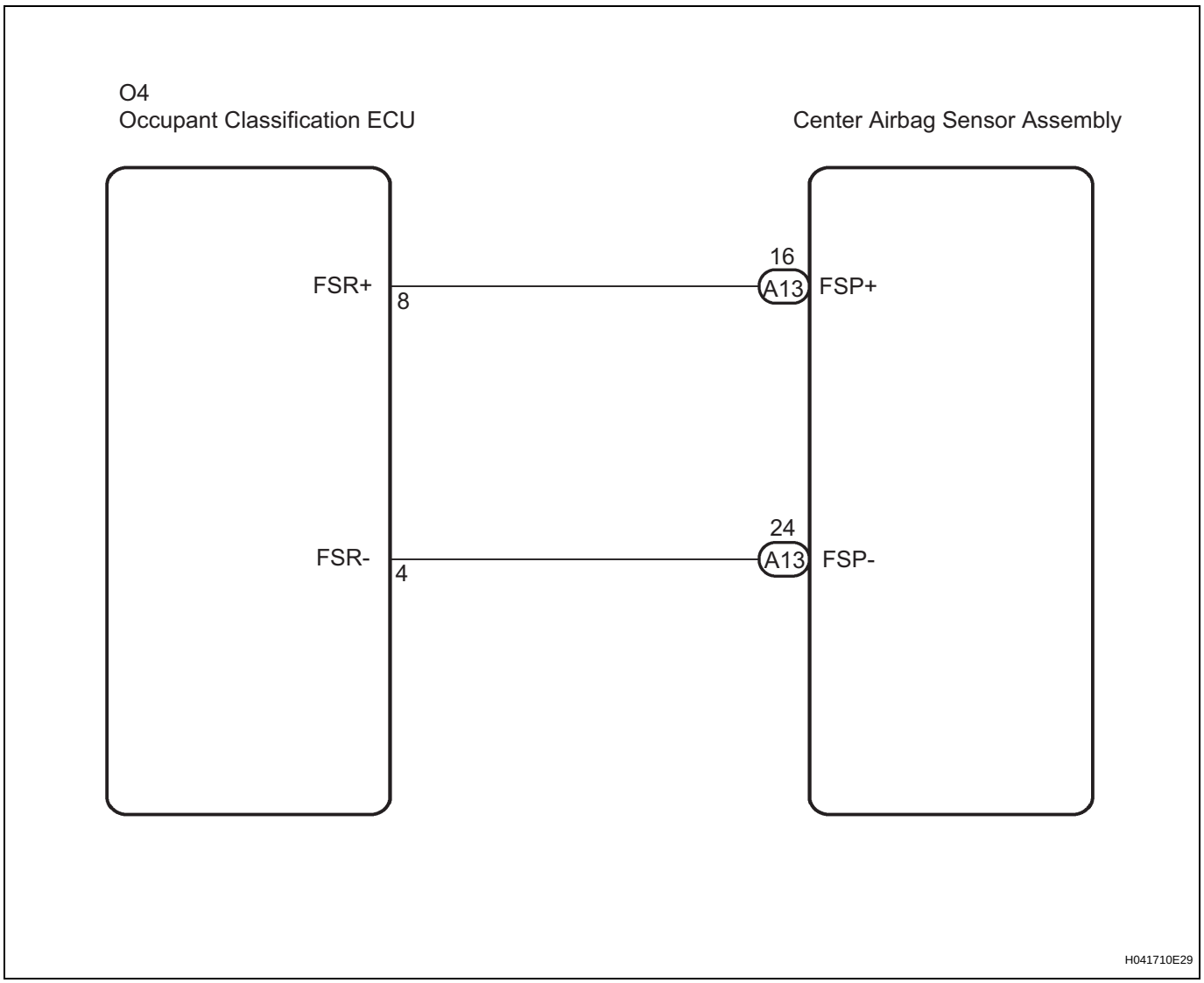
DTC B1790 is recorded when a malfunction is detected in the center airbag sensor assembly communication circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1790	• The occupant classification 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 center airbag sensor assembly communication circuit for 2 seconds. • Center airbag sensor assembly malfunction • Occupant classification ECU malfunction	• Occupant classification ECU • Center airbag sensor assembly • Floor wire No. 2

HINT:

When DTC B1650/32 is detected as a result of troubleshooting for the AIRBAG SYSTEM, check the DTCs stored in the occupant classification ECU. When DTC B1790 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front passenger seat installation bolts to see the under surface of seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in memory (See page RS-257).
HINT:
First clear DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).

OK:

DTC B1790 is not output.

HINT:

Codes other than DTC B1790 may be output at this time, but they are not related to this check.

RS

NG → **Go to step 2**

OK

USE SIMULATION METHOD TO CHECK

2 CHECK CONNECTION OF CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Check that the connectors are properly connected to the occupant classification ECU and the center airbag sensor assembly.

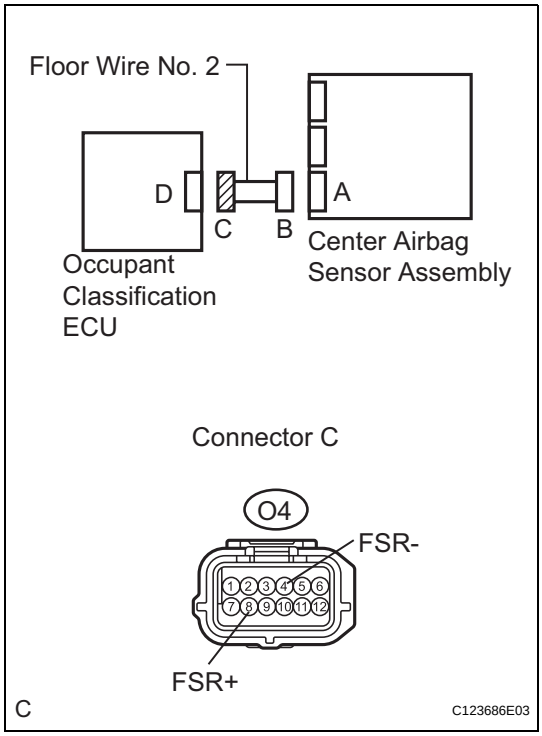
OK:

The connectors are connected.

NG → **CONNECT CONNECTORS PROPERLY, THEN GO TO STEP 1**

OK

3 CHECK FLOOR WIRE NO. 2 (SHORT TO B+)



(a) Disconnect the connectors from the occupant classification ECU and the center airbag sensor assembly.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

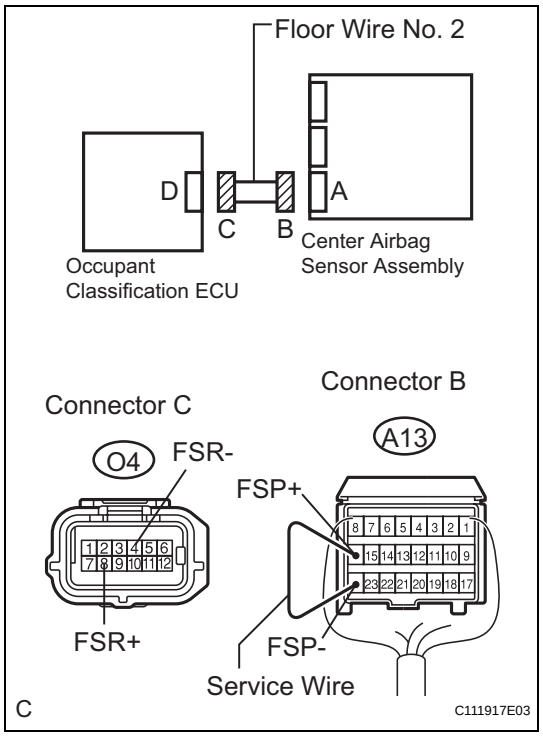
Standard voltage

Tester Connection	Condition	Specified Condition
O4-8 (FSR+) - Body ground	Ignition switch ON	Below 1 V
O4-4 (FSR-) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FLOOR WIRE NO. 2**

OK

4 CHECK FLOOR WIRE NO. 2 (OPEN)



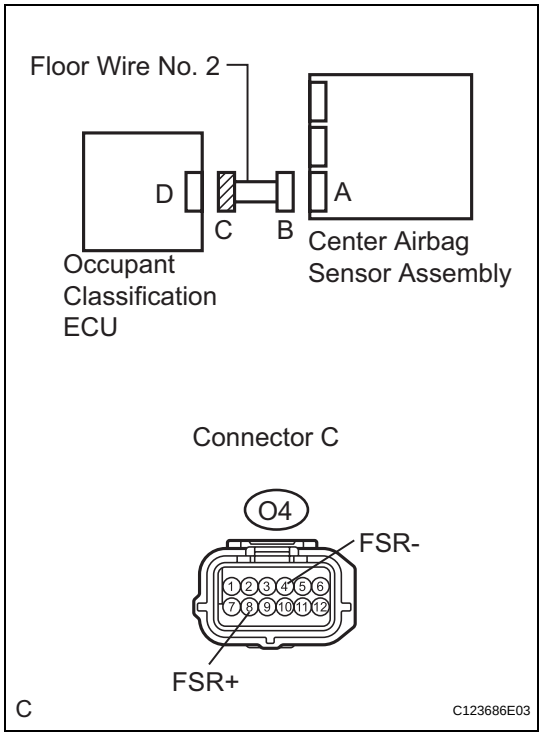
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Using a service wire, connect terminals 16 (FSP+) and 24 (FSP-) of connector C.
NOTICE:
Do not forcibly insert a service wire into the terminals of the connector when connecting.
(d) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
O4-8 (FSR+) - O4-4 (FSR-)	Always	Below 1 Ω

NG → REPLACE FLOOR WIRE NO. 2

OK

5 CHECK FLOOR WIRE NO. 2 (SHORT)



(a) Disconnect the service wire from connector C.
(b) Measure the resistance according to the value(s) in the table below.
Standard resistance

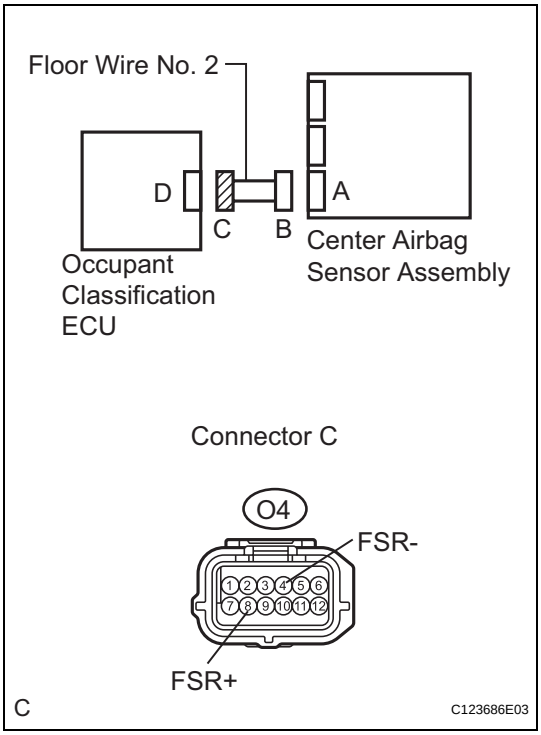
Tester Connection	Condition	Specified Condition
O4-8 (FSR+) - O4-4 (FSR-)	Always	1 MΩ or higher

NG → REPLACE FLOOR WIRE NO. 2

OK

6	CHECK FLOOR WIRE NO. 2 (SHORT TO GROUND)

RS



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
O4-8 (FSR+) - Body ground	Always	1 MΩ or higher
O4-4 (FSR-) - Body ground	Always	1 MΩ or higher

NG → **REPLACE FLOOR WIRE NO. 2**

OK

7	CHECK DTC

(a) Connect the connectors to the occupant classification ECU and the center airbag sensor assembly.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Clear the DTCs stored in memory (See page RS-257).
HINT:
First clear DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position.
(g) Check the DTCs (See page RS-257).
OK:
DTC B1790 is not output.
HINT:
Codes other than DTC B1790 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

USE SIMULATION METHOD TO CHECK

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

10	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard value:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

11	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in memory (See page RS-257).
HINT:
First clear DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1790 is not output.
HINT:
Codes other than DTC B1790 may be output at this time, but they are not related to this check.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

END

DTC	B1793	Occupant Classification Sensor Power Supply Circuit Malfunction

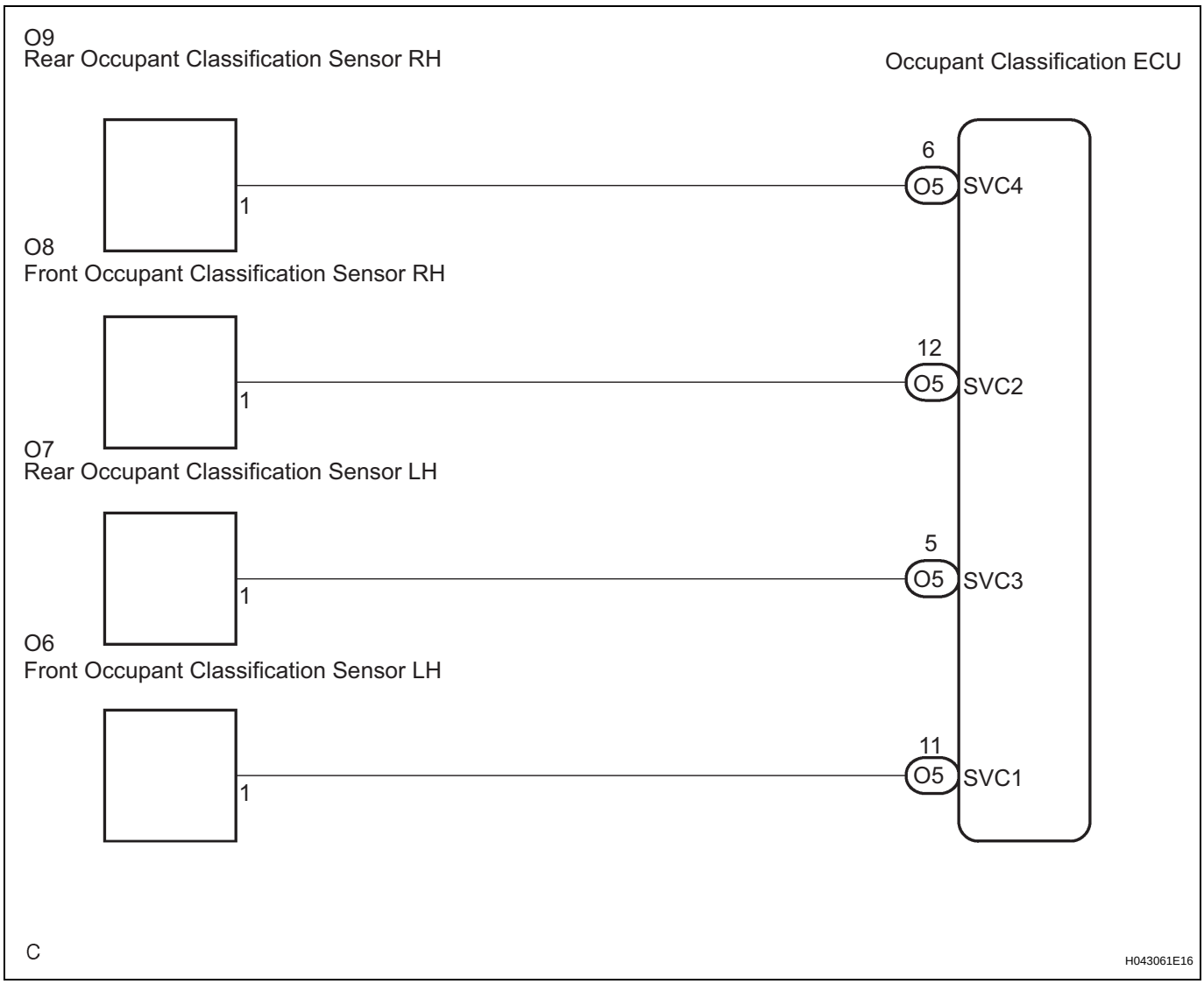
DESCRIPTION

The occupant classification sensor power supply circuit consists of the occupant classification ECU and the occupant classification sensors.
DTC B1793 is recorded when a malfunction is detected in the occupant classification sensor power supply circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1793	• The occupant classification 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 classification sensor power supply circuit for 2 seconds. • Occupant classification ECU malfunction	• Front seat assembly RH (Occupant classification sensors) • Occupant classification ECU • Front seat wire RH

HINT:
When DTC B1650/23 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1793 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If troubleshooting (wire harness inspection) is difficult to perform, remove the front passenger seat installation bolts to see the under surface of the seat cushion.
- In the above case, hold the seat so that it does not fall down. Holding the seat for a long period of time may cause a problem, such as seat rail deformation. Hold the seat only as necessary.

1	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).

OK:
DTC B1793 is not output.
HINT:
Codes other than DTC B1793 may be output at this time, but they are not related to this check.

NG → **Go to step 2**

OK

USE SIMULATION METHOD TO CHECK

2 CHECK CONNECTION OF CONNECTORS

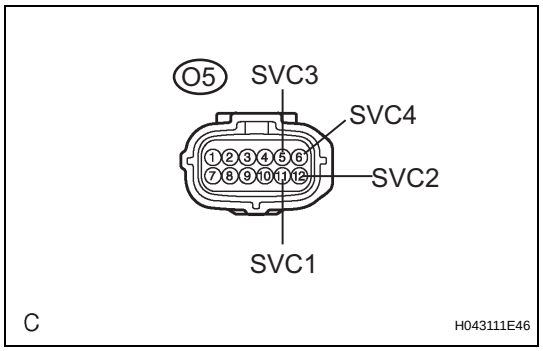
(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Check that the connectors are properly connected to the occupant classification ECU and the occupant classification sensors.

OK:
The connectors are properly connected.

NG → **CONNECT CONNECTORS PROPERLY, THEN GO TO STEP 1**

OK

3 CHECK FRONT SEAT WIRE RH (SHORT TO B+)



(a) Disconnect the connectors from the occupant classification ECU and the 4 occupant classification sensors.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Measure the voltage according to the value(s) in the table below.

Standard voltage

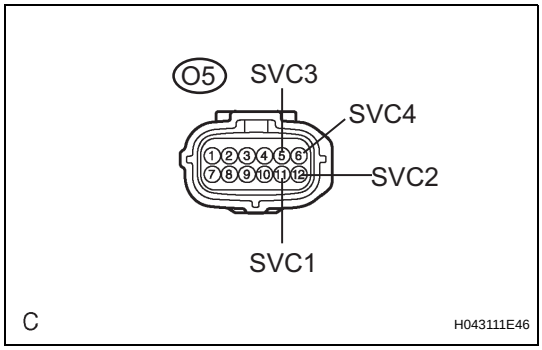
Tester Connection	Condition	Specified Condition
O5-5 (SVC3) - Body ground	Ignition switch ON	Below 1 V
O5-6 (SVC4) - Body ground	Ignition switch ON	Below 1 V
O5-11 (SVC1) - Body ground	Ignition switch ON	Below 1 V
O5-12 (SVC2) - Body ground	Ignition switch ON	Below 1 V

NG → **REPLACE FRONT SEAT WIRE RH**

OK

RS

4 CHECK FRONT SEAT WIRE RH (SHORT TO GROUND)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Measure the resistance according to the value(s) in the table below.

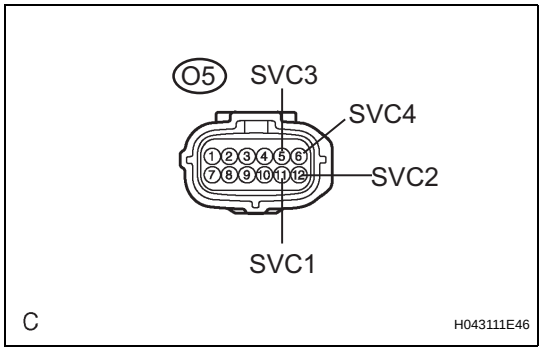
Standard resistance

Tester Connection	Condition	Specified Condition
O5-5 (SVC3) - Body ground	Always	1 MΩ or higher
O5-6 (SVC4) - Body ground	Always	1 MΩ or higher
O5-11 (SVC1) - Body ground	Always	1 MΩ or higher
O5-12 (SVC2) - Body ground	Always	1 MΩ or higher

NG → REPLACE FRONT SEAT WIRE RH

OK

5 CHECK FRONT SEAT WIRE RH (OPEN)



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

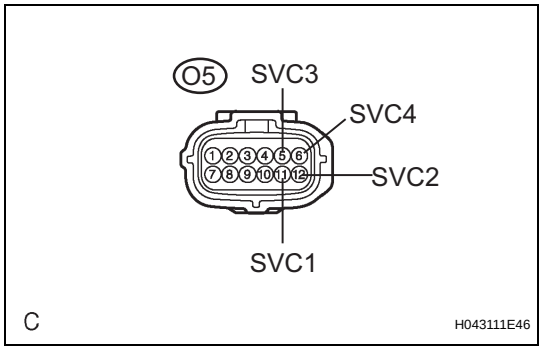
Tester Connection	Condition	Specified Condition
O5-5 (SVC3) - O7-1 (SVC3)	Always	Below 1 Ω
O5-6 (SVC4) - O9-1 (SVC4)	Always	Below 1 Ω
O5-11 (SVC1) - O6-1 (SVC1)	Always	Below 1 Ω
O5-12 (SVC2) - O8-1 (SVC2)	Always	Below 1 Ω

NG → REPLACE FRONT SEAT WIRE RH

OK

RS

6 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
O5-5 (SVC3) - O5-6 (SVC4)	Always	1 MΩ or higher
O5-6 (SVC4) - O5-11 (SVC1)	Always	1 MΩ or higher
O5-11 (SVC1) - O5-12 (SVC2)	Always	1 MΩ or higher
O5-12 (SVC2) - O5-5 (SVC3)	Always	1 MΩ or higher
O5-12 (SVC2) - O5-6 (SVC4)	Always	1 MΩ or higher
O5-11 (SVC1) - O5-5 (SVC3)	Always	1 MΩ or higher

NG → **REPLACE FRONT SEAT WIRE RH**

OK

7 CHECK DTC

(a) Connect the connectors to the occupant classification ECU and the 4 occupant classification sensors.
(b) Connect the negative (-) terminal cable to the battery.
(c) Turn the ignition switch to the ON position.
(d) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(e) Turn the ignition switch to the LOCK position.
(f) Turn the ignition switch to the ON position.
(g) Check the DTCs (See page RS-257).
OK:
DTC B1793 is not output.
HINT:
Codes other than DTC B1793 may be output at this time, but they are not related to this check.

NG → **Go to step 8**

OK

USE SIMULATION METHOD TO CHECK

8	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

9	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NG → **Go to step 12**

OK

10	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 12**

OK

11	CHECK DTC

(a) Connect the negative (-) terminal cable to the battery.
(b) Turn the ignition switch to the ON position.
(c) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear the DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(d) Turn the ignition switch to the LOCK position.
(e) Turn the ignition switch to the ON position.
(f) Check the DTCs (See page RS-257).
OK:
DTC B1793 is not output.

HINT:
Codes other than DTC B1793 may be output at this time, but they are related to this check.

OK → Go to step 12

OK

END

12 REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).

NEXT

13 PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

14 PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

RS

DTC	B1794	Open in Occupant Classification ECU Battery Positive Line

DESCRIPTION

RS

This circuit consists of the occupant classification ECU and the power source circuit (battery, fuse, wire harness).

DTC B1794 is recorded when a malfunction is detected in the occupant classification ECU or the power source circuit.

HINT:

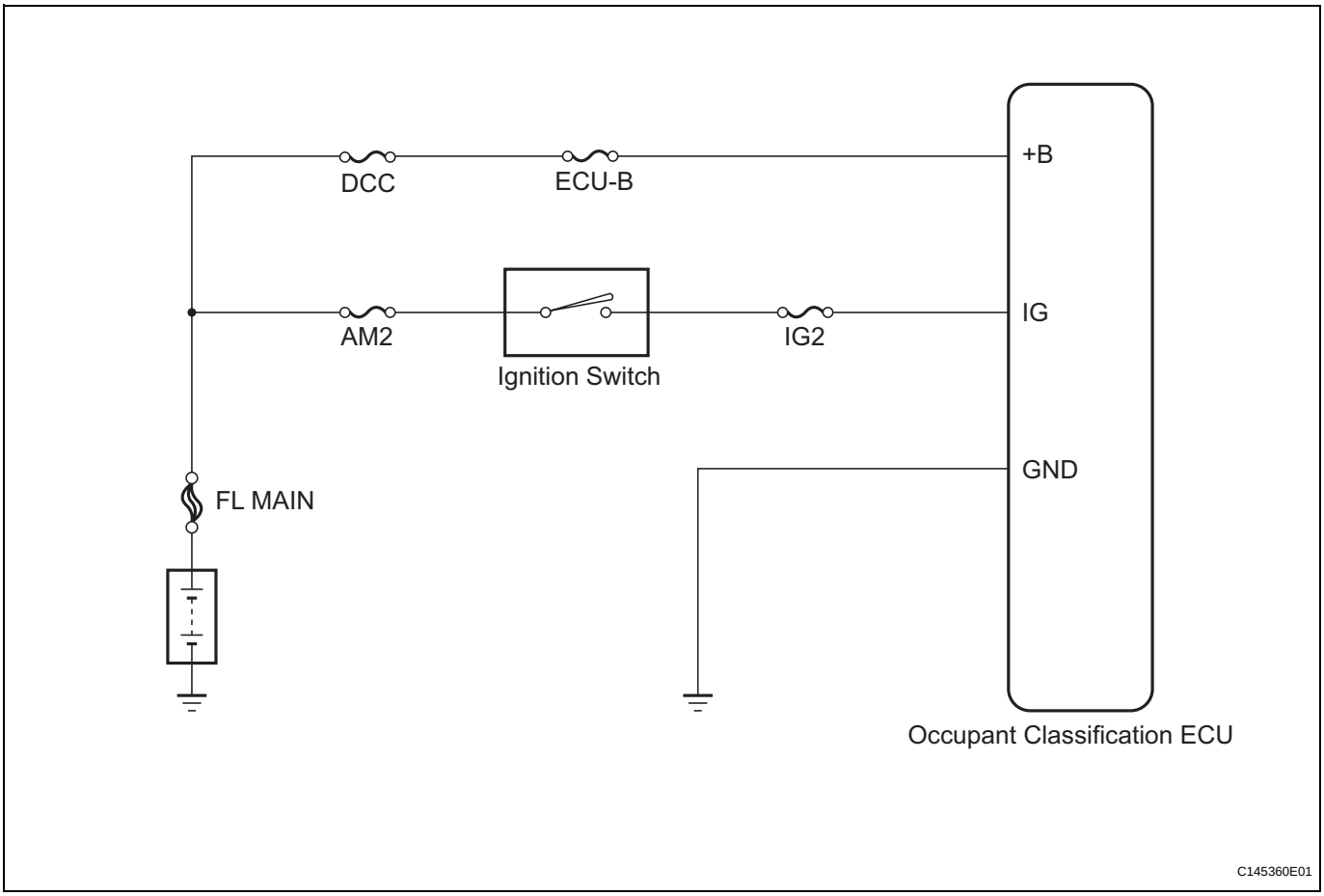
When DTC B1794 is output after switching the ignition switch LOCK-ON-LOCK 50 times in a row when a malfunction occurs in the power circuit for the occupant classification system, the DTC is output again when a malfunction is detected even once after being cleared, unless the normal system code is input.

DTC No.	DTC Detecting Condition	Trouble Area
B1794	• The ignition switch is turned from LOCK to ON, hold for 10 seconds or more, and back to LOCK again 50 times in a row when a malfunction occurs in the power circuit for the occupant classification system. • Occupant classification ECU malfunction	• Battery • ECU-B Fuse • Floor wire No. 2 • Occupant classification ECU

HINT:

When DTC B1650/32 is detected as a result of troubleshooting for the AIRBAG SYSTEM, check the DTCs stored in the occupant classification ECU. When DTC B1794 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK BATTERY

(a) Measure the voltage of the battery.
Standard voltage:
11 to 14 V

NG → **REPLACE BATTERY**

OK

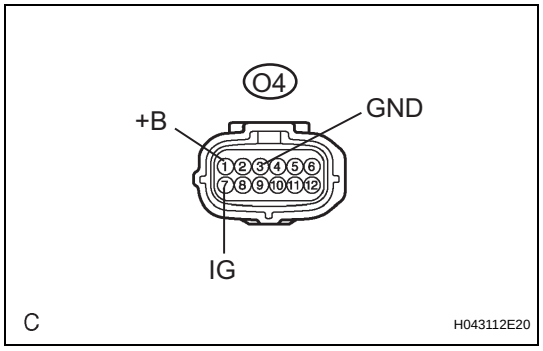
2	CHECK FUSE

(a) Check the ECU-B fuse.
Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

OK

3	CHECK HARNESS AND CONNECTOR (OCCUPANT CLASSIFICATION ECU - BATTERY)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Disconnect the connector from the occupant classification ECU.
(d) Connect the negative (-) terminal cable to the battery.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.
Standard voltage

Tester Connection	Condition	Specified Condition
O4-1 (+B) - Body ground	Ignition switch ON	10 to 14 V
O4-7 (IG) - Body ground	Ignition switch ON	10 to 14 V

(g) Turn the ignition switch to the LOCK position.
(h) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
O4-3 (GND) - Body ground	Always	Below 1 Ω

NG → **REPLACE HARNESS OR CONNECTOR**

OK

RS

4	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in memory (See page RS-257).
HINT:
First clear DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position.
(d) Turn the ignition switch to the ON position, and wait for at least 10 seconds.
(e) Using the intelligent tester, check the DTCs of the occupant classification ECU (See page RS-257).
OK:
DTC B1794 is not output.
HINT:
Codes other than code B1794 may be output at this time, but they are not related to this check.

NG → **Go to step 5**

OK

USE SIMULATION METHOD TO CHECK

5	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery, and wait for at least 90 seconds.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

6	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

7	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).

Standard value:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1795	Occupant Classification ECU Malfunction

DESCRIPTION

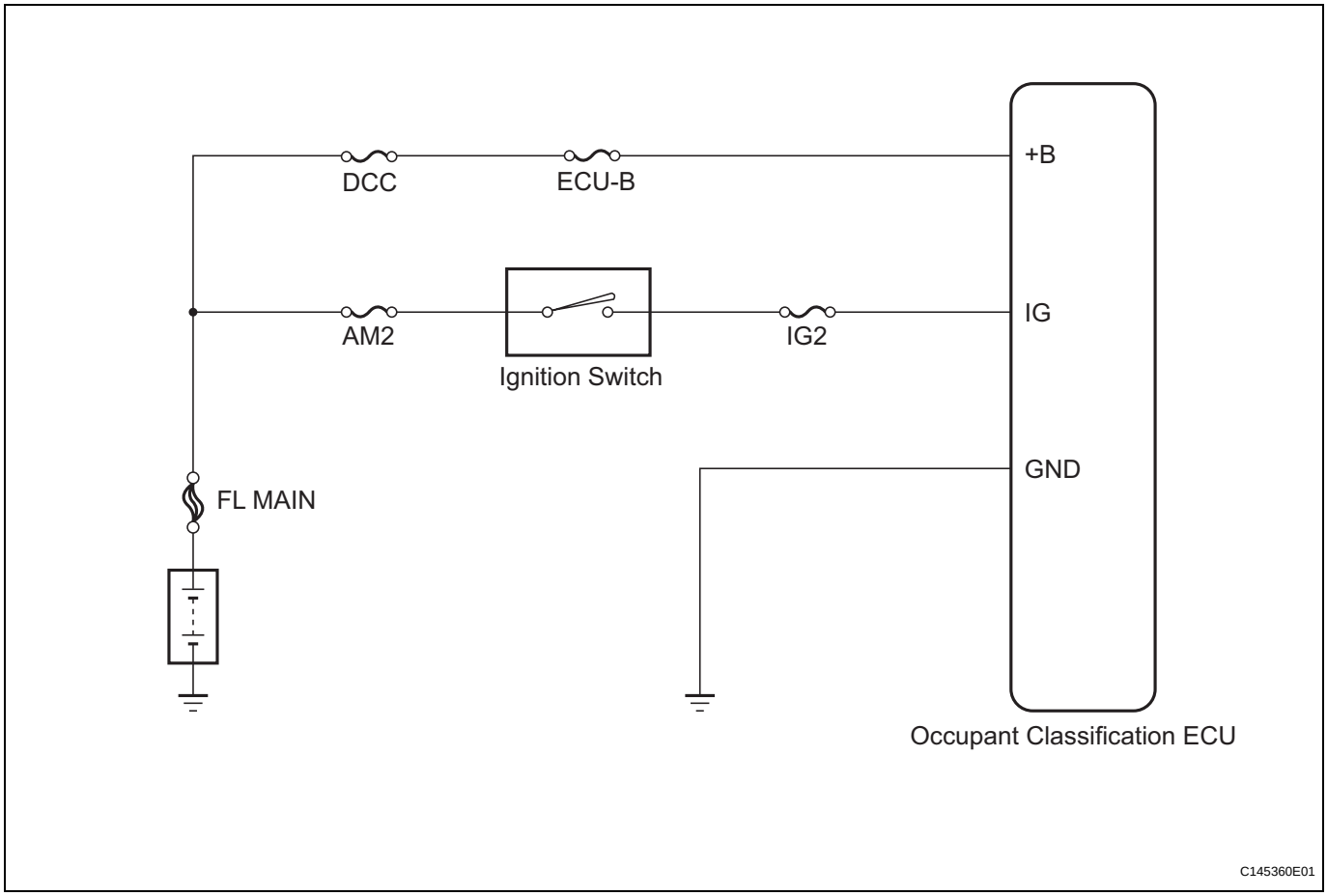
DTC B1795 is recorded when a malfunction is detected in the occupant classification ECU.
Troubleshoot DTC B1771 first when the DTCs B1771 and B1795 are output simultaneously.

RS

DTC No.	DTC Detecting Condition	Trouble Area
B1795	• The occupant classification ECU receives the ignition switch LOCK to ON signal 50 times in a row when a malfunction occurs in the power circuit for the occupant classification ECU (LOCK to ON to LOCK should be counted as 1 time). • Occupant classification ECU circuit malfunction • The occupant classification ECU receives a short circuit to ground signal in the passenger side buckle switch circuit for 2 seconds. • Occupant classification ECU malfunction	• Battery • ECU-B Fuse • Floor wire No. 2 • Front seat inner belt assembly RH (Passenger side buckle switch) • Occupant classification ECU

HINT:
When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1795 is output, perform troubleshooting for the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK DTC

(a) Turn the ignition switch to the ON position, and wait for at least 10 seconds.
(b) Check for DTCs (See page RS-257).
Result:
A:
DTCs B1771 and B1795 are output.
B:
DTC B1795 is output.
HINT:
Codes other than DTCs B1771 and B1795 may be output at this time, but they are not related to this check.

A	GO TO DTC B1771

B

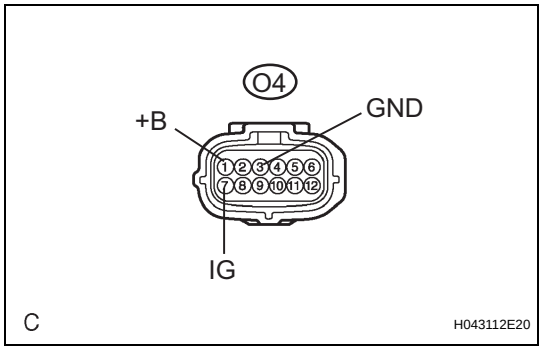
2	CHECK FUSE

(a) Measure the resistance of the ECU-B fuse.
Standard resistance:
Below 1 Ω

NG	REPLACE FUSE

OK

3	CHECK HARNESS AND CONNECTOR (OCCUPANT CLASSIFICATION ECU - BATTERY)



(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Disconnect the connector from the occupant classification ECU.
(d) Connect the negative (-) terminal cable to the battery.
(e) Turn the ignition switch to the ON position.
(f) Measure the voltage according to the value(s) in the table below.
Standard voltage

Tester Connection	Condition	Specified Condition
O4-1 (+B) - Body ground	Always	10 to 14 V
O4-7 (IG) - Body ground	Ignition switch ON	10 to 14 V

(g) Turn the ignition switch to the LOCK position.
(h) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
O4-3 (GND) - Body ground	Always	Below 1 Ω

NG → **REPLACE HARNESS OR CONNECTOR**

OK

4	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

5	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

6	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

DTC	B1796	Sleep Operation Failure of Occupant Classification ECU

DESCRIPTION

During sleep mode, the occupant classification ECU reads the condition of each sensor while the ignition switch is off.
In this mode, if the occupant classification ECU detects an internal malfunction, DTC B1796 is output.

DTC No.	DTC Detecting Condition	Trouble Area
B1796	Occupant classification ECU malfunction	Occupant classification ECU

HINT:
When DTC B1650/32 is detected as a result of troubleshooting for "AIRBAG SYSTEM", check the DTCs stored in the occupant classification ECU. When DTC B1796 is output, perform troubleshooting for the DTC.

INSPECTION PROCEDURE

1	CHECK DTC

(a) Turn the ignition switch to the ON position.
(b) Clear the DTCs stored in the memory (See page RS-257).
HINT:
First clear for DTCs stored in the occupant classification ECU and then in the center airbag sensor assembly.
(c) Turn the ignition switch to the LOCK position, and wait for at least 10 seconds.
(d) Turn the ignition switch to the ON position.
(e) Check the DTCs (See page RS-257).
OK:
DTC B1796 is not output.
HINT:
Codes other than DTC B1796 may be output at this time, but they are not related to this check.

NG	Go to step 2

OK

USE SIMULATION METHOD TO CHECK

2	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).

NEXT

3	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETED" is displayed.

NEXT

4	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

END

Trouble in Passenger Airbag ON / OFF Indicator

DESCRIPTION

The occupant classification system detects the front passenger seat condition. It then informs a passenger of the front passenger airbag assembly and front seat side airbag assembly RH condition (activated/not activated) by the passenger airbag ON/OFF indicator.

HINT:

Approximately 6 seconds after the ignition switch is turned to the ON position, the passenger airbag ON/OFF indicator will be ON/OFF depending on the conditions listed below.

Front Passenger Seat Condition	Passenger Airbag ON/OFF Indicator		SRS Warning Light
	ON Indicator	OFF Indicator	
Adult is seated.	ON	OFF	OFF
Child is seated.	OFF	ON	OFF
Vacant	OFF	OFF	OFF
Occupant classification system failure	OFF	ON	ON

INSPECTION PROCEDURE

1 CHECK SRS WARNING LIGHT

(a) Turn the ignition switch to the ON position, and check the SRS warning light condition.

HINT:

If this trouble occurs, the SRS warning light is off. If the light is on, a DTC is output. Troubleshoot for the output DTC.

OK:

After the primary check period, SRS warning light goes off.

HINT:

The primary check period is approximately 6 seconds after the ignition switch is turned ON.

NG → **GO TO DTC CHART**

OK

2 PERFORM ZERO POINT CALIBRATION

(a) Turn the ignition switch to the LOCK position.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).

OK:

"COMPLETE" is displayed.

NG → **Go to step 4**

OK

RS

3	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 4**

OK

END

4	RETIGHTEN FRONT SEAT ASSEMBLY RH BOLT

(a) Turn the ignition switch to the LOCK position.
(b) Loosen the 4 installation bolts of the front seat assembly RH.
(c) Tighten the 4 installation bolts of the front seat assembly RH to the specified torque.
Torque: 42 N*m (430 kgf*cm, 31 ft.*lbf)

NEXT

5	PERFORM ZERO POINT CALIBRATION

(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to the ON position.
(c) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETE" is displayed.

NG → **Go to step 7**

OK

6	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 7**

OK

END

7 READ VALUE OF DATA LIST

(a) Turn the ignition switch to the ON position.
(b) Using the intelligent tester, read the DATA LIST (See page SB-5).
(c) Read the the display when the passenger side buckle switch is operated.

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
P BUCKLE SW	Passenger Buckle SW/ UNSET: The seat belt is not fastened SET: The seat belt is fastened NG: Data is not determined	UNSET/SET	-

OK:
The tester display changes correctly in accordance with the operation of the buckle switch.

NG → **REPLACE FRONT SEAT INNER BELT ASSEMBLY RH**

OK

8 CHECK CONNECTORS

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Check that the connectors are properly connected to the occupant classification ECU and the 4 occupant classification sensors.
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 classification ECU and the 4 occupant classification sensors.
(e) Check that the connectors are not damaged or deformed.
OK:
The connectors are normal.

NG → **REPAIR OR REPLACE CONNECTORS, THEN GO TO STEP 1**

OK

9 CHECK DTC

(a) Connect the connectors to the occupant classification ECU and the 4 occupant classification sensors.
(b) Connect the negative (-) terminal cable to the battery.

(c) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(d) Turn the ignition switch to the LOCK position.
(e) Clear the DTCs stored in the memory (See page RS-257).
(f) Turn the ignition switch to the ON position, and wait for at least 60 seconds.
(g) Check the DTCs (See page RS-257).
OK:
DTC is not output.

NG → **REPLACE CENTER AIRBAG SENSOR ASSEMBLY**

OK

10	REPLACE OCCUPANT CLASSIFICATION ECU

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the occupant classification ECU (See page RS-407).
HINT:
Perform the inspection using parts from a normal vehicle if possible.

NEXT

11	PERFORM ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform "zero point calibration" (See page RS-250).
OK:
"COMPLETE" is displayed.

NEXT

12	PERFORM SENSITIVITY CHECK

(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NG → **Go to step 13**

OK

END

13	REPLACE FRONT SEAT ASSEMBLY RH

(a) Turn the ignition switch to the LOCK position.
(b) Disconnect the negative (-) terminal cable from the battery.
(c) Replace the front seat assembly RH (See page SE-5).

NEXT

14	ZERO POINT CALIBRATION

(a) Connect the negative (-) terminal cable to the battery.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Using the intelligent tester, perform zero point calibration (See page RS-250).
OK:
"COMPLETE" is displayed.

NEXT

15	SENSITIVITY CHECK

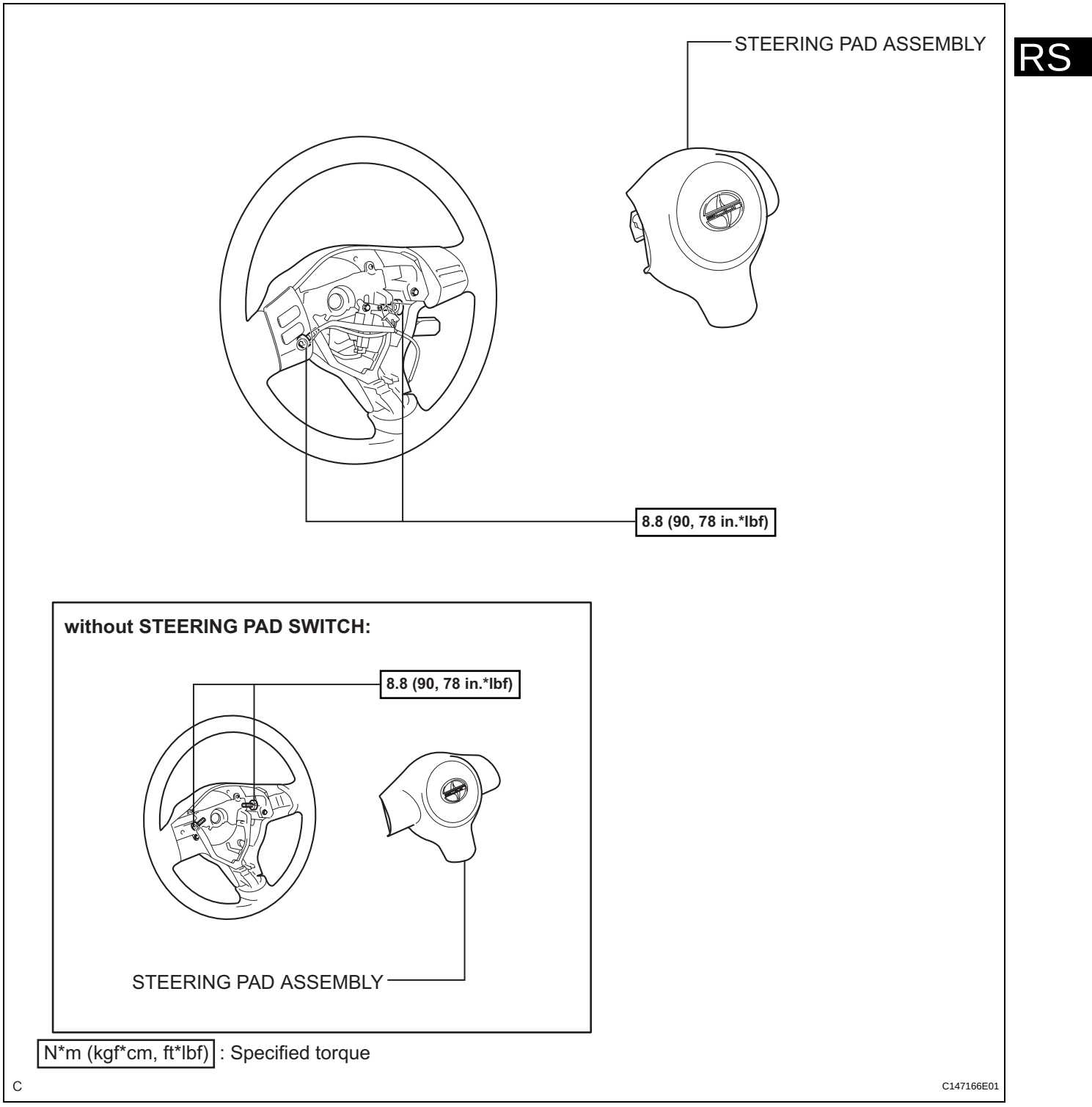
(a) Using the intelligent tester, perform "sensitivity check" (See page RS-250).
Standard values:
27 to 33 kg (59.52 to 72.75 lb)

NEXT

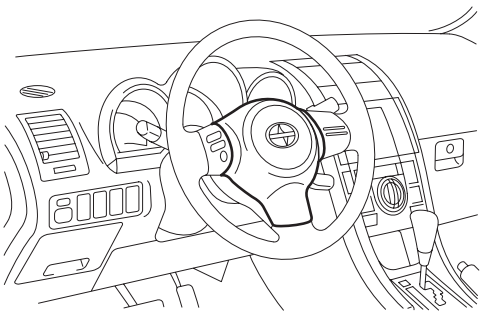
END

STEERING PAD

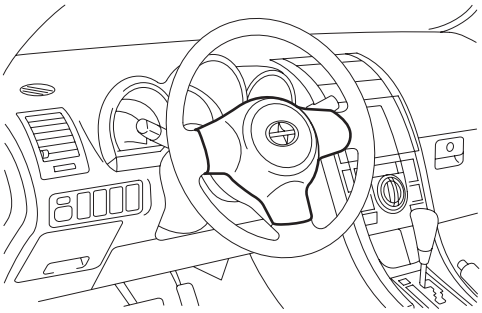
COMPONENTS



with STEERING PAD SWITCH:



without STEERING PAD SWITCH:



C C147167E01

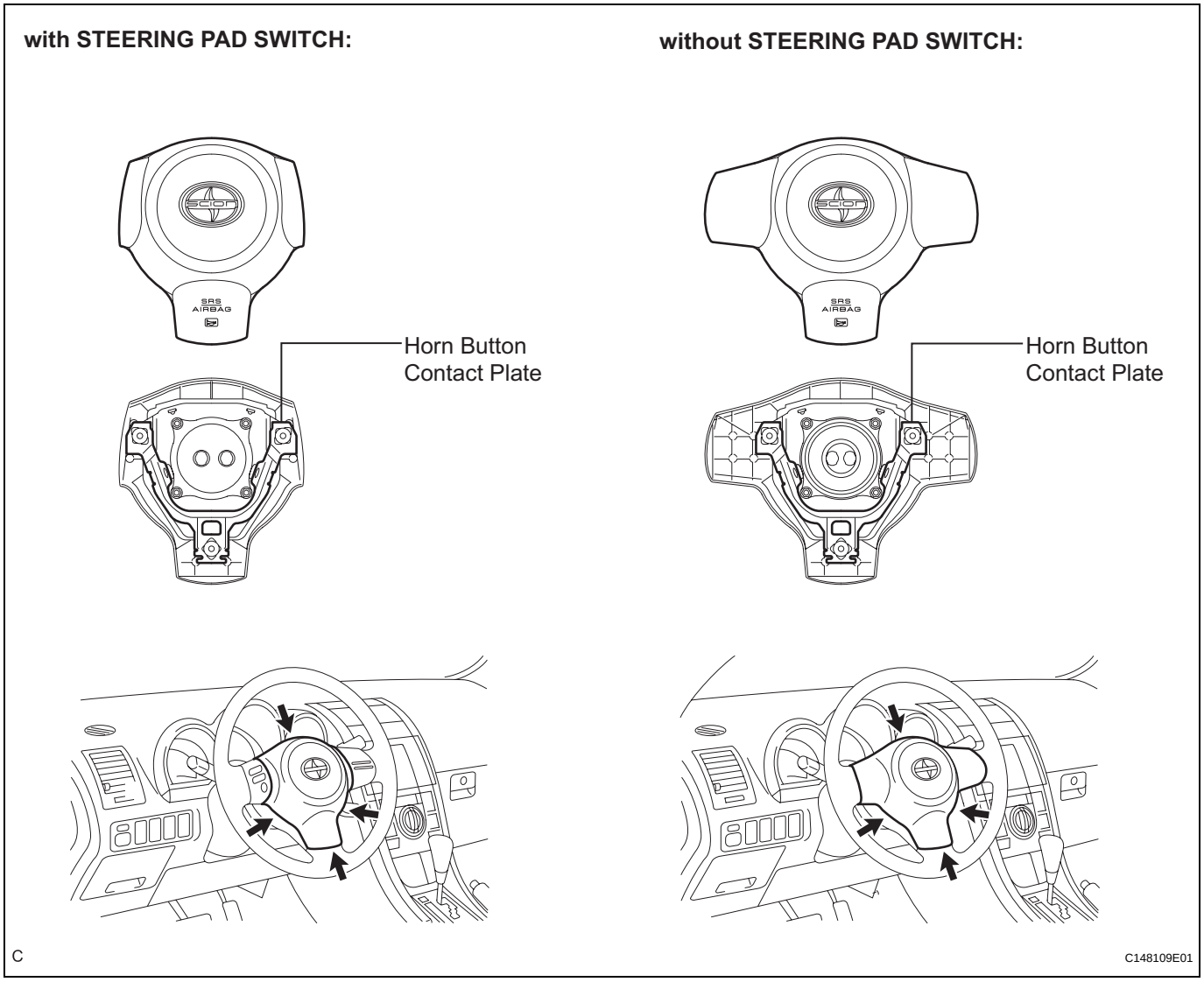
ON-VEHICLE INSPECTION

1. CHECK STEERING PAD ASSEMBLY (VEHICLE NOT INVOLVED IN COLLISION AND AIRBAG NOT DEPLOYED)

(a) Perform a diagnostic system check (see page RS-18).

(b) With the steering pad installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the steering pad with a new one:
Cuts, minute cracks or marked discoloration on the steering pad top surface or in the grooved portion.

2. CHECK STEERING PAD ASSEMBLY (VEHICLE INVOLVED IN COLLISION AND AIRBAG NOT DEPLOYED)



(a) Perform a diagnostic system check (see page RS-18).

(b) With the steering pad removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the steering pad or steering wheel assembly with a new one:
- Cuts, minute cracks or marked discoloration on the steering pad top surface or in the grooved portion.
- Cracks or other damage to the connectors.
- Deformation of the steering wheel assembly.
- Deformation of the horn button contact plate of the steering pad.

- There should be no interference between the steering pad and steering wheel assembly, and the clearance should be uniform all the way around when the new steering pad is installed on the steering wheel assembly. Horn Button Contact Plate

CAUTION:
Be sure to follow the correct removal and installation procedures.

REMOVAL

1. PRECAUTION

CAUTION:
Be sure to read "PRECAUTION" thoroughly before servicing (See page RS-1).

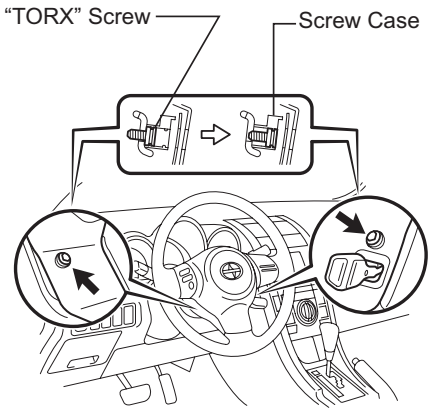
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:
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.

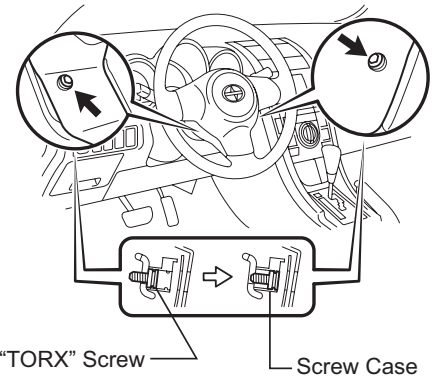
3. REMOVE STEERING PAD ASSEMBLY

(a) Using a "TORX" socket (T30), loosen the 2 "TORX" screws until the groove along the screw circumference catches on the screw case.

with STEERING PAD SWITCH:



without STEERING PAD SWITCH:



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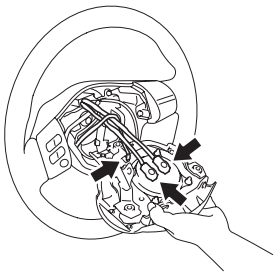
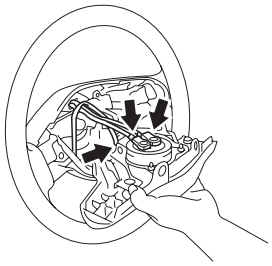
RS

with STEERING PAD SWITCH:



without STEERING PAD SWITCH:



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(b) Pull out the steering pad from the steering wheel assembly and support the steering pad with one hand.

NOTICE:

When removing the steering pad, do not pull the airbag wire harness.

(c) Disconnect the horn connector from the steering pad.

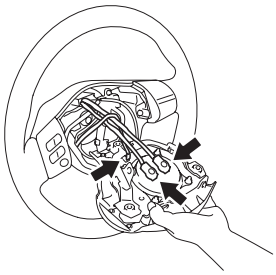
(d) Disconnect the 2 airbag connectors and remove the steering pad.

CAUTION:

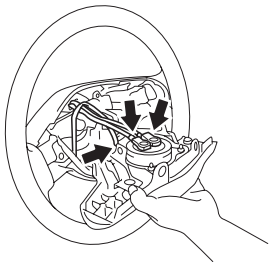
When handling the airbag connector, take care not to damage the airbag wire harness.

(e) Remove the steering pad.

with STEERING PAD SWITCH:



without STEERING PAD SWITCH:



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INSTALLATION

1. INSTALL STEERING PAD ASSEMBLY

(a) Check that the ignition switch is in the OFF position.

(b) Check that the battery negative (-) cable is disconnected.

CAUTION:

Work must be started at least 90 seconds after the engine switch is turned off and after the cable is disconnected from the negative (-) battery terminal.

(c) Support the steering pad with one hand.

(d) Connect the 2 airbag connectors to the steering pad.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(e) Connect the horn connector to the steering pad.

(f) Confirm that the circumference groove of the "TORX" screw fits in the screw case, and place the steering pad onto the steering wheel assembly.

(g) Using a "TORX" socket (T30), tighten the 2 "TORX" screws.

Torque: 8.8 N*m (90 kgf*cm, 78 in.*lbf)

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

HINT:

Some systems need initialization after reconnecting the cable to the negative battery terminal.

4. INSPECT STEERING PAD ASSEMBLY

(a) With the steering pad installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the steering pad with a new one:
Cuts, minute cracks or marked discoloration on the steering pad top surface or in the grooved portion.

(b) Make sure that the horn sounds.
HINT:
If the horn does not sound, inspect the horn system (See page HO-3).

5. INSPECT SRS WARNING LIGHT

(a) Inspect the SRS warning light (see page RS-11).

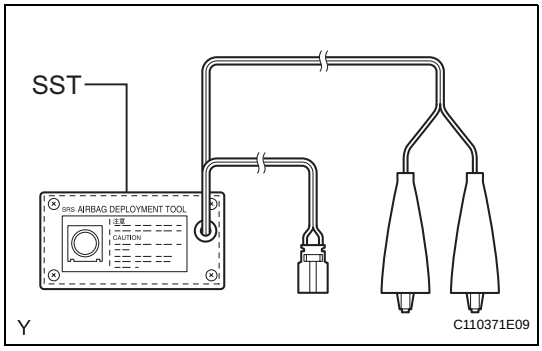
RS

DISPOSAL

HINT:
When scrapping a vehicle equipped with an SRS or disposing of the steering pad, 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.

CAUTION:

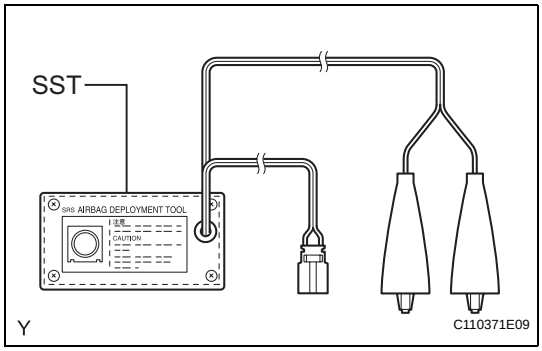
- **Never dispose of a steering pad with an unactivated airbag.**
- **The airbag produces a loud, exploding sound when it activates. Perform the operation where it will not be a nuisance to people nearby.**
- **When activating the airbag, always use the specified SST (SRS airbag deployment tool).**
- **Perform procedures in a place away from electrical interference.**
- **When activating the airbag, stand at least 10 m (33 ft.) away from the steering pad.**
- **The steering pad becomes very hot when the airbag is deployed. Do not touch it for at least 30 minutes after activation.**
- **Use gloves and safety glasses when handling a steering pad with a deployed airbag.**
- **Do not apply water to a steering pad with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **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.

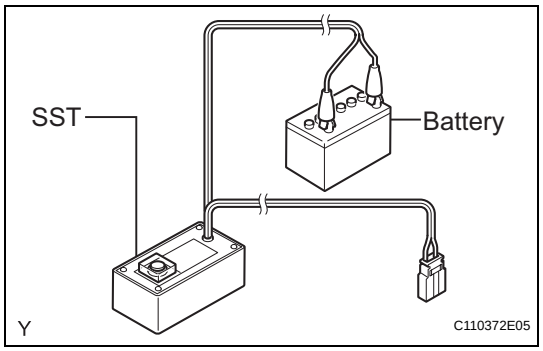


1. DISPOSE OF STEERING PAD ASSEMBLY TOGETHER WITH VEHICLE

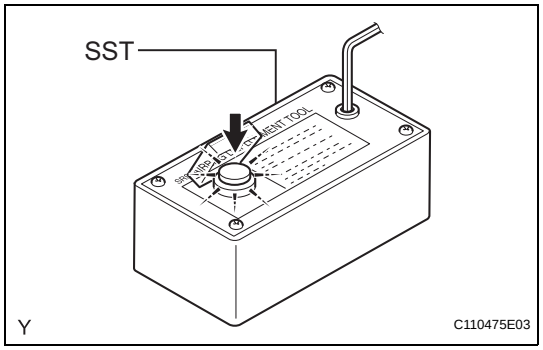
HINT:
Prepare a battery as the power source to deploy the airbag.

(a) Check if SST is functioning properly.
SST 09082-00700





(1) Connect the SST's red clip to the positive (+) battery terminal and the black clip to the negative (-) battery terminal.
HINT:
The yellow connector will be used to connect to another SST in a later step.

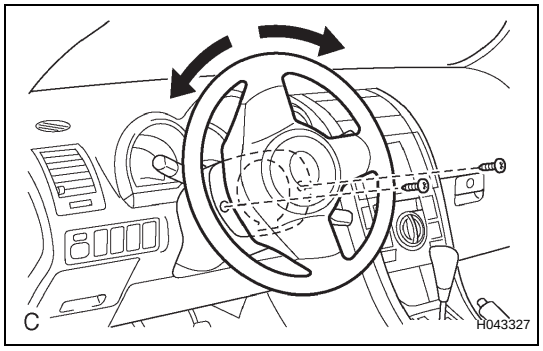


(2) Press the SST activation switch, and check that the LED of the SST activation switch illuminates.
CAUTION:
If the LED illuminates when the activation switch is not pressed, SST may have a malfunction, in which case that SST should not be used.

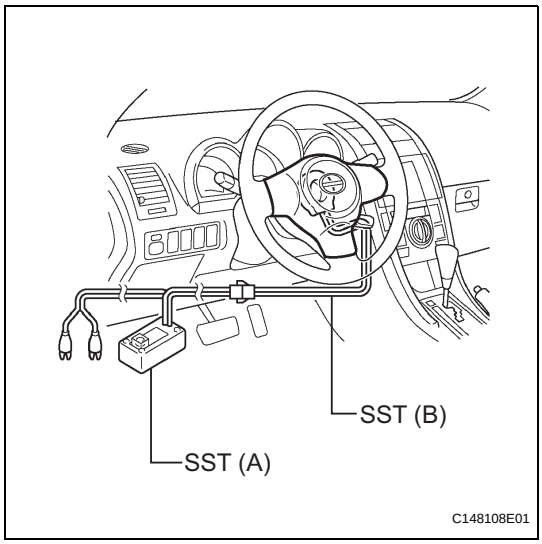
(3) Disconnect SST from the battery.

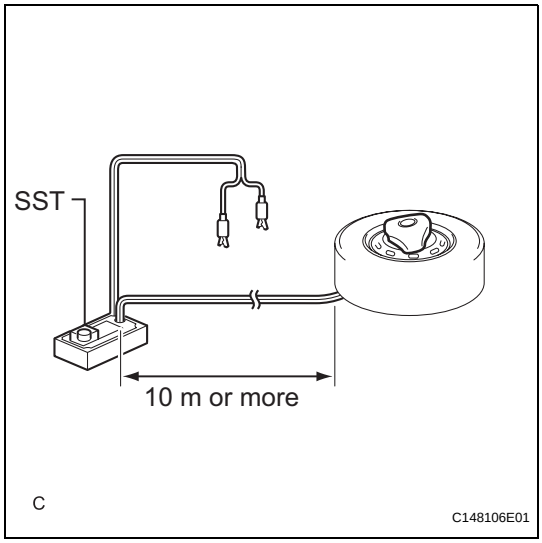
(b) Follow the "Precaution" (see page RS-1).

(c) Disconnect the cable from the negative (-) battery terminal.
CAUTION:
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.



(d) Remove the steering column cover lower.
(1) Turn the steering wheel to the right and left as necessary to remove the 2 screws.
(2) Remove the screw and cover lower.





(e) Install SST.

CAUTION:

Check that there is no free play in the steering wheel and steering pad.

(1) Disconnect the yellow airbag connector from the spiral cable.

NOTICE:

When handling the airbag connector, do not damage the airbag wire harness.

(2) Connect SST (A) to SST (B). Then connect SST (B)'s connector to the spiral cable.

SST 09082-00700, 09082-00780

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

(3) Move SST at least 10 m (33 ft.) away from the front side window.

(4) Maintain a small opening in the front side window for the SST wire harness. Close the remaining windows of the vehicle. Close all doors.

NOTICE:

Take care not do damage the SST wire harness.

(5) Connect the SST red clip to the positive (+) battery terminal and the black clip to the negative (-) battery terminal.

(f) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (33 ft.) radius of the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **When deploying the airbag, make sure that no one is near the vehicle.**
- **The steering pad becomes extremely hot when the airbag is deployed. Do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering pad with a deployed airbag.**
- **Do not apply water to a steering pad with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

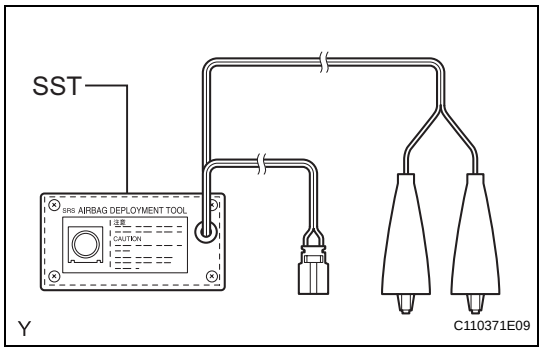
HINT:

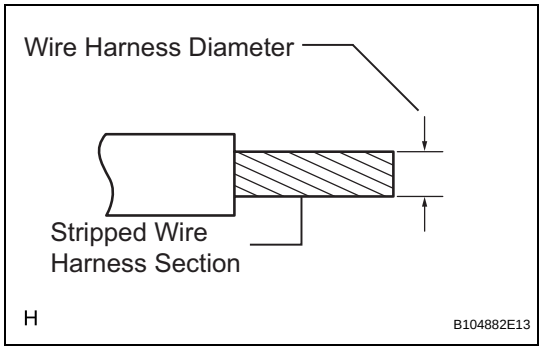
The airbag is deployed as the SST activation switch LED illuminates.

2. DISPOSE OF ONLY STEERING PAD ASSEMBLY

NOTICE:

- **When disposing of the steering pad, never use the customer's vehicle to deploy the airbag.**





- **Be sure to follow the procedure detailed below when deploying the airbag.**

HINT:
Prepare a battery as the power source to deploy the airbag.

(a) Check if SST is functioning properly (see previous step).

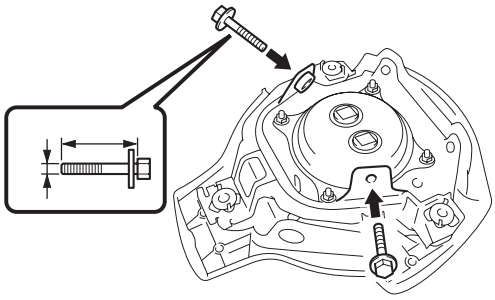
(b) Remove the steering pad (see page RS-344).
CAUTION:
- **When removing the steering pad, work must be started 90 seconds after the ignition switch is turned OFF and after the cable is disconnected from the negative (-) battery terminal.**
- **When storing the steering pad, keep the airbag deployment side facing upward.**

(c) Using service wire harnesses for the vehicle, tie down the steering pad to a disc wheel (with tire).
Wire harness:
Stripped wire harness section
1.25 mm^2 or more (0.0019 $in.^2$ or more)
NOTICE:
Use a disc wheel (with tire) that you are planning to throw away, as the airbag deployment will damage the disc wheel.
CAUTION:
Do not use wire harnesses that are too thin or any other substitute items to tie down the steering pad. They may snap when the airbag deploys. Always use vehicle wire harnesses that have an area of at least 1.25 mm^2 or more (0.0019 $in.^2$).
HINT:
To calculate the area of the stripped wire harness section:
Area = 3.14 x $Diameter^2/4$

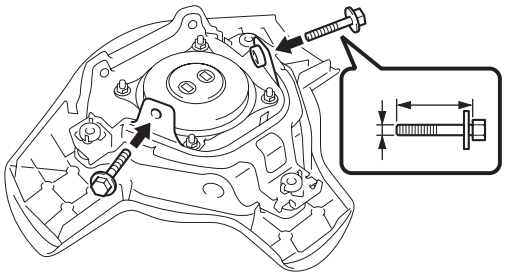
RS

RS

with STEERING PAD SWITCH:



without STEERING PAD SWITCH:



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(1) Install the 2 bolts with washers into the 2 bolt holes of the steering pad.

Bolt:

L:

35.0 mm (1.378 in.)

M:

6.0 mm (0.236 in.)

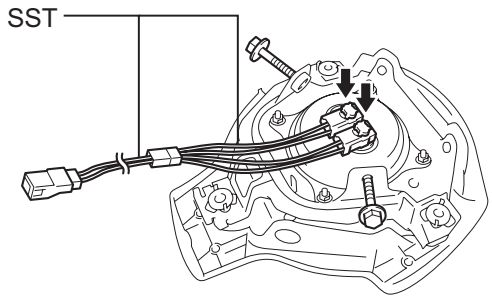
Pitch:

1.0 mm (0.039 in.)

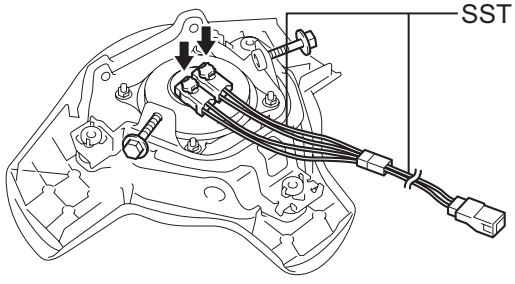
NOTICE:

- **Tighten the bolts by hand until they become difficult to turn.**
- **Do not tighten the bolts excessively.**

with STEERING PAD SWITCH:



without STEERING PAD SWITCH:



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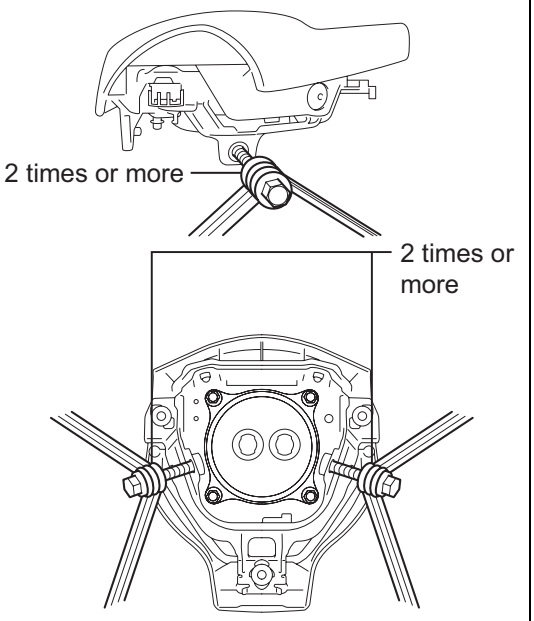
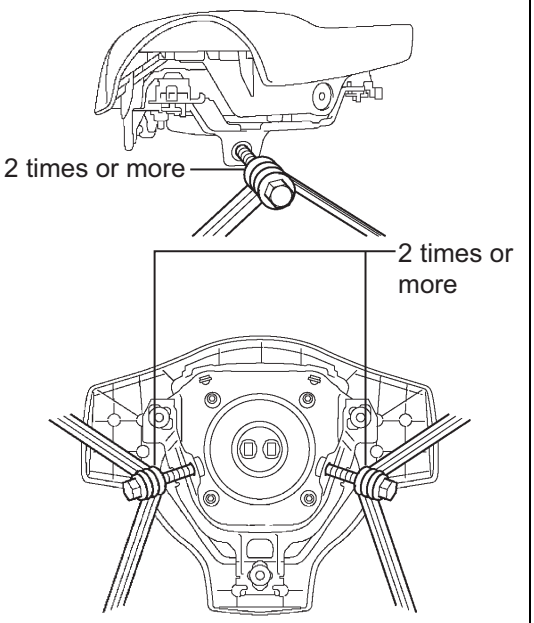
(2) After connecting SST to each other, connect them to the steering pad.

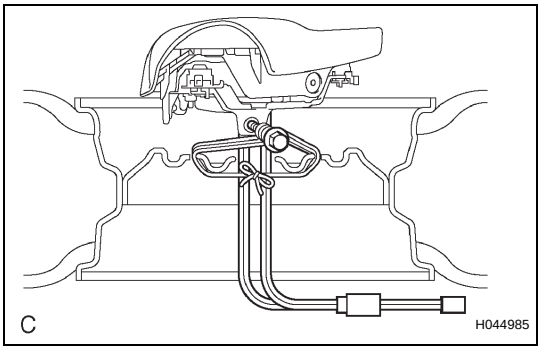
SST 09082-00802 (09082-10801, 09082-30801)

with STEERING PAD SWITCH:



without STEERING PAD SWITCH:





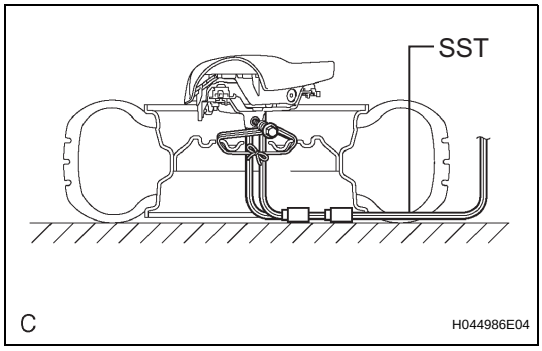
(3) Wind 3 wire harnesses at least twice around the bolts installed on the left and right sides of the steering pad.

CAUTION:
- **Tightly wind the wire harnesses around the bolts so that there is no slack.**
- **Make sure that the wire harnesses are tight. If there is slack in a wire harness, the steering pad may come loose when the airbag is deployed.**

(4) Face the airbag deployment side of the steering pad upward. Separately tie the left and right sides of the steering pad to a disc wheel through the hub nut holes. Position the SST connector so that it hangs downward through the hub hole in the disc wheel.

CAUTION:
- **Make sure that the wire harnesses are tight. If there is slack in a wire harness, the steering pad may come loose when the airbag is deployed.**

- **Always tie down the steering pad with the airbag deployment side facing upward.**

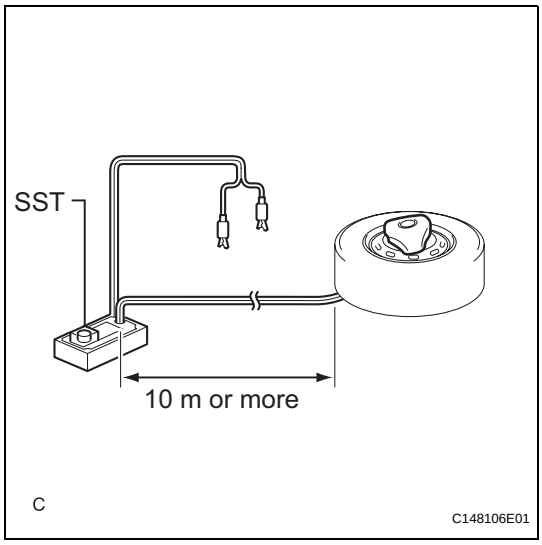


(d) Install SST.

CAUTION:
Place the tire with disc wheel and steering pad on a level surface.

(1) Connect the connector of SST.
SST 09082-00700
NOTICE:
To avoid damaging the SST connector and 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.

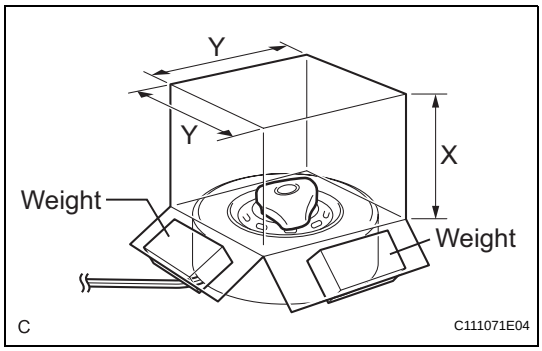
(2) Move SST at least 10 m (33 ft.) away from the steering pad.

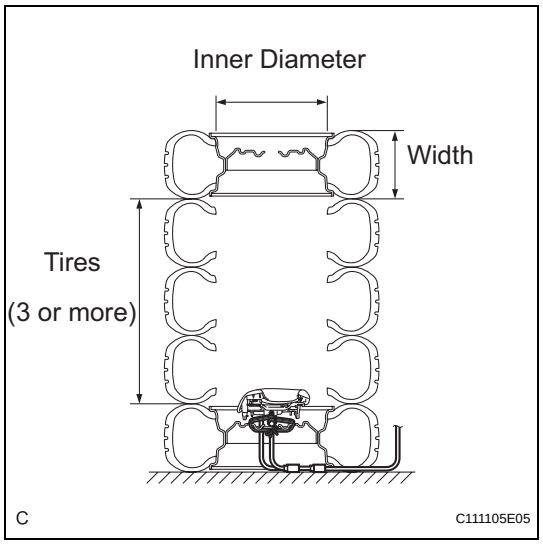


(e) Cover the steering pad with a cardboard box or tires.

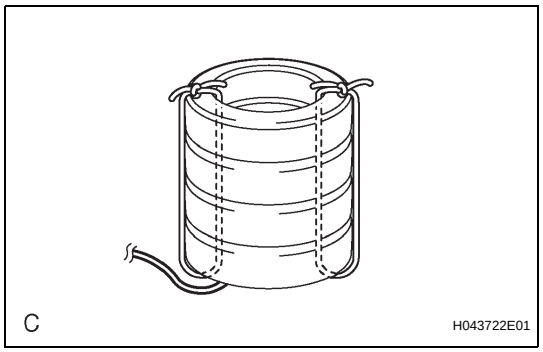
(1) Covering method using a cardboard box:
Cover the steering pad with the cardboard box and place weights of at least 19 kg (43 lb) on the cardboard box in 4 places.
Cardboard box size:
X minimum = 460 mm (18.11 in.)
Y minimum = 650 mm (25.59 in.)
NOTICE:

- **When dimension Y of the cardboard box exceeds the tire dimension, X should be the following size.**
  X minimum = 460 mm (18.11 in.) + width of tire
- **If using a cardboard box which is smaller than the specified size, the cardboard box will break during airbag deployment.**



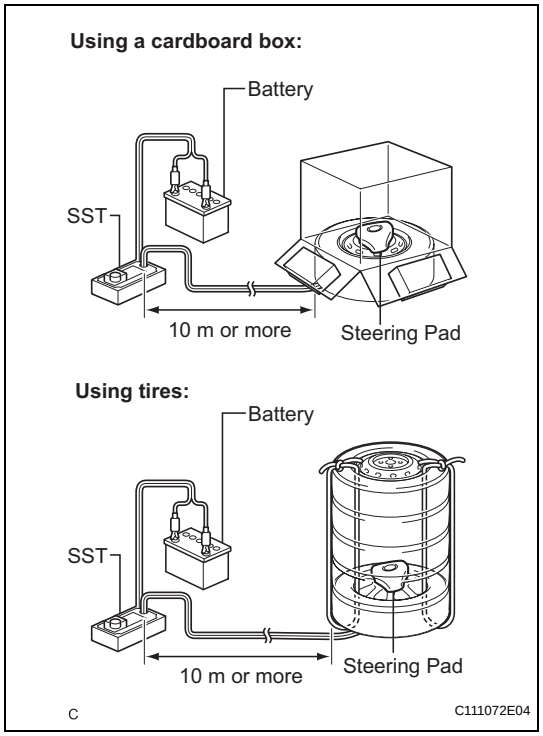


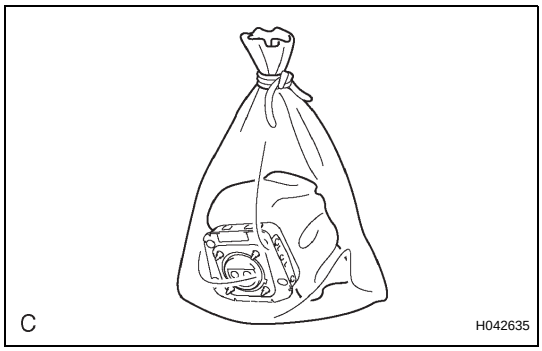
(2) Covering method using tires:
Place at least 3 tires (without disc wheels) on top of the tire (with disc wheel and steering pad).
Tire size:
Width minimum:
185 mm (7.28 in.)
Inner diameter minimum:
360 mm (14.17 in.)
CAUTION:
Do not use tires with disc wheels to cover the tire (with disc wheel and steering pad).
NOTICE:
- **Use tires that you are planning to throw away, as the airbag deployment may damage the tires.**
- **Do not place the SST connector under the tire as the connector may be damaged.**



(3) Tie the tires together with 2 wire harnesses.
CAUTION:
Make sure that the wire harnesses are tight. If there is slack in a wire harness, the tires may come loose when the airbag is deployed.

(f) Deploy the airbag.
(1) Connect the SST red clip to the positive (+) battery terminal and the black clip to the negative (-) battery terminal.
(2) Check that no one is within a 10 m (33 ft.) radius of the steering pad.
(3) Press the SST activation switch and deploy the airbag.
CAUTION:
When deploying the airbag, make sure that no one is near the tires.
HINT:
The airbag is deployed as the SST activation switch LED illuminates.



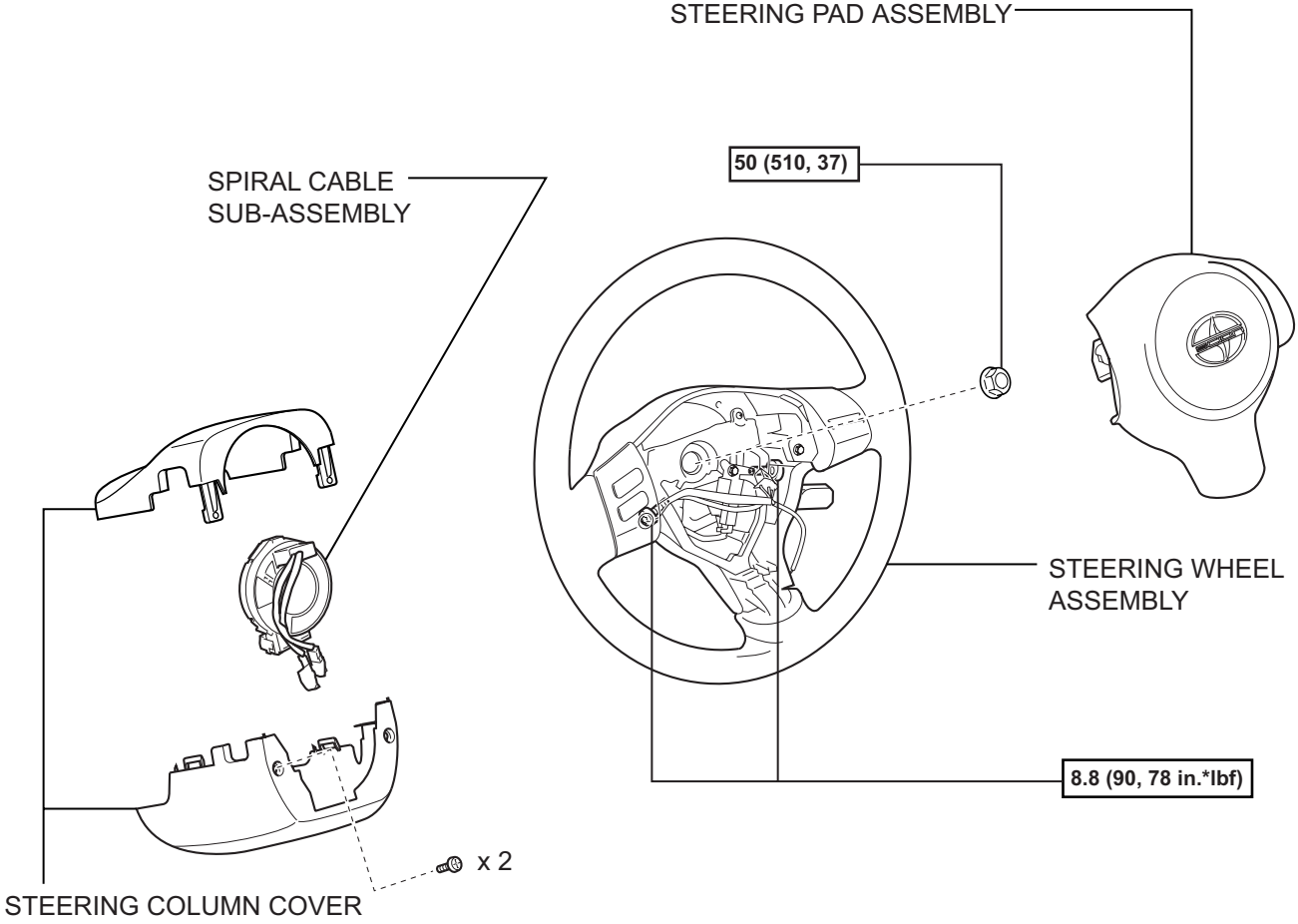


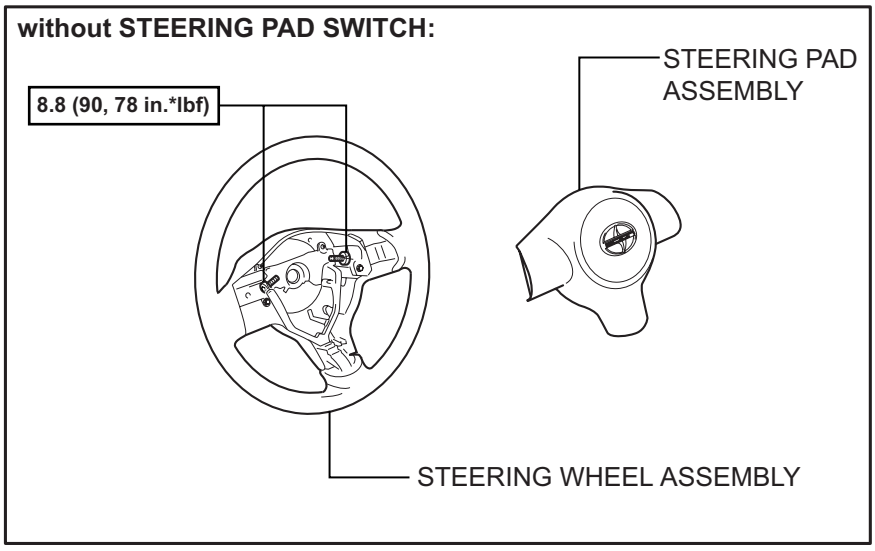
(g) Dispose of the steering pad.
CAUTION:
- **The steering pad becomes extremely hot when the airbag is deployed. Do not touch it for at least 30 minutes after deployment.**
- **Do not apply water to a steering pad with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(1) Remove the steering pad from the disc wheel.
(2) Place the steering pad in a plastic bag, tie it tightly and dispose of it in the same way as other general parts.

SPIRAL CABLE

COMPONENTS





N*m (kgf*cm, ft.*lbf): Specified torque

C

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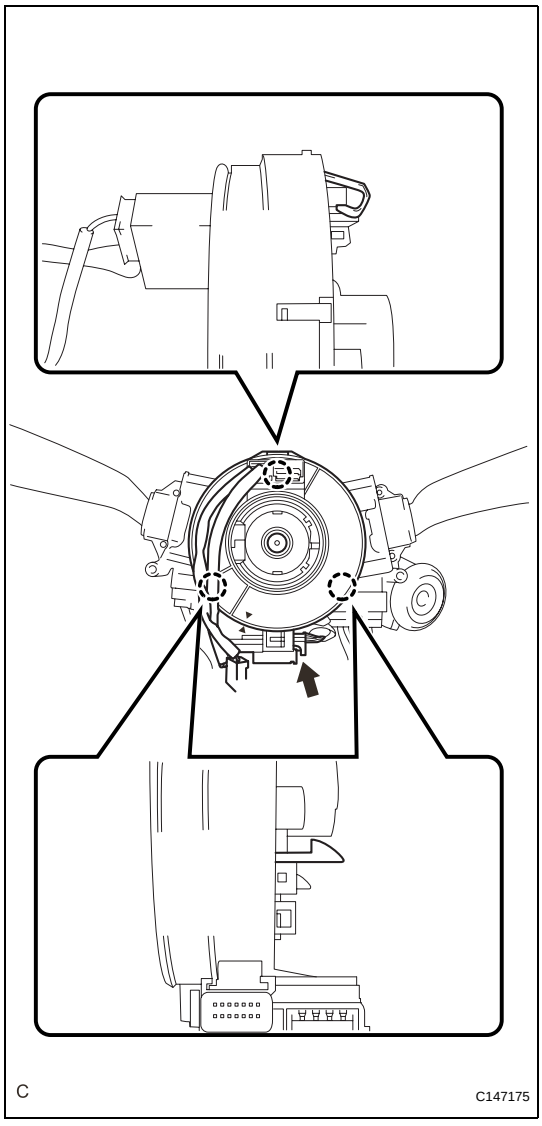
RS

REMOVAL

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE STEERING PAD ASSEMBLY (See page RS-345)**
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **REMOVE STEERING WHEEL ASSEMBLY (See page SR-8)**
5. **REMOVE STEERING COLUMN COVER (See page SR-8)**
6. **REMOVE SPIRAL CABLE SUB-ASSEMBLY**
   (a) Disconnect the connectors from the spiral cable.
   NOTICE:
   When handling the airbag connector, take care not to damage the airbag wire harness.
   (b) Disengage the 3 claws and remove the spiral cable.



INSPECTION

1. INSPECT SPIRAL CABLE SUB-ASSEMBLY

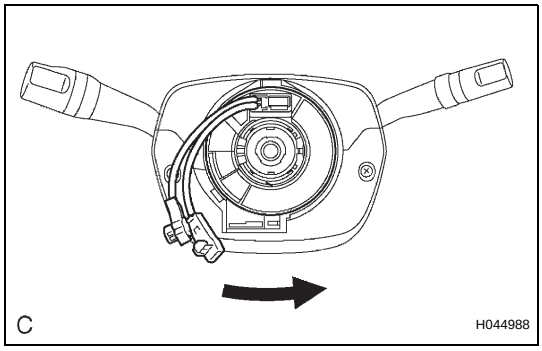
(a) Check that there are no scratches or cracks on its connector, and/or that the cable does not have cracks, dents or chipping.

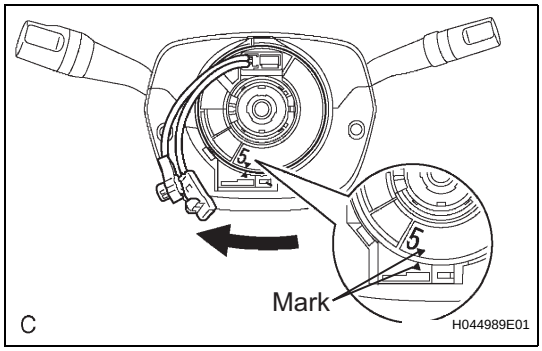
RS

INSTALLATION

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **INSTALL SPIRAL CABLE SUB-ASSEMBLY**
   (a) Check that the front wheels are facing straight ahead.
   (b) Set the turn signal switch to the neutral position.
   NOTICE:
   Make sure that the turn signal switch is in the neutral position, as the pin of the turn signal switch may be snapped.
   (c) Install the spiral cable.
   NOTICE:
   When replacing the spiral cable with a new one, remove the lock pin before installing the steering wheel.
   (d) Connect the connectors to the spiral cable.
   NOTICE:
   When handling the airbag connector, do not damage the airbag wire harness.
2. **INSTALL STEERING COLUMN COVER**
3. **POSITION SPIRAL CABLE**
   (a) Slowly rotate the spiral cable counterclockwise by hand until it feels firm.
   NOTICE:
   Do not use the airbag wire harness to turn the spiral cable.





   (b) Rotate the spiral cable clockwise approximately 2.5 turns to align the marks.
   NOTICE:
   Do not use the airbag wire harness to turn the spiral cable.
   HINT:
   The spiral cable will rotate approximately 2.5 turns to the left and right from the center.
4. **INSTALL STEERING WHEEL ASSEMBLY (See page SR-15)**
5. **INSTALL STEERING PAD ASSEMBLY (See page RS-346)**
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
7. **INSPECT STEERING PAD ASSEMBLY (See page RS-346)**

8. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

9. CHECK SRS WARNING LIGHT

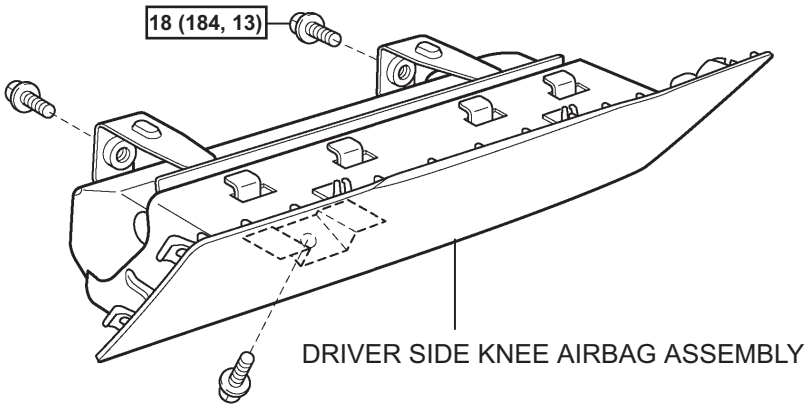
(a) Check the SRS warning light (see page RS-11).

10. INSPECT STEERING WHEEL POSITION

DRIVER SIDE KNEE AIRBAG ASSEMBLY

COMPONENTS

RS



N*m (kgf*cm, ft.*lbf) : Specified torque

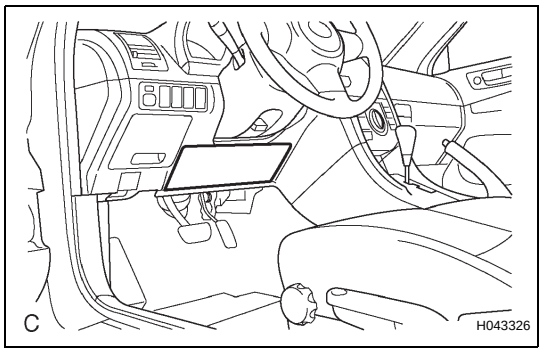
C

B117920E01

ON-VEHICLE INSPECTION

1. INSPECT DRIVER SIDE KNEE AIRBAG ASSEMBLY (VEHICLE NOT INVOLVED IN COLLISION)

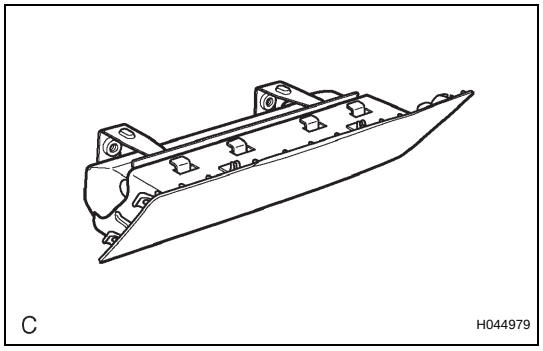
(a) Perform a diagnostic system check (see page RS-18).



(b) With the driver side knee airbag assembly installed on the vehicle, perform a visual check for the following:
Cuts, minute cracks or marked discoloration on the driver side knee airbag assembly.

2. INSPECT DRIVER SIDE KNEE AIRBAG ASSEMBLY (VEHICLE INVOLVED IN COLLISION AND AIRBAG HAS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page RS-18).



(b) With the driver side knee airbag asseembly removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the driver side knee airbag assembly with a new one:

- Cuts, minute cracks or marked discoloration on the driver side knee airbag assembly.
- Cracks or other damage to the connector.
- Deformation or cracks on the instrument panel reinforcement.

CAUTION:
For removal and installation procedures of the driver side knee airbag assembly, be sure to follow the correct procedure.

RS

REMOVAL

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

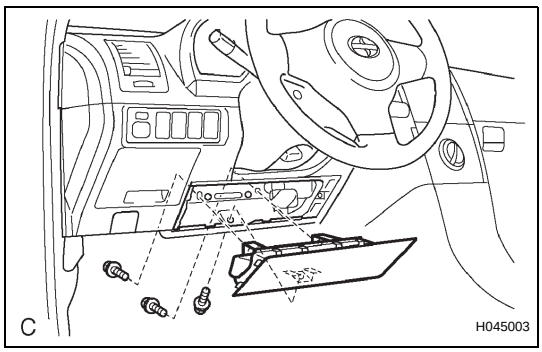
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

2. REMOVE DRIVER SIDE KNEE AIRBAG ASSEMBLY

(a) Remove the 4 bolts and driver side knee airbag.

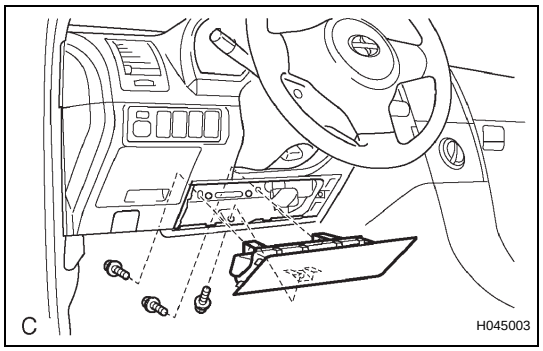
(b) Disconnect the connector.

NOTICE:
When handling the airbag connector, take care not to damage the airbag wire harness.



INSTALLATION

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).



1. INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY

(a) Connect the connector.
NOTICE:
When handling the airbag connector, take care not to damage the airbag wire harness.

(b) Install the front passenger side knee airbag with the 3 bolts.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

4. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

RS

RS

DISPOSAL

HINT:
When scrapping a vehicle equipped with an SRS or disposing of driver side knee 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.

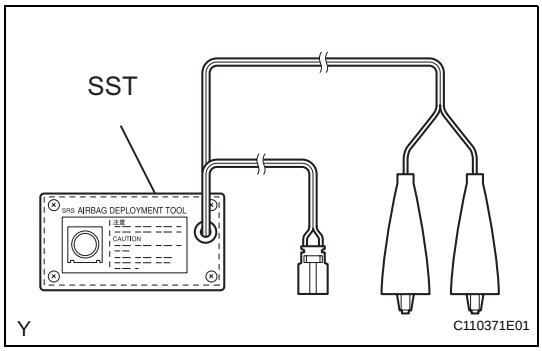
CAUTION:

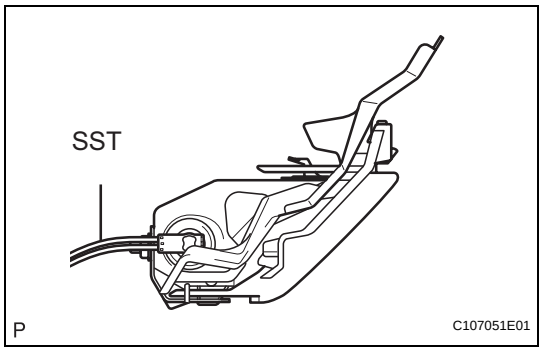
- **Never dispose of a driver side knee airbag assembly that has an undeployed airbag.**
- **The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.**
- **When deploying the airbag, always use the specified 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 (33 ft) away from the driver side knee airbag assembly.**
- **The driver side knee 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 driver side knee airbag assembly with a deployed airbag.**
- **Do not apply water, etc. to a driver side knee airbag assembly with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **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 performing this procedure.

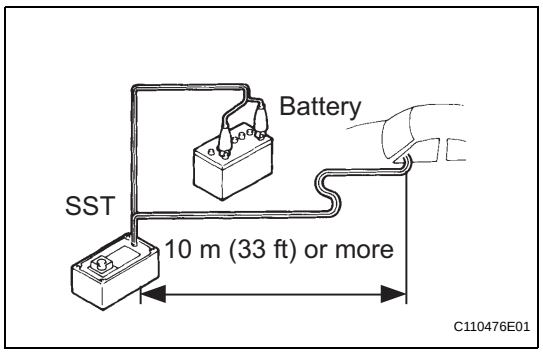
1. DISPOSE OF DRIVER SIDE KNEE AIRBAG ASSEMBLY (WHEN INSTALLED IN VEHICLE)

HINT:
Prepare a battery as the power source to deploy the airbag.

(a) Check the function of the SST (see page RS-347).
(b) Precaution (see page RS-1).
(c) Disconnect the cable from the negative (-) battery terminal.
Wait for 90 seconds after disconnecting the cable to prevent the airbag from deploying.
(d) Remove the driver side knee airbag assembly (see page RS-359).







(e) Install the SST.

(1) Connect the SST connector to the driver side knee airbag assembly.

SST 09082-00700, 09082-00770

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

(2) Install the driver side knee airbag assembly (see page RS-359).

NOTICE:

Take care not to damage the SST wire harness.

(3) Move the SST at least 10 m (33 ft) away from the vehicle front side window.

(4) Maintaining enough 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.

(5) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.

(f) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (33 ft) radius of the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **When deploying the airbag, make sure that no one is near the vehicle.**
- **The driver side knee 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 driver side knee airbag assembly with a deployed airbag.**
- **Do not apply water, etc. to a driver side knee airbag assembly with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

HINT:

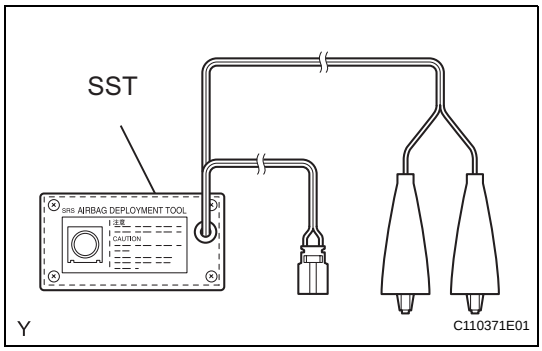
The airbag is deployed as the LED of the SST activation switch comes on.

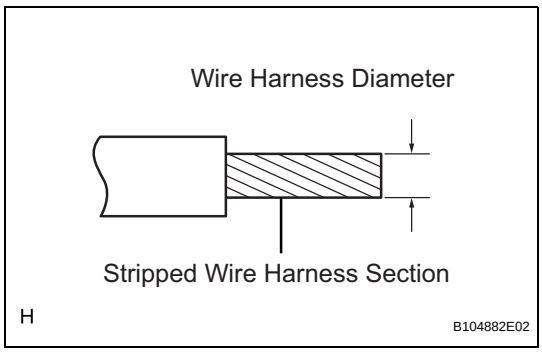
2. DISPOSE OF DRIVER SIDE KNEE AIRBAG ASSEMBLY (WHEN NOT INSTALLED IN VEHICLE)

NOTICE:

- **When disposing of the driver side knee airbag assembly, never use the customer's vehicle to deploy the airbag.**

RS



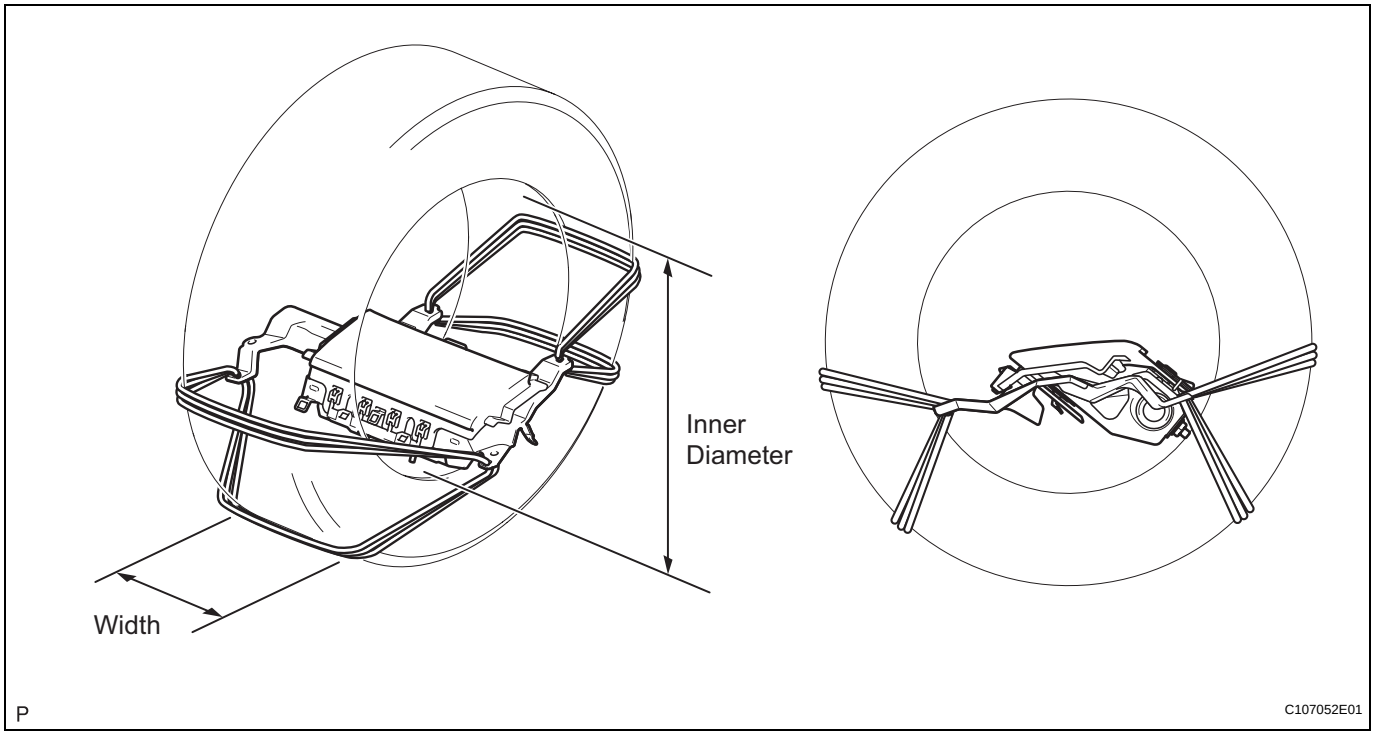


- **Be sure to follow the procedure detailed below when deploying the airbag.**

HINT:
Prepare a battery as the power source to deploy the airbag.

(a) Check the function of the SST (see page RS-349).
(b) Remove the driver side knee airbag assembly (see page RS-359).
CAUTION:
- **When removing the driver side knee airbag assembly, work must be started 90 seconds after the ignition switch is turned off and the negative (-) terminal cable is disconnected from the battery.**
- **When storing the driver side knee airbag assembly, keep the airbag deployment side facing upward.**

(c) Using a service-purpose wire harness for the vehicle, tie down the driver side knee airbag assembly to the tire.
Wire harness:
Stripped wire harness section
1.25 mm^2 or more (0.0019 $in.^2$ or more)
CAUTION:
If the wire harness is too thin or an alternative object is used to tie down the driver side knee airbag assembly, it may be snapped by the shock when the airbag is deployed. Always use a wire harness for vehicle use with an area of at least 1.25 mm^2 (0.0019 $in.^2$).
HINT:
To calculate the area of the stripped wire harness section:
Area = 3.14 x $(Diameter)^2$ divided/4
(1) Position the driver side knee airbag assembly inside the tire with the airbag deployment side facing inside.
Tire size:
Must exceed the following dimensions
Width:
185 mm (7.28 in.)
Inner diameter:
360 mm (14.17 in.)



CAUTION:

- **Make sure that the wire harness is tight. If there is slack in a wire harness, the driver side knee airbag assembly may become loose due to the shock when the airbag is deployed.**
- **Always tie down the driver side knee airbag assembly with the airbag deployment side facing inside the tire.**

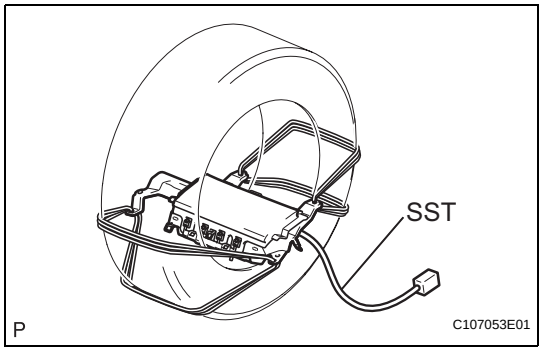
NOTICE:

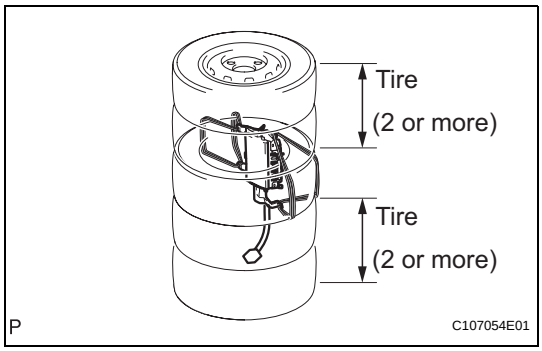
Use a disc wheel (with tire) that you are planning to throw away, as the airbag deployment will damage the disc wheel.

(d) Install the SST.

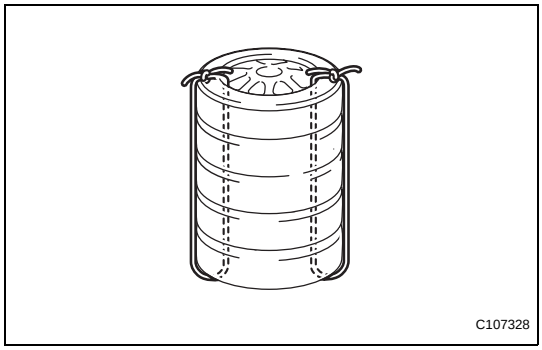
(1) Connect the SST connector to the driver side knee airbag assembly.

SST 09082-00770

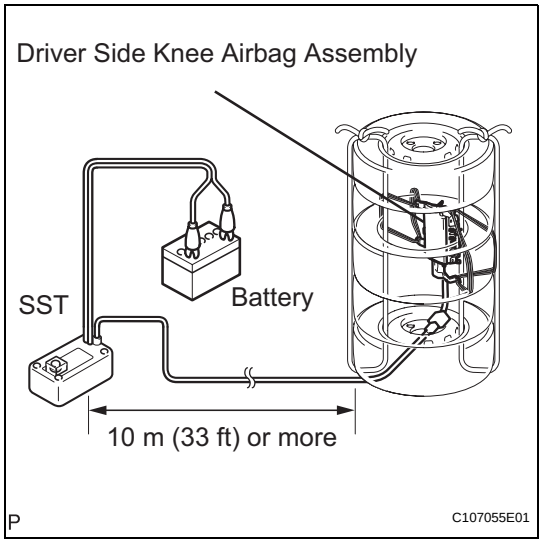




(e) Place the tires.
(1) Place at least 2 tires under the tire which the driver side knee airbag assembly is tied to.
(2) Place at least 2 tires over the tire which the driver side knee airbag assembly is tied to. The top tire should have the disc wheel installed.
NOTICE:
Do not place the SST connector under the tire because it could be damaged.

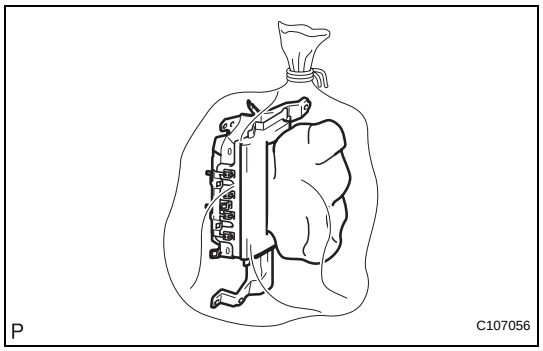


(3) Tie the tires together with 2 wire harnesses.
CAUTION:
Make sure that the wire harness is tight. Looseness in the wire harness results in the tires coming free due to the shock when the airbag is deployed.



(f) Install the SST.
(1) Connect the SST connector.
SST 09082-00700
NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.

(g) Deploy the airbag.
(1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.
(2) Check that no one is within a 10 m (33 ft) radius of the tire which the driver side knee airbag assembly is tied to.
(3) Press the SST activation switch and deploy the airbag.
CAUTION:
When deploying the airbag, make sure that no one is near the tire.
HINT:
The airbag is deployed as the LED of the SST activation switch comes on.



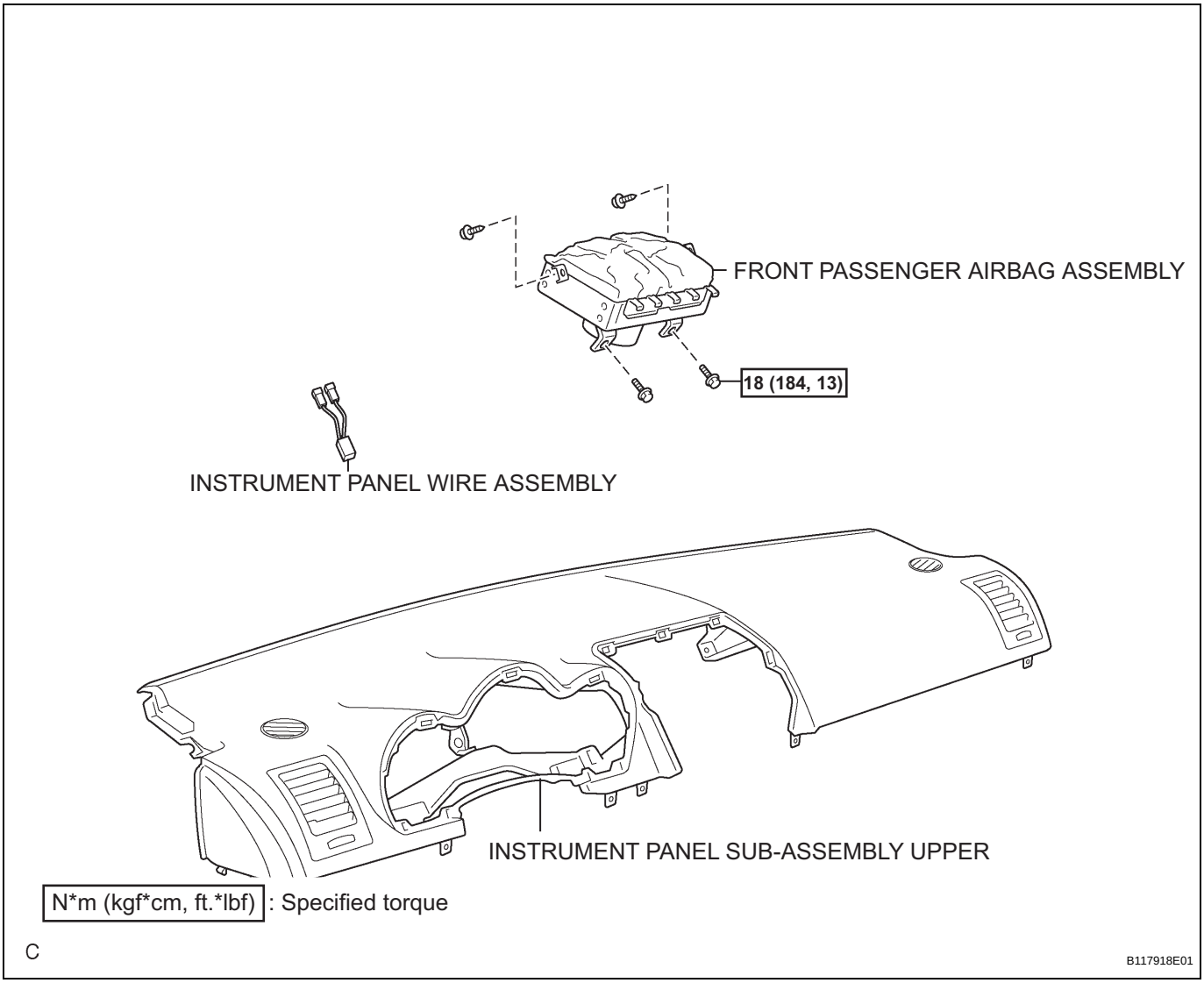
(h) Dispose of the driver side knee airbag assembly.
CAUTION:
- **The driver side knee airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a driver side knee airbag assembly with a deployed airbag.**
- **Do not apply water, etc. to a driver side knee airbag assembly with a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

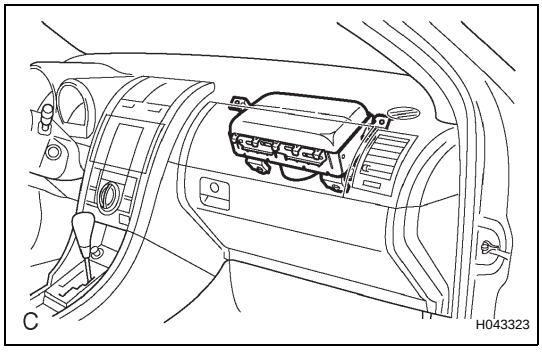
(1) Remove the driver side knee airbag assembly from the tire.
(2) Place the driver side knee airbag assembly in a plastic bag, tie it tightly and dispose of it in the same way as other general parts.

FRONT PASSENGER AIRBAG ASSEMBLY

COMPONENTS

RS

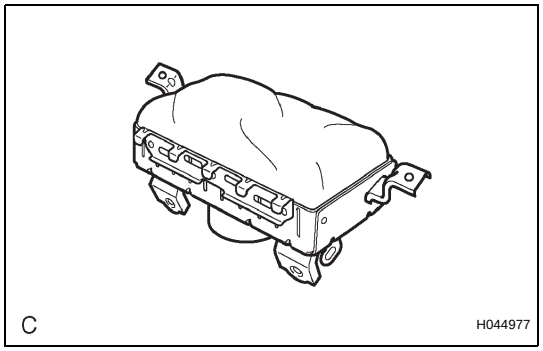




ON-VEHICLE INSPECTION

1. **CHECK FRONT PASSENGER AIRBAG ASSEMBLY (VEHICLE NOT INVOLVED IN COLLISION AND AIRBAG NOT DEPLOYED)**
   (a) Perform a diagnostic system check (see page RS-18).
   (b) With the front passenger airbag installed on the vehicle, perform a visual check:
   Check for cuts, cracks or discoloration on the front passenger airbag surface and in the grooved portion.
   If any of the defects mentioned above are present, replace the front passenger airbag assembly with a new one.

CAUTION:
For removal and installation of the front passenger airbag assembly, be sure to follow the correct procedures.



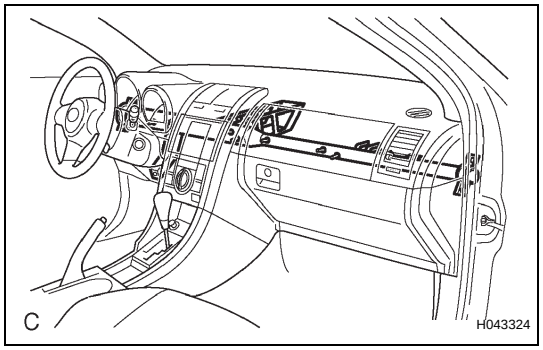
2. CHECK FRONT PASSENGER AIRBAG ASSEMBLY (VEHICLE INVOLVED IN COLLISION AND AIRBAG NOT DEPLOYED)

(a) Perform a diagnostic system check (see page RS-18).

(b) With the front passenger airbag removed from the vehicle, perform a visual check:
- Check for cuts, cracks or discoloration on the front passenger airbag.
- Check for cracks or other damage on the connectors.
- Check for deformation or cracks on the instrument panel and instrument panel reinforcement.

If any of the defects mentioned above are present, replace the front passenger airbag assembly with a new one.

CAUTION:
For removal and installation of the front passenger airbag assembly, be sure to follow the correct procedures.



RS

RS

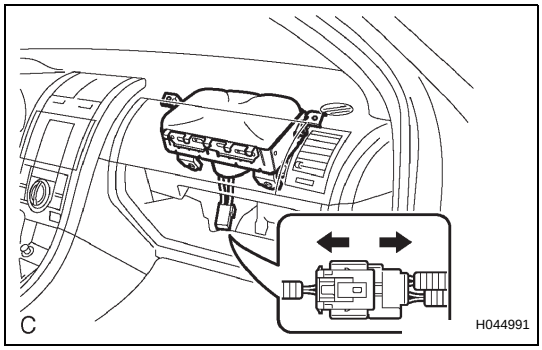
REMOVAL

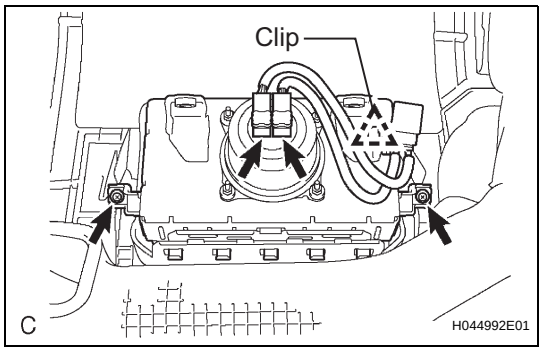
CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

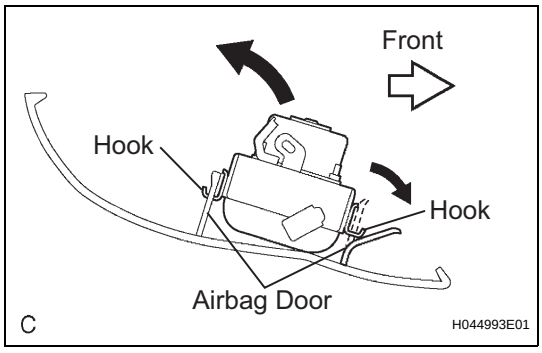
2. **REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY**

3. **REMOVE FRONT PASSENGER AIRBAG ASSEMBLY**
   (a) Disconnect the connector from the airbag.
   NOTICE:
   When handling the airbag connector, do not damage the airbag wire harness.
   (b) Remove the instrument panel sub-assembly upper (see page IP-4).
   (c) Remove the clip.





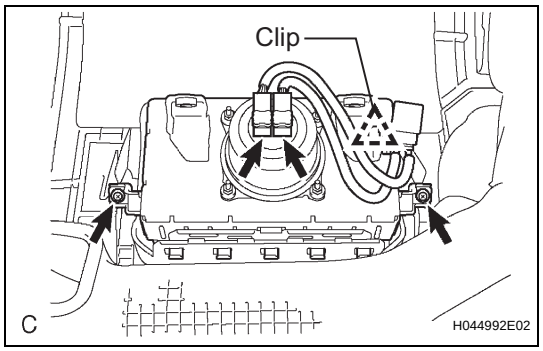
   (d) Disconnect the connectors and remove the instrument panel wire assembly.
   (e) Remove the 2 screws.



   (f) Release the front side airbag door from the hook by slightly deflecting it and roll the front passenger airbag assembly rearward.
   (g) Release the rear side airbag door from the other hook and remove the front passenger airbag assembly.

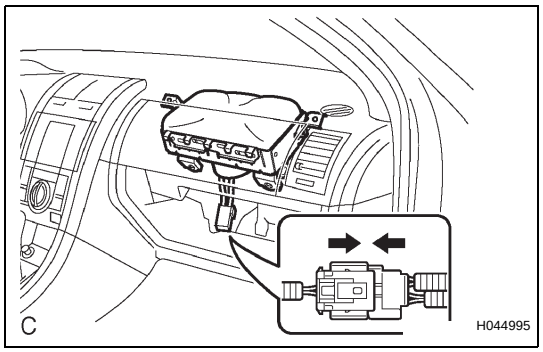
INSTALLATION

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).



1. INSTALL FRONT PASSENGER AIRBAG ASSEMBLY

(a) Install the front passenger airbag assembly with the 2 screws.
(b) Connect the connectors to the airbag.
(c) Install the clip.
(d) Install the instrument panel sub-assembly upper (see page IP-9).



(e) Connect the connector to the airbag.
NOTICE:
When handling the airbag connector, do not damage the airbag wire harness.

2. INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY (See page IP-11)

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

5. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

RS

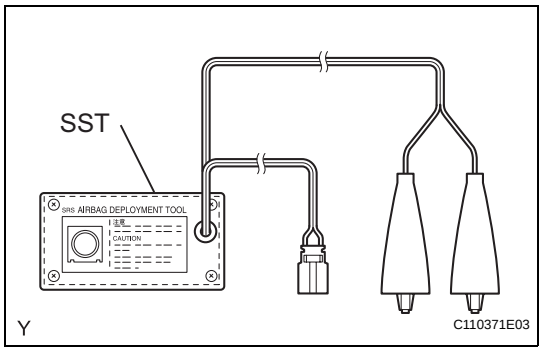
RS

DISPOSAL

HINT:
When scrapping a vehicle equipped with an SRS or disposing of the front passenger side knee 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.

CAUTION:

- **Never dispose of a front passenger airbag with an unactivated airbag.**
- **The airbag produces a loud, exploding sound when it activates. Perform the operation where it will not be a nuisance to people nearby.**
- **When activating the airbag, always use the specified SST (SRS airbag deployment tool).**
- **Perform procedures in a place away from electrical interference.**
- **When activating the airbag, stand at least 10 m (33 ft.) away from the airbag.**
- **The airbag becomes very hot when it is deployed. Do not touch it for at least 30 minutes after activation.**
- **Use gloves and safety glasses when handling a deployed airbag.**
- **Do not apply water to a deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **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 performing this procedure.

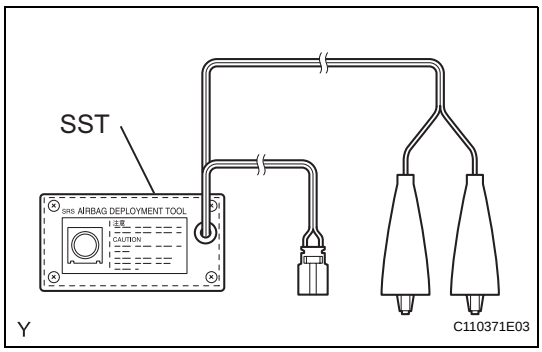


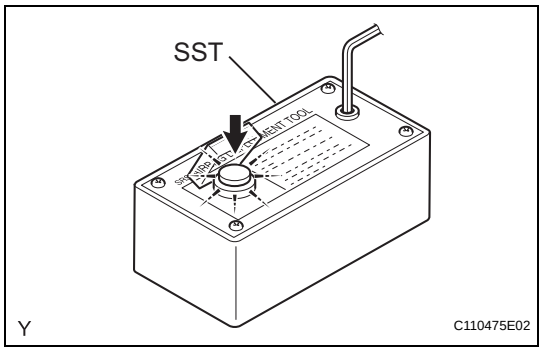
1. DISPOSE OF FRONT PASSENGER AIRBAG ASSEMBLY TOGETHER WITH VEHICLE

HINT:
Prepare a battery as the power source to deploy the airbag.

(a) Check if SST is functioning properly.
SST 09082-00700

(1) Connect the SST's red clip to the positive (+) battery terminal and the black clip to the negative (-) battery terminal.
HINT:
The yellow connector will be used to connect to another SST in a later step.



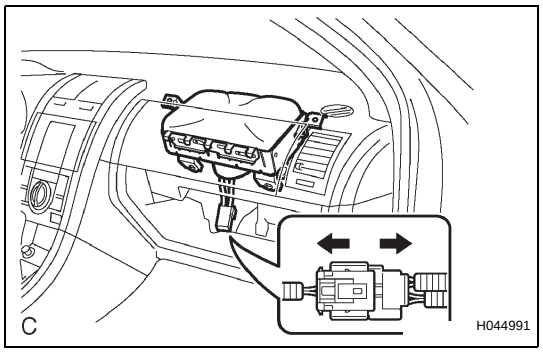


(2) Press the SST activation switch, and check that the LED of the SST activation switch illuminates.
CAUTION:
If the LED illuminates when the activation switch is not pressed, SST may have a malfunction, in which case that SST should not be used.
(3) Disconnect SST from the battery.

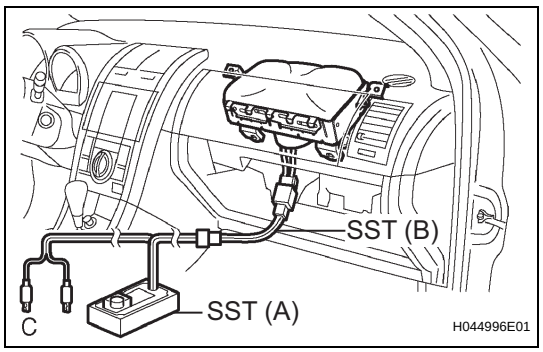
(b) Follow the "Precaution" (see page RS-1).

(c) Disconnect the cable from the negative (-) battery terminal.
CAUTION:
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

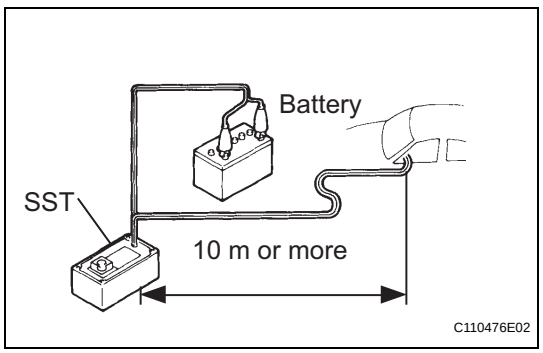
(d) Remove the glove compartment door (see page IP-6).



(e) Install SST.
(1) Disconnect the front passenger airbag connector.
NOTICE:
When handling the airbag connector, do not damage the airbag wire harness.



(2) Connect SST (A) to SST (B). Then connect SST (B)'s connector to the cable.
SST 09082-00700, 09082-00780
NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move SST at least 10 m (33 ft.) away from the front side window.
(4) Maintain a small opening in the front side window for the SST wire harness. Close the remaining windows of the vehicle. Close all doors.
NOTICE:
Take care not to damage the SST wire harness.
(5) Connect the SST red clip to the positive (+) battery terminal and the black clip to the negative (-) battery terminal.

RS

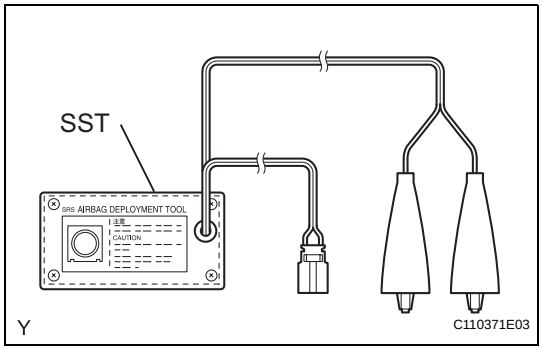
(f) Deploy the airbag.
(1) Check that no one is inside the vehicle or within a 10 m (33 ft.) radius of the vehicle.
(2) Press the SST activation switch and deploy the airbag.
CAUTION:
- **When deploying the airbag, make sure that no one is near the vehicle.**
- **The airbag becomes extremely hot when it is deployed. Do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a deployed airbag.**
- **Do not apply water to a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

HINT:
The airbag is deployed as the SST activation switch LED illuminates.

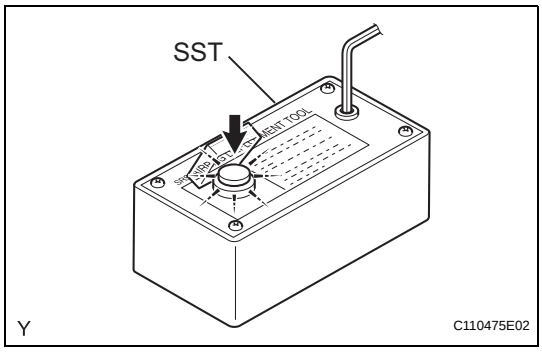
2. DISPOSE OF ONLY FRONT PASSENGER AIRBAG ASSEMBLY
NOTICE:
- **When disposing of the airbag, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure detailed below when deploying the airbag.**

HINT:
Prepare a battery as the power source to deploy the airbag.

