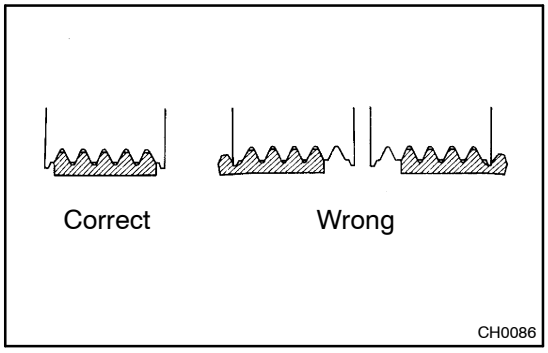


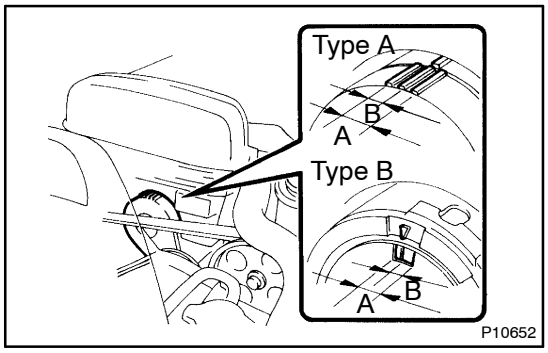
DRIVE BELT (2JZ–GE)

AC3L8–01

ON–VEHICLE INSPECTION

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

Check that the drive belt fits properly in the ribbed grooves.



2. INSPECT DRIVE BELT TENSION

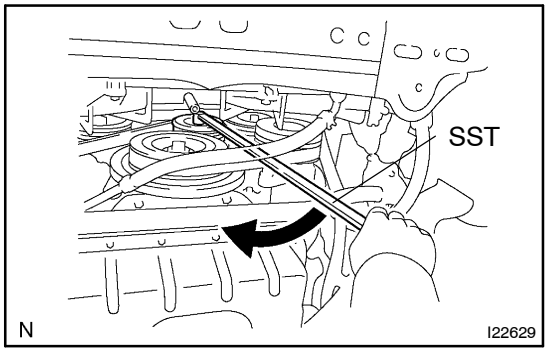
Check that the arrow mark on the belt tensioner falls within area "A" of the scale.

If it is out side area "A", replace the drive belt.

HINT:

When a new belt is installed, it should be lie within area B.

AC3L9–01



REMOVAL

REMOVE DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner clockwise and remove the drive belt.

SST 09216–00041

AC3LA–01

INSTALLATION

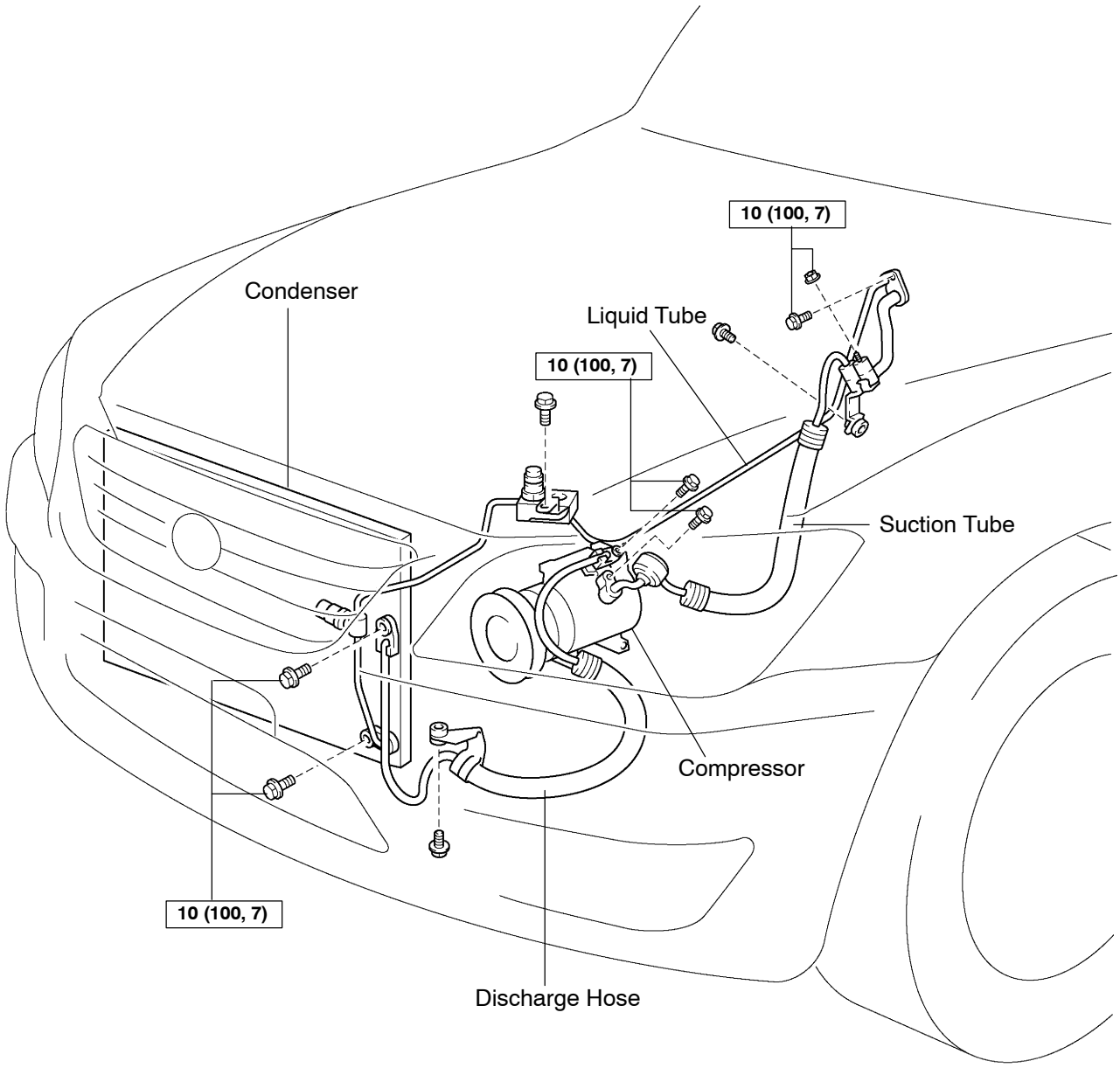
Installation is in the reverse order of removal (See page AC–2).

AFTER INSTALLATION, CHECK DRIVE BELT'S INSTALLATION CONDITION

REFRIGERANT LINE (2JZ–GE)

COMPONENTS

AC3LB–01



N·m (kgf·cm, ft·lbf) : Specified amount

N

I18042

COMPRESSOR AND MAGNETIC CLUTCH (2JZ–GE)

AC3LC–01

ON–VEHICLE INSPECTION

1. INSPECT COMPRESSOR FOR METALLIC SOUND

Check if there is abnormal metallic sound from the compressor when the A/C switch is ON.

If abnormal metallic sound is heard, replace the compressor assembly.

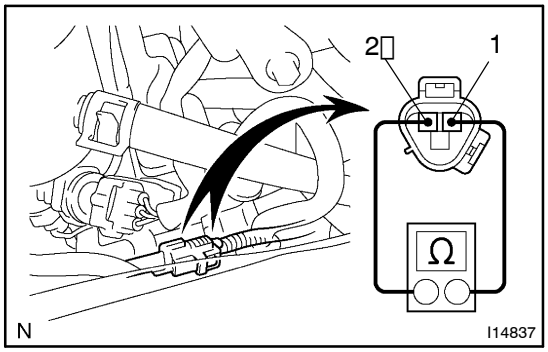
2. INSPECT REFRIGERANT PRESSURE

(See Pub. No. RM684E on page AC–3)

3. INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leakage of refrigerant.

If there is any leakage, replace the compressor assembly.



4. INSPECT COMPRESSOR LOCK SENSOR RESISTANCE

(a) Disconnect the connector.

(b) Measure resistance between terminals 1 and 2.

Standard resistance: 990 – 1,210 Ω at 20°C (68 °F)

If resistance is not as specified, replace the compressor.

5. MAKE THESE VISUAL CHECKS:

(a) Leakage of grease from the clutch bearing.

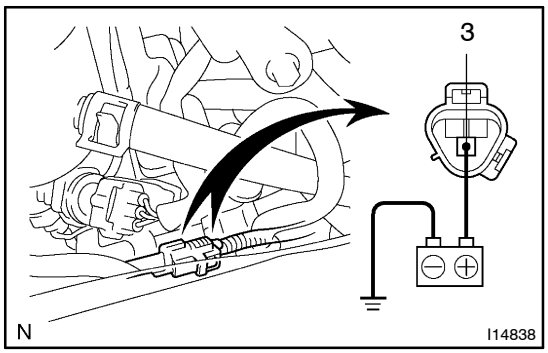
(b) Signs of oil on the pressure plate or rotor.

6. INSPECT MAGNETIC CLUTCH BEARING FOR NOISE

(a) Start engine.

(b) Check for abnormal noise from the compressor when the A/C switch is OFF.

If abnormal noise is being emitted, replace the rotor of magnetic clutch.



7. INSPECT MAGNETIC CLUTCH OPERATION

(a) Disconnect the connector.

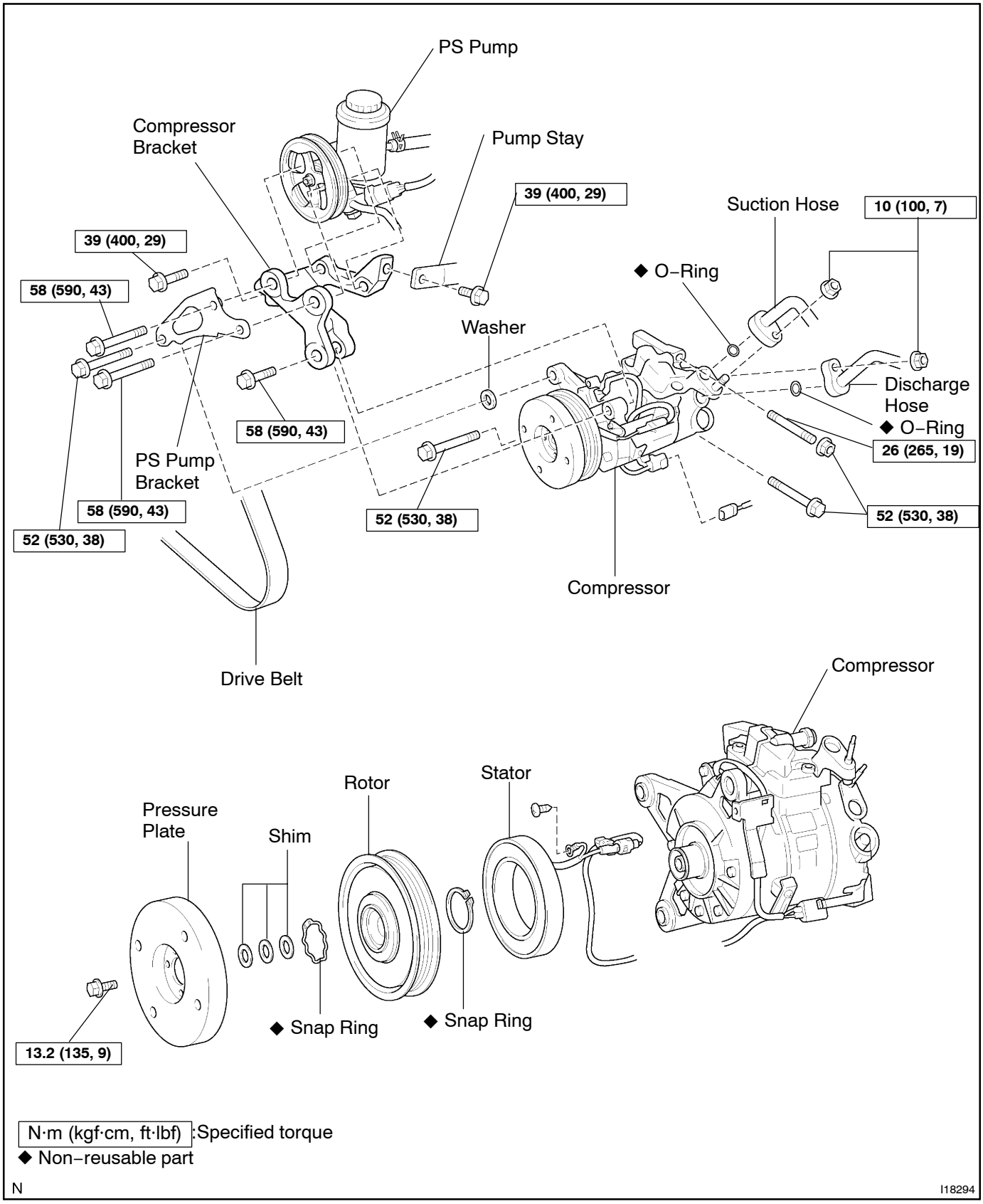
(b) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to the body ground.

(c) Check that the magnetic clutch is energized.

If operation is not as specified, replace the magnetic clutch.

AC3LD–01

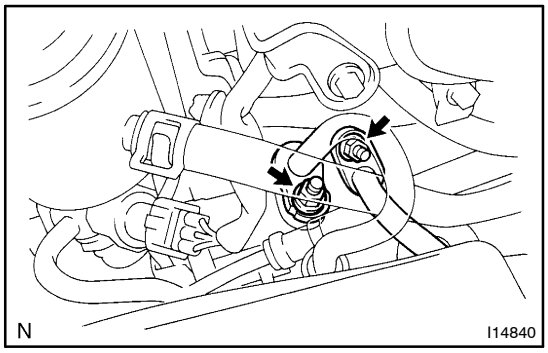
COMPONENTS



AC3LE–01

REMOVAL

1. RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX. 10 MINUTES
2. STOP ENGINE
3. DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY
4. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM
5. REMOVE DRIVE BELT (See page AC–2)

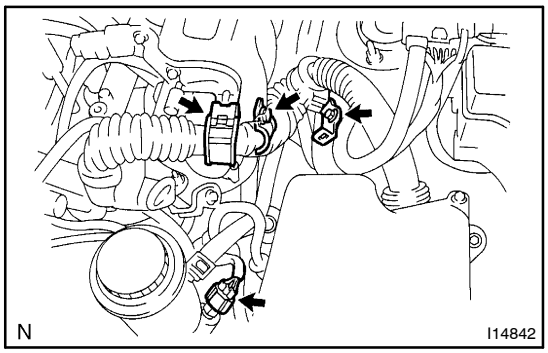


6. DISCONNECT DISCHARGE AND SUCTION HOSES

Remove the 2 nuts and disconnect the both hoses.

NOTICE:

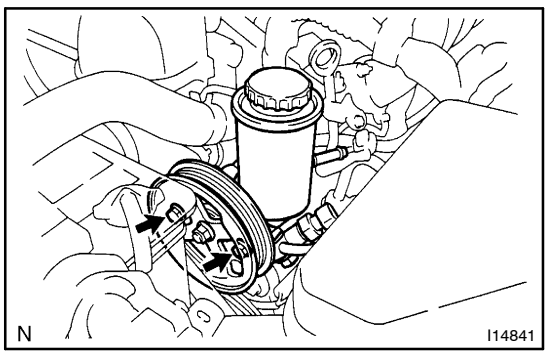
Cap the open fitting immediately to keep moisture or dirt out of the system.



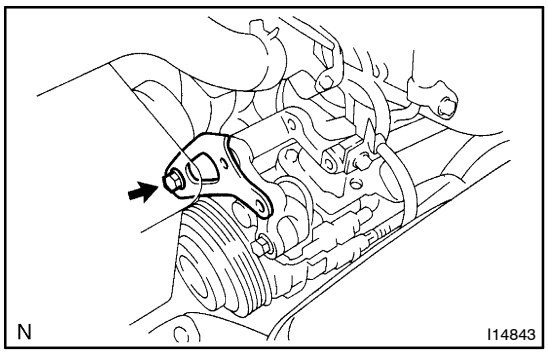
7. REMOVE PS PUMP WITH PRESSURE FEED AND RETURN TUBES STILL CONNECTED

(a) Disconnect the PS pump connector and PS pump tube clamp.

(b) Disconnect the engine wire.

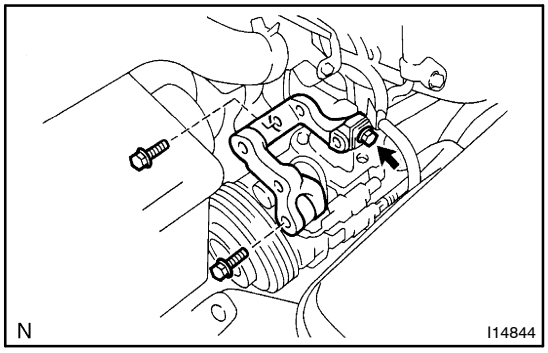


(c) Remove the 2 PS pump set bolts and slide the PS pump backward.

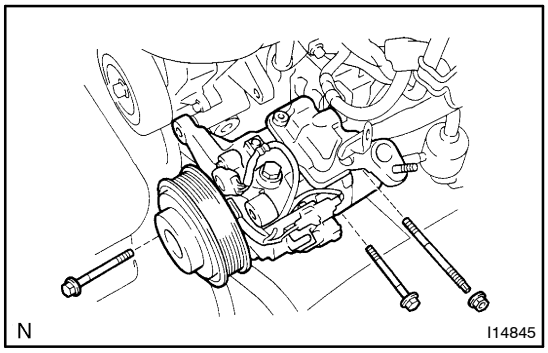


8. REMOVE COMPRESSOR

(a) Remove the bolt and PS pump bracket.



(b) Remove the 3 bolts and compressor bracket.
(c) Disconnect the connector.



(d) Remove the nut and 2 bolts.
(e) Using a torx socket (E10), remove the stud bolt and compressor.

AC3LF–01

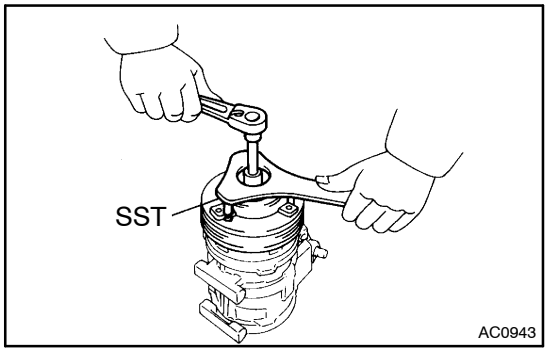
DISASSEMBLY

DISASSEMBLE MAGNETIC CLUTCH

(a) Remove the pressure plate.

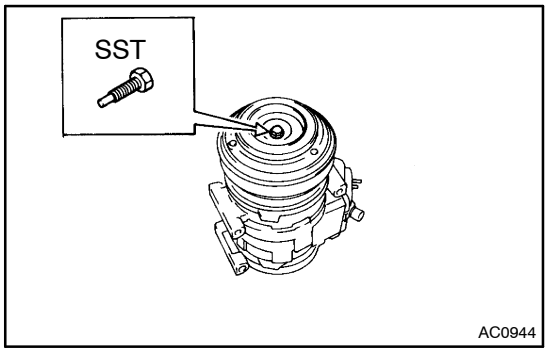
(1) Using SST and a socket wrench, remove the shaft bolt.

SST 07112–76060



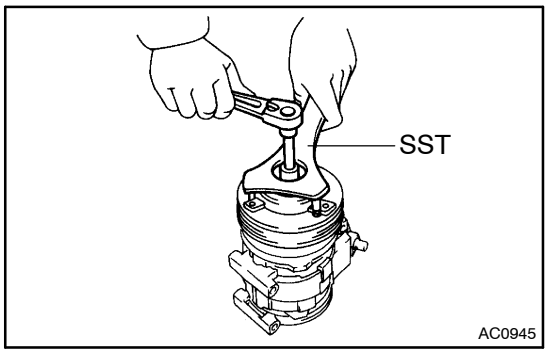
(2) Install SST on the pressure plate.

SST 07112–66040

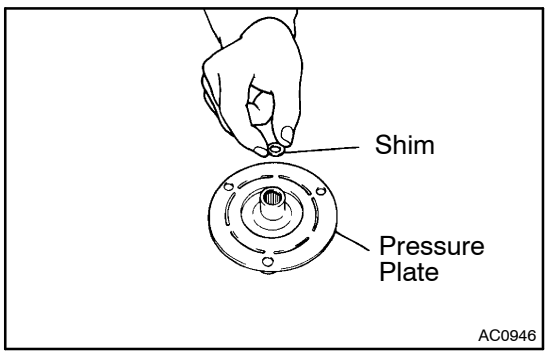


(3) Using SST and a socket wrench, remove the pressure plate.

SST 07112–66040, 07112–76060

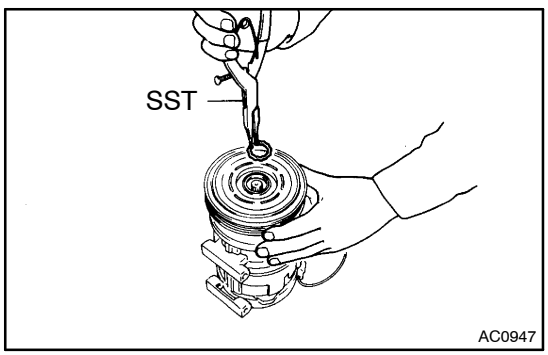


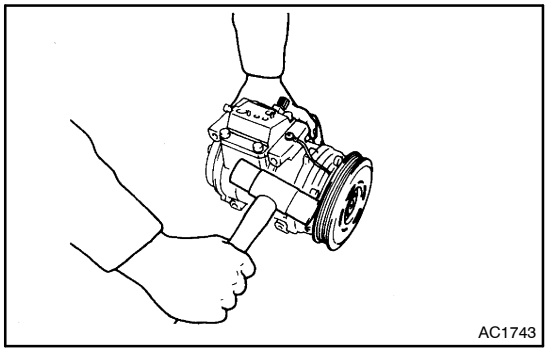
(4) Remove the shims from the pressure plate.



(b) Remove the rotor.

(1) Remove the snap ring.

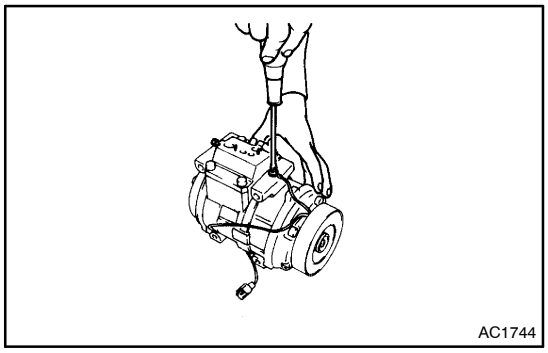




(2) Using a plastic hammer, tap the rotor off the shaft.

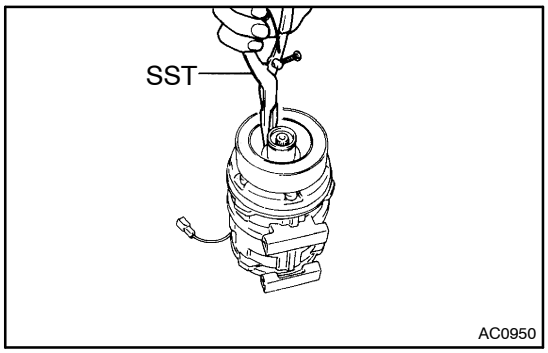
NOTICE:

Be careful not to damage the pulley when tapping on the rotor.

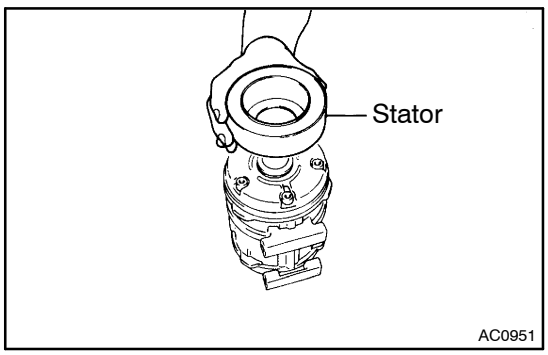


(c) Remove the stator.

(1) Disconnect the stator lead wire from the compressor.



(2) Remove the snap ring.



(3) Remove the stator.

AC3LG–01

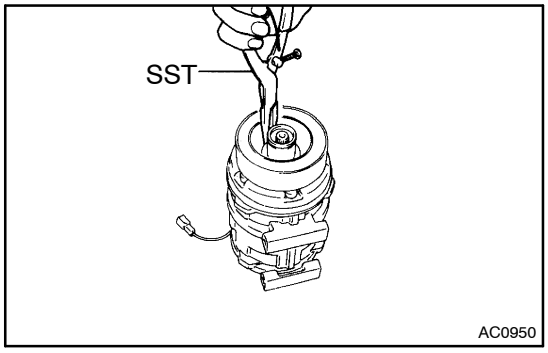
REASSEMBLY

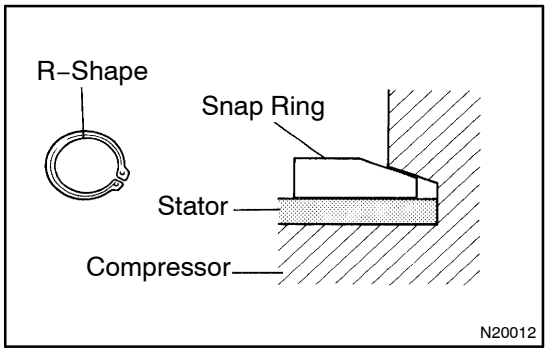
1. ASSEMBLE MAGNETIC CLUTCH

(a) Install the stator.

(1) Install the stator on compressor.

(2) Install the new snap ring.





NOTICE:

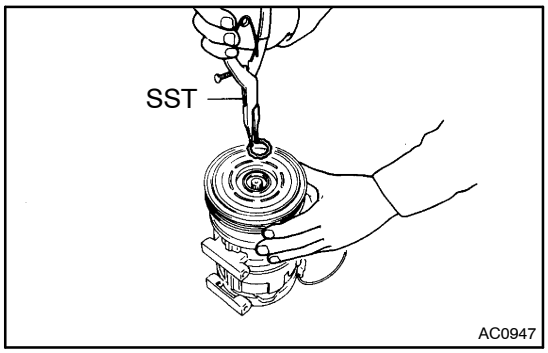
The snap ring should be installed so that its beveled side faces up.

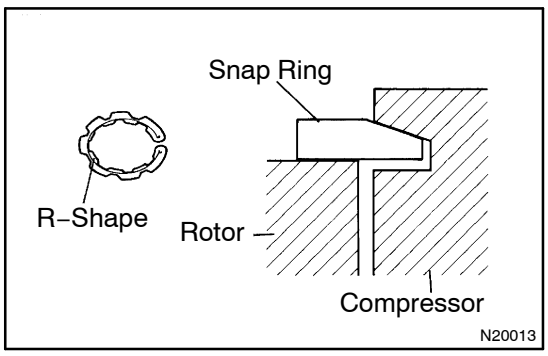
(3) Connect the stator lead wire to the compressor.

(b) Install the rotor.

(1) Install the rotor on the compressor.

(2) Install the new snap ring.





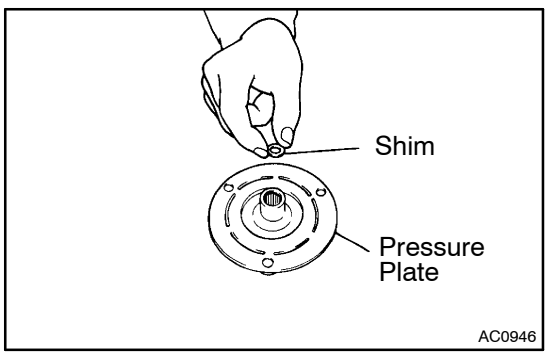
NOTICE:

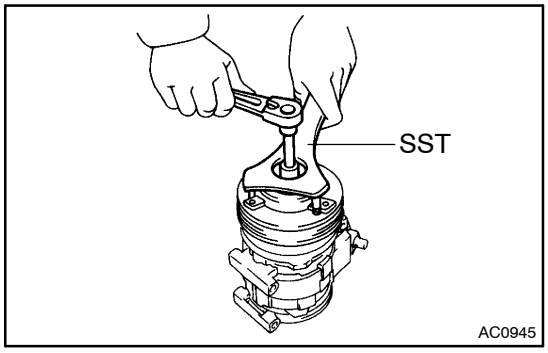
The snap ring should be installed so that its beveled side faces up.

(c) Install the pressure plate.

(1) Install the shims to the pressure plate.

(2) Install the pressure plate on the rotor.

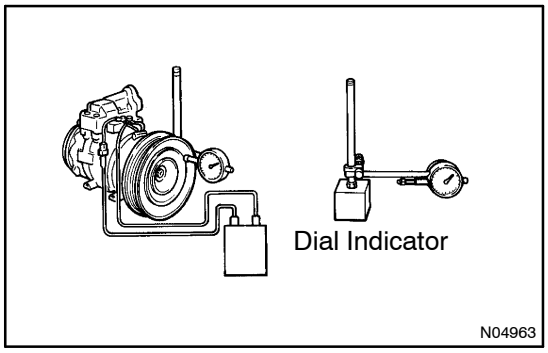




(3) Using SST and a torque wrench, install the shaft bolt.

Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)

SST 07112–76060



2. AFTER REASSEMBLY, CHECK MAGNETIC CLUTCH CLEARANCE

(a) Set the dial indicator to the pressure plate of the magnetic clutch.

(b) Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.

(c) Check the clearance between the pressure plate and rotor when connecting the negative (–) terminal to the battery.

Standard clearance:

0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

If the clearance is not within the standard clearance, adjust the clearance using shims to obtain the standard clearance.

Shim thickness:

0.1 mm (0.004 in.)

0.3 mm (0.012 in.)

0.5 mm (0.020in.)

AC3LH–01

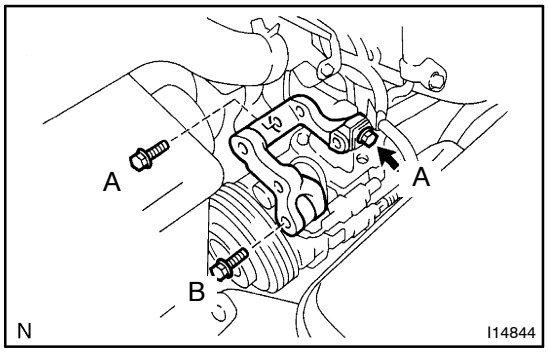
INSTALLATION

1. INSTALL COMPRESSOR

(a) Install the compressor with the stud bolt.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

(b) Install the 2 bolts and nut.
Torque:
Bolt: 52 N·m (530 kgf·cm, 38 ft·lbf)
Nut: 52 N·m (530 kgf·cm, 38 ft·lbf)

(c) Connect the connector.



(d) Install the compressor bracket with the 3 bolts.
Torque:
bolt A: 39 N·m (400 kgf·cm, 29 ft·lbf)
bolt B: 52 N·m (530 kgf·cm, 38 ft·lbf)

(e) Install the PS pump bracket with the bolt.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)

2. INSTALL PS PUMP

(a) Install 2 PS pump set bolt.
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

(b) Connect the engine wire.

(c) Connect the PS pump connector and wire harness clamp.

3. CONNECT DISCHARGE AND SUCTION HOSES

Connect the both hoses with 2 nut.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE:
Hoses should be connected immediately after the caps have been removed.

HINT:
Lubricate 2 new O–rings with compressor oil and install them to the hoses.

4. INSTALL DRIVE BELT (See page AC–3)

5. CONNECT NEGATIVE (–) TERMINAL CABLE TO BATTERY

6. EVACUATE AIR FROM REFRIGERATION SYSTEM AND CHARGE SYSTEM WITH REFRIGERANT
Specified amount: 600 ± 50 g (21.16 ± 1.76 oz.)

7. INSPECT FOR LEAKAGE OF REFRIGERANT

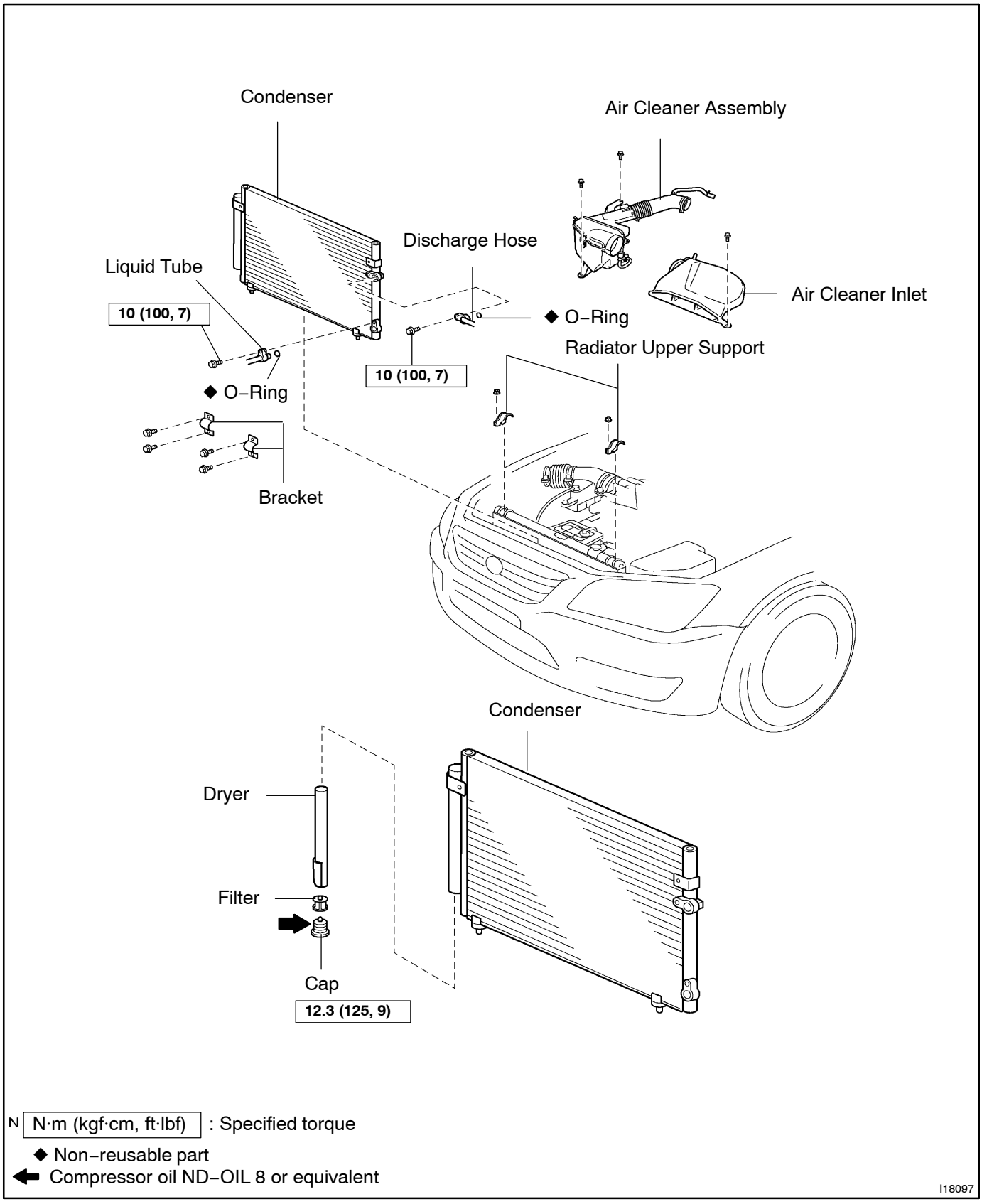
Using a gas leak detector, check for leakage of refrigerant.
If there is leakage, check the tightening torque at the joints.

8. INSPECT A/C OPERATION

CONDENSER (2JZ–GE)

COMPONENTS

AC3LI–01



AC3LJ–01

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

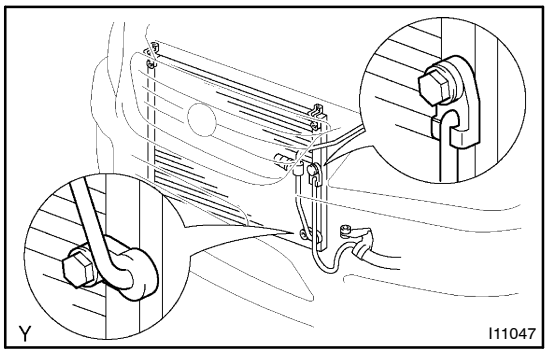
Specified amount : 600 ± 50 g (21.16 ± 1.76 oz.)

2. REMOVE AIR CLEANER DUCT AND AIR CLEANER ASSEMBLY

3. REMOVE ECU OUTLET DUCT

4. REMOVE 2 RADIATOR UPPER SUPPORTS

Remove the 2 bolts and upper supports.



5. DISCONNECT DISCHARGE HOSE AND LIQUID TUBE

Remove the 2 bolts and disconnect the hose and tube.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

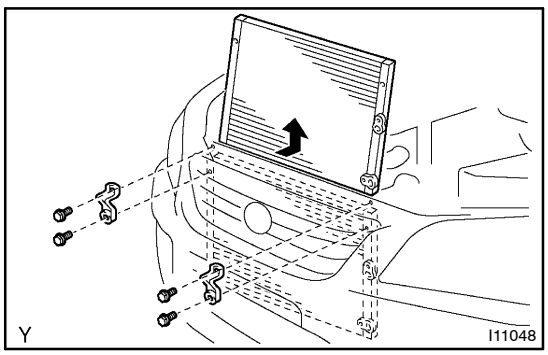
NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

At the time of installation, please refer to the following item.

Lubricate 2 new O–rings with compressor oil and install them to the hose and tube.



6. REMOVE CONDENSER

(a) Remove the 4 bolts and 2 brackets.

(b) Push the radiator toward engine.

(c) Push the condenser toward radiator and pull it upward.

HINT:

At the time of installation, please refer to the following item.

If condenser is replaced, add compressor oil to the condenser.

Add 40 cc (1.4 fl. oz)

Compressor oil: ND – OIL 8 or equivalent

AC3LK–01

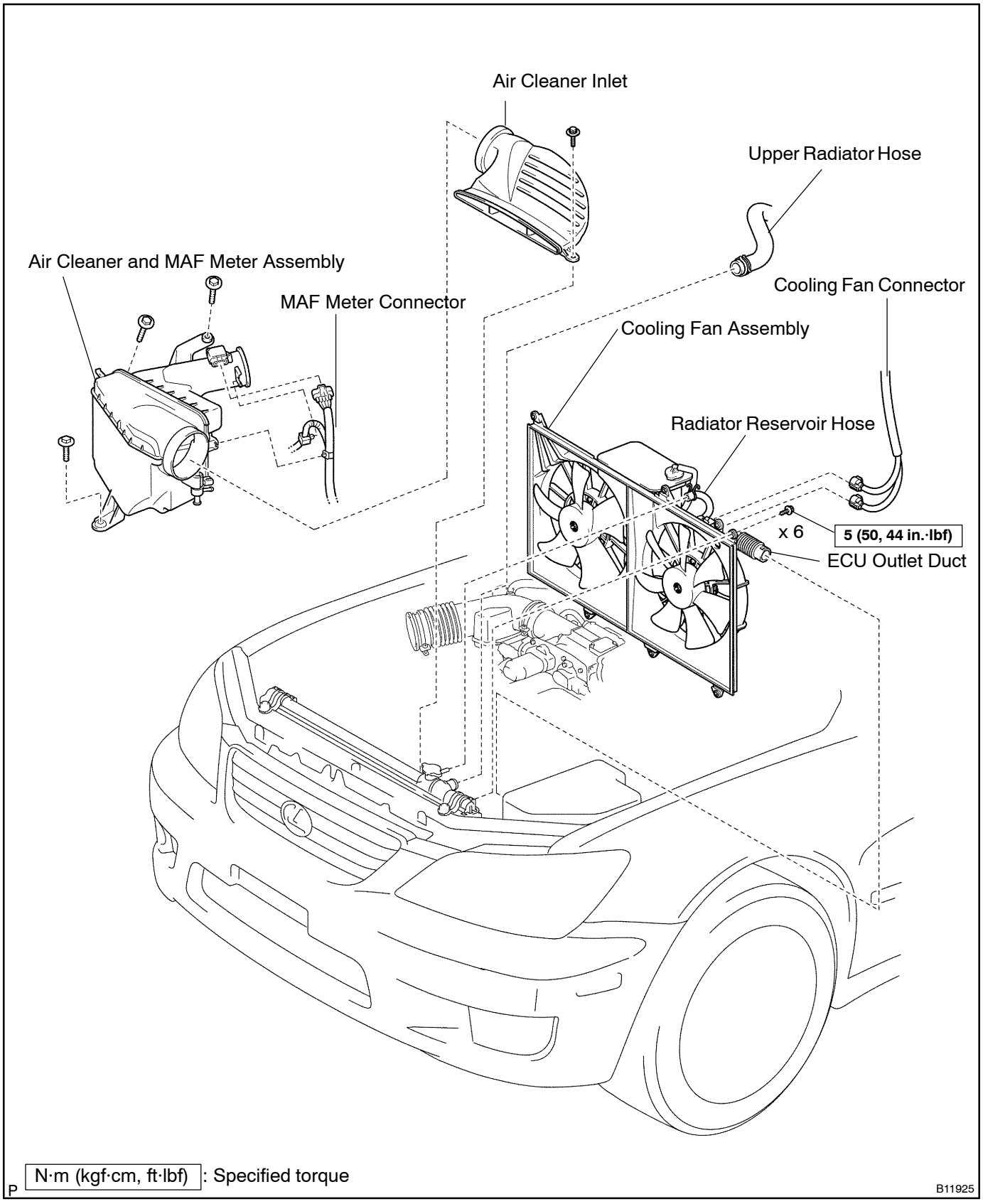
INSTALLATION

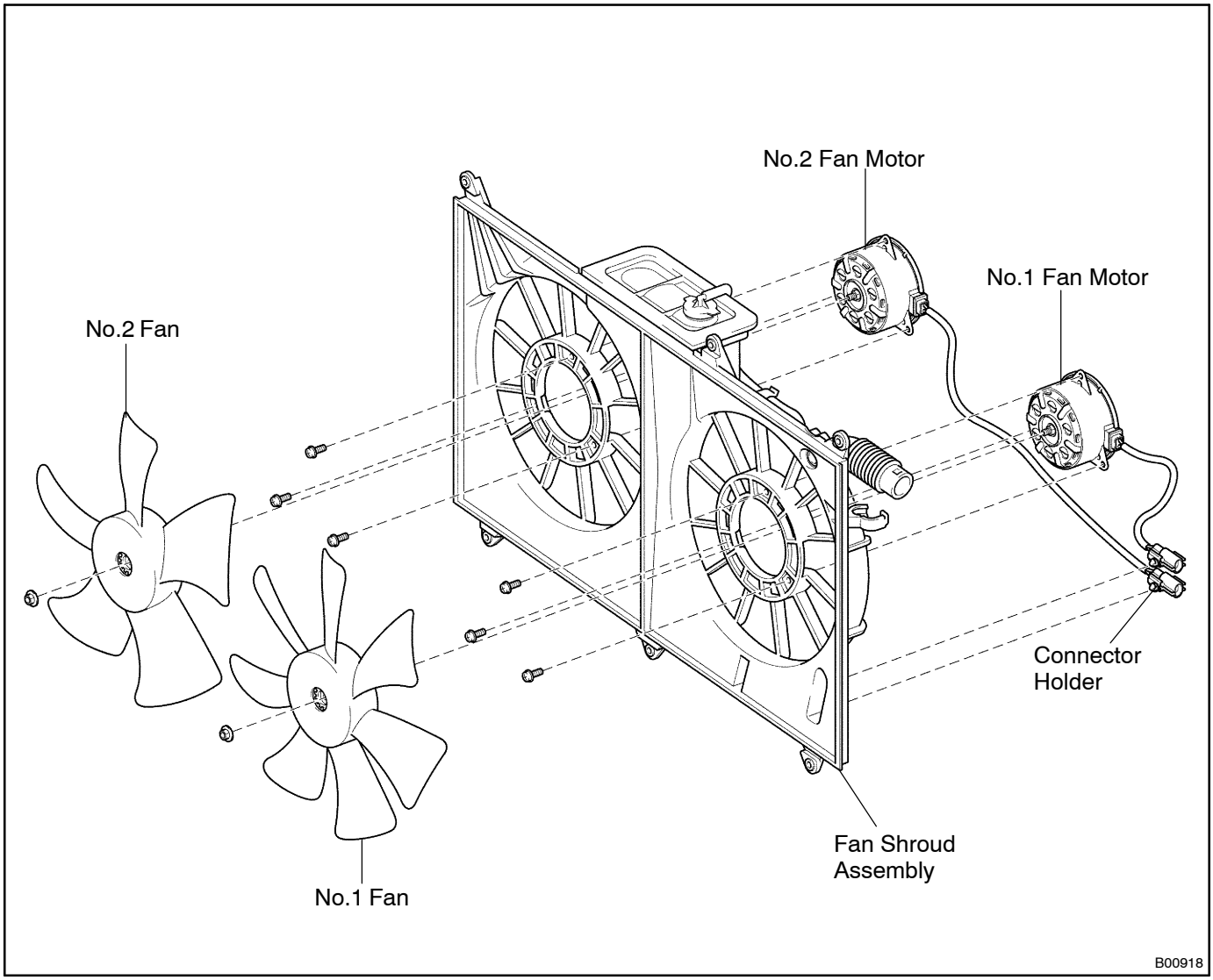
Installation is in the reverse order of removal (See page AC–15).

CONDENSER FAN (2JZ–GE)

COMPONENTS

AC3LL–01




No.2 Fan Motor
No.1 Fan Motor
No.2 Fan
Connector Holder
Fan Shroud Assembly
No.1 Fan
B00918

AC3LM–01

REMOVAL

1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant.

2. REMOVE AIR CLEANER INLET

3. REMOVE AIR CLEANER AND MAF METER ASSEMBLY

4. REMOVE COOLING FAN

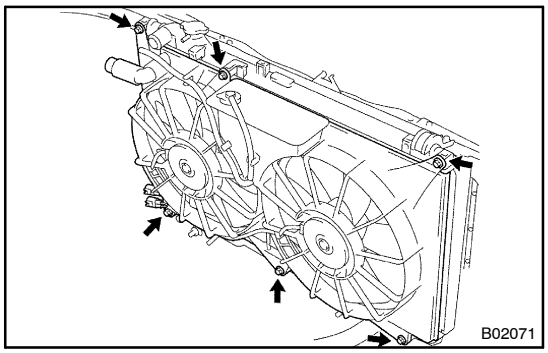
(a) Disconnect the upper radiator hose from the radiator.

(b) Disconnect the ECU outlet duct from the ECU box.

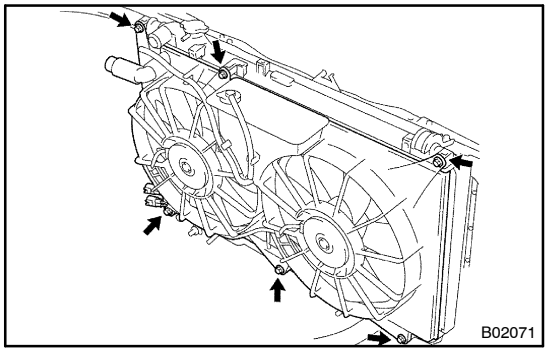
(c) Disconnect the wire for cooling fan from the clamp on the cooling fan.

(d) Disconnect the 2 cooling fan connector.

(e) Disconnect the radiator reservoir hose from the radiator.



(f) Remove the 6 bolts and cooling fan.



AC3LN–01

INSTALLATION

1. INSTALL COOLING FAN

(a) Install the cooling fan with the 6 bolts.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

(b) Connect the upper radiator hose to the radiator.

(c) Connect the ECU outlet duct to the ECU box.

(d) Connect the wire for cooling fan to clamp on the cooling fan.

(e) Connect the 2 cooling fan connectors.

(f) Connect the radiator reservoir hose to the radiator.

2. INSTALL AIR CLEANER AND MAF METER ASSEMBLY

3. INSTALL AIR CLEANER INLET

4. FILL WITH ENGINE COOLANT

5. START ENGINE AND CHECK FOR COOLANT LEAKS

AUTOMATIC TRANSMISSION SYSTEM

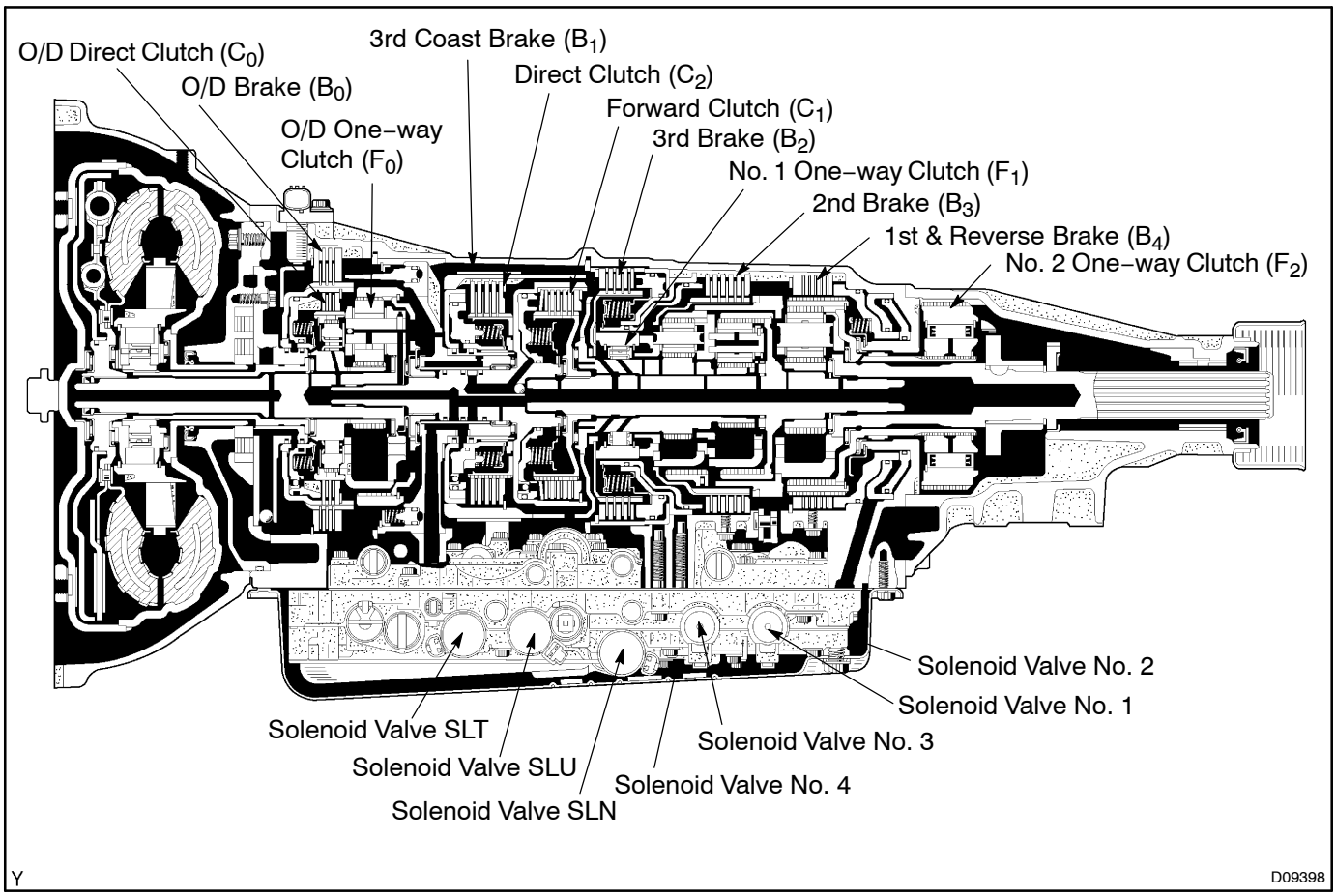
AT0HC–02

PRECAUTION

If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

AT05W–07

OPERATION



Shift Lever Range	Gear Position	S1	S2	S3	S4	C_0	C_1	C_2	B_0	B_1	B_2	B_3	B_4	F_0	F_1	F_2
P	Park	ON	OFF	ON	OFF	○										
R	Reverse	ON	OFF	OFF	OFF			○	○				○			
N	Neutral	ON	OFF	ON	OFF	○										
D M (5)*	1st	ON	OFF	OFF	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
	3rd	OFF	ON	OFF	OFF	○	○				○			○	○	
	4th	OFF	OFF	ON	OFF	○	○	○			○			○		
	5th	OFF	OFF	OFF	ON		○	○	○		○					
3	1st	ON	OFF	OFF	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
	3rd	OFF	ON	ON	OFF	○	○			○	○			○	○	
2	1st	ON	OFF	ON	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
L	1st	ON	OFF	OFF	OFF	○	○						○	○		○

○ : Operating

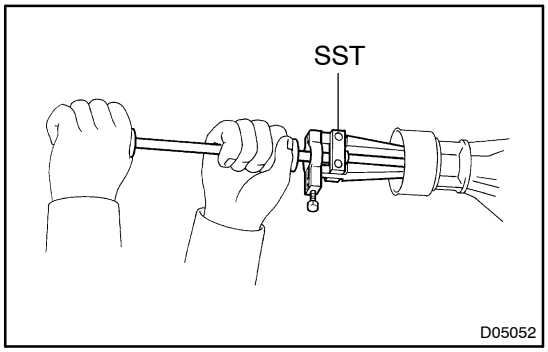
* : When the shift lever range is ”M” and the gear position indicator shows ”5”.

EXTENSION HOUSING OIL SEAL

AT0HE–03

ON–VEHICLE REPAIR

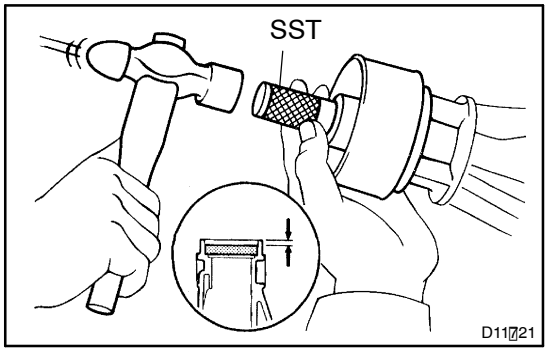
1. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS
2. REMOVE LH FRONT FLOOR CENTER COVER
3. REMOVE NO. 1 REAR FLOOR BOARD
4. POSITION PAN TO CATCH ANY FLUID THAT MAY DRIP
5. REMOVE EXHAUST PIPE ASSEMBLY
   (See page EM–99)
6. REMOVE PROPELLER SHAFT (See page PR–4)



7. REMOVE EXTENSION HOUSING OIL SEAL

Using SST, remove the oil seal.

SST 09308–00010



8. INSTALL EXTENSION HOUSING OIL SEAL

(a) Using SST and a hammer, carefully drive a new oil seal in as far as it will go.

SST 09325–20010

Oil seal drive in depth: 5.4 – 5.8 mm (0.21 – 0.22 in.)

NOTICE:

Clean the extension housing before removing the oil seal.

(b) Coat the lip of a new oil seal with MP grease.

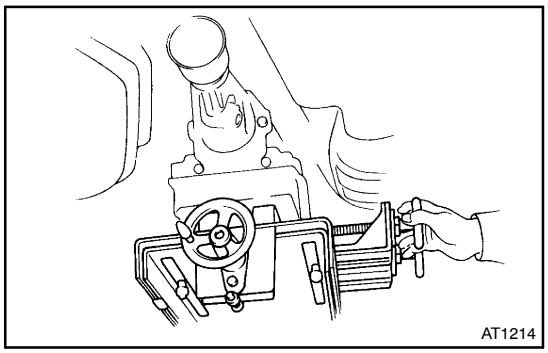
9. INSTALL PROPELLER SHAFT (See page PR–9)
10. INSTALL EXHAUST PIPE ASSEMBLY
    (See page EM–99)
11. FILL ATF AND CHECK FLUID LEVEL
    (See page DI–170)
12. REMOVE NO. 1 REAR FLOOR BOARD
13. REMOVE LH FRONT FLOOR CENTER COVER
14. INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS

SENSOR ROTOR

AT0HF–03

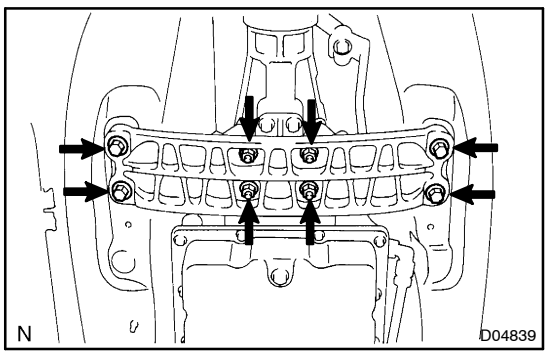
ON–VEHICLE REPAIR

1. POSITION PAN TO CATCH ANY FLUID THAT MAY DRIP
2. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS
3. REMOVE LH FRONT FLOOR CENTER COVER
4. REMOVE NO. 1 REAR FLOOR BOARD
5. REMOVE EXHAUST PIPE (See page EM–99)
6. REMOVE PROPELLER SHAFT (See page PR–4)
7. REMOVE VEHICLE SPEED SENSOR (See page AT–7)



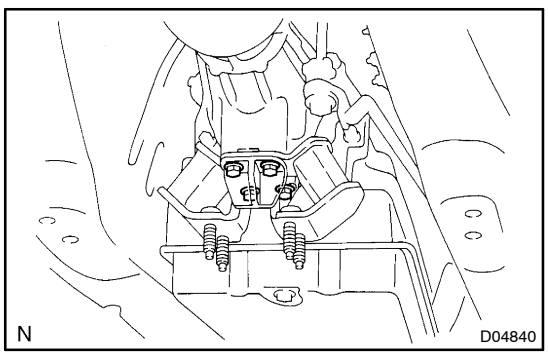
8. JACK UP TRANSMISSION SLIGHTLY

Securely support the transmission on a transmission jack.
Lift the transmission slightly from the rear support member.



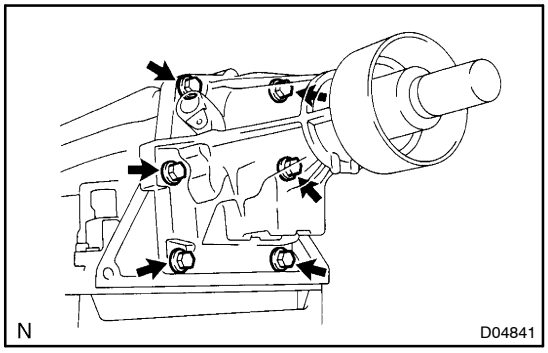
9. REMOVE ENGINE REAR SUPPORT MEMBER

(a) Remove the 4 bolts.
(b) Remove the 4 nuts and rear support member.



10. REMOVE TRANSMISSION MOUNTING BRACKET

Remove the 4 bolts and the transmission mounting bracket from the transmission.



11. REMOVE EXTENSION HOUSING

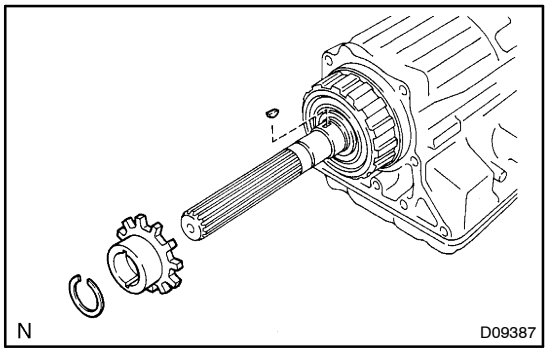
(a) Remove the 6 bolts.

(b) Remove the extension housing.

HINT:

If necessary, tap the extension housing with a plastic hammer.

(c) Remove the extension housing gasket.



12. REMOVE SENSOR ROTOR AND KEY

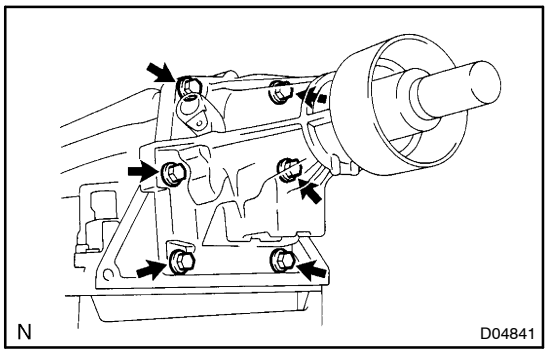
(a) Using a snap ring expander, remove the snap ring.

(b) Remove the sensor rotor and key.

13. INSTALL KEY AND SENSOR ROTOR

(a) Install the key and sensor rotor.

(b) Using a snap ring expander, install a new snap ring.



14. INSTALL EXTENSION HOUSING

(a) Install a new extension housing gasket.

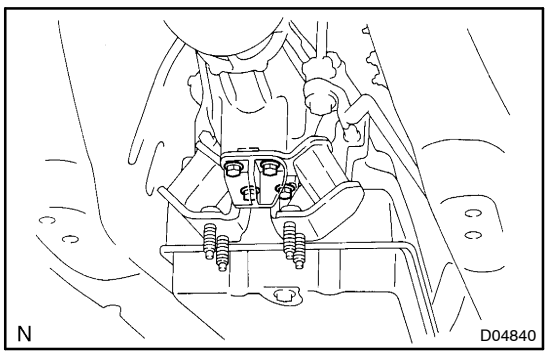
(b) Install the extension housing with the 6 bolts.

Torque: 34 N·m (345 kgf·cm, 25 ft·lbf)

HINT:

Coat the thread of the all bolts with sealant.

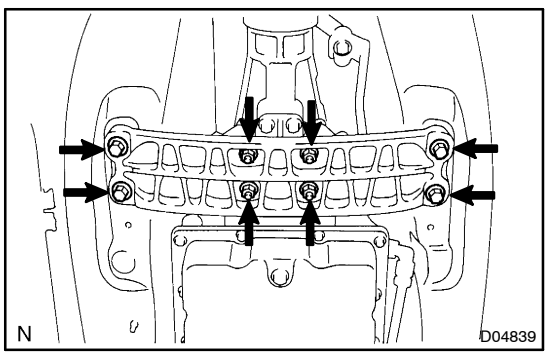
Sealant:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent



15. INSTALL TRANSMISSION MOUNTING BRACKET

Install the transmission mounting bracket with the 4 bolts to the transmission.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



16. INSTALL ENGINE REAR SUPPORT MEMBER

(a) Install the 4 nuts.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

(b) Install the rear support member with the 4 bolts.

Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

17. REMOVE JACK

18. INSTALL VEHICLE SPEED SENSOR (See page AT–7)

19. INSTALL PROPELLER SHAFT (See page PR–9)

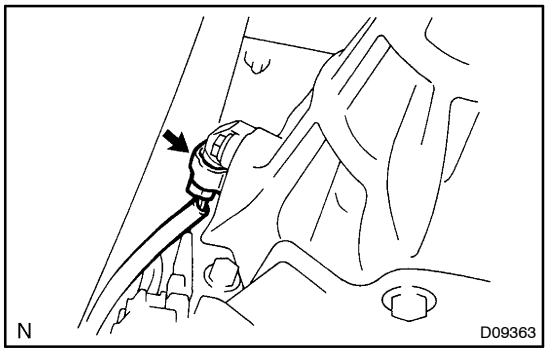
20. INSTALL EXHAUST PIPE (See page EM–99)
21. FILL ATF AND CHECK FLUID LEVEL (See page DI–170)
22. INSTALL NO. 1 REAR FLOOR BOARD
23. INSTALL LH FRONT FLOOR CENTER COVER
24. INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS

VEHICLE SPEED SENSOR

AT0XV–02

ON–VEHICLE REPAIR

1. **REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS**
2. **REMOVE LH FRONT FLOOR CENTER COVER**
3. **REMOVE NO. 1 REAR FLOOR BOARD**



4. **DISCONNECT VEHICLE SPEED SENSOR CONNECTOR**
5. **REMOVE VEHICLE SPEED SENSOR**

(a) Remove the bolt and vehicle speed sensor.

(b) Remove the O–ring from the vehicle speed sensor.

6. **INSTALL VEHICLE SPEED SENSOR**

(a) Coat a O–ring with ATF and install it to the vehicle speed sensor.

(b) Install the vehicle speed sensor to the extension housing and torque the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

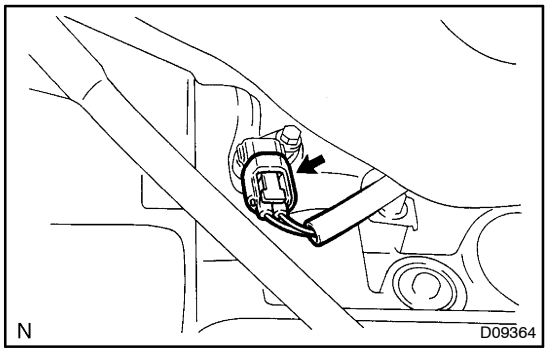
7. **INSTALL NO. 1 REAR FLOOR BOARD**
8. **INSTALL LH FRONT FLOOR CENTER COVER**
9. **INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS**

O/D DIRECT CLUTCH SPEED SENSOR

AT0XW–06

ON–VEHICLE REPAIR

1. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS
2. REMOVE LH FRONT FLOOR CENTER COVER
3. REMOVE NO. 1 REAR FLOOR BOARD



4. DISCONNECT O/D DIRECT CLUTCH SPEED SENSOR CONNECTOR
5. REMOVE O/D DIRECT CLUTCH SPEED SENSOR
(a) Remove the bolt and O/D direct clutch speed sensor.
(b) Remove the O–ring from the O/D direct clutch speed sensor.
6. INSTALL O/D DIRECT CLUTCH SPEED SENSOR
(a) Coat a O–ring with ATF and install it to the O/D direct clutch speed sensor.
(b) Install the O/D direct clutch speed sensor to the transmission case and torque the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
7. INSTALL NO. 1 REAR FLOOR BOARD
8. INSTALL LH FRONT FLOOR CENTER COVER
9. INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS

ATF TEMPERATURE SENSOR

AT0ZY–01

ON–VEHICLE REPAIR

CAUTION:

When working with FIPG material, you must observe the following items.

- **Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components to remove all the loose material.**
- **Clean both sealing surfaces with a non–residue solvent.**
- **Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**

1. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS

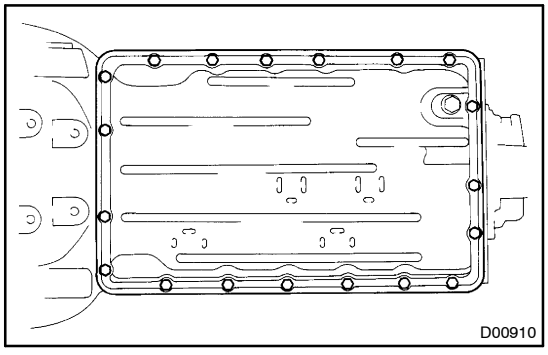
2. REMOVE LH FRONT FLOOR CENTER COVER

3. REMOVE NO. 1 REAR FLOOR BOARD

4. DRAIN ATF

(a) Remove the drain plug, gasket and drain ATF.

(b) Install a new gasket and drain plug.
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

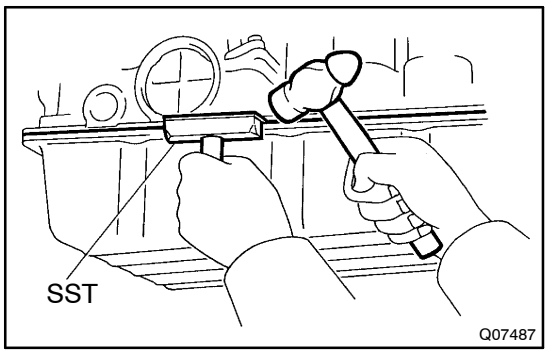


5. REMOVE OIL PAN

NOTICE:

Some fluid will remain in the oil pan.

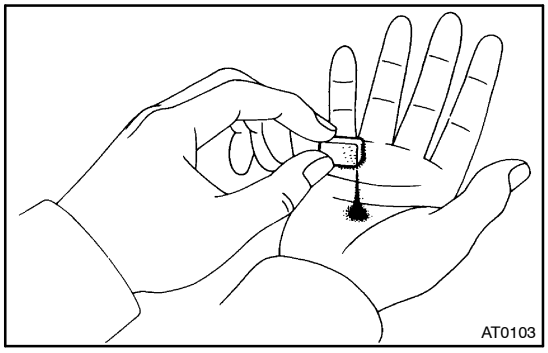
(a) Remove the 19 bolts.



(b) Install the blade of SST between the transmission case and oil pan, cut off applied sealer, and remove the oil pan.
SST 09032–00100

NOTICE:

When removing the oil pan, be careful not to damage the oil pan flange.

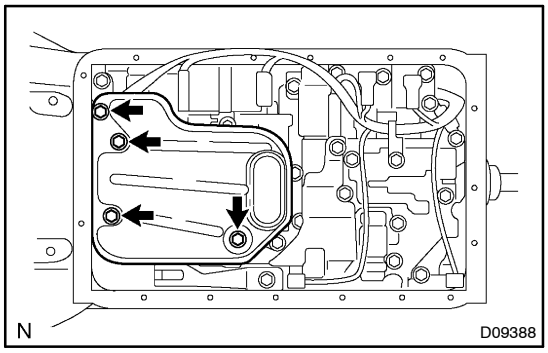


6. EXAMINE PARTICLES IN PAN

Remove the magnets and use them to collect steel particles. Carefully look at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.

Steel (magnetic) ... bearing, gear and clutch plate wear

Brass (non–magnetic) ... bushing wear

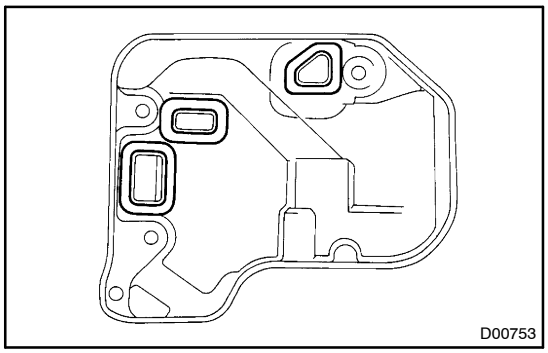


7. REMOVE OIL STRAINER

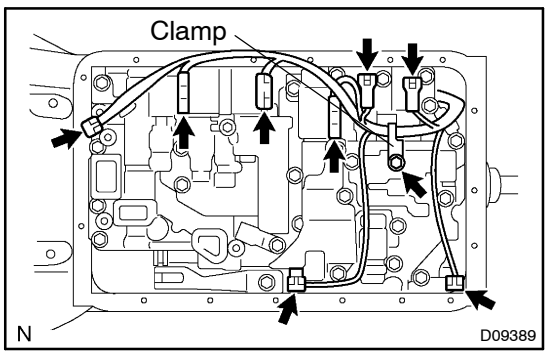
NOTICE:

Be careful as some fluid will come out of the oil strainer.

(a) Remove the 4 bolts and oil strainer.



(b) Remove the 3 gaskets from the oil strainer.

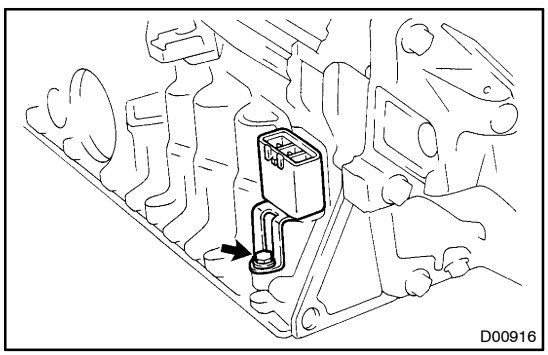


8. REMOVE SOLENOID WIRE WITH ATF TEMPERATURE SENSOR

(a) Disconnect the ATF temperature sensor.

(b) Remove the bolt and clamp.

(c) Disconnect the 7 connectors from the solenoid valves.

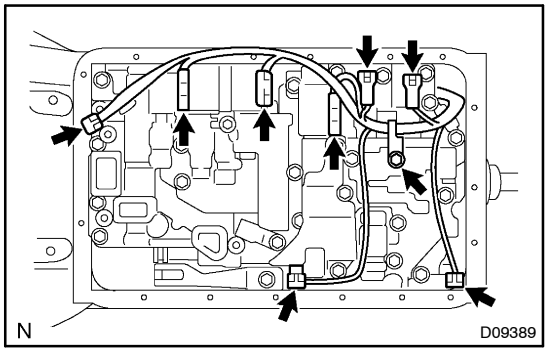


(d) Remove the bolt, solenoid connector and O–ring.

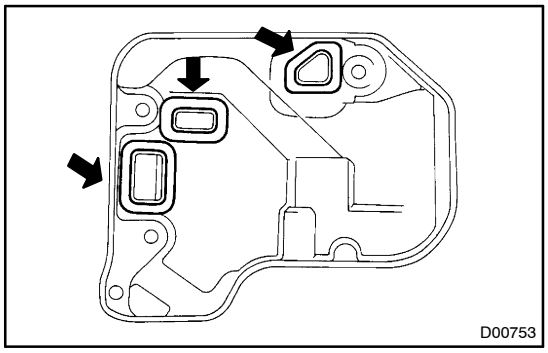
9. INSTALL SOLENOID WIRE WITH ATF TEMPERATURE SENSOR

(a) Install the solenoid connector with the bolt.

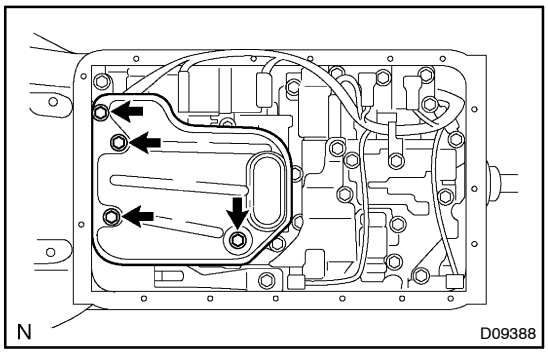
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



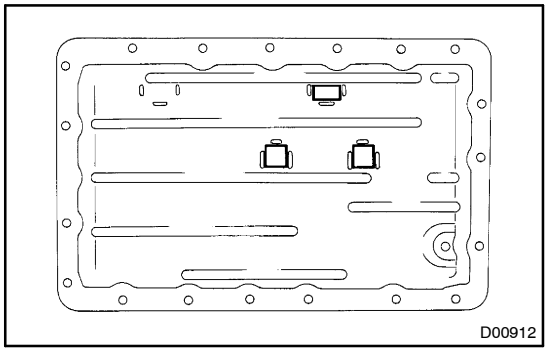
(b) Connect the 7 connectors to the solenoid valves.
(c) Install the clamp with the bolt.
Torque: 6.4 N·m (65 kgf·cm, 56 in.·lbf)
(d) Connect the ATF temperature sensor.



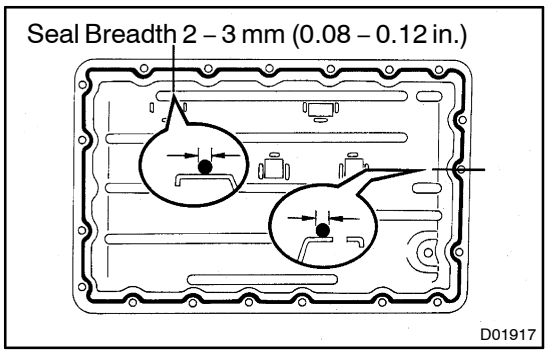
10. INSTALL OIL STRAINER
(a) Install the 3 new gaskets.



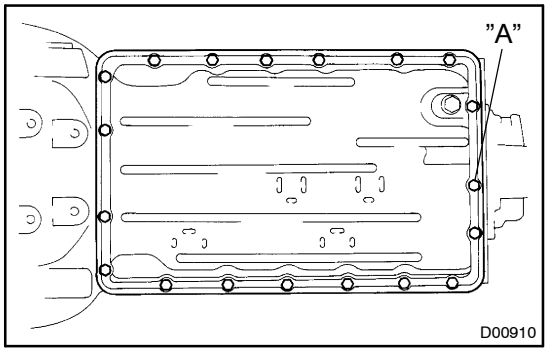
(b) Install the oil strainer with the 4 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



11. INSTALL OIL PAN
(a) Install the 3 magnets in the indications of the oil pan.



(b) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.
(c) Apply FIPG to the oil pan.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent



(d) Install the oil pan with the 19 bolts.
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

HINT:
Replace the only "A" bolt with a new one.

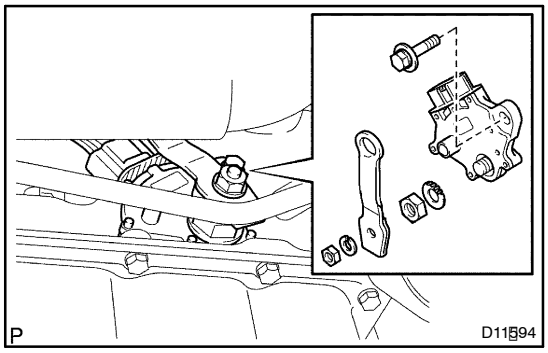
12. FILL FLUID AND CHECK FLUID (See page DI–170)
13. INSTALL NO. 1 REAR FLOOR BOARD
14. INSTALL LH FRONT FLOOR CENTER COVER
15. INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS

NEUTRAL START SWITCH

AT0Y7–03

ON–VEHICLE REPAIR

1. **REMOVE FRONT EXHAUST PIPE (See page EM–99)**
2. **DISCONNECT NEUTRAL START SWITCH CONNECTOR**



3. **REMOVE NEUTRAL START SWITCH**
   (a) Remove the nut and control shaft lever.
   (b) Pry off the lock washer and shaft lever.
   (c) Remove the bolt and neutral start switch.
4. **INSTALL NEUTRAL START SWITCH**
   (a) Install the neutral start switch and bolt.
   Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
   (b) Install a new lock washer and the nut.
   Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)
   (c) Stake the nut with the lock washer.
   (d) Install the control shaft lever and nut.
   Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)
5. **CONNECT NEUTRAL START SWITCH CONNECTOR**
6. **CHECK NEUTRAL START SWITCH OPERATION**

Check that the engine can be started with the shift lever only in the N and P range, but not in the other ranges.
If not as started above, carry out the adjustment procedure (See page DI–170).

7. **INSTALL FRONT EXHAUST PIPE (See page EM–99)**

VALVE BODY ASSEMBLY

AT05Z–05

ON–VEHICLE REPAIR

CAUTION:

When working with FIPG material, you must observe the following items.

- **Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components to remove all the loose material.**
- **Clean both sealing surfaces with a non–residue solvent.**
- **Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**

1. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS

2. REMOVE LH FRONT FLOOR CENTER COVER

3. REMOVE NO. 1 REAR FLOOR BOARD

4. DRAIN ATF

(a) Remove the drain plug, gasket and drain ATF.

(b) Install a new gasket and drain plug.

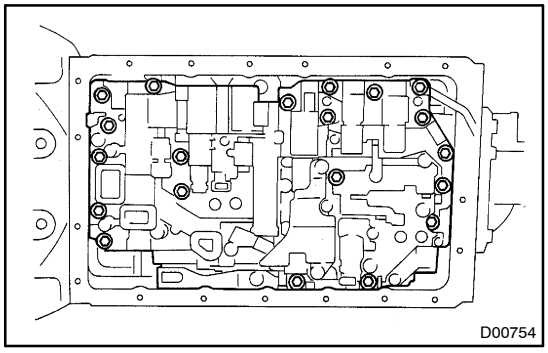
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

5. REMOVE OIL PAN (See page AT–9)

6. EXAMINE PARTICLES IN PAN (See page AT–9)

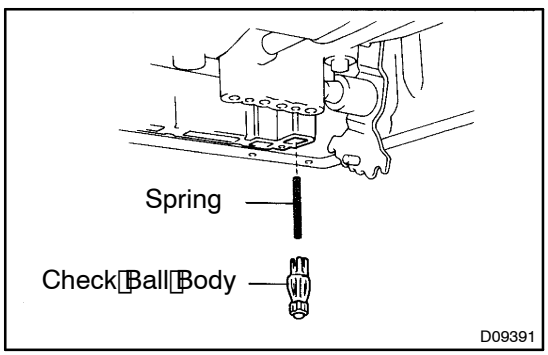
7. REMOVE OIL STRAINER (See page AT–9)

8. REMOVE SOLENOID WIRE WITH ATF TEMPERATURE SENSOR (See page AT–9)



9. REMOVE VALVE BODY

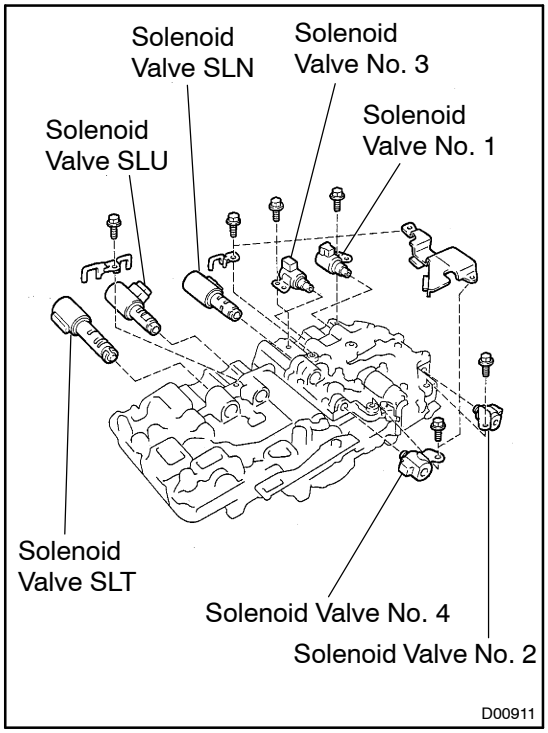
Remove the 20 bolts and valve body.



10. REMOVE CHECK BALL BODY AND SPRING

NOTICE:

Do not drop the check ball body and spring.



11. REMOVE SOLENOID VALVE

(a) Remove the 3 bolts and solenoid valve No. 1, No. 2 and No. 3.

(b) Remove the 2 bolts, oil guide plate, lock plate, solenoid valve SLN and No. 4.

(c) Remove the 6 O–rings from each solenoid valve.

(d) Remove the bolt, lock plate and solenoid valve SLU and SLT.

12. INSTALL SOLENOID VALVE

(a) Install the solenoid valve SLU and SLT and the lock plate with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 56 in.·lbf)

(b) Coat 6 new O–rings with ATF.

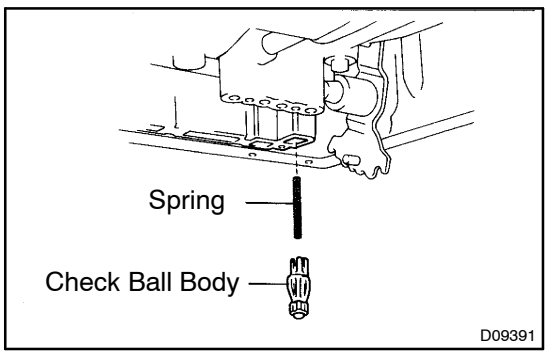
(c) Install the 6 O–rings to the each solenoid valve.

(d) Install the solenoid valve SLN, No. 4, lock plate and oil guide plate with the 2 bolts.

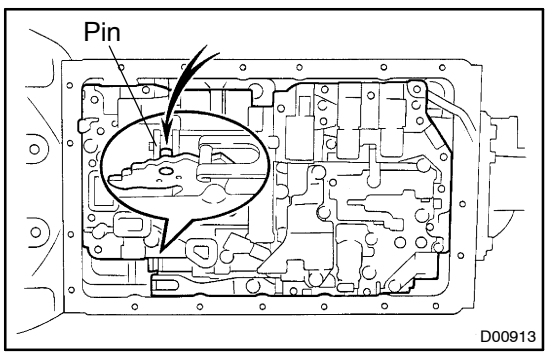
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

(e) Install the solenoid valve No. 1, No. 2 and No. 3 with the 3 bolts.

Torque:
Solenoid valve No. 1 and No. 3:
6.4 N·m (65 kgf·cm, 56 in.·lbf)
Solenoid valve No. 2:
10 N·m (100 kgf·cm, 7 ft·lbf)

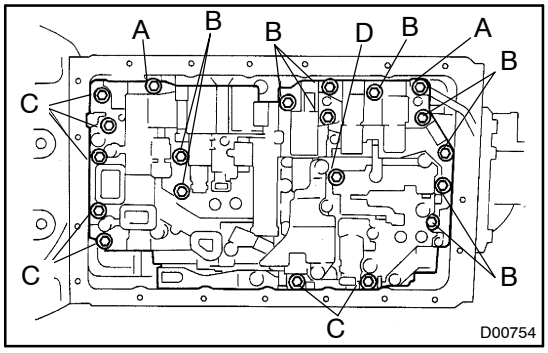


13. INSTALL CHECK BALL BODY AND SPRING



14. INSTALL VALVE BODY

(a) Align the groove of the manual valve to pin of the lever.



(b) Install the 20 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

Bolt length:

Bolt A: 23 mm (0.91 in.)

Bolt B: 28 mm (1.10 in.)

Bolt C: 36 mm (1.42 in.)

Bolt D: 55 mm (2.17 in.)

15. INSTALL SOLENOID WIRE WITH ATF TEMPERATURE SENSOR (See page AT–9)

16. INSTALL OIL STRAINER (See page AT–9)

17. INSTALL OIL PAN (See page AT–9)

18. FILL FLUID AND CHECK FLUID (See page DI–170)

19. INSTALL NO. 1 REAR FLOOR BOARD

20. INSTALL LH FRONT FLOOR CENTER COVER

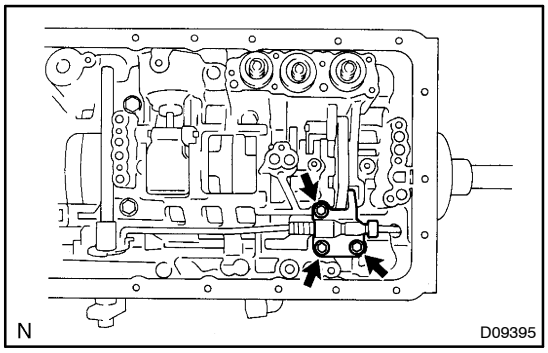
21. INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS

PARKING LOCK PAWL

AT0HL-07

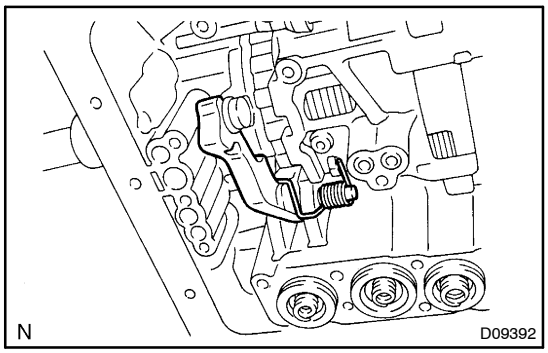
ON–VEHICLE REPAIR

1. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS
2. REMOVE LH FRONT FLOOR CENTER COVER
3. REMOVE NO. 1 REAR FLOOR BOARD
4. REMOVE VALVE BODY (See page AT–14)



5. REMOVE PARKING LOCK PAWL BRACKET

Remove the 3 bolts and parking lock pawl bracket.