(a) Check if SST is functioning properly.
SST 09082-00700
(1) Connect the SST red clip to the positive (+) battery terminal and the black clip to the negative (-) battery terminal.
HINT:
The yellow connector will be used to connect to another SST in a later step.



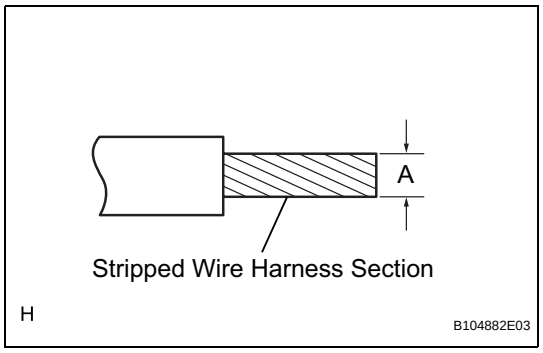
(2) Press the SST activation switch, and check that the LED of the SST activation switch illuminates.
CAUTION:
If the LED illuminates when the activation switch is not pressed, SST may have a malfunction, in which case that SST should not be used.
(3) Disconnect SST from the battery.



(b) Remove the front passenger airbag (see page RS-367).

CAUTION:

- **When removing the airbag, work must be started 90 seconds after the ignition switch is turned OFF and after the cable is disconnected from the negative (-) battery terminal.**
- **When storing the airbag, keep the airbag deployment side facing upward.**



(c) Using service wire harnesses for the vehicle, tie down the airbag to a tire.

Wire harness:

Stripped wire harness section

1.25 mm^2 or more (0.0019 $in.^2$ or more)

NOTICE:

Use a tire that you are planning to throw away, as the airbag deployment may damage the tire.

CAUTION:

Do not use wire harnesses that are too thin or any other substitute items to tie down the front passenger airbag assembly. They may snap when the airbag deploys. Always use vehicle wire harnesses that have an area of at least 1.25 mm^2 (0.0019 $in.^2$).

HINT:

To calculate the area of the stripped wire harness section:

Area = 3.14 x $Diameter^2$ /4

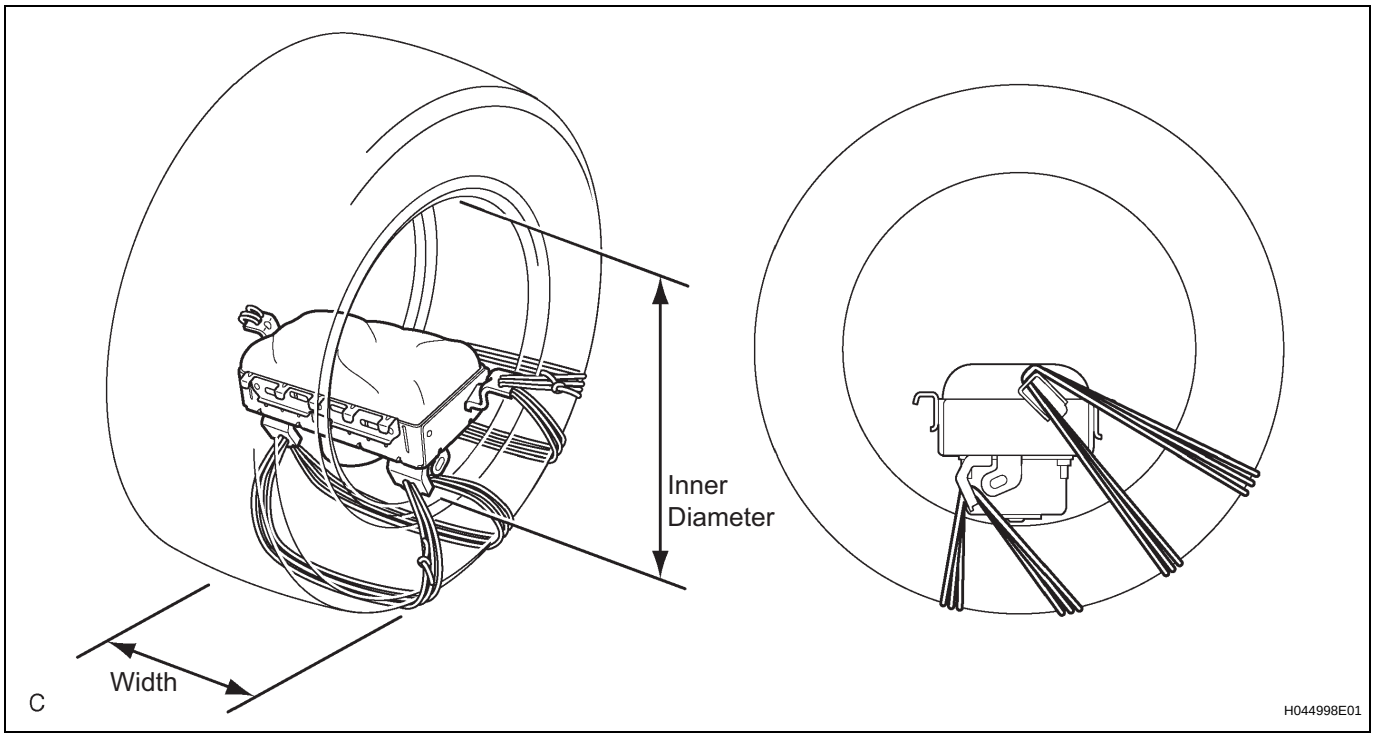
(1) Position the airbag inside the tire so that the brackets contact the tire.

Tire size minimum:

Width minimum: 185 mm (7.28 in.)

Inner diameter minimum: 360 mm (14.17 in.)

(2) Wind 3 wire harnesses at least twice around the airbag brackets and tire.

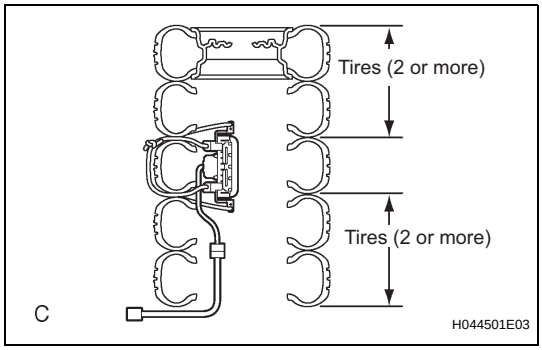


CAUTION:

- **Tightly wind the wire harnesses around the brackets so that there is no slack.**
- **Make sure that the wire harnesses are tight. If there is slack in a wire harness, the airbag may come loose when it is deployed.**
- **Always tie down the airbag with the airbag deployment side facing inside the tire.**

(d) Install SST.

(1) Connect the SST connector to the airbag.
SST 09082-00780



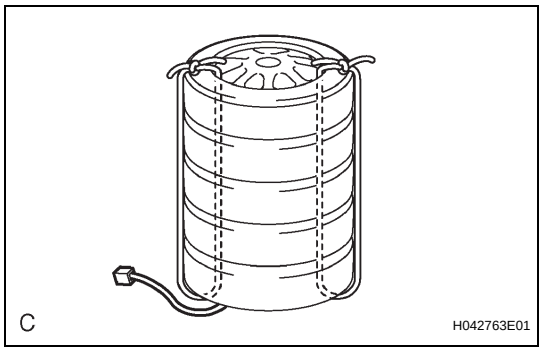
(e) Place the tires.

(1) Place at least 2 tires under the tire to which the airbag is tied.

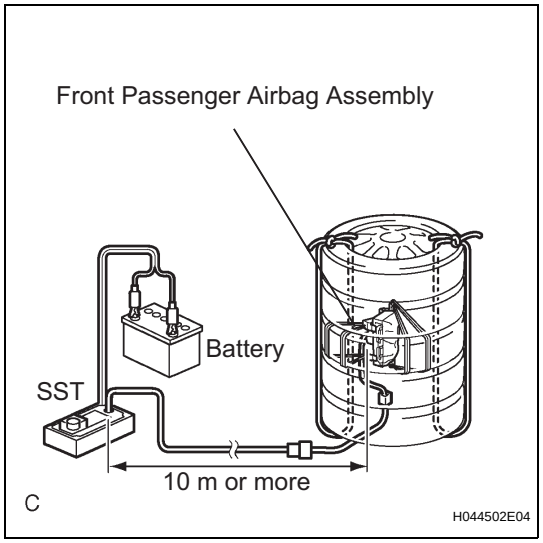
(2) Place at least 2 tires on top of the tire to which the airbag is tied. The top tire should have a disc wheel installed.

NOTICE:

- **Do not place the SST connector under the tire as the connector may be damaged.**
- **Use a disc wheel that you are planning to throw away, as the airbag deployment will damage the disc wheel.**
- **Use tires that you are planning to throw away, as the airbag deployment may damage the tires.**

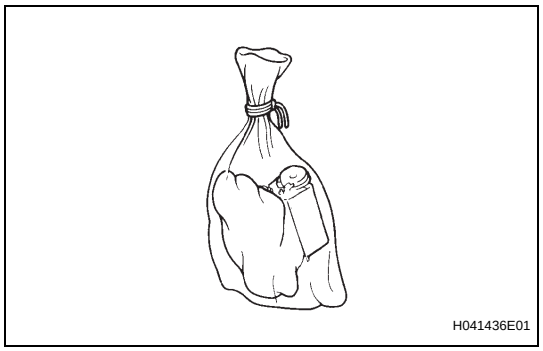


(3) Tie the tires together with 2 wire harnesses.
CAUTION:
Make sure that the wire harnesses are tight. If there is slack in a wire harness, the tires may come loose when the airbag is deployed.



(f) Install SST.
(1) Connect the SST connector.
SST 09082-00700
NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.

(g) Deploy the airbag.
(1) Connect the SST red clip to the positive (+) battery terminal and the black clip to the negative (-) battery terminal.
(2) Check that no one is within a 10 m (33 ft.) radius of the airbag.
(3) Press the SST activation switch and deploy the airbag.
CAUTION:
When deploying the airbag, make sure that no one is near the tires.
HINT:
The airbag is deployed as the SST activation switch LED illuminates.

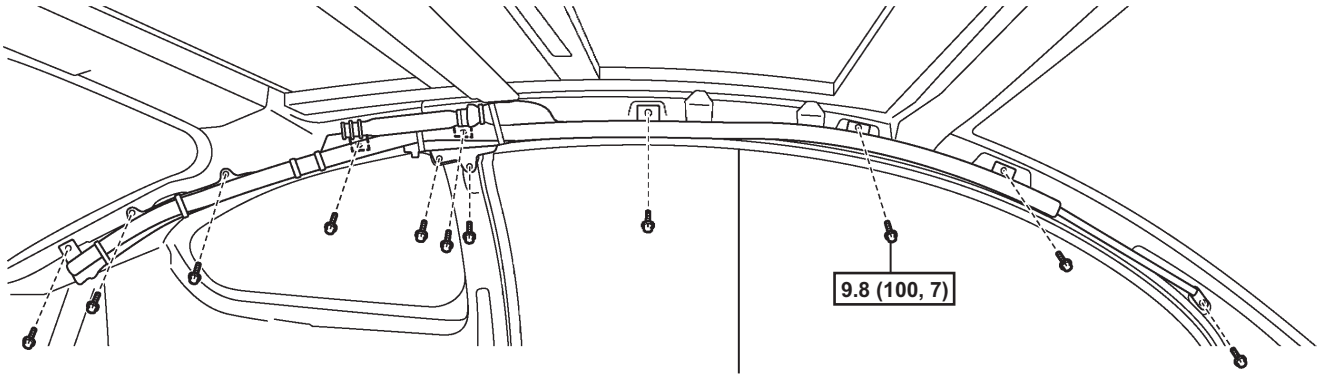


(h) Dispose of the airbag.
CAUTION:
- **The airbag becomes extremely hot when it is deployed. Do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a deployed airbag.**
- **Do not apply water to a deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(1) Remove the airbag from the tire.
(2) Place the airbag in a plastic bag, tie it tightly and dispose of it in the same way as other general parts.

CURTAIN SHIELD AIRBAG ASSEMBLY

COMPONENTS



CURTAIN SHIELD AIRBAG ASSEMBLY LH

N*m (kgf*cm, ft.*lbf) : Specified torque

C

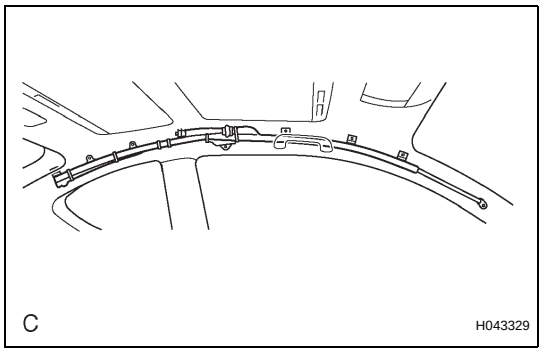
B117919E01

ON-VEHICLE INSPECTION

1. INSPECT CURTAIN SHIELD AIRBAG ASSEMBLY (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page RS-18).

(b) With the curtain shield airbag assembly installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front pillar garnish or roof headlining assembly with a new one:
Cuts, minute cracks or marked discoloration on the front pillar garnish or roof headlining assembly around the curtain shield airbag assembly.



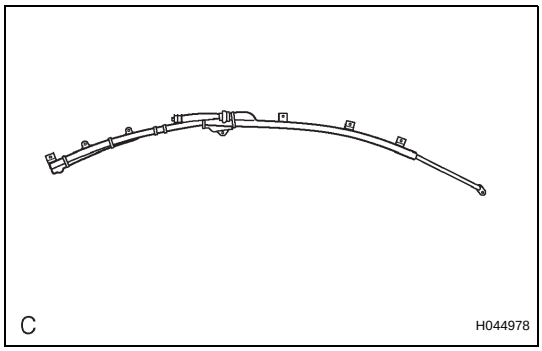
2. INSPECT CURTAIN SHIELD AIRBAG ASSEMBLY (VEHICLE INVOLVED IN COLLISION AND AIRBAG HAS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page RS-18).

(b) With the curtain shield airbag assembly removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the curtain shield airbag assembly with a new one:

- Cuts, minute cracks or marked discoloration on the curtain shield airbag assembly.
- Cracks or other damage to the connectors.

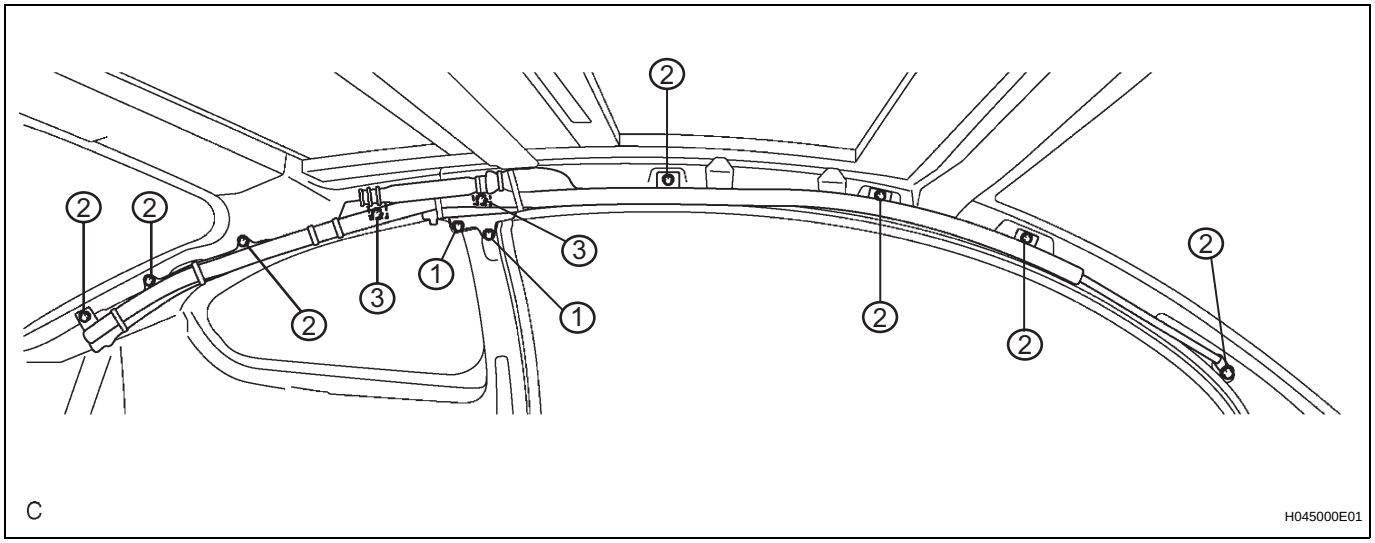
CAUTION:
For removal and installation procedures of the curtain shield airbag assembly, be sure to follow the correct procedure.



REMOVAL

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE ROOF HEADLINING ASSEMBLY**
   (a) Remove the roof headlining (see page IR-8).
3. **REMOVE CURTAIN SHIELD AIRBAG ASSEMBLY LH**



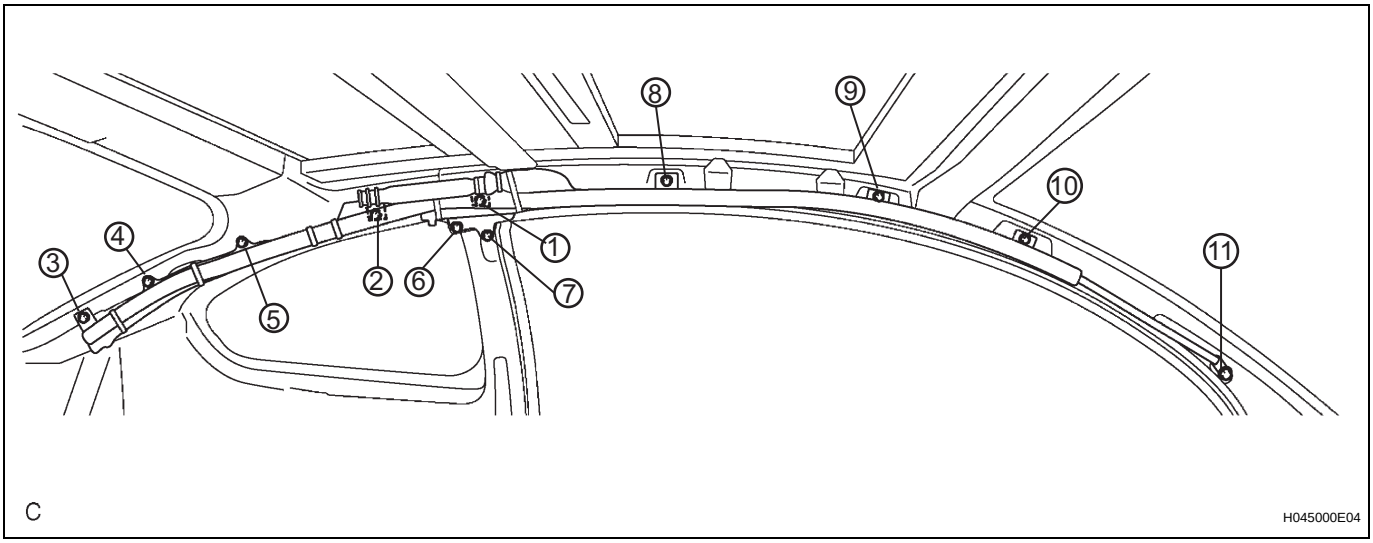
(a) Disconnect the connector.
NOTICE:
When handling the airbag connector, take care not to damage the airbag wire harness.
(b) Remove the 11 bolts and the curtain shield airbag assembly.

INSTALLATION

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

RS

1. INSTALL CURTAIN SHIELD AIRBAG ASSEMBLY LH



(a) Install the curtain shield airbag assembly with the 11 bolts.
Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)
NOTICE:
Do not twist the curtain shield airbag assembly when installing it.

(b) Connect the connector.
NOTICE:
When handling the airbag connector, take care not to damage the airbag wire harness.

2. INSTALL ROOF HEADLINING ASSEMBLY

(a) Install the roof headlining assembly (see page IR-14).

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
CAUTION:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

5. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

DISPOSAL

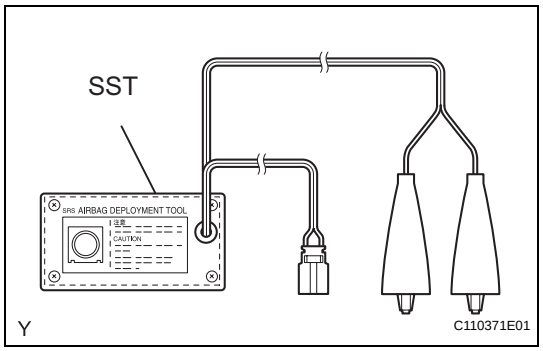
HINT:
When scrapping a vehicle equipped with an SRS or disposing of the curtain shield airbag assembly, be sure to deploy the airbag first in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION:

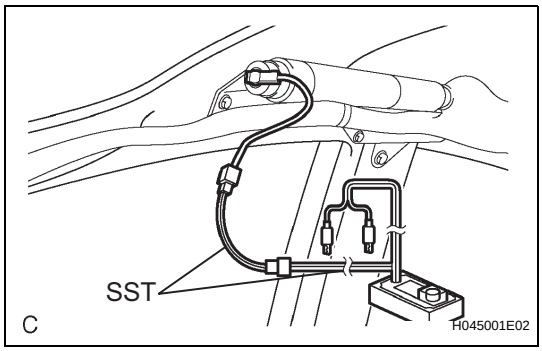
- **Never dispose of a curtain shield airbag assembly that has an undeployed airbag.**
- **The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.**
- **When deploying the airbag, always use the specified 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 (33 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.**
- **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 performing this procedure.

1. DISPOSE OF CURTAIN SHIELD AIRBAG ASSEMBLY (WHEN INSTALLED IN VEHICLE)

HINT:
Prepare a battery as the power source to deploy the airbag.



(a) Check the function of the SST (see page RS-347).
(b) Precaution (see page RS-1).
(c) Disconnect the cable from the negative battery terminal. Wait for 90 seconds after disconnecting the cable to prevent the airbag from deploying.
(d) Remove the roof headlining assembly (see page IR-8).
(e) Install the SST.
  (1) Disconnect the connector from the curtain shield airbag assembly.
  NOTICE:
  When handling the airbag connector, take care not to damage the airbag wire harness.

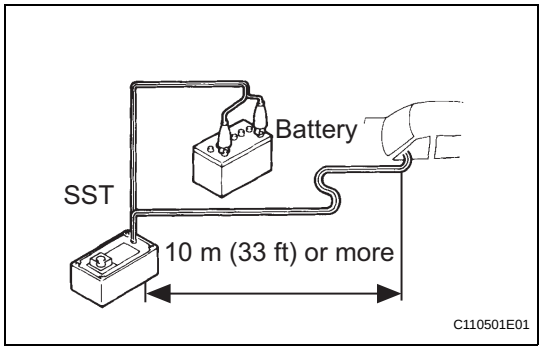


(2) After connecting the SST below to each other, connect them to the curtain shield airbag assembly.

SST 09082-00700, 09082-00802 (09082-10801, 09082-20801)

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(3) Move the SST at least 10 m (33 ft) away from the vehicle rear side window.

(4) Maintaining enough 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 red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.

(f) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (33 ft) radius of the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **When deploying the airbag, 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.**

HINT:

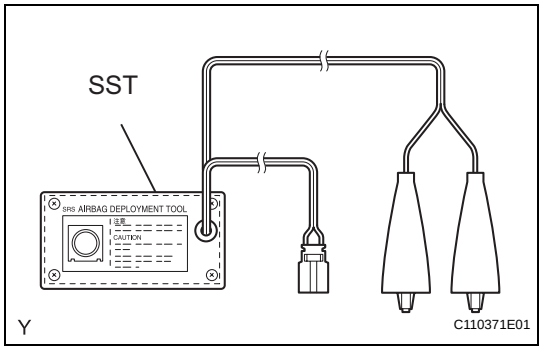
The airbag is deployed as the LED of the SST activation switch comes on.

2. DISPOSE OF CURTAIN SHIELD AIRBAG ASSEMBLY (WHEN NOT INSTALLED IN VEHICLE)

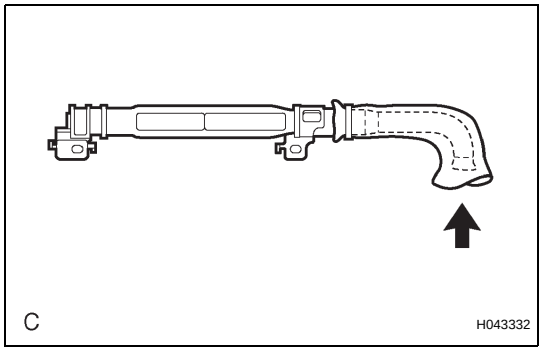
NOTICE:

- **When disposing of the curtain shield airbag assembly, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure detailed below when deploying the airbag.**

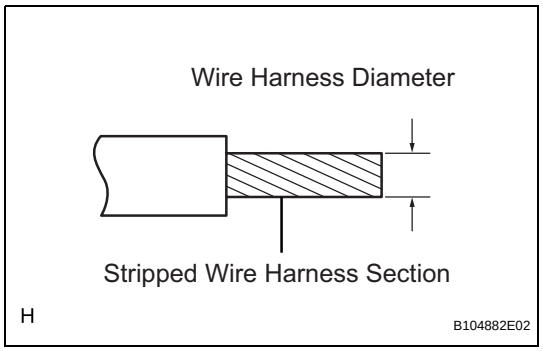
HINT:
Prepare a battery as the power source to deploy the airbag.



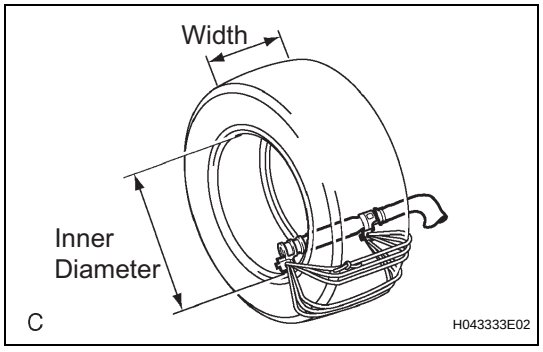
(a) Check the function of the SST (see page RS-349).
(b) Remove the curtain shield airbag assembly (see page RS-376).
CAUTION:
When removing the curtain shield airbag assembly, work must be started 90 seconds after the ignition switch is turned off and the negative (-) terminal cable is disconnected from the battery.



(c) Cut off the deployment section of the curtain shield airbag assembly.



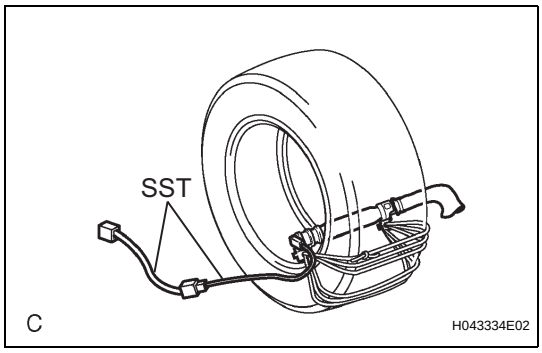
(d) Using a service-purpose wire harness for the vehicle, tie down the curtain shield airbag assembly to the tire.
Wire harness:
Stripped wire harness section
1.25 mm^2 or more (0.0019 $in.^2$ or more)
CAUTION:
If the wire harness is too thin or an alternative object is used to tie down the curtain shield airbag assembly, it may be snapped by the shock when the airbag is deployed. Always use a wire harness for vehicle use with an area of at least 1.25 mm^2 (0.0019 $in.^2$).
HINT:
To calculate the area of the stripped wire harness section:
Area = 3.14 x $(Diameter)^2$ divided/4



(1) Position the curtain shield airbag assembly inside the tire as shown in the illustration.
Tire size:
Must exceed the following dimensions
Width:
185 mm (7.28 in.)
Inner diameter:
360 mm (14.17 in.)

RS

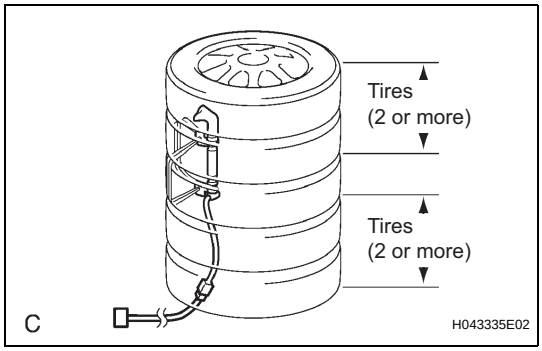
CAUTION:
Make sure that the wire harness is tight. If there is slack in the wire harness, the curtain shield airbag assembly may become loose due to the shock when the airbag is deployed.
NOTICE:
Use a disc wheel (with tire) that you are planning to throw away, as the airbag deployment will damage the disc wheel.



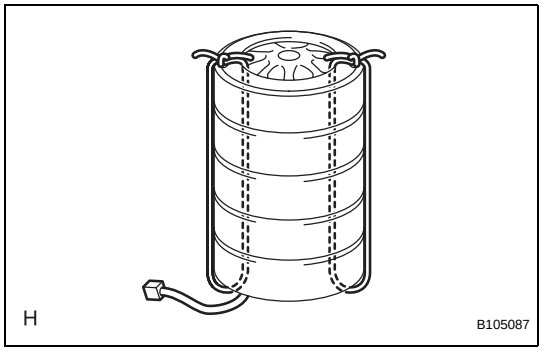
(e) Install the SST.
(1) After connecting the SST below to each other, connect them to the curtain shield airbag assembly.
SST 09082-00802 (09082-10801, 09082-20801)

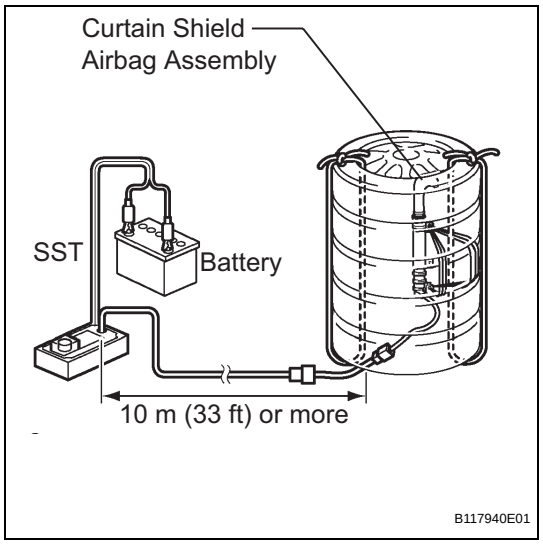
(f) Place the tires.
CAUTION:
Do not place the deployment direction of the curtain shield airbag assembly facing toward the ground.

(1) Place at least 2 tires under the tire which the curtain shield airbag assembly is tied to.
(2) Place at least 2 tires over the tire which the curtain shield airbag assembly is tied to. The top tire should have the disc wheel installed.
NOTICE:
Do not place the SST connector under the tire because it could be damaged.



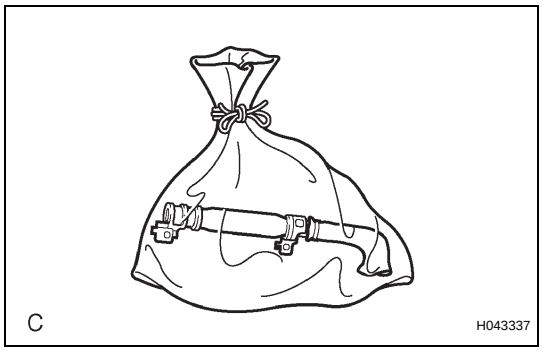
(3) Tie the tires together with 2 wire harnesses.
CAUTION:
Make sure that the wire harness is tight. Looseness in the wire harness results in the tires coming free due to the shock when the airbag is deployed.





(g) Install the SST.
  (1) Connect the SST connector.
  SST 09082-00700
  NOTICE:
  To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.

(h) Deploy the airbag.
  (1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.
  (2) Check that no one is within a 10 m (33 ft) radius of the tire which the curtain shield airbag assembly is tied to.
  (3) Press the SST activation switch and deploy the airbag.
  CAUTION:
  When deploying the airbag, make sure that no one is near the tire.
  HINT:
  The airbag is deployed as the LED of the SST activation switch comes on.



(i) 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 in the same way as other general parts.

RS

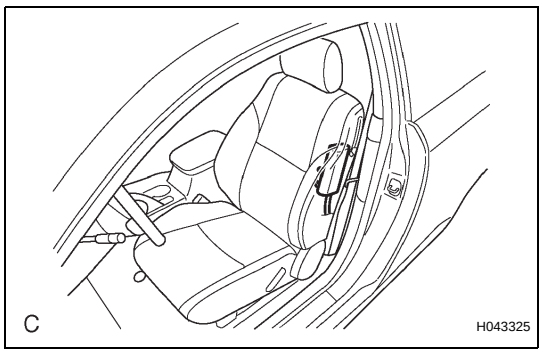
FRONT SEAT SIDE AIRBAG ASSEMBLY

ON-VEHICLE INSPECTION

1. FRONT SEAT SIDE AIRBAG ASSEMBLY (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page RS-18).

(b) With the front seat airbag assembly installed on the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front seat assembly with a new one:
Cuts, minute cracks or marked discoloration on the front seat back assembly or around the front seat airbag assembly.



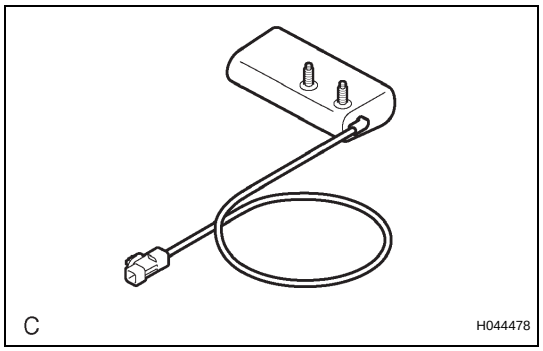
2. FRONT SEAT SIDE AIRBAG ASSEMBLY (VEHICLE INVOLVED IN COLLISION AND AIRBAG HAS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page RS-18).

(b) With the front seat airbag assembly removed from the vehicle, perform a visual check. If there are any defects as mentioned below, replace the front seat airbag assembly with a new one:

- Cuts, minute cracks or marked discoloration on the front seat airbag assembly.
- Cracks or other damage to the wire harness or connector.

CAUTION:
For removal and installation procedures of the front seat airbag assembly. Be sure to follow the correct procedure.



RS

DISPOSAL

HINT:
When scrapping a vehicle equipped with the 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.

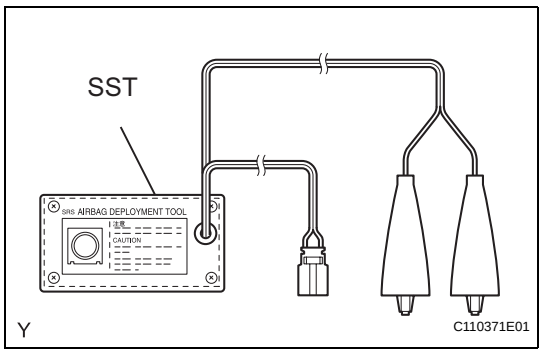
CAUTION:

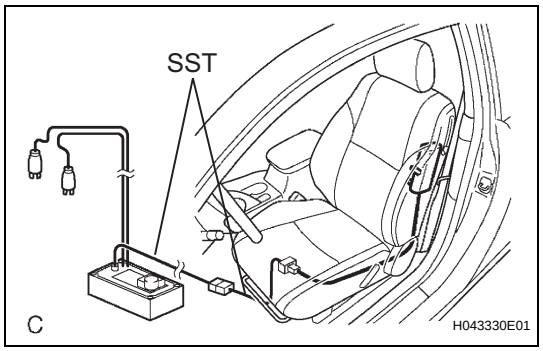
- **Never dispose of a front seat airbag assembly that has an undeployed airbag.**
- **The airbag produces an exploding sound when it is deployed, so perform the operation outdoors and where it will not create a nuisance to nearby residents.**
- **When deploying the airbag, always use the specified SST (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 (33 ft) away from the 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.**
- **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 performing this procedure.

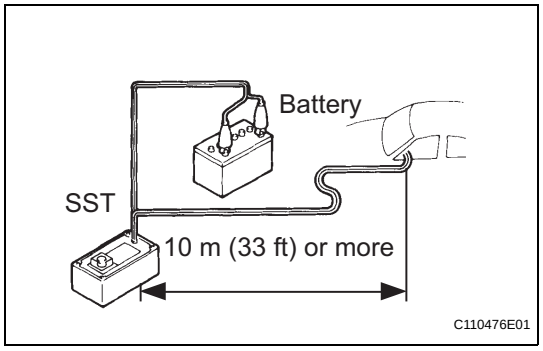
1. DISPOSE OF FRONT SEAT SIDE AIRBAG ASSEMBLY (WHEN INSTALLED IN VEHICLE)

HINT:
Prepare a battery as the power source to deploy the airbag.

(a) Check the function of the SST (see page RS-347).
(b) Precaution (see page RS-1).
(c) Disconnect the cable from the negative battery terminal. Wait for 90 seconds after disconnecting the cable to prevent the airbag from deploying.
(d) Remove the front seat assembly (see page SE-5).
HINT:
Keep the front seat assembly in the cabin.
(e) Install the SST.
(1) Disconnect the connector (yellow colored one) from the front seat airbag assembly.
NOTICE:
When handling the airbag connector, take care not to damage the airbag wire harness.







(2) Connect the SST connector to the front seat airbag assembly connector.
SST 09082-00700, 09082-00750
NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

(3) Install the front seat assembly (see page SE-11).

(4) Move the SST at least 10 m (33 ft) away from the vehicle front side window.

(5) Maintaining enough 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.

(6) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.

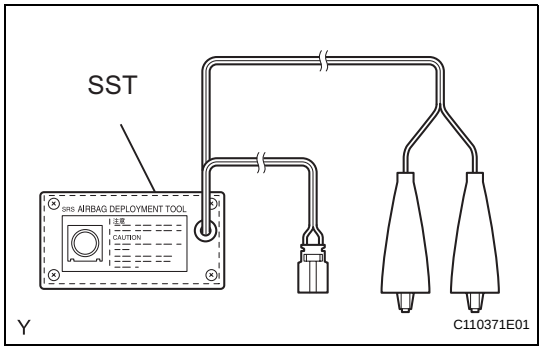
(f) Deploy the airbag.

(1) Check that no one is inside the vehicle or within a 10 m (33 ft) radius of the vehicle.

(2) Press the SST activation switch and deploy the airbag.
CAUTION:
- **When deploying the airbag, 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.**

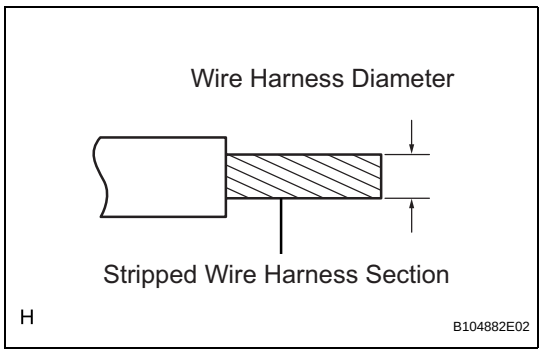
HINT:
The airbag is deployed as the LED of the SST activation switch comes on.

2. DISPOSE OF FRONT SEAT SIDE AIRBAG ASSEMBLY (WHEN NOT 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 follow the procedure detailed below when deploying the airbag.**

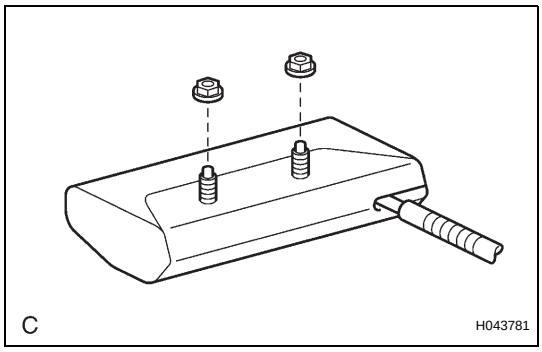


HINT:
Prepare a battery as the power source to deploy the airbag.

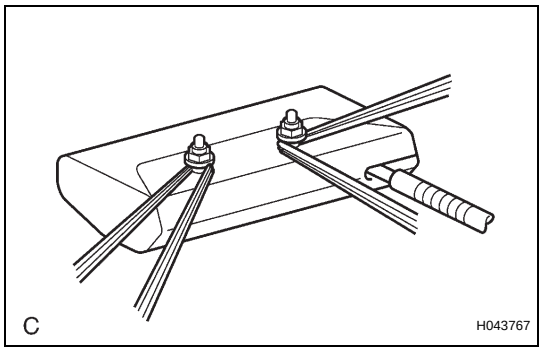
(a) Check the function of the SST (see page RS-349).
(b) Remove the front seat airbag assembly.
  (1) Remove the front seat assembly (see page SE-5).
  (2) Remove the 2 nuts and the front seat airbag assembly from the seatback assembly.
  CAUTION:
  - **When removing the front seat airbag assembly, work must be started 90 seconds after the ignition switch is turned off and the negative (-) terminal cable is disconnected from the battery.**
  - **When storing the front seat airbag assembly, keep the airbag deployment side facing upward.**



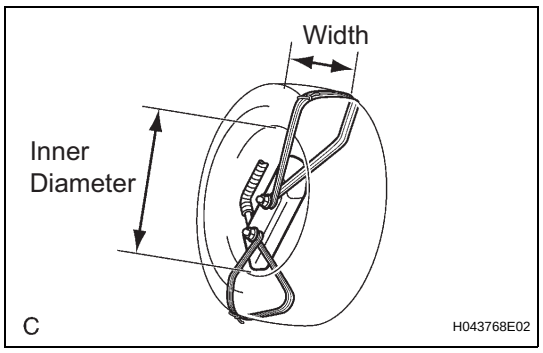
(c) Using a service-purpose wire harness for the vehicle, tie down the front seat airbag assembly to the tire.
Wire harness:
Stripped wire harness section
1.25 mm^2 or more (0.0019 $in.^2$ or more)
HINT:
To calculate the area of the stripped wire harness section:
Area = 3.14 x $(Diameter)^2$ divided/4
CAUTION:
If the wire harness is too thin or an alternative object is used to tie down the front seat airbag assembly, it may be snapped by the shock when the airbag is deployed. Always use a wire harness for vehicle use with an area of at least 1.25 mm^2 (0.0019 $in.^2$).



  (1) Install the 2 nuts to the front seat airbag assembly.



(2) Wind the wire harness 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.

Tire size:

Must exceed the following dimensions

Width:

185 mm (7.28 in.)

Inner diameter:

360 mm (14.17 in.)

CAUTION:

- **Make sure that the wire harness is tight. If there is slack in a wire harness, the front seat airbag assembly may become loose due to the shock when the airbag is deployed.**
- **Always tie down the front seat airbag assembly with the airbag deployment direction facing inside the tire.**

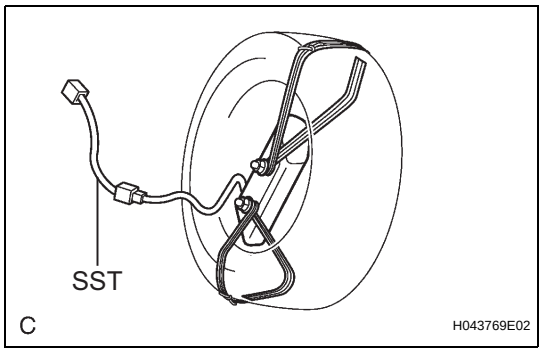
NOTICE:

Use a disc wheel (with tire) that you are planning to throw away, as the airbag deployment will damage the disc wheel.

(d) Install the SST.

(1) Connect the SST connector to the front seat airbag assembly connector.

SST 09082-00750



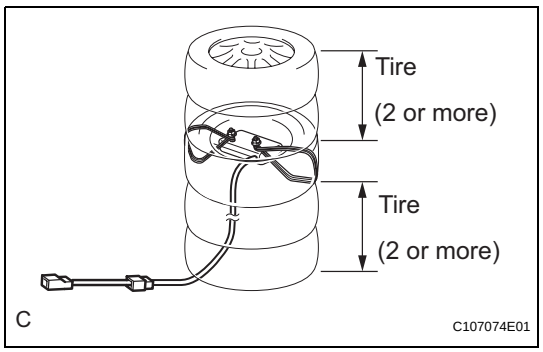
(e) Place the tires.

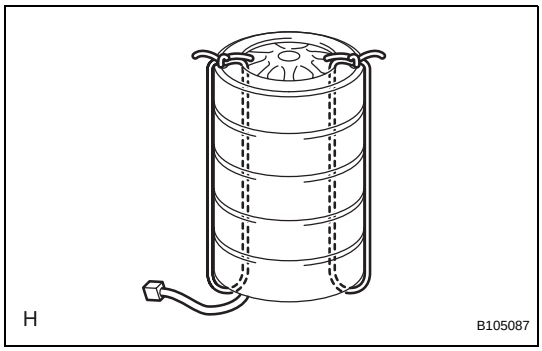
(1) Place at least 2 tires under the tire which the front seat airbag assembly is tied to.

(2) Place at least 2 tires over the tire which the front seat airbag assembly is tied to. The top tire should have the disc wheel installed.

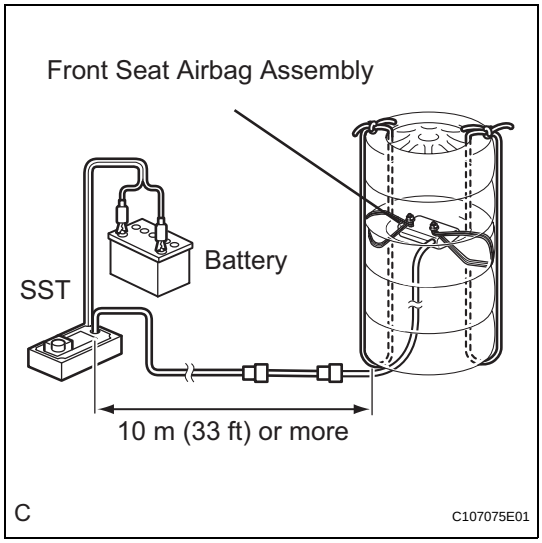
NOTICE:

Do not place the SST connector under the tire because it could be damaged.



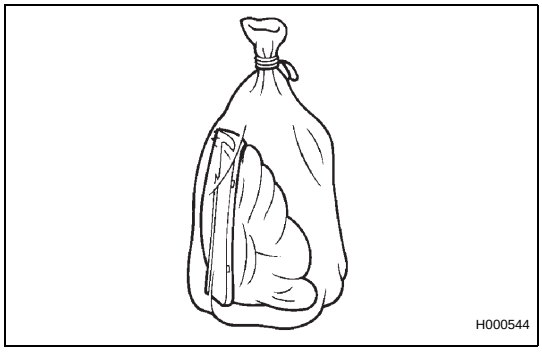


(3) Tie the tires together with 2 wire harnesses.
CAUTION:
Make sure that the wire harness is tight. Looseness in the wire harness results in the tires coming free due to the shock when the airbag is deployed.



(f) Install the SST.
(1) Connect the SST connector.
SST 09082-00700
NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the tire.

(g) Deploy the airbag.
(1) Connect the red clip of the SST to the battery positive (+) terminal and the black clip of the SST to the battery negative (-) terminal.
(2) Check that no one is within a 10 m (33 ft) radius of the tire which the front seat airbag assembly is tied to.
(3) Press the SST activation switch and deploy the airbag.
CAUTION:
When deploying the airbag, make sure that no one is near the tire.
HINT:
The airbag is deployed as the LED of the SST activation switch comes on.

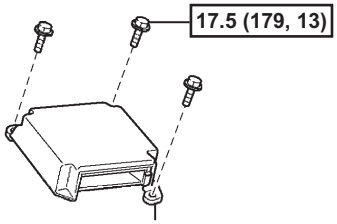


(h) Dispose of the front seat airbag assembly.
CAUTION:
- **The front seat airbag assembly becomes extremely hot when the airbag is deployed, so do not touch it for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front seat airbag assembly with a deployed airbag.**
- **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 in the same way as other general parts.

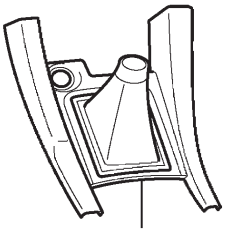
CENTER AIRBAG SENSOR ASSEMBLY

COMPONENTS

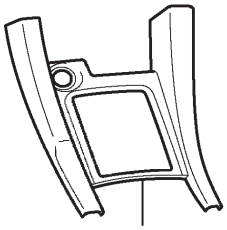


CENTER AIRBAG SENSOR ASSEMBLY

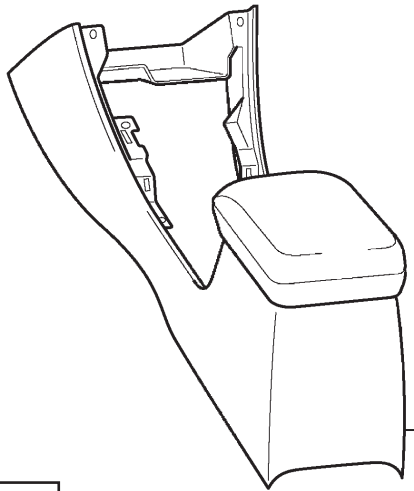
Manual Transaxle:
SHIFT LEVER KNOB SUB-ASSEMBLY



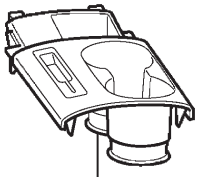
Manual Transaxle:
FRONT CONSOLE UPPER PANEL ASSEMBLY



Automatic Transaxle:
FRONT CONSOLE UPPER PANEL ASSEMBLY



REAR CONSOLE BOX ASSEMBLY



CONSOLE UPPER REAR PANEL SUB-ASSEMBLY

N*m (kgf*cm, ft.*lbf) : Specified torque

C

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ON-VEHICLE INSPECTION

1. **CHECK CENTER AIRBAG SENSOR ASSEMBLY (VEHICLE NOT INVOLVED IN COLLISION AND AIRBAG NOT DEPLOYED)**
   (a) Perform a diagnostic system check (see page RS-18).

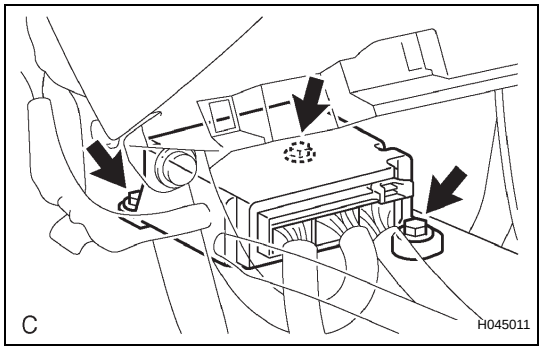
2. **CHECK CENTER AIRBAG SENSOR ASSEMBLY (VEHICLE INVOLVED IN COLLISION AND AIRBAG NOT DEPLOYED)**
   (a) Perform a diagnostic system check (see page RS-18).

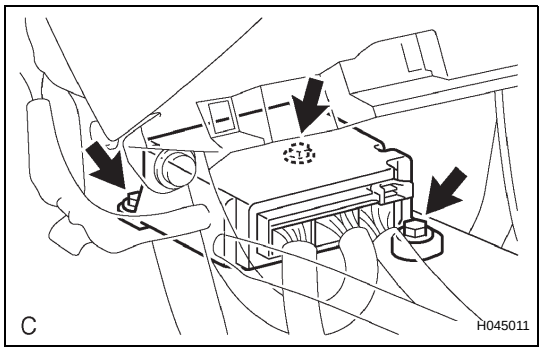
3. **CHECK CENTER AIRBAG SENSOR ASSEMBLY (VEHICLE INVOLVED IN COLLISION AND AIRBAG DEPLOYED)**
   (a) Replace the center airbag sensor.
   CAUTION:
   For removal and installation of the center airbag sensor assembly, be sure to follow the correct procedures.

REMOVAL

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE SHIFT LEVER KNOB SUB-ASSEMBLY (Manual Transaxle) (See page IP-5)**
3. **REMOVE FRONT CONSOLE UPPER PANEL ASSEMBLY (See page IP-5)**
4. **REMOVE CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-18)**
5. **REMOVE REAR CONSOLE BOX ASSEMBLY (See page IP-18)**
6. **REMOVE CENTER AIRBAG SENSOR ASSEMBLY**
   (a) Disconnect the airbag sensor connectors.
   (b) Remove the 3 bolts and airbag sensor.





INSTALLATION

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

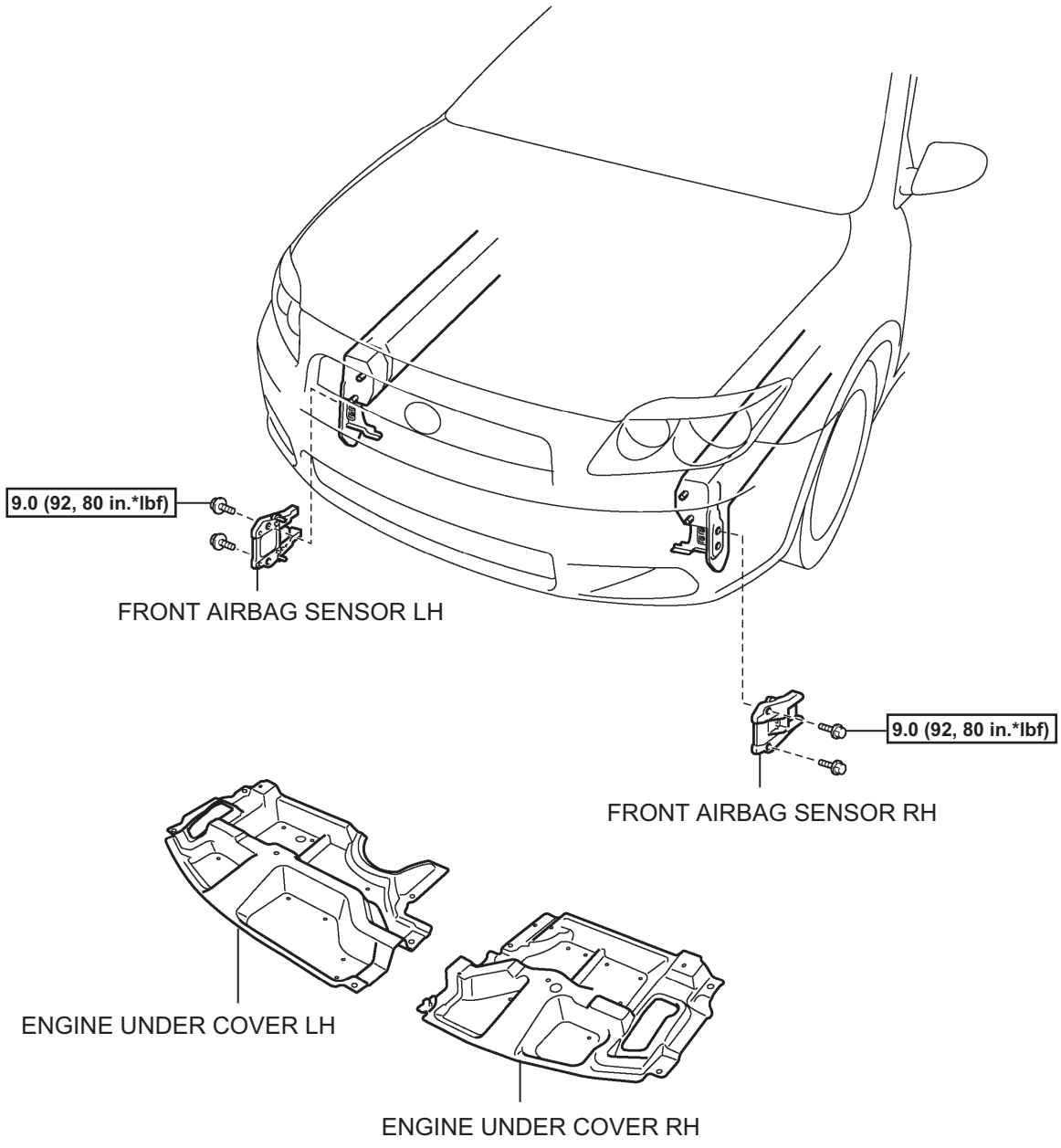
1. **INSTALL CENTER AIRBAG SENSOR ASSEMBLY**
   (a) Install the airbag sensor with the 3 bolts.
   Torque: 17.5 N*m (179 kgf*cm, 13 ft.*lbf)
   NOTICE:
   - **If the airbag sensor has been dropped, or there are any cracks, dents or other defects in the case, bracket or connector, replace it with a new one.**
   - **When installing the airbag sensor, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

   (b) Connect the airbag sensor connectors.
2. **INSTALL REAR CONSOLE BOX ASSEMBLY (See page IP-22)**
3. **INSTALL CONSOLE UPPER REAR PANEL SUB-ASSEMBLY (See page IP-23)**
4. **REMOVE FRONT CONSOLE UPPER PANEL ASSEMBLY (See page IP-11)**
5. **INSTALL SHIFT LEVER KNOB SUB-ASSEMBLY (Manual Transaxle) (See page IP-12)**
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
7. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
8. **CHECK SRS WARNING LIGHT**
   (a) Check the SRS warning light (see page RS-11).

FRONT AIRBAG SENSOR

COMPONENTS

RS



N*m (kgf*cm, ft.*lbf) : Specified torque

C

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ON-VEHICLE INSPECTION

1. **CHECK FRONT AIRBAG SENSOR (VEHICLE NOT INVOLVED IN COLLISION AND AIRBAG NOT DEPLOYED)**
   (a) Perform a diagnostic system check (see page RS-18).

2. **CHECK FRONT AIRBAG SENSOR (VEHICLE INVOLVED IN COLLISION AND AIRBAG NOT DEPLOYED)**
   (a) Perform a diagnostic system check (see page RS-18).
   (b) If the front fender of the vehicle or its periphery are damaged, perform a visual check:
   - Check for cracks, dents or chips in the case.
   - Check for cracks, dents, chips and scratches in the connector.
   - Check for peeling of the label or damage of the serial number.

   If any of the defects mentioned above are present, replace the front airbag sensor with a new one.

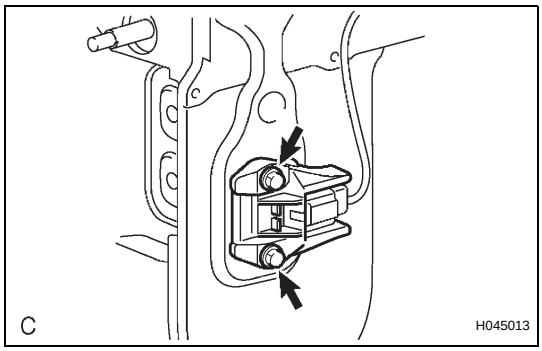
3. **CHECK FRONT AIRBAG SENSOR (VEHICLE INVOLVED IN COLLISION AND AIRBAG DEPLOYED)**
   (a) Replace the front airbag sensor.
   CAUTION:
   For removal and installation of the front airbag sensor, be sure to follow the correct procedures.
   HINT:
   If the airbags have deployed, replace the front airbag sensor on the side in which the collision occurred. Replace both if necessary.

RS

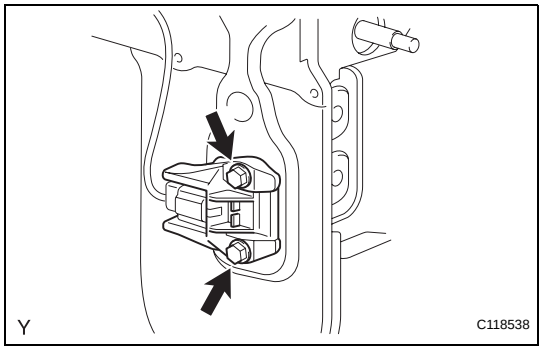
REMOVAL

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   NOTICE:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE ENGINE UNDER COVER LH**
3. **REMOVE ENGINE UNDER COVER RH**
4. **REMOVE FRONT AIRBAG SENSOR LH**
   (a) Disconnect the sensor connector.
   (b) Remove the 2 bolts and sensor.

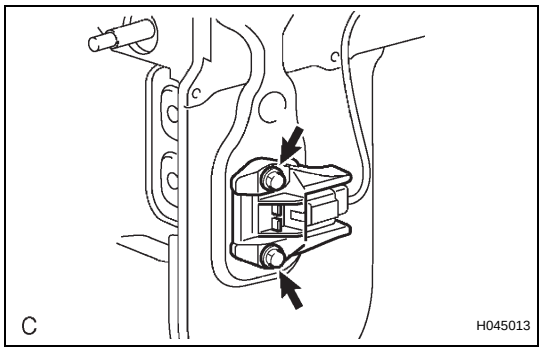


5. **REMOVE FRONT AIRBAG SENSOR RH**
   (a) Disconnect the sensor connector.
   (b) Remove the 2 bolts and sensor.



INSTALLATION

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

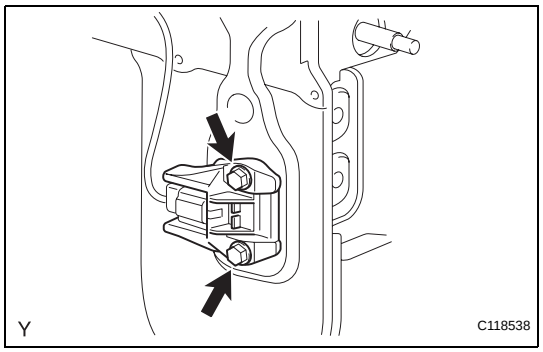


1. INSTALL FRONT AIRBAG SENSOR LH

(a) Install the sensor with the 2 bolts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
NOTICE:
- **If the 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 airbag sensor, make sure that the SRS wiring does not interfere with other parts and is not pinched between other parts.**

(b) Check that there is no free play in the installation parts of the sensor.

(c) Connect the sensor connector.



2. INSTALL FRONT AIRBAG SENSOR RH

(a) Install the sensor with the 2 bolts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
NOTICE:
- **If the 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 airbag sensor, make sure that the SRS wiring does not interfere with other parts and is not pinched between other parts.**

(b) Check that there is no free play in the installation parts of the sensor.

(c) Connect the sensor connector.

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

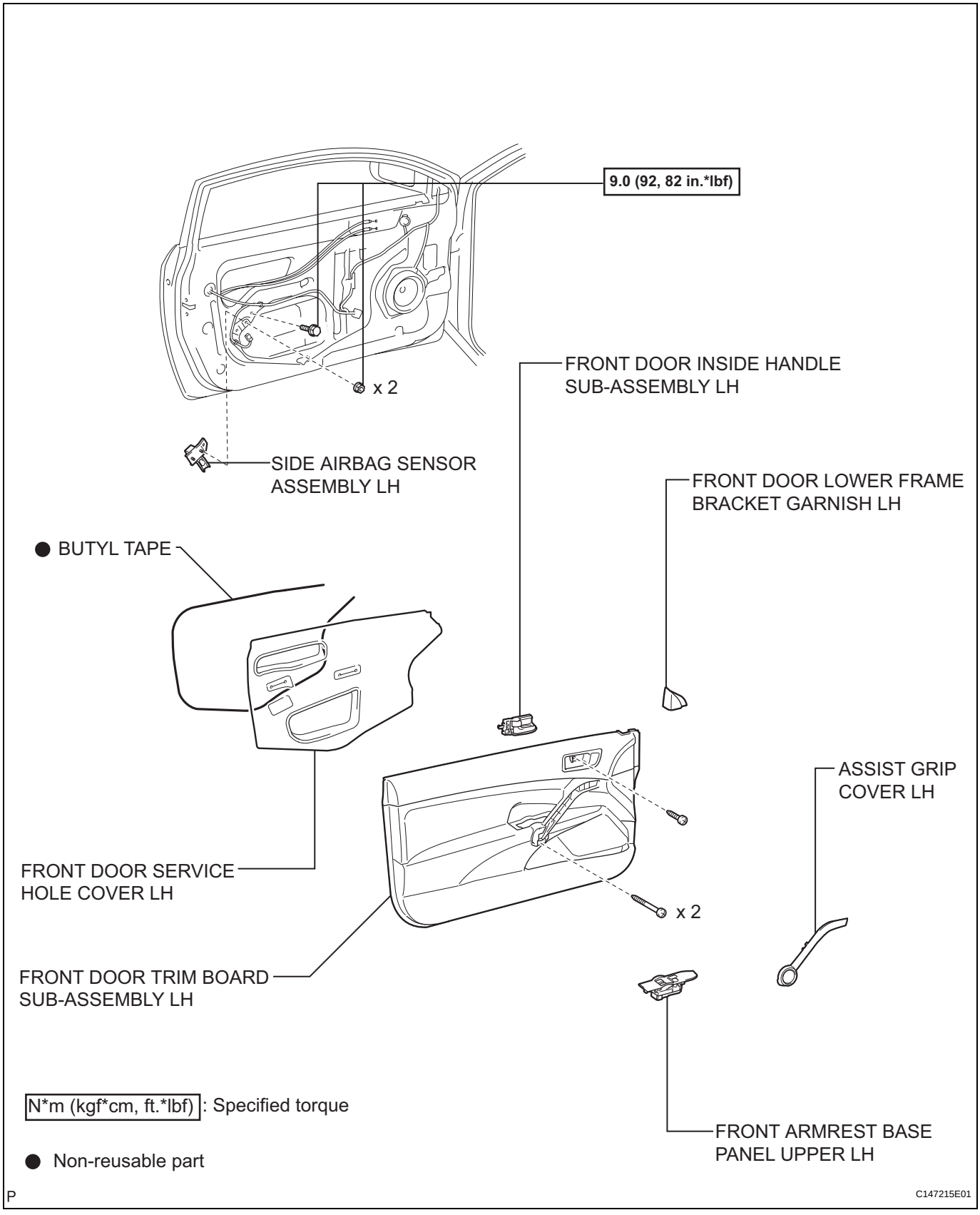
5. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

SIDE AIRBAG SENSOR

COMPONENTS

RS



ON-VEHICLE INSPECTION

1. CHECK SIDE AIRBAG SENSOR (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page RS-18).

2. CHECK SIDE AIRBAG SENSOR (VEHICLE INVOLVED IN COLLISION AND AIRBAG HAS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page RS-18).

(b) When the center pillar of the vehicle or its area is damaged, check if there is any damage to the side airbag sensor. If there are any defects as mentioned below, replace the side airbag sensor with a new one:

- Cracks, dents or chips on the sensor housing.
- Cracks or other damage to the connector.
- Peeling off of the label or damage to the serial number.

CAUTION:
For removal and installation procedures of the side airbag sensor, be sure to follow the correct procedure.

3. CHECK SIDE AIRBAG SENSOR (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

(a) Replace the side airbag sensor.

CAUTION:
For removal and installation procedures of the side airbag sensor, be sure to follow the correct procedure.

HINT:
The side airbag sensor on the impacted side should be replaced after the front seat airbag assembly and curtain shield airbag assembly have deployed.

RS

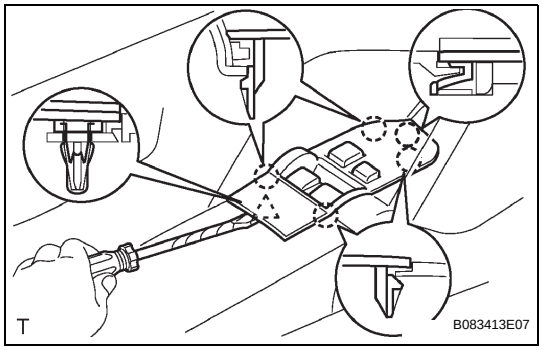
REMOVAL

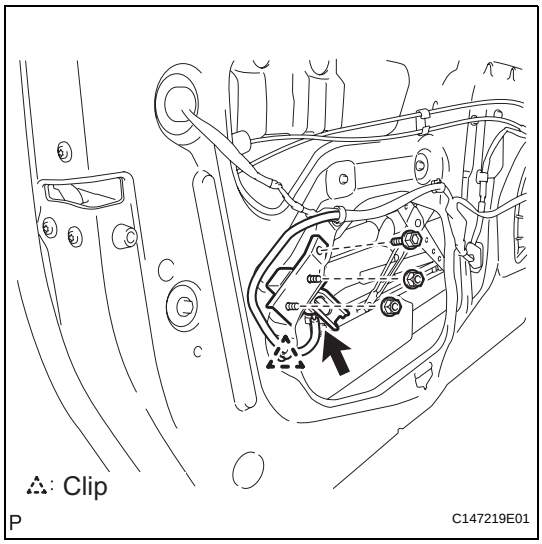
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT DOOR LOWER FRAME BRACKET GARNISH LH (See page ED-8)**
3. **REMOVE ASSIST GRIP COVER LH (See page ED-8)**
4. **REMOVE FRONT ARMREST BASE PANEL UPPER LH**
   (a) Using a screwdriver, detach the clip and 5 claws, and remove the front armrest base panel upper LH together with the window regulator master switch.
   HINT:
   Tape the screwdriver tip before use.
   (b) Disconnect the switch connector.
5. **REMOVE FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH (See page ED-9)**
6. **REMOVE FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY LH (See page ED-10)**
7. **REMOVE FRONT DOOR SERVICE HOLE COVER LH (See page ED-10)**
8. **REMOVE SIDE AIRBAG SENSOR ASSEMBLY LH**
   (a) Disconnect the connector.
   (b) Remove the 2 nuts and bolt.
   (c) Remove the side airbag sensor.



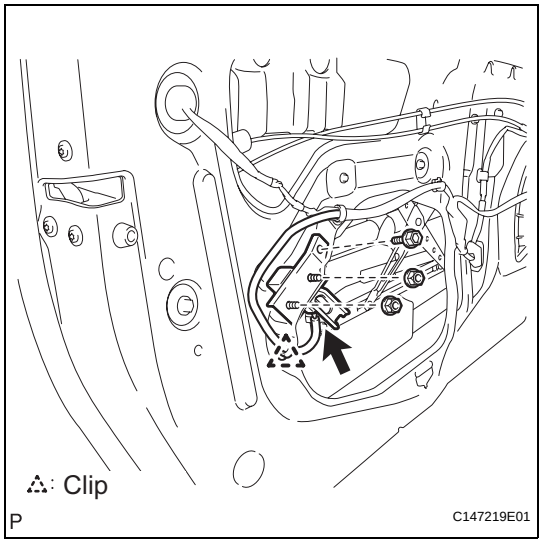


INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).



1. INSTALL SIDE AIRBAG SENSOR ASSEMBLY LH

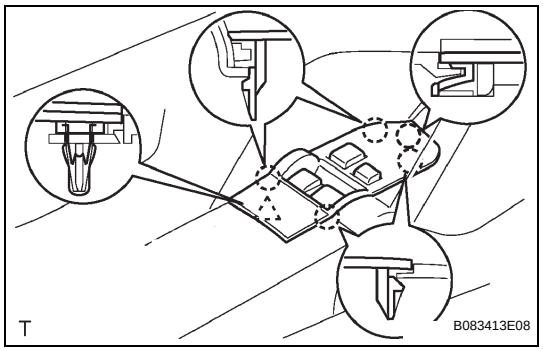
(a) Install the side airbag sensor with the 2 nuts and bolt.
Torque: 9.0 N*m (92 kgf*cm, 82 in.*lbf)
NOTICE:
- **If the airbag sensor has been dropped, or there are any cracks, dents or other defects in the case, bracket or connector, replace it with a new one.**
- **When installing the airbag sensor, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

(b) Check that there is no looseness in the installation parts of the sensor.
(c) Connect the connector.

2. INSTALL FRONT DOOR SERVICE HOLE COVER LH (See page ED-19)

3. INSTALL FRONT DOOR INSIDE HANDLE SUB-ASSEMBLY LH (See page ED-19)

4. INSTALL FRONT DOOR TRIM BOARD SUB-ASSEMBLY LH (See page ED-19)



5. INSTALL FRONT ARMREST BASE PANEL UPPER LH

(a) Connect the switch connector.
(b) Attach the clip and 5 claws to install the front armrest base panel upper LH together with the window regulator master switch.

6. INSTALL ASSIST GRIP COVER LH (See page ED-21)

7. INSTALL FRONT DOOR LOWER FRAME BRACKET GARNISH LH (See page ED-21)

8. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

9. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

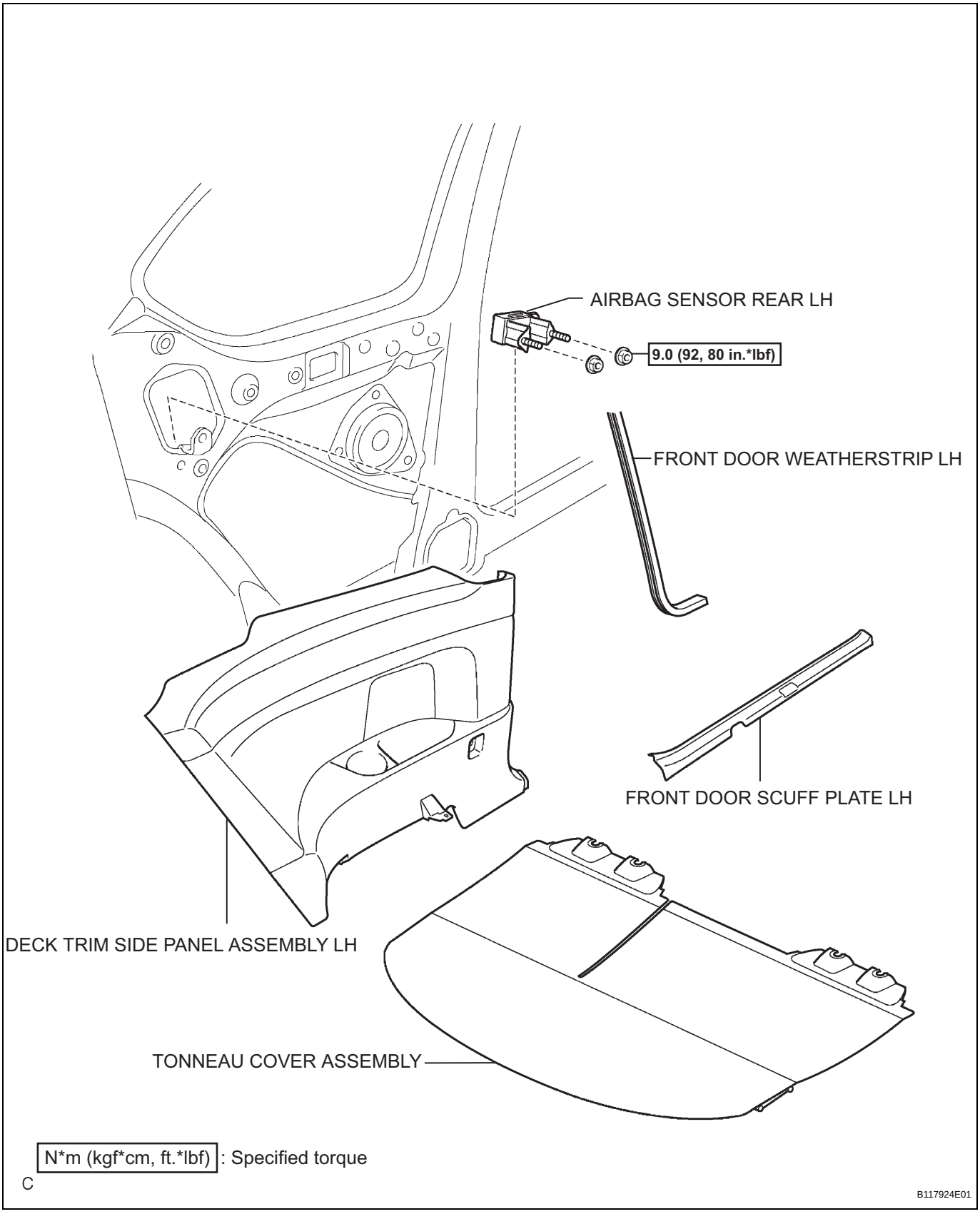
10. CHECK SRS WARNING LIGHT

(a) Check the SRS warning light (see page RS-11).

REAR AIRBAG SENSOR

COMPONENTS

RS



ON-VEHICLE INSPECTION

1. CHECK REAR AIRBAG SENSOR (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page RS-18).

2. CHECK REAR AIRBAG SENSOR (VEHICLE INVOLVED IN COLLISION AND AIRBAG HAS NOT DEPLOYED)

(a) Perform a diagnostic system check (see page RS-18).

(b) When the quarter panel of the vehicle or its periphery is damaged, check if there is any damage to the rear airbag sensor. If there are any defects as mentioned below, replace the rear airbag sensor with a new one:

- Cracks, dents or chips on the sensor housing.
- Cracks or other damage to the connector.
- Peeling off of the label or damage to the serial number.

CAUTION:
For removal and installation procedures of the rear airbag sensor, be sure to following the correct procedure.

3. CHECK REAR AIRBAG SENSOR (VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED)

(a) Replace the rear airbag sensor.

CAUTION:
For removal and installation procedures of the rear airbag sensor, be sure to follow the correct procedure.

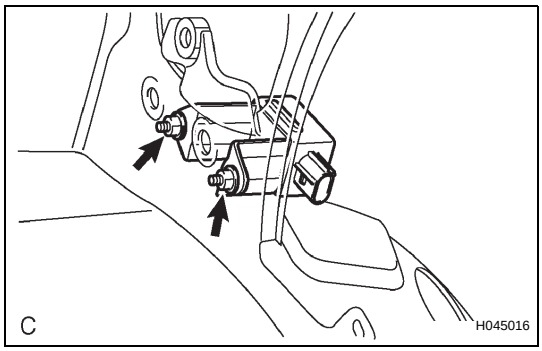
HINT:
The rear airbag sensor on the impacted side should be replaced after the curtain shield airbag assembly has deployed.

RS

REMOVAL

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE TONNEAU COVER ASSEMBLY**
3. **REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-9)**
4. **REMOVE FRONT DOOR WEATHERSTRIP LH**
5. **REMOVE DECK TRIM SIDE PANEL ASSEMBLY LH (See page IR-11)**
6. **REMOVE AIRBAG SENSOR REAR LH**
   (a) Disconnect the connector.
   (b) Remove the 2 nuts and airbag sensor.



INSTALLATION

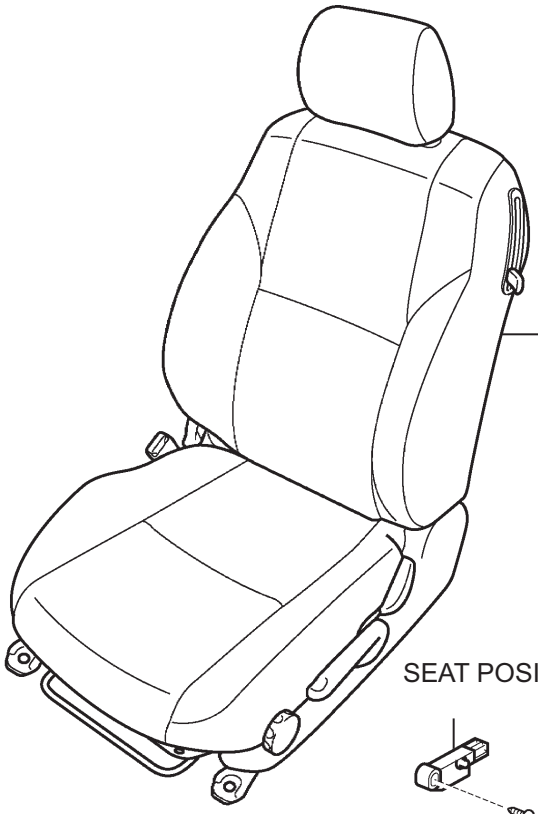
CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **INSTALL AIRBAG SENSOR REAR LH**
   (a) Install the airbag sensor with the 2 nuts.
   Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
   NOTICE:
   - **If the airbag sensor has been dropped, or there are any cracks, dents or other defects in the case, bracket or connector, replace it with a new one.**
   - **When installing the airbag sensor, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**
2. **INSTALL DECK TRIM SIDE PANEL ASSEMBLY LH (See page IR-18)**
3. **INSTALL FRONT DOOR WEATHERSTRIP LH**
4. **INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-20)**
5. **INSTALL TONNEAU COVER ASSEMBLY**
6. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
7. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
8. **CHECK SRS WARNING LIGHT**
   (a) Check the SRS warning light (see page RS-11).

SEAT POSITION SENSOR

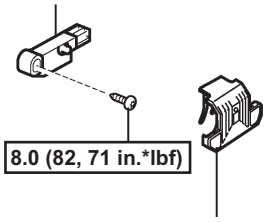
COMPONENTS

RS



FRONT SEAT ASSEMBLY

SEAT POSITION AIRBAG SENSOR



8.0 (82, 71 in.*lbf)

SEAT POSITION SENSOR PROTECTOR

N*m (kgf*cm, ft.*lbf) : Specified torque

C

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ON-VEHICLE INSPECTION

1. INSPECT SEAT POSITION SENSOR (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page RS-18).

2. INSPECT SEAT POSITION SENSOR (VEHICLE INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (see page RS-18).

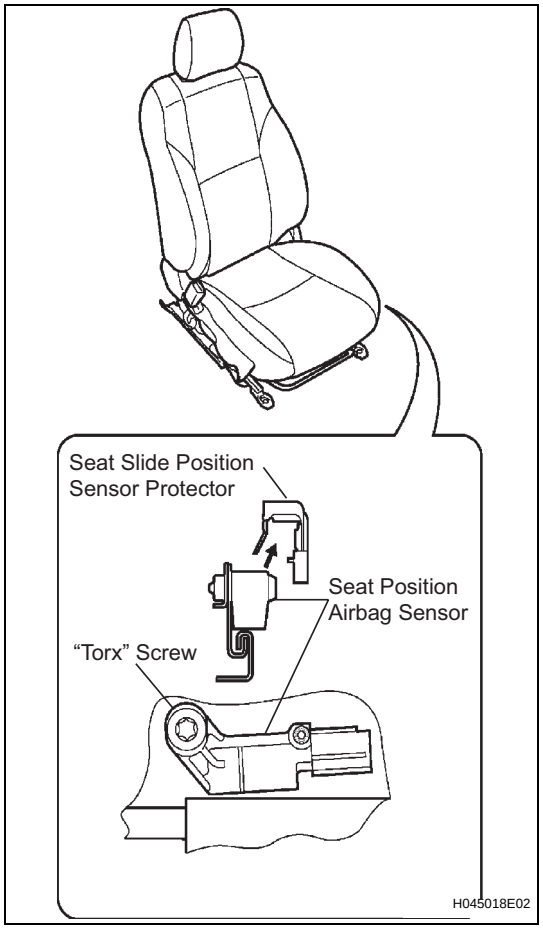
(b) Even if the airbag was not deployed, check if there is any damage to the seat position sensor.
If there are any defects as mentioned below, replace the seat position sensor with a new one:
- Cracks, dents or chips on the sensor housing.
- Cracks or other damage to the connector.

CAUTION:
For removal and installation procedures of the seat position sensor, be sure to follow the correct procedure.

REMOVAL

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE FRONT SEAT ASSEMBLY**
   (a) Remove the front seat (see page SE-5).
3. **REMOVE SEAT SLIDE POSITION SENSOR PROTECTOR**
4. **REMOVE SEAT POSITION AIRBAG SENSOR**
   (a) Remove the seat slide position sensor protector from the seat position sensor.
   (b) Using a "torx" socket (T30), remove the "torx" screw and seat position sensor with sensor protector.
   (c) Disconnect the connector.



INSTALLATION

CAUTION:
Be sure to read the precautionary notices concerning the SRS airbag system before servicing it (see page RS-1).

1. **INSTALL SEAT POSITION AIR BAG SENSOR**
   (a) Using a feeler gauge 1 mm (0.039 in.), install the seat position sensor.
   NOTICE:
   - **If the seat position sensor has been dropped, or there are any cracks, dents or other defects in the case or connector, replace the seat position sensor with a new one.**
   - **When installing the seat position sensor, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

   HINT:
   Be sure that the clearance between the seat position sensor and the seat rail is within 0.6 mm (0.023 in.) to 1.4 mm (0.055 in.).
   (b) Using a "torx" socket (T30), tighten the "torx" screw to install the seat position sensor.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
   (c) Make sure that a clearance between the seat position sensor and the seat rail is within 0.6 mm (0.023 in.) to 1.4 mm (0.055 in.).
   (d) Connect the connector.
   (e) Install the seat slide position sensor protector to the seat position sensor.

2. **INSTALL FRONT SEAT ASSEMBLY**
   (a) Install the front seat (see page SE-11).

3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

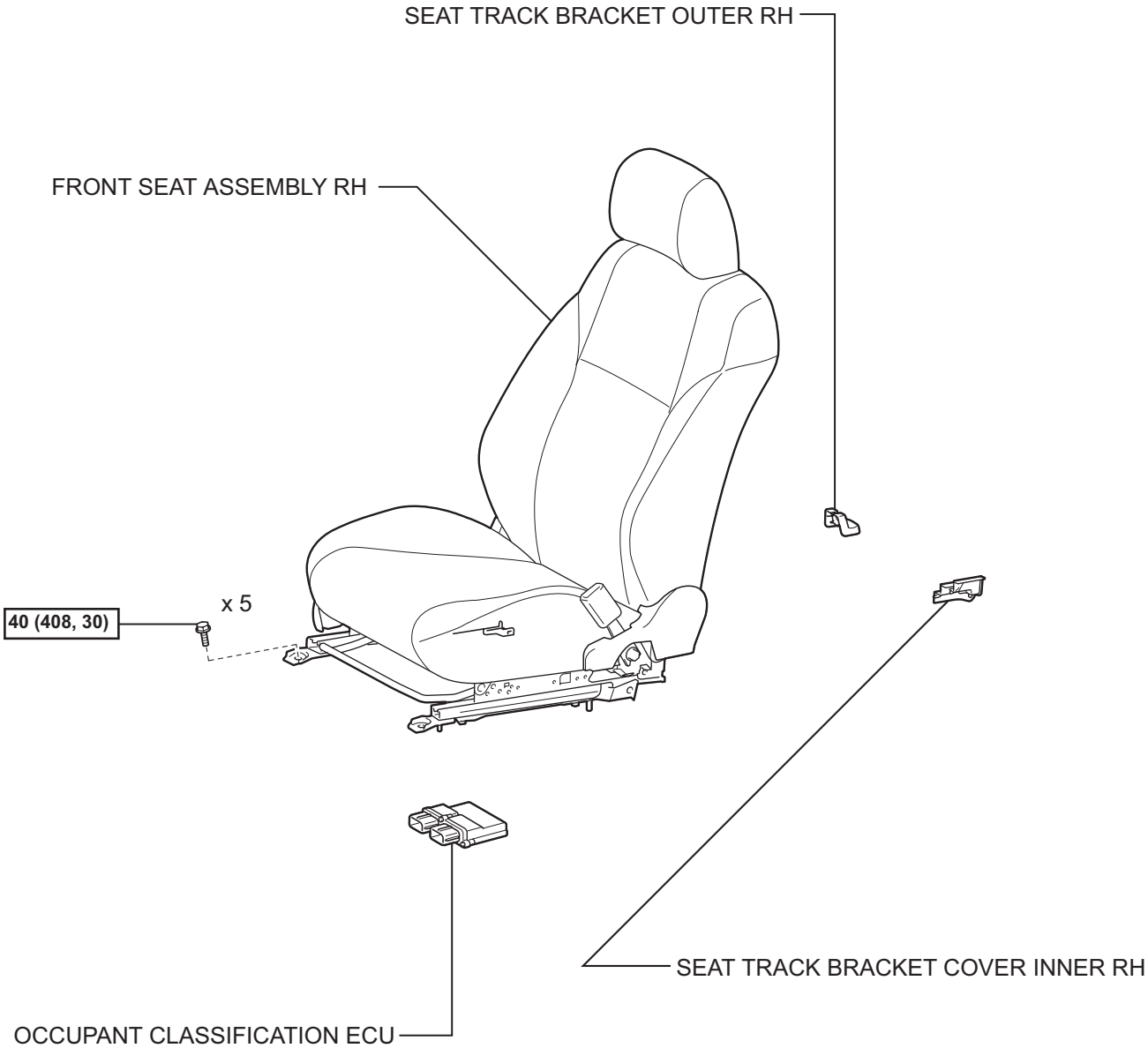
4. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

5. **CHECK SRS WARNING LIGHT**
   (a) Check the SRS warning light (see page RS-11).

OCCUPANT CLASSIFICATION ECU

COMPONENTS

RS



N*m (kgf*cm, ft.*lbf): Specified torque

P

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ON-VEHICLE INSPECTION

1. INSPECT OCCUPANT CLASSIFICATION ECU (VEHICLE NOT INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (See page RS-18).

2. INSPECT OCCUPANT CLASSIFICATION ECU (VEHICLE INVOLVED IN COLLISION)

(a) Perform a diagnostic system check (See page RS-18).

(b) Even if the airbag was not deployed, check if there is any damage to the occupant classification ECU. If there are any defects as mentioned below, replace the occupant classification ECU with a new one:

- Cracks, dents or chips on the case.
- Cracks or other damage to the connector.

CAUTION:
Be sure to follow the correct removal and installation procedures.

RS

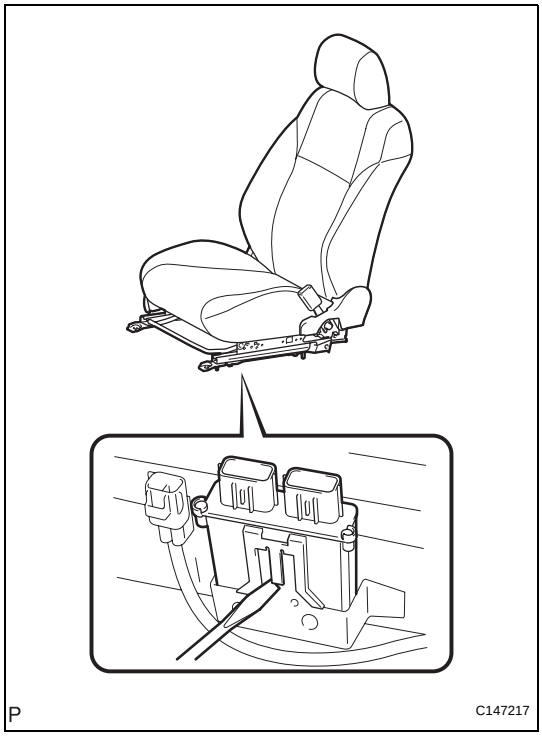
REMOVAL

1. **PRECAUTION**
   CAUTION:
   Be sure to read "PRECAUTION" thoroughly before servicing (See page RS-1).

2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   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.

3. **REMOVE FRONT SEAT ASSEMBLY RH**
   HINT:
   Refer to the procedures up to "REMOVE FRONT SEAT ASSEMBLY" (See page SE-5)

4. **REMOVE OCCUPANT CLASSIFICATION ECU**
   (a) Disconnect the connectors from the occupant classification ECU.
   (b) Using a screwdriver, remove the occupant classification ECU.



INSTALLATION

1. INSTALL OCCUPANT CLASSIFICATION ECU

(a) Check that the ignition switch is in the OFF position.

(b) Check that the negative battery (-) cable is disconnected.

CAUTION:
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.

(c) Install the occupant classification ECU.

(d) Connect the connectors to the occupant classification ECU.

NOTICE:
- **If the occupant classification ECU has been dropped, or there are any cracks, dents or other defects in the case or connector, replace the occupant classification ECU with a new one.**
- **When installing the occupant classification ECU, be careful that the SRS wiring does not interfere with other parts and that it is not pinched between other parts.**

2. INSTALL FRONT SEAT ASSEMBLY RH

HINT:
Refer to the procedures up to "INSTALL FRONT SEAT ASSEMBLY" (See page SE-11).

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

(a) Perform initialization (See page IN-23).
HINT:
Some systems need initialization after reconnecting the cable to the negative battery terminal.

5. PERFORM ZERO POINT CALIBRATION AND SENSITIVITY CHECK

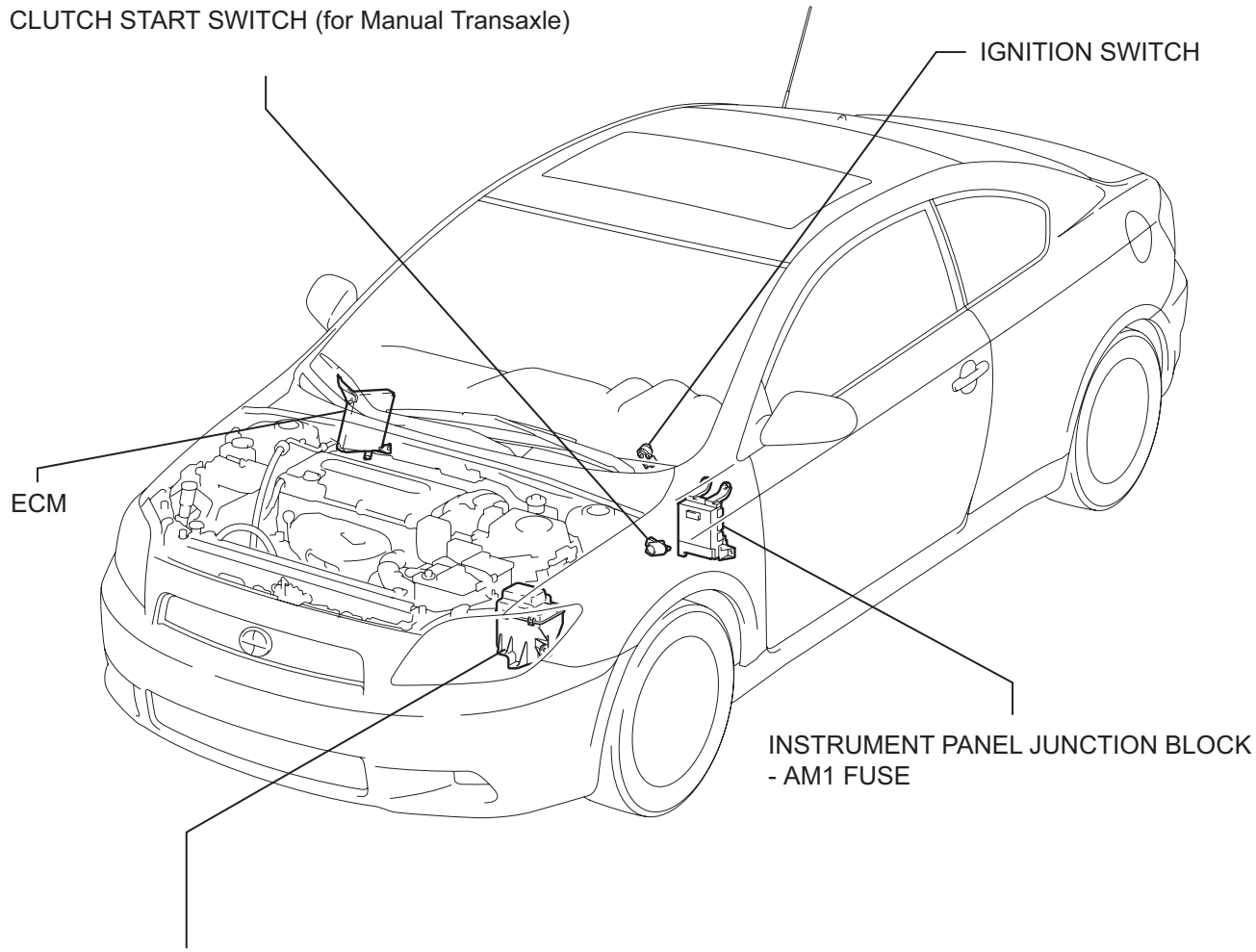
(a) Perform zero point calibration and sensitivity check (See page RS-250).

6. INSPECT SRS WARNING LIGHT

(a) Inspect the SRS warning light (See page RS-11).

STARTING SYSTEM

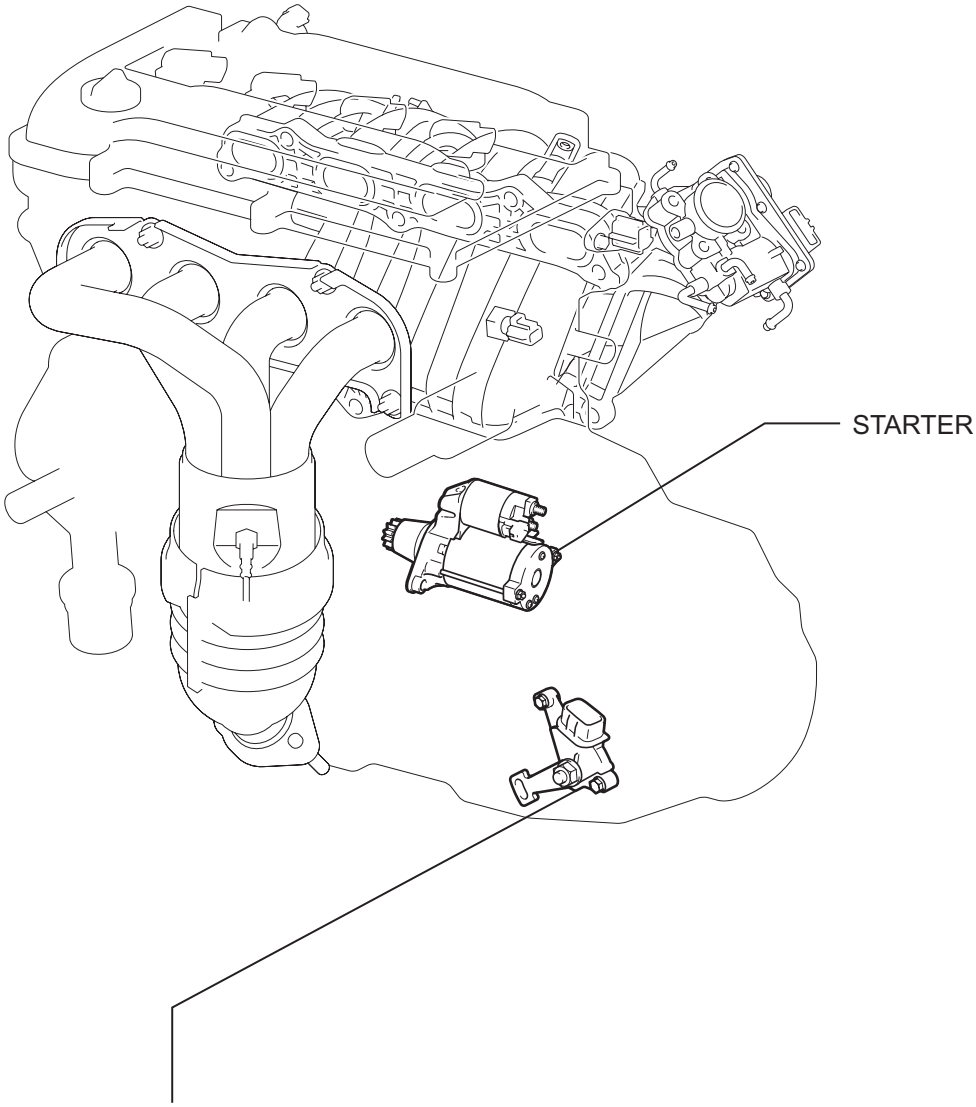
PARTS LOCATION



P

A114722E01

ST



P

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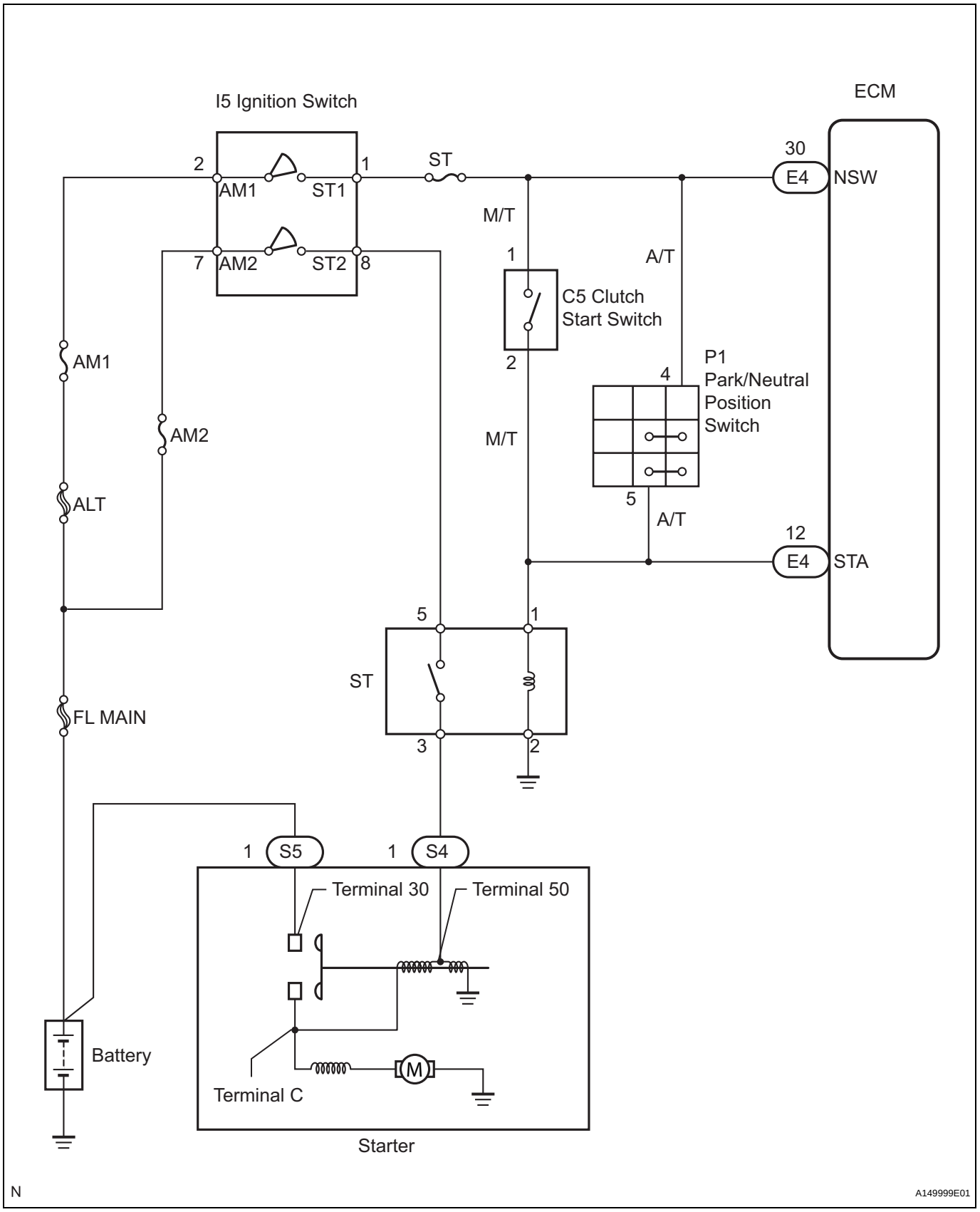
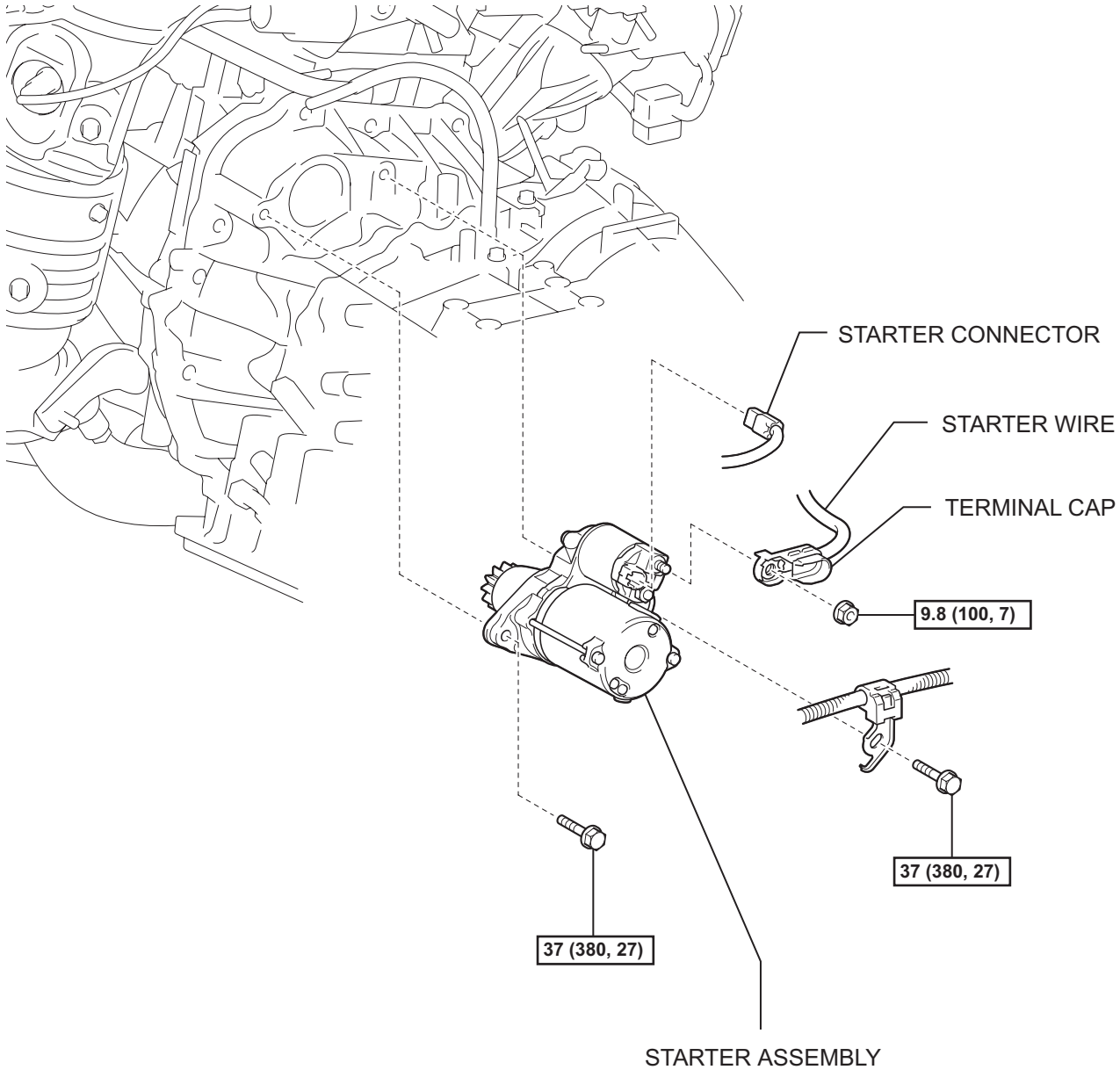
SYSTEM DIAGRAM



ST

STARTER

COMPONENTS

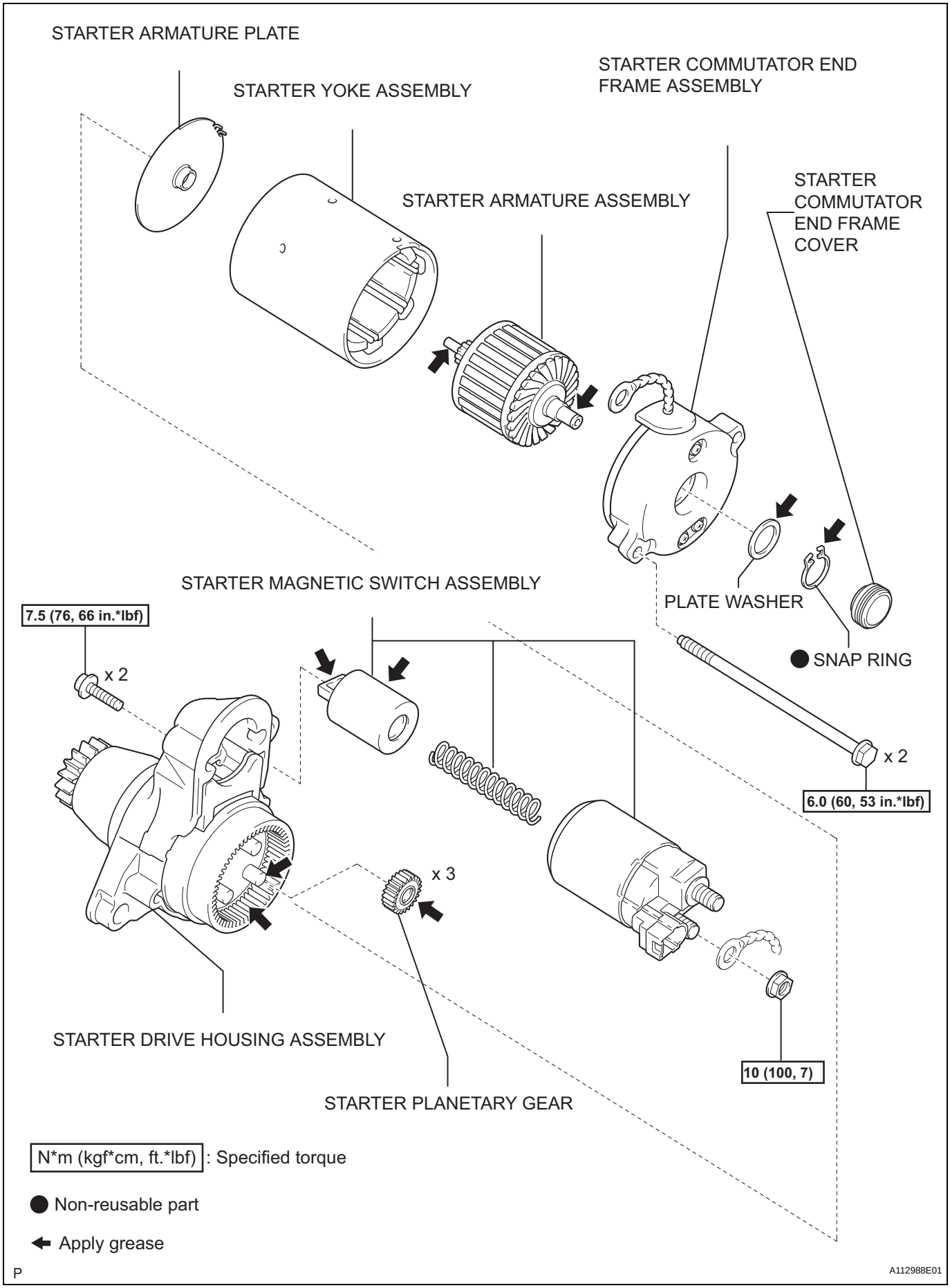


N*m (kgf*cm, ft.*lbf) : Specified torque

P

A112987E01

ST


STARTER ARMATURE PLATE
STARTER YOKE ASSEMBLY
STARTER COMMUTATOR END FRAME ASSEMBLY
STARTER ARMATURE ASSEMBLY
STARTER COMMUTATOR END FRAME COVER
STARTER MAGNETIC SWITCH ASSEMBLY
PLATE WASHER
SNAP RING
7.5 (76, 66 in.*lbf)
x 2
x 2
6.0 (60, 53 in.*lbf)
x 3
10 (100, 7)
STARTER DRIVE HOUSING ASSEMBLY
STARTER PLANETARY GEAR
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
Apply grease
P
A112988E01

ST

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

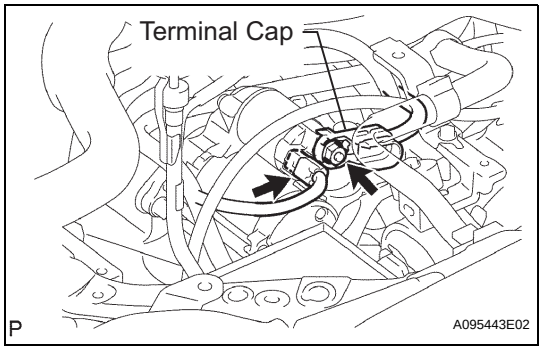
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE STARTER ASSEMBLY

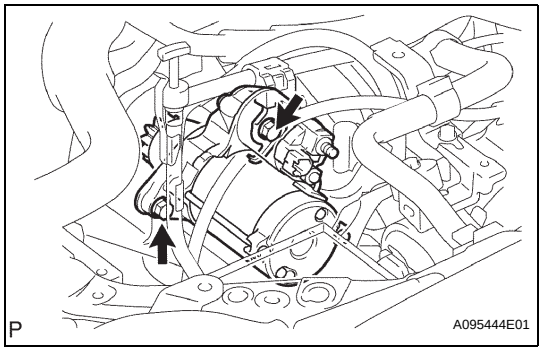
(a) Disconnect the starter connector.

(b) Open the terminal cap.

(c) Remove the nut and disconnect the starter wire.



(d) Remove the 2 bolts and starter.

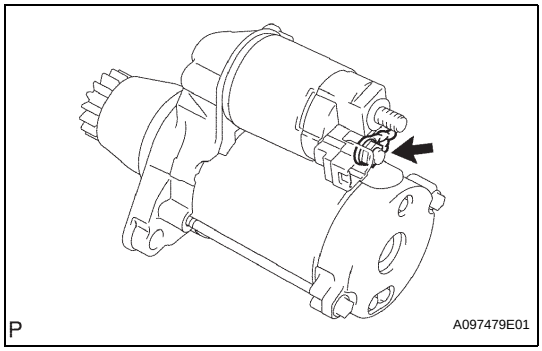


ST

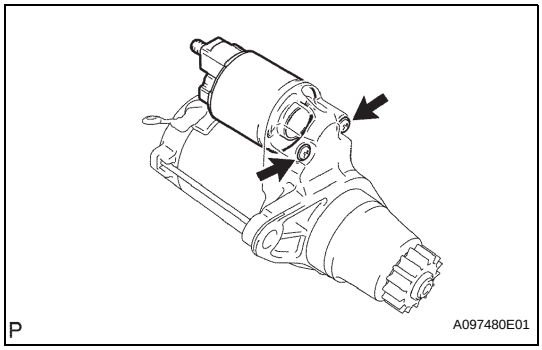
DISASSEMBLY

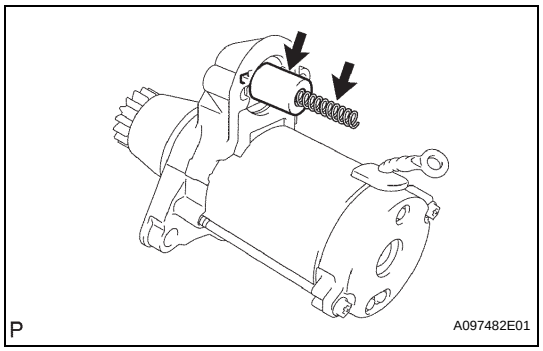
1. REMOVE STARTER MAGNETIC SWITCH ASSEMBLY

(a) Remove the nut and disconnect the lead wire.

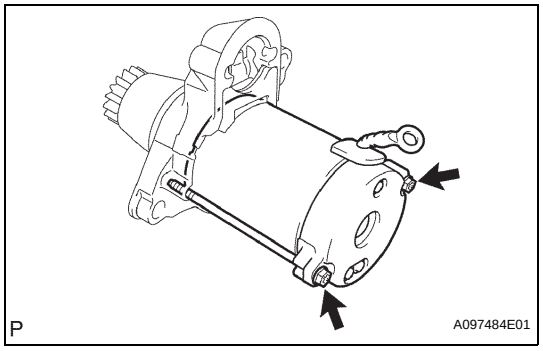


(b) Remove the 2 screws and starter magnetic switch.



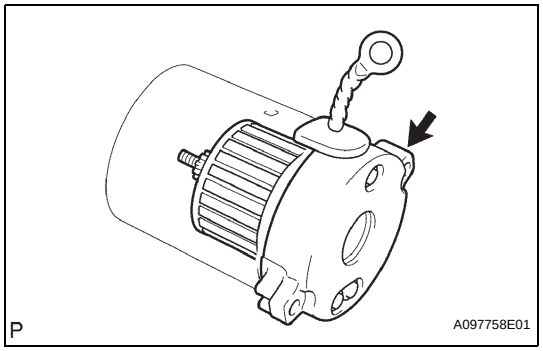


(c) Remove the return spring and plunger from the starter drive housing.

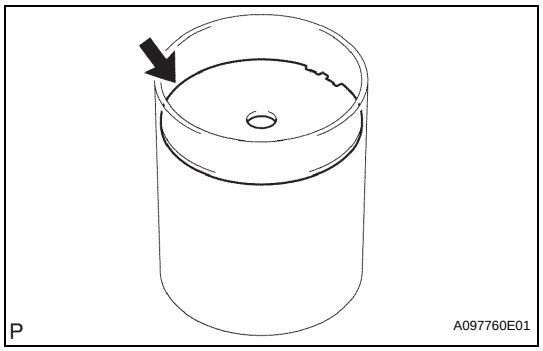


2. REMOVE STARTER COMMUTATOR END FRAME ASSEMBLY

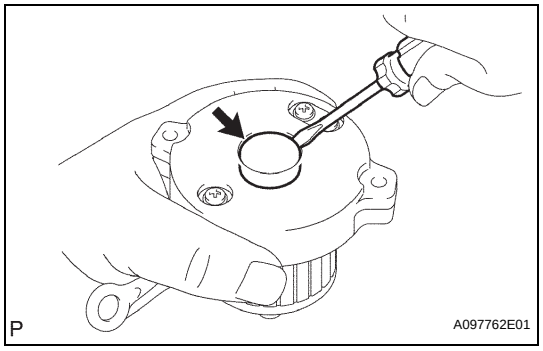
(a) Remove the 2 bolts and the starter commutator end frame together with the starter yoke.



(b) Remove the starter commutator end frame from the starter yoke.



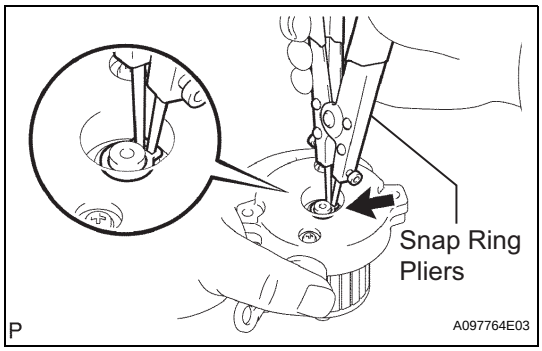
(c) Remove the starter armature plate from the starter yoke.



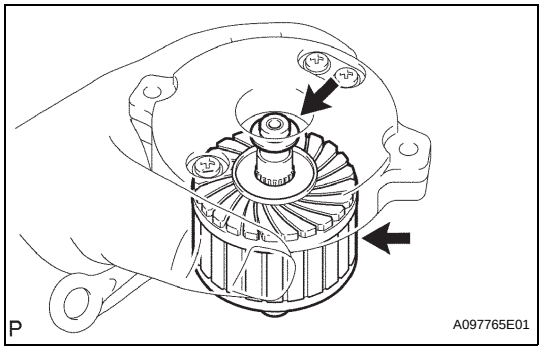
3. REMOVE STARTER ARMATURE ASSEMBLY

(a) Using a thin-bladed screwdriver, remove the starter commutator end frame cover.

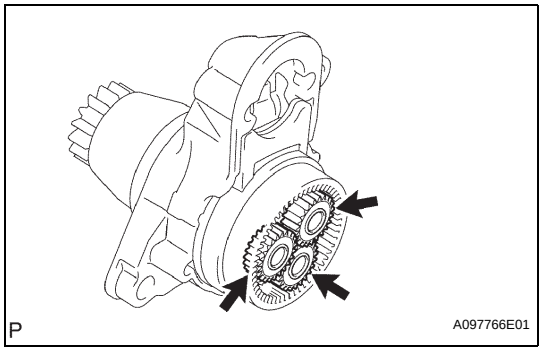
ST



(b) Using snap ring pliers, remove the snap ring.



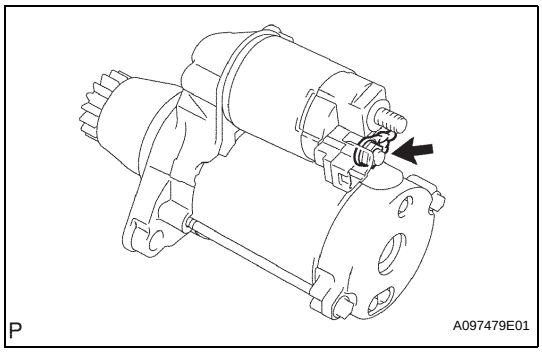
(c) Remove the plate washer and starter armature from the starter commutator end frame.



4. REMOVE STARTER PLANETARY GEAR

(a) Remove the 3 planetary gears from the starter drive housing.

INSPECTION



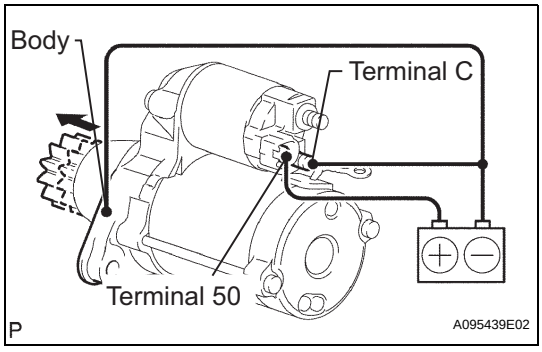
1. INSPECT STARTER ASSEMBLY

NOTICE:

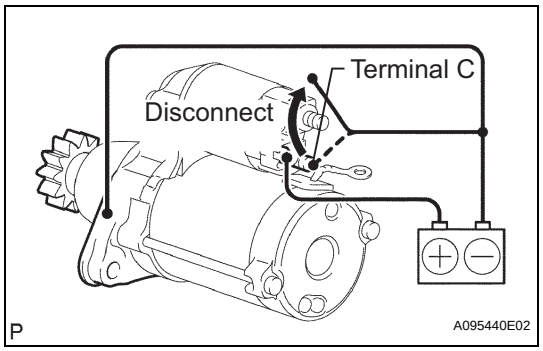
These tests must be performed within 3 to 5 seconds to prevent burnout of the coil.

(a) Perform the pull-in test.

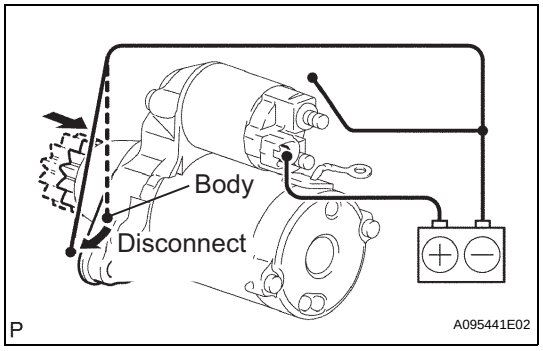
(1) Remove the nut and disconnect the lead wire from terminal C.



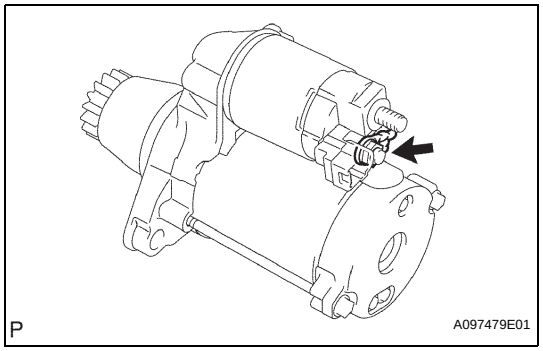
(2) Connect the battery to the starter magnetic switch as shown in the illustration. Check that the clutch pinion gear is extended.
If the clutch pinion gear does not move, replace the starter assembly.



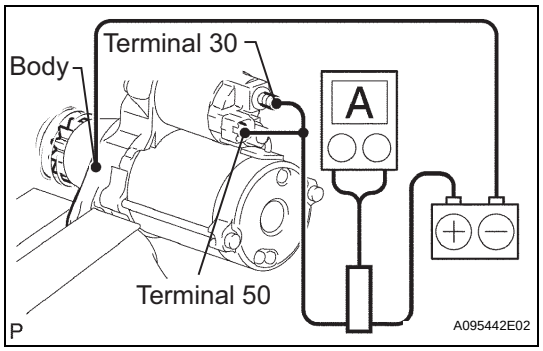
(b) Perform the hold-in test.
(1) Disconnect the negative (-) lead from terminal C. Check that the clutch pinion gear remains extended.
If the clutch pinion gear returns inward, replace the starter assembly.



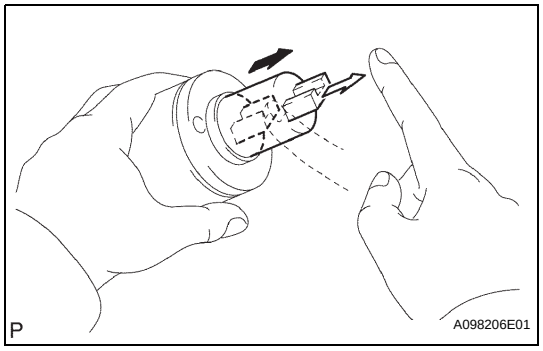
(c) Check the operation.
(1) Disconnect the negative (-) lead from the starter body. Check that the clutch pinion gear returns.
If the clutch pinion gear does not return inward, replace the starter assembly.



(d) Perform the no-load performance test.
(1) Connect the lead wire to terminal C. Make sure that the lead is not grounded.
Torque: 10 N*m (100 kgf*cm, 7 ft.*lbf)



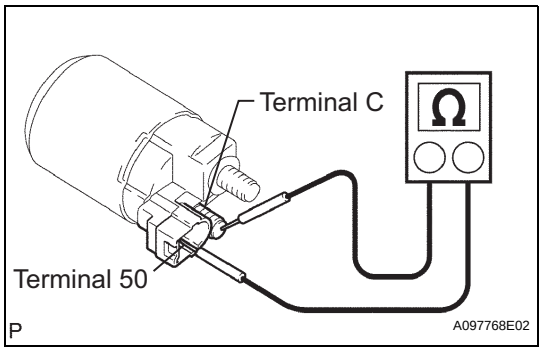
(2) Clamp the starter in a vise.
(3) Connect the battery and an ammeter to the starter as shown in the illustration.
(4) Check that the starter rotates smoothly and steadily with the clutch pinion gear extended. Check that the ammeter reads the specified current.
Standard current:
90 A or less at 11.5 V
If the result is not as specified, replace the starter.



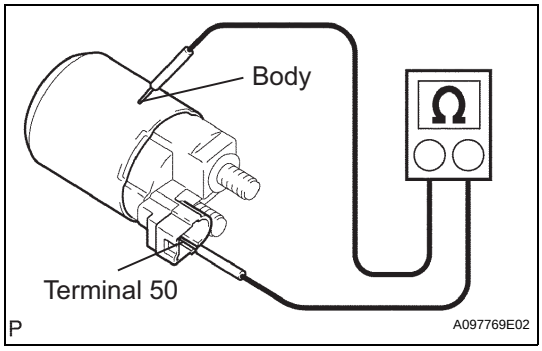
2. INSPECT STARTER MAGNETIC SWITCH ASSEMBLY

(a) Check the plunger.
(1) Push in the plunger, and then check that it returns quickly to its original position.
OK:
The plunger moves smoothly.
If the result is not as specified, replace the starter assembly.

ST

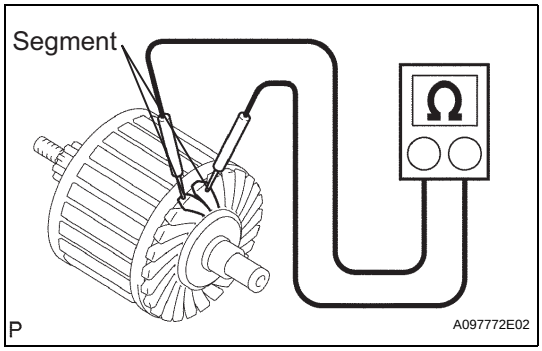


(b) Check the resistance.
(1) Measure the resistance between terminals 50 and C.
Standard resistance:
Below 1 Ω
If the result is not as specified, replace the starter assembly.

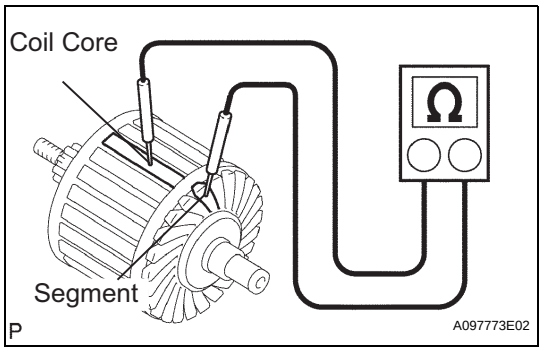


(2) Measure the resistance between terminals 50 and the body.
Standard resistance:
Below 2 Ω
If the result is not as specified, replace the starter assembly.

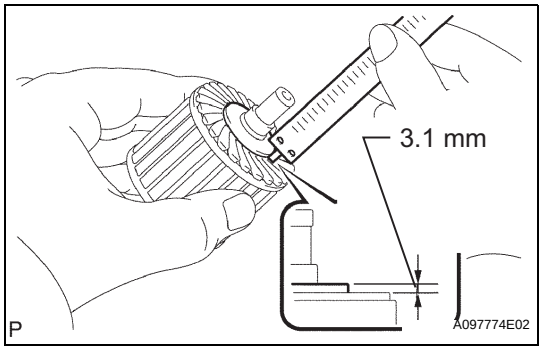
3. INSPECT STARTER ARMATURE ASSEMBLY



(a) Check the resistance.
(1) Measure the resistance between the segments.
Standard resistance:
Below 1 Ω
If the results is not as specified, replace the starter armature.

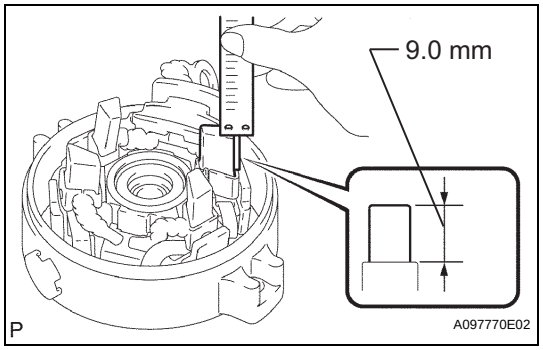


(2) Measure the resistance between the segments and coil core.
Standard resistance:
10 kΩ or higher
If the result is not as specified, replace the starter armature.