6. REMOVE SPRING FROM PARKING LOCK PAWL SHAFT
7. REMOVE PARKING LOCK PAWL SHAFT AND PARKING LOCK PAWL
8. INSTALL PARKING LOCK PAWL AND PARKING LOCK PAWL SHAFT
9. INSTALL SPRING TO PARKING LOCK PAWL SHAFT
10. INSTALL PARKING LOCK PAWL BRACKET

Install the parking lock pawl bracket with the 3 bolts.

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

HINT:

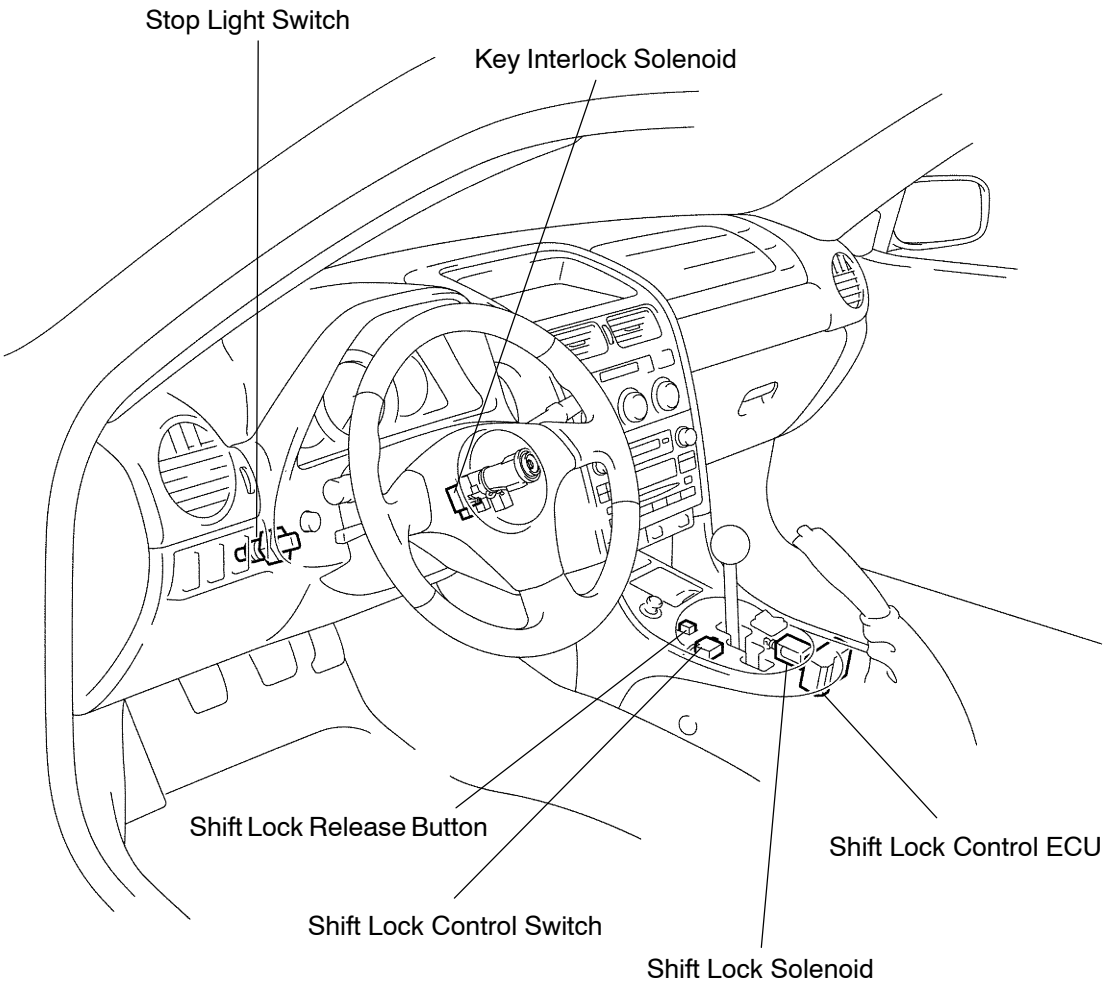
- Push the lock rod fully forward.
- Check that the parking lock pawl operates smoothly.

11. INSTALL VALVE BODY (See page AT–14)
12. INSTALL NO. 1 REAR FLOOR BOARD
13. INSTALL LH FRONT FLOOR CENTER COVER
14. INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS

SHIFT LOCK SYSTEM

AT0HM–04

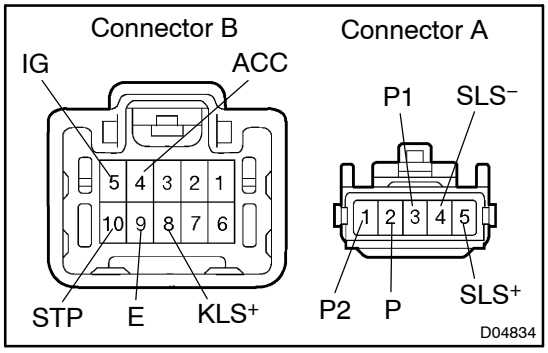
LOCATION



P

D09393

AT0HN–03



INSPECTION

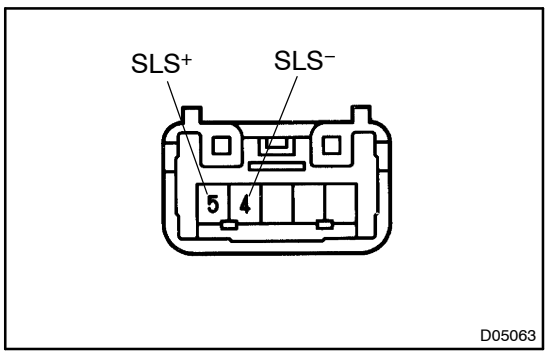
1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the shift lock control ECU connector.

Terminal	Measuring condition	Voltage (V)
B4 – B9 (ACC – E)	Ignition switch ACC	10 – 14
B5 – B9 (IG – E)	Ignition switch ON	10 – 14
B8 – B9 (KLS+ – E)	1. Ignition switch ACC and P range 2. Ignition switch ACC and except P range 3. Ignition switch ACC and except P range (After approx. 1 second)	0 7.5 – 11.5 6 – 9
B10 – B9 (STP – E)	Depressing brake pedal	10 – 14
A5 – A4 (SLS+ – SLS–)	1. Ignition switch ON and P range 2. Depress brake pedal 3. Depress brake pedal (After approx. 1 second) 4. Shift between P and N range under conditions above 5. Shift D range under conditions above	0 8 – 15 6 – 11 6 – 11 0
A3 – A2 (P1 – P)	1. Ignition switch ON, P range and depress brake pedal 2. Shift except P range under condition above	0 10 – 14
A1 – A2 (P2 – P)	1. Ignition switch ON, P range and depress brake pedal 2. Shift except P range under conditions above	10 – 14 0



2. INSPECT SHIFT LOCK SOLENOID

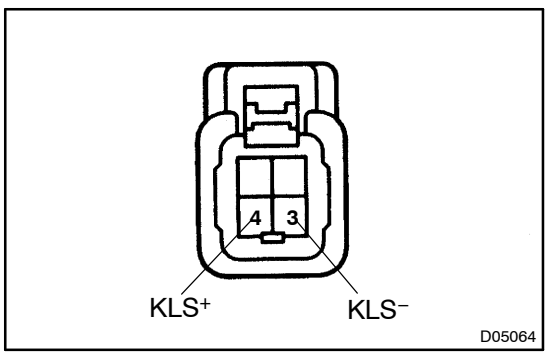
(a) Disconnect the solenoid connector.

(b) Using an ohmmeter, measure resistance between terminals.

If resistance value is not as specified, replace the solenoid.

(c) Check the solenoid operating sound when connecting the battery positive terminal to 5 (SLS+) and battery negative terminal to 4 (SLS–).

If the solenoid does not operate, replace the solenoid.



3. INSPECT KEY INTERLOCK SOLENOID

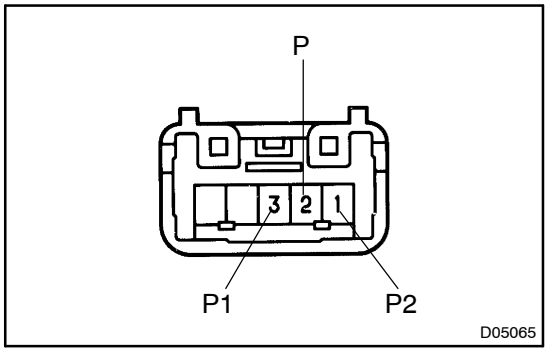
(a) Disconnect the solenoid connector.

(b) Using an ohmmeter, measure resistance between terminals.

If resistance valve is not as specified, replace the solenoid.

(c) Check the solenoid operating sound when connecting the battery positive terminal to 4 (KLS+) and battery negative terminal to 3 (KLS–).

If the solenoid does not operate, replace the solenoid.



4. INSPACT SHIFT LOCK CONTROL SWITCH

(a) Disconnect the shift lock control switch.

(b) Inspect that continuity exists between each terminal.

Shift position	Terminal condition to terminal number	Specified value
P range (Release button is not pushed)	P – P1	Continuity
P range (Release button is pushed)	P – P1 P – P2	Continuity
Except P range	P – P2	Continuity

WATER COOLED OIL COOLER

AT0ZV–01

ON–VEHICLE REPAIR

1. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS

2. DRAIN ATF

(a) Remove the drain plug, gasket and drain ATF.

(b) Install a new gasket and drain plug.

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

3. REMOVE ENGINE COOLANT

4. DISCONNECT OIL COOLER INLET HOSE

Loosen the clip and disconnect the oil cooler inlet hose from the oil cooler.

5. DISCONNECT OIL COOLER OUTLET HOSE

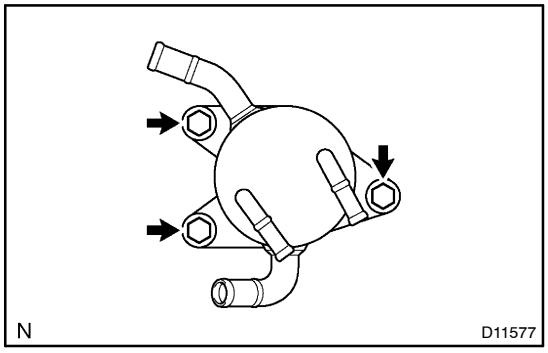
Loosen the clip and disconnect the oil cooler outlet hose from the oil cooler.

6. DISCONNECT WATER BY–PASS HOSE NO. 3

Loosen the clip and disconnect the water by–pass hose No. 3. from the oil cooler.

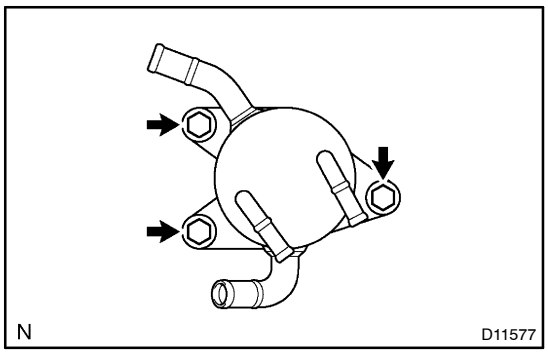
7. DISCONNECT WATER BY–PASS HOSE NO. 8

Loosen the clip and disconnect the water by–pass hose No. 8. from the oil cooler.



8. REMOVE TRANSMISSION OIL COOLER

Remove the 3 bolts and the oil cooler from the cylinder block.



9. INSTALL TRANSMISSION OIL COOLER

Install the oil cooler to the cylinder block with the 3 bolts.

Torque: 29 N·m (296 kgf·cm, 21.4 ft·lbf)

10. CONNECT WATER BY–PASS HOSE NO. 8

Connect the water by–pass hose No. 8 with the clip to the oil cooler.

11. CONNECT WATER BY–PASS HOSE NO. 3

Connect the water by–pass hose No. 3 with the clip to the oil cooler.

12. CONNECT OIL COOLER OUTLET HOSE

Connect the oil cooler outlet hose with the clip to the oil cooler.

13. CONNECT OIL COOLER INLET HOSE

Connect the oil cooler inlet hose with the clip to the oil cooler.

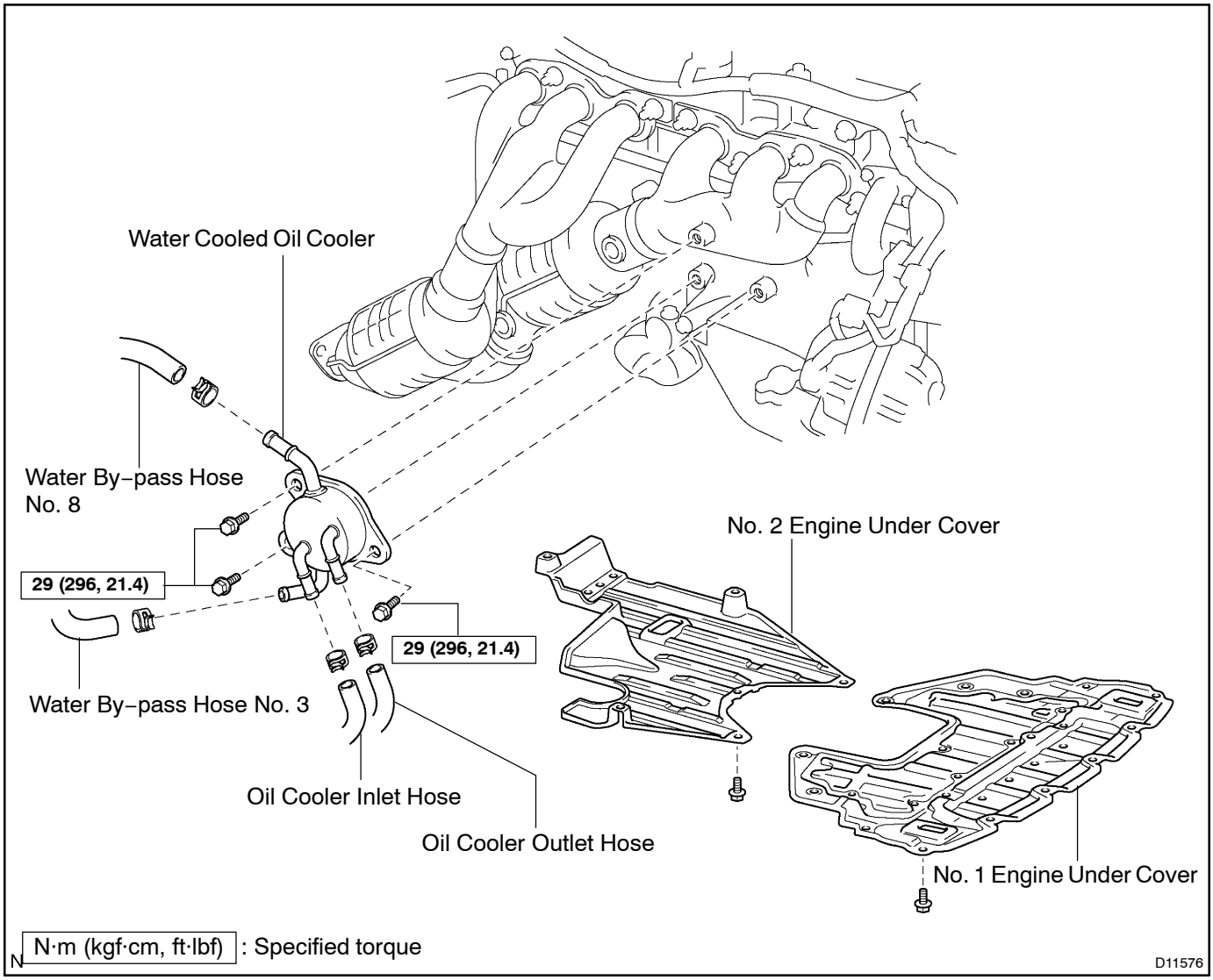
14. FILL ENGINE COOLANT (See page CO–1)

15. FILL ATF AND CHECK FLUID LEVEL (See page DI–1770)

16. INSTALL NO. 1 AND NO. 2 ENGINE UNDER COVERS

AT0ZW–01

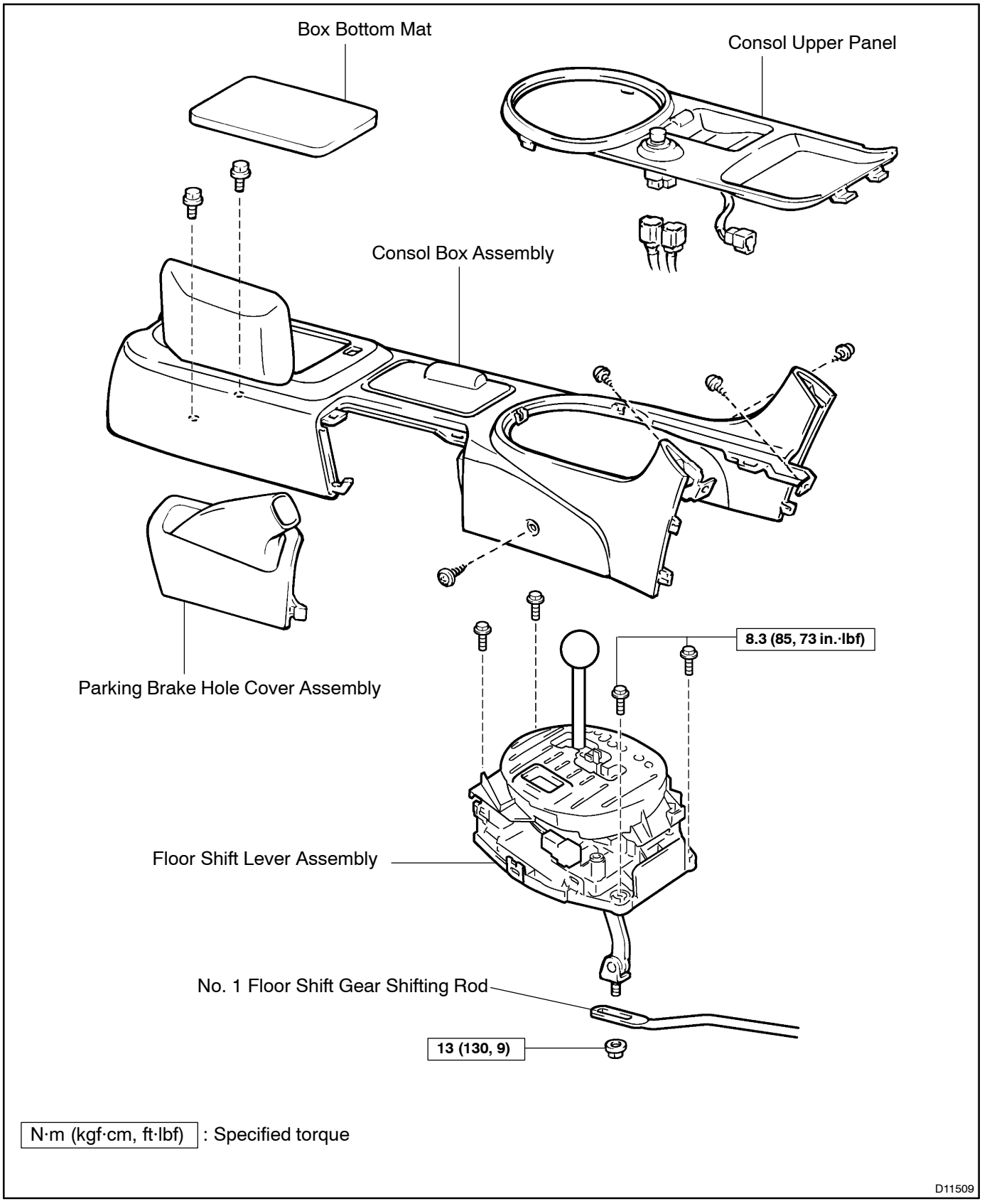
COMPONENTS

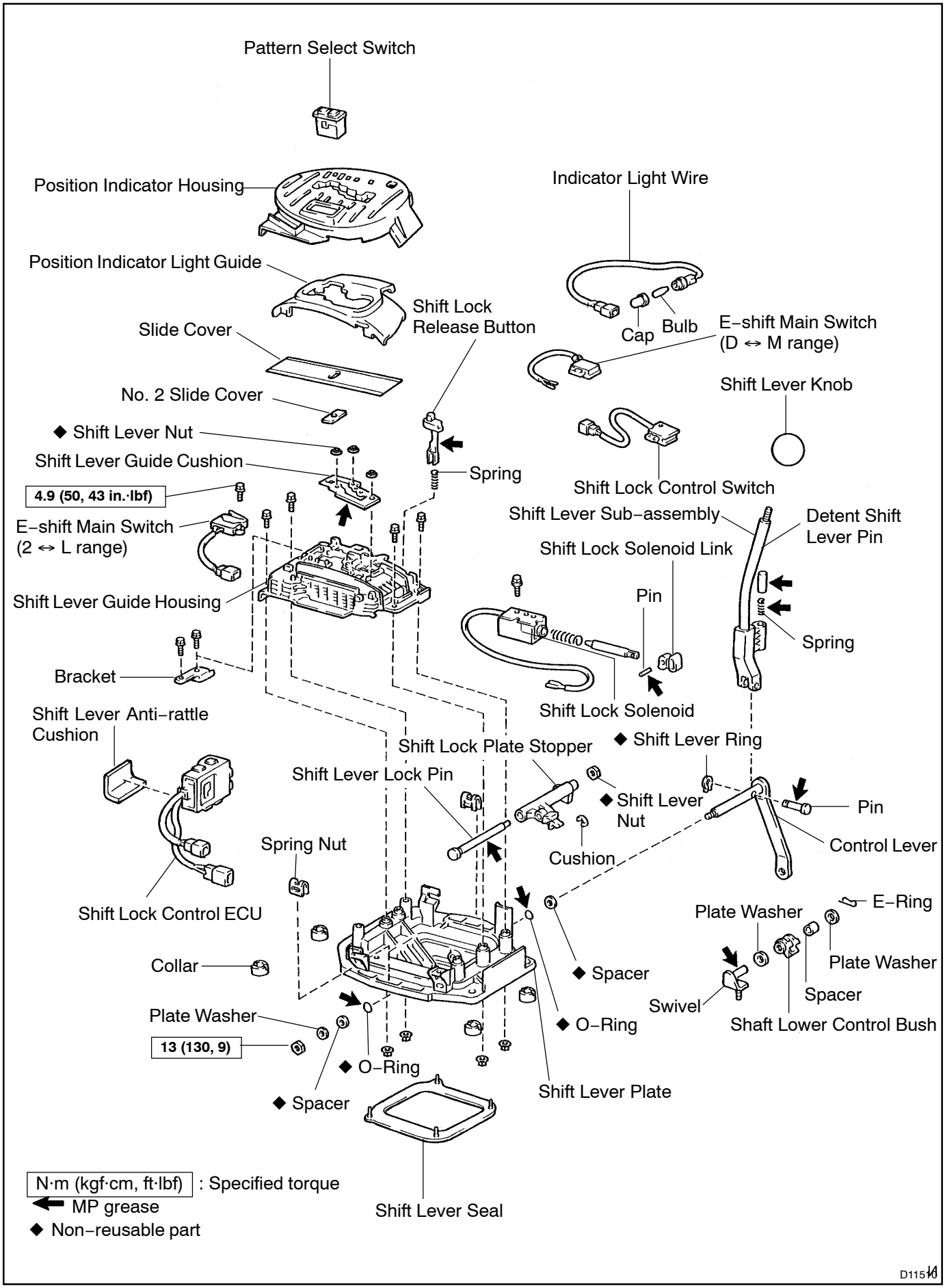


FLOOR SHIFT ASSEMBLY

COMPONENTS

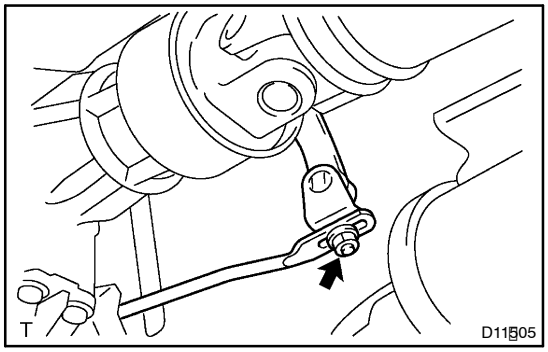
AT0HO–03




Pattern Select Switch
Position Indicator Housing
Indicator Light Wire
Position Indicator Light Guide
Shift Lock Release Button
Cap
Bulb
E–shift Main Switch (D ↔ M range)
Slide Cover
No. 2 Slide Cover
Shift Lever Knob
◆ Shift Lever Nut
Shift Lever Guide Cushion
Spring
Shift Lock Control Switch
4.9 (50, 43 in.·lbf)
Shift Lever Sub–assembly
Detent Shift Lever Pin
E–shift Main Switch (2 ↔ L range)
Shift Lock Solenoid Link
Pin
Shift Lever Guide Housing
Spring
Bracket
Shift Lock Solenoid
Shift Lever Anti–rattle Cushion
Shift Lock Plate Stopper
◆ Shift Lever Ring
Shift Lever Lock Pin
◆ Shift Lever Nut
Pin
Spring Nut
Cushion
Control Lever
Shift Lock Control ECU
E–Ring
Plate Washer
Collar
◆ Spacer
Plate Washer
Swivel
Spacer
Plate Washer
◆ O–Ring
Shaft Lower Control Bush
13 (130, 9)
◆ O–Ring
Shift Lever Plate
◆ Spacer
N·m (kgf·cm, ft·lbf) : Specified torque
MP grease
◆ Non–reusable part
Shift Lever Seal
D11510

AT0HP–03

REMOVAL



1. SEPARATE NO. 1 FLOOR SHIFT GEAR SHIFTING ROD

(a) Shift into the N range.

(b) Remove the nut and separate the No. 1 floor shift gear shifting rod from the connecting rod swivel.

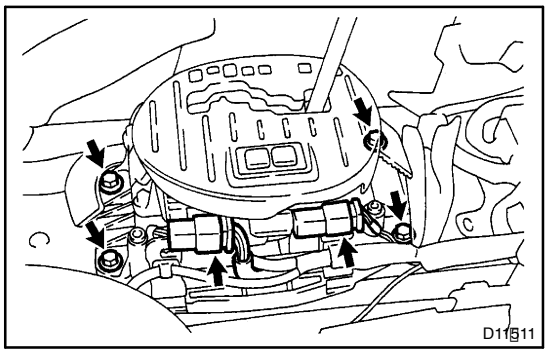
2. REMOVE CONSOLE BOX ASSEMBLY
(See page BO–59)

(a) Remove the console upper panel.

(b) Remove the box bottom mat.

(c) Remove the parking brake hole cover assembly.

(d) Remove the console box assembly.



3. REMOVE FLOOR SHIFT LEVER ASSEMBLY

(a) Remove the 4 bolts.

(b) Disconnect the 2 connectors.

(c) Remove the floor shift lever assembly.

AT0HQ–03

DISASSEMBLY

1. REMOVE SHIFT LEVER KNOB

2. REMOVE POSITION INDICATOR HOUSING

(a) Disconnect the pattern select switch connector.

(b) Remove the position indicator housing assembly.

(c) Remove the pattern select switch from the position indicator housing assembly.

3. REMOVE POSITION INDICATOR LIGHT GUIDE

(a) Disconnect the indicator light wire from the position indicator light guide.

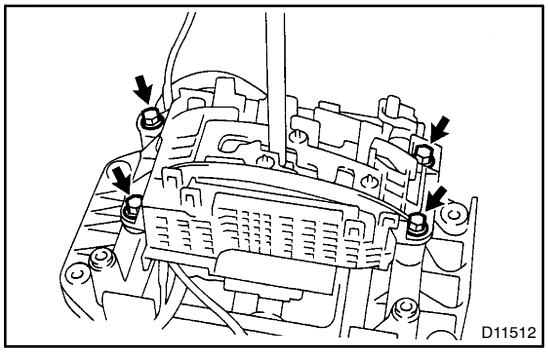
(b) Remove the position indicator light guide.

4. REMOVE SLIDE COVER AND NO. 2 SLIDE COVER

5. REMOVE SHIFT LEVER GUIDE HOUSING

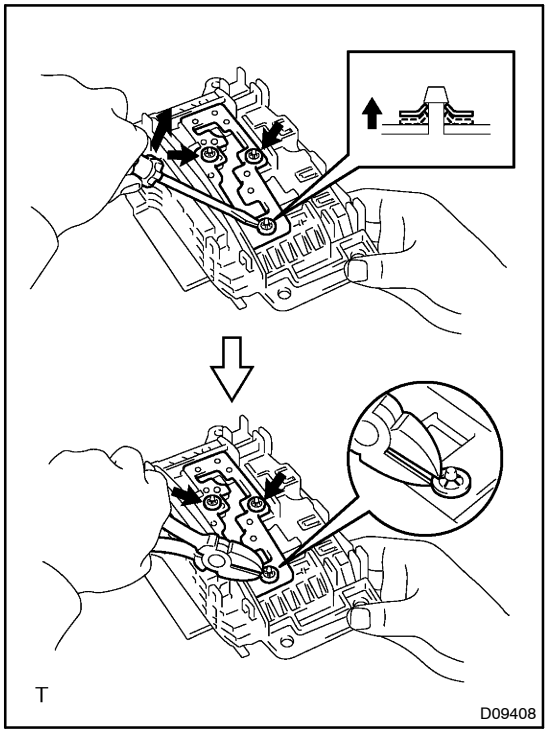
(a) Disconnect the shift lock control ECU connector and indicator light wire from the shift lever plate.

(b) Remove the 2 E–shift main switchs and shift lock control switch from the shift lever guide housing.



(c) Remove the 4 bolts, nuts and shift lever guide housing assembly.

(d) Remove the bulb and cap and from the indicator light wire.



6. DISASSEMBLE SHIFT LEVER GUIDE HOUSING

(a) Using a screwdriver, ply and push up 3 shift lever nuts.

(b) Using nippers, cut the 3 shift lever nuts off then.

HINT:

Remove the shift lever lock pin of shift lever nut in the same way.

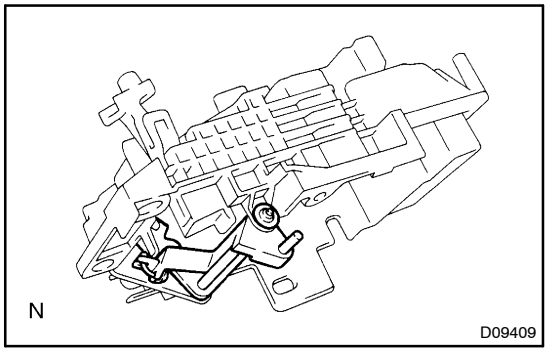
(c) Remove the shift lever guide cushion.

(d) Remove the 3 screws, shift lock control ECU and shift lock solenoid.

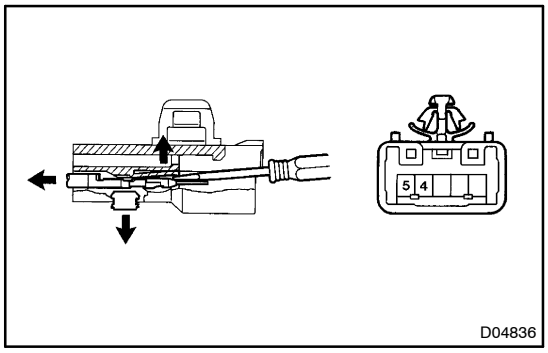
(e) Remove the shift lock control ECU bracket and shift lever anti–rattle cushion from the shift lock control ECU.

(f) Disconnect the E–shift main switch connector from the shift lever guide housing.

(g) Remove the shift lock release button and spring.



(h) Remove the shift lever lock pin, shift lock plate stopper and cushion.



7. DISCONNECT SHIFT LOCK CONTROL ECU, SHIFT LOCK SOLENOID, SHIFT LOCK CONTROL SWITCH AND E–SHIFT MAIN SWITCH

(a) Disengage the secondary locking device of shift lock solenoid.

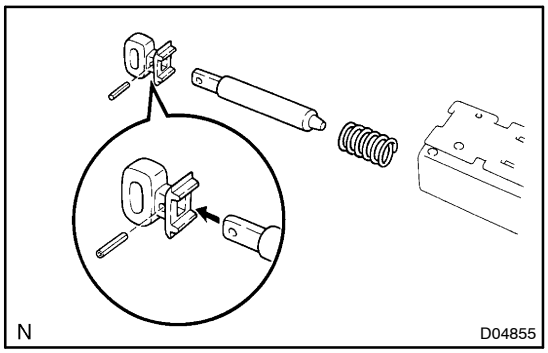
(b) Release the locking lug of the terminals 4 and 5, and pull the terminals out from the rear.

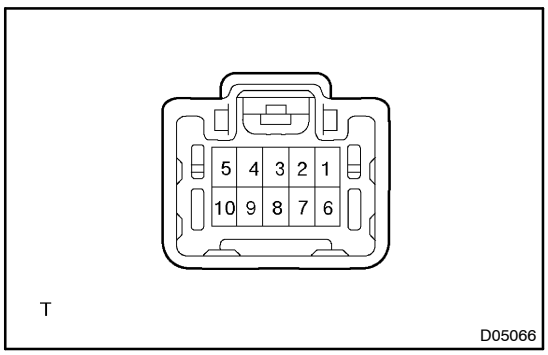
HINT:

Remove the E–shift main switch in the same way.

(c) Remove the shift lock solenoid.

(d) Using 2 mm dia. steel wire, remove the pin the remove the shift lock solenoid link from the shift lock solenoid plunger.

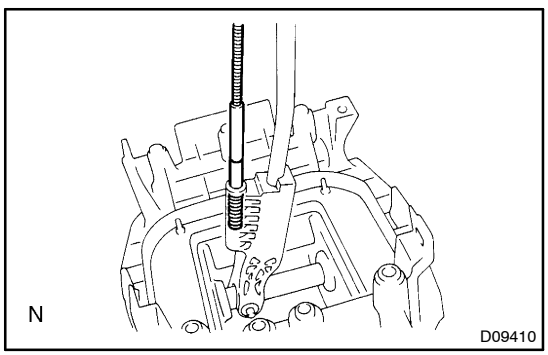




(e) Disengage the secondary locking device of shift lock solenoid.

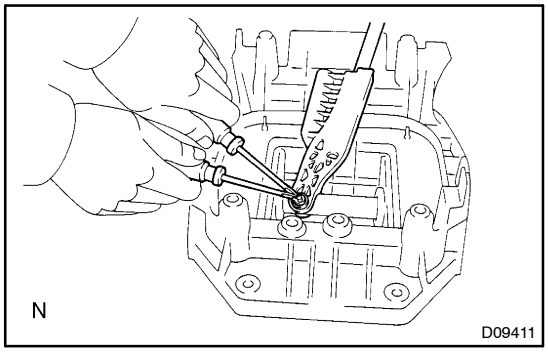
(f) Release the locking lag of the terminals 1 and 6, and pull the terminals out from the rear.

(g) Remove the E–shift main switch.

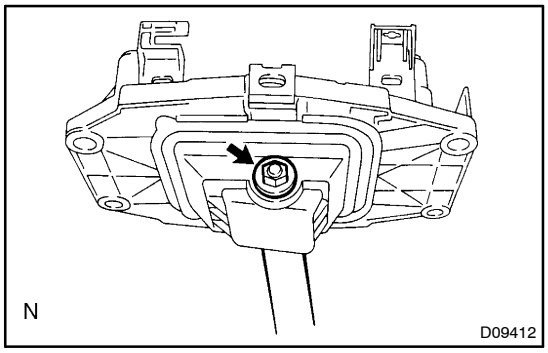


8. REMOVE SHIFT LEVER SUB–ASSEMBLY

(a) Using a magnetic finger, remove the detent shift lever pin and spring.

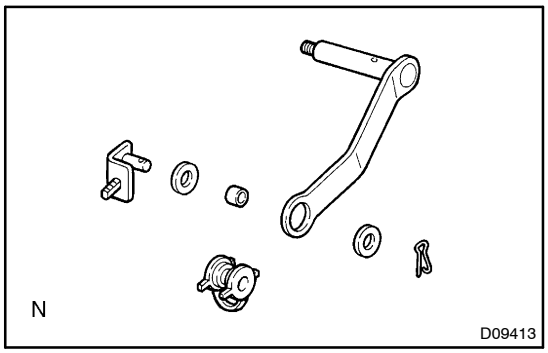


(b) Using 2 screwdrivers, remove the shift lever ring.
(c) Remove the pin and shift lever sub–assembly.



9. DISASSEMBLE SHIFT LEVER PLATE

(a) Remove the nut, control lever, plate washer, 2 spacers and 2 O–ring.



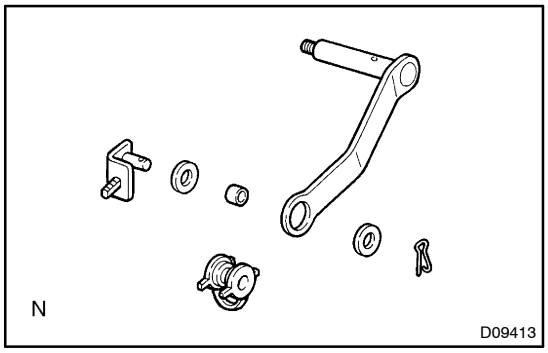
(b) Using pliers, remove the E–ring.
(c) Remove the swivel, 2 plate washer, shaft lower control bush and spacer.
(d) Remove the shift lever seal.
(e) Remove the 4 collars.
(f) Remove the 2 spring nuts.

AT0HR–03

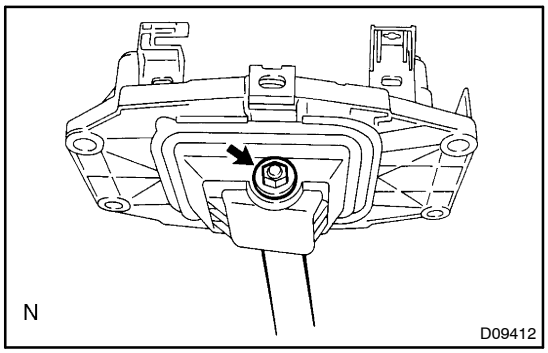
REASSEMBLY

1. REASSEMBLE SHIFT LEVER PLATE

(a) Install the 2 spring nuts.
(b) Install the 4 collars.
(c) Install the shift lever seal.



(d) Install the shaft lower control bush, spacer, 2 plate washers and swivel.
(e) Using pliers, install the E–ring.

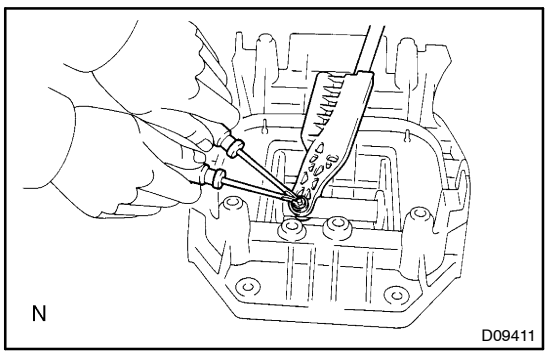


(f) Apply MP grease to the new 2 O–rings.
(g) Install the 2 O–rings, 2 new spacers, plate washer, control lever and nut.

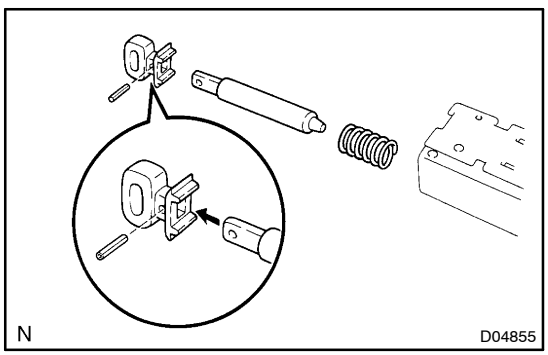
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

2. INSTALL SHIFT LEVER SUB–ASSEMBLY

(a) Apply MP grease to the pin.
(b) Install the shift lever sub–assembly and pin.



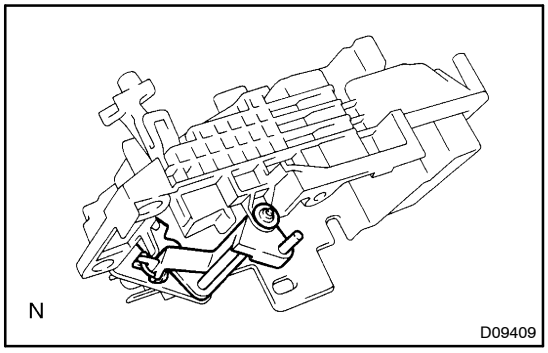
(c) Using 2 screwdriver, install the shift lever ring.
(d) Apply MP grease to the detent shift lever pin and spring.
(e) Install the detent shift lever pin and spring.



3. REASSEMBLE SHIFT LOCK SOLENOID

(a) Apply MP grease to the shift lock solenoid link.
(b) Install the shift lock solenoid link and pin to the shift lock solenoid plunger.
(c) Install the shift lock solenoid link with shift lock solenoid plunger and spring to the shift lock solenoid.

4. CONNECT SHIFT LOCK CONTROL ECU, SHIFT LOCK SOLENOID, SHIFT LOCK CONTROL SWITCH AND E–SHIFT MAIN SWITCH



5. RASSEMBLE SHIFT LEVER GUIDE HOUSING

(a) Apply MP grease to the shift lever lock pin.

(b) Install the shift lever lock pin, shift lock plate stopper and cushion to the shift lever guide housing.

(c) Install the new shift lever nut to the shift lever lock pin by knocking them lightly via the 10 mm seated nut.

HINT:

Install the shift lever guide cushion of the shift lever nut in the same way.

(d) Apply MP grease to the shift lock release button.

(e) Install the spring and shift lock release button.

(f) Connect the E–shift main switch connector to the shift lever guide housing.

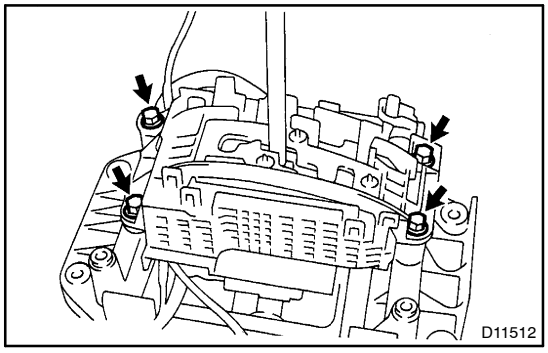
(g) Install the shift lock control ECU bracket and shift lever anti–rattle cushion to the shift lock control ECU.

(h) Install the shift lock control ECU and shift lock solenoid with the 3 screws to the shift lever guide housing.

(i) Install the shift lever guide cushion with new 3 shift lever nuts.

6. INSTALL SHIFT LEVER GUIDE HOUSING

(a) Install the bulb and cap to the indicator light wire.



(b) Install the shift lever guide housing assembly with the 4 bolts and nuts to the shift lever plate.

Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

(c) Install the 2 E–shift main switches and shift lock control switch to the shift lever guide housing.

(d) Connect the shift lock control ECU and indicator light wire connector to the shift lever plate.

7. INSTALL SLIDE COVER AND NO. 2 SLIDE COVER

8. INSTALL POSITION INDICATOR LIGHT GUIDE

(a) Install the position indicator light guide.

(b) Connect the indicator light wire to the position indicator light guide.

9. INSTALL POSITION INDICATOR HOUSING

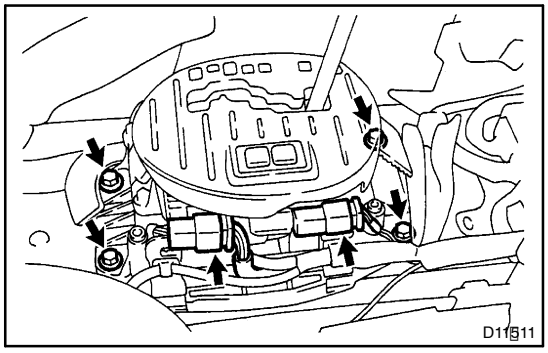
(a) Install the pattern select switch to the position indicator housing.

(b) Install the position indicator housing.

(c) Connect the pattern select switch connector.

10. INSTALL SHIFT LEVER KNOB

AT0HS–03



INSTALLATION

1. INSTALL FLOOR SHIFT LEVER ASSEMBLY

(a) Connect the 2 connectors to the floor shift lever assembly.

(b) Install the floor shift lever assembly with the 4 bolts.

Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)

2. INSTALL CONSOLE BOX ASSEMBLY

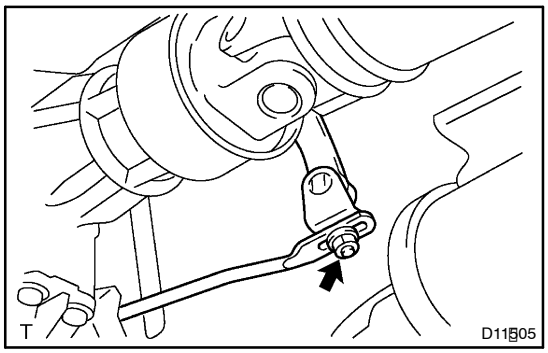
(See page BO–65)

(a) Install the console box assembly.

(b) Install the parking brake hole cover assembly.

(c) Install the box bottom mat.

(d) Install the console upper panel.



3. INSTALL NO. 1 FLOOR SHIFT GEAR SHIFTING ROD

(a) Shift into the N range.

(b) Connect the No. 1 floor shift gear shifting rod and connecting rod swivel with the nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

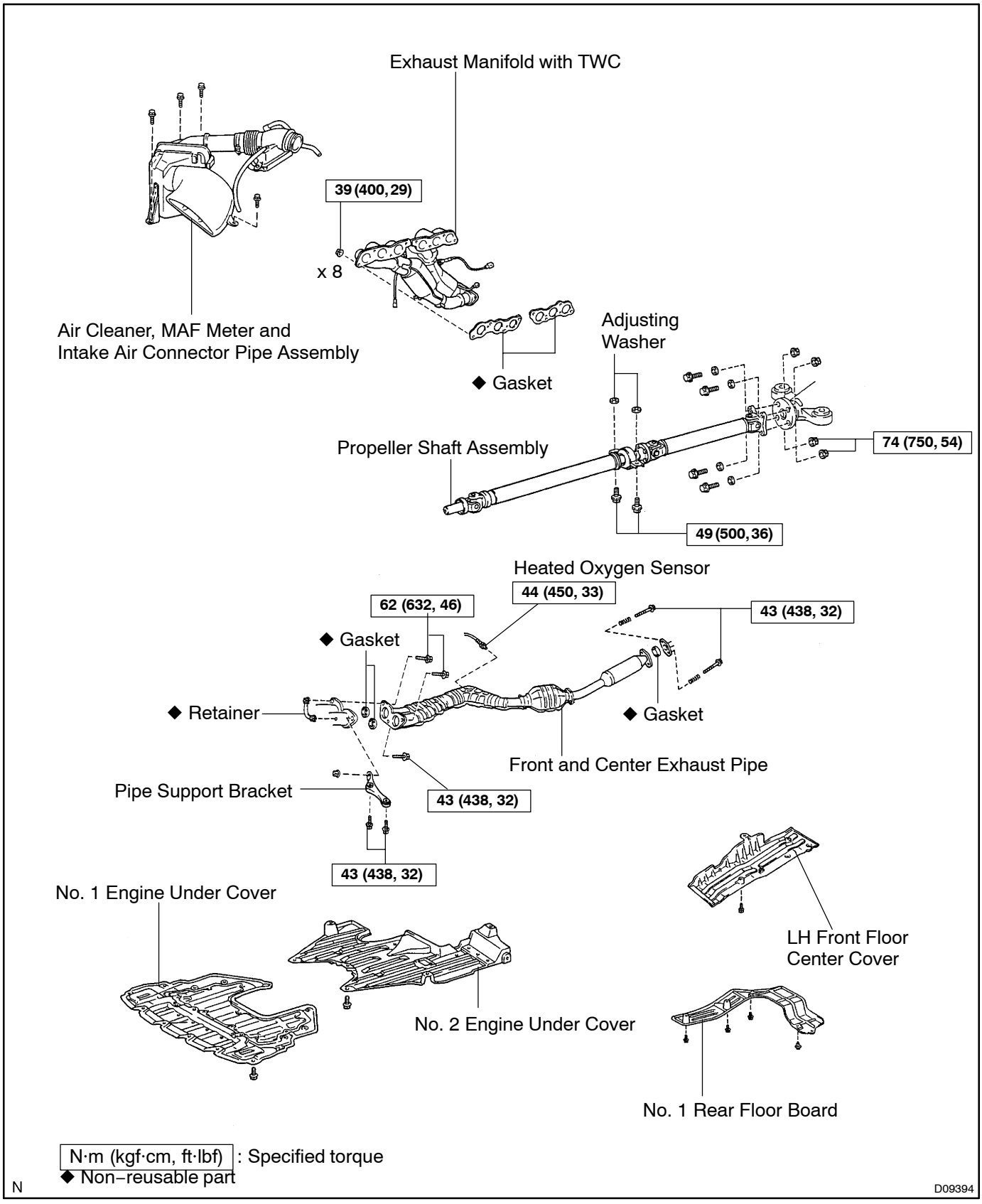
4. CHECK SHIFTING LEVER POSITION

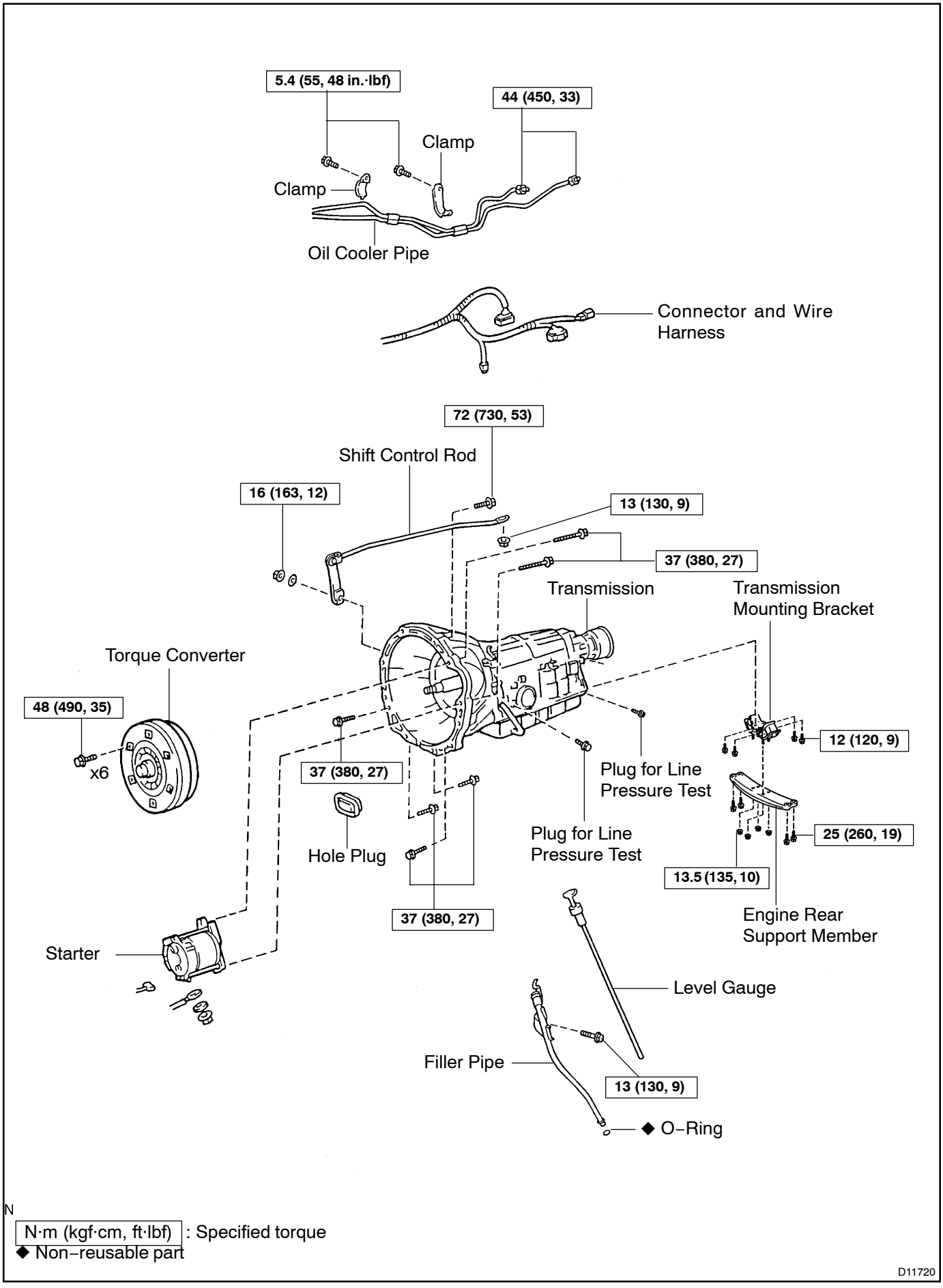
(See page DI–170)

AUTOMATIC TRANSMISSION UNIT

COMPONENTS

AT0XX–02





N

N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

D11720

AT0ZX-01

REMOVAL

1. REMOVE LEVEL GAUGE

2. REMOVE FILLER PIPE

Remove the bolt and filler pipe with the O–ring.

HINT:

At the time of installation, please refer to the following item.

Replace the used O–ring with a new one.

3. REMOVE AIR CLEANER, MAF METER AND INTAKE AIR CONNECTOR PIPE ASSEMBLY

Make sure that the vehicle is securely supported.

4. REMOVE NO. 1 AND NO. 2 ENGINE UNDER COVERS

5. REMOVE LH FRONT FLOOR CENTER COVER

6. REMOVE NO. 1 REAR FLOOR BOARD

7. DRAIN ATF

(a) Remove the drain plug, gasket and drain ATF.

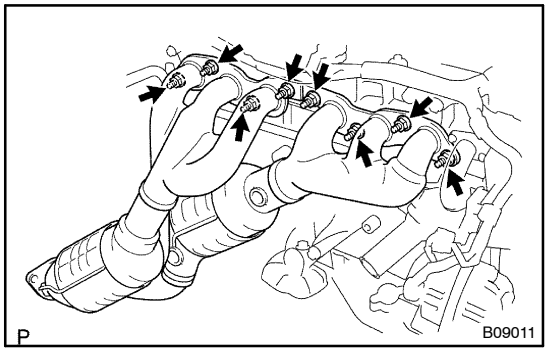
(b) Install a new gasket and drain plug.

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

8. DRAIN ENGINE COOLANT

9. REMOVE UPPER RADIATOR HOSE FROM RADIATOR

10. REMOVE FRONT AND CENTER EXHAUST PIPES (See page EM–99)



11. REMOVE EXHAUST MANIFOLD WITH TWC

(a) Disconnect the 3 connectors.

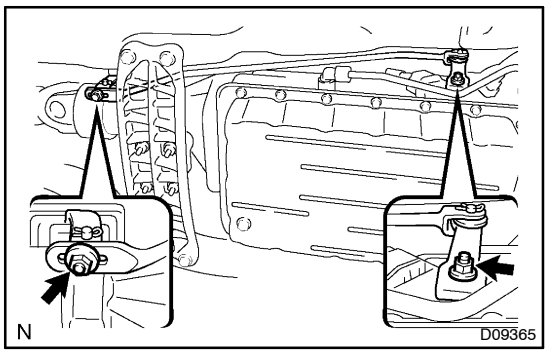
(b) Remove the 8 nuts, 2 gaskets and exhaust manifold with the TWC.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

HINT:

At the time of installation, please refer to the following item.

Replace the used gaskets with new ones.



12. REMOVE SHIFT CONTROL ROD

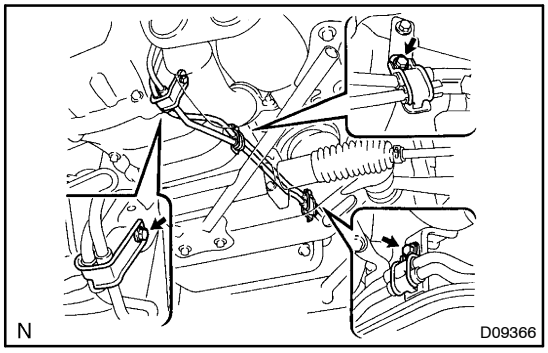
(a) Remove the nut and washer, and disconnect the rod.

Torque: 16 N·m (163 kgf·cm, 12 ft·lbf)

(b) Remove the nut and shift control rod.

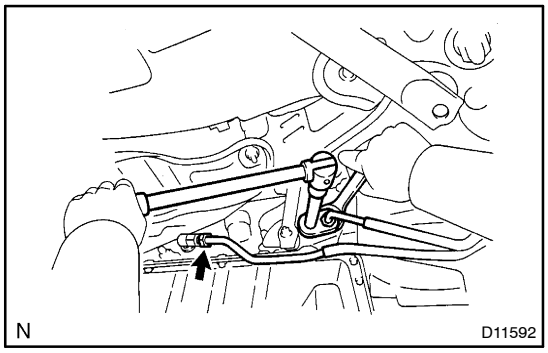
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

13. REMOVE PROPELLER SHAFT (See page PR–4)



14. DISCONNECT OIL COOLER PIPE

(a) Remove the 3 bolts and 3 clamps.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

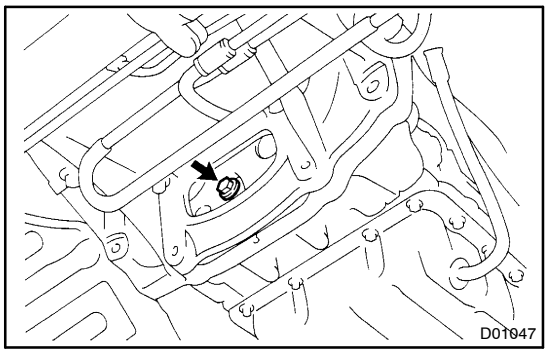


(b) Loosen the 2 union nuts from the transmission.
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

NOTICE:

Be careful not to damage the oil cooler pipe.

(c) Disconnect the 2 oil cooler pipes from the transmission.



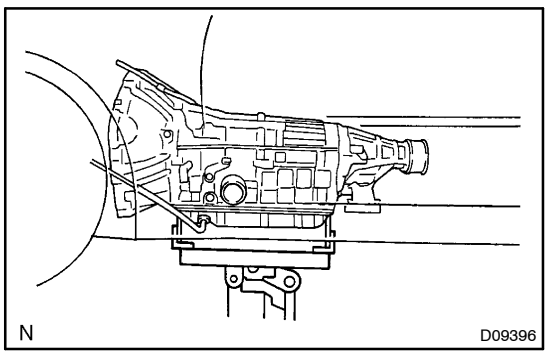
15. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT

(a) Remove the hole plug.
(b) Turn the crankshaft to gain access to each bolt.
(c) Hold the crankshaft pulley nut with a wrench and remove the 6 bolts.
Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)

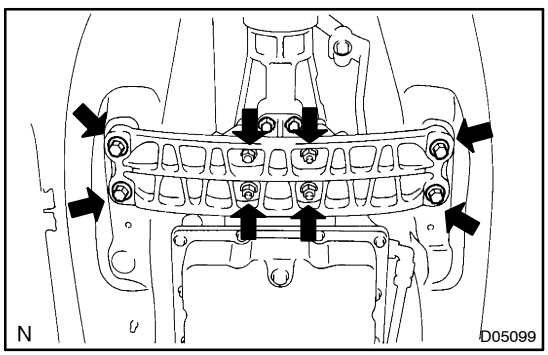
HINT:

At the time of installation, please refer to the following item.

First install black colored bolt and then the 5 other bolts.

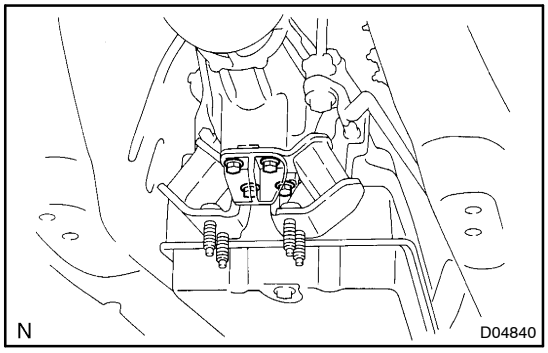


16. SUPPORT TRANSMISSION WITH JACK



17. REMOVE ENGINE REAR SUPPORT MEMBER

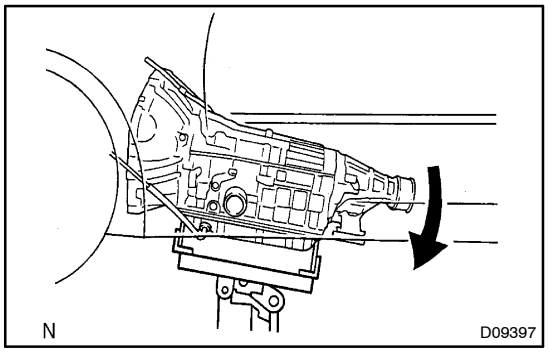
(a) Remove the 4 bolts.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
(b) Remove the 4 nuts and rear support member.
Torque: 13.5 N·m (135 kgf·cm, 10 ft·lbf)



18. REMOVE TRANSMISSION MOUNTING BRACKET

Remove the 4 bolts and the transmission mounting bracket from the transmission.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



19. DISCONNECT CONNECTORS AND WIRE HARNESS

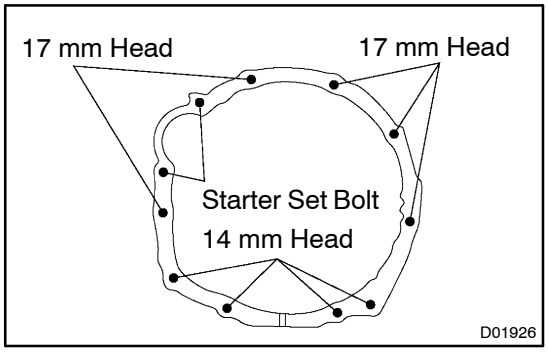
(a) Tilt down the transmission.

NOTICE:

Take care so that the cooling fan does not come in contact with the fan shroud.

(b) Disconnect the following connectors:
  (1) O/D direct clutch speed sensor connector
  (2) Vehicle speed sensor connector
  (3) Neutral position switch connector
  (4) Solenoid connector

(c) Disconnect the wire harness from the clamps on the transmission.



20. REMOVE STARTER

(a) Disconnect the connector and wire from the starter.

(b) Remove the 2 bolts and starter.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

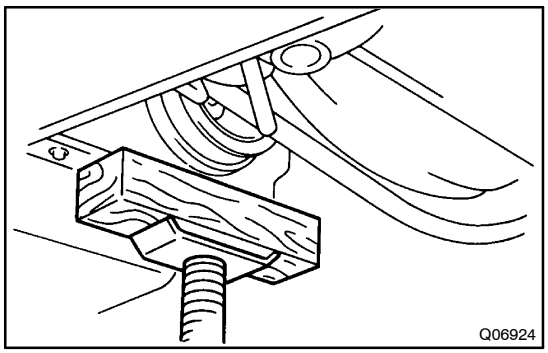
21. REMOVE TRANSMISSION

Remove the 9 bolts, ground cable and transmission.

Torque:

17 mm head: 72 N·m (730 kgf·cm, 53 ft·lbf)

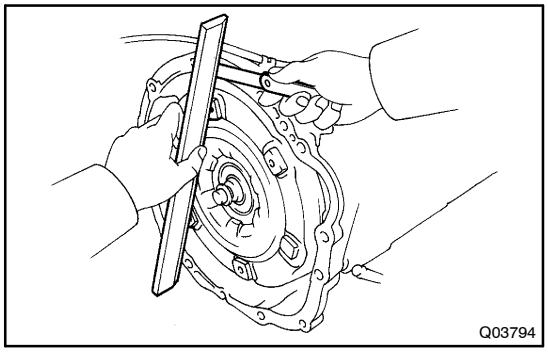
14 mm head: 37 N·m (380 kgf·cm, 27 ft·lbf)



HINT:

At the time of installation, please refer to the following item.

Lift the front side of the engine.



AT0HV–03

INSTALLATION

1. CHECK TORQUE CONVERTER INSTALLATION

Using calipers and a straight edge, measure from the distance from the installed surface of the transmission housing to the installed surface of the torque converter.

Correct distance: More than 0.1 mm (0.004 in.)

If the distance is less than the standard, check for an improper installation.

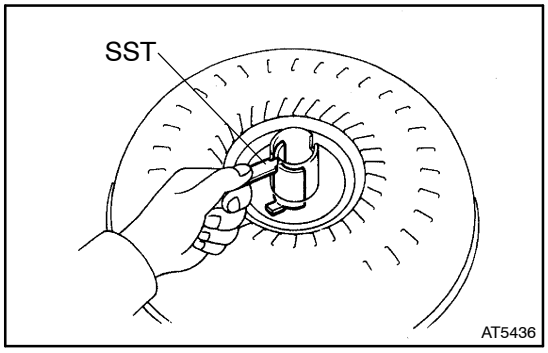
2. INSTALL TRANSMISSION

Installation is in the reverse order of removal (See page AT–35).

HINT:

After installation, check and inspect items as follows.

- Adjust the shift lever position (See page DI–170).
- Fill ATF and check fluid level (See page DI–170).
- Do the road test (See page DI–170).
- Fill with engine coolant (See page CO–1).



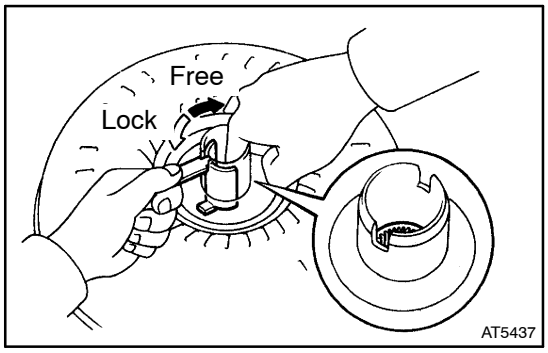
TORQUE CONVERTER AND DRIVE PLATE

INSPECTION

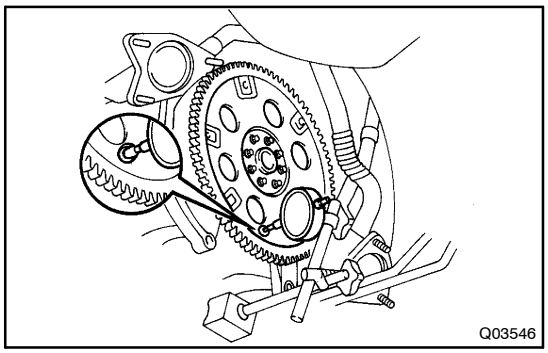
AT070–02

1. INSPECT ONE–WAY CLUTCH

(a) Install SST so that it fits in the notch of the converter hub and outer race of the one–way clutch.
SST 09350–30020 (09351–32020)



(b) Press on the serrations of stater with a finger and rotate the stater.
Check if it rotates smoothly when turned clockwise and locks up when turned counterclockwise.



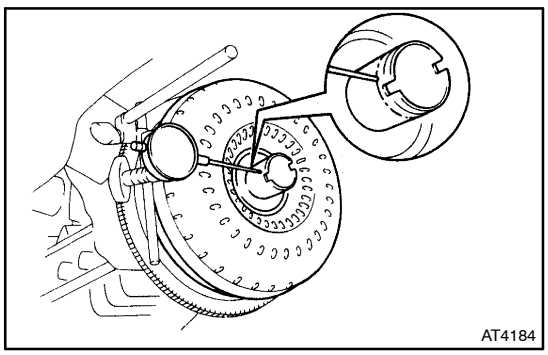
2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

Set up a dial indicator and measure the drive plate runout.

Maximum runout: 0.20 mm (0.0079 in.)

If the runout exceeds 0.20 mm (0.0079 in.) or if the ring gear is damaged, replace the drive plate. If installing a new drive plate, note the orientation of spacers and tighten the bolts.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



3. MEASURE TORQUE CONVERTER SLEEVE RUNOUT

(a) Temporarily mount the torque converter to the drive plate.
Set up a dial indictor.

Maximum runout: 0.30 mm (0.0118 in.)

If the runout exceeds 0.30 mm (0.0118 in.), try to correct by re-orienting the installation of the torque converter.

If excessive runout cannot be corrected, replace the torque converter.

HINT:

Mark the position of the torque converter to ensure correct installation.

(b) Remove the torque converter.

BODY ELECTRICAL SYSTEM

BE01I–14

PRECAUTION

HINT:

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. HEADLIGHT SYSTEM

- Halogen bulbs have pressurized gas inside and require special handling. They can burst if scratched or dropped. Hold a bulb only by its plastic or metal case. Don't touch the glass part of a bulb with bare hands.
- When high voltage socket of discharge headlight is touched with the light control switch HEAD, high voltage of 20,000 V is momentarily generated. This might lead to a serious accident.
- Never connect the tester to the high voltage socket of discharge headlight for measurement, as this leads to a serious accident because of high voltage.
- When performing operation related to the discharge headlight, make sure to do it in the place with no water of rain to prevent electric shock, with light control switch OFF, battery terminal removed, connector of light control ECU disconnected.
- When performing operation related to the discharge headlight, make sure to do it after assembling has been completely over and never light up without a bulb installed.
- Do not light up the discharge headlight using another power source except vehicle's.
- When there is a defect on the discharge headlight or any shock has been applied to it, replace the light with a new one.
  Even if the light operates normally, there is a possibility that the fail–safe function works.

2. SRS (SUPPLEMENTAL RESTRAINT SYSTEM)

The LEXUS IS300/IS200 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag, front passenger airbag, side airbag and curtain shield airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

3. AUDIO SYSTEM

If the negative (–) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so make sure to note the stations and reset them after the negative (–) terminal cable is reconnected to the battery.

4. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BE16S–04

WIPER AND WASHER SYSTEM

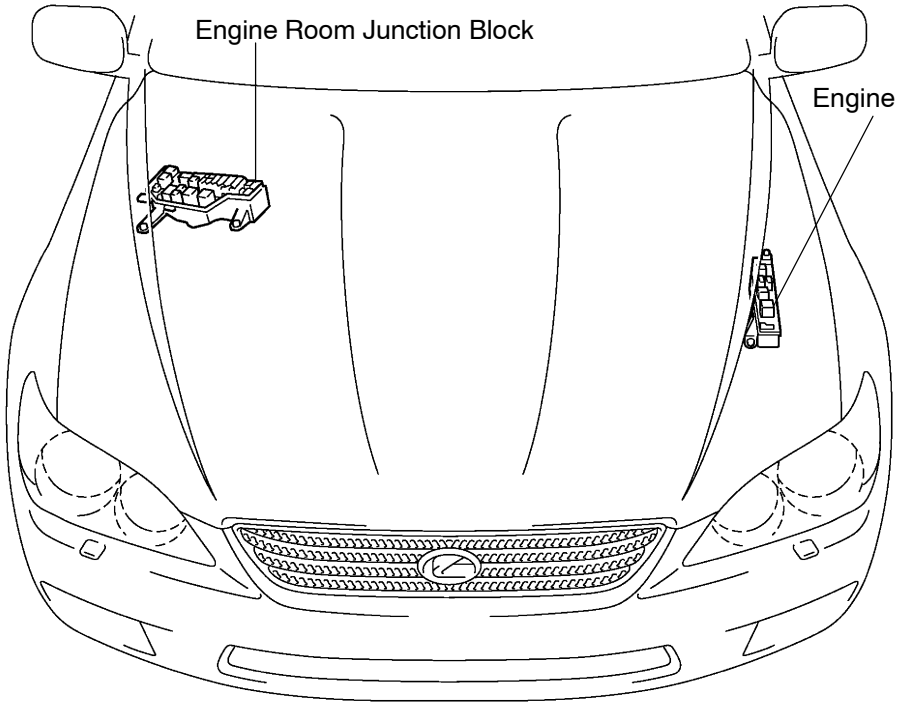
Symptom	Suspect Area	See page
Rear wiper does not operate.	1. WIPER Fuse 2. Rear Wiper Motor 3. Rear Wiper Switch 4. Wire Harness	– BE–28 BE–28 –
Rear wiper does not operate in INT or ON position.	1. Rear Wiper Switch 2. Wire Harness	BE–28 –
Rear wiper does not return to OFF position.	1. Rear Wiper Motor 2. Wire Harness	BE–28 –
Rear Washer Motor does not operate.	1. Rear Washer Motor 2. Rear Washer Switch 3. Wire Harness	BE–28 BE–28 –
Washer fluid does not operate.	Washer Hose and Nozzle	–

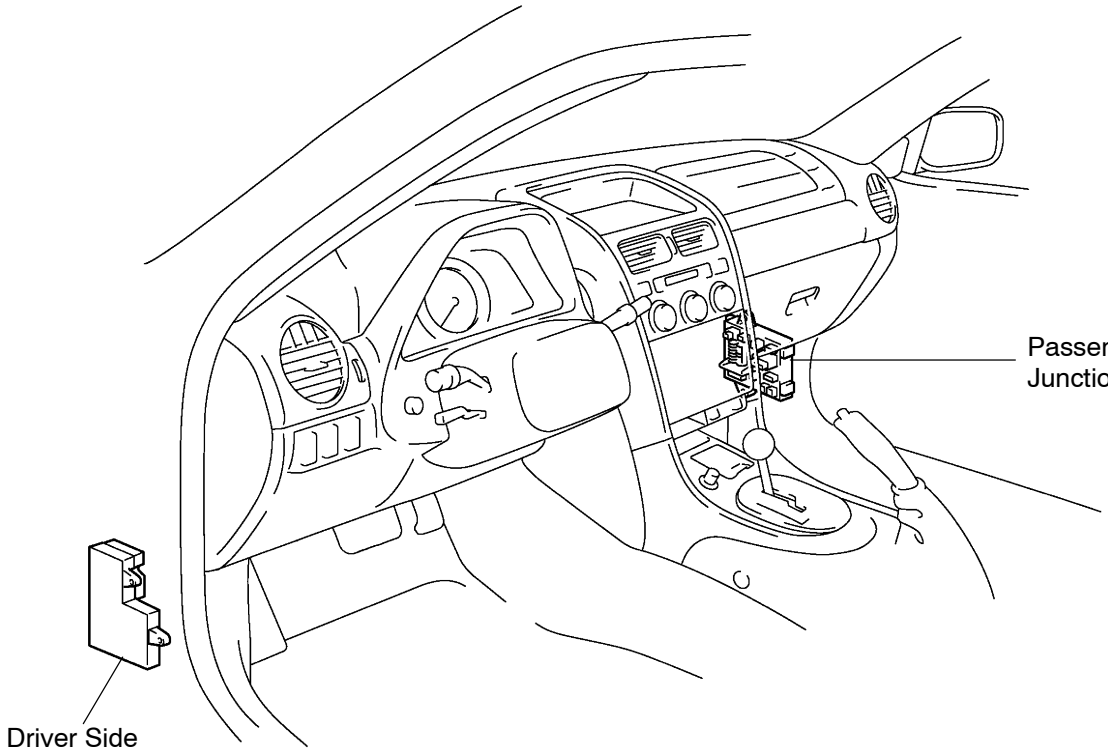
POWER SOURCE

LOCATION

BE15V–02

Power Source

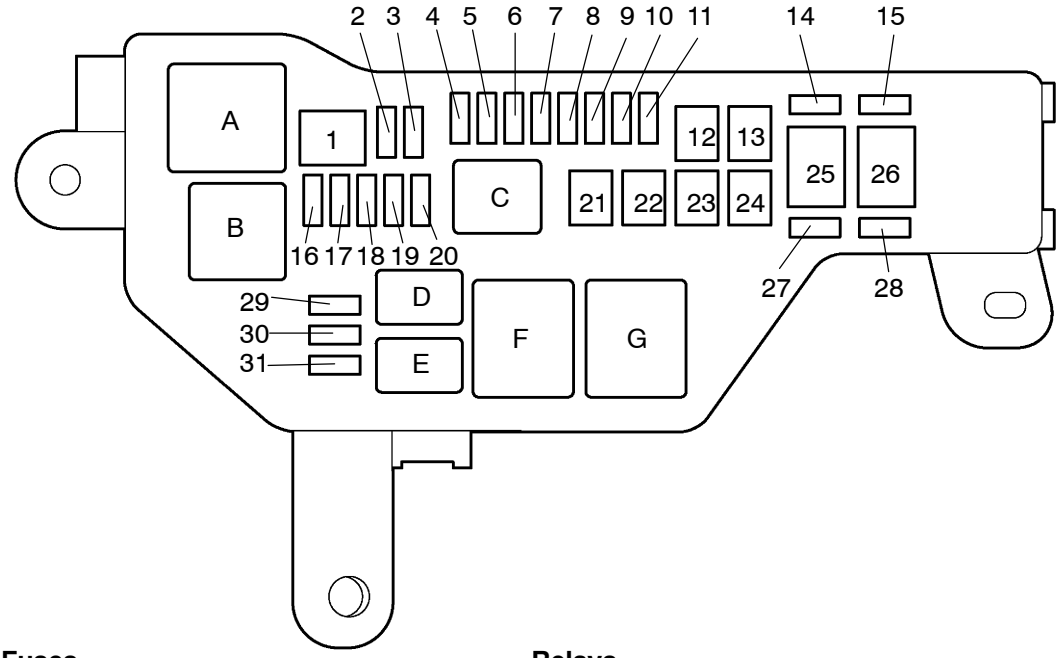




C

I23130

● **Engine Room Junction Block**
LHD Models



Fuses

1. MAIN FL 40A
2. ECU–B1 20A
3. –
4. ALT–S 7.5A
5. ETCS 15A
6. AM2 20A
7. HORN 10A
8. –
9. RADIO NO. 1 20A
10. TURN 15A
11. EFI 25A
12. P/SEAT 30A
13. HEAD CLNER 30A
14. SPARE
15. SPARE
16. –
17. DRL NO. 1 7.5A
18. H–LP LH–LO 15A
19. H–LP RH–LO 15A
20. ABS2 7.5A
21. –
22. –
23. CDS FAN 30A
24. RDI FAN 30A
25. ALT 120A
26. ABS1 60A
27. SPARE
28. SPARE
29. H–LP LH–HI 10A
30. H–LP RH–HI 10A
31. H–LP LVL 10A

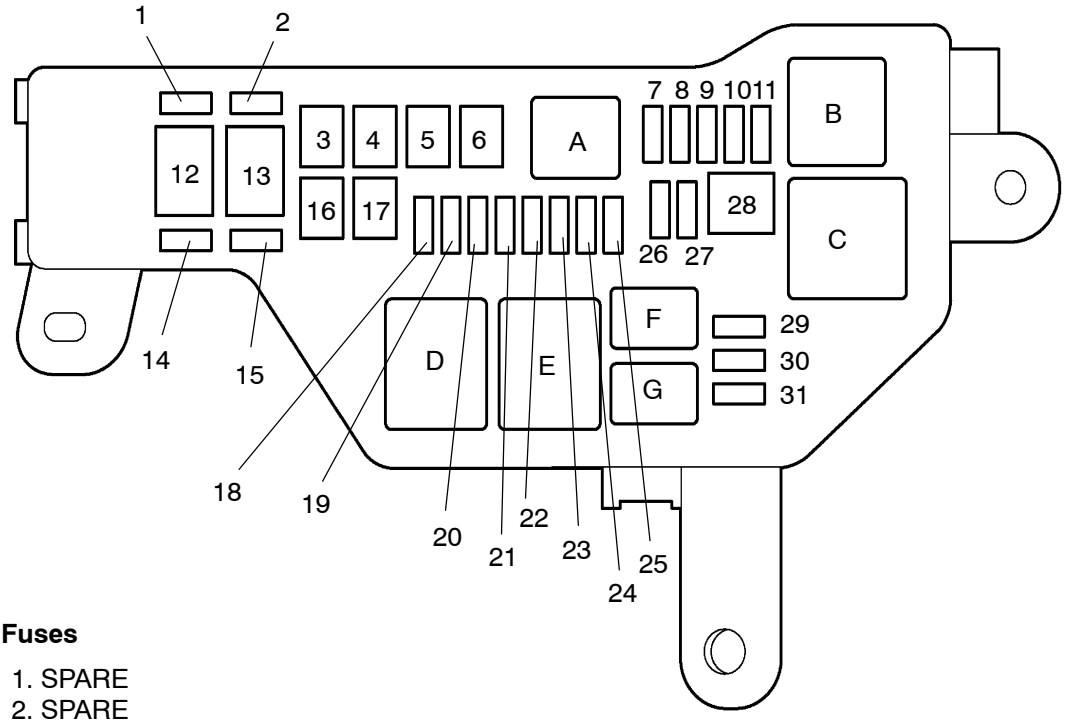
Relays

A. Headlight Control Relay
B. Starter relay
C. Circuit Opening Relay
D. Horn Relay
E. EFI Main Relay
F. ABS MTR Relay
G. ABS SOL Relay

N

I11570

● **Engine Room Junction Block**
RHD Models



Fuses

1. SPARE
2. SPARE
3. RDI FAN 30A
4. CDS FAN 30A
5. –
6. –
7. ABS2 7.5A
8. H–LP RH–LO 15A
9. H–LP LH–LO 15A
10. H–LP LVL 10A
11. –
12. ABS 60A
13. ALT 120A
14. –
15. SPARE
16. H–LP CLNER 30A
17. P/SEAT 30A
18. EFI 25A
19. TURN 10A
20. RADIO NO. 1 20A
21. –
22. HORN 10A
23. AM2 20A
24. ETCS 15A
25. ALT–S 7.5A
26. –
27. ECU–B1 20A
28. MAIN 40A
29. –
30. H–LP RH–HI 10A
31. H–LP LH–HI 10A

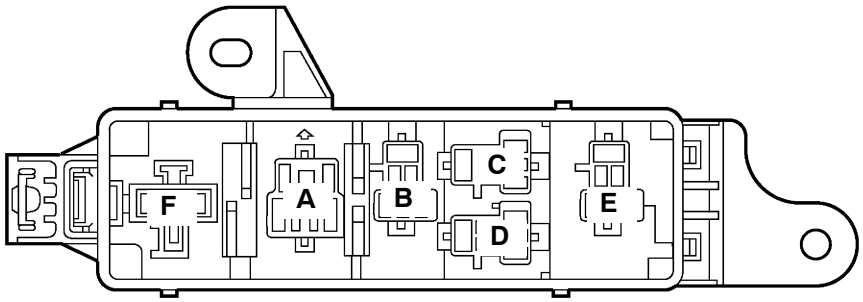
Relays

A. Circuit Opening Relay
B. Starter relay
C. Headlight Control Relay
D. ABS SOL Relay
E. ABS MTR Relay
F. Horn Relay
G. EFI Main Relay

N

I11474

● **Engine Room Relay Block**



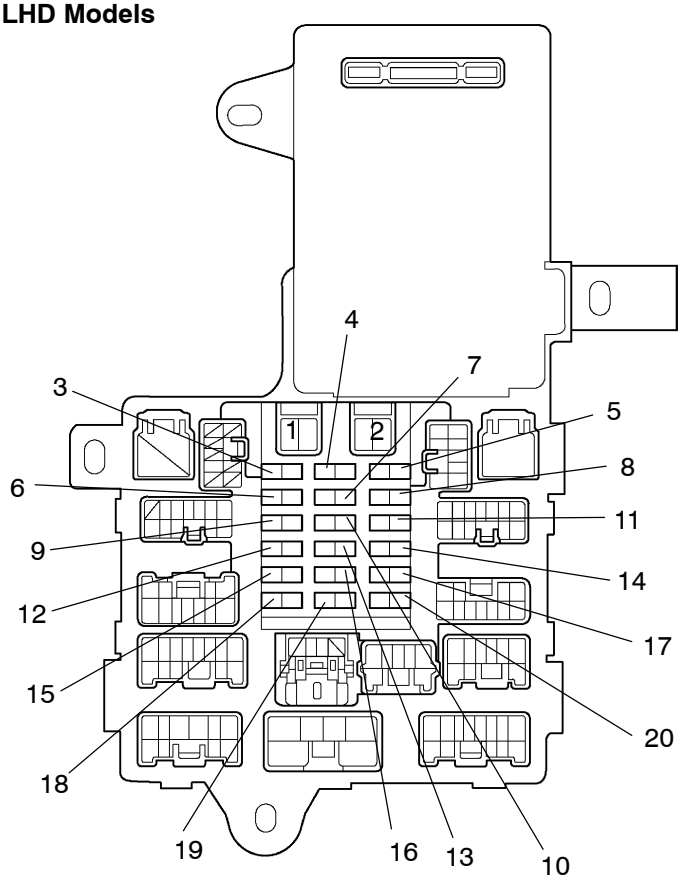
Relays

A. Headlight Dimmer Relay
B. A/C Compressor Relay
C. FAN NO.3 Relay
D. FAN NO.2 Relay
E. FAN NO.1 Relay
F. F/PMP Relay

C

I23236

● **Driver Side Junction Block**
LHD Models

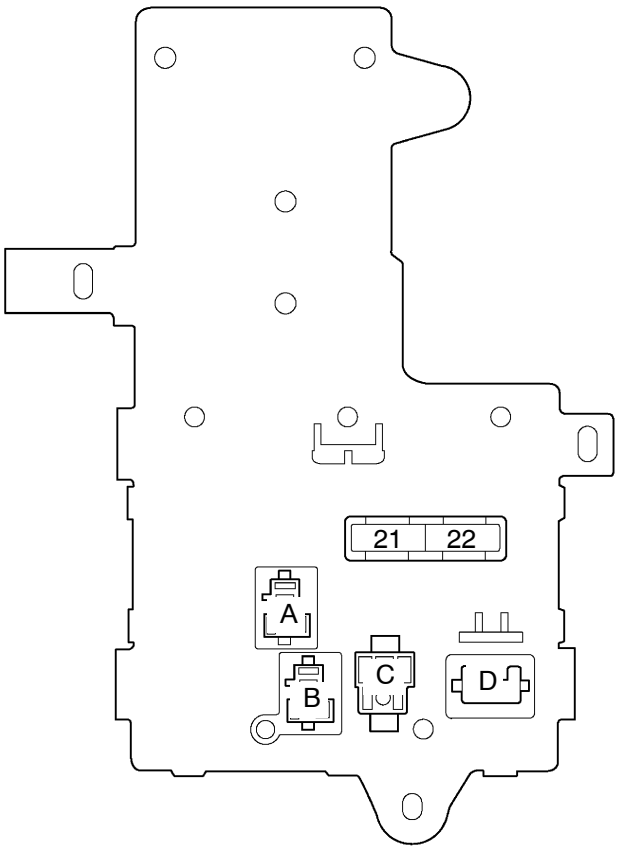


Fuses

1. DEF 40A
2. AM1 40A
3. P/W 20A
4. TAIL 10A
5. GAUGE 10A
6. D/L 20A
7. PANEL 7.5A
8. WSH 15A
9. ST 7.5A
10. FR DEF 20A
11. A/C 10A
12. S/HTR 15A
13. CIG 15A
14. S/R 30A
15. ECU–IG 10A
16. SRS–ACC 10A
17. STOP 15A
18. WIP 25A
19. RADIO2 10A
20. –

Condenser

21. DEF CDS
22. DEF CDS



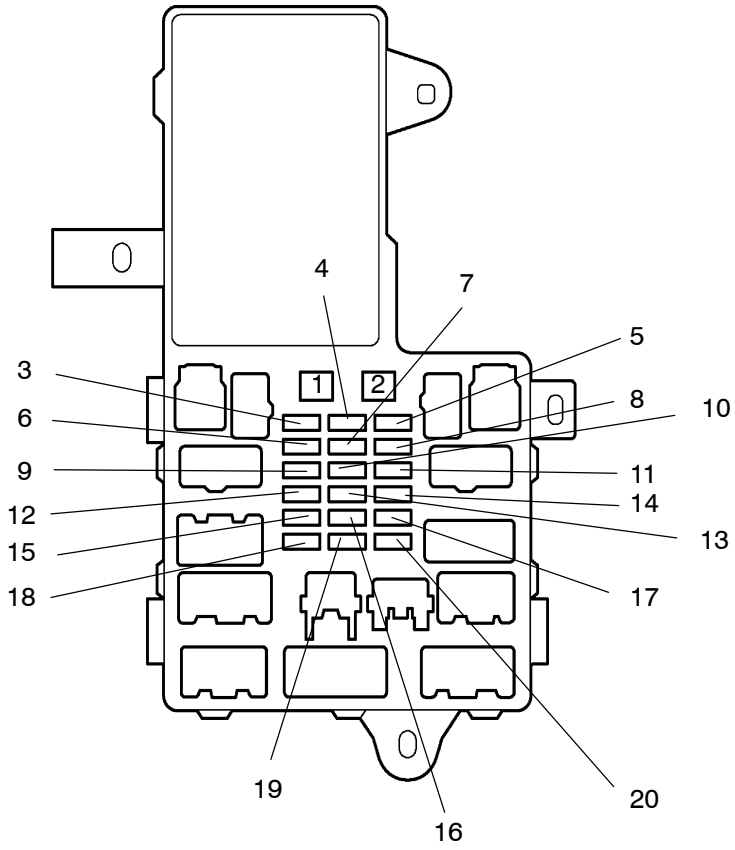
Relays

A. Deicer Relay
B. Taillight Control Relay
C. Rear Window Defogger Relay
D. Turn Signal Flasher Relay

N

I11547

● **Driver Side Junction Block**
RHD Models

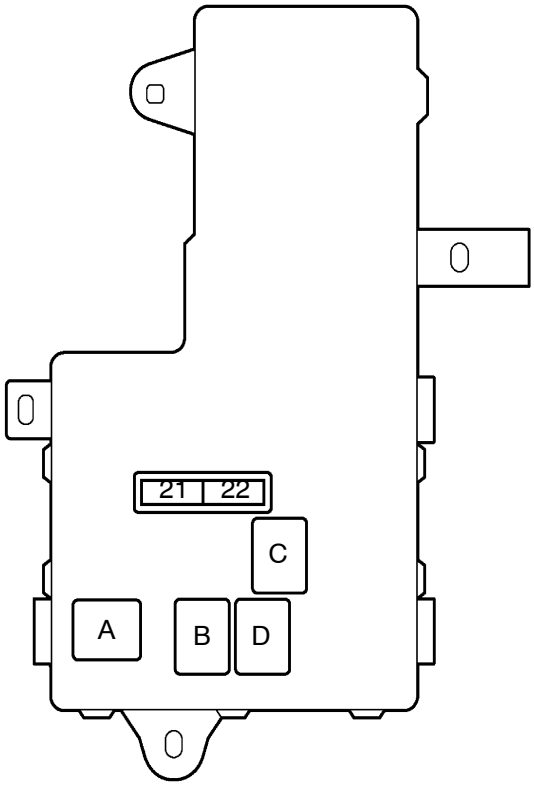


Fuses

1. AM1	40A
2. DEF	30A
3. PANEL	7.5A
4. D/L	20A
5. ECU–IG	10A
6. TAIL	10A
7. FR DEF	20A
8. GAUGE	10A
9. S/R	30A
10. P/W	20A
11. WIP	25A
12. STOP	15A
13. WSH	15A
14. A/C	10A
15. P/OUTLET	15A
16. CIG	15A
17. RADIO2	10A
18. ST	7.5A
19. SRS ACC	10A
20. S/HTR	15A

Condenser

21. DEF CDS
22. DEF CDS



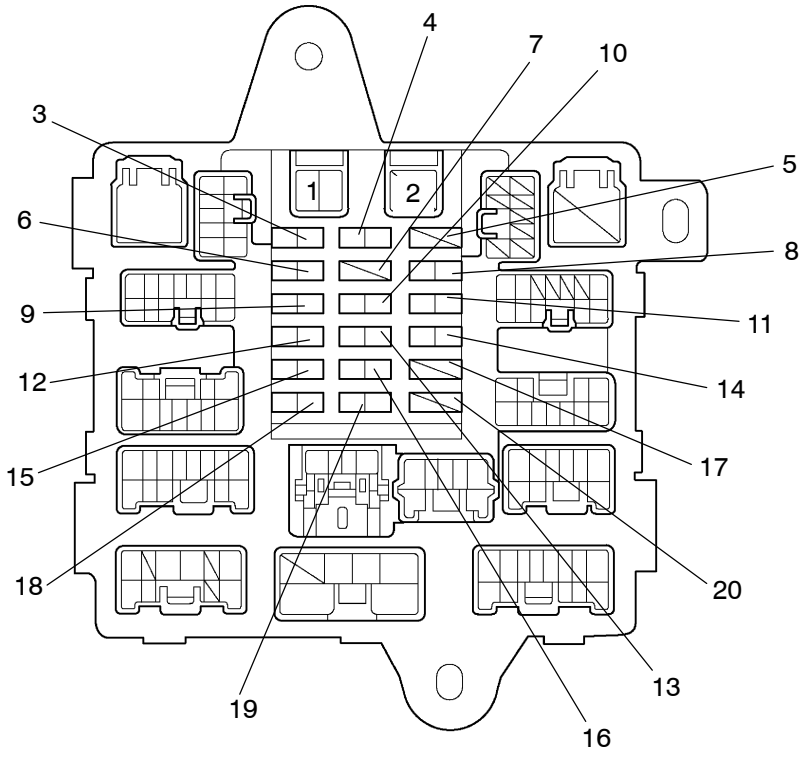
Relays

A. Turn Signal Flasher Relay
B. Rear Window Defogger Relay
C. Taillight Control Relay
D. Deicer Relay

N

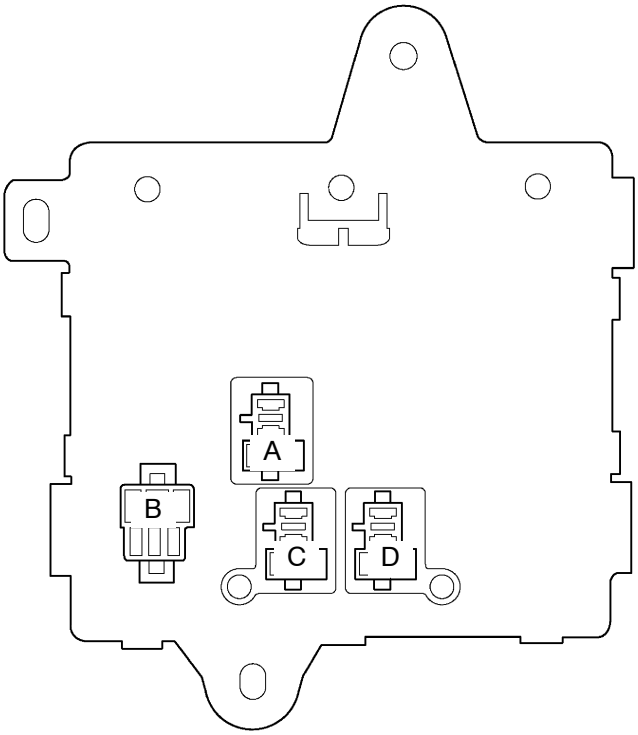
I11476

● **Passenger Side Junction Block**
LHD Models



Fuses

1. FL HTR 40A
2. –
3. DOOR DL 15A
4. DOME 7.5A
5. –
6. FR FOG 15A
7. –
8. P/W2 20A
9. P/OUTLET 15A
10. ECU–B2 7.5A
11. P/W3 20A
12. MIR HIR 15A
13. MPX–B 10A
14. P/W4 20A
15. SRS–B 7.5A
16. TV 7.5A
17. –
18. OBD2 7.5A
19. IGN 7.5A
20. –



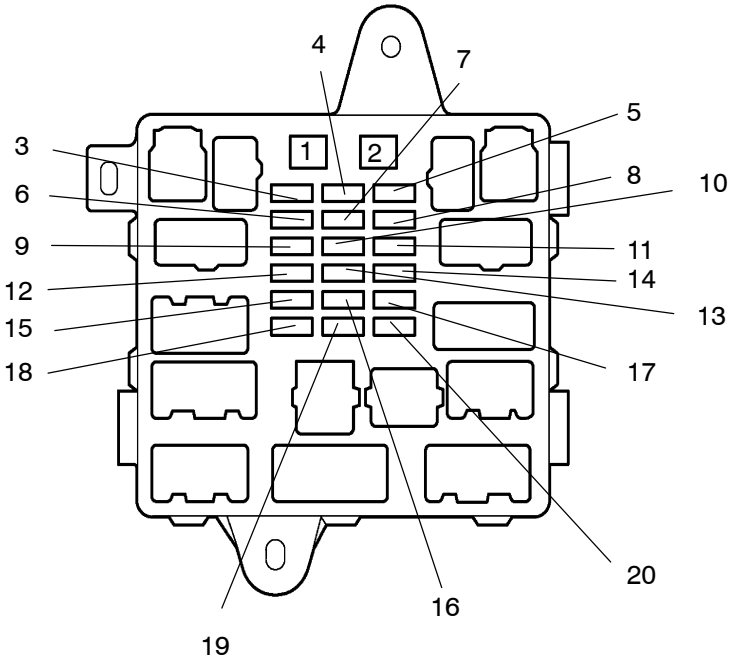
Relays

A. Front Fog Light Relay
B. Heater Main Relay
C. Mirror Heater Relay
D. Power Window Main Relay

N

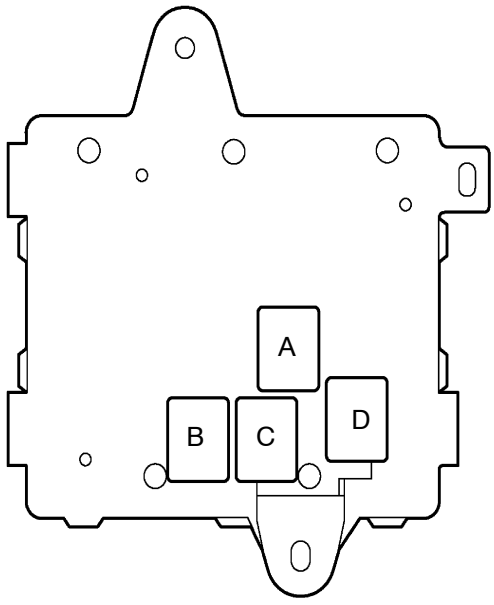
I11548

● **Passenger Side Junction Block**
RHD Models



Fuses

1. –	
2. FL HTR	40A
3. P/W2	20A
4. IGN	7.5A
5. DOOR DL	15A
6. P/W3	20A
7. –	
8. TV	7.5A
9. –	
10. DOME	7.5A
11. FR FOG	15A
12. P/W4	20A
13. –	
14. MIR HTR	15A
15. –	
16. MPX–B	10A
17. SRS–B	7.5A
18. –	
19. ECU–B2	7.5A
20. OBD2	7.5A



Relays

A. Front Fog Light Relay
B. Power Window Main Relay
C. Mirror Heater Relay
D. Heater Main Relay

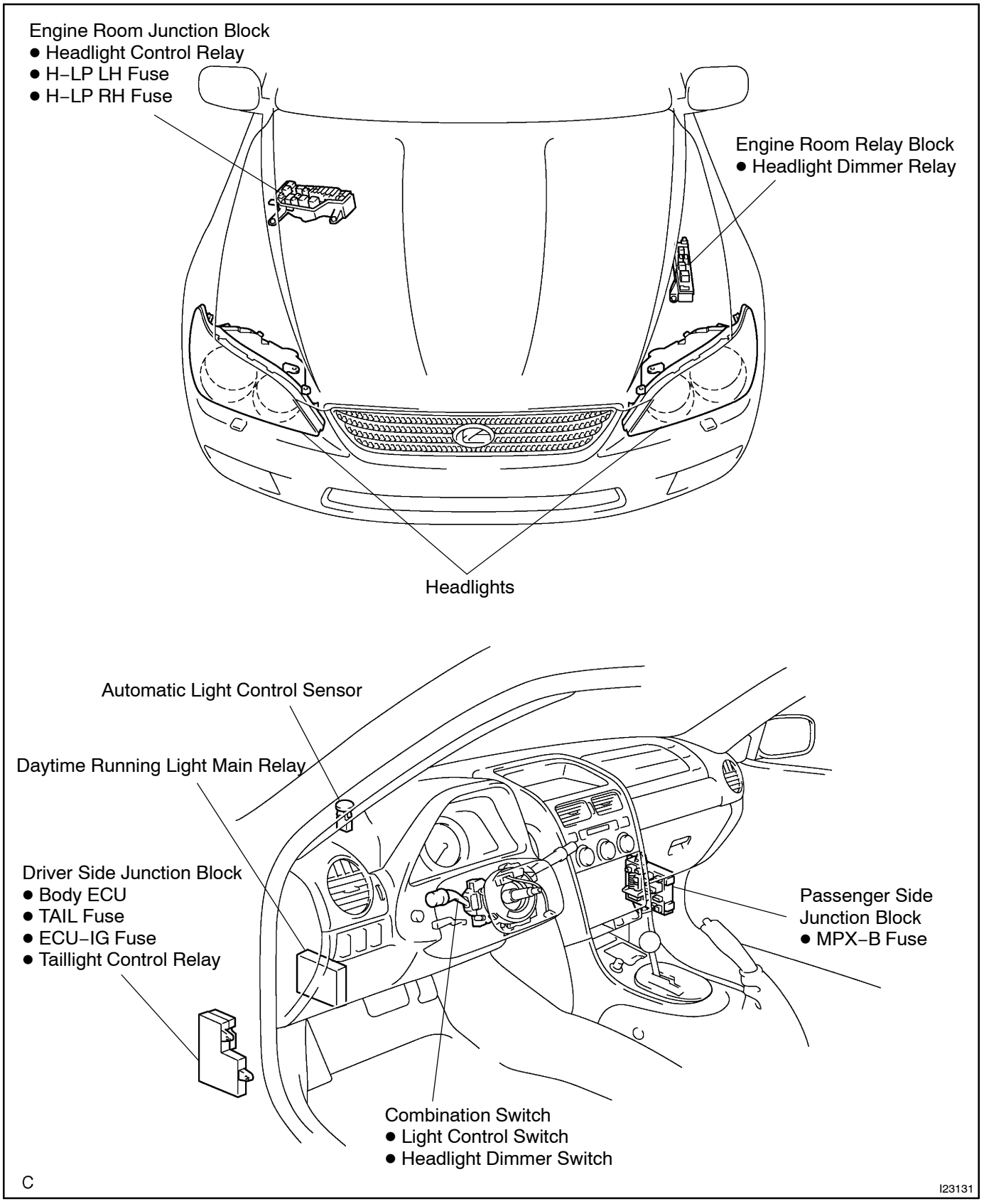
N

I11475

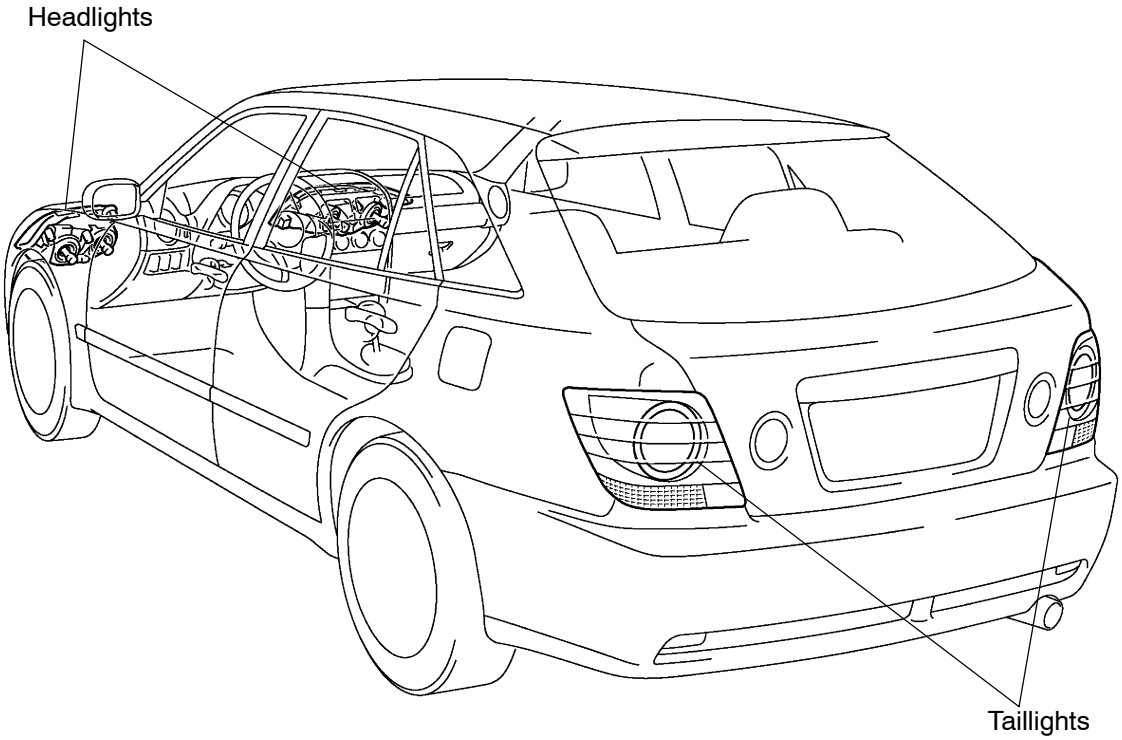
HEADLIGHT AND TAILLIGHT SYSTEM

BE296–01

LOCATION



Wagon:



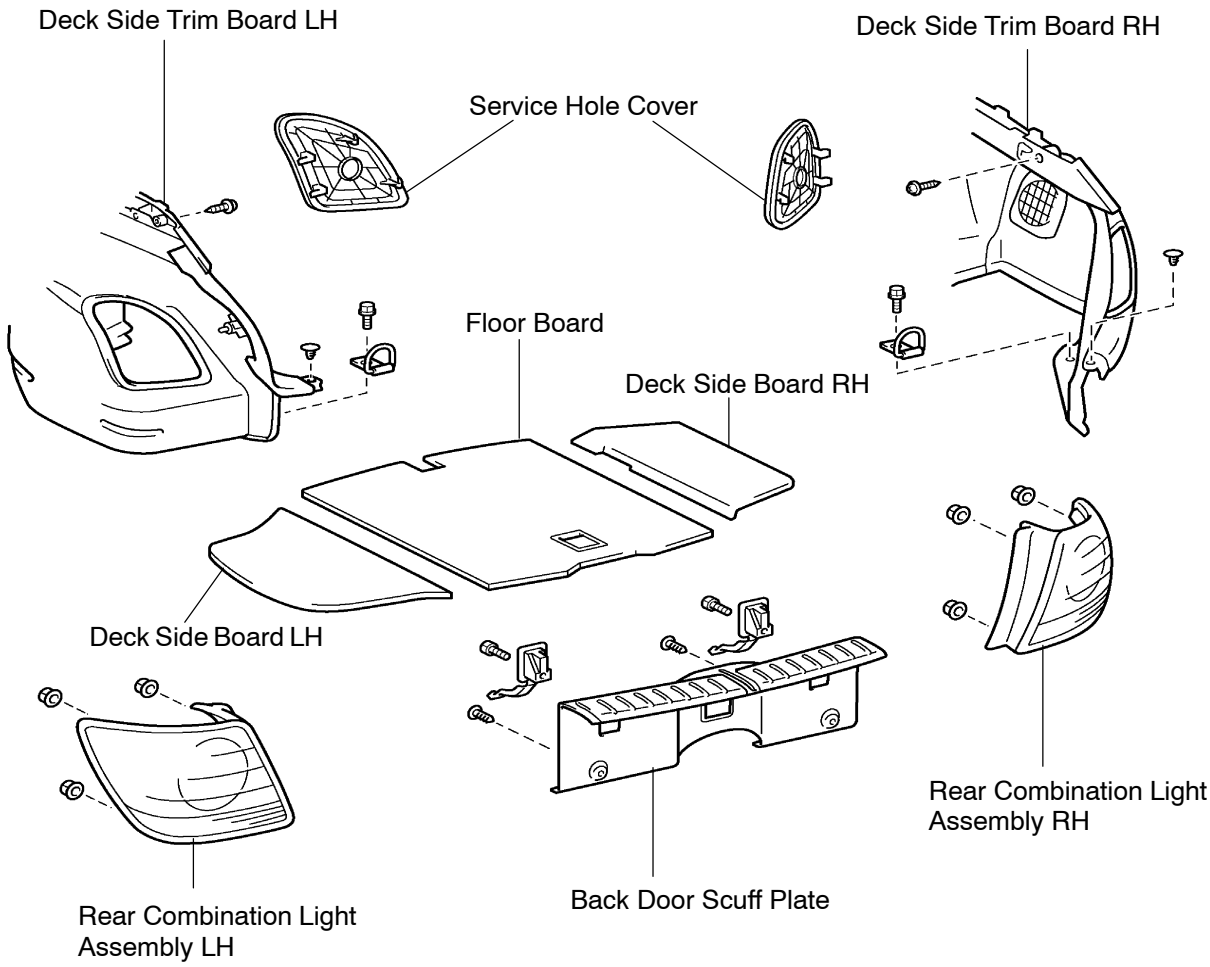
C

I23256

BE297–01

COMPONENTS

Wagon:

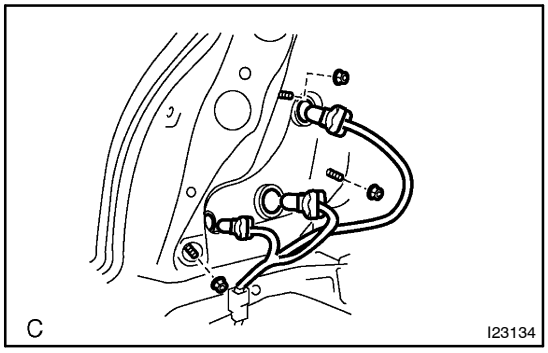


C

I23133

BE298–01

REMOVAL

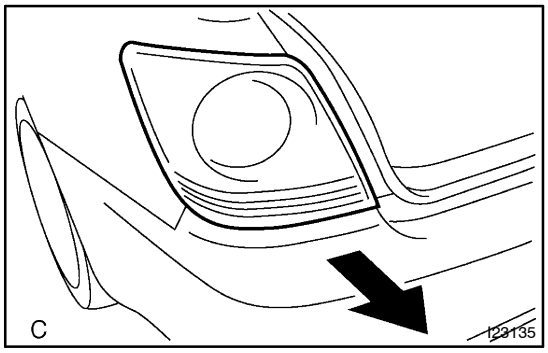


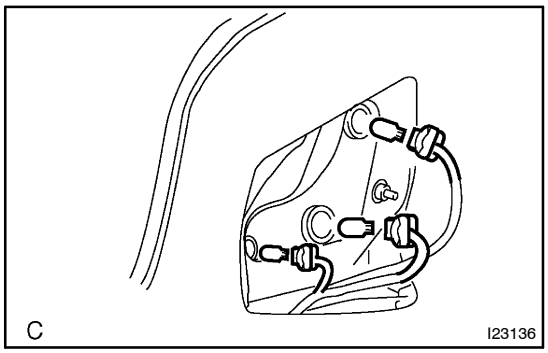
1. Wagon:
REMOVE REAR COMBINATION LIGHT

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove floor board and deck side board LH.
(b) Remove back door scuff plate.
(c) Remove a part of deck side trim board LH.
(d) Disconnect the bulb sockets and 3 nuts.
(e) Remove the combination light assembly.



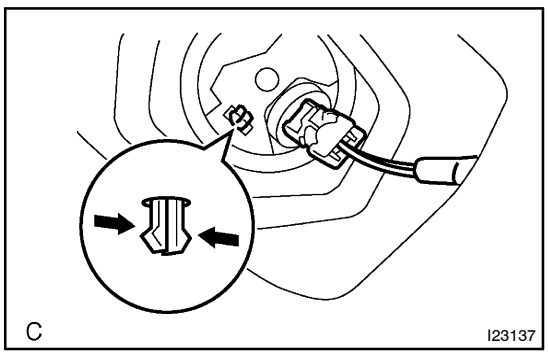


2. Wagon:
REMOVE REAR COMBINATION BULB

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove a service hole cover.
(b) Remove the bulb sockets and remove the bulbs.

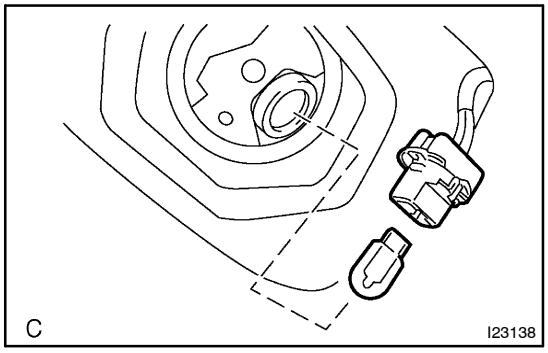


3. Wagon:
REMOVE REAR LAMP ASSEMBLY

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove the back door trim service hole cover.
(b) Compress the claw to disconnect the engagement as shown in the illustration.
(c) Separate the connector and remove the rear light assembly.



4. Wagon:
REMOVE REAR LAMP BULB

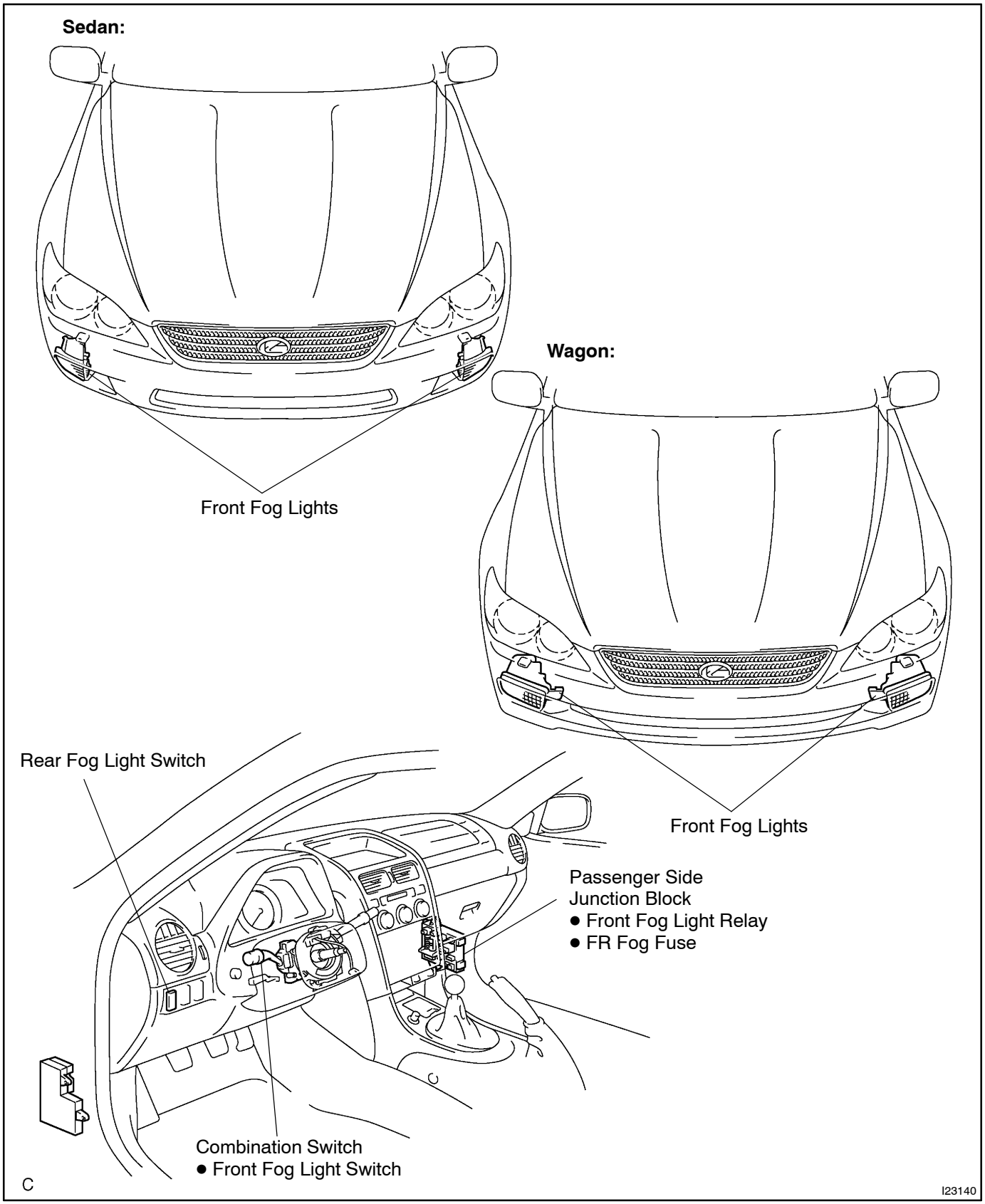
HINT:
Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.

(a) Remove the back door trim service hole cover.
(b) Remove the bulb socket and bulb.

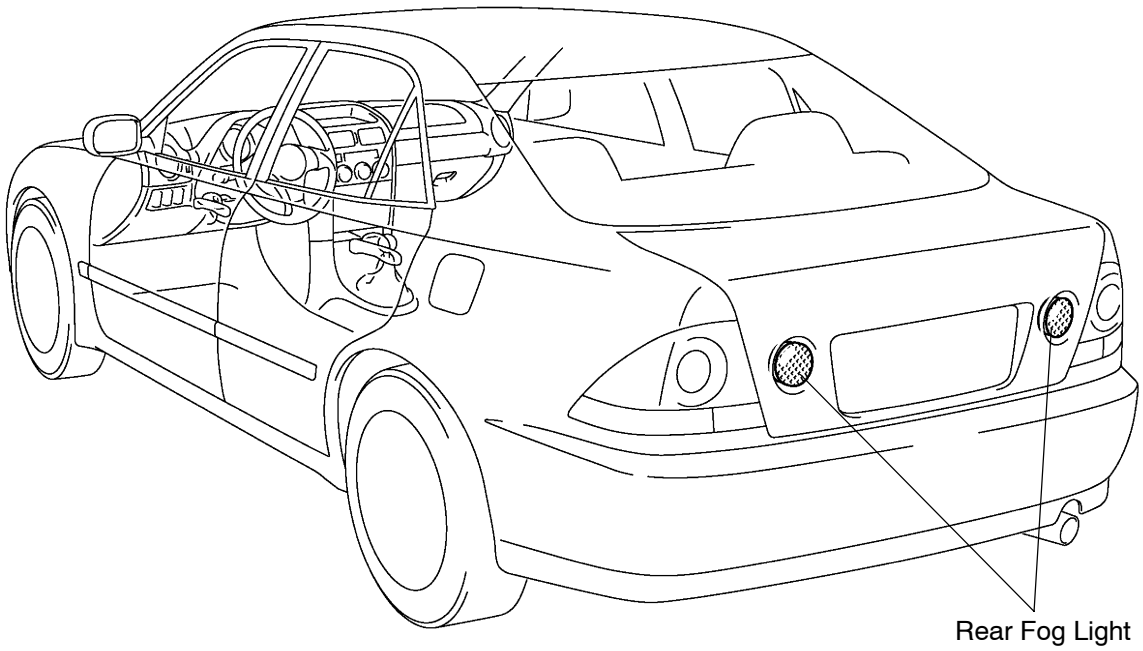
FOG LIGHT SYSTEM

LOCATION

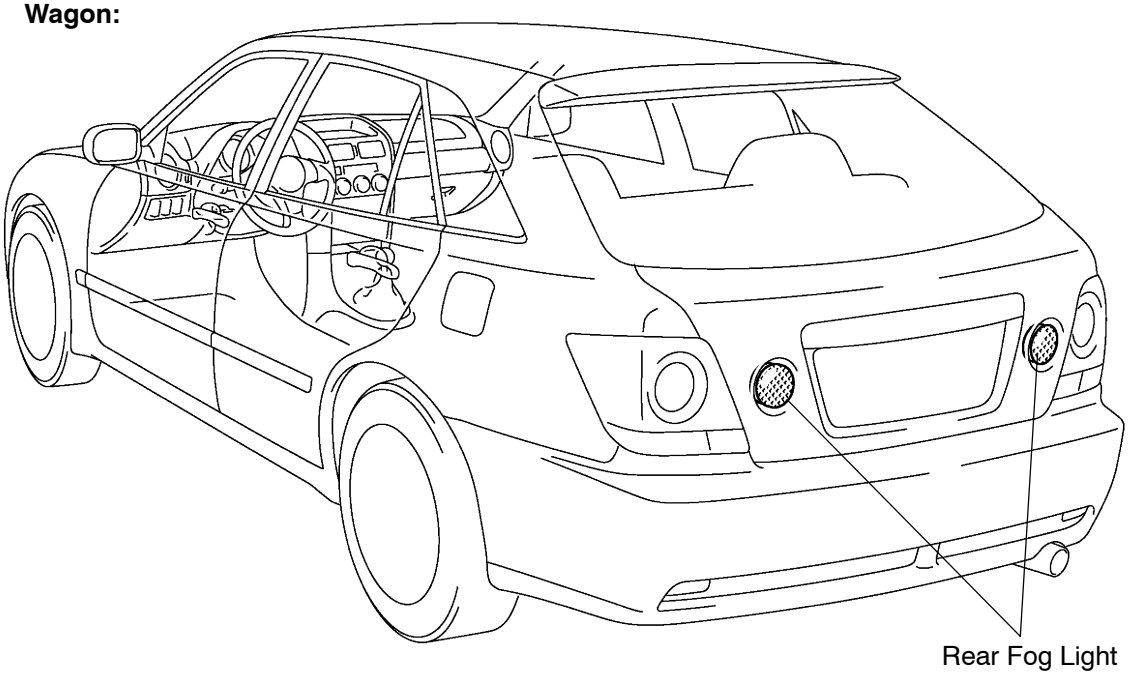
BE299–01



Sedan:



Wagon:

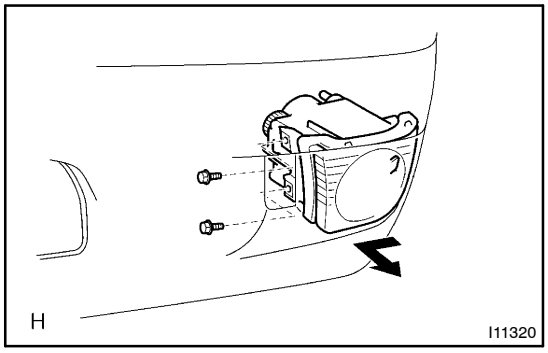


C

I23207

BE29A–01

REMOVAL

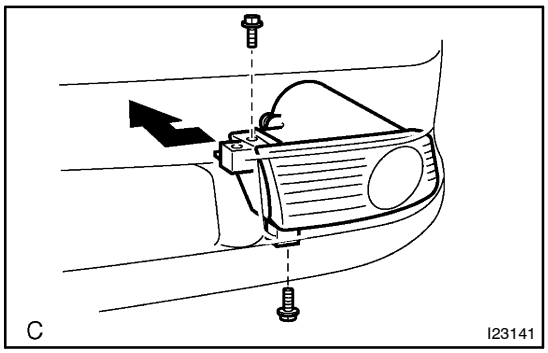


1. Sedan:
REMOVE FRONT FOG LIGHT ASSEMBLY

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove the front portion of fender liner.
(b) Disconnect the connecter.
(c) Remove the 2 bolts.
(d) Remove the front fog light assembly, as shown in the illustration.
(e) Install front fog light assembly.
(f) Adjust optical axis of front fog light
(See Pub No. RM684E on page BE–48).

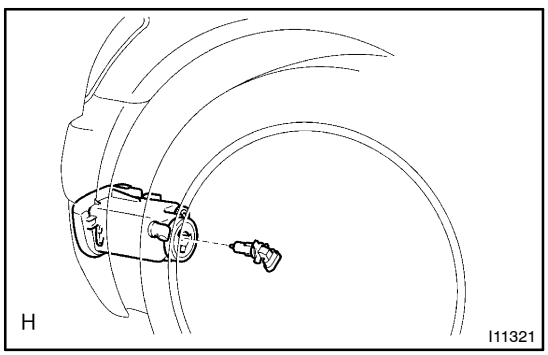


2. Wagon:
REMOVE FRONT FOG LIGHT ASSEMBLY

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove the front portion of fender liner.
(b) Disconnect the connecter.
(c) Remove the 2 bolts.
(d) Remove the front fog light assembly, as shown in the illustration.
(e) Install front fog light assembly.
(f) Adjust optical axis of front fog light
(See Pub No. RM684E on page BE–48).



3. REMOVE FRONT FOG LIGHT BULB

HINT:

Follow the same procedure for RH as for LH.

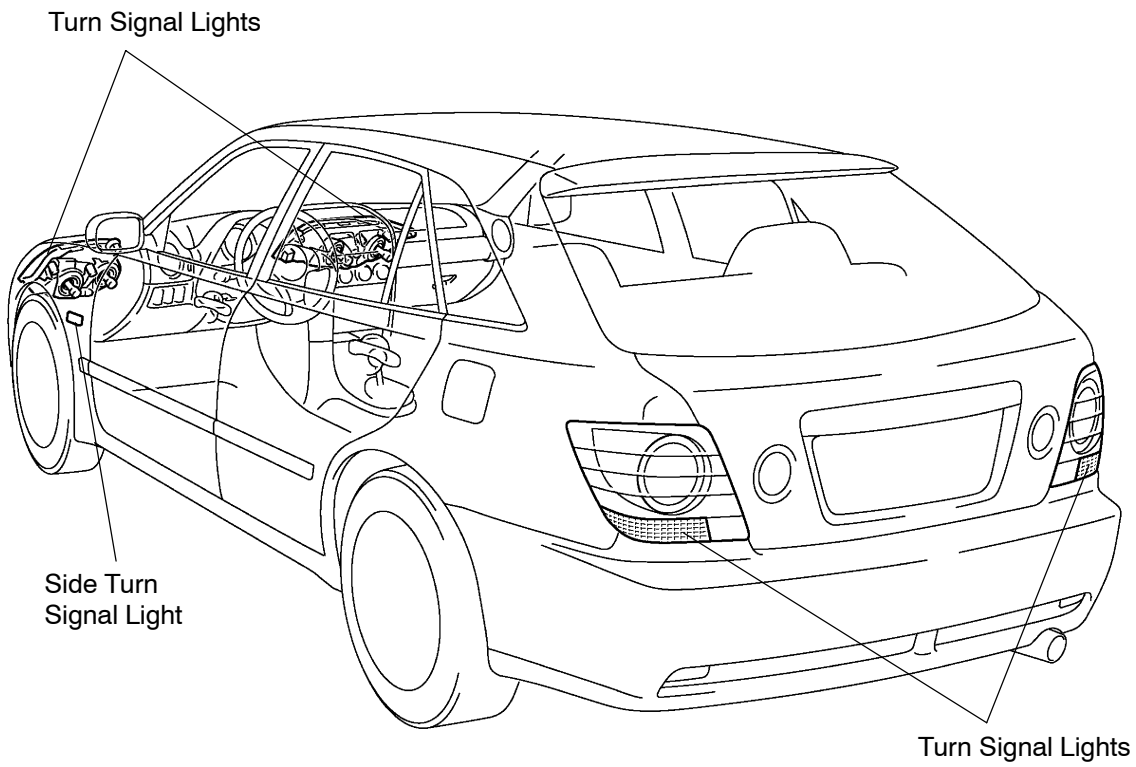
(a) Remove a part of LH front fender liner.
(b) Separate the connector and remove the bulb.

TURN SIGNAL AND HAZARD WARNING SYSTEM

BE0H0-10

LOCATION

Wagon:



C

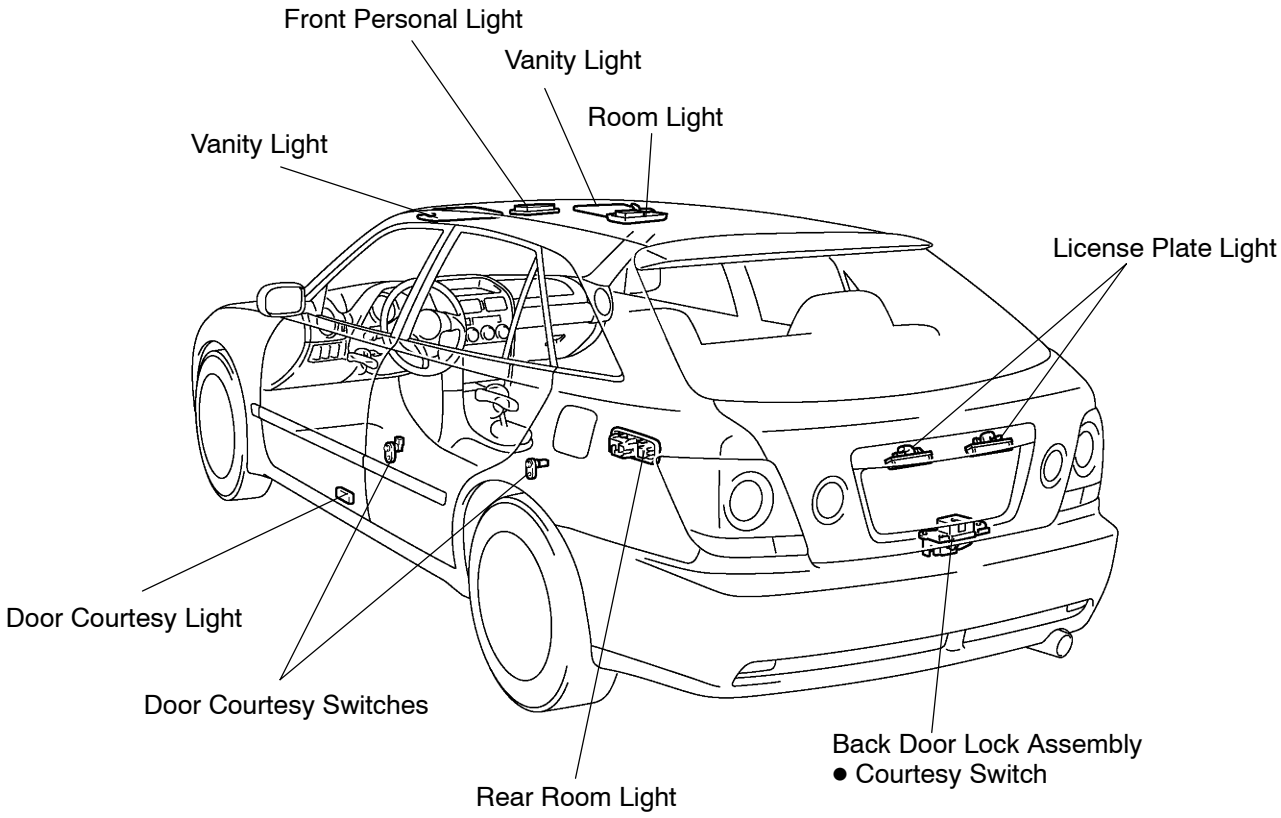
I23195

INTERIOR LIGHT SYSTEM

LOCATION

BE0GY–08

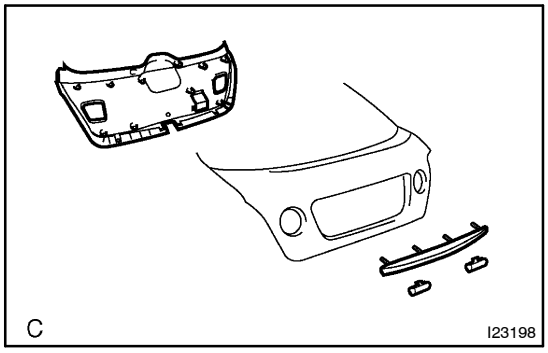
Wagon:



C

I23196

BE167–03



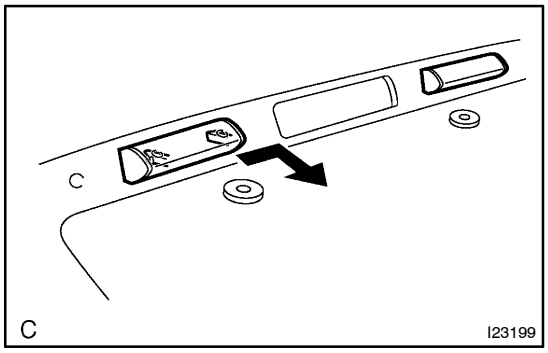
REMOVAL

1. Wagon:
REMOVE LICENSE PLATE LIGHT

HINT:

- Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.
- Follow the same procedure for RH as for LH.

(a) Remove the back door trim.
(b) Remove the 4 nuts.
(c) Remove back door outer garnish.
(d) Disconnect the connector.
(e) Pull the claw towards the inside of the vehicle as shown in the illustration, disconnect the engagement of 2 claws, and remove the license plate light assembly.

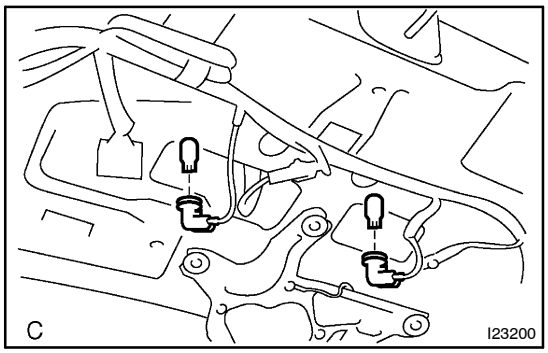


2. Wagon:
REMOVE LICENSE PLATE BULB

HINT:

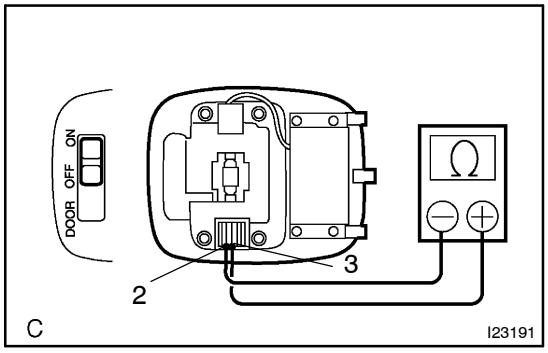
Installation is in the reverse order of removal. Only if there is a specified procedure for installation it is shown.

(a) Remove the back door trim.
(b) Disconnect the bulb sockets and remove the bulbs.



BE29B–01

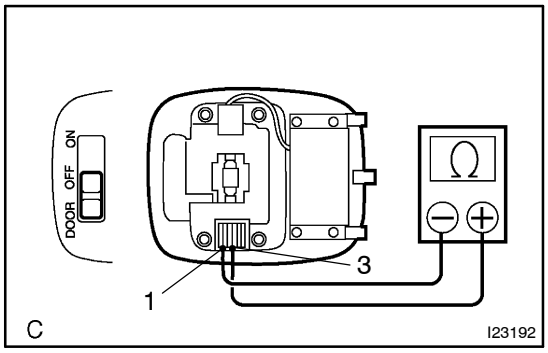
INSPECTION



1. w/ Reader sensor:
INSPECT ROOM LIGHT CONTINUITY

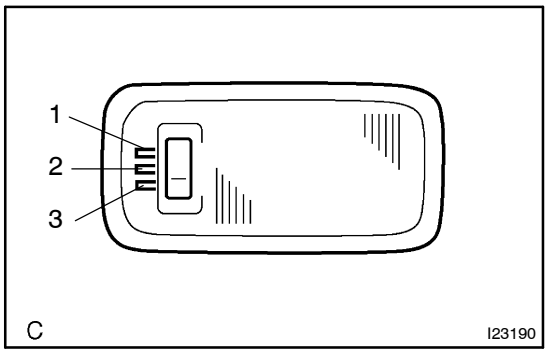
(a) Disconnect the connector from the room light.

(b) Turn the room light switch ON, check that continuity exists between terminal 2 and 3.



(c) Turn the room light switch DOOR, check that continuity exists between terminals 1 and 3.

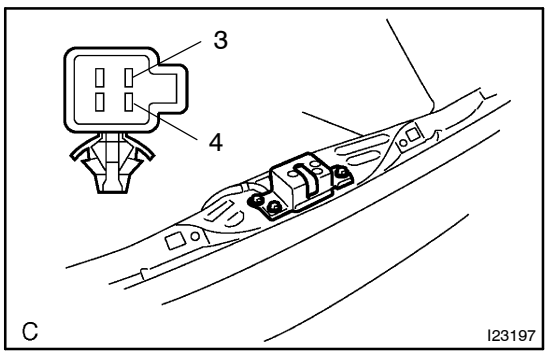
If continuity is not as specified, replace the light assembly or bulb.



2. REAR ROOM LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	1 – 2	No continuity
ON	2 – 3	Continuity

If continuity is not as specified, replace the light assembly or bulb.



3. BACK DOOR COURTESY SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (closed)	–	No continuity
ON (opened)	3 – 4	Continuity

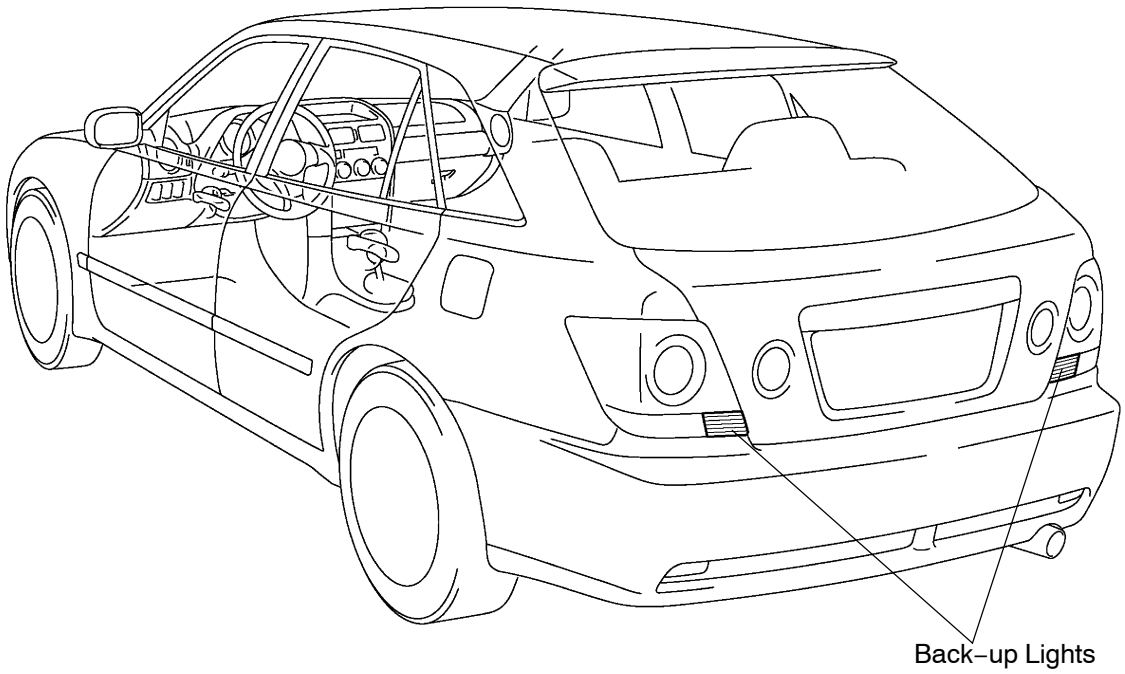
If continuity is not as specified, replace the switch.

BACK–UP LIGHT SYSTEM

LOCATION

BE0GW–10

Wagon:



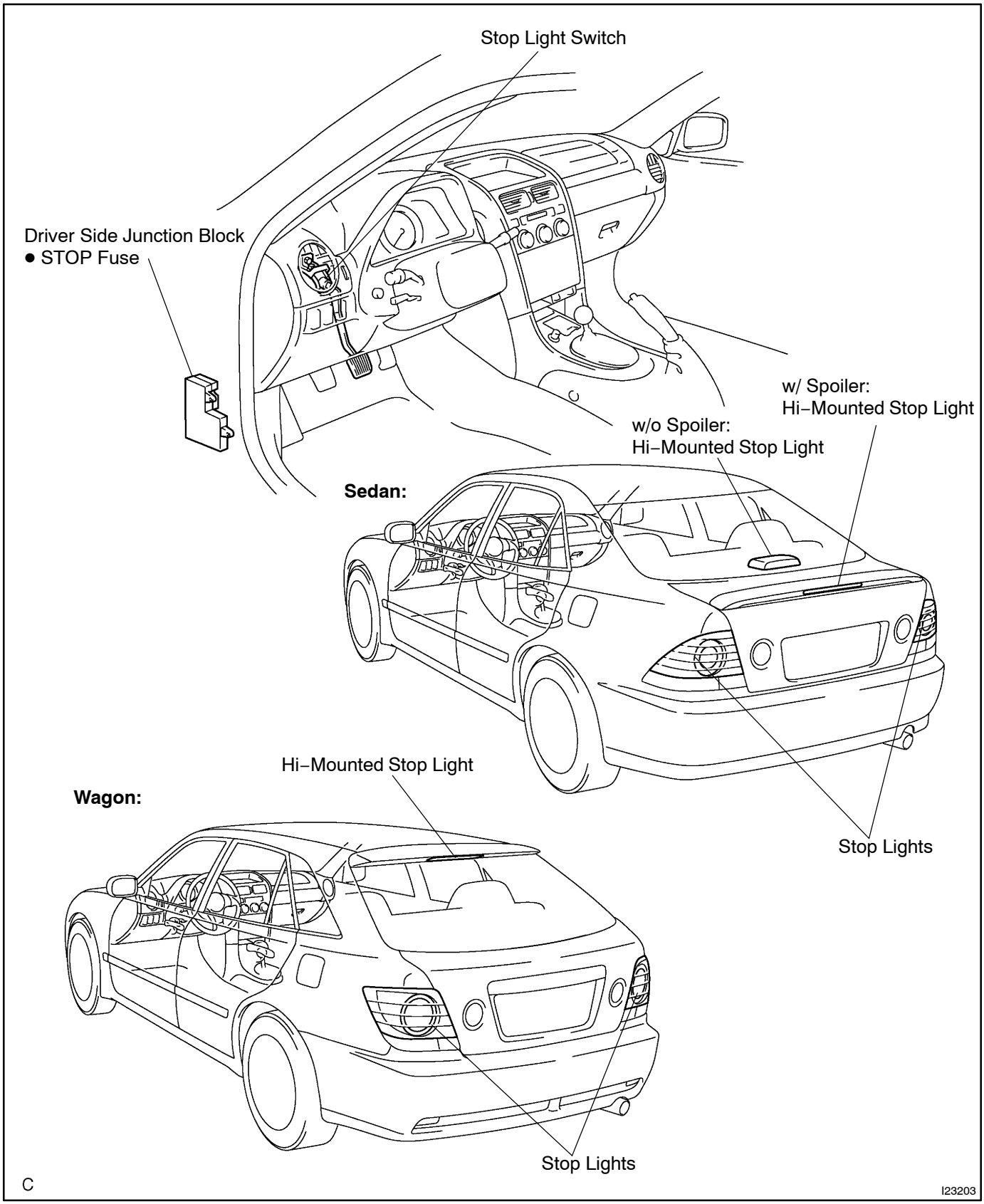
C

I23257

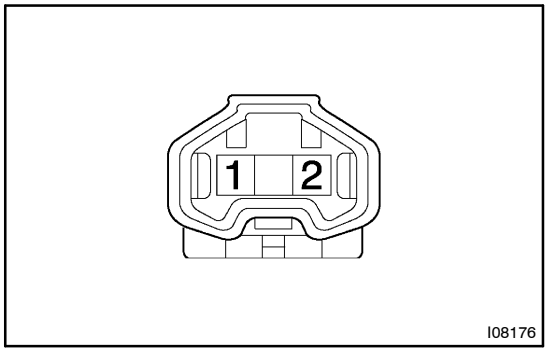
STOP LIGHT SYSTEM

LOCATION

BE0H6–10



BE29C–01



INSPECTION

w/ Spoiler:

INSPECT HI–MOUNTED STOP LIGHT ASSEMBLY CONTINUITY

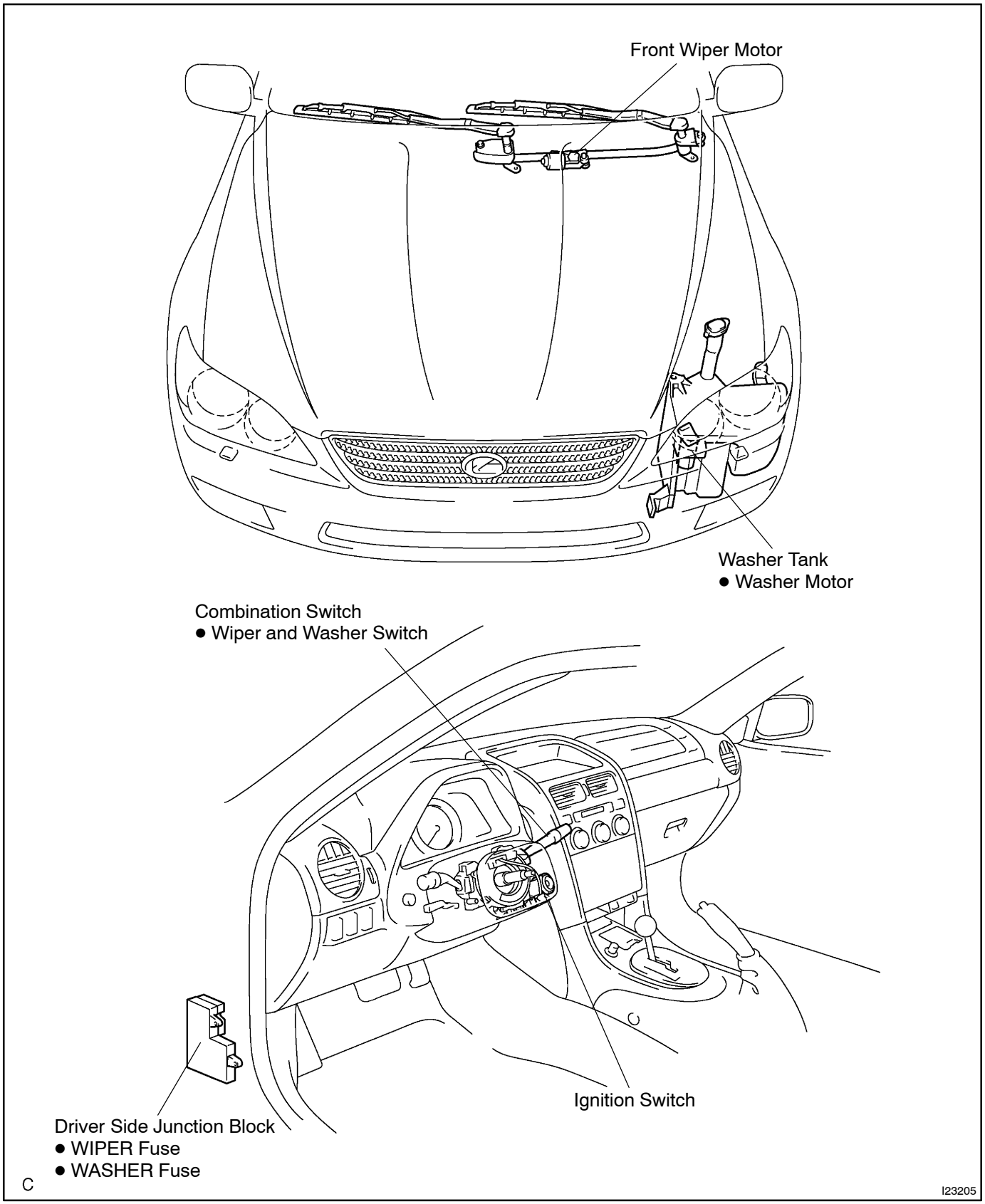
Using the ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the bulb or light assembly.

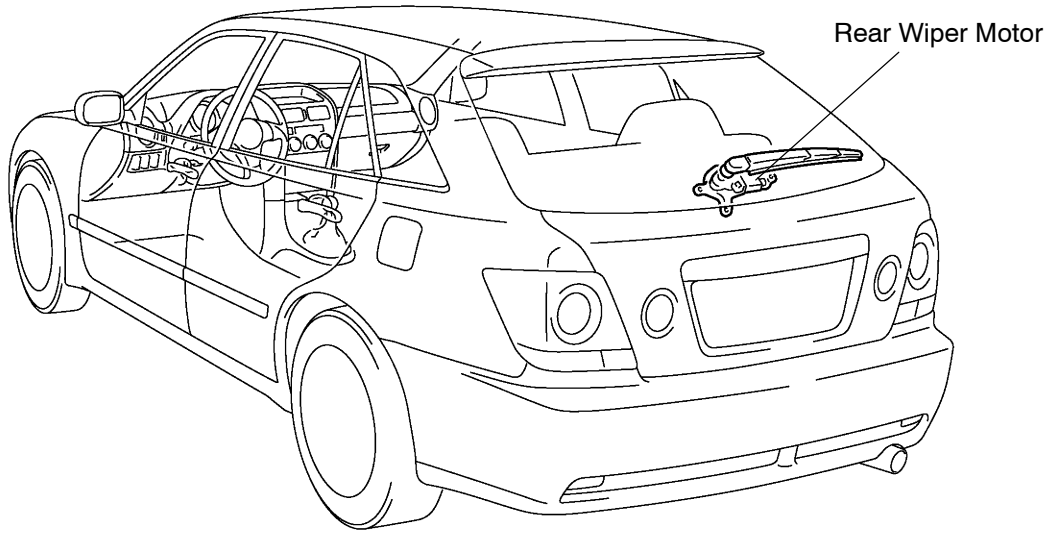
WIPER AND WASHER SYSTEM

BE29D–01

LOCATION



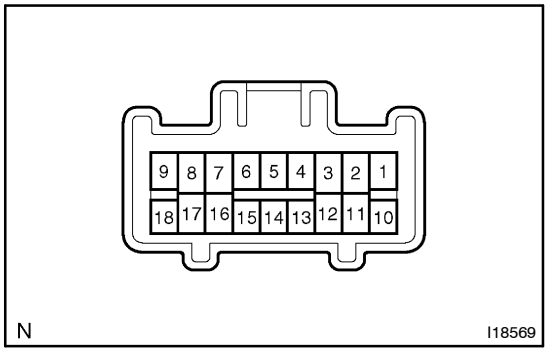
Wagon:



C

I23206

BE29E–01



INSPECTION

1. LHD models:
INSPECT REAR WIPER AND WASHER SWITCH CONTINUITY

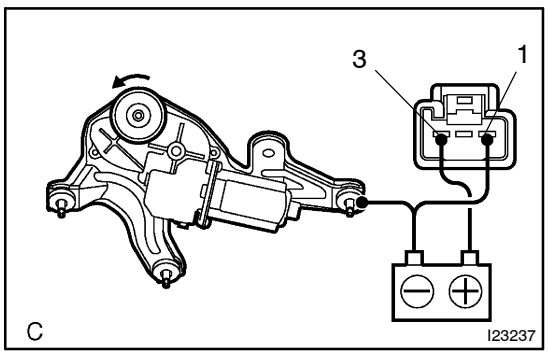
Switch position	Tester connection	Specified condition
OFF	–	Continuity
INT	2 – 13	Continuity
ON	2 – 10	Continuity
Washer OFF	–	No continuity
Washer ON	2 – 12	Continuity

If continuity is not as specified, replace the switch.

2. RHD models:
INSPECT REAR WIPER AND WASHER SWITCH CONTINUITY

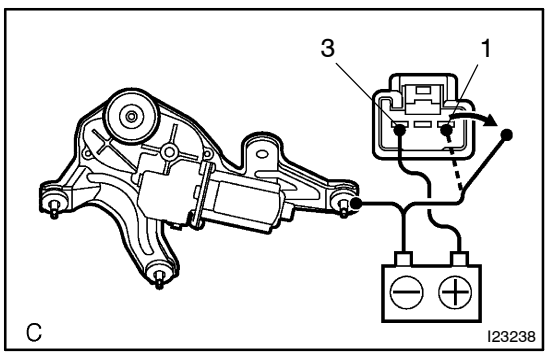
Switch position	Tester connection	Specified condition
OFF	–	Continuity
INT	8 – 15	Continuity
ON	8 – 18	Continuity
Washer OFF	–	No continuity
Washer ON	8 – 16	Continuity

If continuity is not as specified, replace the switch.



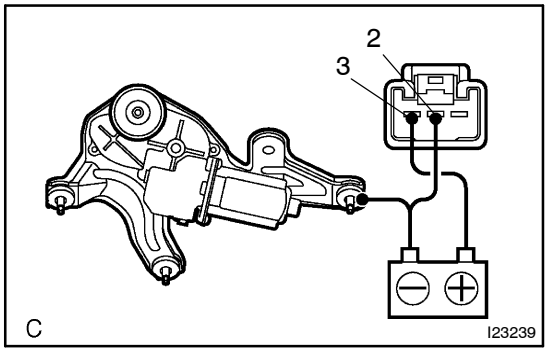
3. INSPECT REAR WIPER MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and negative (–) lead to terminal 1 and the motor body, check that the motor operates.



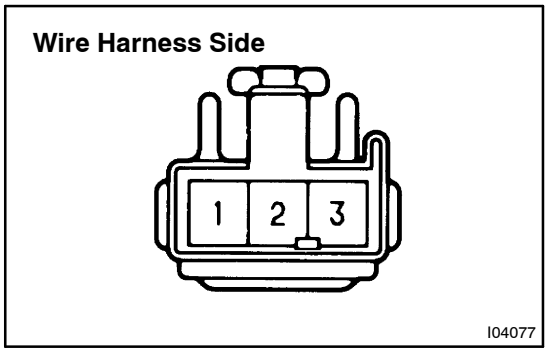
(b) Disconnect the negative (–) lead from terminal 1, check that the motor stops running at the stop position.

If operation is not as specified, replace the motor.



4. Intermittent:
INSPECT REAR WIPER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2 and the motor body, check that the motor operates intermittently for 9–15 seconds.
If operation is not as specified, replace the motor.

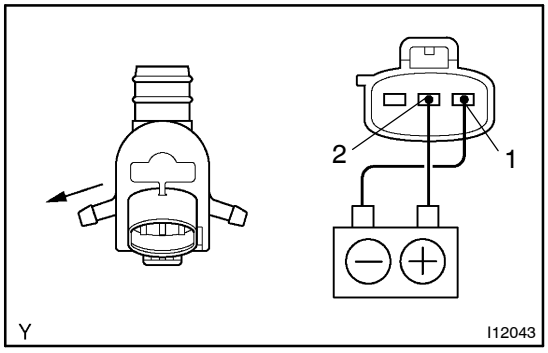


5. Connector disconnected:
INSPECT REAR WIPER MOTOR CIRCUIT

Disconnect the connector from the motor and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
2 – Ground	Constant	Continuity
3 – Ground	Ignition switch OFF or ACC	No voltage
3 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.



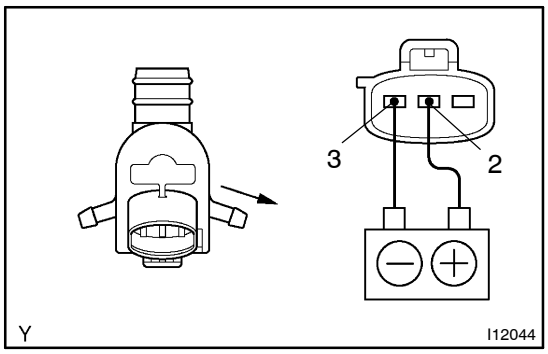
6. Wagon:
INSPECT FRONT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



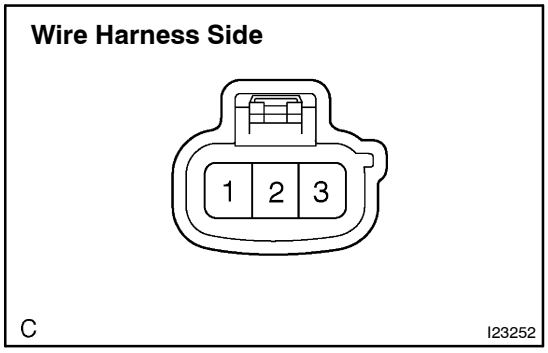
7. INSPECT REAR WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



8. Connector disconnected:
INSPECT WASHER MOTOR CIRCUIT

Disconnect the connector from the motor and inspect the connector on the wire harness side, as shown.

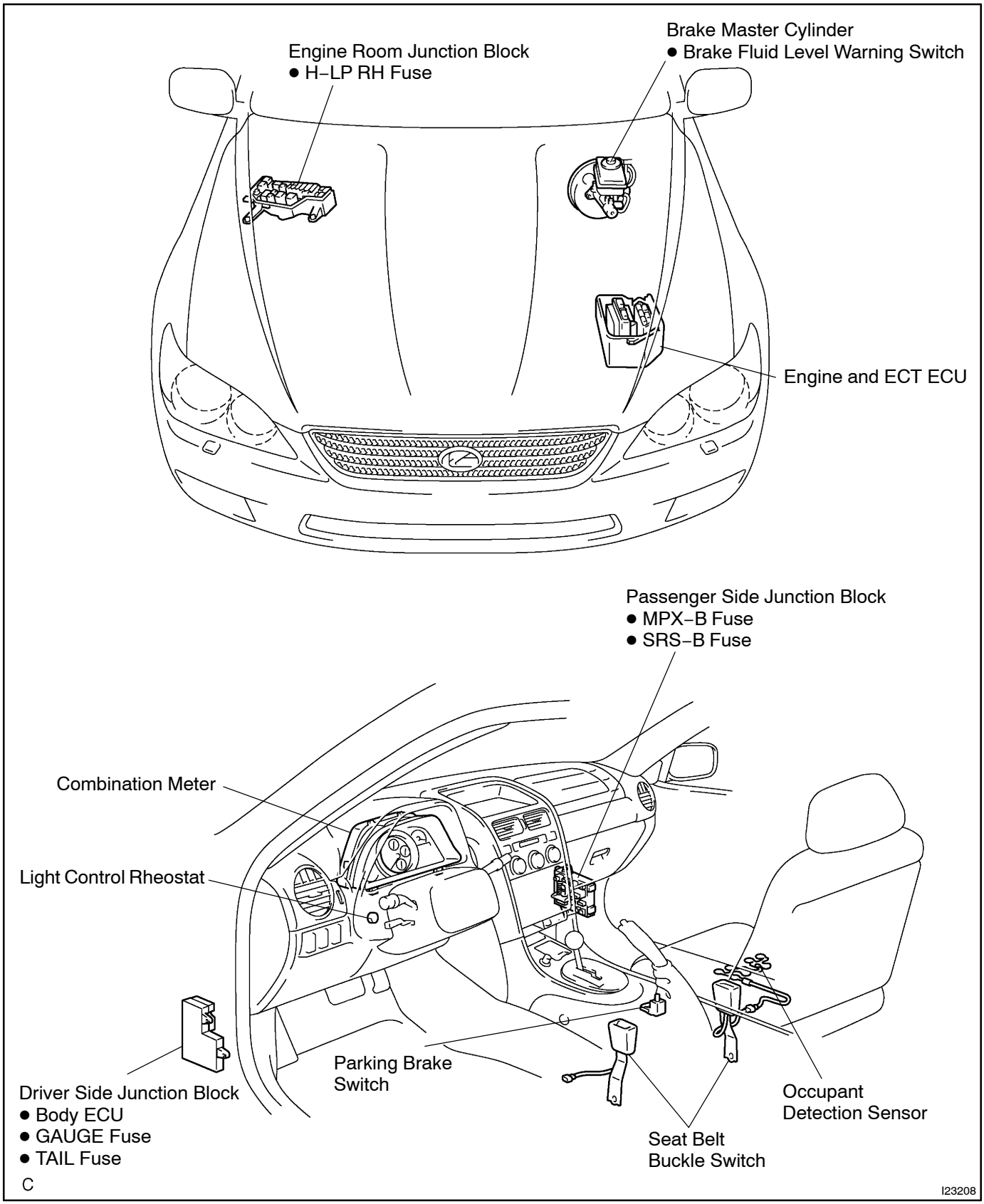
Tester connection	Condition	Specified condition
2 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect the power source, wire harness and wiper switch.

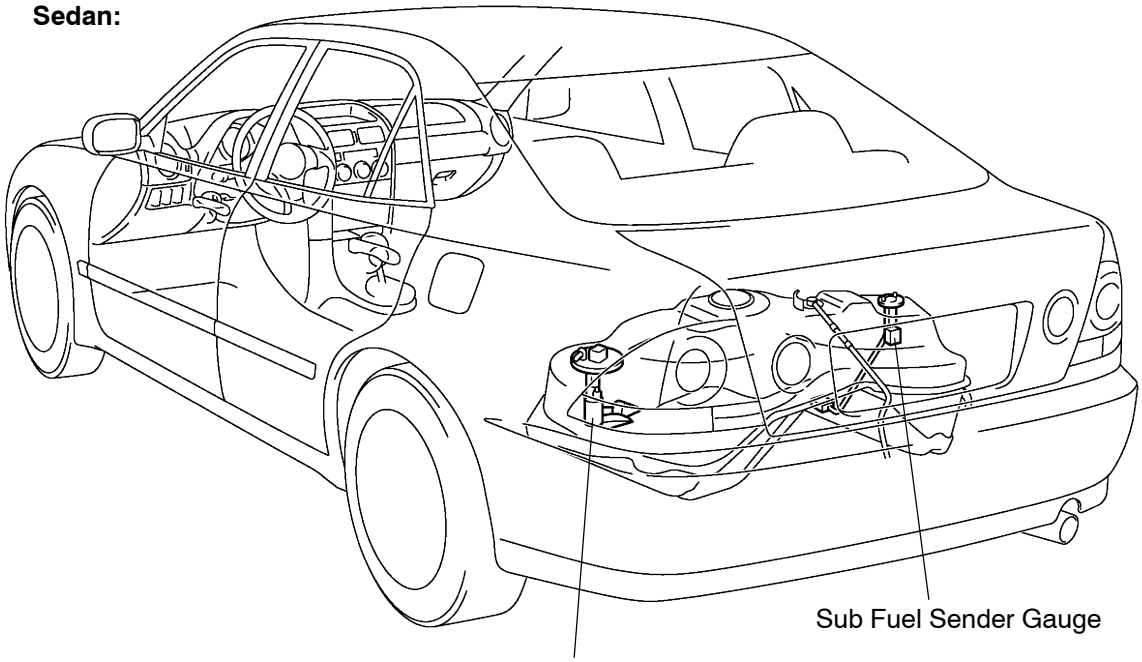
COMBINATION METER

BE0HH–11

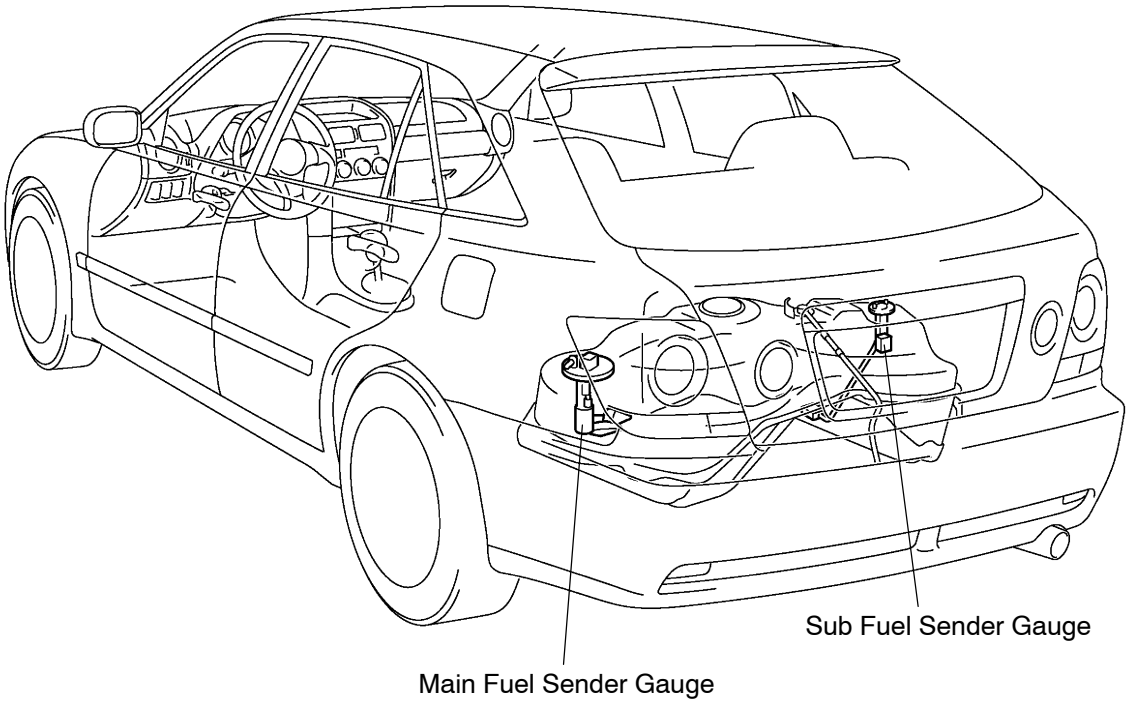
LOCATION



Sedan:



Wagon:

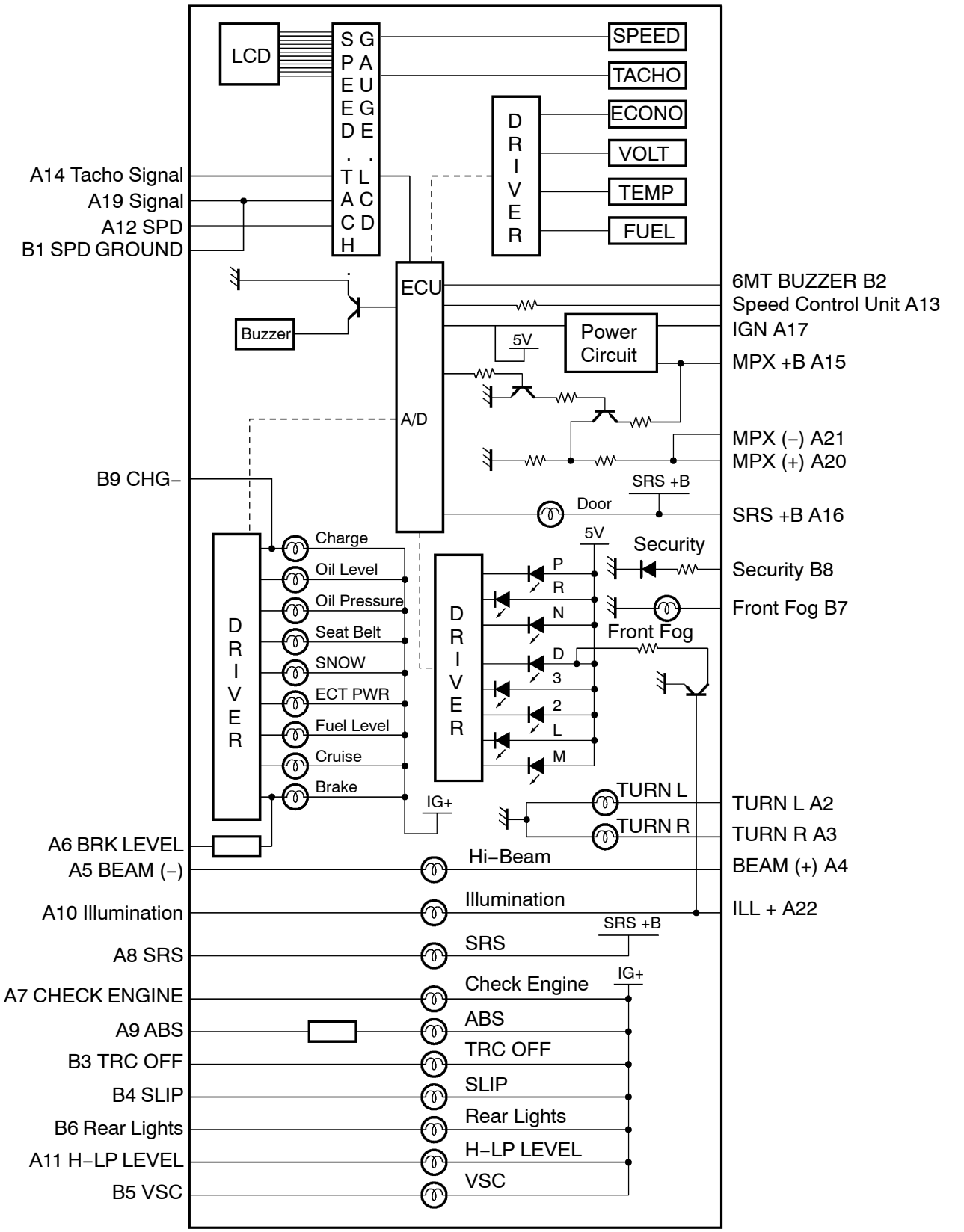


C

I23209

BE29F–01

CIRCUIT



C

I23210

No.		Wiring connector side
A	2	Turn signal light switch (Left)
	3	Turn signal light switch (Right)
	4	HEAD Fuse
	5	Headlight dimmer switch
	6	Brake fluid level warning switch
	7	Engine and ECT ECU
	8	Airbag sensor assembly
	9	ABS ECU
	10	Rheostat light control volume
	11	Headlight beam level control ECU
	12	Speed sensor (M/T) or ABS ECU (A/T)
	13	Speed control unit
	14	Engine and ECT ECU
	15	MPX+B Fuse
	16	SRS+B Fuse
	17	GAUGE Fuse
	18	Power ground
	19	Signal ground
	20	Multiplex communication circuit (MPX+)
	21	Multiplex communication circuit (MPX–)
	22	TAIL Fuse
B	1	Speed signal ground (M/T vehicle only)
	2	6M/T reverse buzzer (M/T vehicle only)
	3	ABS and TRC ECU
	4	ABS and TRC ECU
	5	ABS and TRC ECU (w/ VSC)
	6	Light failure relay
	7	Front fog light switch
	8	Transponder key ECU
	9	Daytime running light relay

BE29G–01

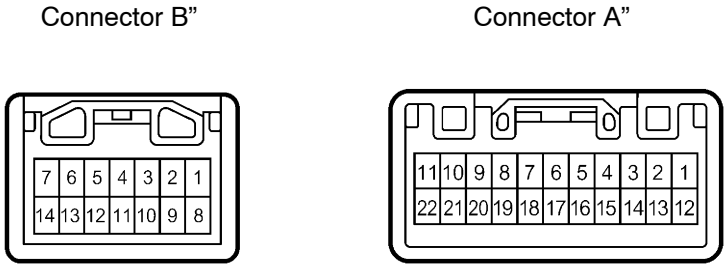
INSPECTION

1. INSPECT COMBINATION METER CIRCUIT

Connector connected:

Connect connector ”A” and ”B” from the combination meter and inspect the connectors on the wire harness side as shown in the table.

Connector connected



I11995

Tester connection	Condition	Specified condition
A2 – Ground (Turn L)	Ignition switch ON and turn signal switch Left	Battery voltage
A3 – Ground (Turn R)	Ignition switch ON and turn signal switch Right	Battery voltage
A4 – Ground (Beam +)	Constant	Battery voltage
A5 – Ground (Beam –)	Headlight dimmer switch HI	Battery voltage
A6 – Ground (BRK level)	Ignition switch ON and Brake fluid level warning switch LO	Battery voltage
A7 – Ground (Check engine)	Ignition switch ON and engine running	Battery voltage
A8 – Ground (SRS)	SRS warning light does not light up	Battery voltage
A9 – Ground (ABS)	Ignition switch ON and ABS warning does not lights up	Battery voltage
A10 – Ground (ILL–)	Light control switch TAIL or HEAD	Continuity
A11 – Ground (Headlight beam level)	Headlight beam level control system is operation	Battery voltage
A12 – Ground (Speed signal input)	Ignition switch ON and turn propeller shaft slowly	Battery voltage
A13 – Ground (Speed signal output)	Ignition switch ON and turn propeller shaft slowly	1 V to 4.5 – 5.5 V
A14 – Ground (Tachometer signal)	Engine running	Pulse generation *1
A15 – Ground (MPX +B)	Constant	Battery voltage

A16 – Ground (DOME +B)	Constant	Battery voltage
A17 – Ground (IGN)	Ignition switch ON	Battery voltage
A18 – Ground (Power ground)	Constant	Continuity
A19 – Ground (Signal ground)	Constant	Continuity
A20 – Ground (MPX+)	Ignition switch ON	Pulse generation
A21 – Ground (MPX–)	Ignition switch ON	Pulse generation
A22 – Ground (ILL+)	Light control switch TAIL or HEAD	Battery voltage
B1 – Ground (SP ground)	Constant	Continuity
B2 – Ground (6M/T R buzzer)	Ignition switch ON and shift lever except R range	Battery voltage
B3 – Ground (TRC OFF)	Ignition switch ON and TRC OFF indicator does not light up	Battery voltage
B4 – Ground (SLIP)	Ignition switch ON and SLIP indicator does not light up	Battery voltage
B5 – Ground (VSC)	Ignition switch ON and VSC indicator does not light up	Battery voltage
B6 – Ground (Rear Lights)	Ignition Switch ON and rear lights bulb is blown	Battery voltage
B7 – Ground (Front Fog)	Light control switch TAIL and Front fog light Switch ON	Battery voltage
B8 – Ground (Security)	Theft deterrent system is operating	Battery voltage
B9 – Ground (Alternator L terminal)	Engine running	Battery voltage

If circuit is not as specified, wiring diagram and inspect the circuits connected to other parts.

2. INSPECT SPEEDOMETER/ON–VEHICLE

Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.
HINT:
Tire wear and tire over or under inflation will increase the indication error.

Europe Models

(mph)		(km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
20	21 – 23.5	20	21 – 25
40	41.5 – 44	40	41.5 – 46
60	62.5 – 66	60	62.5 – 67
80	83 – 87	80	83 – 88
100	104 – 108.5	100	104 – 109
120	125 – 130	120	125 – 130.5
140	146 – 151.5	140	145.5 – 151.5
–	–	160	166 – 173
–	–	180	186.5 – 194.5
–	–	200	207 – 216
–	–	220	227.5 – 237.5
–	–	240	248 – 259

Australia

(mph)		(km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
–	–	20	17.5 – 21.5
–	–	40	38 – 42
–	–	60	58 – 63
–	–	80	78 – 84
–	–	100	99 – 104.5
–	–	120	119.5 – 125.5
–	–	140	139.5 – 146.5
–	–	160	159.5 – 167.5
–	–	180	179.5 – 188.5
–	–	200	199.5 – 209.5
–	–	220	219.5 – 230.5
–	–	240	239.5 – 251.5

If error is excessive, replace the speedometer.