(b) Check the commutator.
(1) Using a vernier caliper, measure the depth indicated in the illustration.
Standard depth:
3.1 mm (0.122 in.)
Maximum depth:
3.8 mm (0.150 in.)
If the depth is greater than the maximum, replace the starter armature.

ST



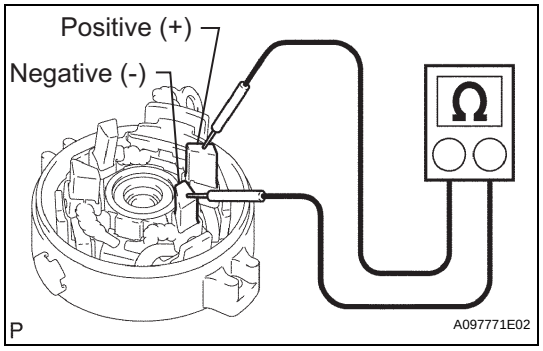
4. INSPECT STARTER COMMUTATOR END FRAME ASSEMBLY

(a) Check the brush length.

(1) Using vernier calipers, measure the brush length.

Standard length:
9.0 mm (0.354 in.)
Minimum length:
4.0 mm (0.158 in.)

If the length is less than the minimum, replace the starter assembly.

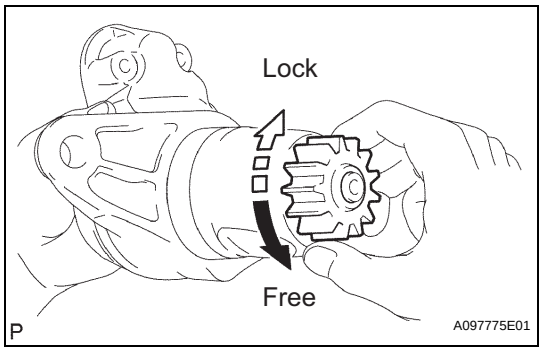


(b) Check the resistance.

(1) Measure the resistance between resistance the positive (+) and negative (-).

Standard resistance:
10 kΩ or higher

If the results is not as specified, replace the starter assembly.



5. INSPECT STARTER DRIVE HOUSING ASSEMBLY

(a) Check the starter clutch.

(1) Rotate the clutch pinion gear counterclockwise, and then check that it turns freely. Try to rotate the clutch pinion gear clockwise, and then check that it locks.

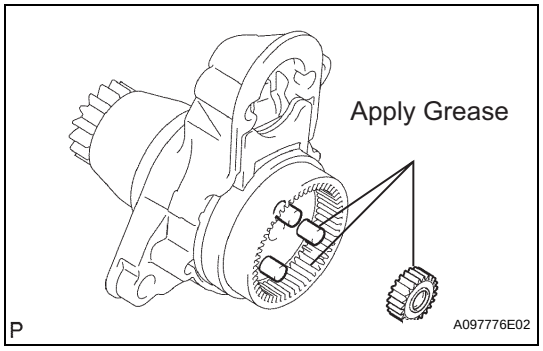
If necessary, replace the starter assembly.

ST

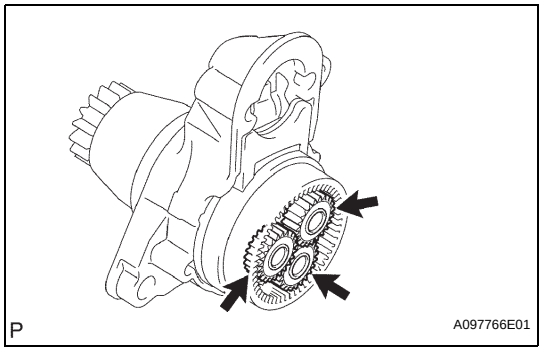
REASSEMBLY

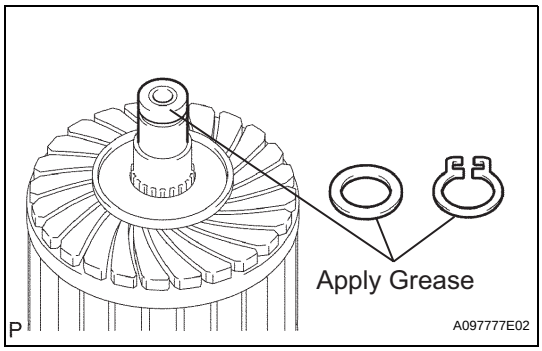
1. INSTALL STARTER PLANETARY GEAR

(a) Apply grease to the planetary gears and pins parts of the planet shaft.



(b) Install the 3 planetary hears into the pin of the planet shaft.

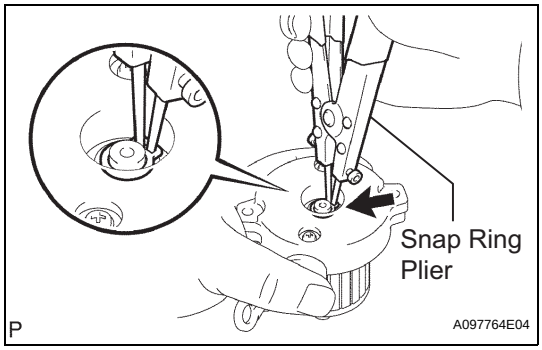




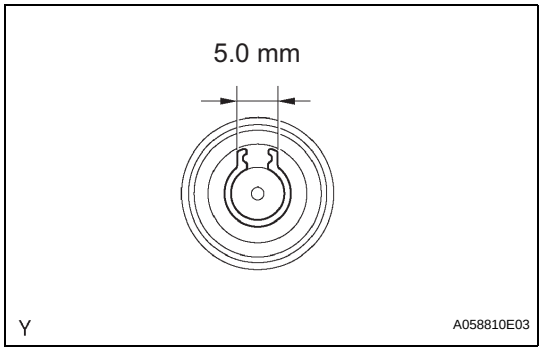
2. INSTALL STARTER ARMATURE ASSEMBLY

(a) Apply grease to the plate washer, armature shaft and new snap ring.

(b) Install the starter armature and plate washer into the starter commutator end frame.



(c) Using snap ring pliers, install the snap ring.



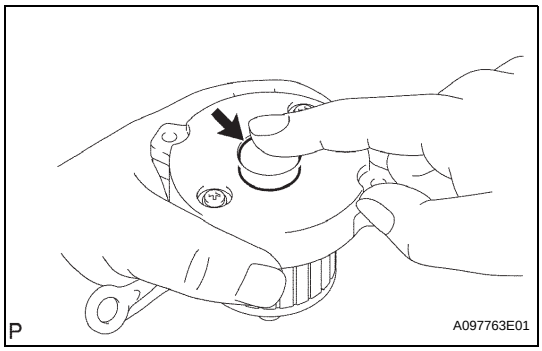
(d) Check the snap ring length.

(1) Using a vernier caliper, measure the snap ring length.

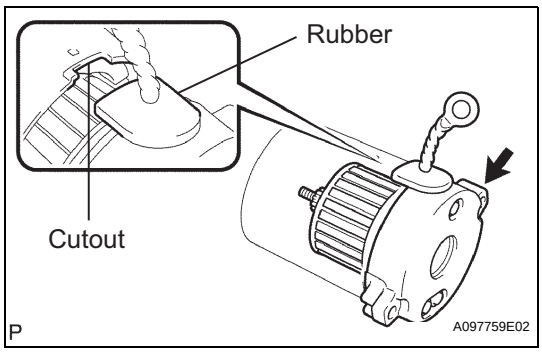
Maximum length:

5.0 mm (0.197 in.)

If the snap ring length is greater than the maximum, replace the snap ring.



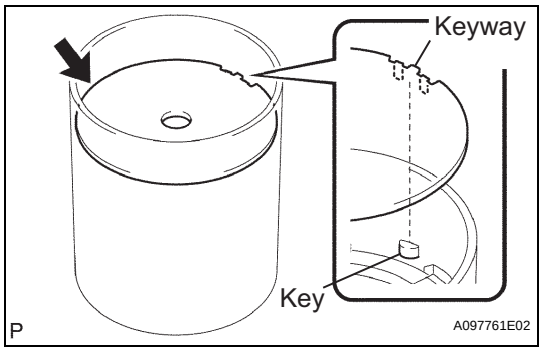
(e) Install the commutator end frame cover into the starter commutator end frame.



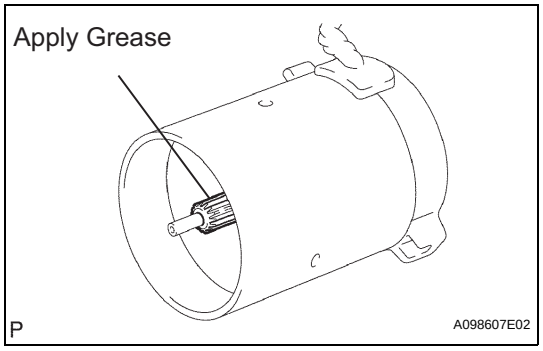
3. INSTALL STARTER COMMUTATOR END FRAME ASSEMBLY

(a) Align the rubber of the starter commutator end frame with the convex cutout of the starter yoke, and then install the starter commutator end frame into the starter yoke.

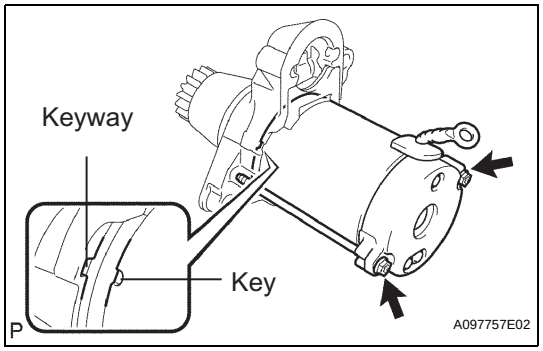
ST



(b) Align the keyway of the starter armature plate with the key inside the starter yoke, and then install the starter armature plate into the starter yoke.



(c) Apply grease to the starter armature gear.



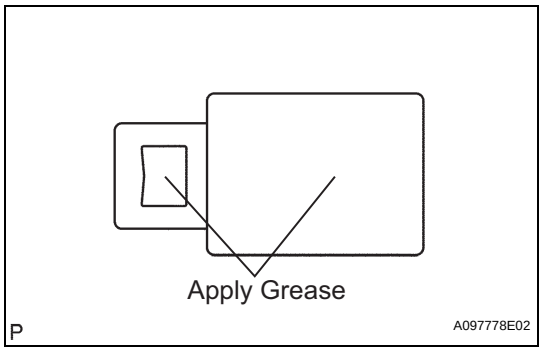
(d) Align the key of the starter yoke with the keyway of the starter drive housing, and then install the starter commutator end frame together with the starter yoke into the starter drive housing.

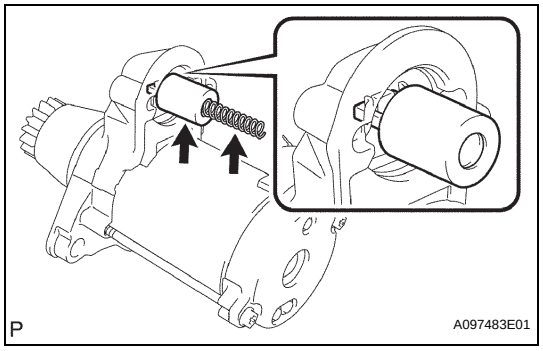
(e) Install the 2 bolts.
Torque: 6.0 N*m (60 kgf*cm, 53 in.*lbf)

ST

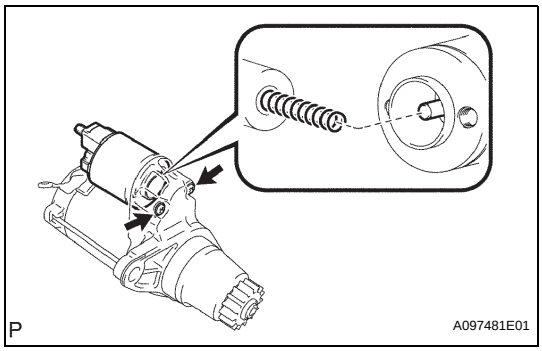
4. INSTALL STARTER MAGNETIC SWITCH ASSEMBLY

(a) Apply grease to the plunger and hook.

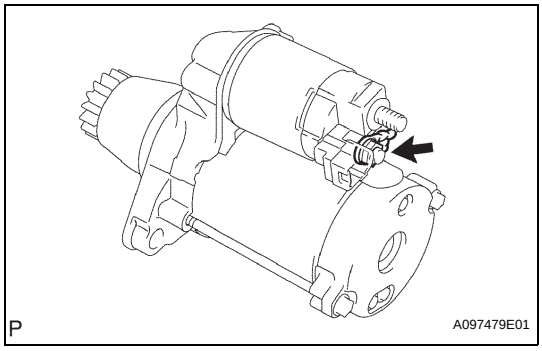




(b) Install the plunger and return spring into the starter drive housing.



(c) Install the starter magnetic switch into the starter drive housing.
(d) Install the 2 screws.
Torque: 7.5 N*m (76 kgf*cm, 66 in.*lbf)

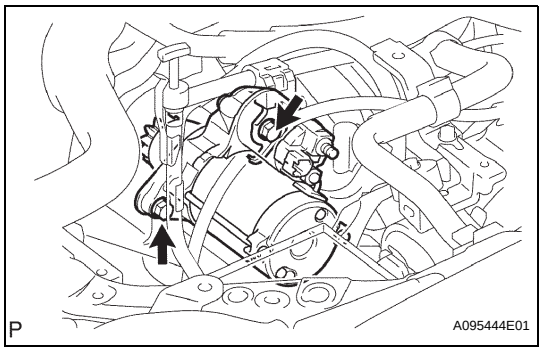


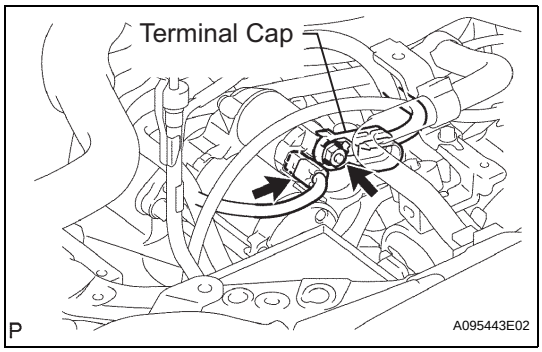
(e) Connect the lead wire with the nut.
Torque: 10 N*m (100 kgf*cm, 7 ft.*lbf)

INSTALLATION

1. INSTALL STARTER ASSEMBLY

(a) Install the starter with the 2 bolts.
Torque: 37 N*m (380 kgf*cm, 27 ft.*lbf)





(b) Connect the starter wire with the nut.
Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)
(c) Cover the terminal cap.
(d) Connect the starter connector.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ST

STARTER RELAY

ON-VEHICLE INSPECTION

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

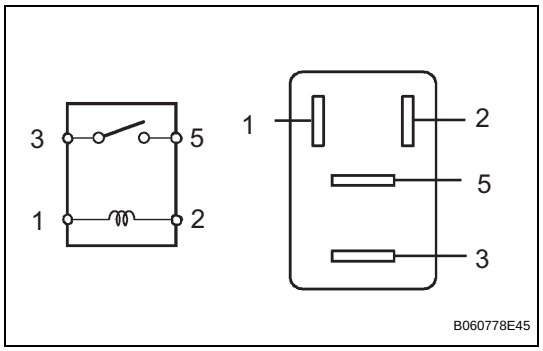
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE STARTER RELAY (Marking: ST)

(a) Remove the engine room No. 2 relay box cover.

(b) Remove the starter relay.



3. INSPECT STARTER RELAY

(a) Measure the resistance of the relay.

Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

If the resistance is not as specified, replace the relay.

4. INSTALL STARTER RELAY (Marking: ST)

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

6. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

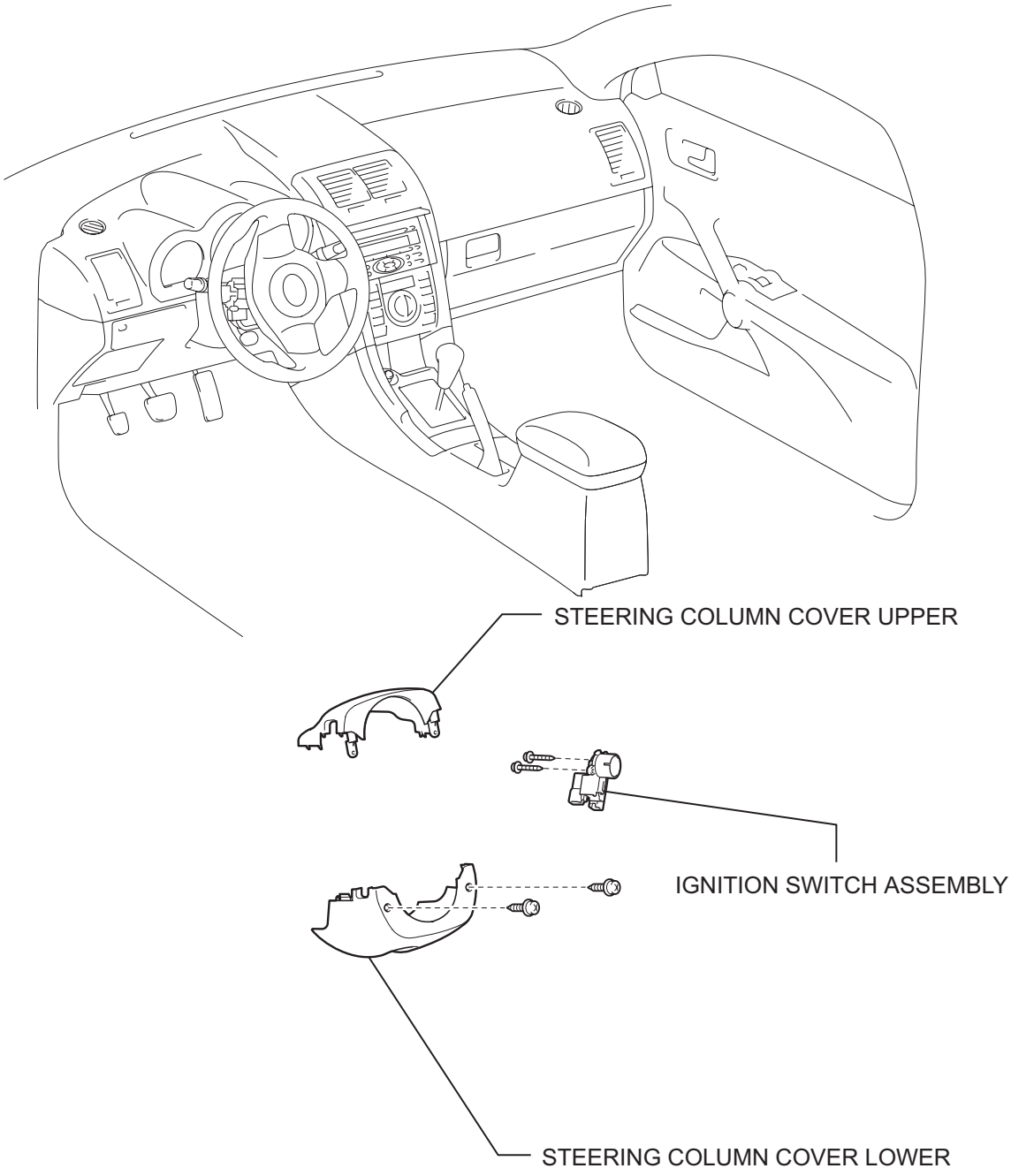
NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ST

IGNITION SWITCH

COMPONENTS

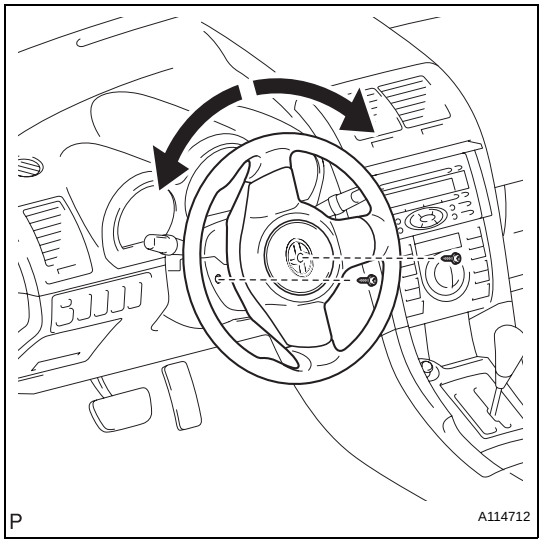


REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

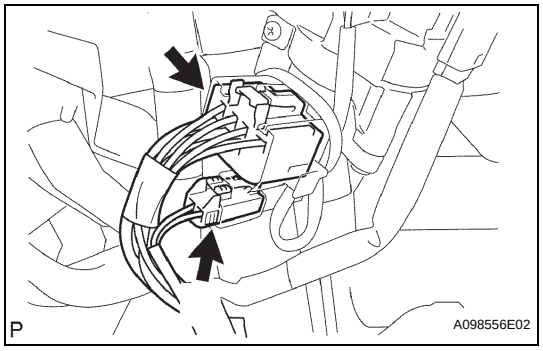


2. REMOVE STEERING COLUMN COVER

(a) Remove the 2 screws and cover lower.

HINT:

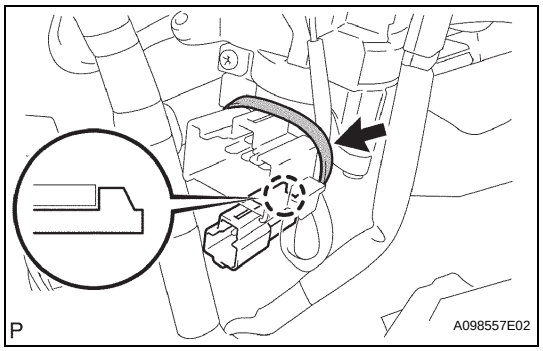
Turn the steering wheel to the right and left as necessary to remove the 2 screws and cover lower.



3. REMOVE IGNITION SWITCH ASSEMBLY

(a) Disconnect the ignition switch connector.

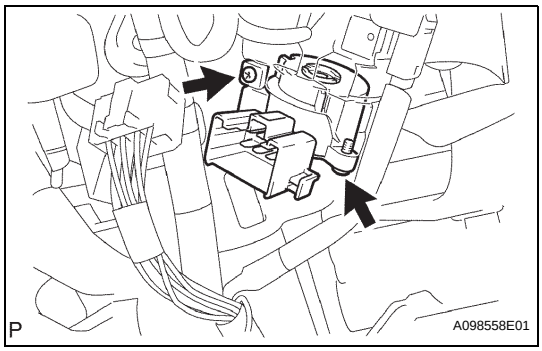
(b) Disconnect the unlock warning switch connector.



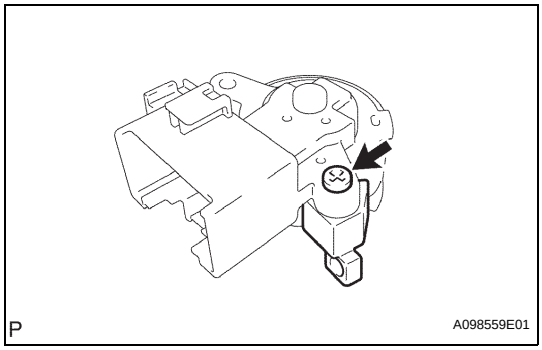
(c) Remove the cable tie.

(d) Using a small screwdriver, disconnect the claw fitting, and then remove the connector of the unlock warning switch.

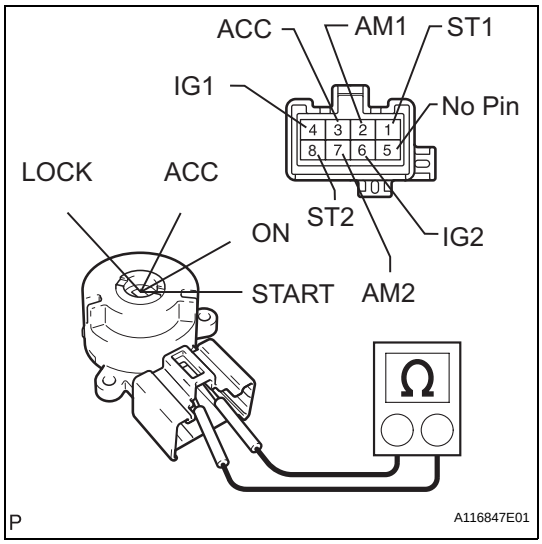
ST



(e) Remove the 2 screws and ignition switch.



(f) Remove the screw and lock stopper.



INSPECTION

1. INSPECT IGNITION SWITCH ASSEMBLY

(a) Check the resistance.

(1) Measure the resistance between the terminals.

Standard resistance

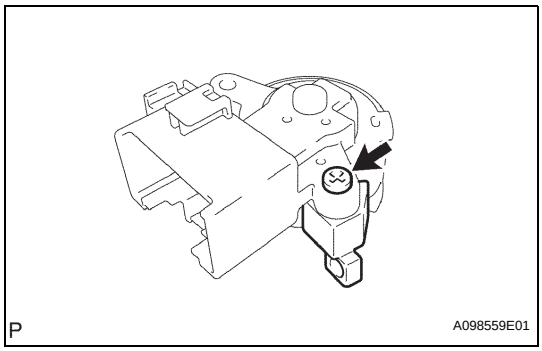
Switch Condition	Tester Connection	Specified Condition
LOCK	-	10 kΩ or higher
ACC	2 (AM1) - 3 (ACC)	Below 1 Ω
ON	2 (AM1) - 3 (ACC) 3 (ACC) - 4 (IG1) 7 (AM2) - 6 (IG2)	Below 1 Ω
START	2 (AM1) - 4 (IG1) 4 (IG1) - 1 (ST1) 7 (AM2) - 6 (IG2) - 8 (ST2)	Below 1 Ω

If the result is not as specified, replace the ignition switch assembly.

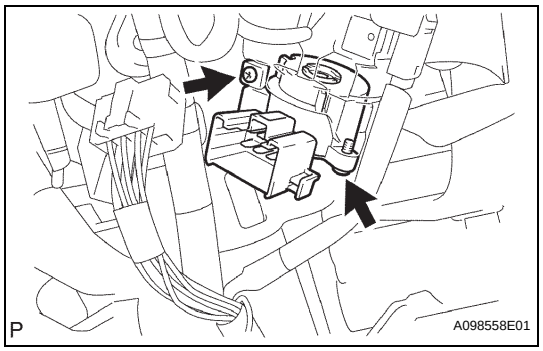
INSTALLATION

1. INSTALL IGNITION SWITCH ASSEMBLY

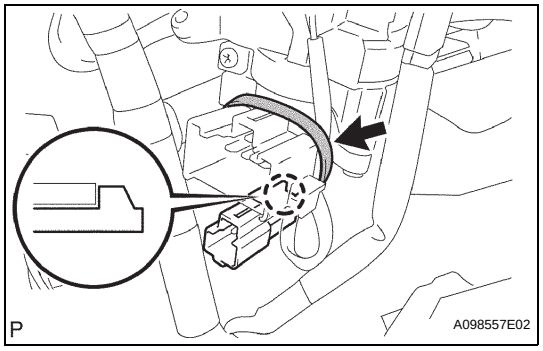
(a) Install the lock stopper with the screw.



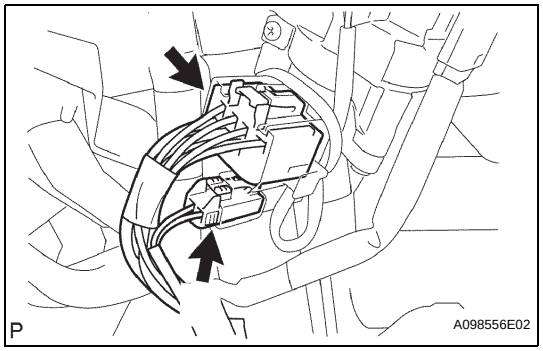
ST



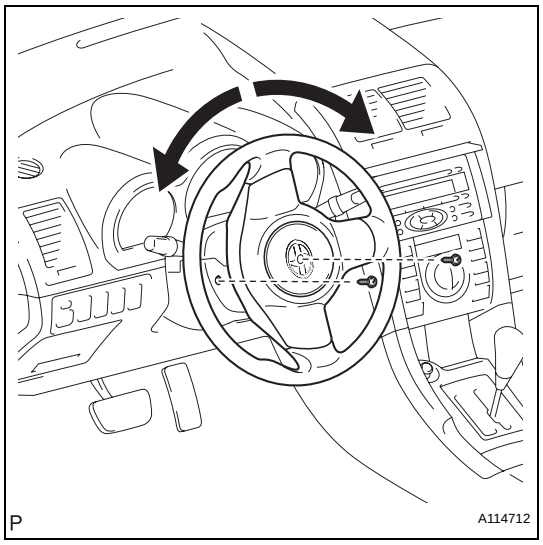
(b) Install the ignition switch with the 2 screws.



(c) Align the claw position, and then install the connector of the unlock warning switch.
(d) Install the cable tie.



(e) Connect the unlock warning switch connector.
(f) Connect the ignition switch connector.



2. INSTALL STEERING COLUMN COVER

(a) Install the cover lower with the 2 screws.
HINT:
Turn the steering wheel to the right and left as necessary to install the 2 screws and cover lower.

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ST

STEERING SYSTEM

PRECAUTION

1. HANDLING PRECAUTIONS FOR STEERING SYSTEM

(a) Care must be taken when replacing parts. Incorrect replacement could affect the performance of the steering system and result in a driving hazard.

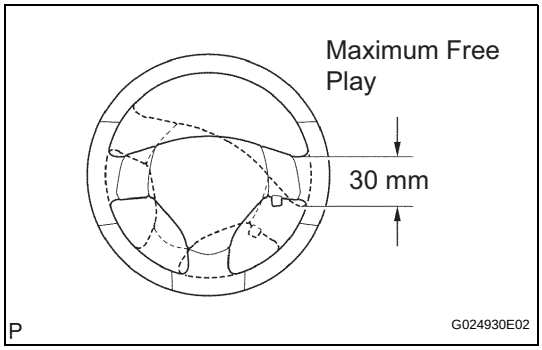
2. HANDLING PRECAUTIONS FOR SRS

(a) The vehicle is equipped with a Supplemental Restraint System (SRS) which includes a driver side airbag. Failure to carry out service procedures in the correct sequence may unexpectedly deploy the SRS and cause serious injuries. Furthermore, if a mistake is made in servicing the SRS, it may fail to operate when required. Before servicing (including installation, removal, inspection or replacement of parts), read the SRS section's "Precaution" (see page RS-11).

PROBLEM SYMPTOMS TABLE

STEERING SYSTEM

Symptom	Suspected Area	See page
Hard steering	1. Tires (Improperly inflated)	TW-3
	2. Power steering fluid level (Low)	PS-3
	3. Drive belt (Loose)	-
	4. Front wheel alignment (Incorrect)	SP-2
	5. Steering system joints (Worn)	-
	6. Suspension arm ball joints (Worn)	SP-26
	7. Steering column (Binding)	-
	8. Power steering vane pump	PS-11
	9. Power steering link assembly	PS-21
Poor return	1. Tires (Improperly inflated)	TW-3
	2. Front wheel alignment (Incorrect)	SP-2
	3. Steering column (Binding)	-
	4. Power Steering link assembly	PS-21
Excessive free play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	SP-26
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	AH-6
	5. Power steering link assembly	PS-21
Abnormal noise	1. Power steering fluid level (Low)	PS-3
	2. Steering system joints (Worn)	-
	3. Power steering vane pump	PS-11
	4. Power steering link assembly	PS-21



ON-VEHICLE INSPECTION

1. CHECK STEERING WHEEL FREE PLAY

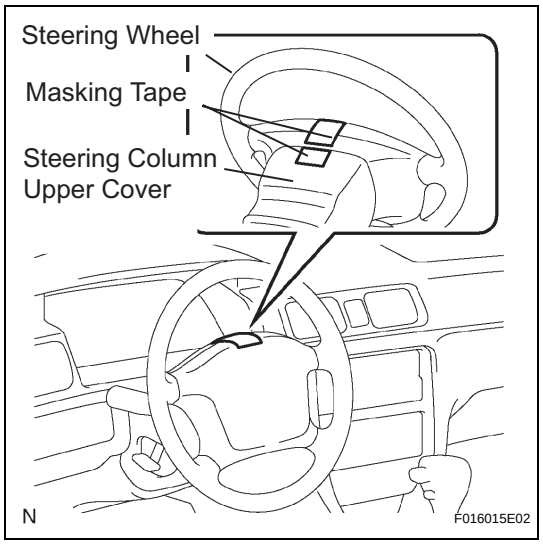
(a) Stop the vehicle. Position the steering wheel in the center position with the tires pointing straight ahead.

(b) Turn the steering wheel gently right and left, and check the steering wheel free play.

Maximum free play:

30 mm (1.18 in.)

If the free play exceeds the maximum, replace the steering intermediate shaft sub-assembly or steering link assembly.

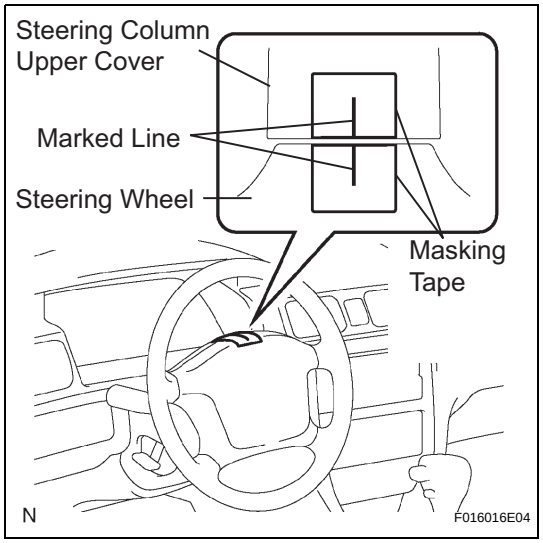


REPAIR

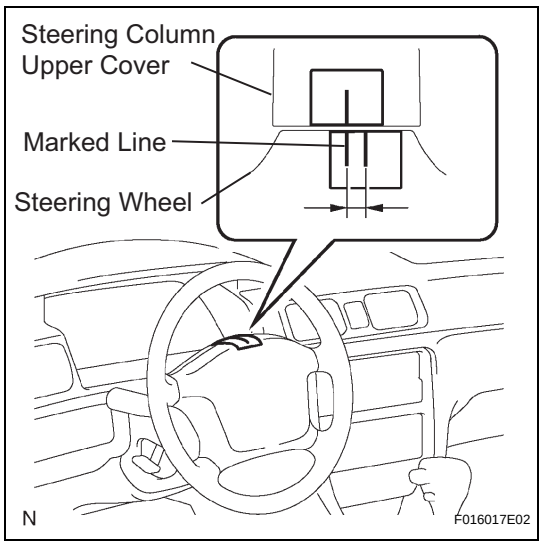
1. INSPECT STEERING POSITION

(a) Apply masking tape on the top center of the steering wheel and steering column upper cover.

(b) Drive the vehicle in a straight line for 100 m (3.28 ft.) at a constant speed of 56 km/h (35 mph), and hold the steering wheel to maintain the course.



(c) Draw a line on the masking tape as shown in the illustration.



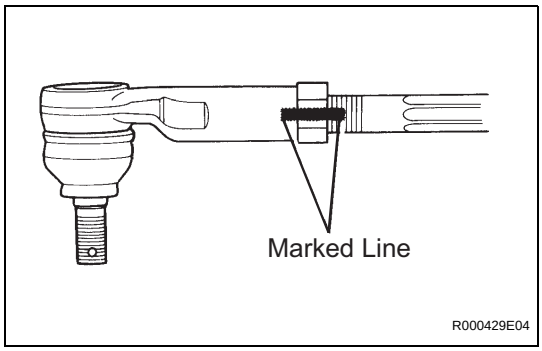
(d) Rotate the steering wheel to the center position.
HINT:
Locate the center position by looking at: 1) the upper surface of the steering wheel, 2) the cover upper, and 3) the horizontal line of the "SRS Airbag" symbol imprinted on the steering pad.

(e) Draw a new line on the masking tape of the steering wheel as shown in the illustration.

(f) Measure the distance between the 2 lines on the masking tape of the steering wheel.

(g) Calculate the measured distance in terms of steering angle.
Reference:
1 mm (0.004 in.) = 1°
HINT:
Make a note of the steering angle.

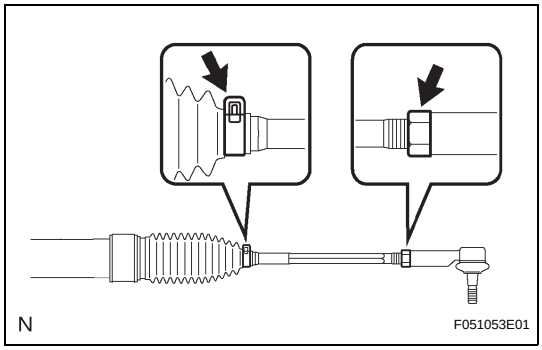
SR



2. ADJUST STEERING ANGLE

(a) Draw a line on the RH and LH tie rod and rack ends respectively, where it can be easily seen.

(b) Using a paper gauge, measure the distance from the RH and LH tie rod ends to the rack end screws.
HINT:
- Measure both the RH and LH sides.
- Make a note of the measured values.



(c) Remove the RH and LH boot clips from the rack boots.

(d) Loosen the RH and LH look nuts.

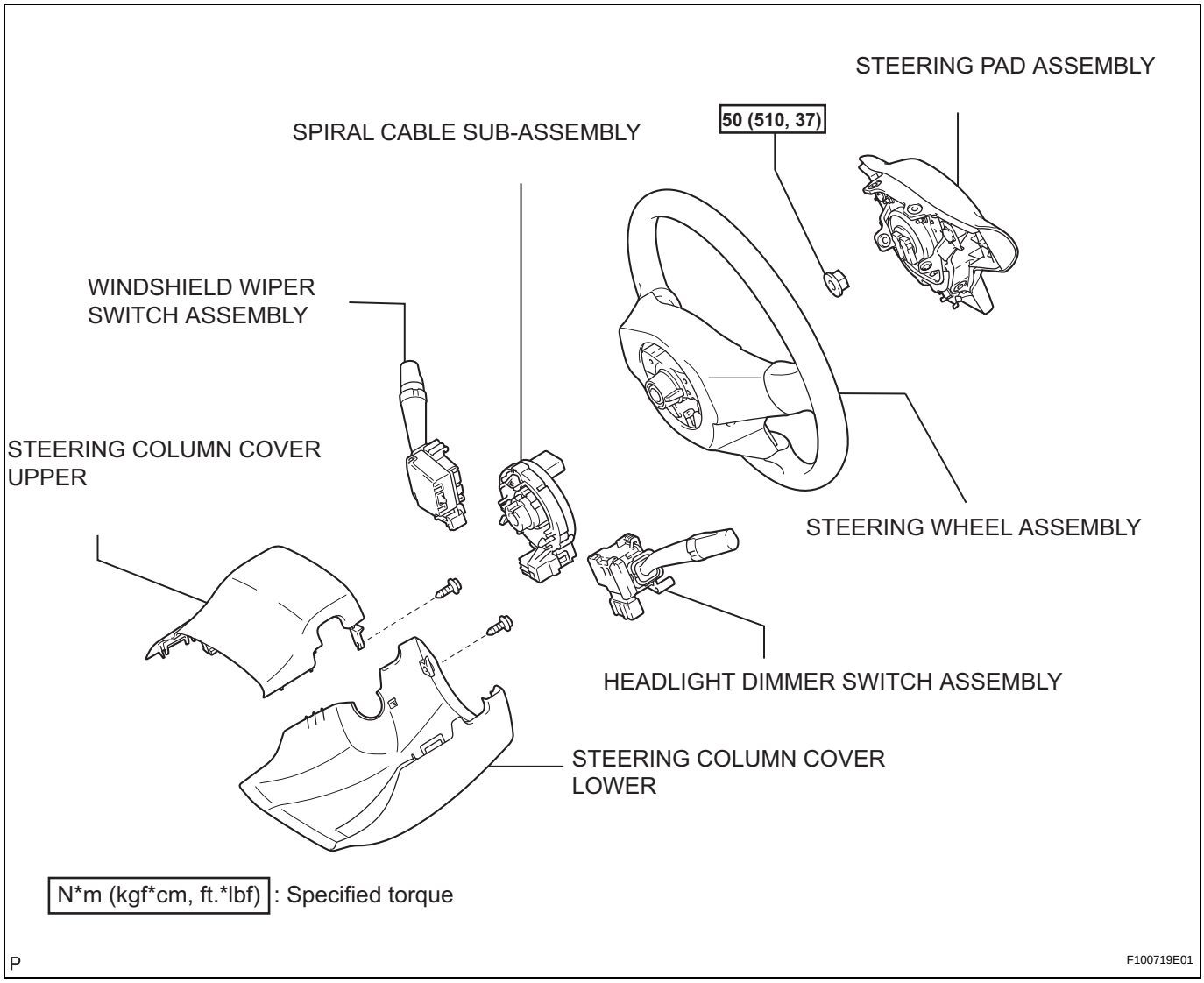
(e) Turn the RH and LH rack ends equally in different directions according to the steering angle.
Reference:
One 360° turn of rack end (1.5 mm (0.059 in.) horizontal movement) is equal to 13° of steering angle.

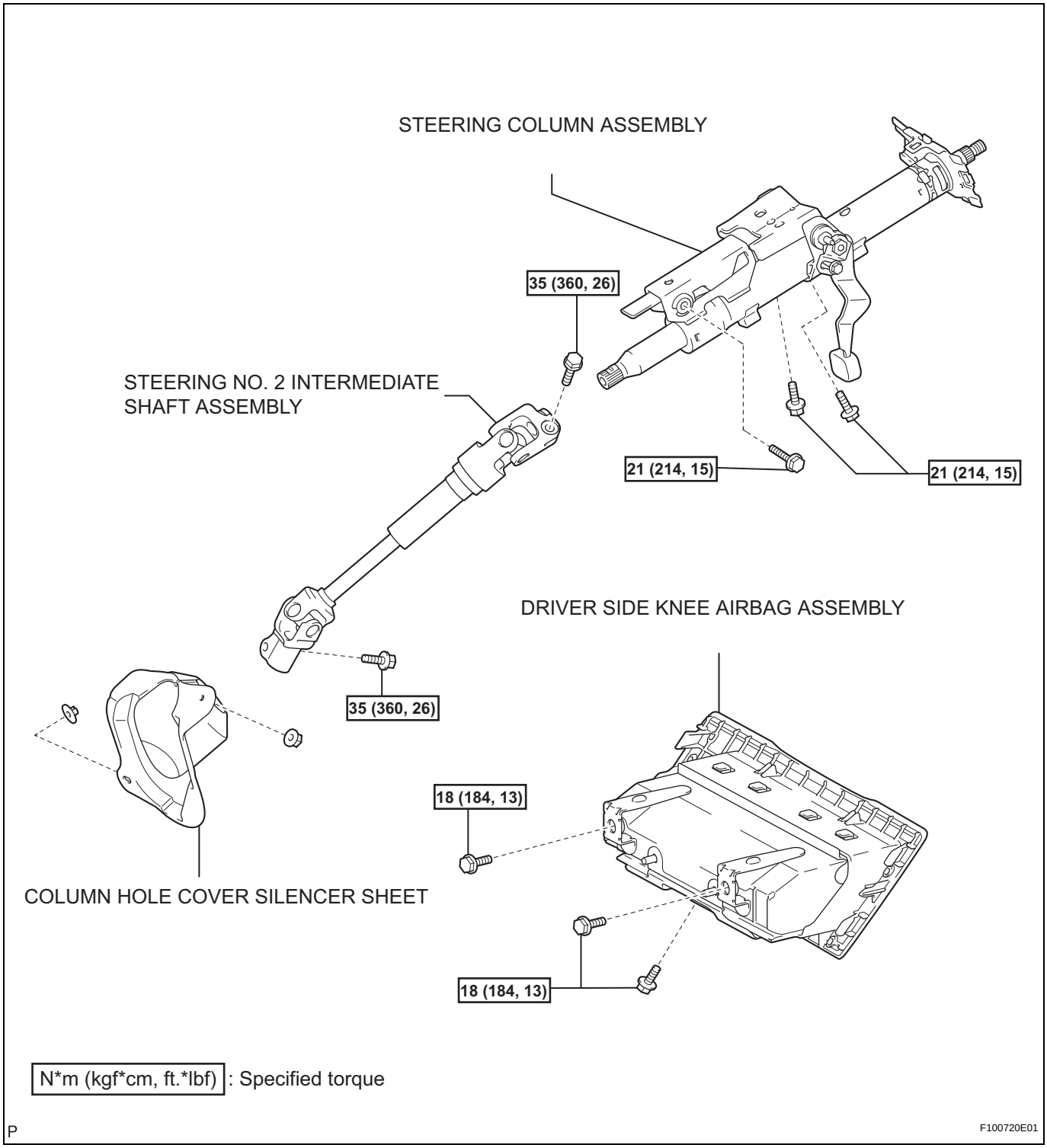
(f) Tighten the RH and LH lock nuts.
Torque: 74 N*m (750 kgf*cm, 54 ft.*lbf)
NOTICE:
Make sure that the difference in length between the RH and LH tie rod ends and rack end screws is within 1.5 mm (0.059 in.).

(g) Install the RH and LH boot clips.

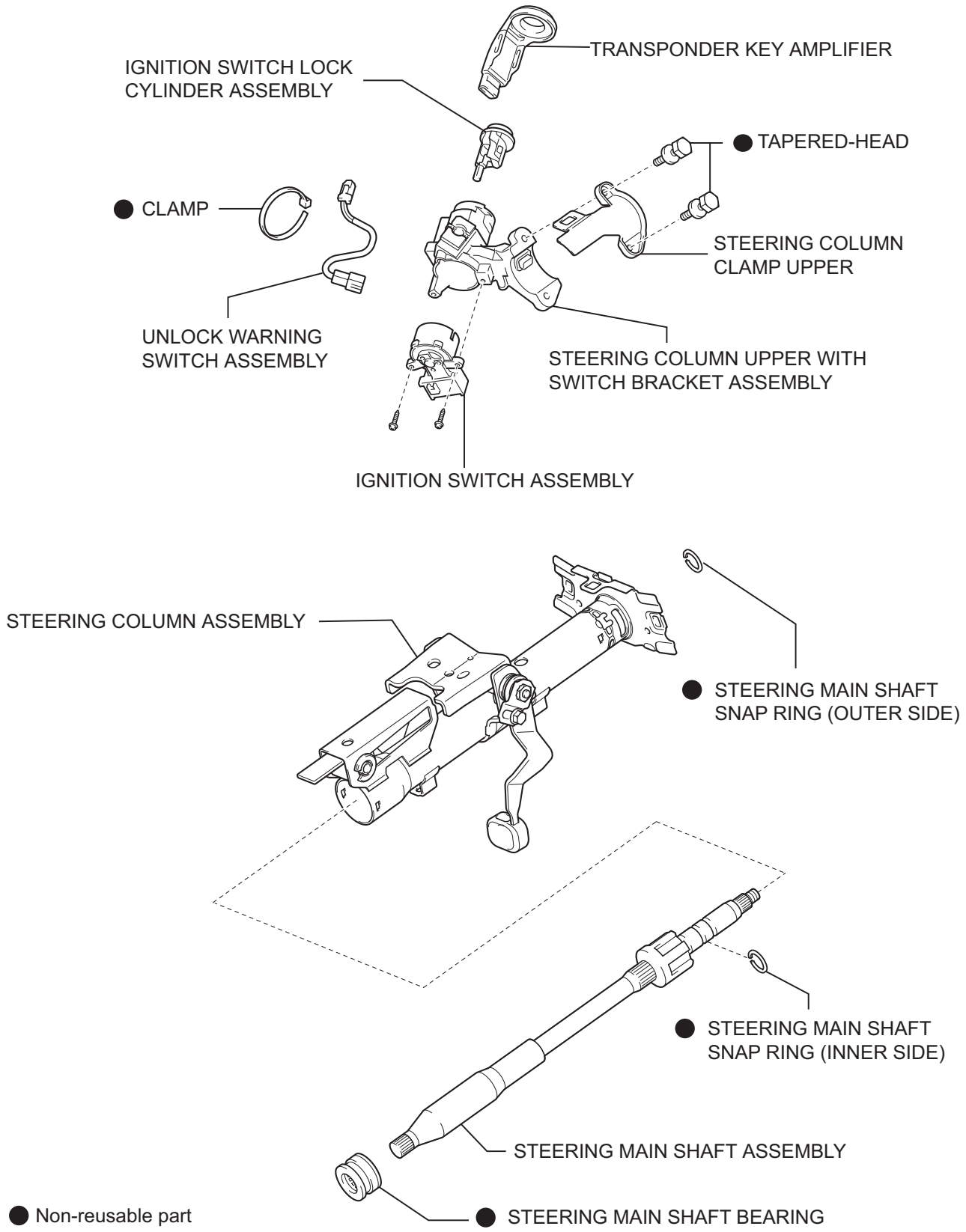
STEERING COLUMN ASSEMBLY

COMPONENTS




STEERING COLUMN ASSEMBLY
35 (360, 26)
STEERING NO. 2 INTERMEDIATE SHAFT ASSEMBLY
21 (214, 15)
21 (214, 15)
DRIVER SIDE KNEE AIRBAG ASSEMBLY
35 (360, 26)
18 (184, 13)
18 (184, 13)
COLUMN HOLE COVER SILENCER SHEET
N*m (kgf*cm, ft.*lbf) : Specified torque
P
F100720E01

Manual Transaxle



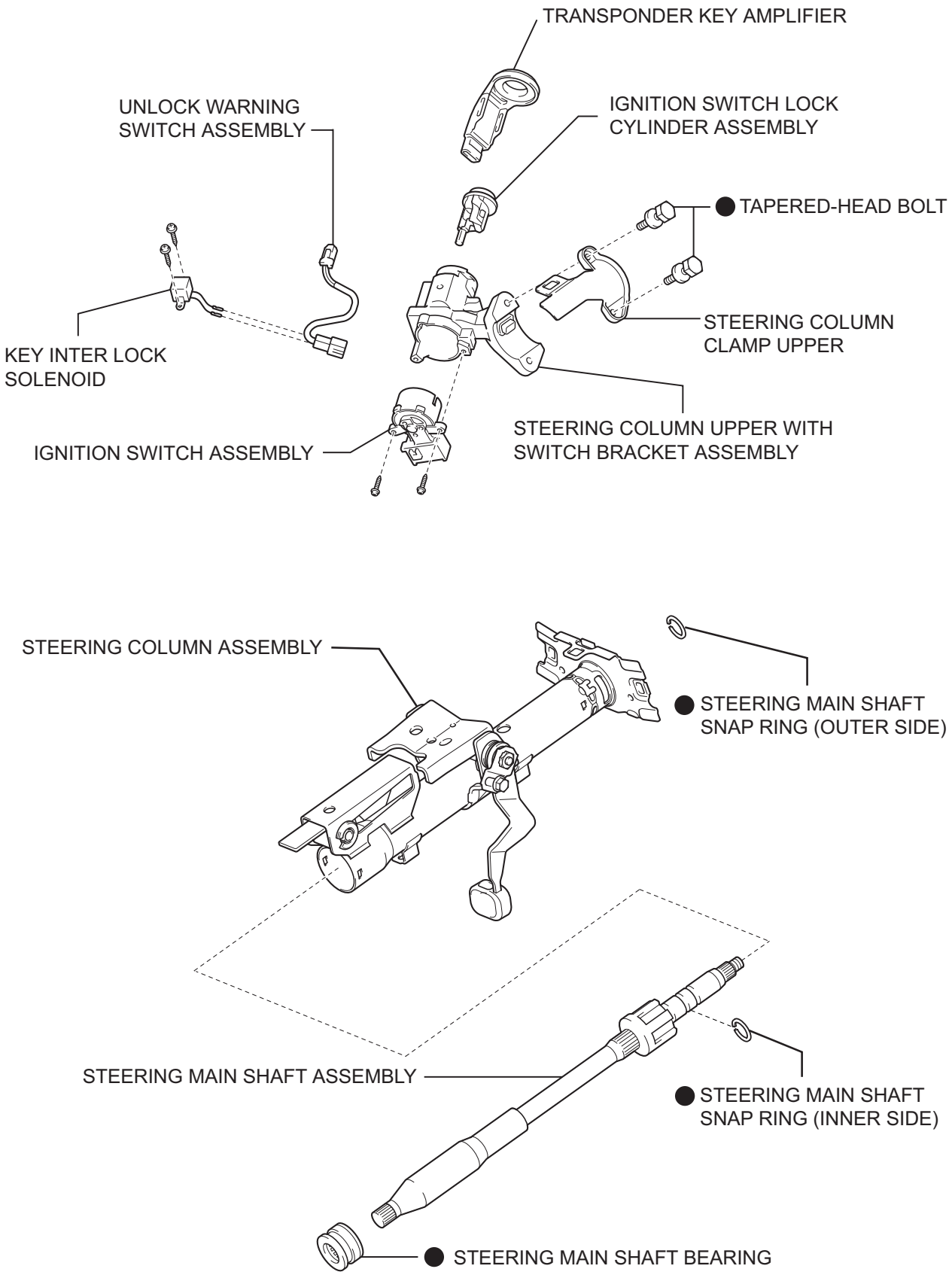
● Non-reusable part

P

F100718E01

SR

Automatic Transaxle



● Non-reusable part

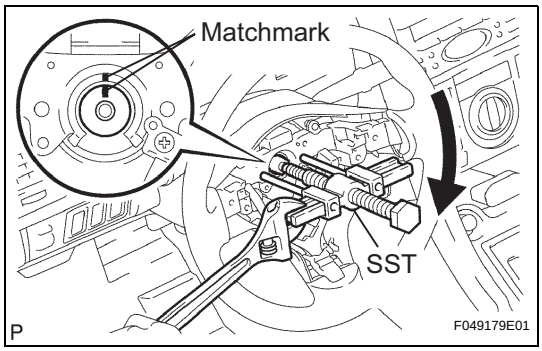
P

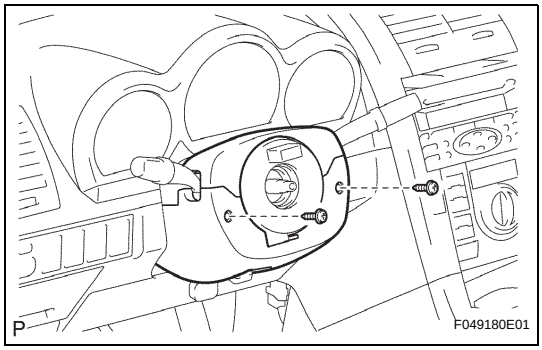
F100717E02

SR

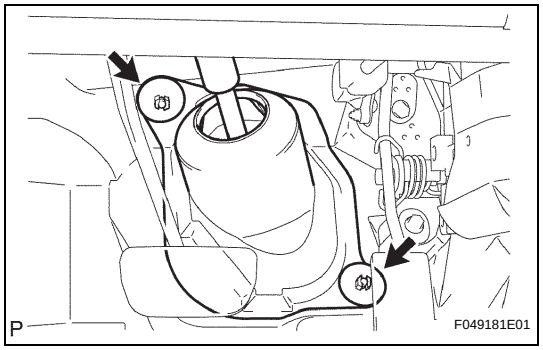
REMOVAL

1. **PRECAUTION**
   (a) Refer to precaution (see page RS-11).
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
3. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
4. **REMOVE STEERING PAD ASSEMBLY (See page RS-345)**
5. **REMOVE STEERING WHEEL ASSEMBLY**
   (a) Remove the steering wheel assembly set nut.
   (b) Put matchmarks on the steering wheel and main shaft.
   (c) Using SST, remove the steering wheel.
   SST 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)



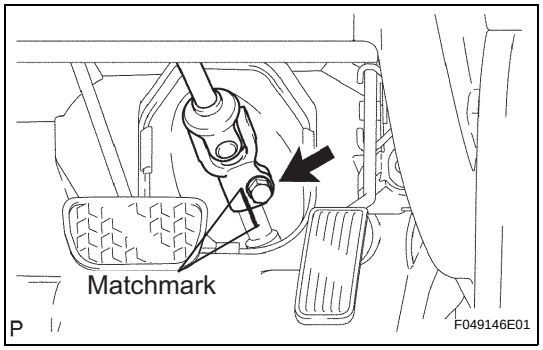


6. **REMOVE STEERING COLUMN COVER**
   (a) Remove the 2 screws, steering column cover lower and steering column cover upper.
   HINT:
   - Tilt the steering column assembly to the lowermost position when removing the steering column upper cover.
   - Tilt it to the uppermost position when removing the steering column lower cover.
7. **REMOVE SPIRAL CABLE SUB-ASSEMBLY (See page RS-356)**
8. **REMOVE HEADLIGHT DIMMER SWITCH ASSEMBLY (See page LI-41)**
9. **REMOVE WINDSHIELD WIPER SWITCH ASSEMBLY (See page WW-12)**
10. **TEST DRIVER SIDE KNEE AIRBAG ASSEMBLY (See page RS-359)**



11. REMOVE COLUMN HOLE COVER SILENCER SHEET

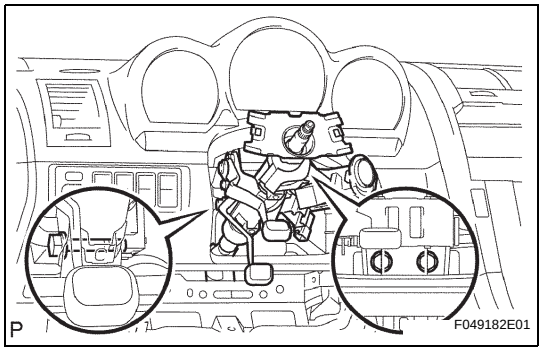
(a) Fold back the floor carpet, and remove the 2 clips and column hole cover silencer sheet.



12. DISCONNECT STEERING NO. 2 INTERMEDIATE SHAFT ASSEMBLY

(a) Put matchmarks on the No. 2 intermediate shaft and the intermediate shaft.

(b) Remove bolt and disconnect the No. 2 intermediate shaft from the intermediate shaft.

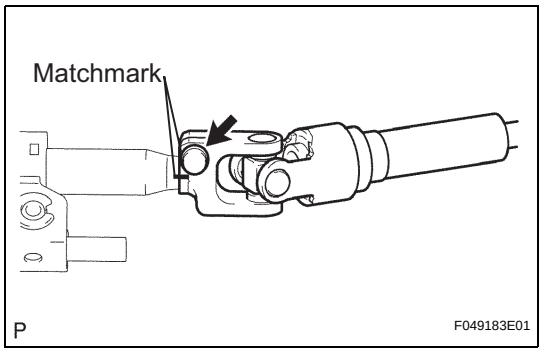


13. REMOVE STEERING COLUMN ASSEMBLY

(a) Disconnect the connectors and wire harness clamps from the steering column.

(b) Remove the 3 bolts and steering column.

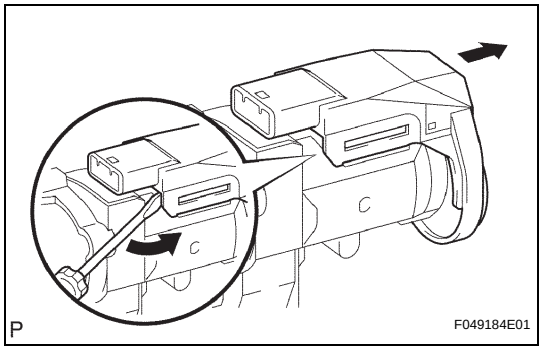
DISASSEMBLY



1. REMOVE NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY

(a) Put matchmarks on the No. 2 intermediate shaft and steering main shaft.

(b) Remove the bolt and No. 2 intermediate shaft.



2. REMOVE TRANSPONDER KEY AMPLIFIER

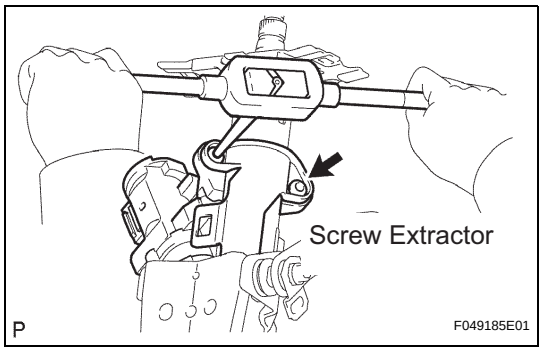
(a) Pry out the claw hung onto the upper bracket by approximately 1.0 mm (0.039 in.) using a screwdriver.

(b) Pull the transponder key amplifier towards the rear of the vehicle with the claw open.

NOTICE:

Do not pull the amplifier with excessive force.

SR

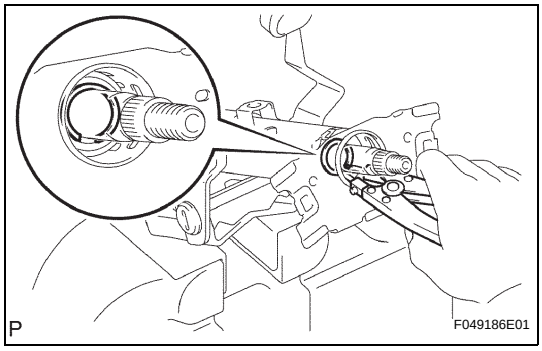


3. REMOVE STEERING COLUMN UPPER WITH SWITCH BRACKET ASSEMBLY

(a) Using a centering punch, mark the center of the 2 tapered-head bolts.

(b) Using a 3 to 4 mm (0.12 to 0.6 in.) drill, drill a hole in the 2 bolt heads.

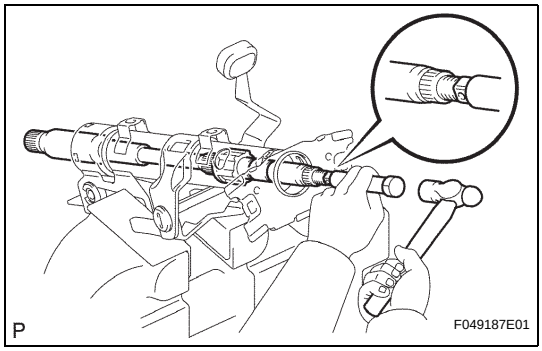
(c) Using a screw extractor, remove the 2 bolts, steering column upper with switch bracket assembly and steering column clamp upper.



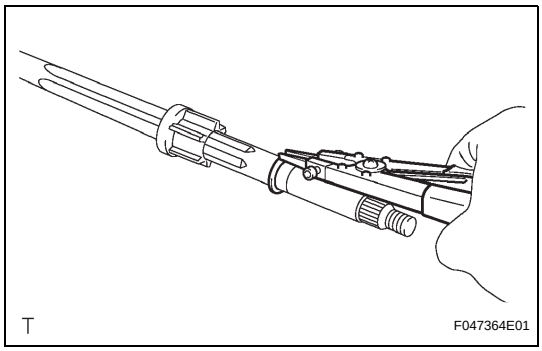
4. REMOVE STEERING MAIN SHAFT ASSEMBLY

(a) Secure the steering column tube in a vise. Insert aluminum plates between the steering column tube and the vise to prevent damage.
NOTICE:
Do not overtighten the vise.

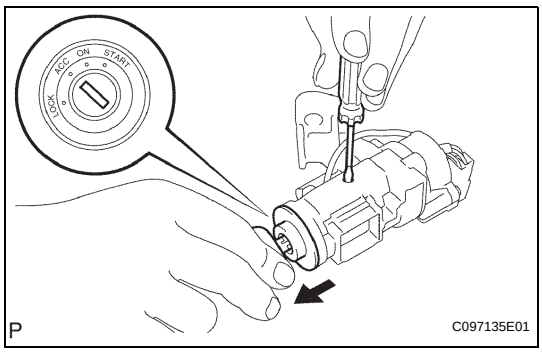
(b) Using a snap ring expander, remove the steering main shaft snap ring (outer side).



(c) Using a brass bar and hammer, remove the steering main shaft and steering main shaft bearing.
NOTICE:
Be careful not to drop the steering main shaft assembly.



(d) Using a snap ring expander, remove the steering main shaft snap ring (inner side).

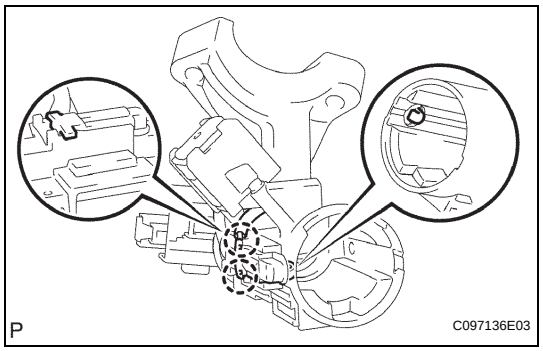


5. REMOVE IGNITION SWITCH LOCK CYLINDER ASSEMBLY

(a) Place the ignition switch lock cylinder in the ACC position.

(b) Push down the stop pin with a screwdriver, and pull out the cylinder.

SR

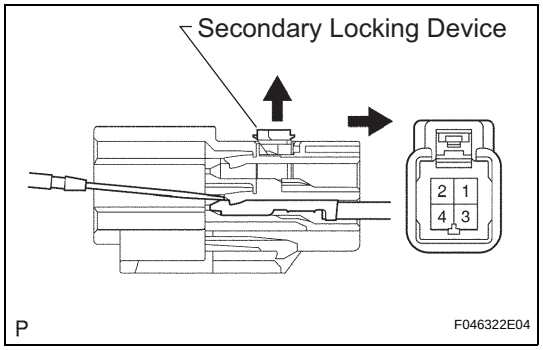


6. REMOVE UNLOCK WARNING SWITCH ASSEMBLY

(a) Disconnect the unlock warning switch connector from the ignition switch.

(b) Remove the unlock warning switch by pushing up on the center part and detach the 2 claws.

(c) Manual transaxle:
Remove the clamp from the steering column upper bracket.



(d) Automatic transaxle:
Detach the secondary locking device.

(e) Automatic transaxle:
Using a screwdriver, detach the locking lug of terminals 3 and 4, and pull the terminals out from the unlock warning switch connector rear side.

7. REMOVE KEY INTER LOCK SOLENOID (for Automatic Transaxle)

(a) Remove the 2 screws and key inter lock solenoid from the steering column upper bracket.

8. REMOVE IGNITION SWITCH ASSEMBLY

(a) Remove the 2 screws and ignition switch from the steering column upper bracket.

REASSEMBLY

1. INSTALL IGNITION SWITCH ASSEMBLY

(a) Install the starter switch assembly to the steering column upper bracket with the 2 screws.

2. INSTALL KEY INTER LOCK SOLENOID (for Automatic Transaxle)

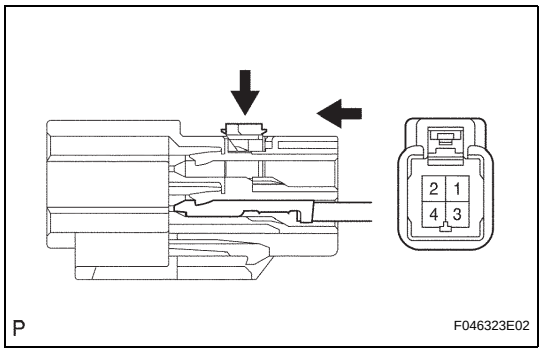
(a) Install the key inter lock solenoid to the steering column upper bracket assembly with the 2 screws.

3. INSTALL UNLOCK WARNING SWITCH ASSEMBLY

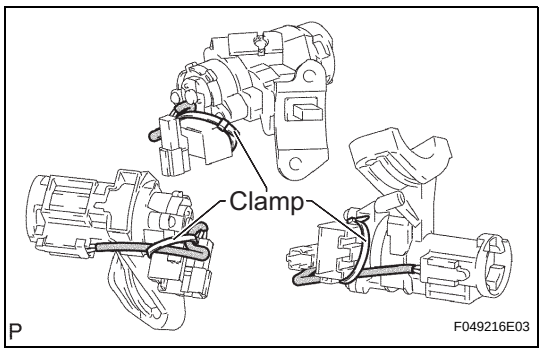
(a) Install the unlock warning switch.

(b) Automatic transaxle:
Connect terminals 3 and 4 of the unlock warning switch connector.

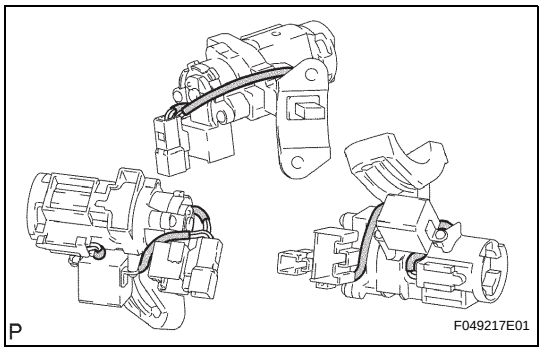
(c) Connect the unlock warning switch connector to the ignition switch.



(d) Manual transaxle:
Secure the unlock warning switch wire harness to the steering column upper bracket with a new clamp as shown in the illustration.
NOTICE:
Do not overtighten the clamp when securing the wire harness as the wire harness could be cut.



(e) Automatic transaxle:
Secure the unlock warning switch wire harness to the steering column upper bracket as shown in the illustration.



4. INSTALL IGNITION SWITCH LOCK CYLINDER ASSEMBLY

(a) Make sure the ignition switch lock cylinder is in the ACC position.

(b) Install the ignition switch lock cylinder.

5. INSPECT STEERING LOCK OPERATION

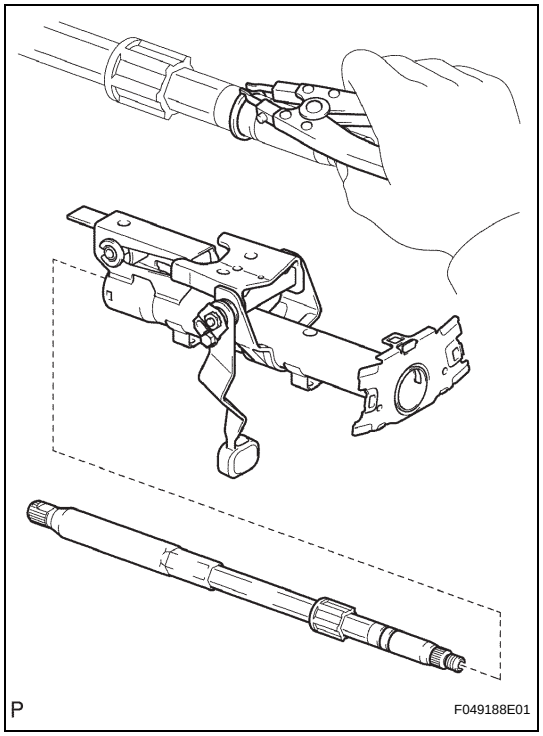
(a) Check that the steering lock mechanism is activated when the key is removed.

(b) Check that the steering lock mechanism is deactivated when the key is inserted and turned to the ACC position.
HINT:
If there is any abnormality, replace the ignition switch lock cylinder.

6. INSPECT STEERING COLUMN TUBE SUB-ASSEMBLY

(a) Check that the steering column tube bearing rotates smoothly without looseness in the axial direction or any irregular noise.
HINT:
Replace the steering column if the bearing does not rotate as specified.

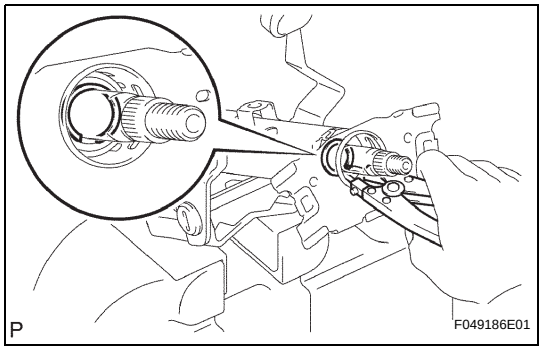
7. INSTALL STEERING MAIN SHAFT ASSEMBLY



(a) Using a snap ring expander, install a new steering main shaft snap ring (inner side) to the steering main shaft.

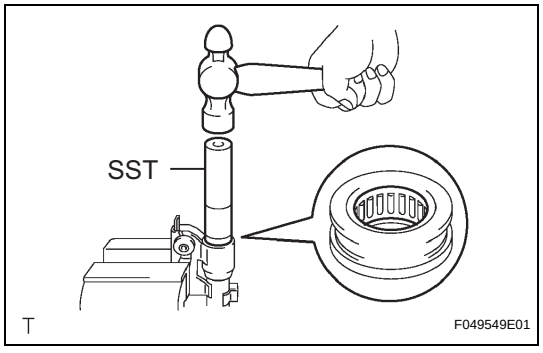
(b) Install the steering main shaft to the steering column tube.

(c) Secure the steering column tube in a vise. Insert aluminum plates between the steering column tube and the vise to prevent damage.
NOTICE:
- **Do not apply excessive force to the steering column tube bracket when holding the steering column tube in a vise.**
- **Do not drop the steering main shaft.**



(d) Using a snap ring expander, install a new steering main shaft snap ring (outer side) to the steering main shaft assembly.

8. INSTALL STEERING MAIN SHAFT BEARING



(a) Hold the steering column tube in a vise between aluminum plates.
NOTICE:
Do not apply excessive force to the steering column tube bracket when holding the steering column tube in a vise.

(b) Using SST and hammer, tap in a new steering main shaft bearing to the steering column tube.
SST 09612-22011

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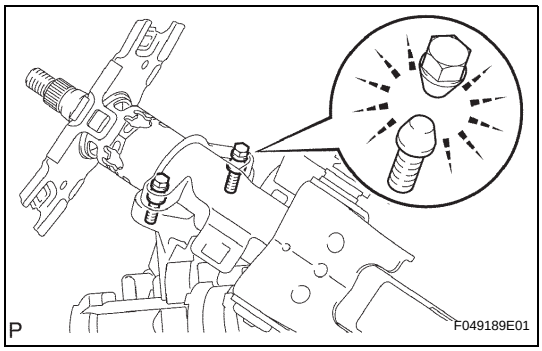
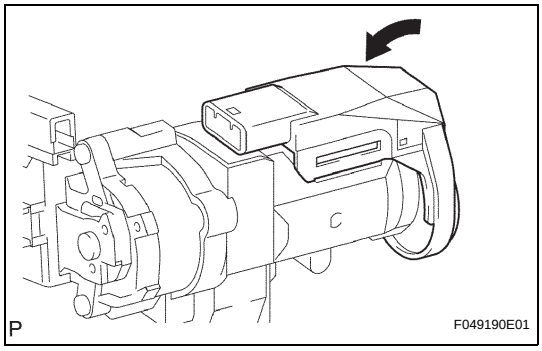


9. INSTALL STEERING COLUMN UPPER WITH SWITCH BRACKET ASSEMBLY

(a) Temporarily install the steering column upper with switch bracket and steering column upper clamp with 2 new tapered-head bolts.

(b) Tighten the 2 tapered-head bolts until the bolt heads break off.



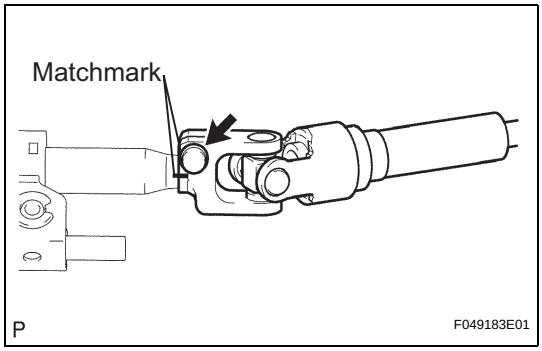
10. INSTALL TRANSPONDER KEY AMPLIFIER

(a) Align the transponder key amplifier with the installation position of the upper bracket with the amplifier inclined.

(b) Push on the transponder key amplifier and install it to the upper bracket.

NOTICE:

Do not push the amplifier with excessive force.

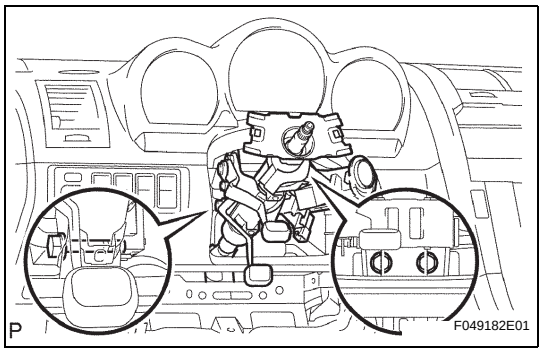


11. INSTALL NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the No. 2 intermediate shaft and the steering main shaft and install them with the bolt.

Torque: 35 N*m (360 kgf*cm, 26 ft.*lbf)

INSTALLATION

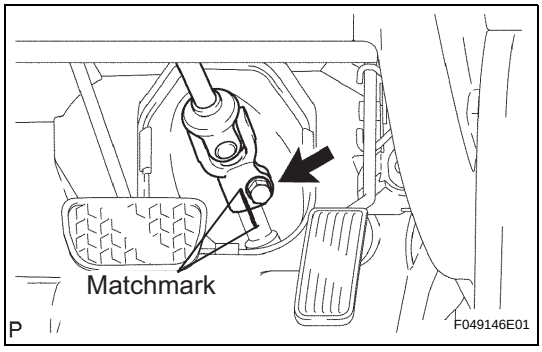


1. INSTALL STEERING COLUMN ASSEMBLY

(a) Install the steering column with the 3 bolts.

Torque: 21 N*m (214 kgf*cm, 15 ft.*lbf)

(b) Connect each connector and clamp the wire harness to the steering column bracket.



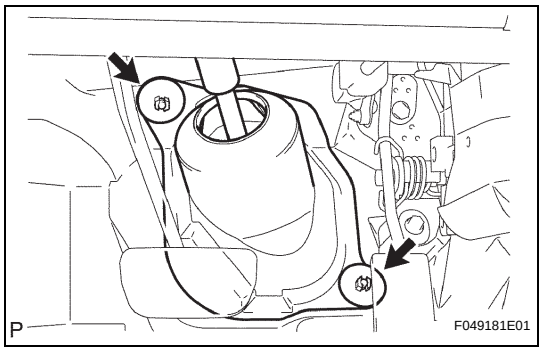
2. CONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the No. 2 intermediate shaft and the intermediate shaft and install them with bolt.

Torque: 35 N*m (360 kgf*cm, 26 ft.*lbf)

3. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

4. INSTALL SPIRAL CABLE SUB-ASSEMBLY (See page RS-356)



5. **INSPECT SPIRAL CABLE SUB-ASSEMBLY (See page RS-356)**

6. **INSTALL COLUMN HOLE COVER SILENCER SHEET**
   (a) Install the column hole cover silencer sheet with the 2 clips. Then return the carpet to its original position.

7. **INSTALL DRIVER SIDE KNEE AIRBAG ASSEMBLY (See page RS-359)**

8. **INSTALL WINDSHIELD WIPER SWITCH ASSEMBLY (See page WW-13)**

9. **INSTALL HEADLIGHT DIMMER SWITCH ASSEMBLY (See page LI-42)**

10. **INSTALL STEERING COLUMN COVER**

11. **INSTALL STEERING WHEEL ASSEMBLY**
    (a) Align the matchmarks on the steering wheel and steering main shaft.
    (b) Install the steering wheel with the set nut.
    Torque: 50 N*m (510 kgf*cm, 37 ft.*lbf)

12. **INSPECT STEERING WHEEL CENTER POINT**

13. **INSTALL STEERING PAD ASSEMBLY (See page RS-346)**

14. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

15. **PERFORM INITIALIZATION**
    (a) Perform initialization (see page IN-23).
    NOTICE:
    Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

16. **INSPECT STEERING PAD ASSEMBLY**
    (a) Inspect steering pad (see page RS-342).

17. **INSPECT SRS WARNING LIGHT**
    (a) Inspect SRS warning light (see page RS-11).

SUSPENSION SYSTEM

PROBLEM SYMPTOMS TABLE

Use the table below to help determine the cause of the problem. The numbers indicate the priority of the possible cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspected Area	See page
Vehicle/pulls	1. Tire (worn or improperly inflated)	TW-3
	2. Wheel alignment (incorrect), for front	SP-2
	3. Wheel alignment (incorrect), for rear	SP-9
	4. Steering linkage (loose or worn)	-
	5. Hub bearing (worn)	AH-6
	6. Steering gear (out of adjustment or broken)	PS-3
	7. Suspension parts (worn)	-
Bottoming	1. Vehicle (overloaded)	-
	2. Spring (weak), for front	SP-16
	3. Spring (weak), for rear	SP-35
	4. Shock absorber (worn), for front	SP-16
	5. Shock absorber (worn), for rear	SP-35
Sway/pitches	1. Tire (worn or improperly inflated)	TW-3
	2. Stabilizer bar (bent or broken), for front	SP-29
	3. Stabilizer bar (bent or broken), for rear	SP-55
	4. Shock absorber (worn), for front	SP-16
	5. Shock absorber (worn), for rear	SP-35
Wheel shimmy	1. Tire (worn or improperly inflated)	TW-3
	2. Wheel (out of balance)	TW-3
	3. Shock absorber (worn), for front	SP-16
	4. Shock absorber (worn), for rear	SP-35
	5. Wheel alignment (incorrect), for front	SP-2
	6. Wheel alignment (incorrect), for rear	SP-9
	7. Ball joint (worn)	SP-25
	8. Hub bearing (worn)	AH-6
	9. Steering linkage (loose or worn)	-
	10. Steering gear (out of adjustment or broken)	PS-24
Abnormal tire wear	1. Tire (worn or improperly inflated)	TW-3
	2. Wheel alignment (incorrect), for front	SP-2
	3. Wheel alignment (incorrect), for rear	SP-9
	4. Shock absorber (worn), for front	SP-16
	5. Shock absorber (worn), for rear	SP-35
	6. Suspension parts (worn)	-

FRONT WHEEL ALIGNMENT

ADJUSTMENT

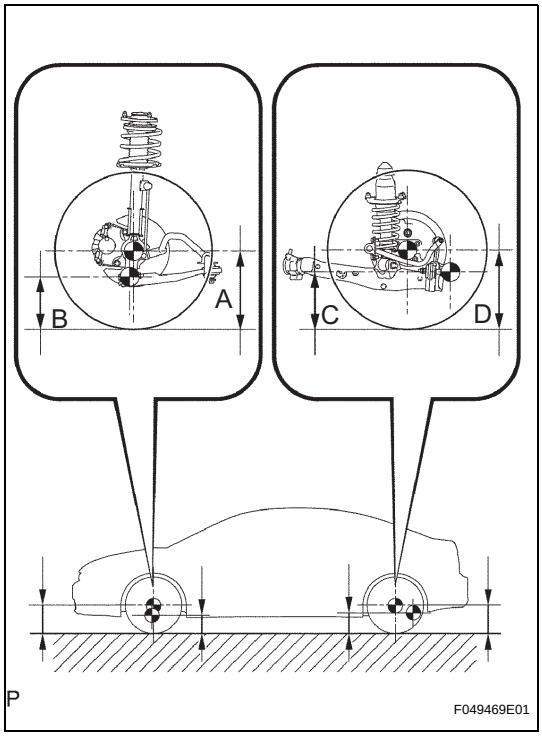
1. INSPECT TIRE

(a) Inspect tire (see page TW-3).

2. MEASURE VEHICLE HEIGHT

Standard vehicle height

Item	Specified Condition
Front A - B	92 mm (3.62 in.)
Rear D - C	63 mm (2.48 in.)



Measuring points:

A:
Ground clearance of front wheel center

B:
Ground clearance of lower suspension arm front bolt center

C:
Ground clearance of tie rod set bolt center

D:
Ground clearance of rear wheel center

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

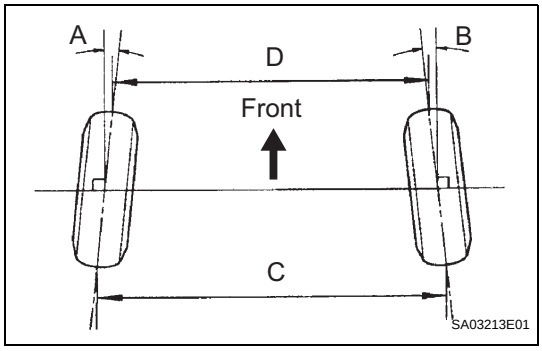
HINT:

Bounce the vehicle at the corners to stabilize the suspension and inspect the vehicle height.

3. INSPECT TOE-IN

Standard toe-in

Item	Specified Condition
Toe-in (total)	A + B: 0° +- 12' (0° +- 0.2°) C - D: 0 +- 2 mm (0 +- 0.08 in.)



HINT:

- Measure "C - D" only when "A + B" connot be measured.
- If the toe-in is not within the specified range, adjust it at the rack ends.

4. ADJUST TOE-IN

(a) Measure the thread lengths of the right and left rack ends.

Rack end length difference:
1.5 mm (0.059 in.) or less

(b) Remove the rack boot set clips.

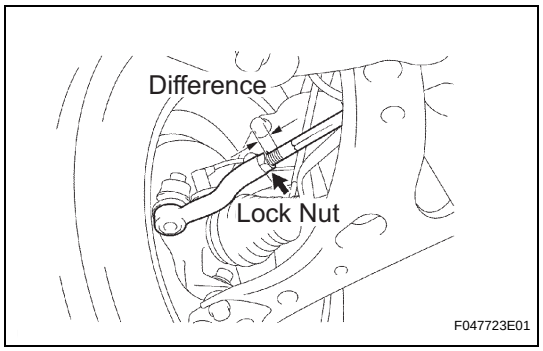
(c) Loosen the tie rod end lock nuts.

(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) Extend the shorter rack end if the measured toe-in deviates toward the outer side.

(2) Shorten the longer rack end if the measured toe-in deviates toward the inner side.

(e) Turn the right and left rack ends in opposite directions an equal amount to adjust toe-in.
HINT:
Try to adjust toe-in to the center of the specified range.



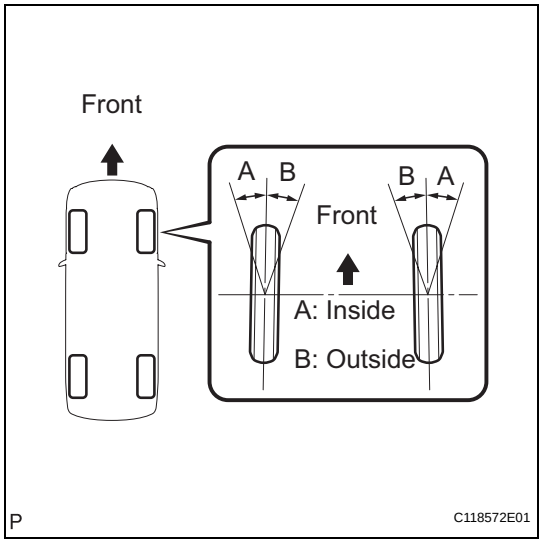
(f) Make sure that the lengths of the right and left rack ends are the same.
Standard rack end length difference:
0 +- 1 mm (0.0039 in.)

(g) Torque the tie rod ends lock nuts.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
NOTICE:
Temporarily tighten the lock nut while holding the hexagonal part of the steering rack ends so that the lock nut and the steering rack end do not turn together. Hold the width across flat of the tie rod end and tighten the lock nut.

(h) Place the boots on the seats and install the clips.
HINT:
Make sure that the boots are not twisted.

5. INSPECT WHEEL ANGLE

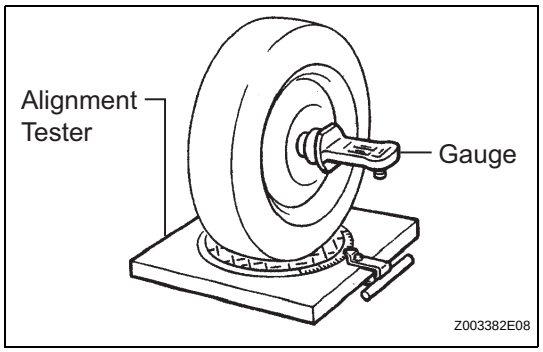
(a) Turn the steering wheel fully to the left and right and measure the turning angle.
Standard wheel turning angle



Item	Specified Condition
Inside wheel	38°12' +- 12' (38.20° +- 2°)
Outside wheel (reference)	32°49' (32.82°)

If the right and left inside wheel angles differ from the specified range, check the right and left rack end lengths.

6. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION



(a) Put the front wheel on the center of the alignment tester.
(b) Remove the center ornament.
(c) Install 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 camber, caster and steering axis inclination

Item	Specified Condition
Camber Right-left error	-0°31' +- 45' (-0.52° +- 0.75°) 45' (0.75°) or less
Caster Right-left error	3°02' +- 45' (3.03° +- 0.75°) 45' (0.75°) or less

SP

Item	Specified Condition
Steering axis inclination Right-left error	12°31' +- 45' (12.52° +- 0.75°) 45' (0.75°) or less

NOTICE:
- **Inspect while the vehicle is empty (without the spare tire or tools).**
- **The maximum tolerance of right and left difference for the camber and caster is 45' or less.**

(e) Remove the camber-caster-steering axis inclination gauge and attachment.

(f) Install the center ornament.

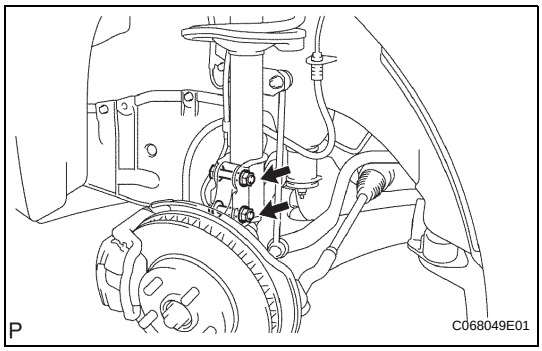
If the caster and steering axis inclination are not within the specified range after the camber has been correctly adjusted, recheck the suspension parts for damage and/or wear.

7. ADJUST CAMBER

HINT:

After the camber has been adjusted, inspect to toe-in.

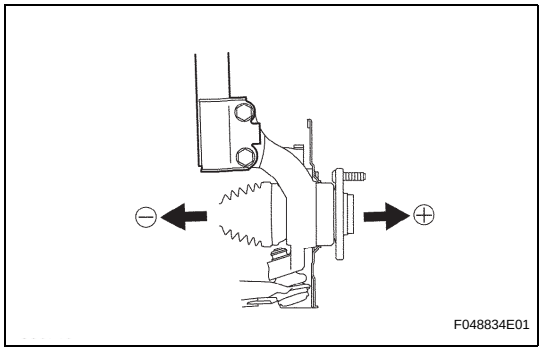
(a) Remove the front wheel.



(b) Remove the 2 nuts on the lower side of the shock absorber assembly front LH.

(c) Clean the installation surfaces of the shock absorber assembly front LH and the steering knuckle.

(d) Temporarily install the 2 nuts (Step A).



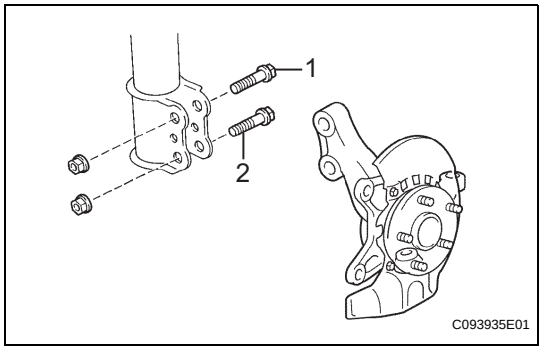
(e) Fully push or pull the front axle hub in the direction of the required adjustment (Step B).

(f) Tighten the nuts.

Torque: 240 N*m (2,450 kgf*cm, 177 ft.*lbf)

(g) Install the front wheel.

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)



(h) Check the camber.

If the measured value is within the specified range, calculate the required adjustment amount using the formula below.

Camber adjustment amount:

Center of the specified range - Measured value

SP

(i) Check installed bolts combination. Select appropriate bolts from the table below to adjust the camber within the specified range.

Standard selection table

Item	Selection Table
Move the axle toward (+) in step (B)	**Refer to table (1) (Move the axle toward positive side)**
Move the axle toward (-) in step (B)	**Refer to table (2) (Move the axle toward positive side)**

Table (1):
Move the axle toward positive side

Installed Bolt / Adjusting Value								
	1	90105-17008	90105-17008	90105-17008	90105-17008	90105-17009	90105-17010	90105-17011
	2	90105-17008	90105-17009	90105-17010	90105-17011	90105-17011	90105-17011	90105-17011
−1°30' to −1°15'								G
−1°15' to −1°00'							G	A
−1°00' to −0°45'						G	A	B
−0°45' to −0°30'					G	A	B	C
−0°30' to −0°15'				G	A	B	C	D
−0°15' to 0°			G	A	B	C	D	E
0°to 0°15'		A	B	C	D	E	F	
0°15' to 0°30'		B	C	D	E	F		
0°30' to 0°45'		C	D	E	F			
0°45' to 1°00'		D	E	F				
1°00' to 1°15'		E	F					
1°15' to 1°30'		F						

	A	B	C	D	E	F	G
1	90105-17008	90105-17008	90105-17008	90105-17009	90105-17010	90105-17011	90105-17008
2	90105-17009	90105-17010	90105-17011	90105-17011	90105-17011	90105-17011	90105-17008

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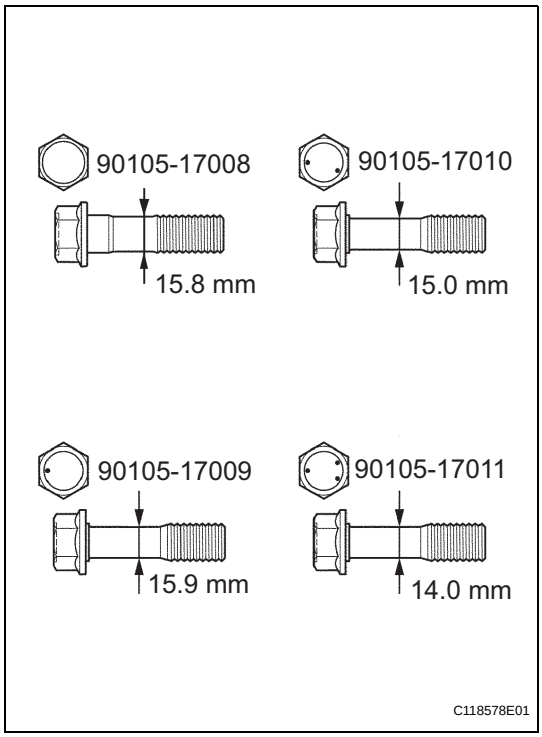

The body and suspension may be damaged if the camber is not correctly adjusted according to the above table.

NOTICE:

Replace the nut with a new one when replacing the bolt.

(j) Repeat the steps mentioned above. At step (A), replace 1 or 2 selected bolts.

HINT:

Replace 1bolt at a time when replacing 2 bolts.

Table (2):

Move the axle toward negative side

Installed Bolt / Adjusting Value		1						
		90105-17008	90105-17008	90105-17008	90105-17008	90105-17009	90105-17010	90105-17011
	2	90105-17008	90105-17009	90105-17010	90105-17011	90105-17011	90105-17011	90105-17011
−1°30' to −1°15'		F						
−1°15' to −1°00'		E	F					
−1°00' to −0°45'		D	E	F				
−0°45' to −0°30'		C	D	E	F			
−0°30' to −0°15'		B	C	D	E	F		
−0°15' to 0°		A	B	C	D	E	F	
0°to 0°15'			G	A	B	C	D	E
0°15' to 0°30'				G	A	B	C	D
0°30' to 0°45'					G	A	B	C
0°45' to 1°00'						G	A	B
1°00' to 1°15'							G	A
1°15' to 1°30'								G

	A	B	C	D	E	F	G
1	90105-17008	90105-17008	90105-17008	90105-17009	90105-17010	90105-17011	90105-17008
2	90105-17009	90105-17010	90105-17011	90105-17011	90105-17011	90105-17011	90105-17008

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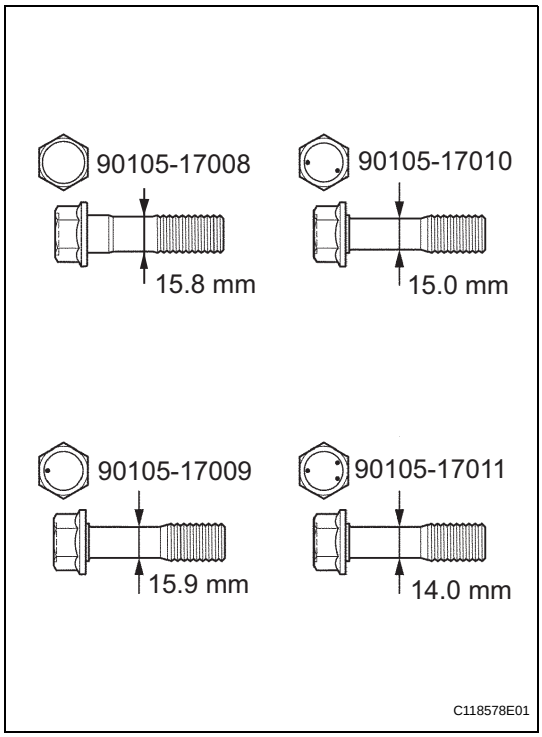


The body and suspension may be damaged if the camber is not correctly adjusted according to the above table.

NOTICE:

Replace the nut with a new one when replacing the bolt.

(k) Replace 1 bolt at a time when replacing 2 bolts.

REAR WHEEL ALIGNMENT

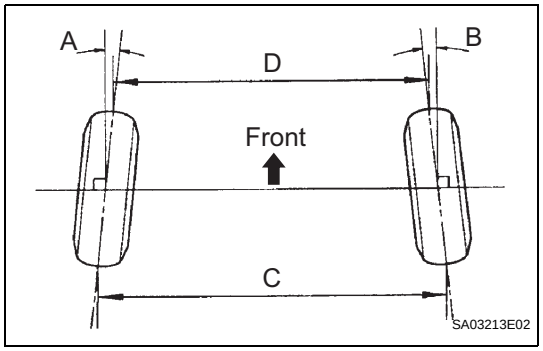
ADJUSTMENT

1. INSPECT TIRE

(a) Inspect the tire (see page TW-3).

2. MEASURE VEHICLE HEIGHT

(a) Measure the vehicle height (see page SP-2).



3. INSPECT TOE-IN

Standard toe-in

Item	Specified Condition
Toe-in (total)	A + B: 0°18' +- 12' (0.3° +- 0.2°) C + D: 3.0 +- 2.0 mm (0.12 +- 0.08 in.)

If the toe-in is not within the specified range, inspect the suspension parts and replace them if necessary.

4. INSPECT CAMBER

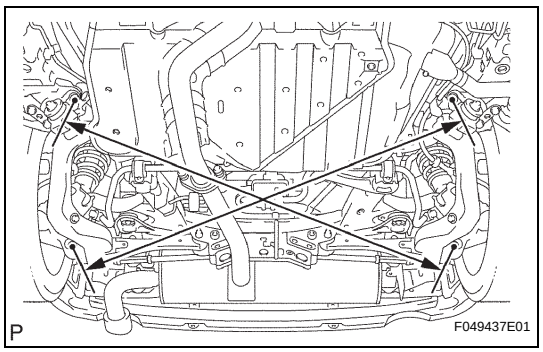
(a) Install the camber-caster-kingpin gauge or position the vehicle on the wheel alignment tester.

(b) Inspect the camber.

Standard camber

Item	Specified Condition
Camber	-0°56' +- 30' (-0.9° +- 0.5°)
Right-left error	30' (0.5°) or less

If the measured value is not within the specified range, inspect the suspension parts for damage and/or wear and replace them if necessary because camber is not adjustable.



5. ADJUST CAMBER AND TOE-IN

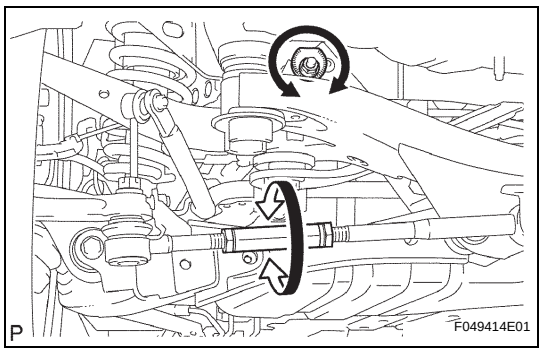
(a) Measure the distance from the LH rear suspension arm bracket set bolt to the RH rear axle carrier rear side set bolt as shown in the illustration.

(b) Measure the distance from the RH rear suspension arm bracket set bolt to the LH rear axle carrier rear side set bolt as shown in the illustration.

Standard length difference:

6.0 mm (0.236 in.) or less

If the difference exceeds the specified value, adjust it by turning the camber adjusting cam and tie rod adjusting tube.



(c) Loosen the camber adjusting cam set nut.

(d) Loosen the tie rod adjusting tube set nuts.

(e) Adjust the camber and toe-in by turning the adjust cam and adjusting tube.

HINT:

Adjust the camber and toe-in to the center of the specified ranges as much as possible.

Standard toe-in

Item	Specified Condition
Toe-in (total)	A + B: 0°18' +- 6' (0.3° +- 0.1°) C + D: 3.0 +- 1.0 mm (0.12 +- 0.04 in.)

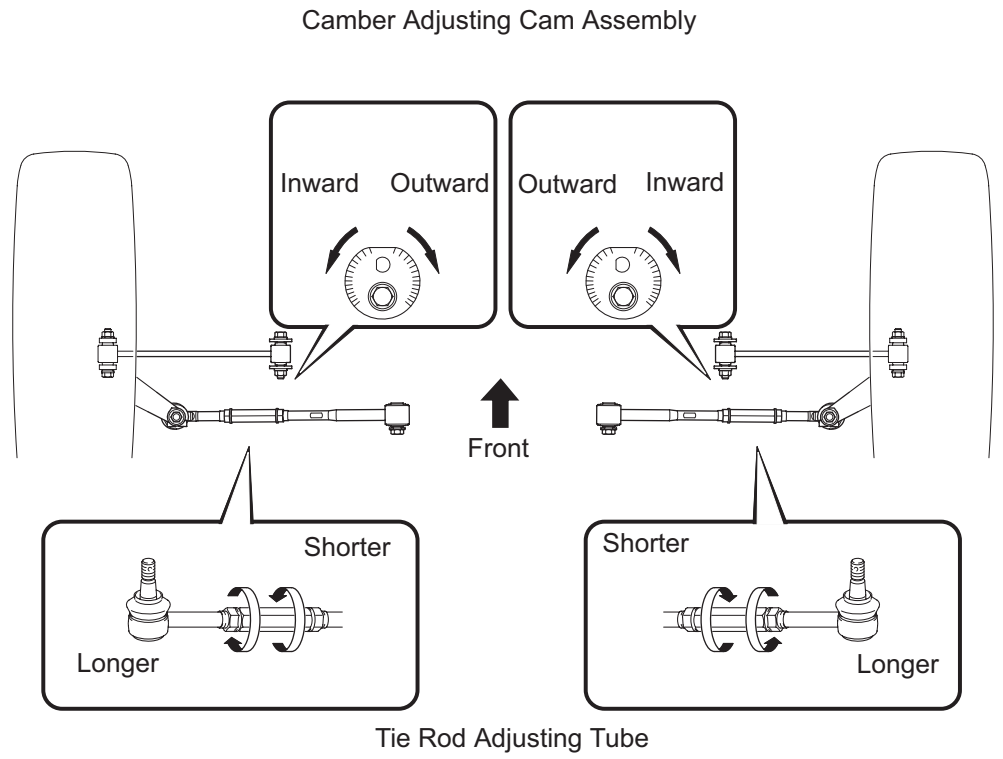
SP

Standard camber

Item	Specified Condition
Camber	-0°56' +- 20' (-0.9° +- 0.3°)
Right-left error	30' (0.5°) or less

(f) Tighten the camber adjusting cam set nut.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)

(g) Tighten the tie rod adjusting tube set nut.
Torque: 56 N*m (571 kgf*cm, 41 ft.*lbf)



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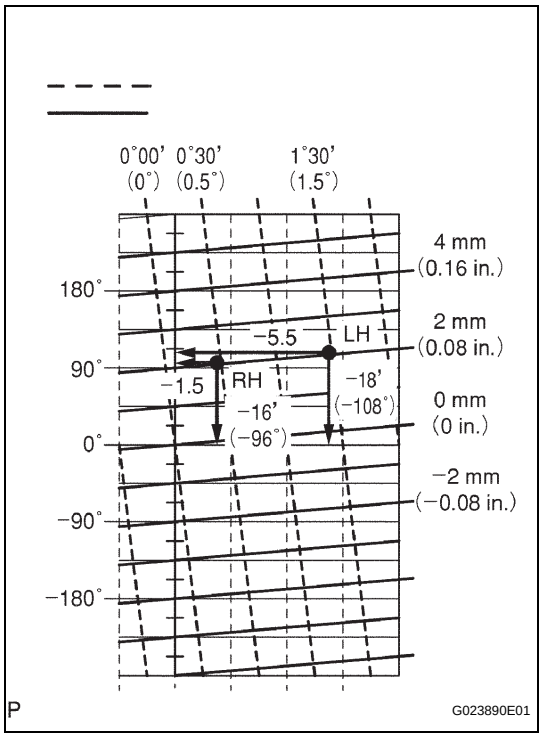


(h) How to read an adjustment chart (Using examples).

(1) Measure the present alignment.

Example:

Camber (RH):

-1°26' (-1.4°)

Camber (LH):

-2°26' (-2.4°)

Toe-in (total):

IN 7.0 mm (0.276 in.)

(2) Mark the difference between the standard value (A) and the measured value (B) on the adjustment chart.

Standard value:

Camber:

-0°56' (-0.9°)

Toe-in (total):

IN 3.0 mm (0.12 in.)

Formula:

A - B = C

Camber (RH):

-0°56' - (-1°26') = 0°30'

Camber (LH):

-0°56' - (-2°26') = 1°30'

Toe-in (total):

IN 3.0 - IN 7.0 = OUT 4.0

Toe-in (each side):

OUT 2.0

(3) As shown in the example chart, read the distance from the marked point to the center of the chart, and adjust the upper and/or lower arm adjusting cams accordingly.

Amount to turn camber adjusting cam assembly (by graduation):

Scale (RH):

- (Inward) 1.5

Scale (LH):

- (Inward) 5.5

Amount to turn tie rod adjusting tube (by graduation):

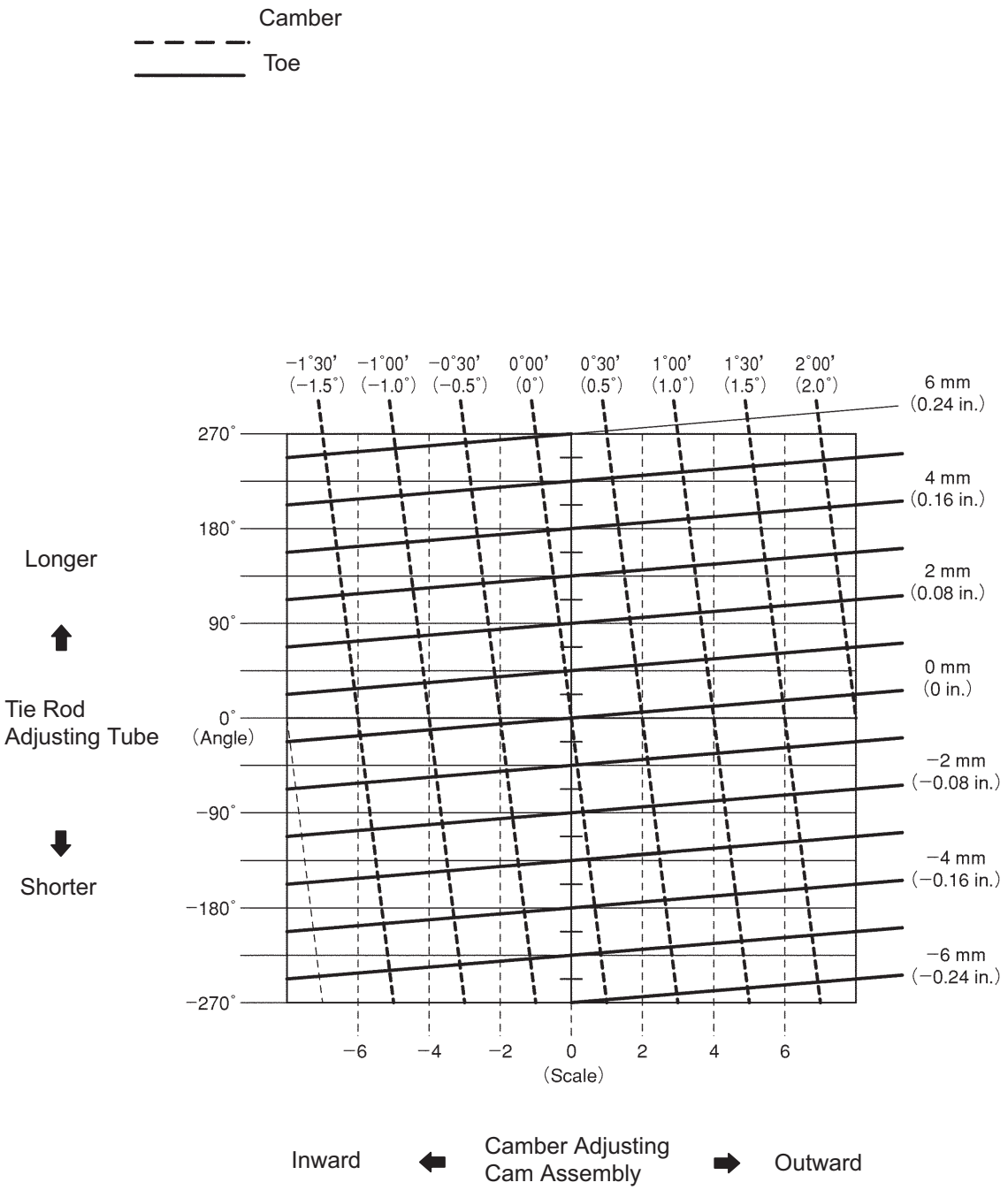
Angle (RH):

- (Shorter) 96°

Angle (LH):

- (Shorter) 108°

SP



SP

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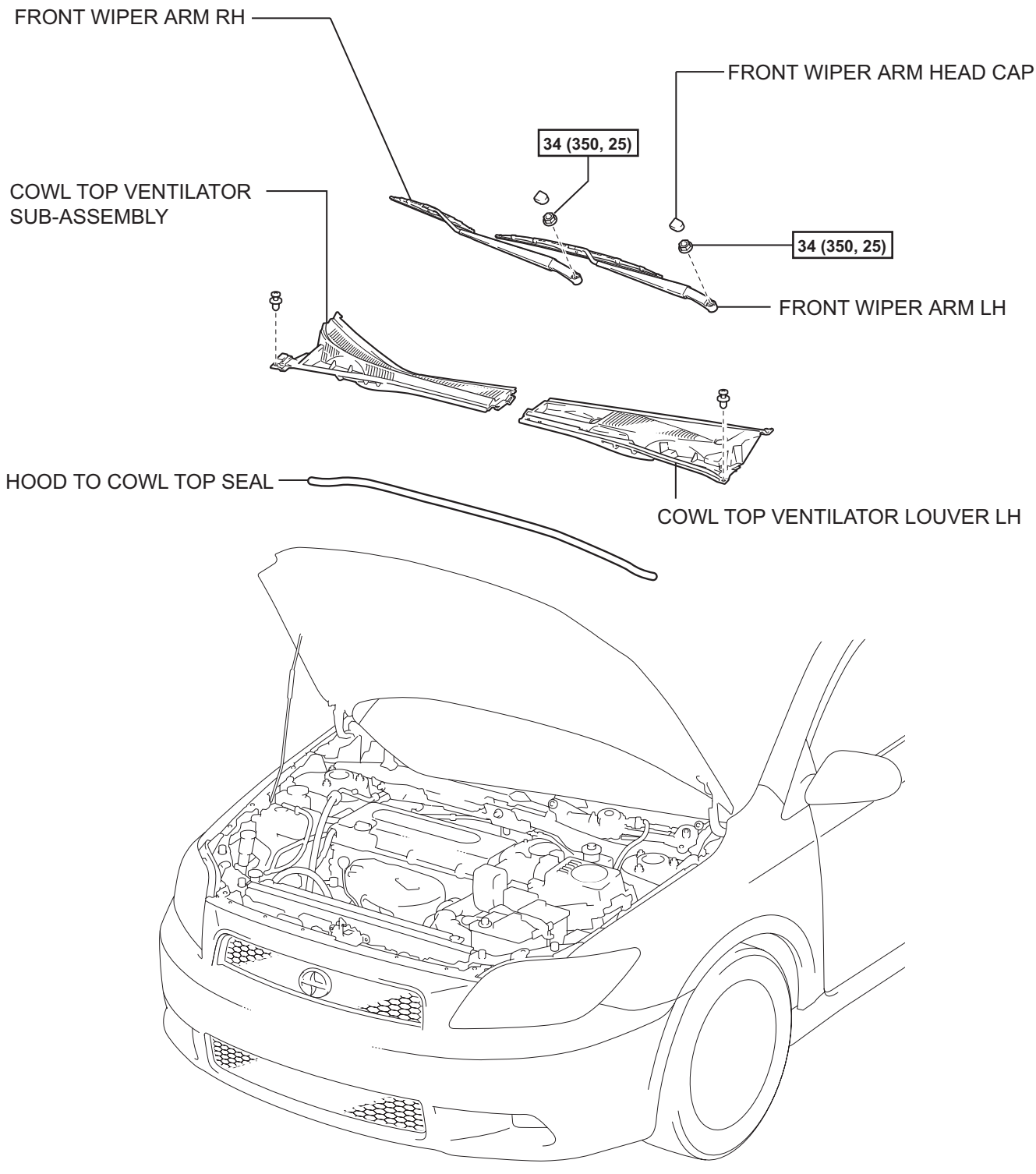
FRONT SHOCK ABSORBER WITH COIL SPRING

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

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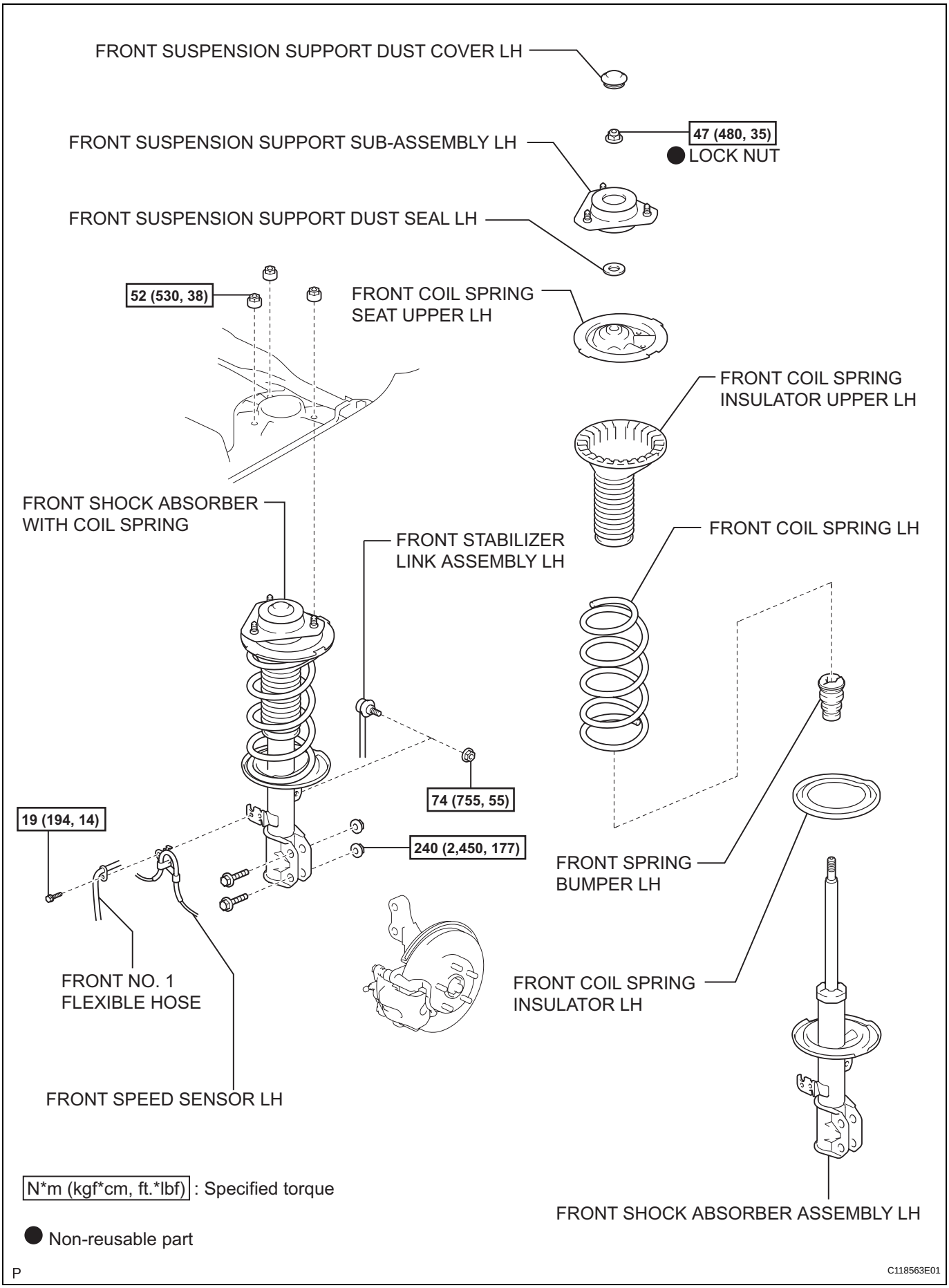
FRONT SUSPENSION SUPPORT DUST COVER LH
47 (480, 35)
LOCK NUT
FRONT SUSPENSION SUPPORT SUB-ASSEMBLY LH
FRONT SUSPENSION SUPPORT DUST SEAL LH
52 (530, 38)
FRONT COIL SPRING SEAT UPPER LH
FRONT COIL SPRING INSULATOR UPPER LH
FRONT SHOCK ABSORBER WITH COIL SPRING
FRONT STABILIZER LINK ASSEMBLY LH
FRONT COIL SPRING LH
74 (755, 55)
19 (194, 14)
240 (2,450, 177)
FRONT SPRING BUMPER LH
FRONT NO. 1 FLEXIBLE HOSE
FRONT COIL SPRING INSULATOR LH
FRONT SPEED SENSOR LH
FRONT SHOCK ABSORBER ASSEMBLY LH
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
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C118563E01

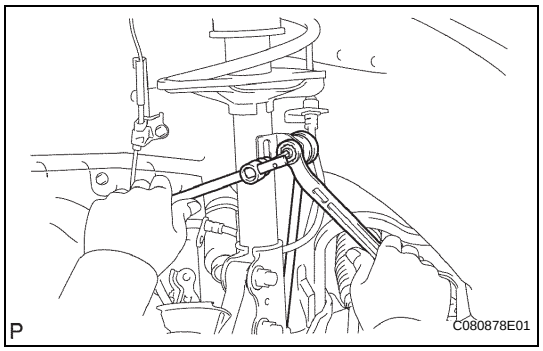
SP

REMOVAL

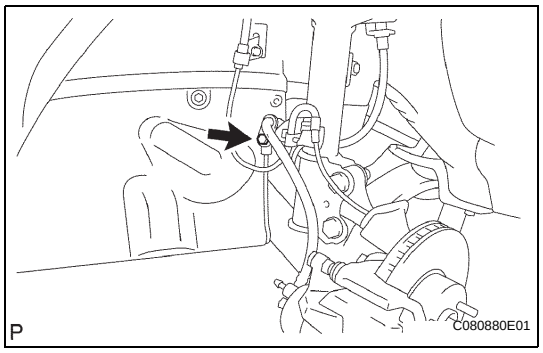
HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

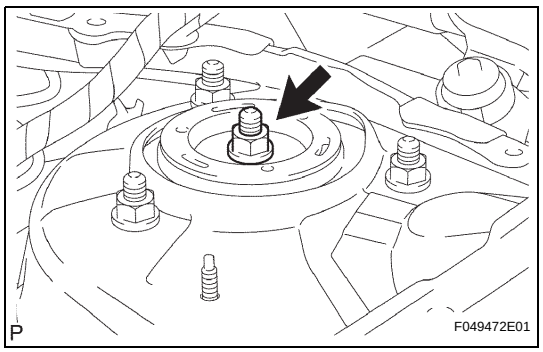
1. **REMOVE FRONT WHEEL**
2. **REMOVE FRONT WIPER ARM HEAD CAP (See page WW-4)**
3. **REMOVE FRONT WIPER ARM LH (See page WW-4)**
4. **REMOVE FRONT WIPER ARM RH**
5. **REMOVE HOOD TO COWL TOP SEAL (See page WW-4)**
6. **REMOVE COWL TOP VENTILATOR LOUVER LH (See page WW-4)**
7. **DISCONNECT FRONT STABILIZER LINK ASSEMBLY LH**
   (a) Place a wooden block on a jack, and support the front No. 1 suspension lower arm LH with the jack.
   (b) Remove the nut and disconnect the front stabilizer link assembly LH from the shock absorber with coil spring.
   HINT:
   Use a 6 mm hexagon wrench to hold the stud if the ball joint turns together with the nut.



8. **DISCONNECT FRONT SPEED SENSOR LH**
   (a) Remove the bolt, and then disconnect the front No. 1 flexible hose and speed sensor.
   NOTICE:
   Be sure to completely disconnect the speed sensor from the shock absorber assembly.



9. **REMOVE FRONT SHOCK ABSORBER WITH COIL SPRING**
   (a) Remove the front suspension support dust cover.
   (b) Loosen the lock nut.
   NOTICE:
   - **Do not loosen except when disassembling the shock absorber assembly with coil spring.**
   - **Do not remove the lock nut.**



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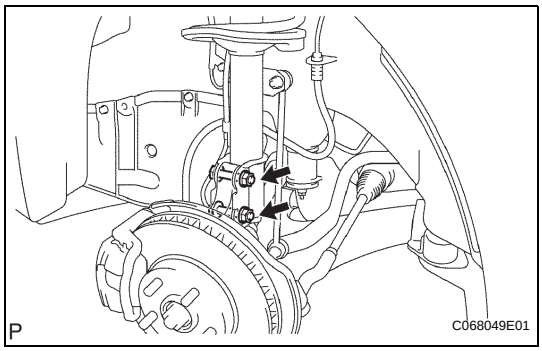
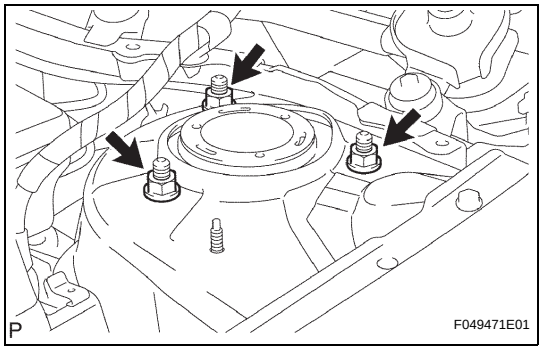


(c) Remove the 2 nuts on the lower side of the shock absorber with coil spring.
NOTICE:
Keep the bolts inserted.

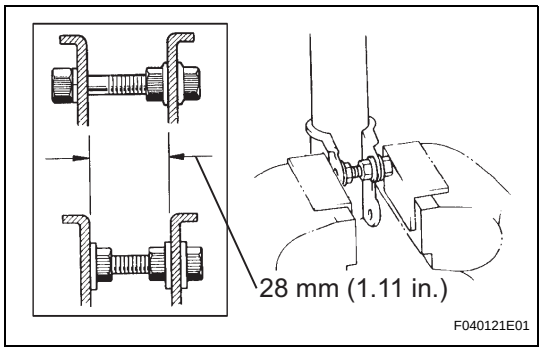


(d) Remove the 3 nuts on the upper side of the shock absorber with coil spring.
(e) Lower the jack slowly. Remove the 2 bolts on the lower side and the shock absorber with coil spring.
NOTICE:
Ensure that the speed sensor is completely disconnected from the shock absorber with coil spring.

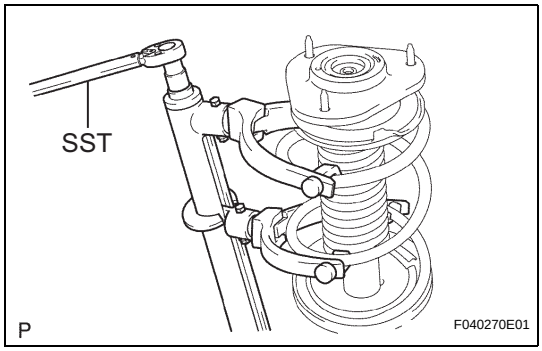
DISASSEMBLY

1. FIX FRONT SHOCK ABSORBER WITH COIL SPRING

(a) Secure the shock absorber with coil spring in a vise by clamping onto a double-nutted bolt affixed to the bracket at the bottom of the absorber, as shown in the illustration.



2. REMOVE FRONT SHOCK ABSORBER ASSEMBLY LH

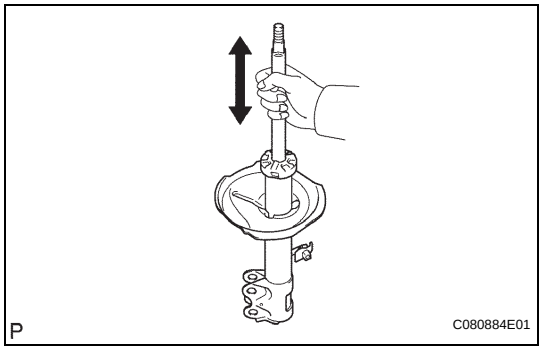


(a) Attach SST to the coil spring so that the upper and lower hooks of the installed area are as wide as possible.
SST 09727-30021 (09727-00010, 09727-00021, 09727-00031)
(b) Compress the coil spring with SST.
NOTICE:
Do not use an impact wrench. It will damage SST.
HINT:
The coil spring can be installed/removed using the hydraulic spring compressor.
(c) Remove the lock nut.
(d) Remove the suspension support LH.
(e) Remove the suspension support dust seal LH.
(f) Remove the coil spring seat upper LH.
(g) Remove the coil spring insulator upper LH.

SP

(h) Remove the coil spring LH and SST.
NOTICE:
Do not use an impact wrench. It will damage SST.
(i) Remove the spring bumper LH.
(j) Remove the coil spring insulator lower LH.

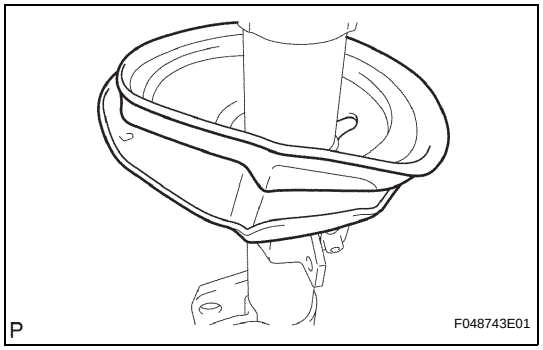
INSPECTION



1. INSPECT FRONT SHOCK ABSORBER ASSEMBLY LH

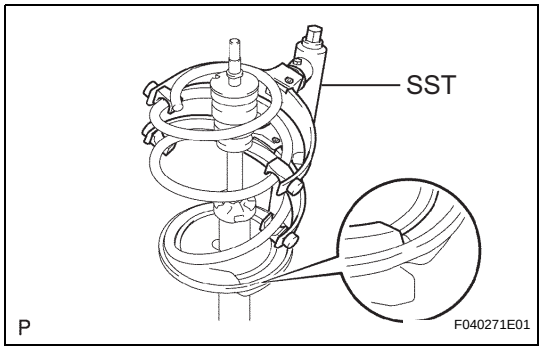
(a) Compress and extend the shock absorber rod 4 or more times. Check that there is no abnormal resistance or sound.
If there is any abnormality, replace the shock absorber with a new one.
NOTICE:
When disposing of the shock absorber, see DISPOSAL on page SP-19.

REASSEMBLY

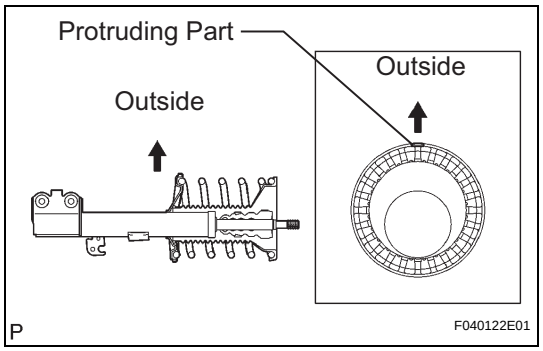


1. INSTALL FRONT SHOCK ABSORBER ASSEMBLY LH

(a) Install the coil spring insulator lower LH to the shock absorber so that both recessed parts are aligned.
(b) Install the spring bumper LH to the shock absorber piston rod.

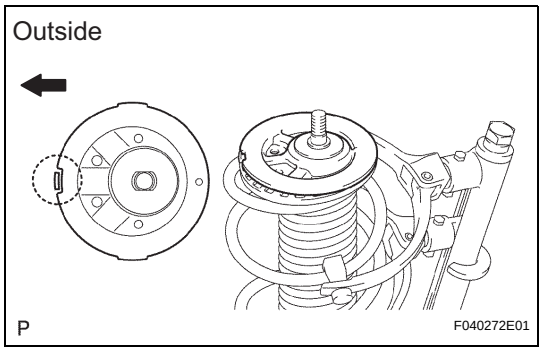


(c) Using SST, compress the coil spring LH.
SST 09727-30021
NOTICE:
Do not use an impact wrench. It will damage SST.
HINT:
The coil spring can be installed/removed using the hydraulic spring compressor.
(d) Fit the lower end of the coil spring LH into the recessed part of the spring lower seat.



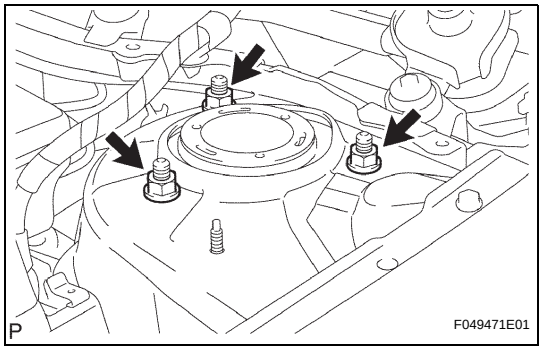
(e) Install the coil spring insulator upper LH to the shock absorber with the protruding part facing the outside of the vehicle.

SP



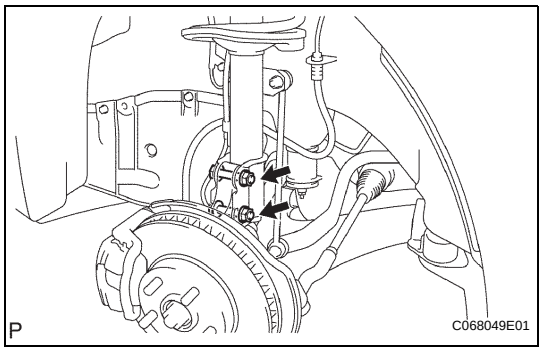
(f) Install the coil spring seat upper LH to the shock absorber LH with the notch facing the outside of the vehicle.
(g) Install the suspension support LH dust seal and suspension support LH.
(h) Temporarily tighten a new lock nut.
(i) Remove SST.

INSTALLATION

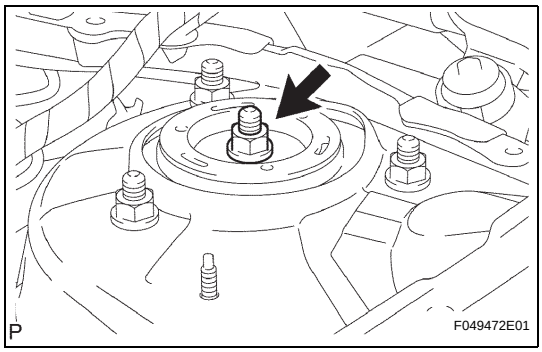


1. INSTALL FRONT SHOCK ABSORBER WITH COIL SPRING

(a) Insert the 2 bolts from the front side of the vehicle and install the shock absorber with coil spring to the steering knuckle.
(b) Place a wooden block between the shock absorber with coil spring and a jack. Slowly raise the jack and install the shock absorber with coil spring (upper side) to the vehicle.
(c) Install the shock absorber with coil spring (upper side) with the 3 nuts.
Torque: 52 N*m (530 kgf*cm, 38 ft.*lbf)

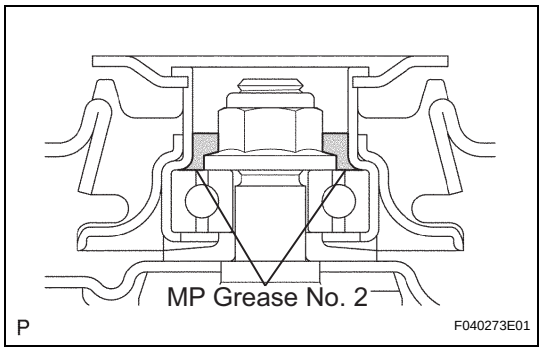


(d) Install the shock absorber with coil spring to the steering knuckle with the 2 nuts.
Torque: 240 N*m (2,450 kgf*cm, 177 ft.*lbf)
NOTICE:
When installing the nuts, keep the bolts from rotating and torque the nuts.

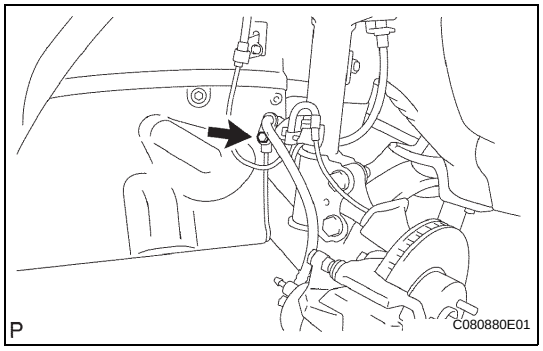


(e) Tighten the lock nut.
Torque: 47 N*m (480 kgf*cm, 35 ft.*lbf)

SP

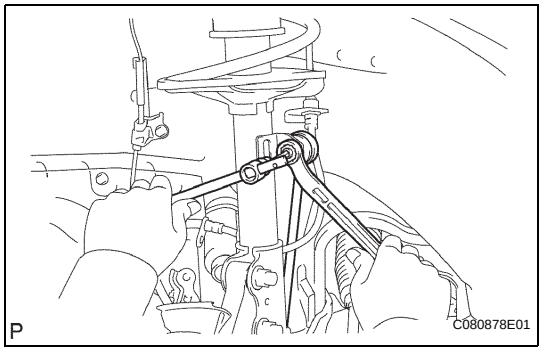


(f) Apply MP grease No. 2 to the parts indicated in the illustration and install the suspension dust cover.



2. INSTALL FRONT SPEED SENSOR LH

(a) Install the front No. 1 flexible hose and speed sensor LH with the bolt.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)



3. INSTALL FRONT STABILIZER LINK ASSEMBLY LH

(a) Install the stabilizer link to the shock absorber with coil spring with the nut.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
HINT:
Use a 6 mm hexagon wrench to hold the stud if the ball joint turns together with nut.

4. INSTALL FRONT WHEEL
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

5. INSTALL COWL TOP VENTILATOR LOUVER LH

(a) Install the cowl top ventilator louver (see page WW-6).

6. INSTALL HOOD TO COWL TOP SEAL

(a) Install the hood to cowl top seal (see page WW-6).

7. INSTALL FRONT WIPER ARM LH (See page WW-7)

8. INSTALL FRONT WIPER ARM RH (See page WW-8)

9. INSTALL FRONT WIPER ARM HEAD CAP

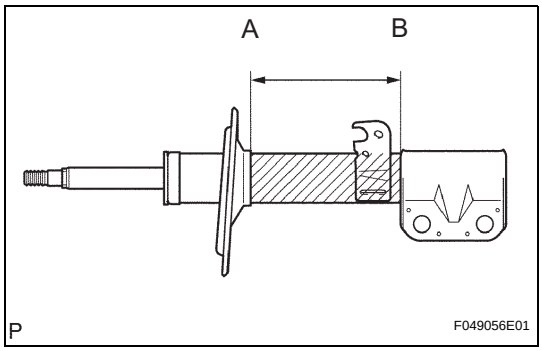
(a) Install the wiper arm head cap (see page WW-6).

10. INSPECT AND ADJUST FRONT WHEEL ALIGNMENT

(a) Inspect and adjust front wheel alignment (see page SP-2).

DISPOSAL

HINT:
Dispose of the RH side following the same procedures as the LH side.



1. DISPOSE OF FRONT SHOCK ABSORBER ASSEMBLY LH

(a) Fully extend the shock absorber piston rod.

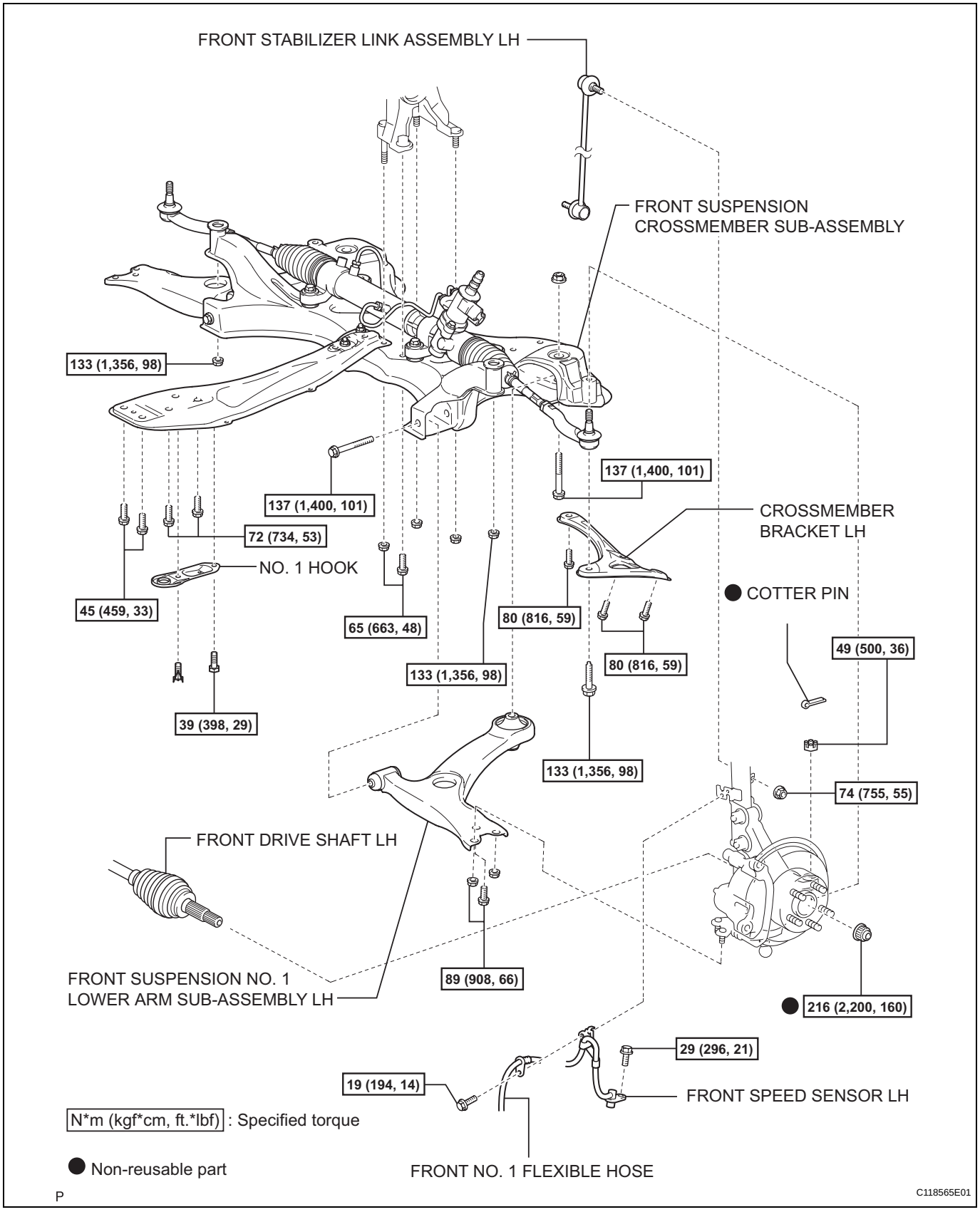
(b) Using a drill, make a hole in the cylinder between A and B as shown in the illustration to discharge the gas to discharge the gas inside the cylinder.

CAUTION:
Be careful when drilling because shards of metal may fly about, so always use the proper safety equipment.

NOTICE:
The gas is colorless, orderless and non-poisonous.

FRONT SUSPENSION LOWER NO. 1 ARM

COMPONENTS

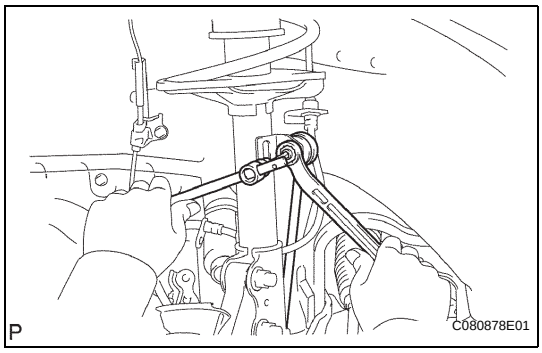


SP

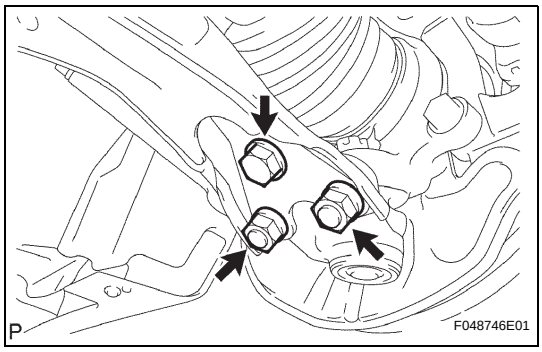
REMOVAL

HINT:
- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. **PLACE FRONT WHEELS FACING STRAIGHT AHEAD**
2. **REMOVE COLUMN HOLE COVER SILENCER SHEET (See page SR-9)**
3. **DISCONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY (See page PS-21)**
4. **DISCONNECT NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY**
5. **REMOVE FRONT WHEELS**
6. **REMOVE ENGINE UNDER COVER LH**
7. **REMOVE ENGINE UNDER COVER RH**
8. **DISCONNECT TIE ROD END SUB-ASSEMBLY LH (See page DS-6)**
9. **DISCONNECT TIE ROD END SUB-ASSEMBLY RH (See page DS-7)**
10. **DISCONNECT PRESSURE FEED TUBE ASSEMBLY (See page PS-21)**
11. **DISCONNECT FRONT STABILIZER LINK ASSEMBLY LH**
    (a) Remove the nut and disconnect the stabilizer link from the shock absorber with coil spring.
    HINT:
    Use a 6 mm hexagon wrench to hold the stud if the ball joint turns together with the nut.



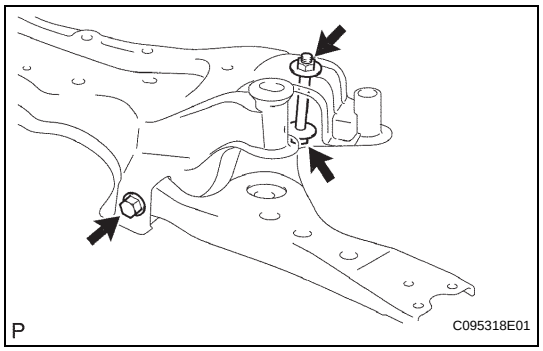
12. **DISCONNECT FRONT STABILIZER LINK ASSEMBLY RH**
    HINT:
    Disconnect the RH side following the same procedures as the LH side.
13. **DISCONNECT FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY LH**
    (a) Remove the bolt and 2 nuts.
    (b) Lower the suspension arm lower LH and disconnect it from the lower ball joint.

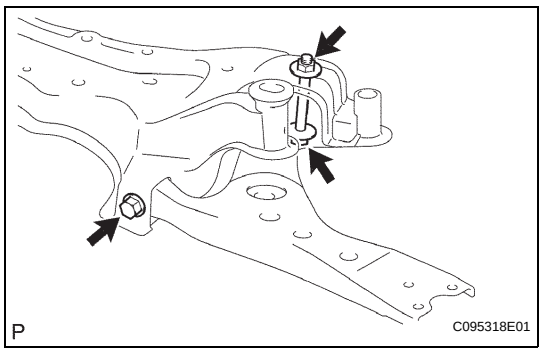


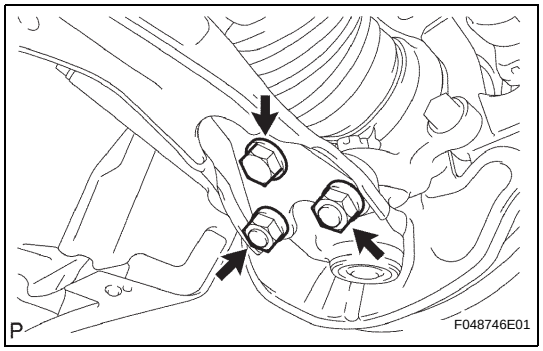
14. **DISCONNECT FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY RH**
    HINT:
    Disconnect the RH side following the same procedures as the LH side.
15. **REMOVE FRONT FLOOR PANEL BRACE (See page EX-2)**
16. **REMOVE CENTER EXHAUST PIPE ASSEMBLY (See page EX-2)**

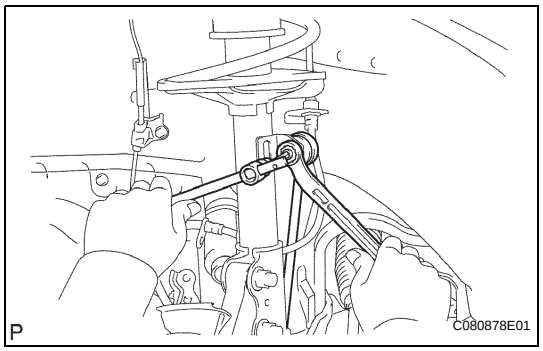
SP

17. **REMOVE HOOD SUB-ASSEMBLY**
18. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY**
19. **SUSPEND ENGINE ASSEMBLY (See page MX-19)**
20. **REMOVE NO. 1 HOOK (See page PS-22)**
21. **REMOVE FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY (See page PS-22)**
22. **REMOVE FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY LH**
    (a) Remove the 2 bolts, nut and suspension lower arm.
    NOTICE:
    Keep the nut from rotating and loosen the bolt.







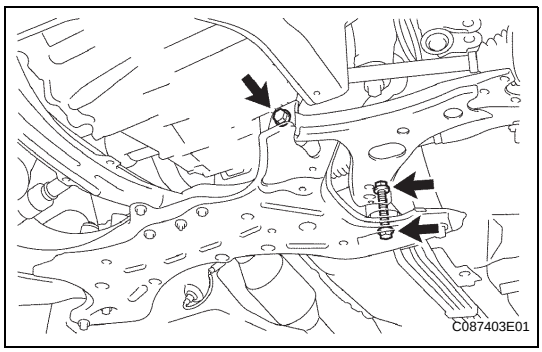


INSTALLATION

1. **TEMPORARILY TIGHTEN FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY LH**
    (a) Install the No. 1 suspension lower arm LH to the suspension crossmember and temporarily tighten the No. 1 suspension lower arm with the 2 bolts and nut.
2. **INSTALL FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY (See page PS-37)**
3. **INSTALL NO. 1 HOOK (See page PS-38)**
4. **CONNECT FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY LH**
    (a) Install the No. 1 suspension lower arm LH to the lower ball joint with the bolt and 2 nuts.
    Torque: 89 N*m (908 kgf*cm, 66 ft.*lbf)
5. **CONNECT FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY RH**
    HINT:
    Connect the RH side following the same procedures as the LH side.
6. **CONNECT FRONT STABILIZER LINK ASSEMBLY LH**
    (a) Connect the stabilizer link LH to the shock absorber with coil spring with the nut.
    Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
    HINT:
    Use a 6 mm hexagon wrench to hold the stud if the ball joint turns together with the nut.
7. **CONNECT FRONT STABILIZER LINK ASSEMBLY RH**
    HINT:
    Connect the RH side following the same procedures as the LH side.

SP

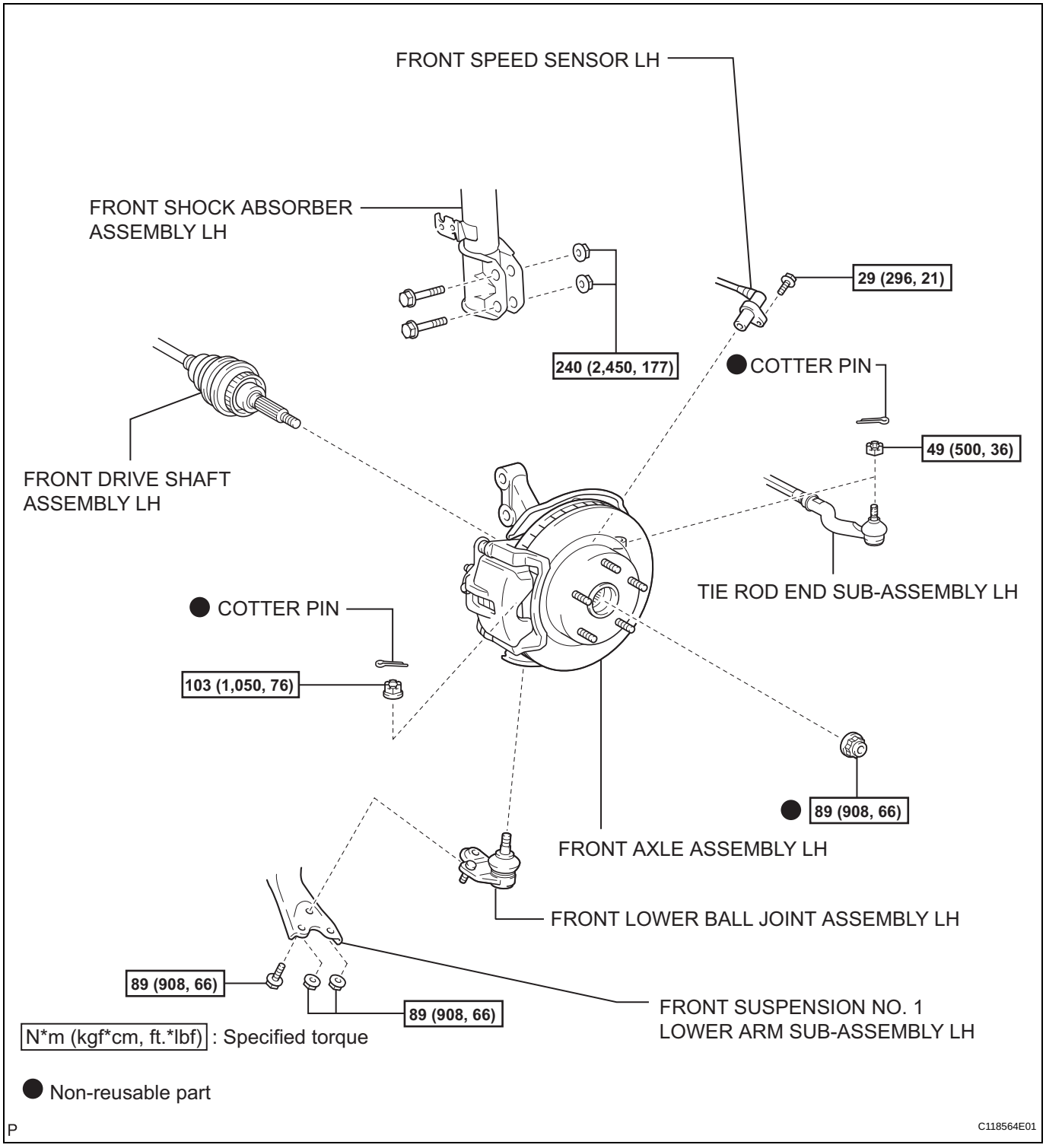
8. **CONNECT PRESSURE FEED TUBE ASSEMBLY (See page PS-38)**
9. **CONNECT TIE ROD END SUB-ASSEMBLY LH (See page DS-17)**
10. **CONNECT TIE ROD END SUB-ASSEMBLY RH (See page DS-17)**
11. **INSTALL CENTER EXHAUST PIPE ASSEMBLY (See page EX-4)**
12. **INSTALL FRONT FLOOR PANEL BRACE (See page EX-5)**
13. **STABILIZE SUSPENSION**
    (a) Install the front tire.
    Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
    (b) Lower the vehicle and bounce it several times to stabilize the front suspension.



14. **FULLY TIGHTEN FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY LH**
    (a) Fully tighten the 2 bolts.
    Torque: 137 N*m (1,400 kgf*cm, 101 ft.*lbf)
    NOTICE:
    - **Keep the nut from rotating while tightening the rear side bolt.**
    - **Make the tire condition contact ground with a 4 post lift.**
15. **CONNECT NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY**
16. **CONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY (See page PS-39)**
17. **INSTALL COLUMN HOLE COVER SILENCER SHEET**
18. **INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY**
19. **ADD POWER STEERING FLUID**
20. **BLEED POWER STEERING FLUID (See page PS-3)**
21. **CHECK POWER STEERING FLUID LEVEL IN RESERVOIR**
    (a) Check the power steering fluid level in reservoir (see page PS-3).
22. **CHECK POWER STEERING FLUID LEAKS**
23. **INSPECT HOOD SUB-ASSEMBLY**
24. **ADJUST HOOD SUB-ASSEMBLY**
    (a) Adjust the hood (see page ED-1).
25. **INSPECT AND ADJUST FRONT WHEEL ALIGNMENT**
    (a) Inspect and adjust front wheel alignment (see page SP-2).
26. **INSTALL ENGINE UNDER COVER LH**
27. **INSTALL ENGINE UNDER COVER RH**

FRONT LOWER BALL JOINT

COMPONENTS

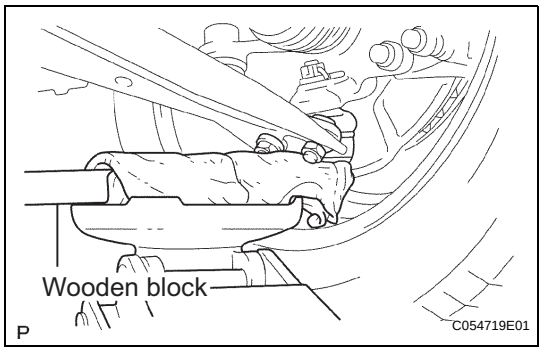


SP

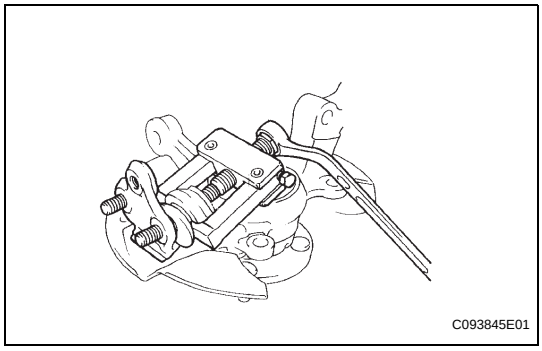
REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

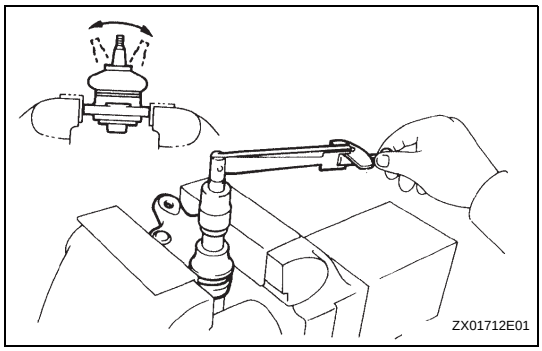


1. **INSPECT FRONT LOWER BALL JOINT ASSEMBLY LH**
   (a) Jack up the front part of the vehicle.
   (b) Move the front suspension arm lower No. 1 up and down to check vertical looseness of the lower ball joint.
   HINT:
   Wrap a cloth around the wooden block to prevent damage to the bolt and nuts.
2. **REMOVE FRONT WHEEL**
3. **REMOVE FRONT AXLE HUB LH NUT (See page AH-6)**
4. **DISCONNECT FRONT SPEED SENSOR LH (See page BC-77)**
5. **DISCONNECT TIE ROD END SUB-ASSEMBLY LH**
   (a) Disconnect the tie rod end (see page PS-21).
6. **SEPARATE FRONT NO. 1 SUSPENSION ARM SUB-ASSEMBLY LOWER LH (See page SP-23)**
7. **REMOVE FRONT AXLE ASSEMBLY LH (See page AH-9)**



8. **REMOVE FRONT LOWER BALL JOINT ASSEMBLY LH**
   (a) Remove the cotter pin and the castle nuts.
   (b) Using SST, remove the lower ball joint.
   SST 09628-62011

SP



INSPECTION

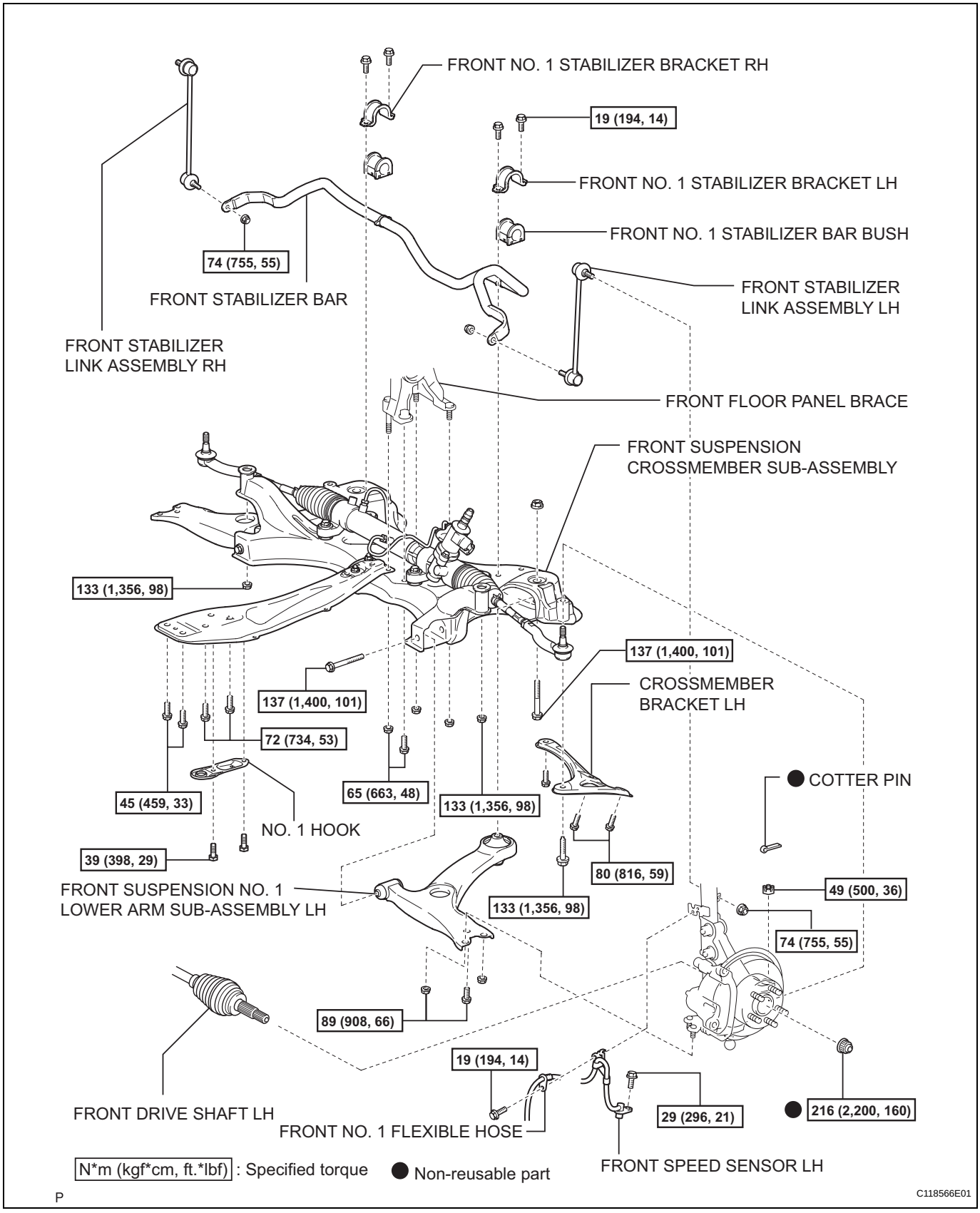
1. **INSPECT FRONT LOWER BALL JOINT ASSEMBLY LH**
   (a) Secure the lower ball joint LH with a vise.
   (b) Install the nut to the stud bolt.
   (c) Flip the stud bolt back and forth 5 times or more.
   (d) Use a torque wrench to turn the nut continuously at a rate of 3 to 5 seconds per turn. Take the torque reading on the fifth turn.
   Torque: Standard turning torque
   5.0 N*m (51 kgf*cm, 44 in.*lbf) or less
   (e) Check the dust boots for cracks or grease leakage. If the value is not within the specified range, replace the lower ball joint with a new one.

INSTALLATION

1. **INSTALL FRONT LOWER BALL JOINT ASSEMBLY LH**
   (a) Install the lower ball joint LH to the steering knuckle with the castle nut.
   Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
   NOTICE:
   Ensure that the thread and taper are free of oil, etc.
   (b) Install a new cotter pin to the steering knuckle.
   NOTICE:
   Further tighten the nut up to 60° if the holes for the cotter pin are not aligned.
2. **INSTALL FRONT AXLE ASSEMBLY LH (See page AH-10)**
3. **INSTALL FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY LH (See page SP-24)**
4. **INSTALL TIE ROD END SUB-ASSEMBLY LH**
   (a) Install the tie rod end (see page PS-36).
5. **INSTALL FRONT SPEED SENSOR LH (See page BC-78)**
6. **INSTALL FRONT AXLE HUB LH NUT (See page AH-11)**
7. **INSTALL FRONT WHEEL**
   Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)
8. **INSPECT AND ADJUST FRONT WHEEL ALIGNMENT**
   (a) Inspect and adjust the front wheel alignment (see page SP-2).
9. **CHECK ABS SPEED SENSOR SIGNAL**
   (a) Check the ABS speed sensor signal (see page BC-4).

FRONT STABILIZER BAR

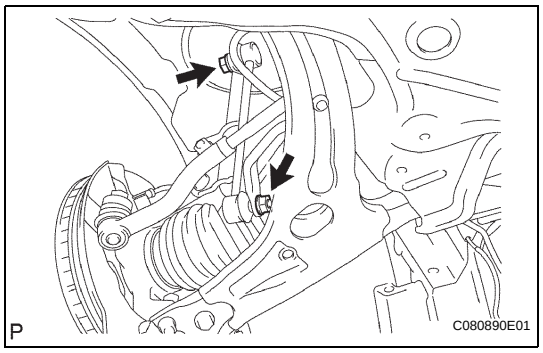
COMPONENTS



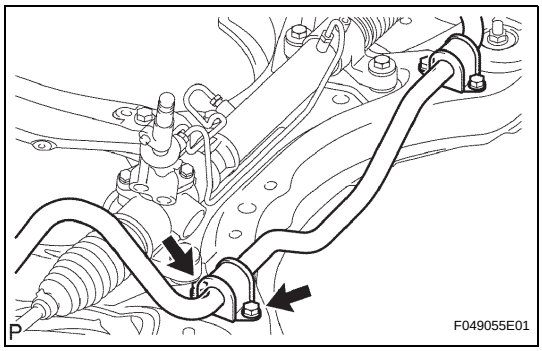
SP

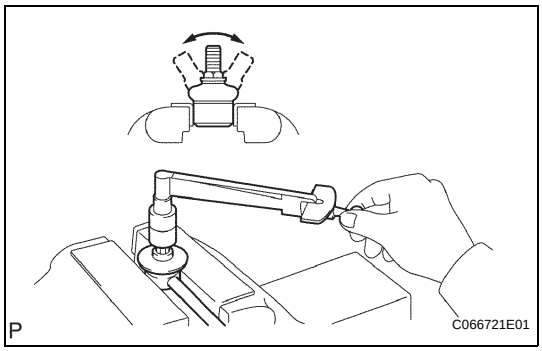
REMOVAL

1. **PLACE FRONT WHEEL FACING STRAIGHT AHEAD**
2. **REMOVE COLUMN HOLE COVER SILENCER SHEET (See page SR-9)**
3. **DISCONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY (See page PS-21)**
4. **DISCONNECT NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY**
5. **REMOVE FRONT WHEEL**
6. **REMOVE ENGINE UNDER COVER LH**
7. **REMOVE ENGINE UNDER COVER RH**
8. **REMOVE FRONT STABILIZER LINK ASSEMBLY LH**
   (a) Remove the 2 nuts and front stabilizer link LH.
   HINT:
   Use a 6 mm hexagon wrench to hold the stud if the ball joint turns together with the nut.



9. **REMOVE FRONT STABILIZER LINK ASSEMBLY RH**
   HINT:
   Use the same procedures described for the LH side.
10. **DISCONNECT TIE ROD END SUB-ASSEMBLY LH (See page DS-6)**
11. **DISCONNECT TIE ROD END SUB-ASSEMBLY RH (See page PS-21)**
12. **DISCONNECT PRESSURE FEED TUBE ASSEMBLY (See page PS-21)**
13. **DISCONNECT FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY LH (See page SP-22)**
14. **DISCONNECT FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY RH**
    HINT:
    Use the same procedures described for the LH side.
15. **REMOVE FRONT FLOOR PANEL BRACE (See page EX-2)**
16. **REMOVE CENTER EXHAUST PIPE ASSEMBLY (See page EX-2)**
17. **REMOVE HOOD SUB-ASSEMBLY**
18. **REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY**
19. **SUSPEND ENGINE ASSEMBLY (See page MX-19)**
20. **REMOVE NO. 1 HOOK (See page PS-22)**
21. **REMOVE FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY (See page PS-22)**





22. REMOVE FRONT NO. 1 STABILIZER BRACKET LH

(a) Remove the 2 bolts and front No. 1 stabilizer bracket LH from the suspension crossmember.

23. REMOVE FRONT NO. 1 STABILIZER BRACKET RH

HINT:

Use the same procedures described for the LH side.

24. REMOVE FRONT NO. 1 STABILIZER BAR BUSH

(a) Remove the 2 No. 1 stabilizer bar bushes from the stabilizer bar.

25. REMOVE FRONT STABILIZER BAR

INSPECTION

1. INSPECT FRONT STABILIZER LINK ASSEMBLY

(a) Secure the stabilizer link LH with a vise.

(b) Install the nut to the stud bolt.

(c) Flip the ball joint back and forth 5 times or more.

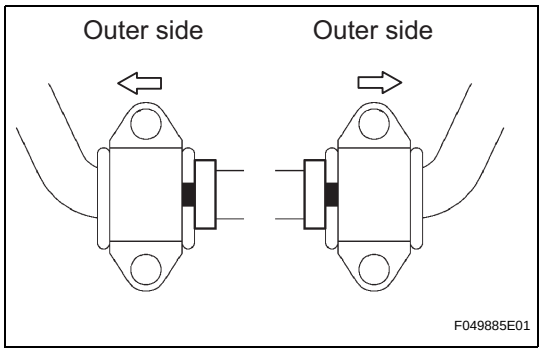
(d) Use a torque wrench to turn the nut continuously at a rate of 3 to 5 seconds per turn. Take the torque reading on the fifth turn.

Torque: Standard turning torque

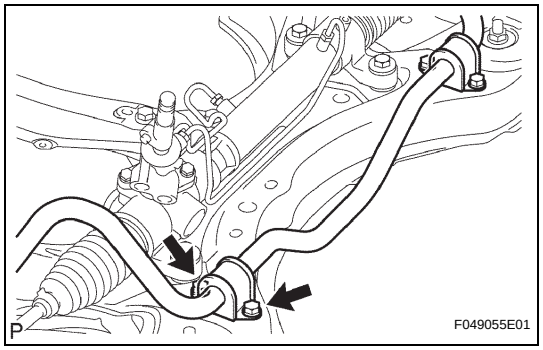
1.0 N*m (10 kgf*cm, 8.9 in.*lbf) or less

(e) Check the dust boots for cracks or grease leakage. If the value is not within the specified range, replace the stabilizer link with a new one.

INSTALLATION



1. **INSTALL FRONT STABILIZER BAR**
2. **INSTALL FRONT NO. 1 STABILIZER BAR BUSH**
   (a) Install the bushes to the outer side of the bush stopper on the stabilizer bar.
   NOTICE:
   Place the cutout of the stabilizer bush facing the rear side.

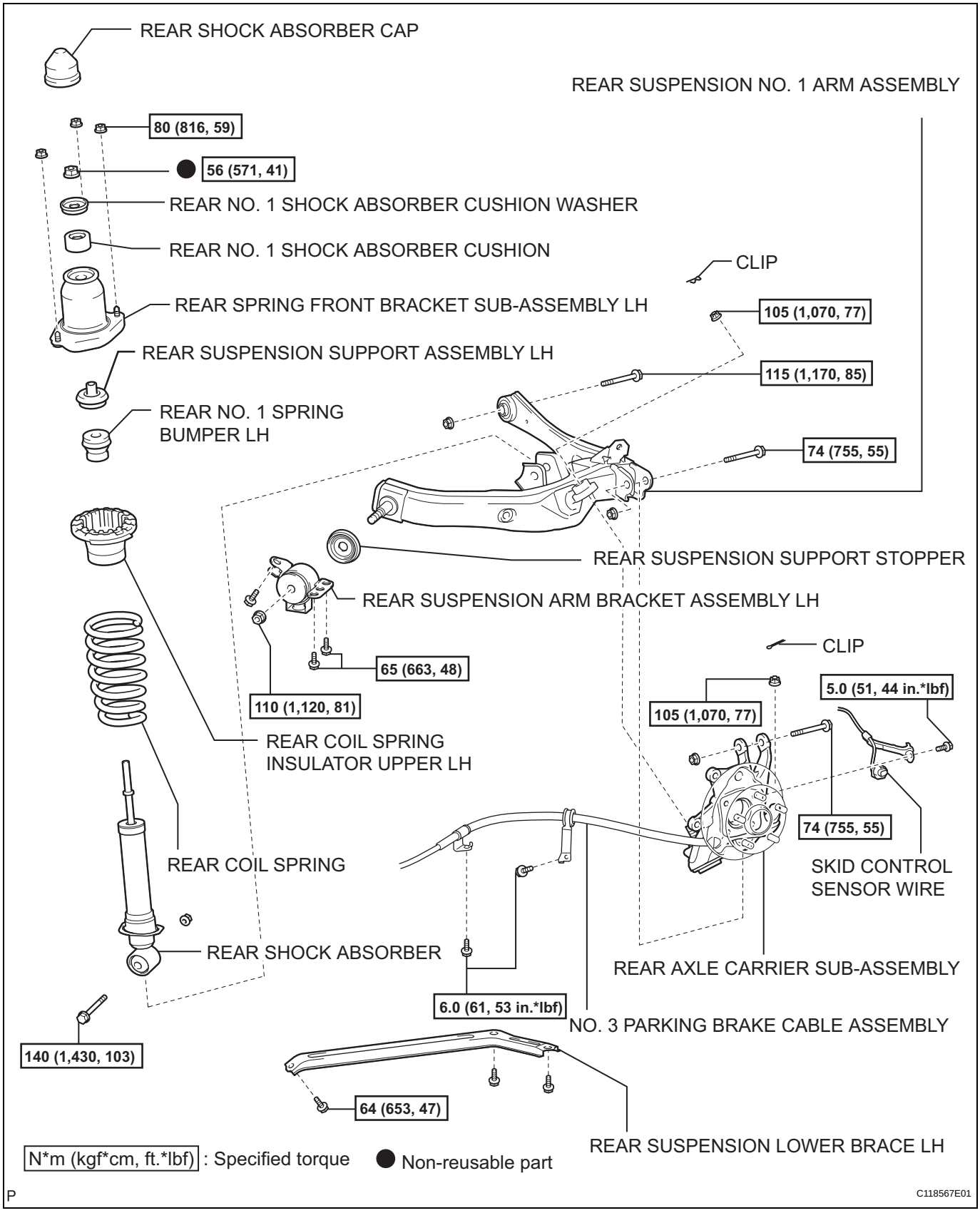


3. **INSTALL FRONT NO. 1 STABILIZER BRACKET LH**
   (a) Install the No. 1 stabilizer bracket to the suspension crossmember with the 2 bolts.
   Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)
4. **INSTALL FRONT NO. 1 STABILIZER BRACKET RH**
   HINT:
   Use the same procedures described for the LH side.
5. **INSTALL FRONT SUSPENSION CROSSMEMBER SUB-ASSEMBLY (See page PS-37)**
6. **INSTALL NO. 1 HOOK (See page PS-38)**
7. **CONNECT FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY LH (See page SP-24)**
8. **CONNECT FRONT SUSPENSION NO. 1 LOWER ARM SUB-ASSEMBLY RH**
   HINT:
   Use the same procedures described for LH side.
9. **INSTALL FRONT STABILIZER LINK ASSEMBLY LH**
10. **INSTALL FRONT STABILIZER LINK ASSEMBLY RH**
11. **CONNECT PRESSURE FEED TUBE ASSEMBLY (See page PS-38)**
12. **CONNECT TIE ROD END SUB-ASSEMBLY LH**
    (a) Connect the tie rod end LH (see page PS-36).
13. **CONNECT TIE ROD END SUB-ASSEMBLY RH**
    HINT:
    Use the same procedures described for LH side.
14. **INSTALL CENTER EXHAUST PIPE ASSEMBLY (See page EX-4)**
15. **INSTALL FRONT FLOOR PANEL BRACE (See page EX-5)**
16. **INSTALL FRONT WHEEL**
17. **CONNECT NO. 1 STEERING COLUMN HOLE COVER SUB-ASSEMBLY**
18. **CONNECT NO. 2 STEERING INTERMEDIATE SHAFT ASSEMBLY (See page PS-39)**

19. **INSTALL COLUMN HOLE COVER SILENCER SHEET**
    (a) Install the silencer sheet (see page SR-14).
20. **INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY**
21. **ADD POWER STEERING FLUID**
22. **BLEED POWER STEERING FLUID**
    (a) Bleed the power steering fluid (see page PS-3).
23. **CHECK POWER STEERING FLUID LEVEL IN RESERVOIR**
    (a) Check the power steering fluid level in reservoir (see page PS-3).
24. **CHECK POWER STEERING FLUID LEAKS**
25. **INSPECT HOOD SUB-ASSEMBLY**
26. **ADJUST HOOD SUB-ASSEMBLY (See page ED-1)**
27. **INSPECT AND ADJUST FRONT WHEEL ALIGNMENT**
    (a) Inspect and adjust the front wheel alignment (see page SP-2).
28. **INSTALL ENGINE UNDER COVER LH**
29. **INSTALL ENGINE UNDER COVER RH**

REAR SHOCK ABSORBER WITH COIL SPRING

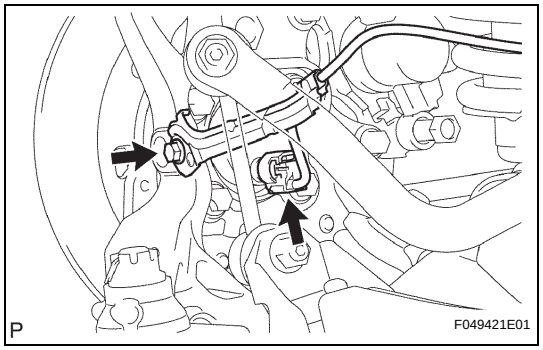
COMPONENTS



SP

REMOVAL

1. **REMOVE TONNEAU COVER ASSEMBLY**
   (a) Remove the tonneau cover (see page IR-8).
2. **REMOVE DECK BOARD ASSEMBLY**
   (a) Remove the deck board (see page IR-8).
3. **REMOVE BACK DOOR SCUFF PLATE (See page IR-8)**
4. **REMOVE DECK FLOOR BOX LH (See page IR-8)**
5. **REMOVE DECK FLOOR BOX RH (See page IR-8)**
6. **REMOVE ROPE HOOK**
   (a) Remove the rope hook (see page IR-8).
7. **REMOVE REAR NO. 1 FLOOR BOARD (See page IR-9)**
8. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
9. **REMOVE REAR SEATBACK ASSEMBLY (See page SE-17)**
10. **REMOVE FRONT DOOR SCUFF PLATE (See page IR-9)**
11. **REMOVE NO. 1 LUGGAGE COMPARTMENT TRIM HOOK**
    (a) Remove the No. 1 luggage compartment trim hook (see page IR-8).
12. **REMOVE NO. 1 SIDE TRIM ASSEMBLY (See page IR-10)**
13. **REMOVE NO. 2 DECK SIDE TRIM HOOK**
    (a) Remove the No. 2 deck side trim hook (see page IR-8).
14. **REMOVE DECK TRIM SIDE PANEL ASSEMBLY**
    (a) Remove the deck trim side panel (see page IR-8).
15. **REMOVE REAR WHEEL**
16. **DISCONNECT SKID CONTROL SENSOR WIRE**
    (a) Disconnect the skid control sensor connector.
    (b) Remove the bolt and wire bracket.



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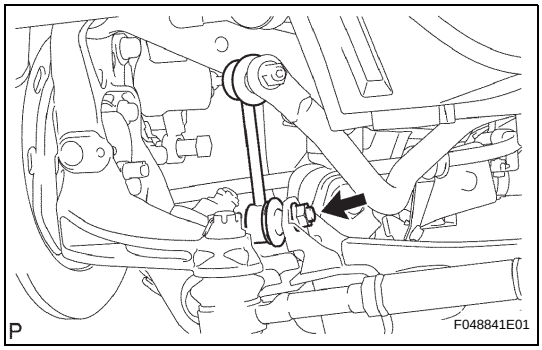
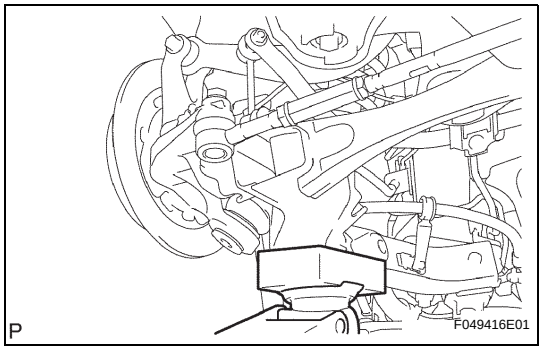


17. DISCONNECT REAR STABILIZER LINK ASSEMBLY LH

(a) Remove the nut and disconnect the stabilizer link LH.
HINT:
If the ball joint turns together with the nut, use a h5 mm hexagon wrench to hold the stud.

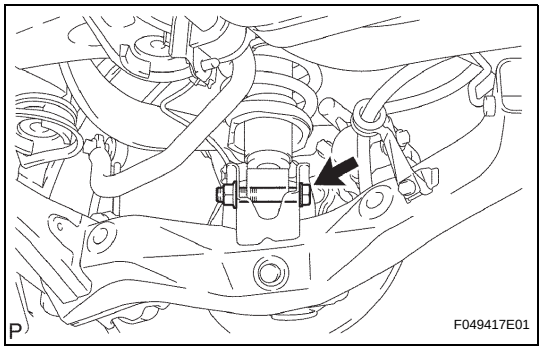
18. DISCONNECT REAR STABILIZER LINK ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.

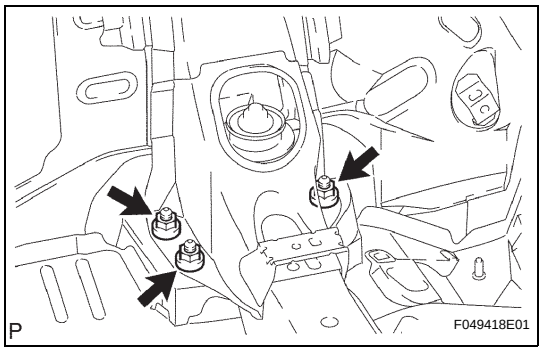


19. REMOVE REAR SHOCK ABSORBER WITH COIL SPRING

(a) Support the suspension No. 1 arm LH.

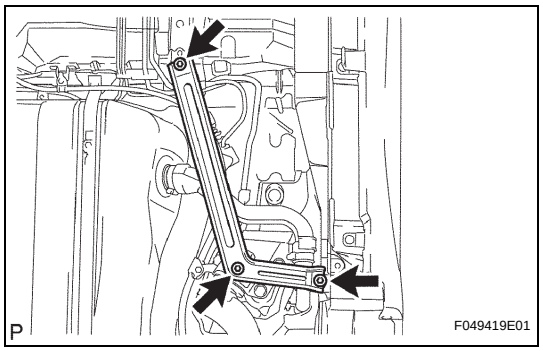


(b) Remove the bolt and nut from the No. 1 suspension arm LH.
NOTICE:
When removing the bolt, hold the nut in place.

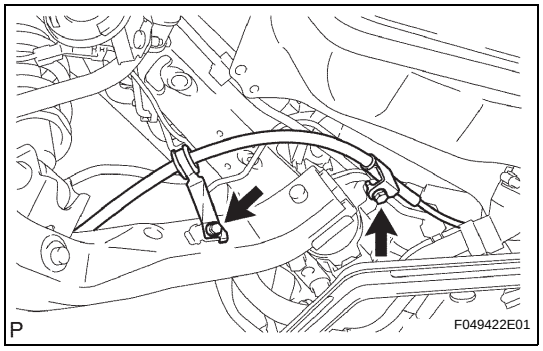


(c) Remove the 3 nuts.

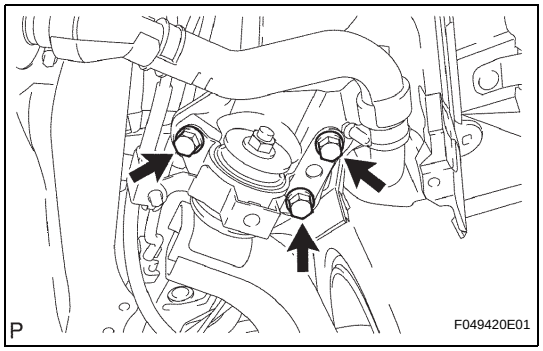
SP



(d) Remove the 3 bolts and suspension lower brace LH.



(e) Remove the 2 bolts, and disconnect the No. 3 parking brake cable.



(f) Remove the 3 bolts from the suspension arm bracket LH.
(g) Press the No. 1 suspension arm LH down to the outside of the vehicle and remove the shock absorber with coil spring.

DISASSEMBLY

1. REMOVE REAR SHOCK ABSORBER CAP

(a) Remove the cap from the shock absorber.

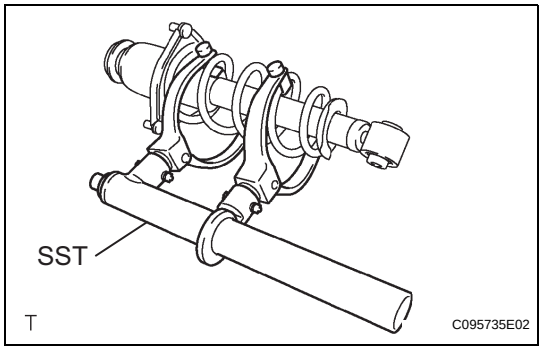
2. REMOVE REAR SHOCK ABSORBER

(a) Using SST, compress the coil spring.

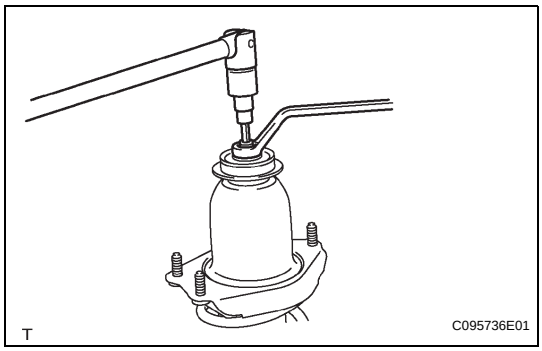
SST 09727-30021 (09727-00010, 09727-00021, 09727-00031)

NOTICE:

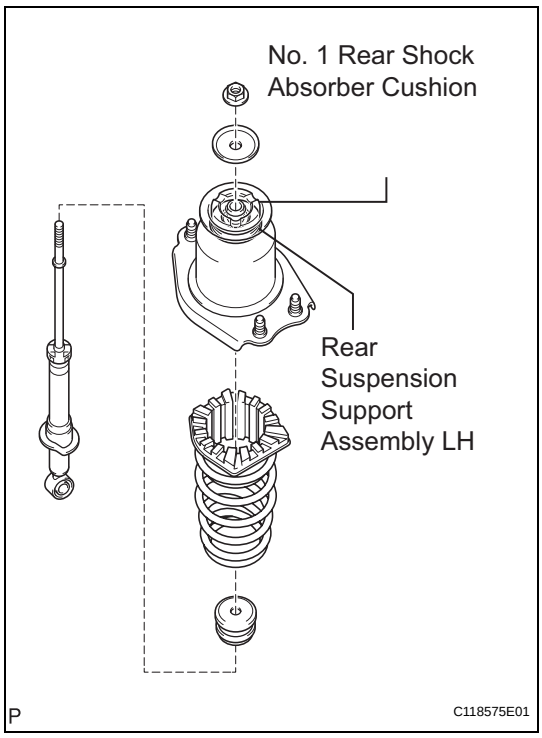
Do not use an impact wrench. It will damage SST.



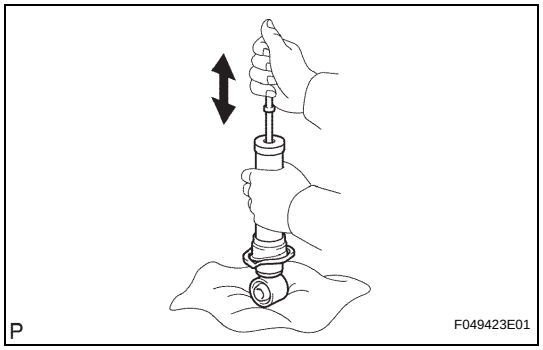
(b) Using a 6 mm hexagon wrench to hold the piston rod, remove the nut.



(c) Remove the No. 1 shock absorber cushion washer.
(d) Remove the suspension support LH.
(e) Remove the spring front bracket LH.
(f) Remove the No. 1 shock absorber cushion.
(g) Remove the No. 1 spring bumper LH.
(h) Remove the coil spring insulator upper LH.
(i) Remove the coil spring.



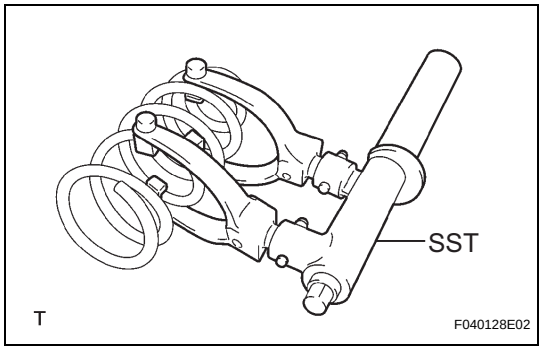
SP



INSPECTION

1. INSPECT REAR SHOCK ABSORBER

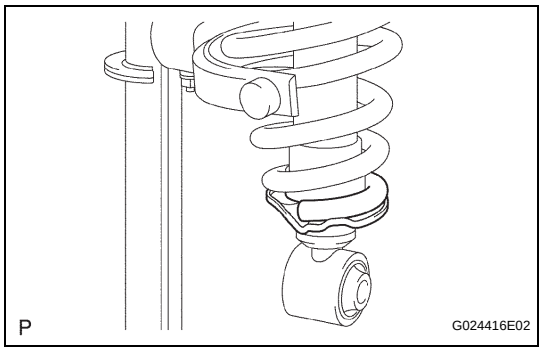
(a) Compress and extend the shock absorber rod and check for unusual resistance or unusual sound during the operation.
If there is any malfunction, replace the shock absorber with a new one.



REASSEMBLY

1. INSTALL REAR SHOCK ABSORBER

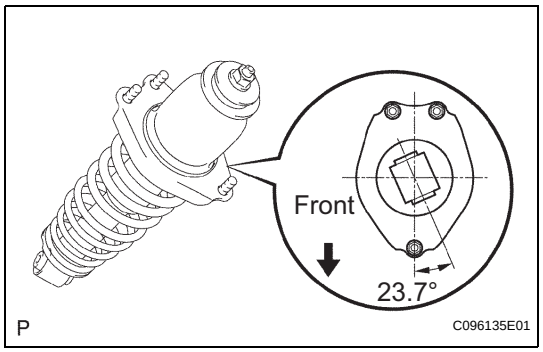
(a) Using SST, compress the coil spring.
SST 09727-30021 (09727-00010, 09727-00021, 09727-00031)
NOTICE:
Do not use an impact wrench. It will damage SST.



(b) Install the coil spring to the shock absorber.
NOTICE:
Fit the lower end of the coil spring into the gap of the spring lower seat.

(c) Install the No. 1 spring bumper LH and suspension support LH.

(d) Set the coil spring insulator upper LH to the spring front bracket LH.



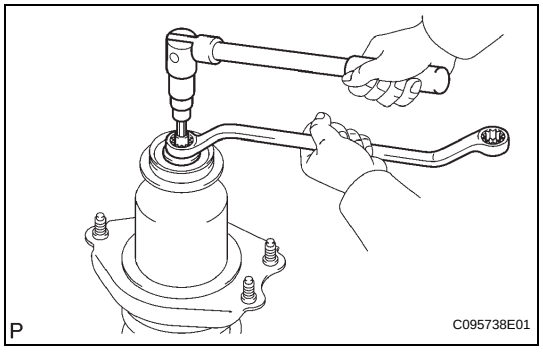
(e) Position the spring front bracket LH with coil spring insulator upper LH as shown in the illustration.
HINT:
Place the RH side on the symmetric position to the illustration.

(f) Install the suspension support LH and No. 1 shock absorber cushion washer.

(g) Temporarily tighten a new center nut.

(h) Remove SST.

(i) Recheck the direction of the spring bracket.

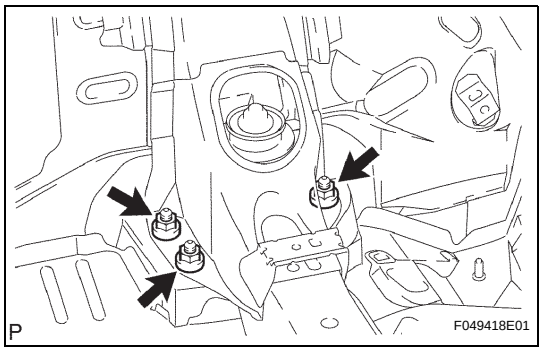


(j) Using a 6 mm hexagon wrench to hold the piston rod, tighten the nut.
Torque: 56 N*m (571 kgf*cm, 41 ft.*lbf)

2. INSTALL REAR SHOCK ABSORBER CAP

(a) Install the cap to the shock absorber.

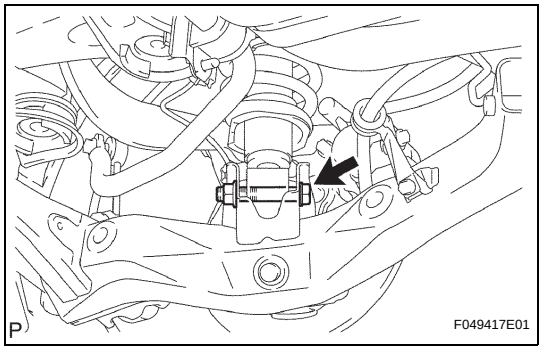
SP



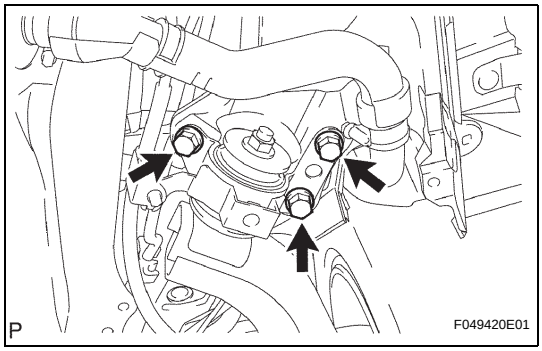
INSTALLATION

1. INSTALL REAR SHOCK ABSORBER WITH COIL SPRING

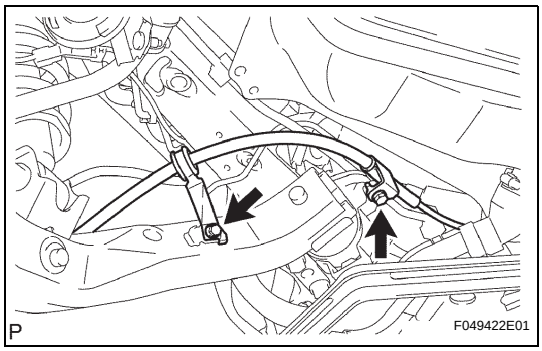
(a) Install the shock absorber with coil spring with the 3 nuts.
Torque: 80 N*m (816 kgf*cm, 59 ft.*lbf)



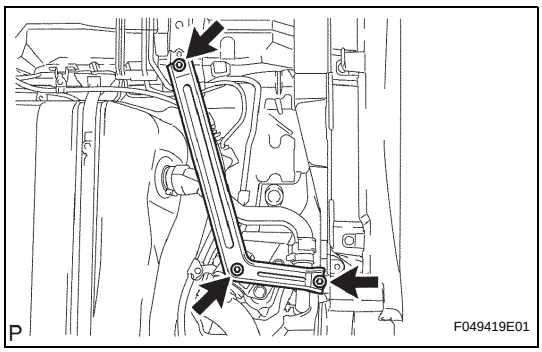
(b) Temporarily tighten the bolt and nut.
NOTICE:
When installing the bolt, tighten the bolt temporarily with the nut fixed.



(c) Install the suspension No. 1 arm LH with the 3 bolts.
Torque: 65 N*m (663 kgf*cm, 48 ft.*lbf)

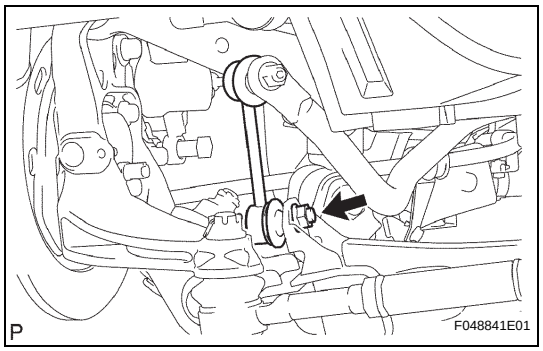


(d) Connect the No. 3 parking brake cable with the 2 bolts.
Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf)



(e) Install the suspension lower brace LH with the 3 bolts.
Torque: 64 N*m (653 kgf*cm, 47 ft.*lbf)

SP

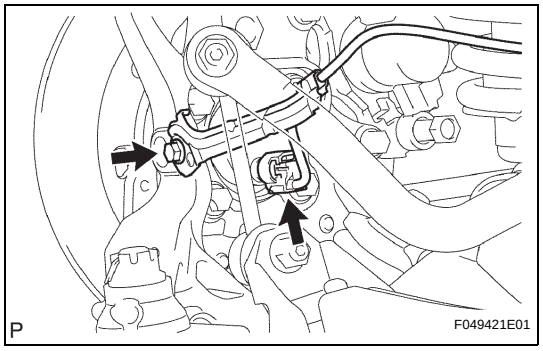


2. CONNECT REAR STABILIZER LINK ASSEMBLY LH

(a) Connect the stabilizer link LH with the nut.
Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf)
HINT:
If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.

3. CONNECT REAR STABILIZER LINK ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.



4. CONNECT SKID CONTROL SENSOR WIRE

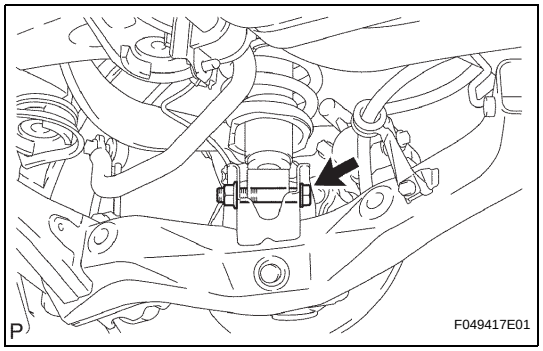
(a) Install the wire bracket and bolt.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
(b) Connect the skid control sensor connector.

5. INSTALL REAR WHEEL

Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

6. STABILIZE SUSPENSION

(a) Bounce the vehicle several times to stabilize the suspension.



7. FULLY TIGHTEN REAR SHOCK ABSORBER WITH COIL SPRING

(a) Fully tighten the bolt and nut.
Torque: 140 N*m (1,430 kgf*cm, 103 ft.*lbf)
NOTICE:
- **When installing the bolt, hold the nut in place.**
- **Be sure to empty the vehicle when fully tightening the bolt and nut.**

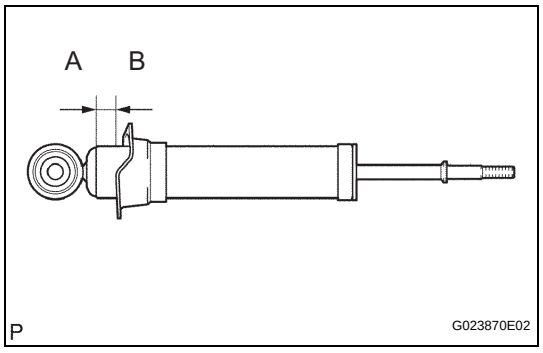
8. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

(a) Inspect and adjust the rear wheel alignment (see page SP-9).

9. CHECK ABS SPEED SENSOR SIGNAL

(a) Check ABS speed sensor signal (see page BC-4).

DISPOSAL



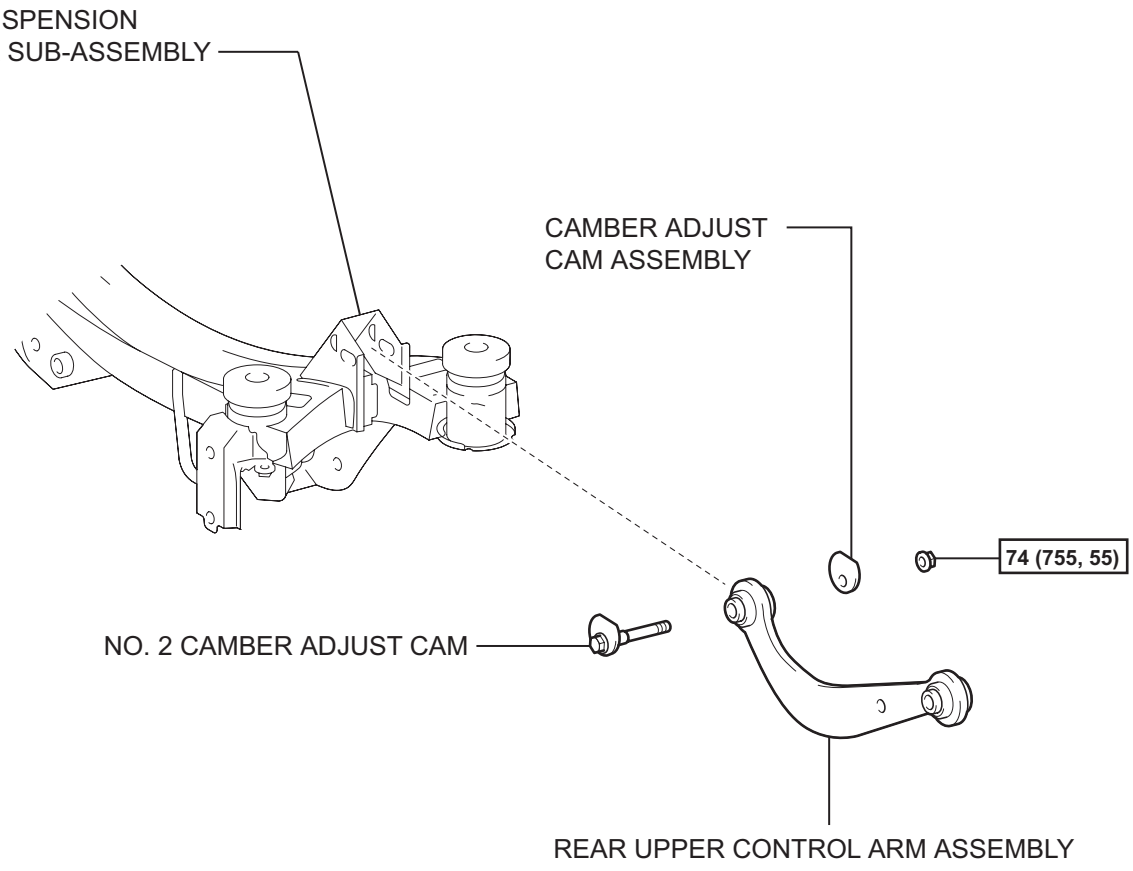
1. DISPOSE OF REAR SHOCK ABSORBER

(a) Fully extend the shock absorber rod.
(b) Using a drill, make a hole in the cylinder somewhere between A and B as shown in the illustration to discharge the gas inside the cylinder.
CAUTION:
Be careful when drilling because shards of metal may fly about, so always use the proper safety equipment.
NOTICE:
The discharged gas is colorless, odorless and non-poisonous.

SP

REAR UPPER CONTROL ARM

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

P

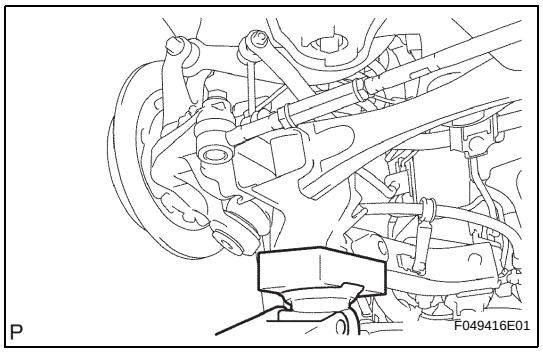
C118570E01

REMOVAL

1. REMOVE REAR WHEEL

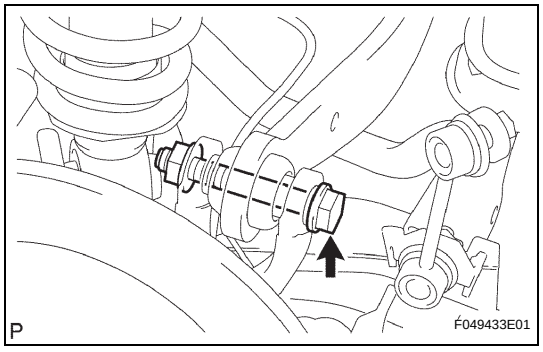
2. REMOVE REAR UPPER CONTROL ARM ASSEMBLY

(a) Support the No. 1 suspension arm.



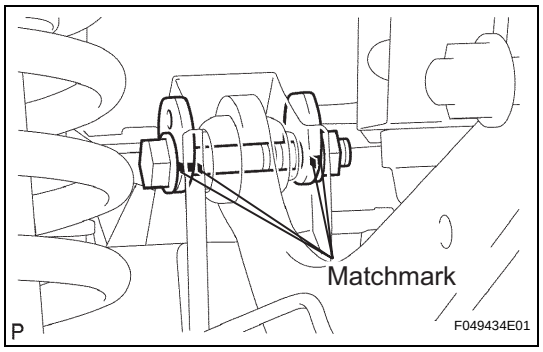
(b) Remove the bolt and nut, and disconnect the upper control arm.

NOTICE:
When removing the bolt, hold the nut in place.



(c) Put matchmarks on the camber adjust cam, No. 2 camber adjust cam and suspension member.

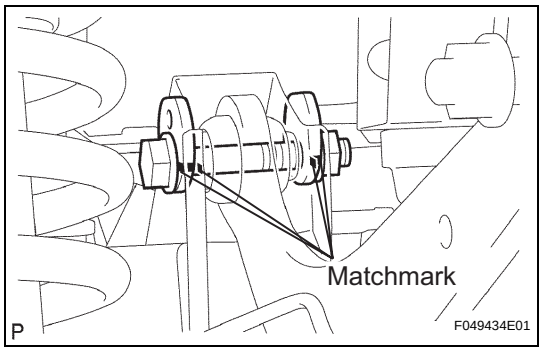
(d) Remove the nut, No. 2 camber adjust cam and camber adjust cam.



INSTALLATION

1. INSTALL REAR UPPER CONTROL ARM ASSEMBLY

(a) Install the camber adjust cam from the front side of the vehicle, and temporarily fix it with the nut and the No. 2 camber adjust cam.



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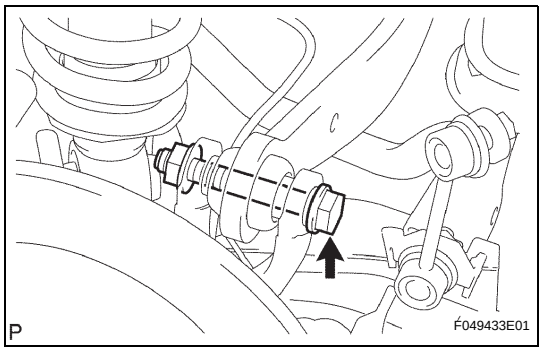
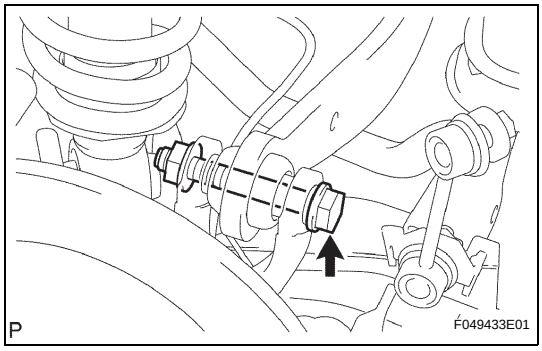


(b) Install the upper control arm, and temporarily tighten the bolt and nut.

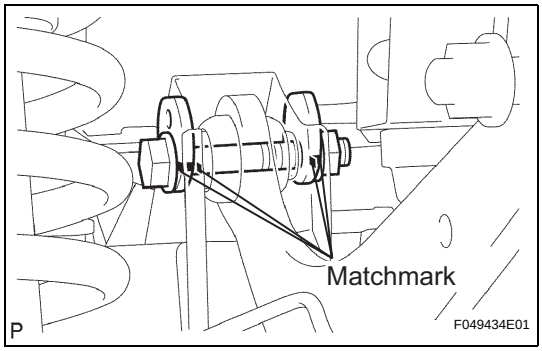
2. INSTALL REAR WHEEL
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

3. STABILIZE SUSPENSION (See page SP-38)



4. FULLY TIGHTEN REAR UPPER CONTROL ARM ASSEMBLY

(a) Fully tighten the bolt and nut.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
NOTICE:
When installing the bolt, hold the nut in place.



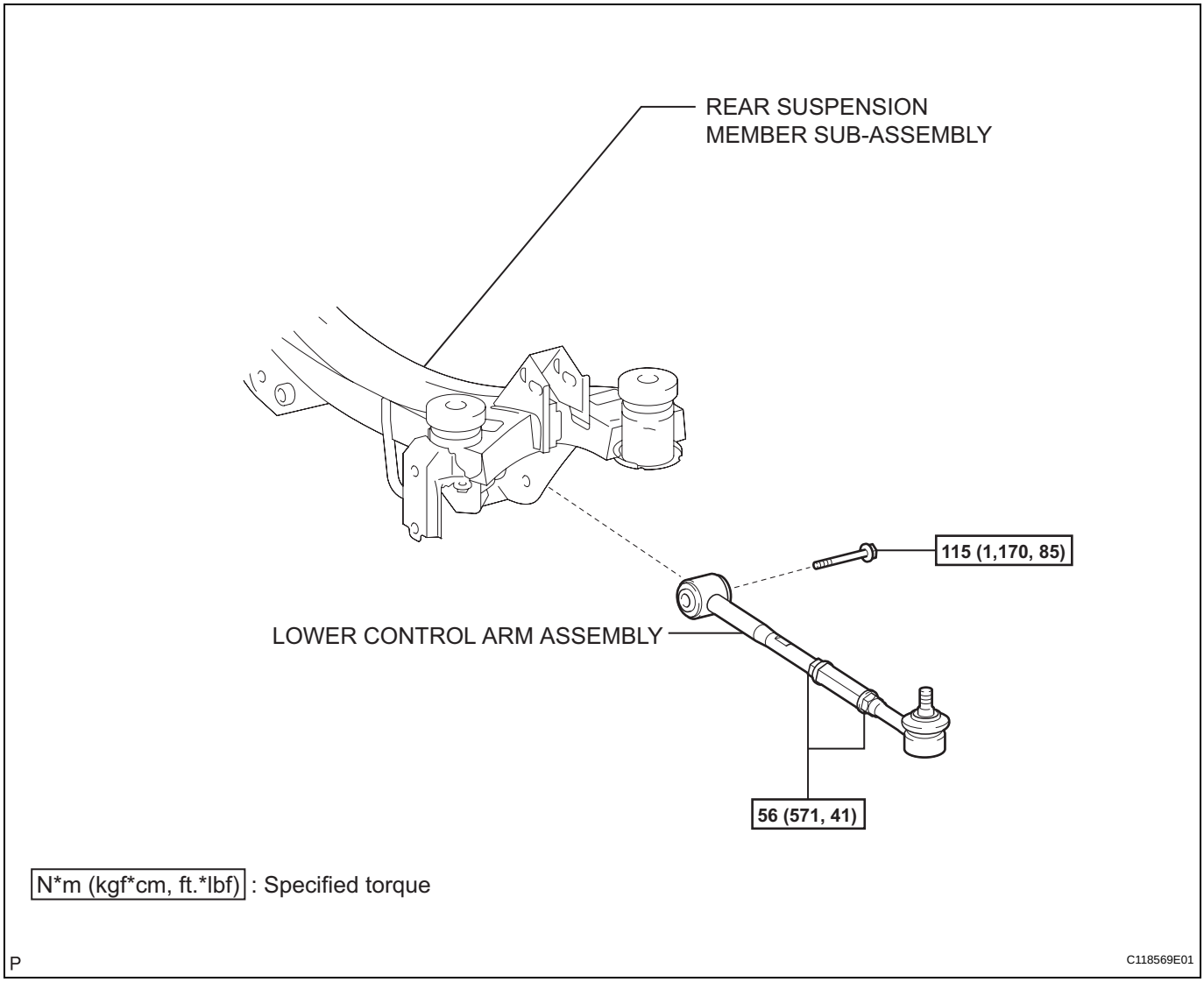
(b) Align the matchmarks, and fully tighten the nut.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)

5. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

(a) Inspect and adjust the rear wheel alignment (see page SP-9).

REAR LOWER CONTROL ARM

COMPONENTS

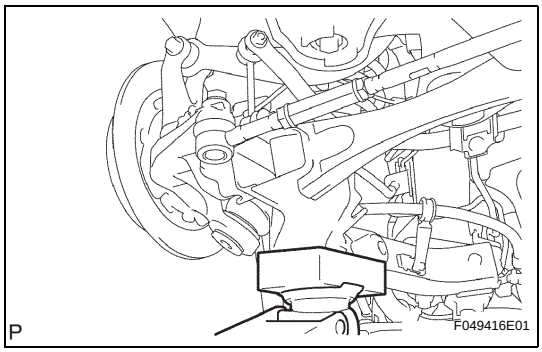


REMOVAL

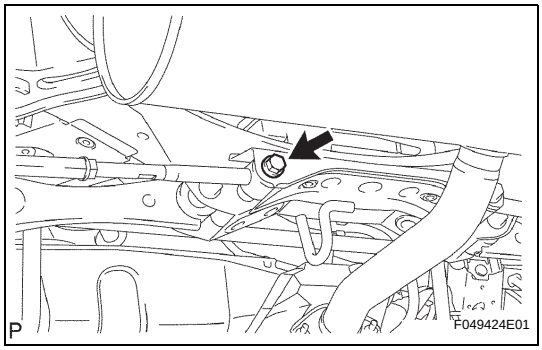
1. REMOVE REAR WHEEL

2. REMOVE LOWER CONTROL ARM ASSEMBLY

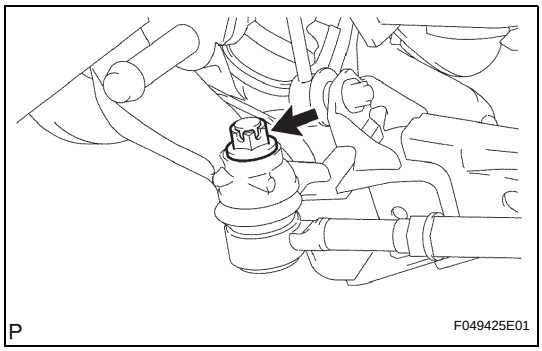
(a) Support the No. 1 suspension arm LH.



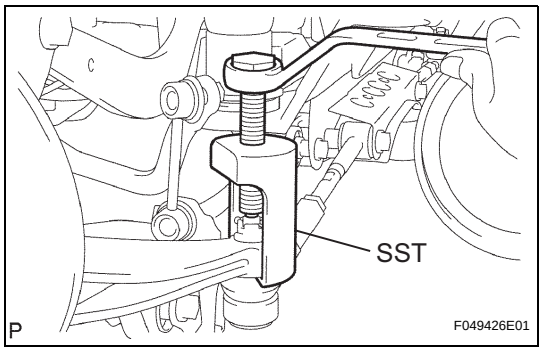
(b) Remove the bolt and disconnect the member side lower control arm LH fromt the rear suspension member.



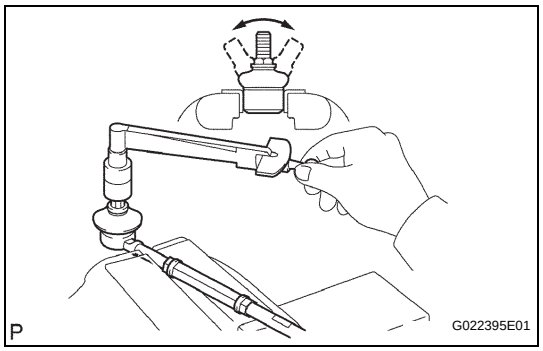
(c) Remove the clip and nut.



(d) Using SST, remove the lower control arm LH from the axle carrier LH.
SST 09610-20012
NOTICE:
Do not damage the dust cover.



SP



INSPECTION

1. INSPECT LOWER CONTROL ARM ASSEMBLY

(a) Before installing the nut, flip the ball joint stud back and forth 5 times as shown in the illustration.

(b) Using a torque wrench, continuously turn the nut for 2 to 4 seconds per turn, and take the torque reading at the fifth turn.

Torque: Standard turning torque
3.5 N*m (36 kgf*cm, 31 in.*lbf) or less

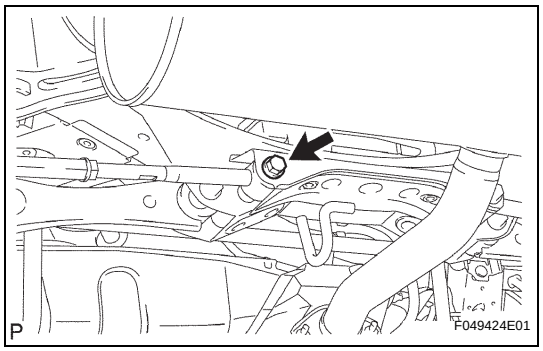
NOTICE:

- **Make sure that neither unusual drag nor rattle occurs during the rotation.**
- **Make sure that neither crack nor grease leakage exists on the dust cover.**
- **Make sure that the lower control arm LH is not deformed.**

INSTALLATION

1. INSTALL LOWER CONTROL ARM ASSEMBLY

(a) Install the lower control arm to the rear suspension member, and temporarily tighten the bolt.

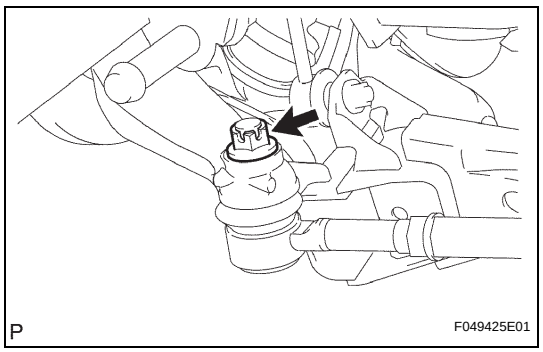


(b) Install the nut.
Torque: 105 N*m (1,050 kgf*cm, 77 ft.*lbf)

(c) Install the clip.

NOTICE:

- **When the holes for the clip are not aligned, adjust them by tightening the nut. The tightening angle for the adjustment must be less than 60°.**
- **Insert the clip from the rear side of the vehicle.**



2. INSTALL REAR WHEEL
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

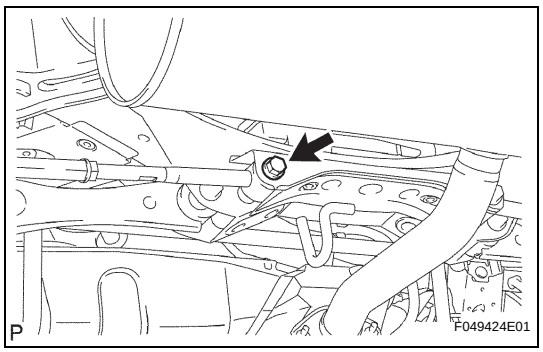
3. STABILIZE SUSPENSION (See page SP-38)

4. FULLY TIGHTEN LOWER CONTROL ARM ASSEMBLY

(a) Fully tighten the bolt.
Torque: 115 N*m (1,170 kgf*cm, 85 ft.*lbf)

5. INSPECT AND ADJUST REAR WHEEL ALIGNMENT

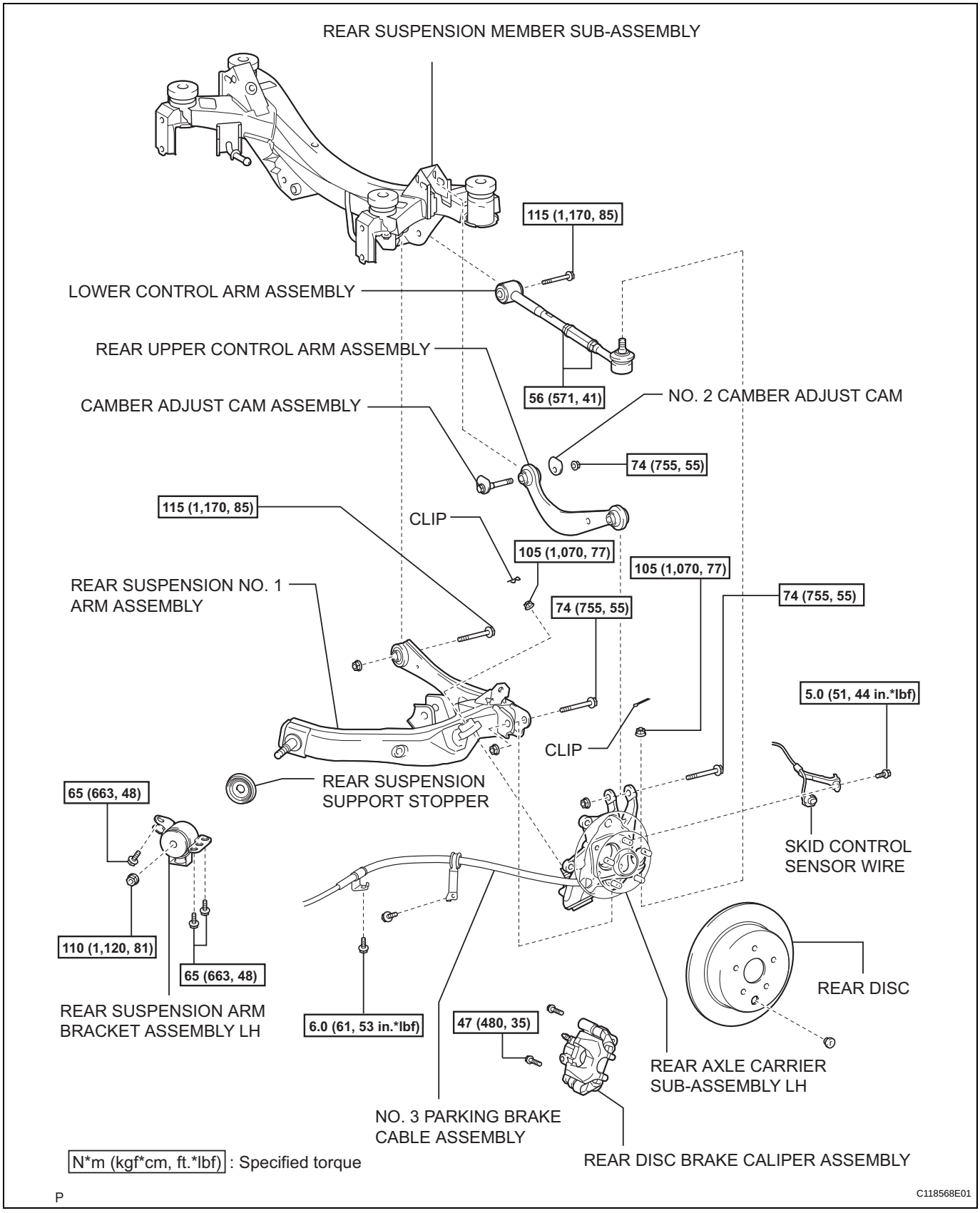
(a) Inspect and adjust the rear wheel alignment (see page SP-9).



SP

REAR NO. 1 SUSPENSION ARM

COMPONENTS



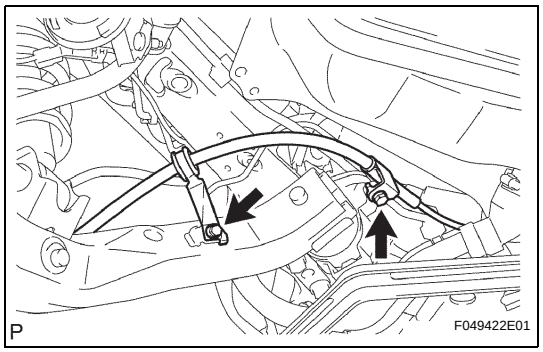
SP

REMOVAL

1. REMOVE REAR WHEEL

2. DISCONNECT NO. 3 PARKING BRAKE CABLE ASSEMBLY

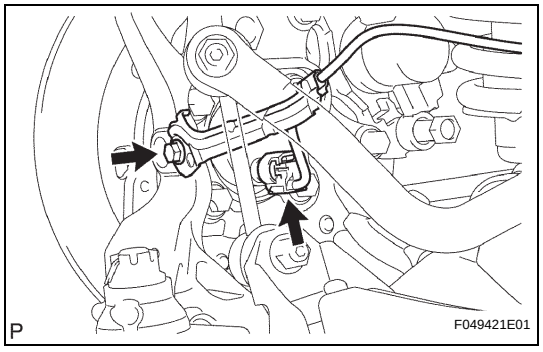
(a) Remove the 2 bolts and disconnect the No. 3 parking brake cable.



3. DISCONNECT SKID CONTROL SENSOR WIRE

(a) Disconnect the skid control sensor connector.

(b) Remove the bolt and disconnect the wire.

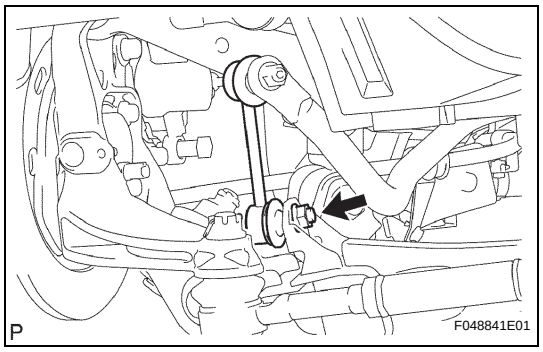


4. DISCONNECT REAR STABILIZER LINK ASSEMBLY

(a) Remove the nut, and disconnect the stabilizer link LH.

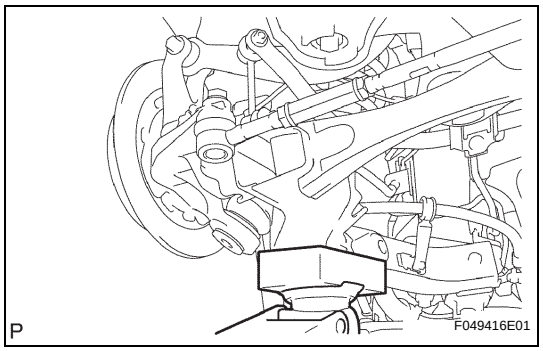
HINT:

If the ball joint turns together with the nut, use a 5mm hexagon wrench to hold the stud.

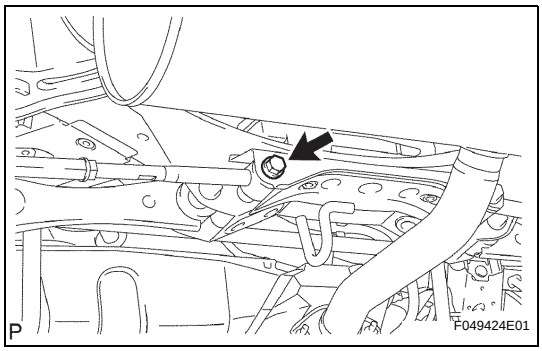


5. REMOVE LOWER CONTROL ARM ASSEMBLY

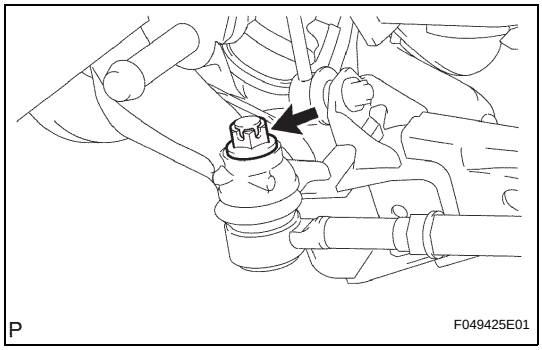
(a) Support the No. 1 suspension arm LH.



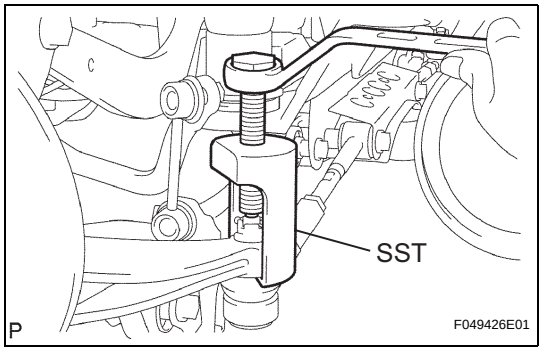
SP



(b) Remove the bolt and disconnect the member side lower control arm LH from the rear suspension member.



(c) Remove the clip and nut.

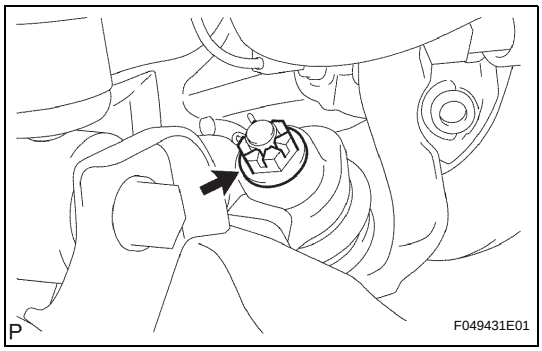


(d) Using SST, remove the lower control arm LH from the axle carrier LH.
SST 09610-20012
NOTICE:
Do not damage the dust cover.

6. REMOVE REAR DISC BRAKE CALIPER ASSEMBLY

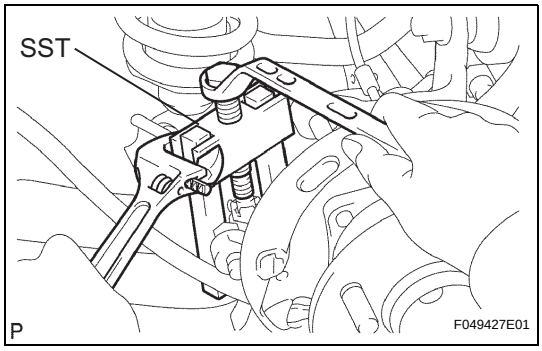
(a) Remove the disc brake caliper (see page BR-32).

7. REMOVE REAR DISC (See page BR-32)



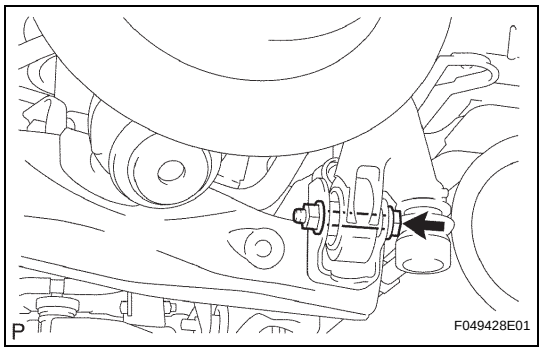
8. REMOVE REAR SUSPENSION NO. 1 ARM ASSEMBLY

(a) Remove the clip and nut.

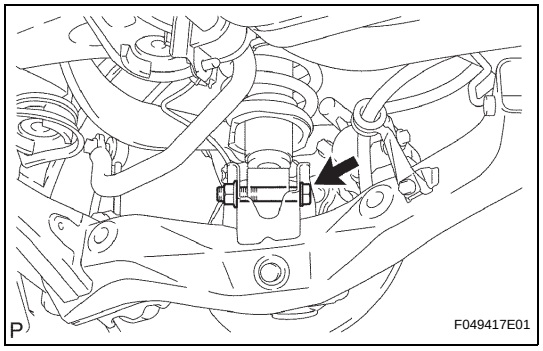


(b) Using SST, disconnect the axle carrier LH front side from the No. 1 suspension arm LH.
SST 09628-62011
NOTICE:
- **Do not damage the dust cover.**
- **Hang the upper control arm on the axle carrier LH side with a wire or equivalent.**

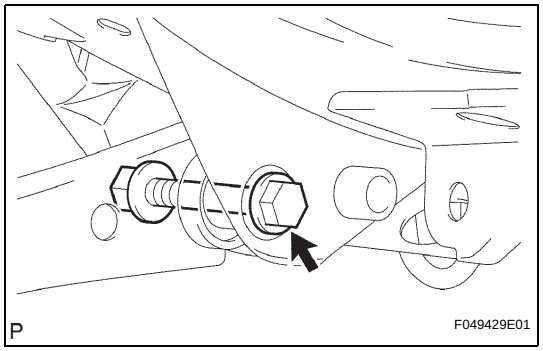
SP



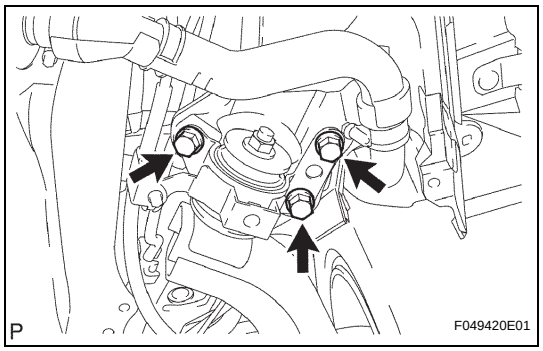
(c) Remove the bolt and nut, and disconnect the axle carrier LH side from the suspension No. 1 arm LH.
NOTICE:
When removing the bolt, hold the nut in place.



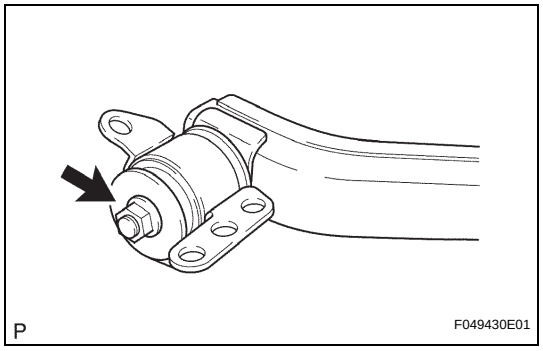
(d) Remove the bolt and nut, and disconnect the shock absorber with coil spring.
NOTICE:
When removing the bolt, hold the nut in place.



(e) Remove the bolt and nut, and disconnect the rear side suspension No. 1 arm LH.
NOTICE:
When removing the bolt, hold the nut in place.



(f) Remove the 3 bolts and suspension No. 1 arm LH.

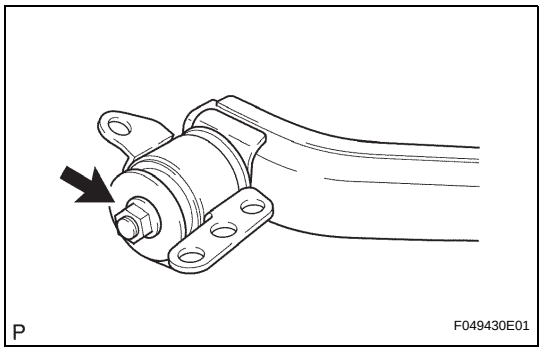


(g) Remove the nut, suspension arm bracket LH and suspension support stopper.

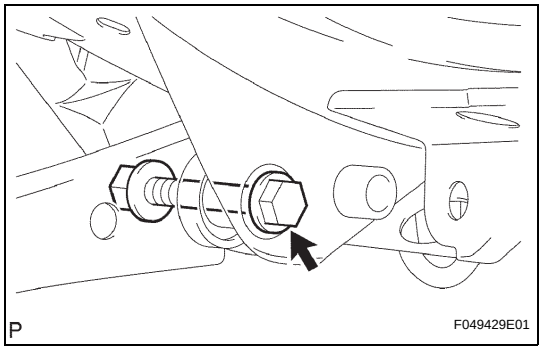
SP

INSTALLATION

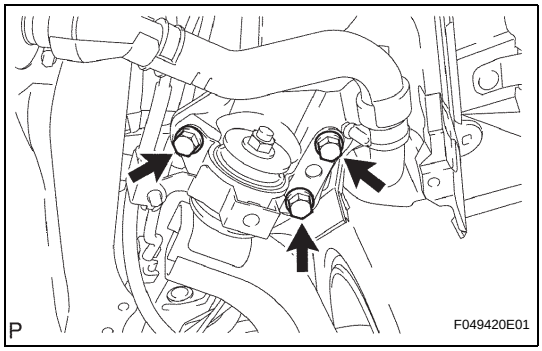
1. INSTALL REAR SUSPENSION NO. 1 ARM ASSEMBLY



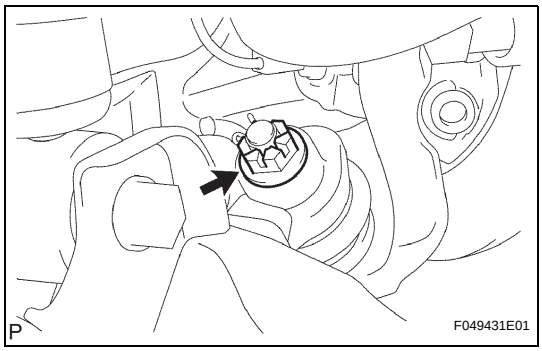
(a) Install the suspension support stopper and suspension arm bracket LH, and temporarily tighten the nut.



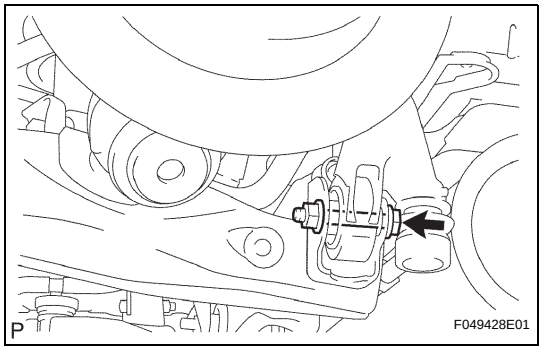
(b) Install the rear side suspension No. 1 arm LH and temporarily tighten the bolt and nut.
NOTICE:
When installing the bolt, hold the nut in place.



(c) Install the 3 bolts.
Torque: 65 N*m (663 kgf*cm, 48 ft.*lbf)

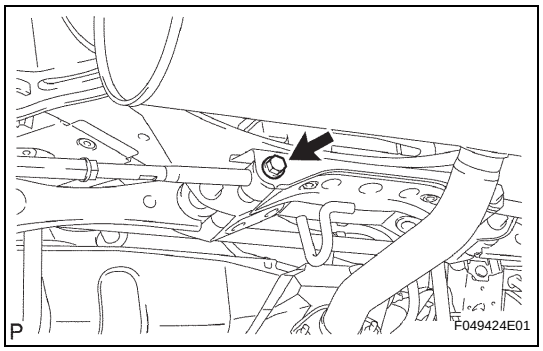


(d) Install the front side rear axle carrier LH to the suspension No. 1 arm LH and temporarily tighten the nut.

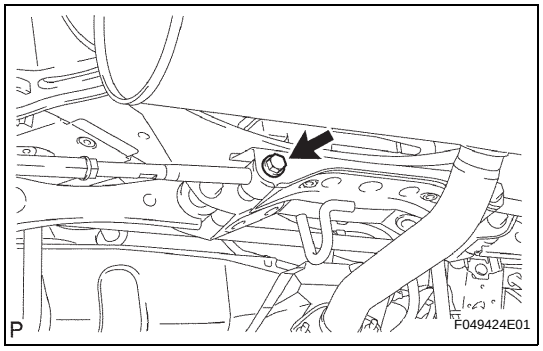


(e) Install the axle carrier LH to the No. 1 suspension arm LH and temporarily tighten the bolt and nut.

SP

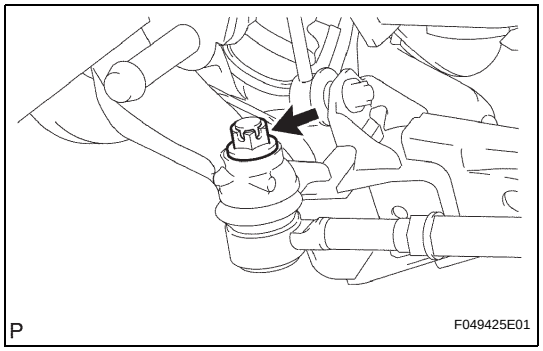


(f) Install the shock absorber with coil spring to the suspension No. 1 arm LH and temporarily tighten the bolt and nut.



2. INSTALL LOWER CONTROL ARM ASSEMBLY

(a) Install the lower control arm LH and temporarily tighten the bolt.

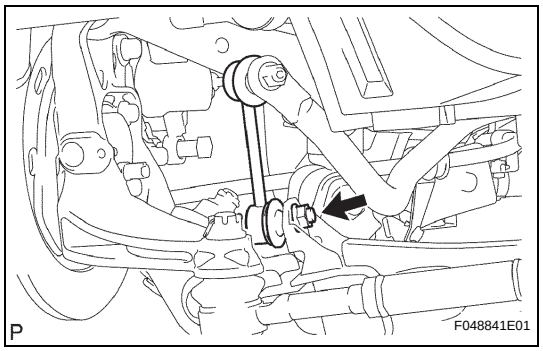


(b) Install the lower control arm LH to the axle carrier LH and temporarily tighten the nut.

3. INSTALL REAR DISC (See page BR-35)

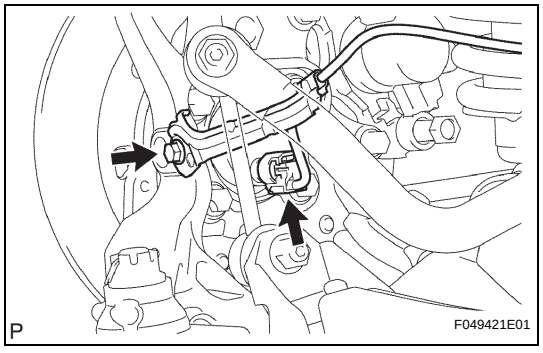
4. INSTALL REAR DISC BRAKE CALIPER ASSEMBLY

(a) Install the disc brake caliper (see page BR-34).



5. INSTALL REAR STABILIZER LINK ASSEMBLY

(a) Install the stabilizer link LH with the nut.
Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf)
HINT:
If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.

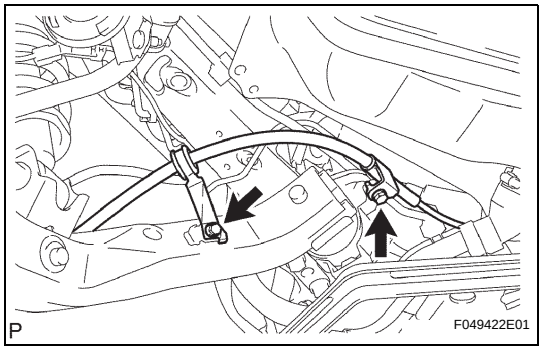


6. CONNECT SKID CONTROL SENSOR WIRE

(a) Install the wire with bolt.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)

(b) Connect the skid control sensor connector.

SP



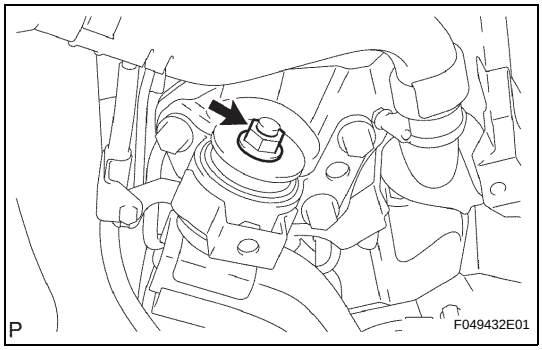
7. INSTALL NO. 3 PARKING BRAKE CABLE ASSEMBLY

(a) Connect the No. 3 parking brake cable with the 2 bolts.
Torque: 6.0 N*m (61 kgf*cm, 53 in.*lbf)

8. INSTALL REAR WHEEL
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

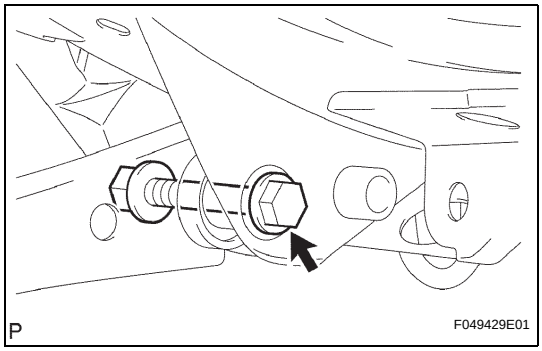
9. STABILIZE SUSPENSION

(a) Bounce the vehicle several times to stabilize the suspension.

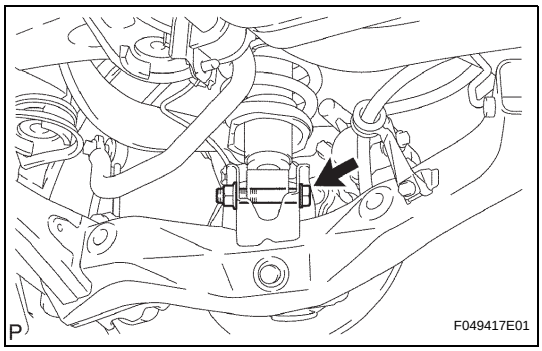


10. FULLY TIGHTEN REAR SUSPENSION NO. 1 ARM ASSEMBLY
NOTICE:
Be sure to empty the vehicle when fully tightening the bolt and nut.

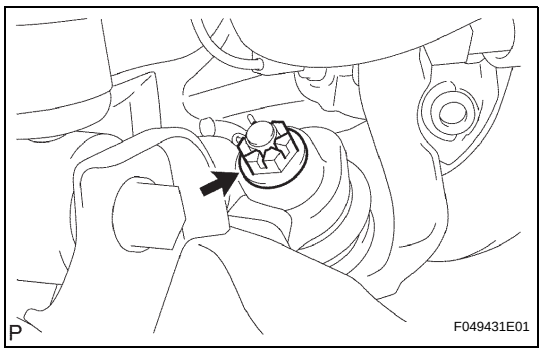
(a) Fully tighten the nut.
Torque: 110 N*m (1,120 kgf*cm, 81 ft.*lbf)



(b) Fully tighten the bolt.
Torque: 115 N*m (1,170 kgf*cm, 85 ft.*lbf)



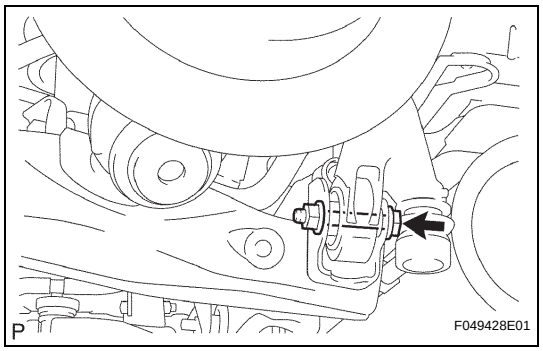
(c) Fully tighten the bolt and nut.
Torque: 140 N*m (1,430 kgf*cm, 103 ft.*lbf)
NOTICE:
When installing the bolt, hold the nut in place.



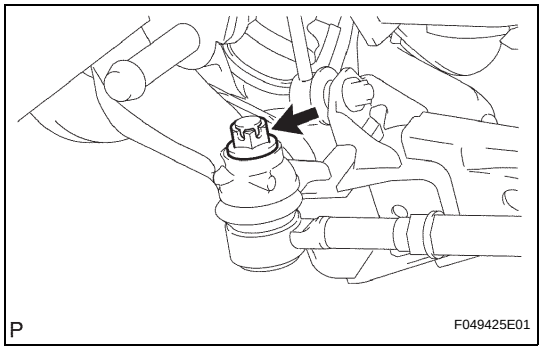
(d) Fully tighten the nut.
Torque: 105 N*m (1,070 kgf*cm, 77 ft.*lbf)

(e) Install the clip.
NOTICE:
- **When the holes for the clip are not aligned, adjust them by tightening the nut. The tightening angle for the adjustment must be less than 60°.**
- **Insert the clip from the front side of the vehicle.**

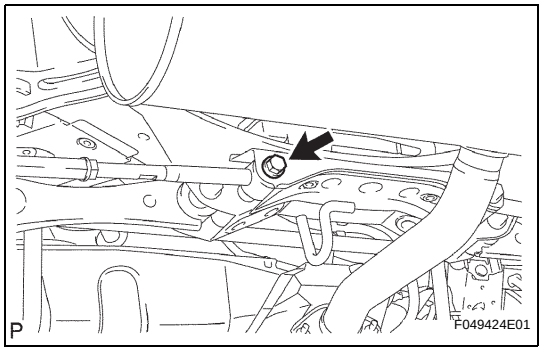
SP



(f) Fully tighten the bolt and nut.
Torque: 74 N*m (755 kgf*cm, 55 ft.*lbf)
NOTICE:
When installing the bolt, hold the nut in place.



11. FULLY TIGHTEN LOWER CONTROL ARM ASSEMBLY
NOTICE:
Be sure to empty the vehicle when fully tightening the bolt and nut.
(a) Fully tighten the nut.
Torque: 105 N*m (1,070 kgf*cm, 77 ft.*lbf)
(b) Install the clip.
NOTICE:
- **When the holes for the clip are not alignment, adjust them by tightening the nut. The tightening angle for the adjustment must be less than 60°.**
- **Insert the clip from the rear side of the vehicle.**



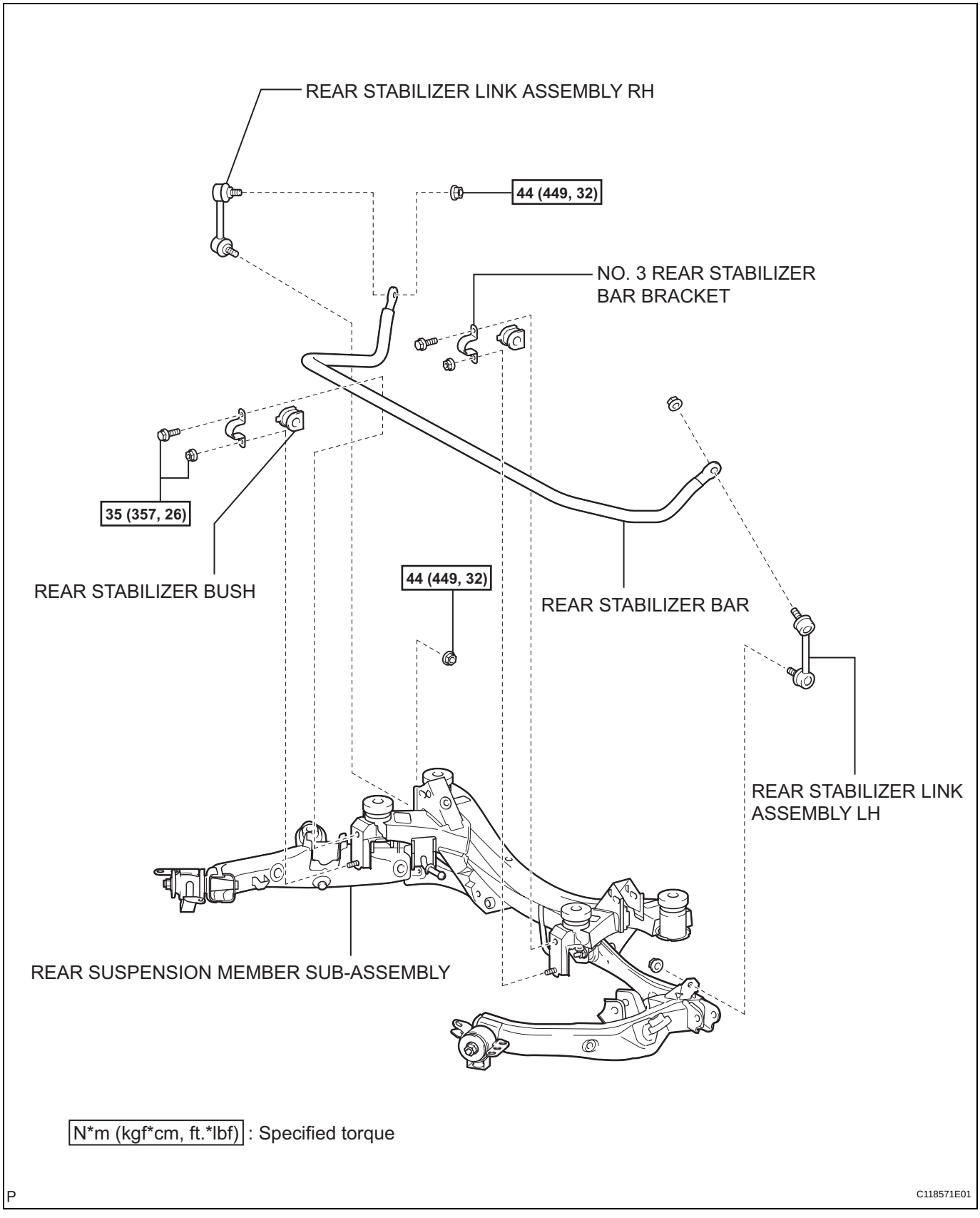
(c) Fully tighten the bolt.
Torque: 115 N*m (1,170 kgf*cm, 85 ft.*lbf)

12. INSPECT AND ADJUST REAR WHEEL ALIGNMENT
(a) Inspect and adjust the rear wheel alignment (see page SP-9).

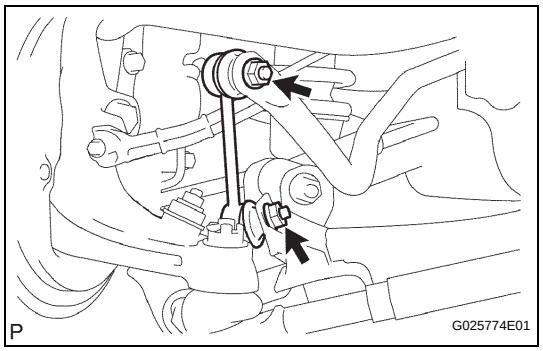
13. CHECK ABS SPEED SENSOR SIGNAL
(a) Check the ABS speed sensor signal (see page BC-4).

REAR STABILIZER BAR

COMPONENTS



SP



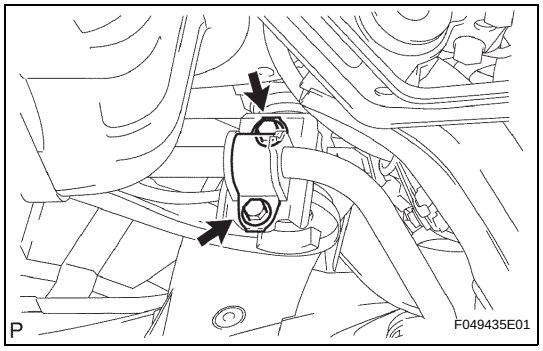
REMOVAL

1. REMOVE REAR STABILIZER LINK ASSEMBLY LH

(a) Remove the 2 nuts and stabilizer link LH.
HINT:
If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.

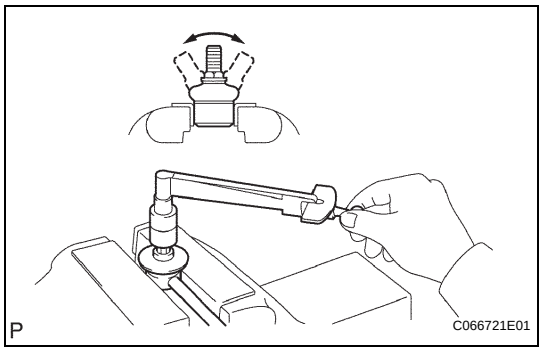
2. REMOVE REAR STABILIZER LINK ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.



3. REMOVE REAR STABILIZER BAR

(a) Remove the 2 bolts, 2 nuts and 2 No. 3 stabilizer bar brackets from the suspension member.
(b) Remove the 2 stabilizer bushes from the stabilizer bar.



INSPECTION

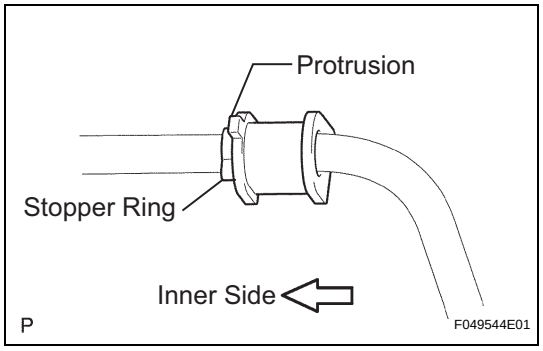
1. INSPECT REAR STABILIZER BAR

(a) Before installing the nut, flip the ball joint stud back and forth 5 times as shown in the illustration.
(b) Using a torque wrench, continuously turn the nut for 2 to 4 seconds per turn, and take the torque reading on the fifth turn.

Torque: Standard turning torque
1.0 N*m (10 kgf*cm, 8.7 in.*lbf) or less

NOTICE:

- **Make sure that neither unusual drag nor rattle occurs during the rotation.**
- **Make sure that neither crack nor grease leakage exists on the dust cover.**
- **Make sure that the stabilizer link LH is not deformed.**



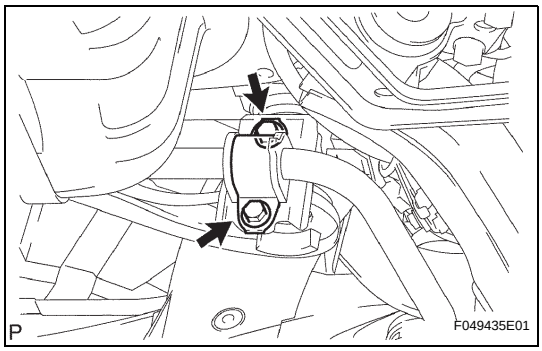
INSTALLATION

1. INSTALL REAR STABILIZER BAR

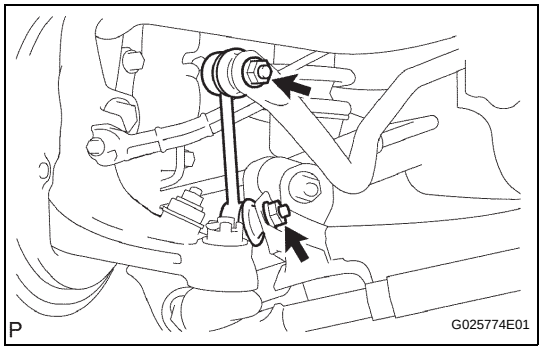
(a) Install the 2 stabilizer bushes to the stabilizer bar.
HINT:

- Install the stabilizer bush to the outer side of the stopper ring on the stabilizer bar.
- Install the stabilizer bush with the protrusion facing towards the inside of the vehicle.

SP



(b) Install the stabilizer bar and 2 No. 3 stabilizer bar brackets with the 2 bolts and 2 nuts.
Torque: 35 N*m (357 kgf*cm, 26 ft.*lbf)



2. INSTALL REAR STABILIZER LINK ASSEMBLY LH

(a) Install the stabilizer link LH with the 2 nuts.
Torque: 44 N*m (49 kgf*cm, 32 ft.*lbf)
HINT:
If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.

3. INSTALL REAR STABILIZER LINK ASSEMBLY RH

HINT:
Use the same procedures described for the LH side.

4. INSTALL REAR WHEEL ALIGNMENT

(a) Inspect and adjust the rear wheel alignment (see page SP-9).

TIRE AND WHEEL SYSTEM

PRECAUTION

1. REMOVAL AND INSTALLATION OF THE TIRE PRESSURE WARNING VALVE SUB-ASSEMBLY

(a) When installing a tire, make sure that the tire pressure warning valve sub-assembly does not interfere with the tire bead in order to prevent damage to the tire pressure warning valve sub-assembly.

(b) After completing the operation, remove the valve core to rapidly release the air in the tire and check that the tire pressure warning light comes on. If the warning light does not come on, the system may be defective.

(c) If there is air leakage, tighten the nut to a torque of 4.0 N*m (41 kgf*cm, 35 in.*lbf) and 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.

(d) When installing the tire pressure warning valve sub-assembly, check whether the rim, grommet, washer, and nut are clean. Use a manufacturer-specified cap.

(e) When putting air into the tire, first install the tire pressure valve straight onto the stem of the tire pressure warning valve sub-assembly.

2. TIRE AND WHEEL REPLACEMENT

(a) If replacing a tire, be sure to check the grommet of the tire valve and transmitter for damage. If the grommet is damaged, replace the grommet.

(b) If tires, wheels and tire valve and transmitter are replaced, register the transmitter ID (See page TW-15).

HOW TO PROCEED WITH TROUBLESHOOTING

1. VEHICLE PULLING DIAGNOSIS
2. DIAGNOSTICS OF TIRE VIBRATION

1	CHECK THAT WHEEL NUTS ARE FULLY TIGHTENED

NG → REPAIR

OK

2	CHECK TIRE PRESSURE

NG → Go to step 5

OK

3	CHECK WHEEL BALANCE

NG → Go to step 7

OK

4	INSPECT BEARING LOOSENESS AND AXLE HUB RUNOUT

NG → REPAIR

OK

REPLACE TIRE(S)

5	ADJUSTMENT

NEXT

6	CHECK WHEEL BALANCE

OK → Go to step 8

NG

7	ADJUSTMENT

NEXT

8	INSPECT BEARING LOOSENESS AND AXLE HUB RUNOUT

NG → REPAIR

OK

RETURN VEHICLE TO CUSTOMER

3. DIAGNOSIS OF IRREGULAR TIRE WEAR

1	CHECK TIRE PRESSURE

NG → Go to step 3

OK

2	CHECK WHEEL ALIGNMENT

NG → Go to step 5

OK

TIRE ROTATION OR REPLACE TIRE(S)

3	ADJUSTMENT

NEXT

4	CHECK WHEEL ALIGNMENT

NG → Go to step 5

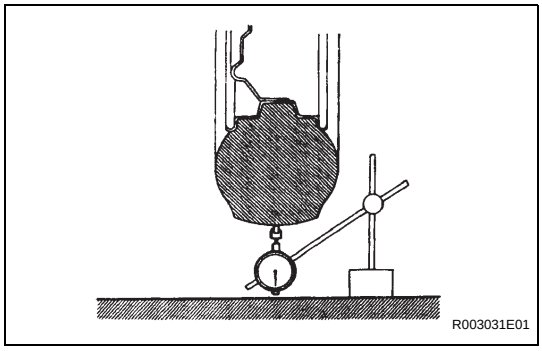
OK

TIRE ROTATION OR REPLACE TIRE(S)

5	ADJUSTMENT

NEXT

TIRE ROTATION OR REPLACE TIRE(S)



INSPECTION

1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.