3. INSPECT TACHOMETER/ON–VEHICLE

(a) Connect a tune–up test tachometer, and start the engine.

NOTICE:

- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.**

(b) Compare the tester and tachometer indications.

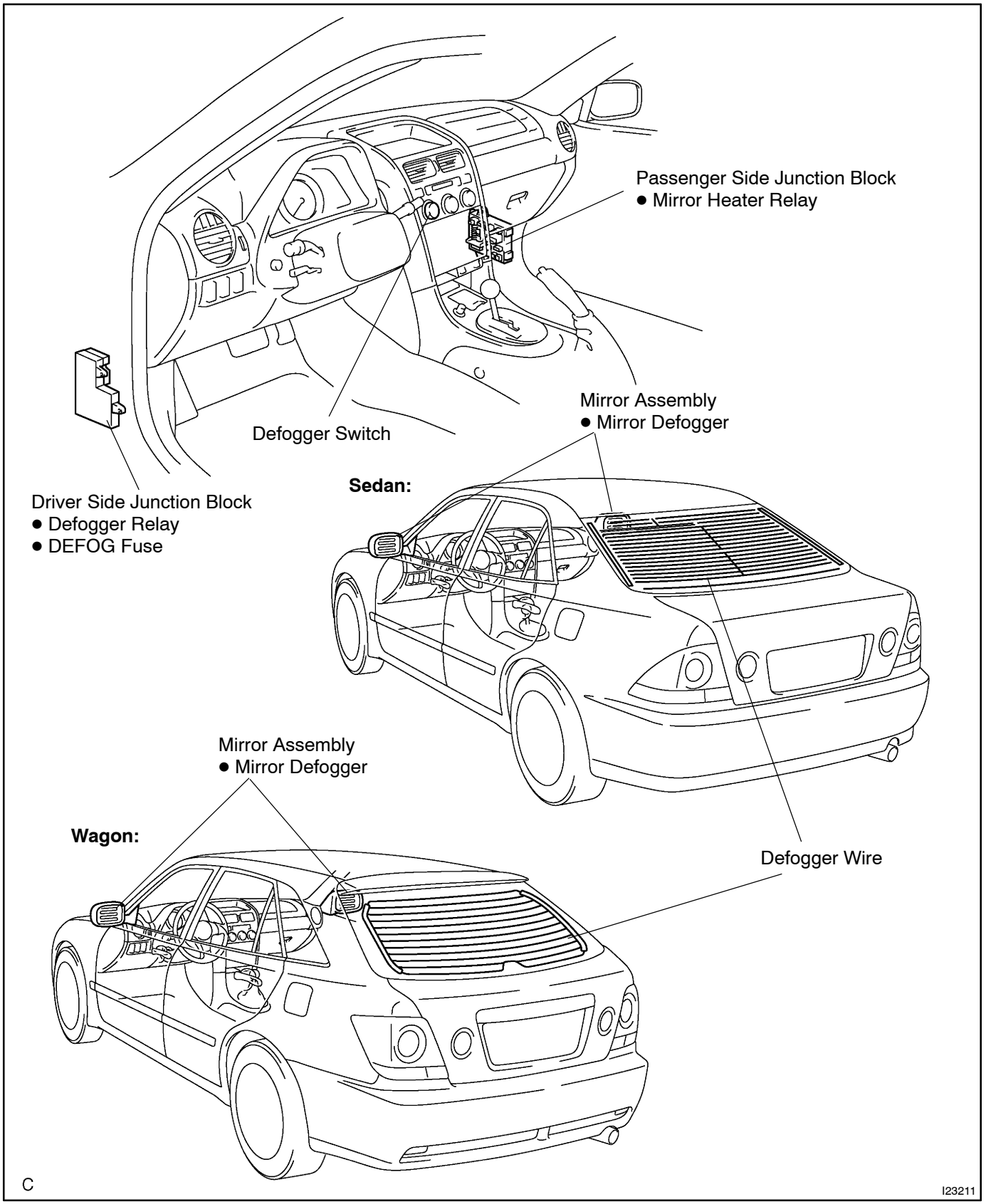
DC 13.5 V 25 ˚C at (77˚F)

Standard indication	Allowable range
700	630 – 770
1,000	(900 – 1,100)
2,000	(1,850 – 2,150)
3,000	2,850 – 3,150
4,000	(3,800 – 4,200)
5,000	4,800 – 5,200
6,000	(5,750 – 6,250)
7,000	6,700 – 7,300
8,000	7,700 – 8,300

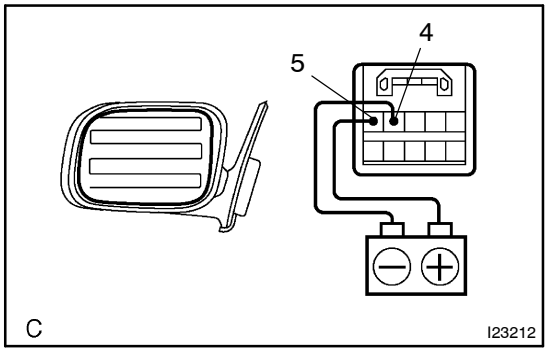
DEFOGGER SYSTEM

LOCATION

BE0GS–15



BE29H–01



INSPECTION

w/ Mirror heater:

INSPECT MIRROR DEFOGGER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 4.

(b) Check that the mirror becomes warm.

HINT:

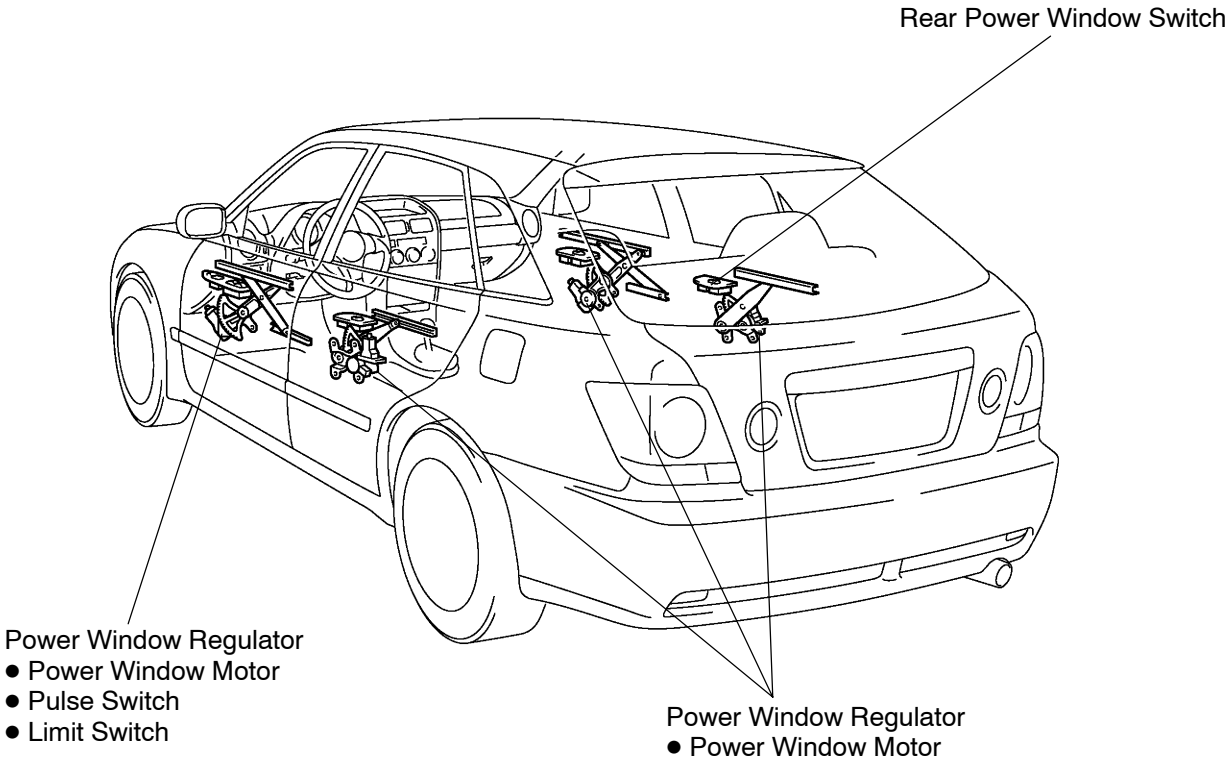
It will take a short time for the mirror to become warm.

POWER WINDOW CONTROL SYSTEM

BE0HE–16

LOCATION

Wagon:



C

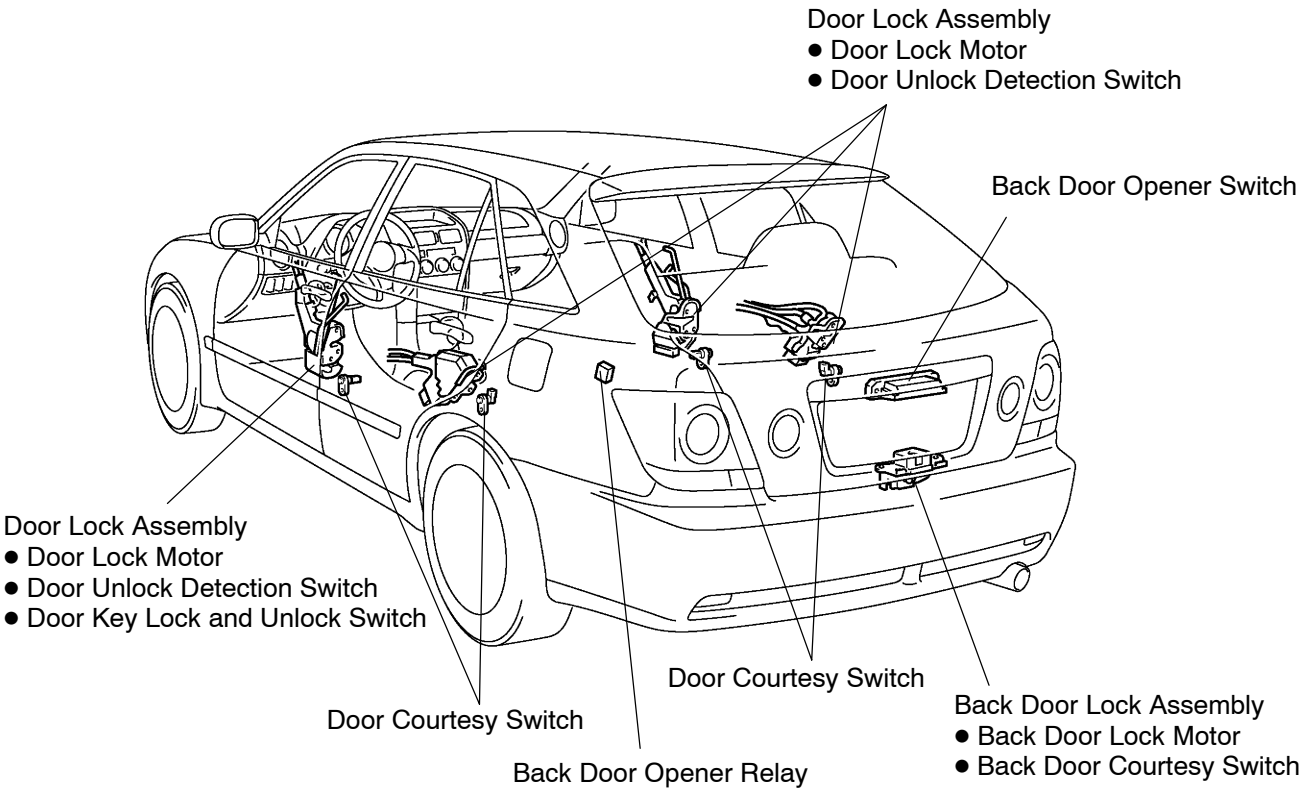
I23217

POWER DOOR LOCK CONTROL SYSTEM

LOCATION

BE0HQ-15

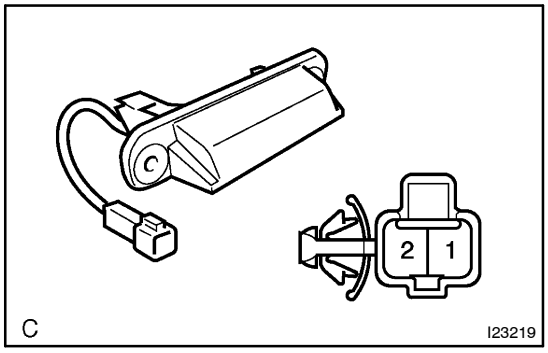
Wagon:



C

I23218

BE29I–01

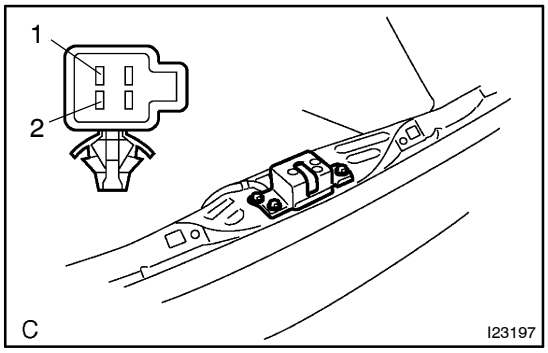


INSPECTION

1. INSPECT BACK DOOR OPENER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	1 – 2	Continuity

If continuity is not as specified, replace the door lock assembly.



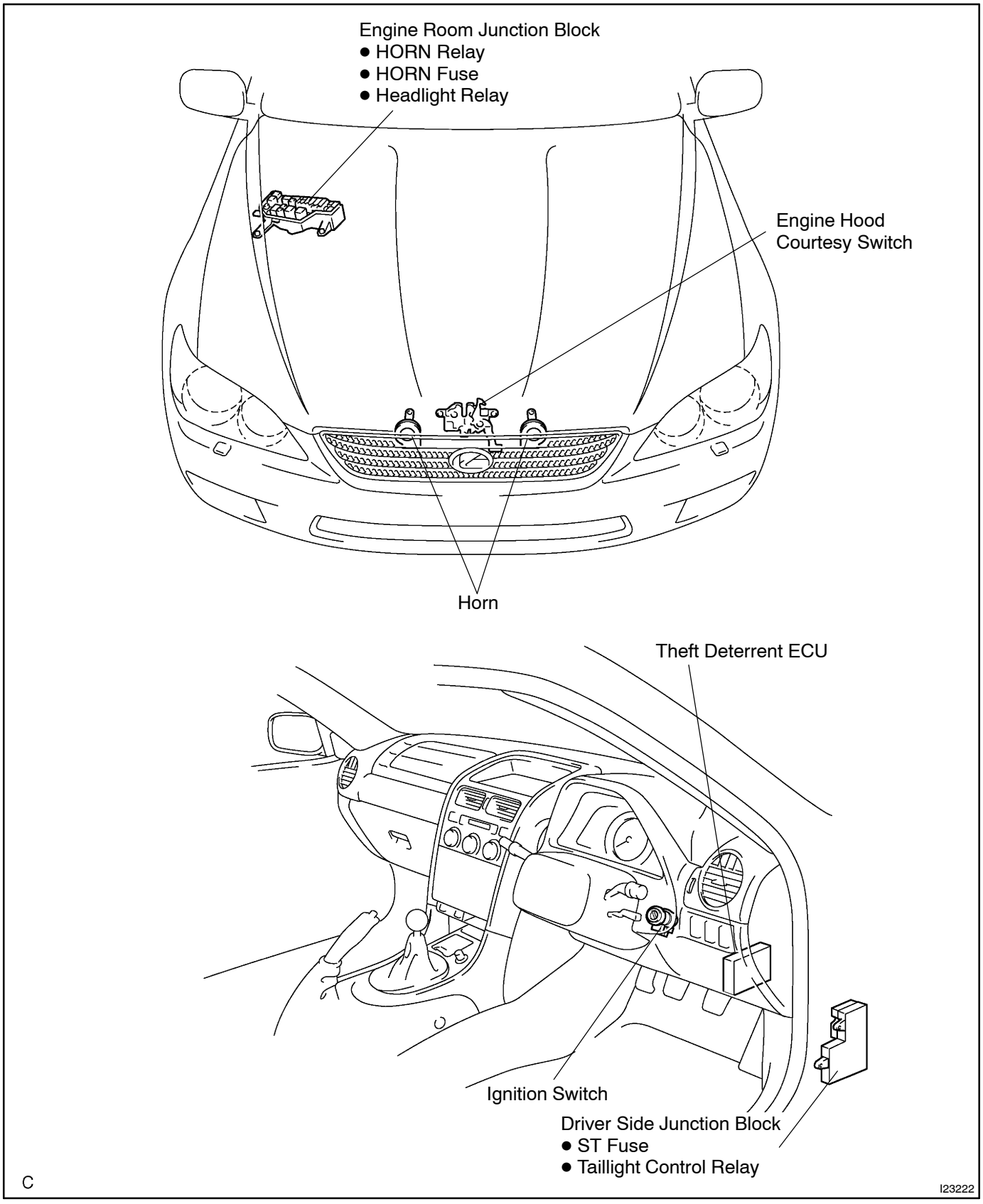
2. INSPECT BACK DOOR OPENER MOTOR OPERATION

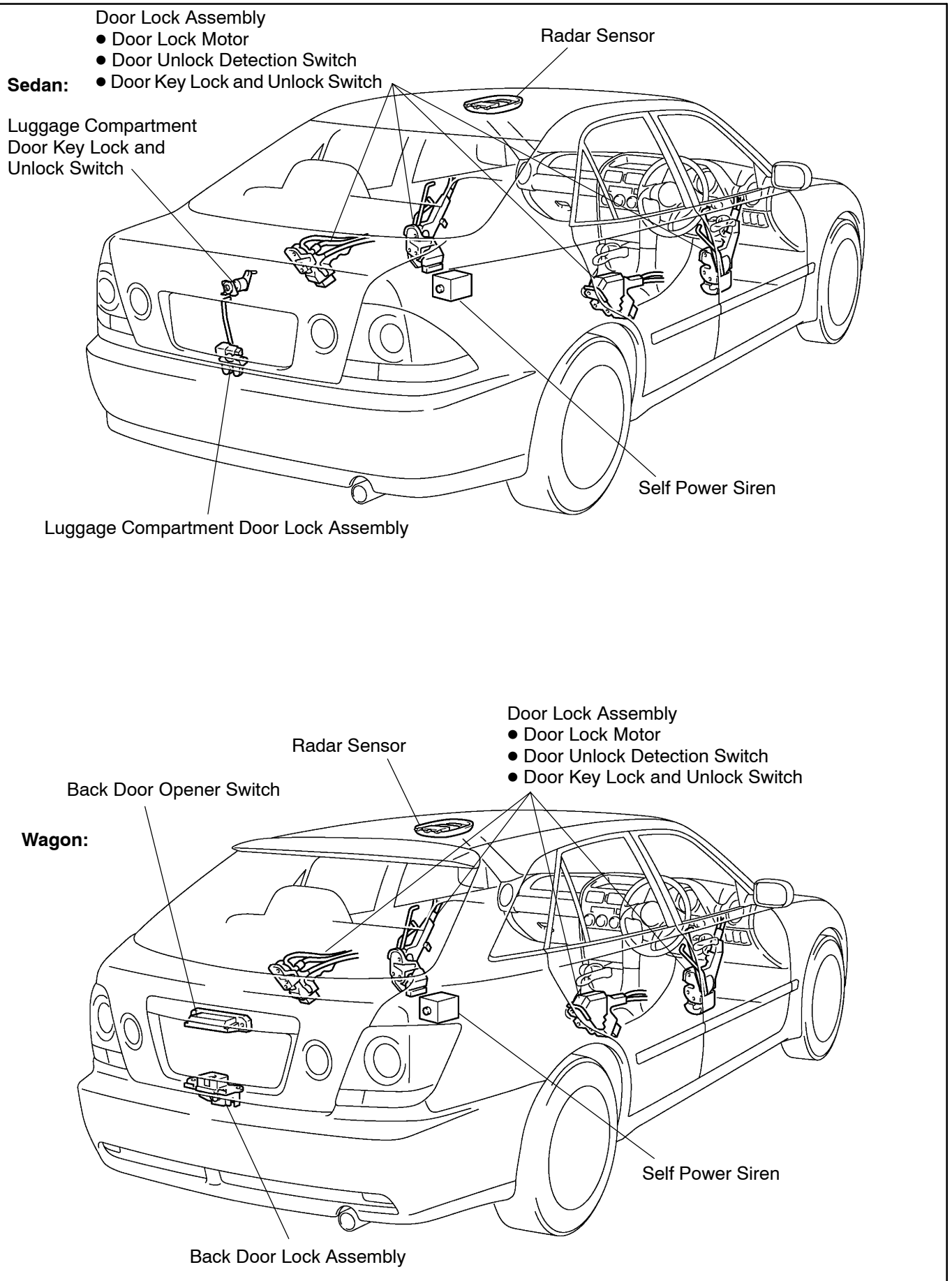
Connect positive (+) lead to the terminal 1 and negative (–) lead to the terminal 2, and check that the motor operates.
If operation is not as specified, replace the motor assembly.

THEFT DETERRENT SYSTEM

LOCATION

BE29J–01



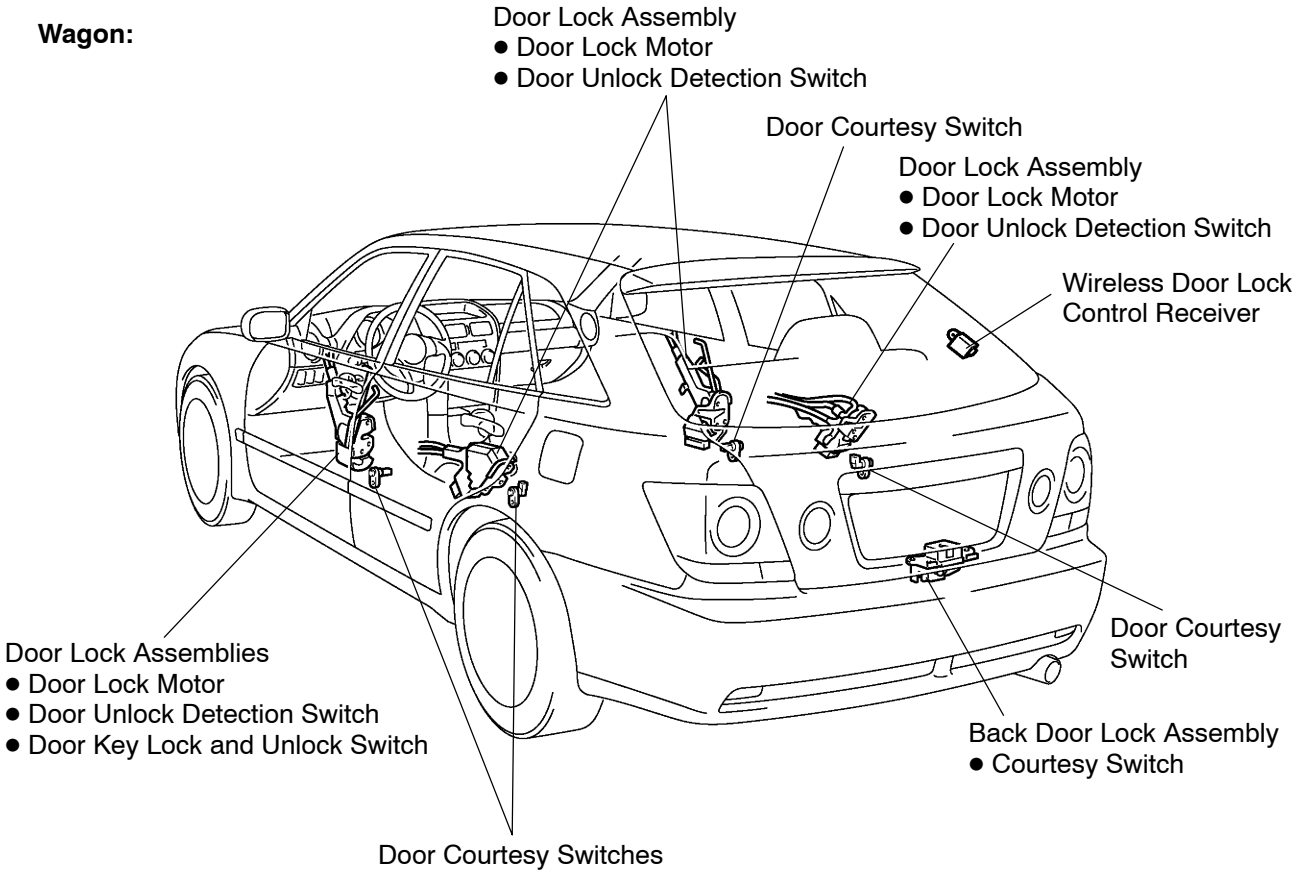

Door Lock Assembly
● Door Lock Motor
● Door Unlock Detection Switch
● Door Key Lock and Unlock Switch
Sedan:
Radar Sensor
Luggage Compartment Door Key Lock and Unlock Switch
Self Power Siren
Luggage Compartment Door Lock Assembly
Door Lock Assembly
● Door Lock Motor
● Door Unlock Detection Switch
● Door Key Lock and Unlock Switch
Radar Sensor
Back Door Opener Switch
Wagon:
Self Power Siren
Back Door Lock Assembly
C
I23223

WIRELESS DOOR LOCK CONTROL SYSTEM

LOCATION

BE0GM–12

Wagon:



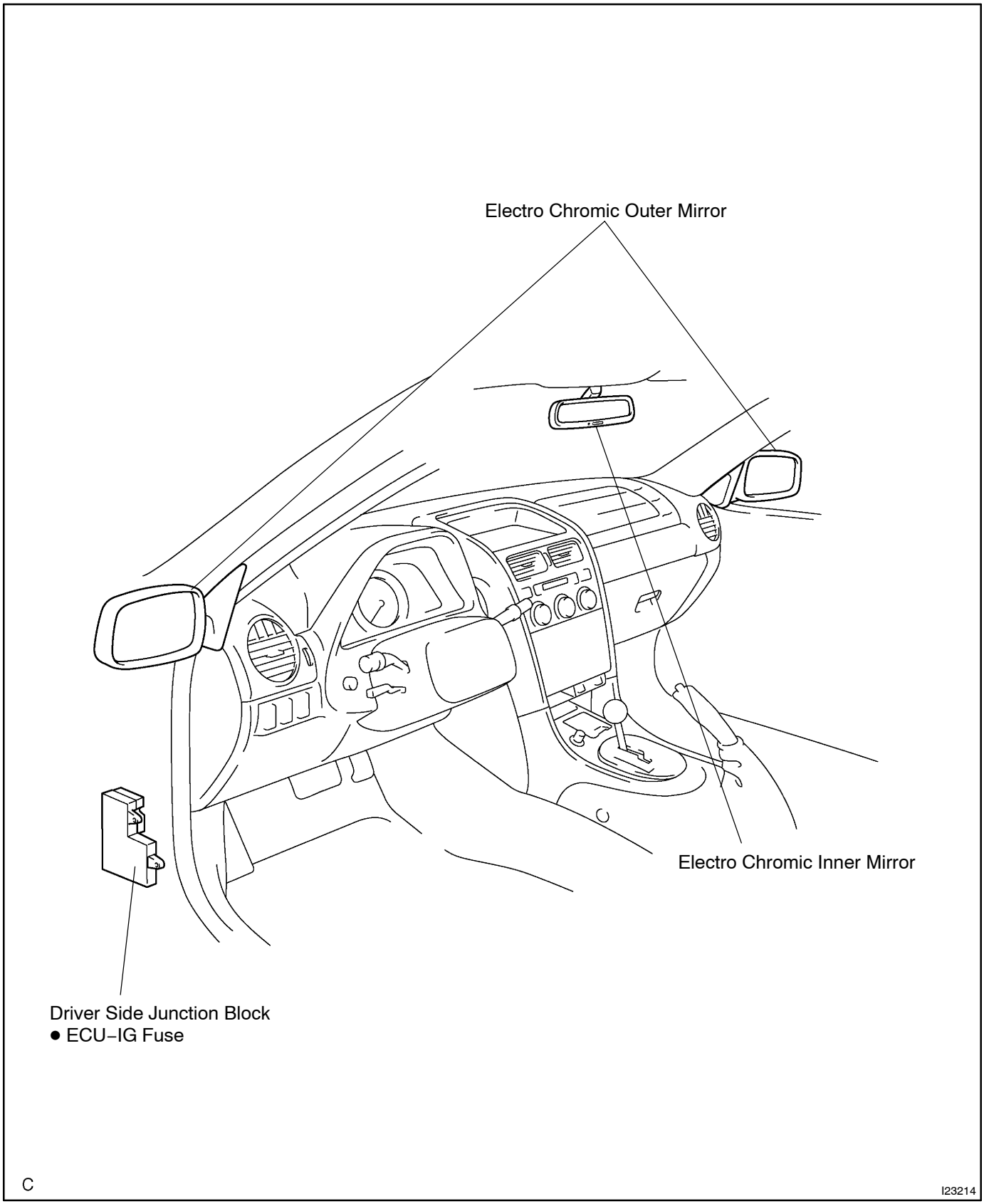
C

I23224

ELECTRO CHROMIC MIRROR SYSTEM

LOCATION

BE0HC–11



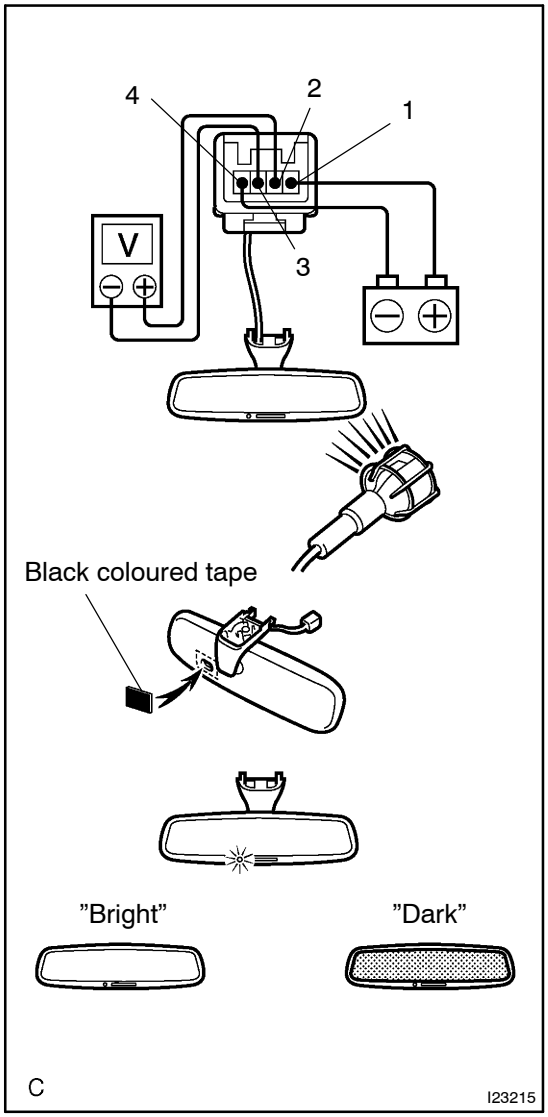
BE29K–01

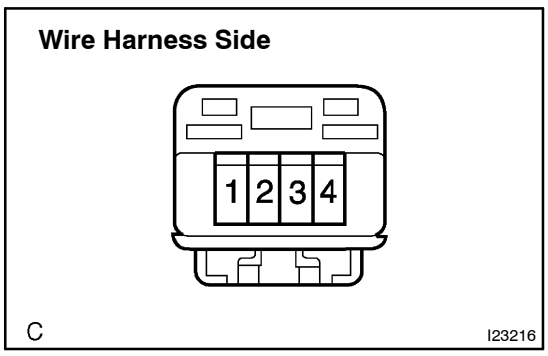
INSPECTION

1. INSPECT ELECTRO CHROMIC INNER MIRROR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 4.
(b) Connect the positive (+) lead from the voltmeter to terminal 2 and the negative (–) lead to terminal 3.
(c) Attach a black coloured tape to forward sensor to prevent it from sensing.
(d) When the mode is turned to AUTO, check that indicator light lights up.
(e) Light up the mirror with an electric light, and check that there is battery positive voltage and mirror surface changes ”bright” to ”dark”.

If operation is not as specified, replace the inner mirror.



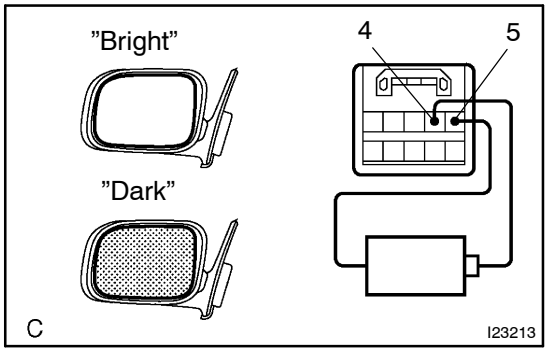


2. INSPECT ELECTRO CHROMIC INNER MIRROR CIRCUIT

Disconnect the connector from the mirror and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.



3. INSPECT ELECTRO CHROMIC OUTER MIRROR OPERATION

(a) Disconnect the outer mirror connector.

(b) Connect the positive (+) lead from the dry cell battery to terminal 4 and the negative (–) lead to terminal 5, then check that the mirror surface changes to ”dark”.

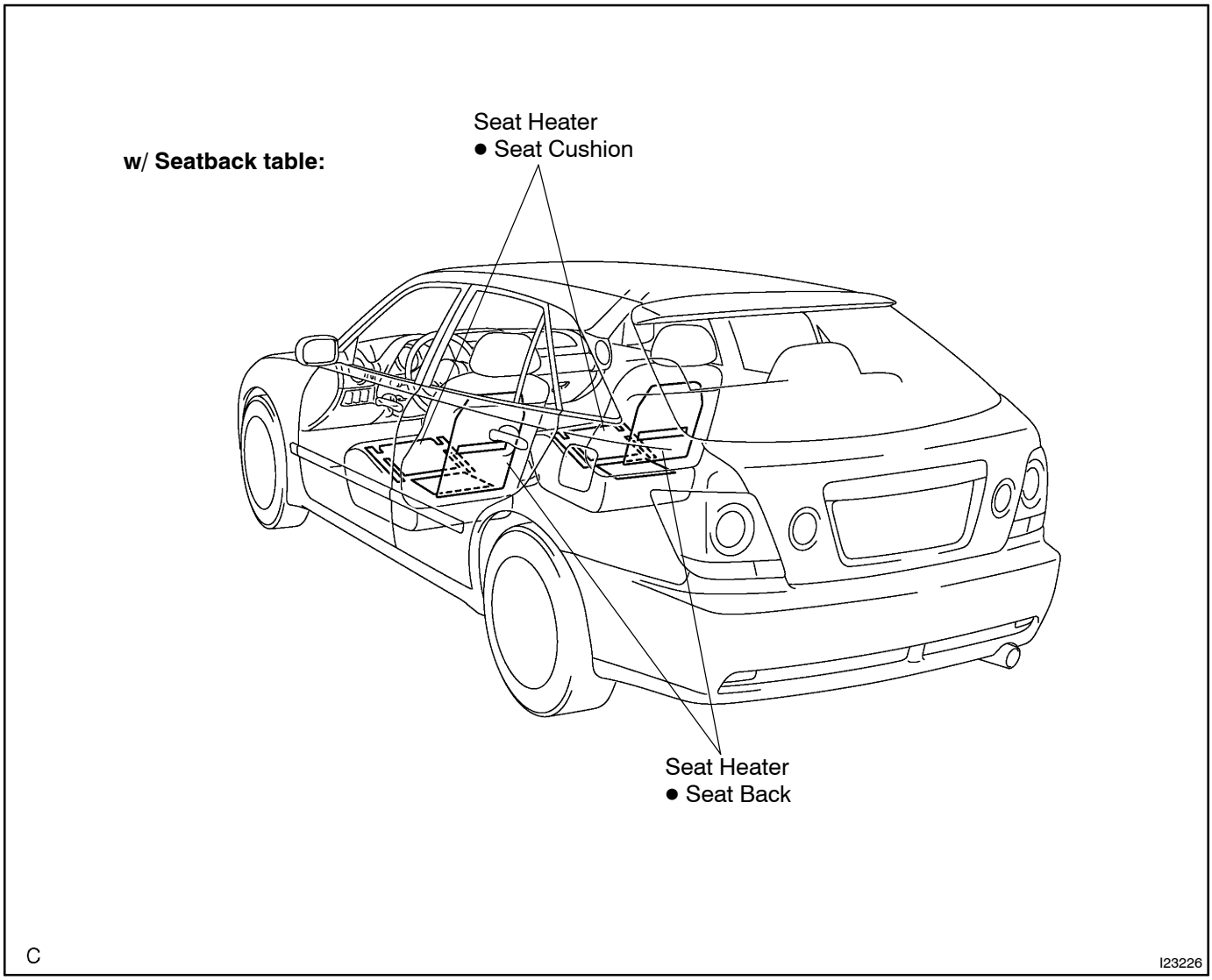
(c) Check the mirror turns to ”bright” after disconnecting the battery.

If operation is not as specified, replace the mirror assembly.

SEAT HEATER SYSTEM

LOCATION

BE0GH–17

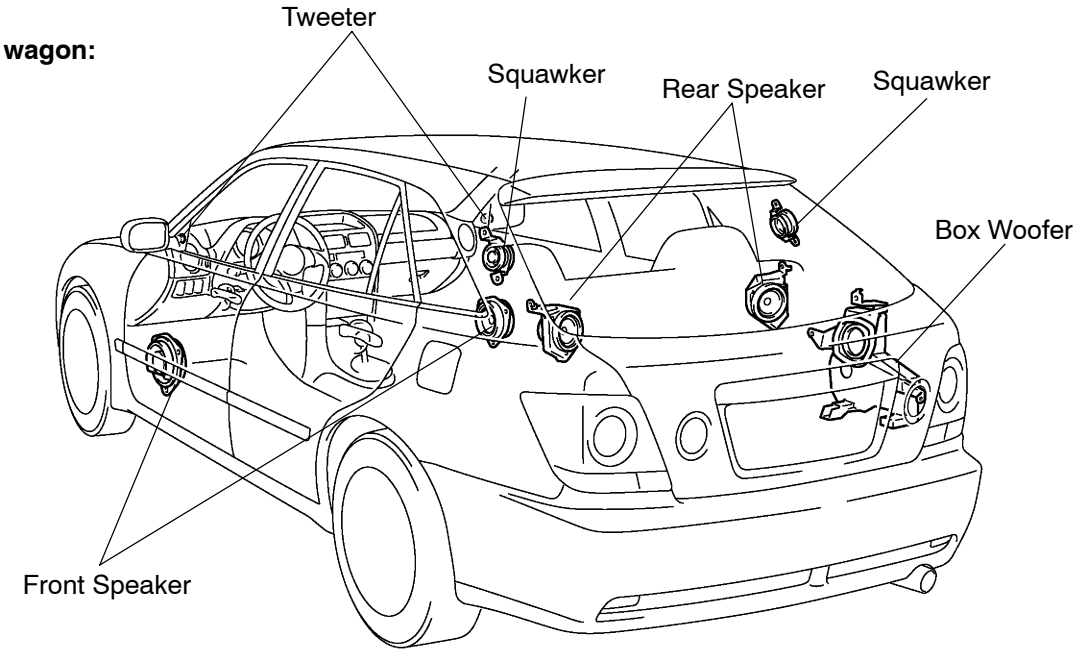


AUDIO SYSTEM

LOCATION

BE0GD-19

wagon:



C

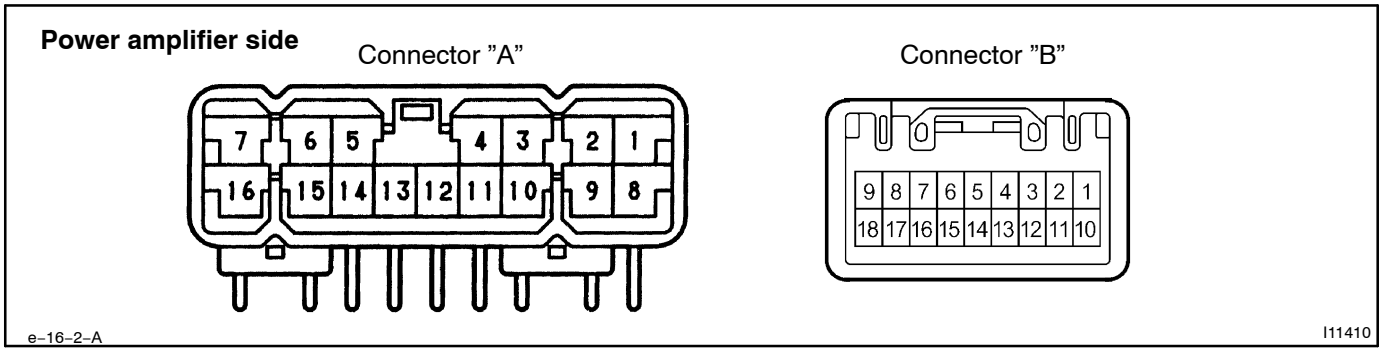
I23227

BE29L–01

INSPECTION

INSPECT POWER AMPLIFIER CIRCUIT

Connect the connector from power amplifier and inspect the connector on the wire harness side.



Tester connection	Condition	Specified condition
A1 – Ground (FL+)	Audio sounding	5 – 7 V
A2 – Ground (FR+)	Audio sounding	5 – 7 V
A3 – Ground (RL+)	Audio sounding	5 – 7 V
A4 – Ground (WL+)	Audio sounding	5 – 7 V
A5 – Ground (RR+)	Audio sounding	5 – 7 V
A6 – Ground (WR+)	Audio sounding	5 – 7 V
A7 – Ground (BU+)	Audio sounding	Battery voltage
A8 – Ground (FL–)	Audio sounding	5 – 7 V
A9 – Ground (FR–)	Audio sounding	5 – 7 V
A10 – Ground (RL–)	Audio sounding	5 – 7 V
A11 – Ground (WL–)	Audio sounding	5 – 7 V
A12 – Ground (GND)	Constant	Continuity
A14 – Ground (RR–)	Audio sounding	5 – 7 V
A15 – Ground (WR–)	Audio sounding	5 – 7 V
A16 – Ground (ACC)	Ignition switch ACC	Battery voltage
B1 – Ground (TX+)	Constant	Battery voltage
B2 – Ground (CTX+)	Radio power switch ON	Battery voltage

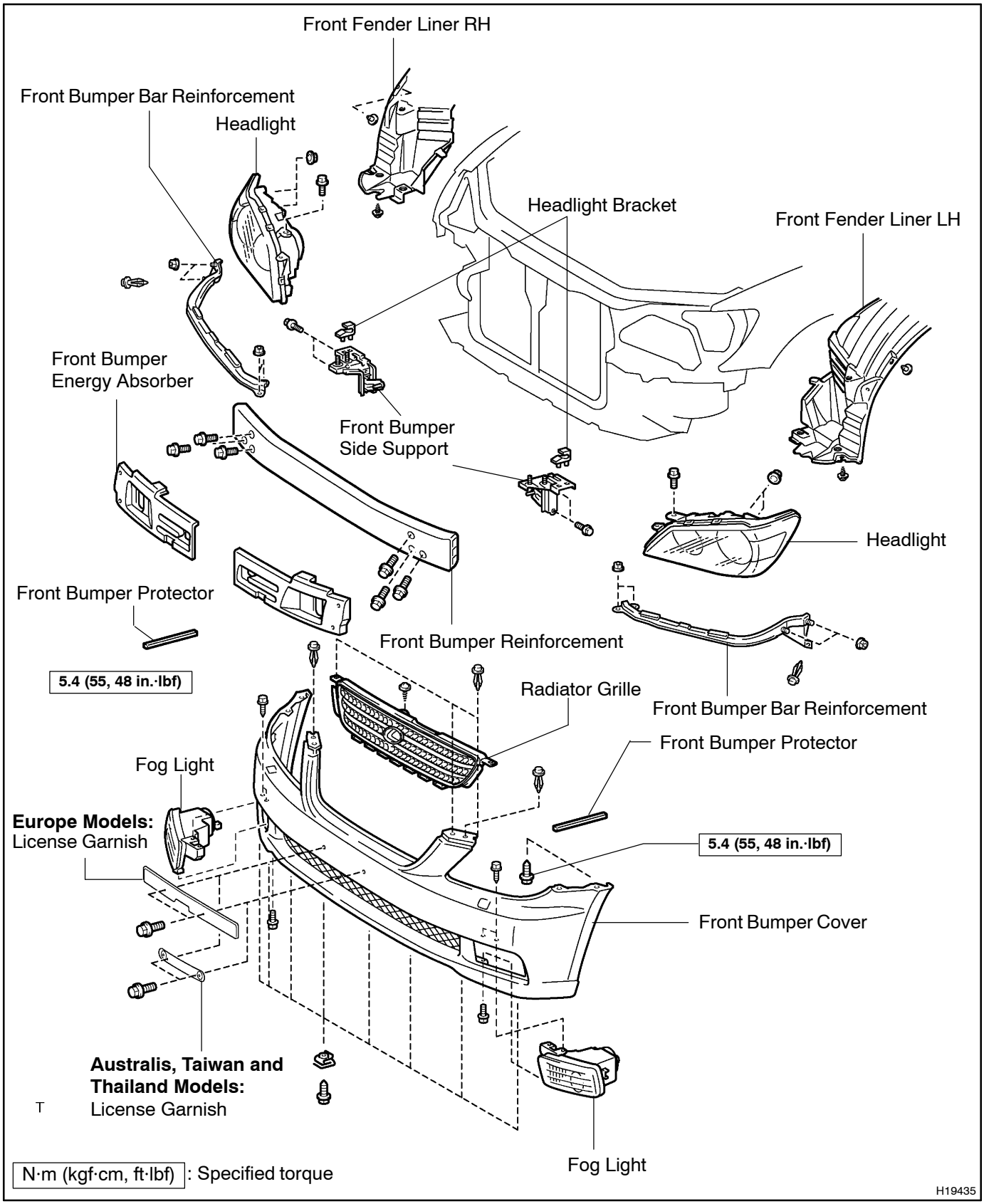
B5 – Ground (N–MUTE)	Audio sounding	Battery voltage
B6 – Ground (T–MUTE)	Audio sounding	Battery voltage
B7 – Ground (MUTE)	Audio sounding	1 V or below
B8 – Ground (L+)	Audio sounding	1 V or below
B9 – Ground (R+)	Audio sounding	1 V or below
B10 – Ground (TX–)	Constant	Continuity
B11 – Ground (CTX–)	Constant	Continuity
B14 – Ground (GND)	Constant	Continuity
B15 – Ground (GND)	Constant	Continuity
B17 – Ground (L–)	Audio sounding	1 V or below
B18 – Ground (R–)	Audio sounding	1 V or below

If the circuit is not as specified, inspect the circuits connected to other parts.

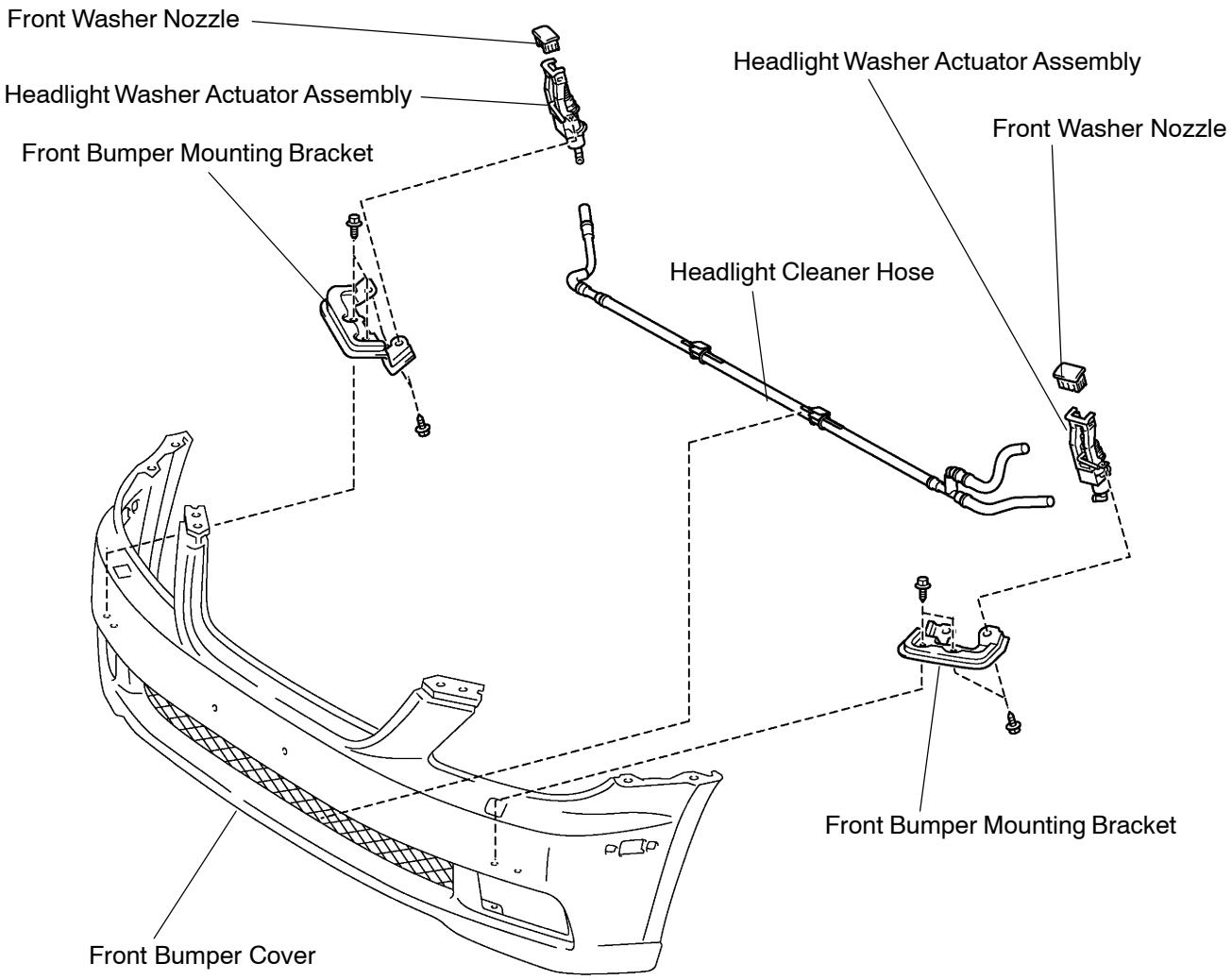
FRONT BUMPER (Wagon)

COMPONENTS

BO4BA–01



w/ Headlight Washer



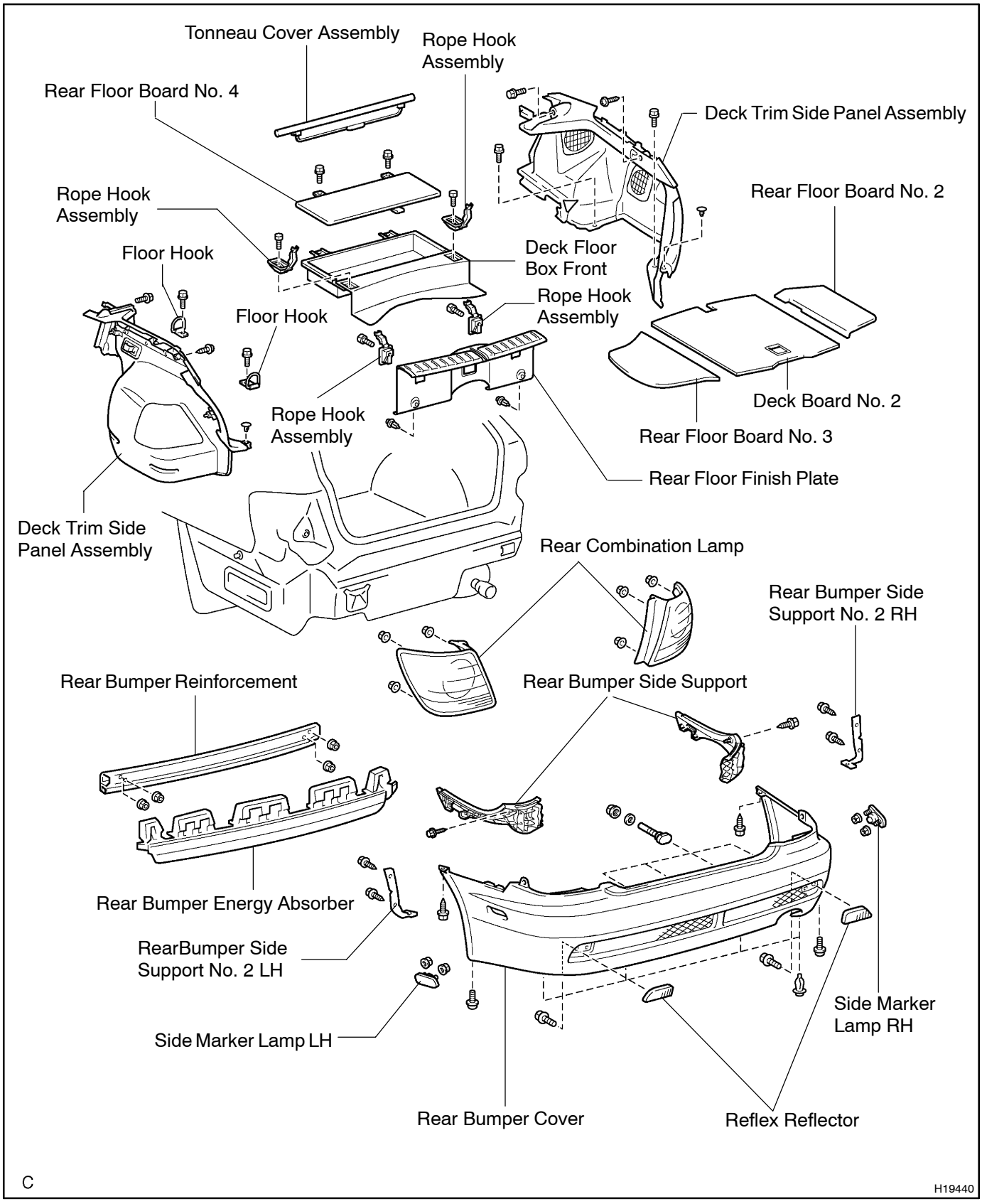
T

H19436

REAR BUMPER (Wagon)

COMPONENTS

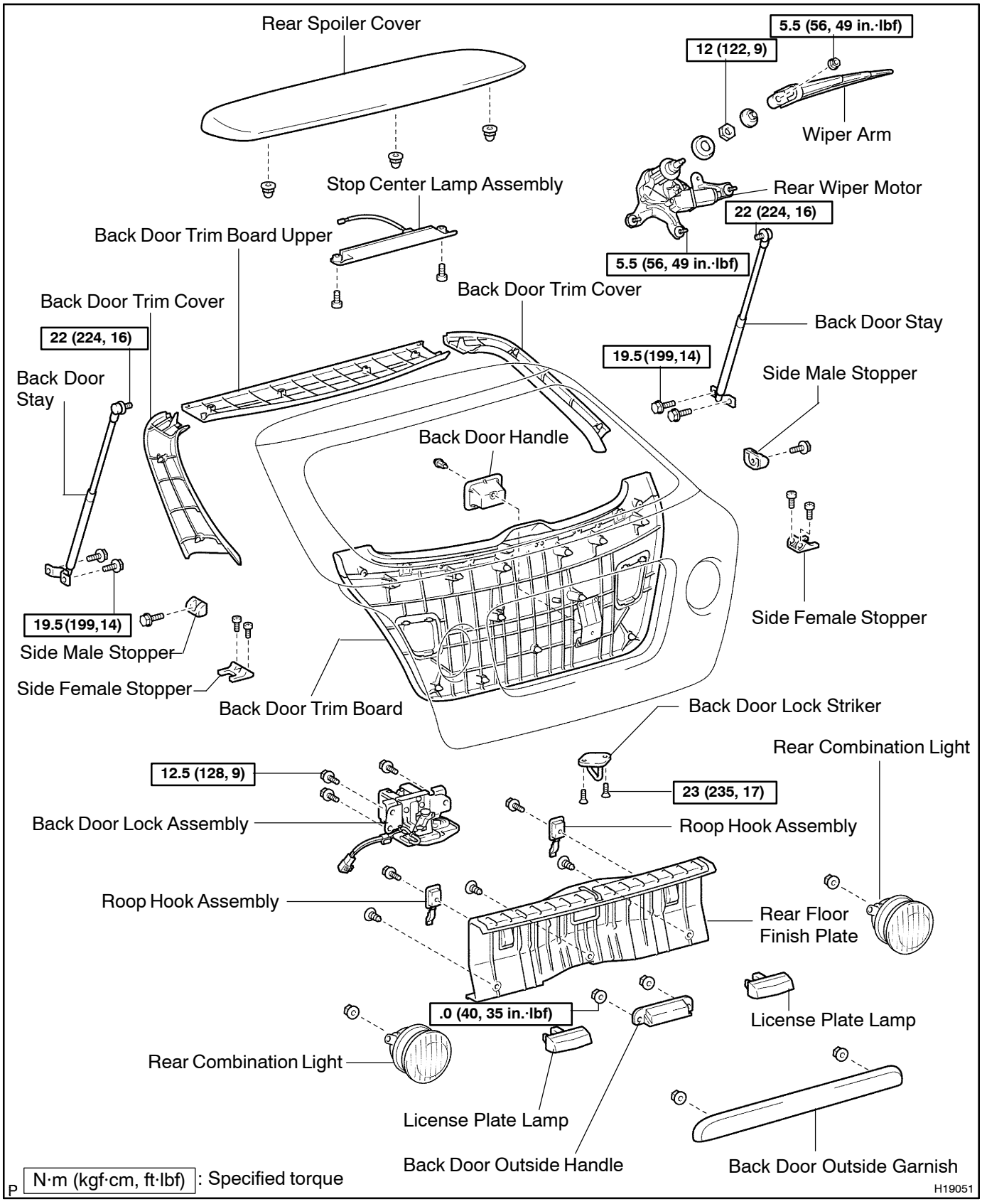
BO4BB–01



BACK DOOR

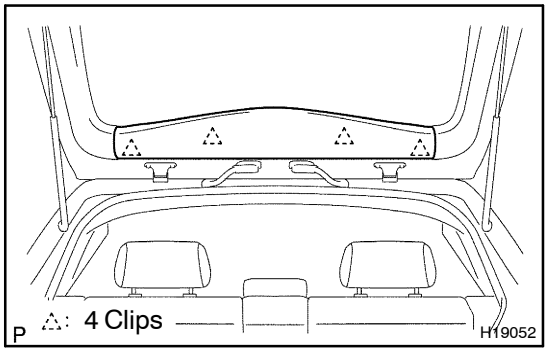
COMPONENTS

BO4BT–01



BO4BU–01

DISASSEMBLY

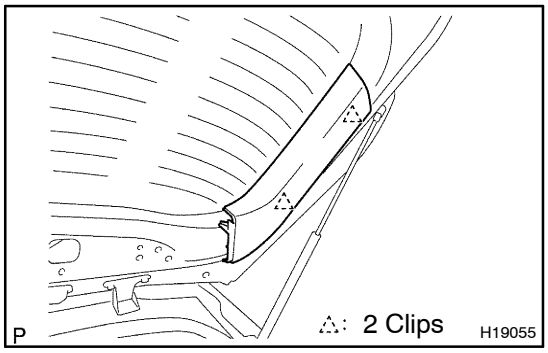


1. REMOVE BACK DOOR TRIM BOARD UPPER

Using a screwdriver, remove the back door trim board upper.

HINT:

Tape the screwdriver tip before use.



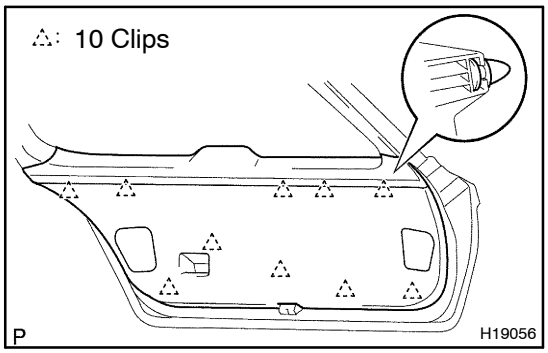
2. REMOVE BACK DOOR TRIM COVERS

(a) Insert a screwdriver between the back door panel and back door trim cover to pry the cover.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



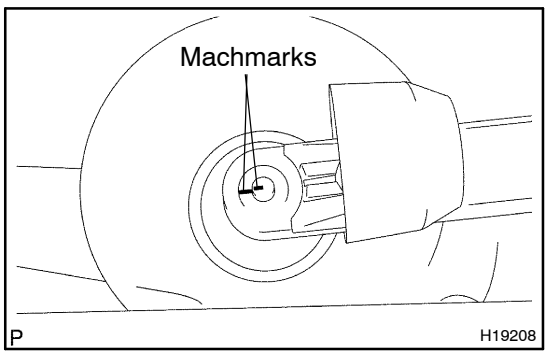
3. REMOVE BACK DOOR TRIM BOARD

(a) Remove the clip and back door handle.

(b) Using a screwdriver, remove the back door trim board.

HINT:

Tape the screwdriver tip before use.

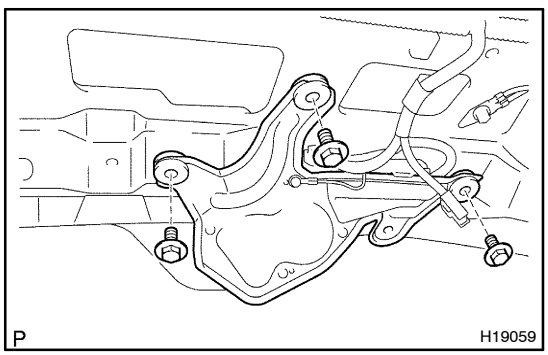


4. REMOVE REAR WIPER ARM

(a) Remove the wiper arm cover.

(b) Place machmarks on the wiper arm and wiper motor.

(c) Remove the nut and rear wiper arm.



5. REMOVE REAR WIPER MOTOR

(a) Remove the nut and washer on the outer side of the back door panel.

(b) Disconnect the connector.

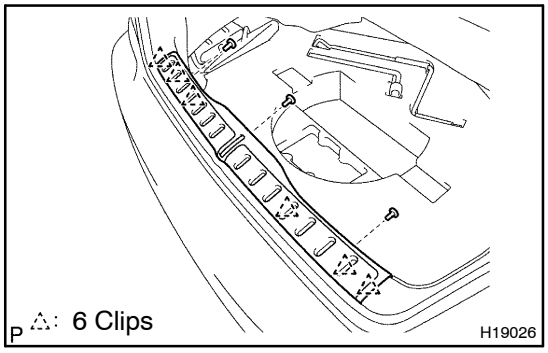
(c) Remove the 3 bolts and rear wiper motor.

6. REMOVE REAR COMBINATION LIGHT

(a) Disconnect the connector.

(b) Remove the nut and rear combination light.

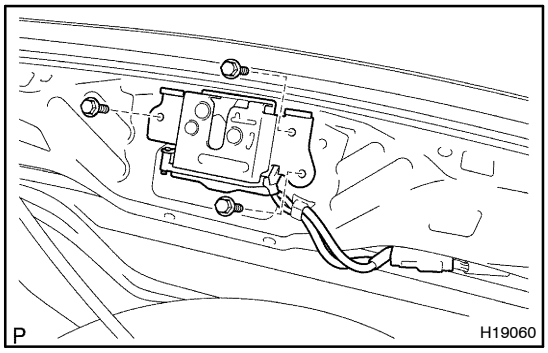
(c) Employ the same manner described above to the other side.



7. REMOVE REAR FLOOR FINISH PLATE

(a) Remove the 2 bolts and the 2 rope hook assemblies.
(b) Remove the 3 clips.
(c) Using a screwdriver, remove the rear floor finish plate.

HINT:
Tape the screwdriver tip before use.

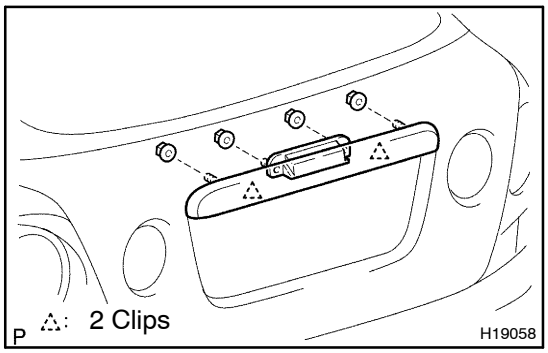


8. REMOVE BACK DOOR LOCK ASSEMBLY

Remove the 3 bolts and the back door lock assembly then disconnect the connector.

9. REMOVE LICENSE PLATE LAMPS

Remove the license plate lamps then disconnect the connectors.



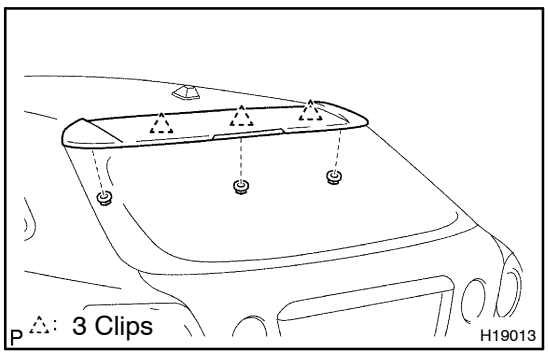
10. REMOVE BACK DOOR OUTSIDE GARNISH

(a) Remove the 4 nuts and back door outside garnish.
(b) Using a screwdriver, remove the back door outside garnish.

HINT:
Tape the screwdriver tip before use.

11. REMOVE BACK DOOR OUTSIDE HANDLE

Remove the 2 bolts and back door outside handle then disconnect the connector.



12. REMOVE REAR SPOILER COVER

(a) Remove the 3 nuts.
(b) Using a screwdriver, remove the rear spoiler cover then disconnect the connector.

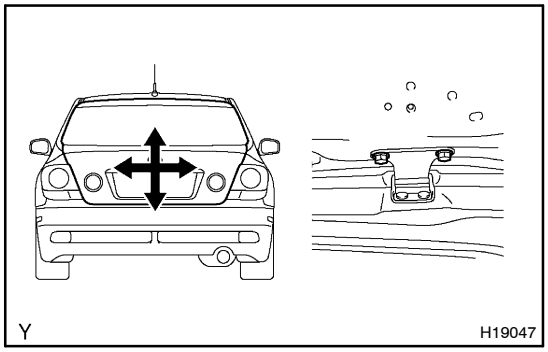
HINT:
Tape the screwdriver tip before use.

13. REMOVE STOP CENTER LAMP ASSEMBLY

Remove the 2 screws and the stop center lamp assembly.

BO4BV–01

ADJUSTMENT

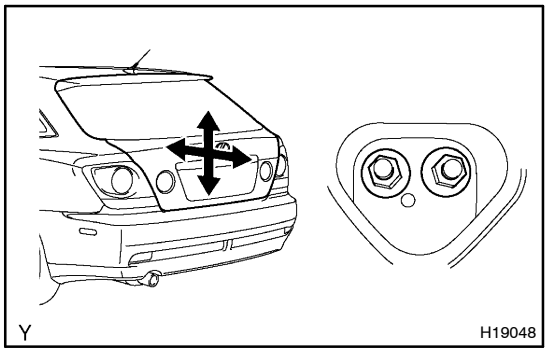


1. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Adjust the door by loosening the door side hinge bolts.

Torque: 15 N·m (153 kgf·cm, 11 ft·lbf)

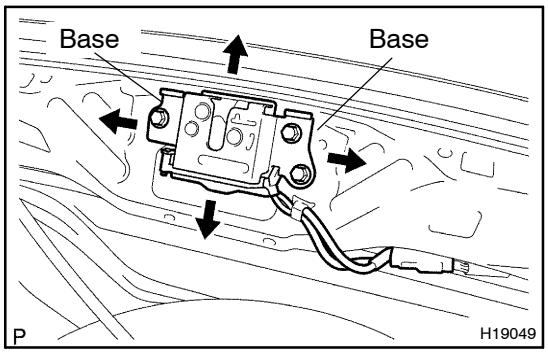
2. ADJUST DOOR IN FORWARD/ REARWARD AND VERTICAL DIRECTIONS



(a) Pull down rear part of roof headlining.
(See page BO–80)

(b) Adjust the door by loosening the body side hinge nuts.

Torque: 11.5 N·m (117 kgf·cm, 8 ft·lbf)



3. ADJUST BACK DOOR LOCK ASSEMBLY

(a) Check that the door fit and door linkage are adjusted correctly.

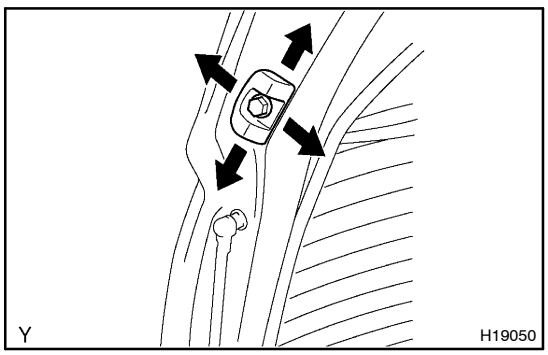
(b) Adjust the back door lock assembly by loosening the back door lock bolts.

Torque: 12.5 N·m (128 kgf·cm, 9 ft·lbf)

(c) Using a plastic hammer, tap the back door lock assembly to adjust.

NOTICE:

Tap the base for adjustment.



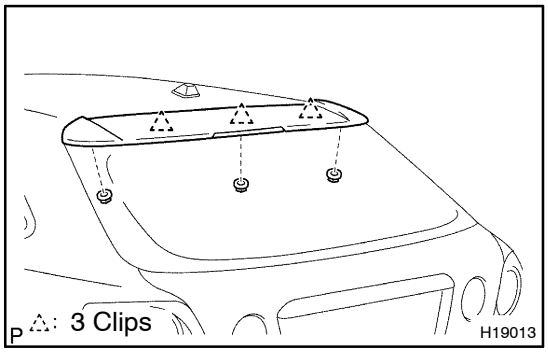
4. ADJUST SIDE MALE STOPPER

Adjust the stopper by loosening the stopper mounting bolt.

BO4BW–01

REASSEMBLY

1. INSTALL STOP CENTER LAMP ASSEMBLY



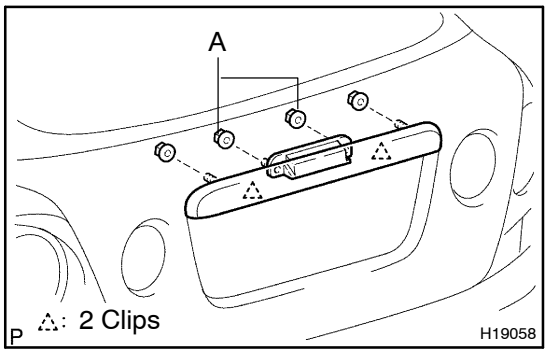
2. INSTALL REAR SPOILER COVER

Install the rear spoiler cover with the 3 nuts.

3. INSTALL BACK DOOR OUTSIDE HANDLE

(a) Connect the connector.

(b) Install the back door rock outside handle with the 2 bolts.



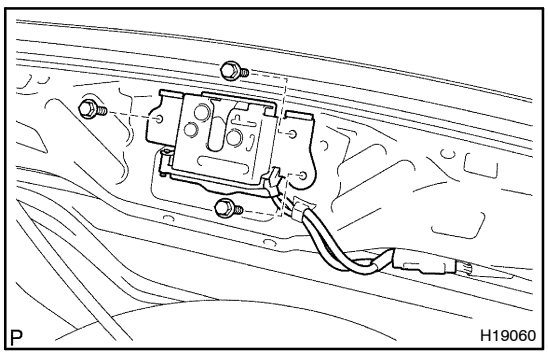
4. INSTALL BACK DOOR OUTSIDE GARNISH

Install the back door outside garnish with the 4 nuts.

Torque:

A: 4.0 N·m (40 kgf·cm, 35 in.·lbf)

5. INSTALL LICENSE PLATE LAMPS

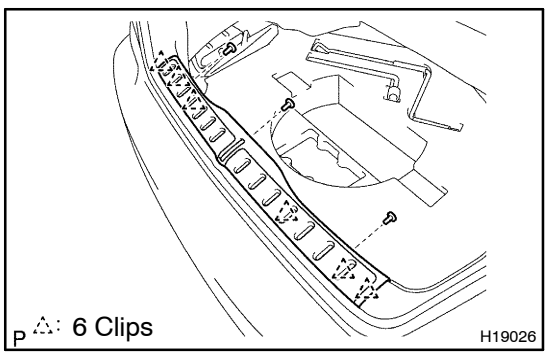


6. INSTALL BACK DOOR LOCK ASSEMBLY

(a) Install the back door lock assembly with the 3 bolts .

Torque: 12.5 N·m (128 kgf·cm, 9 ft·lbf)

(b) Connect the connector.

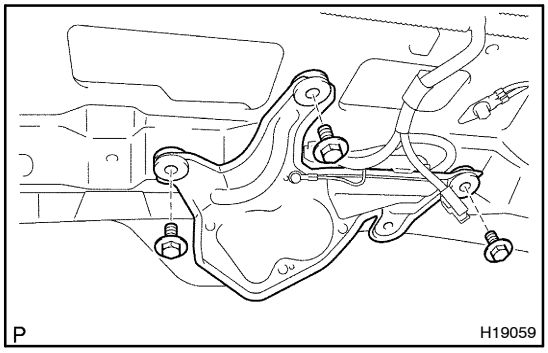


7. INSTALL REAR FLOOR FINISH PLATE

(a) Install the rear floor finish plate with the 3 clips.

(b) Install the 2 rope hook assemblies with the 2 bolts.

8. INSTALL REAR COMBINATION LIGHTS

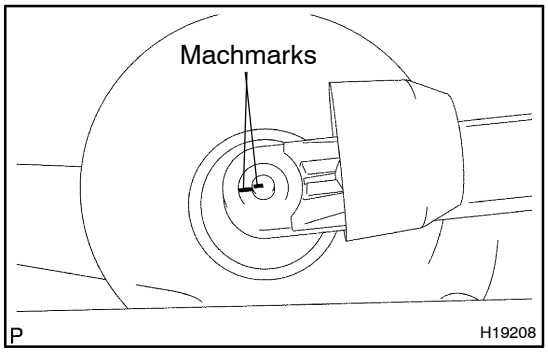


9. INSTALL REAR WIPER MOTOR

(a) Install the rear wiper motor with the 3 bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(b) Connect the connector.

(c) Install the nut and washer on the outer side of the back door panel.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)



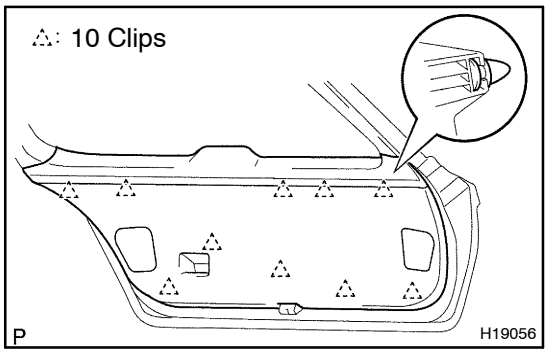
10. INSTALL REAR WIPER ARM

(a) Install the wiper arm and tighten the nut by hand. Operate the wiper once and turn the wiper switch OFF.

(b) Align the machmarks on the wiper arm and wiper motor.

(c) Install the rear wiper arm with the nut.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

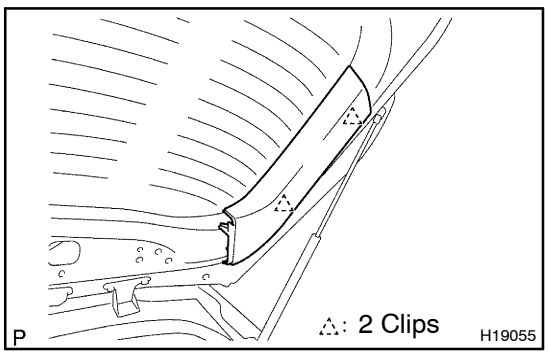
(d) Install the wiper arm cover.



11. INSTALL BACK DOOR TRIM BOARD

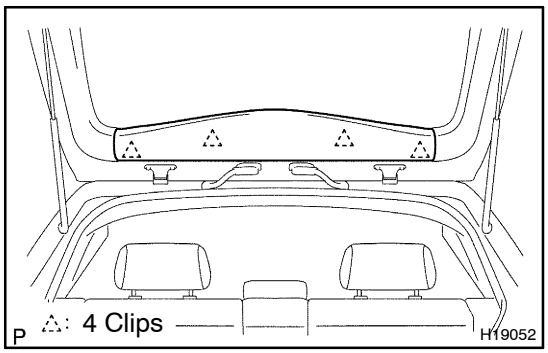
(a) Install the back door trim board to the back door panel.

(b) Install the back door handle with the clip.



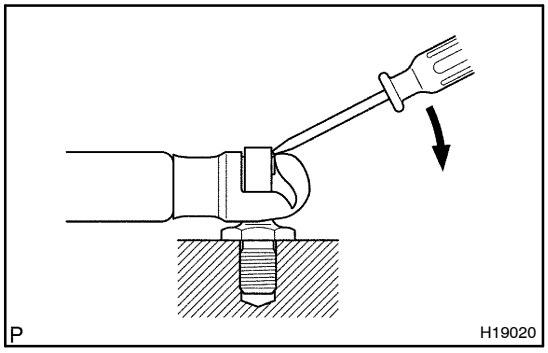
12. INSTALL BACK DOOR TRIM COVERS

Install the trim cover to the body.



13. INSTALL BACK DOOR TRIM BOARD UPPER

Install the back door trim board upper to the body.



BACK DOOR STAY

BO4BX–01

REPLACEMENT

1. REMOVE BACK DOOR STAY

(a) Using a screwdriver, remove the back door stay from the back door panel.

HINT:

While supporting the back door with your hand, remove the back door stay.

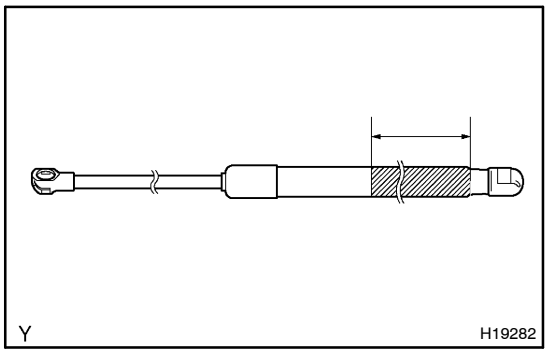
(b) Remove the bolt and back door stay from the body.

2. IF NECESSARY, REPLACE BACK DOOR STAY

NOTICE:

When handling the back door stay.

- **Do not disassemble the back door stay because the cylinder is filled with pressurized gas.**



- **If the back door stay is to be replace, drill a 2.0 – 3.0 mm (0.079 – 0.118 in.) hole in the lower half of the bottom of the back door stay as shown in the illustration to completely release the high–pressure gas before disposing of it.**
- **When drilling, chips may fly out so work carefully.**
- **The gas is colorless, odorless and non–toxic.**
- **When working, handle the back door stay carefully. Never score or scratch the exposed part of the piston rod, and never allow paint or oil to get on it.**
- **Do not turn the piston rod and cylinder with the back door stay fully extended.**

3. INSTALL BACK DOOR STAY

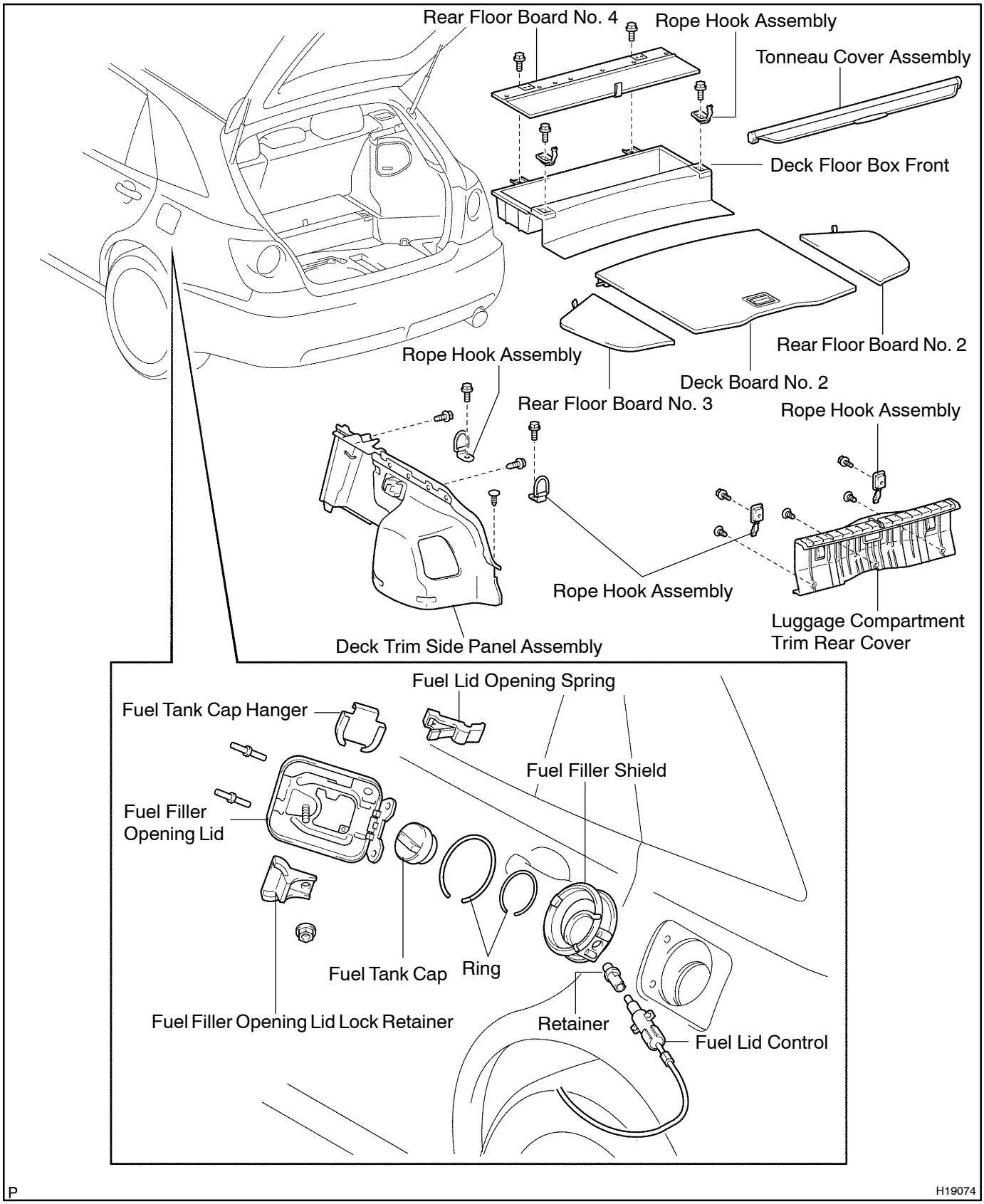
(a) Install the back door stay to the body with the bolt.
Torque: 19.5 N·m (199 kgf·cm, 14 ft.·lbf)

(b) Install the back door stay to the back door panel with the bolts.
Torque: 22 N·m (224 kgf·cm, 16 ft.·lbf)

FUEL LID (Wagon)

COMPONENTS

BO4BC–01



BO4BD–01

REMOVAL

1. REMOVE REAR SEAT CUSHION (See page BO–112)
2. REMOVE SIDE SEAT BACK ASSEMBLY (See page BO–112)
3. REMOVE REAR SEAT FLOOR BOARD NO. 4

(a) Remove the seat back board carpets.

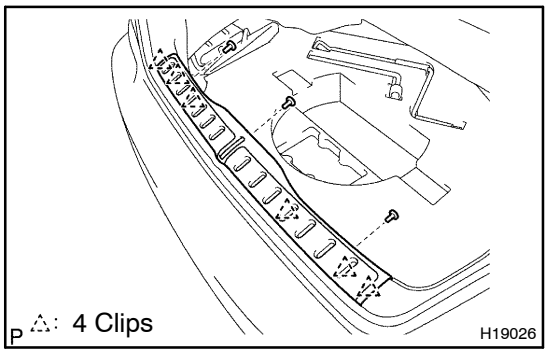
(b) Remove the 2 bolts and rear floor board.

4. REMOVE DECK FLOOR BOX FRONT

(a) Remove the 2 bolts and the 2 rope hook assemblies.

(b) Remove the deck floor box.

5. REMOVE DECK BOARD NO. 2
6. REMOVE REAR FLOOR BOARD NO. 2
7. REMOVE REAR FLOOR BOARD NO. 3
8. REMOVE TONNEAU COVER ASSEMBLY



9. REMOVE REAR FLOOR FINISH PLATE

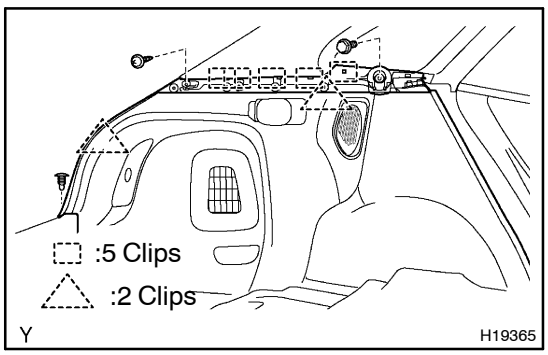
(a) Remove the 2 bolts and the 2 rope hook assemblies.

(b) Remove the 3 clips.

(c) Using a screwdriver, remove the rear floor finish plate.

HINT:

Tape the screwdriver tip before use.



10. REMOVE DECK TRIM SIDE PANEL ASSEMBLY

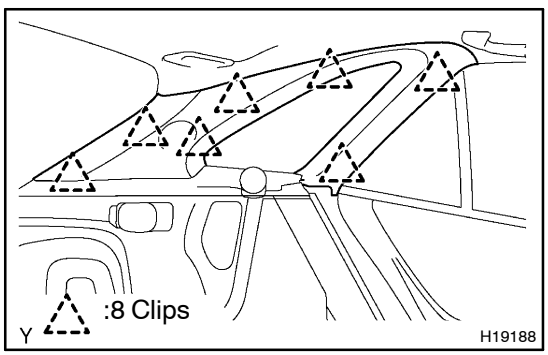
(a) Remove the 2 bolts and 2 floor hooks.

(b) Remove the screw, bolt and clip.