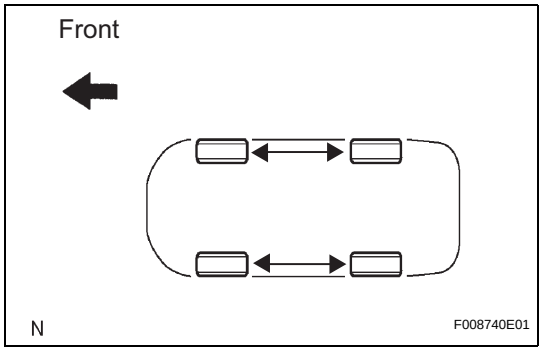
Cold tire inflation pressure

Tire Size	Front Pressure	Rear Pressure
215/45 ZR 17	220 kPa (2.2 kgf/cm^2, 32 psi)	200 kPa (2.0 kgf/cm^2, 29 psi)
205/55 R 16	220 kPa (2.2 kgf/cm^2, 32 psi)	200 kPa (2.0 kgf/cm^2, 29 psi)

(b) Using a dial indicator, check the tire runout.

Tire runout:

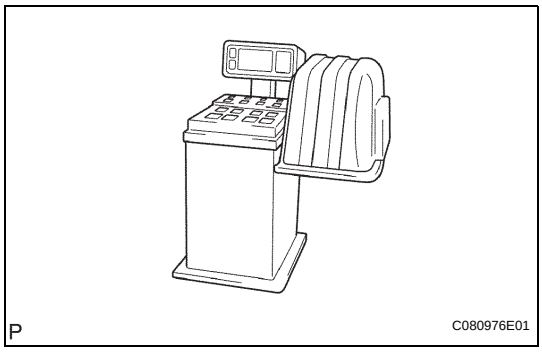
1.4 mm (0.055 in.) or less



2. ROTATE TIRES

HINT:

Rotate the tires as shown in the illustration.



3. INSPECT WHEEL BALANCE

(a) Check and adjust the off-the-car balance.

(1) Steel wheel

Imbalance after adjustment:

8.0 g (0.018 lb) or less

HINT:

If necessary, check and adjust the on-the-car balance.

(2) Others (Non-steel wheel)

Imbalance after adjustment:

8.0 g (0.018 lb) or less

HINT:

If necessary, check and adjust the on-the-car balance.

4. INSPECT BEARING LOOSENESS

(a) Inspect the bearing looseness (see page AH-6) for front.

(b) Inspect the bearing looseness (see page AH-17) for rear.

TW

5. INSPECT AXLE HUB RUNOUT

(a) Inspect the axle hub runout (see page AH-6) for front.

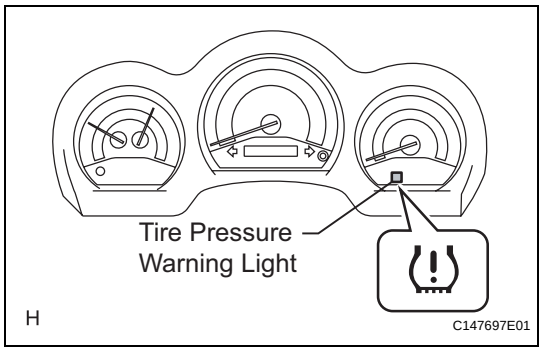
(b) Inspect the axle hub runout (see page AH-17) for rear.

TIRE PRESSURE WARNING SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

System	See procedure
Power window control system (w/ Jam protection function)	IN-23
Sliding roof system	



1. TIRE PRESSURE WARNING SYSTEM PRECAUTION

(a) When the tire pressure warning light comes on, immediately check the tire pressure of the tire and adjust it to the specified value. (The tire pressure warning light will come on after blinking for 1 minute if there is an open in the tire pressure warning light circuit.)

Cold tire inflation pressure

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	220 (2.2, 32)	200 (2.0, 29)
P205/55R16	220 (2.2, 32)	200 (2.0, 29)

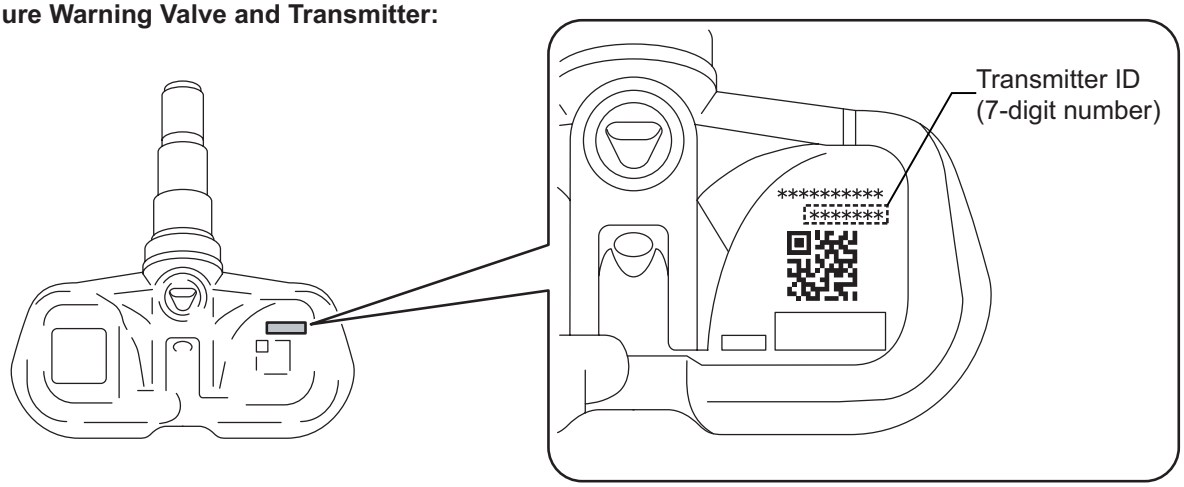
(b) When the tire pressure warning light comes on after blinking for 1 minute, there is a malfunction in the system. Check for DTCs.

(c) It is necessary to register the transmitter ID in the tire pressure warning ECU after replacing the tire pressure warning valve and transmitter and/or tire pressure warning ECU (See page TW-15).

(d) When replacing the tire pressure warning ECU;
(1) Using the DATA LIST, read the transmitter IDs registered in the ECU and make a note of them before removing the tire pressure warning ECU.
(2) Register the transmitter IDs after installing a new tire pressure warning ECU.

(e) When replacing the tire pressure warning valve and transmitter;
(1) Take a note of the 7-digit number (transmitter ID) written on the new tire pressure warning valve and transmitter when replacing it. Register the transmitter IDs in the tire pressure warning ECU after replacing the tire pressure warning valve and transmitter and installing the tires and wheels on the vehicle.

Tire Pressure Warning Valve and Transmitter:



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NOTICE:
The transmitter ID is written on the tire pressure warning valve and transmitter. It will be unable to be read after installing the tire pressure warning valve and transmitter on the tire and wheel. Therefore, take a note of the transmitter ID before installing the tire pressure warning valve and transmitter.

(f) When replacing the tire pressure warning ECU and the tire pressure warning valves and transmitters, it is necessary to perform the initialization (See page TW-19) after the registration (See page TW-15).

(g) Precautions about the tire pressure;
- The tire pressures decrease naturally.
- In winter, tire pressure may decrease due to low ambient temperatures (tire pressure decreases by approximately 10 kPa (0.1 kgf/cm^2, 1.45 psi) for every 10°C (50°F) drop in the ambient temperature). Therefore, the tire pressure warning is more likely to operate if the tire pressures are not adjusted appropriately. If the daily temperature variation is large, pressurize the tires high so that the tire pressures are suitable under cold conditions. Incorrect tire pressure warning operation becomes less likely.

2. IN CASE OF TIRE AND WHEEL REPLACEMENT

(a) When the tires and wheels are replaced, always ensure that each transmitter ID is correctly registered.

3. IN CASE OF REPLACEMENT OF TIRE PRESSURE WARNING ECU, TIRE PRESSURE WARNING VALVE AND TRANSMITTER, OR TIRE(S) WITH DIFFERENT TIRE PRESSURE

(a) Initialize the tire pressure warning system after any of the following is performed:

- Replacing the tire pressure warning ECU and/or the tire pressure warning valve and transmitter.
- Installing tire(s) which require different tire pressure.
- When rotating the tires on vehicles differing with front rear tire inflation pressures.
- When changing the tire inflation pressure by changing traveling speed or load weight, etc.

HINT:

The tire pressure warning system will not operate properly if it is not initialized (See page TW-19).

4. FAIL-SAFE FUNCTION

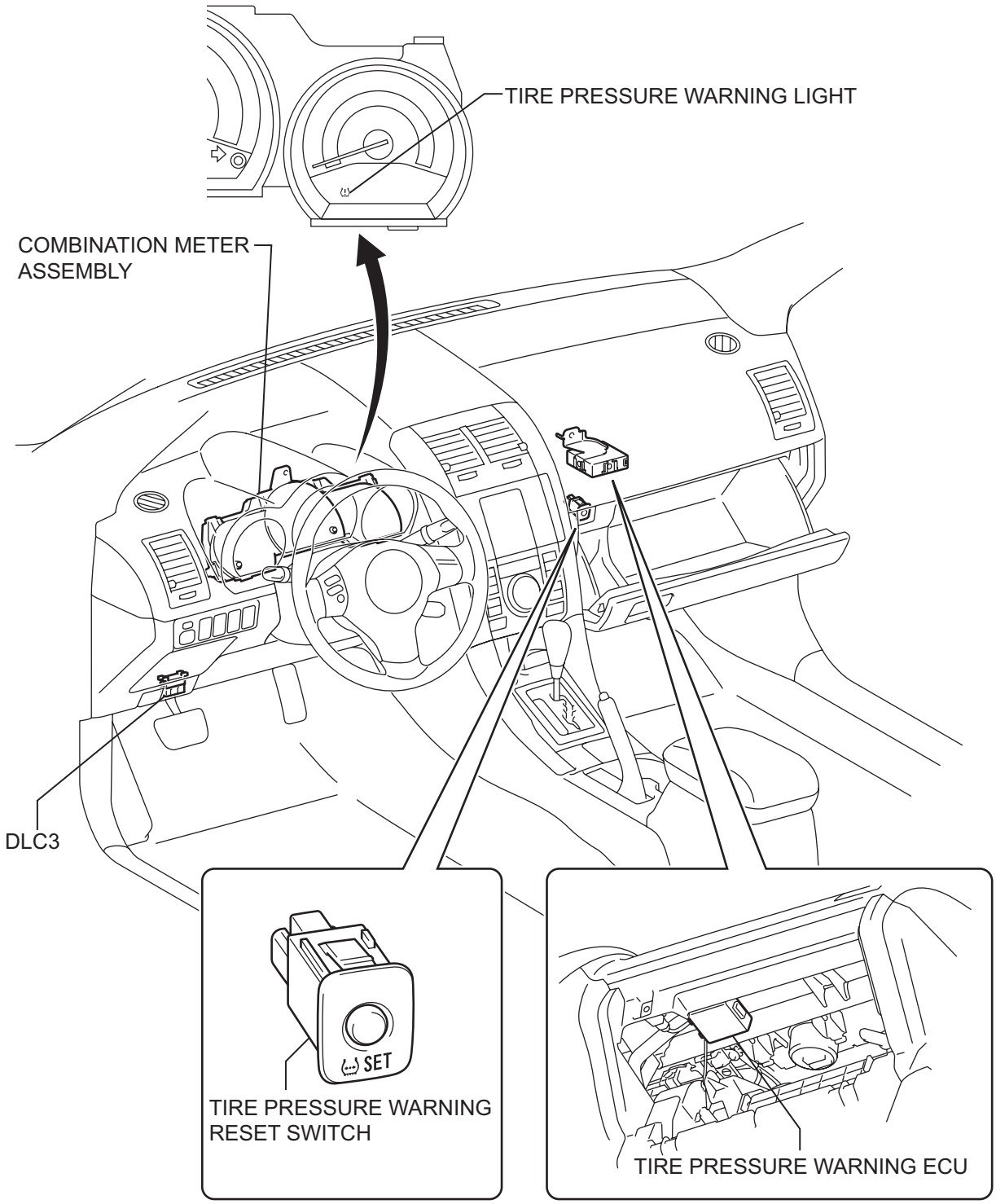
(a) When a system malfunction occurs in the tire pressure warning system, the tire pressure warning light comes on after blinking for 1 minute and informs the driver of the system failure.

(b) The result of this diagnosis is stored in the tire pressure warning ECU.

5. CHECK TIRE PRESSURE AFTER REPAIRS

(a) After repairs, confirm that the actual tire pressures are displayed in DATA LIST (See page TW-30).

PARTS LOCATION



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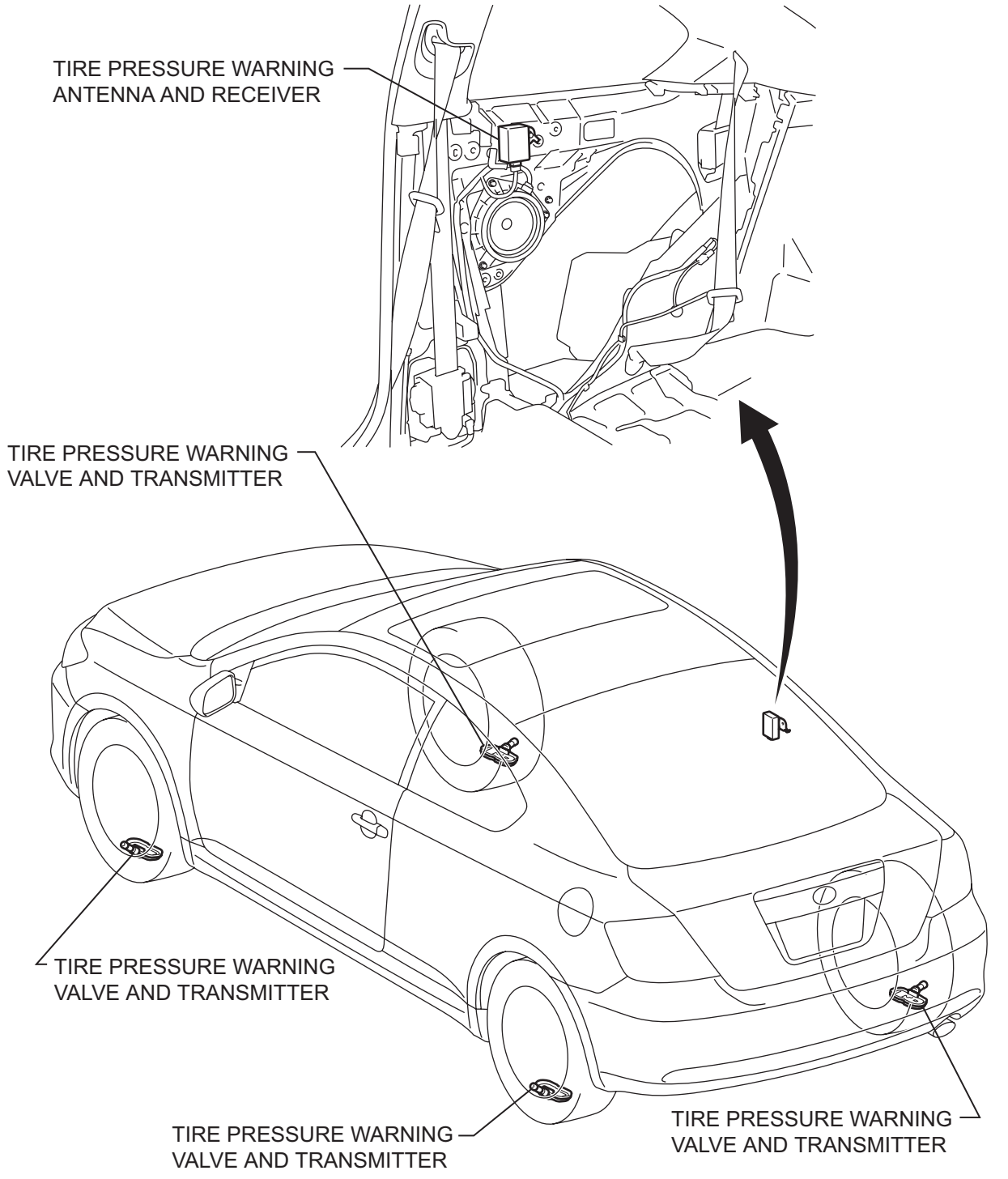
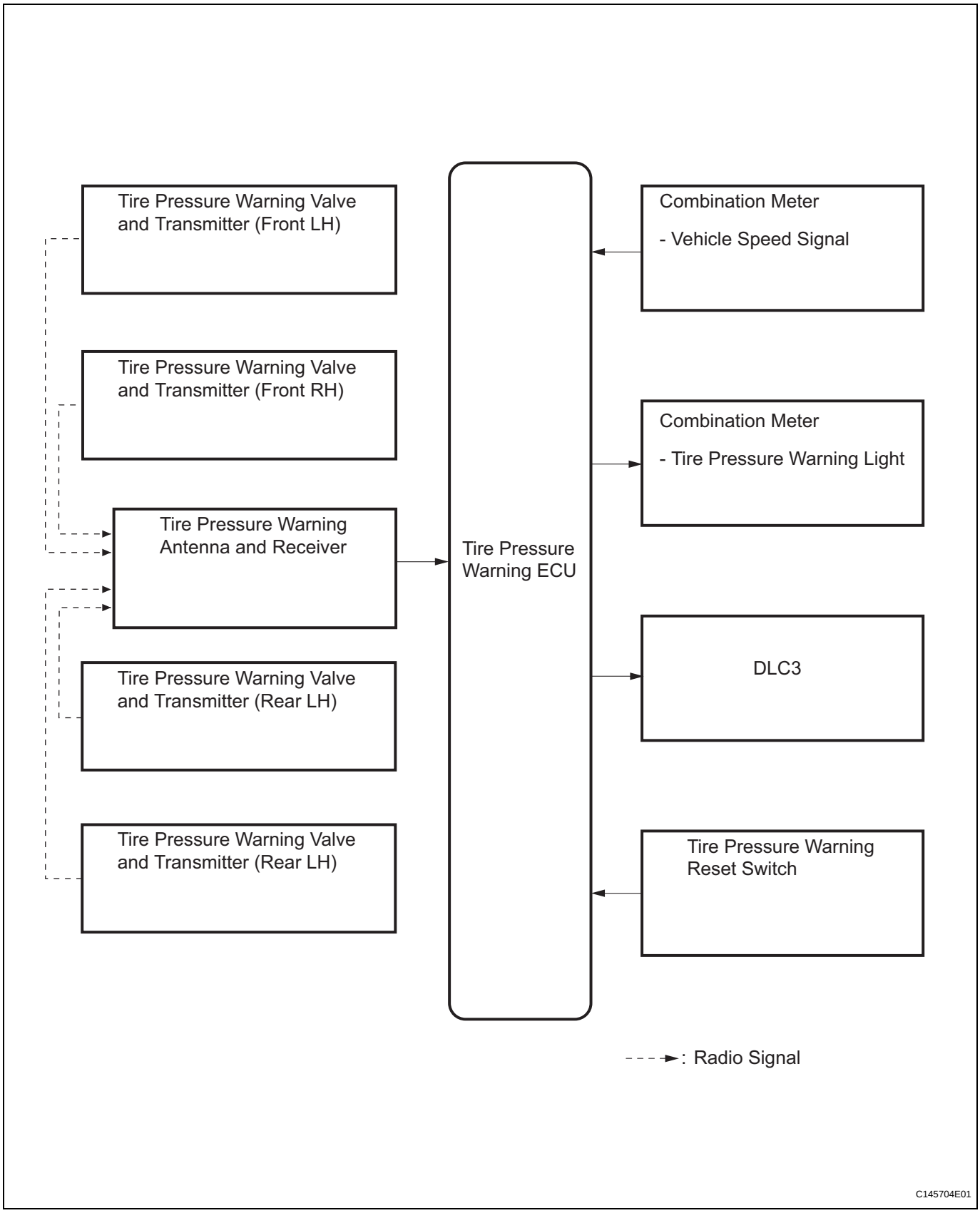

TIRE PRESSURE WARNING
ANTENNA AND RECEIVER
TIRE PRESSURE WARNING
VALVE AND TRANSMITTER
TIRE PRESSURE WARNING
VALVE AND TRANSMITTER
TIRE PRESSURE WARNING
VALVE AND TRANSMITTER
TIRE PRESSURE WARNING
VALVE AND TRANSMITTER
H
C147704E01

SYSTEM DIAGRAM



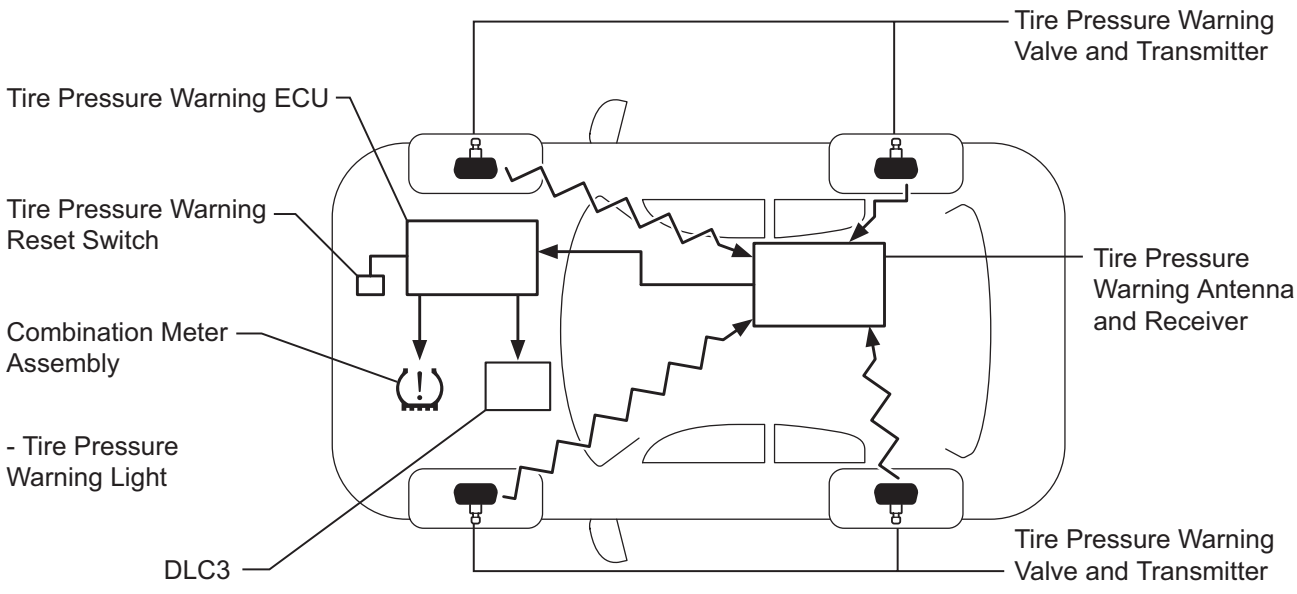
HINT:
The tire pressure warning valve and transmitter sends information on the temperature inside the tire, the ID, and the tire pressure.

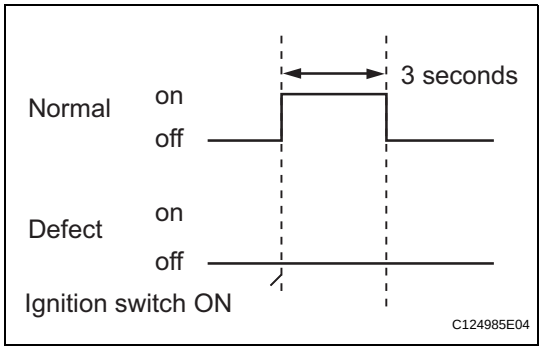
SYSTEM DESCRIPTION

1. DESCRIPTION OF SYSTEM

(a) A tire pressure warning valve and transmitter is equipped with a tire pressure sensor and a transmitter and is installed in a tire wheel assembly. The sensor measures the tire pressure. The measured value and transmitter ID are transmitted to the tire pressure warning antenna and receiver on the body as radio waves and then sent to the tire pressure warning ECU from the tire pressure warning antenna and receiver. If the transmitter ID has already been registered, the ECU compares the measured air pressure value with the standard value. When the value is less than the standard value registered in the tire pressure warning ECU, the warning light on the combination meter comes on.

- For the differences in the air pressure settings by the type of tires, a tire pressure warning reset switch has been adopted.





2. INITIAL CHECK

(a) The tire pressure warning light turns on for 3 seconds after the ignition switch is turned to the ON position and then goes off.

HINT:

If the warning light does not turn on for 3 seconds, trouble shoot the pressure warning light circuit.

Trouble Area	See page
Tire pressure warning light circuit	TW-69

3. WHEN TIRE PRESSURE WARNING LIGHT IS LIT

(a) When the tire pressure warning light does not go off, or when it comes on during driving, check tire pressure. If the tire pressure warning light comes on within several hours after adjusting the tire pressure, the tire may have a slow air leak.

(b) Under the following conditions, the system may not function properly.
- Facilities or devices that use similar radio frequencies are located in the vicinity of the vehicle.
- A radio device of similar frequency is used in the vehicle.
- A large amount of snow or ice is stuck to the vehicle, especially onto the wheels and around the wheel houses.
- The battery of the sensor has been depleted.
- The tires without tire pressure warning valve and transmitter are used.
- Tire chains are used.
- If any wheels other than the specified ones are used, the system may not function properly because interference may prevent the radio waves from being correctly transmitted from the tire pressure warning valve and transmitter.
- Depending on the tire type, the system may not function properly even though the specified wheels are used.

(c) The average usage life of the grommet of the tire pressure warning valve and transmitter is approximately 5 years, at which time it must be replaced.
Re-tighten the valve nut if the valve is leaking air, although it is less than 5 years old and there is no problem with grommets.

(d) After removing and installing the ECU or a sensor, check for a diagnostic trouble code and verify that it is a normal code.

4. FUNCTION OF COMPONENTS

Components	Function
Tire pressure warning valve and transmitter	Combined as a single unit with a disc wheel air valve, it measures tire pressure and temperature and transmits an ID number for measurement value and identification. Built-in the battery.
Tire pressure warning antenna and receiver	Receives and transmits a necessary signal from the transmitter to the tire pressure warning ECU.
Tire pressure warning ECU	Receives a signal from the receiver and identifies it as vehicle's own signal. If the measured value is equal to or lower than the specified value, it transmits a signal so that the tire pressure warning light on the combination meter comes on.
Tire pressure warning light	Located in the combination meter, it informs the driver of lowered tire air pressure and system failure.
Tire pressure warning reset switch	Enters the initialization mode for tire or wheel replacement.

5. TIRE PRESSURE WARNING RESET SWITCH

- By operating the tire pressure warning reset switch, the tire pressure warning ECU can be set to issue a warning at an inflation pressure that corresponds to the type of tires.
  Therefore, the dealer must set the warning threshold to the proper value in order to comply with the local regulations.
- Operate the tire pressure warning reset switch only after the inflation pressures of all tires have been adjusted on the vehicle.
- To initialize the system, press and hold the tire pressure warning reset switch for 3 seconds or longer with the ignition switch in the ON position. After the initialization process has started, the warning light blinks 3 times (1 second on, 1 second off).
- During initialization, the tire pressure warning valve and transmitter measures the inflation pressure of the tires, and registers the signals that are transmitted into the tire pressure warning ECU at a frequency of once per minute. The initialization process is completed when signals from the all tires have been received.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedures to troubleshoot the tire pressure warning system.
- *: Use the intelligent tester.

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) Adjust all tire pressures to the standard values.
Result

Condition	Proceed to
Tire pressure warning light goes off.	A
Tire pressure warning light remains on.	B

A → **Go to step 9**

B

4 CHECK FOR DTC*

(a) Check for DTC (See page TW-29).
Result

Result	Proceed to
DTC is output.	A
DTC is not output.	B

B → **Go to step 6**

A

5 DTC CHART

(a) Refer to DIAGNOSTIC TROUBLE CODE CHART (See page TW-32).

NEXT

Go to step 7

6	PROBLEM SYMPTOMS TABLE

(a) Refer to PROBLEM SYMPTOMS TABLE (See page TW-24).

NEXT

7	CIRCUIT INSPECTION*

(a) Refer to ELECTRONIC CIRCUIT INSPECTION PROCEDURE (See page IN-34).

NEXT

8	REPAIR OR REPLACE

(a) Repair or replace parts based on the diagnosis result.

NEXT

9	CONFIRMATION TEST

(a) Check the DATA LIST to confirm that the tire inflation pressure has been received (See page TW-30).
(b) Perform initialization (See page TW-19).
(c) Confirm that the initialization has been completed.

NEXT

END

REGISTRATION

1. DESCRIPTION OF CODE REGISTRATION

It is necessary to register the transmitter ID in the tire pressure warning ECU when replacing the tire pressure warning valve and transmitter and/or tire pressure warning ECU.

(a) Before registration

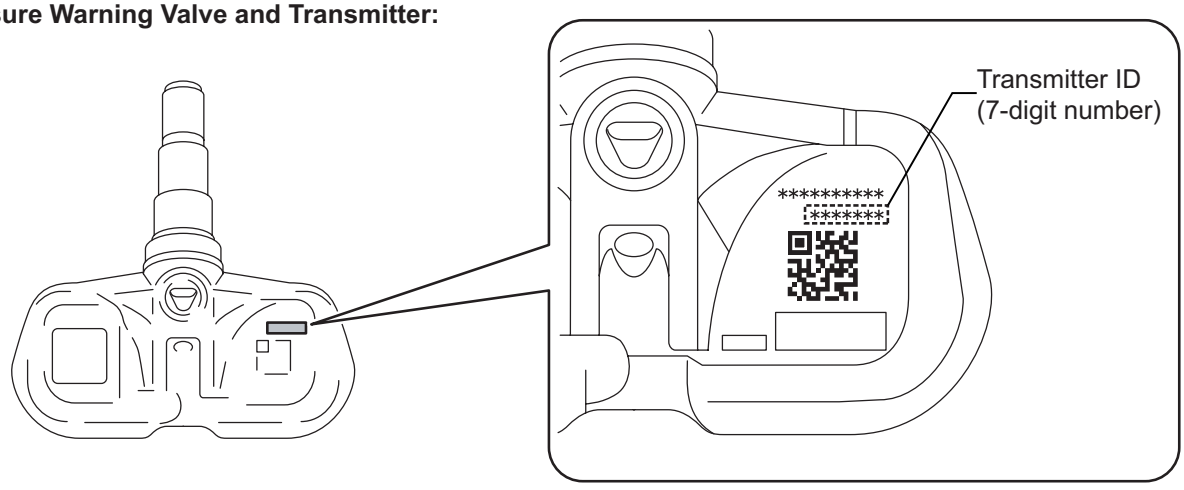
(1) In case of tire pressure warning ECU replacement.

- Read the registered transmitter IDs that are stored in the old ECU using the intelligent tester and note them down.
- If reading stored transmitter IDs is impossible due to malfunctions of components such as the tire pressure warning antenna and receiver, remove the tires from the wheels and check the IDs located on the tire pressure warning valves and transmitters (See page TW-5).

(2) In case of tire pressure warning valve and transmitter replacement.

- When replacing the tire pressure warning valves and transmitters, note down the IDs written on the tire pressure warning valves and transmitters.
- Take a note of the 7-digit number (transmitter ID) written on the tire pressure warning valve and transmitter.

Tire Pressure Warning Valve and Transmitter:



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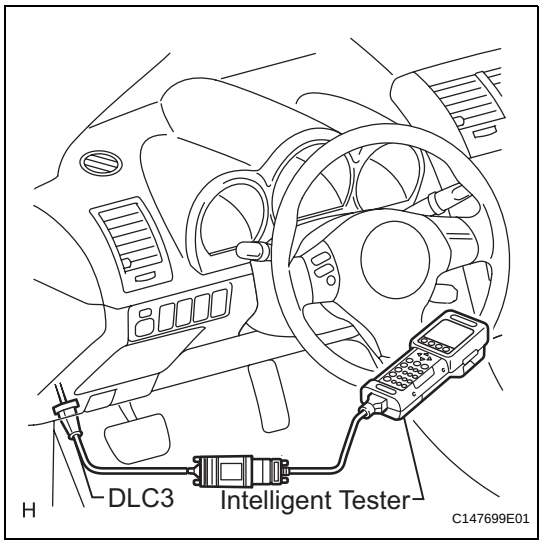
NOTICE:
The transmitter ID is written on the tire pressure warning valve and transmitter. It will be unable to be read after installing the tire pressure warning valve and transmitter on the tire and wheel. Therefore, take a note of the transmitter ID before installing the tire pressure warning valve and transmitter.

TW

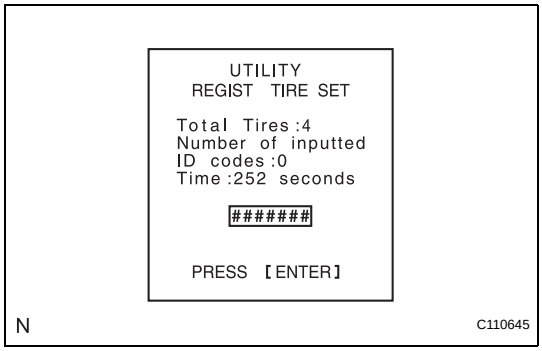


2. REGISTER TRANSMITTER ID

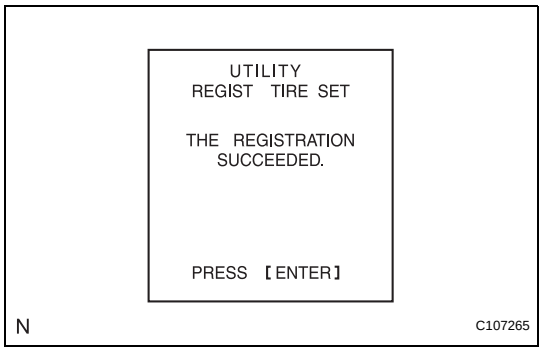
(a) Connect the intelligent tester to DLC3 (Procedure "A").

(b) Turn the ignition switch to the ON position (Procedure "B").

(c) Select REGIST TIRE following the intelligent tester screen (UTILITY - REGIST TIRE) (Procedure "C").

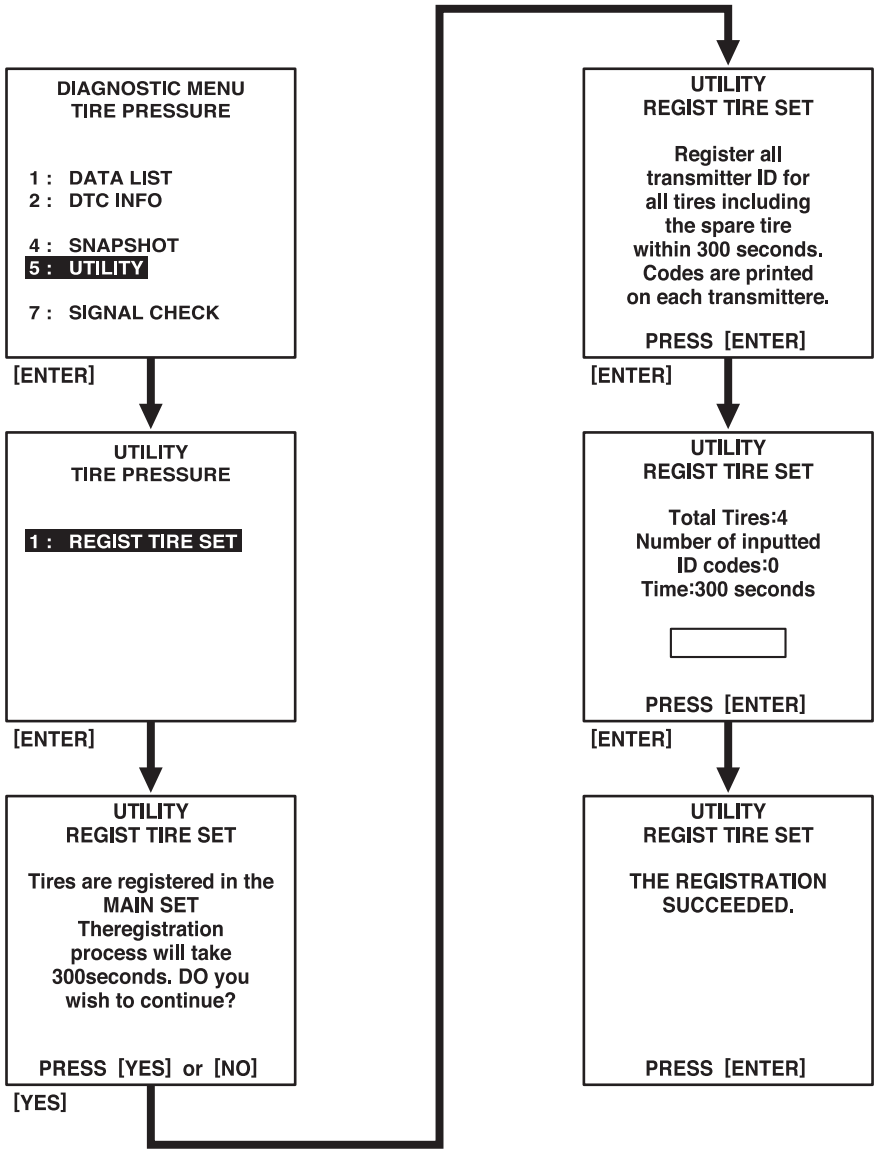


(d) Input the IDs (ID1 to ID4) using the intelligent tester and transmit them to the tire pressure warning ECU (Procedure "D").



(e) Set the ID transmission condition to "ID Registration is complete" (Procedure "E").
HINT:
- The previously registered IDs will be deleted from the memory when the registration is completed.
- If the procedures "C" to "D" are not completed within 5 min., the mode will return to the normal operation mode.
- When the system is in initialization mode after the tire pressure warning reset switch has been operated, the registration is disabled until the initialization process is canceled or completed.

Tester menu flow (for reference):



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3. CONFIRMATION OF TRANSMITTER ID REGISTRATION

(a) Connect the intelligent tester to DLC3 (ignition switch is off).
(b) Turn the ignition switch to the ON position.
(c) Following the display on the intelligent tester.
(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

(e) Confirm that the data of tire pressure of all tires are displayed on the intelligent tester screen.

NOTICE:

- **It may take up to about 2 or 3 minute or more to update the tire pressure data.**
- **If the IDs have not been registered, DTC C2171/71 is set in the tire pressure warning ECU after 51 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.**

INITIALIZATION

1. DESCRIPTION OF INITIALIZATION

(a) Perform initialization in the following cases:
- Before delivery of a new vehicle.
- After replacement of the tire pressure warning ECU*.
- After replacement of the tire pressure warning valve and transmitter.
- Specified tire pressure changes depending on the size or type of the tire.

*: Perform initialization after the transmitter ID registration is completed (See page TW-15).

(b) Before initialization

(1) Set the air pressure of all wheels to the specified value.

Cold tire inflation pressure

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	220 (2.2, 32)	200 (2.0, 29)
P205/55R16	220 (2.2, 32)	200 (2.0, 29)

NOTICE:
Perform the tire pressure adjustment after the vehicle has sufficiently cooled down. If the vehicle is not sufficiently cooled down, increase the air pressure by 20 to 30 kPa (0.2 to 0.3 kgf/cm^2, 2.9 to 4.3 psi) above the specified value.

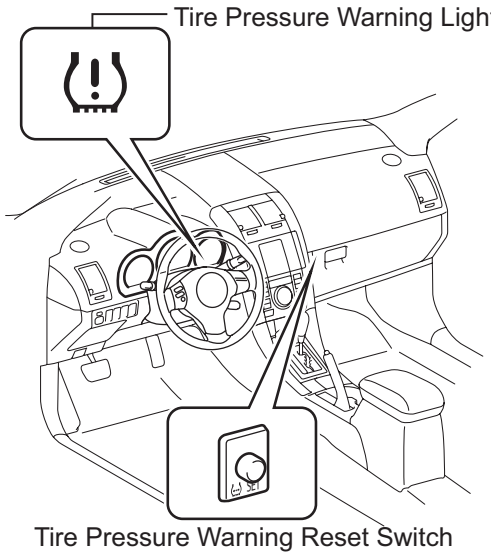
2. INITIALIZATION PROCEDURE

(a) Make sure that the ignition switch is off.

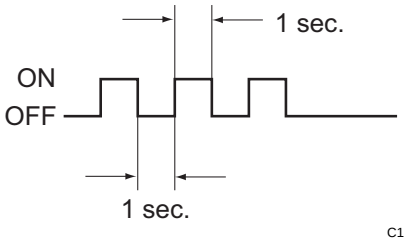
(b) Connect the intelligent tester to the DLC3.

(c) Turn the ignition switch to the ON position.

(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.



Tire Pressure Warning Light Output Pattern:



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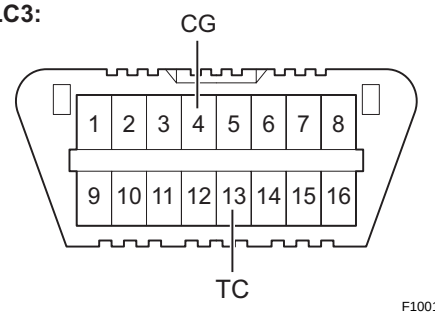
(e) Press the tire pressure warning reset switch within 30 seconds after turning the ignition switch to the ON position. Keep the tire pressure warning reset switch pressed for 3 seconds or more with the ignition switch in the ON position.

(f) Check that the tire pressure warning light blinks 3 times (1 second ON, 1 second OFF).
HINT:
Initialization will be completed if signals are received from all wheels.

DLC3:



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(g) Wait for 2 or 3 minutes with the ignition switch in the ON position.
NOTICE:
- **The initialization is normally completed within 2 to 3 minutes.**
- **If the initialization has not been completed successfully, DTC C2177/77 is set after approximately 20 minutes.**
- **The initialization can be terminated by making a short circuit between terminals TC and CG of the DLC3 connector.**

3. CHECK THAT INITIALIZATION HAS BEEN COMPLETED

(a) Confirm that the data of tire pressure of all tires are displayed on the intelligent tester screen.

TW

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:

*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

NOTICE:

The following operations can be used instead of above procedure:

1. **Monitor the tire pressure values of all the wheels using the intelligent tester.**
2. **If the tire pressure values cannot be displayed on the intelligent tester screen, initialization has not been completed. If the tire pressure values cannot be confirmed on the tester screen correctly, the data have not been received.**
3. **It takes about 2 or 3 minutes to display the tire pressure data.**

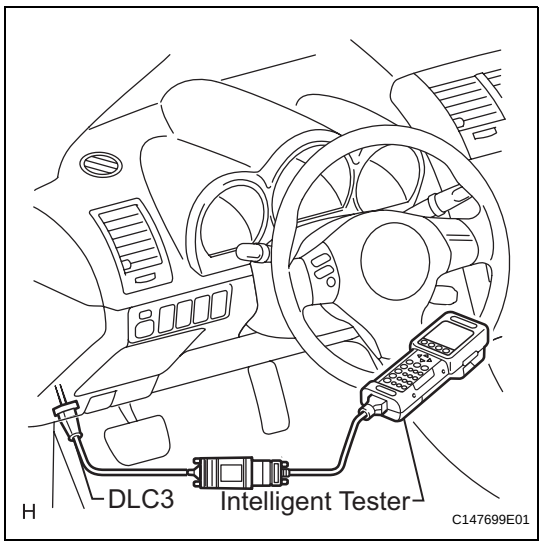
TEST MODE PROCEDURE

1. ENTER TEST MODE

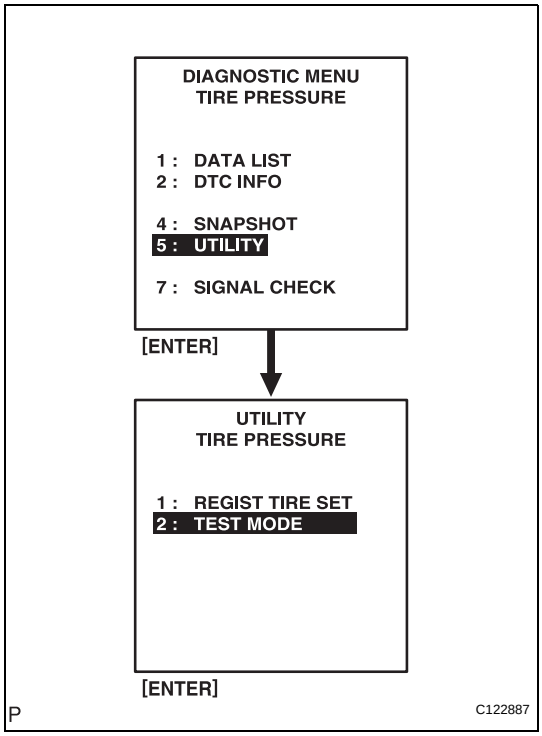
HINT:

- Operation of the tire pressure warning reset switch can be checked in TEST MODE.
- During TEST MODE, the system is not initialized by pushing the tire pressure warning reset switch. The circuit of the tire pressure warning reset switch can be inspected during this mode.

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to DLC3.
(c) Turn the ignition switch to the ON position.
(d) Check that the tire pressure warning light comes on for 3 seconds and then goes off.



(e) Select TEST MODE on the intelligent tester.



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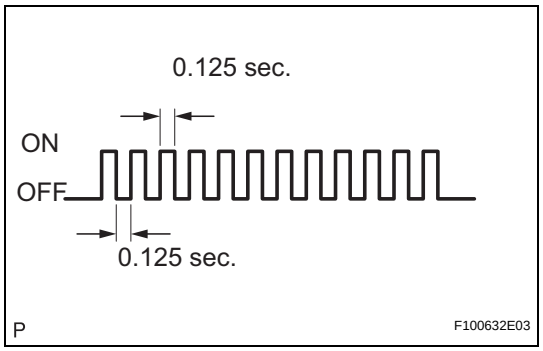
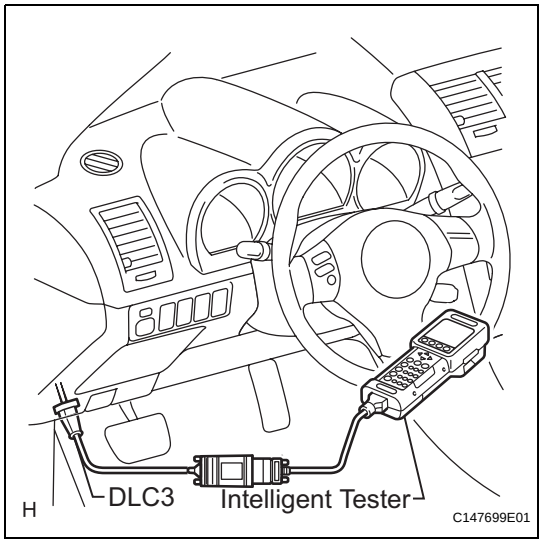


(f) Confirm that the tire pressure warning light in the combination meter blinks at 0.125 second intervals.

2. PERFORM SIGNAL CHECK

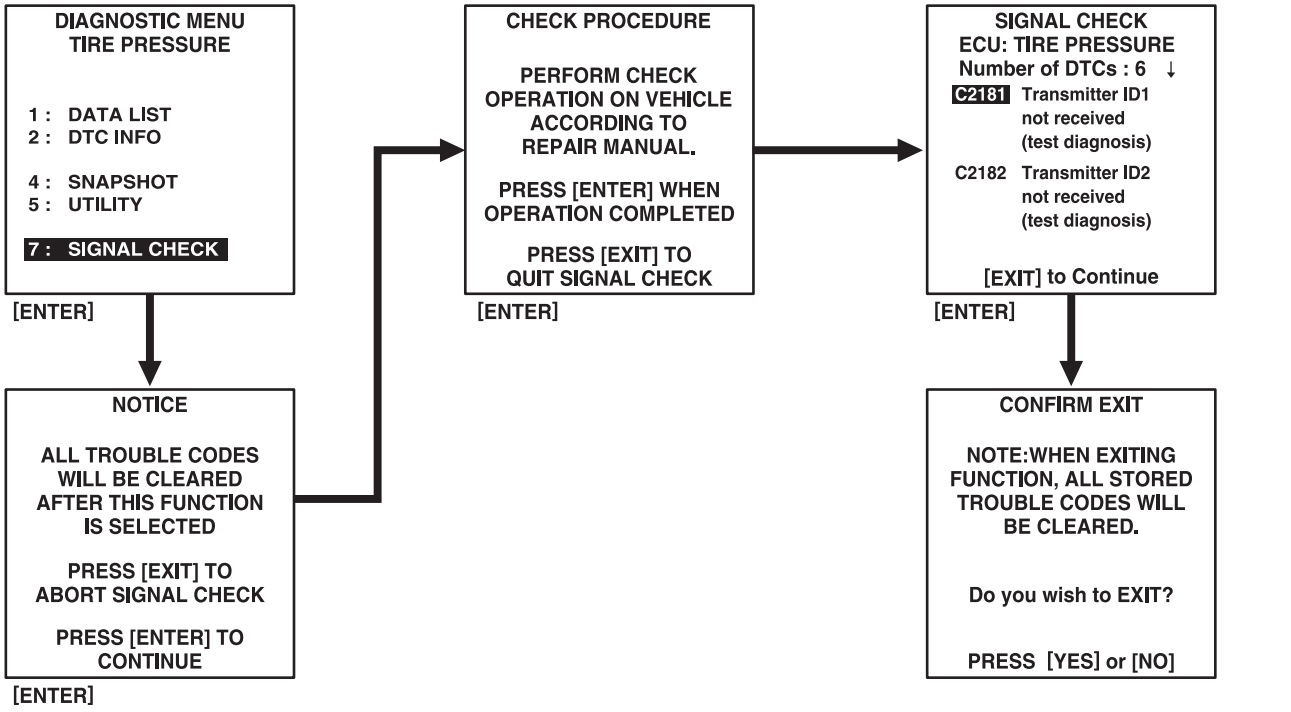
HINT:

- When entering signal check mode, the tire pressure warning ECU sets all the signal check DTCs first. After completing signal check for each inspection item, the DTCs for systems that are determined to be normal by the tire pressure warning ECU will be erased.
  The DTCs for other inspection items may not be erased when only a certain signal is inspected.
- When signal check returns to normal mode, all the signal check DTCs will be erased.



(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select SIGNAL CHECK on the intelligent tester.
HINT:
Every time the test mode DTC erasure conditions are satisfied, the tire pressure warning light comes on for 1 second. Then, the tire pressure warning light blinks at 0.125 second intervals.

Tester menu flow (for reference):



(e) Drive the vehicle at 12 mph (20 km/h) or more for 10 seconds or more to check the vehicle speed signal (C2191/91).

(f) Loosen the valve core and rapidly reduce the pressure (at least 40 kPa (0.41 kg/cm^2, 5.8 psi) within 30 seconds or more) to check the transmitter data (C2181/81 to C2184/84).
HINT:
The transmitter ID can be transmitted by rapidly reducing the tire pressure.

(g) Check that the tire pressure warning system test mode DTCs are erased.

TW

SIGNAL CHECK DTC	Test Signal	Signal Check DTC Clear Condition
C2181/81 to C2184/84	Transmitter Data	Receive data from the transmitter which has a registered ID in the tire pressure warning ECU
C2191/91	Vehicle Speed Signal	Vehicle speed of 12 mph (20 km/h) or more is detected for 3 seconds or more

(h) Check the tire pressure warning reset switch.
(1) Press the tire pressure warning reset switch.
(2) Check the tire pressure warning light.

Test Signal	Normal Condition
Tire Pressure Warning Reset Switch	• Switch ON: TPWS indicator comes on • Switch OFF: TPWS indicator blinks

(i) Result
HINT:
After the signal check is completed, check for a DTC and signal check DTC to confirm the system status.

Condition	Procedure
SIGNAL CHECK DTC is output	Repair the faulty part and enter SIGNAL CHECK again
SIGNAL CHECK DTCs are cleared	No problem

(j) End of SIGNAL CHECK
After completing the test mode (SIGNAL CHECK), turn the ignition switch off and disconnect the intelligent tester.

DTC of SIGNAL CHECK (TEST DIAGNOSIS) function:
If a trouble code is displayed during the test mode DTC check, check the circuit listed for that code. For details of each code, refer to the relevant page listed under respective "DTC No." in the chart.

DTC No.	Detection Item	Trouble Area	See procedure
C2181/81	Transmitter ID1 not received	• Tire pressure warning valve and transmitter • Tire pressure warning antenna and receiver • Wire harness or connector • Tire pressure warning ECU	TW-37
C2182/82	Transmitter ID2 not received	• Tire pressure warning valve and transmitter • Tire pressure warning antenna and receiver • Wire harness or connector • Tire pressure warning ECU	TW-37
C2183/83	Transmitter ID3 not received	• Tire pressure warning valve and transmitter • Tire pressure warning antenna and receiver • Wire harness or connector • Tire pressure warning ECU	TW-37
C2184/84	Transmitter ID4 not received	• Tire pressure warning valve and transmitter • Tire pressure warning antenna and receiver • Wire harness or connector • Tire pressure warning ECU	TW-37
C2191/91	Vehicle speed signal error	• Vehicle speed sensor • Combination meter assembly • Wire harness or connector • Tire pressure warning ECU	TW-65

PROBLEM SYMPTOMS TABLE

HINT:

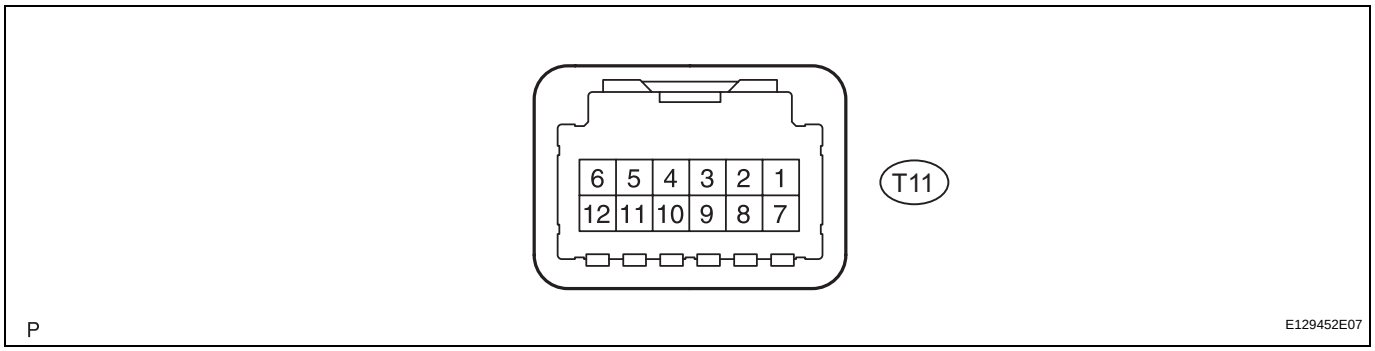
- Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

TIRE PRESSURE WARNING SYSTEM:

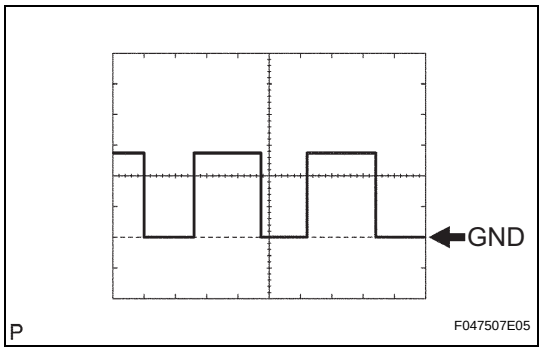
Symptom	Suspected Area	See page
Tire pressure warning light does not illuminate, despite tire pressure decreasing	1. Initialization	TW-19
	2. Check DATA LIST (Tire inflation pressure)	TW-30
Tire pressure warning light does not illuminate	Tire pressure warning light circuit	TW-69
Tire pressure warning light remains illuminated (Goes off during initial check)	1. ECU power source circuit	TW-71
	2. Tire pressure warning light circuit	TW-69
Tire pressure warning light remains illuminated (Comes on during initial check)	1. Tire pressure adjustment	TW-3
	2. Initialization	TW-19
	3. Tire pressure warning light circuit	TW-69
	4. ID code check (Registration)	TW-15
	5. Check DATA LIST (Tire inflation pressure)	TW-30
Initialization cannot be done	Tire pressure reset switch circuit	TW-67
DTC check cannot be done	1. ECU power source circuit	TW-71
	2. TC and CG terminal circuit	TW-73

TERMINALS OF ECU

HINT:
Inspect the connectors from the back side while the connectors are connected.



Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
T11-1 (CLSW) - T11-9 (GND)	GR - W-B	Tire pressure warning reset switch	• Ignition switch on • Tire pressure warning reset switch on	8 to 15 V
T11-2 (SPD) - T11-9 (GND)	L - W-B	Vehicle speed signal	Ignition switch on	Pulse generation (See waveform 1)
T11-5 (IND) - T11-9 (GND)	LG - W-B	Tire pressure warning light signal	Ignition switch on	10 to 16 V
T11-6 (RF5V) - T11-9 (GND)	O - W-B	Tire pressure warning antenna and receiver power source	Ignition switch on	4.5 to 5.5 V
T11-7 (IG) - T11-9 (GND)	R - W-B	IG power source	Ignition switch on	10 to 16 V
T11-10 (SIL) - T11-9 (GND)	P - W-B	Diagnostic communication terminal	• Ignition switch on • Intelligent tester is connected to DLC3	Pulse generation (See waveform 2)
T11-11 (GND2) - T11-9 (GND)	BR - W-B	Tire pressure warning antenna and receiver ground	Always	Below 1 Ω
T11-12 (RDA) - T11-9 (GND)	V - W-B	Tire pressure warning antenna and receiver signal	• Ignition switch on • The tire pressure warning antenna and receiver is not connected	9 to 16 V

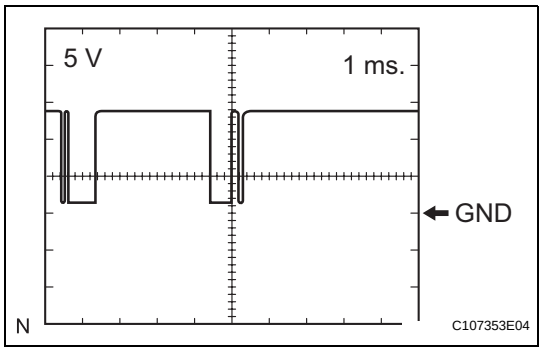


1. Waveform 1 (Reference)

(a) Waveform

Item	Contents
Terminal	SPD - GND
Tool setting	5 V/DIV., 200 ms./DIV.
Vehicle condition	While driving at approximately 12 mph (20 km/h)

TW



2. Waveform 2 (Reference)

(a) Waveform

Item	Contents
Terminal	SIL - Body ground
Tool setting	5 V/DIV., 1 ms./DIV.
Vehicle condition	Communicating using intelligent tester

DIAGNOSIS SYSTEM

1. CHECK BATTERY VOLTAGE

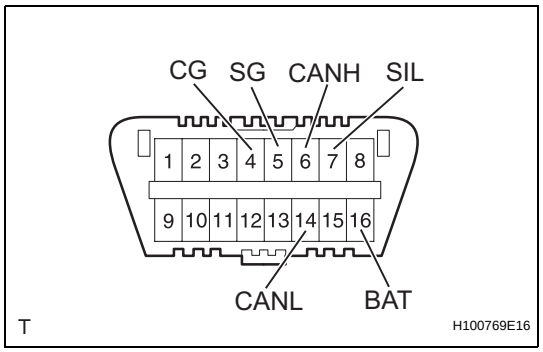
Standard voltage:

11 to 14 V

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

2. CHECK DLC3

(a) The ECU uses ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



Symbols (Terminal No.)	Terminal Description	Condition	Specified Condition
SIL (7) - SG (5)	Bus "+" line	During transmission	Pulse generation
CG (4) - Body ground	Chassis ground	Always	Below 1 Ω
SG (5) - Body ground	Signal ground	Always	Below 1 Ω
BAT (16) - Body ground	Battery positive	Always	11 to 14 V
CANH (6) - CANL (14)	CAN bus line	Ignition switch off*	54 to 69 Ω
CANH (6) - CG (4)	HIGH-level CAN bus line	Ignition switch off*	200 Ω or higher
CANL (14) - CG (4)	LOW-level CAN bus line	Ignition switch off*	200 Ω or higher
CANH (6) - BAT (16)	HIGH-level CAN bus line	Ignition switch off*	6 kΩ or higher
CANL (14) - BAT (16)	LOW-level CAN bus line	Ignition switch off*	6 kΩ or higher

NOTICE:

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

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

HINT:

Connect the cable of the intelligent tester to DLC3, turn the ignition switch to the ON position and attempt to use the tester. If the display indicates that a communication error has occurred, there is a problem either with the vehicle or with the tester.

- If communication is normal when the tester is connected to another vehicle, inspect DLC3 of the original vehicle.
- If communication is still not possible when the tester is connected to another vehicle, the problem may be in the tester itself. Consult the Service Department listed in the tester's instruction manual.

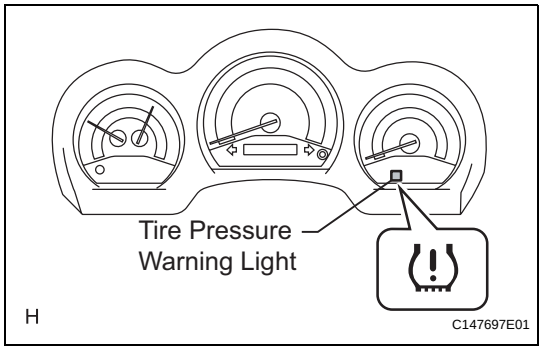
3. DIAGNOSIS SYSTEM

(a) DTCs (Normal mode)

(1) DTCs are memorized in the tire pressure warning ECU and read by the blinks of the tire pressure warning light or by using the intelligent tester (See page TW-29).

(b) Test mode

(1) By switching from normal mode into test mode (input signal check), you can inspect the tire pressure warning antenna and receiver, each tire pressure warning valve and transmitter, and vehicle speed sensor (See page TW-21).



4. CHECK WARNING LIGHT

(a) Turn the ignition switch to the ON position.

(b) Check that the tire pressure warning light comes on for 3 seconds.

If the warning check result is not normal, proceed to the troubleshooting for the tire pressure warning light circuit.

Trouble Area	See procedure
Tire pressure warning light circuit	TW-69

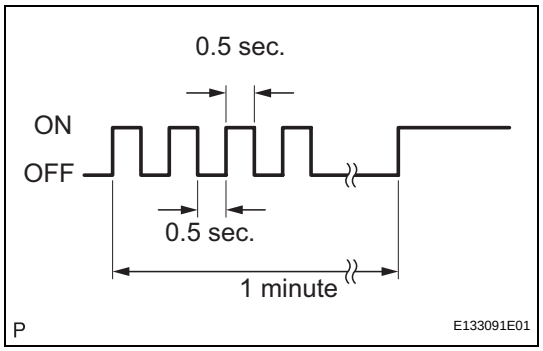
5. TIRE PRESSURE WARNING LIGHT AND INDICATOR CHART

HINT:

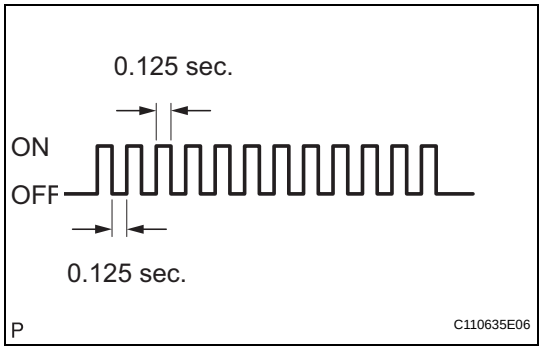
The table below indicates the state of the tire pressure warning light and indicator after the ignition switch is turned to the ON position.

	Immediately after turning the ignition switch to the ON position	Always						
		Warning light output pattern						
	Comes on for 3 sec.	Goes off	Comes on	Blinks (*1)	Blinks (*2)	Blinks (*3)	Blinks (*4)	Outputs DTC
Normal	○	○	-	-	-	-	-	-
Low tire pressure	○	-	○	-	-	-	-	-
System fail	○	-	-	○	-	-	-	-
Test mode	○	-	-	-	○	-	-	-
Initialization	○	-	-	-	-	○	-	-
ECU connector poorly connected	-	-	-	○	-	-	-	-
TC ground (DTC is output)	○	-	-	-	-	-	-	○
TC ground (DTC is not output)	○	-	-	-	-	-	○	-

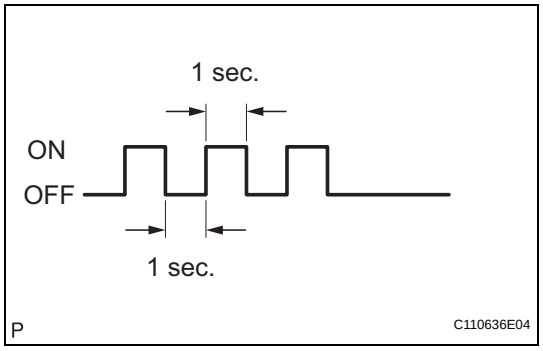
TW



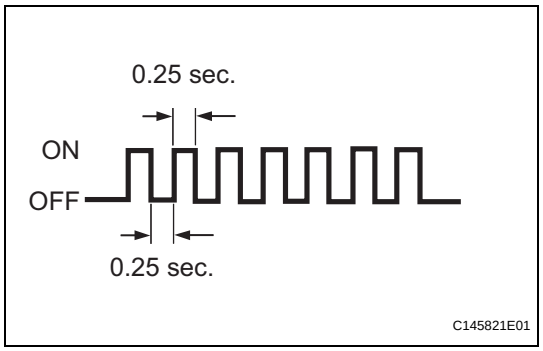
*1: Comes on and goes off repeatedly at 0.5 second intervals, and comes on after 1 minute.



*2: Comes on and goes off repeatedly at 0.125 second intervals.



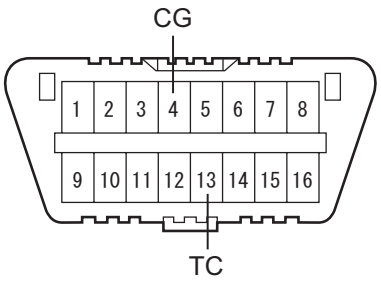
*3: Blinks 3 times (1 second on, 1 second off).

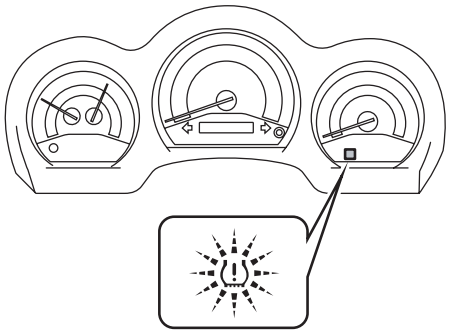


*4: Comes on and goes off repeatedly at 0.25 second intervals.

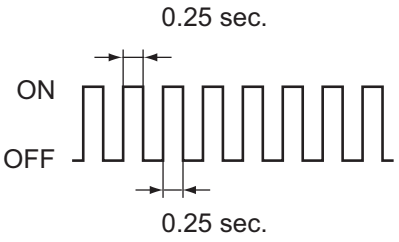
TW

DLC3:

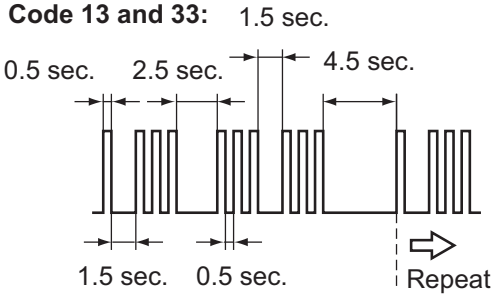




Normal System Code:



Code 13 and 33:



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C147702E01

DTC CHECK / CLEAR

1. DTC CHECK (USING SST CHECK WIRE)

(a) Check for DTCs.

(1) Using SST, connect terminals TC and CG of DLC3.
SST 09843-18040

(2) Turn the ignition switch to the ON position.

(3) Read and record any DTCs from the tire pressure warning light on the combination meter. Refer to the illustration as examples of a normal system code and codes 13 and 33.
HINT:

- If the tire pressure warning light does not indicate any DTCs or the normal system code, inspect the tire pressure warning light circuit or TC and CG terminal circuit.

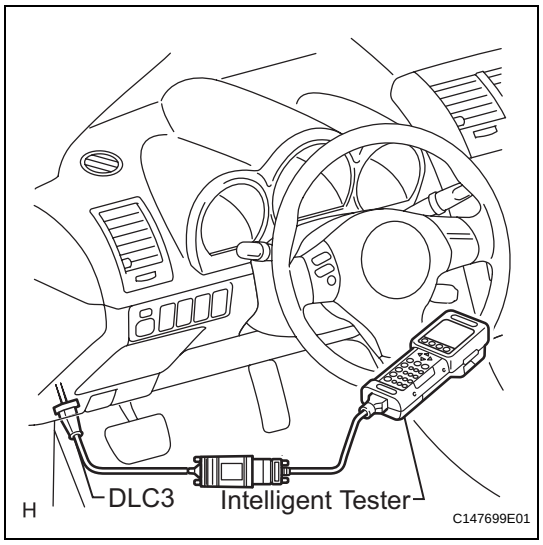
Trouble Area	See procedure
Tire pressure warning light circuit	TW-69
TC and CG terminal circuit	TW-73

- If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC is displayed first.

(4) Refer to the Diagnostic Trouble Code Chart (See page TW-32) for DTC information.

(5) After completing the check, turn the ignition switch off and remove SST from DLC3.
SST 09843-18040

TW



2. DTC CHECK (USING INTELLIGENT TESTER)

(a) Check for DTCs.
  (1) Connect the intelligent tester to the DLC3.
  (2) Turn the ignition switch to the ON position.
  (3) Read the DTCs following the prompts on the tester screen.
    HINT:
    Refer to the intelligent tester operator's manual for further details.

(b) Clear the DTCs.
  HINT:
  After repairing the malfunctions, clear the DTCs.
  (1) Connect the intelligent tester to DLC3.
  (2) Turn the ignition switch to the ON position.
  (3) Clear the DTCs following the prompts on the tester screen.
    HINT:
    Refer to the intelligent tester operator's manual for further details.

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the intelligent tester to read the DATA LIST allow the values or states of switches, sensor, 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) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to DLC3.
(c) Turn the ignition switch to the ON position.
(d) Following the display on the intelligent tester, read "DATA LIST".

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
MODE STATUS	Tire pressure warning system mode/ NORMAL or REG 2nd or REG M or TEST	NORMAL: Normal mode TEST: Test mode	-
MAIN TIRE	Number of main tire ID to be registered/ 0, 1, 2, 3, 4	0 to 4 should be displayed	-
INITIAL SW	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
REGIT ID1 CODE	Registered ID1 code/ min.: 0, max.: FFFFFFF*1	The ID No. registered in the transmitter ID1 is displayed	-
REGIT ID2 CODE	Registered ID2 code/ min.: 0, max.: FFFFFFF*1	The ID No. registered in the transmitter ID2 is displayed	-
REGIT ID3 CODE	Registered ID3 code/ min.: 0, max.: FFFFFFF*1	The ID No. registered in the transmitter ID3 is displayed	-
REGIT ID4 CODE	Registered ID4 code/ min.: 0, max.: FFFFFFF*1	The ID No. registered in the transmitter ID4 is displayed	-
TRANS STATUS	ID code transmission status/ FINISH or NOW	FINISH or NOW	-
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*2
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*2
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*2

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*2
TIRE TEMP1	ID1 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	If -40°C (-40°F) is displayed, the data have not been received.
TIRE TEMP2	ID2 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	If -40°C (-40°F) is displayed, the data have not been received.
TIRE TEMP3	ID3 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	If -40°C (-40°F) is displayed, the data have not been received.
TIRE TEMP4	ID4 temperature in tire/ min.: -40°C (-40°F), max.: 215°C (419°F)	Actual tire temperature	If -40°C (-40°F) is displayed, the data have not been received.
BATT VOLT1	ID1 battery voltage/ OVER or LESS	OVER	-
BATT VOLT2	ID2 battery voltage/ OVER or LESS	OVER	-
BATT VOLT3	ID3 battery voltage/ OVER or LESS	OVER	-
BATT VOLT4	ID4 battery voltage/ OVER or LESS	OVER	-
INITIAL SW INFO	Tire pressure warning reset switch setting information/ WITH or WITHOUT	WITH or WITHOUT	-
INIT THRESHOLD1	ID1 initial threshold of low-pressure/ min.: 0 kPa (0 kgf/cm^2, 0 psi), max.: 637.5 kPa (6.48 kgf/cm^2, 92.2 psi)	Tire pressure after initialization	-
INIT THRESHOLD2	ID2 initial threshold of low-pressure/ min.: 0 kPa (0 kgf/cm^2, 0 psi), max.: 637.5 kPa (6.48 kgf/cm^2, 92.2 psi)	Tire pressure after initialization	-
INIT THRESHOLD3	ID3 initial threshold of low-pressure/ min.: 0 kPa (0 kgf/cm^2, 0 psi), max.: 637.5 kPa (6.48 kgf/cm^2, 92.2 psi)	Tire pressure after initialization	-
INIT THRESHOLD4	ID4 initial threshold of low-pressure/ min.: 0 kPa (0 kgf/cm^2, 0 psi), max.: 637.5 kPa (6.48 kgf/cm^2, 92.2 psi)	Tire pressure after initialization	-
# CODES	Number of DTCs recorded/ min.: 0, max.: 255	Min.: 0, Max.: -	-

HINT:

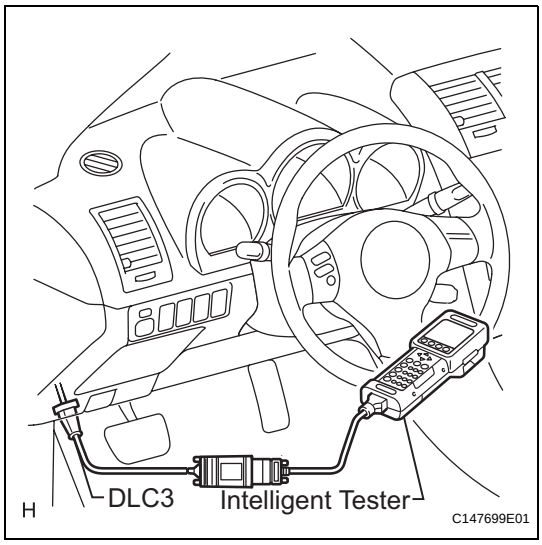
*1: Displayed only when the ID No. is not registered.

*2: It may take about 2 or 3 minutes until the values are displayed. If the values are not displayed after a few minutes, perform troubleshooting according to the inspection procedure for DTSs C2121/21 to C2124/24 (See page TW-37).

TW

METER:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
SPEED METER	Vehicle speed/ Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Almost same as actual vehicle speed (When driving)	-



2. ACTIVE TEST

Performing the ACTIVE TEST using the intelligent tester allows the meters, indicators and other items to be operated without removing any parts. Performing the ACTIVE TEST as the first step in troubleshooting is one way to save diagnostic time. It is possible to display the DATA LIST on the intelligent tester during the ACTIVE TEST.

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Enter the following menus: DIAGNOSIS / OBD/ MOBD / METER / ACTIVE TEST.

METER:

Tester Display	Test Part	Control Range	Diagnostic Note
TIRE PRESS WARN	Tire Pressure Warning Light	OFF / ON	Confirm that the vehicle is stopped with the engine idling

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.

TIRE PRESSURE WARNING SYSTEM:

DTC Code	Detection Item	Trouble Area	See page
C2111/11	Transmitter ID1 Operation Stop	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU	TW-35
C2112/12	Transmitter ID2 Operation Stop	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU	TW-35
C2113/13	Transmitter ID3 Operation Stop	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU	TW-35
C2114/14	Transmitter ID4 Operation Stop	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU	TW-35
C2121/21	No Signal from Transmitter ID1 in Main Mode	1. Tire pressure warning valve and transmitter 2. Tire pressure warning antenna and receiver 3. Wire harness or connector 4. Tire pressure warning ECU	TW-37
C2122/22	No Signal from Transmitter ID2 in Main Mode	1. Tire pressure warning valve and transmitter 2. Tire pressure warning antenna and receiver 3. Wire harness or connector 4. Tire pressure warning ECU	TW-37
C2123/23	No Signal from Transmitter ID3 in Main Mode	1. Tire pressure warning valve and transmitter 2. Tire pressure warning antenna and receiver 3. Wire harness or connector 4. Tire pressure warning ECU	TW-37
C2124/24	No Signal from Transmitter ID4 in Main Mode	1. Tire pressure warning valve and transmitter 2. Tire pressure warning antenna and receiver 3. Wire harness or connector 4. Tire pressure warning ECU	TW-37
C2141/41	Transmitter ID1 Error	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU	TW-45
C2142/42	Transmitter ID2 Error	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU	TW-45
C2143/43	Transmitter ID3 Error	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU	TW-45
C2144/44	Transmitter ID4 Error	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU	TW-45
C2165/65	Abnormal Temperature Inside ID1 Tire	1. Tires 2. Tire pressure warning valve and transmitter 3. Tire pressure warning ECU	TW-49
C2166/66	Abnormal Temperature Inside ID2 Tire	1. Tires 2. Tire pressure warning valve and transmitter 3. Tire pressure warning ECU	TW-49
C2167/67	Abnormal Temperature Inside ID3 Tire	1. Tires 2. Tire pressure warning valve and transmitter 3. Tire pressure warning ECU	TW-49
C2168/68	Abnormal Temperature Inside ID4 Tire	1. Tires 2. Tire pressure warning valve and transmitter 3. Tire pressure warning ECU	TW-49
C2171/71	Transmitter ID not Registered	Tire pressure warning ECU	TW-53
C2176/76	Receiver Error	1. Tire pressure warning antenna and receiver 2. Wire harness or connector 3. Tire pressure warning ECU	TW-55
C2177/77	Initialization not Completed	1. Tire pressure warning valve and transmitter 2. Tire pressure warning ECU 3. Tire pressure warning antenna and receiver 4. Wire harness or connector	TW-57

DTC Code	Detection Item	Trouble Area	See page
C2181/81	Transmitter ID1 not Received (Test Mode DTC)	1. Tire pressure warning valve and transmitter 2. Tire pressure warning antenna and receiver 3. Wire harness or connector 4. Tire pressure warning ECU	TW-37
C2182/82	Transmitter ID2 not Received (Test Mode DTC)	1. Tire pressure warning valve and transmitter 2. Tire pressure warning antenna and receiver 3. Wire harness or connector 4. Tire pressure warning ECU	TW-37
C2183/83	Transmitter ID3 not Received (Test Mode DTC)	1. Tire pressure warning valve and transmitter 2. Tire pressure warning antenna and receiver 3. Wire harness or connector 4. Tire pressure warning ECU	TW-37
C2184/84	Transmitter ID4 not Received (Test Mode DTC)	1. Tire pressure warning valve and transmitter 2. Tire pressure warning antenna and receiver 3. Wire harness or connector 4. Tire pressure warning ECU	TW-37
C2191/91	Vehicle Speed Signal Error (Test Mode DTC)	1. Vehicle speed sensor 2. Tire pressure warning ECU 3. Combination meter 4. Wire harness or connector	TW-65

DTC	C2111/11	Transmitter ID1 Operation Stop

DTC	C2112/12	Transmitter ID2 Operation Stop

DTC	C2113/13	Transmitter ID3 Operation Stop

DTC	C2114/14	Transmitter ID4 Operation Stop

DESCRIPTION

The tire pressure warning valve and transmitters that are installed in the tire and wheel assemblies measure the air pressures of the tires. The measured values are transmitted to the tire pressure warning antenna and receiver on the body as radio waves and then sent to the tire pressure warning ECU. 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 comes on. The tire pressure warning ECU stores a DTC when the tire pressure warning valve and transmitter stops transmitting signals. At this time, the signals can be forcibly transmitted by releasing the tire pressure rapidly. The stored DTC is cleared when the signal transmission is resumed.

DTC No.	DTC Detection Condition	Trouble Area
C2111/11 C2112/12 C2113/13 C2114/14	Tire pressure warning valve and transmitters stop transmitting signals	• Tire pressure warning valve and transmitter • Tire pressure warning ECU

HINT:
It is necessary to perform the 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:
It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU and/or valve and transmitter have been replaced.

1	PERFORM FORCED TRANSMISSION OF TRANSMITTER ID OF ALL WHEELS

(a) Set the tire pressure to the specified value.

Cold tire inflation pressure

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	220 (2.2, 32)	200 (2.0, 29)
P205/55R16	220 (2.2, 32)	200 (2.0, 29)

(b) Make sure that the ignition switch is off.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch to the ON position and turn the tester on.
(e) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:

*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

(f) Rapidly release the pressures from each wheel by approximately 40 kPa (0.4 kgf/cm^2, 5.8 psi) within 30 seconds.

(1) Check that each tire pressure data displayed on the intelligent tester screen has changed.

OK:

Each tire pressure data displayed on the intelligent tester screen will change to the value of the tire pressure.

NOTICE:

- **It takes about 2 or 3 minute to display the updated tire pressure data.**
- **When the "TIREPRESS" 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 it.**

(2) After confirming that all of the tire pressure data displayed on the intelligent tester screen have changed, set the tire pressure to the appropriate specified values.

HINT:

If the tire pressure data displayed on the intelligent tester screen has not changed after rechecking, go to other problem procedure (for malfunctions in transmission or reception function) (See page TW-24).

NG → **INSPECT OTHER PROBLEM (MALFUNCTION IN TRANSMISSION OR RECEPTION FUNCTION)**

OK

END

DTC	C2121/21	No Signal from Transmitter ID1 in Main Mode
DTC	C2122/22	No Signal from Transmitter ID2 in Main Mode
DTC	C2123/23	No Signal from Transmitter ID3 in Main Mode
DTC	C2124/24	No Signal from Transmitter ID4 in Main Mode
DTC	C2181/81	Transmitter ID1 not Received (Test Mode DTC)
DTC	C2182/82	Transmitter ID2 not Received (Test Mode DTC)
DTC	C2183/83	Transmitter ID3 not Received (Test Mode DTC)
DTC	C2184/84	Transmitter ID4 not Received (Test Mode DTC)

DESCRIPTION

The tire pressure warning valve and transmitters that are installed in the tire and wheel assemblies measure the air pressure of the tires. The measured values are transmitted to the tire pressure warning antenna and receiver on the body as radio waves and then sent to the tire pressure warning ECU. 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 comes on.

The tire pressure warning valve and transmitters constantly send radio waves to the tire pressure warning antenna and receiver.

Under the following conditions below, the tire pressure warning antenna and receiver is unable to receive the signals from the tire pressure warning valves 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.

HINT:

When no signals are received for 51 minutes or more, a DTC is output.

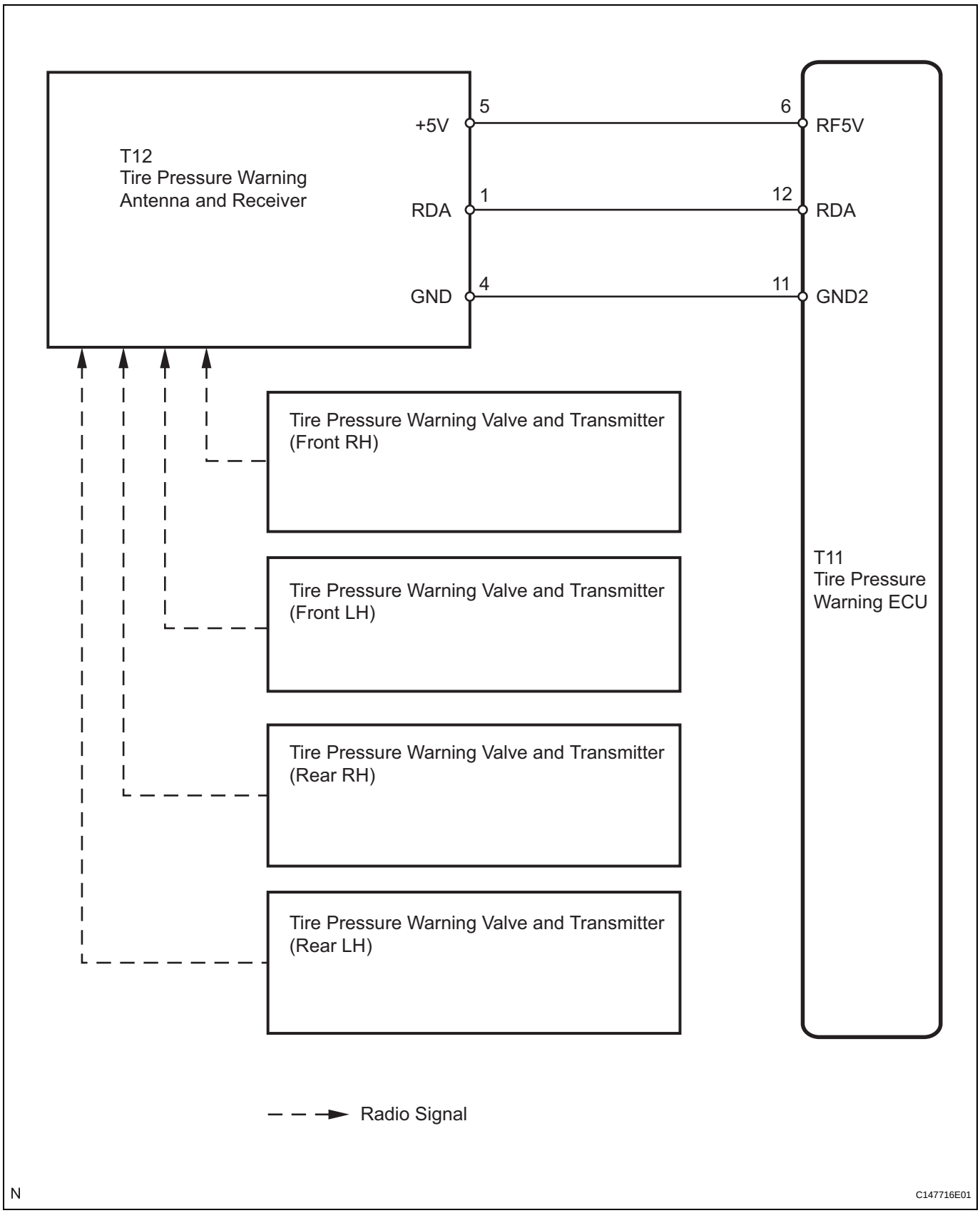
DTCs from C2121/21 to C2124/24 can only be cleared by using the tester. DTCs from C2181/81 to C2184/84 can be cleared when the transmitter in the tire pressure warning valve and transmitter sends a forced transmission signal or test mode ends. DTCs from C2181/81 to C2184/84 are output only in test mode.

DTC No.	DTC Detection Condition	Trouble Area
C2121/21 C2122/22 C2123/23 C2124/24	These DTCs are detected when no signals are received for 51 minutes or more.	• Tire pressure warning valve and transmitter • Tire pressure warning antenna and receiver • Wire harness or connector • Tire pressure warning ECU
C2181/81 C2182/82 C2183/83 C2184/84	Malfunctions in the transmitting/receiving circuit	• Tire pressure warning valve and transmitter • Tire pressure warning antenna and receiver • Wire harness or connector • Tire pressure warning ECU

HINT:

It is necessary to perform the 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 tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU and/or valve and transmitter have been replaced.**

1 CHECK FREQUENCY RECEIVING CONDITION

(a) Check if the vehicle is not located in areas 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 areas 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 frequency may be interrupted due to 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 appropriate specified values.

Cold tire inflation pressure

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	220 (2.2, 32)	200 (2.0, 29)
P205/55R16	220 (2.2, 32)	200 (2.0, 29)

(b) Make sure that the ignition switch is off.

(c) Connect the intelligent tester to the DLC3.

(d) Turn the ignition switch to the ON position.

(e) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS2	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS3	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS4	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.

(f) Rapidly reduce the tire pressure for each wheel at least 40 kPa (0.41 kg/cm^2, 5.8 psi) within 30 seconds.

(g) Check the DATA LIST.

NOTICE:

- **It takes about 2 or 3 minute to display the updated tire pressure data.**
- **When "TIREPRESS" 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 it.**
- **Record the transmitter ID of which "TIREPRESS" data corresponds to each tire.**

(h) After confirming that one of the "TIREPRESS" data for one tire (ID1 to ID4) has changed, repeat this procedure one by one. Identify the transmitter that corresponds to the DTC.

Result

Condition	Proceed to
One or more of transmitters abnormal	A
All normal	B
All abnormal	C

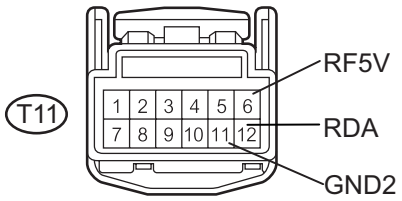
A → **Go to step 4**

B → **END**

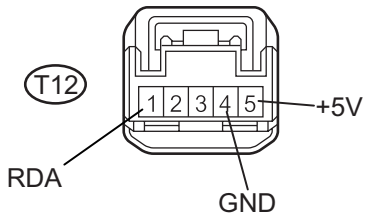
C

3 CHECK HARNESS AND CONNECTOR (ECU - RECEIVER)

Front View of Wire Harness Connector (to Tire Pressure Warning ECU):



Front View of Wire Harness Connector (to Tire Pressure Warning Antenna and Receiver):



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(a) Disconnect the T11 ECU connector.
(b) Disconnect the T12 receiver connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
T11-12 (RDA) - T12-1 (RDA)	Always	Below 1 Ω
T11-11 (GND2) - T12-4 (GND)		
T11-6 (RF5V) - T12-5 (+5V)		
T11-12 (RDA) - Body ground		10 kΩ or higher
T11-11 (GND2) - Body ground		
T11-6 (RF5V) - Body ground		

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 INSPECT TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select REGIT ID CODE by following the prompts displayed on the intelligent tester.

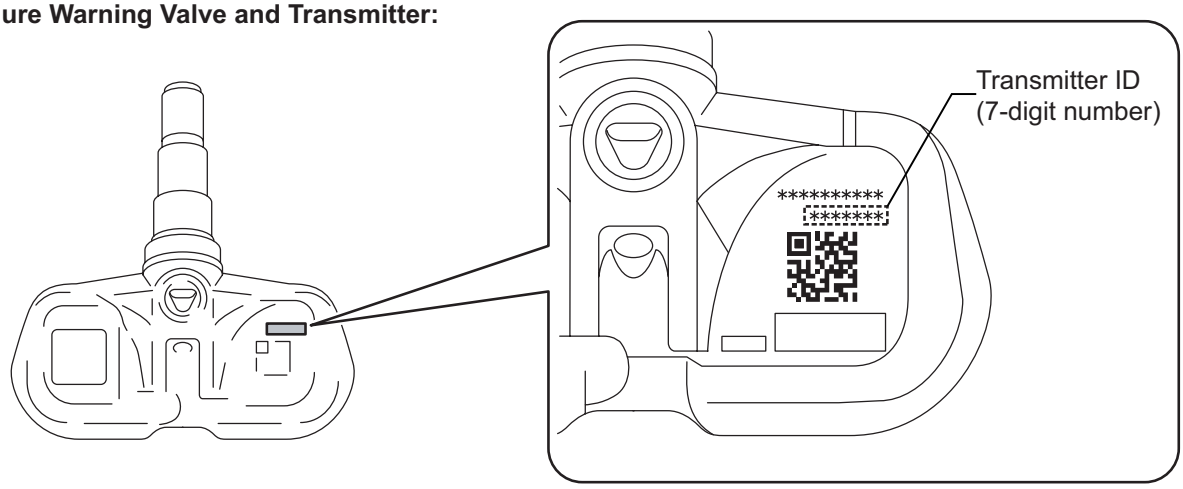
TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
REGIT ID1 CODE	Registered ID1 code/ min.: 0, max.: FFFFFF*	The ID No. registered in the transmitter ID1 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID2 CODE	Registered ID2 code/ min.: 0, max.: FFFFFF*	The ID No. registered in the transmitter ID2 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID3 CODE	Registered ID3 code/ min.: 0, max.: FFFFFF*	The ID No. registered in the transmitter ID3 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID4 CODE	Registered ID4 code/ min.: 0, max.: FFFFFF*	The ID No. registered in the transmitter ID4 is displayed	*: Displayed only when the ID No. is not registered.

(e) Check the ID number on the identified transmitter by removing it from the tire and wheel.

TW

Tire Pressure Warning Valve and Transmitter:



(f) Confirm that the ID number on the transmitter and recorded transmitter ID match.
Result

Result	Proceed to
Match	A
Do not match	B

B → **Go to step 6**

A

5 REPLACE TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Replace the tire pressure warning valve and transmitter (See page TW-79).

NEXT

6 REGISTRATION OF TRANSMITTER ID

(a) Perform registration (See page TW-15).

NEXT

TW

7 PERFORM INITIALIZATION

(a) Perform initialization (See page TW-19).

NEXT

8 READ VALUE ON DATA LIST

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.

(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS2	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS3	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS4	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.

HINT:
It may take about 2 or 3 minute until the values are displayed.

Result

Condition	Proceed to
All tire pressure readings are equal to specified values.	**A**
Tire pressure values are not displayed.	**B**

A → **END**

B

9 REPLACE TIRE PRESSURE WARNING ANTENNA AND RECEIVER

(a) Replace the tire pressure warning antenna and receiver (See page TW-76).

NEXT

10 READ VALUE ON DATA LIST

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TW

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS2	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS3	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS4	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.

HINT:
It may take about 2 or 3 minute until the values are displayed.

Result

Condition	Proceed to
All tire pressure readings are equal to specified values.	**A**
Tire pressure values are not displayed.	**B**

B → **REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)**

A

END

DTC	C2141/41	Transmitter ID1 Error

DTC	C2142/42	Transmitter ID2 Error

DTC	C2143/43	Transmitter ID3 Error

DTC	C2144/44	Transmitter ID4 Error

DESCRIPTION

The tire pressure warning valve and transmitters that are installed in the tire and wheel assemblies measure the air pressure of the tires. The measured values are transmitted to the tire pressure warning antenna and receiver on the body as radio waves and then sent to the tire pressure warning ECU. 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 comes on.
When the internal circuit of the tire pressure warning valve and transmitter is malfunctioning, this DTC is output.

DTC No.	DTC Detection Condition	Trouble Area
C2141/41 C2142/42 C2143/43 C2144/44	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. This will happen in situations where the inflation pressure is outside the range 0 to 637.5 kPa (0 to 6.48 kgf/cm^2, 0 psi to 92.2 psi), the 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.	• Tire pressure warning valve and transmitter • Tire pressure warning ECU

HINT:
It is necessary to perform the 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 tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-15) after registration (See page TW-19) of the transmitter IDs into the tire pressure warning ECU after the ECU and/or valve and transmitter have been replaced.**

1	IDENTIFY TRANSMITTER CORRESPONDING TO DTC

TW

(a) Set the tire pressure to the specified value.

Cold tire inflation pressure

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	220 (2.2, 32)	200 (2.0, 29)
P205/55R16	220 (2.2, 32)	200 (2.0, 29)

(b) Make sure that the ignition switch is off.
(c) Connect the intelligent tester to the DLC3.
(d) Turn the ignition switch to the ON position.
(e) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

(f) Rapidly reduce the tire pressure for each wheel at least 40 kPa (0.41 kg/cm^2, 5.8 psi) within 30 seconds. If "TIREPRESS" displayed on the tester (ID1 to ID4) does not change, the tire pressure warning valve and transmitter corresponds to the DTC that was detected.
HINT:
- Identify the malfunctioning tire pressure warning valve and transmitter by repeatedly decreasing the tire pressure for each tire.
- Record which "TIREPRESS" data (ID1 to ID4) corresponds to each tire.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:
*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

(g) Check the DATA LIST.

Result

Condition	Detection Condition
One of "TIREPRESS" data (ID1 to ID4) changed.	**Normal**
"TIREPRESS" data did not change.	**Transmitter corresponding to DTC**

NOTICE:
- **When the "TIREPRESS" data has not changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then forcibly transmit the transmitter ID and recheck it.**
- **Record the transmitter ID and position of transmitters that are normal.**

(h) When the "TIREPRESS" data (ID1 to ID4) has changed, repeat this procedure to identify the tire pressure warning valve and transmitter that corresponds to a DTC.

(i) When all of the "TIREPRESS" data (ID1 to ID4) have changed, identify the malfunctioning tire pressure warning valve and transmitter using recorded ID numbers and output DTC.

(j) Set the tire pressures to the appropriate specified values.

NEXT

2	REPLACE TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Replace the identified tire pressure warning valve and transmitter with a new one (See page TW-79).
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 transmitter not to be replaced should be checked using the tester and recorded.

NEXT

3	REGISTRATION OF TRANSMITTER ID

(a) Register the transmitter ID for all wheels (See page TW-15).

NEXT

4	PERFORM INITIALIZATION

(a) Perform initialization (See page TW-19).

NEXT

5	READ VALUE ON INTELLIGENT TESTER

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:

*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

Result

Condition	Proceed to
Tire pressure values are not displayed.	A
All tire pressure readings are equal to specified values.	B

A → **REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)**

B

END

DTC	C2165/65	Abnormal Temperature Inside ID1 Tire

DTC	C2166/66	Abnormal Temperature Inside ID2 Tire

DTC	C2167/67	Abnormal Temperature Inside ID3 Tire

DTC	C2168/68	Abnormal Temperature Inside ID4 Tire

DESCRIPTION

Each tire pressure warning valve and transmitter measures the internal temperature of its tire as well as tire pressure, and transmits the information to the tire pressure warning ECU along with the transmitter ID. If the measured temperature is out of the specified range, the tire pressure warning ECU recognizes it as a malfunction, outputs DTCs, and blinks the tire pressure warning light.

DTC No.	DTC Detection Condition	Trouble Area
C2165/65 C2166/66 C2167/67 C2168/68	Temperature inside the tire exceeds 119°C (246.2°F) more than once.	• Tires • Tire pressure warning valve and transmitter • Tire pressure warning ECU

HINT:
It is necessary to perform the 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 tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and note them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU and/or valve and transmitter have been replaced.**

1	CHECK TIRES

(a) Check the tire is not flat, and there is no indication of air pressure drop.
OK:
Tire is normal.
HINT:
If a tire is damaged, the tire pressure warning valve and transmitter may also have been damaged at the same time.

NG → **REPLACE TIRE AND TIRE PRESSURE WARNING VALVE AND TRANSMITTER (See page TW-79)**

OK

2	IDENTIFY TRANSMITTER CORRESPONDING TO DTC

(a) Set the tire pressure to the specified value.

Cold tire inflation pressure

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	220 (2.2, 32)	200 (2.0, 29)
P205/55R16	220 (2.2, 32)	200 (2.0, 29)

(b) Display the "TIREPRESS" data for each wheel using the intelligent tester.

(c) Rapidly reduce the tire pressure for each wheel at least 40 kPa (0.41 kg/cm^2, 5.8 psi) within 30 seconds.

(d) Check the DATA LIST.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:

*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

(e) When the "TIREPRESS" data (ID1 to ID4) has changed, repeat this procedure to identify the tire pressure warning valve and transmitter that corresponds to a DTC.

(f) When all of the "TIREPRESS" data (ID1 to ID4) have changed, identify the malfunctioning tire pressure warning valve and transmitter based on the recorded ID numbers and output DTC.

Result

Condition	Detection Condition
One of "TIREPRESS" data (ID1 to ID4) changed.	Normal
No "TIREPRESS" data changed.	Transmitter corresponding to DTC

NOTICE:

- **It takes about 2 or 3 minute to display the updated data.**
- **When "TIREPRESS" data has not changed, reset the tire pressure to the appropriate specified value and rotate the tire 90 to 270 degrees. Then forcibly transmit the transmitter ID and recheck it.**
- **Record the transmitter ID and position in normal condition.**

NEXT

3	REPLACE TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Replace the identified tire pressure warning valve and transmitter with a new one (See page TW-79).
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 transmitter not to be replaced should be checked using the tester and recorded.

NEXT

4	REGISTRATION OF TRANSMITTER ID

(a) Register the transmitter ID for all wheels (See page TW-15).

NEXT

5	PERFORM INITIALIZATION

(a) Perform initialization (See page TW-19).

NEXT

6	READ VALUE ON INTELLIGENT TESTER

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS2	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS3	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.
TIREPRESS4	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.

HINT:
It may take about 2 or 3 minute or until the values are displayed.

Result

Condition	Proceed to
Tire pressure values are not displayed.	A
All tire pressure readings are equal to specified values.	B

B → END

A

REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)

DTC	C2171/71	Transmitter ID not Registered

DESCRIPTION

The IDs of each tire pressure warning valve and transmitters are registered to the tire pressure warning ECU.
When the ECU detects that an ID is not the one of the registered IDs, or cannot receive an ID signal, this DTC is output.

DTC No.	DTC Detection Condition	Trouble Area
C2171/71	Transmitter ID code is not registered. (When an ID code is unregistered for 51 minutes or more)	Tire pressure warning ECU

INSPECTION PROCEDURE

NOTICE:

- **When replacing the tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and note them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.**

1	CONFIRM REGISTRATION CONDITION (REGISTERED ID CODES)

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select REGIT ID CODE by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
REGIT ID1 CODE	Registered ID1 code/ min.: 0, max.: FFFFFFF*	The ID No. registered in the transmitter ID1 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID2 CODE	Registered ID1 code/ min.: 0, max.: FFFFFFF*	The ID No. registered in the transmitter ID2 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID3 CODE	Registered ID1 code/ min.: 0, max.: FFFFFFF*	The ID No. registered in the transmitter ID3 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID4 CODE	Registered ID1 code/ min.: 0, max.: FFFFFFF*	The ID No. registered in the transmitter ID4 is displayed	*: Displayed only when the ID No. is not registered.

OK:
The registered transmitter ID codes are displayed on the intelligent tester screen.

NG → **Go to step 2**

OK

REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)

TW

2	PERFORM REGISTRATION (TRANSMITTER ID)

(a) Register the transmitter IDs for all the wheels (See page TW-15).

NEXT

3	READ VALUE ON DATA LIST

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:
*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

Result

Condition	Proceed to
All tire pressure readings are equal to specified values.	**A**
Tire pressure values are not displayed	**B**

TW

B → **REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)**

A

END

DTC	C2176/76	Receiver Error

DESCRIPTION

The signals are transmitted to the tire pressure warning antenna and receiver on the body as radio waves and then sent to the tire pressure warning ECU.

DTC No.	DTC Detection Condition	Trouble Area
C2176/76	DTC is stored when any of the following is detected: • Malfunction in the tire pressure warning ECU internal circuit. • Terminal RF5V is shorted to ground. • Malfunction in the tire pressure warning antenna and receiver internal circuit.	• Tire pressure warning antenna and receiver • Wire harness or connector • Tire pressure warning ECU

WIRING DIAGRAM

INSPECTION PROCEDURE

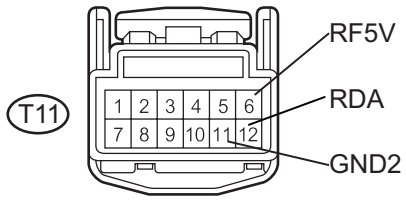
NOTICE:

- **When replacing the tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.**

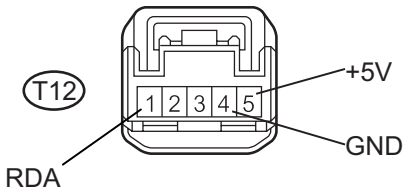
TW

1 CHECK HARNESS AND CONNECTOR (ECU - RECEIVER)

Front View of Wire Harness Connector (to Tire Pressure Warning ECU):



Front View of Wire Harness Connector (to Tire Pressure Warning Antenna and Receiver):



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(a) Disconnect the T11 ECU connector.
(b) Disconnect the T12 receiver connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

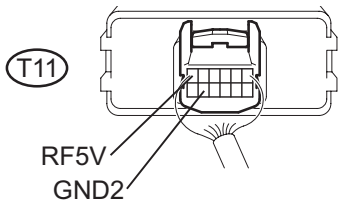
Tester Connection	Condition	Specified Condition
T11-6 (RF5V) - T12-5 (+5V)	Always	Below 1 Ω
T11-12 (RDA) - T12-1 (RDA)		
T11-11 (GND2) - T12-4 (GND)		
T11-6 (RF5V) - Body ground		10 kΩ or higher
T11-12 (RDA) - Body ground		
T11-11 (GND2) - Body ground		

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 CHECK TIRE PRESSURE WARNING ECU

Rear View of Wire Harness Connector (to Tire Pressure Warning ECU):



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(a) Reconnect the T11 ECU connector.
(b) Turn the ignition switch to the ON position.
(c) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Switch Condition	Specified Condition
T11-6 (RF5V) - T11-11 (GND2)	Ignition switch ON	4.5 to 5.5 V

NG → **REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)**

OK

REPLACE TIRE PRESSURE WARNING ANTENNA AND RECEIVER (See page TW-76)

TW

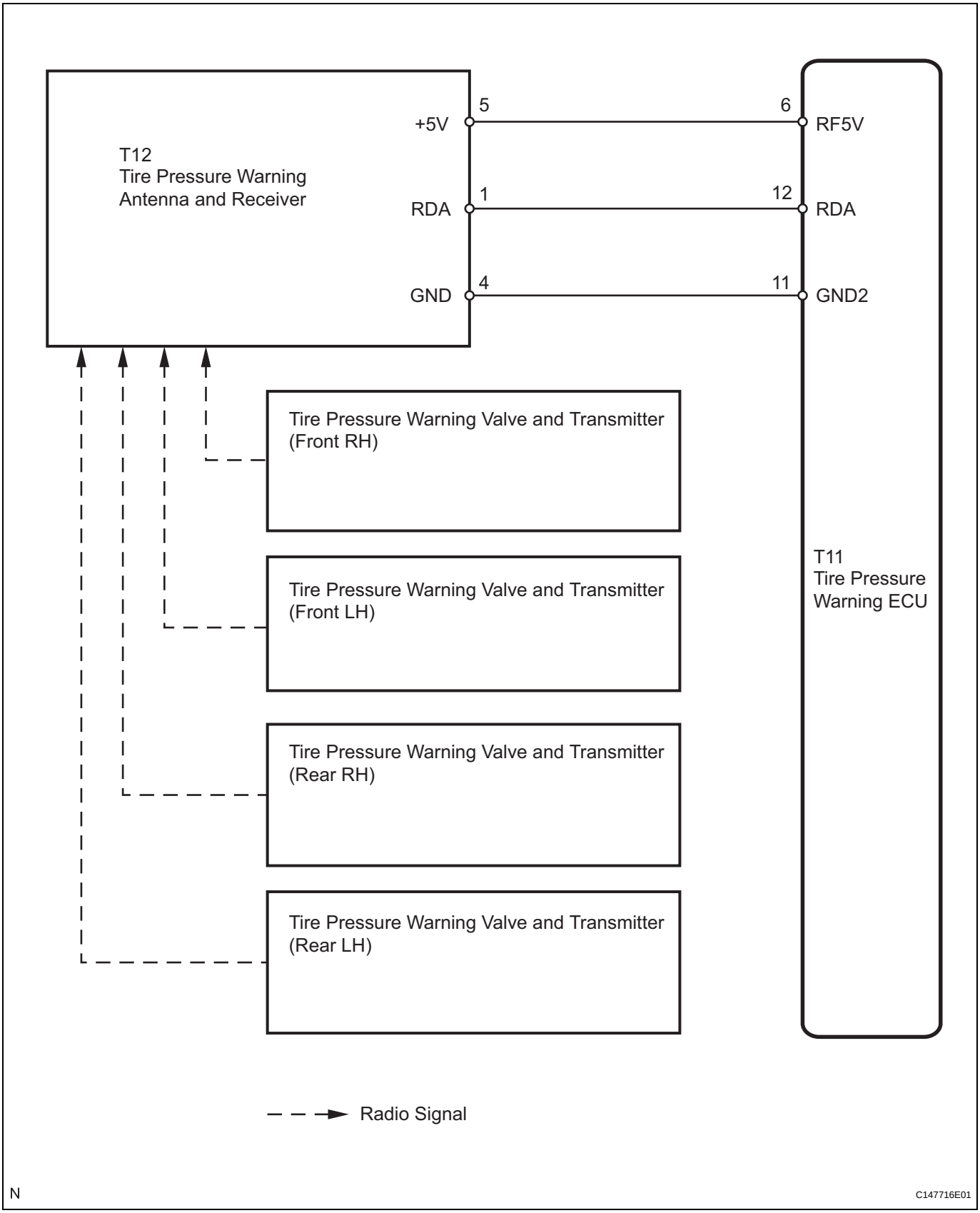
DTC	C2177/77	Initialization not Completed

DESCRIPTION

Initialization is necessary after replacing any of the ECU, tires with different tire pressure, or tire pressure warning valve and transmitter, after rotating the tires or when a new vehicle is delivered.

DTC No.	DTC Detection Condition	Trouble Area
C2177/77	Initialization is not completed after vehicle speed of 5 mph (8 km/h) or more continues for 20 minutes or more (total).	• Tire pressure warning valve and transmitter • Tire pressure warning ECU • Tire pressure warning antenna and receiver • Wire harness or connector

WIRING DIAGRAM



TW

INSPECTION PROCEDURE

NOTICE:

- **When replacing the tire pressure warning ECU, read the IDs stored in the old ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU and/or valve and transmitter has been replaced.**

1 CHECK FREQUENCY RECEIVING CONDITION

(a) Check if the vehicle is not located in areas 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 areas described above, the tire pressure warning light may come on only in a particular area.

(2) Devices using similar radio frequencies are not located in the vicinity of the vehicle.

OK:

Facilities, or devices that use similar radio frequencies are not located in the vicinity of the vehicle.

HINT:

Radio frequency may be interrupted due to 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 appropriate specified values.

Cold tire inflation pressure

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	220 (2.2, 32)	200 (2.0, 29)
P205/55R16	220 (2.2, 32)	200 (2.0, 29)

(b) Make sure that the ignition switch is off.

(c) Connect the intelligent tester to the DLC3.

(d) Turn the ignition switch to the ON position.

(e) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:

*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

(f) Rapidly reduce the tire pressure for each wheel at least 40 kPa (0.41 kg/cm^2, 5.8 psi) within 30 seconds.

(g) Check the DATA LIST.

NOTICE:

- **It takes about 2 or 3 minute to display the updated tire pressure data.**
- **When "TIREPRESS" 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 it.**
- **Record the transmitter ID of which "TIREPRESS" data corresponds to each tire.**

(h) After confirming that one of "TIREPRESS" data for one tire (ID1 to ID4) has changed, repeat this procedure one by one. Identify the transmitter that corresponds to a DTC.

Result

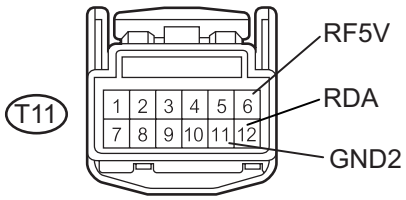
Condition	Proceed to
One or more of transmitters abnormal	A
All normal	B
All abnormal	C

A	Go to step 4
B	END

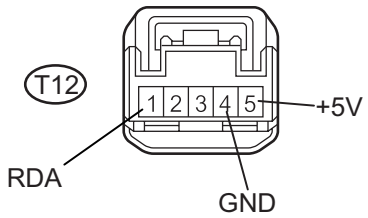
C

3 CHECK HARNESS AND CONNECTOR (ECU - RECEIVER)

Front View of Wire Harness Connector (to Tire Pressure Warning ECU):



Front View of Wire Harness Connector (to Tire Pressure Warning Antenna and Receiver):



H E129461E26

(a) Disconnect the T11 ECU connector.
(b) Disconnect the T12 receiver connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
T11-12 (RDA) - T12-1 (RDA)	Always	Below 1 Ω
T11-11 (GND2) - T12-4 (GND)		
T11-6 (RF5V) - T12-5 (+5V)		
T11-12 (RDA) - Body ground		10 kΩ or higher
T11-11 (GND2) - Body ground		
T11-6 (RF5V) - Body ground		

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4 INSPECT TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select REGIT ID CODE by following the prompts displayed on the intelligent tester.

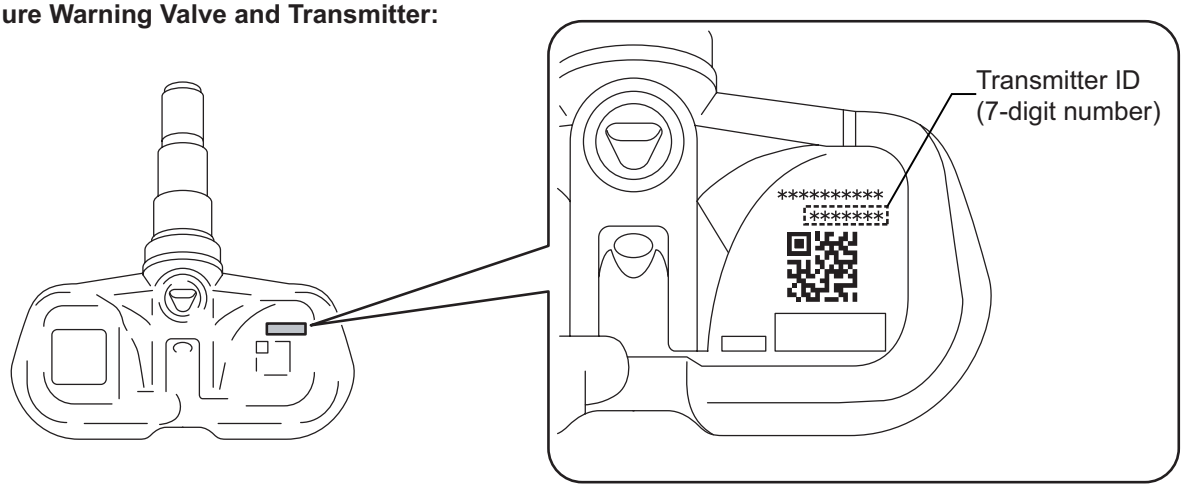
TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
REGIT ID1 CODE	Registered ID1 code/ min.: 0, max.: FFFFFF*	The ID No. registered in the transmitter ID1 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID2 CODE	Registered ID2 code/ min.: 0, max.: FFFFFF*	The ID No. registered in the transmitter ID2 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID3 CODE	Registered ID3 code/ min.: 0, max.: FFFFFF*	The ID No. registered in the transmitter ID3 is displayed	*: Displayed only when the ID No. is not registered.
REGIT ID4 CODE	Registered ID4 code/ min.: 0, max.: FFFFFF*	The ID No. registered in the transmitter ID4 is displayed	*: Displayed only when the ID No. is not registered.

(e) Check the ID number on the identified transmitter by removing it from the tire and wheel.

TW

Tire Pressure Warning Valve and Transmitter:



H

E128762E12

(f) Confirm that the ID number on the transmitter and recorded transmitter ID match.

Result

Result	Proceed to
Match	A
Do not match	B

B → **Go to step 6**

A

5 REPLACE TIRE PRESSURE WARNING VALVE AND TRANSMITTER

(a) Replace tire pressure warning valve and transmitter (See page TW-79).

NEXT

6 REGISTRATION OF TRANSMITTER ID

(a) Perform registration (See page TW-15).

NEXT

TW

7 PERFORM INITIALIZATION

(a) Perform initialization (See page TW-19).

NEXT

8 READ VALUE ON DATA LIST

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.

(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:

*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

Result

Condition	Proceed to
All tire pressure readings are equal to specified values.	**A**
Tire pressure values are not displayed.	**B**

A → **END**

B

9 REPLACE TIRE PRESSURE WARNING ANTENNA AND RECEIVER

(a) Replace the tire pressure warning antenna and receiver (See page TW-76).

NEXT

10 READ VALUE ON DATA LIST

(a) Make sure that the ignition switch to the ON position.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select "TIREPRESS" by following the prompts displayed on the intelligent tester.

TIRE PRESSURE:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS1	ID1 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS2	ID2 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TIREPRESS3	ID3 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*
TIREPRESS4	ID4 tire inflation pressure/ min.: -100 kPa (-1 kgf/cm^2, -14 psi), max.: 537.5 kPa (5.4 kgf/cm^2, 78 psi)	Actual tire inflation pressure	If -100 kPa (-1 kgf/cm^2, -14 psi) is displayed, the data have not been received.*

HINT:

*: It may take about 2 or 3 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 C2121/21 to C2124/24 (See page TW-37).

Result

Condition	Proceed to
All tire pressure readings are equal to specified values.	**A**
Tire pressure values are not displayed.	**B**

B → **REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)**

A

END

DTC	C2191/91	Vehicle Speed Signal Error (Test Mode DTC)

DESCRIPTION

The tire pressure warning ECU receives a speed signal from the combination meter. This DTC is stored upon entering test mode, and cleared when a vehicle speed signal of 12 mph (20 km/h) is detected for 3 seconds or more. This DTC is output only in test mode.

DTC No.	DTC Detection Condition	Trouble Area
C2191/91	Speed sensor circuit malfunction	• Vehicle speed sensor • Tire pressure warning ECU • Combination meter • Wire harness or connector

WIRING DIAGRAM

INSPECTION PROCEDURE

NOTICE:

- **When replacing the tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.**

TW

1	READ VALUE ON INTELLIGENT TESTER

(a) Make sure that the ignition switch is off.
(b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to the ON position.
(d) Select the item below in the Data List, and read the value displayed on the intelligent tester.

HINT:
Enter the following menus: DIAGNOSIS / OBD/MOBD / METER / DATA LIST.

METER:

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
SPEED METER	Vehicle speed/ Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Almost same as actual vehicle speed	-

(e) Check that the values indicated on the tester and on the combination meter are the same.
OK:
The vehicle speed displayed on the tester changes depending in the actual vehicle speed.

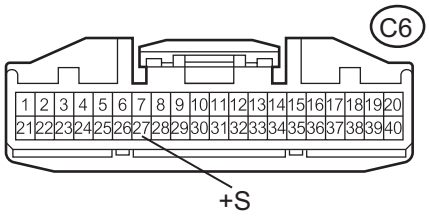
NG → **GO TO METER / GAUGE SYSTEM (See page ME-4)**

OK

2 CHECK HARNESS AND CONNECTOR (ECU - COMBINATION METER)

Front View of Wire Harness Connector (to Tire Pressure Warning ECU):

Front View of Wire Harness Connector (to Combination Meter):



H C147705E03

(a) Disconnect the T11 ECU connector.
(b) Disconnect the C6 meter connector.
(c) Measure the resistance according to the value(s) in the table below.
Standard resistance

Tester Connection	Condition	Specified Condition
T11-2 (SPD) - C6-27 (+S)	Always	Below 1 Ω
T11-2 (SPD) - Body ground		10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)

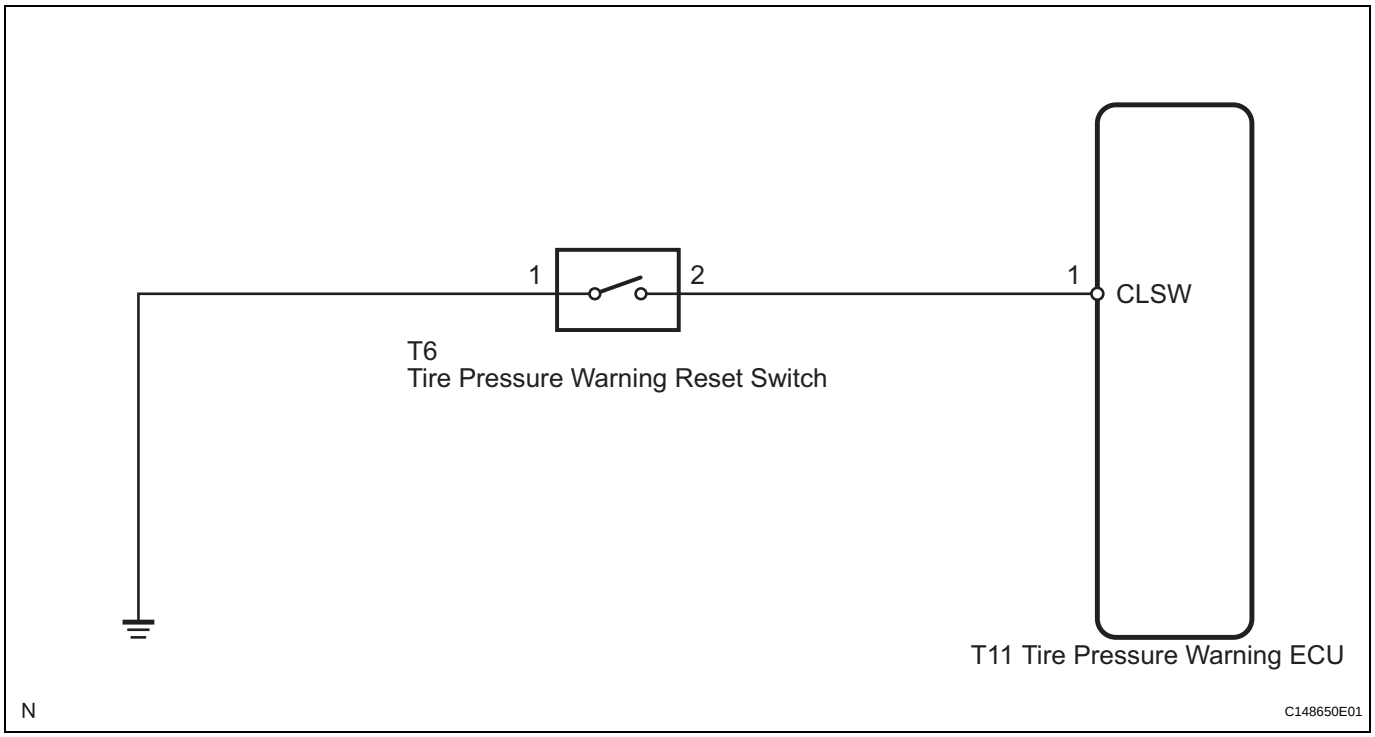
TW

Tire Pressure Warning Reset Switch Circuit

DESCRIPTION

Receiving a signal from the tire pressure warning reset switch, the tire pressure warning ECU and receiver indicate the initialization of the tire pressure warning system.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **When replacing the tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.**

1	CHECK TIRE PRESSURE WARNING RESET SWITCH FUNCTION

(a) Perform the tire pressure warning reset switch test in TEST MODE PROCEDURE (See page TW-21).

OK:

Reset switch ON:
Tire pressure warning light comes on.
Reset switch OFF:
Tire pressure warning light blinks.

NG → **Go to step 2**

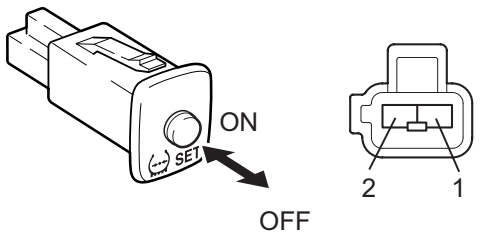
OK

END

TW

2 INSPECT TIRE PRESSURE WARNING RESET SWITCH

Tire Pressure Warning Reset Switch:



P C107260E01

(a) Remove the tire pressure warning reset switch.
(b) Measure the resistance between terminals 1 and 2 of the tire pressure warning reset switch when the tire pressure warning switch is ON and OFF.

Standard resistance

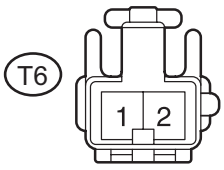
Switch Condition	Specified Condition
ON	Below 1 Ω
OFF	10 kΩ or higher

NG → **REPLACE TIRE PRESSURE WARNING RESET SWITCH (See page TW-86)**

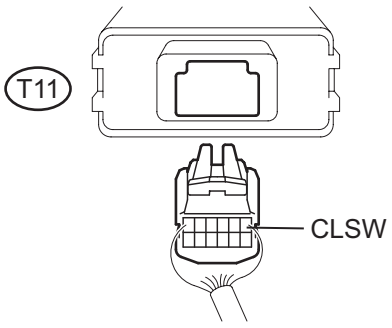
OK

3 CHECK HARNESS AND CONNECTOR (TIRE PRESSURE WARNING RESET SW - TIRE PRESSURE WARNING ECU)

Front View of Wire Harness Connector (to Tire Pressure Warning Reset Switch):



Rear View of Wire Harness Connector (to Tire Pressure Warning ECU):



P C111010E13

(a) Disconnect the tire pressure warning reset switch T6 connector and tire pressure warning ECU T11 connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Switch Condition	Condition	Specified Condition
T11-1 (CLSW) - T6-1	Always	Below 1 Ω
T11-1 (CLSW) - Body ground		10 kΩ or higher
T6-2 - Body ground		Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)

TW

Tire Pressure Warning Light Circuit

DESCRIPTION

If the ECU detects trouble, the tire pressure warning light blinks (comes on after blinking for 1 minute) and tire pressure monitor is cancelled at the same time. At this time, the ECU records a DTC in the memory. Connect terminals TC and CG of DLC3 to blink the tire pressure warning light and output the DTC.

WIRING DIAGRAM

INSPECTION PROCEDURE

NOTICE:

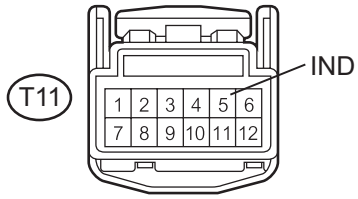
- **When replacing the tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.**

HINT:

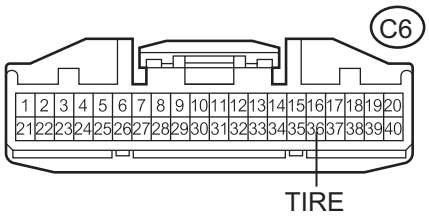
This procedure must be performed according to PROBLEM SYMPTOMS TABLE.

1	CHECK HARNESS AND CONNECTOR (COMBINATION METER - TIRE PRESSURE WARNING ECU)

Front View of Wire Harness Connector (to Tire Pressure Warning ECU):



Front View of Wire Harness Connector (to Combination Meter):



H C147705E02

(a) Disconnect the C6 combination meter connector.
(b) Disconnect the T11 tire pressure warning ECU connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

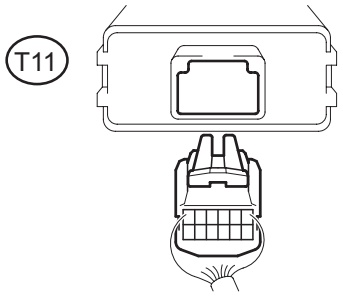
Tester Connection	Condition	Specified Condition
C6-36 (TIRE) - T11-5 (IND)	Always	Below 1 Ω
C6-36 (TIRE) - Body ground		10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2	INSPECT COMBINATION METER

Rear View of Wire Harness Connector (to Tire Pressure Warning ECU):



P E138170E01

(a) Disconnect the connector from the tire pressure warning ECU.
(b) Turn the ignition switch to the ON position, check if the tire pressure warning light illuminates.

Result

Condition	Proceed to
Illuminates	A
Does not illuminate	B

B → **REPLACE COMBINATION METER (See page ME-44)**

A

REPLACE TIRE PRESSURE WARNING ECU (See page TW-83)

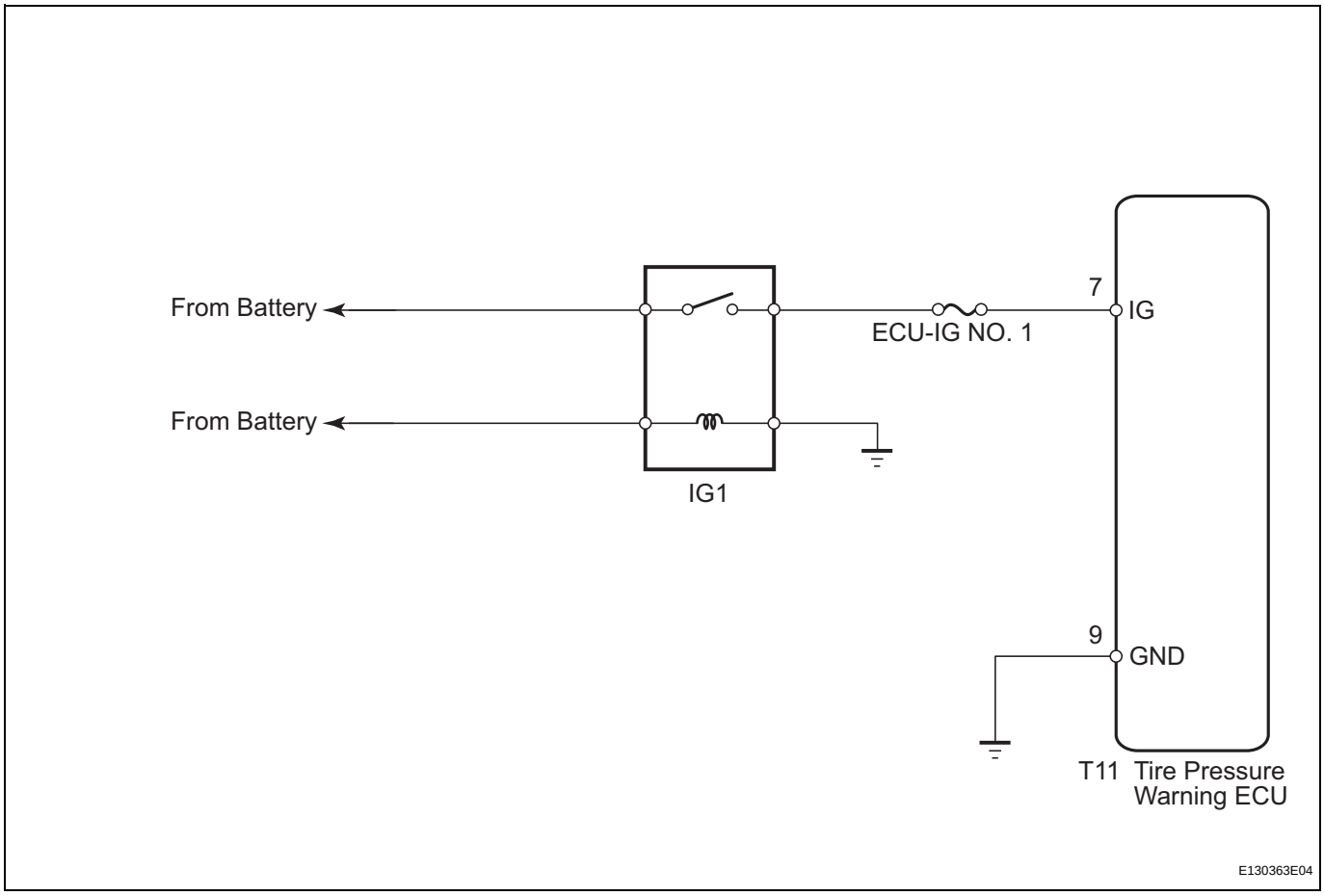
TW

ECU Power Source Circuit

DESCRIPTION

This is the power source for the tire pressure warning ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

- **When replacing the tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU has been replaced.**

TW

1	**INSPECT FUSE (ECU-IG NO. 1)**

(a) Remove the ECU-IG NO. 1 fuse from the instrument panel junction block.

(b) Measure the resistance of the fuse.

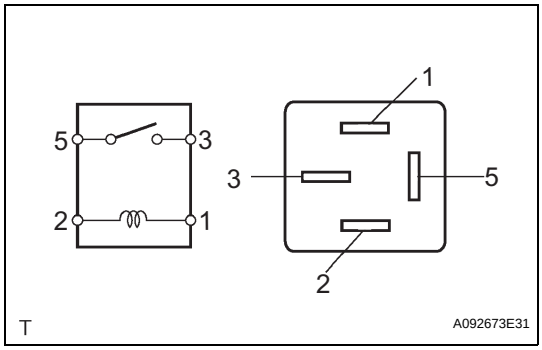
Standard resistance:

Below 1 Ω

NG	**REPLACE FUSE**

OK

2 INSPECT IG1 RELAY



(a) Remove the IG1 relay from the instrument panel junction block.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

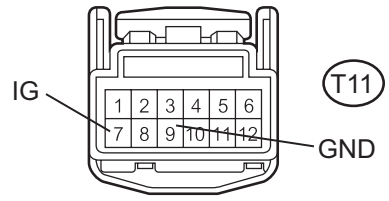
Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
	Below 1 Ω (When battery voltage is applied to terminals 1 and 2)

NG → REPLACE IG1 RELAY

OK

3 CHECK HARNESS AND CONNECTOR (ECU - BATTERY AND BODY GROUND)

Front View of Wire Harness Connector (to Tire Pressure Warning ECU):



(a) Disconnect the T11 ECU connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Switch Condition	Specified Condition
T11-7 (IG) - Body ground	Ignition switch on	10 to 14 V
	Ignition switch off	Below 1 V

(c) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
T11-9 (GND) - Body ground	Always	Below 1 Ω

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

TW

OK

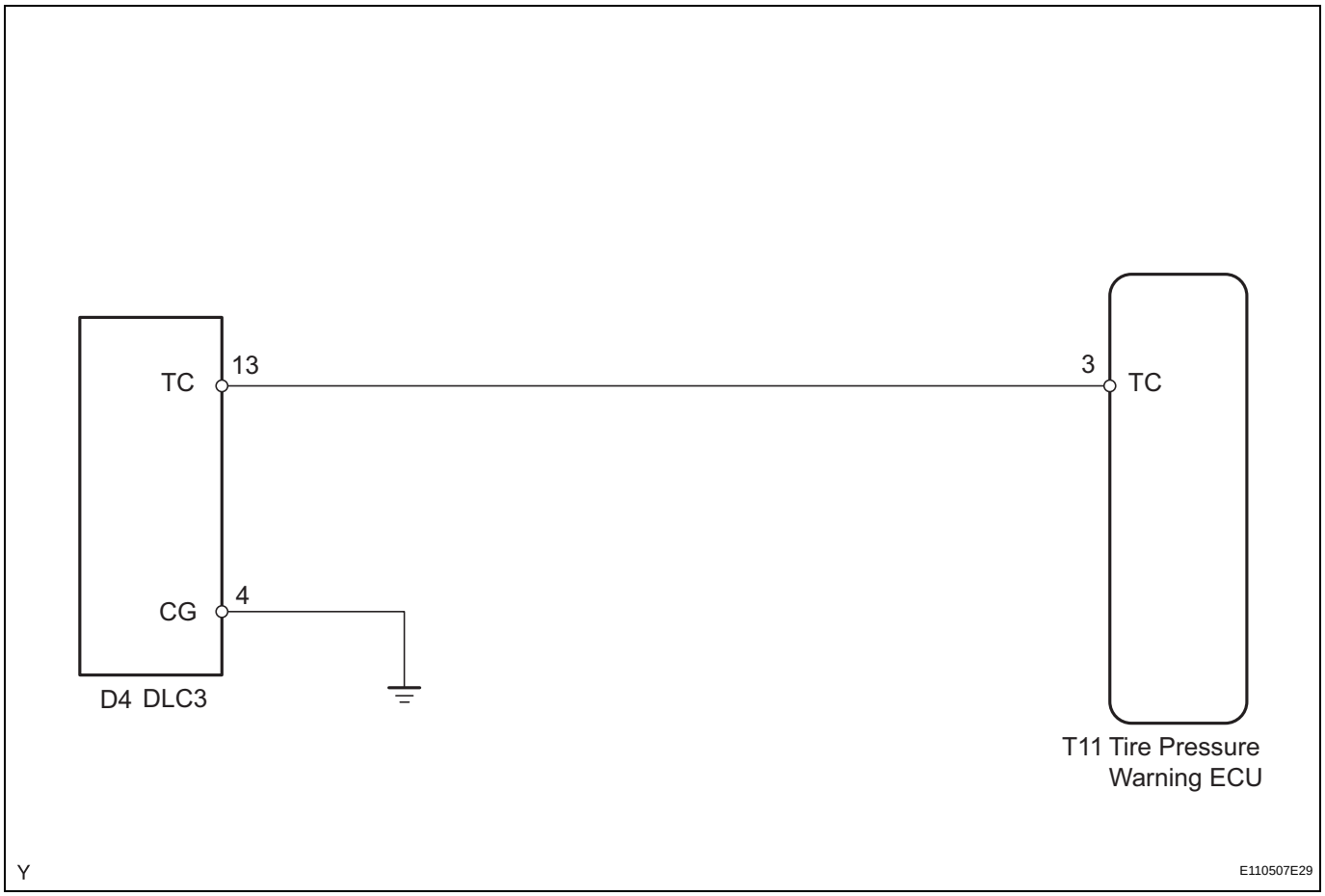
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page TW-24)

TC and CG Terminal Circuit

DESCRIPTION

DTC output mode is set by connecting terminals 13 (TC) and 4 (CG) of the DLC3. The DTCs are indicated by blinks of the tire pressure warning light.

WIRING DIAGRAM



HINT:
When each warning light blinks continuously, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in an ECU connected to this circuit may have occurred.

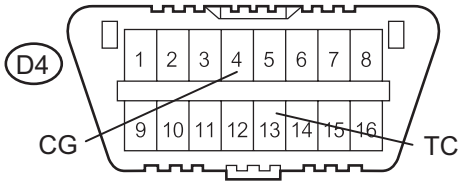
INSPECTION PROCEDURE

NOTICE:

- **When replacing the tire pressure warning ECU, read the IDs stored in the ECU using the intelligent tester and write them down before removal.**
- **It is necessary to perform initialization (See page TW-19) after registration (See page TW-15) of the transmitter IDs into the tire pressure warning ECU after the ECU and/or valve and transmitter have been replaced.**

1	CHECK HARNESS AND CONNECTOR (DLC3 - TIRE PRESSURE WARNING ECU)

Front View of Wire Harness Connector (to DLC3):



Front View of Wire Harness Connector (to Tire Pressure Warning ECU):

H E129465E04

(a) Disconnect the T11 ECU connector.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
T11-3 (TC) - D4-13 (TC)	Always	Below 1 Ω
D4-4 (CG) - Body ground		

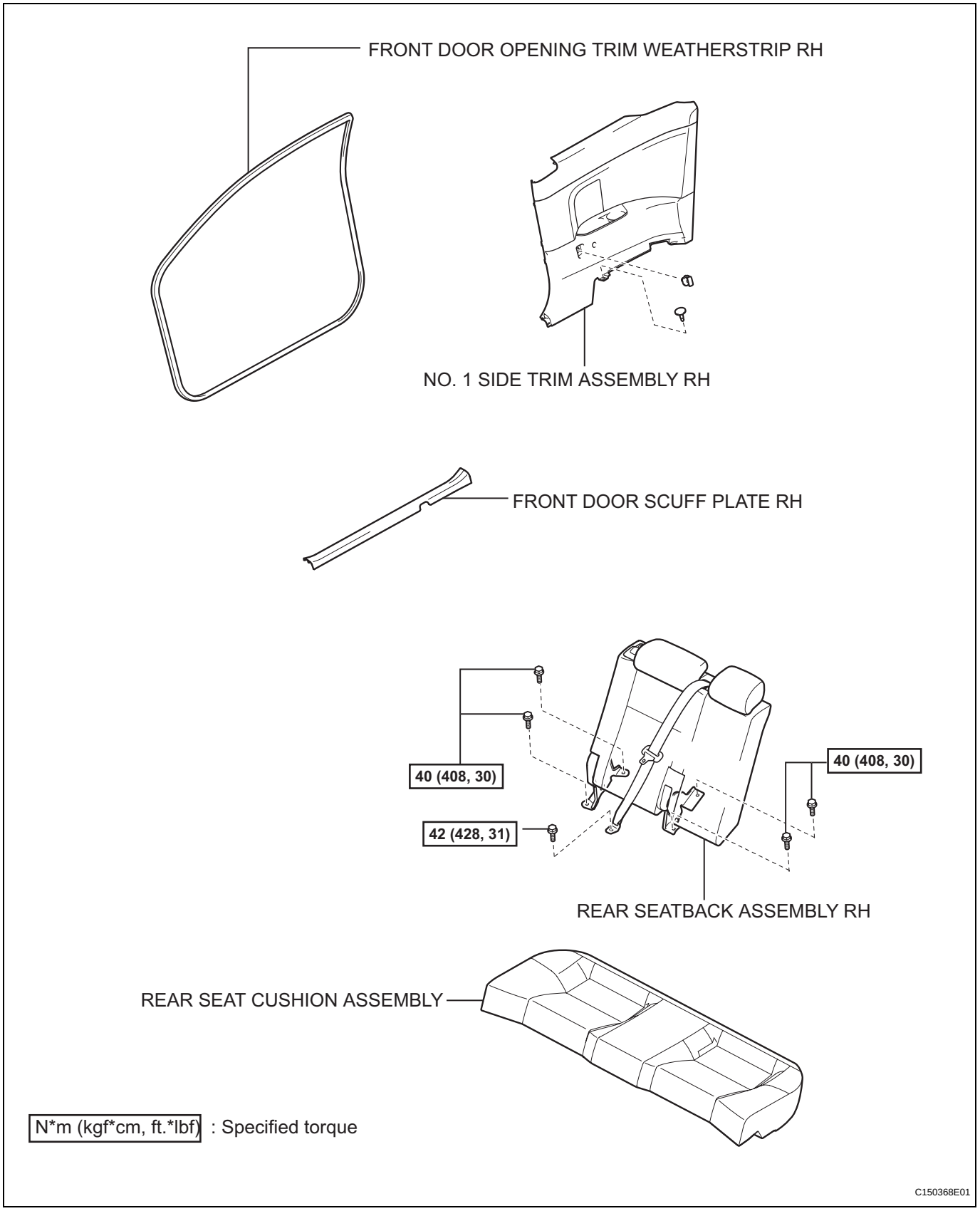
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

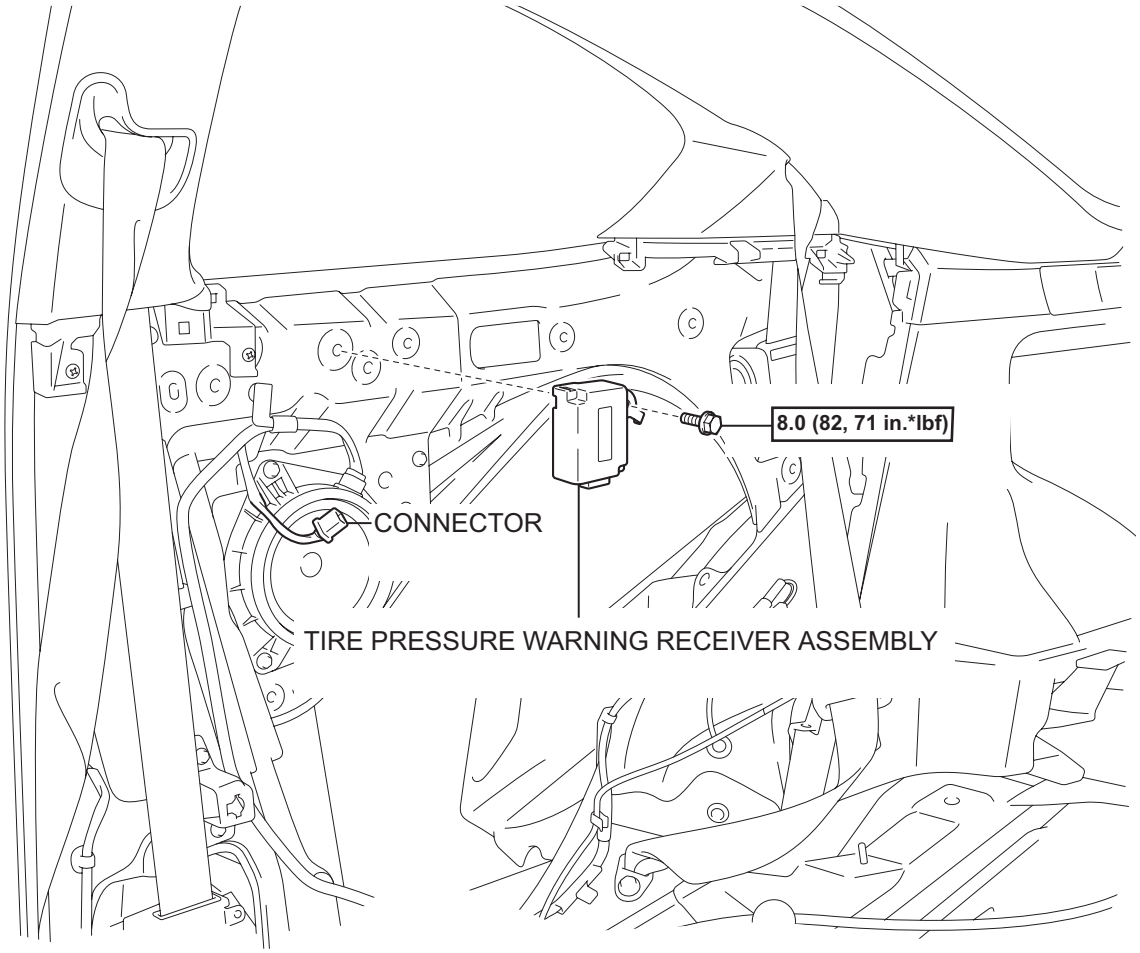
PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (See page TW-24)

TIRE PRESSURE WARNING RECEIVER

COMPONENTS



TW



N*m (kgf*cm, ft.*lbf) : Specified torque

P

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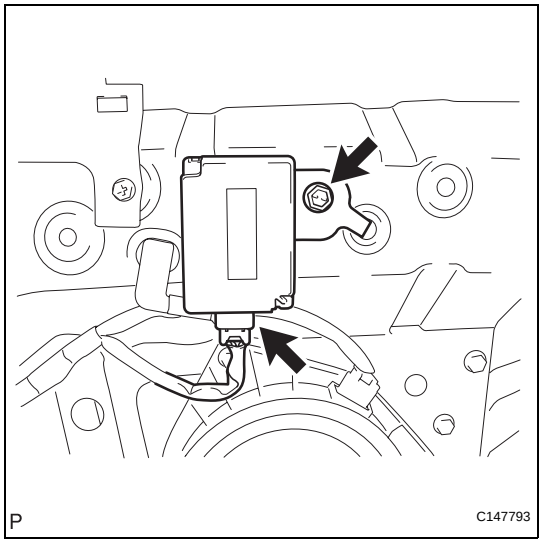
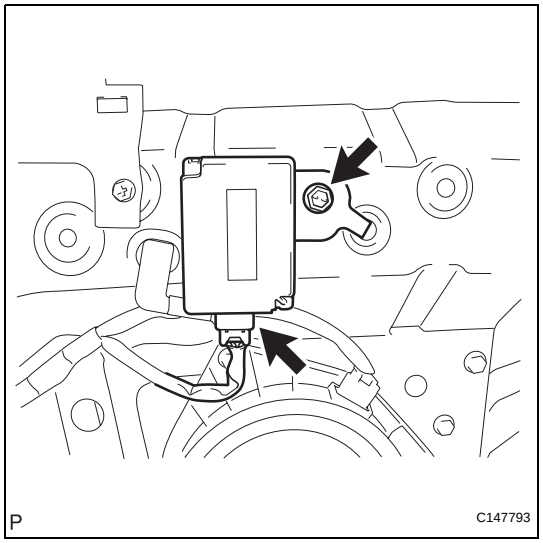
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE FRONT DOOR SCUFF PLATE RH (See page IP-19)**
3. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
4. **REMOVE REAR SEATBACK ASSEMBLY RH (See page SE-18)**
5. **REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH**
6. **REMOVE NO. 1 SIDE TRIM ASSEMBLY RH (See page IR-10)**
7. **REMOVE TIRE PRESSURE WARNING RECEIVER ASSEMBLY**
   (a) Disconnect the connector.
   (b) Remove the bolt and the tire pressure warning receiver assembly.



INSTALLATION

1. **INSTALL TIRE PRESSURE WARNING RECEIVER ASSEMBLY**
   (a) Install the tire pressure warning receiver assembly with the bolt.
   Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
   (b) Connect the connector.
2. **INSTALL NO. 1 SIDE TRIM ASSEMBLY RH (See page IR-19)**
3. **INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH**
4. **INSTALL REAR SEATBACK ASSEMBLY RH (See page SE-28)**
5. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**
6. **INSTALL FRONT DOOR SCUFF PLATE RH (See page IP-22)**
7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

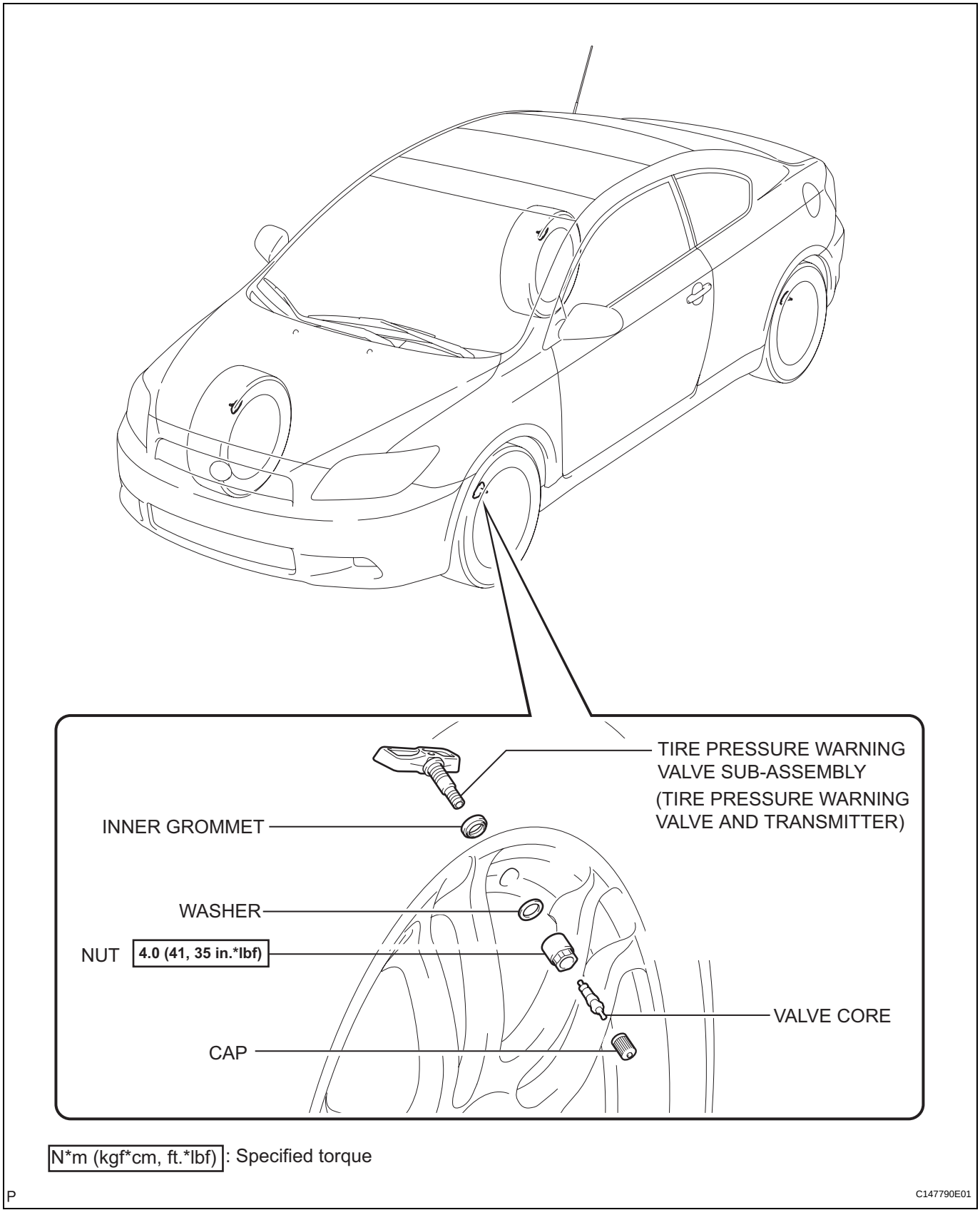


8. **PERFORM INITIALIZATION**
NOTICE:
Some systems need initialization after reconnecting the cable to the negative battery terminal (See page IN-23).

9. **INSPECT TIRE PRESSURE WARNING SYSTEM**
HINT:
See page TW-21.

TIRE PRESSURE WARNING VALVE AND TRANSMITTER

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

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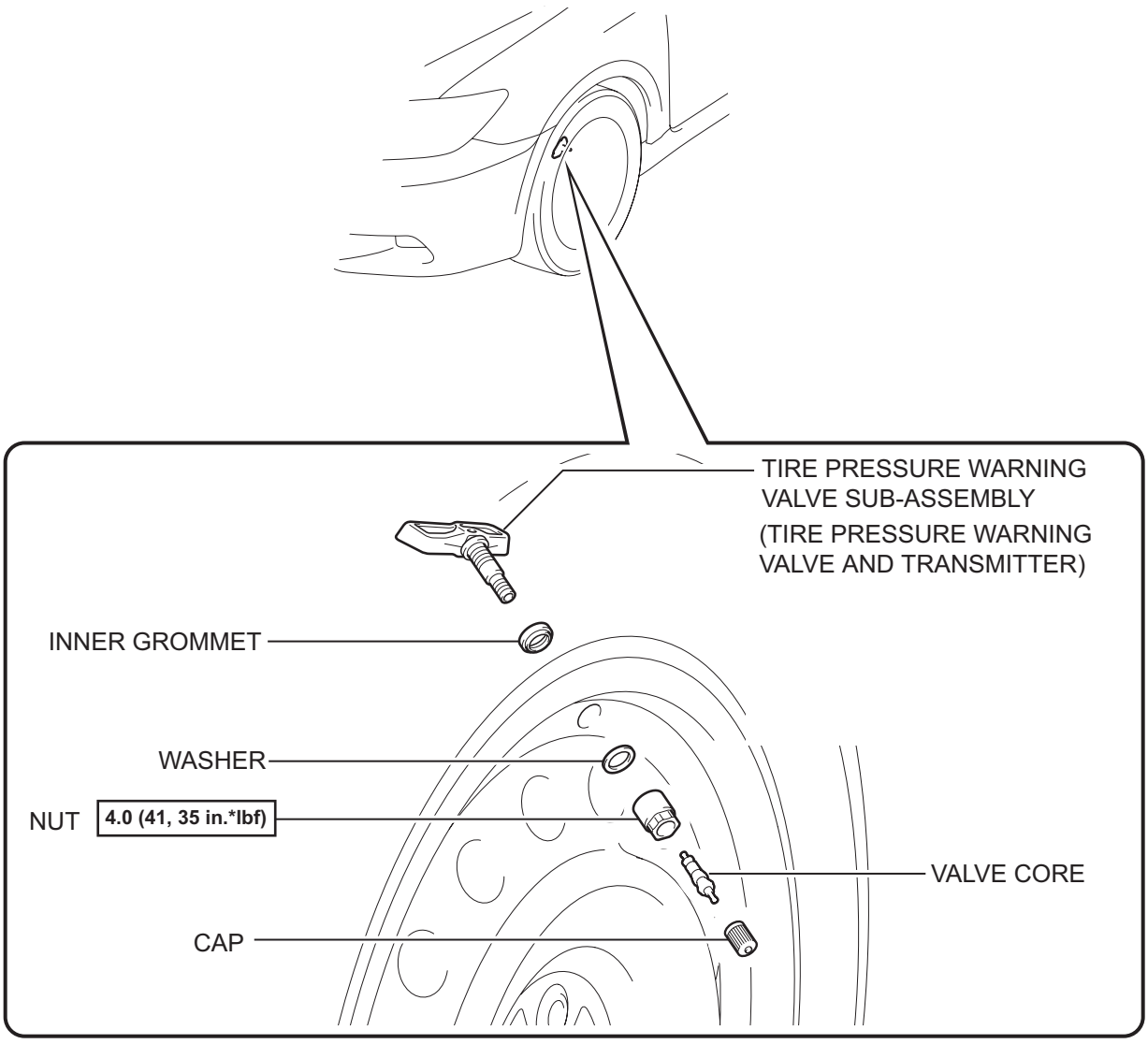
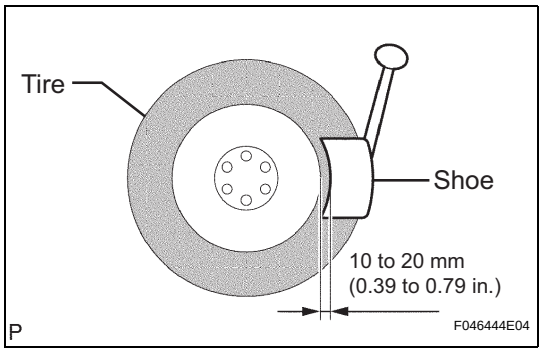
TW


TIRE PRESSURE WARNING VALVE SUB-ASSEMBLY
(TIRE PRESSURE WARNING VALVE AND TRANSMITTER)
INNER GROMMET
WASHER
NUT
4.0 (41, 35 in.*lbf)
VALVE CORE
CAP
N*m (kgf*cm, ft.*lbf): Specified torque
P
C147791E01

TW

REMOVAL

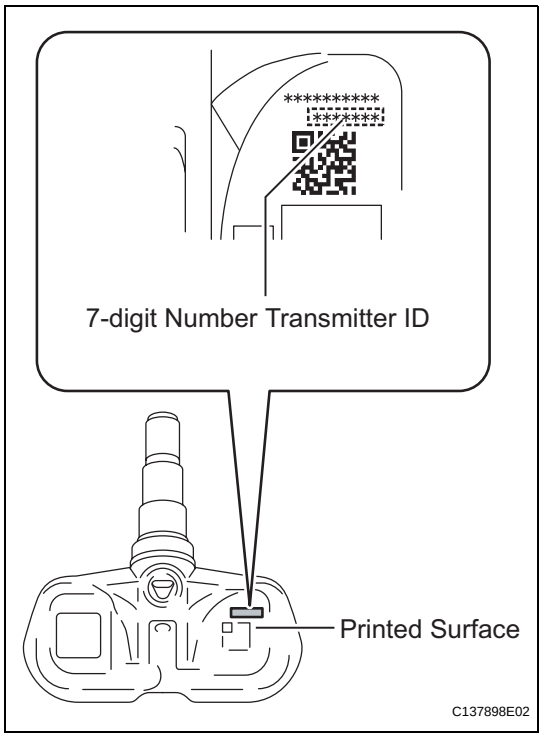
1. **REMOVE FRONT WHEEL**
2. **REMOVE REAR WHEEL**
3. **REMOVE TIRE PRESSURE WARNING VALVE SUB-ASSEMBLY**
   (a) Remove the valve core and cap, and release the air from the tire.
   (b) After ensuring that a sufficient amount of air has been released, remove the nut and washer that are used to secure the tire pressure warning valve and transmitter. Drop the tire pressure warning valve and transmitter into the tire.
   HINT:
   Keep the removed cap, valve core, nut, and washer.



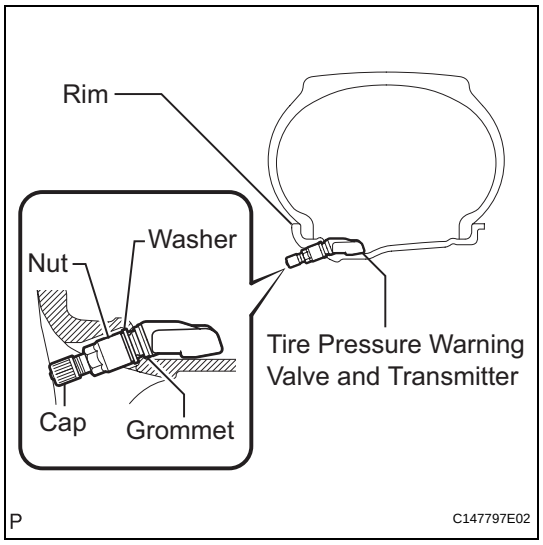
   (c) After dropping the tire pressure warning valve and transmitter into the tire, disengage the bead using the shoe of the tire remover.
   NOTICE:
   Be careful not to damage the tire pressure warning valve and transmitter due to interference between the valve and the tire bead.
   (d) Remove the bead on the upper side in the usual way.
   (e) Take out the tire pressure warning valve and transmitter from the tire and remove the bead on the lower side in the usual way.
   HINT:
   Check that no cracks or damage are identified on the grommet. If any damage is found, replace the grommet.

INSTALLATION

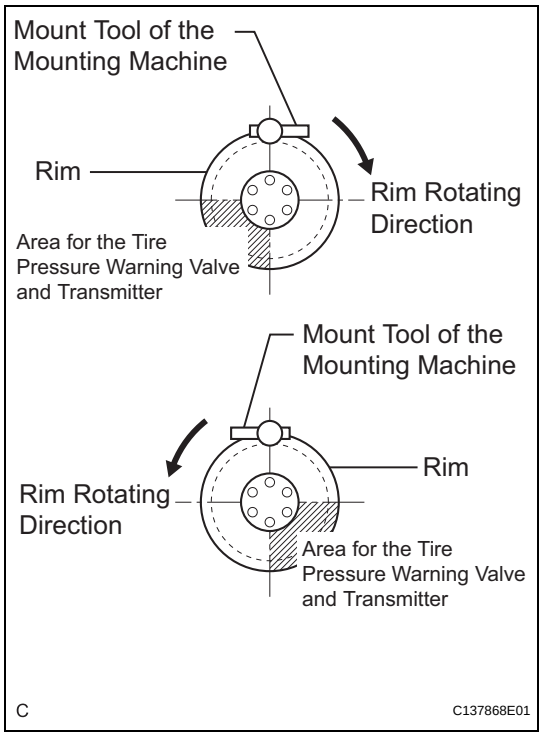
1. **INSTALL TIRE PRESSURE WARNING VALVE SUB-ASSEMBLY**
   (a) Insert the tire pressure warning valve and transmitter into the valve installation hole. Insert it from the inside of the rim so that the printed surface can be seen.
   NOTICE:
   - **Check that there is no visible deformation, damage, or other abnormalities on the tire pressure warning valve and transmitter.**
   - **Check that there is no foreign matter on the inner 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 running at high speeds.**
   - **If installing a new tire pressure warning valve and transmitter, write down the ID number before installation.**
   - **It is necessary to register the ID in the ECU after installation (See page TW-15).**



TW



(b) Install the washer on the tire pressure warning valve and transmitter from the rim side and tighten the nut.
Torque: 4.0 N*m (41 kgf*cm, 35 in.*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.**
- **If the tire and tire pressure warning valve and transmitter have been removed, check that there is no damage or cuts visible, and no foreign matter, such as mud, dirt, or sand is attached to the grommet. Replace the grommet with a new one if any of the defects mentioned above are found.**
- **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.**



(c) Set the wheel disc to the mounting machine and install the lower tire bead. Position the main body of the tire pressure warning valve and transmitter in the shaded area shown in the illustration.
NOTICE:
- **If the tire pressure warning valve and transmitter is positioned outside this area, it will interfere with the tire bead, and may cause damage to the tire pressure warning valve and transmitter.**
- **If application of lubricant is required when installing the bead, do not apply the lubricant directly to the tire pressure warning valve and transmitter.**

(d) 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.

(e) After the tire is inflated, the valve nut may be loose. Retighten the nut to the specified torque and then check for air leaks with soapy water.
Torque: 4.0 N*m (41 kgf*cm, 35 in.*lbf)
NOTICE:
No further tightening is required once the nut is tightened to the specified torque.

2. INSTALL FRONT WHEEL
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

3. INSTALL REAR WHEEL
Torque: 103 N*m (1,050 kgf*cm, 76 ft.*lbf)

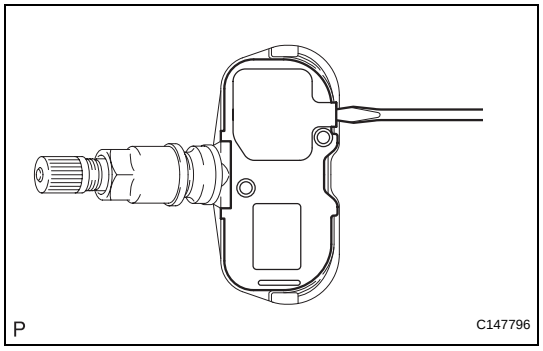
4. **INSPECT TIRE**
   HINT:
   See page TW-3.

5. **REGISTER TRANSMITTER ID**
   HINT:
   See page TW-15.

6. **INSPECT TIRE PRESSURE WARNING SYSTEM**
   HINT:
   See page TW-21.

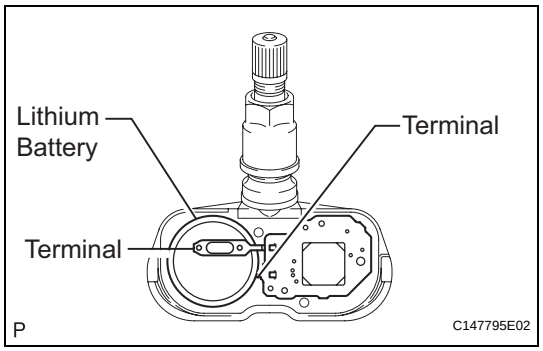
DISPOSAL

HINT:
The tire pressure warning valve sub-assembly is powered by a lithium battery. When disposing of the tire pressure warning valve sub-assembly, remove the battery and dispose of it correctly.



1. DISPOSE OF TIRE PRESSURE WARNING VALVE SUB-ASSEMBLY

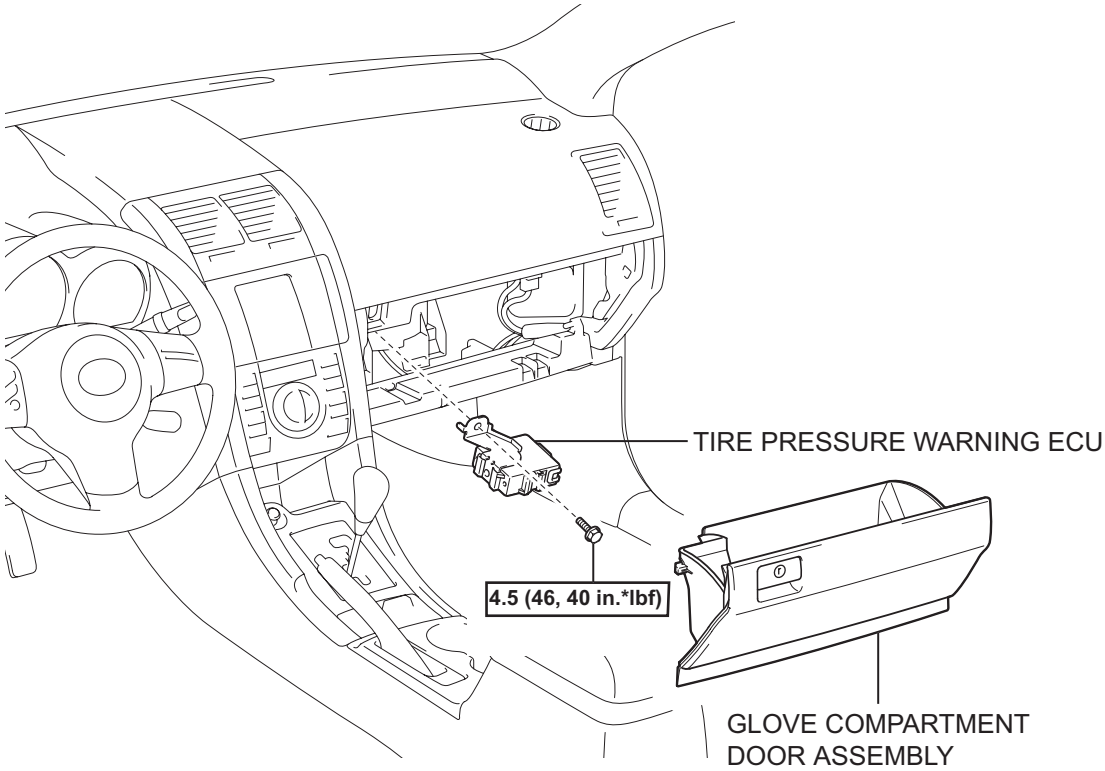
(a) Use the tip of a screwdriver to pry off the back cover.



(b) The battery and base board covered with resin are exposed. While taking out the battery, cut the 2 terminals that connect the battery to the base board.
HINT:
The battery and base board are covered with silicon.

TIRE PRESSURE WARNING ECU

COMPONENTS



N*m (kgf*cm, ft.*lbf) : Specified torque

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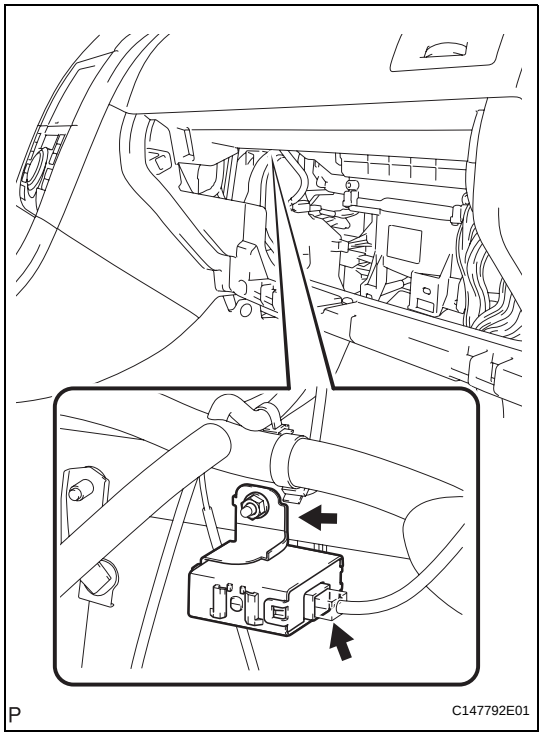
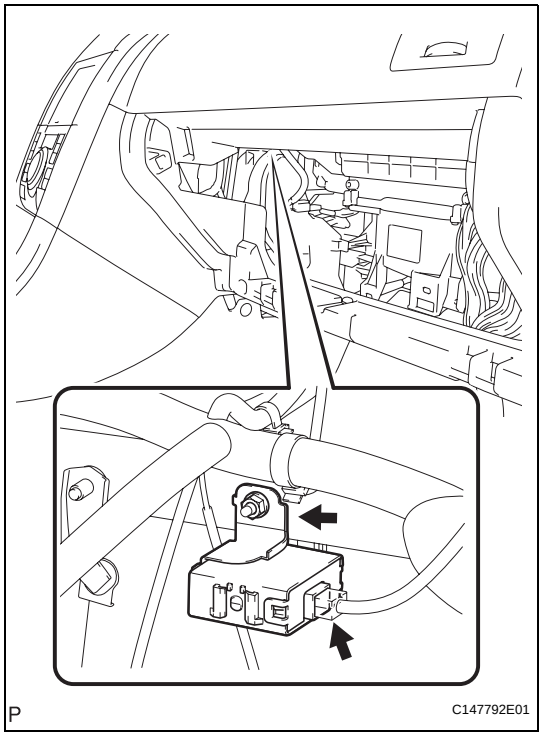
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY (See page IP-6)**
3. **REMOVE TIRE PRESSURE WARNING ECU**
   (a) Remove the nut.
   (b) Disconnect the connector and remove the tire pressure warning ECU.



INSTALLATION

1. **INSTALL TIRE PRESSURE WARNING ECU**
   (a) Connect the connector to the tire pressure warning ECU.
   (b) Install the tire pressure warning ECU with the nut.
   Torque: 4.5 N*m (46 kgf*cm, 40 in.*lbf)
2. **INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY (See page IP-11)**
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
4. **PERFORM INITIALIZATION**
   CAUTION:
   Some systems need initialization after reconnecting the cable to the negative battery terminal (See page IN-23).
5. **REGISTER TRANSMITTER ID**
   HINT:
   See page TW-15.
6. **INSPECT TIRE PRESSURE WARNING SYSTEM**
   HINT:
   See page TW-21.



TW

7. INITIALIZE SYSTEM

NOTICE:

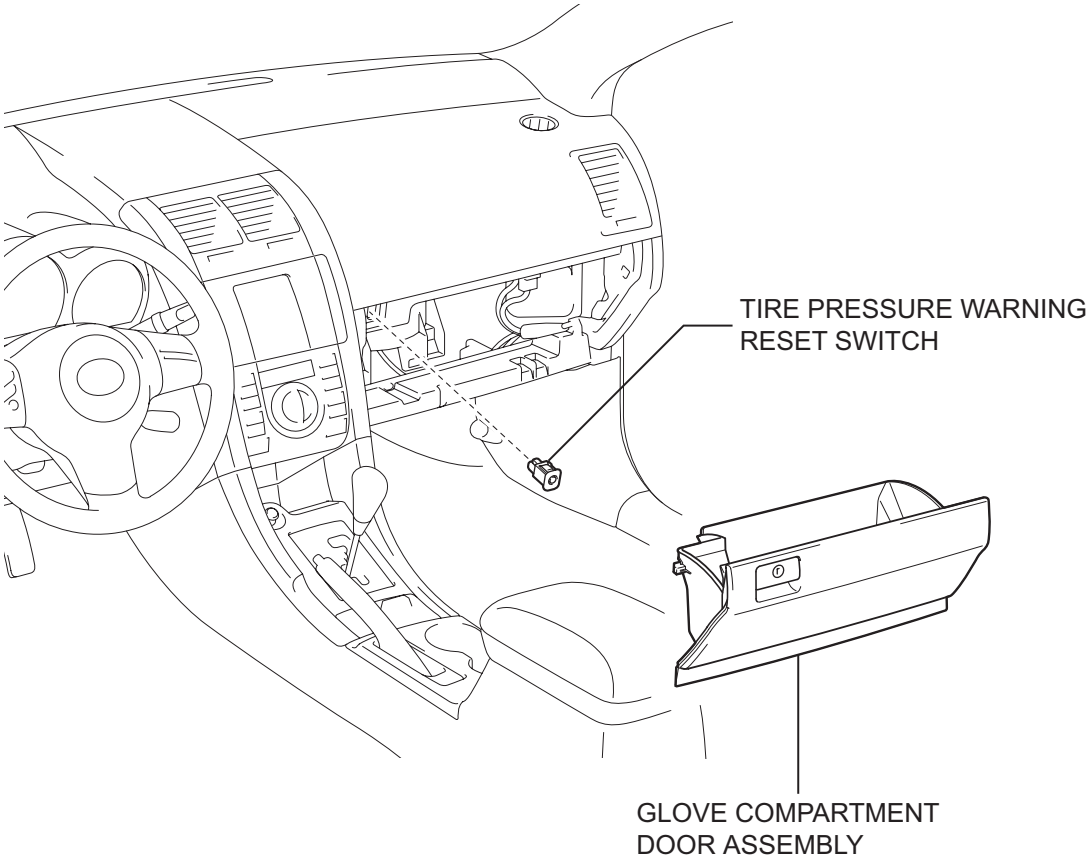
- **Be sure to register the transmitter IDs of all tires including the full-size spare tire in the ECU before initialization.**
- **Be sure to inflate all tires including the full-size spare tire to the proper inflation pressure before initialization.**

HINT:

See page TW-19.

TIRE PRESSURE WARNING RESET SWITCH

COMPONENTS



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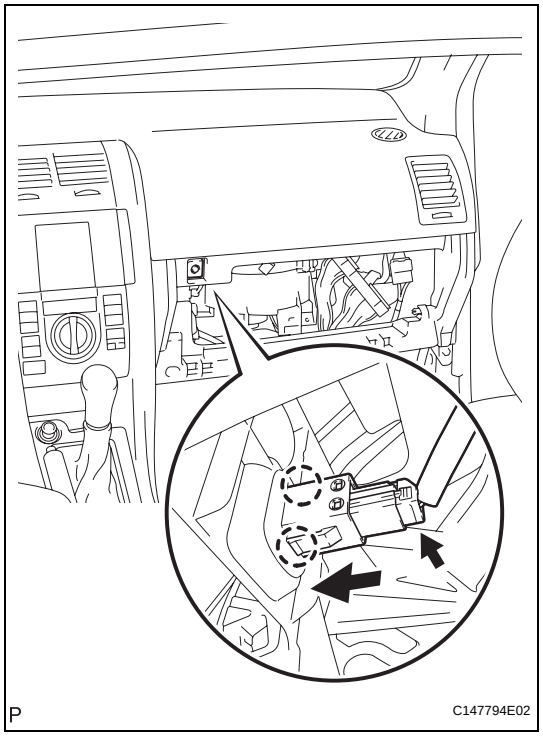
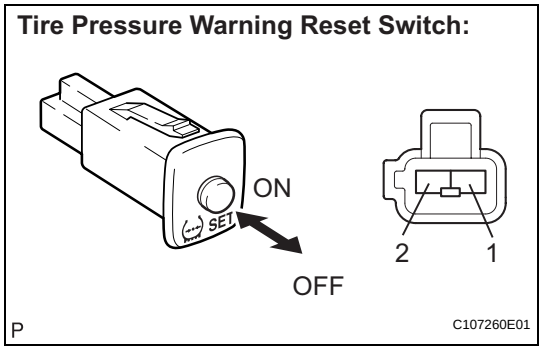
REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE GLOVE COMPARTMENT DOOR ASSEMBLY (See page IP-6)**
3. **REMOVE TIRE PRESSURE WARNING RESET SWITCH**
   (a) Disconnect the connector.
   (b) Disengage the 2 claws and remove the tire pressure warning reset switch from the instrument panel assembly.





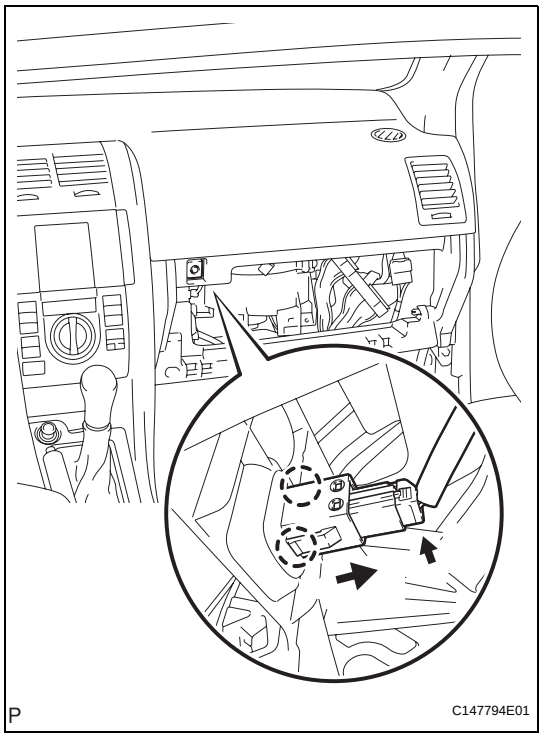
INSPECTION

1. **INSPECT TIRE PRESSURE WARNING RESET SWITCH**
   (a) Remove the tire pressure warning reset switch.
   (b) Measure the resistance between terminals 1 and 2 of the tire pressure warning reset switch when the tire pressure warning switch is ON and OFF.
   Standard resistance

Switch Condition	Specified Condition
ON	Below 1Ω
OFF	10 kΩ or higher

If the result is not as specified, replace the tire pressure warning reset switch.

TW



INSTALLATION

1. **INSTALL TIRE PRESSURE WARNING RESET SWITCH**
   (a) Engage the 2 claws to install the tire pressure warning reset switch to the instrument panel assembly.
   (b) Connect the connector.
2. **INSTALL GLOVE COMPARTMENT DOOR ASSEMBLY (See page IP-11)**
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
4. **PERFORM INITIALIZATION**
   NOTICE:
   Some systems need initialization after reconnecting the cable to the negative battery terminal (See page IN-23).
5. **INSPECT TIRE PRESSURE WARNING SYSTEM**
   HINT:
   See page TW-21.

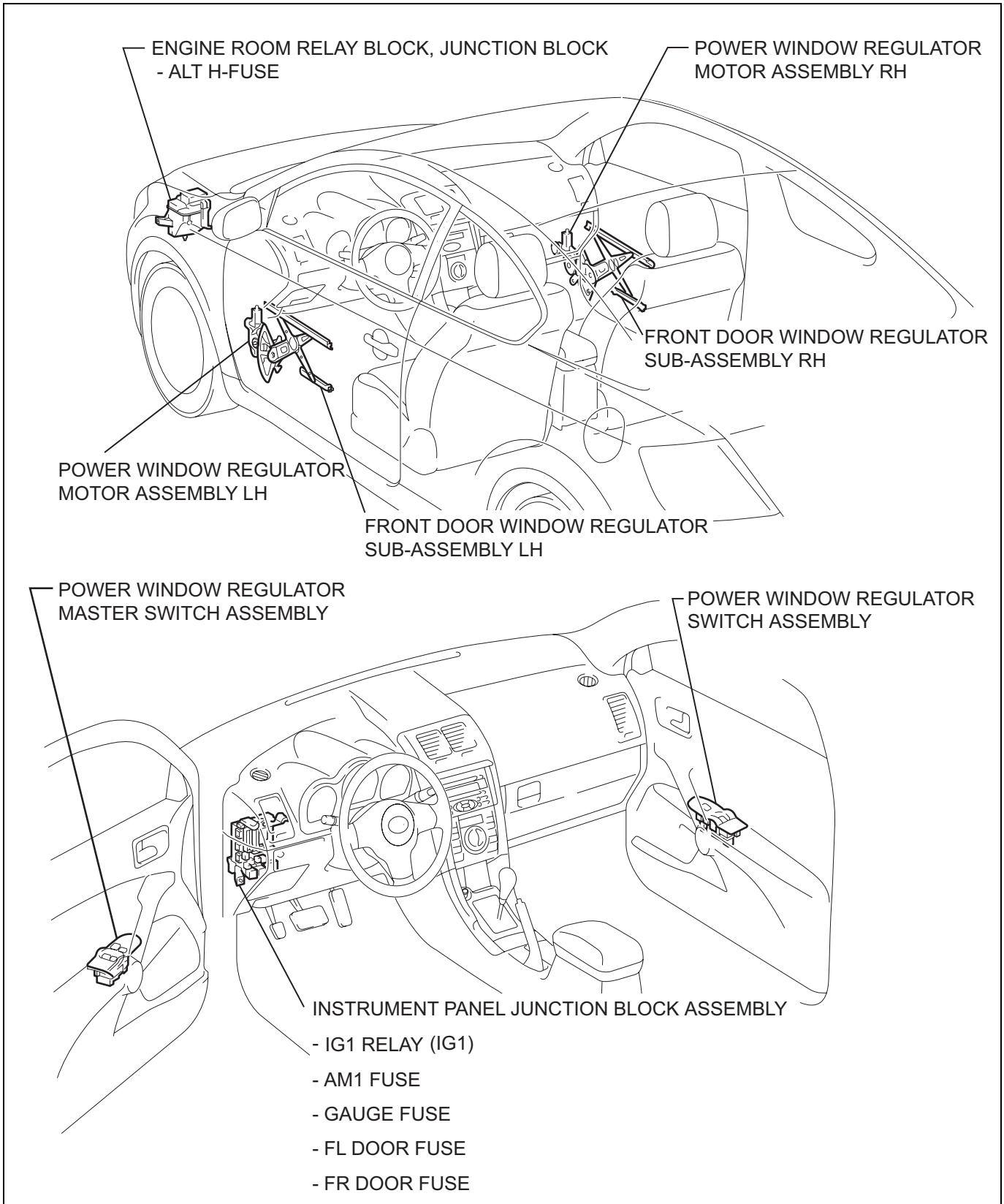
POWER WINDOW CONTROL SYSTEM (w/ Jam Protection Function)

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

System Name	See procedure
Power Window Control System	IN-23
Sliding Roof Control System	

PARTS LOCATION



WS

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SYSTEM DESCRIPTION

1. POWER WINDOW CONTROL SYSTEM DESCRIPTION

(a) The power window control system controls the power windows' UP / DOWN function using regulator motors.

The main controls of this system are: 1) the power window regulator master switch assembly (built into the driver side door), and 2) the power window regulator switch assembly (built into the passenger side door). Pressing the regulator switch or either of the 2 switches on the master switch transmits an UP / DOWN signal to the corresponding power window regulator motor.

The jammed window detection mechanism consists of a magnet on the worm gear of the power window motor and the 2 Hall ICs on the motor.

(b) The power window control system has the following functions:

Function	Outline
Manual UP/DOWN function	Function that causes window to raise while power window switch is being pulled halfway up, and lower while switch is pushed halfway down. Window stops as soon as switch is released.
AUTO UP/DOWN function	Function that enables window of all doors to be fully opened or closed by one press or pull of power window switch respectively.
Jam protection function	Function that automatically stops power window and moves it downward if object is jammed in power window during AUTO UP operation.
Remote control function	Function that allows power window master switch assembly to control AUTO and manual UP / DOWN operations of passenger door power window.
Window lock function	Function where passenger side power window operation is disabled when window lock switch of master switch is pressed. Passenger side power window can be operated when window lock switch is pressed again.
Diagnosis	Function where power window switch can detect malfunctions in power window system. Power window switch light illuminates or blinks to inform driver.
Fall-safe	Function that disables power window AUTO UP / DOWN function if pulse sensor (Hall IC) in power window regulator motor has malfunction. Manual operation is possible through power window switches.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:
Use these procedure to troubleshoot the power window control system.

1	VEHICLE BROUGHT TO WORKSHOP

NEXT

2	INSPECT BATTERY VOLTAGE

Standard voltage:
11 to 14 V
If the voltage is below 11V, recharge or replace the battery before proceeding.

NEXT

3	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 (See page WS-7).
(b) On-vehicle inspection (See page WS-9).
(c) Inspection (See page WS-52).

NEXT

5	REPAIR OR REPLACE

NEXT

6	RESET POWER WINDOW MOTOR

(a) If the AUTO switch light of the power window switch is blinking after the repair, reset the power window motor (See page WS-5).

NEXT

7	**CONFIRMATION TEST**

NEXT

END

INITIALIZATION

1. RESET (INITIALIZE) POWER WINDOW REGULATOR MOTOR

NOTICE:

- **Resetting the power window motors (initializing the pulse sensors) is necessary if one of the following occur: 1) the cable is disconnected from the negative (-) battery terminal: 2) the power window regulator master switch, power window regulator switch, wire harness, power window regulator and power window motor are replaced or removed/installed: or 3) the GAUGE fuse, AM1 fuse, FL DOOR fuse and FR DOOR fuse are replaced. the AUTO operation function, jam protection function and remote operation function via the power window regulator master switch will not operate unless the motors are reset.**
- **Be sure to reset the power window regulator motors using the power window switch on each door. The motors cannot be reset by remote operation through the power window regulator master switch.**
- **In order to prevent overcurrent into the system, do not simultaneously reset 2 or more power window regulator motors.**
- **If the power window switch has been continuously operated for a long time, the power window regulator motor will stop so that no additional load can be applied to the motor. Continuing to operate the switch even after the motor has stopped will cause the switch indicator to blink while restricting the AUTO UP/DOWN function and the remote UP/DOWN function. If this happens, reset the motor again after a few minutes have passed.**

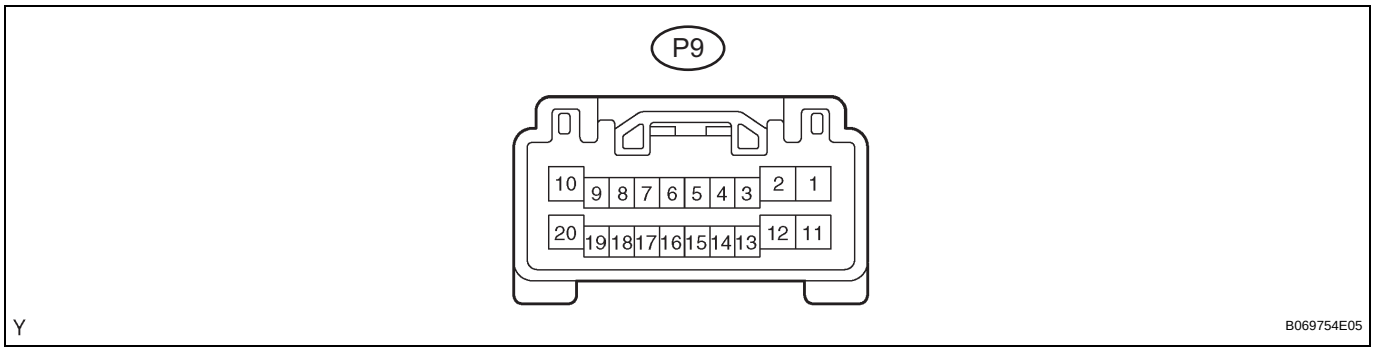
(a) Turn the ignition switch ON.
(b) Halfway open the power window by pressing the power window switch.
(c) Fully pull up the switch until the power window is fully closed and continue to hold the switch for approximately 1 second after the power window is fully closed.
(d) Check that the AUTO UP/DOWN function operates normally.
If the AUTO/DOWN function operates normally, reset operations are complete.
If not normal, follow steps (e) to (g) below.
(e) Disconnect the cable from the negative (-) battery terminal for 10 seconds.
(f) Connect the cable.
(g) Perform steps (a) to (d) again.
If the AUTO/DOWN function operates normally, reset operations are complete.
If not normal, proceed to steps (h) to (k) below.
(h) Turn the ignition switch ON.
(i) Halfway open the power window by pressing the power window switch.
(j) Fully pull up the switch until the power window is fully closed, and continue to hold the switch for approximately 12 seconds after the power window is fully closed.
(k) Check that the AUTO UP/DOWN function operates normally.

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See page
Power Window do not Operate at All	1. Power window regulator master switch assembly	WS-27
	2. AM1 fuse	WS-27
	3. GAUGE fuse	WS-27
	4. FL DOOR fuse	WS-27
	5. IG1 relay	WS-27
	6. Wire harness	WS-27
Driver Side Power Window Auto Up / Down Function dose not Operate with Power Window Master Switch	1. Power window regulator master switch assembly	WS-21
	2. Power window regulator motor assembly LH (driver side)	WS-21
	3. Wire harness	WS-21
Front Passenger Side Power Window Auto Up / Down Function dose not Operate with Front Passenger Side Power Window Switch	1. Power window regulator switch assembly (passenger side)	WS-24
	2. Power window regulator motor assembly RH (passenger side)	WS-24
	3. Wire harness	WS-24
Driver Side Power Window dose not Operate with Power Window Master Switch	1. Power window regulator master switch assembly	WS-15
	2. Power window regulator motor assembly LH (driver side)	WS-15
	3. Wire harness	WS-15
Front Passenger Side Power Window dose not Operate with Front Passenger Side Power Window Switch	1. Power window regulator master switch assembly	WS-17
	2. Power window regulator switch assembly (passenger side)	WS-17
	3. Power window regulator motor assembly RH (passenger side)	WS-17
	4. FR DOOR fuse	WS-17
	5. Wire harness	WS-17
Remote Up / Down Function dose not Operate	1. Power window regulator master switch assembly	WS-12
	2. Power window regulator switch assembly (passenger side)	WS-12
	3. Wire harness	WS-12
Auto Up Operation dose not Fully Close Power Window (Jam Protection Function is Activated)	1. Power window regulator motor assembly	WS-31
	2. Front door window regulator sub-assembly	WS-31
	3. Door glass run	WS-31
Jam Protection Function dose not Operate	1. Power window regulator switch assembly	WS-32
	2. Power window regulator motor assembly	WS-32

TERMINALS OF ECU

1. CHECK POWER WINDOW REGULATOR MASTER SWITCH (DRIVER SIDE)



(a) Disconnect the P9 switch connector.
(b) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (P9-2) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
B (P9-10) - GND (P9-2)	B - W-B	+B (B) power supply	Always	11 to 14 V
IG (P9-20) - GND (P9-2)	R - W-B	Ignition power supply	Ignition switch OFF	Below 1 V
IG (P9-20) - GND (P9-2)	R - W-B	Ignition power supply	Ignition switch ON	11 to 14 V

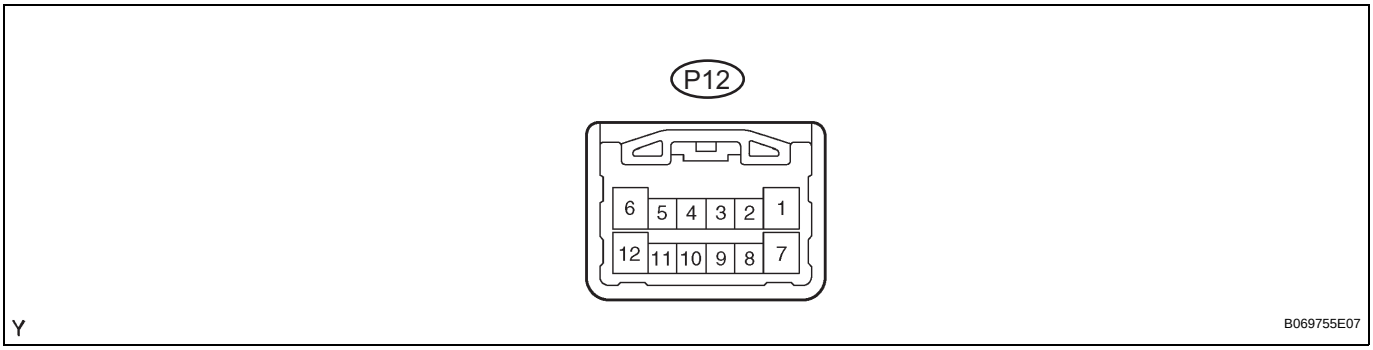
If the result is not as specified, there may be a malfunction on the wire harness side.
(c) Reconnect the P9 switch connector.
(d) Reset the power window motor (See page WS-5).
(e) Measure the voltage of the connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
U (P9-1) - GND (P9-2)	Y - W-B	Power window motor UP output	Ignition switch ON, driver side power window switch OFF	Below 1 V
U (P9-1) - GND (P9-2)	Y - W-B	Power window motor UP output	Ignition switch ON, driver side power window switch UP (manual operation)	11 to 14 V
U (P9-1) - GND (P9-2)	Y - W-B	Power window motor UP output	Ignition switch ON, driver side window fully open	Below 1 V
U (P9-1) - GND (P9-2)	Y - W-B	Power window motor UP output	Ignition switch ON, driver side power window switch UP (AUTO operation)	11 to 14 V
U (P9-1) - GND (P9-2)	Y - W-B	Power window motor UP output	Ignition switch ON, driver side power window fully closed	Below 1 V
D (P9-11) - GND (P9-2)	P - W-B	Power window motor DOWN output	Ignition switch ON, driver side power window switch OFF	Below 1 V
D (P9-11) - GND (P9-2)	P - W-B	Power window motor DOWN output	Ignition switch ON, driver side power window switch DOWN (manual operation)	11 to 14 V
D (P9-11) - GND (P9-2)	P - W-B	Power window motor DOWN output	Ignition switch ON, driver side power window fully closed	Below 1 V
D (P9-11) - GND (P9-2)	P - W-B	Power window motor DOWN output	Ignition switch ON, driver side power window switch DOWN (AUTO operation)	11 to 14 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
D (P9-11) - GND (P9-2)	P - W-B	Power window motor DOWN output	Ignition switch ON, driver side power window fully open	Below 1 V
PCT (P9-6) - GND (P9 - 2)	B - W-B	Power window lock switch output	Ignition switch ON, power window lock switch NORMAL	11 to 14 V
PCT (P9-6) - GND (P9 - 2)	B - W-B	Power window lock switch output	Ignition switch ON, power window lock switch LOCK	Below 1 V
VC (P9-19) - SGND (P9-12)	W - BR	Power window motor sensor power source	Always	11 to 14 V
VC (P9-19) - SGND (P9-12)	W - BR	Power window sensor ground	Always	11 to 14 V

If the result is not as specified, the master switch may have a malfunction.

2. CHECK POWER WINDOW REGULATOR SWITCH (PASSENGER SIDE)



(a) Disconnect the P12 switch connector.
(b) Measure the voltage and resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND (P12-7) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω
B (P12-12) - GND (P12-7)	P - W-B	+B (B) power supply	Always	11 to 14 V

If the result is not as specified, there may be a malfunction on the wire harness side.
(c) Reconnect the P12 switch connector.
(d) Reset the power window motor (See page WS-5).
(e) Measure the voltage of the connector.

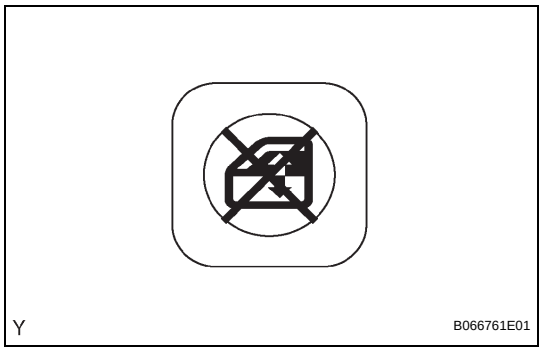
Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
U (P12-6) - GND (P12-7)	Y - W-B	Power window motor UP output	Ignition switch ON, regulator switch OFF	Below 1 V
U (P12-6) - GND (P12-7)	Y - W-B	Power window motor UP output	Ignition switch ON, regulator switch UP (manual operation)	11 to 14 V
U (P12-6) - GND (P12-7)	Y - W-B	Power window motor UP output	Ignition switch ON, passenger side power window fully open	Below 1 V
U (P12-6) - GND (P12-7)	Y - W-B	Power window motor UP output	Ignition switch ON, regulator switch UP (AUTO operation)	11 to 14 V
U (P12-6) - GND (P12-7)	Y - W-B	Power window motor UP output	Ignition switch ON, passenger side power window fully closed	Below 1 V

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
D (P12-1) - GND (P12-7)	G - W-B	Power window motor DOWN output	Ignition switch ON, regulator switch OFF	Below 1 V
D (P12-1) - GND (P12-7)	G - W-B	Power window motor DOWN output	Ignition switch ON, regulator switch DOWN (manual operation)	11 to 14 V
D (P12-1) - GND (P12-7)	G - W-B	Power window motor DOWN output	Ignition switch ON, passenger side power window fully closed	Below 1 V
D (P12-1) - GND (P12-7)	G - W-B	Power window motor DOWN output	Ignition switch ON, regulator switch DOWN (AUTO operation)	11 to 14 V
D (P12-1) - GND (P12-7)	G - W-B	Power window motor DOWN output	Ignition switch ON, passenger side power window fully open	Below 1 V
PCT (P12-11) - GND (P12-7)	B - W-B	Power window lock switch input	Ignition switch ON, power window lock switch of master switch NORMAL	11 to 14 V
PCT (P12-11) - GND (P12-7)	B - W-B	Power window lock switch input	Ignition switch ON, power window lock switch of master switch LOCK	Below 1 V
VCC (P12-5) - SGND (P12-8)	R - BR	Power window motor sensor power source	Always	11 to 14 V
VCC (P12-5) - SGND (P12-8)	R - BR	Power window motor sensor ground	Always	11 to 14 V

If the result is not as specified, the regulator switch may have a malfunction.

HINT:

An operation permission signal is output from terminal PCT of the master switch to the power window regulator switch. If the value is not as specified, there may be a malfunction on the wire harness side. An operation permission signal is also output through the MPX line to the power window regulator switch. Even if both signals are not output, the power windows will function normally.



ON-VEHICLE INSPECTION

1. CHECK WINDOW LOCK SWITCH

(a) Check that the passenger side power window operation is disabled when the window lock switch of the power window regulator master switch is pressed.

(b) Check that the passenger side power window can be operated when the window lock switch is pressed again.

2. CHECK MANUAL UP/DOWN FUNCTION

(a) Check that the driver side power window operates as follows:

Condition	Master Switch	Switch Operation	Power Window
Ignition switch ON	Driver side	Pulled halfway up	UP (closes)
Ignition switch ON	Driver side	Pushed halfway down	DOWN (opens)

(b) Check that the passenger side power window operates as follows:

Condition	Regulator switch	Switch Operation	Power Window
Ignition switch ON	Passenger side	Pulled halfway up	UP (closes)
Window lock switch OFF			
Ignition switch ON	Passenger side	Pushed halfway down	DOWN (opens)
Window lock switch OFF			

3. CHECK AUTO UP/DOWN FUNCTION

(a) Check that the driver side power window operates as follows:

Condition	Master Switch	Switch Operation	Power Window
Ignition switch ON	Driver side	Pulled fully up	AUTO UP (fully closes)
Ignition switch ON	Driver side	Pushed fully down	AUTO DOWN (fully opens)

(b) Check that the passenger side power window operates as follows:

Condition	Regulator switch	Switch Operation	Power Window
Ignition switch ON	Passenger side	Pulled fully up	AUTO UP (fully closes)
Window lock switch OFF			
Ignition switch ON	Passenger side	Pushed fully down	AUTO DOWN (fully opens)
Window lock switch OFF			

4. CHECK REMOTE MANUAL UP/DOWN FUNCTION

(a) Check that the passenger side power window operates as follows:

Condition	Master Switch	Switch Operation	Power Window
Ignition switch ON	Passenger side	Pulled fully up	UP (closes)
Window lock switch OFF			
Ignition switch ON	Passenger side	Pushed fully down	DOWN (opens)
Window lock switch OFF			

5. CHECK REMOTE AUTO UP/DOWN FUNCTION

(a) Check that the passenger driver side power window operates as follows:

Condition	Master Switch	Switch Operation	Power Window
Ignition switch ON	Passenger side	Pulled fully up	AUTO UP (fully closes)
Window lock switch OFF			
Ignition switch ON	Passenger side	Pushed fully down	AUTO DOWN (fully opens)
Window lock switch OFF			

6. CHECK JAM PROTECTION FUNCTION

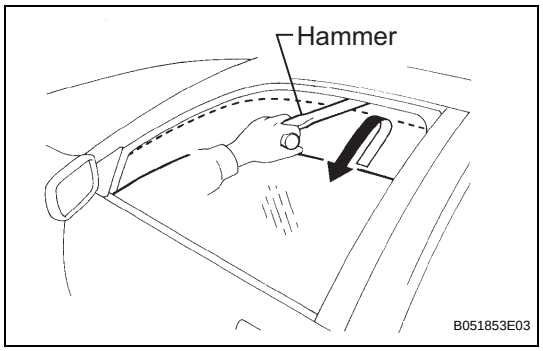
HINT:

The jam protection function helps prevent power window operation related injuries.

NOTICE:

If the power window motor has just been reset, raise and lower the door glass several times through MANUAL operation before performing the check.

WS



(a) Check that the door glass moves down by approximately 50 mm (1.97 in.) when something is caught between the door frame and door glass during power window operation. However, when the opening between the door frame and the door glass is less than 200 mm (7.87 in.), the door glass continues to move down and does not stop until an opening of 200 mm (7.87 in.) is achieved.
Operative condition
- AUTO UP

7. CHECK POWER WINDOW FAIL-SAFE FUNCTION

HINT:
If there is a malfunction in the power window system, some of the power window functions will be disabled.

Driver side power window

Malfunctioning Part	Disabled Function	Operative Function
Pulse sensor circuit in power window motor	AUTO UP/DOWN function	• Manual UP (fully pulled UP position) • Manual DOWN • Remote (AUTO and manual)
CPU in master switch	AUTO UP/DOWN function	Manual UP (fully pulled UP position)
		Manual DOWN
	Remote function (AUTO and manual)	Manual UP (fully pulled UP position)
		Manual DOWN

Passenger side power window

Malfunctioning Part	Disabled Function	Operative Function
Pulse sensor circuit in power window motor	AUTO UP/DOWN function	• Manual UP (fully pulled UP position) • Manual DOWN
CPU in power window switch	AUTO UP/DOWN function	• Manual UP (fully pulled UP position) • Manual DOWN
Communication between master switch and power window switch	AUTO UP/DOWN function	• Manual UP (fully pulled UP position) • Manual DOWN

8. CHECK POWER WINDOW SWITCH'S LED OPERATION

(a) Make sure that the power window lock switch on the power window regulator master switch is not pressed.

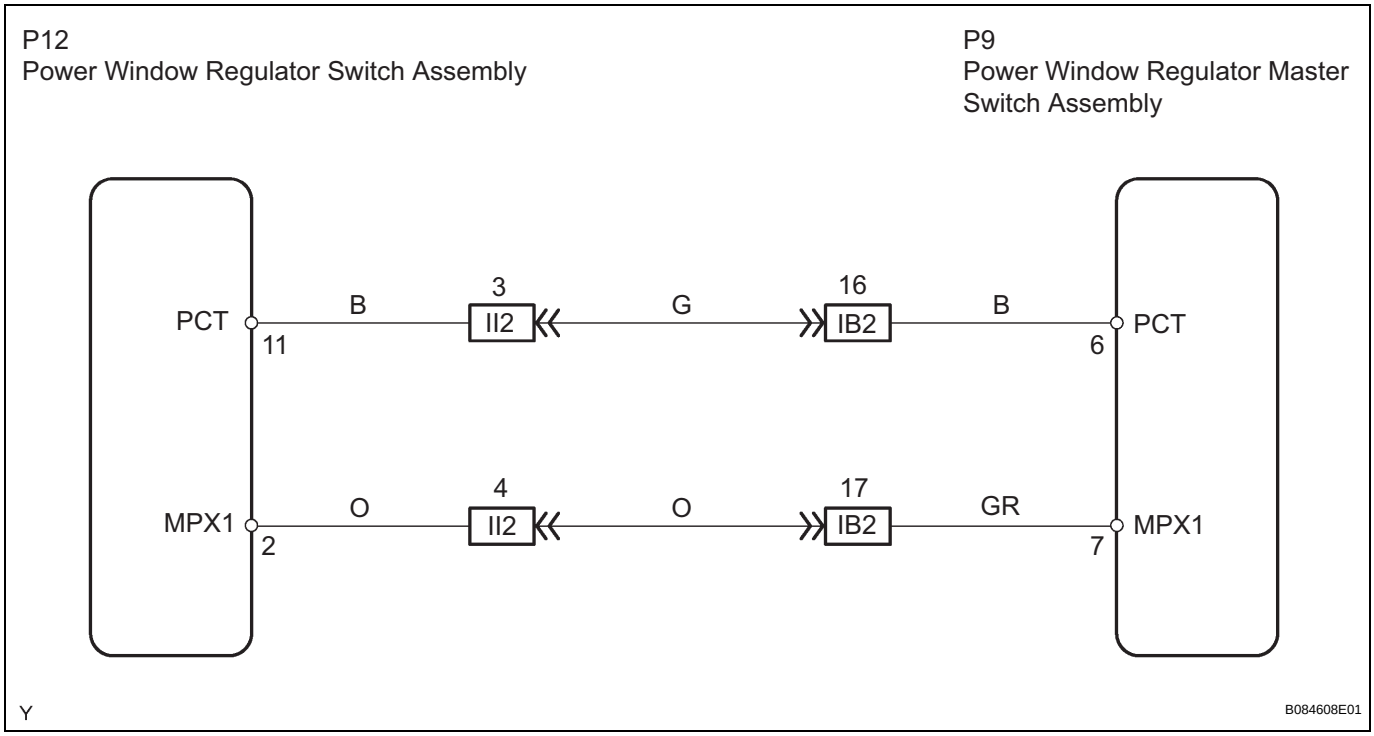
(b) Turn the ignition switch ON. Then check that all the LEDs on the power window switches illuminate.

Remote Up / Down Function does not Operate

DESCRIPTION

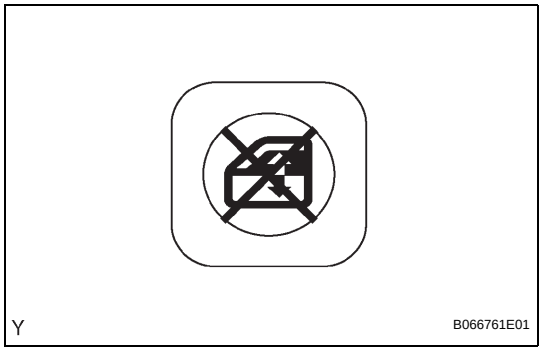
Operating the passenger side power window switch on the power window regulator master switch inputs a remote signal to the power window regulator switch. Then, the power window regulator switch drives the passenger side window motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK POWER WINDOW LOCK SWITCH



(a) Turn the window lock switch OFF and operate the passenger side power window switch on the power window regulator master switch. Check that the remote UP/DOWN function operates normally.

OK:

Remote UP/DOWN function operates normally.

OK → **END**

NG

2	CHECK MANUAL UP/DOWN FUNCTION (PASSENGER SIDE)

(a) Check that the power window can be operated with the power window regulator switch.

OK:
Manual UP/DOWN function operates normally.

NG → **GO TO PROBLEM SYMPTOMS TABLE**

OK

3	CHECK AUTO UP/DOWN FUNCTION (PASSENGER SIDE)

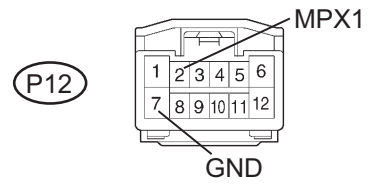
(a) Check that the power window can be operated with the power window regulator switch.
OK:
AUTO UP/DOWN function operates normally.

NG → **GO TO PROBLEM SYMPTOMS TABLE**

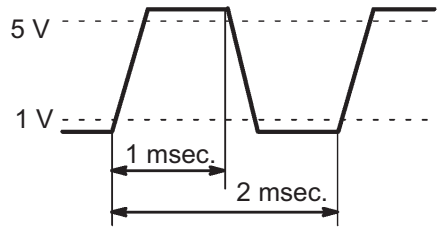
OK

4	CHECK WIRE HARNESS (REGULATOR SWITCH (PASSENGER SIDE))

Wire Harness Side:



10 V/DIV., 1 msec./DIV.



B082654E02

(a) Disconnect the P12 regulator switch connector.
(b) Turn the ignition switch ON.
(c) Using an oscilloscope, check the waveform of the connector.
Standard:
The waveform is as shown in the illustration.

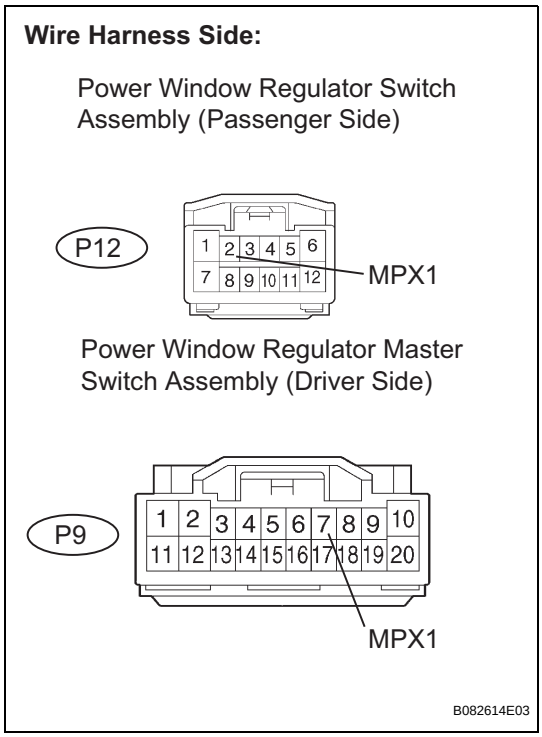
Tester Connection	Tool Setting	Condition
P12-2 (MPX1) - P12-7 (GND)	10 V/DIV., 1 msec./DIV.	Operating passenger side switch on master switch

OK → **REPLACE POWER WINDOW REGULATOR SWITCH ASSEMBLY (PASSENGER SIDE)**

NG

WS

5	**CHECK WIRE HARNESS (POWER WINDOW REGULATOR SWITCH ASSEMBLY - POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY)**



(a) Disconnect the P12 regulator switch connector.
(b) Disconnect the P9 regulator master switch connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

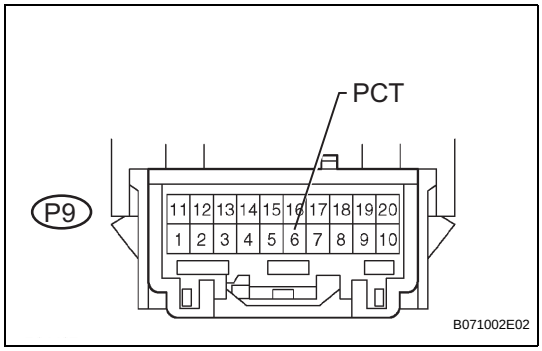
Tester Connection	Specified Condition
P12-2 (MPX1) - P9-7 (MPX1)	Below 1 Ω
P12-2 (MPX1) - Body ground	10 kΩor higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

WS

OK

6	**INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY (WINDOW LOCK SWITCH)**



(a) Remove the master switch but do not disconnect the connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage of the connector.

Standard voltage

Tester Connection	Condition	Specified Condition
P9-6 (PCT) - Body ground	Window LOCK switch OFF (Normal)	11 to 14 V
P9-6 (PCT) - Body ground	Window LOCK switch ON (Lock)	Below 1 V

NG → **REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**

OK

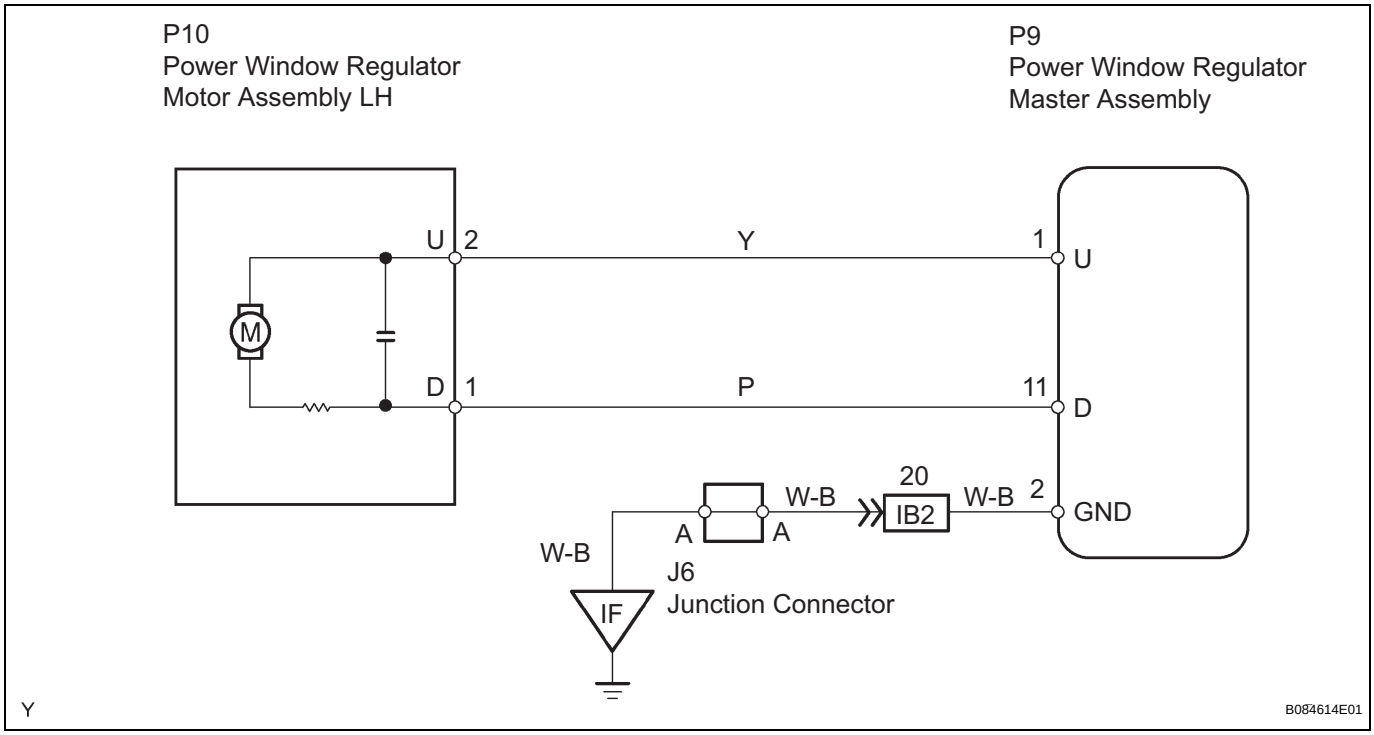
REPLACE POWER WINDOW REGULATOR SWITCH ASSEMBLY

Driver Side Power Window does not Operate with Power Window Master Switch

DESCRIPTION

If the manual UP/DOWN function does not operate, a malfunction may be present in the power window regulator motor, the power window regulator master switch or the wire harness.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK AUTO UP/DOWN FUNCTION (DRIVER SIDE)

(a) Check that the power window AUTO UP/DOWN function operates normally.

OK → **REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**

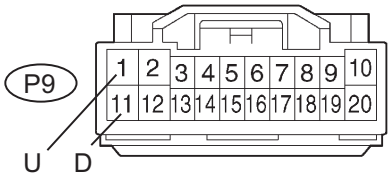
NG

WS

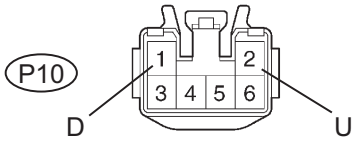
2	**CHECK WIRE HARNESS (POWER WINDOW MASTER SWITCH - POWER WINDOW MOTOR)**

Wire Harness Side:

Power Window Regulator Master Switch Assembly



Power Window Regulator Motor Assembly LH (Driver Side)



B052055E13

(a) Disconnect the P9 master switch connector.
(b) Disconnect the P10 motor connector.
(c) Measure the resistance of the wire harness side connectors.

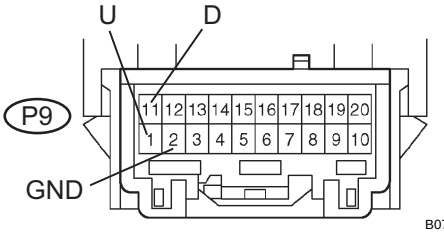
Standard resistance

Tester Connection	Specified Condition
P9-1 (U) - P10-2 (U)	Below 1 Ω
P9-11 (D) - P10-1 (D)	Below 1 Ω
P9-1 (U) - Body ground	10 kΩor higher
P9-11 (D) - Body ground	10 kΩor higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

3	**CHECK POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**



B071002E01

(a) Remove the master switch but do not disconnect the connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage of the connector.

Standard voltage

Tester Connection	Switch Condition	Specified Condition
P9-1 (U) - P9-2 (GND)	UP	11 to 14 V
P9-11 (D) - P9-2 (GND)	DOWN	11 to 14 V

NG → **REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**

OK

REPLACE POWER WINDOW REGULATOR MOTOR ASSEMBLY LH (DRIVER SIDE)

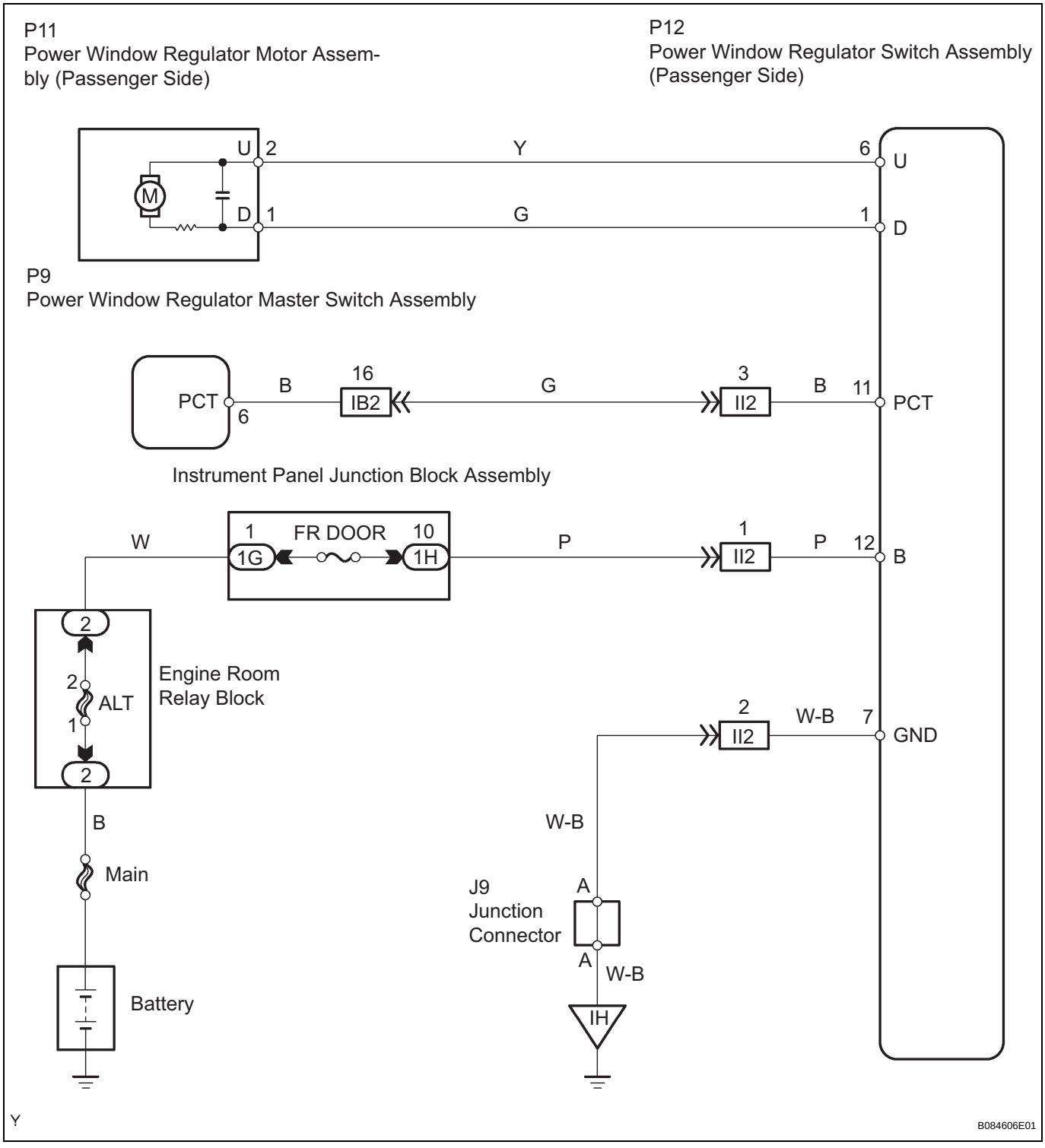
WS

Front Passenger Side Power Window does not Operate with Front Passenger Side Power Window Switch

DESCRIPTION

If the manual UP/DOWN function does not operate, a malfunction may by present in the power window regulator motor, the power window regulator switch or the wire harness.

WIRING DIAGRAM



WS

INSPECTION PROCEDURE

1	CHECK AUTO UP/DOWN FUNCTION (PASSENGER SIDE)

(a) Check that the power window AUTO UP/DOWN function operates normally.

OK → **REPLACE POWER WINDOW REGULATOR SWITCH ASSEMBLY (PASSENGER SIDE)**

NG

2	INSPECT FUSE (FR DOOR)

(a) Disconnect the FR DOOR fuse from the instrument panel junction block.
(b) Measure the resistance of the fuse.
Standard resistance:
Below 1 Ω

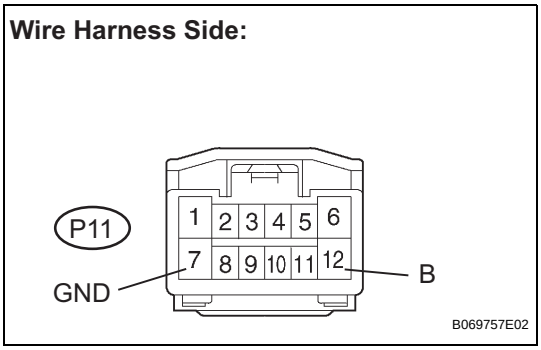
NG → **REPLACE FUSE**

OK

WS

3	CHECK WIRE HARNESS (POWER WINDOW REGULATOR SWITCH ASSEMBLY (PASSENGER SIDE) - BATTERY AND BODY GROUND)

Wire Harness Side:



(a) Disconnect the P11 regulator switch connector.
(b) Measure the voltage and resistance of the wire harness side connector.
Standard voltage

Tester Connection	Specified Condition
P11-12 (B) - Body ground	11 to 14 V

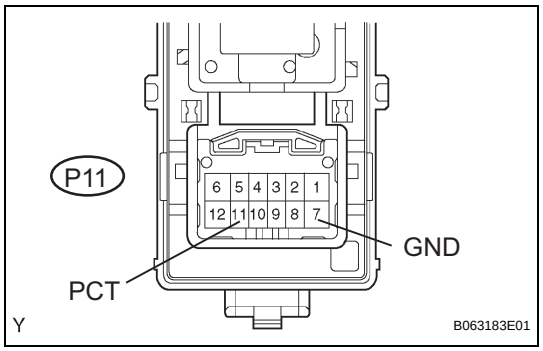
Standard resistance

Tester Connection	Specified Condition
P11-7 (GND) - Body ground	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4	CHECK POWER WINDOW REGULATOR SWITCH ASSEMBLY (WINDOW LOCK SWITCH SIGNAL)



(a) Remove the regulator switch but do not disconnect the connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage of the connector.

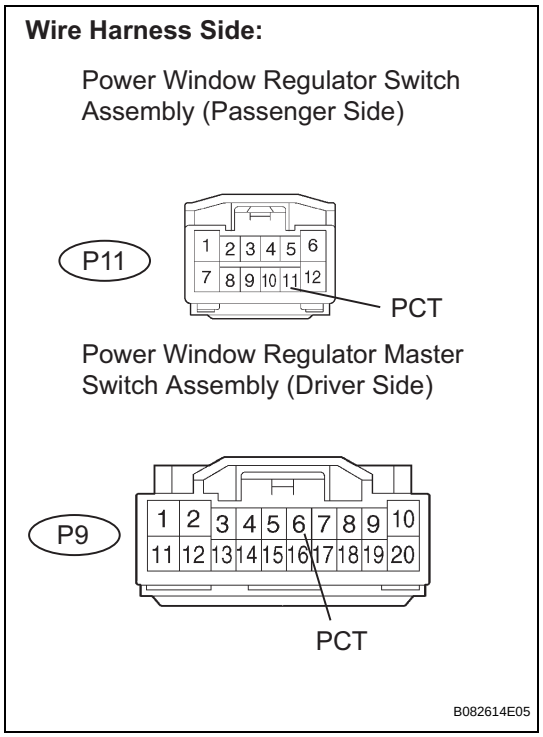
Standard voltage

Tester Connection	Condition	Specified Condition
P11-11 (PCT) - P11-7 (GND)	Window LOCK switch OFF (Normal)	11 to 14 V
P11-11 (PCT) - P11-7 (GND)	Window LOCK switch ON (Lock)	Below 1 V

OK → **Go to step 6**

NG

5	CHECK WIRE HARNESS (POWER WINDOW REGULATOR SWITCH ASSEMBLY - POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY)



(a) Disconnect the P11 regulator switch connector.
(b) Disconnect the P9 master switch connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
P11-11 (PCT) - P9-6 (PCT)	Below 1 Ω
P11-11 (PCT) - Body ground	10 kΩor higher

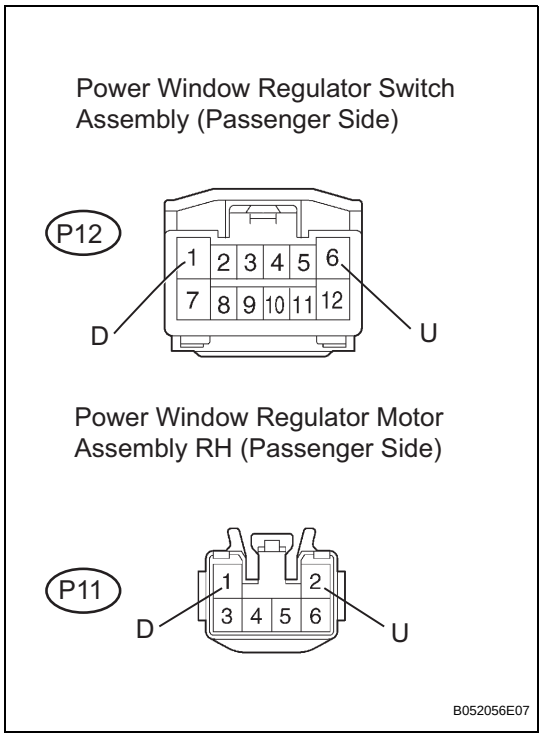
NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY

WS

6	**CHECK WIRE HARNESS (REGULATOR SWITCH ASSEMBLY - POWER WINDOW REGULATOR MOTOR ASSEMBLY RH)**



(a) Disconnect the P12 regulator switch connector.
(b) Disconnect the P11 power window motor connector.
(c) Measure the resistance of the wire harness side connectors.

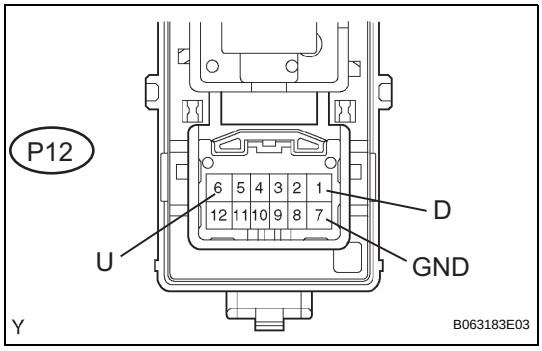
Standard resistance

Tester Connection	Specified Condition
P12-1 (D) - P11-1 (D)	Below 1 Ω
P12-6 (U) - P11-2 (U)	Below 1 Ω
P12-1 (D) - Body ground	10 kΩor higher
P12-6 (U) - Body ground	10 kΩor higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

7	**CHECK POWER WINDOW REGULATOR SWITCH ASSEMBLY (PASSENGER SIDE)**



(a) Remove the regulator switch but do not disconnect the connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage of the connector.

Standard voltage

Tester Connection	Condition	Specified Condition
P12-6 (U) - P12-7 (GND)	UP	11 to 14 V
P12-1 (D) - P12-7 (GND)	DOWN	11 to 14 V

NG → **REPLACE POWER WINDOW REGULATOR SWITCH ASSEMBLY (PASSENGER SIDE)**

OK

REPLACE POWER WINDOW REGULATOR MOTOR ASSEMBLY RH (PASSENGER SIDE)

WS

Driver Side Power Window Auto Up / Down Function does not Operate with Power Window Master Switch

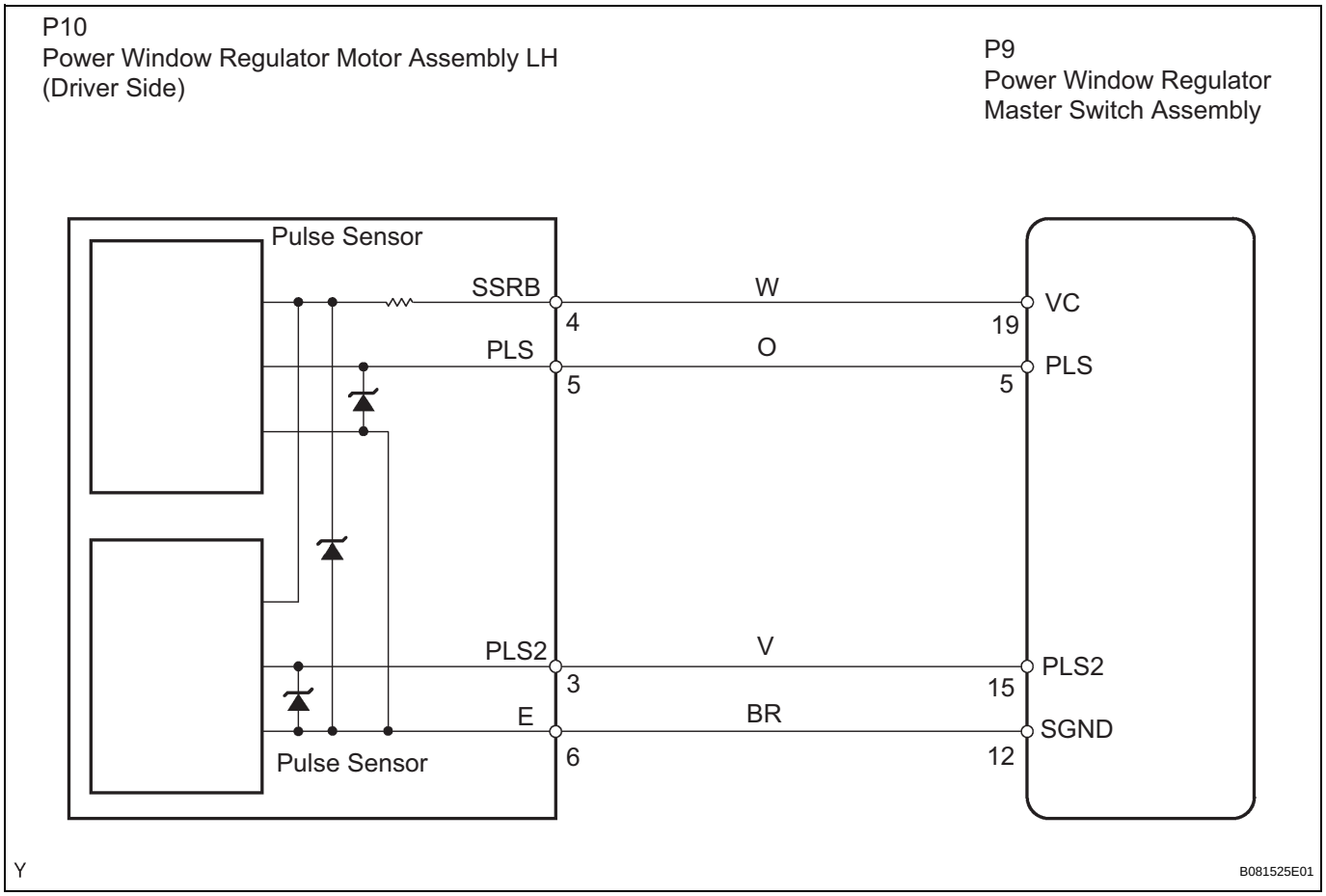
DESCRIPTION

The power window regulator master switch controls the driver side power window and activates the driver side power window motor. If a malfunction is found in the pulse sensor during motor operation, the fail-safe function will stop UP/DOWN operation.

If the AUTO UP/DOWN function does not operate, the cause may be one or more of the following:

- The recorded power window fully closed position, which is stored in the power window regulator master switch, was erased as a result of the battery terminal cable or the power window regulator master switch connector being disconnected.
- The pulse sensor in the power window regulator motor has a malfunction.
- The wiring between the power window regulator master switch and the corresponding power window regulator motor is open or short circuited.
- The power window regulator master switch has a malfunction.

WIRING DIAGRAM



WS

INSPECTION PROCEDURE

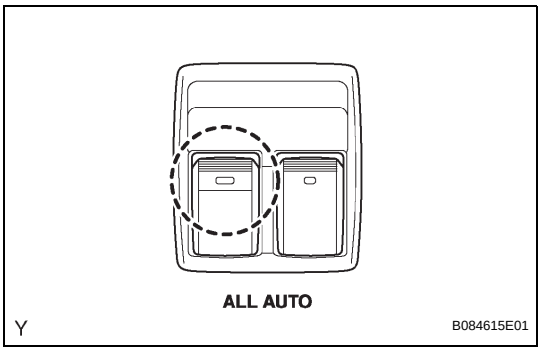
1	CHECK MANUAL UP/DOWN FUNCTION (DRIVER SIDE)

(a) Check that the power window manual UP/DOWN function operates normally.

NG → **OTHER PROBLEM**

OK

2	CHECK LIGHT OF POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY (DRIVER SIDE SWITCH)



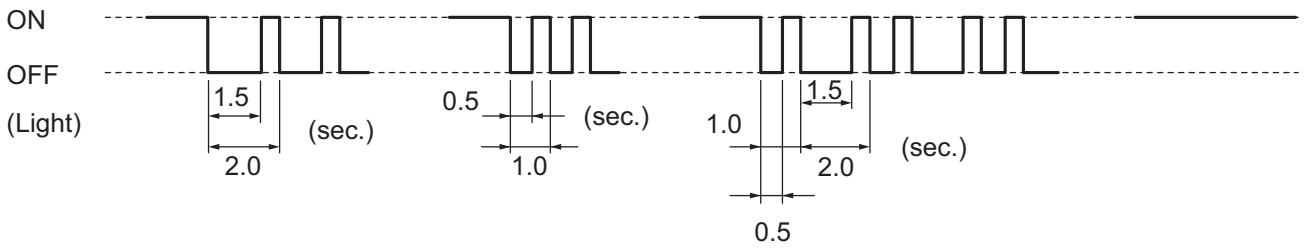
(a) Turn the ignition switch ON.
(b) Operate the driver side switch on the master switch.
(c) Check the blinking pattern of the AUTO light as shown in the illustration.

Result

Result	Proceed to
Pattern (1) or (3) is displayed	A
Pattern (2) is displayed	B
Normal pattern is displayed	C

Blinking Pattern of Light

(1): Fully closed position is misaligned
(2): Pulse sensor circuit malfunction
(3): Both (1) and (2)
Normal



B → **Go to step 4**

C → **REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY (DRIVER SIDE)**

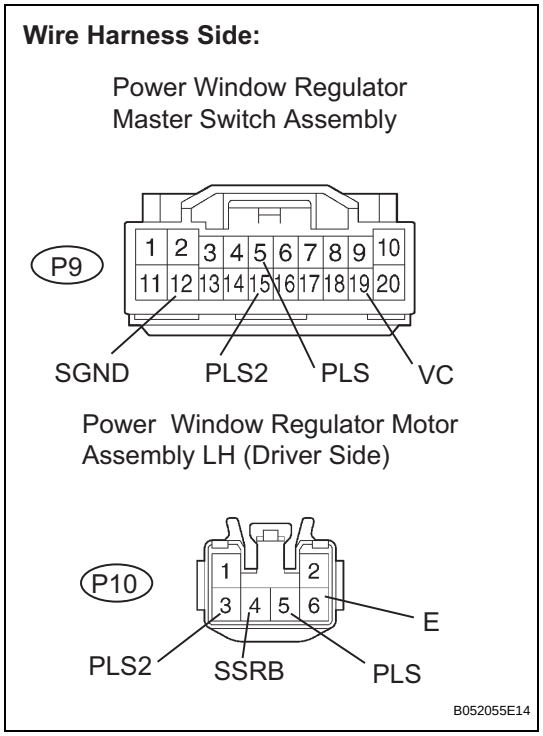
A

3	RESET POWER WINDOW REGULATOR MOTOR ASSEMBLY LH (DRIVER SIDE)

OK → **END**

NG

4	CHECK WIRE HARNESS (POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY - POWER WINDOW REGULATOR MOTOR ASSEMBLY LH)



(a) Disconnect the P9 master switch connector.
(b) Disconnect the P10 motor connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
P9-19 (VC) - P10-4 (SSRB)	Below 1 Ω
P9-5 (PLS) - P10-5 (PLS)	Below 1 Ω
P9-15 (PLS2) - P10-3 (PLS2)	Below 1 Ω
P9-12 (SGND) - P10-6 (E)	Below 1 Ω
P9-19 (VC) - Body ground	10 kΩor higher
P9-5 (PLS) - Body ground	10 kΩor higher
P9-15 (PLS2) - Body ground	10 kΩor higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

REPLACE POWER WINDOW REGULATOR MOTOR ASSEMBLY LH (DRIVER SIDE)

WS

Front Passenger Side Power Window Auto Up / Down Function does not Operate with Front Passenger Side Power Window Switch

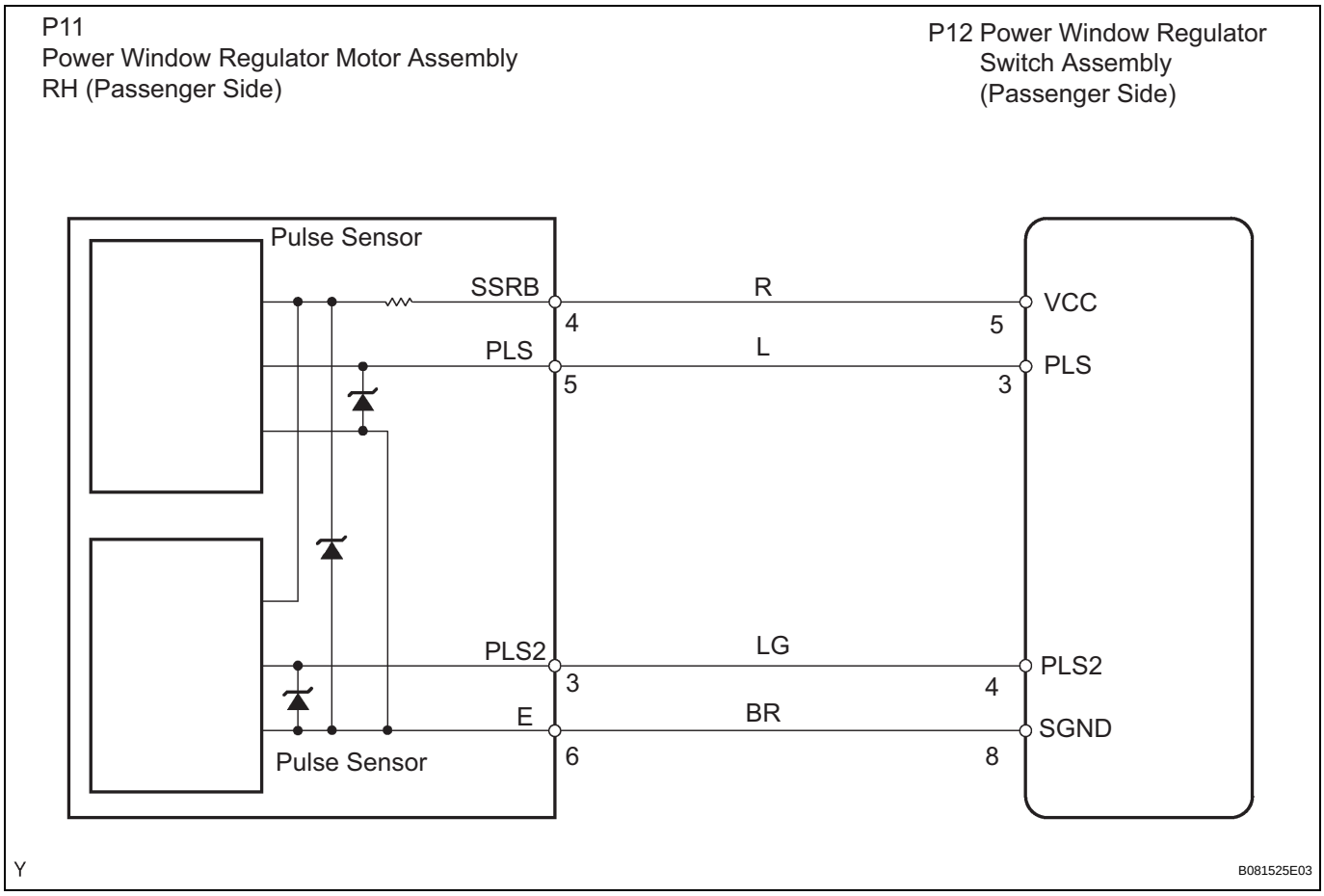
DESCRIPTION

The power window regulator switch controls the passenger side power window and activates the passenger side power window motor.

If the AUTO UP/DOWN function does not operate, the cause may be one or more of the following:

- The recorded power window fully closed position, which is stored in the power window regulator switch, was erased as a result of the battery terminal cable or the power window switch connector being disconnected.
- The pulse sensor in the power window regulator motor has a malfunction.
- The wiring between the power regulator window switch and the corresponding power window regulator motor is open or short circuited.
- The power window regulator switch has a malfunction.

WIRING DIAGRAM



INSPECTION PROCEDURE

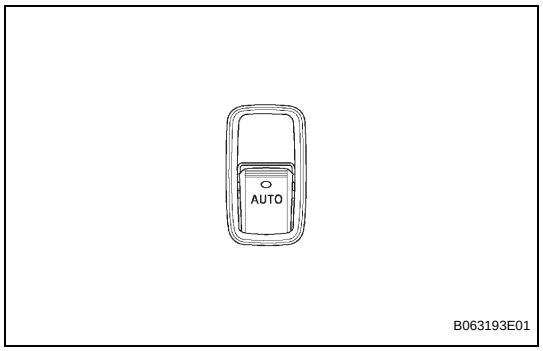
1	CHECK MANUAL UP/DOWN FUNCTION (PASSENGER SIDE)

(a) Check that the power window manual UP/DOWN function operates normally.

NG → **OTHER PROBLEM**

OK

2	**CHECK LIGHT OF POWER WINDOW REGULATOR SWITCH ASSEMBLY (PASSENGER SIDE)**



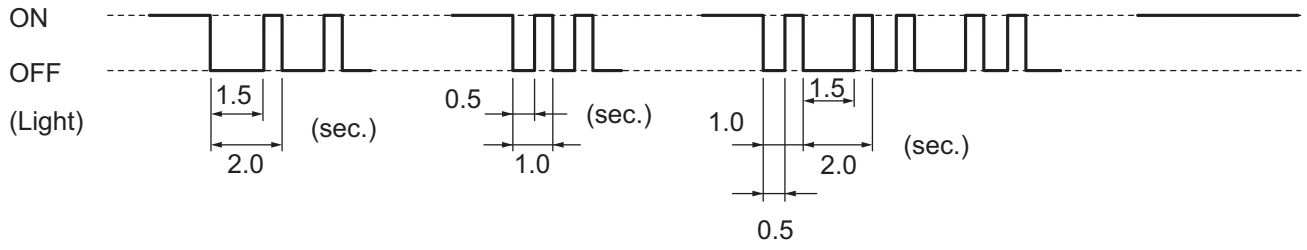
(a) Turn the ignition switch ON.
(b) Operate the power window regulator switch.
(c) Check the blinking pattern of the light as shown in the illustration below.

Result

Result	Proceed to
Pattern (1) or (3) is displayed	A
Pattern (2) is displayed	B
Normal pattern is displayed	C

Blinking Pattern of Light

1: Fully closed position is misaligned
2: Pulse sensor circuit malfunction
3: Both (1) and (2)
4: Normal



B → **Go to step 4**

C → **REPLACE POWER WINDOW REGULATOR SWITCH ASSEMBLY (PASSENGER SIDE)**

A

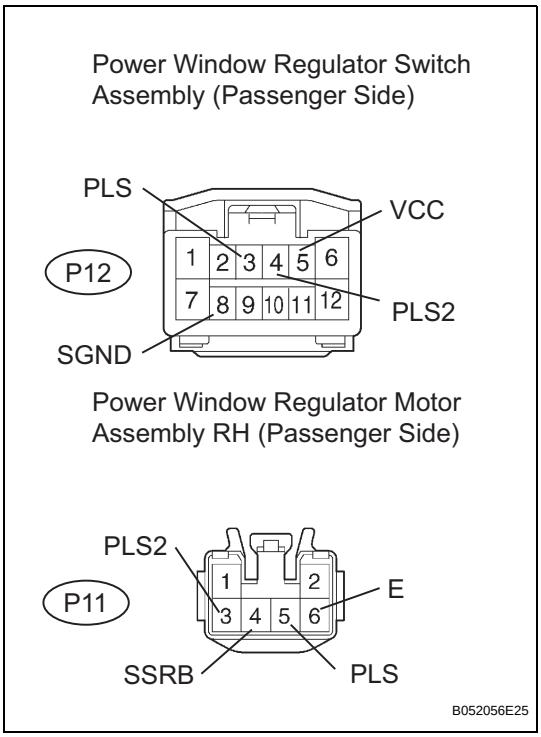
3	**RESET POWER WINDOW REGULATOR MOTOR ASSEMBLY RH (PASSENGER SIDE)**

OK → **END**

NG

WS

4	**CHECK WIRE HARNESS (POWER WINDOW REGULATOR SWITCH ASSEMBLY - POWER WINDOW REGULATOR MOTOR ASSEMBLY RH)**



(a) Disconnect the P12 regulator switch connector.
(b) Disconnect the P11 power window motor connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
P12-5 (VCC) - P11-4 (SSRB)	Below 1 Ω
P12-3 (PLS) - P11-5 (PLS)	Below 1 Ω
P12-4 (PLS2) - P11-3 (PLS2)	Below 1 Ω
P12-8 (SGND) - P11-6 (E)	Below 1 Ω
P12-5 (VCC) - Body ground	10 kΩor higher
P12-3 (PLS) - Body ground	10 kΩor higher
P12-4 (PLS2) - Body ground	10 kΩor higher

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

WS

OK

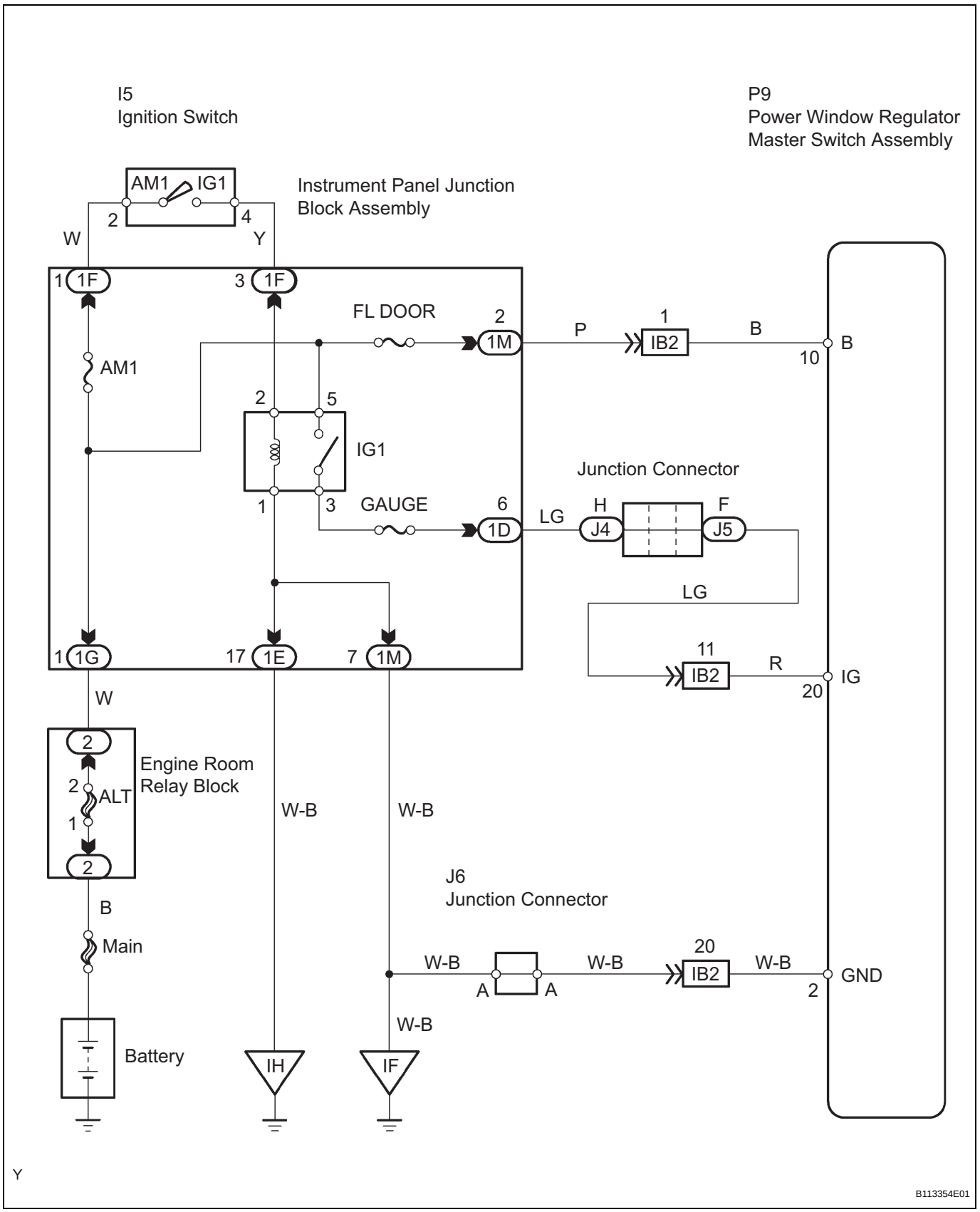
REPLACE POWER WINDOW REGULATOR MOTOR ASSEMBLY RH (PASSENGER SIDE)

Power Windows do not Operate at All

DESCRIPTION

If all of the power windows do not operate, it is possible that no power is being supplied to the power window master switch, or that the power window master switch is malfunctioning.

WIRING DIAGRAM



WS

INSPECTION PROCEDURE

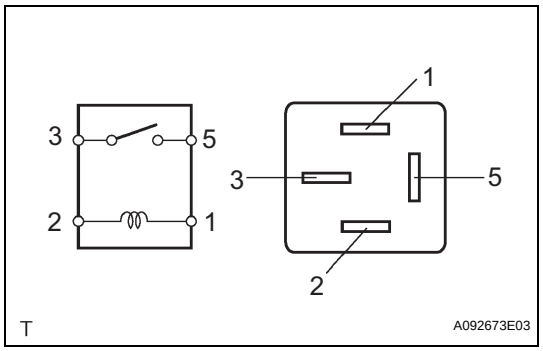
1 **INSPECT FUSE (AM1, GAUGE, FL DOOR)**

(a) Remove the AM1, GAUGE, FL DOOR fuses from the instrument panel junction block.
(b) Measure the resistance of the fuses.
Standard resistance:
Below 1 Ω

NG → **REPLACE FUSE**

OK

2 **INSPECT IG1 RELAY (Marking: IG1)**



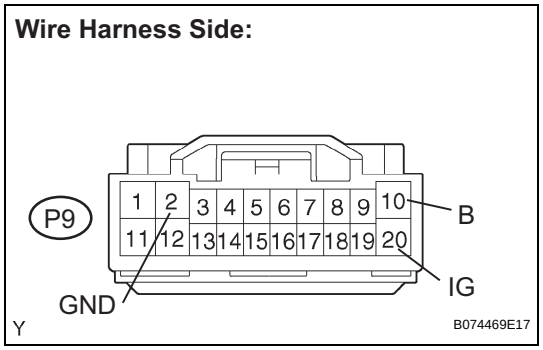
(a) Remove the IG1 relay from the instrument panel junction block.
(b) Measure the resistance of the relay.
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG → **REPLACE IG1 RELAY**

OK

3 **CHECK WIRE HARNESS (POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY - BATTERY AND BODY GROUND)**



(a) Disconnect the P9 master switch connector.
(b) Measure the voltage and resistance of the wire harness side connector.
Standard voltage

Tester Connection	Condition	Specified Condition
P9-10 (B) - Body ground	Always	11 to 14 V
P9-20 (IG) - Body ground	Ignition switch OFF	Below 1 V
P9-20 (IG) - Body ground	Ignition switch ON	11 to 14 V

Standard resistance

Tester Connection	Specified Condition
P9-2 (GND) - Body ground	Below 1 kΩ

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

WS

OK

REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY

Auto Up Operation does not Fully Close Power Window (Jam Protection Function is Activated)

DESCRIPTION

If the AUTO UP operation does not fully close the power window, the cause may be one or more of the following:

- The power window motor has not been reset, resulting in activation of the jam protection function.
- The power window switch memory cannot recognize true fully close position and incorrectly stops the window AUTO UP operation halfway.
- The jam protection function is activated at the fully closed position.
- During what should be smooth window movement, too much resistance occurs and the jam protection function is activated.

INSPECTION PROCEDURE

1	RESET POWER WINDOW REGULATOR MOTOR ASSEMBLY (LH AND RH)

(a) Reset the power window regulator motor for the power window that does not fully close (See page WS-5).

(b) Check if the window AUTO UP/DOWN function operates normally.

OK:

AUTO UP/DOWN function operates normally.

OK → **END**

NG

2	CHECK FRONT DOOR WINDOW REGULATOR SUB-ASSEMBLY (LH AND RH)

(a) Remove the door glass (See page ED-3).

(b) Operate the power window regulator without installing the door glass using the power window switch.

(c) Check that the power window regulator operates smoothly.

OK:

Power window regulator operates smoothly.

NG → **REPLACE FRONT DOOR WINDOW REGULATOR SUB-ASSEMBLY (LH AND RH)**

OK

REPLACE DOOR GLASS RUN (LH AND RH)

WS

Jam Protection Function does not Operate

DESCRIPTION

The power window regulator master switch controls the driver and passenger side power window regulator motors. The power window regulator switch controls the passenger side power window regulator motor. The jam protection function operates only within the specified range during AUTO UP operation.
HINT:
The jam protection function is available on the driver side power window and passenger side power window.

INSPECTION PROCEDURE

1	POWER WINDOW REGULATOR MOTOR ASSEMBLY (LH AND RH)

(a) Reset the power window regulator motor (See page WS-5).
(b) Check if the power window AUTO UP/DOWN function operates normally.
OK:
AUTO UP/DOWN function operates normally.

NG → **OTHER PROBLEM**

OK ↓

WS

2	CHECK JAM PROTECTION FUNCTION OPERATING RANGE

(a) Check that the jam protection function operates normally (See page WS-9).
HINT:
The jam protection function does not operate from the fully closed position of the door glass to 4 mm (0.16 in.) below that.

NG → **REPLACE POWER WINDOW REGULATOR SWITCH ASSEMBLY (LH AND RH)**

OK ↓

END

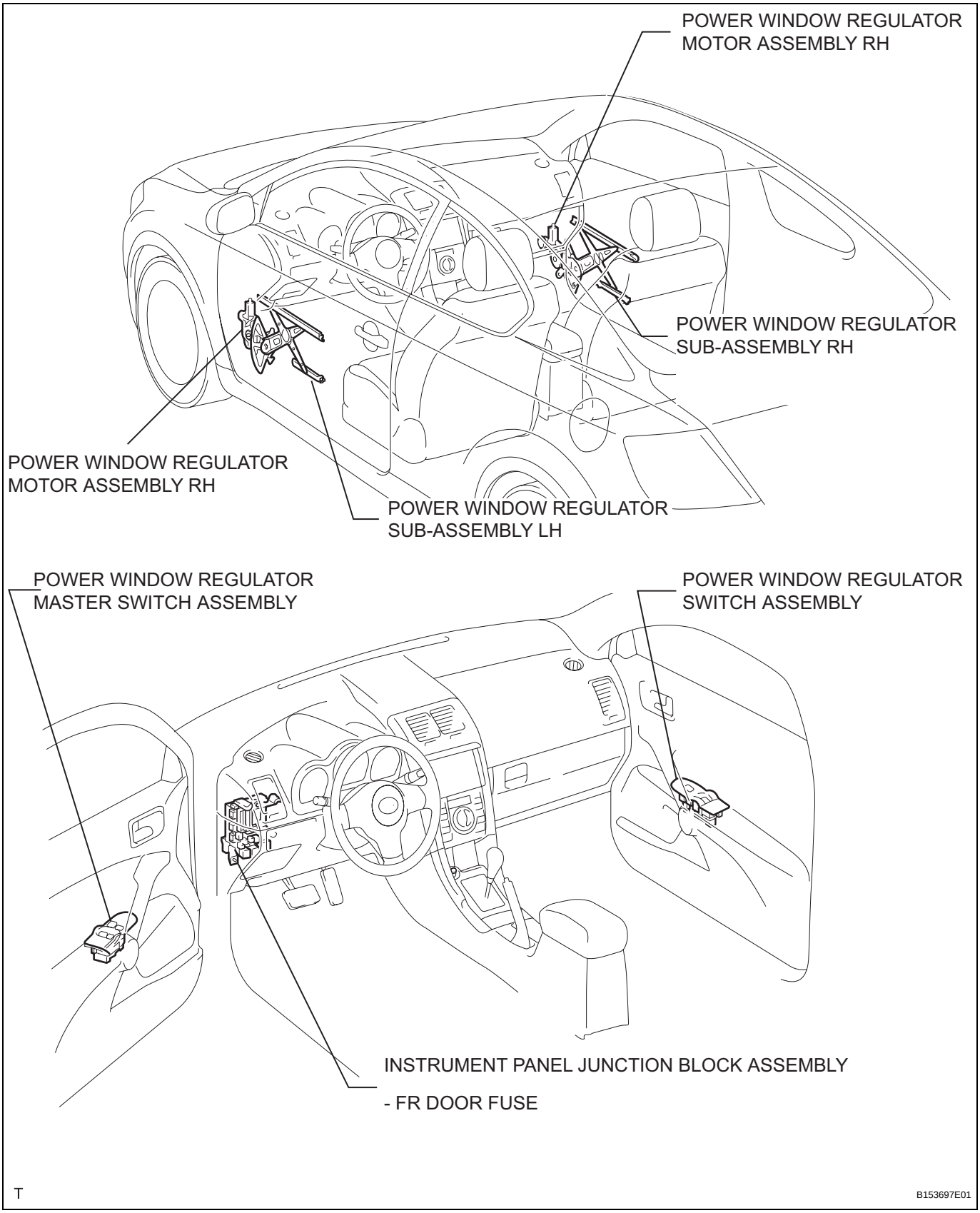
POWER WINDOW CONTROL SYSTEM (w/o Jam Protection Function)

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system after the cable is reconnected.