(c) Using a screwdriver, remove the deck trim side panel assembly then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

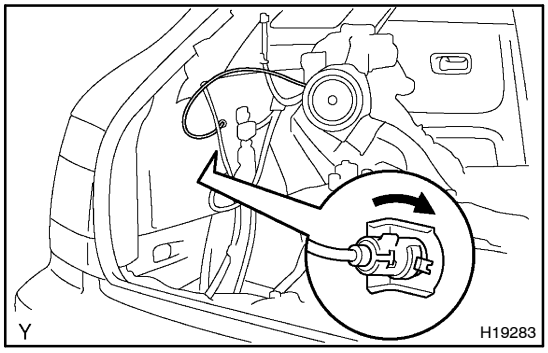


11. REMOVE ROOF SIDE INNER GARNISH

Using a screwdriver, remove the roof side inner garnish.

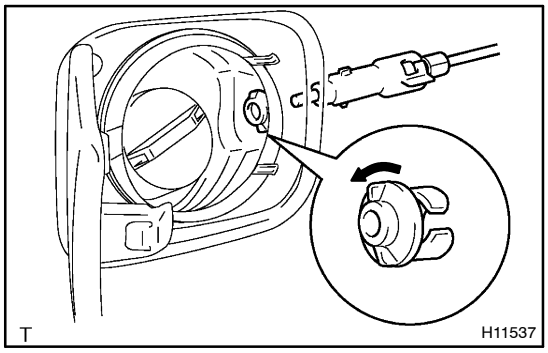
HINT:

Tape the screwdriver tip before use.

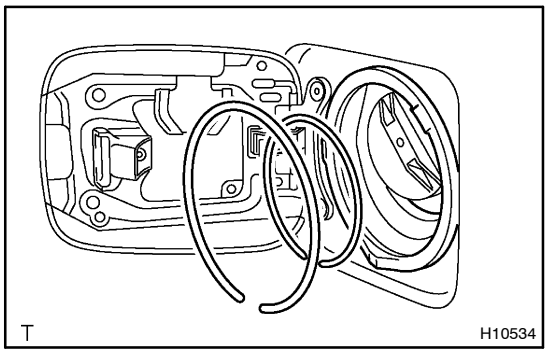


12. REMOVE FUEL LID LOCK CONTROL

(a) Rotate the fuel lid lock right to disengage the lock, then pull it out.



(b) Rotate the retainer left to disengage the lock, then pull it out.



13. REMOVE FUEL FILLER SHIELD

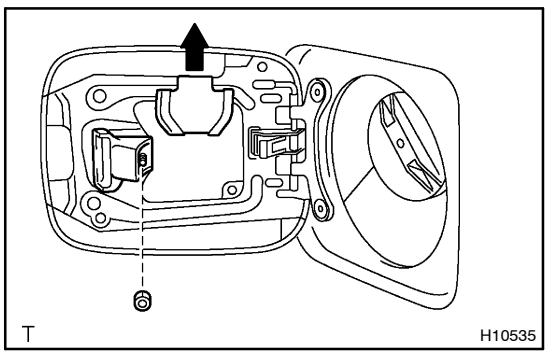
(a) Remove the 2 rings from the fuel filler shield.

(b) Remove the fuel tank cap and shield.

CAUTION:

Always keep the tank cap closed when it is not required to be open. Keep all fire away during the operation.

(c) Install the fuel tank cap quickly.

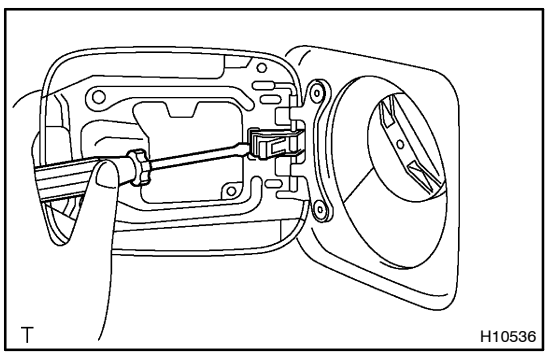


14. REMOVE FUEL TANK CAP HANGER

Pull up the fuel tank cap hanger to remove it.

15. REMOVE FUEL FILLER OPENING LID LOCK RETAINER

Remove the nut and fuel filler opening lid lock retainer.

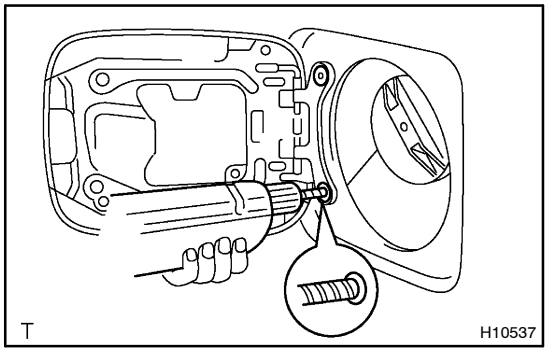


16. REMOVE FUEL LID OPENING SPRING

Insert a screwdriver between the spring and fuel filler opening lid to remove the spring as shown in the illustration.

HINT:

Tape the screwdriver tip before use.



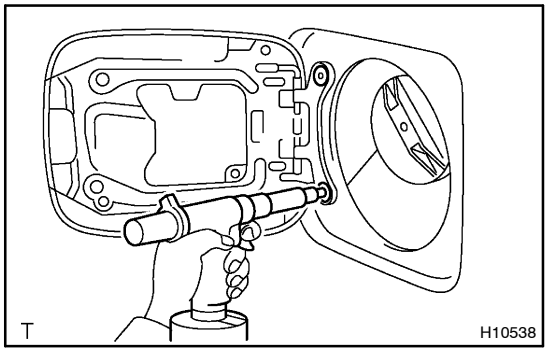
17. REMOVE FUEL FILLER OPENING LID

(a) Using a drill, drill out the rivet heads.

(b) Remove the fuel filler opening lid.

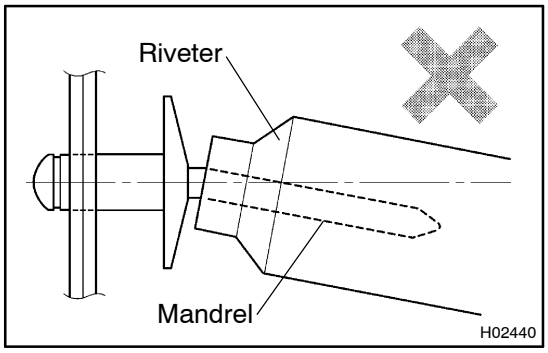
BO4BE–01

INSTALLATION



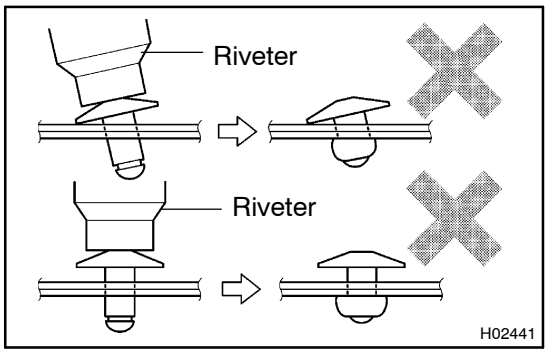
1. INSTALL FUEL FILLER OPENING LID

Using a riveter, install the fuel filler opening lid with the 2 rivets to the body.

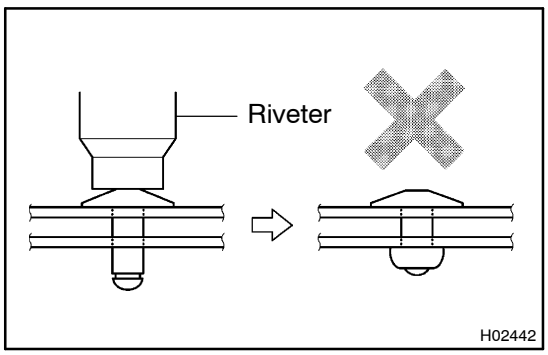


NOTICE:

- **Do not prize a riveter, as riveter is damaged, it it not tightened and the mandrel is bent.**

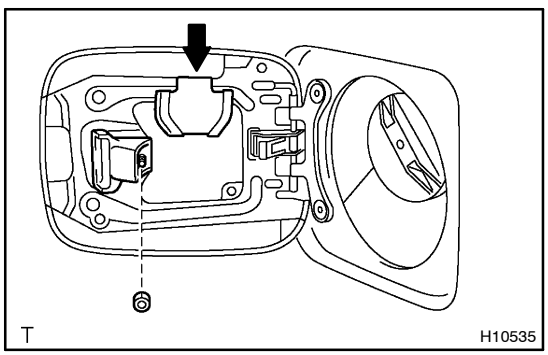


- **Do not tilt the riveter and disconnect the rivet from the material while handling a riveter, as the materials are not tightened firmly.**



- **Install the rivet while attaching materials, as they are not tightened firmly.**

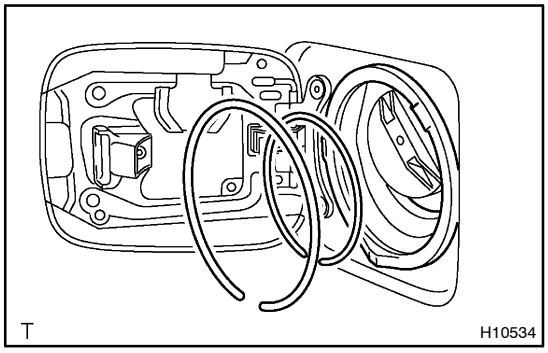
2. INSTALL FUEL FILLER OPENING SPRING



3. INSTALL FUEL FILLER OPENING LID LOCK RETAINER

Install the fuel filler opening lid lock retainer with the nut.

4. INSTALL FUEL TANK CAP HANGER



5. INSTALL FUEL FILLER SHIELD

(a) Remove the fuel tank cap.

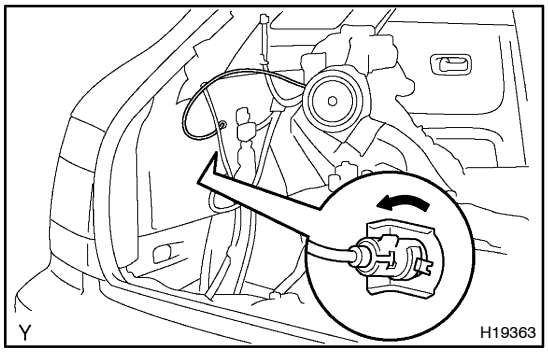
(b) Install the fuel filler shield to the body.

(c) Install the fuel tank cap quickly.

CAUTION:

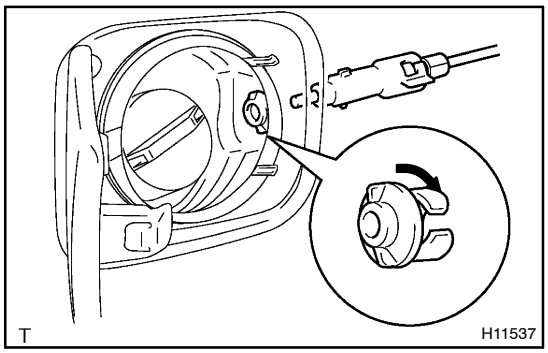
Always keep the tank cap closed when it is not required to be open. Keep all fire away during the operation.

(d) Install the 2 rings to the fuel filler shield as shown in the illustration.

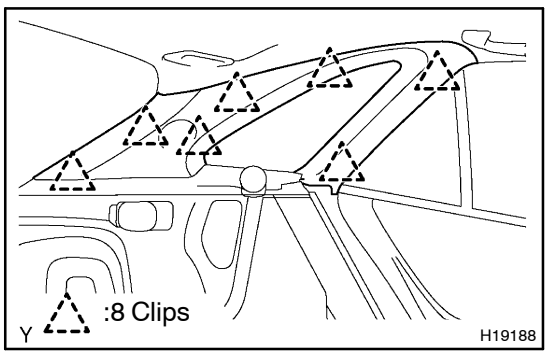


6. INSTALL FUEL LID LOCK CONTROL

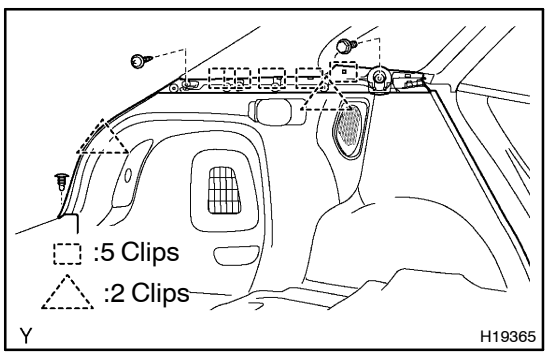
(a) Install the retainer to the body from the outside of the vehicle and rotate it right to lock.



(b) Insert the fuel lid lock control to the retainer and rotate it left to lock.



7. INSTALL ROOF SIDE INNER GARNISH

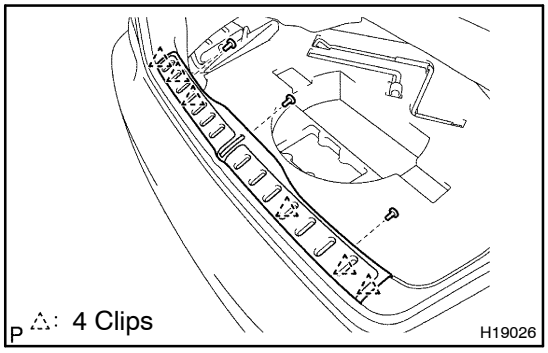


8. INSTALL DECK TRIM SIDE PANEL ASSEMBLY

(a) Install the deck trim side panel assembly then connect the connector.

(b) Install the screw, bolt and clip.

(c) Install the 2 floor hooks with the 2 bolts.



9. INSTALL REAR FLOOR FINISH PLATE

(a) Install the rear floor finish plate.

(b) Install the 3 clips.

(c) Install the 2 rope hook assemblies with the 2 bolts.

10. INSTALL TONNEAU COVER ASSEMBLY

11. INSTALL REAR FLOOR BOARD NO. 3

12. INSTALL REAR FLOOR BOARD NO. 2

13. INSTALL DECK BOARD NO. 2

14. INSTALL DECK FLOOR BOX FRONT

(a) Install the deck floor box.

(b) Install the 2 rope hook assemblies with the 2 bolts.

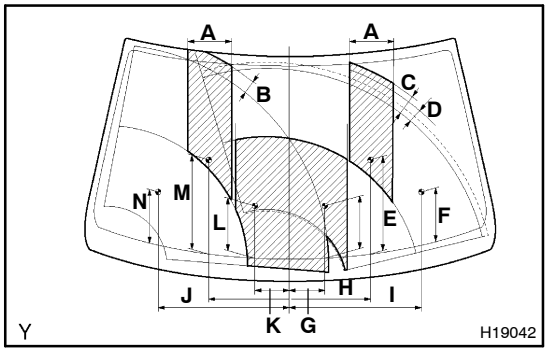
15. INSTALL REAR SEAT FLOOR BOARD NO. 4

(a) Install the rear floor board with the 2 bolts.

(b) Install the seat back board carpets.

16. INSTALL SIDE SEAT BACK ASSEMBLY (See page BO–112)

17. INSTALL REAR SEAT CUSHION (See page BO–112)



FRONT WIPER AND WASHER

BO4CU–01

INSPECTION

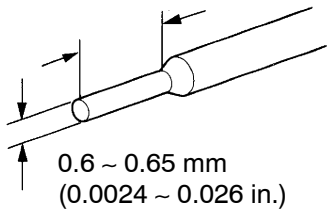
INSPECT WASHER NOZZLE

(a) While operating the washer. Check whether the upper point where the washer fluid hits the windshield and the surge area are within the range indicated by the hatched line.

A: Approx. 150 mm (5.91 in.)
B: Approx. 50 mm (1.97 in.)
C: Approx. 50 mm (1.97 in.) (Australia models only)
D: Approx. 50 mm (1.97 in.) (Except Australia models)
E: Approx. 320 mm (12.60 in.)
F: Approx. 181 mm (7.13 in.)
G: Approx. 120 mm (4.72 in.)
H: Approx. 546 mm (21.50 in.)
I: Approx. 447 mm (17.60 in.)
J: Approx. 443 mm (17.45 in.)
K: Approx. 117 mm (4.61 in.)
L: Approx. 176 mm (6.93 in.)
M: Approx. 320 mm (12.60 in.)
N: Approx. 181 mm (7.13 in.)

(b) Check if the lower point where the washer fluid hits the windshield is within the range of the wiping pattern (the area of the glass which is wiped by the wiper blades).

BO4CV–01



ADJUSTMENT

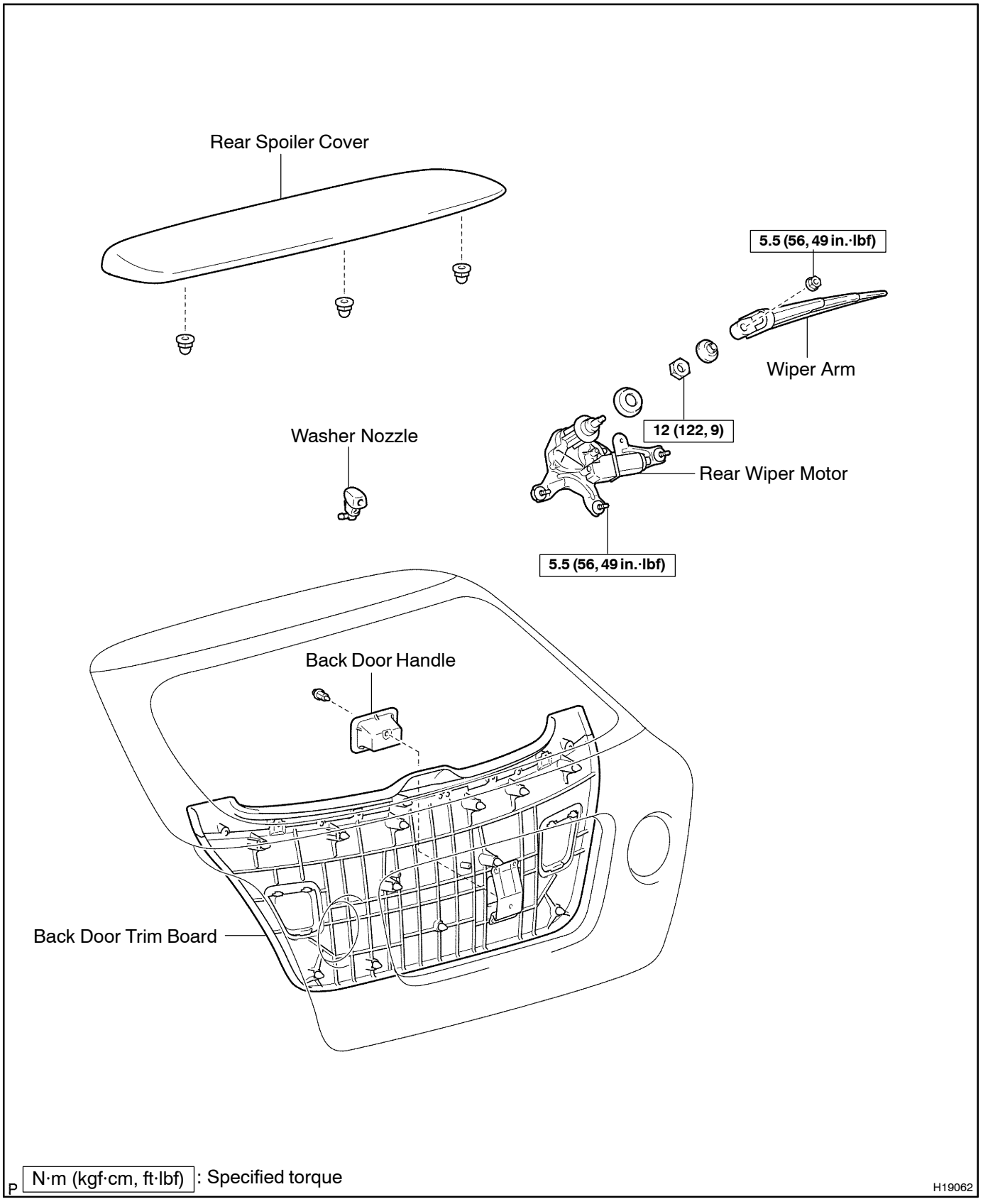
ADJUST WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid hits the windshield.

REAR WIPER AND WASHER (Wagon)

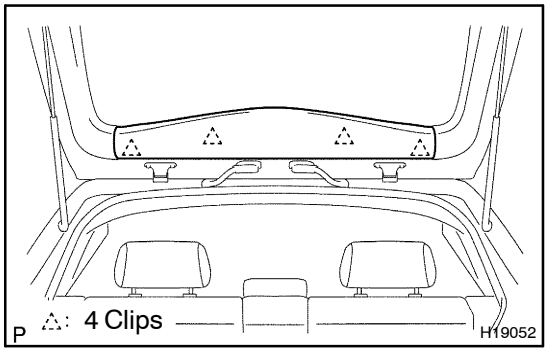
COMPONENTS

BO4BF–01



BO4BG–01

REMOVAL

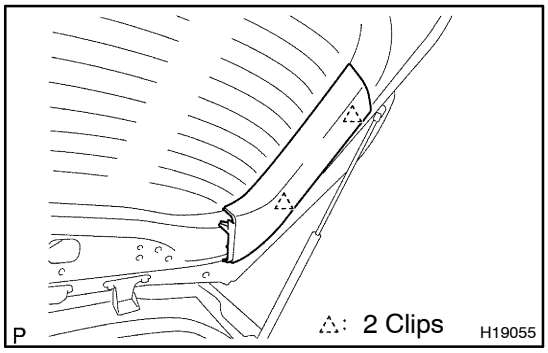


1. REMOVE BACK DOOR TRIM BOARD UPPER

Using a screwdriver, remove the back door trim board upper.

HINT:

Tape the screwdriver tip before use.



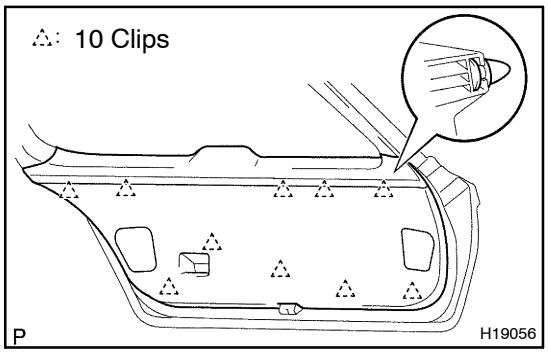
2. REMOVE BACK DOOR TRIM COVERS

(a) Insert a screwdriver between the back door panel and back door trim cover to pry the cover.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



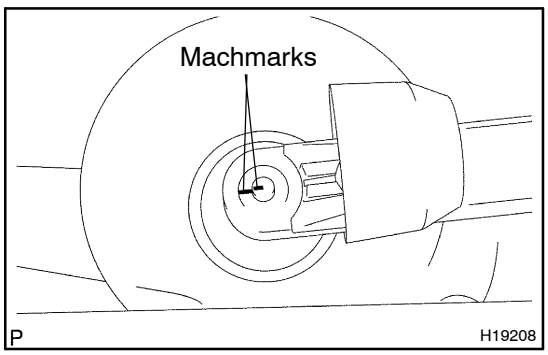
3. REMOVE BACK DOOR TRIM BOARD

(a) Remove the clip and back door handle.

(b) Using a screwdriver, remove the back door trim board.

HINT:

Tape the screwdriver tip before use.

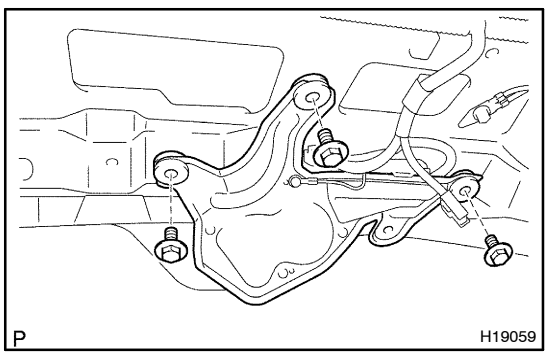


4. REMOVE REAR WIPER ARM

(a) Remove the wiper arm cover.

(b) Place machmarks on the wiper arm and wiper motor.

(c) Remove the nut and rear wiper arm.



5. REMOVE REAR WIPER MOTOR

(a) Remove the nut and washer on the outer side of the back door panel.

(b) Disconnect the connector.

(c) Remove the 3 bolts and rear wiper motor.

BO4BH–01

INSPECTION

INSPECT WASHER NOZZLE

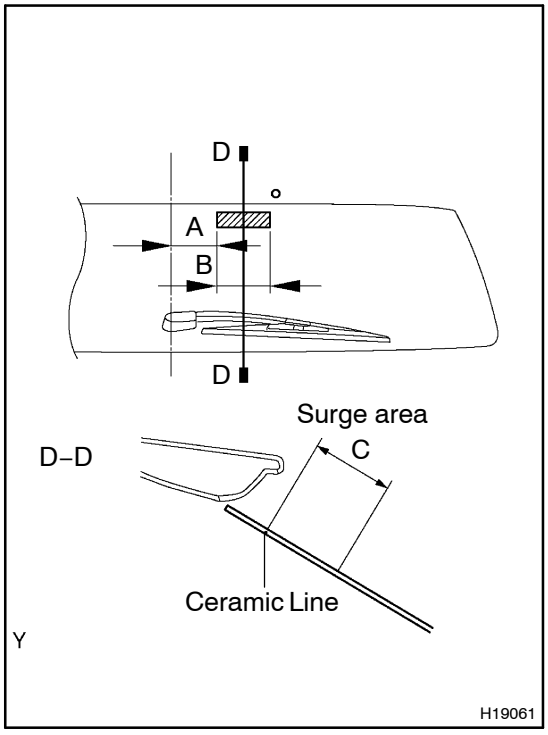
(a) While operating the washer, check whether the upper point where the washer fluid hits the back door glass and the surge area are within the range indicated by the hatched line.

A: 88 mm (3.46 in.)

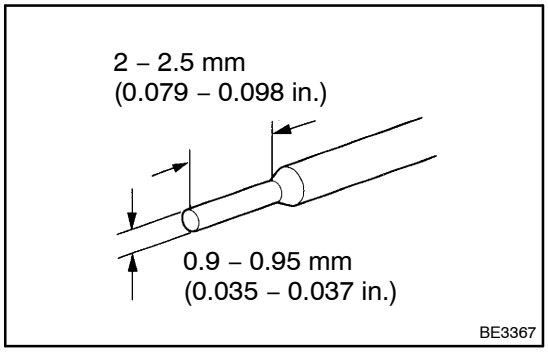
B: 100 mm (3.94 in.)

C: 55 mm (2.17 in.)

(b) Check if the lower point where the washer fluid hits the back door glass is within the range of the wiping pattern (the are of the glass which is wiped by the wiper blades).



BO4BI–01



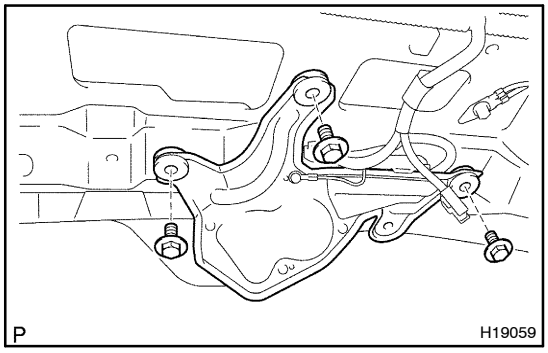
ADJUSTMENT

ADJUST WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid hits the back door glass.

BO4BJ–01

INSTALLATION

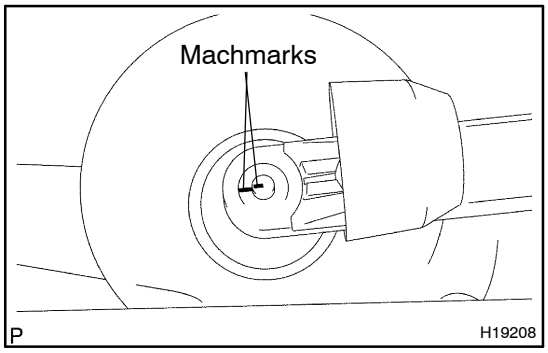


1. INSTALL REAR WIPER MOTOR

(a) Install the rear wiper motor with the 3 bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(b) Connect the connector.

(c) Install the nut and washer on the outer side of the back door panel.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)



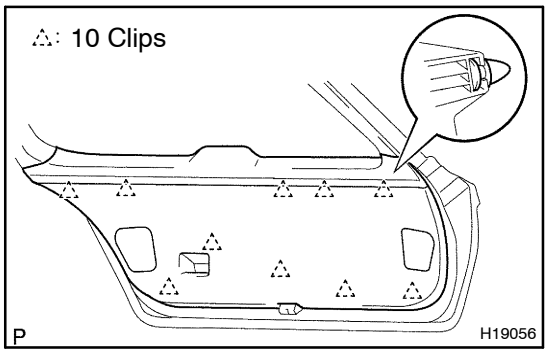
2. INSTALL REAR WIPER ARM

(a) Install the wiper arm and tighten the nut by hand. Operate the wiper once and turn the wiper switch OFF.

(b) Align the machmarks on the wiper arm and wiper motor.

(c) Install the rear wiper arm with the nut.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

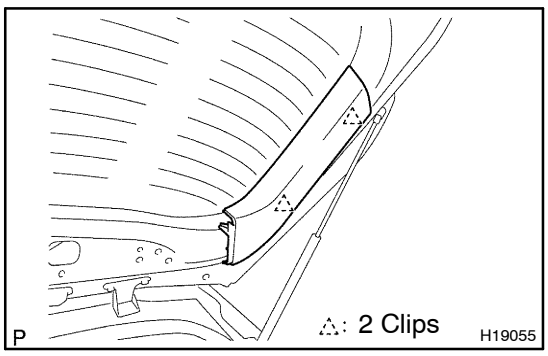
(d) Install the wiper arm cover.



3. INSTALL BACK DOOR TRIM BOARD

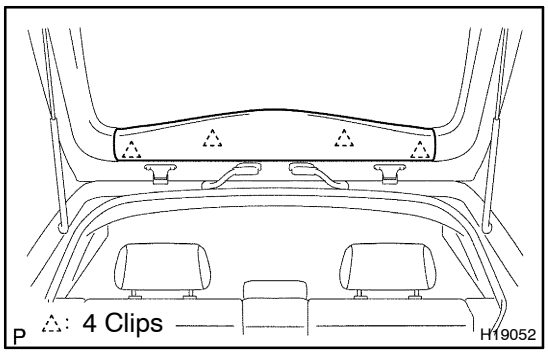
(a) Install the back door trim board to the back door panel.

(b) Install the back door handle with the clip.



4. INSTALL BACK DOOR TRIM COVERS

Install the trim covers to the body.



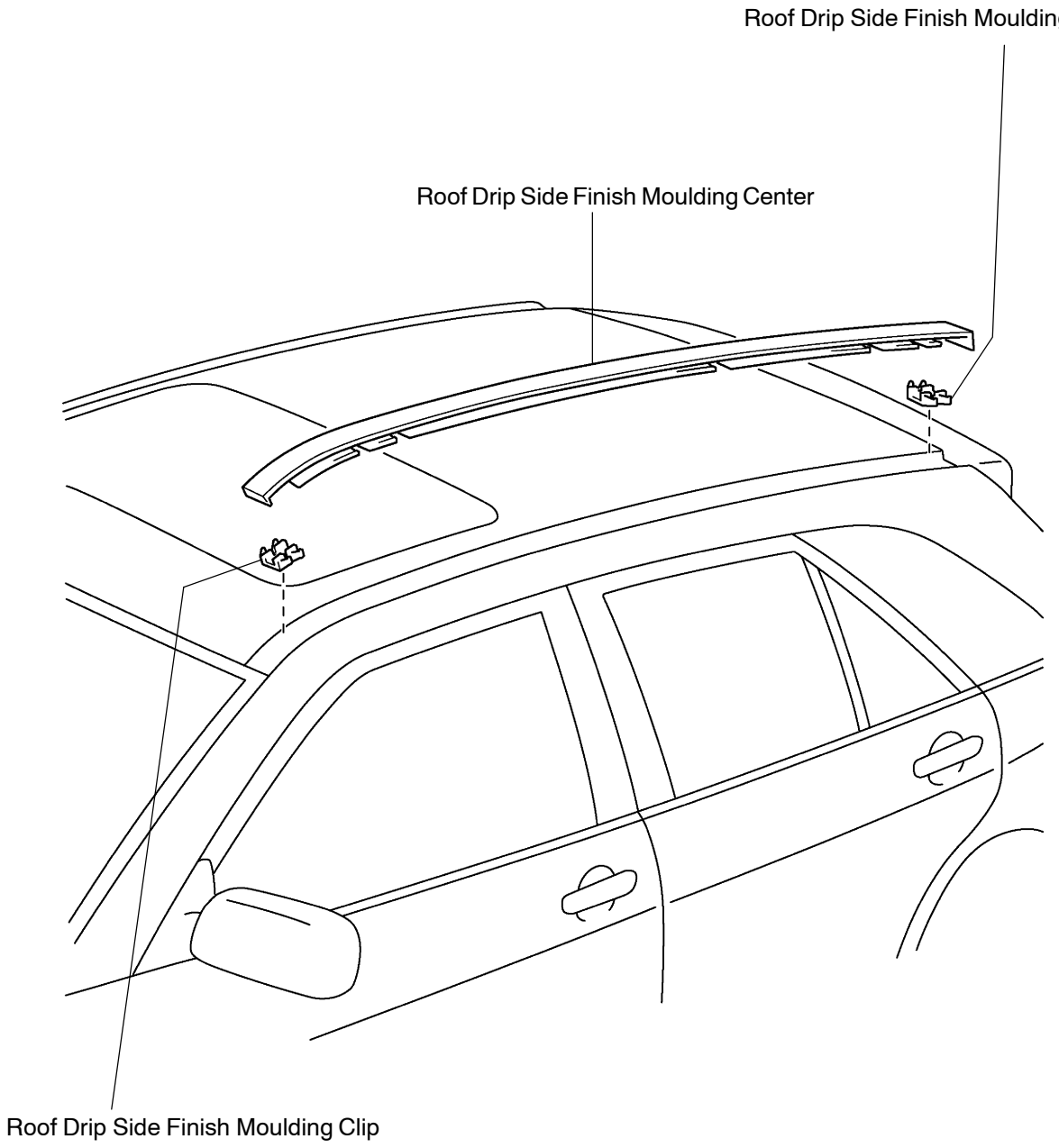
5. INSTALL BACK DOOR TRIM BOARD UPPER

Install the back door trim board upper to the body.

ROOF DRIP SIDE FINISH CENTER MOULDING (Wagon)

COMPONENTS

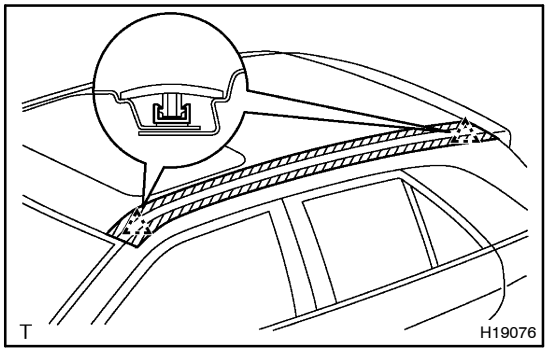
BO4BQ-01



T

H19075

BO4BR–01



REMOVAL

REMOVE ROOF DRIP SIDE FINISH MOULDING CENTER

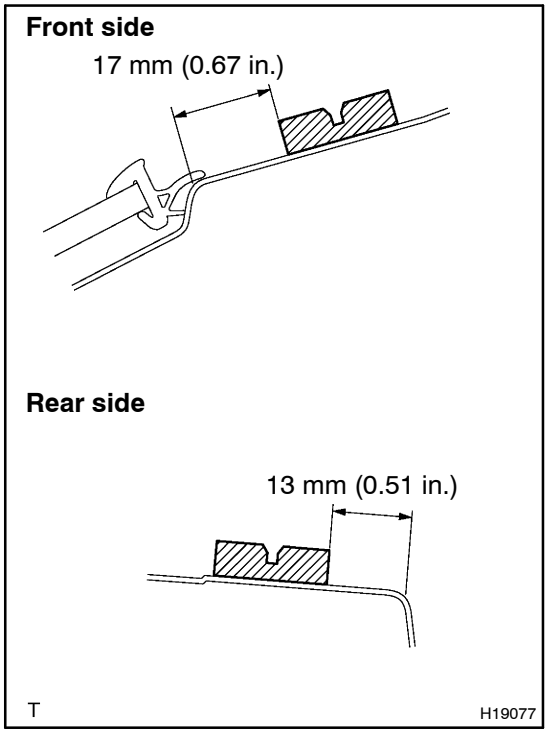
(a) Tape the circumference of the moulding for protection.

(b) Using a remover for the roof moulding, release the engage ments of the clips both in the front and rear ends of the moulding, and then remove the roof drip side finish moulding.

NOTICE:

- **Do not remove the clips.**
- **In case that the clips are damaged or removed accidentaly, exchange them into supplied onces.**

BO4BS–01



INSTALLATION

1. INSTALL ROOF DRIP SIDE FINISH MOULDING CLIP

NOTICE:

Only when exchanging the clips.

(a) Remove the adhesive tape that remains on the moulding surface of the body, and then clean the surface with white gasoline.

(b) Heat up the clip installation surfaces of the body with a heat light.

Body: 40 – 60°C (104 – 140°F)

Moulding: 20 – 30°C (68 – 86°F)

NOTICE:

Do not heat the moulding excessively.

(c) Set the supplied clips into the positions as shown in the illustration, and press–fit those clips by hand to install them.

(d) The installation of the moulding should be carried out when 30 minutes or more has passed after press–fitting the clips.

HINT:

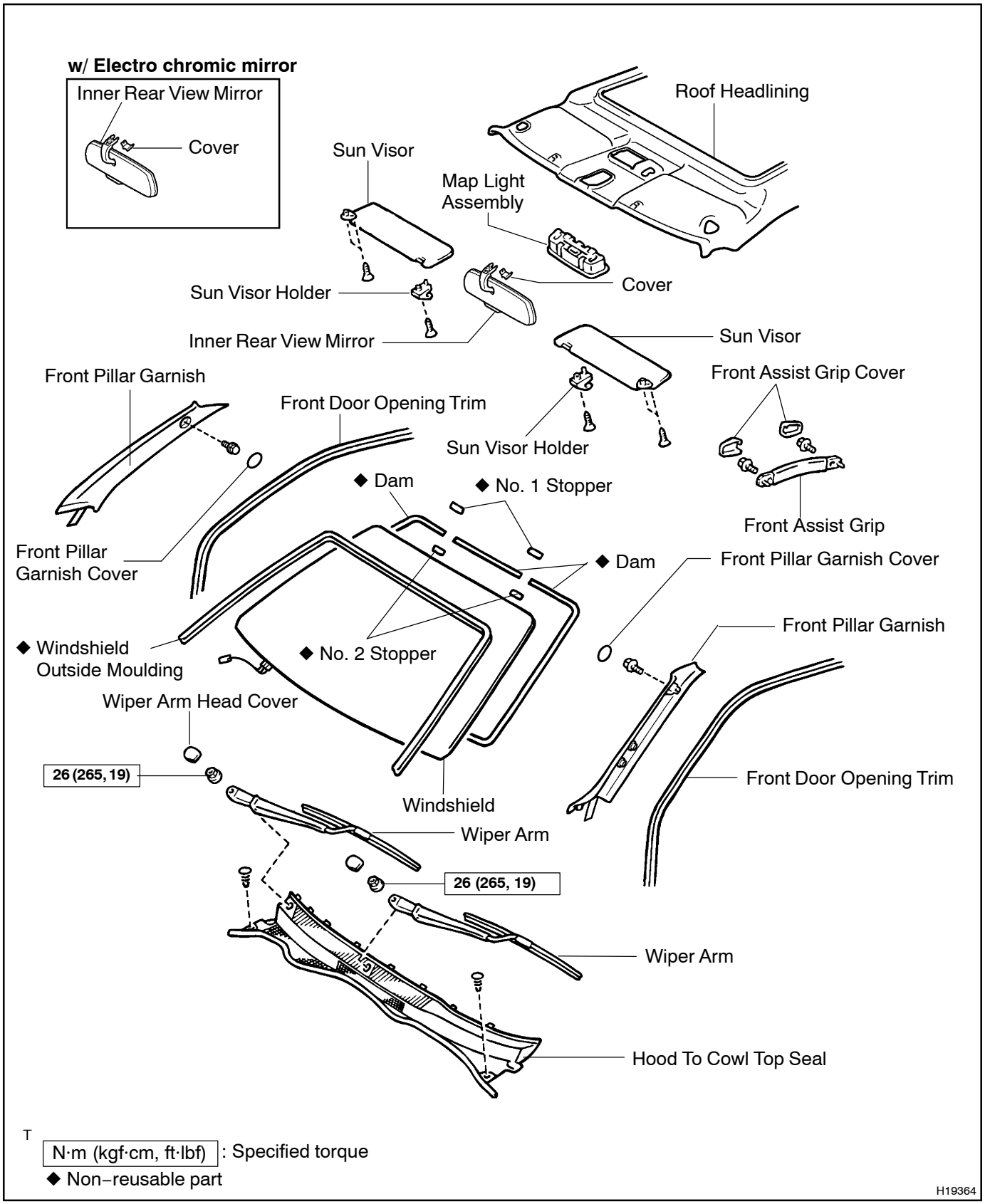
- Initial hardening time: 30 minutes
- Prefect hardening time: 24 hours

2. INSTALL MOULDING

WINDSHIELD

COMPONENTS

BO0V2–09



T

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

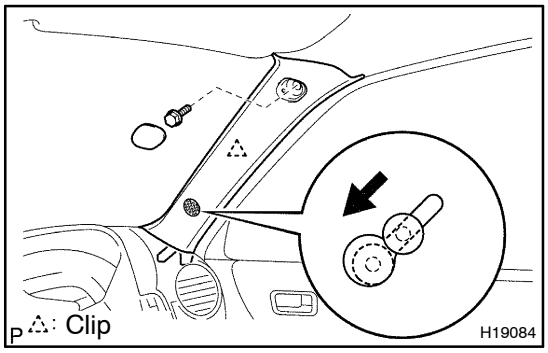
◆ Non–reusable part

H19364

BO4BY–01

REMOVAL

1. REMOVE FRONT PART OF FRONT DOOR OPENING TRIMS



2. REMOVE FRONT PILLAR GARNISHS

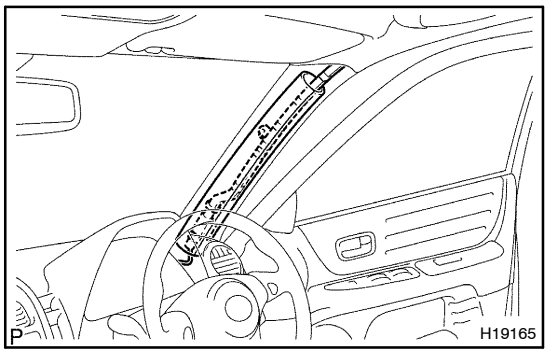
(a) Using a screwdriver, remove the front pillar garnish cover.

HINT:

Tape the screwdriver tip before use.

(b) Remove the bolt.

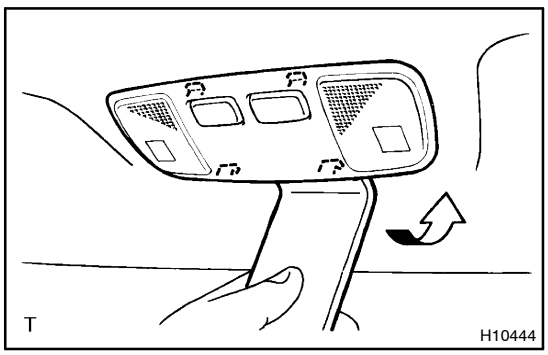
(c) Using a screwdriver, remove the front pillar garnish.



(d) Remove the bolt.

(e) Pack the airbag with protection cover.

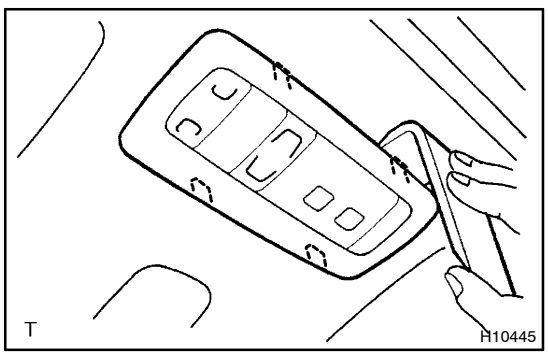
(f) Employ the same manner described above to the other side.



3. w/o Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a moulding remover, remove the lens.

(b) Remove the 2 screws and the map light assembly, then disconnect the connectors.



4. w/ Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a moulding remover, remove the cover.

(b) Remove the 2 screws and the map light assembly.

(c) Disconnect the connectors.

5. REMOVE SUN VISORS

(a) Remove the 2 screws and sun visor, then disconnect the connector.

(b) Employ the same manner described above to the other side.

6. REMOVE SUN VISOR HOLDERS

Remove the 2 screws and sun visor holder.

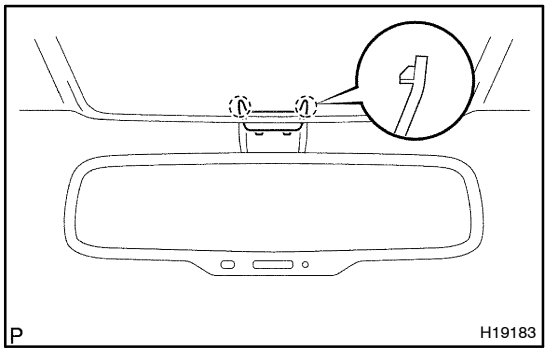
7. REMOVE FRONT ASSIST GRIP

(a) Using a screwdriver, remove the caps.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 bolts and assist grip.

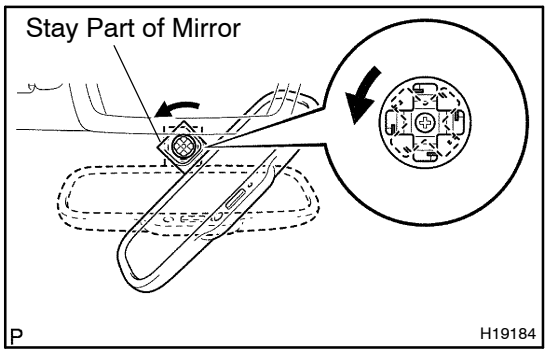


8. REMOVE INNER REAR VIEW MIRROR

(a) Using a screwdriver, remove the inner rear view mirror stay holder cover.

HINT:

Tape the screwdriver tip before use.



(b) w/ electro chromic inner mirror:
Disconnect the connector.

(c) Remove the mirror assembly by turning the stay part of the mirror counterclockwise.

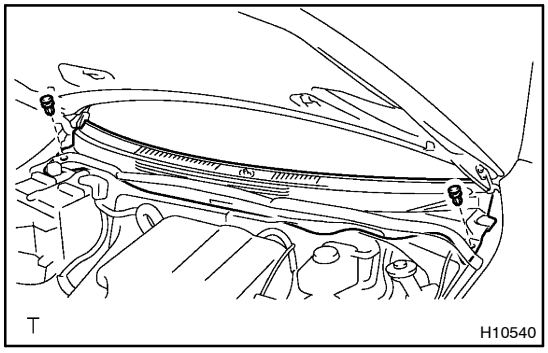
9. REMOVE WIPER ARMS

(a) Using a screwdriver, remove the 2 wiper arm head covers.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 nuts and 2 wiper arms.

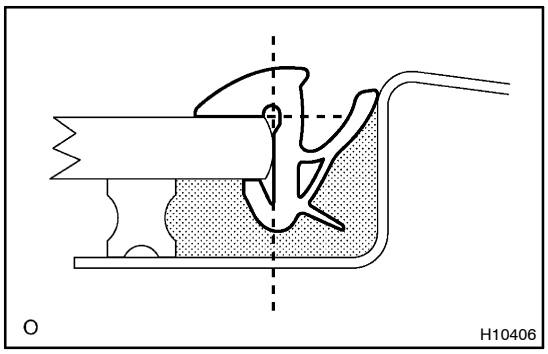


10. REMOVE COWL TOP VENTILATOR LOUVER

(a) Remove the hood to cowl top seal.

(b) Remove the 2 clips and cowl top ventilator louver.

11. PULL DOWN FRONT PART OF ROOF HEADLINING



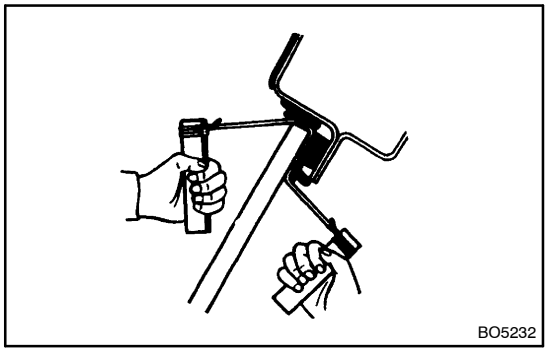
12. REMOVE WINDSHIELD OUTSIDE MOULDING

(a) Using a knife, cut off the moulding as shown in the illustration.

NOTICE:

Do not damage the body with the knife.

(b) Remove the remaining moulding.


BO5232

13. REMOVE WINDSHIELD GLASS

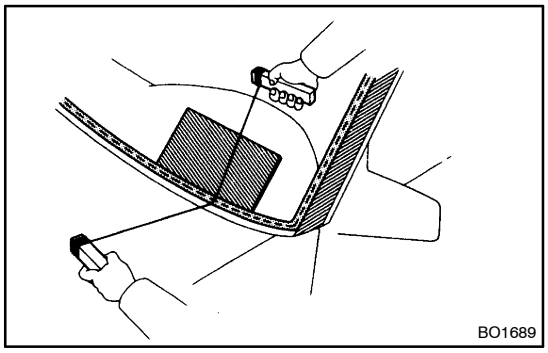
(a) Push piano wire through between the body and glass from the interior.

(b) Tie both wire ends to wooden blocks or similar objects.

(c) w/ Front window defogger:
Disconnect the connector.

NOTICE:

Be careful not to damage the wire harness.


BO1689

(d) Cut the adhesive by pulling the piano wire around it.

NOTICE:

When separating the glass, take care not to damage the paint and exterior ornaments. To prevent scratching the safety pad when removing the windshield, place a plastic sheet between the piano wire and safety pad.

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

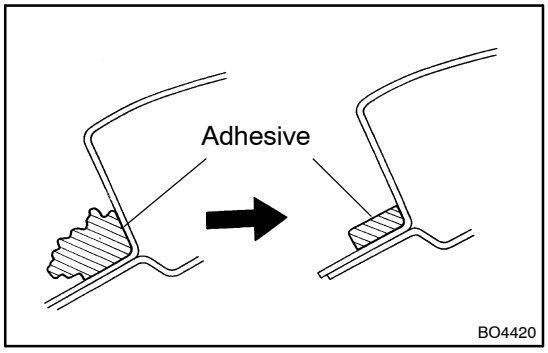
(e) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO419–02

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

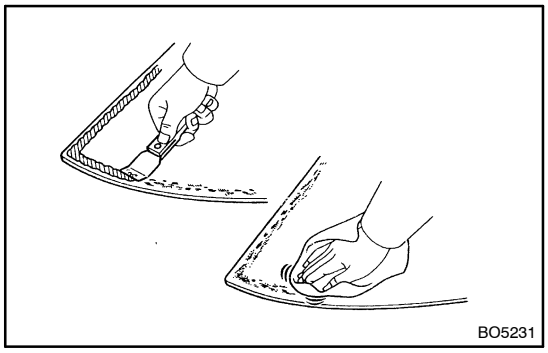
HINT:

Leave as much of the adhesive on the body as possible.

(b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



2. CLEAN REMOVED GLASS

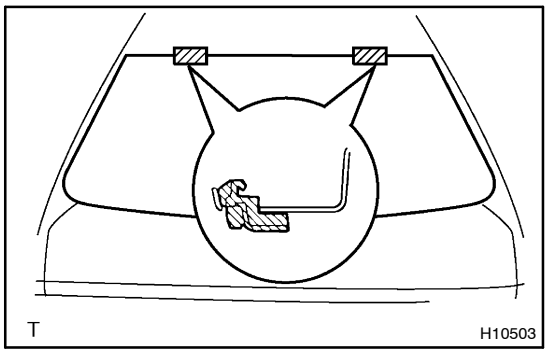
(a) Remove the damaged No. 2 stoppers and dams.

(b) Using a scraper, remove the adhesive sticking to the glass.

(c) Clean the glass with cleaner.

NOTICE:

- **Be careful not to damage the glass.**
- **Do not touch the glass face after cleaning it.**



3. REPLACE NO. 1 STOPPERS

(a) Remove the damaged stoppers.

(b) Cut off the old adhesive around the stoppers installation area.

NOTICE:

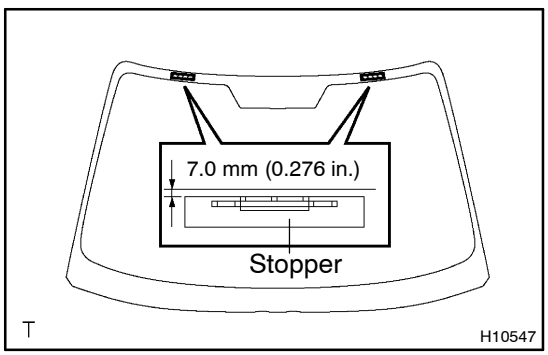
Be careful not to damage the body.

(c) Clean the installation area.

(d) Attach new stoppers to the body with the notches on the body aligned with the stoppers as shown in the illustration.

HINT:

Make sure that the stoppers are installed facing in the correct direction.

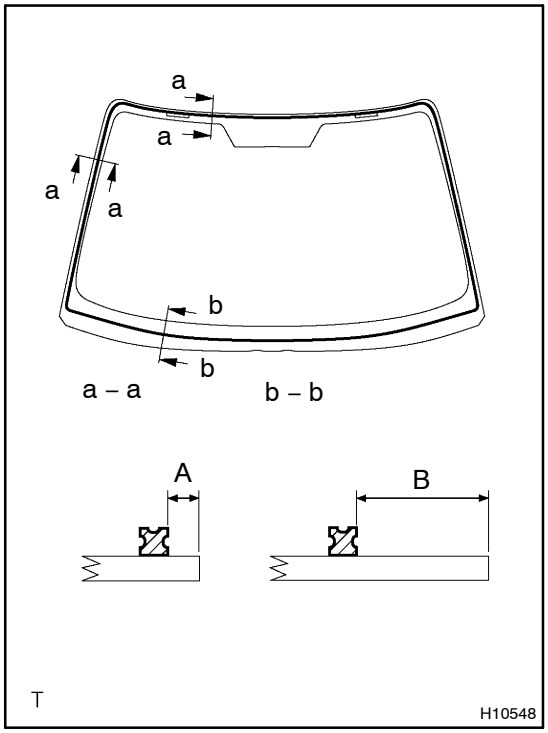


4. INSTALL NEW NO. 2 STOPPERS

Attach new stoppers to the glass with the ceramic notches on the glass aligned with the stoppers as shown in the illustration.

HINT:

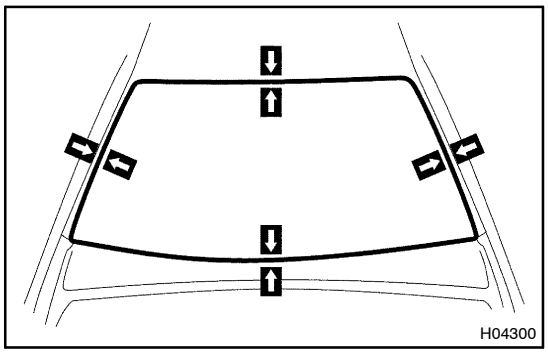
Make sure that the stoppers are installed facing in the correct direction.



5. INSTALL NEW DAMS

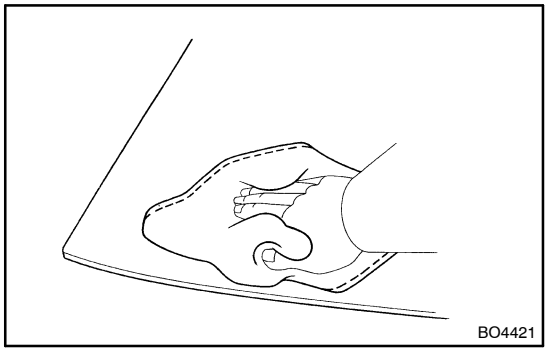
Install new dams with double–stick tape as shown in the illustration.

A: 7.0 mm (0.276 in.)
B: 35.9 mm (1.413 in.)



6. POSITION GLASS

(a) Place the glass in the correct position.
(b) Check that all contacting parts of the glass rim are perfectly even.
(c) Place reference marks between the glass and body.
(d) Remove the glass.

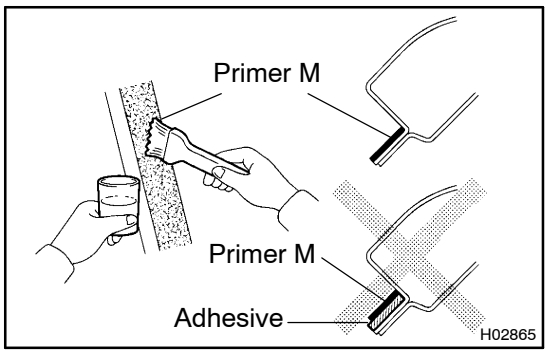


7. CLEAN CONTACT SURFACE OF GLASS

Using a cleaner, clean the contact surface which is black–colored area around the entire glass rim.

NOTICE:

Do not touch the glass face after cleaning it.

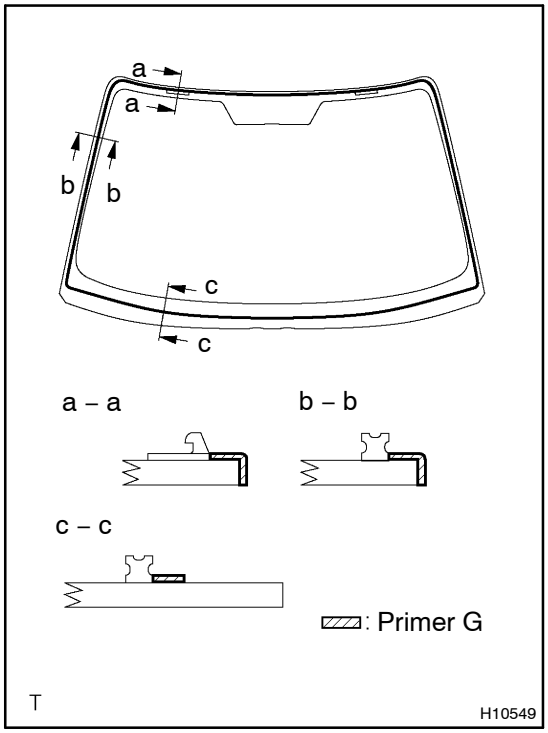


8. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat Primer M to the adhesive.**
- **Do not keep any of the opened Primer M for later use.**



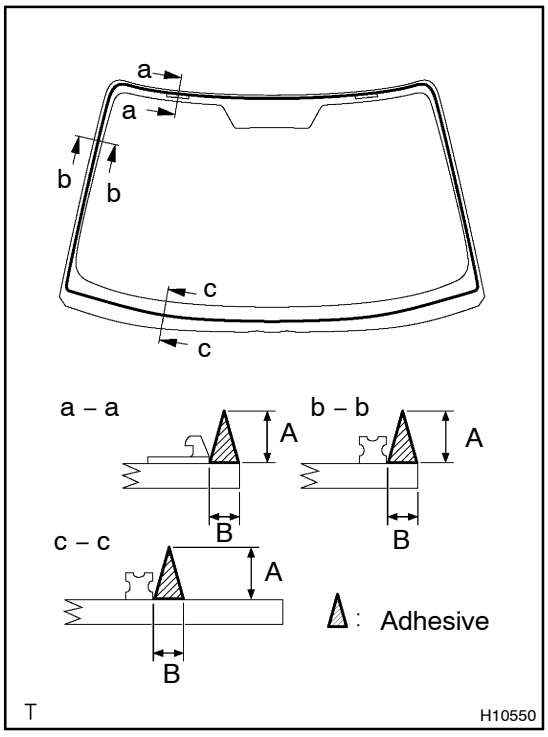
9. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G as shown in the illustration.

(b) When the primer is coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not keep any of the opened Primer G for later use.**



10. APPLY ADHESIVE

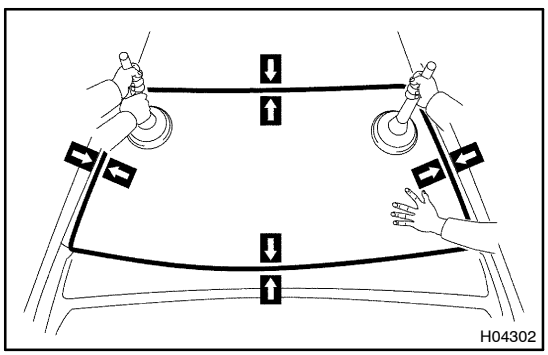
(a) Cut off the tip of the cartridge nozzle.
Part No. 08850–00801 or equivalent

HINT:
After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35˚C (95˚F)	15 minutes
20˚C (68˚F)	100 minutes
5˚C (41˚F)	8 hours

(b) Load the cartridge into the sealer gun.

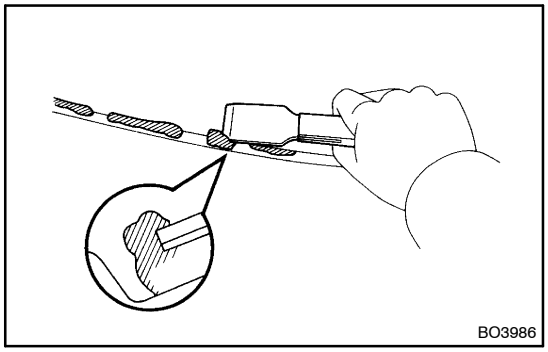
(c) Coat the glass with adhesive as shown in the illustration.
A: 12.5 mm (0.492 in.)
B: 8.0 mm (0.315 in.)



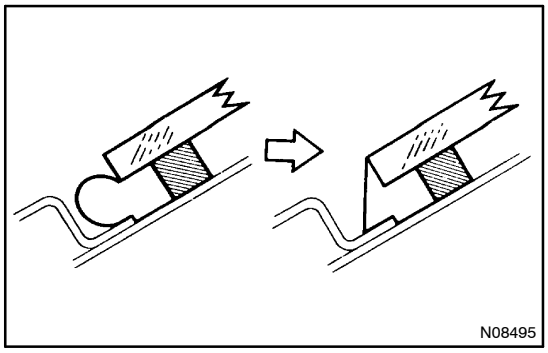
11. INSTALL GLASS

(a) Position the glass so that the reference marks are lined up, and press in gently along the rim.

(b) Using a spatula, apply adhesive on the glass rim.


BO3986

(c) Use a scraper to remove any excess or protruding adhesive.

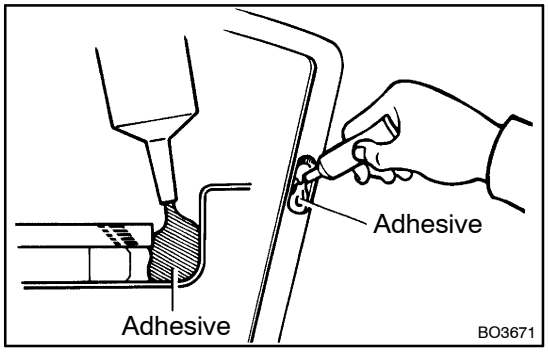

N08495

HINT:
Confirm that the dam is attached to the body panel as shown in the illustration.

(d) Hold the windshield glass in place securely with a protective tape or equivalent until the adhesive hardens.

NOTICE:
Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35˚C (95˚F)	1.5 hours
20˚C (68˚F)	5 hours
5˚C (41˚F)	24 hours

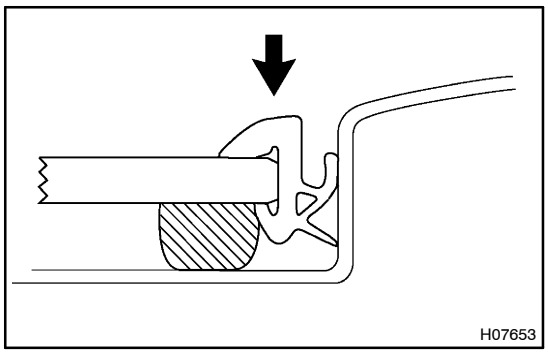


BO3671

12. APPLY ADHESIVE TO MOULDING INSTALLATION AREA

Apply adhesive to the moulding installation area between the glass and the body.

Part No. 08833–00030 or equivalent


H07653

13. INSTALL WINDSHIELD OUTSIDE MOULDING

Place new moulding onto the body and tap it by hand.

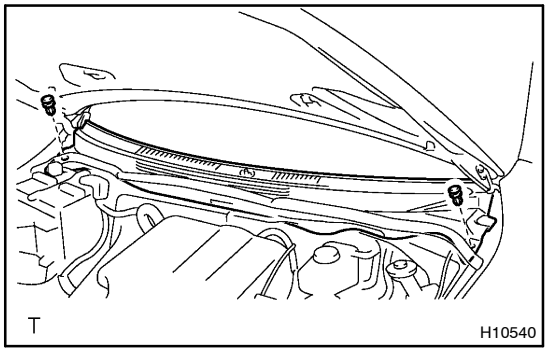
14. INSPECT FOR LEAK AND REPAIR

(a) Conduct a leak test after the hardening time has elapsed.

(b) Seal any leak with sealant.

Part No. 08833–00030 or equivalent

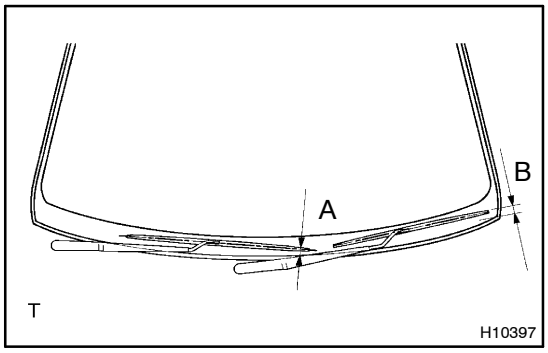
15. INSTALL FRONT PART OF ROOF HEADLINING



16. INSTALL COWL LOUVER

(a) Install the cowl louver with the 2 clips.

(b) Install the hood to cowl top seal.



17. INSTALL WIPER ARMS

(a) Operate the wipers once and turn the wiper switch OFF.

(b) Install the wiper arms and tighten the nuts by hand.

(c) Adjust the installation positions of the wiper arms to the positions as shown in the illustration.

A: 20.0 mm (0.787 in.)

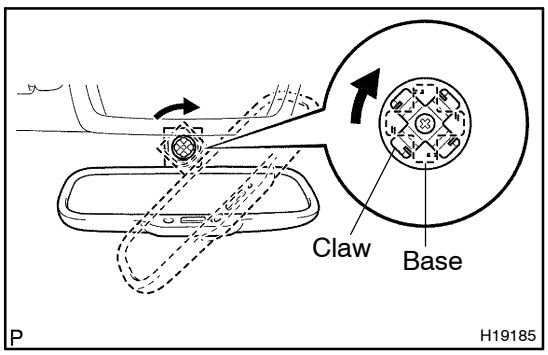
B (Europe modoels): 25.0 mm (0.984 in.)

B (Australia models): 28.0 mm (1.102 in.)

(d) Install the 2 wiper arms with the 2 nuts.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

(e) Install the 2 wiper arm head covers.



18. REMOVE ELECTRO CHROMIC INNER MIRROR

(a) Match the claw part of the mirror with a cut part of the base.

(b) Turn the stay part of the mirror clockwise so that the stay can come to the original position, and then install the mirror assembly.

(c) w/ Electro chromic inner mirror:
Connect the inner rear view mirror connector.

19. INSTALL FRONT ASSIST GRIP

(a) Install the assist grip with the 2 screws.

(b) Install the caps.

20. INSTALL SUN VISOR HOLDERS

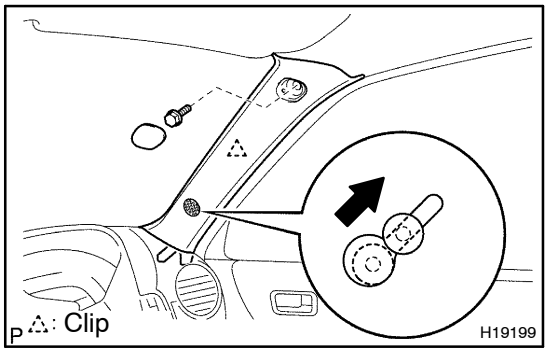
Install the sun visor holders with the 2 screws.

21. INSTALL SUN VISORS

Connect the connectors, then install the sun visors with the 4 screws.

22. INSTALL MAP LIGHT ASSEMBLY

(a) Connect the connectors.
(b) Install the map light assembly with the 2 screws.
(c) w/o Sliding roof:
Install the lens.
(d) w/ Sliding roof:
Install the cover.



23. INSTALL FRONT PILLAR GARNISH

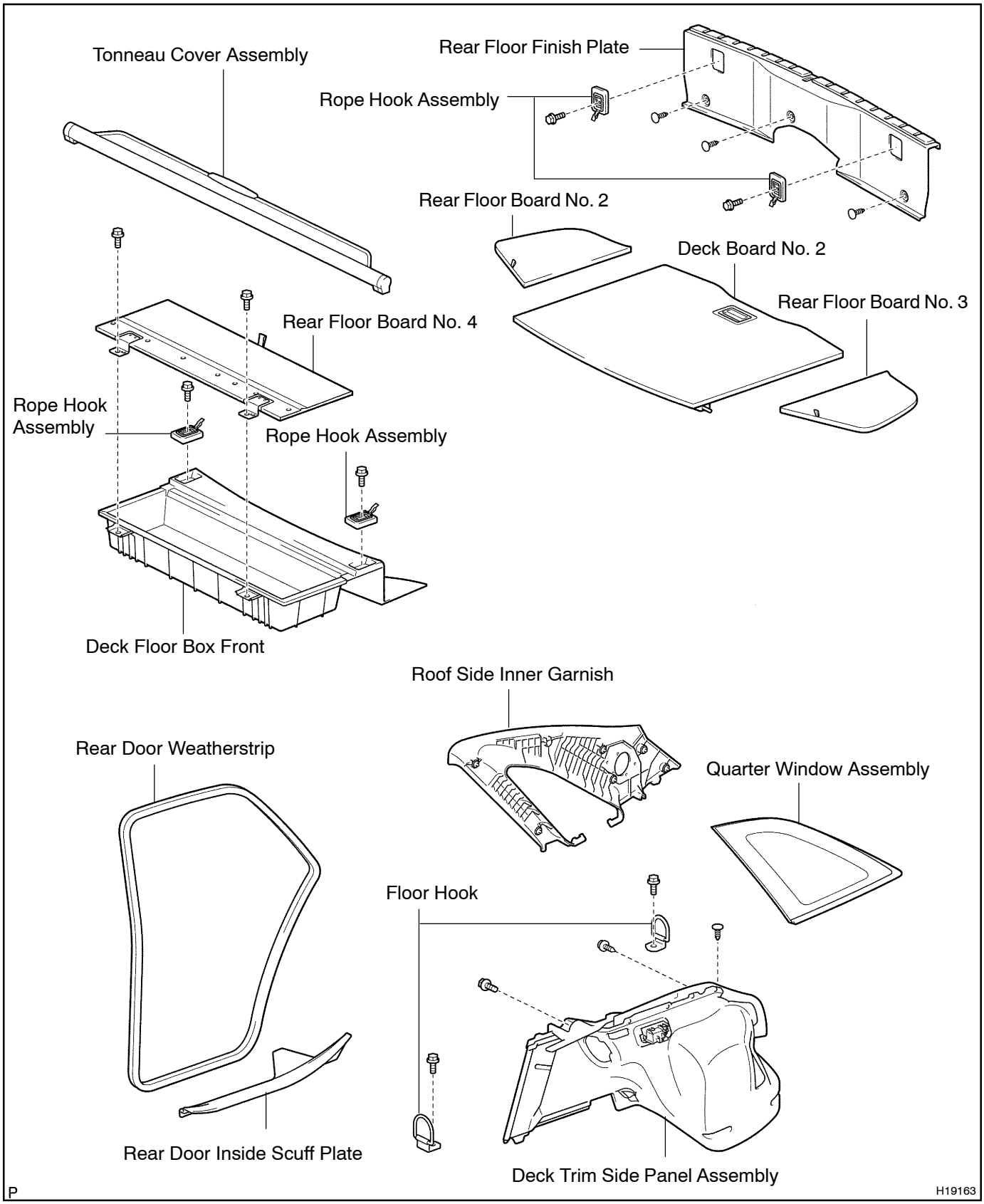
(a) Remove the protection cover.
(b) Install the bolt.
Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)
(c) Install the front pillar garnish to the body.
(d) Install the bolt.
(e) Install the front pillar garnish cover.
(f) Employ the same manner described above to the other side.

24. INSTALL FRONT PART OF FRONT DOOR OPENING TRIMS

QUARTER WINDOW GLASS

COMPONENTS

BO4BN–01



BO4BO–01

REMOVAL

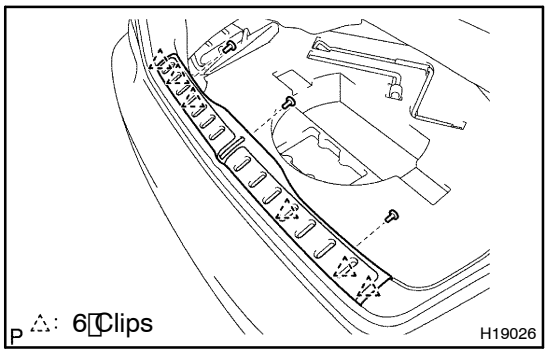
1. REMOVE REAR SEAT CUSHION (See page BO–112)
2. REMOVE SIDE SEAT BACK ASSEMBLY (See page BO–112)
3. **REMOVE REAR SEAT FLOOR BOARD NO. 4**

(a) Remove the seat back board carpets.
(b) Remove the 2 bolts and rear floor board.

4. **REMOVE DECK FLOOR BOX FRONT**

(a) Remove the 2 bolts and the 2 rope hook assemblies.
(b) Remove the deck floor box.

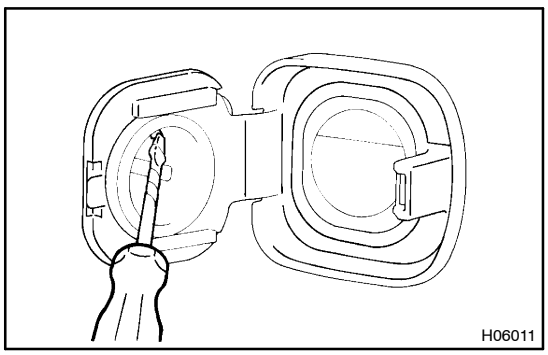
5. **REMOVE DECK BOARD NO. 2**
6. **REMOVE REAR FLOOR BOARD NO. 2**
7. **REMOVE REAR FLOOR BOARD NO. 3**
8. **REMOVE TONNEAU COVER ASSEMBLY**



9. **REMOVE REAR FLOOR FINISH PLATE**

(a) Remove the 2 bolts and the 2 rope hook assemblies.
(b) Remove the 3 clips.
(c) Using a screwdriver, remove the rear floor finish plate.

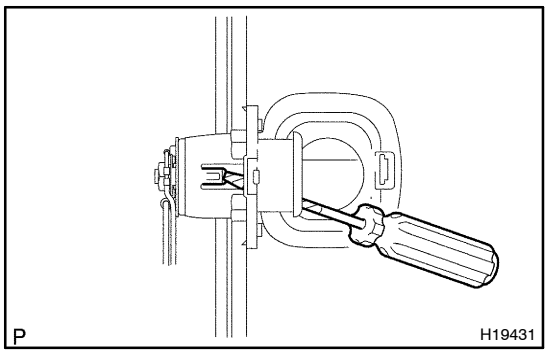
HINT:
Tape the screwdriver tip before use.



10. **RH side:**
REMOVE ACCESSORY SOCKET

(a) Using a screwdriver, disengage the claw on the accessory socket cover from the hole in the accessory socket, then pull out the accessory socket approx. 15 mm (0.59 in.).

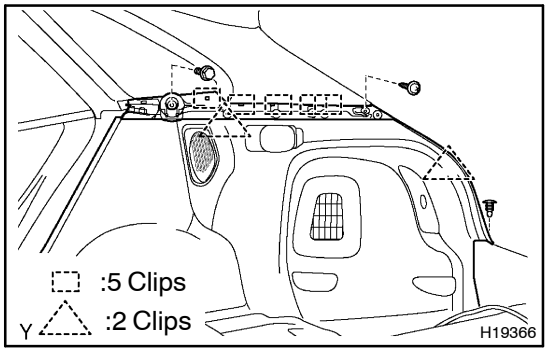
HINT:
Tape the screwdriver tip before use.



(b) Using a screwdriver, disengage the claw on the accessory socket cover from the body and remove the accessory socket and cover as a unit.

HINT:
Tape the screwdriver tip before use.

(c) Disconnect the connector.
(d) Disassemble the accessory socket from the socket cover.



11. REMOVE DECK TRIM SIDE PANEL ASSEMBLY

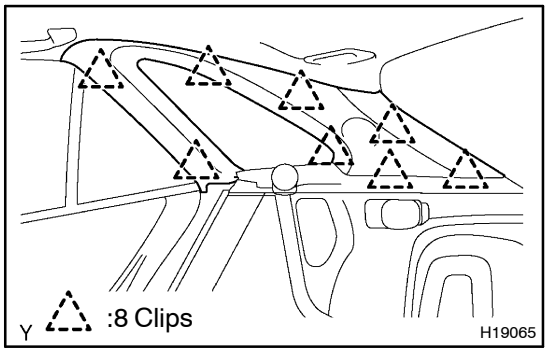
(a) Remove the 2 bolts and 2 floor hooks.

(b) Remove the screw, bolt and clip.

(c) Using a screwdriver, remove the deck trim side panel assembly then disconnect the connector.

HINT:

Tape the screwdriver tip before use.



12. REMOVE ROOF SIDE INNER GARNISH

Using a screwdriver, remove the roof side inner garnish.

HINT:

Tape the screwdriver tip before use.

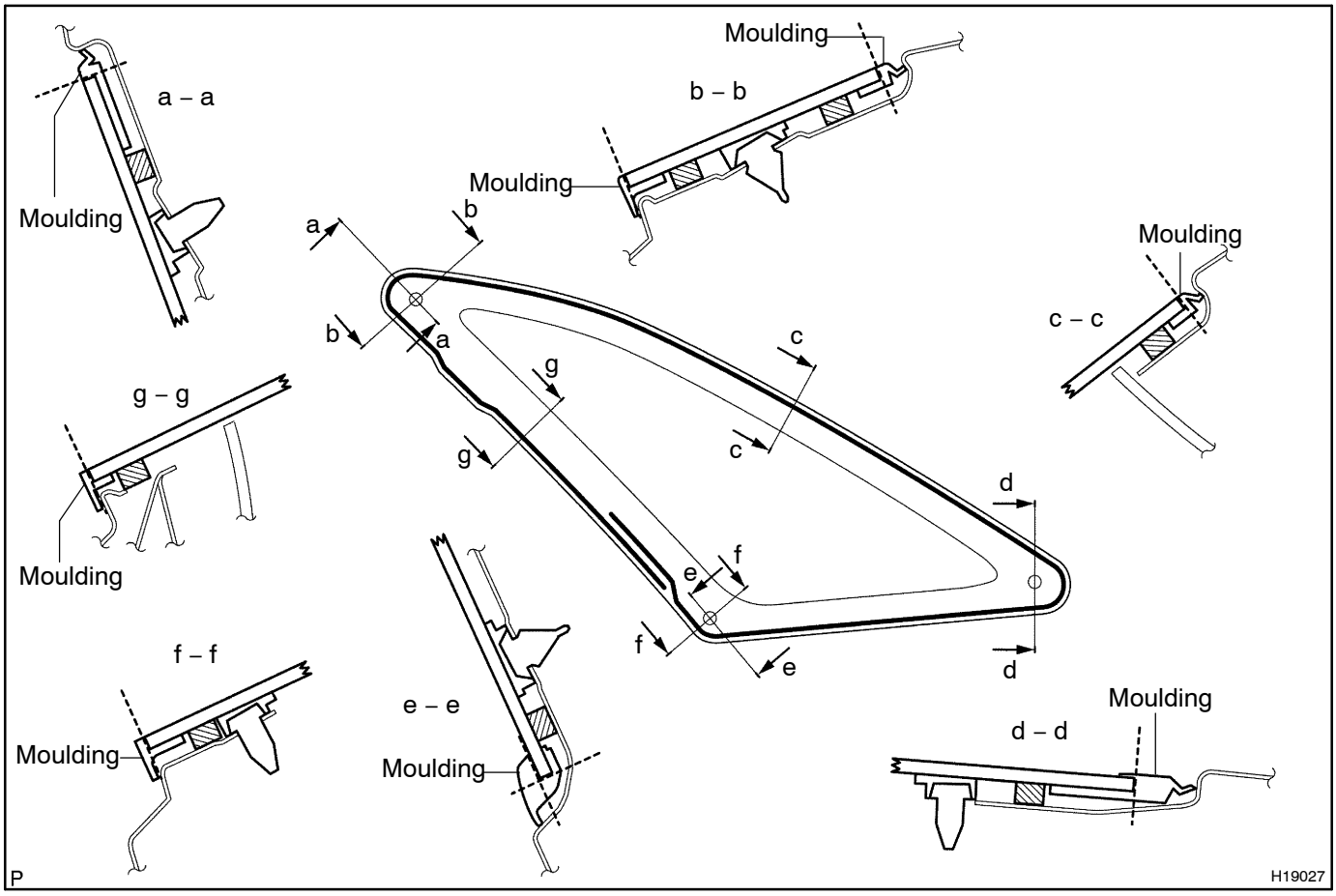
13. REMOVE QUARTER WINDOW GLASS

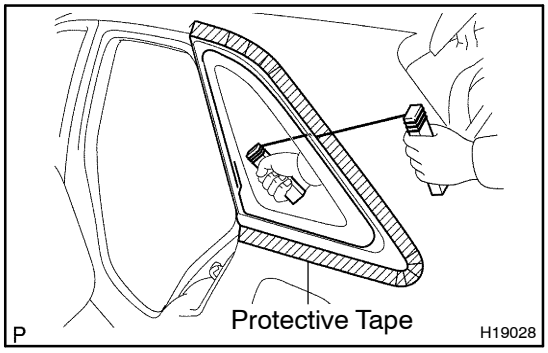
(a) Using a knife, cut off the moulding as shown in the illustration.

NOTICE:

Do not damage the body with a knife.

(b) Disconnect the connector.





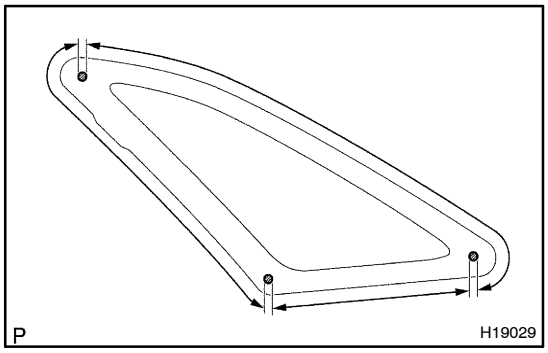
(c) Push a piano wire through from the interior.
(d) Tie both wire ends to wooden blocks or similar object.

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

NOTICE:

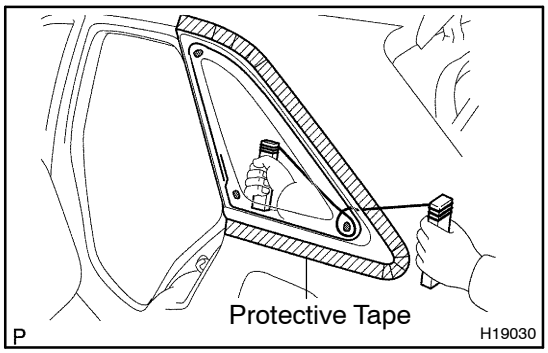
When separating the glass, take care not to damage the paint and exterior.



(e) Cut the adhesive by pulling the piano wire around it.

HINT:

Cut the adhesive areas as shown in the illustration, leaving the adhesive where the clips are.



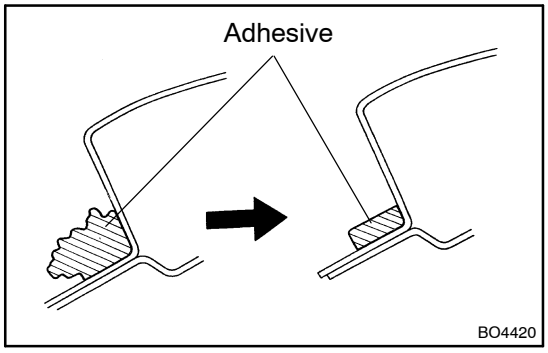
(f) Push the piano wire through as shown in the illustration, cut off the adhered part to the clips.
(g) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO4BP–01

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY PANEL

(a) Using a knife, cut away any rough areas on the body.

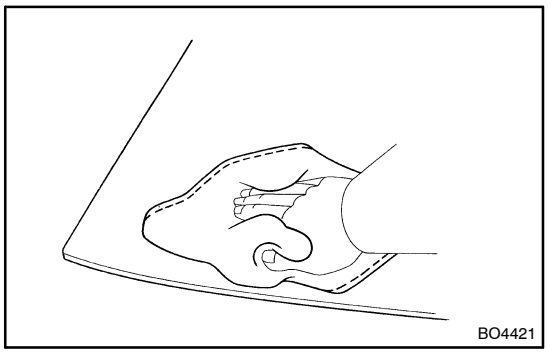
HINT:

Leave as much of the adhesive on the body as possible.

(b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.

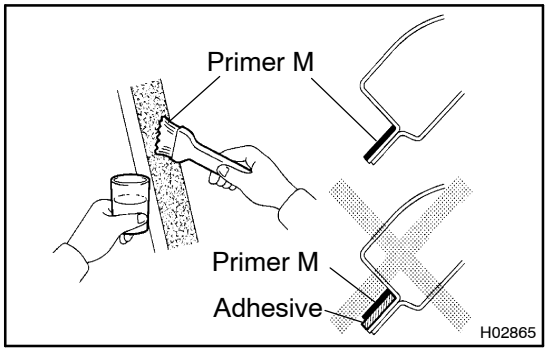


2. CLEAN CONTACT SURFACE OF GLASS

Using a cleaner, clean the contact surface which is black–colored area around the entire glass rim.

NOTICE:

Do not touch the glass face after cleaning it.



3. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat Primer M to the adhesive.**
- **Do not keep any of the opened Primer M for later use.**

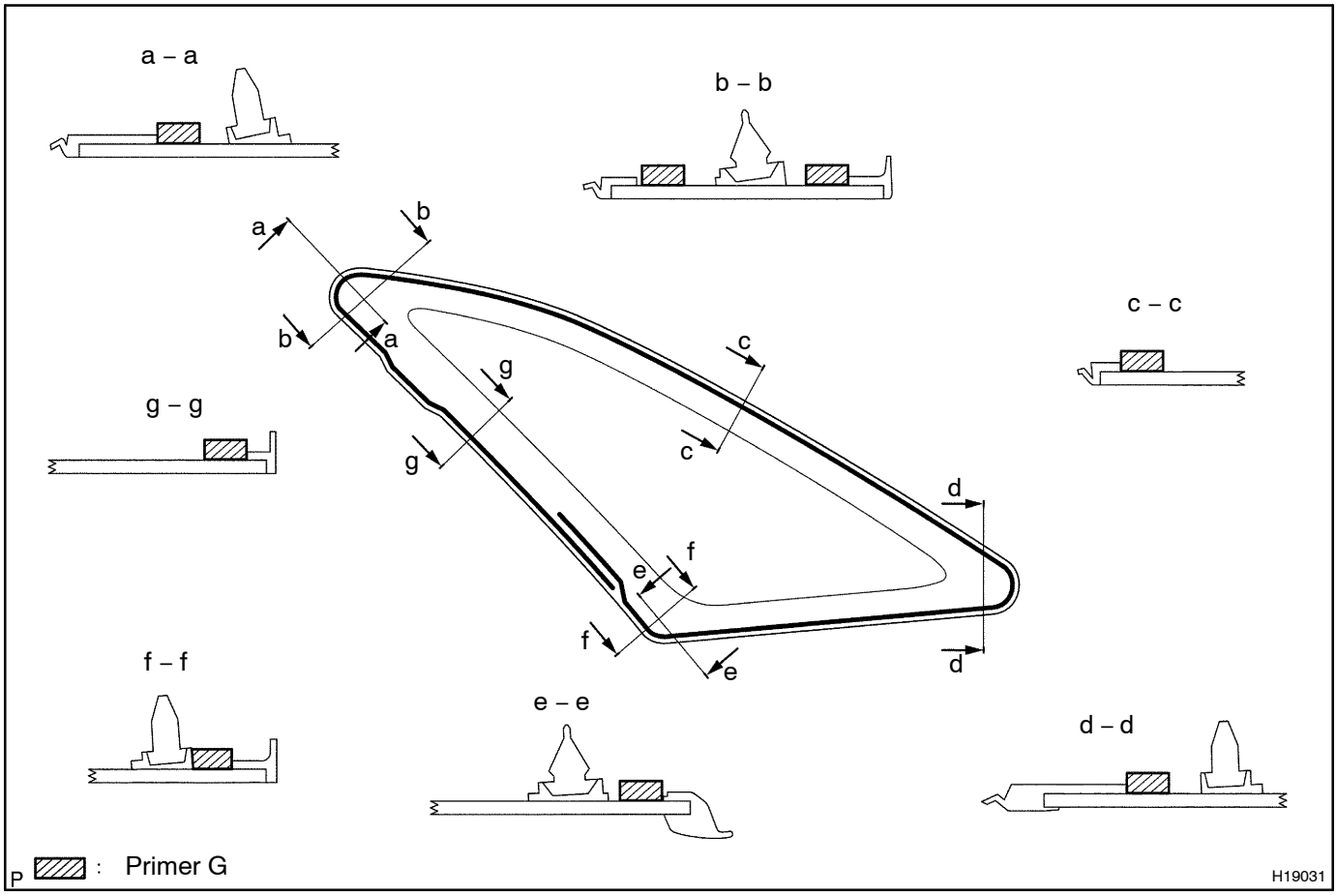
4. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G as shown in the illustration on the following page.

(b) When the primer is coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not keep any of the opened Primer G for later use.**



5. APPLY ADHESIVE

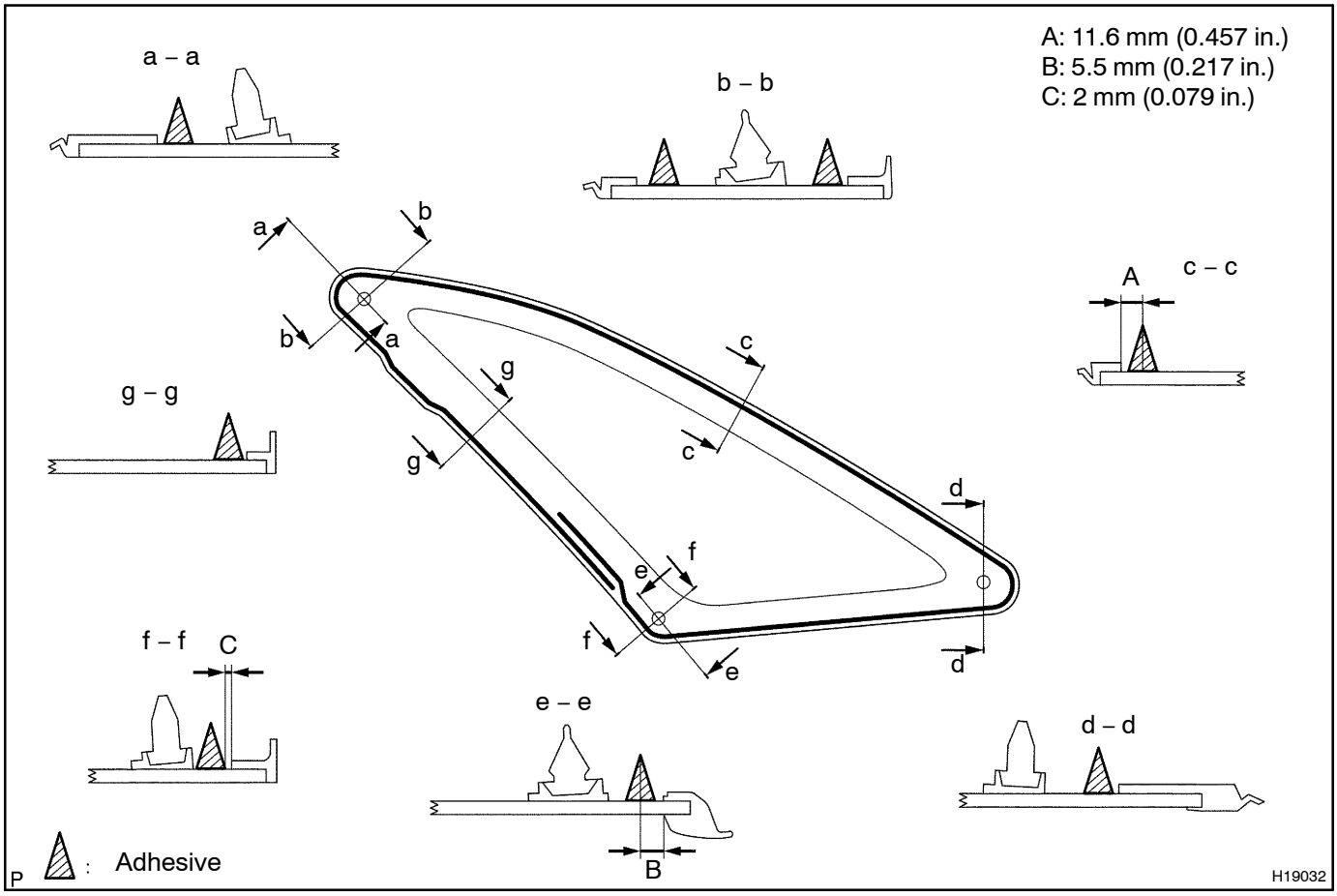
(a) Cut off the tip of the cartridge nozzle.
Part No. 08850–00801 or equivalent.

HINT:
After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35˚C (95˚F)	15 minutes
20˚C (68˚F)	100 minutes
5˚C (41˚F)	8 hours

(b) Load the cartridge into the sealer gun.

(c) Coat the glass with adhesive as shown in the illustration on the following page.
Adhesive height: 12.5 mm (0.492 in.)
Adhesive width: 8.0 mm (0.315 in.)



6. INSTALL GLASS

(a) Install the glass to the body.

(b) Hold the glass in place securely with a protective tape or equivalent until the adhesive hardens.

NOTICE:

Take care not to drive the vehicle during the time described in the table below.

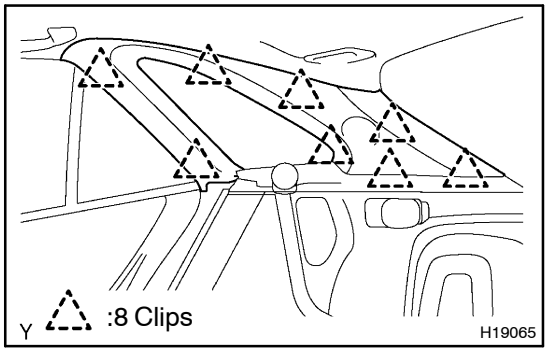
Temperature	Minimum time prior to driving the vehicle
35˚C (95˚F)	1.5 hours
20˚C (68˚F)	5 hours
5˚C (41˚F)	24 hours

7. INSPECT FOR LEAK AND REPAIR

(a) Conduct a leak test after the hardening time has elapsed.

(b) Seal any leak with sealant.

Part No. 08833–00030 or equivalent.

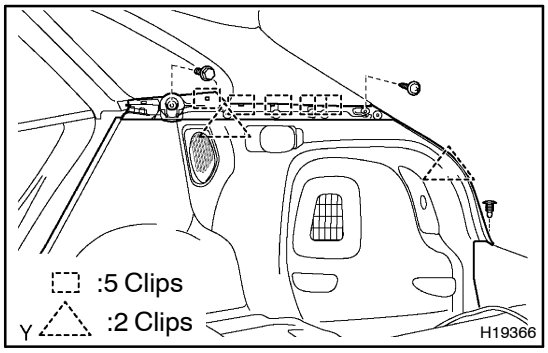


8. INSTALL ROOF SIDE INNER GARNISH

Install the roof side inner garnish to the body.

HINT:

After cutting off the tip, use all adhesive within the time described in the table below.



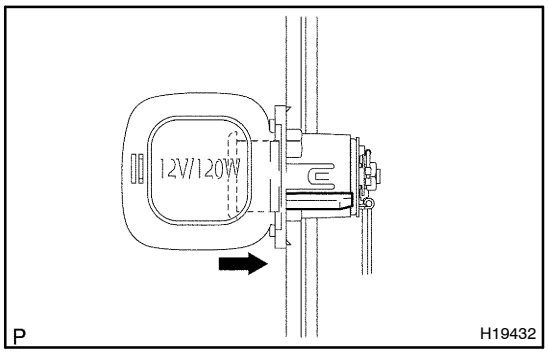
9. INSTALL DECK TRIM SIDE PANEL ASSEMBLY

(a) Install the deck trim side panel with the screw, bolt and clip.

(b) Install the 2 floor hooks with the 2 bolts.

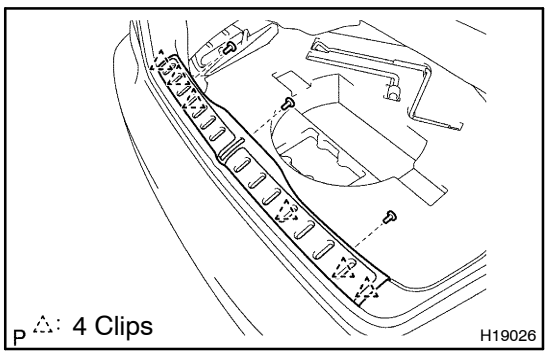
10. RH side:
INSTALL ACCESSORY SOCKET

(a) Assemble the accessory socket to the accessory socket cover at the position 15 mm (0.59 in.) away from full lock position and ensure that they are temporarily locked.



(b) Align the cut–out on the body with the claw on the accessory socket cover, and install the accessory socket and cover to the body.

(c) After installing them, push in the accessory socket approx. 15 mm (0.59 in.) to lock it.



11. INSTALL REAR FLOOR FINISH PLATE

(a) Install the rear floor finish plate with the 3 clips.

(b) Install the 2 rope hook assemblies with the 2 bolts.

12. INSTALL TONNEAU COVER

13. INSTALL REAR FLOOR BOARD NO. 3

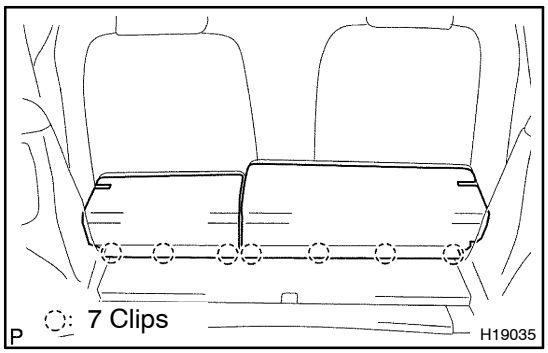
14. INSTALL REAR FLOOR BOARD NO. 2

15. INSTALL DECK BOARD NO. 2

16. INSTALL DECK FLOOR BOX FRONT

(a) Install the deck floor box.

(b) install the 2 rope hook assemblies with the 2 bolts.



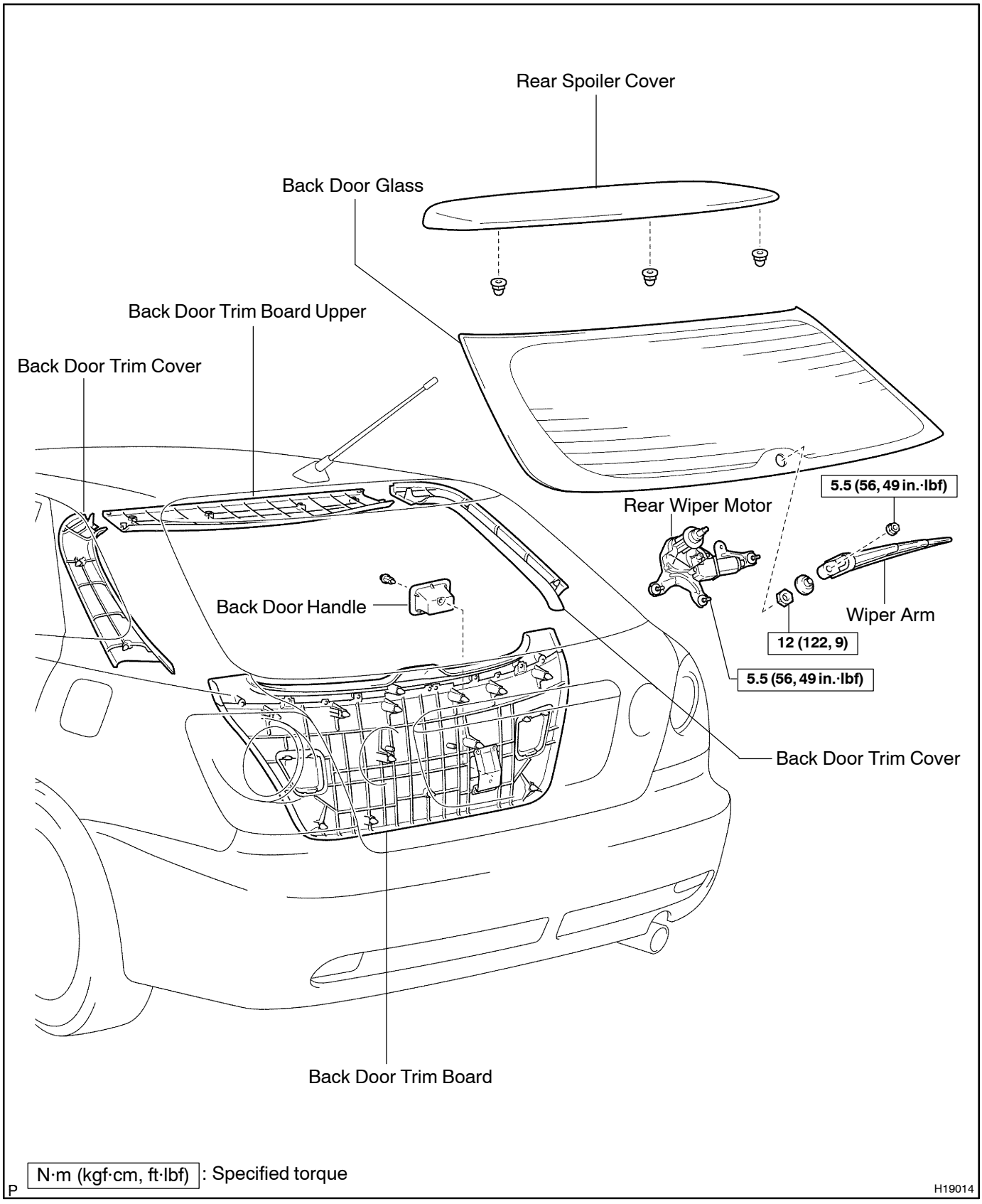
17. INSTALL REAR SEAT FLOOR BOARD NO. 4

Install the rear floor board with the 2 bolts.

BACK DOOR GLASS

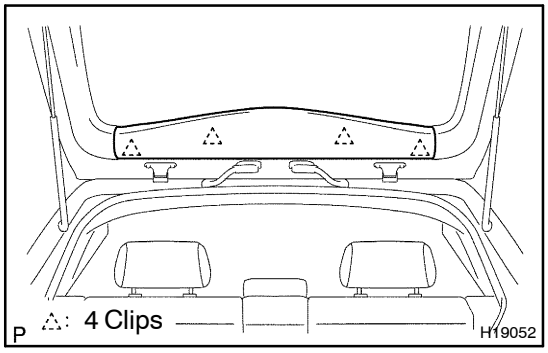
COMPONENTS

BO4BL–01



BO4BM–01

REMOVAL

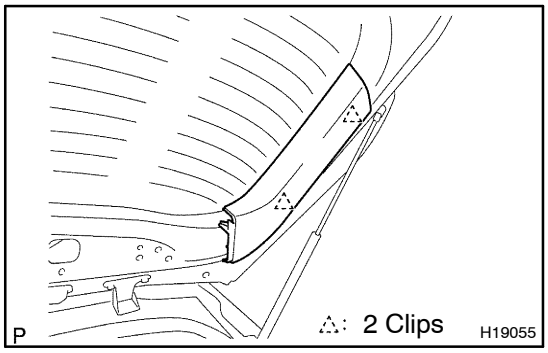


1. REMOVE BACK DOOR TRIM BOARD UPPER

Using a screwdriver, remove the back door trim board upper.

HINT:

Tape the screwdriver tip before use.



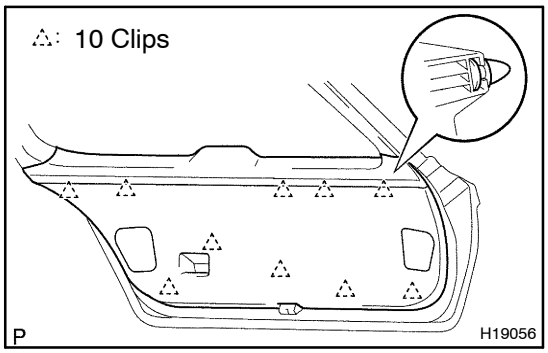
2. REMOVE BACK DOOR TRIM COVERS

(a) Insert a screwdriver between the back door panel and back door trim cover to pry the cover.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



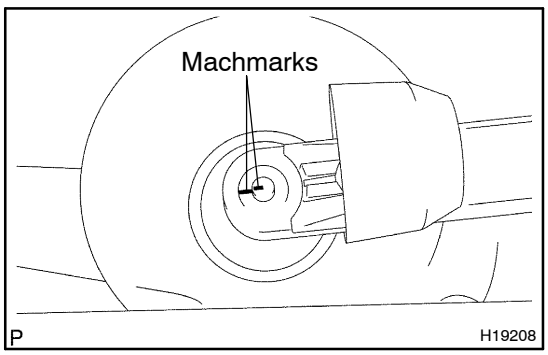
3. REMOVE BACK DOOR TRIM BOARD

(a) Remove the clip and back door handle.

(b) Using a screwdriver, remove the back door trim board.

HINT:

Tape the screwdriver tip before use.

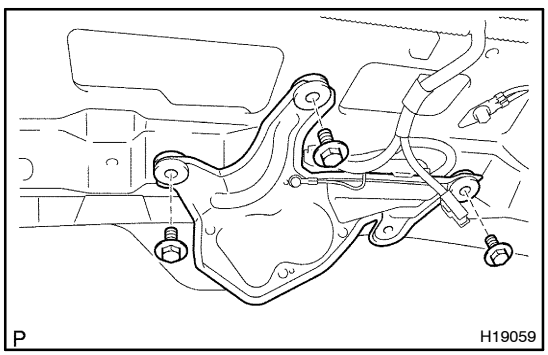


4. REMOVE REAR WIPER ARM

(a) Remove the wiper arm cover.

(b) Place machmarks on the wiper arm and wiper motor.

(c) Remove the nut and rear wiper arm.

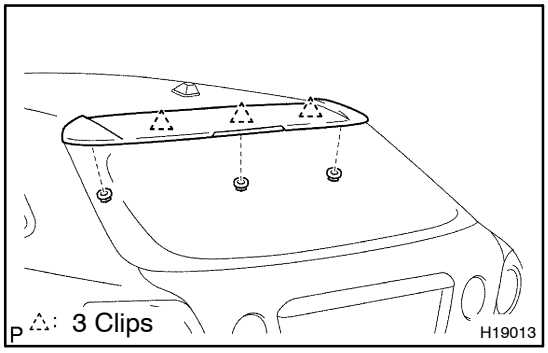


5. REMOVE REAR WIPER MOTOR

(a) Remove the nut and washer on the outer side of back door panel.

(b) Disconnect the connector.

(c) Remove the 3 bolts and rear wiper motor.



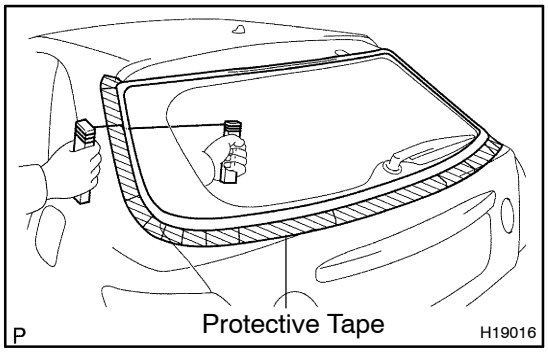
6. REMOVE REAR SPOILER COVER

(a) Remove the 3 nuts.

(b) Using a screwdriver, remove the rear spoiler cover then disconnect the connector.

HINT:

Tape the screwdriver tip before use.



7. REMOVE BACK DOOR GLASS

(a) Disconnect the connector.

(b) Push piano wire through from the interior.

(c) Tie both wire ends to wooden blocks or similar object.

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

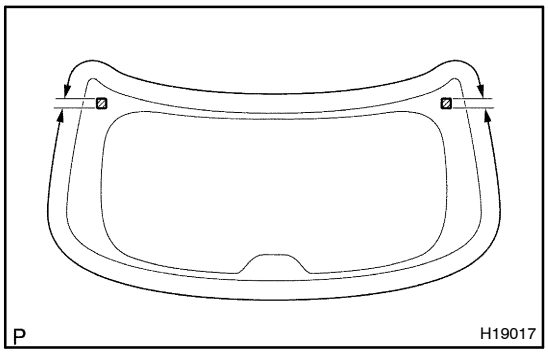
NOTICE:

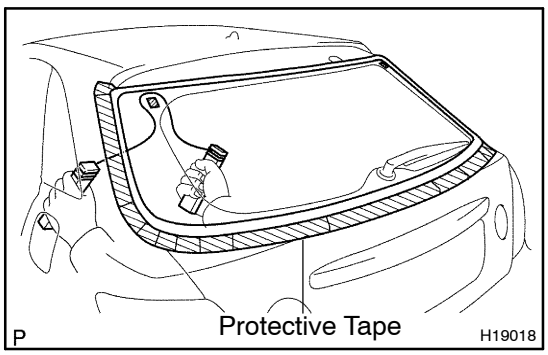
When separating the glass, take care not to damage the paint and exterior.

(d) Cut the adhesive by pulling the piano wire around it.

HINT:

Cut the adhesive areas as shown in the illustration, leaving the adhesive where the clips are.





(e) Let the piano wire pass as shown in the illustration, cut off the adhered part to the clips.

NOTICE:

Do not damage the glass retainers.

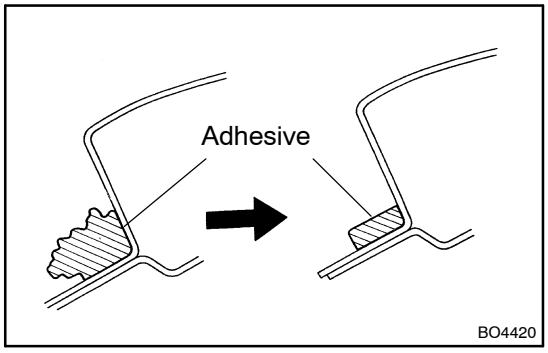
(f) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO4BK–01

INSTALLATION



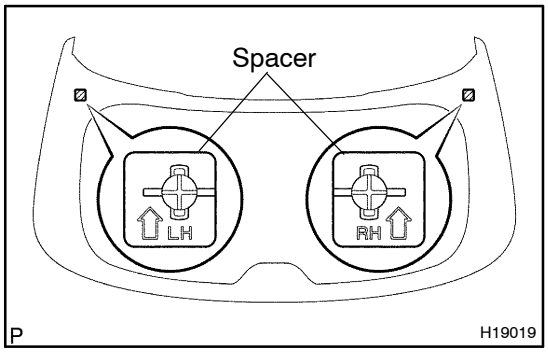
1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

HINT:

Leave as much of the adhesive on the body as possible.

(b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in cleaner.



2. REPLACE SPACER

(a) Remove the damaged spacers.

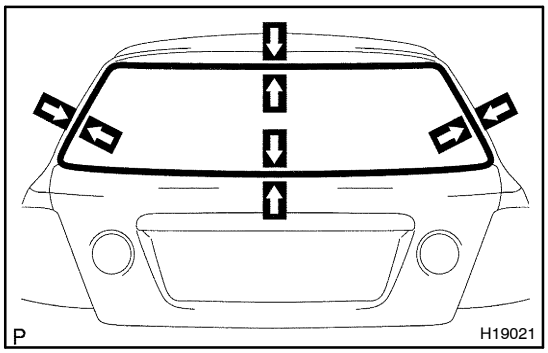
(b) Cut off the old adhesive around the spacers installation area.

NOTICE:

Be careful not to damage the body.

(c) Clean the installation area.

(d) Attach the new spacers to the glass with the ceramic notch on the glass aligned with the spacers as shown in the illustration.



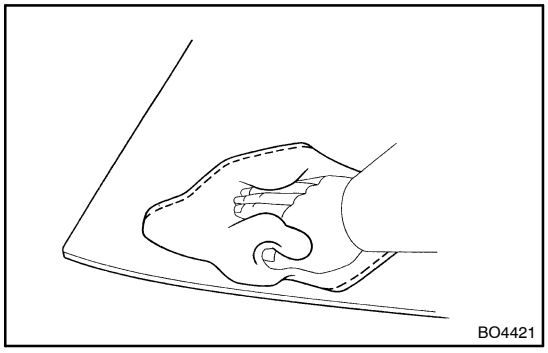
3. POSITION GLASS

(a) Place the glass in the correct position.

(b) Check that all contacting part of the glass rim are perfectly even.

(c) Place reference marks between the glass and body.

(d) Remove the glass.

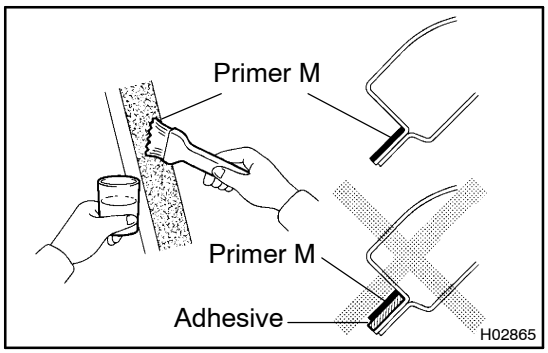


4. CLEAN CONTACT SURFACE OF GLASS

Using a cleaner, clean the contact surface which is black–colored area around the entire glass rim.

NOTICE:

Do not touch the glass face after cleaning it.

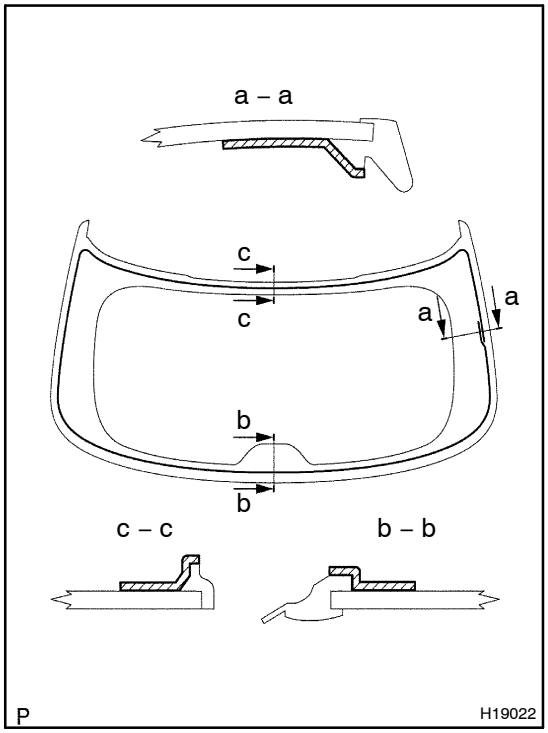


5. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat Primer M to the adhesive.**
- **Do not keep any of the opened Primer M for later use.**



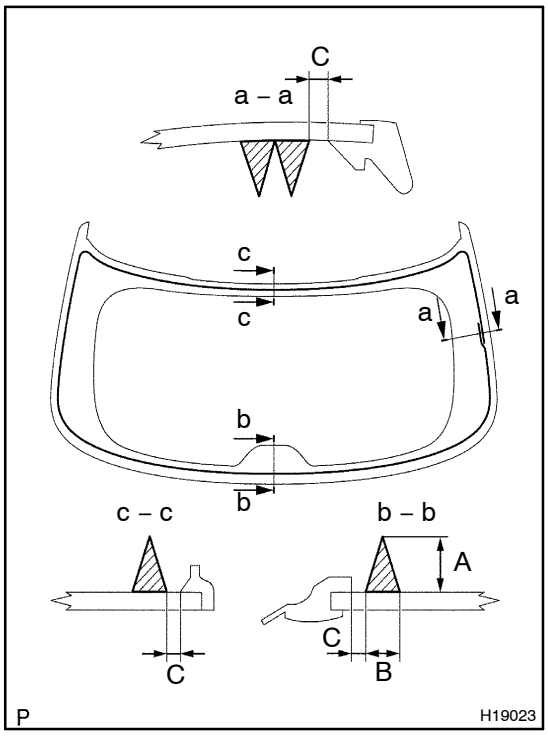
6. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G as shown in the illustration.

(b) When the primer is coated wrongly to the area other than the specified, wipe it off with a clean shop rag before the primer dries.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not keep any of the opened Primer G for later use.**



7. APPLY ADHESIVE

(a) Cut off the tip of the cartridge nozzle.
Part No. 08850–00801 or equivalent.

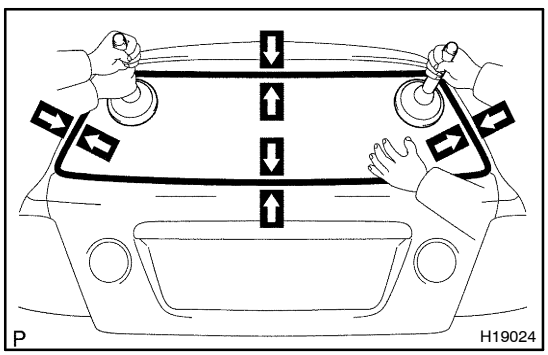
HINT:

After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35˚C (95˚F)	15 minutes
20˚C (68˚F)	100 minutes
5˚C (41˚F)	8 hours

(b) Load the cartridge into the sealer gun.

(c) Coat the glass with adhesive as shown in the illustration.
A: 12.0 mm (0.472 in.)
B: 8.0 mm (0.315 in.)
C: 3.0 mm (0.118 in.)

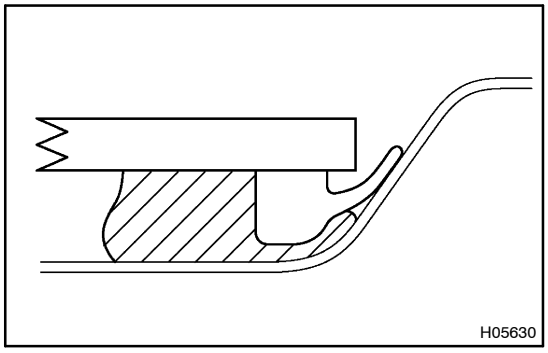


8. INSTALL GLASS

(a) Position the glass so that the reference marks are lined up, and press in gently along the rim.

(b) Using a spatula, apply adhesive on the glass rim.

(c) Use a scraper to remove any excess or protruding adhesive.



HINT:
Confirm that the moulding is attached to the body panel as shown in the illustration.

(d) Hold the back door glass in place securely with a protective tape or equivalent until the adhesive hardens.

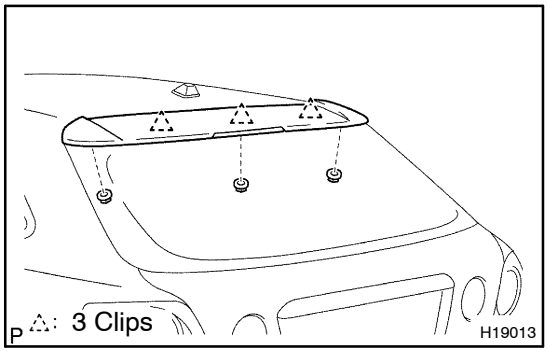
NOTICE:
Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35˚C (95˚F)	1.5 hours
20˚C (68˚F)	5 hours
5˚C (41˚F)	24 hours

9. INSPECT FOR LEAK AND REPAIR

(a) Conduct a leak test after the hardening time has elapsed.

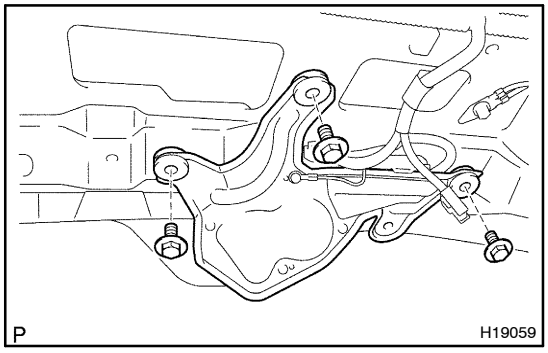
(b) Seal any leak with sealant.
Part No. 08833–00030 or equivalent.



10. INSTALL REAR SPOILER COVER

Install the rear spoiler cover with the 3 nuts.

11. INSTALL BACK DOOR OUTSIDE HANDLE

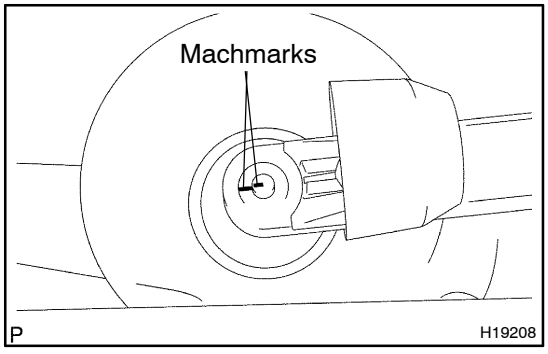


12. INSTALL REAR WIPER MOTOR

(a) Install the rear wiper motor with the 3 bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(b) Connect the connector.

(c) Install the nut and washer on the outer side of the back door panel.
Torque: 12 N·m (122 kgf·cm, 9 ft·lbf)



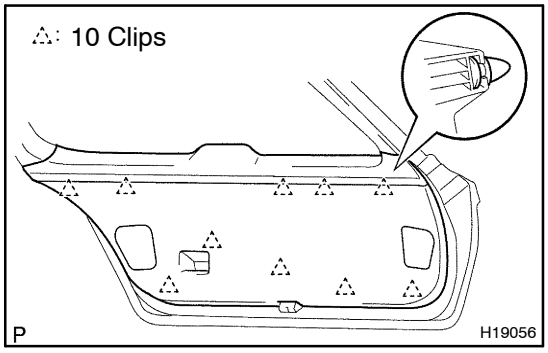
13. INSTALL REAR WIPER ARM

(a) Install the wiper arm and tighten the nut by hand. Operate the wiper once and turn the wiper switch OFF.

(b) Align the machmarks on the wiper arm and wiper motor.

(c) Install the rear wiper arm with the nut.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

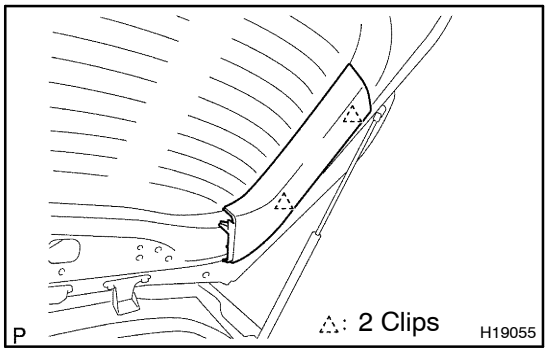
(d) Install the wiper arm cover.



14. INSTALL BACK DOOR TRIM BOARD

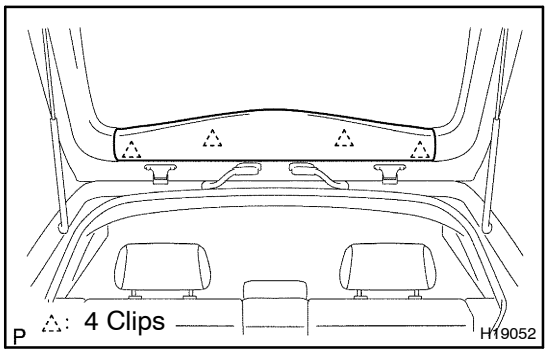
(a) Install the back door trim board to the back door panel.

(b) Install the back door handle with the clip.



15. INSTALL BACK DOOR TRIM COVERS

Install the trim cover to the body.



16. INSTALL BACK DOOR TRIM BOARD UPPER

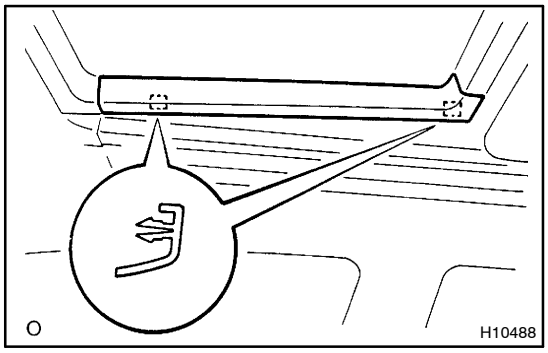
Install the back door trim board upper to the body.

SLIDING ROOF

BO4BZ–01

REMOVAL

1. **Sedan type:**
   REMOVE ROOF HEADLINING (See page BO–72)
2. **Wagon type:**
   REMOVE ROOF HEADLINING (See page BO–80)



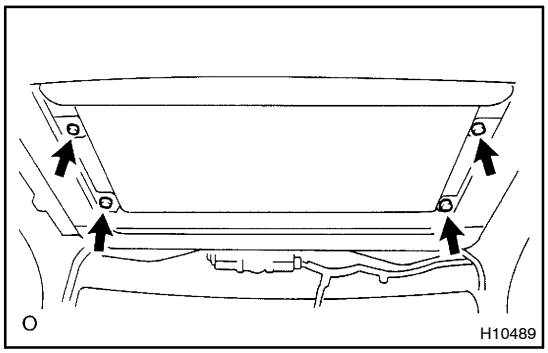
3. **REMOVE SLIDING ROOF SIDE GARNISH**

(a) Using a screwdriver, remove the garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



4. **REMOVE SLIDING ROOF GLASS ASSEMBLY**

(a) Using a torx wrench, remove the 4 nuts.

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

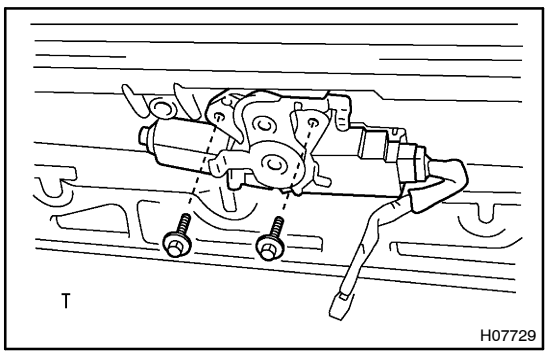
(b) Pull the glass upward to remove it.

5. **REMOVE SLIDING ROOF FRONT AND REAR GARNISHES**

Using a screwdriver, remove the front and rear garnishes.

HINT:

Tape the screwdriver tip before use.



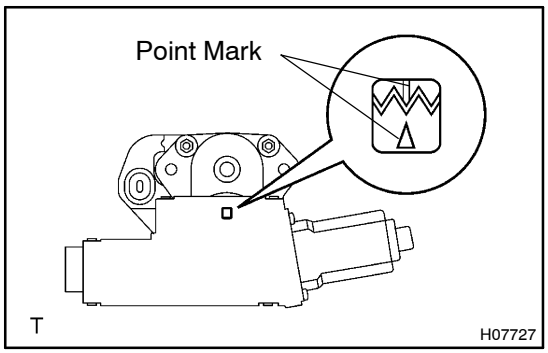
6. **REMOVE DRIVE GEAR**

NOTICE:

Remove the drive gear with the sliding roof fully closed.

(a) Disconnect the connector.

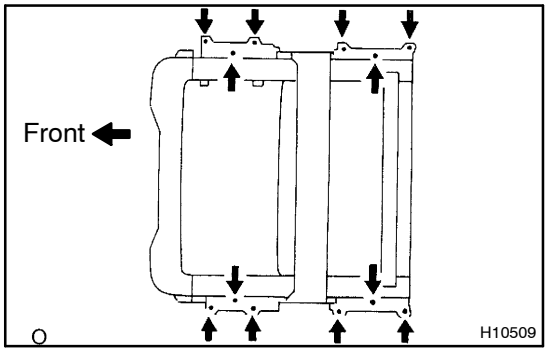
(b) Remove the 2 bolts and drive gear.



(c) Turn the drive gear to align the point marks as shown in the illustration.

NOTICE:

At the time of installation, please refer to the following item. If the sliding roof position and drive gear fully closed position are not matched, the sliding roof does not operate normally.



7. REMOVE SLIDING ROOF BRACKET

(a) Remove the 3 bolts and sliding roof bracket.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

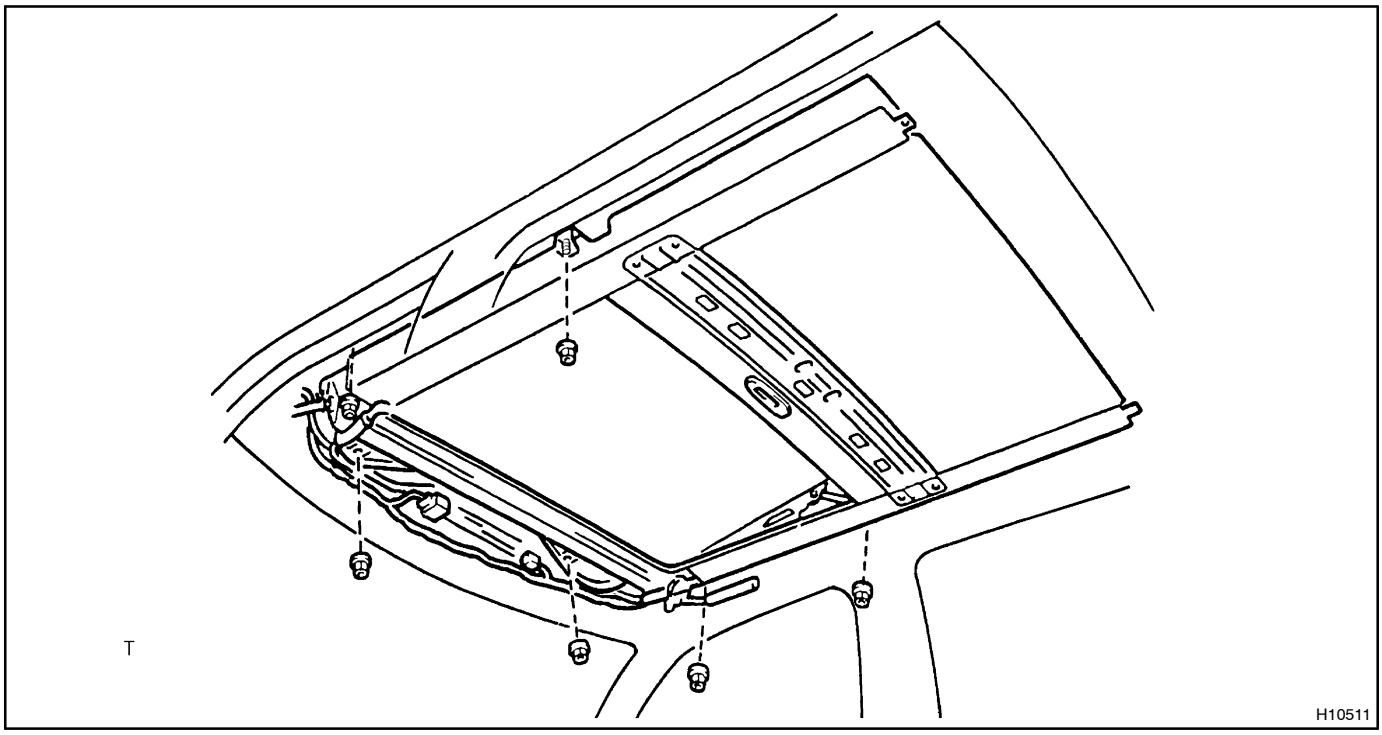
(b) Employ the same manner described above to the other sides.

8. REMOVE SLIDING ROOF HOUSING

(a) Disconnect the 4 drain hoses from the housing.

(b) Disengage the wire harness clamps.

(c) Remove the 6 nuts, then remove the housing as shown in the illustration.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



BO4C0–01

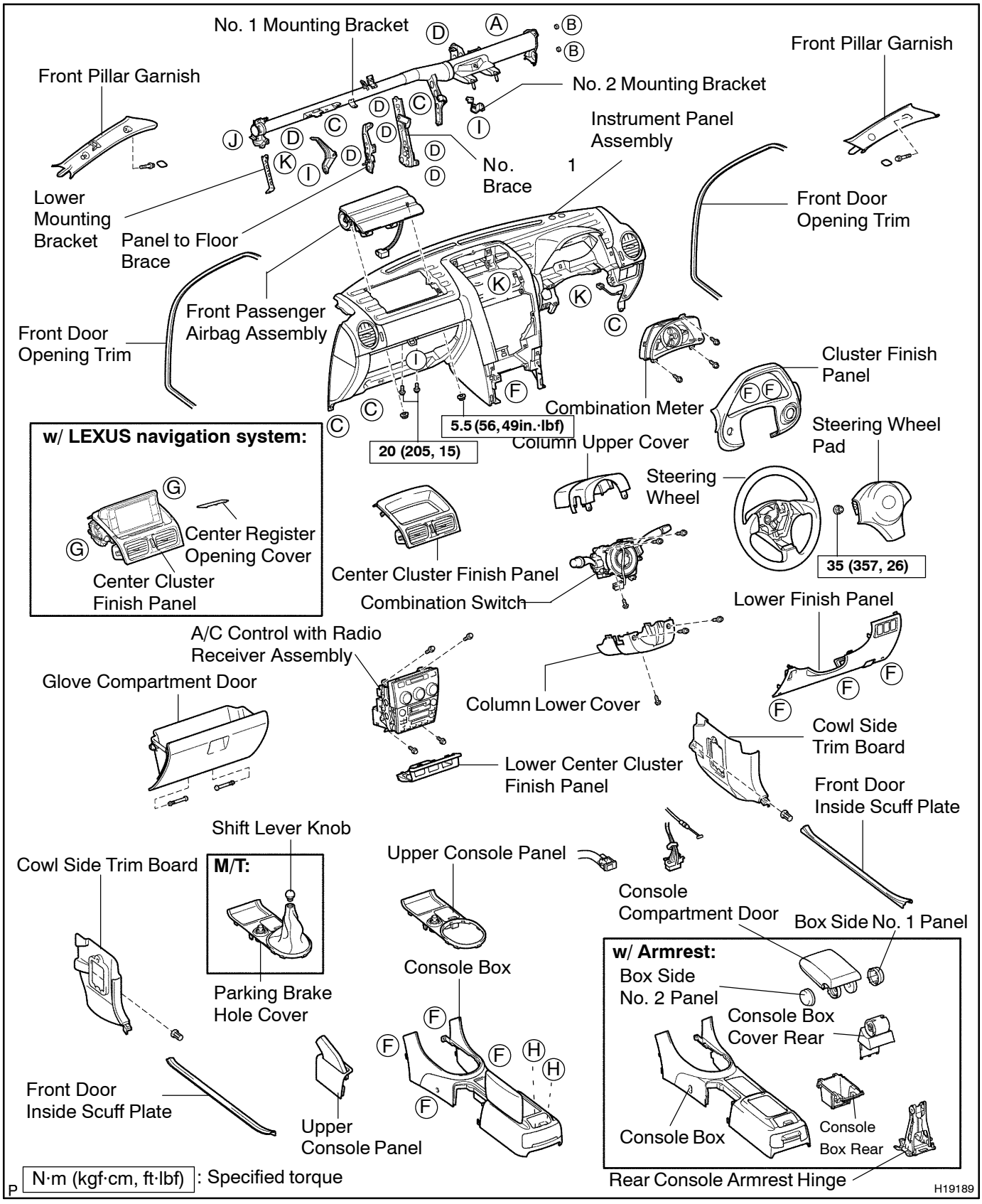
INSTALLATION

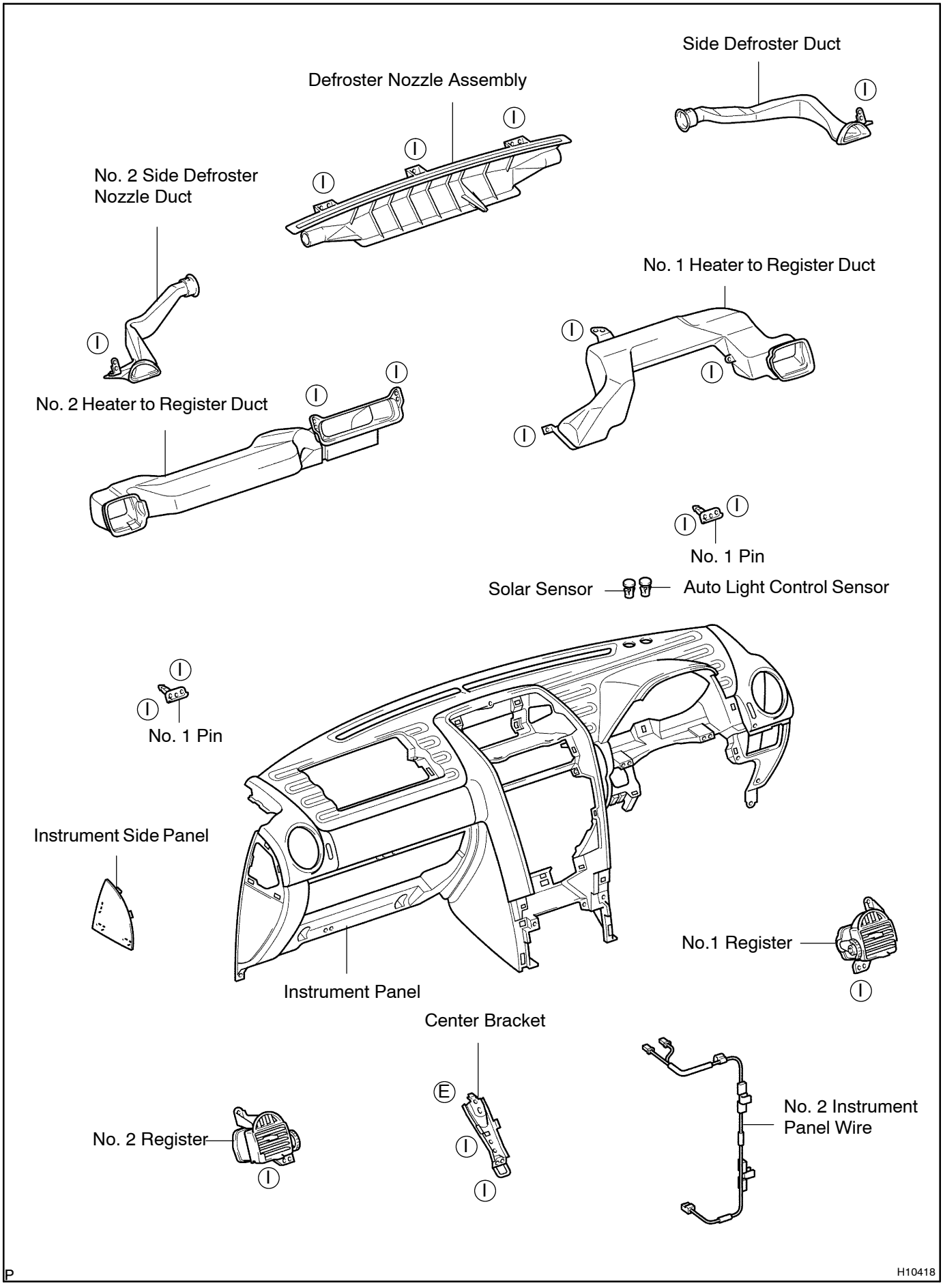
Installation is in the reverse order of removal (See page BO–55).

INSTRUMENT PANEL

COMPONENTS

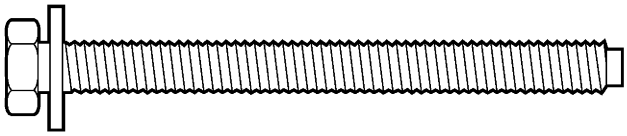
BO0WL–07

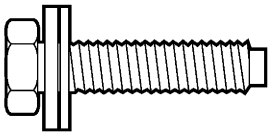
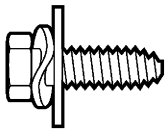


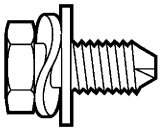
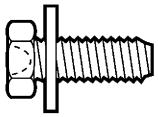
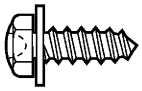
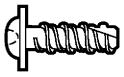
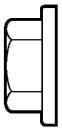
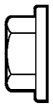

Side Defroster Duct
Defroster Nozzle Assembly
No. 2 Side Defroster Nozzle Duct
No. 1 Heater to Register Duct
No. 2 Heater to Register Duct
No. 1 Pin
Solar Sensor
Auto Light Control Sensor
No. 1 Pin
Instrument Side Panel
Instrument Panel
No.1 Register
Center Bracket
No. 2 Register
No. 2 Instrument Panel Wire
P
H10418

HINT:
Screw shapes and size are indicated in the table below. The codes (”A”–”K”) correspond to those indicated on the previous pages.

mm (in.)

code	Shape	Size
Ⓐ		ø = 8 (0.31) L = 90 (3.54)

code	Shape	Size	code	Shape	Size
Ⓑ		ø = 8 (0.31) L = 35 (1.38)	Ⓒ		ø = 6 (0.24) L = 20 (0.79)

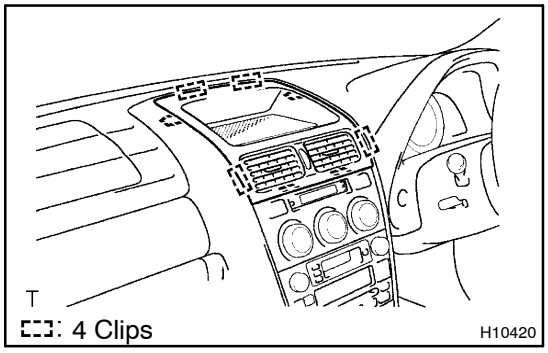
code	Shape	Size	code	Shape	Size	code	Shape	Size
Ⓓ		ø = 8 (0.31) L = 18 (0.71)	Ⓔ		ø = 6 (0.24) L = 18 (0.71)	Ⓕ		ø = 5.22 (0.2055) L = 16 (0.63)
Ⓖ		ø = 5 (0.20) L = 16 (0.63)	Ⓗ		ø = 5 (0.20) L = 16 (0.63)	Ⓘ		ø = 5 (0.20) L = 14 (0.55)
Ⓙ		ø = 8 (0.31)	Ⓚ		ø = 6 (0.24)			

T

H11337

BO4C1–01

REMOVAL



1. REMOVE CENTER CLUSTER FINISH PANEL

(a) w/ LEXUS navigation system:
Using a screwdriver, remove center register opening cover.

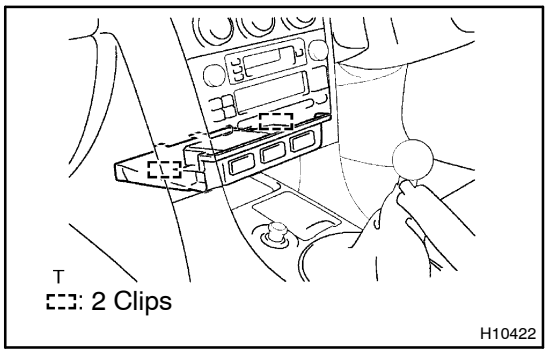
HINT:
Tape the screwdriver tip before use.

(b) w/ LEXUS navigation system:
Remove the 2 screws.

(c) Using a screwdriver, remove center cluster finish panel.

HINT:
Tape the screwdriver tip before use.

(d) w/ LEXUS navigation system:
Disconnect the connectors.

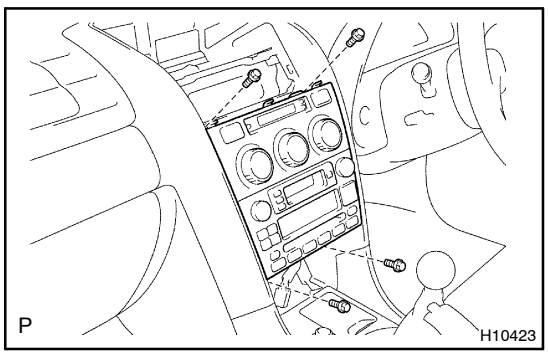


2. REMOVE LOWER CENTER CLUSTER FINISH PANEL

(a) Using a screwdriver, remove the lower center cluster finish panel.

HINT:
Tape the screwdriver tip before use.

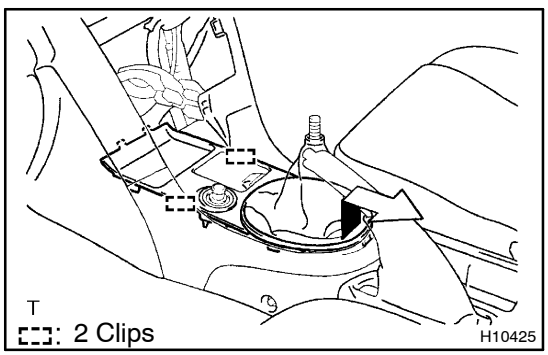
(b) Disconnect the connectors.



3. REMOVE A/C CONTROL WITH RADIO RECEIVER ASSEMBLY

(a) Remove the 4 bolts and the A/C control with radio receiver assembly.

(b) Disconnect the connectors.



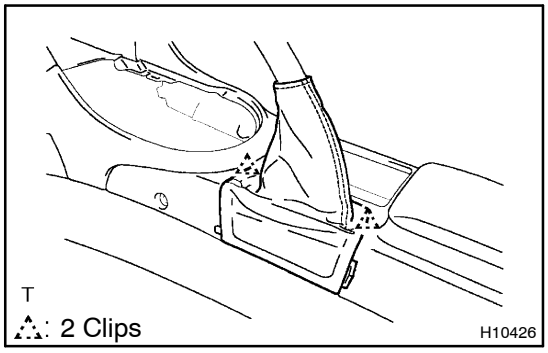
4. REMOVE UPPER CONSOLE PANEL

(a) M/T:
Remove the shift lever knob.

(b) Using a screwdriver, remove the upper console panel as shown in the illustration.

HINT:
Tape the screwdriver tip before use.

(c) Disconnect the connector.

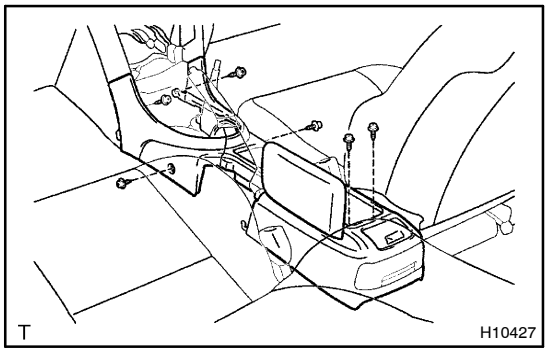


5. REMOVE PARKING BRAKE HOLE COVER

Using a screwdriver, remove the parking brake hole cover.

HINT:

Tape the screwdriver tip before use.

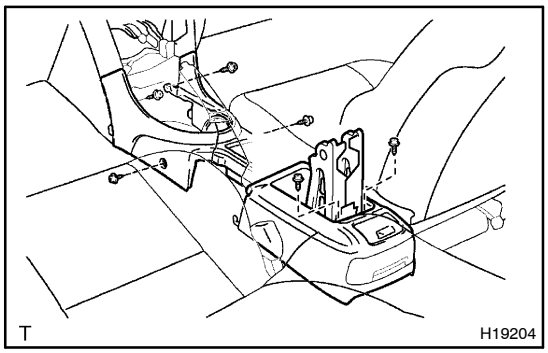


6. w/o Arm rest:
REMOVE CONSOLE BOX

(a) Remove the 6 screws.

(b) w/o LEXUS navigation system:
Pull the console box rearward to remove it.

(c) w/ LEXUS navigation system:
Pull the console box rearward to remove it then disconnect the connector.



7. w/ Arm rest:
REMOVE CONSOLE BOX

(a) Using a screwdriver, remove the box side No. 1 and No. 2 panel.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 bolts and console compartment door.

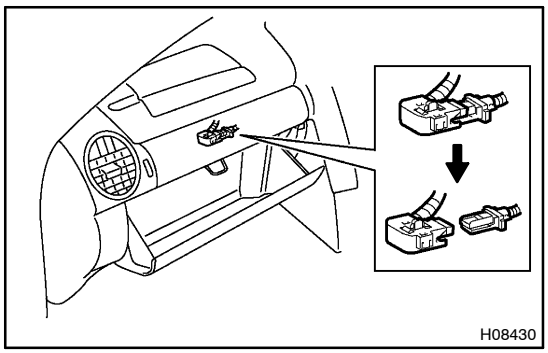
(c) Remove the console box cover rear.

(d) Remove the 6 screws.

(e) w/o LEXUS navigation system:
Pull the console box rearward to remove it.

(f) w/ LEXUS navigation system:
Pull the console box rearward to remove it then disconnect the connector.

(g) Remove the 4 bolts and rear console armrest hinge.



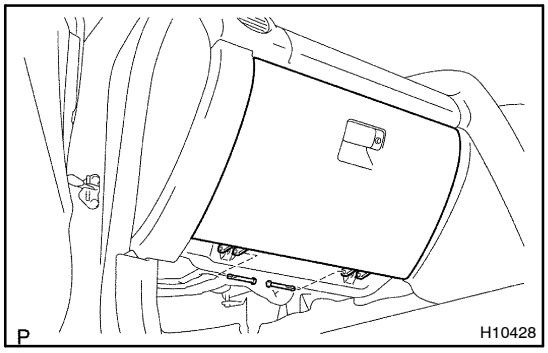
8. DISCONNECT PASSENGER AIRBAG CONNECTOR

(a) Using a clip remover, disengage the connector clamp.

(b) Disconnect the passenger airbag connector.

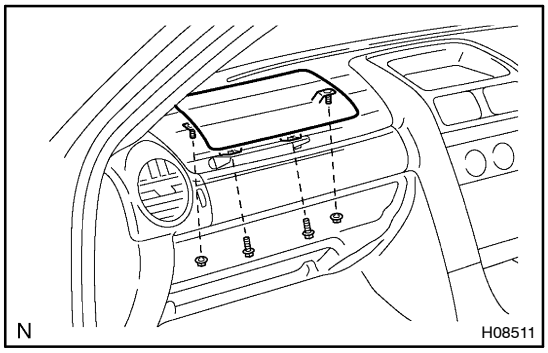
NOTICE:

When disconnecting the airbag connector, take care not to damage the airbag wire harness.



9. REMOVE GLOVE COMPARTMENT DOOR

Disconnect the hinge shaft and remove the glove compartment door.



10. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

Remove the 2 bolts, 2 nuts and the front passenger airbag assembly from the instrument panel.

Torque:
20 N·m (205 kgf·cm, 15 ft·lbf.) for bolt
5.5 N·m (56 kgf·cm, 49 in.·lbf) for nut

CAUTION:

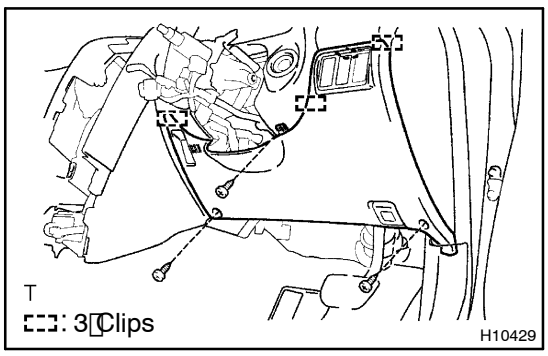
- **Do not store the front passenger airbag assembly with the airbag deployment side facing downward.**
- **Never disassemble the front passenger airbag assembly.**

11. REMOVE STEERING WHEEL PAD (See page SR–8)

12. REMOVE STEERING WHEEL (See page SR–8)

13. REMOVE COLUMN UPPER AND LOWER COVERS (See page SR–8)

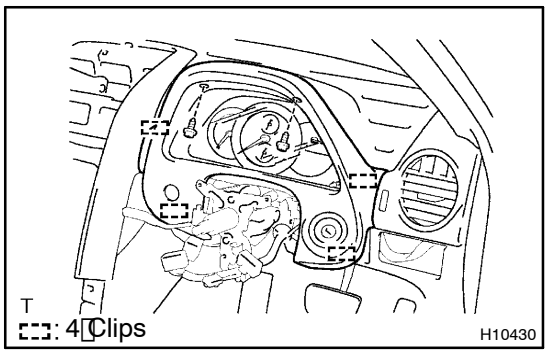
14. REMOVE SPIRAL CABLE (See page SR–8)



15. REMOVE LOWER FINISH PANEL

(a) Remove the 3 screws and lower finish panel.

(b) Disconnect the connectors and hood lock control cable.



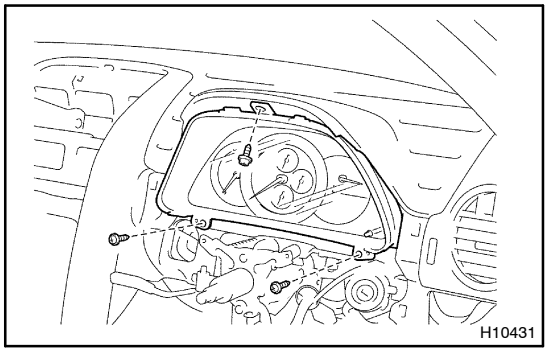
16. REMOVE CLUSTER FINISH PANEL

(a) Remove the 2 screws.

(b) Using a screwdriver, remove the cluster finish panel.

HINT:

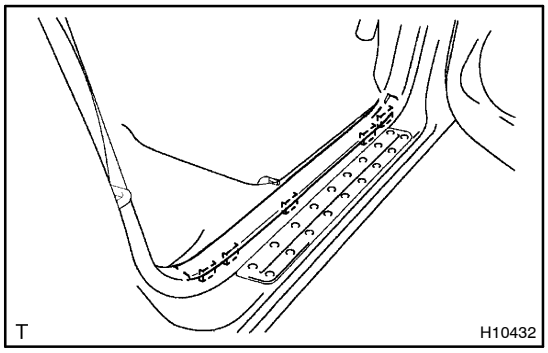
Tape the screwdriver tip before use.



17. REMOVE COMBINATION METER

(a) Remove the 3 screws and combination meter.

(b) Disconnect the connector.



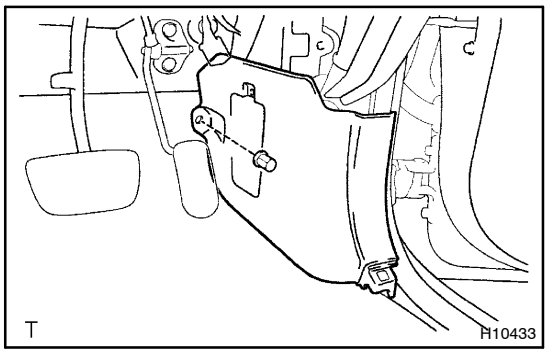
18. REMOVE FRONT DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the front door inside scuff plate.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



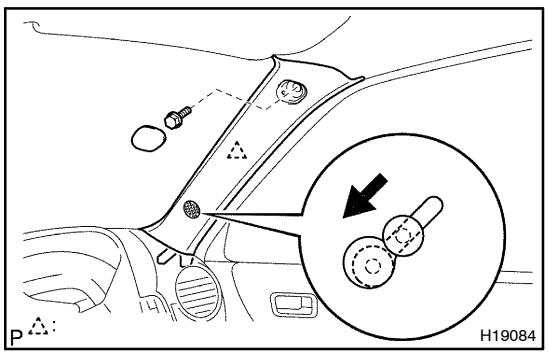
19. REMOVE COWL SIDE TRIM BOARD

(a) Remove the clip.

(b) Pull the cowl side trim board rearward to remove it.

(c) Employ the same manner described above to the other side.

20. REMOVE FRONT PART OF FRONT DOOR OPENING TRIMS



21. REMOVE FRONT PILLAR GARNISH

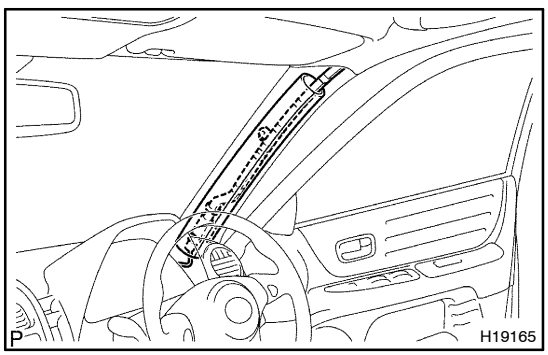
(a) Using a screwdriver, remove the front pillar garnish cover.

HINT:

Tape the screwdriver tip before use.

(b) Remove the bolt.

(c) Using a screwdriver, remove the front pillar garnish.



(d) Remove the bolt.

Torque: 9.8 N·m (100 kgf·cm, 87 in.·lbf)

(e) Pack the airbag with protection cover.

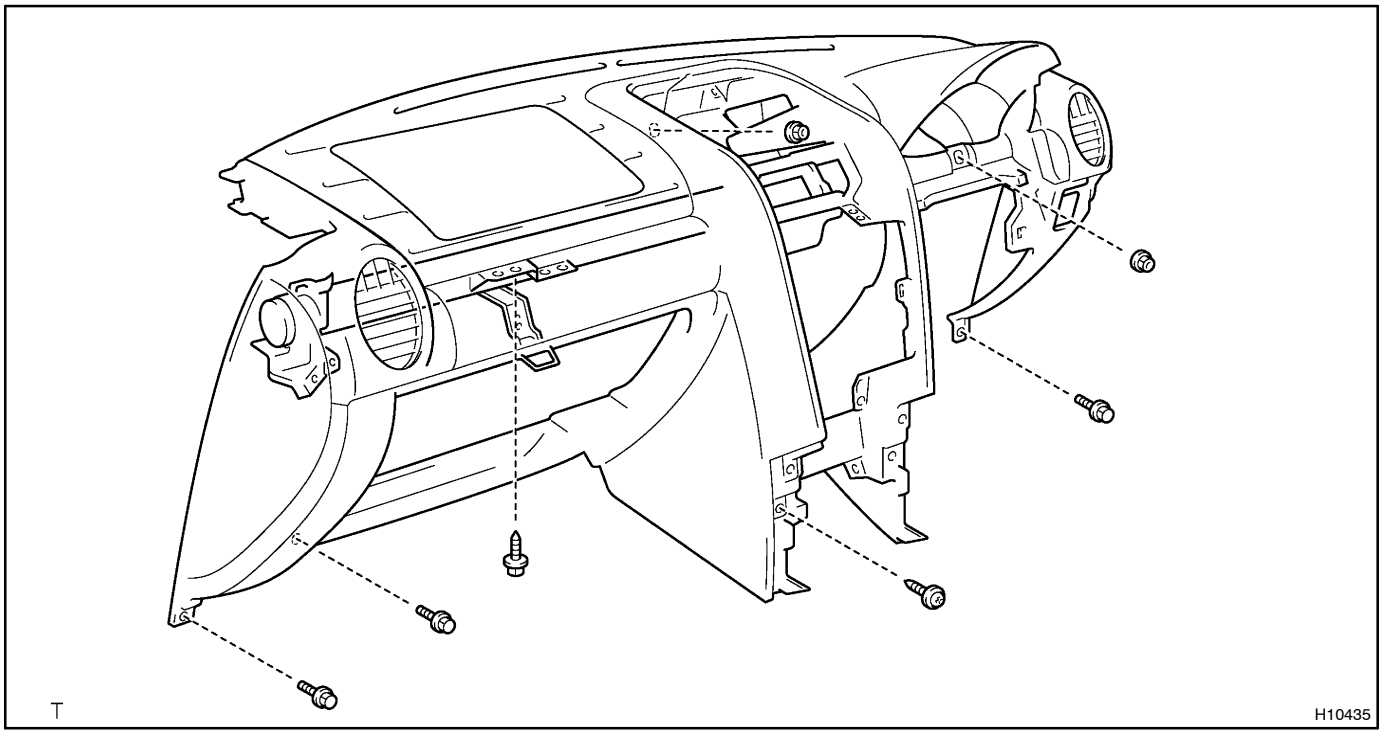
(f) Employ the same manner described above to the other side.

22. REMOVE INSTRUMENT PANEL

(a) Disconnect the connectors.
(b) Disengage the wire harness clamps.
(c) Remove the 3 bolts, 2 screws and 2 nuts.
(d) Pull the instrument panel rearward to remove it.

NOTICE:

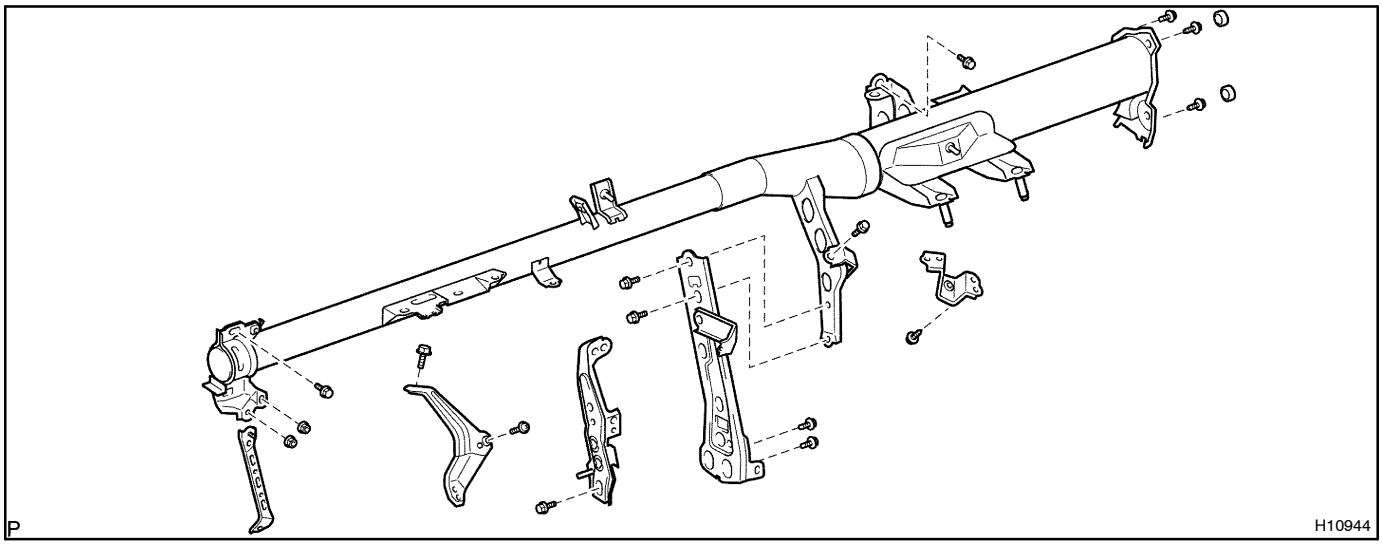
Be careful not to damage the instrument panel and wire harness.



23. REMOVE INSTRUMENT PANEL REINFORCEMENT

(a) Disengage the wire harness clamps.
(b) Remove the 2 nuts and wire harness from the reinforcement.
(c) Remove the bolt and ground cable.
(d) Remove the bolt, screw and No. 1 mounting bracket.
(e) Remove the bolt and panel to floor brace LH.
(f) Remove the bolt and No. 2 mounting bracket.
(g) Remove the 4 bolts and No.1 brace.
(h) Remove the 5 bolts, 2 nuts, instrument panel reinforcement and lower mounting bracket.

NOTICE:
Be careful not to damage the body and wire harness.



BO0WP–03

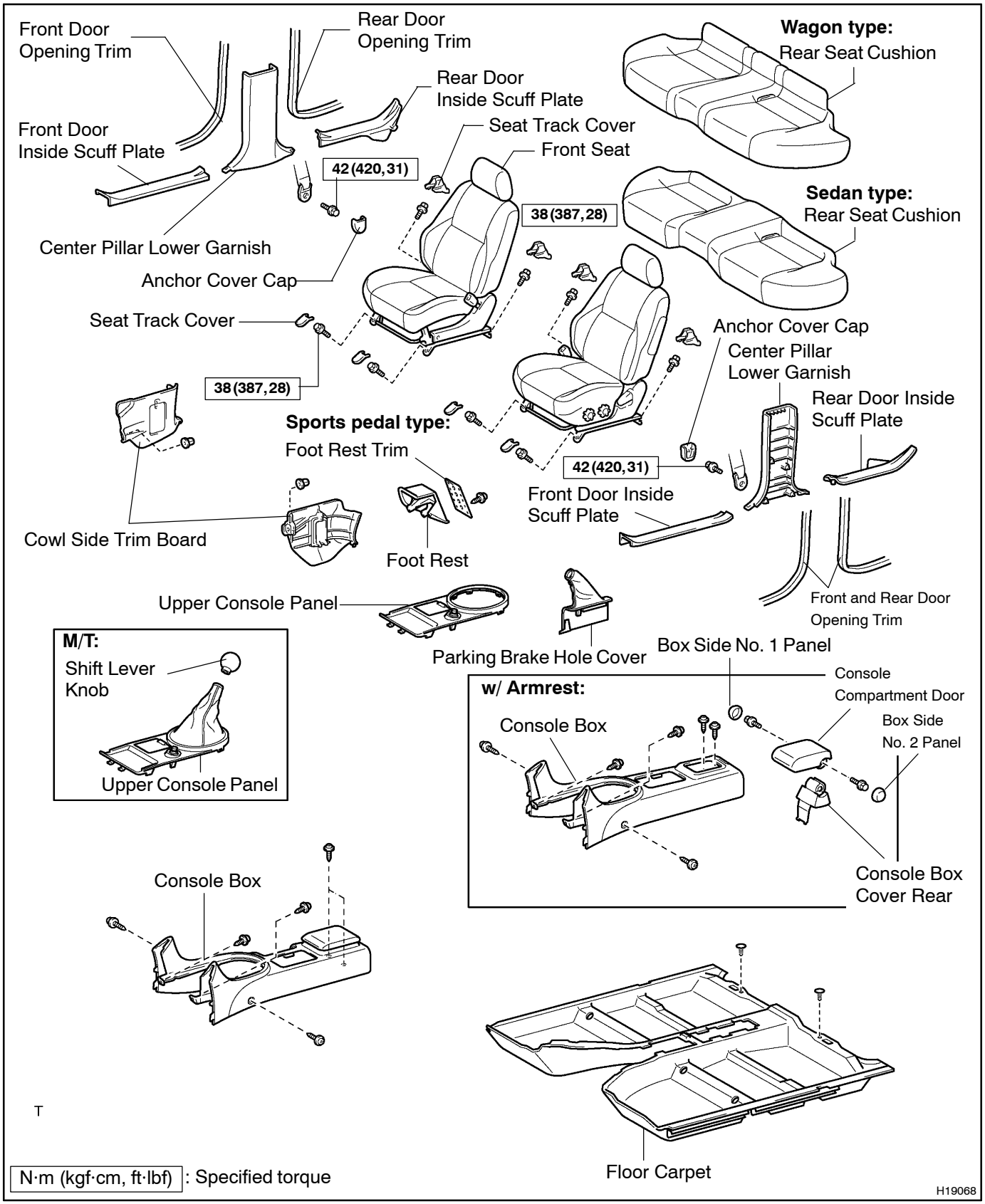
INSTALLATION

Installation is in the reverse order of removal (See page BO–59).

FLOOR CARPET

COMPONENTS

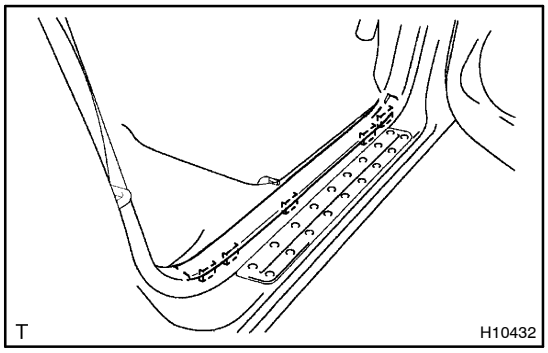
BO4C2–01



BO4C3–01

REMOVAL

1. **REMOVE FRONT SEAT**
(See page BO–89 and BO–101)
2. **Sedan type:**
REMOVE REAR SEAT CUSHION
(See Pub. No. RM 684E on page BO–142)
3. **Wagon type:**
REMOVE REAR SEAT CUSHION (See page BO–112)



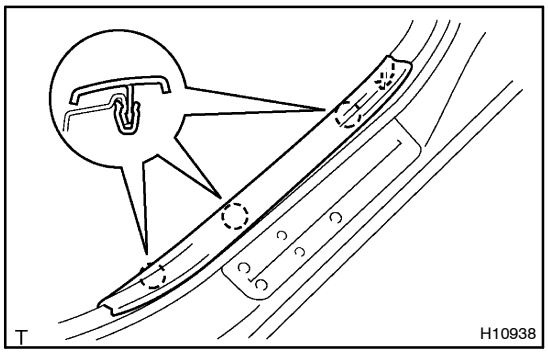
4. **REMOVE FRONT DOOR INSIDE SCUFF PLATE**

(a) Using a screwdriver, remove the front door inside scuff plate.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



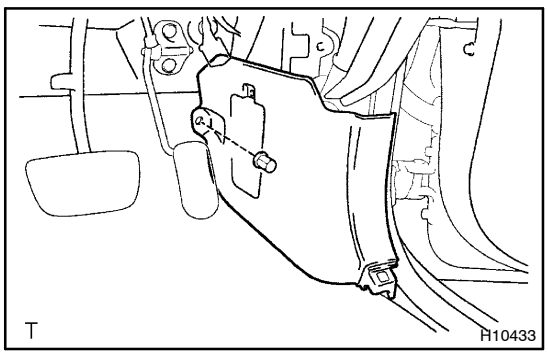
5. **REMOVE REAR DOOR INSIDE SCUFF PLATE**

(a) Using a screwdriver, remove the rear door inside scuff plate.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



6. **REMOVE COWL SIDE TRIM BOARD**

(a) Remove the clip and cowl side trim board.

(b) Employ the same manner described above to the other side.

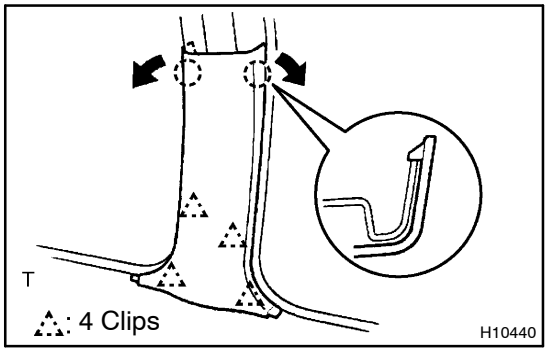
7. **REMOVE FRONT DOOR OPENING TRIMS**
8. **REMOVE REAR DOOR OPENING TRIMS**
9. **REMOVE FRONT SEAT OUTER BELT FLOOR ANCHORS**

(a) Using a screwdriver, remove the floor anchor cover caps.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 bolts and floor anchors.
Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

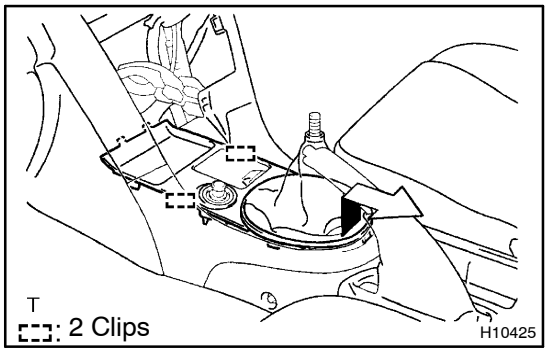


10. REMOVE CENTER PILLAR LOWER GARNISH

(a) Remove the center pillar lower garnish as shown in the illustration.

(b) Employ the same manner described above to the other side.

11. M/T:
REMOVE SHIFT LEVER KNOB



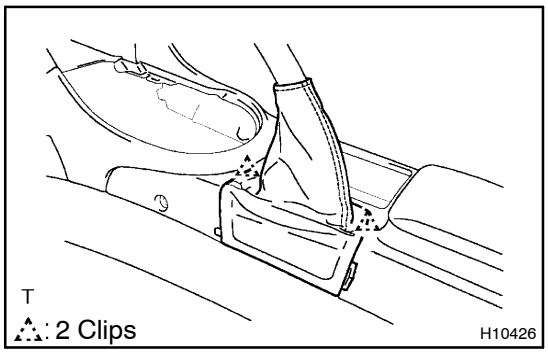
12. REMOVE UPPER CONSOLE PANEL

(a) Using a screwdriver, remove the upper console panel.

HINT:

Tape the screwdriver tip before use.

(b) Disconnect the connector.

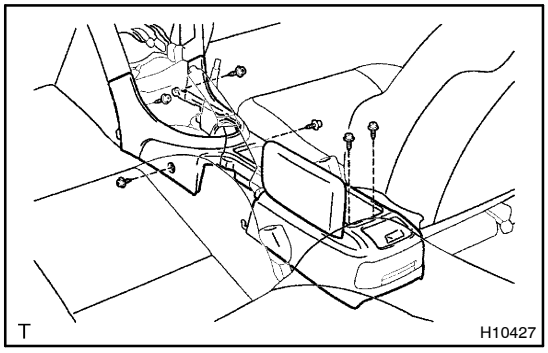


13. REMOVE PARKING BRAKE HOLE COVER

Using a screwdriver, remove the parking brake hole cover.

HINT:

Tape the screwdriver tip before use.

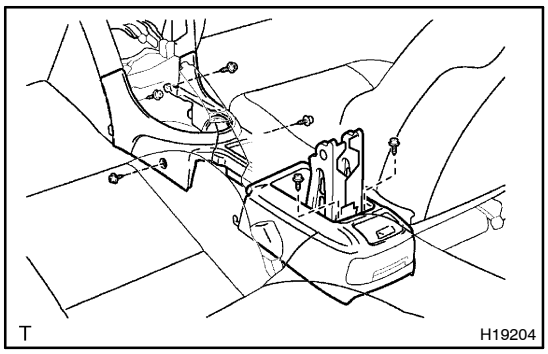


14. w/o Arm rest:
REMOVE CONSOLE BOX

(a) Remove the 6 screws.

(b) w/o LEXUS navigation system:
Pull the console box rearward to remove it.

(c) w/ LEXUS navigation system:
Pull the console box rearward to remove it then disconnect the connector.



15. w/ Arm rest:
REMOVE CONSOLE BOX

(a) Using a screwdriver, remove the box side No.1 and No.2 panels.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 bolts and console compartment door.

(c) Remove the console box cover rear.

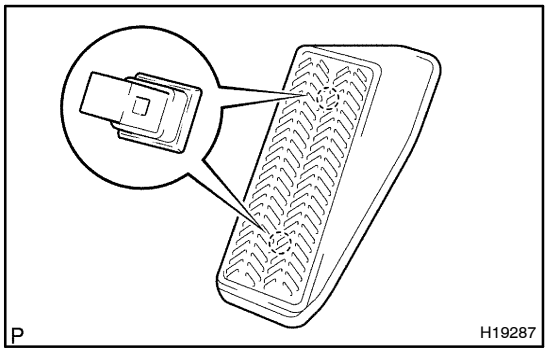
(d) Remove the 6 screws.

(e) w/o LEXUS navigation system:
Pull the console box rearward to remove it.

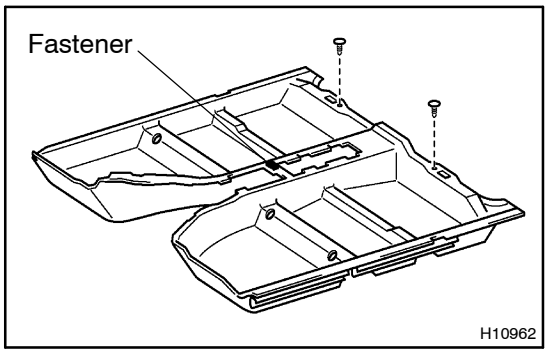
(f) w/ LEXUS navigation system:
Pull the console box rearward to remove it then disconnect the connector.

16. REMOVE FOOT REST

(a) Sports pedal type:
Remove the 4 screws and foot rest trim.



(b) Using a screwdriver, remove the foot rest.



17. REMOVE FLOOR CARPET

(a) Peel off the fastener.

(b) Remove the 2 clips.

(c) Disengage the hooks and remove the floor carpet.

NOTICE:

Be careful not to pull the wire harness.

HINT:

At the time of installation, please refer to the following items.

- When installing the floor mat, pull out the wire harness and levers through the cutout of the floor carpet.
- There should be no wrinkles or folds after attaching the floor carpet.

BO4C4–01

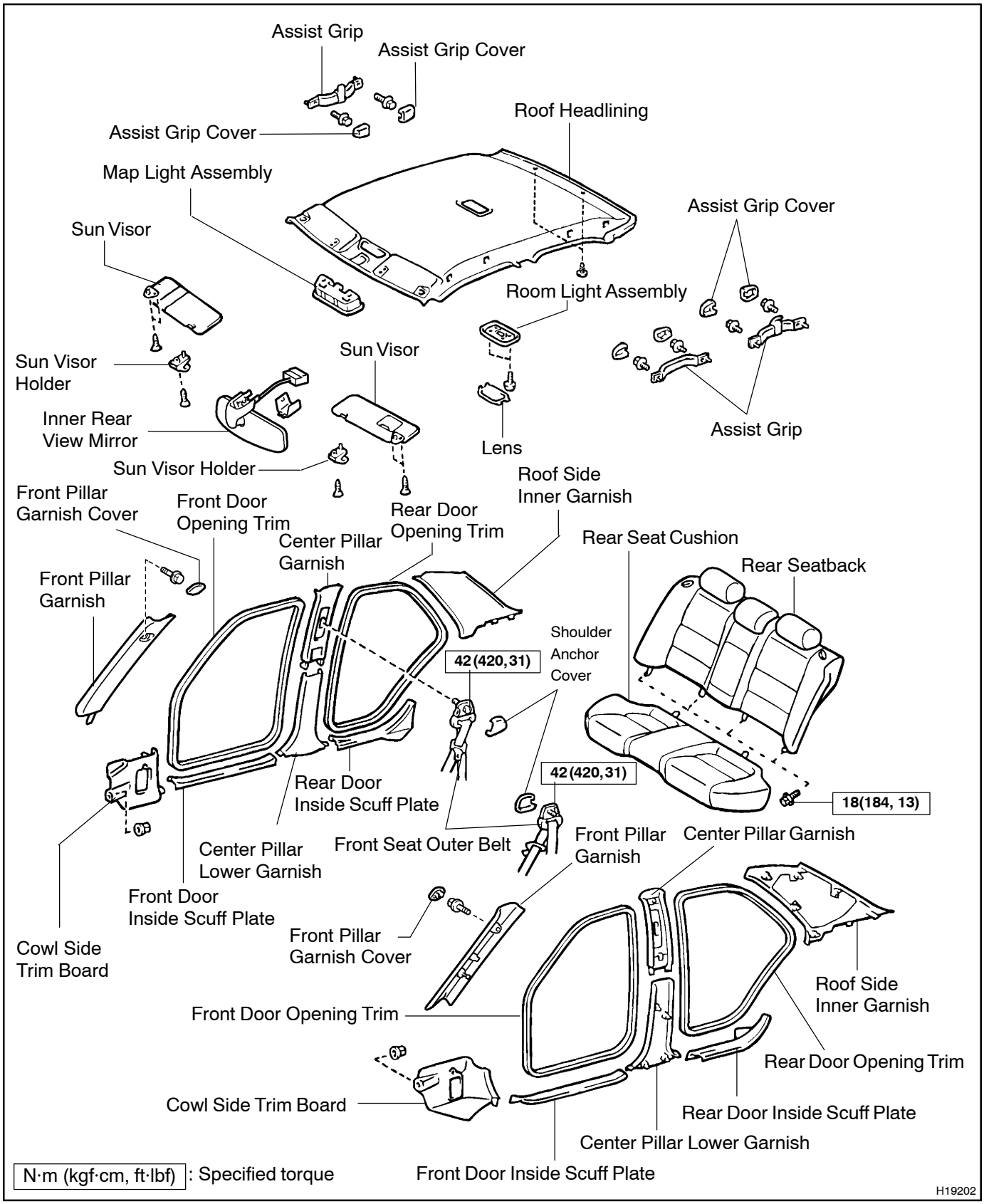
INSTALLATION

Installation is in the reverse order of removal (See page BO–67).

ROOF HEADLINING (Sedan)

BO4C5–01

COMPONENTS

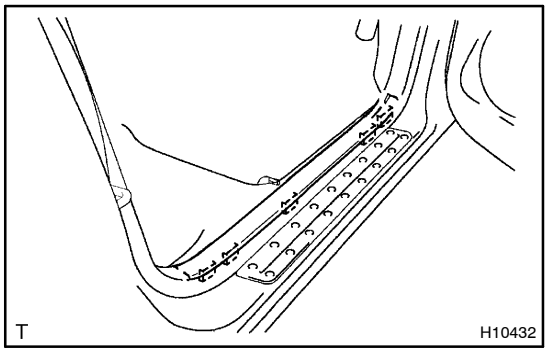


BO4C6–01

REMOVAL

1. REMOVE REAR SEAT CUSHION
(See Pub. No. RM684E BO section)

2. REMOVE REAR SEATBACK
(See Pub. No. RM684E BO section)



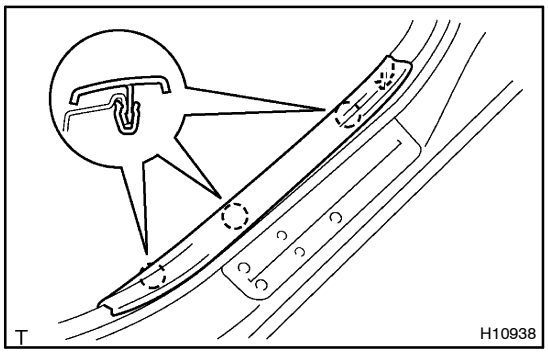
3. REMOVE FRONT DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the front door inside scuff plate as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



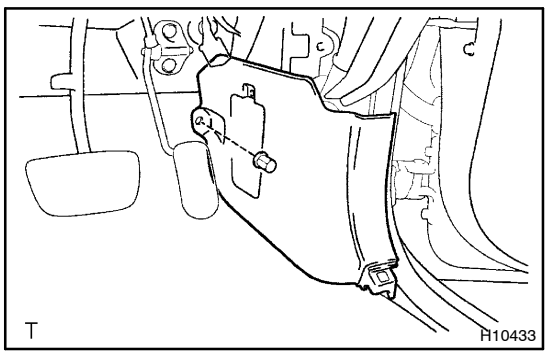
4. REMOVE REAR DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the rear door inside scuff plate as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



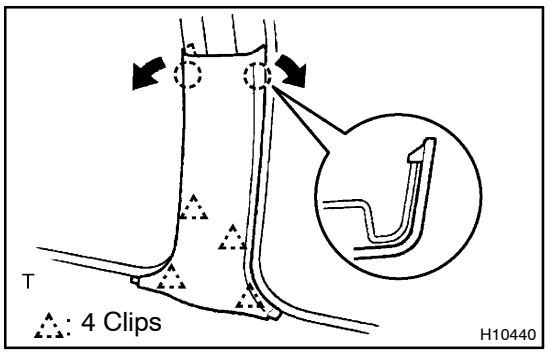
5. REMOVE COWL SIDE TRIM BOARD

(a) Remove the clip and cowl side trim board.

(b) Employ the same manner described above to the other side.

6. REMOVE FRONT DOOR OPENING TRIMS

7. REMOVE REAR DOOR OPENING TRIMS



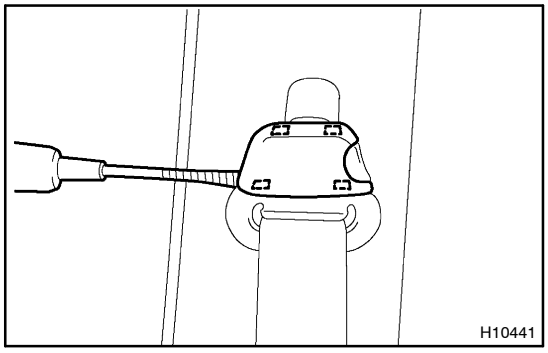
8. REMOVE CENTER PILLAR LOWER GARNISH

(a) Using a screwdriver, remove the center pillar lower garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



9. REMOVE FRONT SEAT OUTER BELT SHOULDER ANCHOR

(a) Using a screwdriver, remove the anchor cap.

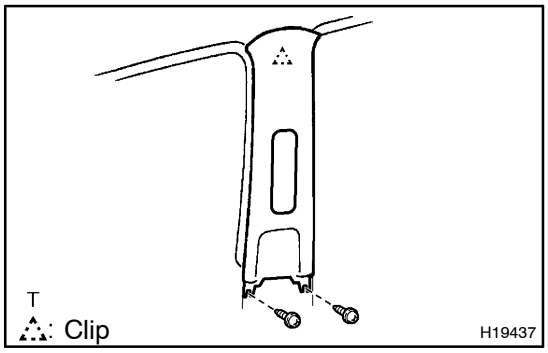
HINT:

Tape the screwdriver tip before use.

(b) Remove the bolt and front seat outer belt shoulder anchor.

Torque: 42 N·m (428 kgf·cm, 31 ft·lbf)

(c) Employ the same manner described above to the other side.



10. REMOVE CENTER PILLAR GARNISH

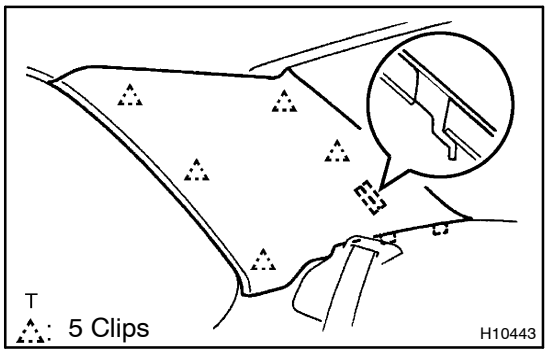
(a) Remove the 2 screws.

(b) Using a screwdriver, remove the center pillar garnish.

HINT:

Tape the screwdriver tip before use.

(c) Employ the same manner described above to the other side.



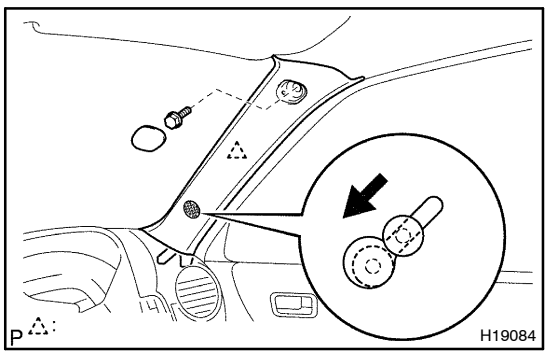
11. REMOVE ROOF SIDE INNER GARNISH

(a) Using a screwdriver, remove the roof side inner garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



12. REMOVE FRONT PILLAR GARNISH

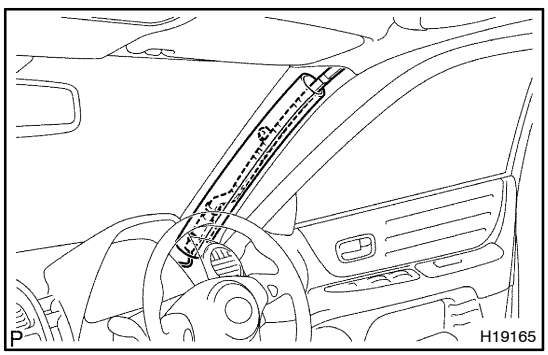
(a) Using a screwdriver, remove the front pillar garnish cover.

HINT:

Tape the screwdriver tip before use.

(b) Remove the bolt.

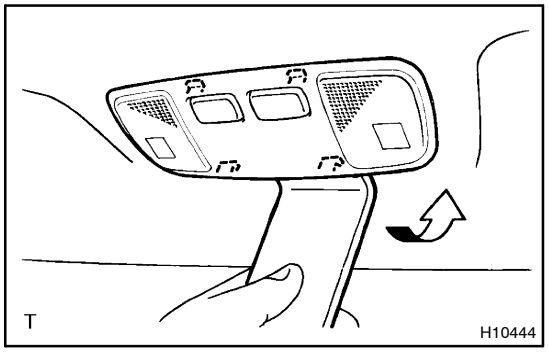
(c) Using a screwdriver, remove the front pillar garnish.



(d) Remove the bolt.

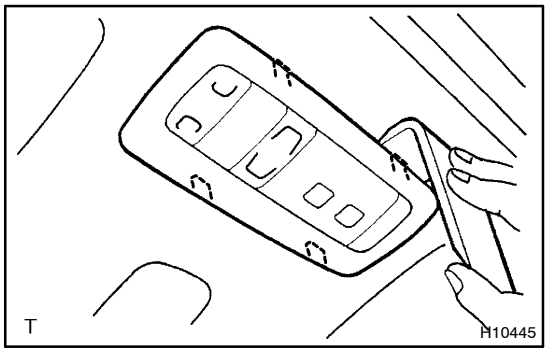
(e) Pack the airbag with protection cover.

(f) Employ the same manner described above to the other side.



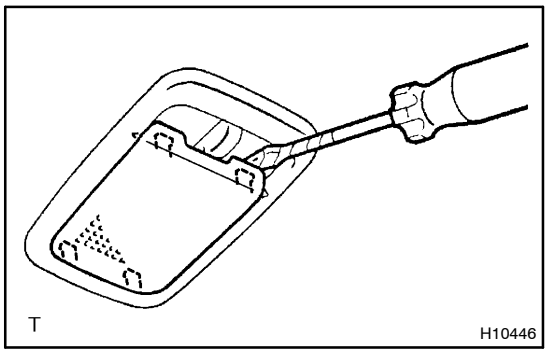
13. w/o Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a moulding remover, remove the lens.
(b) Remove the 2 screws and the map light assembly.
(c) Disconnect the connector.



14. w/ Sliding roof:
REMOVE MAP LIGHT ASSEMBLY

(a) Using a moulding remover, remove the cover.
(b) Remove the 2 screws and the the map light assembly.
(c) Disconnect the connector.



15. REMOVE ROOM LIGHT ASSEMBLY

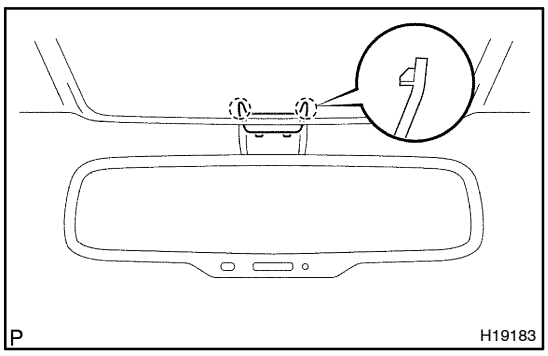
(a) Using a screwdriver, remove the lens.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 screws and the room light assembly.
(c) Disconnect the connector.

16. w/ Sliding roof:
REMOVE ROOF OPENING TRIM

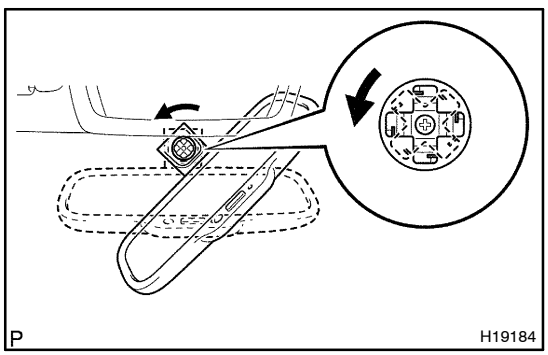


17. REMOVE INNER REAR VIEW MIRROR

(a) Using a screwdriver, remove the inner rear view mirror stay holder cover.

HINT:

Tape the screwdriver tip before use.



(b) Electro chromic inner mirror:
Disconnect the connector.
(c) Remove the mirror assembly by turning the stay part of the mirror counterclockwise.

18. REMOVE ASSIST GRIPS

(a) Using a screwdriver, remove the caps.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 6 bolts and 3 assist grips.

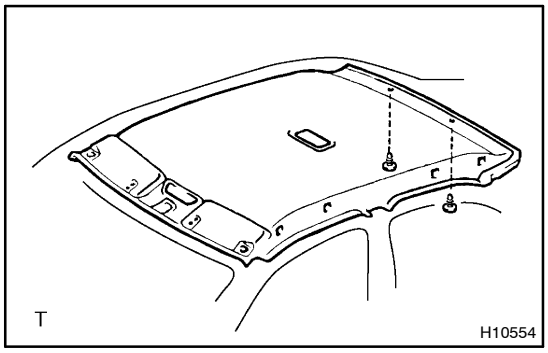
19. REMOVE SUN VISORS

(a) Remove the 4 screws and pull the sun visors downward.

(b) Disconnect the connectors.

20. REMOVE SUN VISOR HOLDERS

Remove the 2 screws and 2 holders.



21. REMOVE ROOF HEADLINING

(a) Remove the 2 clips.

(b) Pull the roof headlining downward to remove it.

BO4C7–01

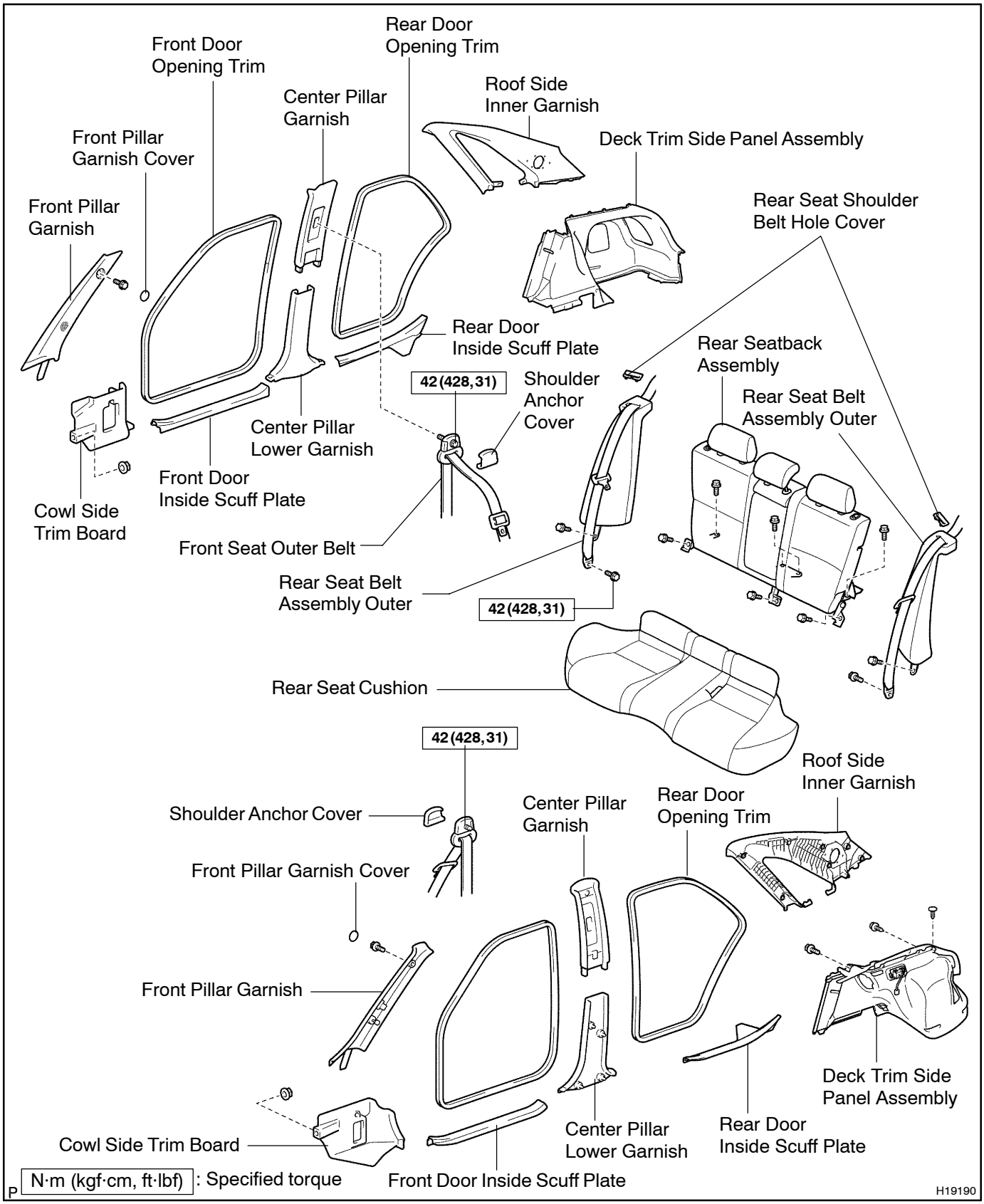
INSTALLATION

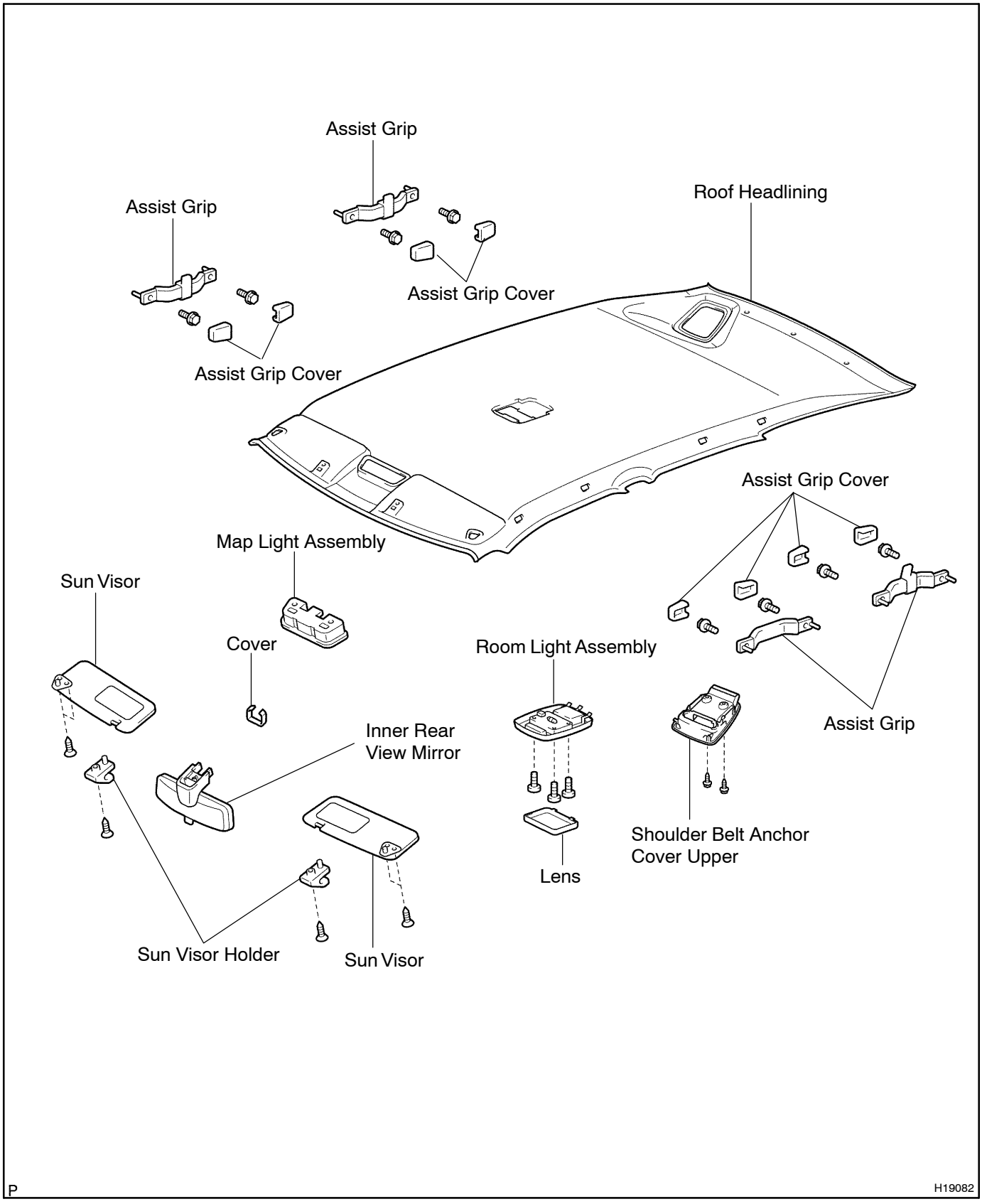
Installation is in the reverse order of removal (See page BO–72).

ROOF HEADLINING (Wagon)

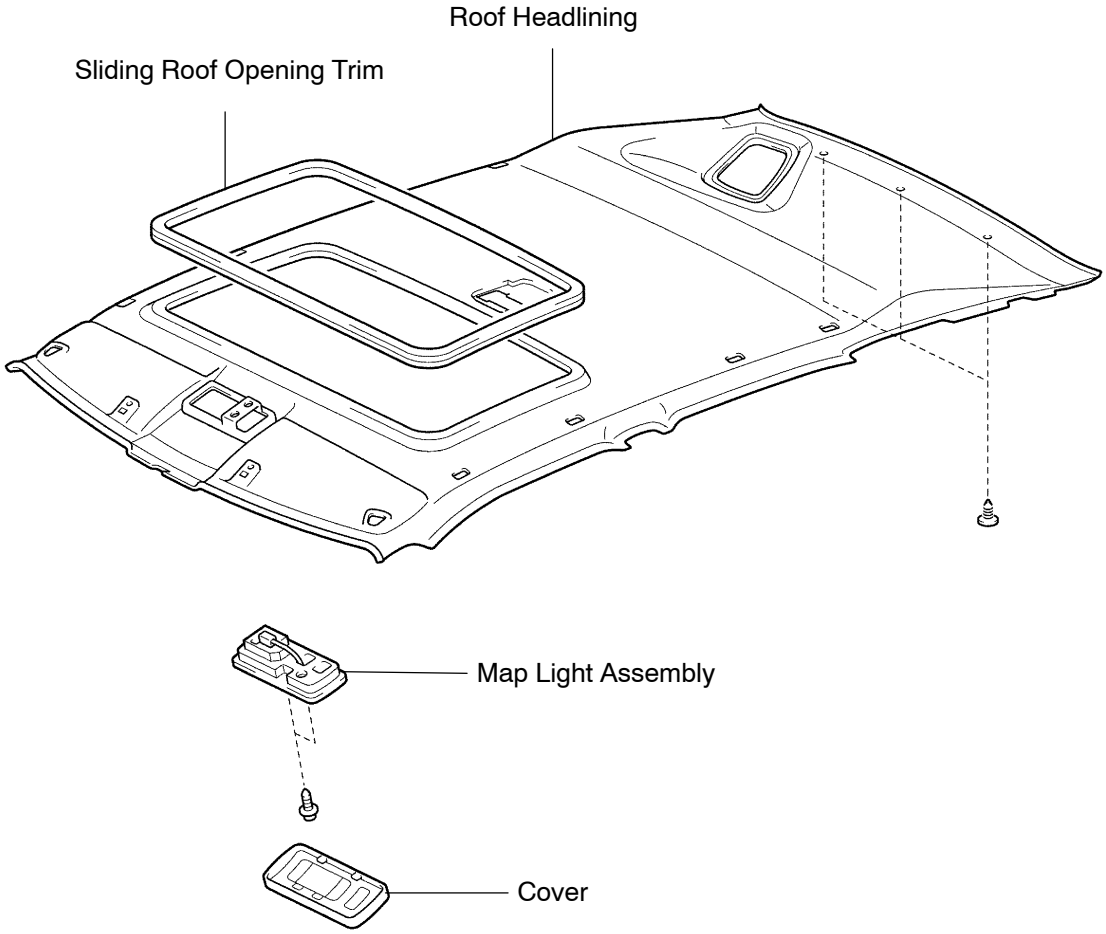
COMPONENTS

BO4C8–01




Assist Grip
Assist Grip
Assist Grip Cover
Roof Headlining
Assist Grip Cover
Assist Grip Cover
Map Light Assembly
Sun Visor
Cover
Room Light Assembly
Inner Rear
View Mirror
Assist Grip
Shoulder Belt Anchor
Cover Upper
Lens
Sun Visor Holder
Sun Visor
P
H19082

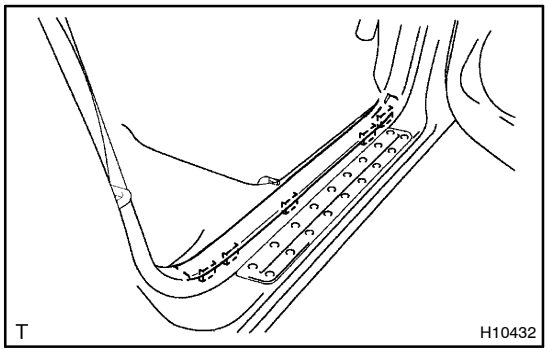
w/ Sliding roof:



BO4C9–01

REMOVAL

1. REMOVE REAR SEAT CUSHION (See page BO–112)
2. REMOVE SIDE SEATBACK (See page BO–112)



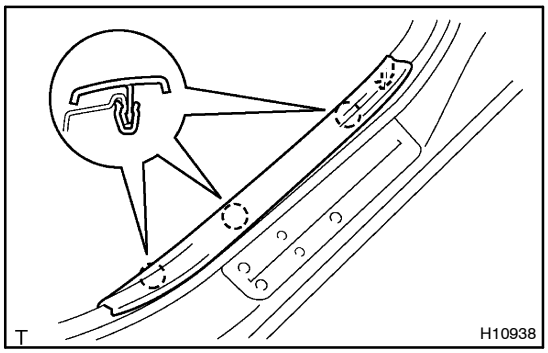
3. REMOVE FRONT DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the front door inside scuff plate as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



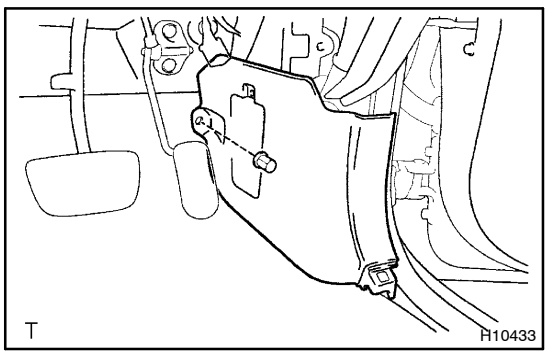
4. REMOVE REAR DOOR INSIDE SCUFF PLATE

(a) Using a screwdriver, remove the rear door inside scuff plate as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



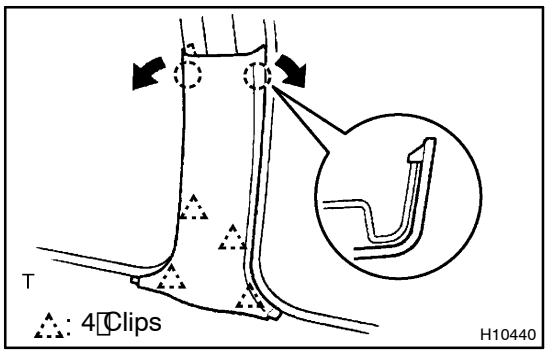
5. REMOVE COWL SIDE TRIM BOARD

(a) Remove the clip and cowl side trim board.

(b) Employ the same manner described above to the other side.

6. REMOVE FRONT DOOR OPENING TRIMS

7. REMOVE REAR DOOR OPENING TRIMS



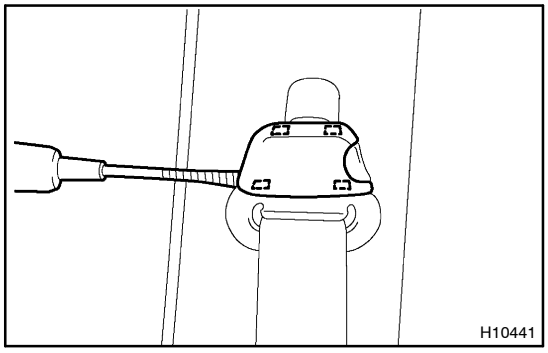
8. REMOVE CENTER PILLAR LOWER GARNISH

(a) Using a screwdriver, remove the center pillar lower garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



9. REMOVE FRONT SEAT OUTER BELT SHOULDER ANCHOR

(a) Using a screwdriver, remove the anchor cap.

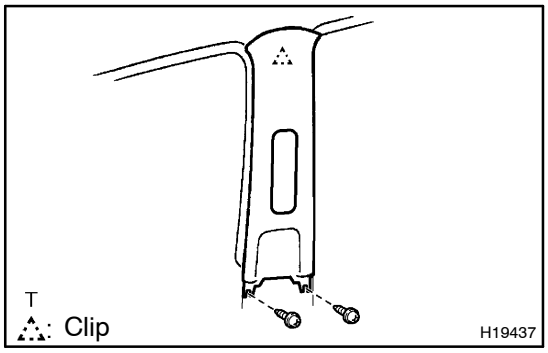
HINT:

Tape the screwdriver tip before use.

(b) Remove the bolt and front seat outer belt shoulder anchor.

Torque: 42 N·m (428 kgf·cm, 31 ft·lbf)

(c) Employ the same manner described above to the other side.



10. REMOVE CENTER PILLAR GARNISH

(a) Remove the 2 screws.

(b) Using a screwdriver, remove the center pillar garnish.

HINT:

Tape the screwdriver tip before use.

(c) Employ the same manner described above to the other side.

11. REMOVE REAR SEAT CUSHION (See page BO–112)

12. REMOVE REAR SIDE SEAT BACK (See page BO–112)

13. REMOVE REAR SEAT FLOOR BOARD NO. 4

(a) Remove the seat back board carpets.

(b) Remove the 2 bolts and rear floor board.

14. REMOVE DECK FLOOR BOX FRONT

(a) Remove the 2 bolts and the 2 rope hook assemblies.

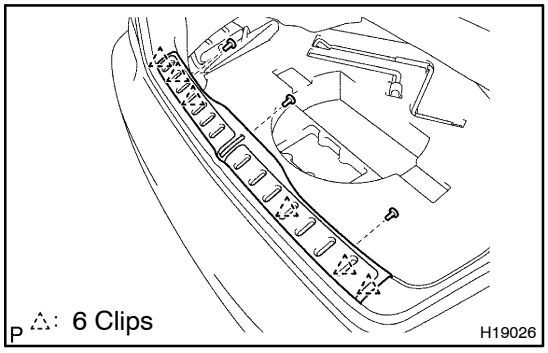
(b) Remove the deck floor box.

15. REMOVE DECK BOARD NO. 2

16. REMOVE REAR FLOOR BOARD NO. 2

17. REMOVE REAR FLOOR BOARD NO. 3

18. REMOVE TONNEAU COVER ASSEMBLY



19. REMOVE REAR FLOOR FINISH PLATE

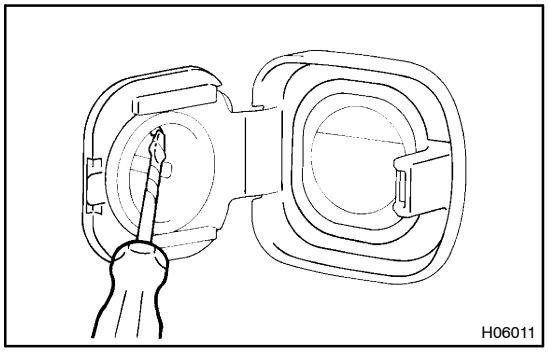
(a) Remove the 2 bolts and 2 rope hook assemblies.

(b) Remove the 3 clips.

(c) Using a screwdriver, remove the rear floor finish plate.

HINT:

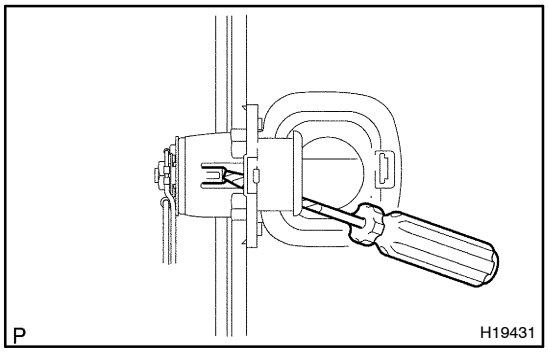
Tape the screwdriver tip before use.



20. RH side:
REMOVE ACCESSORY SOCKET

(a) Using a screwdriver, disengage the claw on the accessory socket cover from the hole in the accessory socket, then pull out the accessory socket approx. 15 mm (0.59 in.).

HINT:
Tape the screwdriver tip before use.

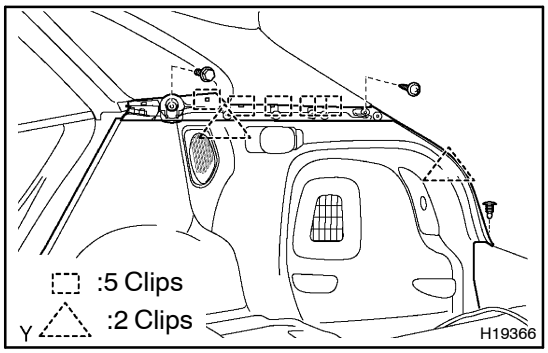


(b) Using a screwdriver, disengage the claw on the accessory socket cover from the body and remove the accessory socket and cover as a unit.

HINT:
Tape the screwdriver tip before use.

(c) Disconnect the connector.

(d) Disassemble the accessory socket from the socket cover.



21. REMOVE DECK TRIM SIDE PANEL ASSEMBLY

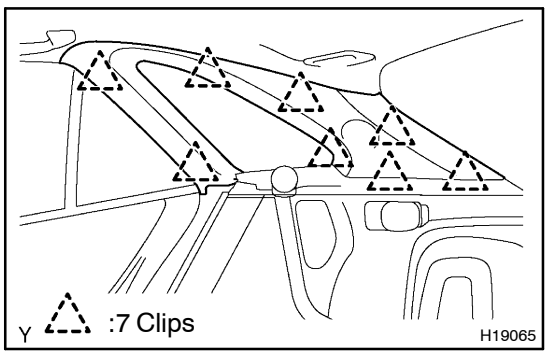
(a) Remove the 2 bolts and 2 floor hooks.

(b) Remove the screw, bolt and clip.

(c) Using a screwdriver, remove the deck trim side panel assembly then disconnect the connector.

HINT:
Tape the screwdriver tip before use.

(d) Employ the same manner described above to the other side.

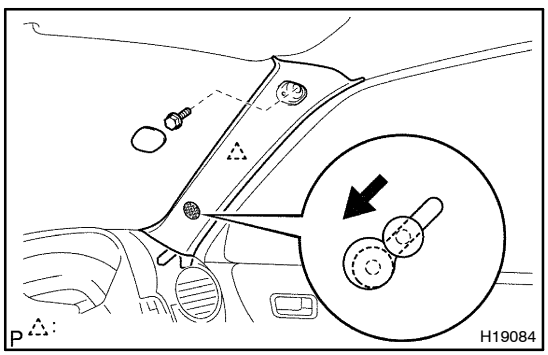


22. REMOVE ROOF SIDE INNER GARNISH

(a) Using a screwdriver, remove the roof side inner garnish.

HINT:
Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



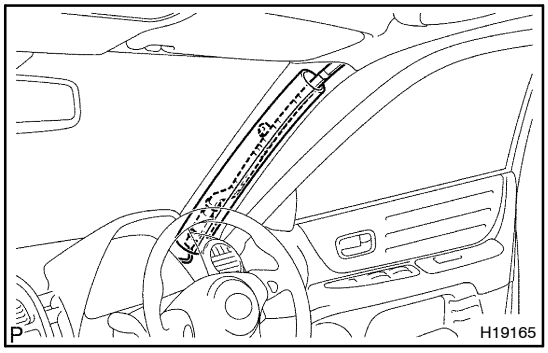
23. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove the front pillar garnish cover.

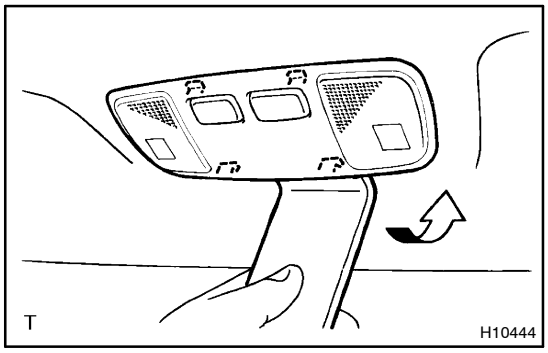
HINT:
Tape the screwdriver tip before use.

(b) Remove the bolt.

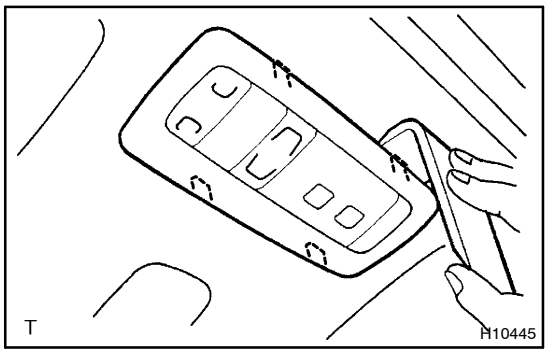
(c) Using a screwdriver, remove the front pillar garnish.



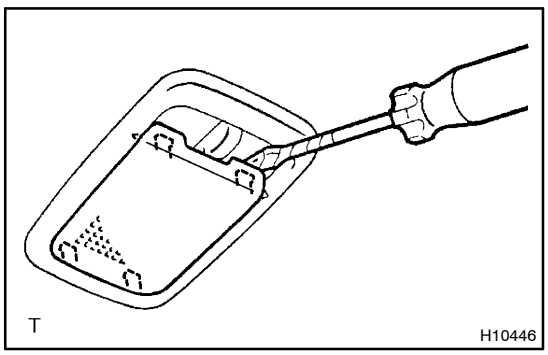
(d) Remove the bolt.
(e) Pack the airbag with protection cover.
(f) Employ the same manner described above to the other side.



24. w/o Sliding roof:
REMOVE MAP LIGHT ASSEMBLY
(a) Using a moulding remover, remove the lens.
(b) Remove the 2 screws and map light assembly.
(c) Disconnect the connector.

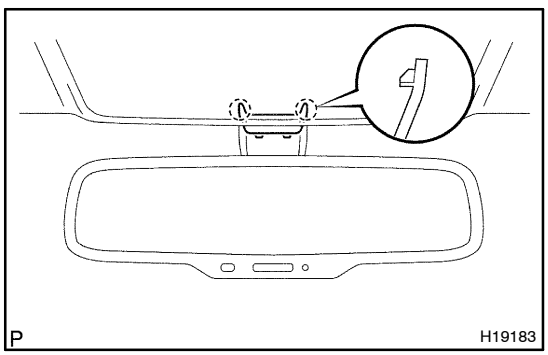


25. w/ Sliding roof:
REMOVE MAP LIGHT ASSEMBLY
(a) Using a moulding remover, remove the cover.
(b) Remove the 2 screws and the map light assembly.
(c) Disconnect the connector.

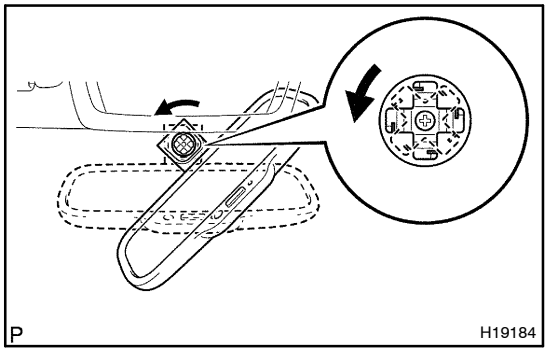


26. REMOVE ROOM LIGHT ASSEMBLY
(a) Using a screwdriver, remove the lens.
HINT:
Tape the screwdriver tip before use.
(b) Remove the 2 screws and the room light assembly.
(c) Disconnect the connector.

27. w/ Sliding Roof:
REMOVE SLIDING ROOF OPENING TRIM



28. REMOVE INNER REAR VIEW MIRROR
(a) Using a screwdriver, remove the inner rear view mirror stay holder cover.
HINT:
Tape the screwdriver tip before use.



(b) Electro chromic inner mirror:
Disconnect the connector.
(c) Remove the mirror assembly by turning the stay part of the mirror counterclockwise.

29. REMOVE ASSIST GRIPS

(a) Using a screwdriver, remove the caps.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 6 bolts and 3 assist grips.

30. REMOVE SUN VISORs

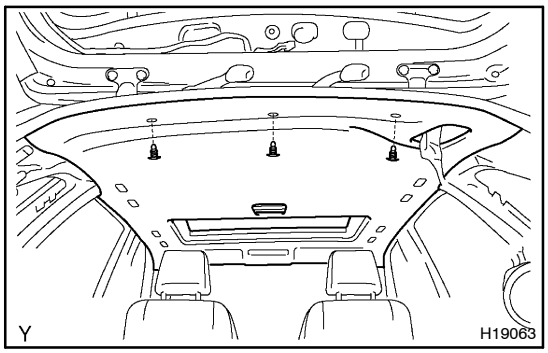
(a) Remove the 4 screws and pull the sun visors downward.
(b) Disconnect the connectors.

31. REMOVE SUN VISOR HOLDERs

Remove the 2 screws and 2 holders.

32. REMOVE SHOULDER BELT ANCHOR COVER UPPER

Remove the 2 scres and shoulder belt anchor cover upper.



33. REMOVE ROOF HEADLINING

(a) Remove the 3 clips.
(b) Pull the roof headlining downward to remove it.

BO4CA–01

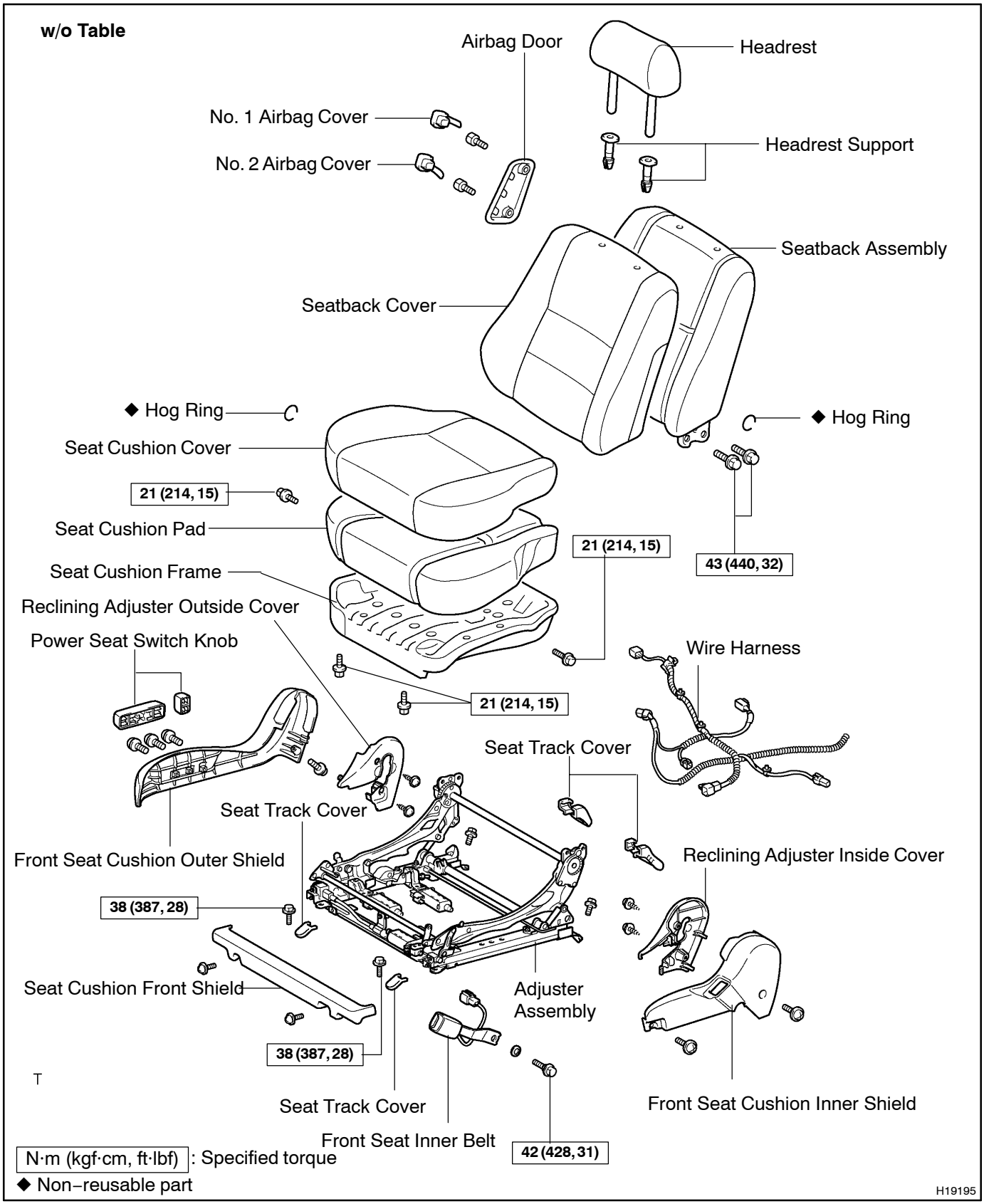
INSTALLATION

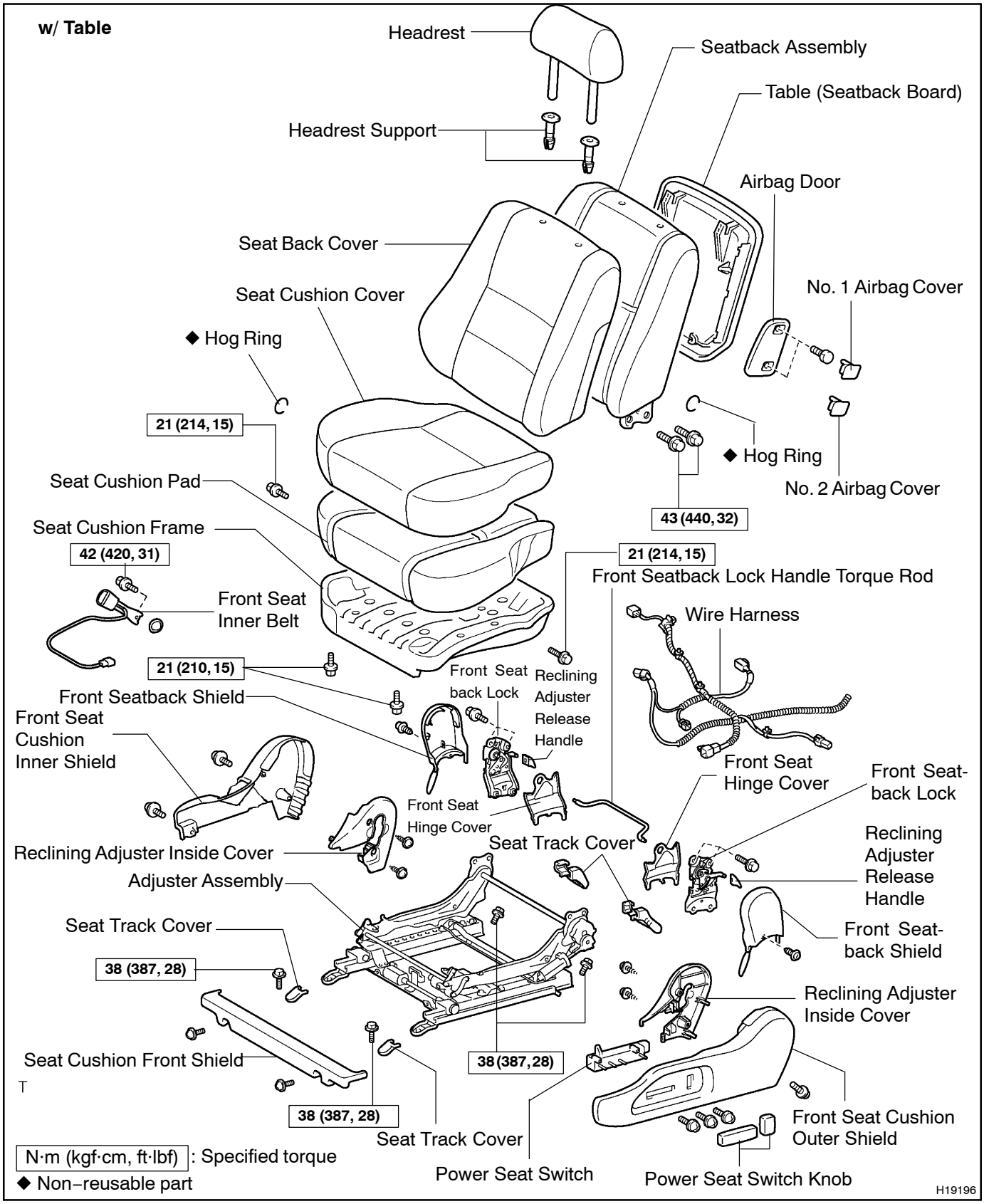
Installation is in the reverse order of removal (See page BO–80).

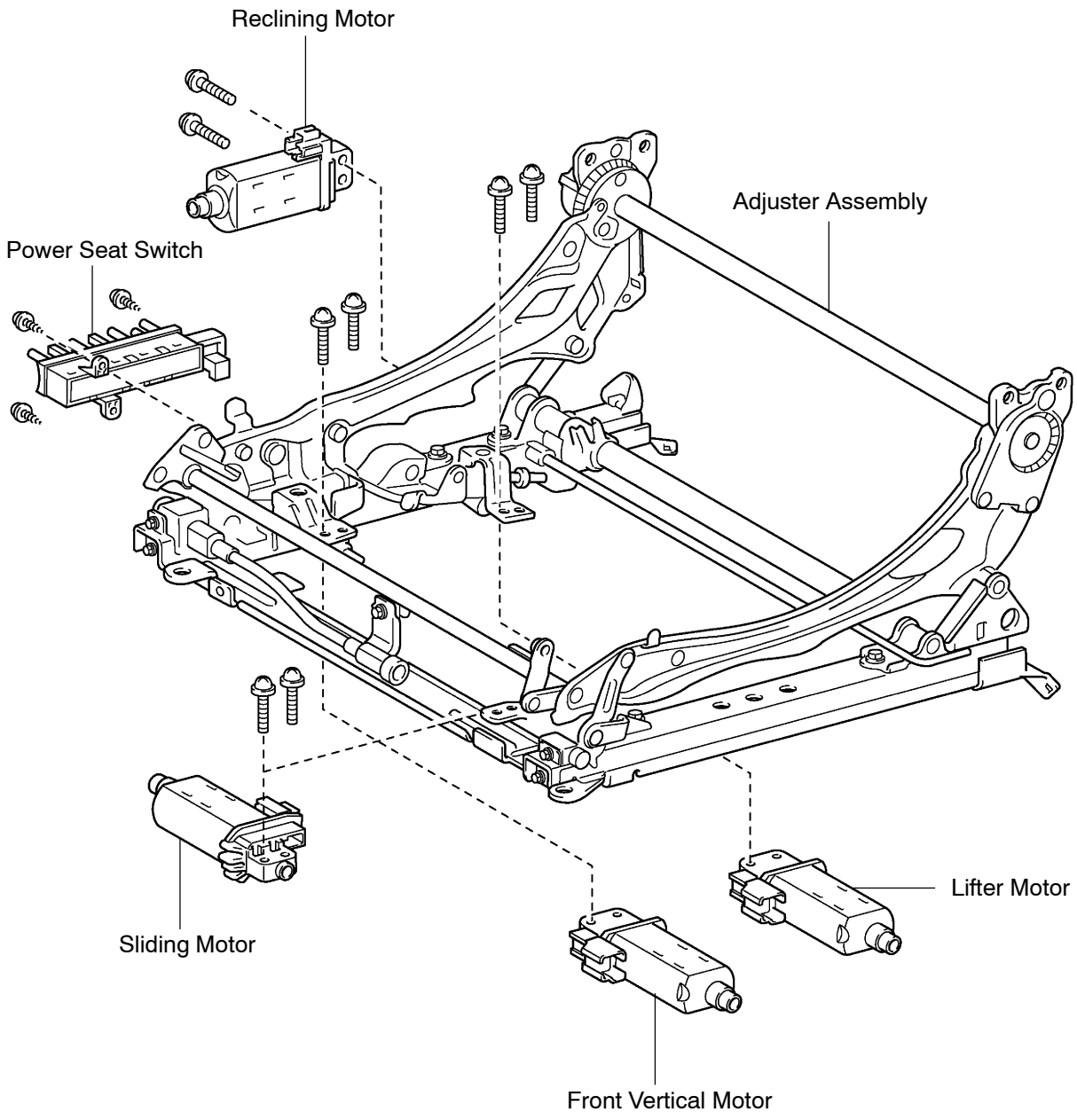
FRONT SEAT (Power Adjuster Type)

BO4CK–01

COMPONENTS



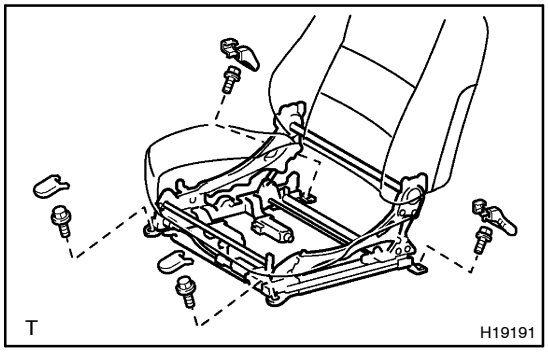

w/ Table
Headrest
Seatback Assembly
Table (Seatback Board)
Headrest Support
Airbag Door
Seat Back Cover
No. 1 Airbag Cover
Seat Cushion Cover
◆ Hog Ring
21 (214, 15)
◆ Hog Ring
No. 2 Airbag Cover
Seat Cushion Pad
43 (440, 32)
Seat Cushion Frame
42 (420, 31)
21 (214, 15)
Front Seatback Lock Handle Torque Rod
Front Seat Inner Belt
Wire Harness
21 (210, 15)
Front Seat back Lock
Reclining Adjuster Release Handle
Front Seatback Shield
Front Seat Cushion Inner Shield
Front Seat Hinge Cover
Front Seat Hinge Cover
Front Seat-back Lock
Seat Track Cover
Reclining Adjuster Release Handle
Reclining Adjuster Inside Cover
Adjuster Assembly
Front Seat-back Shield
Seat Track Cover
38 (387, 28)
Reclining Adjuster Inside Cover
38 (387, 28)
Seat Cushion Front Shield
T
38 (387, 28)
Front Seat Cushion Outer Shield
Seat Track Cover
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Power Seat Switch
Power Seat Switch Knob
H19196


Reclining Motor
Adjuster Assembly
Power Seat Switch
Lifter Motor
Sliding Motor
Front Vertical Motor

T

H10922

BO4CL–01



REMOVAL

1. REMOVE SEAT TRACK COVERS

Using a screwdriver, remove the 4 seat track covers.

HINT:

Tape the screwdriver tip before use.

2. REMOVE FRONT SEAT

(a) Remove the 4 bolts.

(b) Disconnect the connectors.

(c) Remove the front seat.

NOTICE:

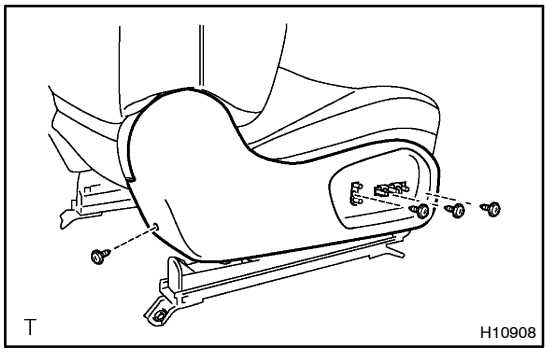
Be careful not to damage the body.

BO4CM–01

DISASSEMBLY

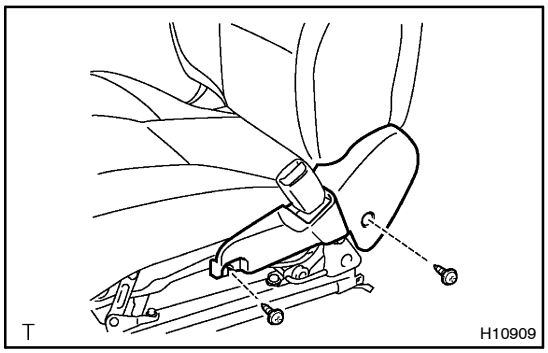
1. REMOVE HEADREST

2. REMOVE POWER SEAT SWITCH KNOB



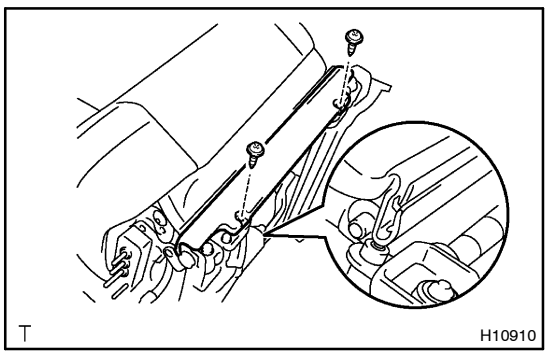
3. REMOVE FRONT SEAT CUSHION OUTER SHIELD

Remove the 4 screws and front seat cushion outer shield.



4. REMOVE FRONT SEAT CUSHION INNER SHIELD

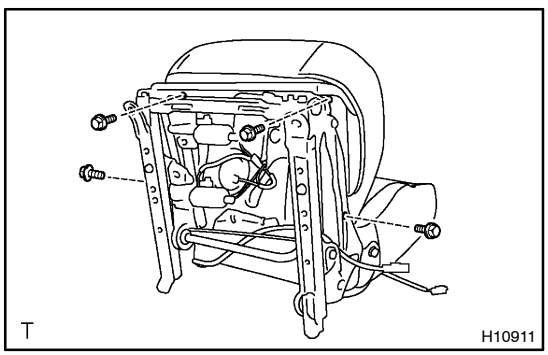
Remove the 2 screws and front seat cushion inner shield.



5. REMOVE SEAT CUSHION FRONT SHIELD

(a) Remove the 2 screws.

(b) Unlatch the seat cushion cover hook, then remove the seat cushion front shield.

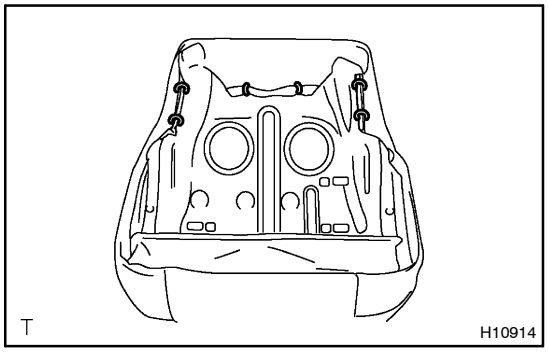


6. REMOVE SEAT CUSHION ASSEMBLY

(a) Disconnect the connectors and unlatch the wire harness clamps.

(b) Remove the 4 bolts and seat cushion assembly with wire harness.

(c) Unlatch the wire harness clamps to remove the wire harness from seat cushion assembly.

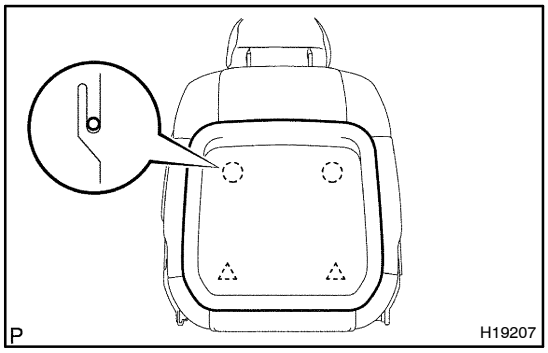


7. REMOVE SEAT CUSHION COVER

(a) Remove the hog rings.

(b) Unlatch the seat cushion cover hooks and remove the seat cushion frame from the seat cushion cover with pad.

(c) Remove the hog rings and seat cushion cover from the seat cushion pad.



8. w/ Table:
REMOVE SEATBACK BOARD

Using a screwdriver, remove the seatback board.

HINT:

Tape the screwdriver tip before use.

9. REMOVE SEATBACK ASSEMBLY

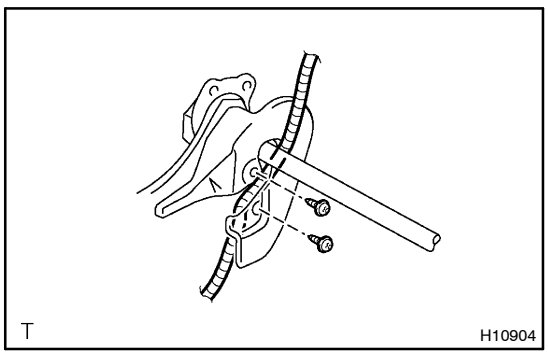
(a) Remove the hog rings.

(b) Turn the seatback cover over, then remove the hog rings.

(c) Remove the 4 seatback assembly set bolts.

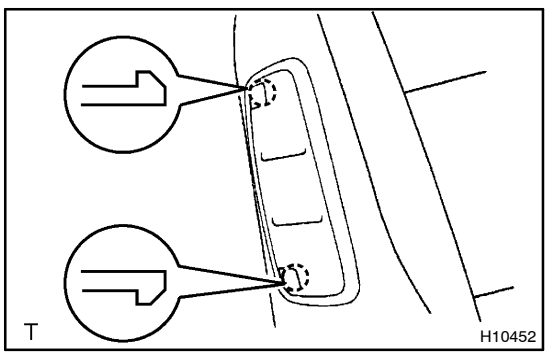
NOTICE:

Be careful not to pull the side airbag assembly wire harness.



(d) Remove the 2 screws and reclining adjuster inside cover and employ the same manner described above to the other side.

(e) Disengage the side airbag assembly wire harness from the reclining adjuster inside cover, then remove the seatback assembly.

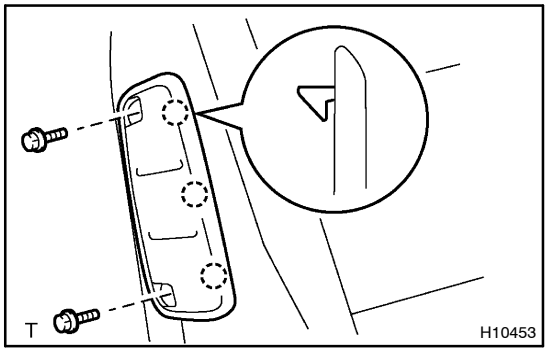


10. REMOVE SEATBACK COVER

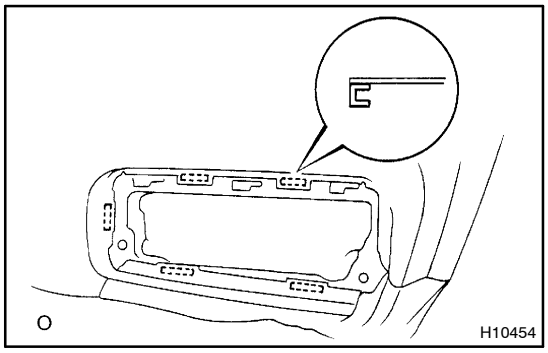
(a) Using a screwdriver, remove the No. 1 and No. 2 airbag covers.

HINT:

Tape the screwdriver tip before use.

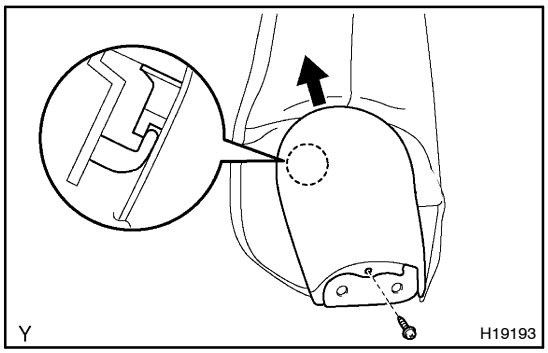


(b) Remove the 2 bolts.
(c) Side the airbag door upward to remove it.



(d) Disengage the seatback cover hooks circumference of the side airbag assembly.
(e) w/ Table:
Using a screwdriver, remove the reclining adjuster release handle and and employ the same manner described above to the other side.

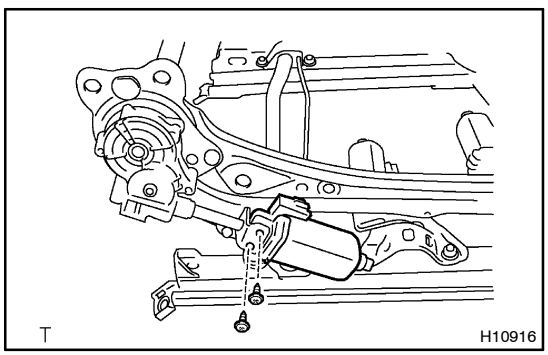
HINT:
Tape the screwdriver tip before use.



(f) w/ Table:
Remove the screw and front seatback shield and employ the same manner described above to the other side.
(g) w/ Table:
Remove the 2 bolts and front seatback lock and employ the same manner described above to the other side.
(h) Remove the hog rings, headrest supports and seatback cover.
(i) Remove the hog rings, headrest supports and seatback cover as shown in the illustration.

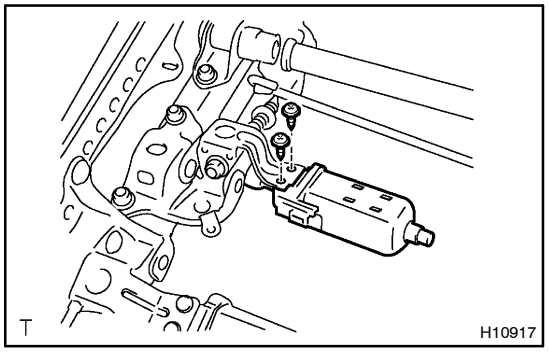
11. REMOVE FRONT SEAT INNER BELT

Remove the bolt, washer and front seat inner belt.



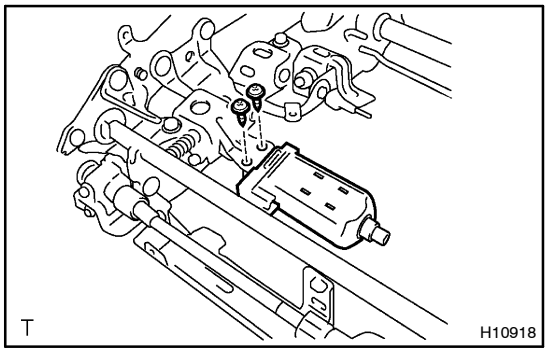
12. REMOVE RECLINING MOTOR

Remove the 2 screws, then disconnect the reclining motor.



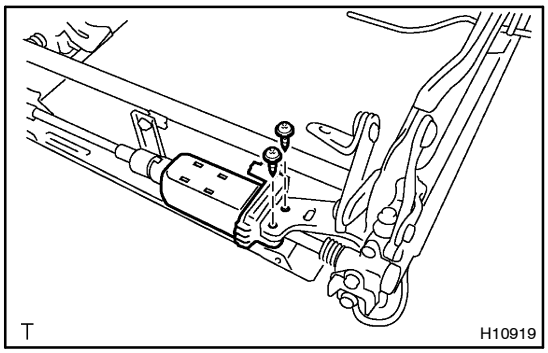
13. REMOVE LIFTER MOTOR

Remove the 2 screws, then disconnect the lifter motor.



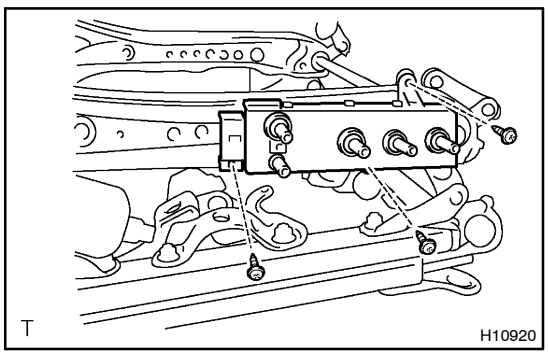
14. REMOVE FRONT VERTICAL MOTOR

Remove the 2 screws, then disconnect the front vertical motor.



15. REMOVE SLIDING MOTOR

Remove the 2 screws, then disconnect the sliding motor.

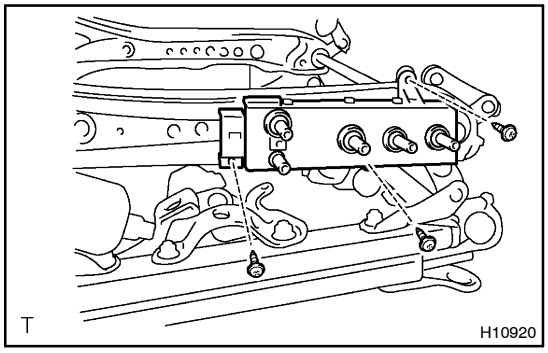


16. REMOVE POWER SEAT SWITCH

Remove the 3 screws and power seat switch.

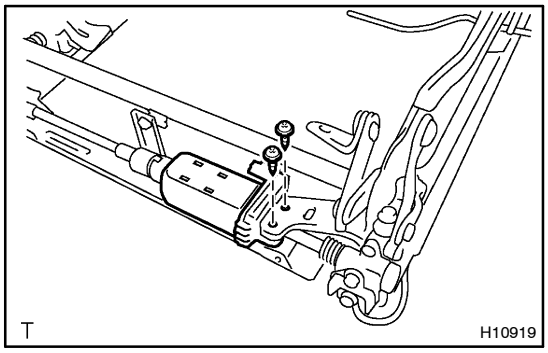
BO4CN–01

REASSEMBLY



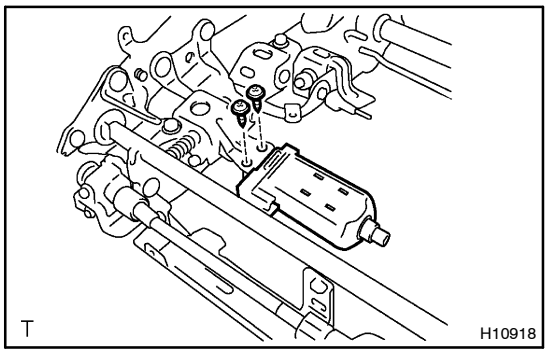
1. INSTALL POWER SEAT SWITCH

Install the power seat switch with the 3 screws.



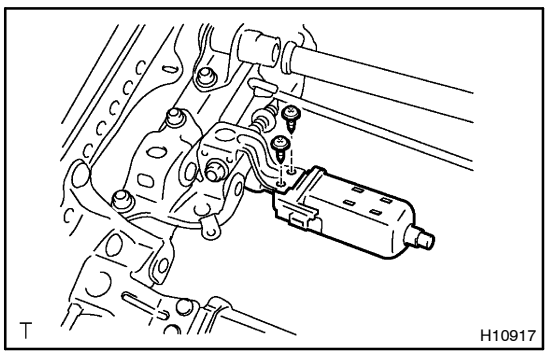
2. INSTALL SLIDING MOTOR

Connect the slide motor to the shaft, then install the 2 screws.



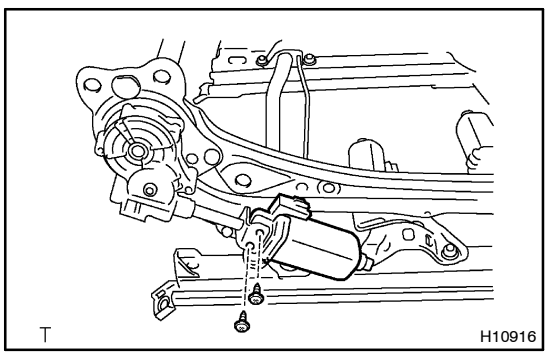
3. INSTALL FRONT VERTICAL MOTOR

Connect the front vertical motor, then install the 2 screws.



4. INSTALL LIFTER MOTOR

Connect the lifter motor, then install the 2 screws.



5. INSTALL RECLINING MOTOR

Connect the reclining motor, then install the 2 screws.

6. INSTALL FRONT SEAT INNER BELT

Install the front seat inner belt with the bolt and washer.

Torque: 42 N·m (428 kgf·cm, 31 ft·lbf)

7. INSTALL SEATBACK COVER

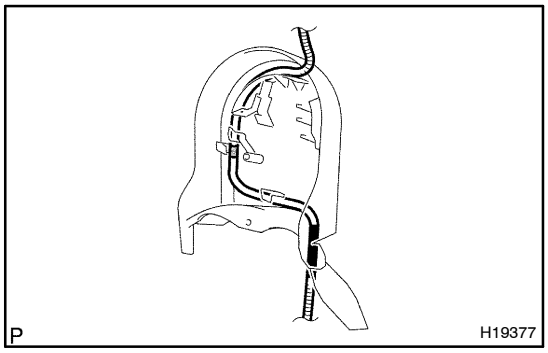
(a) Install the seatback cover with new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(b) Install the headrest supports.

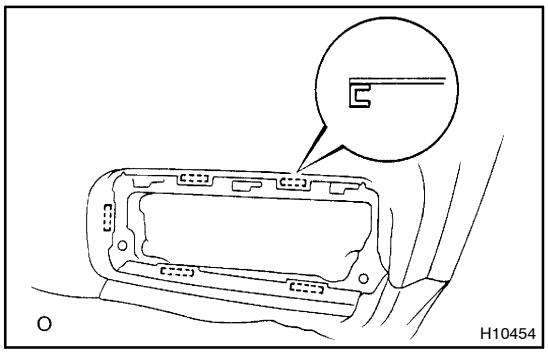
(c) w/ Table:
Install the front seatback lock with the 2 bolts and employ the same manner described above to the other side.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



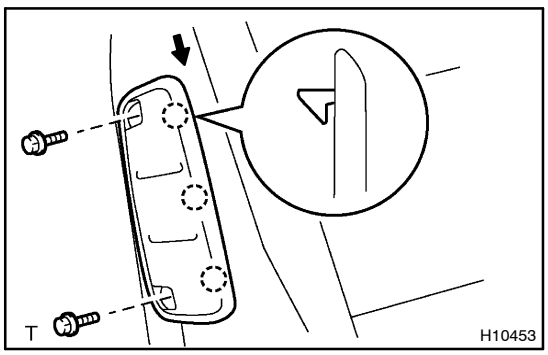
(d) w/ Table:
Set the side airbag assembly wire harness to the front seat back shield.

(e) w/ Table:
Install the front seatback shield with the screw and employ the same manner described above to the other side.

(f) w/ Table:
Install the reclining adjuster release handle and employ the same manner described above to the other side.

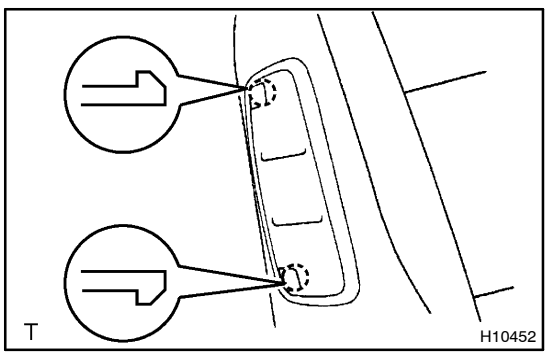


(g) Hook the seatback cover hooks through the holes in the circumference of the side airbag assembly.

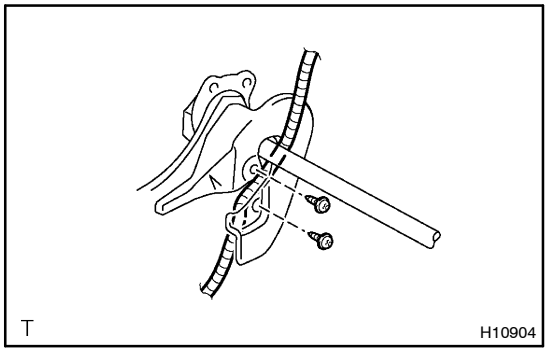


(h) Slide the airbag door downward to install it.

(i) Install the 2 bolts.
Torque: 4.7 N·m (48 kgf·cm, 42 in.·lbf)



(j) Install the No.1 and No.2 airbag covers.



8. INSTALL SEATBACK ASSEMBLY

NOTICE:

Never use the seatback assembly from another vehicle. When replacing parts, replace them with new parts.

(a) Set the side airbag assembly wire harness to the reclining adjuster inside cover.

(b) Install the 2 screws and reclining adjuster inside cover and employ the same manner described above to the other side.

(c) Install the seatback assembly with the 4 bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(d) Turn the seatback cover over, then install new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(e) Install new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

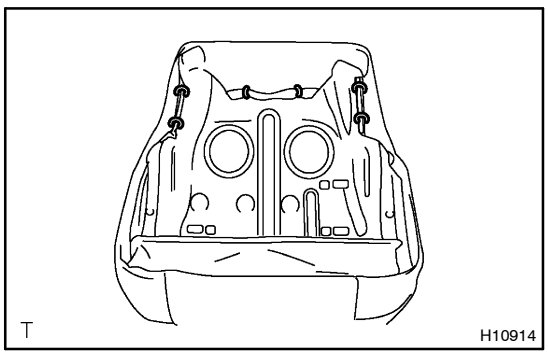
9. w/ Table:
INSTALL SEAT BACK BOARD

10. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to the seat cushion pad.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

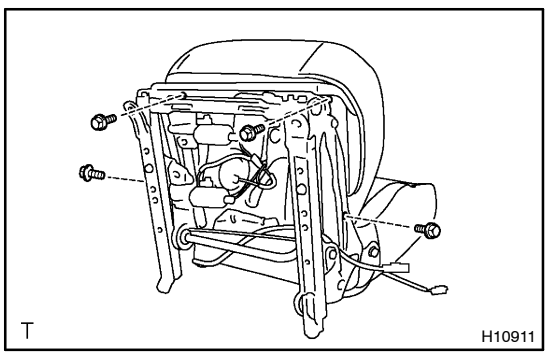


(b) Latch the seat cushion cover hooks to install the seat cushion cover with pad to the seat cushion pad.

(c) Install 6 new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

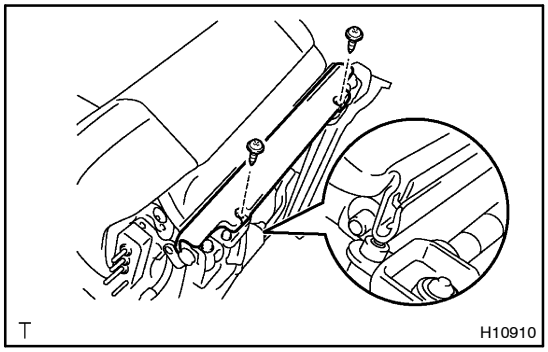


11. INSTALL SEAT CUSHION ASSEMBLY

(a) Install the seat cushion assembly with the 4 bolts.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

(b) Attach the wire harness clamps.

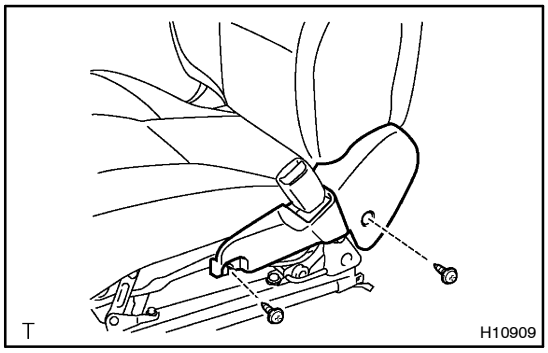
(c) Attach the side airbag assembly wire harness clamps.



12. INSTALL SEAT CUSHION FRONT SHIELD

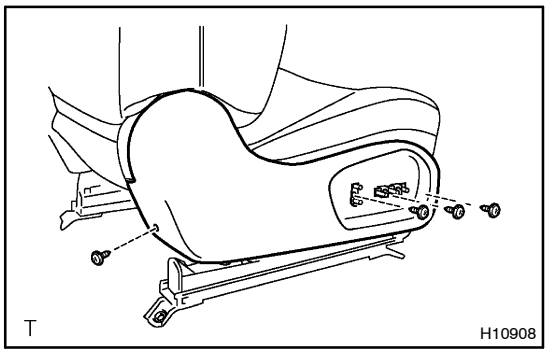
(a) Latch the seat cushion cover hook to the seat cushion front shield.