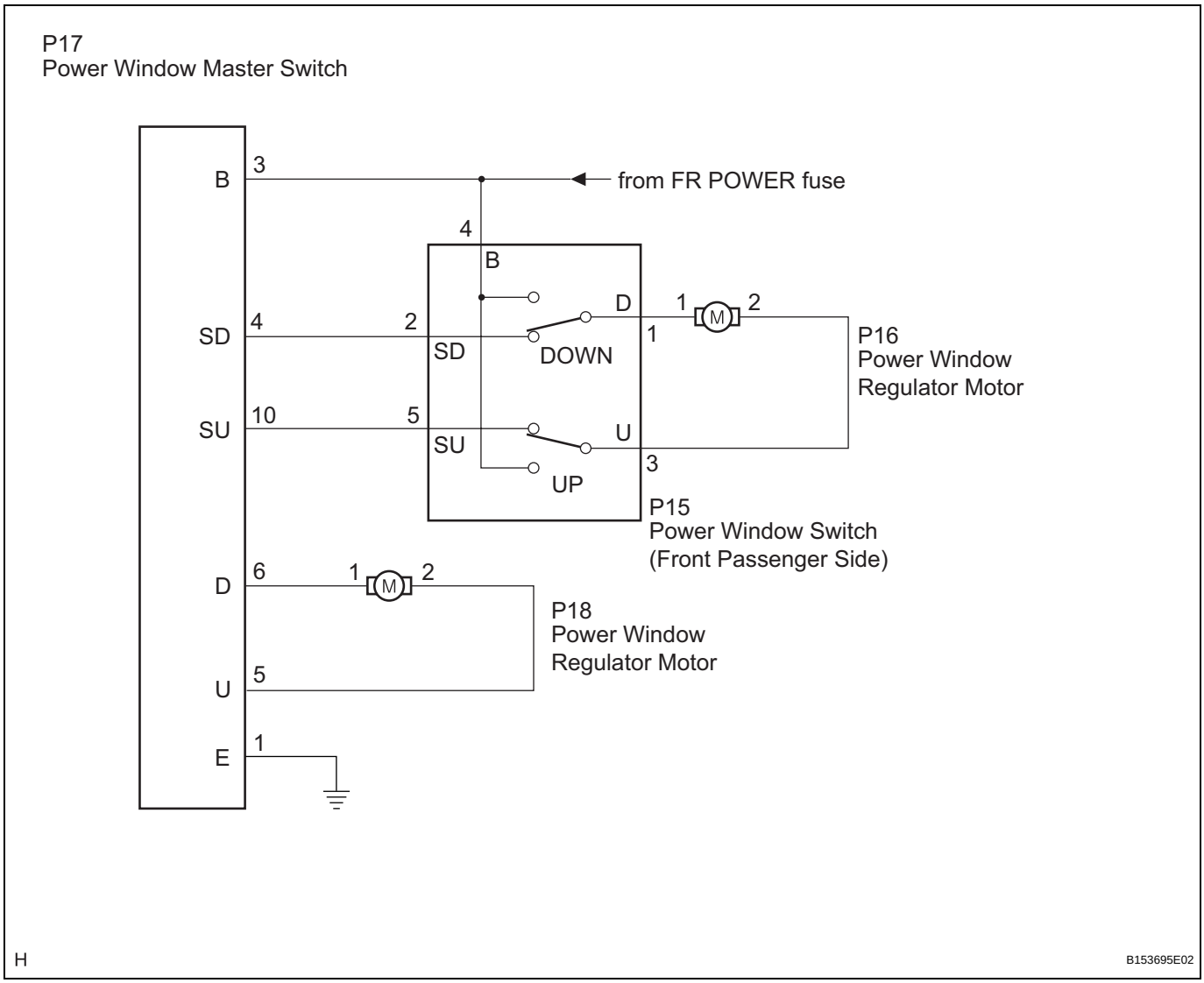
System Name	See procedure
Power Window Control System	IN-23
SFI System	IN-23

PARTS LOCATION



WS

SYSTEM DIAGRAM



WS

SYSTEM DESCRIPTION

1. POWER WINDOW CONTROL SYSTEM DESCRIPTION

(a) The power window control system controls the power window operation using the power window regulator motors. The main controls of this system are the power window regulator master switch, which is mounted on the driver side door, and the power window regulator switches, which are mounted on the passenger side door. Operating a window switch results in electrical power being transmitted to the corresponding power window regulator motor.

(b) The power window control system has the following functions:

Function	Outline
Manual up-and-down function	Function that causes window to go up while power window switch is being pulled halfway up and to go down while pushed halfway down. Window stops as soon as the switch is released.
Remote control function	Function that allows power window master switch to control MANUAL up-and-down operations of front passenger door window and rear door windows.

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use the following procedure to troubleshoot the power window control system.
- The intelligent tester should be used in step 4.

1	**VEHICLE BROUGHT TO WORKSHOP**

NEXT

2	**CUSTOMER PROBLEM ANALYSIS CHECK AND SYMPTOM CHECK**

NEXT

3	**PROBLEM SYMPTOMS TABLE**

HINT:
See page WS-37.

NEXT

4	**OVERALL ANALYSIS AND TROUBLESHOOTING**

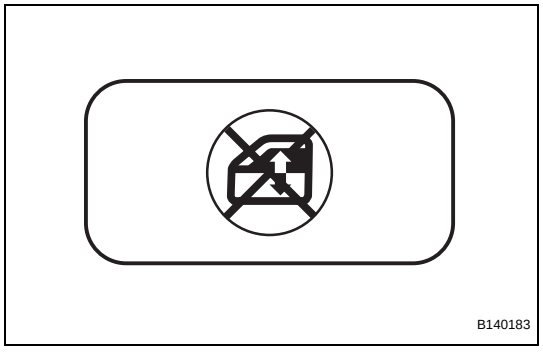
(a) Circuit inspection
(b) Terminal of ECU
HINT:
See page WS-38.

NEXT

5	**ADJUST, REPAIR OR REPLACE**

NEXT

END



OPERATION CHECK

1. CHECK WINDOW LOCK SWITCH

(a) Check that the front passenger side power window operation is disabled when the window lock switch of the power window master switch is pressed.

Standard:

Front passenger side power window operation is disabled.

(b) Check that the front passenger side power window can be operated when the window lock switch is pressed again.

Standard:

Front passenger side power window can be operated.

2. CHECK MANUAL UP/DOWN FUNCTION

(a) Check that the driver side power window operates as follows:

Standard

Condition	Master Switch	Switch Operation	Power Window
Ignition switch ON	Driver side	Pulled halfway up	UP (Closed)
		Pushed halfway down	DOWN (Open)

(b) Check that the front passenger side power window operates as follows:

Standard

Condition	Switch	Switch Operation	Power Window
• Ignition switch ON • Window lock switch OFF	Passenger side	Pulled up	UP (Closed)
		Pushed down	DOWN (Open)

3. CHECK AUTO DOWN FUNCTION

(a) Check that the driver side power window operates as follows:

Standard

Condition	Master Switch	Switch Operation	Power Window
Ignition switch ON	Driver side	Pulled up fully	UP (Closed)
		Pushed down fully	DOWN (Open)

4. CHECK REMOTE MANUAL UP/DOWN FUNCTION

(a) Check that the front passenger side power window operates as follows:

Standard

Condition	Master Switch	Switch Operation	Power Window
• Ignition switch ON • Window lock switch OFF	Passenger side	Pulled up	UP (Closed)
		Pushed down	DOWN (Open)

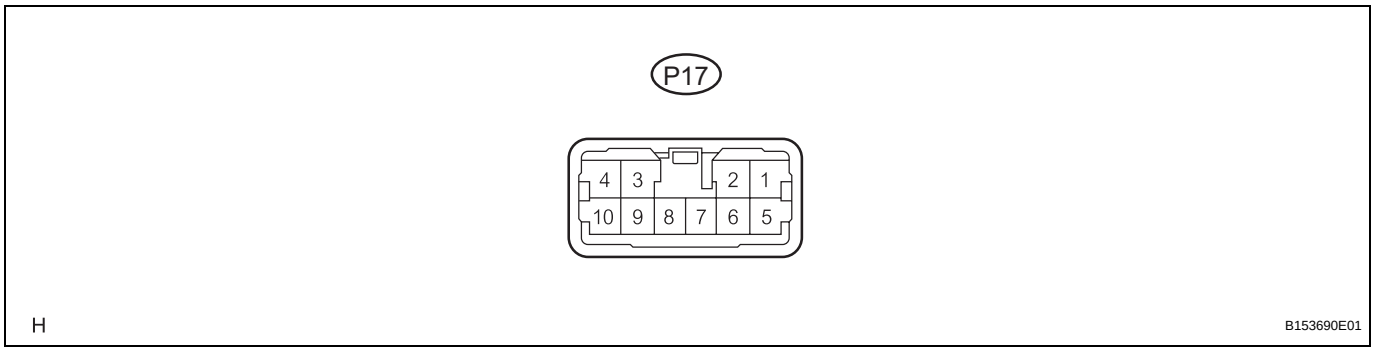
PROBLEM SYMPTOMS TABLE

POWER WINDOW CONTROL SYSTEM

Symptom	Suspected Area	See page
Power window does not operate with power window regulator master switch	1. FR DOOR fuse	-
	2. Power window master switch circuit (power source)	WS-40
	3. Power window regulator motor circuit	WS-44
	4. Power window regulator master switch	WS-48
Front passenger side power window does not operate with power window regulator switch	1. Power window switch circuit (power source)	WS-43
	2. Power window regulator motor circuit (front passenger side)	WS-46
	3. Power window regulator switch (front passenger side)	WS-43
Remote UP/DOWN function does not operate	1. Power window regulator master switch	WS-40
	2. Wire harness	-
Power window can be operated after power switch is turned off even if operation conditions are not met	1. Front door courtesy switch	LI-50
	2. Wire harness	-

TERMINALS OF ECU

1. POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY



(a) Disconnect the P17 switch connector.
(b) Measure the voltage and resistance of each terminal according to the value(s) in the table below.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
E (P17-1) - Body ground	W-B - Body ground	Ground	Always	Below 1 Ω

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
B (P17-3) - E (P17-1)	G - W-B	Power supply	Ignition switch ON	11 to 14 V

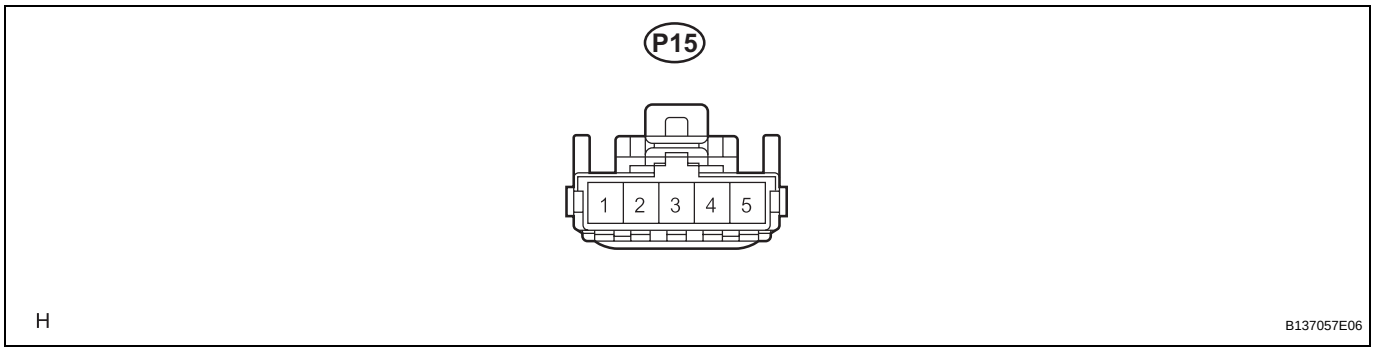
If the result is not as specified, there may be a malfunction in the wire harness.

(c) Reconnect the P17 switch connector and reset the power window motor.
(d) Measure the voltage according to the value(s) in the table below.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
U (P17-5) - E (P17-1)	Y - W-B	Power window motor UP output	Ignition switch ON, driver side power window switch OFF → UP (Manual operation)	0 V → 11 to 14 V
D (P17-6) - E (P17-1)	P - W-B	Power window motor DOWN output	Ignition switch ON, driver side power window switch OFF → DOWN (Manual operation)	0 V → 11 to 14 V
SU (P17-10) - E (P17-1)	GR - W-B	Power window motor UP output	Ignition switch ON, front passenger side power window switch OFF → UP (Manual operation)	0 V → 11 to 14 V
SD (P17-4) - E (P17-1)	B - W-B	Power window motor DOWN output	Ignition switch ON, front passenger side power window switch OFF → DOWN (Manual operation)	0 V → 11 to 14 V

If the result is not as specified, there may be a malfunction in the wire harness.

2. CHECK POWER WINDOW REGULATOR SWITCH ASSEMBLY (FRONT PASSENGER)



(a) Disconnect the P15 switch connector.
(b) Measure the voltage according to the value(s) in the table below.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
B (P15-4) - Body ground	P - Body ground	Power supply	Ignition switch ON	11 to 14 V

If the result is not as specified, there may be a malfunction in the wire harness.

(c) Reconnect the P15 switch connector and reset the power window motor.
(d) Measure the voltage according to the value(s) in the table below.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
U (P15-3) - Body ground	Y - Body ground	Power window motor UP output	Ignition switch ON, front passenger side power window switch OFF → UP (Manual operation)	0 V → 11 to 14 V
D (P15-1) - Body ground	G - Body ground	Power window motor DOWN output	Ignition switch ON, front passenger side power window switch OFF → DOWN (Manual operation)	0 V → 11 to 14 V

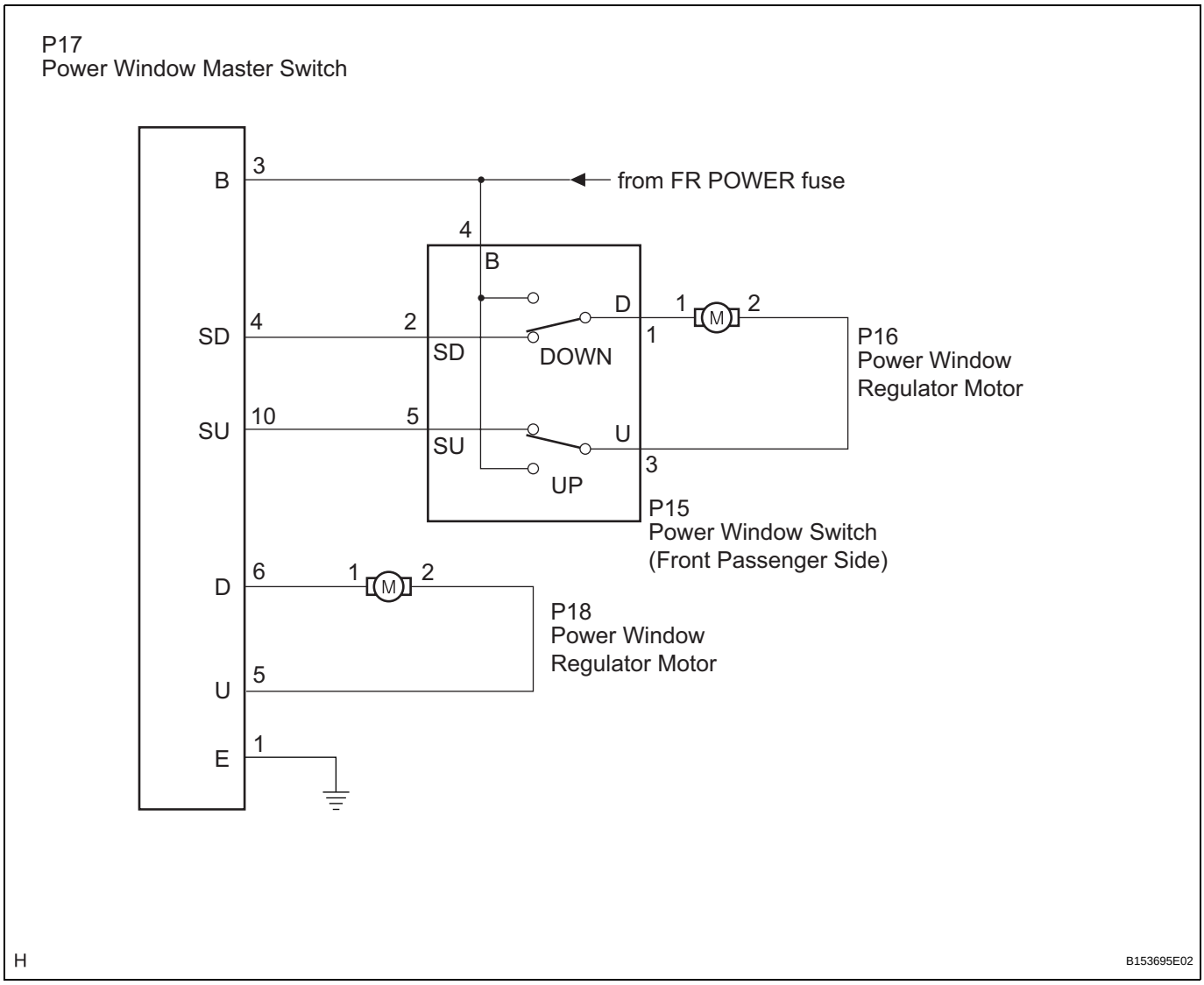
If the result is not as specified, the power window regulator switch assembly may have a malfunction.

Power Window Master Switch Circuit

DESCRIPTION

This circuit transmits signals from the power window regulator master switch assembly to the power window regulator switch.

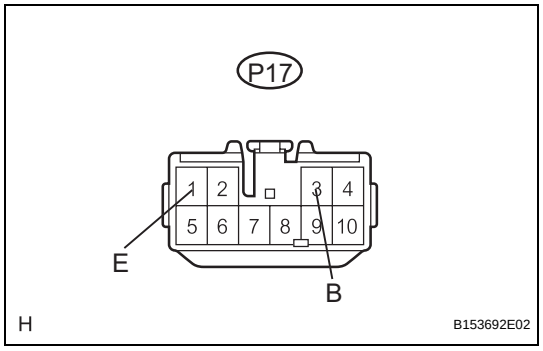
WIRING DIAGRAM



WS

INSPECTION PROCEDURE

1 INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY



(a) Disconnect the P17 connector.
(b) Measure the voltage and resistance according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
3 (B) - Body ground	Ignition switch ON	11 to 14 V

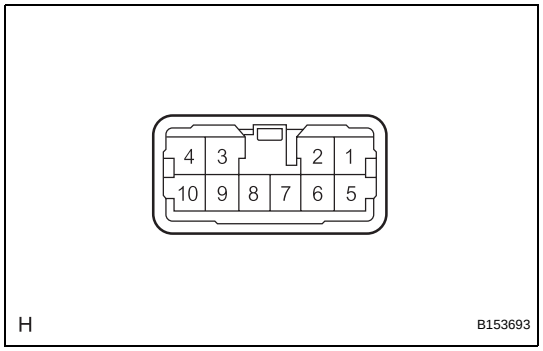
Standard resistance

Tester Connection	Condition	Specified Condition
1 (E) - Body ground	Always	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

2 INSPECT POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY



(a) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
1 (E) - 6 (D)	Manual UP	Below 1 Ω
5 (U) - 3 (B)		Below 1 Ω
1 (E) - 5 (U) - 6 (D)	OFF	Below 1 Ω
1 (E) - 5 (U)	Manual DOWN	Below 1 Ω
6 (D) - 3 (B)		Below 1 Ω
1 (E) - 5 (U)	Auto DOWN	Below 1 Ω
6 (D) - 3 (B)		Below 1 Ω

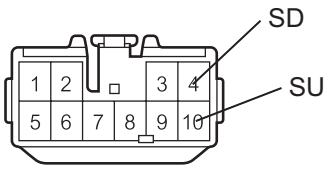
NG → **REPLACE POWER WINDOW REGULATOR MASTER SWITCH ASSEMBLY**

OK

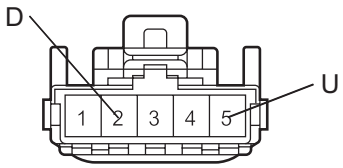
WS

3	**CHECK WIRE HARNESS (POWER WINDOW MASTER SWITCH - POWER WINDOW SWITCH)**

P17
Power Window Regulator Master Switch Assembly:



P15
Power Window Switch (Front Passenger):



H B153694E03

(a) Disconnect the P17 and P15 connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
P17-10 (SU) - P15-5 (SU)	Always	Below 1 Ω
P17-4 (SD) - P15-2 (SD)	Always	Below 1 Ω
P17-10 (SU) - Body ground	Always	10 kΩ or higher
P17-4 (SD) - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

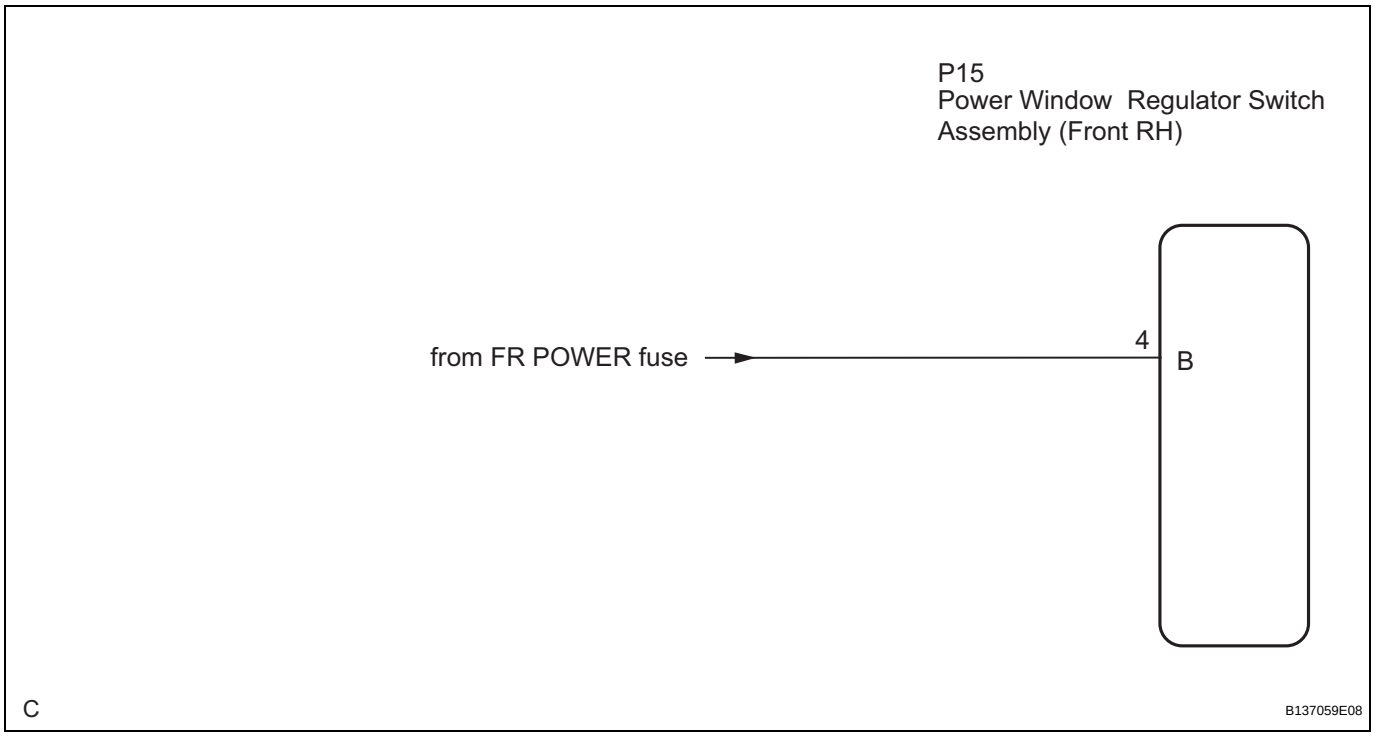
WS

Front Passenger Side Power Window Switch Power Source Circuit

DESCRIPTION

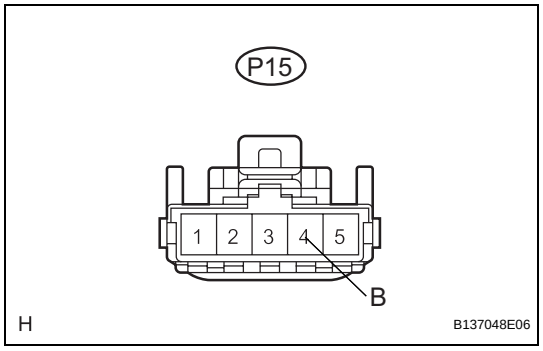
This circuit supplies power to operate the power window regulator switch assembly (Front RH).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK WIRE HARNESS (POWER WINDOW REGULATOR SWITCH - BATTERY AND BODY GROUND)



(a) Disconnect the P15 connector.
(b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Condition	Specified Condition
4 (B) - Body ground	Ignition switch ON	11 to 14 V

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

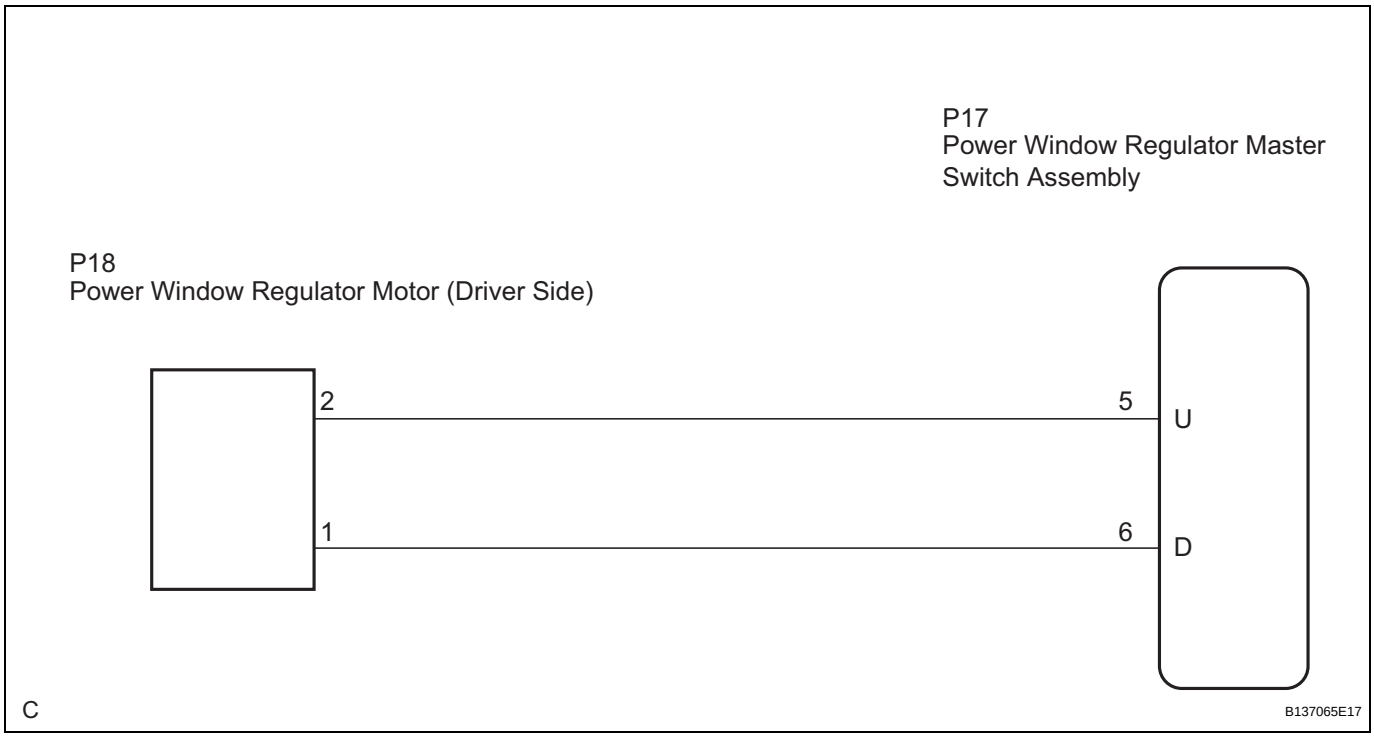
WS

Driver Side Power Window Motor Circuit

DESCRIPTION

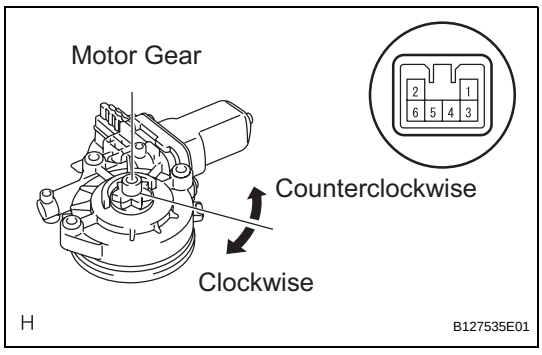
This circuit transmits signals from the power window regulator master switch assembly to the power window regulator motor (Front LH).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT POWER WINDOW REGULATOR MOTOR



(a) Remove the power window motor.
  (1) Apply battery voltage to the motor connector according to the table below.
  NOTICE:
  Do not apply battery voltage to any terminals except terminals 1 and 2.
  Standard

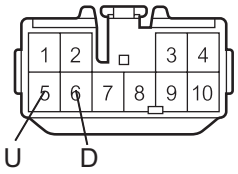
Measurement Condition	Specified Condition
Battery positive (+) → Terminal 2 Battery negative (-) → Terminal 1	Motor gear rotates clockwise
Battery positive (+) → Terminal 1 Battery negative (-) → Terminal 2	Motor gear rotates counterclockwise

NG → **REPLACE POWER WINDOW REGULATOR MOTOR**

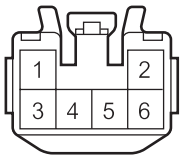
OK

2	**CHECK WIRE HARNESS (WINDOW REGULATOR MOTOR - WINDOW REGULATOR MASTER SWITCH)**

P17
Power Window Regulator Master Switch Assembly:



P18
Power Window Regulator Motor (Driver Side):



H B153691E02

(a) Disconnect the P17 and P18 connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
P17-5 (U) - P18-2	Always	Below 1 Ω
P17-6 (D) - P18-1	Always	Below 1 Ω
P17-5 (U) - Body ground	Always	10 kΩ or higher
P17-6 (D) - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

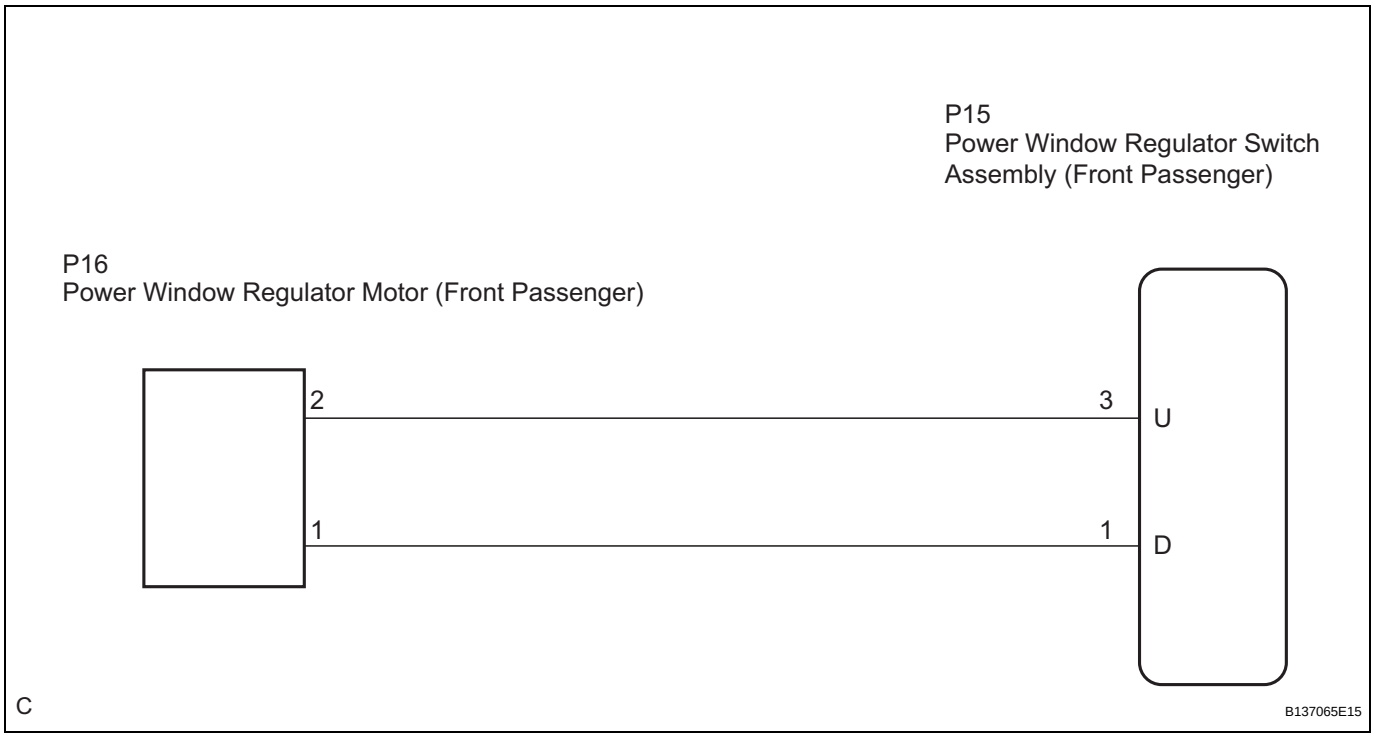
WS

Front Passenger Side Power Window Motor Circuit

DESCRIPTION

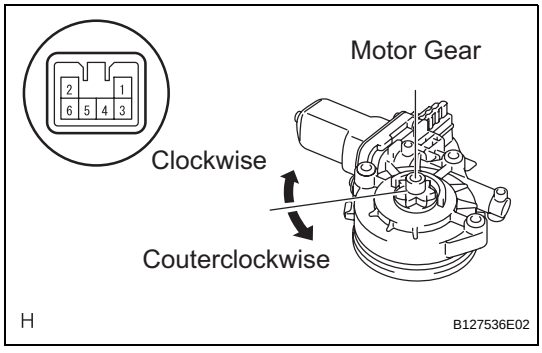
This circuit transmits signals from the power window regulator switch assembly (Front RH) to the power window regulator motor (Front RH).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	INSPECT POWER WINDOW REGULATOR MOTOR



(a) Remove the power window motor.
(b) Apply battery voltage to the motor connector according to the table below.
NOTICE:
Do not apply battery voltage to any terminals except terminals 1 and 2.
Standard

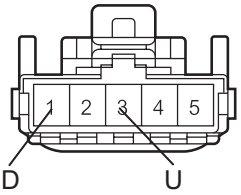
Measurement Condition	Specified Condition
Battery positive (+) → Terminal 1 Battery negative (-) → Terminal 2	Motor gear rotates clockwise
Battery positive (+) → Terminal 2 Battery negative (-) → Terminal 1	Motor gear rotates counterclockwise

NG → **REPLACE POWER WINDOW REGULATOR MOTOR**

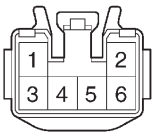
OK

2	**CHECK WIRE HARNESS (WINDOW REGULATOR MOTOR - POWER WINDOW REGULATOR SWITCH)**

P15
Power Window Regulator Switch Assembly (Front Passenger):



P16
Power Window Regulator Motor (Front Passenger):



B137066E07

(a) Disconnect the P15 and P16 connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard resistance

Tester Connection	Condition	Specified Condition
P15-1 (D) - P16-1	Always	Below 1 Ω
P15-3 (U) - P16-2	Always	Below 1 Ω
P15-1 (D) - Body ground	Always	10 kΩ or higher
P15-3 (U) - Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

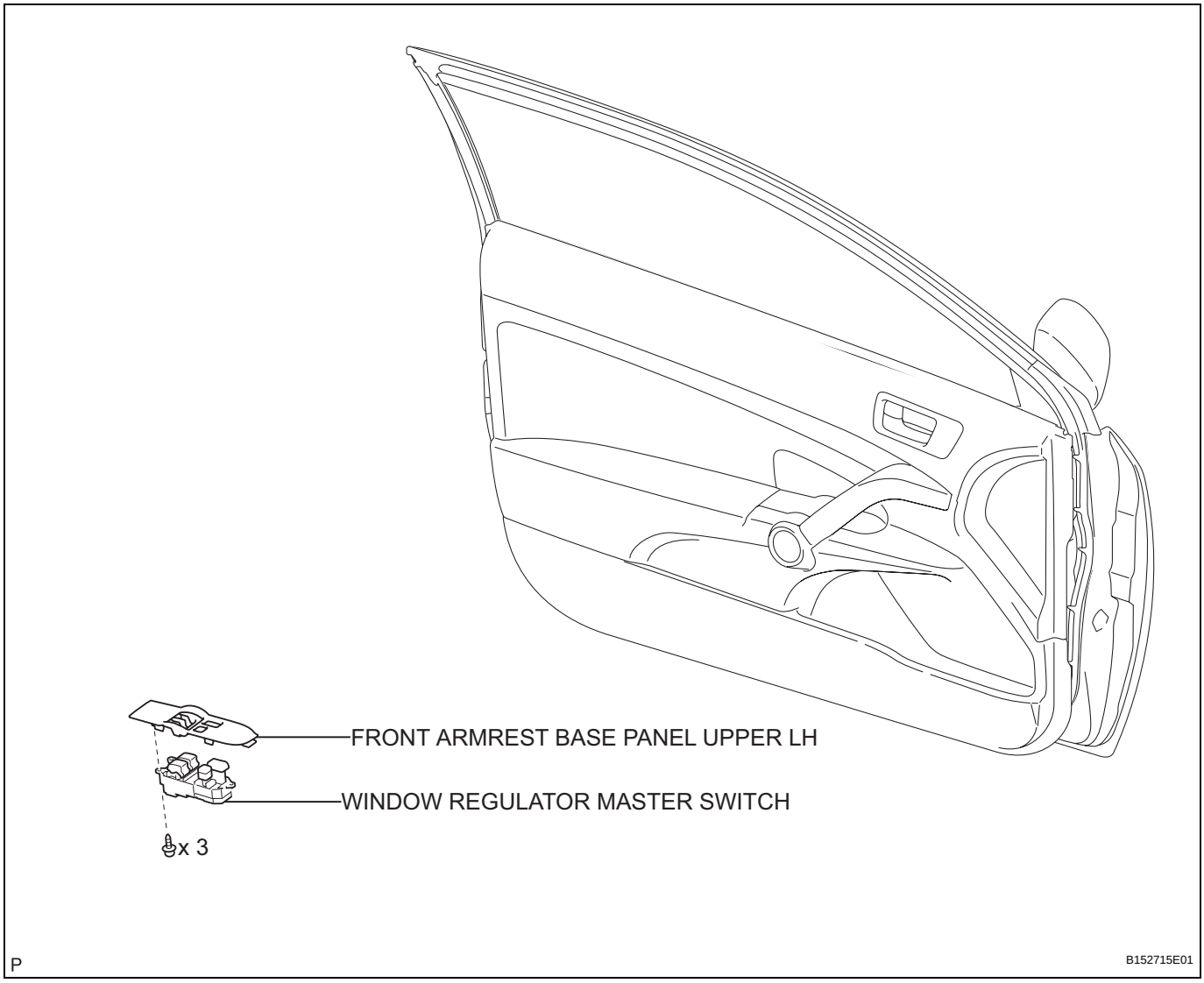
OK

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE

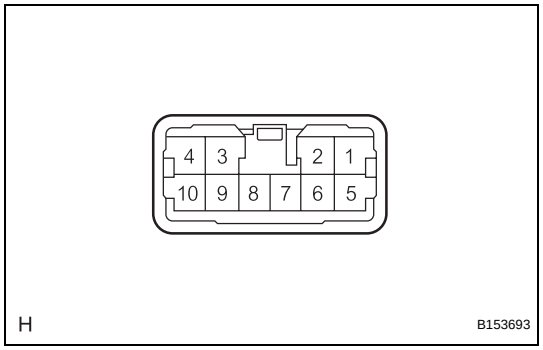
WS

POWER WINDOW MASTER SWITCH

COMPONENTS



WS



REMOVAL

1. **REMOVE FRONT ARMREST BASE PANEL UPPER LH (See page ED-8)**

INSPECTION

1. **INSPECT POWER WINDOW MASTER SWITCH (w/o Jam Protection Function)**
   (a) Measure the resistance when the switch is operated according to the value(s) in the table below.
   Standard resistance

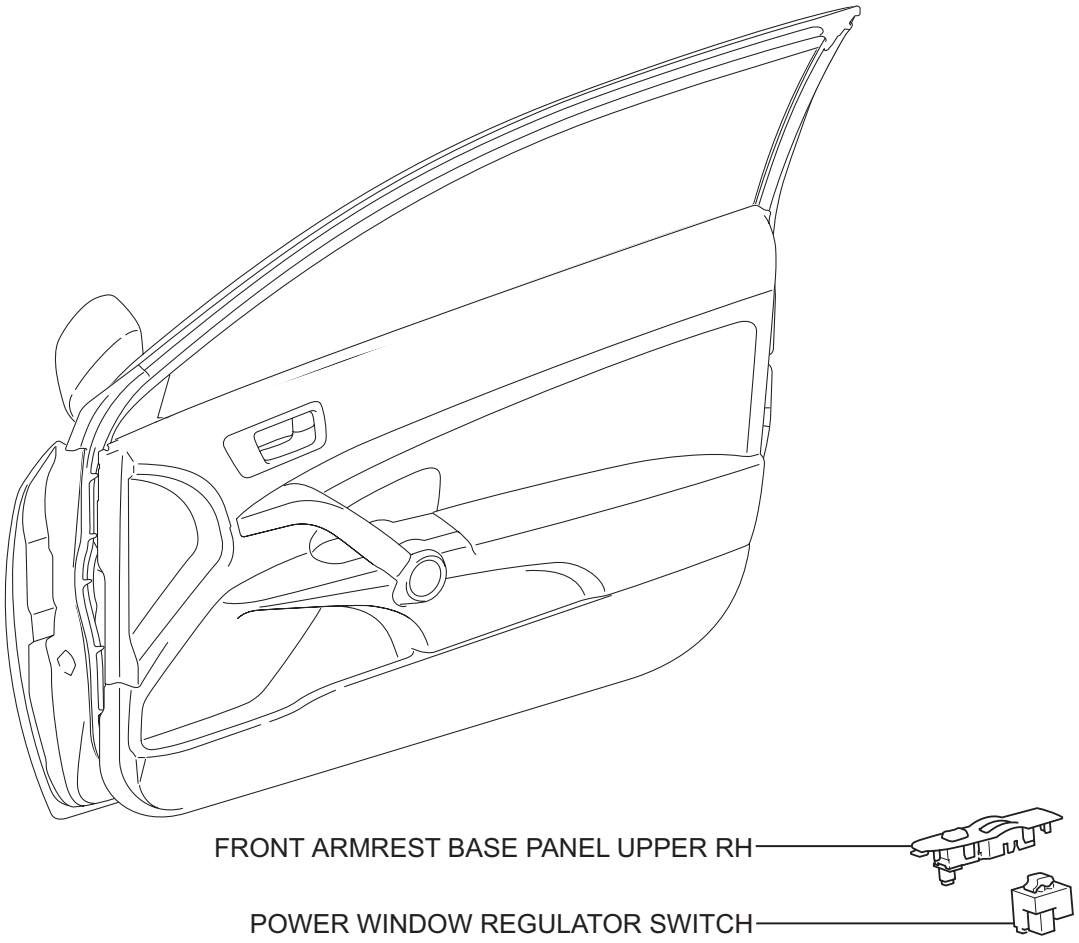
Tester Connection	Switch Condition	Specified Condition
1 (E) - 6 (D)	Manual UP	Below 1 Ω
5 (U) - 3 (B)		Below 1 Ω
1 (E) - 5 (U) - 6 (D)	OFF	Below 1 Ω
1 (E) - 5 (U)	Manual DOWN	Below 1 Ω
6 (D) - 3 (B)		Below 1 Ω
1 (E) - 5 (U)	Auto DOWN	Below 1 Ω
6 (D) - 3(B)		Below 1 Ω
1 (E) - 2 (L)	LOCK	Below 1 Ω
1 (E) - 11 (UL)	UNLOCK	Below 1 Ω

INSTALLATION

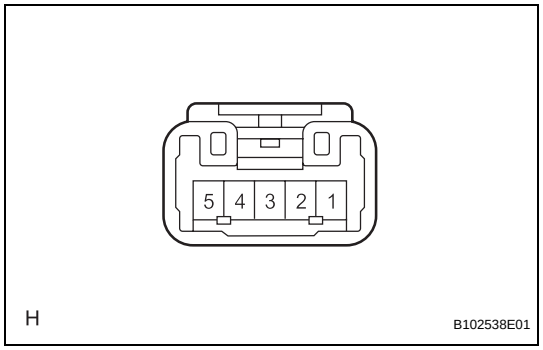
1. **INSTALL FRONT ARMREST BASE PANEL UPPER LH**
   (See page ED-20)

FRONT PASSENGER SIDE POWER WINDOW SWITCH

COMPONENTS



WS



REMOVAL

1. REMOVE FRONT ARMREST BASE PANEL UPPER RH (See page ED-8)

INSPECTION

1. INSPECT POWER WINDOW SWITCH (w/o Jam Protection Function)

(a) Remove the power window switch.

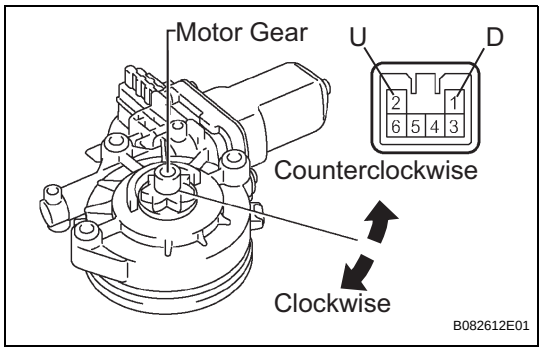
(b) Measure the resistance when the switch is operated according to the value(s) in the table below.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 (D) - 2 (SD)	UP	Below 1 Ω
3 (U) - 4 (B)		Below 1 Ω
1 (D) - 2 (SD)	OFF	Below 1 Ω
3 (U) - 5 (SU)		Below 1 Ω
3 (U) - 5 (SU)	DOWN	Below 1 Ω
1 (D) - 4 (B)		Below 1 Ω

INSTALLATION

1. **INSTALL FRONT ARMREST BASE PANEL UPPER RH (See page ED-20)**



POWER WINDOW REGULATOR MOTOR

INSPECTION

1. INSPECT POWER WINDOW REGULATOR MOTOR ASSEMBLY LH (DRIVER SIDE)

(a) Check operation of the regulator motor.

NOTICE:

Do not apply battery voltage to any terminal except 1 and 2.

(1) Apply battery voltage to the motor terminals.

(2) Check that the motor rotates smoothly.

OK

Measurement Condition	Specified Condition
Battery Positive (+) → Terminal 1 (D) Battery Negative (-) → Terminal 2 (U)	Motor gear rotates clockwise
Battery Positive (+) → Terminal 2 (U) Battery Negative (-) → Terminal 1 (D)	Motor gear rotates counterclockwise

If the result is not as specified, replace the motor.

(b) Check operation of the PTC inside the regulator motor.

NOTICE:

Work must be performed with the power window regulator and door glass installed to the vehicle.

(1) Set an electrical tester DC 400 A probe to the wire harness of terminal 2.

NOTICE:

Match the arrow mark of the probe with the current direction.

(2) Fully close the door glass by operating the power window switch and keep the door glass there for approximately 60 seconds.

(3) With the door glass fully closed, operate the power window switch in the closing direction again. Check how long the current takes to change from a range of 16 A to 34 A, to less than 1 A.

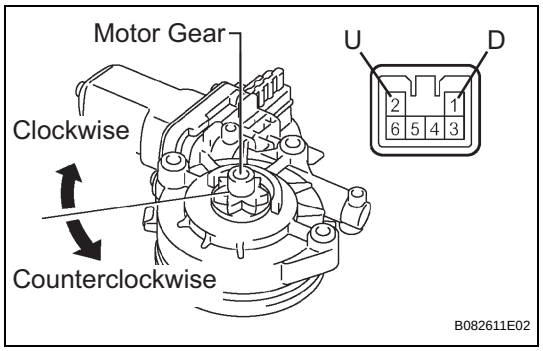
Standard:

4 to 90 seconds

(4) Check that the door glass moves down when the power window regulator switch is pushed DOWN.

If the result is not as specified, replace the motor.

WS



2. INSPECT POWER WINDOW REGULATOR MOTOR ASSEMBLY RH

(a) Check operation of the regulator motor.

NOTICE:

Do not apply battery voltage to any terminal except 1 and 2.

(1) Apply battery voltage to the motor terminals.

(2) Check that the motor rotates smoothly.

OK

Measurement Condition	Specified Condition
Battery Positive (+) → Terminal 2 (U) Battery Negative (-) → Terminal 1 (D)	Motor gear rotates clockwise
Battery Positive (+) → Terminal 1 (D) Battery Negative (-) → Terminal 2 (U)	Motor gear rotates counterclockwise

If the result is not as specified, replace the motor.

(b) Check operation of the PTC inside the regulator motor.

NOTICE:

Work must be performed with the power window regulator and door glass installed to the vehicle.

(1) Set an electrical tester DC 400 A probe to the wire harness of terminal 2.

NOTICE:

Match the arrow mark of the probe with the current direction.

(2) Fully close the door glass by operating the power window switch and keep the door glass there for approximately 60 seconds.

(3) With the door glass fully closed, operate the power window switch in the closing direction again. Check how long the current takes to change from a range of 16 A to 34 A, to less than 1 A.

Standard:

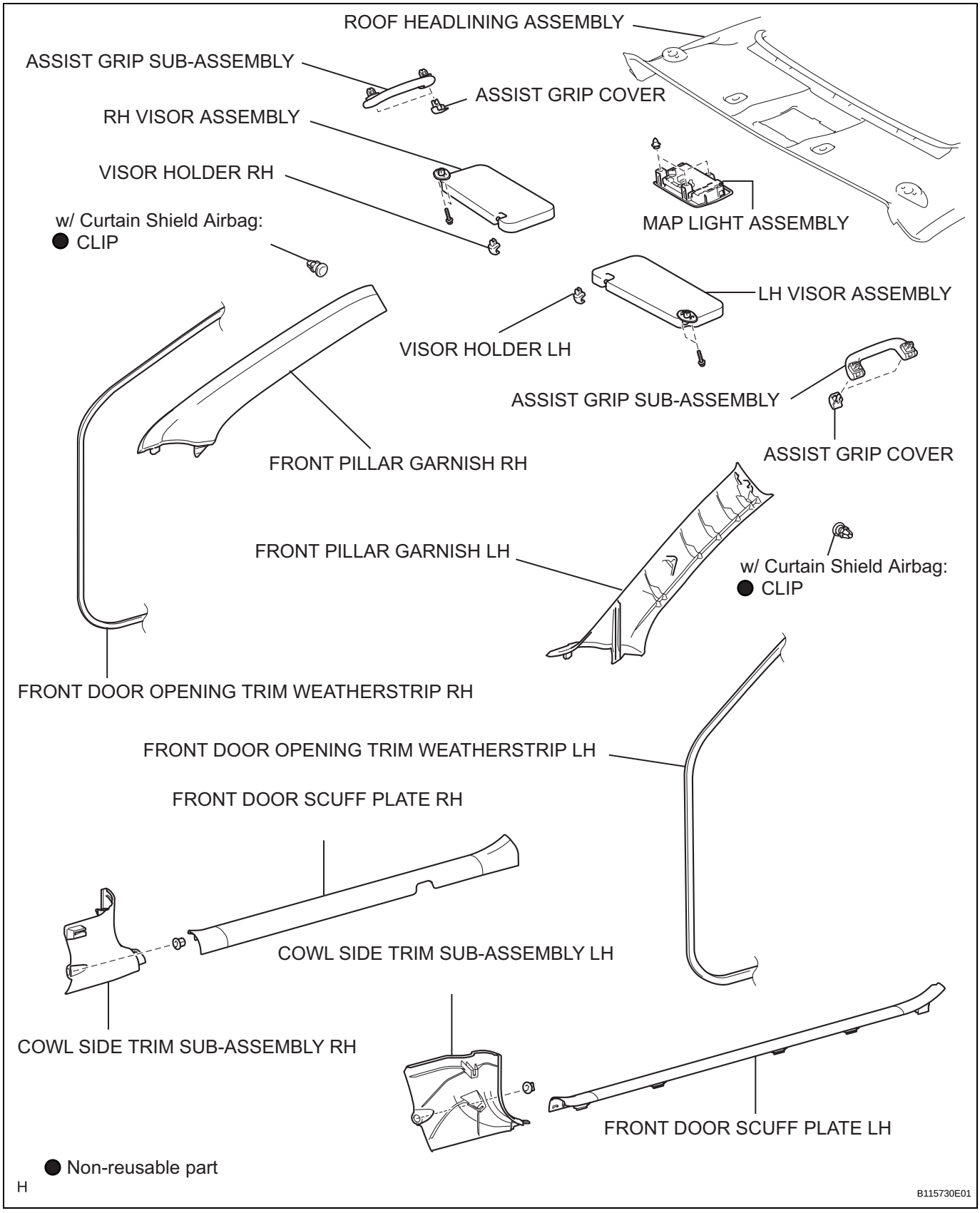
4 to 90 seconds

(4) Check that the door glass moves down when the power window regulator switch is pushed DOWN.

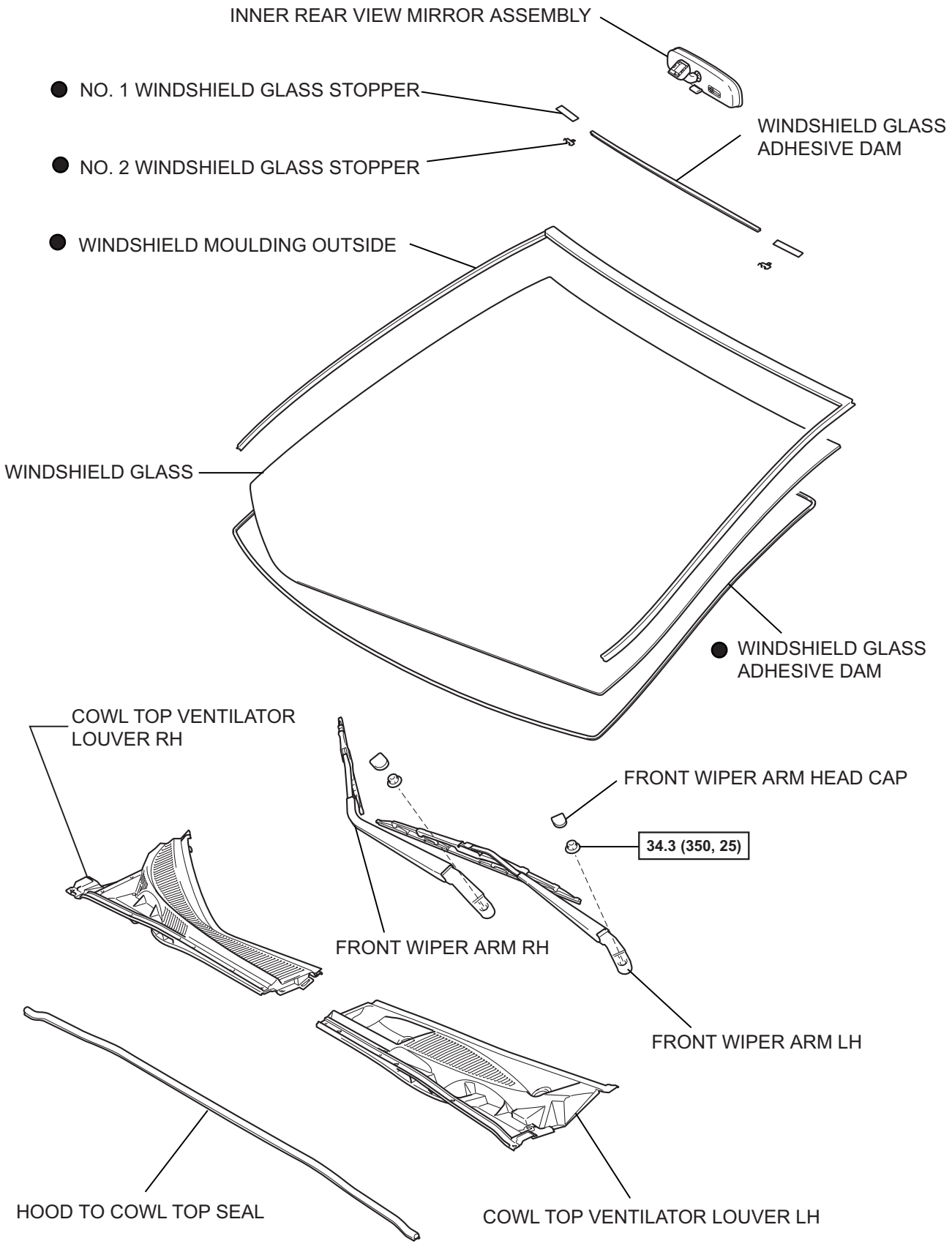
If the result is not as specified, replace the motor.

WINDSHIELD GLASS

COMPONENTS



WS


INNER REAR VIEW MIRROR ASSEMBLY
NO. 1 WINDSHIELD GLASS STOPPER
NO. 2 WINDSHIELD GLASS STOPPER
WINDSHIELD GLASS ADHESIVE DAM
WINDSHIELD MOULDING OUTSIDE
WINDSHIELD GLASS
WINDSHIELD GLASS ADHESIVE DAM
COWL TOP VENTILATOR LOUVER RH
FRONT WIPER ARM HEAD CAP
34.3 (350, 25)
FRONT WIPER ARM RH
FRONT WIPER ARM LH
HOOD TO COWL TOP SEAL
COWL TOP VENTILATOR LOUVER LH
N*m (kgf*cm, ft.*lbf) : Specified torque
Non-reusable part
H
B115731E02

WS

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE INNER REAR VIEW MIRROR ASSEMBLY (See page MI-6)**
3. **REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-9)**
4. **REMOVE FRONT DOOR SCUFF PLATE RH (See page IR-9)**
5. **REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-9)**
6. **REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH (See page IR-9)**
7. **REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH**
8. **REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH**
9. **REMOVE FRONT PILLAR GARNISH LH (See page IR-12)**
10. **REMOVE FRONT PILLAR GARNISH RH (See page IR-12)**
11. **REMOVE ASSIST GRIP COVER (See page IR-13)**
12. **REMOVE ASSIST GRIP SUB-ASSEMBLY (See page IR-14)**
13. **REMOVE LH VISOR ASSEMBLY (See page IR-13)**
14. **REMOVE RH VISOR ASSEMBLY (See page IR-13)**
15. **REMOVE VISOR HOLDER LH (See page IR-13)**
16. **REMOVE VISOR HOLDER RH (See page IR-13)**
17. **REMOVE MAP LIGHT ASSEMBLY (See page IR-12)**
18. **REMOVE ROOF HEADLINING ASSEMBLY**
    (a) Slightly lower the front section of the roof headlining (see page IR-14).
    HINT:
    It is not necessary to completely remove the roof headlining.
19. **REMOVE FRONT WIPER ARM HEAD CAP (See page WW-4)**
20. **REMOVE FRONT WIPER ARM LH (See page WW-4)**
21. **REMOVE FRONT WIPER ARM RH (See page WW-4)**

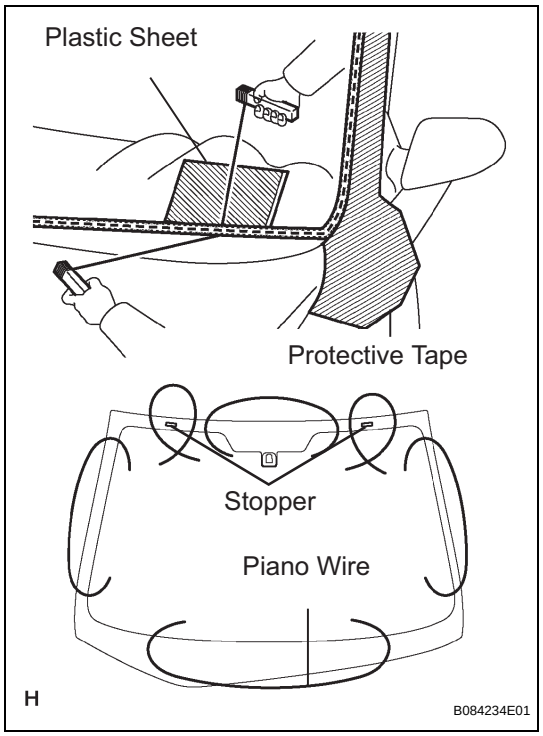
22. **REMOVE HOOD TO COWL TOP SEAL (See page WW-4)**

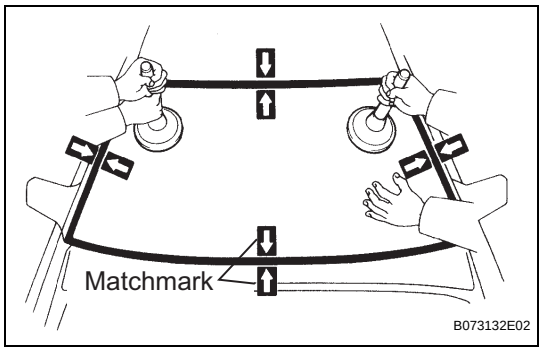
23. **REMOVE COWL TOP VENTILATOR LOUVER LH (See page WW-4)**

24. **REMOVE COWL TOP VENTILATOR LOUVER RH**

25. **REMOVE WINDSHIELD MOULDING OUTSIDE**
    (a) Using a knife, cut off the windshield moulding outside.
    NOTICE:
    Be careful not to damage the vehicle body with the knife.
    (b) Remove the remaining moulding.
    HINT:
    Make a partial cut in the moulding. Then pull and remove it by hand.

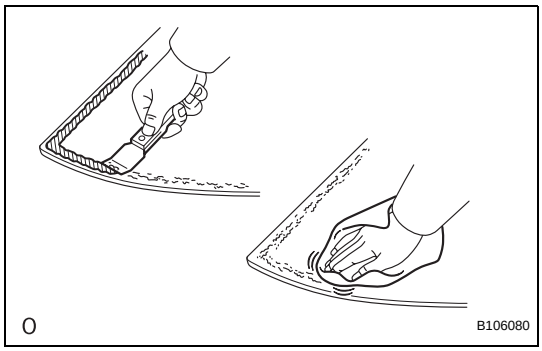
26. **REMOVE WINDSHIELD GLASS**
    (a) Apply protective tape to the outer surface of the vehicle body to prevent scratches.
    (b) From the interior, insert a piano wire between the vehicle body and glass as shown in the illustration.
    (c) Tie objects that can serve as handles (for example, wooden blocks) to all wire ends.
    NOTICE:
    - **When separating the glass from the vehicle, be careful not to damage the vehicle's paint or interior/exterior ornaments.**
    - **To prevent the instrument panel from being scratched when removing the glass, place a plastic sheet between the piano wire and instrument panel.**





    (d) Place matchmarks over the glass and vehicle body on the locations indicated in the illustration.
    HINT:
    Matchmarks do not need to be place if not reusing the glass.
    (e) Cut through the adhesive by pulling the piano wire around the glass.
    NOTICE:
    Leave as much adhesive on the vehicle body as possible when cutting through the adhesive.
    (f) Disengage the stoppers.
    (g) Using suction cups, remove the glass.

WS



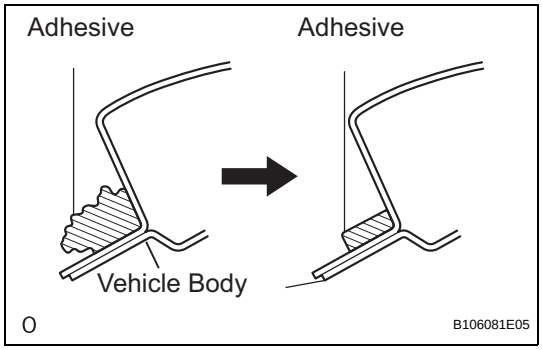
27. CLEAN WINDSHIELD GLASS

(a) Using a scraper, remove the damaged stoppers, dams and adhesive sticking to the glass.

(b) Clean the outer edges of the glass with white gasoline.

NOTICE:

Do not touch the glass surface after cleaning it. Even if using new glass, clean it with white gasoline.



28. CLEAN VEHICLE BODY

(a) Clean and shape the contact surface of the vehicle body.

(1) On the contact surface of the vehicle body, use a knife to cut away excess adhesive as shown in the illustration.

HINT:

Leave as much adhesive on the vehicle body as possible.

NOTICE:

Be careful not to damage the vehicle body.

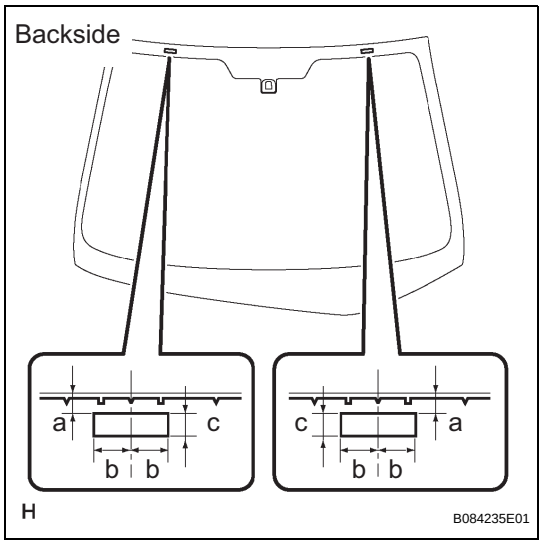
(2) Clean the contact surface of the vehicle body with cleaner.

HINT:

Even if all the adhesive has been removed, clean the vehicle body.

WS

INSTALLATION



1. INSTALL NO. 2 WINDSHIELD GLASS STOPPER

(a) Apply Primer G to the installation part of the stoppers.

HINT:

If primer G is applied to an area other than that which is specified, wipe off the primer with white gasoline before it dries.

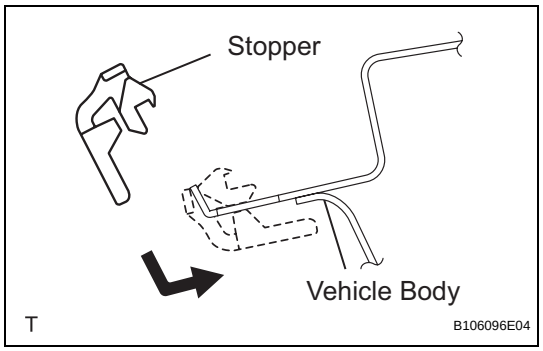
NOTICE:

- **Allow the primer to dry for 3 minutes or more.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

(b) Install 2 new stoppers onto the windshield glass as shown in the illustration.

Standard measurement

Area	Measurement
a	7.7 mm (0.303 in.)
b	7.7 mm (0.303 in.)
c	12.5 mm (0.492 in.)



2. INSTALL NO. 1 WINDSHIELD GLASS STOPPER

(a) Install 2 new stoppers to the vehicle body as shown in the illustration.

3. INSTALL WINDSHIELD GLASS ADHESIVE DAM

(a) Apply Primer G to the glass where the glass adhesive dams will be installed.

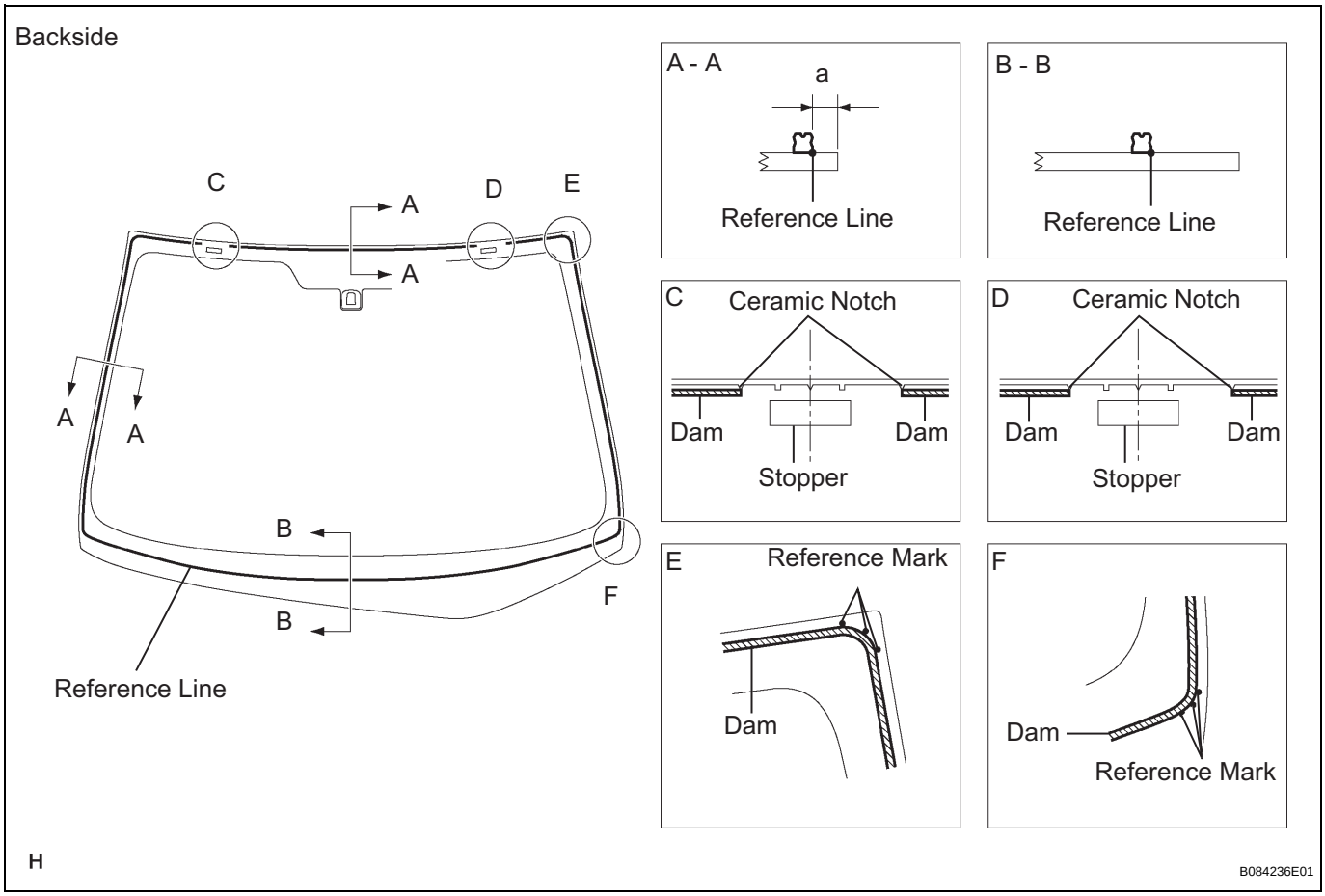
HINT:

If primer G is applied to an area other than that which is specified, wipe off the primer with white gasoline before it dries.

NOTICE:

- **Allow the primer to dry for 3 minutes or more.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

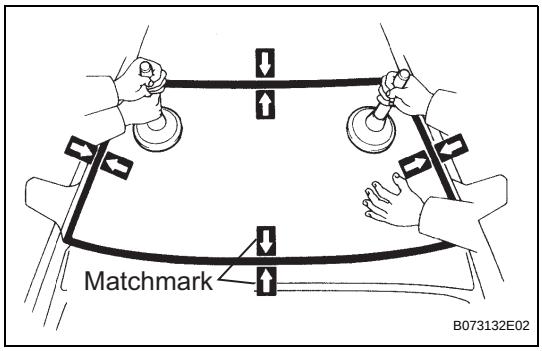
(b) Remove the peeling paper from the adhesive part of the dam. Install the dam (adhesive side) to the glass (Primer G area), but exclude the spacer area A as shown in the illustration.



Standard measurement

Area	Measurement
a	7.0 mm (0.276 in.)

WS



4. INSTALL WINDSHIELD GLASS

(a) Position the glass.

(1) Using suction cups, place the glass in the correct position.

(2) Check that the entire contact surface of the glass rim is perfectly even.

(3) Place matchmarks on the glass and vehicle body on the locations indicated in the illustration.

HINT:

- Placing matchmarks is only necessary when installing new glass. If it is the reused glass, matchmarks should already be present.
- When reusing the glass, check and correct the matchmark positions.

NOTICE:

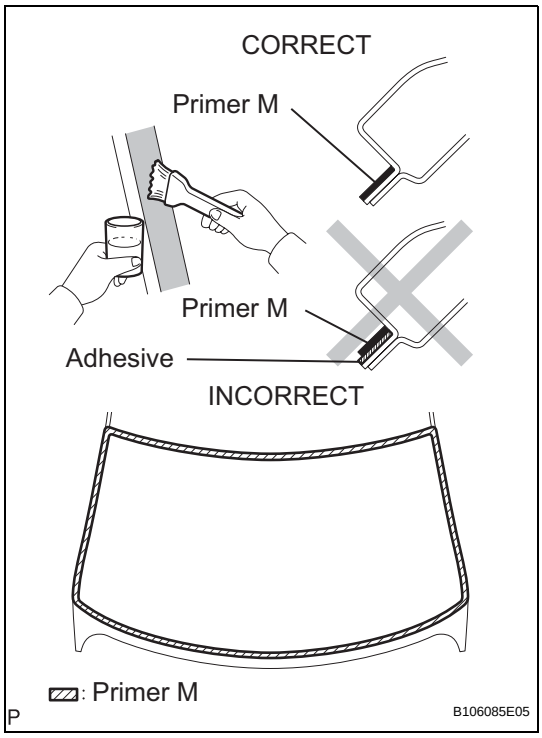
Check that the stoppers are attached to the vehicle body correctly.

(4) Using suction cups, remove the glass.

(b) Using a brush, apply Primer M to the exposed part of the vehicle body.

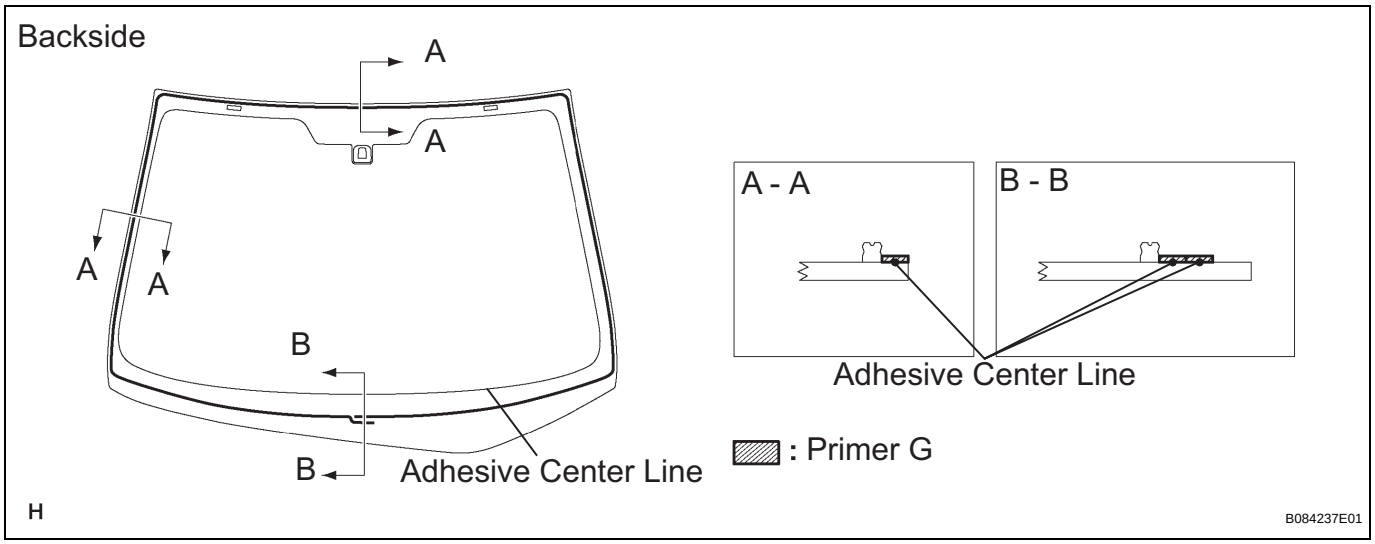
NOTICE:

- **Allow the primer to dry for 3 minutes or more.**
- **Do not apply primer to the adhesive.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**



WS

(c) Using a brush or sponge, apply Primer G to the contact surface of the glass.



HINT:
If the primer is applied to an area that is not specified, apply white gasoline to a clean cloth and wipe off the excess primer.

NOTICE:

- **Allow the primer to dry for 3 minutes or more.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

(d) Apply adhesive to the glass.

Adhesive :

Part No. 08850-00801 or equivalent

(1) Cut off the tip of the cartridge nozzle as shown in the illustration.

HINT:
After cutting off the tip, use all adhesive within the time written in the table below.

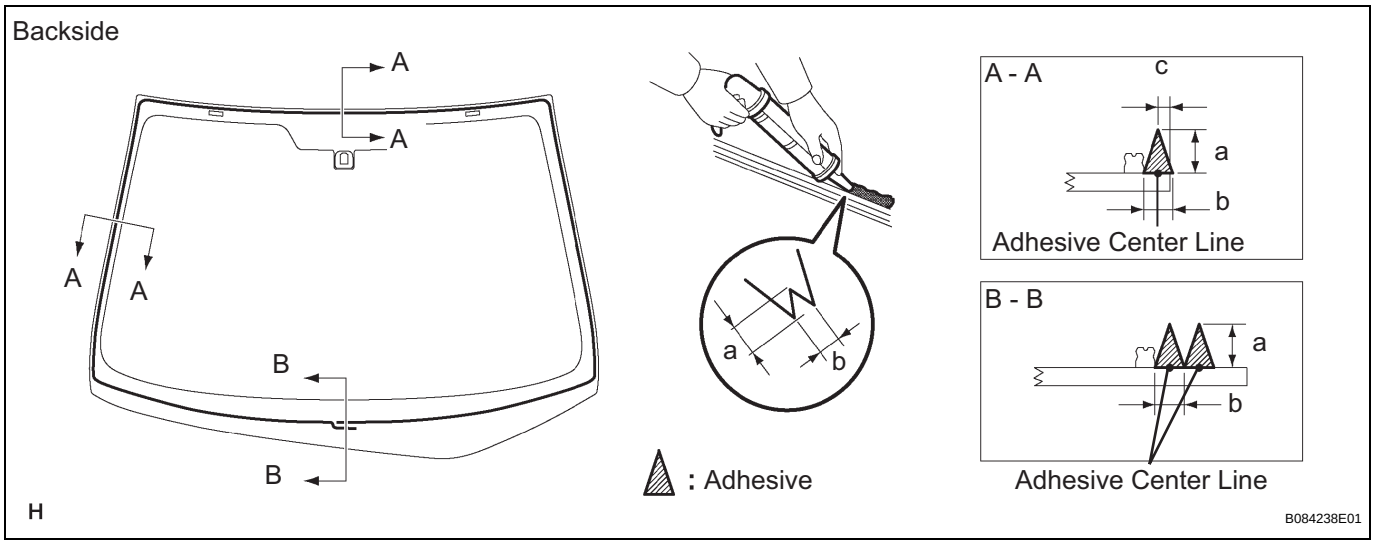
Usage time frame

Temperature	Usage Time Frame
35°C (95°F)	15 minutes
20°C (68°F)	1 hour 40 minutes
5°C (41°F)	8 hours

(2) Load the sealer gun with the cartridge.

WS

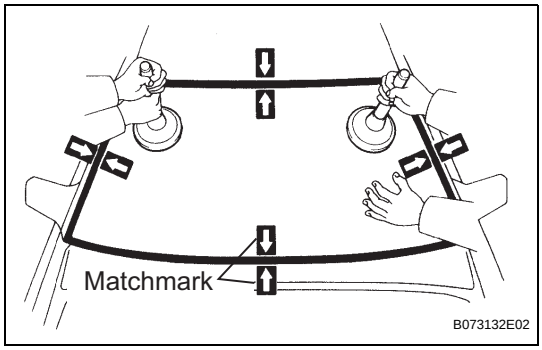
(3) Apply adhesive to the glass as shown in the illustration.



Standard measurement

Area	Measurement
a	12.0 mm (0.472 in.)
b	8.0 mm (0.315 in.)
c	3.0 mm (0.118 in.)

WS



(e) Install the glass to the vehicle body.
(1) Using suction cups, position the glass so that the matchmarks are aligned. Press it in gently along the rim.
(2) Lightly press the outer surface of the glass to ensure that it is securely fit to the vehicle body.
NOTICE:
- **Check that the stoppers are attached to the vehicle body correctly.**
- **Check that the vehicle body and glass have a small gap between them.**

(3) Hold the glass in place securely with protective tape or equivalent until the adhesive hardens.

5. INSTALL WINDSHIELD MOULDING OUTSIDE

(a) Using a brush or sponge, apply Primer G to the contact surface of the windshield glass.
HINT:
If primer G is applied to an area other than that which is specified, wipe off the primer with white gasoline before it dries.
NOTICE:
- **Allow the primer to dry for 3 minutes or more.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

(b) Align the moulding's marks with glass notches and install the moulding before the adhesive dries.
NOTICE:
Do not drive the vehicle for the amount of time written in the table below.

Minimum time

Temperature	Minimum time prior to driving vehicle
35°C (95°F)	1 hour 30 minutes
20°C (68°F)	5 hours
5°C (41°F)	24 hours

6. INSTALL COWL TOP VENTILATOR LOUVER RH
7. INSTALL COWL TOP VENTILATOR LOUVER LH (See page WW-7)
8. INSTALL HOOD TO COWL TOP SEAL (See page WW-7)
9. INSTALL FRONT WIPER ARM RH (See page WW-8)
10. INSTALL FRONT WIPER ARM LH (See page WW-7)
11. INSTALL FRONT WIPER ARM HEAD CAP
12. INSTALL ROOF HEADLINING ASSEMBLY (See page IR-15)
13. INSTALL MAP LIGHT ASSEMBLY (See page IR-16)
14. INSTALL VISOR HOLDER LH (See page IR-15)
15. INSTALL VISOR HOLDER RH (See page IR-15)
16. INSTALL LH VISOR ASSEMBLY (See page IR-15)
17. INSTALL RH VISOR ASSEMBLY (See page IR-16)
18. INSTALL ASSIST GRIP SUB-ASSEMBLY (See page IR-15)
19. INSTALL ASSIST GRIP COVER (See page IR-15)
20. INSTALL FRONT PILLAR GARNISH LH (See page IR-17)
21. INSTALL FRONT PILLAR GARNISH RH (See page IR-17)
22. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH
23. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH
24. INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-19)
25. INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH (See page IR-19)
26. INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-20)
27. INSTALL FRONT DOOR SCUFF PLATE RH (See page IR-20)
28. INSTALL INNER REAR VIEW MIRROR ASSEMBLY (See page MI-6)

29. CHECK FOR LEAKS AND REPAIR

(a) Conduct a leak test after the adhesive has completely hardened.

(b) Seal any leaks with auto glass sealer.

30. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

31. PERFORM INITIALIZATION

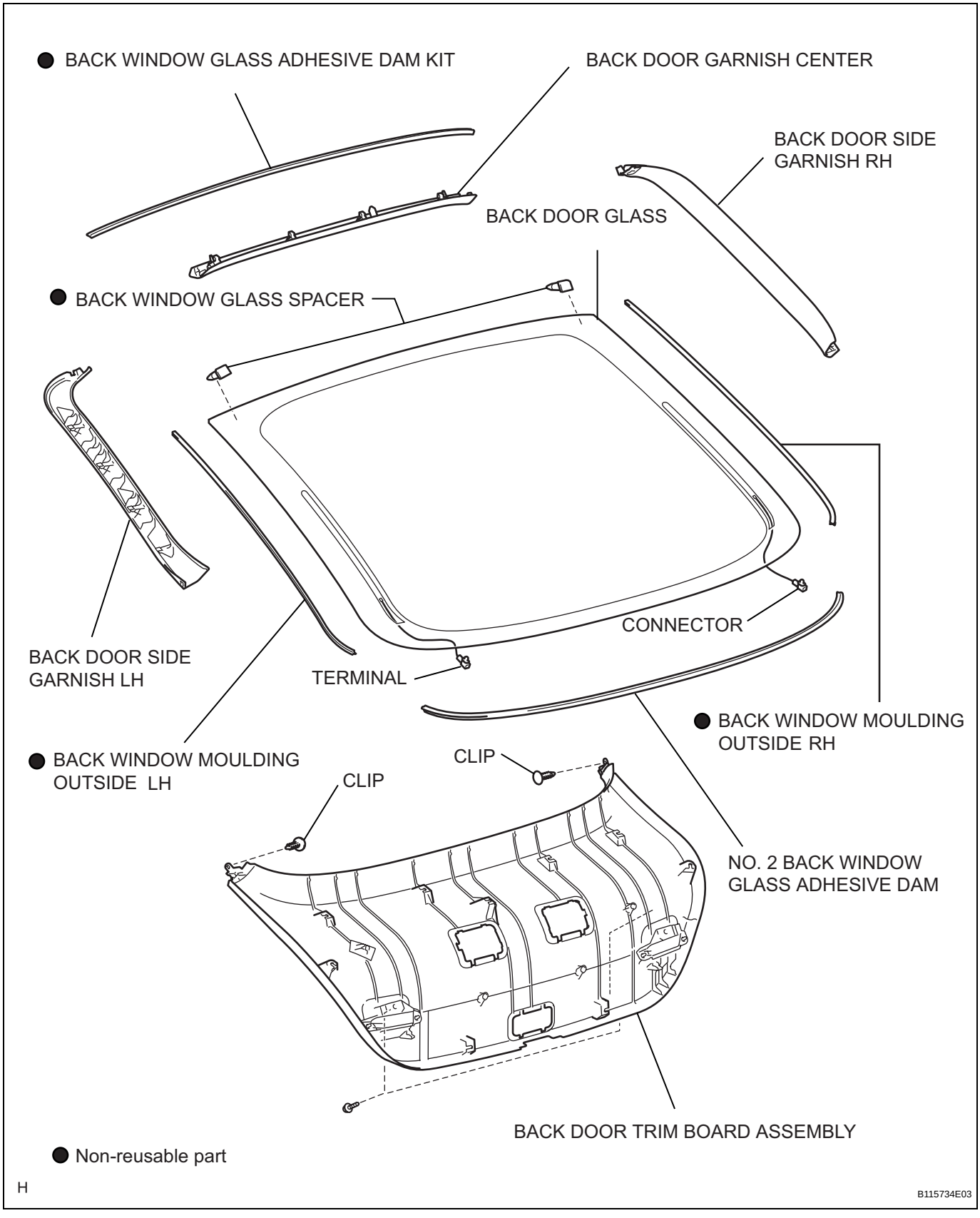
(a) Perform initialization (see page IN-23).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

BACK DOOR GLASS

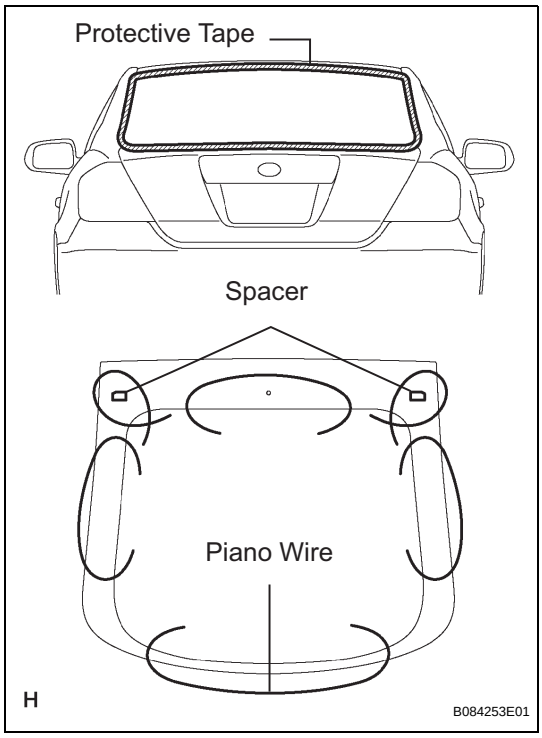
COMPONENTS



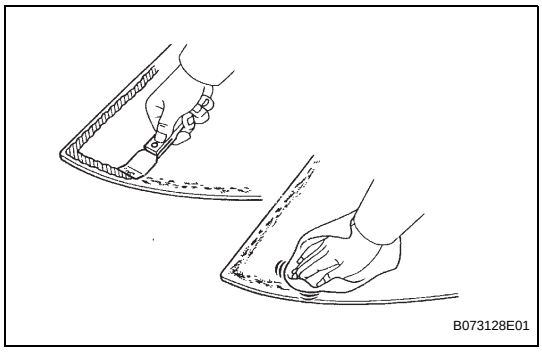
WS

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE BACK DOOR GARNISH CENTER**
3. **REMOVE BACK DOOR SIDE GARNISH LH**
4. **REMOVE BACK DOOR SIDE GARNISH RH**
5. **REMOVE BACK DOOR TRIM BOARD ASSEMBLY**
6. **REMOVE BACK DOOR GLASS**
   (a) Apply protective tape to the outer surface of the vehicle body to prevent scratches.
   (b) From the interior, insert piano wires between the vehicle body and back door glass as shown in the illustration.
   (c) Tie objects that can serve as handles (for example, wooden blocks) to all wire ends.
   NOTICE:
   When separating the back door glass from the vehicle, be careful not to damage the vehicle's paint or interior/exterior ornaments.
   (d) Cut through the adhesive by pulling the piano wire around the back door glass.
   NOTICE:
   Leave as much adhesive on the vehicle body as possible when removing the back door glass.
   (e) Using a suction cup, remove the back door glass.



7. **CLEAN BACK DOOR GLASS**
   (a) Using a scraper, remove the spacers, moulding and adhesive from the back door glass.
   (b) Clean the outer edge of the back door glass with white gasoline.
   NOTICE:
   - **Do not touch the back door glass surface after cleaning it.**
   - **Even if using new back door glass, clean the back door glass with white gasoline.**



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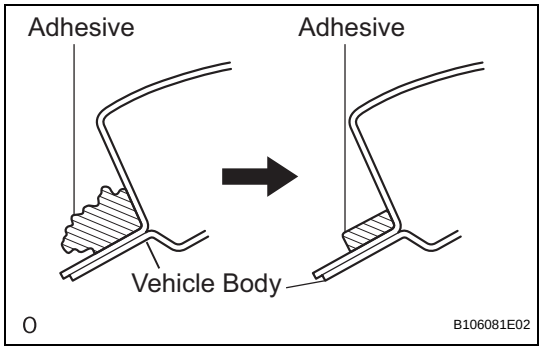


8. CLEAN VEHICLE BODY

(a) Clean and shape the contact surface of the vehicle body.

(1) On the contact surface of the vehicle body, use a knife to cut away excess adhesive as shown in the illustration.

HINT:

Leave as much adhesive on the vehicle body as possible.

NOTICE:

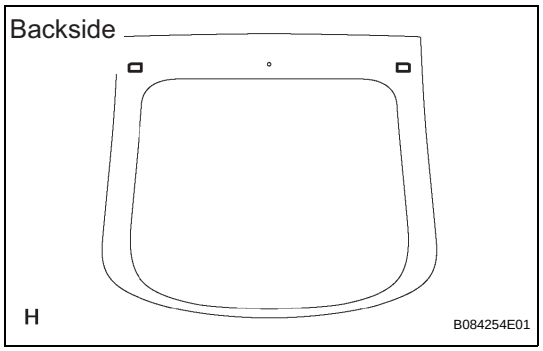
Be careful not to damage the vehicle body.

(2) Clean the contact surface of the vehicle body with cleaner.

HINT:

Even if all the adhesive has been removed, clean the vehicle body.

INSTALLATION



1. INSTALL BACK WINDOW GLASS SPACER

(a) Apply Primer G to the glass where the spacers will be installed.

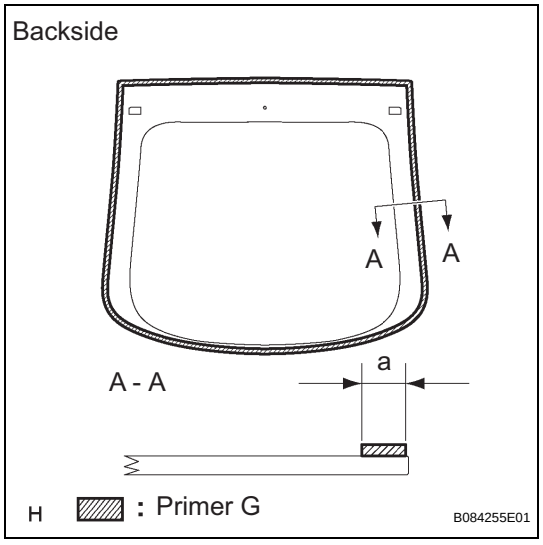
HINT:

If primer G is applied to an area other than that which is specified, wipe off the primer with white gasoline before it dries.

NOTICE:

- **Allow the primer to dry for 3 minutes or more.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

(b) Install 2 new spacers onto the back door glass as shown in the illustration.



2. INSTALL BACK WINDOW GLASS ADHESIVE DAM KIT

(a) Apply Primer G to the installation part of the back window glass adhesive dam kit.

Standard measurement

Area	Measurement
a	14.0 mm (0.551 in.)

HINT:

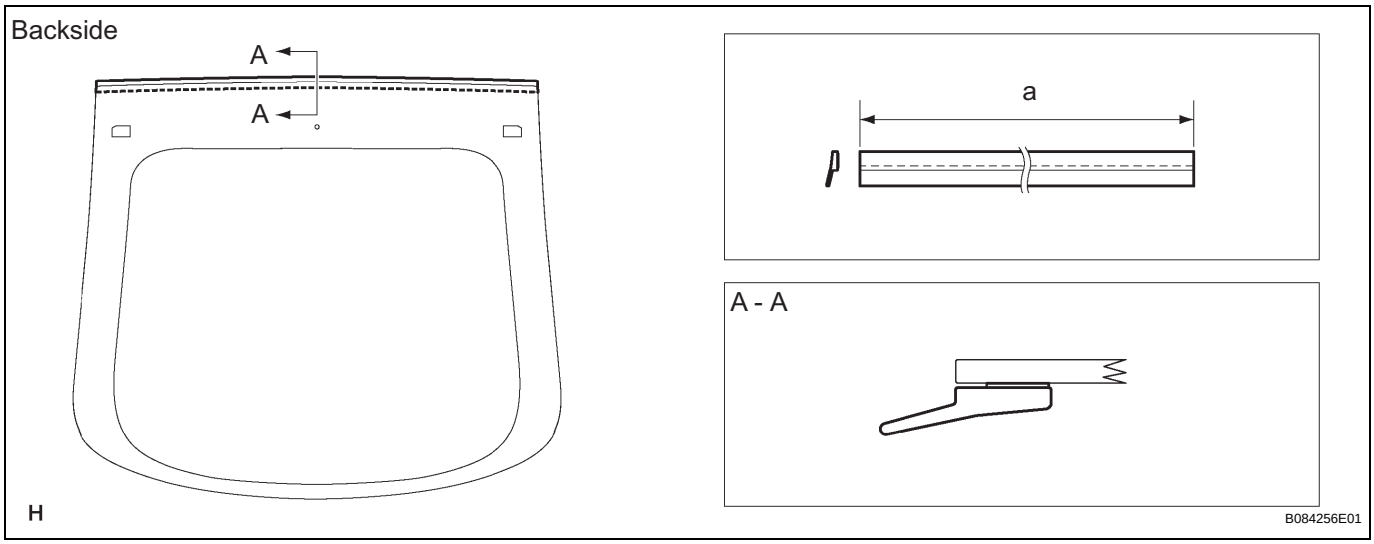
If primer G is applied to an area other than that which is specified, wipe off the primer with white gasoline before it dries.

NOTICE:

- **Allow the primer to dry for 3 minutes or more.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

WS

(b) Install the back window glass adhesive dam kit as shown in the illustration.



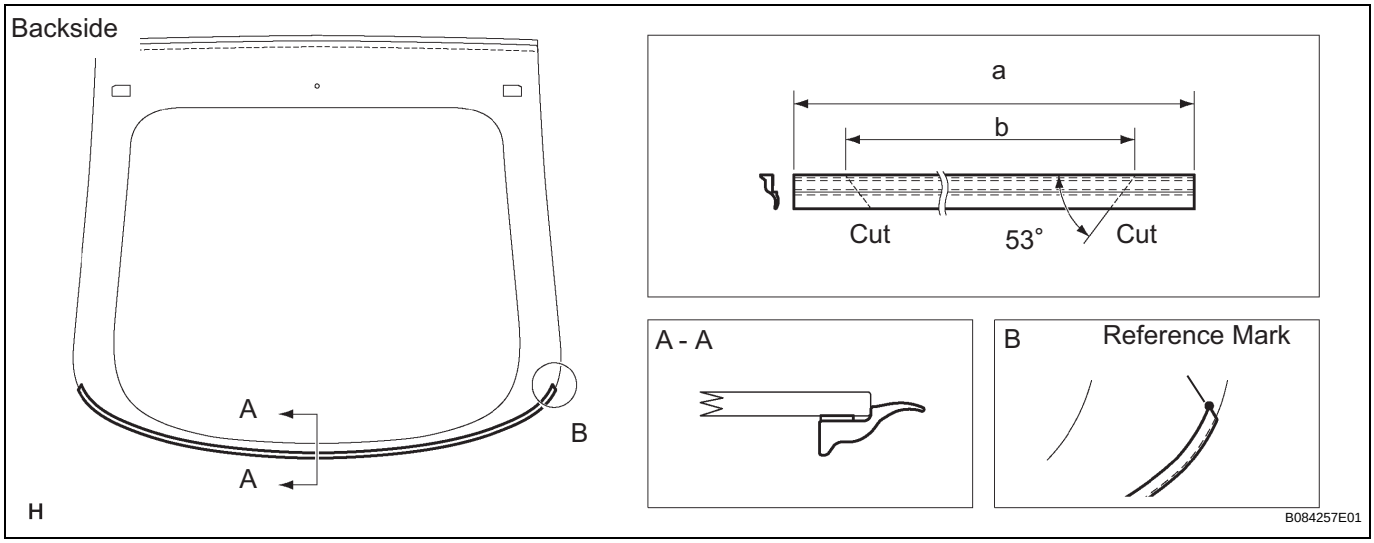
Standard measurement

Area	Measurement
a	1,090.0 mm (42.913 in.)

3. INSTALL NO. 2 BACK WINDOW GLASS ADHESIVE DAM

(a) Cut the No. 2 back window glass adhesive dam as shown in the illustration.

(b) Install the No. 2 back window glass adhesive dam as shown in the illustration.



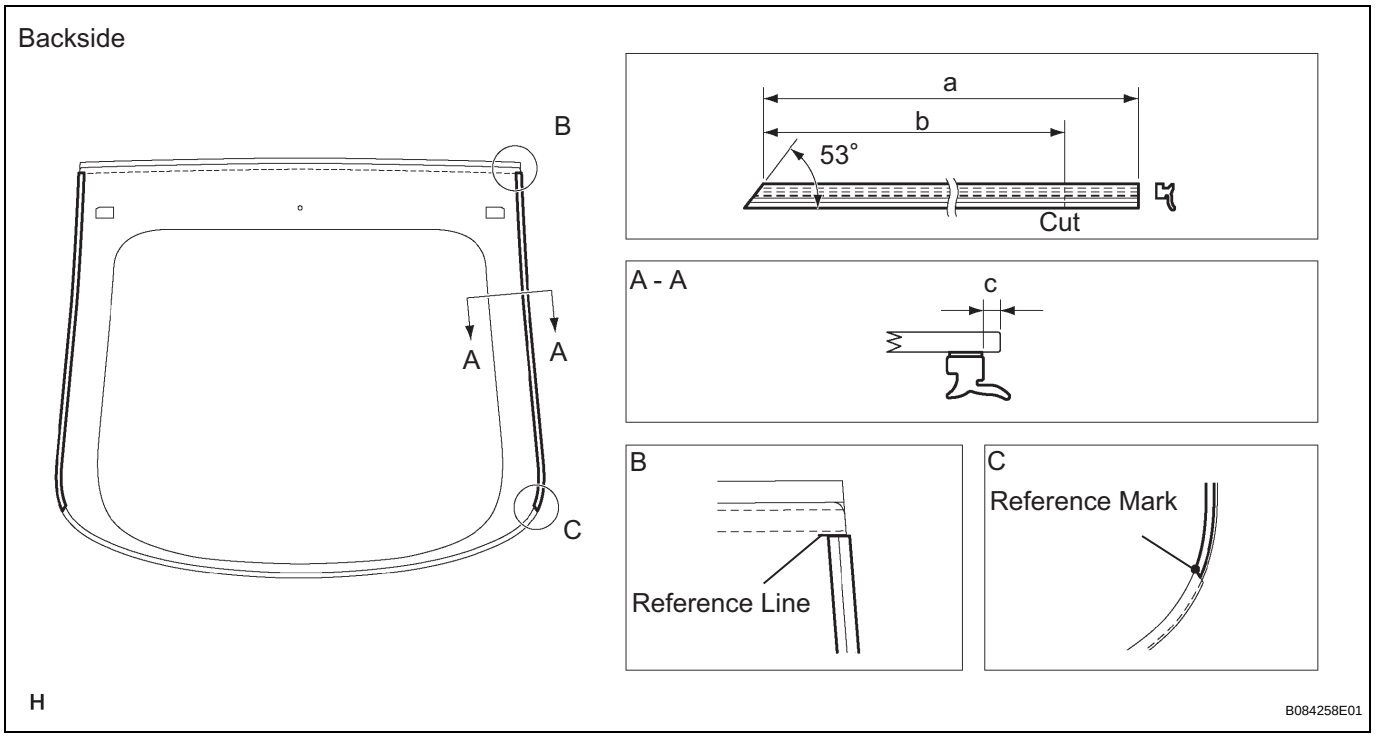
Standard measurement

Area	Measurement
a	1,320.0 mm (51.968 in.)
b	1,258.0 mm (49.527 in.)

4. INSTALL BACK WINDOW MOULDING OUTSIDE

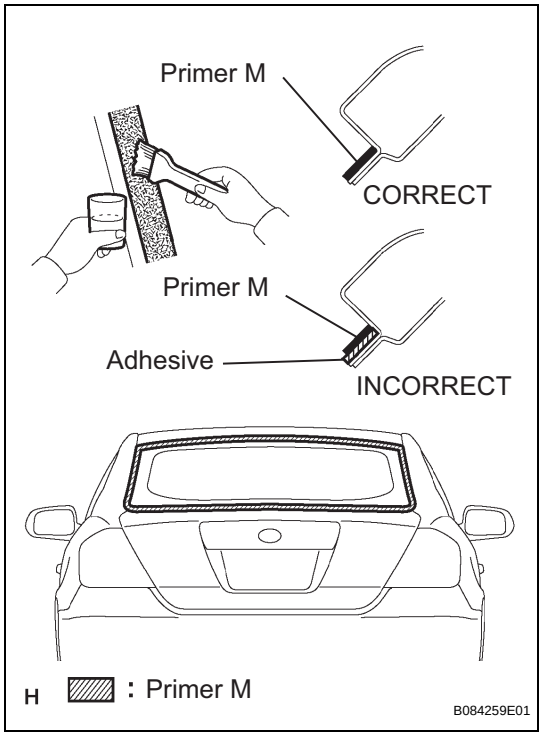
(a) Cut the back window outside moulding as shown in the illustration.

(b) Install the back window outside moulding LH and RH as shown in the illustration.



Standard measurement

Area	Measurement
a	853.0 mm (33.583 in.)
b	823.0 mm (32.402 in.)
c	2.3 mm (0.091 in.)



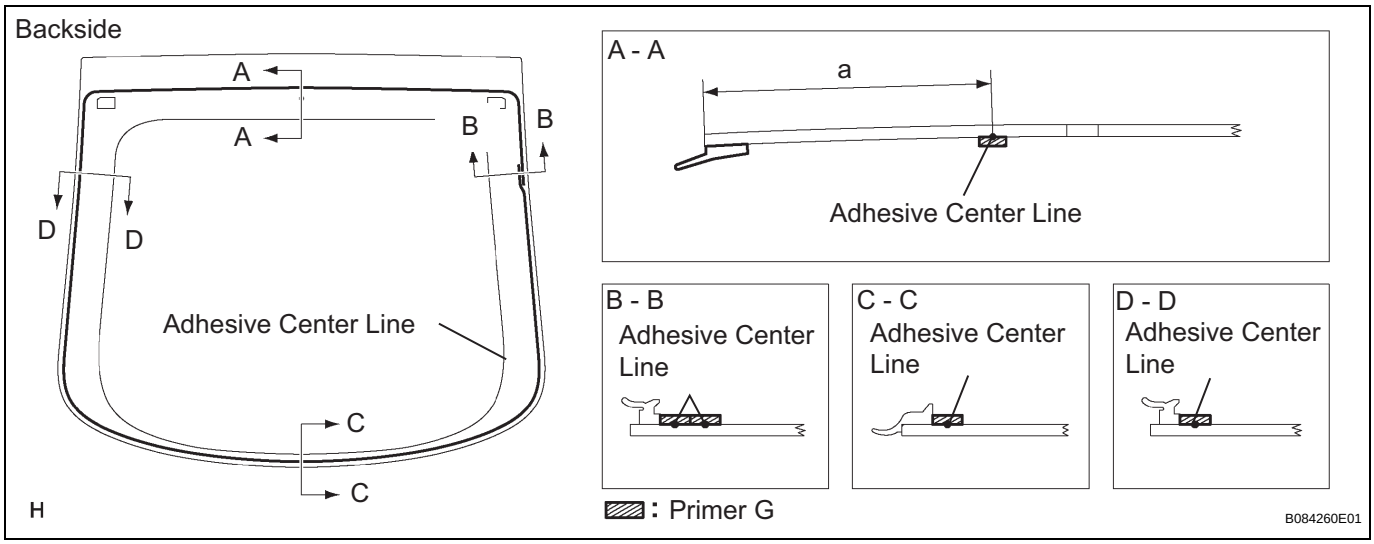
5. INSTALL BACK DOOR GLASS

(a) Using a brush or sponge, apply Primer M to the exposed part of the vehicle body.

NOTICE:

- **Allow the primer to dry for 3 minutes or more.**
- **Do not apply primer to the adhesive.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

(b) Using a brush or sponge, apply Primer G to the contact surface of the back door glass.



Standard measurement

Area	Measurement
a	85.6 mm (3.370 in.)

HINT:
If Primer G is applied to an area other than that which is specified, wipe off the primer with white gasoline before it dries.

NOTICE:

- **Allow the primer to dry for 3 minutes or more.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

(c) Apply adhesive to the back door glass.

Adhesive:

Part No. 08850-00801 or equivalent

(1) Cut off the tip of the cartridge nozzle as shown in the illustration on the following page.
HINT:
After cutting off the tip, use all adhesive within the time written in the table below.

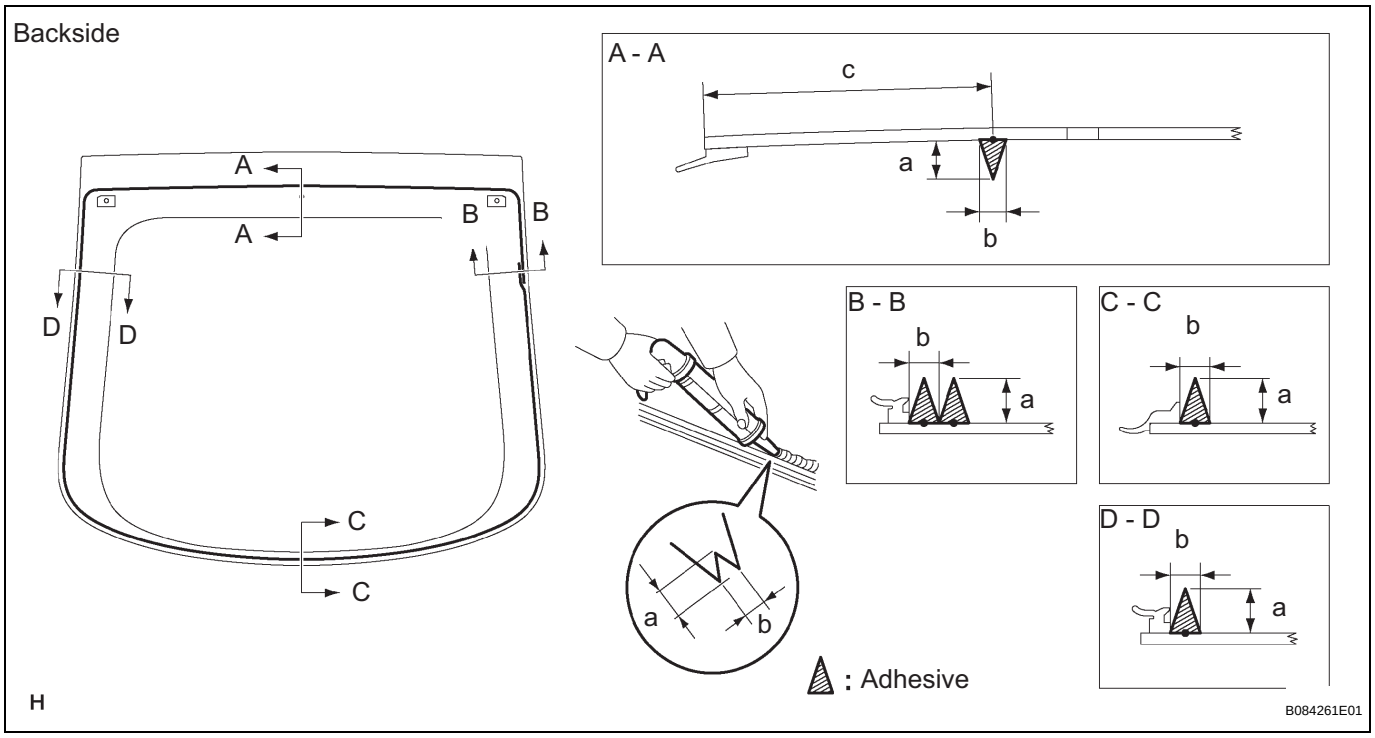
Usage time frame

Temperature	Usage Time Frame
35°C (95°F)	15 minutes
20°C (68°F)	1 hour 40 minutes
5°C (41°F)	8 hours

(2) Load the sealer gun with the cartridge.

WS

(3) Apply adhesive to the back door glass as shown in the illustration.



Standard measurement

Area	Measurement
a	12.0 mm (0.472 in.)
b	8.0 mm (0.315 in.)
c	85.6 mm (3.370 in.)

(d) Install the back door glass to the vehicle body.

(1) Lightly press the front surface of the back door glass to ensure that the back door glass is securely fit to the vehicle body.

NOTICE:

- **Check that the spacers are attached to the vehicle body correctly.**
- **Check that the vehicle body and back door glass have a small gap between them.**

(2) Hold the back door glass in place securely with protective tape or equivalent until the adhesive hardens.

NOTICE:

Do not drive the vehicle for the amount of time written in the table below.

Minimum time

Temperature	Minimum time prior to driving vehicle
35°C (95°F)	1 hour 30 minutes
20°C (68°F)	5 hours
5°C (41°F)	24 hours

WS

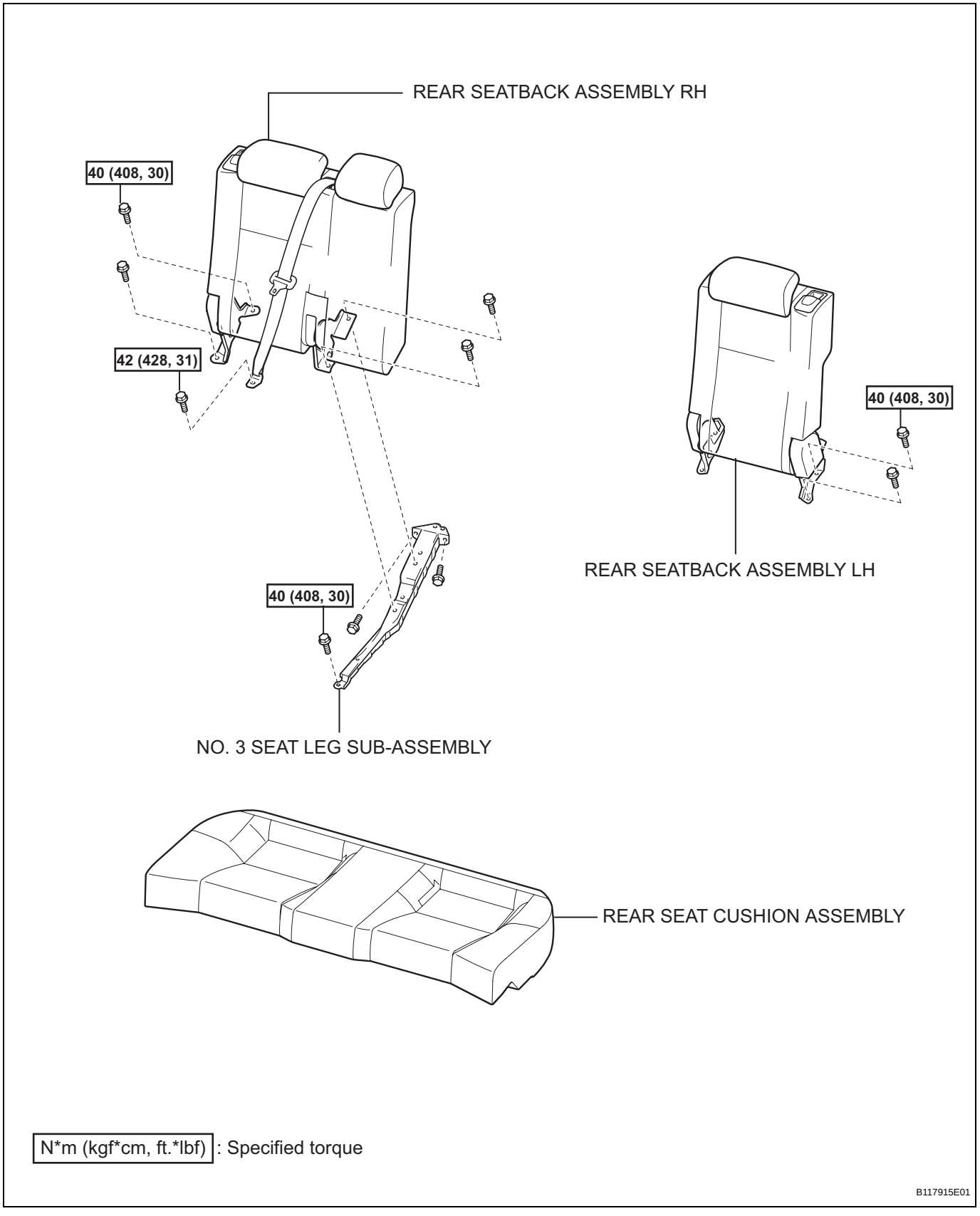
6. **CHECK FOR LEAKS AND REPAIR**
   (a) Conduct a leak test after the adhesive has completely hardened.
   (b) Seal any leaks with auto glass sealer.

7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

8. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

ROOF WINDOW FIX GLASS

COMPONENTS



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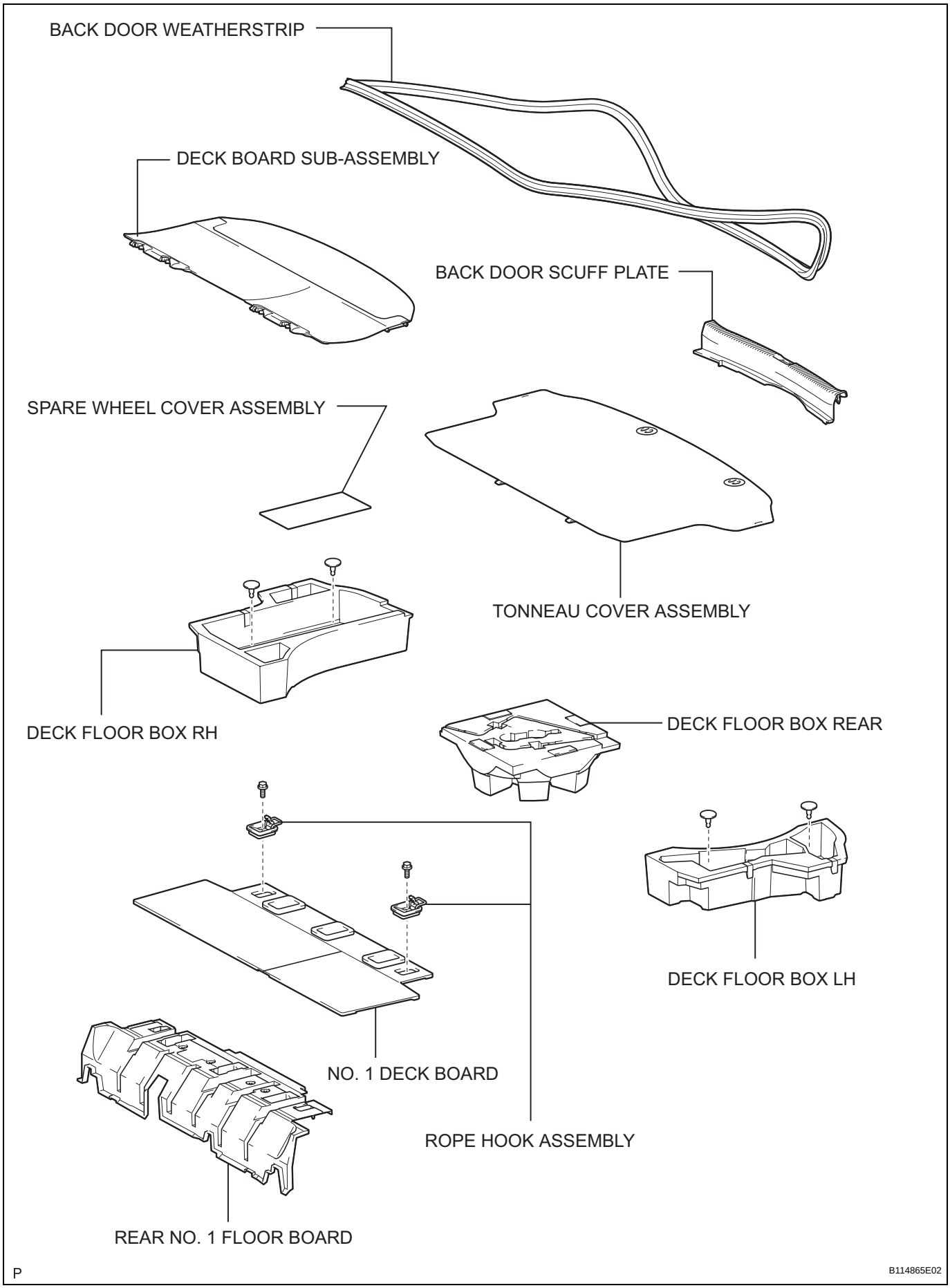
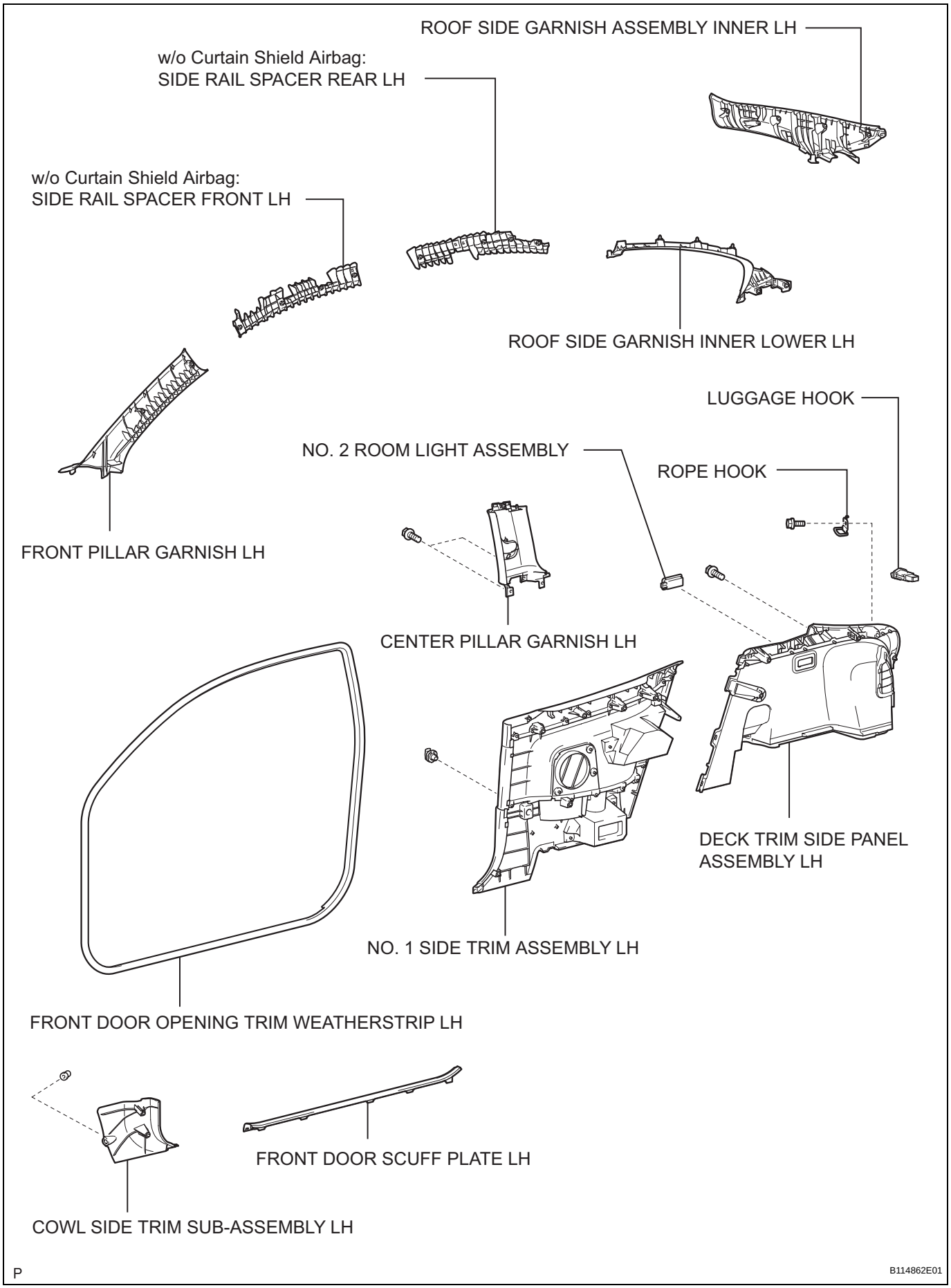
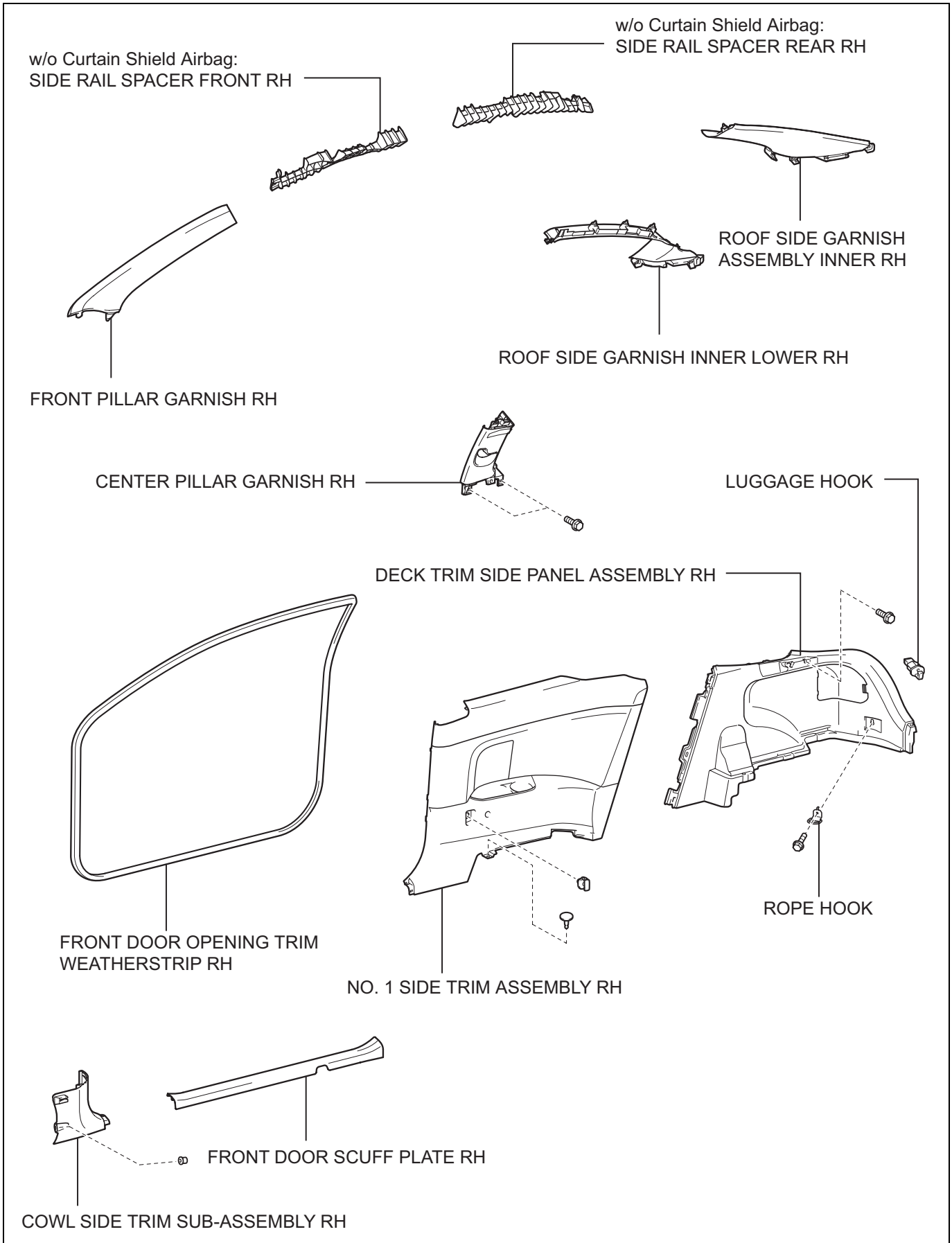

BACK DOOR WEATHERSTRIP
DECK BOARD SUB-ASSEMBLY
BACK DOOR SCUFF PLATE
SPARE WHEEL COVER ASSEMBLY
TONNEAU COVER ASSEMBLY
DECK FLOOR BOX RH
DECK FLOOR BOX REAR
DECK FLOOR BOX LH
NO. 1 DECK BOARD
ROPE HOOK ASSEMBLY
REAR NO. 1 FLOOR BOARD
P
B114865E02

WS


ROOF SIDE GARNISH ASSEMBLY INNER LH
w/o Curtain Shield Airbag:
SIDE RAIL SPACER REAR LH
w/o Curtain Shield Airbag:
SIDE RAIL SPACER FRONT LH
ROOF SIDE GARNISH INNER LOWER LH
LUGGAGE HOOK
NO. 2 ROOM LIGHT ASSEMBLY
ROPE HOOK
FRONT PILLAR GARNISH LH
CENTER PILLAR GARNISH LH
DECK TRIM SIDE PANEL
ASSEMBLY LH
NO. 1 SIDE TRIM ASSEMBLY LH
FRONT DOOR OPENING TRIM WEATHERSTRIP LH
FRONT DOOR SCUFF PLATE LH
COWL SIDE TRIM SUB-ASSEMBLY LH
P
B114862E01

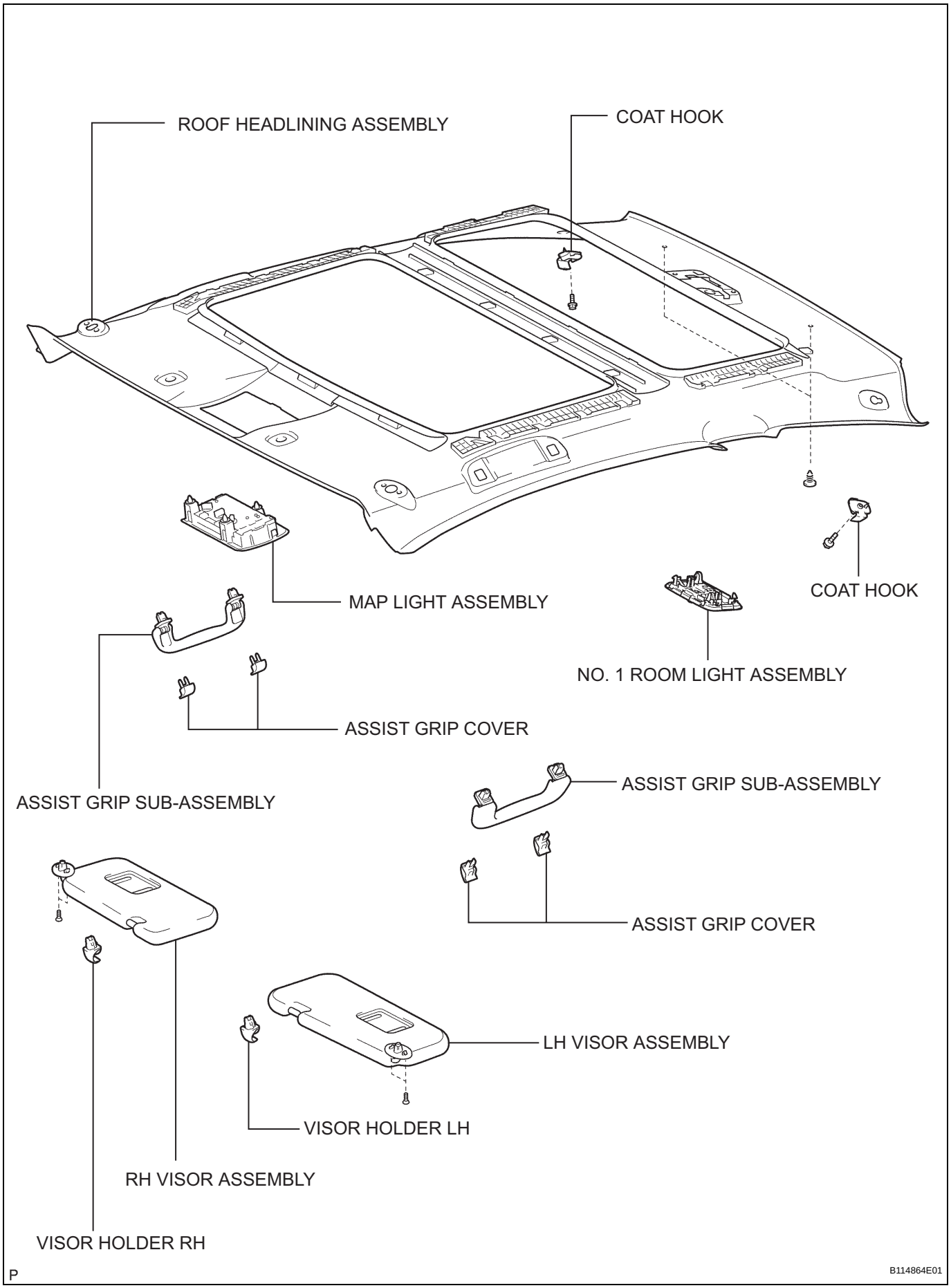
WS



WS

P

B114863E01


ROOF HEADLINING ASSEMBLY
COAT HOOK
MAP LIGHT ASSEMBLY
COAT HOOK
NO. 1 ROOM LIGHT ASSEMBLY
ASSIST GRIP COVER
ASSIST GRIP SUB-ASSEMBLY
ASSIST GRIP SUB-ASSEMBLY
ASSIST GRIP COVER
LH VISOR ASSEMBLY
VISOR HOLDER LH
RH VISOR ASSEMBLY
VISOR HOLDER RH
P
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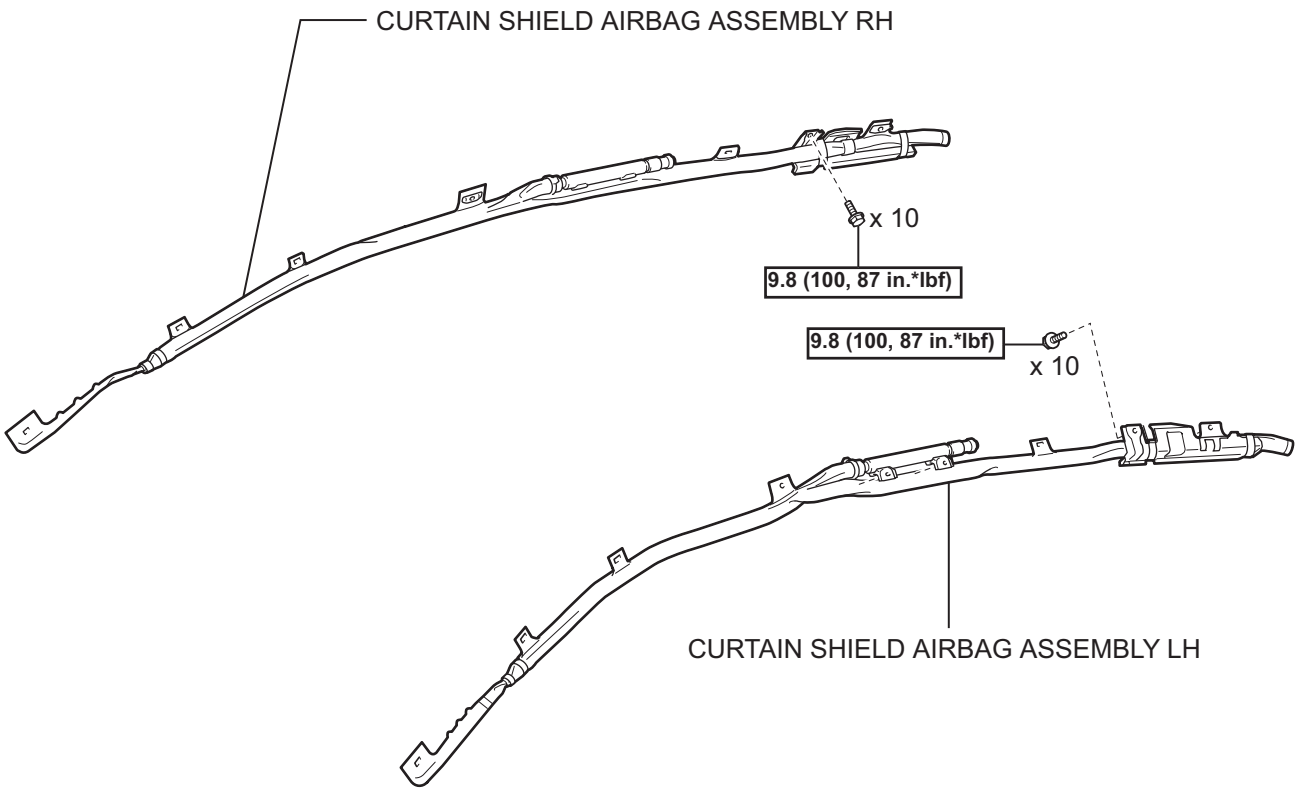
WS

with Curtain Shield Airbag:



N*m (kgf*cm, ft.*lbf): Specified torque

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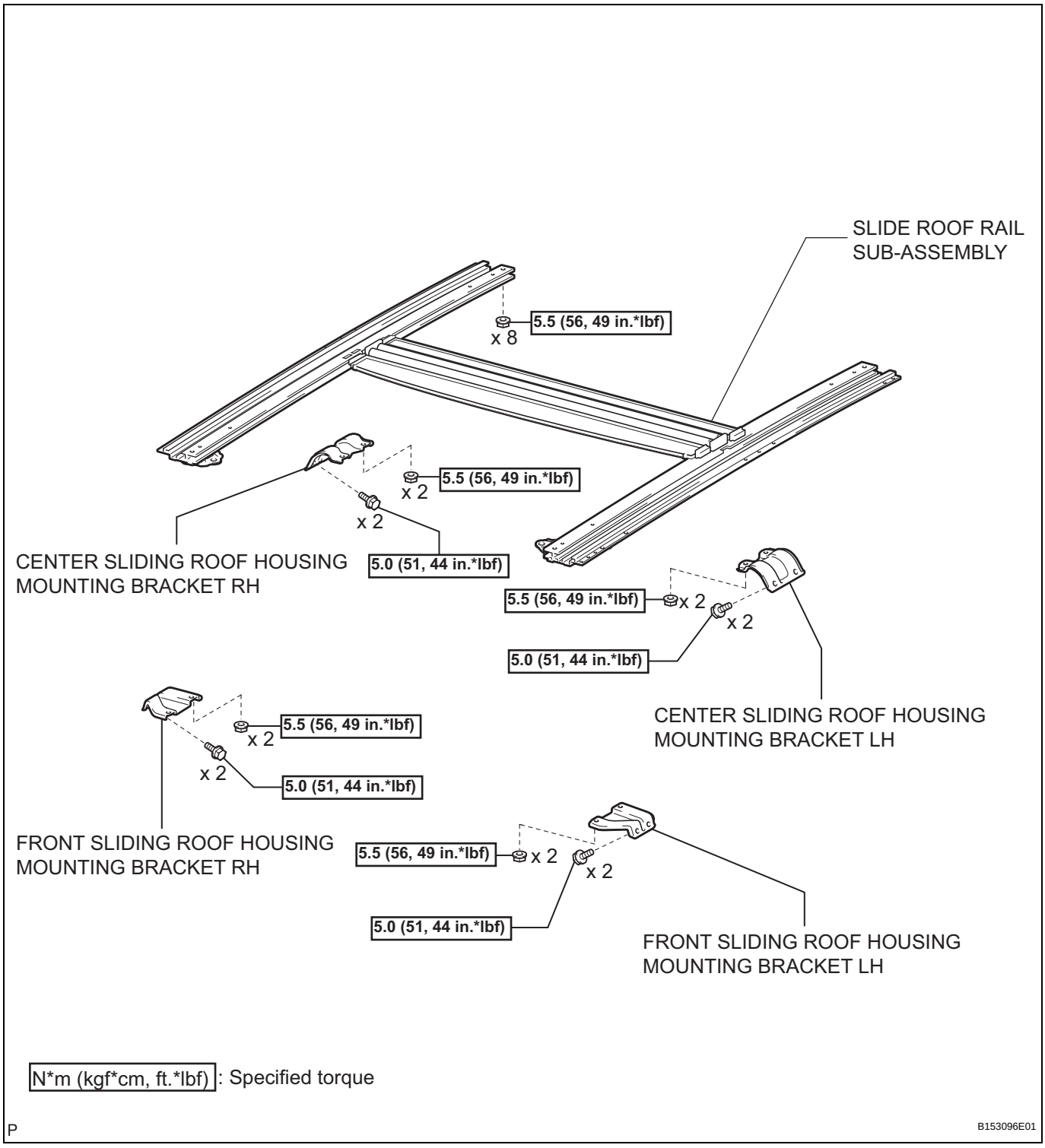
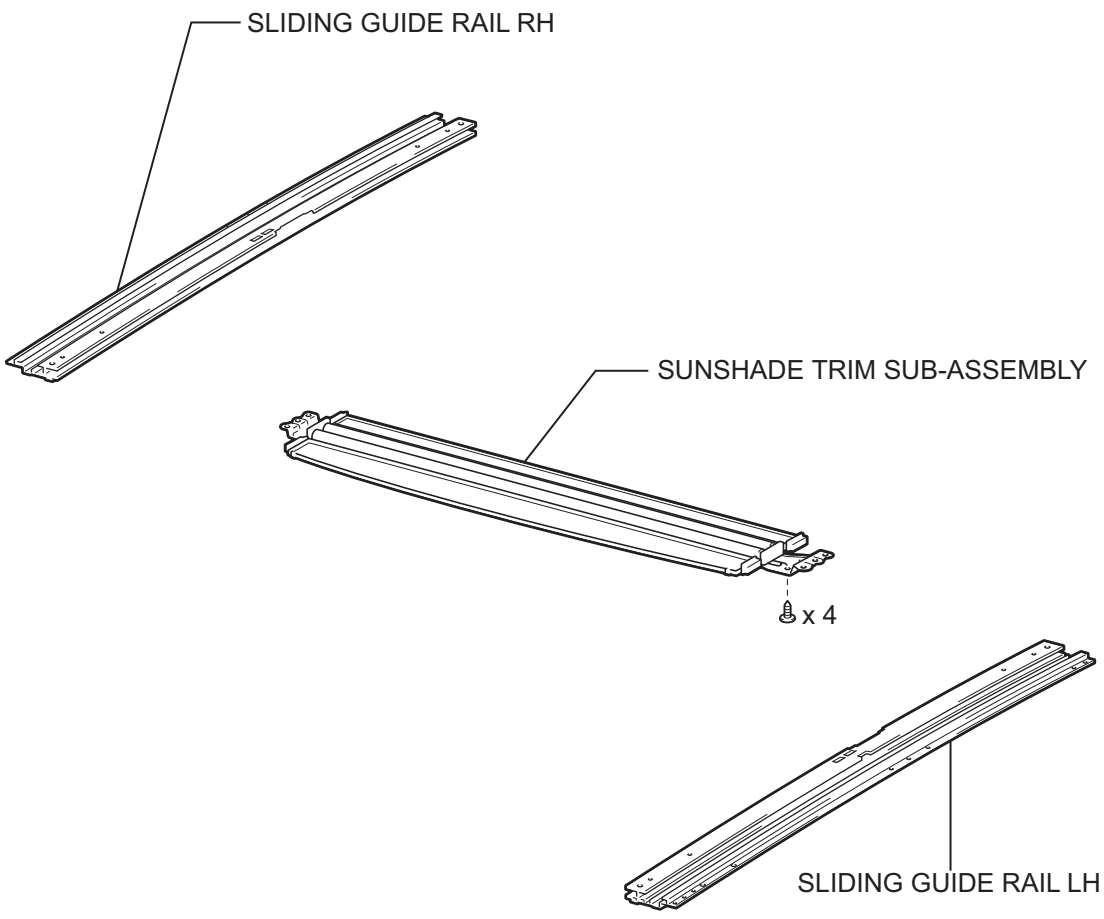
WS


SLIDE ROOF RAIL SUB-ASSEMBLY
5.5 (56, 49 in.*lbf)
x 8
5.5 (56, 49 in.*lbf)
x 2
x 2
5.0 (51, 44 in.*lbf)
CENTER SLIDING ROOF HOUSING MOUNTING BRACKET RH
5.5 (56, 49 in.*lbf)
x 2
x 2
5.0 (51, 44 in.*lbf)
CENTER SLIDING ROOF HOUSING MOUNTING BRACKET LH
5.5 (56, 49 in.*lbf)
x 2
x 2
5.0 (51, 44 in.*lbf)
FRONT SLIDING ROOF HOUSING MOUNTING BRACKET RH
5.5 (56, 49 in.*lbf)
x 2
x 2
5.0 (51, 44 in.*lbf)
FRONT SLIDING ROOF HOUSING MOUNTING BRACKET LH
N*m (kgf*cm, ft.*lbf): Specified torque
P
B153096E01

WS



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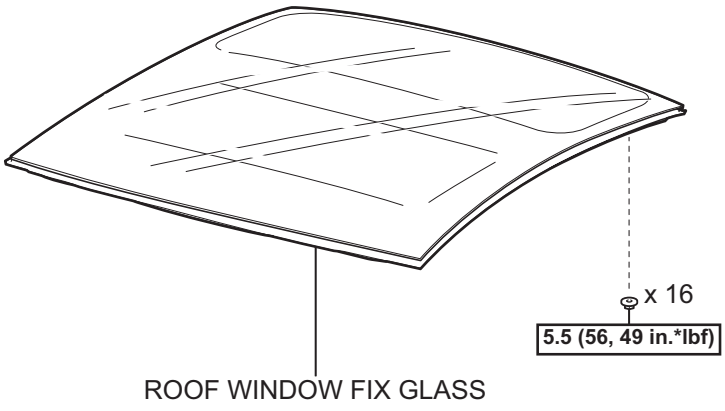


N*m (kgf*cm, ft.*lbf): Specified torque

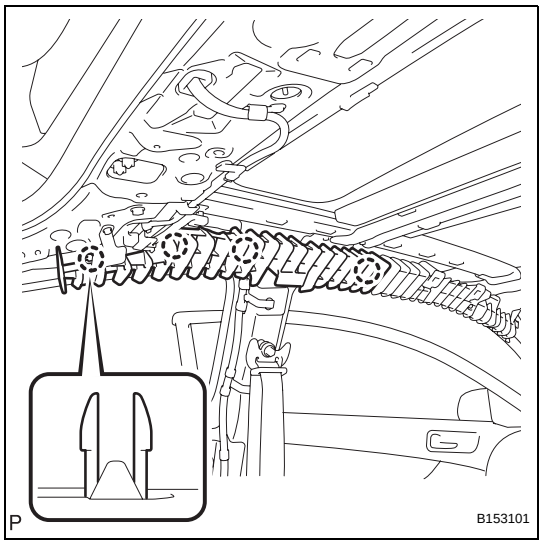
P

B153116E01

REMOVAL

1. DISCONNECT BATTERY NEGATIVE TERMINAL
   NOTICE:
   Wait for 90 seconds after disconnecting the terminal to prevent the airbag from deploying. (See page RS-1)
2. REMOVE TONNEAU COVER ASSEMBLY
3. REMOVE DECK BOARD SUB-ASSEMBLY
4. REMOVE BACK DOOR SCUFF PLATE (See page IR-8)
5. REMOVE BACK DOOR WEATHERSTRIP
6. REMOVE SPARE WHEEL COVER ASSEMBLY
7. REMOVE DECK FLOOR BOX LH (See page IR-8)
8. REMOVE DECK FLOOR BOX RH (See page IR-8)
9. REMOVE DECK FLOOR BOX REAR
10. REMOVE NO. 1 DECK BOARD (See page IR-8)
11. REMOVE REAR NO. 1 FLOOR BOARD (See page IR-9)
12. REMOVE FRONT DOOR SCUFF PLATE OUTSIDE LH (See page IR-9)
13. REMOVE FRONT DOOR SCUFF PLATE OUTSIDE RH (See page IR-9)
14. REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-9)
15. REMOVE FRONT DOOR SCUFF PLATE RH (See page IR-9)
16. REMOVE COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-9)
17. REMOVE COWL SIDE TRIM SUB-ASSEMBLY RH (See page IR-9)
18. REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)
19. REMOVE REAR SEATBACK ASSEMBLY LH (See page SE-17)
20. REMOVE REAR SEATBACK ASSEMBLY RH (See page SE-18)
21. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP LH
22. REMOVE FRONT DOOR OPENING TRIM WEATHERSTRIP RH
23. REMOVE NO. 1 SIDE TRIM ASSEMBLY LH (See page IR-10)

24. REMOVE NO. 1 SIDE TRIM ASSEMBLY RH (See page IR-10)
25. REMOVE CENTER PILLAR GARNISH LH (See page IR-10)
26. REMOVE CENTER PILLAR GARNISH RH (See page IR-10)
27. REMOVE ROOF SIDE GARNISH INNER LOWER LH (See page IR-10)
28. REMOVE ROOF SIDE GARNISH INNER LOWER RH (See page IR-10)
29. REMOVE DECK TRIM SIDE PANEL ASSEMBLY LH (See page IR-11)
30. REMOVE DECK TRIM SIDE PANEL ASSEMBLY RH (See page IR-11)
31. REMOVE ROOF SIDE GARNISH ASSEMBLY INNER LH (See page IR-11)
32. REMOVE ROOF SIDE GARNISH ASSEMBLY INNER RH (See page IR-11)
33. REMOVE FRONT PILLAR GARNISH LH (See page IR-12)
34. REMOVE FRONT PILLAR GARNISH RH (See page IR-12)
35. REMOVE MAP LIGHT ASSEMBLY (See page IR-12)
36. REMOVE NO. 1 ROOM LIGHT ASSEMBLY (See page IR-13)
37. REMOVE NO. 2 ROOM LIGHT ASSEMBLY (See page IR-13)
38. REMOVE LH VISOR ASSEMBLY (See page IR-13)
39. REMOVE RH VISOR ASSEMBLY (See page IR-13)
40. REMOVE VISOR HOLDER LH (See page IR-13)
41. REMOVE VISOR HOLDER RH (See page IR-13)
42. REMOVE ASSIST GRIP COVER (See page IR-13)
43. REMOVE ASSIST GRIP SUB-ASSEMBLY (See page IR-14)
44. REMOVE COAT HOOK (See page IR-14)
45. REMOVE ROOF HEADLINING ASSEMBLY (See page IR-14)

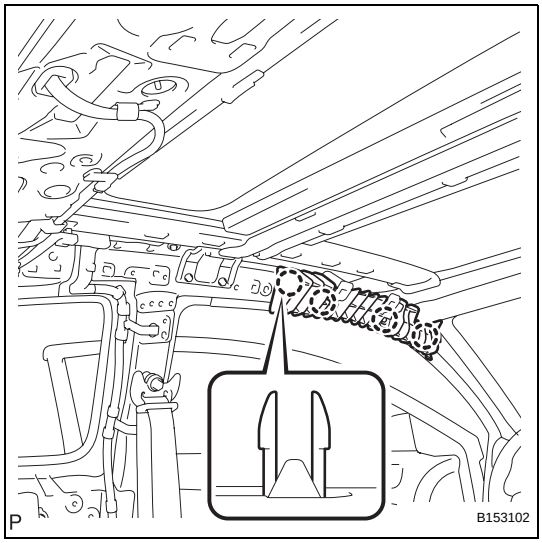


46. REMOVE SIDE RAIL SPACER REAR LH (w/o Curtain Shield Airbag)

(a) Disengage the 4 claws and remove the rear side rail spacer LH.

47. REMOVE SIDE RAIL SPACER REAR RH (w/o Curtain Shield Airbag)

HINT:
Use the same procedure for the RH side and the LH side.



48. REMOVE SIDE RAIL SPACER FRONT LH (w/o Curtain Shield Airbag)

(a) Disengage the 4 claws and remove the side rail spacer front LH

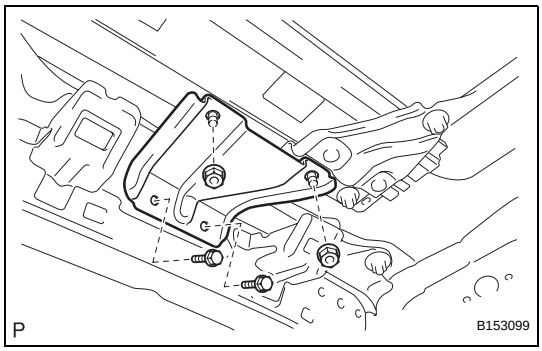
49. REMOVE SIDE RAIL SPACER FRONT RH (w/o Curtain Shield Airbag)

HINT:
Use the same procedure for the RH side and the LH side.

50. REMOVE CURTAIN SHIELD AIRBAG ASSEMBLY LH (w/ Curtain Shield Airbag) (See page RS-376)

51. REMOVE CURTAIN SHIELD AIRBAG ASSEMBLY RH (w/ Curtain Shield Airbag)

HINT:
Use the same procedure for the RH side and the LH side.



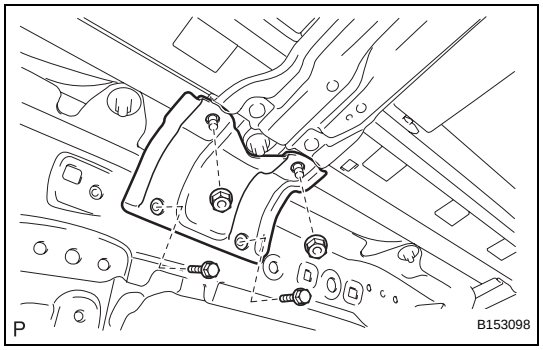
52. REMOVE FRONT SLIDING ROOF HOUSING MOUNTING BRACKET LH

(a) Remove the 2 bolts, 2 nuts, and front sliding roof housing mounting bracket LH.

53. REMOVE FRONT SLIDING ROOF HOUSING MOUNTING BRACKET RH

HINT:
Use the same procedure for the RH side and the LH side.

WS



54. REMOVE CENTER SLIDING ROOF HOUSING MOUNTING BRACKET LH

(a) Remove the 2 bolts, 2 nuts, and center sliding roof housing mounting bracket LH.

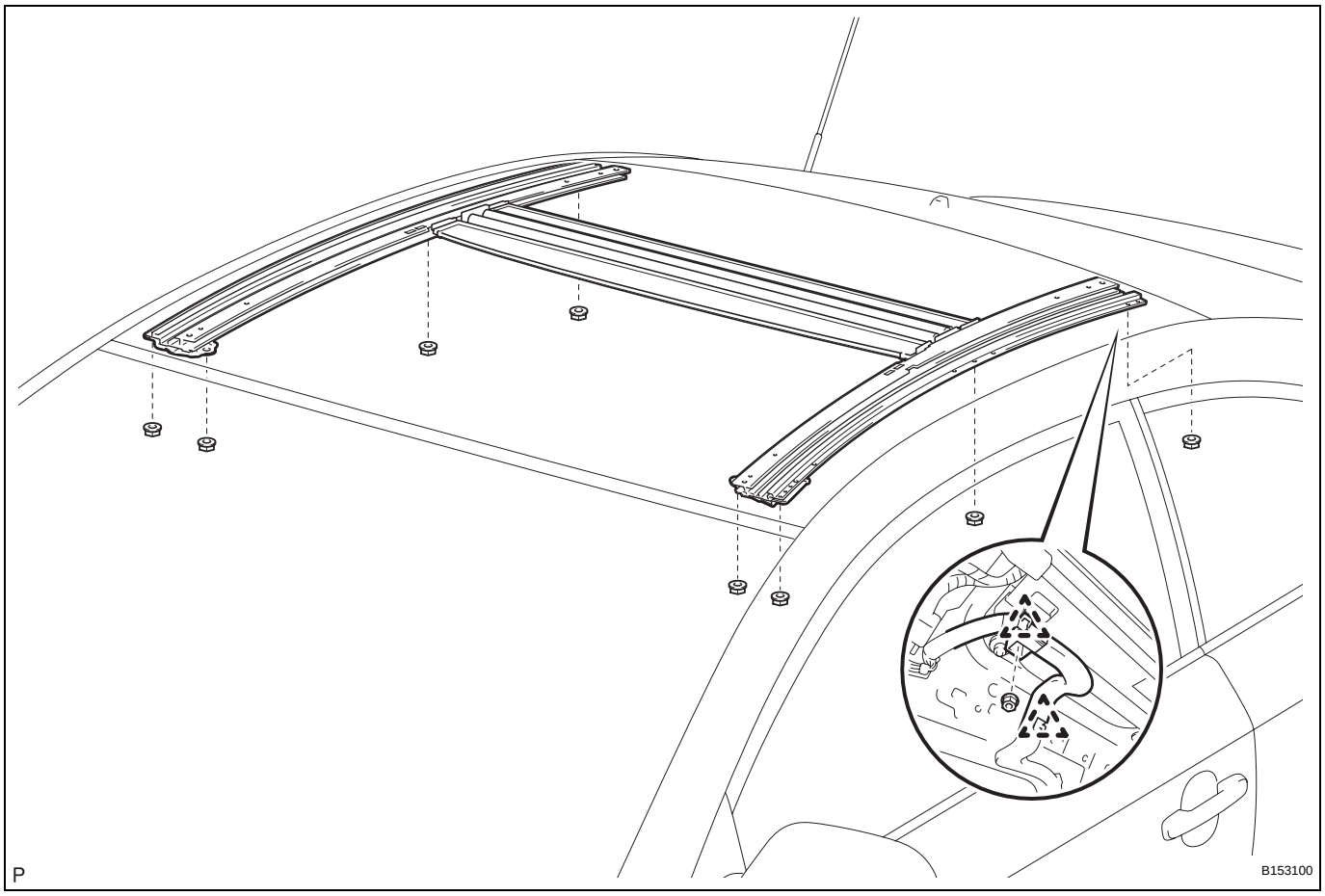
55. REMOVE CENTER SLIDING ROOF HOUSING MOUNTING BRACKET RH

HINT:

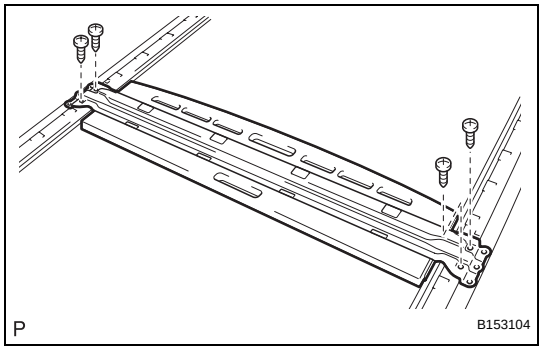
Use the same procedure for the RH side and the LH side.

56. REMOVE SLIDE ROOF RAIL SUB-ASSEMBLY

(a) Remove the 2 clamps.



(b) Remove the 8 nuts and slide roof rail sub-assembly.

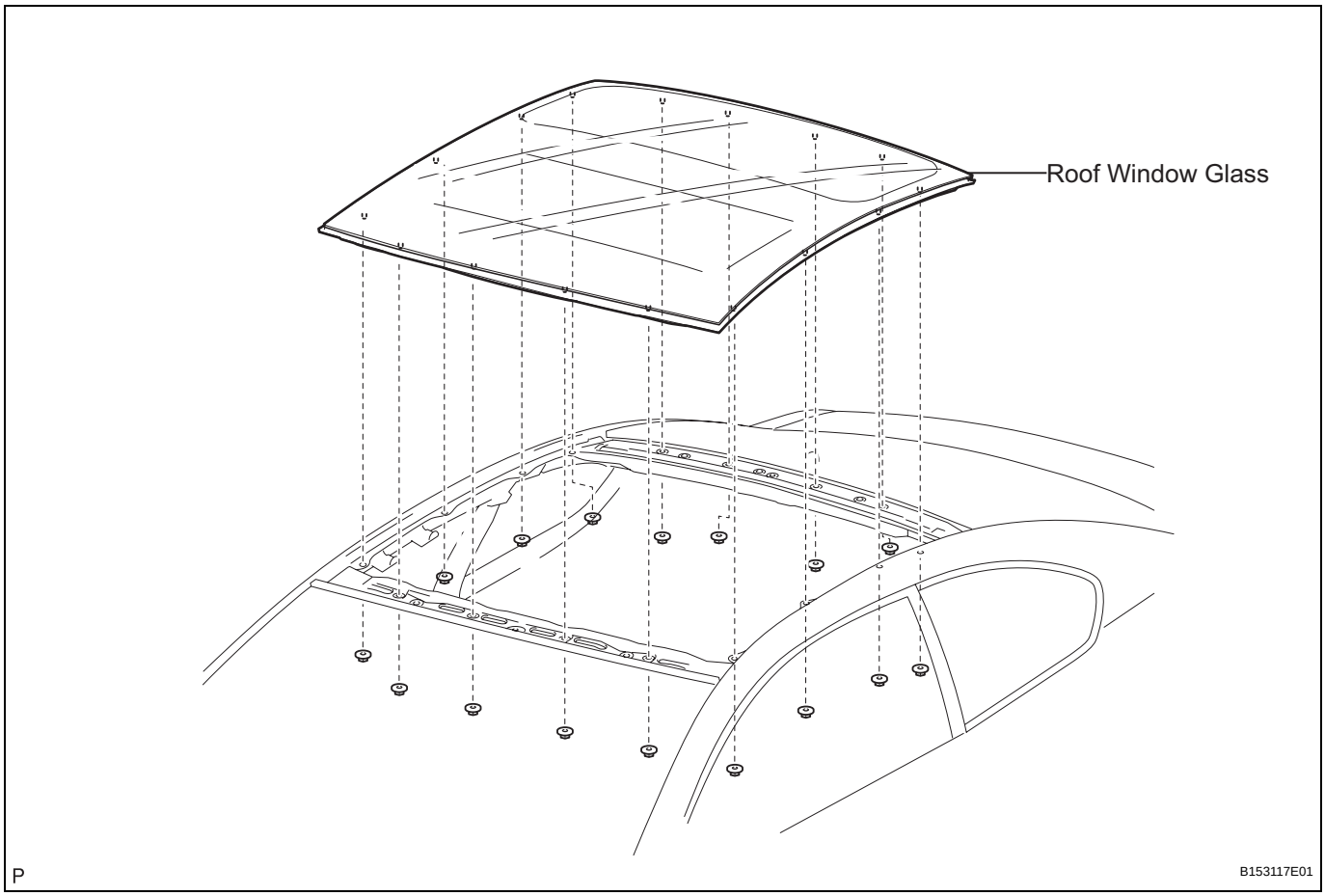


57. REMOVE SUNSHADE TRIM SUB-ASSEMBLY

(a) Remove the 4 screws and sunshade trim sub-assembly.

58. REMOVE ROOF WINDOW FIX GLASS

(a) Remove the 16 nuts and roof window fix glass.

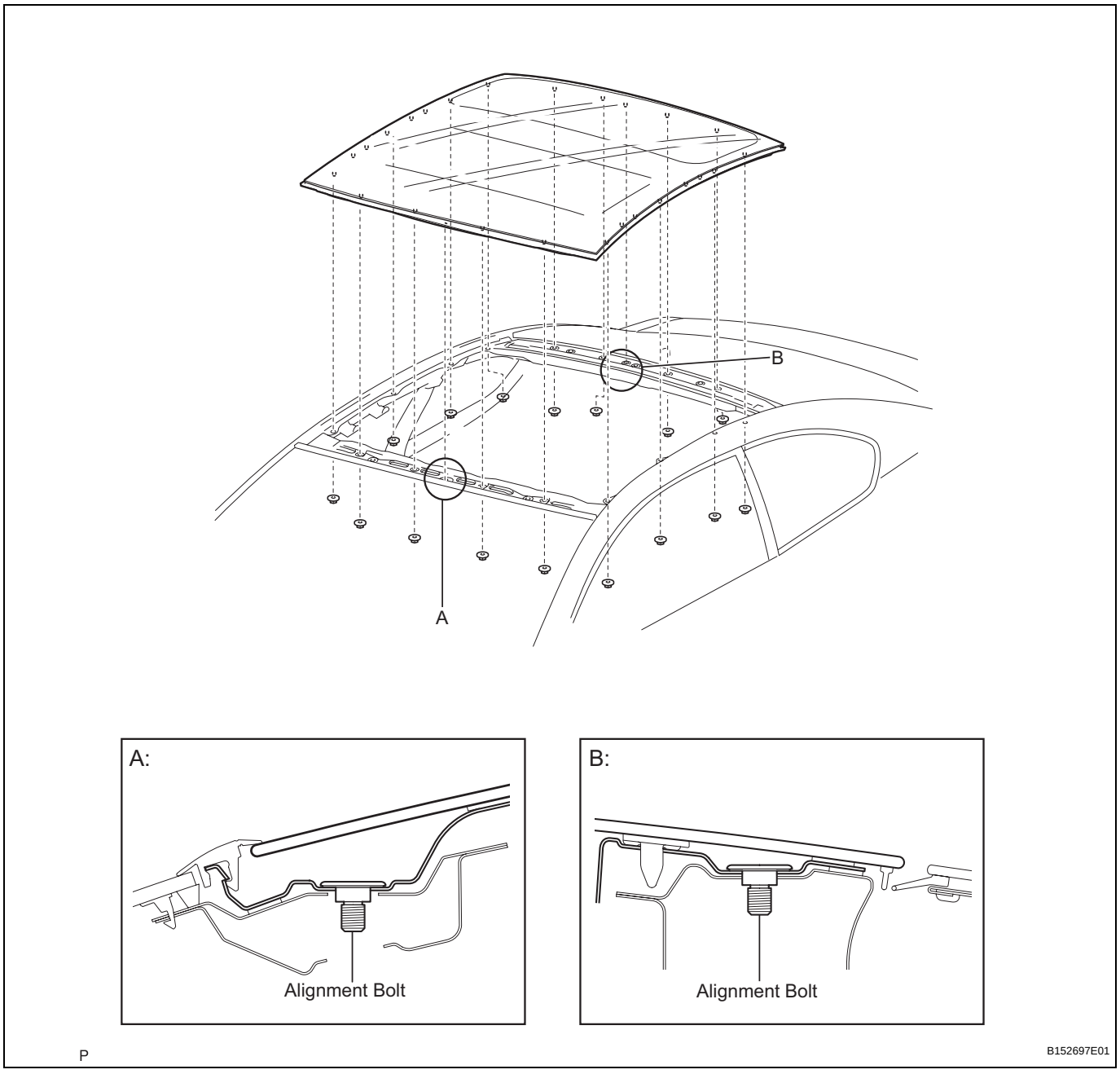


NOTICE:
When removing the panel, be careful not to damage the vehicle. Performing this step will require 2 or more technicians.

INSTALLATION

1. TEMPORARILY TIGHTEN ROOF WINDOW FIX GLASS

(a) Temporarily install the roof window fix glass with the 16 nuts.



NOTICE:

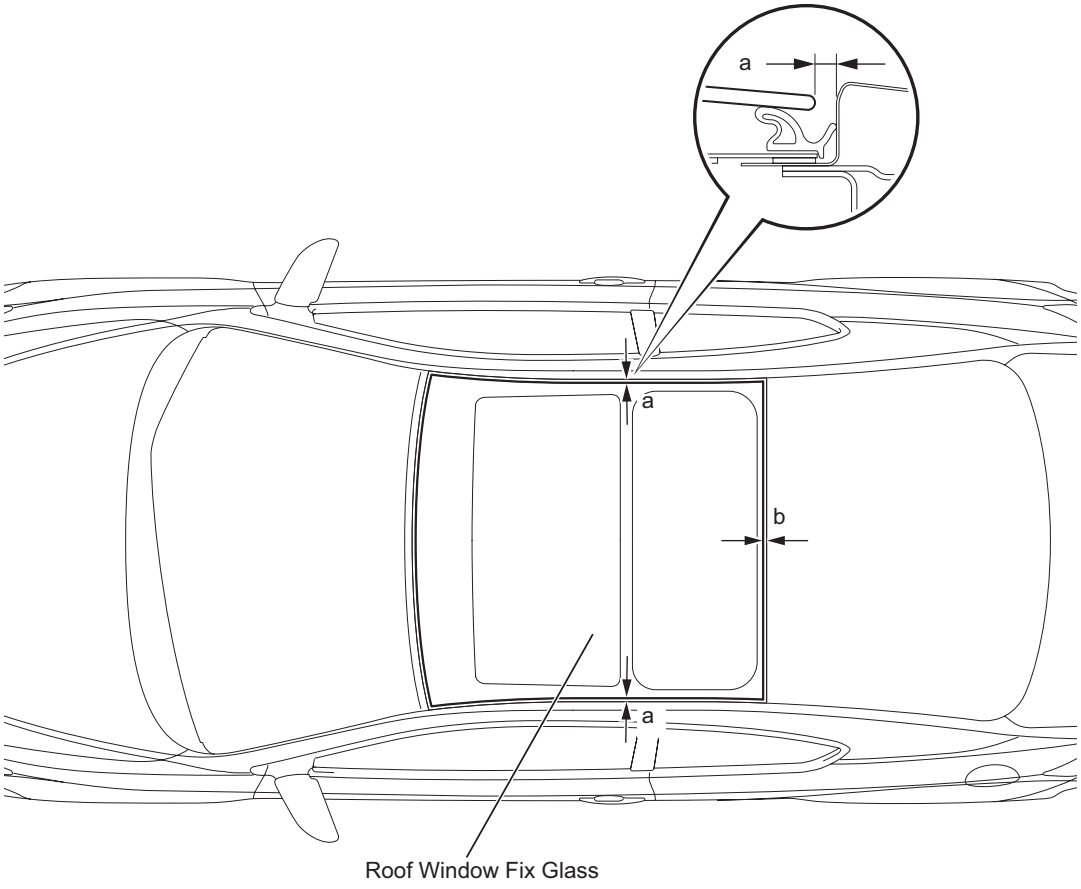
- **When installing the panel to the vehicle, first install the panel center front and center rear alignment bolts to the vehicle, as shown in the illustration.**
- **When installing the panel, be careful not to damage the vehicle.**
- **Performing this step will require 2 or more technicians.**

WS

(b) Check that the alignment bolts are firmly installed.
NOTICE:
When the bolts are not firmly installed, water will leak, causing malfunctions.

2. ADJUST ROOF WINDOW FIX GLASS

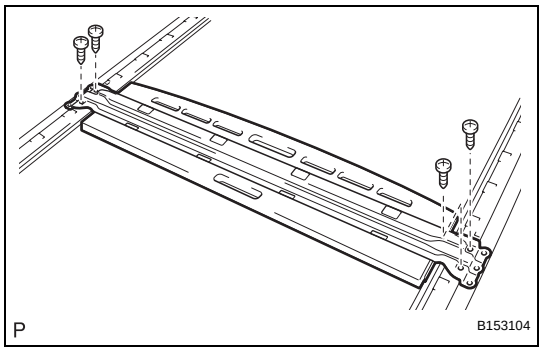
(a) The roof window fix glass does not have adjusting screws. Instead, adjust the position of the roof window glass within the measurement range shown in the illustration and table.



Standard

Area	Measurement range
a	6.0 mm + 1.5 mm (0.244 in. + 0.059 in.) 6.0 mm - 1.5 mm (0.244 in. - 0.059 in.)
b	7.0 mm + 2.0 mm (0.276 in. + 0.039 in.) 7.0 mm - 2.0 mm (0.276 in. - 0.039 in.)

HINT:
"+" represents the condition that the glass is above the panel level. "-" represents the condition that the glass is below the panel level.
Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)

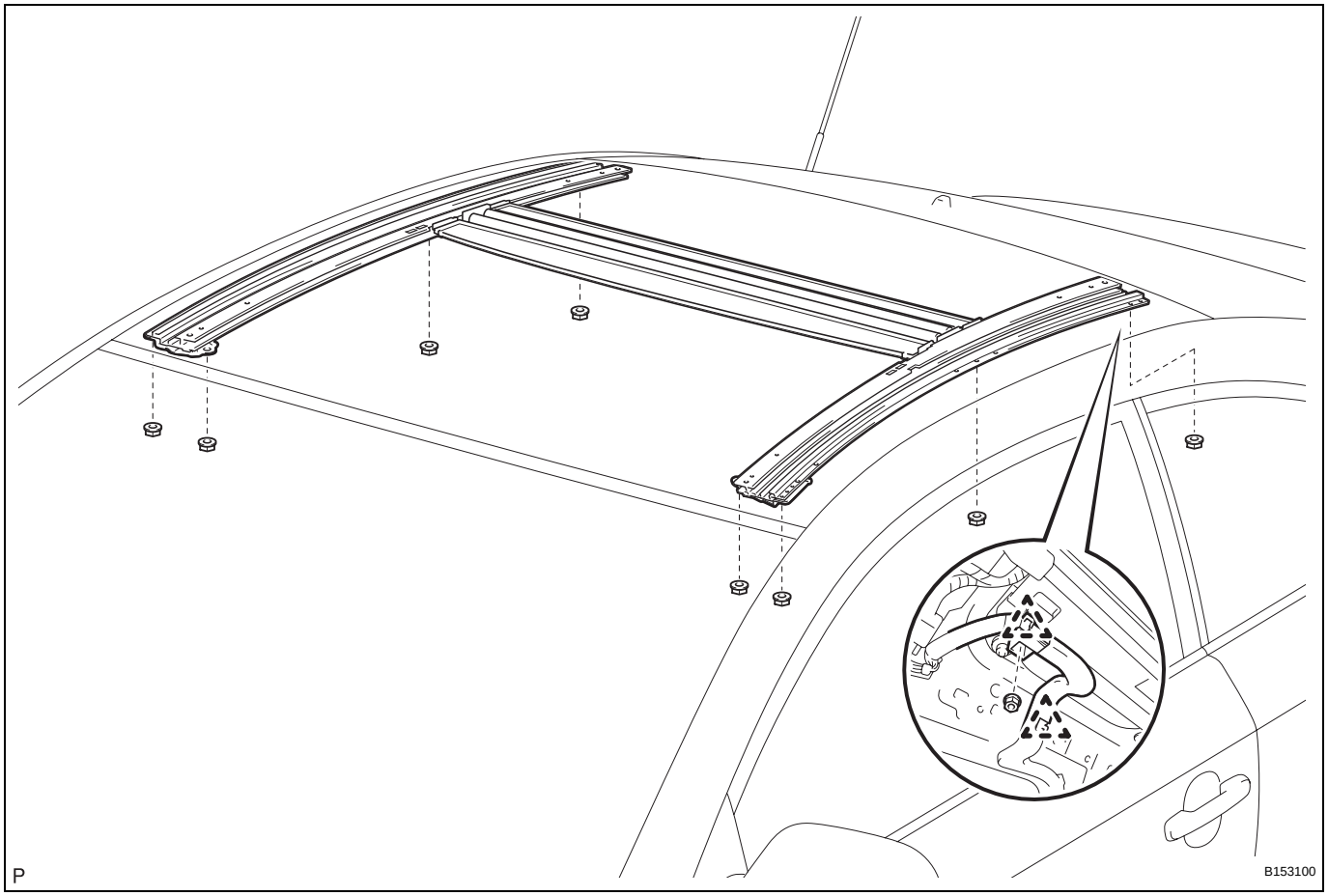


3. INSTALL SUNSHADE TRIM SUB-ASSEMBLY

(a) Install the sunshade trim sub-assembly with the 4 screws.

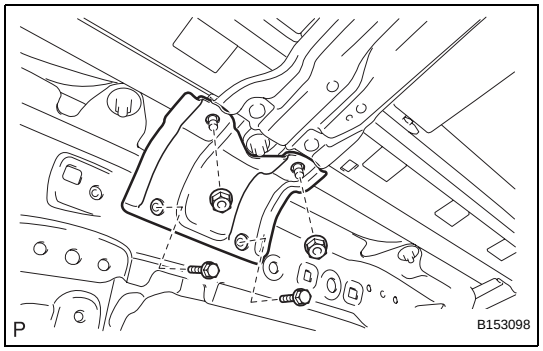
4. INSTALL SLIDE ROOF RAIL SUB-ASSEMBLY

(a) Install the slide roof rail sub-assembly with the 8 nuts.



Torque: 5.5 N*m (56 kgf*cm, 49 in.*lbf)

(b) Install the 2 clamps.



5. INSTALL CENTER SLIDING ROOF HOUSING MOUNTING BRACKET LH

(a) Install the center sliding roof housing mounting bracket LH with the 2 bolts and 2 nuts.

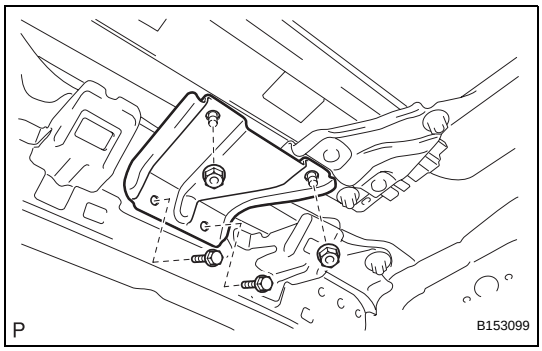
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf) (bolt)
5.5 N*m (56 kgf*cm, 49 in.*lbf) (nut)

6. INSTALL CENTER SLIDING ROOF HOUSING MOUNTING BRACKET RH

HINT:

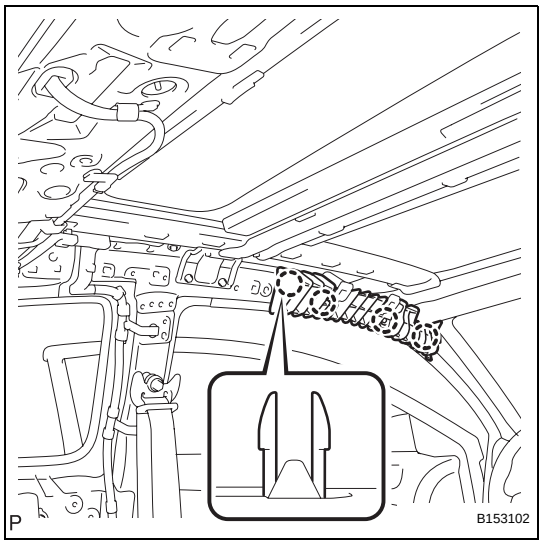
Use the same procedure for the rear side and the front side.

WS



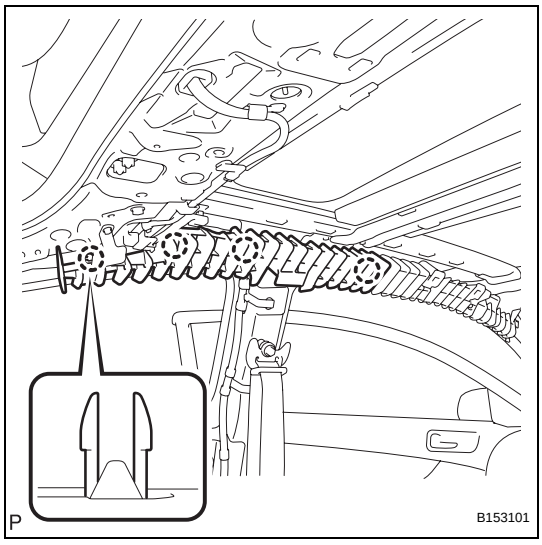
7. **INSTALL FRONT SLIDING ROOF HOUSING MOUNTING BRACKET LH**
   (a) Install the front sliding roof housing mounting bracket LH with the 2 bolts and 2 nuts.
   Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf) (bolt)
   5.5 N*m (56 kgf*cm, 49 in.*lbf) (nut)

8. **INSTALL FRONT SLIDING ROOF HOUSING MOUNTING BRACKET RH**
   HINT:
   Use the same procedure for the rear side and the front side.



9. **INSTALL SIDE RAIL SPACER FRONT LH (w/o Curtain Shield Airbag)**
   (a) Engage the 4 claws to install the front side rail spacer LH

10. **INSTALL SIDE RAIL SPACER FRONT RH (w/o Curtain Shield Airbag)**
    HINT:
    Use the same procedure for the rear side and the front side.



11. **INSTALL SIDE RAIL SPACER REAR LH (w/o Curtain Shield Airbag)**
    (a) Engage the 4 claws to claws to install the

12. **INSTALL SIDE RAIL SPACER REAR RH (w/o Curtain Shield Airbag)**
    HINT:
    Use the same procedure for the rear side and the front side.

13. **INSTALL CURTAIN SHIELD AIRBAG ASSEMBLY LH (w/ Curtain Shield Airbag) (See page RS-377)**

14. **INSTALL CURTAIN SHIELD AIRBAG ASSEMBLY RH (w/ Curtain Shield Airbag)**
    HINT:
    Use the same procedure for the rear side and the front side.

15. **INSTALL ROOF HEADLINING ASSEMBLY (See page IR-15)**

16. **INSTALL COAT HOOK (See page IR-15)**

17. **INSTALL ASSIST GRIP SUB-ASSEMBLY (See page IR-15)**

18. **INSTALL ASSIST GRIP COVER (See page IR-15)**

19. **INSTALL VISOR HOLDER LH (See page IR-15)**

WS

20. INSTALL VISOR HOLDER RH (See page IR-15)
21. INSTALL LH VISOR ASSEMBLY (See page IR-15)
22. INSTALL RH VISOR ASSEMBLY (See page IR-16)
23. INSTALL NO. 2 ROOM LIGHT ASSEMBLY (See page IR-16)
24. INSTALL NO. 1 ROOM LIGHT ASSEMBLY (See page IR-16)
25. INSTALL MAP LIGHT ASSEMBLY (See page IR-16)
26. INSTALL FRONT PILLAR GARNISH LH (See page IR-17)
27. INSTALL FRONT PILLAR GARNISH RH (See page IR-17)
28. INSTALL ROOF SIDE GARNISH ASSEMBLY INNER LH (See page IR-17)
29. INSTALL ROOF SIDE GARNISH ASSEMBLY INNER RH (See page IR-18)
30. INSTALL DECK TRIM SIDE PANEL ASSEMBLY LH (See page IR-18)
31. INSTALL DECK TRIM SIDE PANEL ASSEMBLY RH (See page IR-18)
32. INSTALL ROOF SIDE GARNISH INNER LOWER LH (See page IR-18)
33. INSTALL ROOF SIDE GARNISH INNER LOWER RH (See page IR-18)
34. INSTALL CENTER PILLAR GARNISH LH (See page IR-19)
35. INSTALL CENTER PILLAR GARNISH RH (See page IR-19)
36. INSTALL NO. 1 SIDE TRIM ASSEMBLY LH (See page IR-19)
37. INSTALL NO. 1 SIDE TRIM ASSEMBLY RH (See page IR-19)
38. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP LH
39. INSTALL FRONT DOOR OPENING TRIM WEATHERSTRIP RH
40. INSTALL REAR SEATBACK ASSEMBLY LH (See page SE-28)
41. INSTALL REAR SEATBACK ASSEMBLY RH (See page SE-28)
42. INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)
43. INSTALL COWL SIDE TRIM SUB-ASSEMBLY LH (See page IR-19)

44. **INSTALL COWL SIDE TRIM SUB-ASSEMBLY RH (See page IR-19)**
45. **INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-20)**
46. **INSTALL FRONT DOOR SCUFF PLATE RH (See page IR-20)**
47. **INSTALL FRONT DOOR SCUFF PLATE OUTSIDE LH (See page IR-20)**
48. **INSTALL FRONT DOOR SCUFF PLATE OUTSIDE RH (See page IR-20)**
49. **INSTALL REAR NO. 1 FLOOR BOARD (See page IR-20)**
50. **INSTALL NO. 1 DECK BOARD (See page IR-20)**
51. **INSTALL DECK FLOOR BOX REAR**
52. **INSTALL DECK FLOOR BOX LH (See page IR-20)**
53. **INSTALL DECK FLOOR BOX RH (See page IR-20)**
54. **INSTALL SPARE WHEEL COVER ASSEMBLY**
55. **INSTALL BACK DOOR WEATHERSTRIP**
56. **INSTALL BACK DOOR SCUFF PLATE (See page IR-21)**
57. **INSTALL DECK BOARD SUB-ASSEMBLY**
58. **INSTALL TONNEAU COVER ASSEMBLY**
59. **CONNECT NEGATIVE BATTERY TERMINAL**
60. **PERFORM INITIALIZATION**
    (See Page IN-23)
61. **INSPECT SRS WARNING LIGHT**

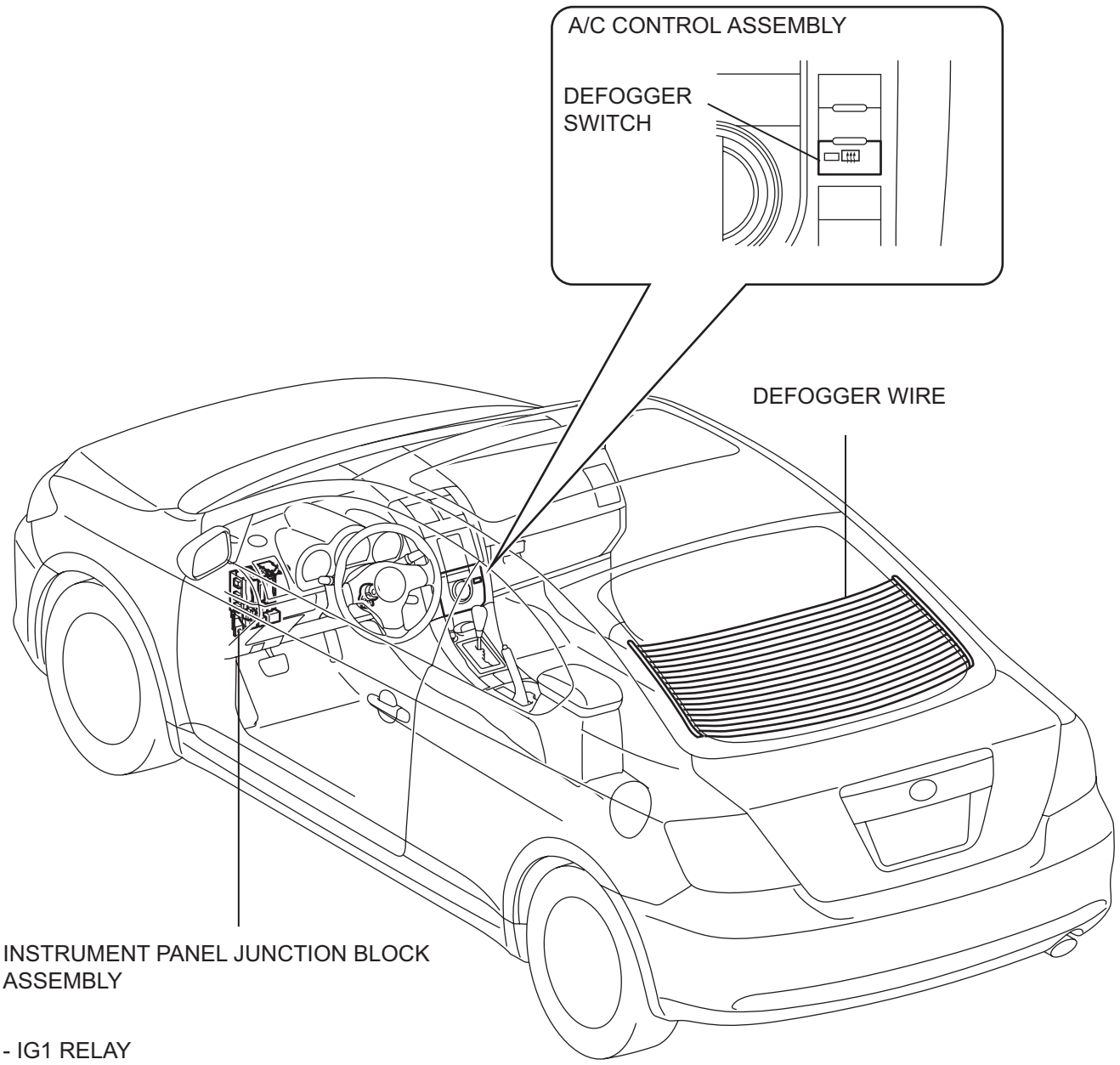
WINDOW DEFOGGER SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following system(s) after the cable is reconnected.

System Name	See Page
Power window control system (with Jam Protection Function)	IN-23
Sliding Roof System	

PARTS LOCATION



- IG1 RELAY
- DEF H-FUSE
- DEF RELAY
- AM1 FUSE
- GAUGE FUSE

(HINT: While the other fuses and relay of the junction block assembly can be replaced individually, the DEF relay can only be replaced by replacing the junction block assembly.)

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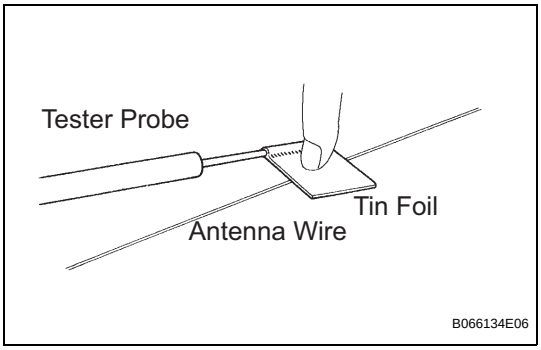
PROBLEM SYMPTOMS TABLE

HINT:
Use the table below to help determine the causes of the problem symptom. 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 order they are listed. Replace parts as necessary.

Window defogger system

Symptom	Suspected Area	See page
Rear window defogger does not operate (indicator ON)	1. DEF H-fuse	WS-93
	2. Defogger wire	WS-94
	3. Wire harness	-
Rear window defogger does not operate (indicator OFF)	1. IG1 relay	WS-94
	2. DEF relay	WS-94
	3. AM1 fuse	WS-93
	4. GAUGE fuse	WS-93
	5. DEF H-fuse	WS-93
	6. A/C control assembly	AC-7
	7. Defogger wire	WS-94
	8. Wire harness	-



INSPECTION

1. INSPECT BACK DOOR GLASS (DEFOGGER WIRE)

NOTICE:

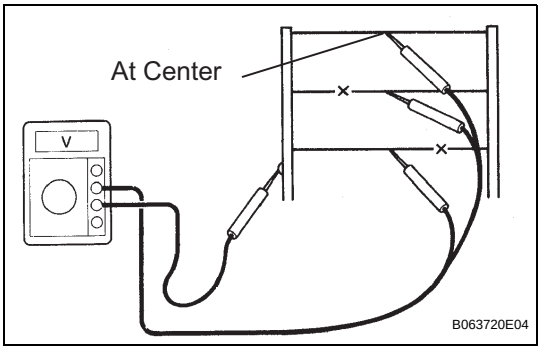
- **When cleaning the glass, wipe the glass along the wire using a soft, dry cloth. Take care not to damage the defogger wires.**
- **Do not use detergents or glass cleaners that have abrasive ingredients.**
- **When measuring voltage, wrap a piece of tin foil around the tip of the negative (-) tester probe and press the foil against the wire with your finger, as shown in the illustration.**

(a) Turn the ignition switch ON.

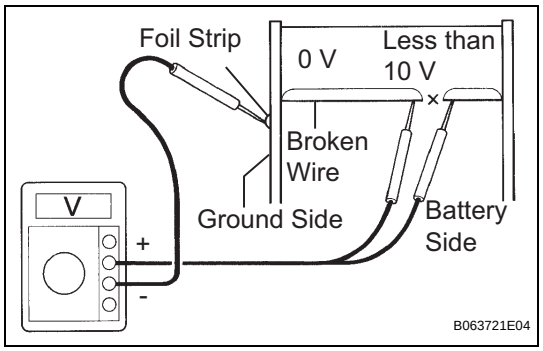
(b) Turn the defogger switch ON.

(c) Measure the voltage at the center of each defogger wire as shown in the illustration.

Standard voltage



Voltage	Criteria
Approx. 5 V	Wire is not broken
Approx. 10 or 0 V	Wire is broken



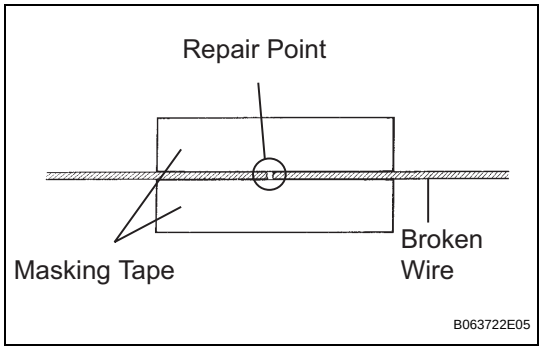
HINT:
If there is approximately 10 V, the wire may be faulty between the center of the wire and the wire end on the battery side. If there is no voltage, the wire may be faulty between the center of the wire end and the wire end on the ground side.

(d) Place the voltmeter's positive (+) lead against the defogger wire on the battery side.

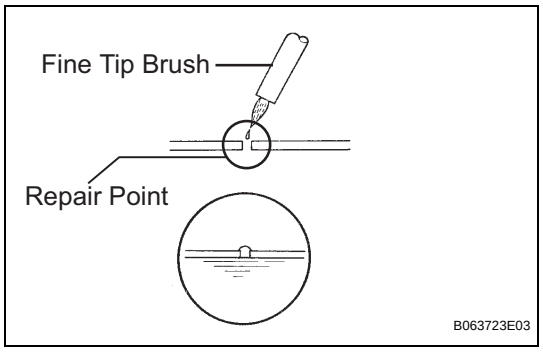
(e) Place the voltmeter's negative (-) lead with the foil strip against the wire on the ground side.

(f) Slide the positive (+) lead from the battery side to the ground side.

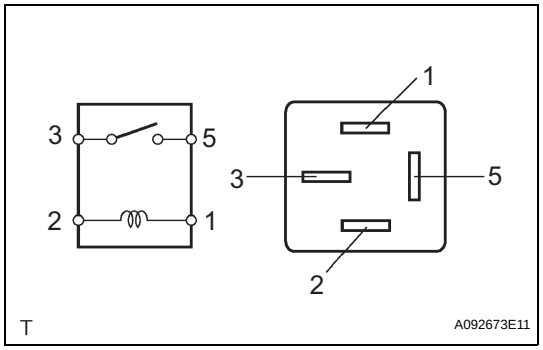
(g) The point where the voltage drops from approximately 10 V to 0 V is where the defogger wire is broken.
HINT:
If the defogger wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the defogger wire and gradually increases to approximately 12 V as the meter probe moves to the other end.



(h) If necessary, repair the defogger wire.
(1) Clean the broken wire tips with grease, wax and silicone remover.
(2) Place masking tape along both sides of the wire.
(3) Thoroughly mix the repair agent.
Dupont paste:
No. 4817 or equivalent



(4) Using a fine tip brush, apply a small amount of the agent to the wire.
(5) After a few minutes, remove the masking tape.
NOTICE:
Do not repair the defogger wire again for at least 24 hours.



2. INSPECT IG1 RELAY (Marking: IG1)

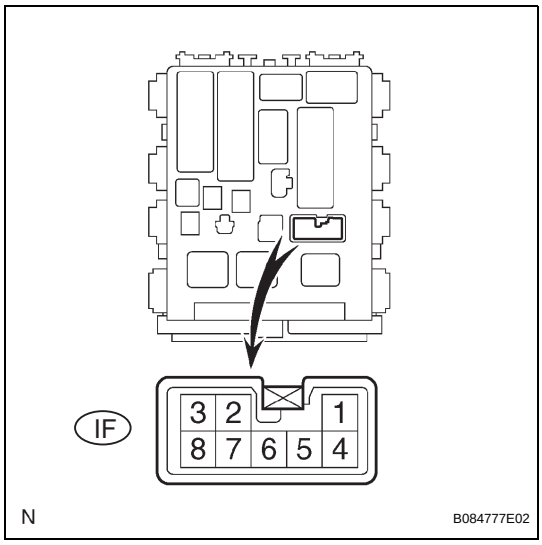
(a) Remove the IG1 relay from the instrument panel junction block.

(b) Measure the resistance of the relay.
Standard resistance

Tester Condition	Specified Condition
3 - 5	10 kΩ or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

If the result is not as specified, replace the relay.

WS



3. INSPECT INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY (DEF RELAY)

(a) Measure the voltage of the connector.

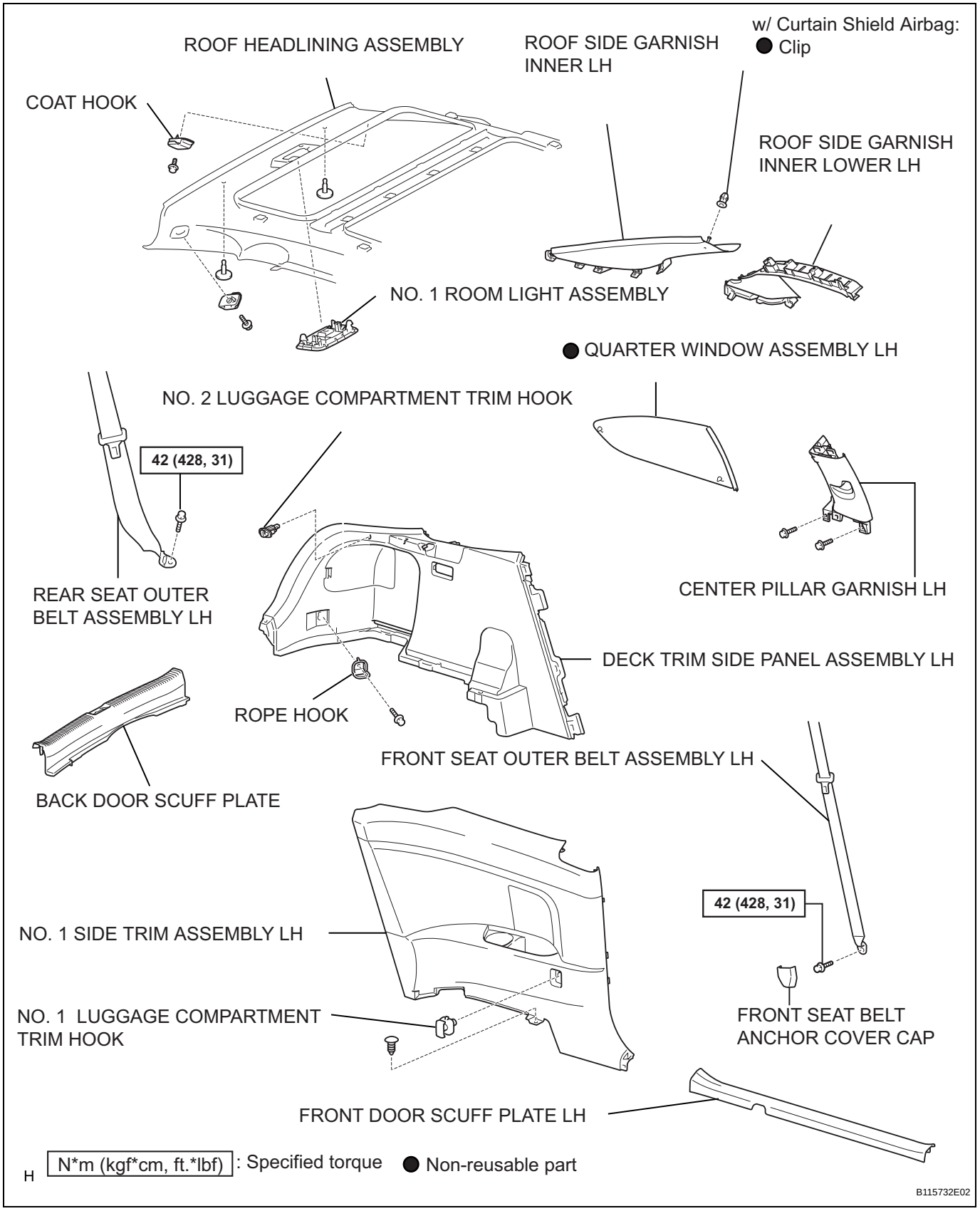
Standard

Tester Connection	Defogger Switch Condition	Specified Condition
1F-2 - Body ground	OFF	0 V
	ON	10 to 14 V

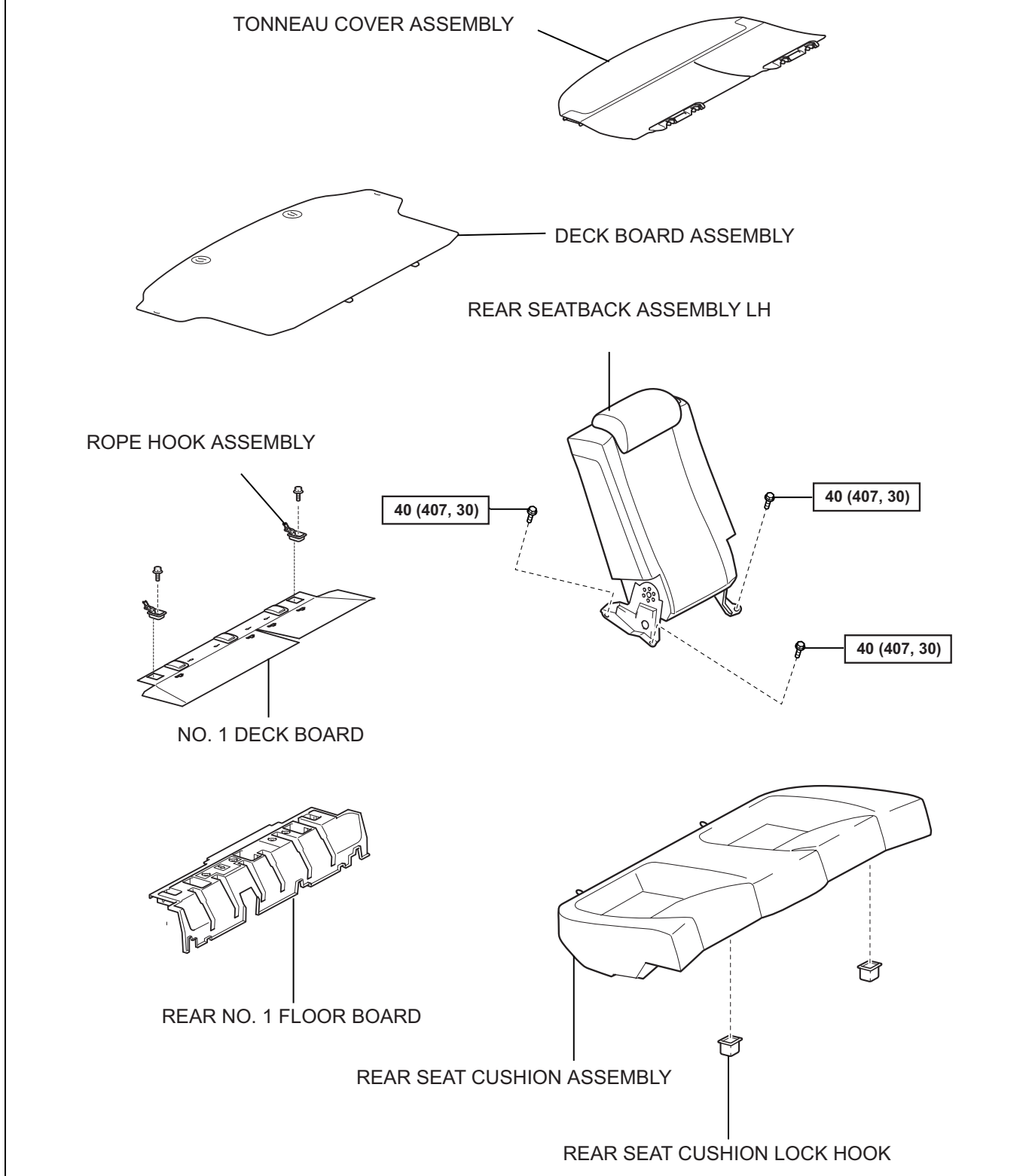
If the result is not as specified, replace the instrument panel junction block assembly.

QUARTER WINDOW GLASS

COMPONENTS



WS



N*m (kgf*cm, ft.*lbf) : Specified torque

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REMOVAL

HINT:

- Use the same procedures for the LH side and RH side.
- The procedures listed below are for the LH side.

1. **REMOVE TONNEAU COVER ASSEMBLY**
2. **REMOVE REAR SEAT CUSHION ASSEMBLY (See page SE-17)**
3. **REMOVE REAR SEATBACK ASSEMBLY LH (See page SE-17)**
4. **REMOVE FRONT DOOR SCUFF PLATE LH (See page IR-9)**
5. **REMOVE DECK BOARD ASSEMBLY**
6. **REMOVE NO. 1 DECK BOARD (See page IR-8)**
7. **REMOVE REAR NO. 1 FLOOR BOARD (See page IR-9)**
8. **REMOVE BACK DOOR SCUFF PLATE (See page IR-8)**
9. **REMOVE FRONT SEAT BELT ANCHOR COVER CAP**
10. **REMOVE FRONT SEAT OUTER BELT ASSEMBLY LH (See page SB-10)**
11. **REMOVE REAR SEAT OUTER BELT ASSEMBLY LH (See page SB-24)**
12. **REMOVE NO. 1 LUGGAGE COMPARTMENT TRIM HOOK**
13. **REMOVE NO. 1 SIDE TRIM ASSEMBLY LH (See page IR-10)**
14. **REMOVE ROPE HOOK**
15. **REMOVE DECK TRIM SIDE PANEL ASSEMBLY LH (See page IR-11)**
16. **REMOVE CENTER PILLAR GARNISH LH (See page IR-10)**
17. **REMOVE ROOF SIDE GARNISH INNER LOWER LH (See page IR-10)**
18. **REMOVE ROOF SIDE GARNISH INNER LH (See page IR-11)**
19. **REMOVE NO. 1 ROOM LIGHT ASSEMBLY (See page IR-13)**
20. **REMOVE COAT HOOK (See page IR-14)**

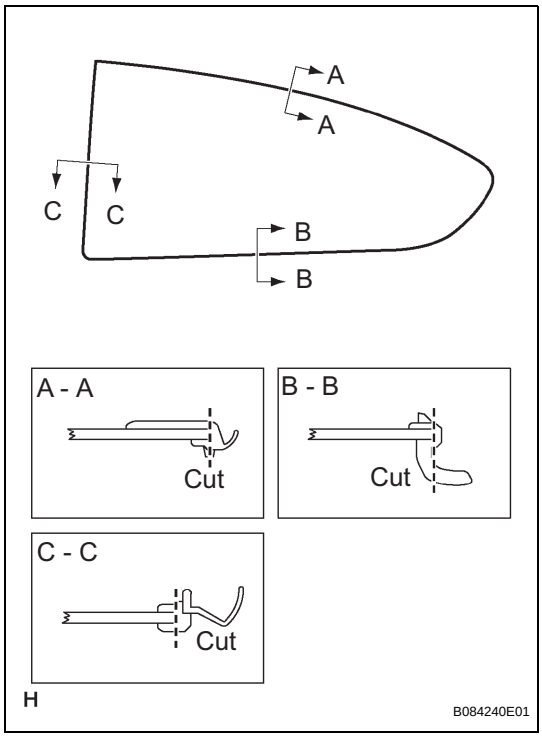
21. REMOVE ROOF HEADLINING ASSEMBLY

(a) Slightly lower the rear section of the roof headlining so that the quarter window glass can be removed (see page IR-14).
HINT:
It is not necessary to completely remove the roof headlining.

22. REMOVE QUARTER WINDOW ASSEMBLY LH

(a) Using a knife, cut off the moulding as shown in the illustration.
NOTICE:
Be careful not to damage the vehicle body with the knife.

(b) Remove the remaining moulding.
HINT:
Make a partial cut in the moulding. Then, pull and remove it by hand.



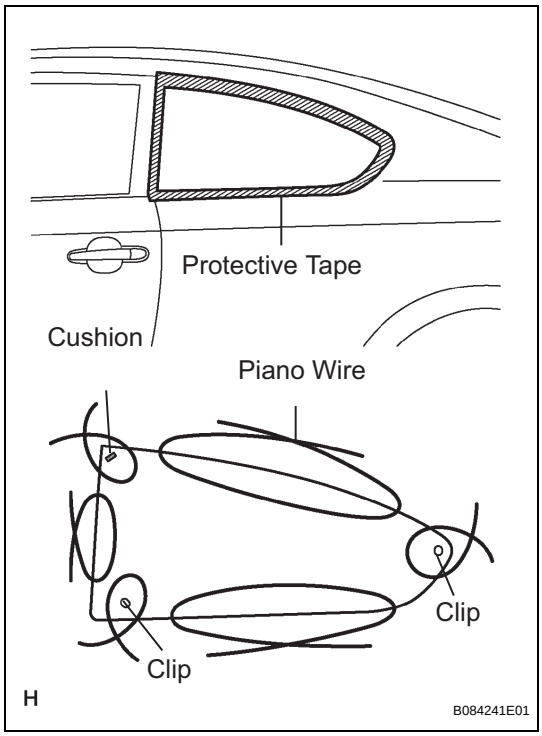
(c) Apply protective tape to the outer surface of the vehicle body to prevent scratches.

(d) From the interior, insert piano wire between the vehicle body and the quarter window glass as shown in the illustration.

(e) Tie objects that can serve as handles (for example, wooden blocks) to all wire ends.
NOTICE:
When separating the quarter window glass from the vehicle, be careful not to damage the vehicle's paint or interior/exterior ornaments.

(f) Cut through the adhesive by pulling the piano wire around the quarter window glass.
NOTICE:
Leave as much adhesive on the vehicle body as possible when removing the quarter window glass.

(g) Using a suction cup, remove the quarter window glass.



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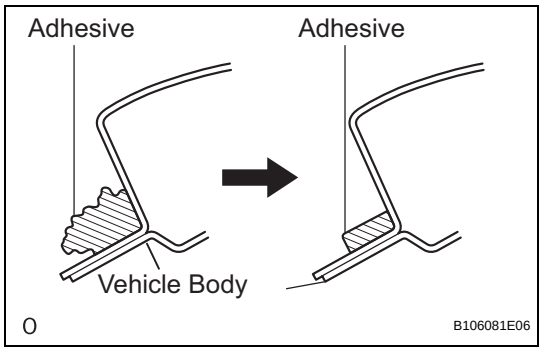


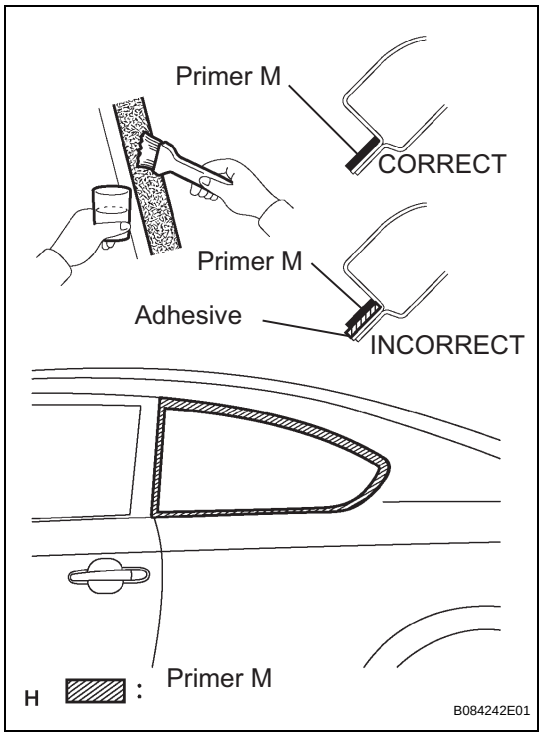
23. CLEAN VEHICLE BODY

(a) Clean and shape the contact surface of the vehicle body.

(1) On the contact surface of the vehicle body, use a knife to cut away excess adhesive as shown in the illustration.
HINT:
Leave as much adhesive on the vehicle body as possible.
NOTICE:
Be careful not to damage the vehicle body.

(2) Clean the contact surface of the vehicle body with cleaner.
HINT:
Even if all the adhesive has been removed, clean the vehicle body.

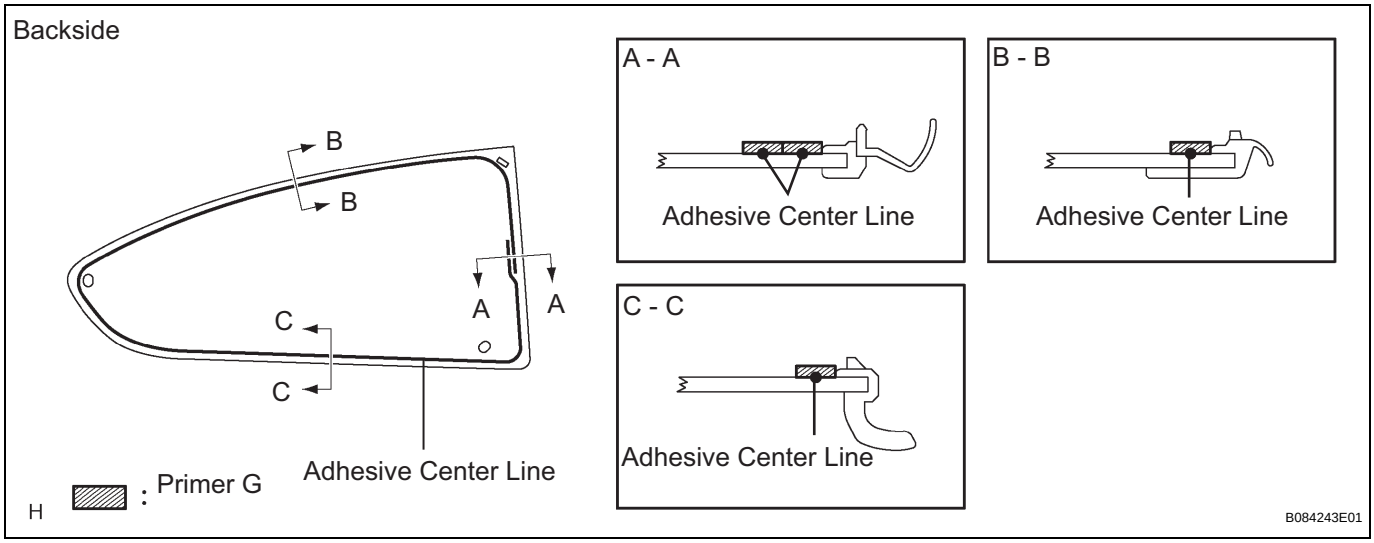
INSTALLATION



1. INSTALL QUARTER WINDOW ASSEMBLY LH

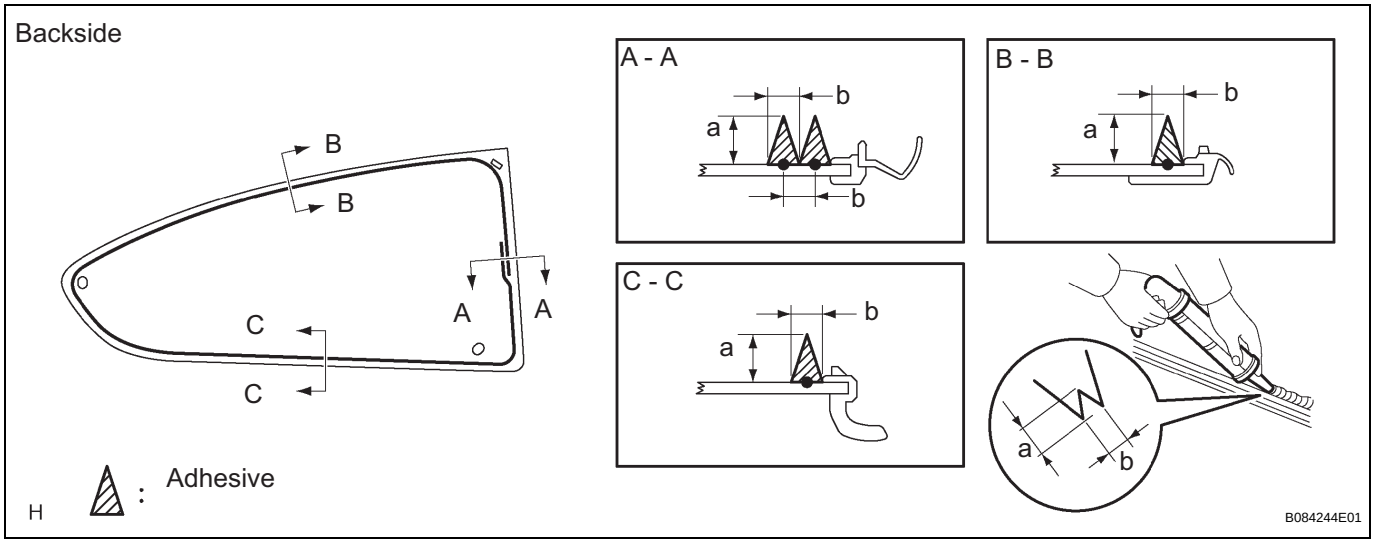
(a) Using a brush, apply Primer M to the exposed part of the vehicle body.
NOTICE:
- **Allow the primer to dry for 3 minutes or more.**
- **Do not apply primer to the adhesive.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

(b) Using a brush or sponge, apply Primer G to the contact surface of the quarter window glass.



HINT:
If Primer G is applied to an area other than that which is specified, wipe off the primer with white gasoline before it dries.
NOTICE:
- **Allow the primer to dry for 3 minutes or more.**
- **Throw away any leftover primer.**
- **Do not apply too much primer.**

(c) Apply adhesive to the quarter window glass.
Adhesive:
Part No. 08850-00801 or equivalent
(1) Cut off the tip of the cartridge nozzle as shown in the illustration.



HINT:
After cutting off the tip, use all adhesive within the time written in the table below.
Usage time frame

Temperature	Usage Time Frame
35°C (95°F)	15 minutes
20°C (68°F)	1 hour 40 minutes
5°C (41°F)	8 hours

(2) Load the sealer gun with the cartridge.
(3) Apply adhesive to the quarter window glass as shown in the illustration.

(d) Install the quarter window glass to the vehicle body.
(1) Lightly press the front surface of the quarter window glass to ensure that the quarter window glass is securely fit to the vehicle body.
NOTICE:
- **Check that the clips are attached to the vehicle body correctly.**
- **Check that the vehicle body and quarter window glass have a small gap between them.**

(2) Hold the quarter window glass in place securely with protective tape or equivalent until the adhesive hardens.
NOTICE:
Do not drive the vehicle for the amount of time written in the table below.

2. **INSTALL ROOF HEADLINING ASSEMBLY (See page IR-15)**
3. **INSTALL COAT HOOK (See page IR-15)**
4. **INSTALL NO. 1 ROOM LIGHT ASSEMBLY (See page IR-16)**
5. **INSTALL ROOF SIDE GARNISH INNER LH (See page IR-17)**
6. **INSTALL ROOF SIDE GARNISH INNER LOWER LH (See page IR-18)**
7. **INSTALL CENTER PILLAR GARNISH LH (See page IR-19)**
8. **INSTALL DECK TRIM SIDE PANEL ASSEMBLY LH (See page IR-18)**
9. **INSTALL ROPE HOOK**
10. **INSTALL NO. 1 SIDE TRIM ASSEMBLY LH (See page IR-19)**
11. **INSTALL NO. 1 LUGGAGE COMPARTMENT TRIM HOOK**
12. **INSTALL REAR SEAT OUTER BELT ASSEMBLY LH (See page SB-26)**
13. **INSTALL FRONT SEAT OUTER BELT ASSEMBLY LH**
    (a) Install the anchor part of the outer belt with the bolt.
    Torque: 42 N*m (428 kgf*cm, 31 ft.*lbf)
14. **INSTALL FRONT SEAT BELT ANCHOR COVER CAP**
15. **INSTALL BACK DOOR SCUFF PLATE (See page IR-21)**
16. **INSTALL REAR NO. 1 FLOOR BOARD (See page IR-20)**
17. **INSTALL NO. 1 DECK BOARD (See page IR-20)**
18. **INSTALL DECK BOARD ASSEMBLY**
19. **INSTALL FRONT DOOR SCUFF PLATE LH (See page IR-20)**
20. **INSTALL REAR SEATBACK ASSEMBLY LH (See page SE-28)**
21. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page SE-29)**
22. **INSTALL TONNEAU COVER ASSEMBLY**

23. CHECK FOR LEAKS AND REPAIR

(a) Conduct a leak test after the adhesive has completely hardened.

(b) Seal any leaks with auto glass sealer.

24. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

25. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).

HINT:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

WIPER AND WASHER SYSTEM

PRECAUTION

NOTICE:
When disconnecting the cable from the negative (-) battery terminal, initialize the following systems after the cable is reconnected.

System	See procedure
Power window control system (with Jam protection function)	IN-23
Sliding roof system	

1. PRECAUTION OF WASHER NOZZLE ADJUSTMENT

(a) Do not clean or adjust the washer nozzle with a safety pin, etc. because;
  (1) the washer nozzle tip is made of resin and could be damaged.
  (2) adjustment is not necessary because the washer nozzle is a spray type.

(b) In case the washer nozzle is clogged with wax, etc., remove it and clean the nozzle hole with a soft resin brush, etc.

PROBLEM SYMPTOMS TABLE

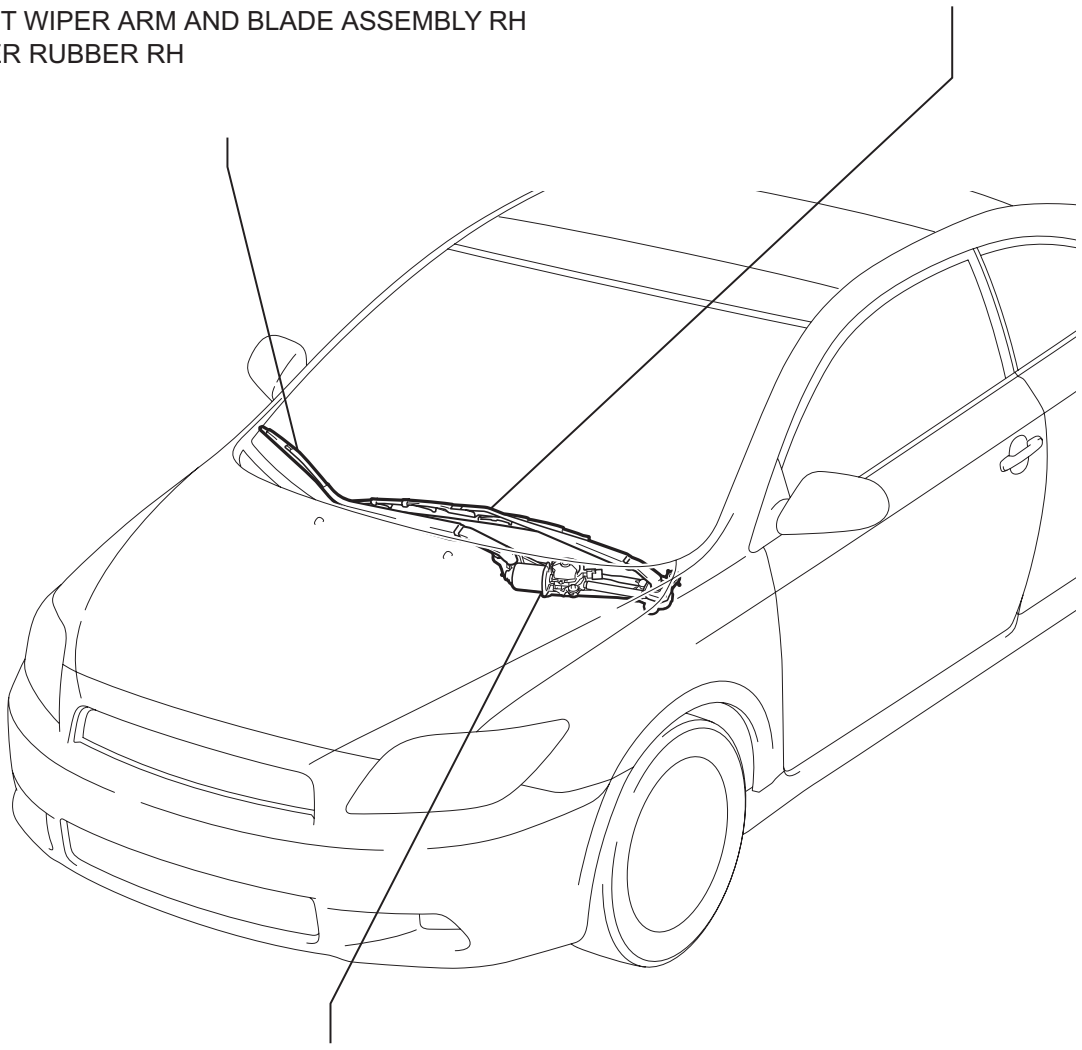
HINT:
Use the table below, with suspected areas listed in numerical order, to determine the cause of the problem. Inspect and repair or replace parts as necessary according to the steps on the following pages.

Wiper and washer system

Symptom	Suspected Area	See page
Front wipers do not operate.	1. FR WIP fuse	-
	2. IG1 relay	ES-402
	3. Windshield wiper switch assembly (Front wiper switch)	WW-12
	4. Windshield wiper motor assembly	WW-5
	5. Wire harness or connector	-
Front wipers do not operate in LO or HI.	1. Windshield wiper switch assembly	WW-12
	2. Windshield wiper motor assembly	WW-5
	3. Wire harness or connector	-
Front wipers do not operate in INT.	1. Windshield wiper switch assembly	WW-12
	2. Windshield wiper motor assembly	WW-5
	3. Wire harness or connector	-
Front washer motor does not operate.	1. FR WSH fuse	-
	2. IG1 relay	ES-402
	3. Windshield wiper switch assembly (Front washer switch)	WW-12
	4. Front washer motor	WW-15
	5. Wire harness or connector	-
Front wipers do not operate when washer switch is in the ON position.	1. Windshield wiper switch assembly (Operation check)	WW-12
	2. Windshield wiper motor assembly	WW-5
	3. Wire harness or connector	-
Washer fluid does not flow.	1. Washer hose and nozzle	-
When the wiper switch is off, the wiper does not retract or retracts in the wrong position.	1. Windshield wiper motor assembly (Wiper arm and blade set position)	WW-4
The wiper blade is in contact with the body.	1. Windshield wiper motor assembly (Wiper arm and blade set position)	WW-4

FRONT WIPER MOTOR AND LINK

COMPONENTS



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REMOVAL

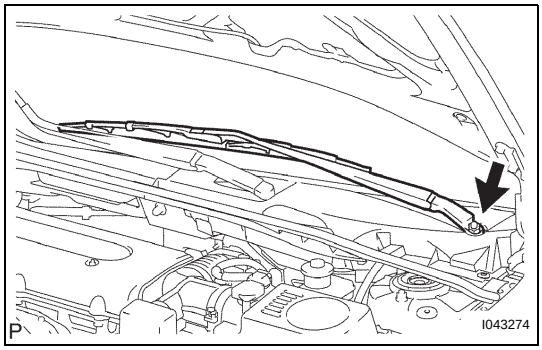
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

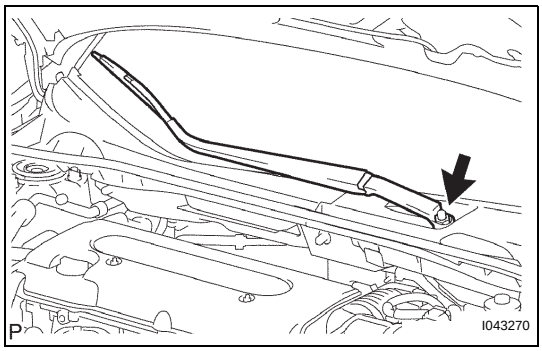
2. REMOVE FRONT WIPER ARM HEAD CAP

(a) Remove the 2 front wiper arm head caps.



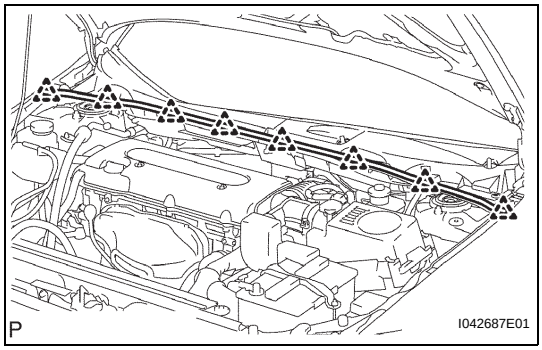
3. REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY LH

(a) Remove the nut and front wiper arm and blade assembly LH.



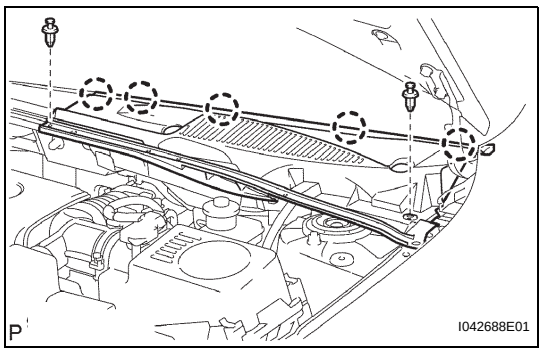
4. REMOVE FRONT WIPER ARM AND BLADE ASSEMBLY RH

(a) Remove the nut and front wiper arm and blade assembly RH.



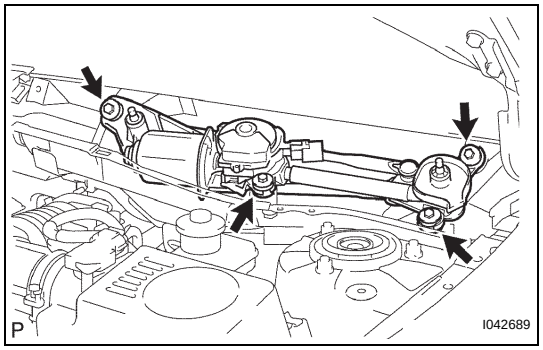
5. REMOVE HOOD TO COWL TOP SEAL

(a) Detach the 8 clips, and remove the hood to cowl top seal.



6. REMOVE COWL TOP VENTILATOR LOUVER LH

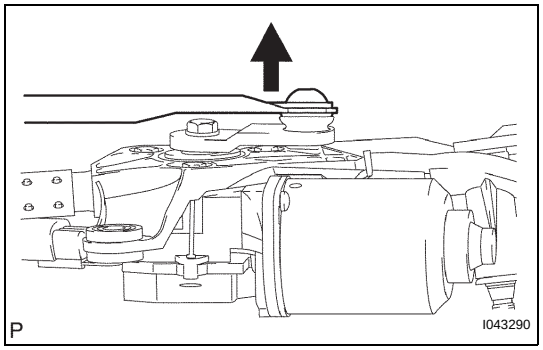
(a) Detach the 5 claws and 2 clips, and remove the cowl top ventilator louver LH.



7. REMOVE WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY

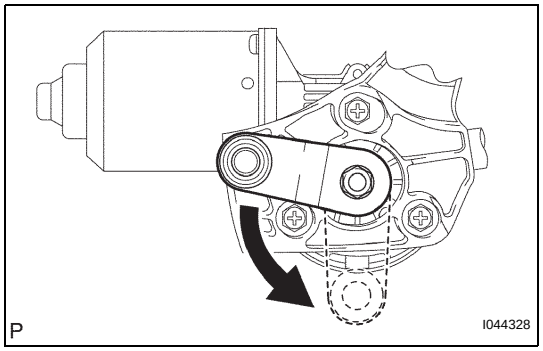
(a) Disconnect the connector.

(b) Remove the 4 bolts and windshield wiper motor and link assembly.

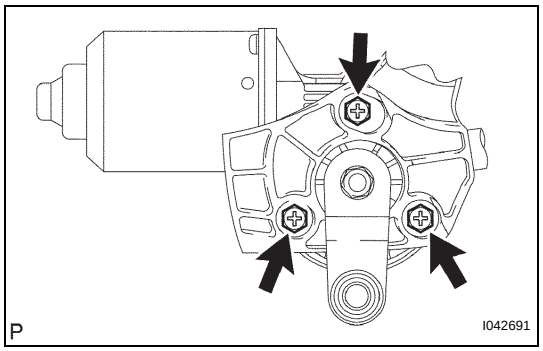


8. REMOVE WIPER LINK ASSEMBLY

(a) Using a screwdriver wrapped with protective tape, disconnect the rod of the wiper link from the windshield wiper motor as shown in the illustration.



(b) Turn the crank arm of the windshield wiper motor by hand to the position shown in the illustration.



(c) Remove the 3 bolts and wiper motor.

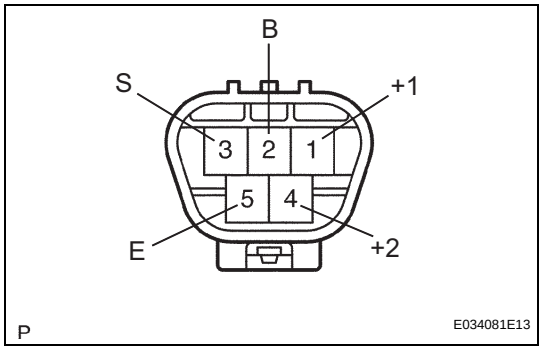
INSPECTION

1. INSPECT WINDSHIELD WIPER MOTOR ASSEMBLY

(a) Check the Lo operation.

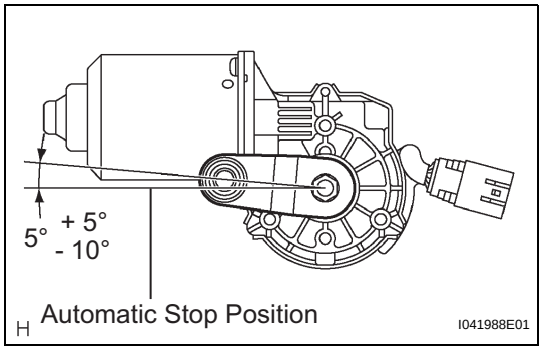
(1) Connect the battery positive (+) lead to terminal 1 (+1) of the connector and the battery negative (-) lead to terminal 5 (E).

(2) Check that the motor operates at low speed (LO).



(b) Check the Hi operation.
  (1) Connect the battery positive (+) lead to terminal 4 (+2) of the connector and the battery negative (-) lead to terminal 5 (E).
  (2) Check that the motor operates at high speed (HI).

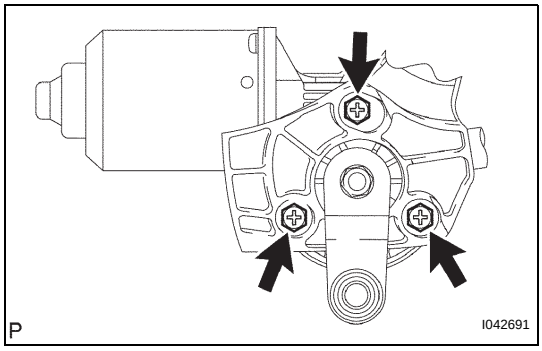
(c) Check the automatic stop operation.
  (1) Connect the battery positive (+) lead to terminal 1 (+1) of the connector and the battery negative (-) lead to terminal 5 (E).
  (2) With the motor being rotated at low speed (LO) disconnect terminal 1 (+1) to stop the wiper motor operation at any position other than the automatic stop position.
  (3) Using SST, connect terminals 1 (+1) and 3 (S).
  SST 09843-18040
  (4) Connect the positive (+) lead from the battery to terminal 2 (B).
  (5) Check that the motor stops running at the stop position after the motor operates again.
  (6) Check the automatic stop position.
  OK:
  See the illustration.



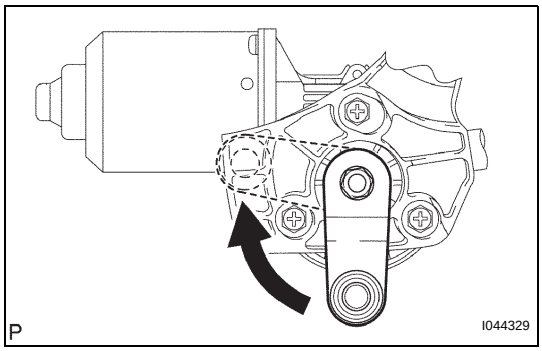
INSTALLATION

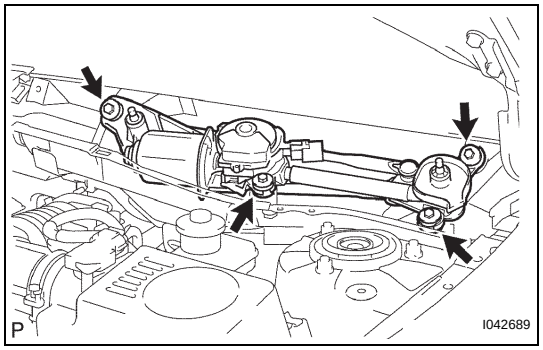
1. INSTALL WIPER LINK ASSEMBLY

(a) Install the windshield wiper motor with the 3 bolts.
Torque: 5.4 N*m (55 kgf*cm, 47 in.*lbf)



(b) Turn the crank arm of the windshield wiper motor by hand to the position shown in the illustration.
(c) Apply DENSO No. 50 grease to the crank arm pivot of the windshield wiper motor.
(d) Install the rod to the wiper link.





2. INSTALL WINDSHIELD WIPER MOTOR AND LINK ASSEMBLY

(a) Install the windshield wiper motor and link assembly with the 4 bolts.
Torque: 5.4 N*m (55 kgf*cm, 47 in.*lbf)

(b) Connect the connector.

3. INSTALL COWL TOP VENTILATOR LOUVER LH

(a) Attach the 5 claws and 2 clips, and install the cowl top ventilator louver LH.

4. INSTALL HOOD TO COWL TOP SEAL

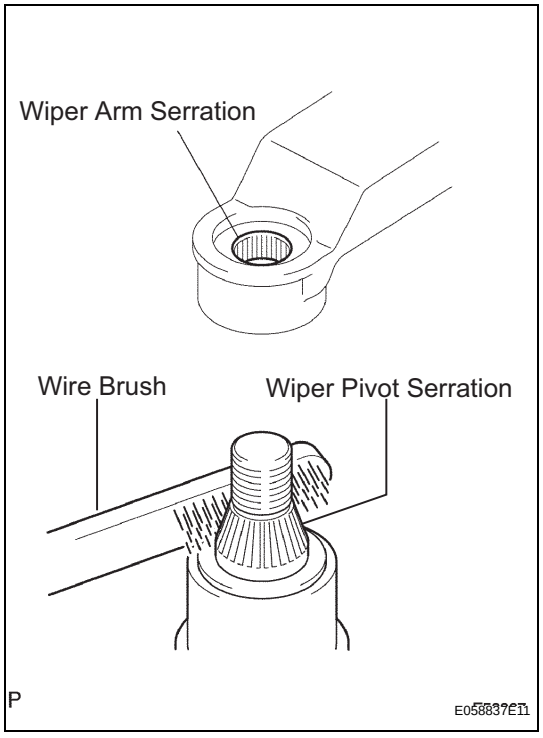
(a) Attach the 8 clips, and install the hood to cowl top seal.

5. INSTALL FRONT WIPER ARM AND BLADE ASSEMBLY LH

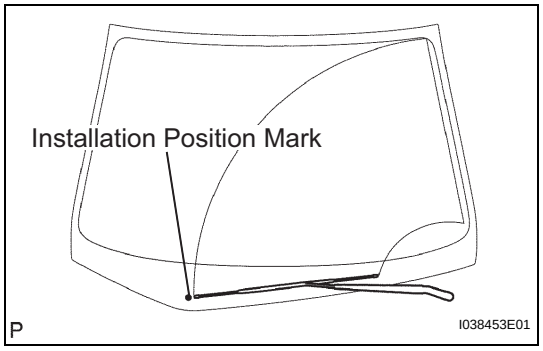
(a) Operate the wiper, and stop the windshield wiper motor assembly at the automatic stop position.

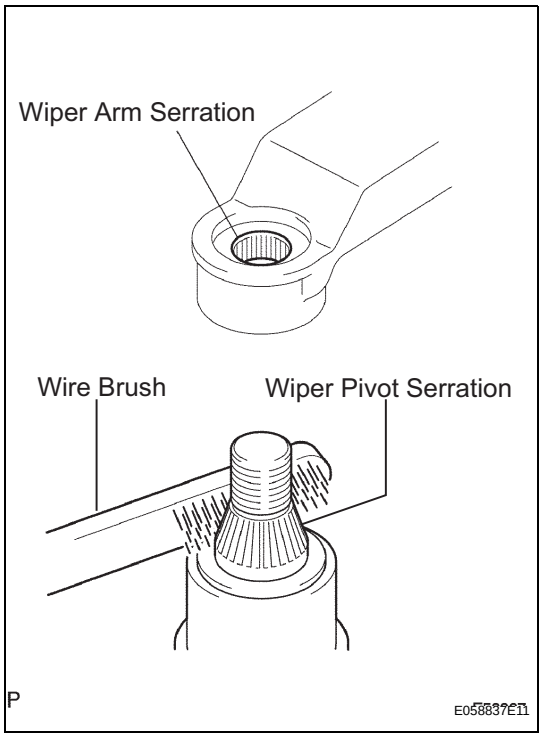
(b) Clean the wiper arm serrations.

(c) Clean the wiper pivot serration with a wire brush (when reinstalling).



(d) Install the front wiper arm and blade assembly LH with the nut at the position as shown in the illustration.
Torque: 34.3 N*m (350 kgf*cm, 25 ft.*lbf)
HINT:
Hold the arm hinge by hand to fasten the nut.

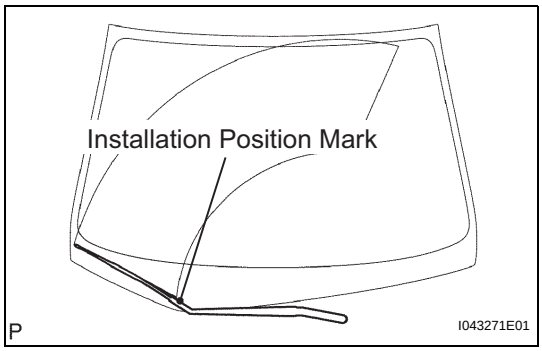




6. INSTALL FRONT WIPER ARM AND BLADE ASSEMBLY RH

(a) Clean the wiper arm serrations.

(b) Clean the wiper pivot serration with a wire brush (when reinstalling).



(c) Install the front wiper arm and blade assembly RH with the nut at the position shown in the illustration.
Torque: 34.3 N*m (350 kgf*cm, 25 in.*lbf)
HINT:
Hold the arm hinge by hand to fasten the nut.

7. INSTALL FRONT WIPER ARM HEAD CAP

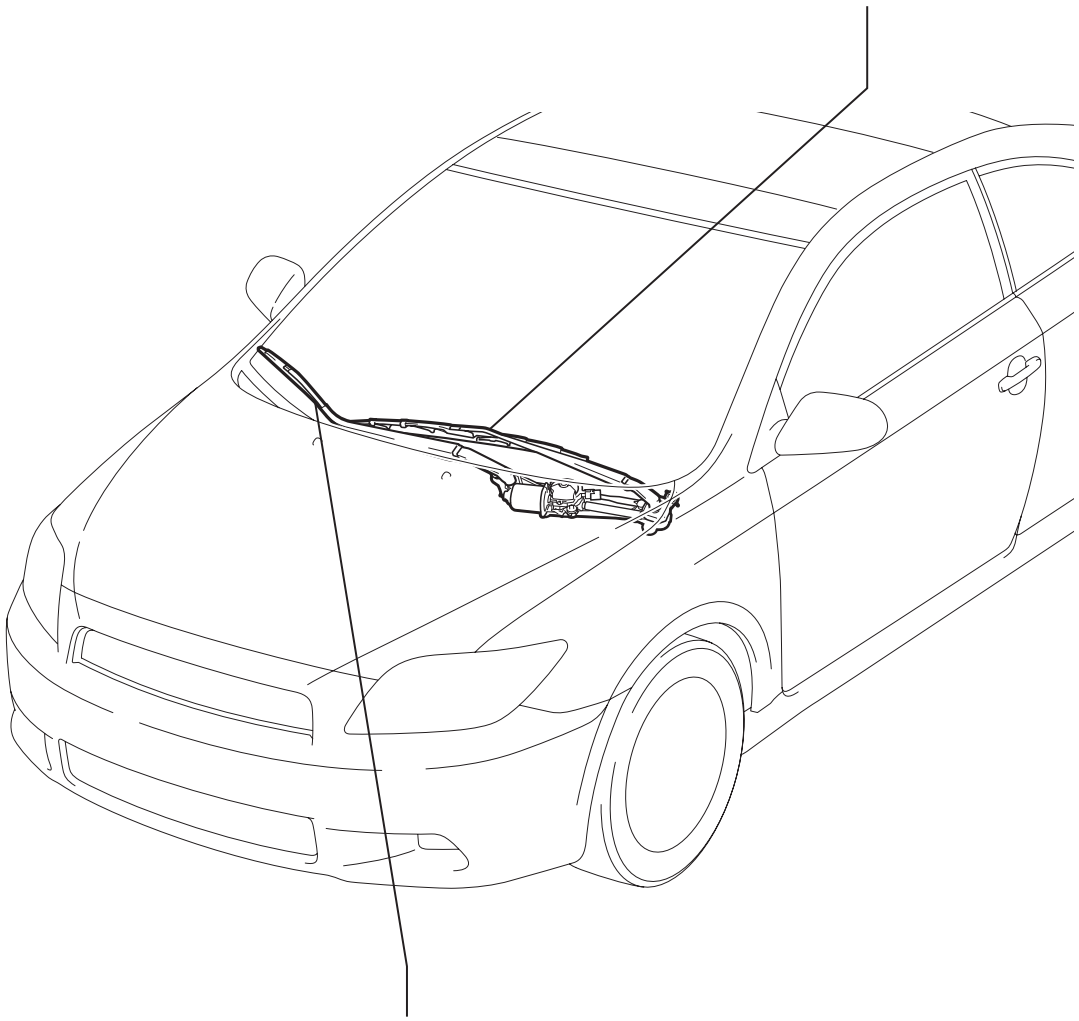
8. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

9. PERFORM INITIALIZATION

(a) Perform initialization (see page IN-23).
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

FRONT WIPER RUBBER

COMPONENTS



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REMOVAL

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

1. REMOVE FRONT WIPER BLADE LH

(a) Remove the front wiper blade LH from the front wiper arm LH.

NOTICE:

Do not bend the front wiper arm with the front wiper blade LH removed, as the arm tip could damage the windshield surface.

2. REMOVE WIPER RUBBER LH

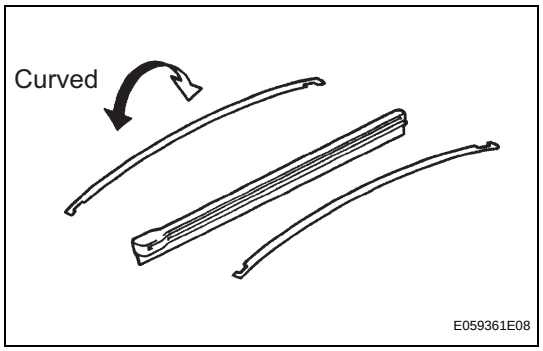
(a) Remove the wiper rubber LH from the front wiper blade LH.

(b) Remove the 2 wiper rubber backing plates from the wiper rubber LH.

INSTALLATION

HINT:

- Use the same procedures for the RH side and LH side.
- The procedures listed below are for the LH side.

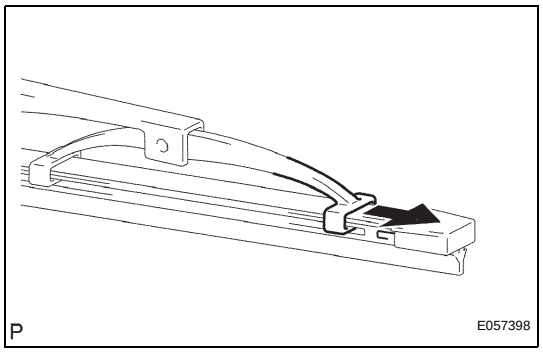


1. INSTALL WIPER RUBBER LH

(a) Install the 2 wiper rubber backing plates to the wiper rubber LH.

NOTICE:

Be sure to install the wiper rubber backing plates in the correct direction.



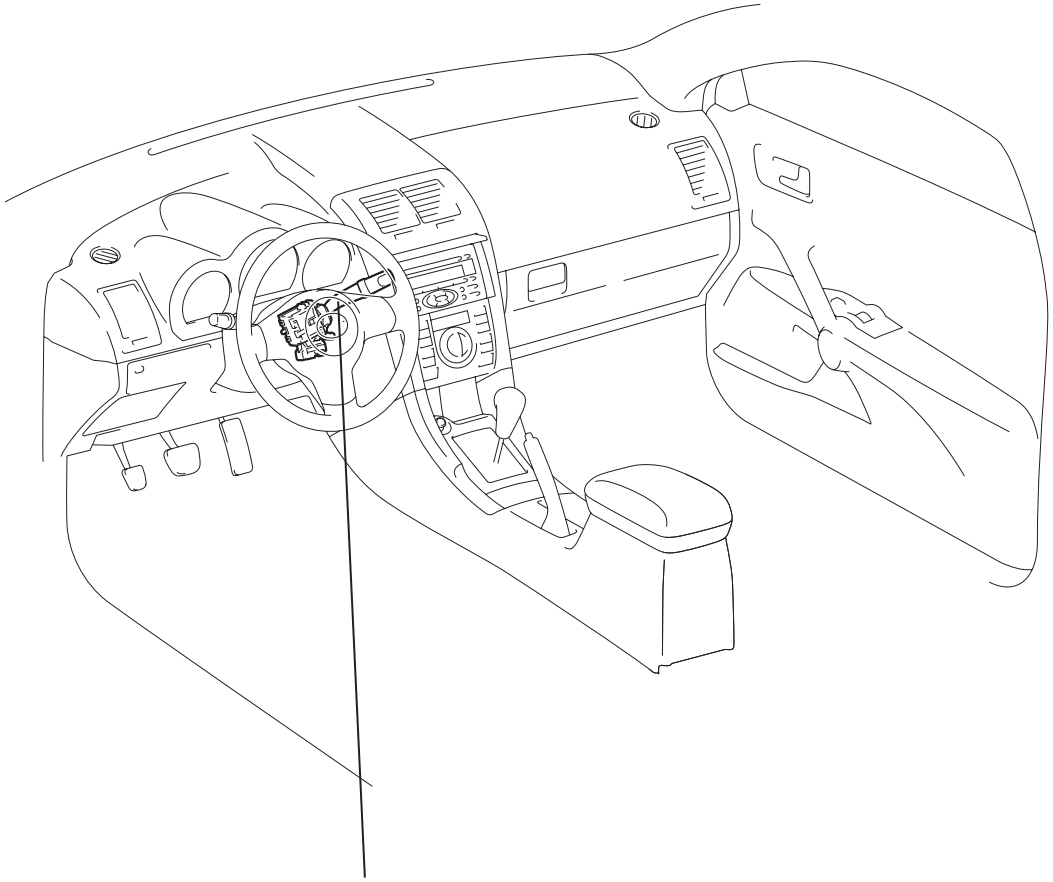
(b) Install the wiper rubber LH so that the head part (longer side) of the wiper rubber faces the arm axle side.

2. INSTALL FRONT WIPER BLADE LH

(a) Install the front wiper blade LH to the front wiper arm LH.

WIPER SWITCH

COMPONENTS



WINDSHIELD WIPER SWITCH ASSEMBLY

P

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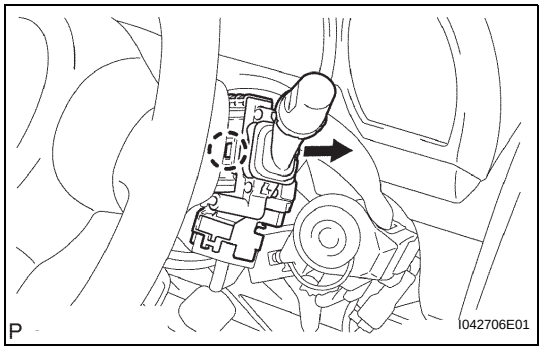
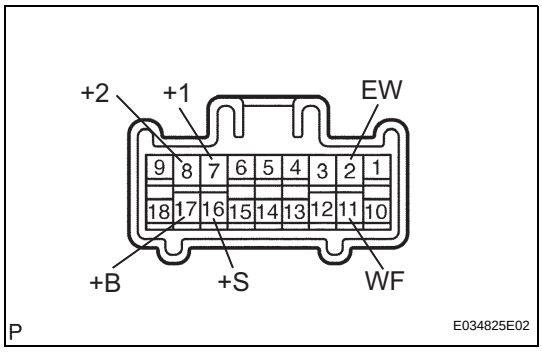
WW

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
   CAUTION:
   Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.
2. **REMOVE STEERING COLUMN COVER (See page SR-8)**
3. **REMOVE WINDSHIELD WIPER SWITCH ASSEMBLY**
   (a) Disconnect the connector.
   (b) Detach the claw, and remove the windshield wiper switch.
   NOTICE:
   If the claw is pushed with excessive force, it may be broken.





INSPECTION

1. **INSPECT WINDSHIELD WIPER SWITCH ASSEMBLY**
   (a) Measure the resistance according to the value(s) in the table below.
   Standard resistance
   Front wiper switch

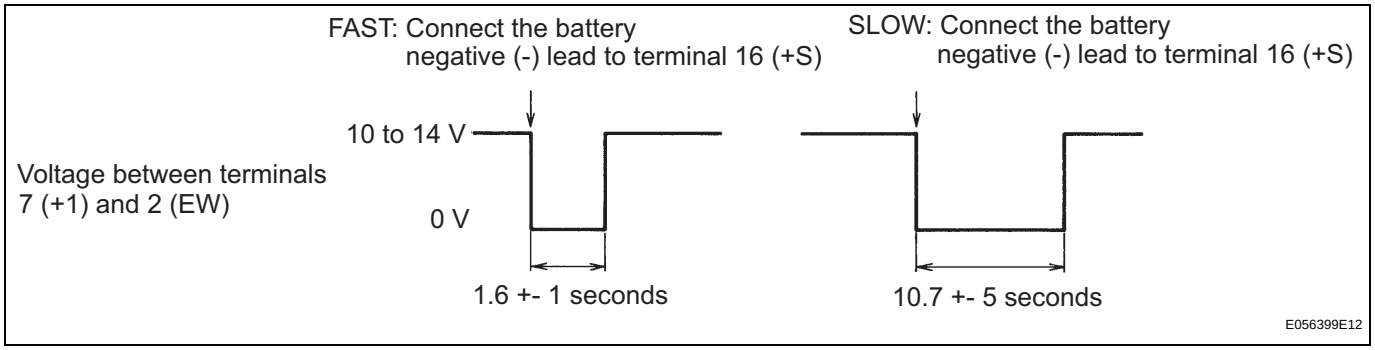
Tester Connection	Condition	Specified Condition
7 (+1) - 17 (+B)	MIST	Below 1 Ω
7 (+1) - 16 (+S)	OFF	Below 1 Ω
7 (+1) - 16 (+S)	INT	Below 1 Ω
7 (+1) - 17 (+B)	LO	Below 1 Ω
8 (+2) - 17 (+B)	HI	Below 1 Ω

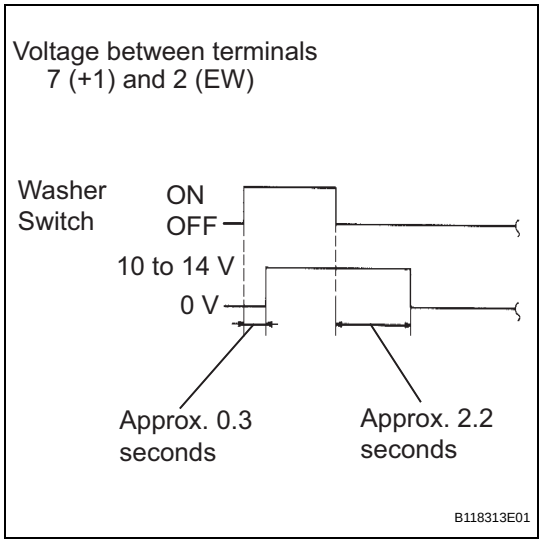
   (b) Measure the resistance of the switch connector terminals when the washer switch is operated.
   Standard resistance
   Front washer switch

Tester Connection	Condition	Specified Condition
2 (EW) -11 (WF)	OFF	10 kΩ or higher
2 (EW) -11 (WF)	ON	Below 1 Ω

   (c) Check the intermittent operation.
      (1) Connect the voltmeter positive (+) terminal to terminal 7 (+1) of the connector and the voltmeter negative (-) terminal to terminal 2 (EW).
      (2) Connect the battery positive (+) lead to terminal 17 (+B) and the battery negative (-) lead to terminals 2 (EW) and 16 (+S).
      (3) Turn the wiper switch to the INT position.
      (4) Connect the battery positive (+) lead to terminal 16 (+S) of the connector for 5 seconds.

(5) Connect the battery negative (-) lead to terminal 16 (+S) of the connector. Operate the intermittent wiper relay.
(6) Check the voltage between terminals 7 (+1) and 2 (EW).





(d) Check the front washer operation.
(1) Turn the wiper switch off.
(2) Connect the battery positive (+) lead to terminal 17 (+B) of the connector and the battery negative cable to terminals 16 (+S) and 2 (EW).
(3) Connect the voltmeter positive (+) terminal to terminal 7 (+1) of the connector and the voltmeter negative (-) terminal to terminal 2 (EW).
(4) Turn the washer switch on and off, and check the voltage between terminals 7 (+1) and 2 (EW).

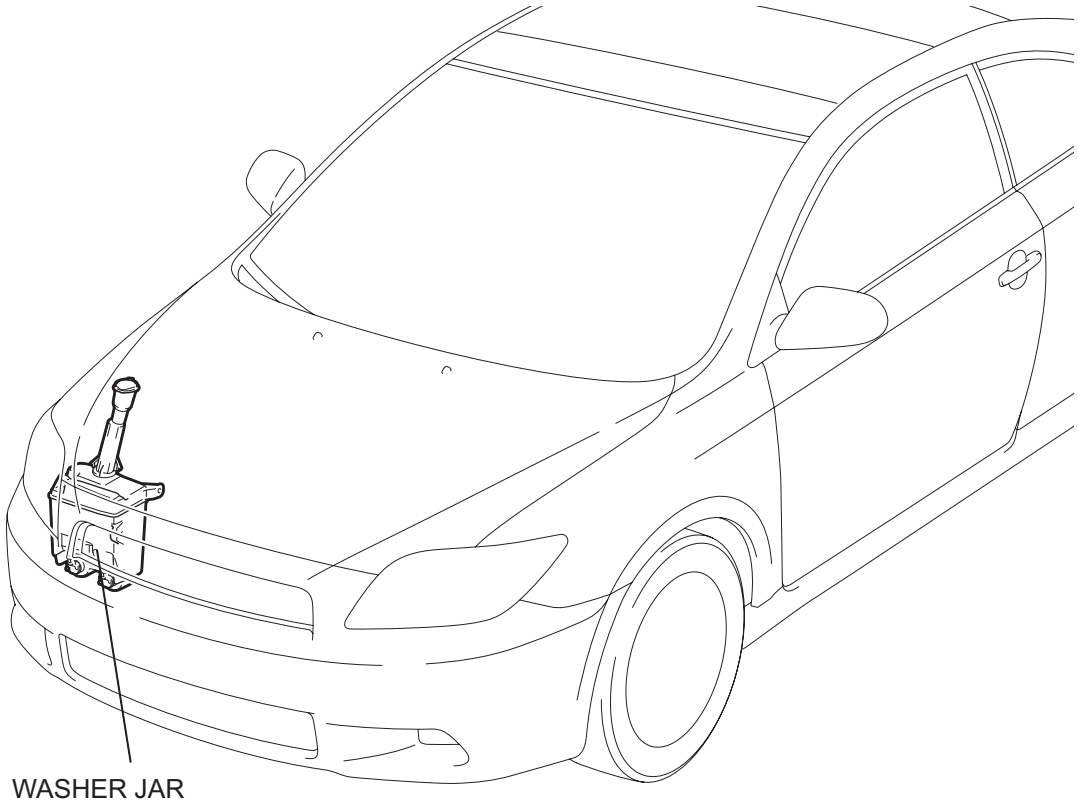
INSTALLATION

1. **INSTALL WINDSHIELD WIPER SWITCH ASSEMBLY**
   (a) Attach the claw to install the windshield wiper switch.
   (b) Connect the connector.
2. **INSTALL STEERING COLUMN COVER**
3. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
4. **PERFORM INITIALIZATION**
   (a) Perform initialization (see page IN-23).
   NOTICE:
   Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

WASHER MOTOR

PARTS LOCATION

WW



WASHER JAR
- WASHER MOTOR

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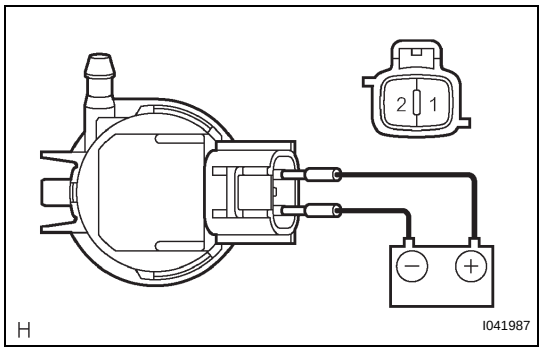

ON-VEHICLE INSPECTION

1. INSPECT FRONT WASHER MOTOR

(a) Check the motor operation.

(1) Fill the washer jar with washer fluid.

(2) Connect the positive battery (+) lead to terminal 1 of the windshield washer motor and pump assembly, and the negative battery (-) lead to terminal 2.

(3) Check that washer fluid flows from the washer jar.