(b) Install the seat cushion front shield with the 2 screws.



13. INSTALL FRONT SEAT CUSHION INNER SHIELD

Install the front seat cushion inner shield with the 2 screws.



14. INSTALL FRONT SEAT CUSHION OUTER SHIELD

Install the front seat cushion outer shield with the 4 screws.

15. INSTALL POWER SEAT SWITCH KNOBS

16. INSTALL HEADREST

BO4CO–01

INSTALLATION

1. INSTALL FRONT SEAT

(a) Mount the front seat to the vehicle.

NOTICE:

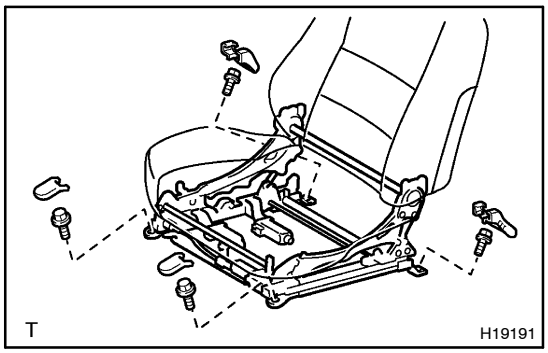
Be careful not to damage the body.

(b) Connect the connectors.

NOTICE:

When the wiring connector of the side airbag assembly is disconnected and the ignition switch is at ON or ACC position, DTCs will be recorded. To clear DTCs, see page DI–413.

(c) Slide the front seat to the rearmost position.



(d) Tighten the bolts on the front side temporarily, starting from the bolt on the inner side tighten them completely.

Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

(e) Slide the front seat to the most front position.

(f) Tighten the bolts on the rear side temporarily, staring from the bolt on the inner side tighten them completely.

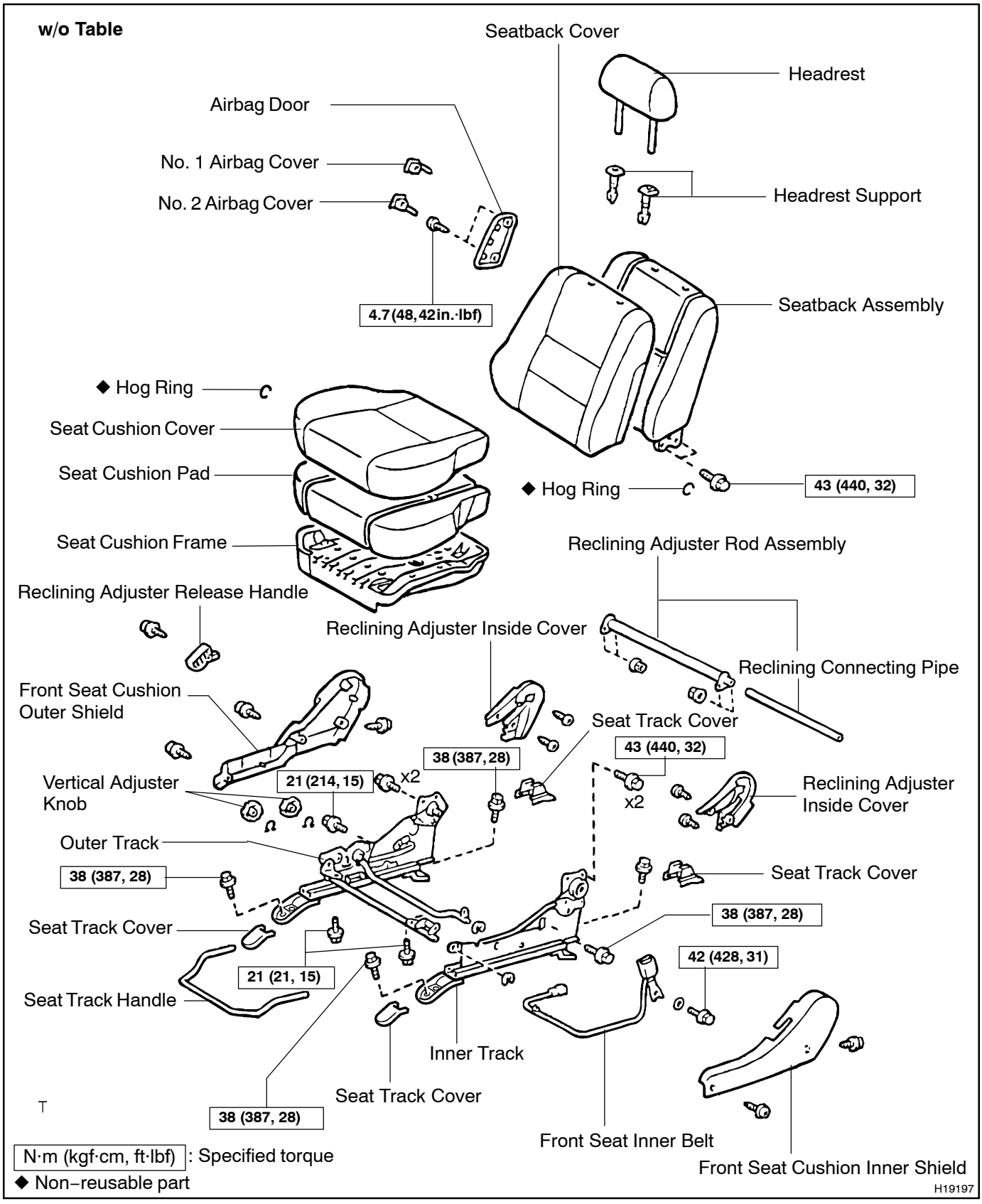
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

2. INSTALL SEAT TRACK COVERS

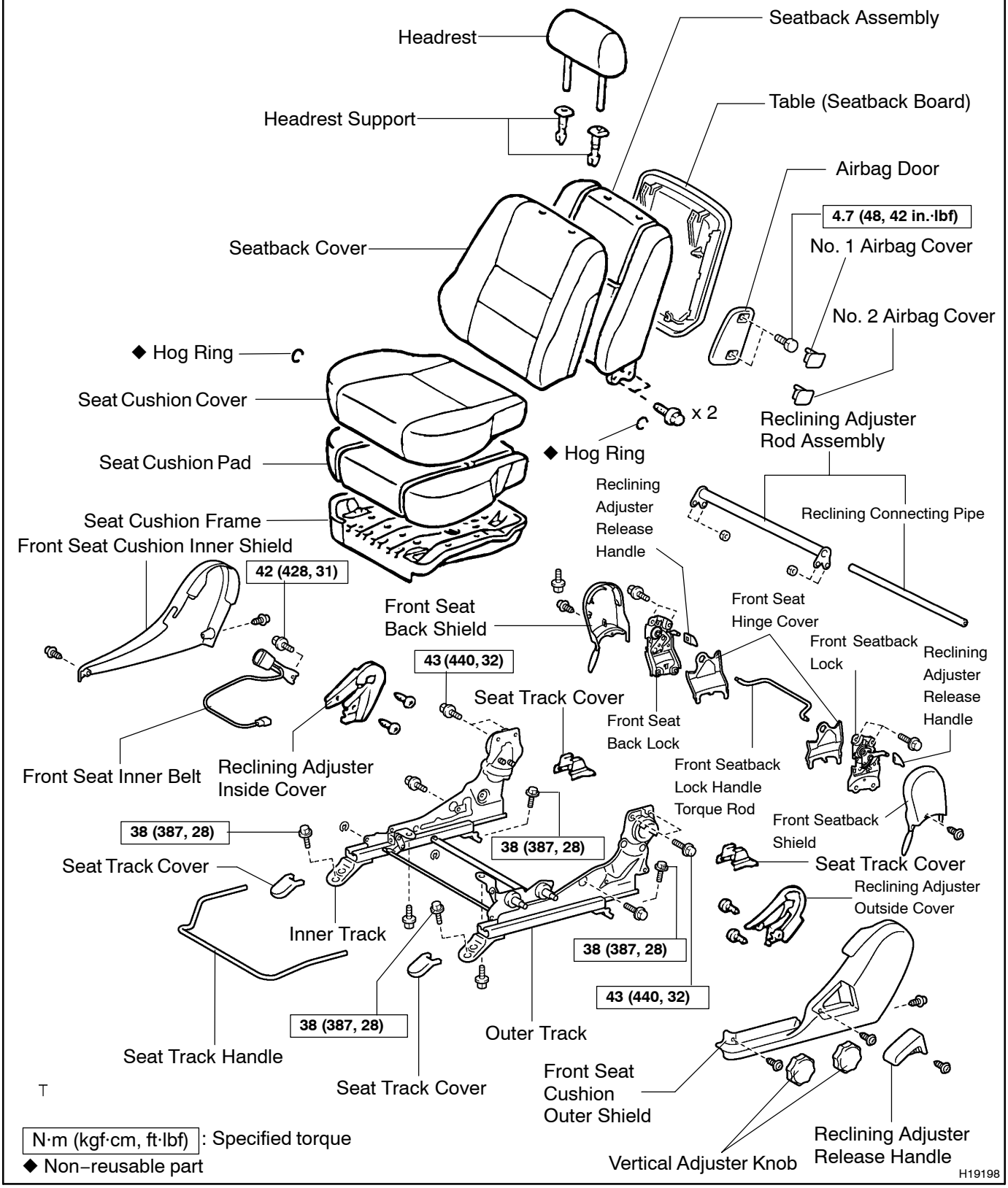
FRONT SEAT (Manual Adjuster Type)

BO4CF–01

COMPONENTS



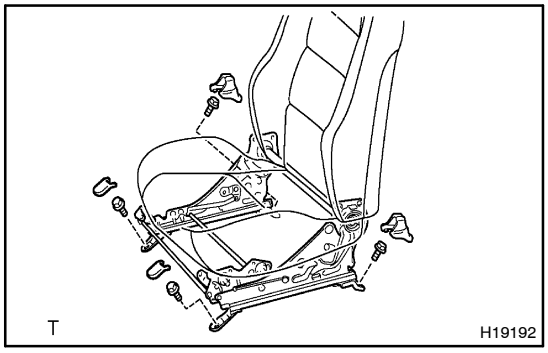
w/ Table



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

◆ Non–reusable part

BO4CG–01



REMOVAL

1. REMOVE SEAT TRACK COVERS

Using a screwdriver, remove the 4 seat track covers.

HINT:

Tape the screwdriver tip before use.

2. REMOVE FRONT SEAT

(a) Remove the 4 bolts.

(b) Disconnect the connector.

(c) Remove the front seat.

NOTICE:

Be careful not to damage the body.

BO4CH–01

DISASSEMBLY

1. REMOVE HEADREST

2. REMOVE VERTICAL ADJUSTER KNOBS

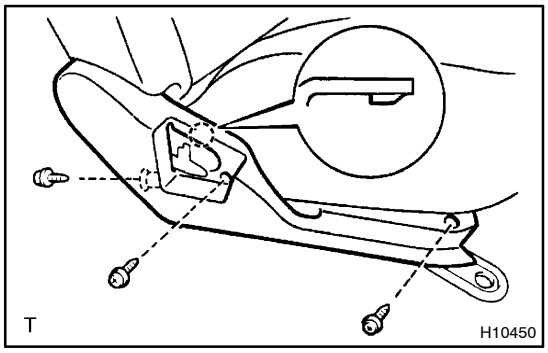
Using a screwdriver, remove the 2 clips and 2 vertical adjuster knobs.

HINT:

Tape the screwdriver tip before use.

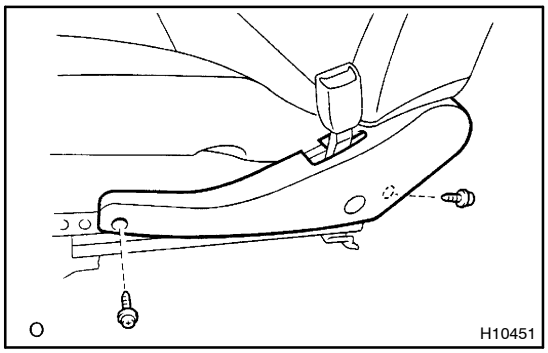
3. REMOVE RECLINING ADJUSTER RELEASE HANDLE

Remove the screw and reclining adjuster release handle.



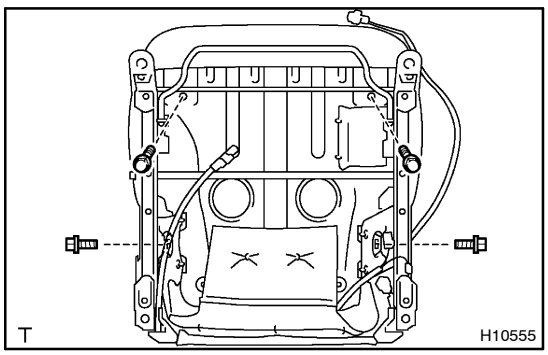
4. REMOVE FRONT SEAT CUSHION OUTER SHIELD

Remove the 3 screws and front seat cushion outer shield.



5. REMOVE FRONT SEAT CUSHION INNER SHIELD

Remove the 2 screws and front seat cushion inner shield.

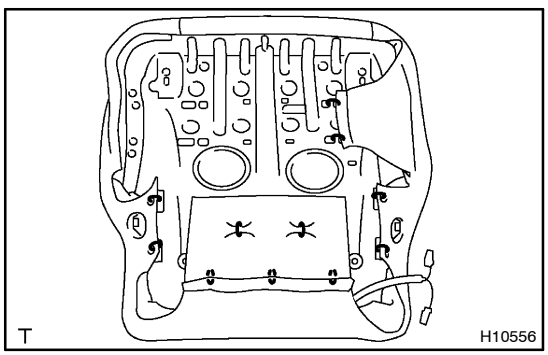


6. REMOVE SEAT CUSHION ASSEMBLY

(a) Unlatch the side airbag assembly wire harness clamps.

(b) Disengage the wire harness clamp.

(c) Remove the 4 bolts and the seat cushion assembly.

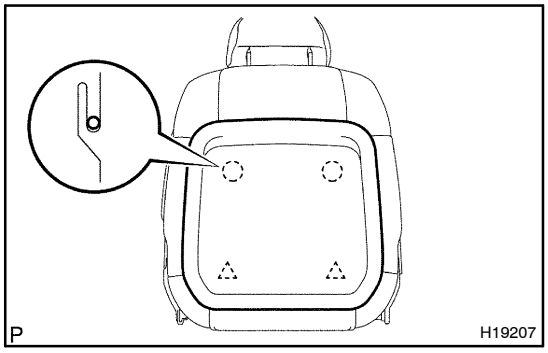


7. REMOVE SEAT CUSHION COVER

(a) Remove the hog rings.

(b) Unlatch the seat cushion cover hooks and remove the seat cushion frame from the seat cushion cover with pad.

(c) Remove the hog rings and seat cushion cover from the seat cushion pad.



8. w/ Table:
REMOVE SEATBACK BOARD

Using a screwdriver, remove the seatback board.

HINT:

Tape the screwdriver tip before use.

9. REMOVE SEATBACK ASSEMBLY

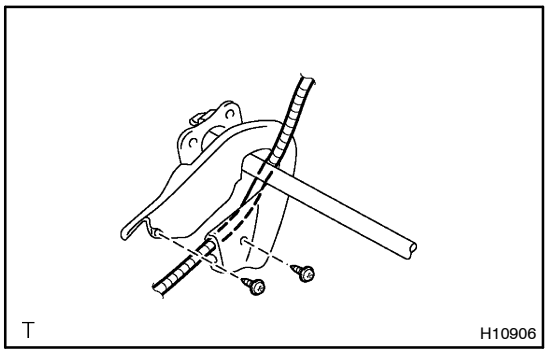
(a) Remove the hog rings.

(b) Turn the seatback cover over, then remove the hog rings.

(c) Remove the 4 seatback assembly set bolts.

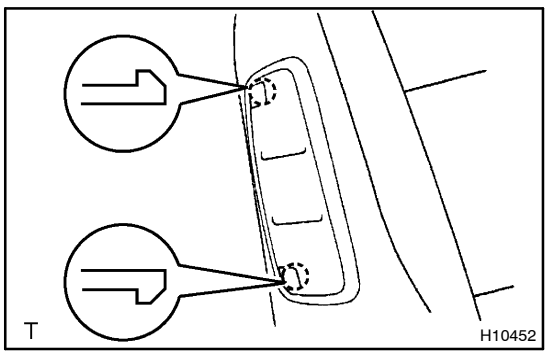
NOTICE:

Be careful not to pull the side airbag assembly wire harness.



(d) Remove the 2 screws and reclining adjuster inside cover and employ the same manner described above to the other side.

(e) Disengage the side airbag assembly wire harness from the reclining adjuster inside covers, then remove the seatback assembly.

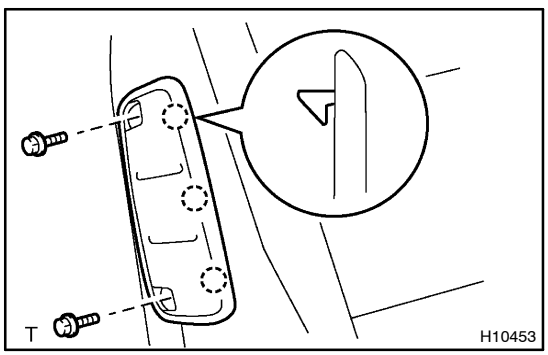


10. REMOVE SEATBACK COVER

(a) Using a screwdriver, remove the No.1 and No.2 airbag covers.

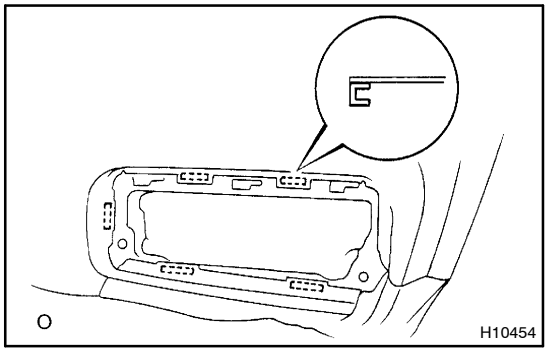
HINT:

Tape the screwdriver tip before use.



(b) Remove the 2 bolts.

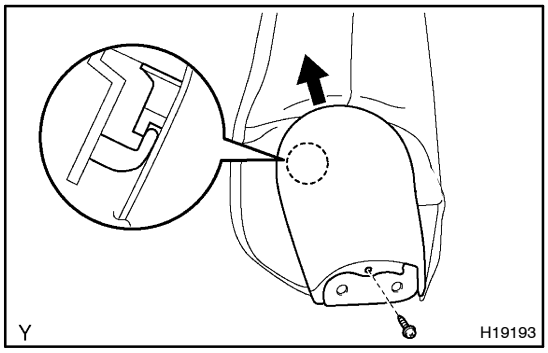
(c) Slide the airbag door upward to remove it.



(d) Unlatch the seatback cover hooks circumference of the side airbag assembly.

(e) w/ Table:
Using a screwdriver, remove the reclining adjuster release handle and employ the same manner described above to the other side.

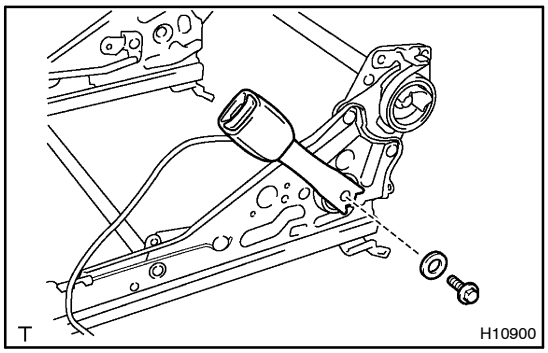
HINT:
Tape the screwdriver tip before use.



(f) w/ Table:
Remove the screw and front seatback shield, and employ the same manner described above to the other side.

(g) w/ Table:
Remove the 2 bolts and front seatback lock, and employ the same manner described above to the other side.

(h) Remove the hog rings, headrest supports and seatback cover.



11. REMOVE FRONT SEAT INNER BELT

Remove the bolt, washer and front seat inner belt.

12. REMOVE SEAT TRACK HANDLE

Using a screwdriver, remove the seat track handle.

HINT:
Tape the screwdriver tip before use.

13. REMOVE RECLINING ADJUSTER ROD ASSEMBLY

Remove the 4 nuts and the reclining adjuster rod assembly.

14. DISASSEMBLE OUTER TRACK AND INNER TRACK

Using a screwdriver, remove the 2 E–rings from the outer side on the inner track.

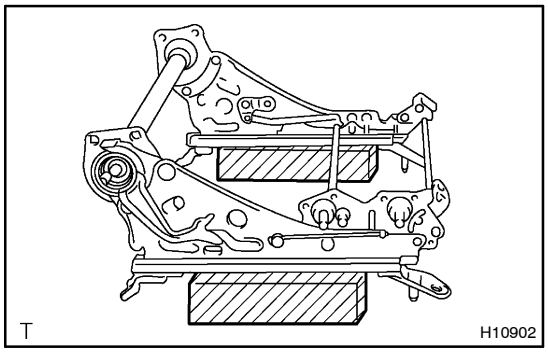
HINT:
Tape the screwdriver tip before use.

BO4CI–01

REASSEMBLY

1. ASSEMBLE OUTER TRACK AND INNER TRACK

Assemble the outer track and inner track with 2 new E–rings.



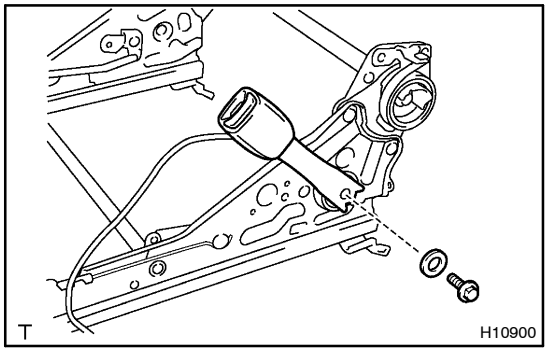
2. INSTALL RECLINING ADJUSTER ROD ASSEMBLY

(a) Adjust the reclining lock positions of the seat adjusters.
(b) Slide the seat adjusters to the most front position.
(c) Place the adjusters on a spacer to adjust the seat rails in parallel and install the reclining adjuster rod assembly with the 4 nuts.

HINT:

When installing the connecting pipe while raising up the adjusters, the lock positions adjusted in 2 – (a) step slip off then lock error will occur.

3. INSTALL SEAT TRACK HANDLE



4. INSTALL FRONT SEAT INNER BELT

Install the front seat inner belt with the washer and bolt.

Torque: 42 N·m (428 kgf·cm, 31 ft·lbf)

5. INSTALL SEATBACK COVER

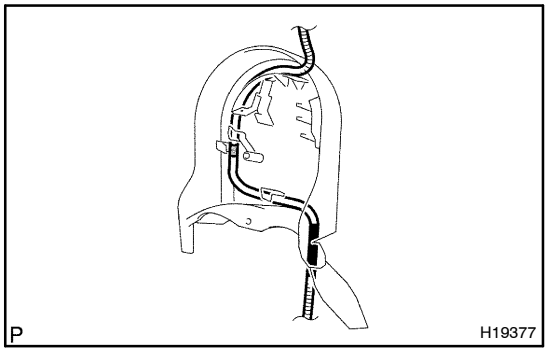
(a) Install the seatback cover with new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(b) Install the 2 headrest supports.
(c) w/ Table:
Install the front seatback lock with the 2 bolts and employ the same manner described above to the other side.

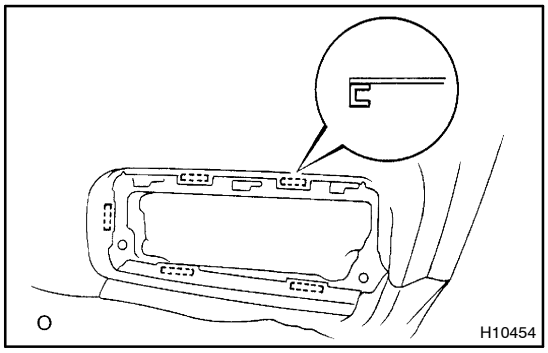
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



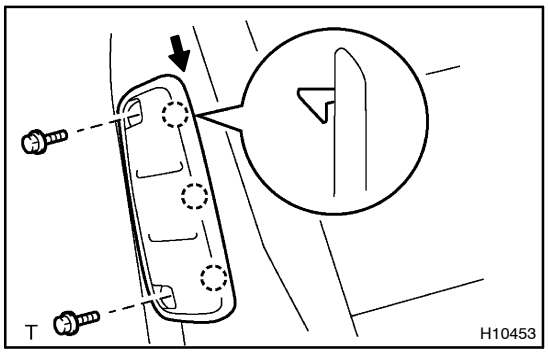
(d) w/ Table:
Set the side airbag assembly wire harness to the front seat back shield.

(e) w/ Table:
Install the front seatback shield with the screw and employ the same manner described above to the other side.

(f) w/ Table:
Install the reclining adjuster release handle and employ the same manner described above to the other side.

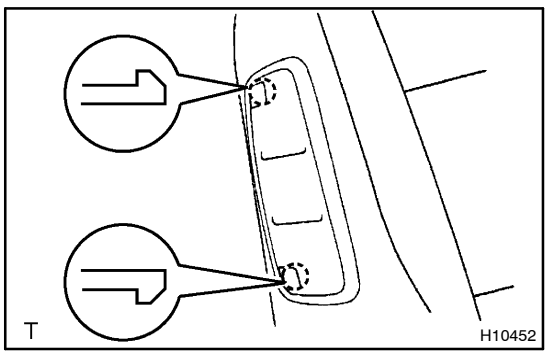


(g) Hook the seatback cover hooks through the holes in the circumference of the side airbag assembly.

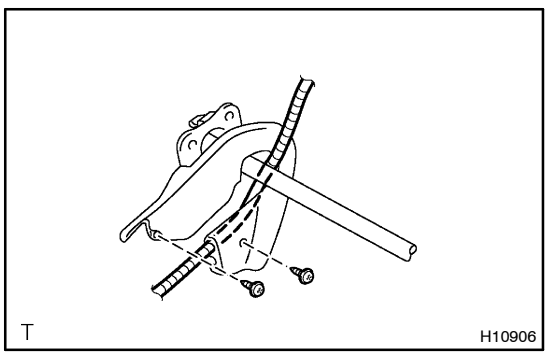


(h) Slide the airbag door downward to install it.

(i) Install the 2 bolts.



(j) Install the No.1 and No.2 airbag covers.



6. INSTALL SEATBACK ASSEMBLY

NOTICE:

Never use the seatback assembly from another vehicle. When replacing parts, replace them with new parts.

(a) Set the side airbag assembly wire harness to the reclining adjuster inside covers.

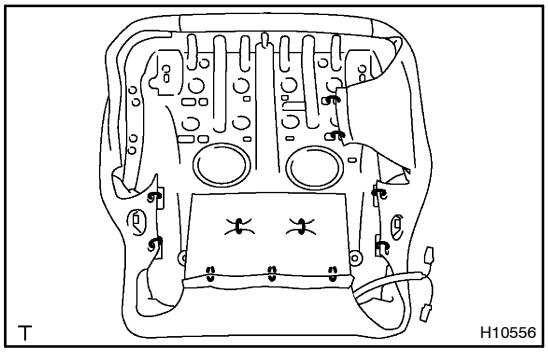
(b) Install the reclining adjuster inside cover with the 2 screws and employ the same manner described above to the other side.

(c) Install the seatback assembly with the 4 bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
(d) Turn the seatback cover over, then install new hog rings.
HINT:
When installing the hog rings, take care to prevent wrinkles as little as possible.
(e) Install new hog rings.
HINT:
When installing the hog rings, take care to prevent wrinkles as little as possible.

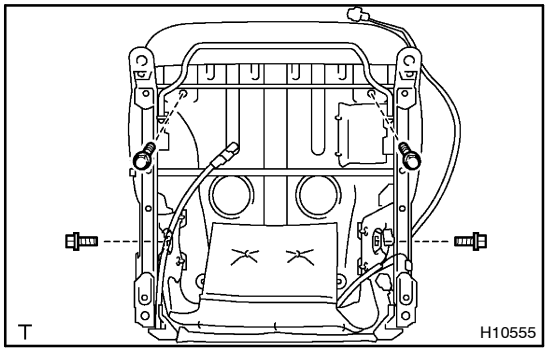
7. w/ Table:
INSTALL SEATBACK BOARD

8. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to the seat cushion pad.
HINT:
When installing the hog rings, take care to prevent wrinkles as little as possible.

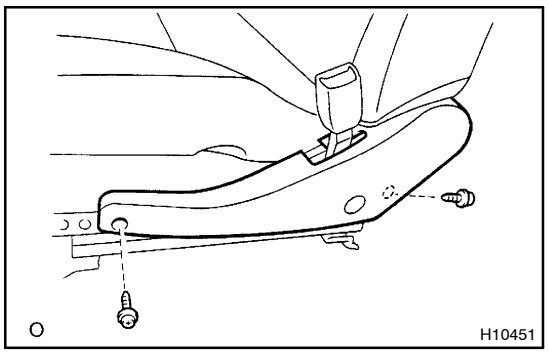


(b) Latch the seat cushion cover hooks to install the seat cushion cover with pad to the seat cushion pad.
(c) Install new hog rings.
HINT:
When installing the hog rings, take care to prevent wrinkles as little as possible.



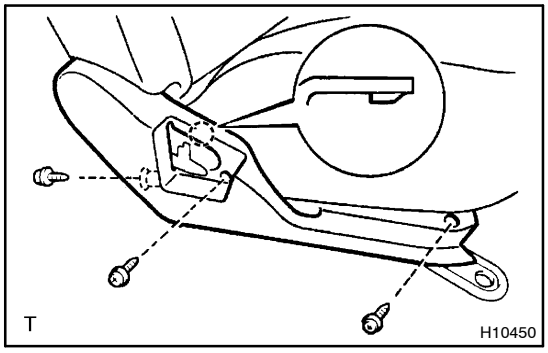
9. INSTALL SEAT CUSHION ASSEMBLY

(a) Install the seat cushion assembly with the 4 bolts.
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)
(b) Attach the wire harness clamps.
(c) Attach the side airbag assembly wire harness clamps.



10. INSTALL FRONT SEAT CUSHION INNER SHIELD

Install the front seat cushion inner shield with the 2 screws.



11. INSTALL FRONT SEAT CUSHION OUTER SHIELD

Install the front seat cushion outer shield with the 3 screws.

12. INSTALL RECLINING ADJUSTER RELEASE HANDLE

Install the reclining adjuster release handle with the screw.

13. INSTALL VERTICAL ADJUSTER KNOBS

Install the 2 vertical adjuster knobs with the 2 clips.

14. INSTALL HEADREST

BO4CJ–01

INSTALLATION

1. INSTALL FRONT SEAT

(a) Mount the front seat to the vehicle.

NOTICE:

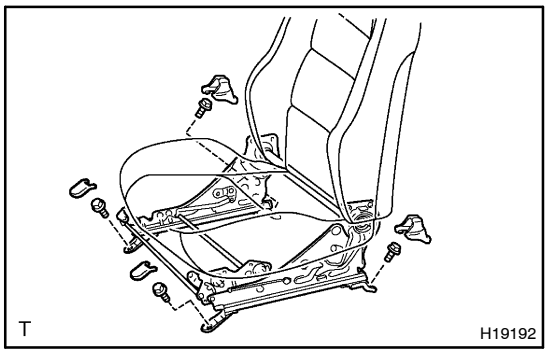
Be careful not to damage the body.

(b) Connect the connectors.

NOTICE:

When the wiring connector of the side airbag assembly is disconnected and the ignition switch is at ON or ACC position, DTCs will be recorded. To clear DTCs, see page DI–413.

(c) Slide the front seat to the rearmost position.



(d) Tighten the bolts on the front side temporarily, starting from the bolt on the inner side tighten them completely.

Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

(e) Slide the front seat to the most front position.

(f) Tighten the bolts on the rear side temporarily, starting from the bolt on the inner side tighten them completely.

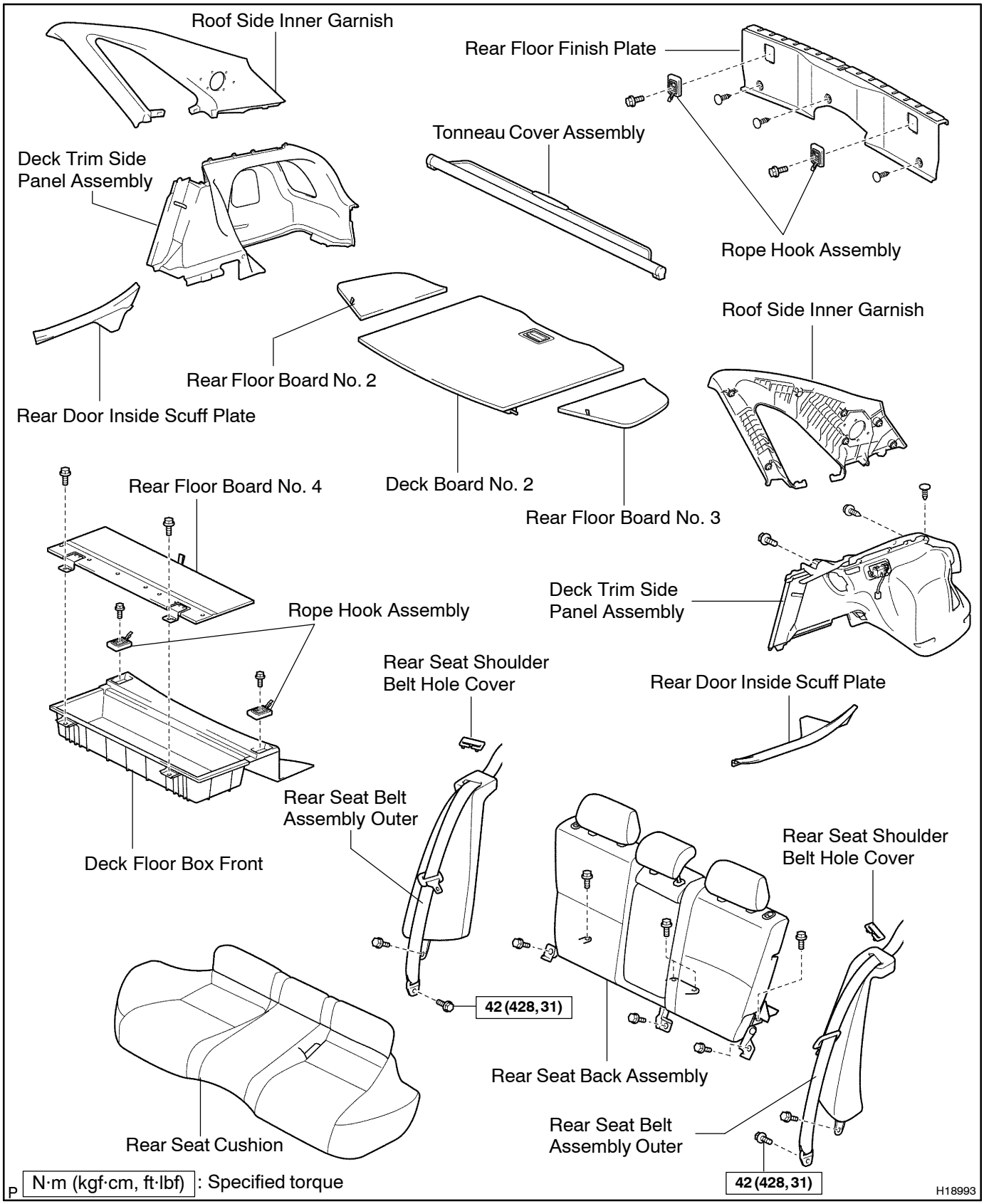
Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

2. INSTALL SEAT TRACK COVERS

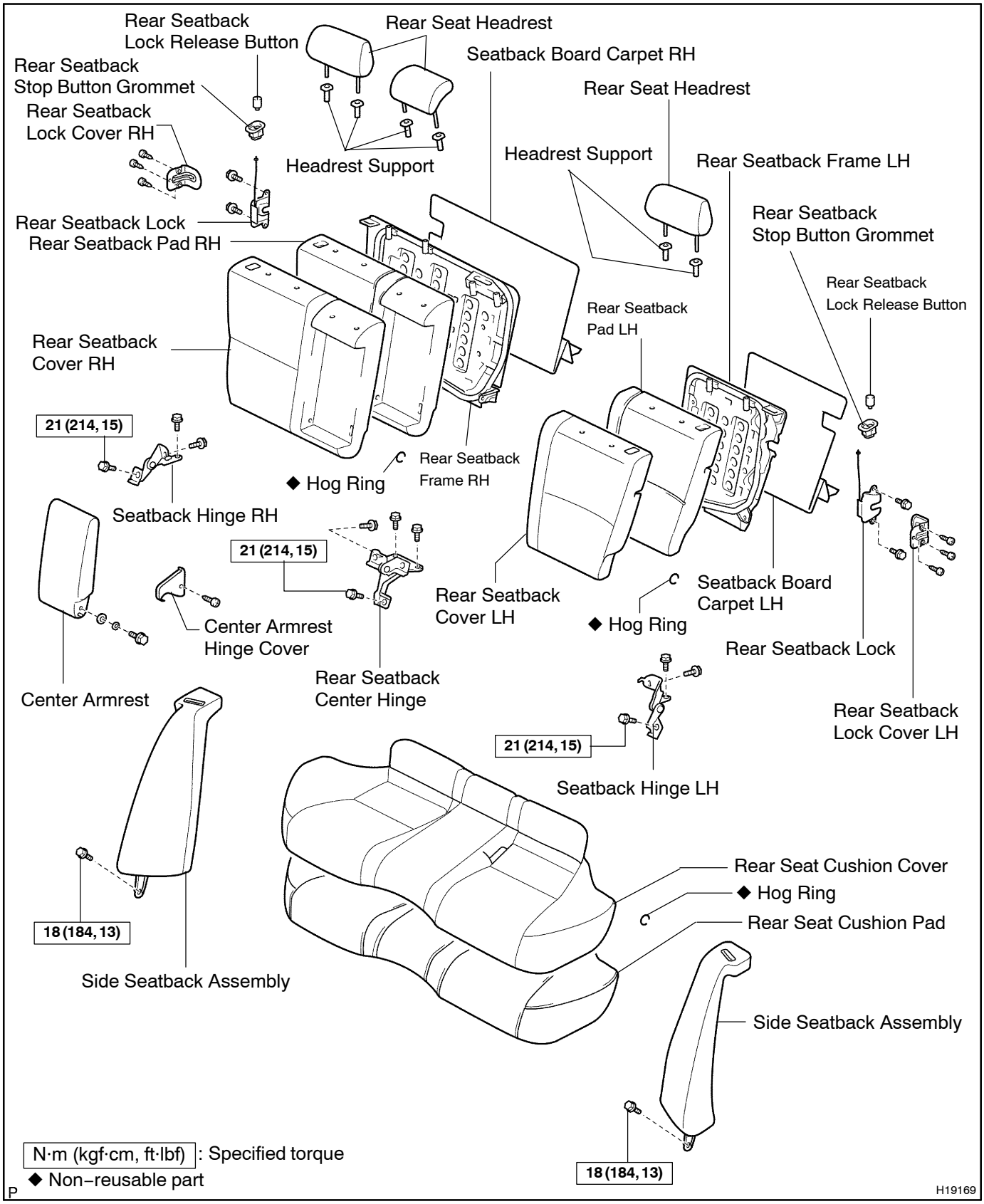
REAR SEAT (Wagon)

COMPONENTS

BO4CP–01

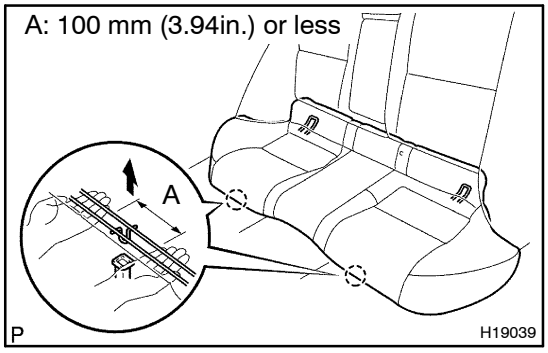


P N·m (kgf·cm, ft·lbf) : Specified torque


Rear Seatback
Lock Release Button
Rear Seatback
Stop Button Grommet
Rear Seatback
Lock Cover RH
Rear Seat Headrest
Headrest Support
Seatback Board Carpet RH
Rear Seat Headrest
Headrest Support
Rear Seatback Frame LH
Rear Seatback
Stop Button Grommet
Rear Seatback
Lock Release Button
Rear Seatback Lock
Rear Seatback Pad RH
Rear Seatback
Pad LH
Rear Seatback
Cover RH
21 (214, 15)
◆ Hog Ring
Rear Seatback
Frame RH
Seatback Hinge RH
21 (214, 15)
Rear Seatback
Cover LH
◆ Hog Ring
Seatback Board
Carpet LH
Rear Seatback Lock
Center Armrest
Hinge Cover
Rear Seatback
Center Hinge
Center Armrest
Rear Seatback
Lock Cover LH
21 (214, 15)
Seatback Hinge LH
Rear Seat Cushion Cover
◆ Hog Ring
Rear Seat Cushion Pad
18 (184, 13)
Side Seatback Assembly
Side Seatback Assembly
18 (184, 13)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
P
H19169

BO4CQ–01

REMOVAL

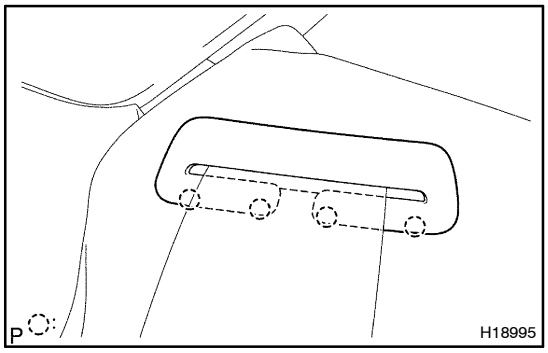


1. REMOVE SEAT CUSHION ASSEMBLY

Pull up the front portion of the seat cushion assembly, then remove it.

NOTICE:

In the case, hold the base of the clip up to prevent the cushion frame from the being distorted.



2. REMOVE SIDE SEATBACK ASSEMBLY

(a) Remove the bolt and floor anchor.

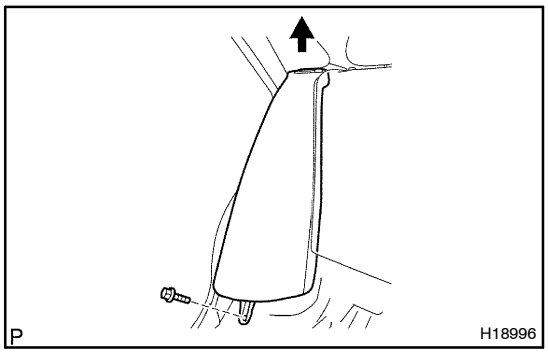
Torque: 42 N·m (428 kgf·cm, 31 ft·lbf)

(b) Using a screwdriver, remove the rear seat shoulder belt hole cover.

HINT:

Tape the screwdriver tip before use.

(c) Employ the same manner described above to the other sides.



(d) Remove the bolt and the side seat back assembly as shown in the illustration.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

3. REMOVE REAR SEAT FLOOR BOARD NO. 4 (See page BO–80)

4. REMOVE DECK FLOOR BOX FRONT (See page BO–80)

5. REMOVE DECK BOARD NO.2 (See page BO–80)

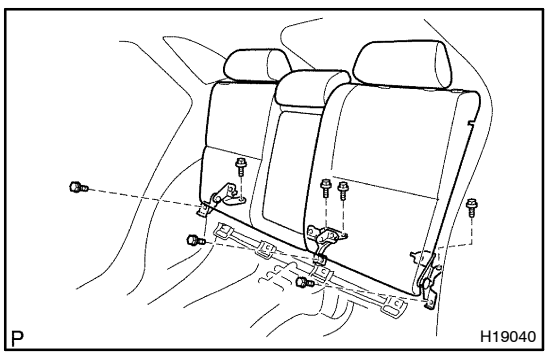
6. REMOVE REAR FLOOR BOARD NO. 2 (See page BO–80)

7. REMOVE REAR FLOOR BOARD NO. 3 (See page BO–80)

8. REMOVE TONNEAU COVER ASSEMBLY (See page BO–80)

9. REMOVE REAR FLOOR FINISH PLATE (See page BO–80)

10. REMOVE DECK TRIM SIDE PANEL ASSEMBLY (See page BO–80)



11. REMOVE SEATBACK ASSEMBLY

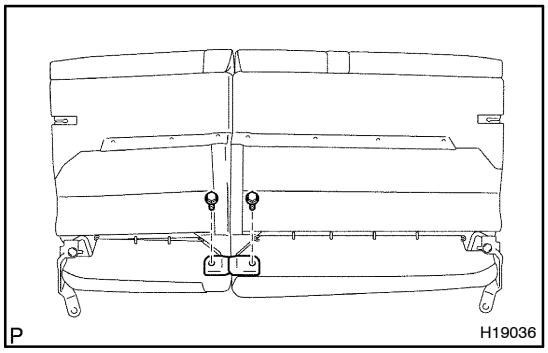
Remove the 7 bolts and the seatback assembly.

Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

BO4CR–01

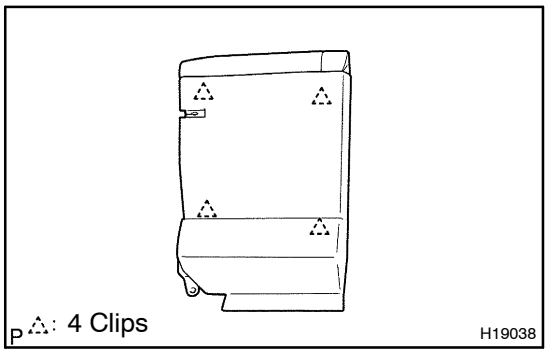
DISASSEMBLY

1. REMOVE REAR SEAT HEADRESTS



2. REMOVE REAR SEATBACK CENTER HINGE

Remove the 2 bolts and rear seat center hinge.



3. REMOVE REAR SEATBACK BOARD CARPET LH

(a) Remove the 3 screws and rear seatback lock cover LH.

(b) Using a screwdriver, remove the seatback board carpet LH.

HINT:

Tape the screwdriver tip before use.

4. REMOVE REAR SEATBACK COVER LH

(a) Remove the bolt and rear seatback hinge LH.

(b) Remove the headrest supports.

(c) Remove the rear back lock release button.

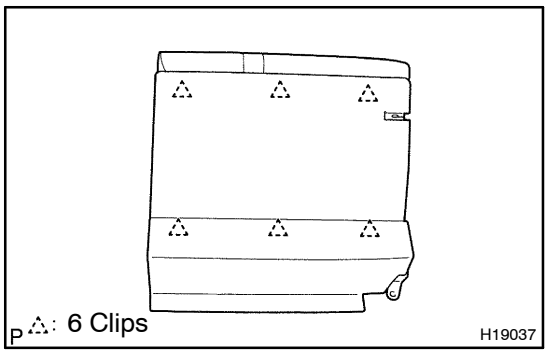
(d) Remove the rear seatback stop button grommet.

(e) Remove the hog rings and rear seatback cover with pad.

(f) Remove the hog rings and rear seatback cover LH from the seatback pad.

5. REMOVE REAR SEATBACK LOCK ASSEMBLY LH

Remove the 2 bolts and the rear seatback lock assembly.



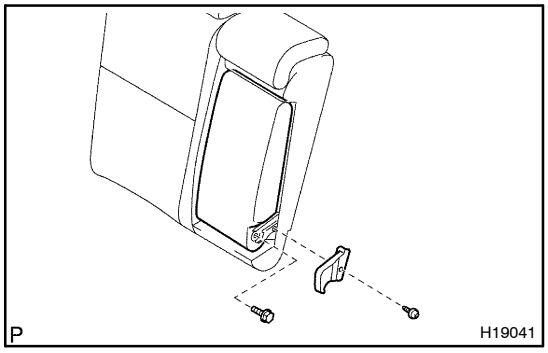
6. REMOVE REAR SEAT BACK BOARD CARPET RH

(a) Remove the 3 screws and rear seatback lock cover.

(b) Using a screwdriver, remove the rear seatback board carpet.

HINT:

Tape the screwdriver tip before use.



7. REMOVE CENTER ARMREST

(a) Remove the screw and center armrest hinge cover.
(b) Remove the bolt and center armrest.

8. REMOVE REAR SEATBACK COVER RH

(a) remove the bolt and rear seatback hinge RH.
(b) Remove the headrest supports.
(c) Remove the rear back lock release button.
(d) Remove the rear seatback stop button grommet.
(e) Remove the hog rings and rear seatback cover with pad fro the seatback frame.
(f) Remove the hog rings and rear seatback cover RH from the seatback pad.

9. REMOVE REAR SEATBACK LOCK ASSEMBLY RH

Remove the 2 bolts and the rear seatback lock assembly.

10. REMOVE REAR SEAT CUSHION COVER

Remove the hog rings and rear seat cushion cover from the seat cushion pad.

BO4CS–01

REASSEMBLY

1. INSTALL REAR SEAT CUSHION COVER

Install the rear seat cushion cover with new hog rings to the front of seat cushion pad.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

2. INSTALL REAR SEATBACK LOCK ASSEMBLY RH

3. INSTALL REAR SEATBACK COVER RH

(a) Install rear seatback cover with new hog rings to the seatback pad.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(b) Install seatback cover with pad new hog rings to the seatback frame.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

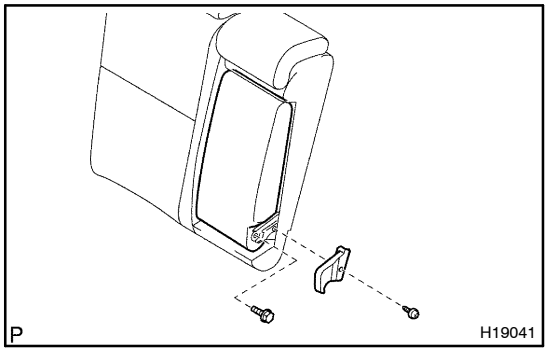
(c) Install the 6 headrest supports.

(d) Install the rear seatback stop button grommet.

(e) Install the rear back lock release button.

(f) Install the bolt and rear seatback hinge RH.

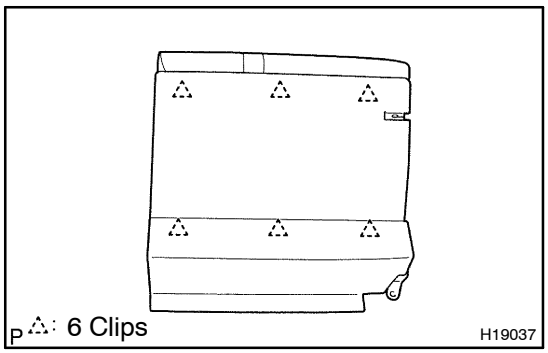
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)



4. INSTALL CENTER ARMREST

(a) Install the center armrest with the bolt.

(b) Install the center armrest hinge cover with the screw.



5. INSTALL SEATBACK BOARD CARPET RH

(a) Install the seatback board carpet RH.

(b) Install the rear seatback lock coverRH.

6. INSTALL REAR SEATBACK LOCK ASSEMBLY LH

7. INSTALL SEATBACK COVER LH

(a) Install rear seatback cover with new hog rings to the seatback pad.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

(b) Install seatback cover with pad new hog rings to the seatback frame.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

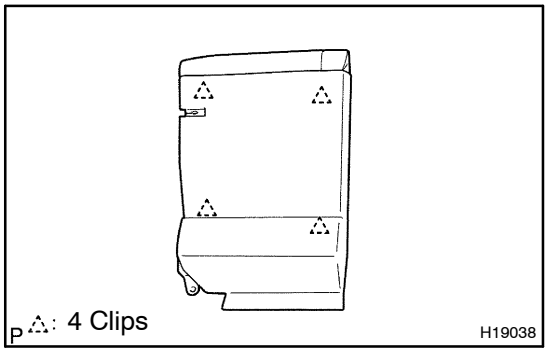
(c) Install the 6 headrest supports.

(d) Install the rear seatback stop button grommet.

(e) Install the rear back lock release button.

(f) Install the bolt and rear seatback hinge LH.

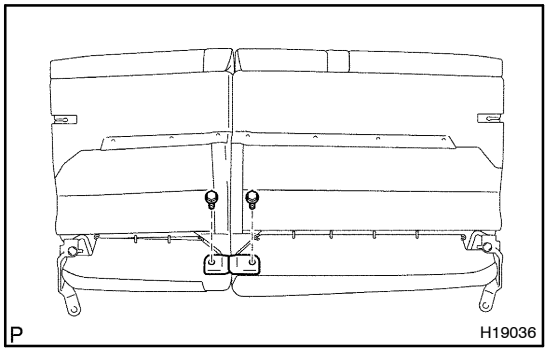
Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)



8. REMOVE SEATBACK BOARD CARPET RH

(a) Install the seatback board carpet LH.

(b) Install the rear seatback lock cover LH.



9. INSTALL REAR SEATBACK CENTER HINGE

Install the rear seat center hinge with the 2 bolts.

Torque: 21 N·m (214 kgf·cm, 15 ft·lbf)

10. INSTALL REAR SEAT HEADRESTS

BO4CT–01

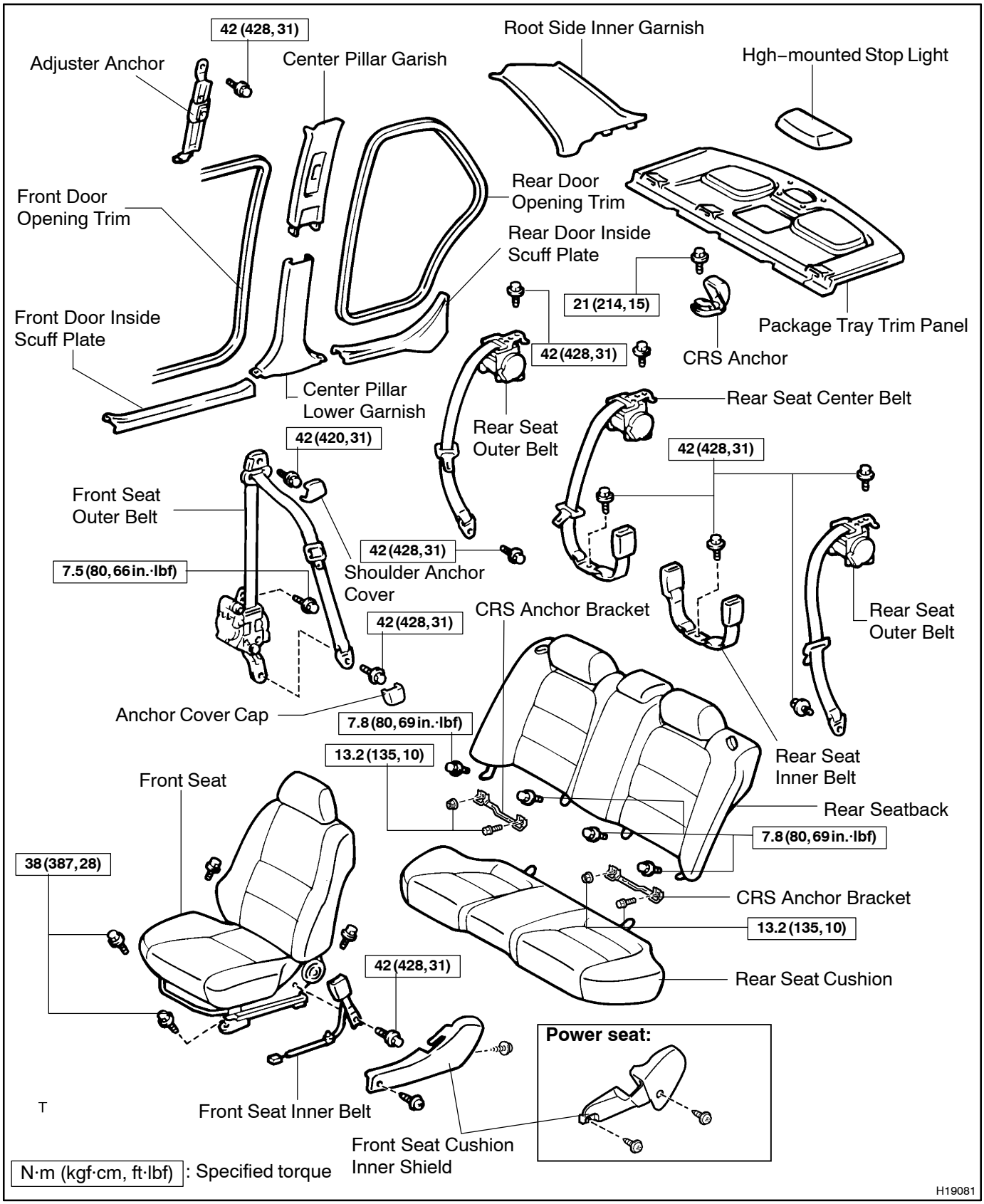
INSTALLATION

Installation is in the reverse order of removal (See page BO–112).

SEAT BELT (Sedan)

COMPONENTS

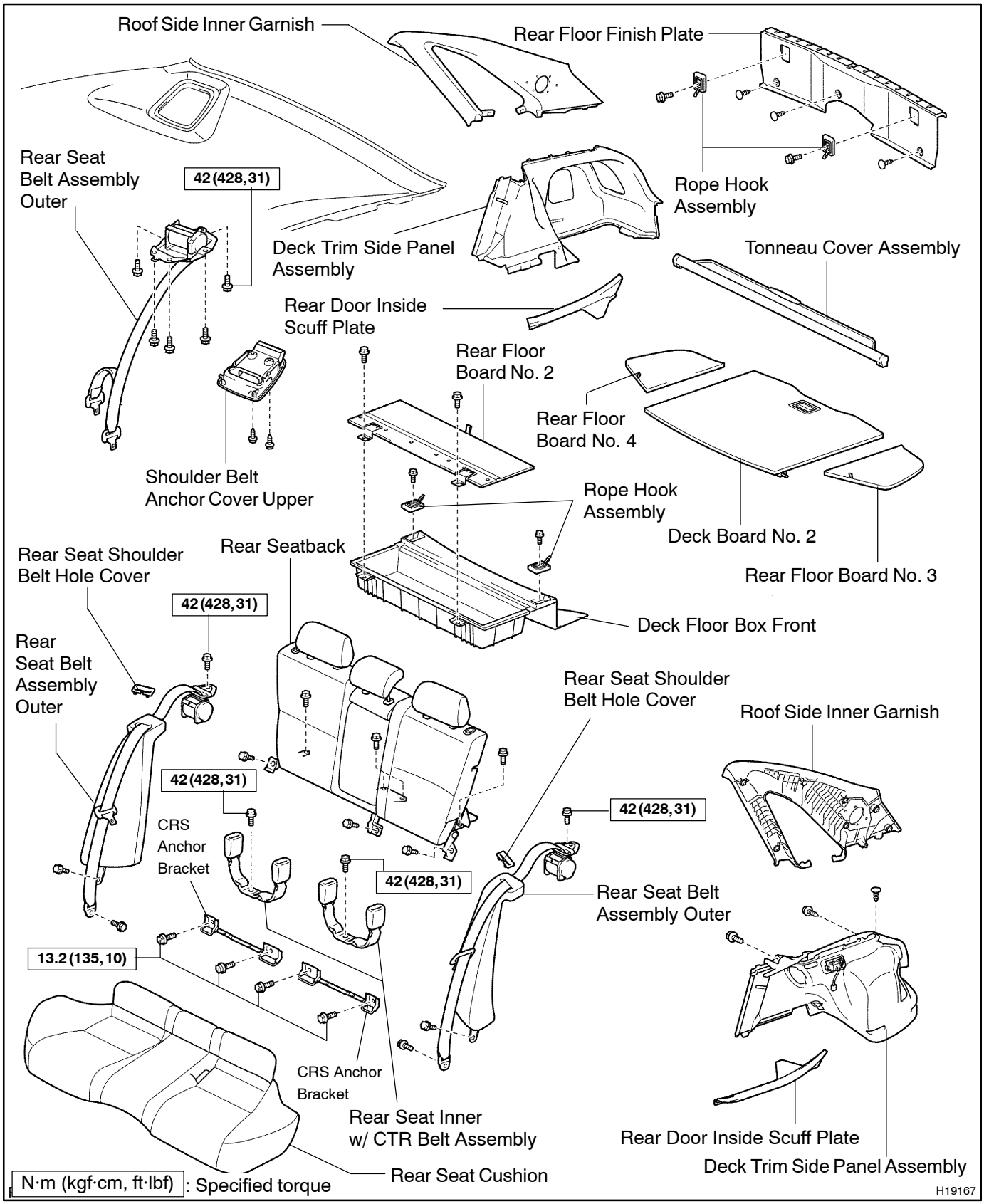
BO4CB–01



SEAT BELT (Wagon)

COMPONENTS

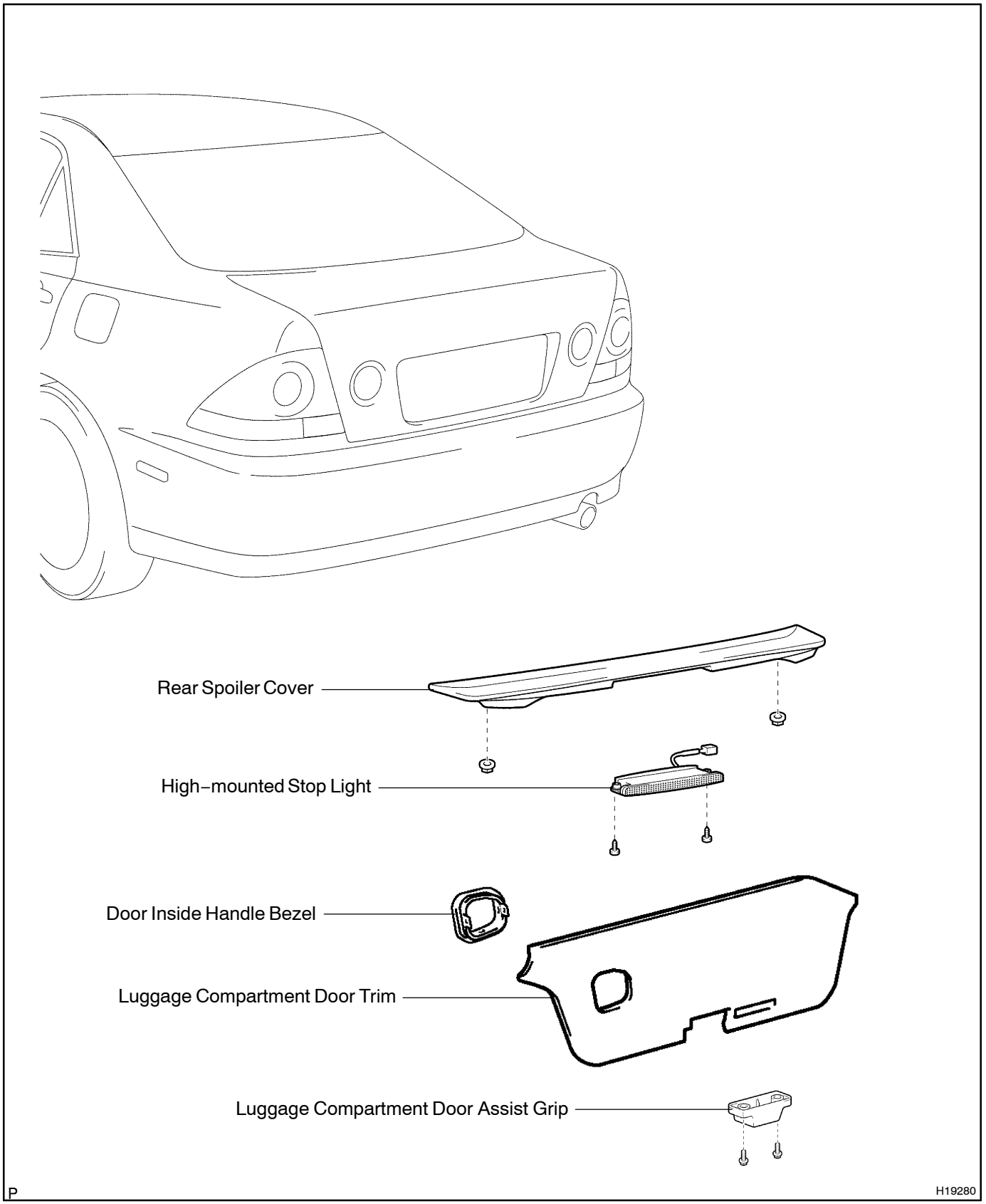
BO4CC–01



SPOILER (Sedan)

COMPONENTS

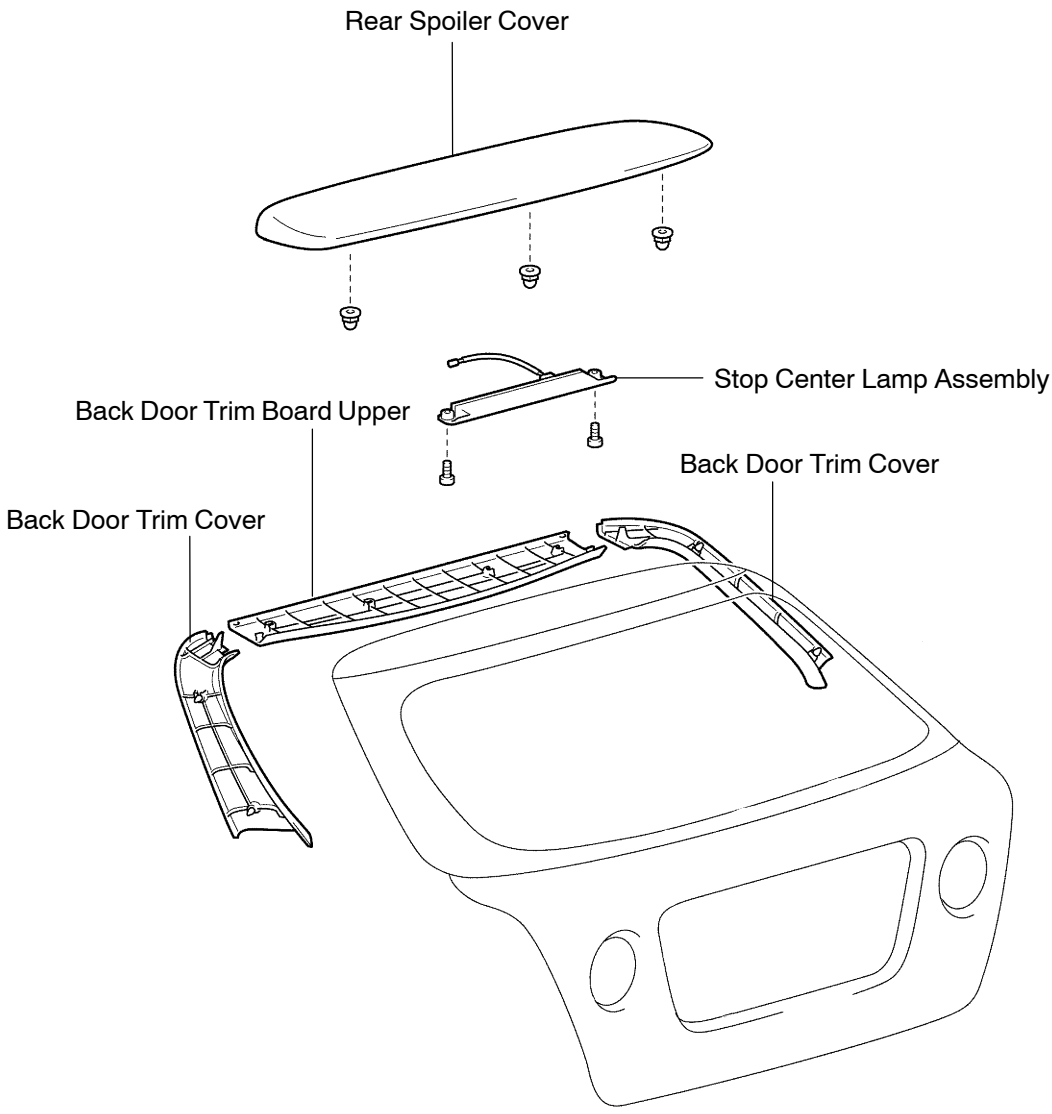
BO4CD–01



SPOILER (Wagon)

COMPONENTS

BO4CE–01



BRAKE FLUID

BR0MJ–07

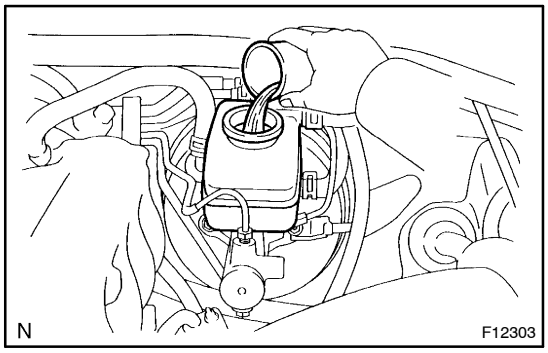
BLEEDING

HINT:

If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the system.

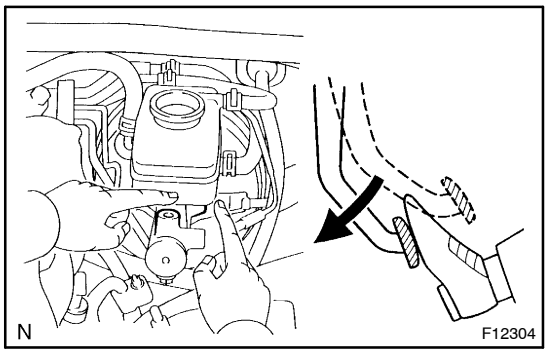
NOTICE:

Do not let brake fluid remain on painted surfaces. Wash it off immediately.



1. FILL RESERVOIR WITH BRAKE FLUID

Fluid: SAE J1703 or FMVSS NO. 116 DOT3



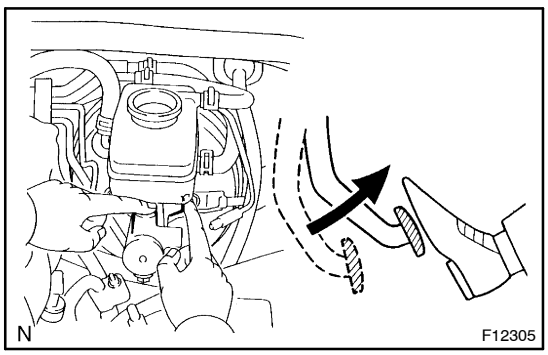
2. BLEED MASTER CYLINDER

HINT:

If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the master cylinder of the air.

(a) Disconnect the brake lines from the master cylinder.
SST 09023–00100

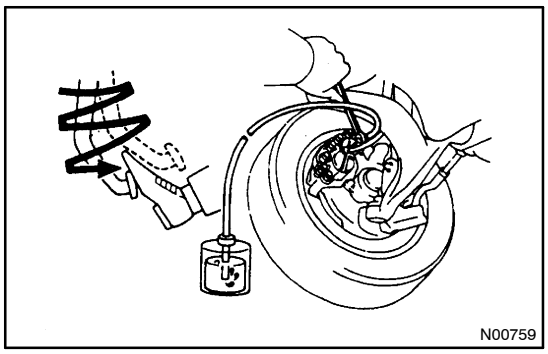
(b) Slowly depress the brake pedal and hold it.



(c) Block off the outer holes with your fingers, and release the brake pedal.

(d) Repeat (b) and (c) 3 or 4 times.

(e) Connect the brake lines to the master cylinder.
SST 09023–00100
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



3. BLEED BRAKE LINE

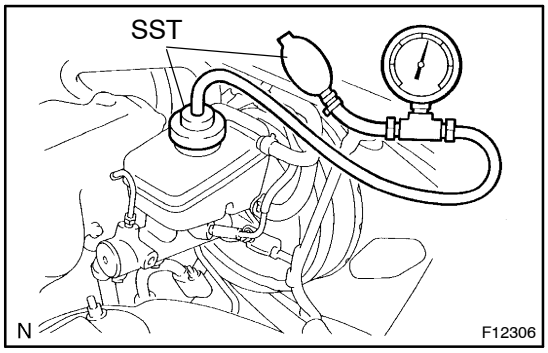
(a) Connect the vinyl tube to the caliper.

(b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.

(c) At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

(d) Repeat (b) and (c) until all the air in the fluid has been bled out.

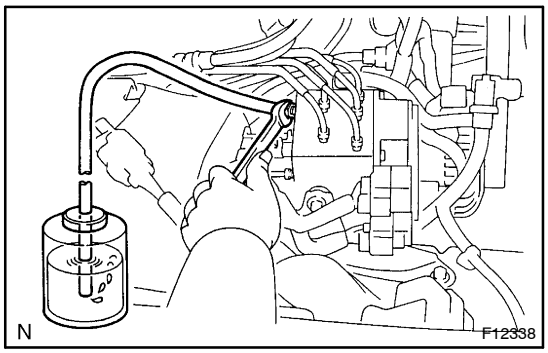
(e) Repeat the procedure on the previous page to bleed the brake line for each wheel.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



4. BLEED ABS & TRC / VSC ACTUATOR

CAUTION:
When repairing the brake master cylinder or ABS & TRC / VSC actuator, bleed the ABS & TRC / VSC actuator of the air.

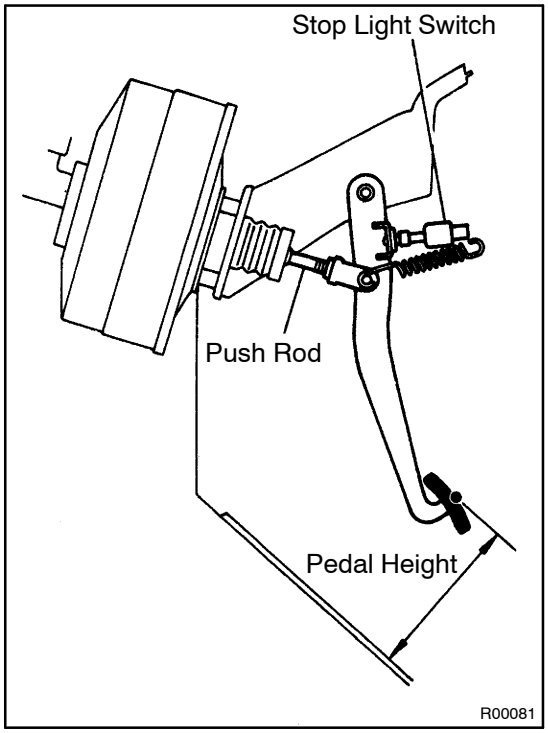
(a) Install the SST to the reservoir.
SST 09992–00242, 09992–00350



(b) Connect the vinyl tube to the ABS & TRC / VSC actuator, and loosen the bleeder plug.
(c) Using SST, apply pressure to the reservoir.
Pressure: 98.1 kpa (1.0 kgf/cm^2, 14.2 psi)
(d) Bleed the ABS & TRC / VSC actuator of the air, tighten the bleeder plug.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

5. CHECK FLUID LEVEL IN RESERVOIR

Check the fluid level and add fluid if necessary.
Fluid: SAE J1703 or FMVSS NO. 116 DOT3



BRAKE PEDAL

BR0MK–06

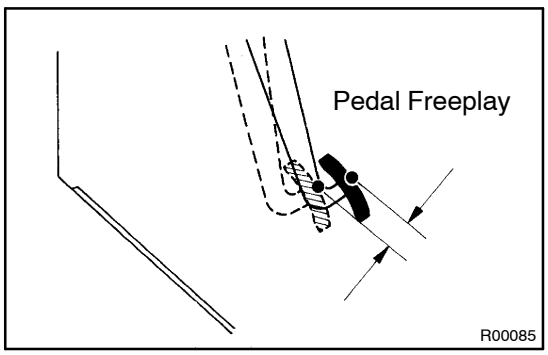
ON–VEHICLE INSPECTION

1. CHECK PEDAL HEIGHT

Pedal height from asphalt sheet:
154 – 164 mm (6.063 – 6.457 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

(a) Remove the lower finish panel (See page BO–56).
(b) Disconnect the connector from the stop light switch.
(c) Loosen the stop light switch lock nut and remove the stop light switch.
(d) Loosen the push rod lock nut.
(e) Adjust the pedal height by turning the pedal push rod.
(f) Tighten the push rod lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
(g) Install the stop light switch and turn it until it slightly contacts the pedal stopper.
(h) Connect the connector to the stop light switch.
(i) Push in the brake pedal 5 – 10 mm (0.20 – 0.39 in.), turn the stop light switch to lock the nut in a position where the stop light goes off.
(j) After installation, push in the brake pedal 5 – 10 mm (0.20 – 0.39 in.), check that stop light lights up.
(k) After adjusting the pedal height, check the pedal freeplay.
(l) Install the lower finish panel (See page BO–56).

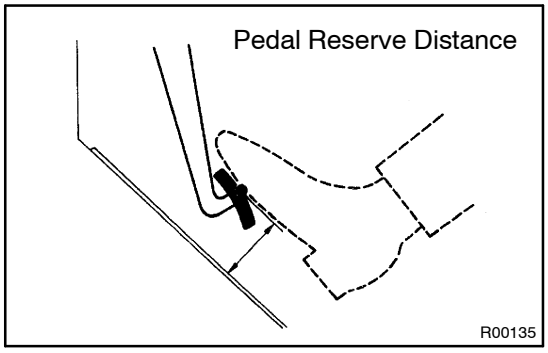


3. CHECK PEDAL FREEPLAY

(a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.
(b) Push in the pedal by hand until the resistance begins to be felt, then measure the distance.
Pedal freeplay: 1 – 6 mm (0.04 – 0.24 in.)

HINT:
The freeplay to the 1st resistance is due to the play between the clevis and pin. This is magnified up to 2.0 – 4.5 mm (0.08 – 0.18 in.) at the pedal.
If incorrect, check the stop light switch clearance. If the clearance is OK, then troubleshoot the brake system.

Stop light switch clearance:
1.5 – 2.5 mm (0.059 – 0.098 in.)



4. CHECK PEDAL RESERVE DISTANCE

Release the parking brake lever.

With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

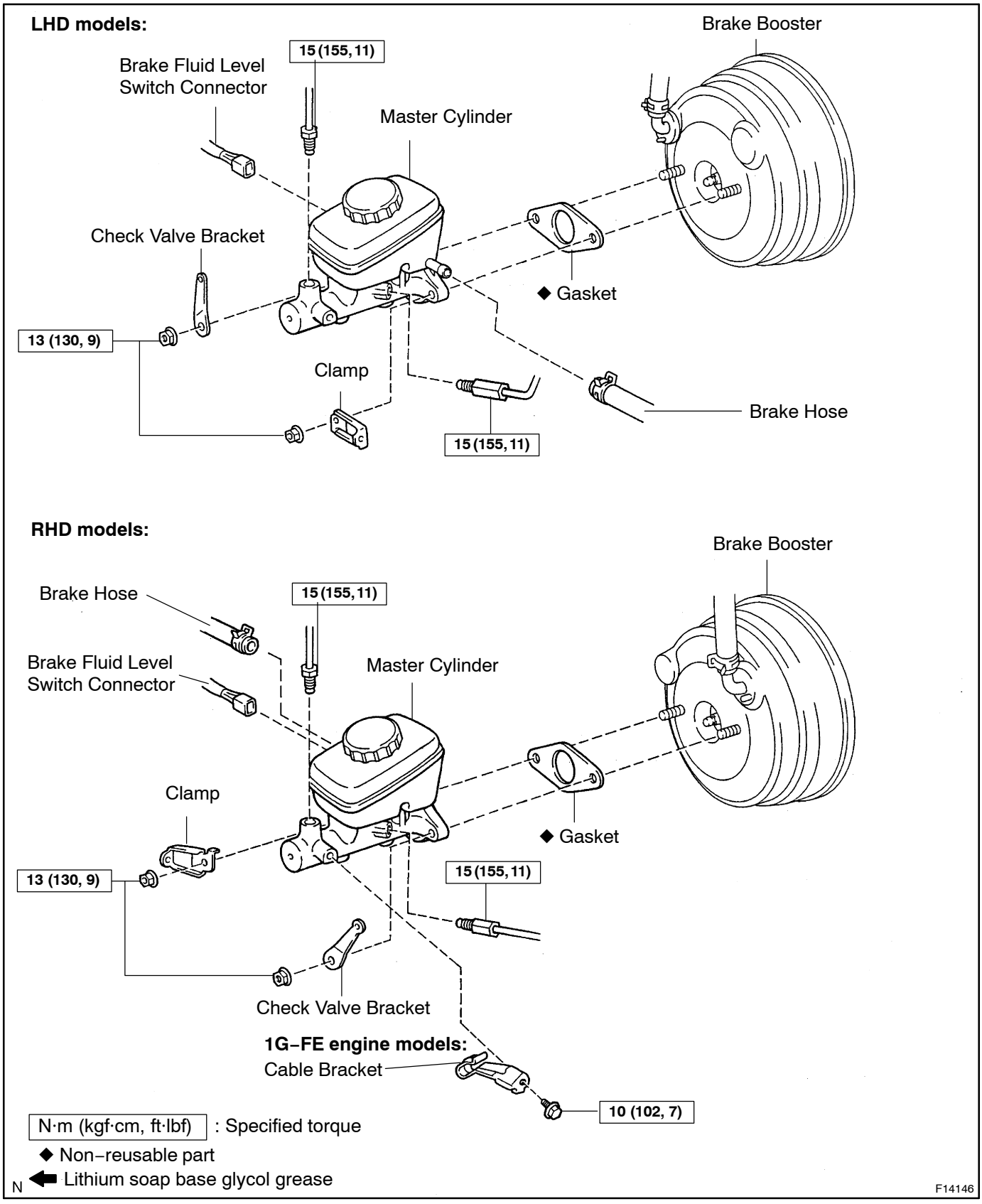
Pedal reserve distance from asphalt sheet at 490 N (50 Kgf, 110.2 lbf): More than 99 mm (3.90 in.)

If the reserve distance is incorrect, troubleshoot the brake system.

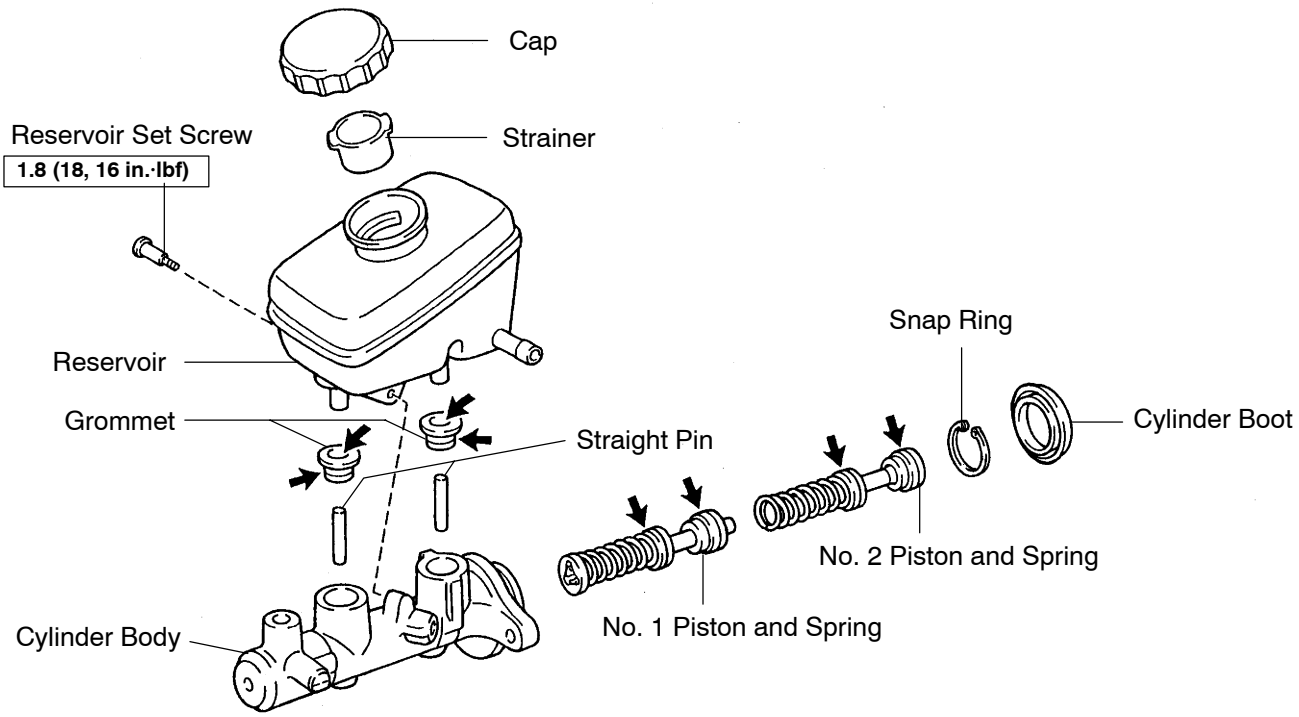
BRAKE MASTER CYLINDER

COMPONENTS

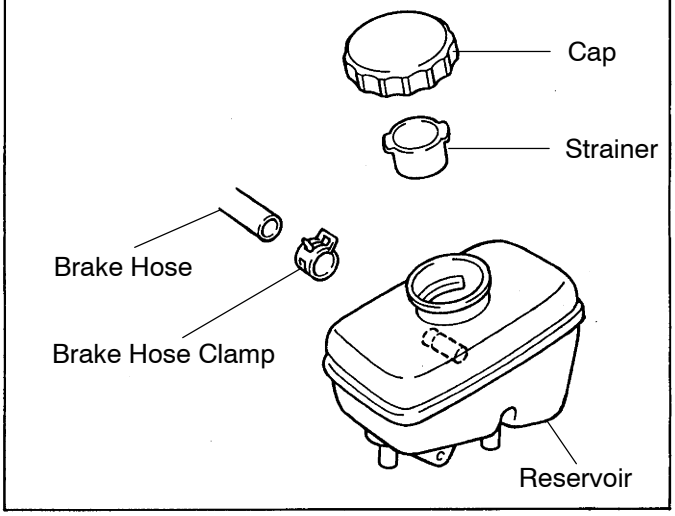
BR1QW–01



LHD models:



RHD models:



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

◀ Lithium soap base glycol grease

N

F14147

BR0AF–11

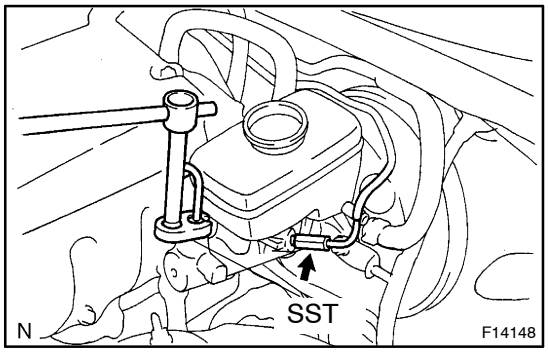
REMOVAL

1. TAKE OUT FLUID WITH SYRINGE

NOTICE:

Do not let brake fluid remain on a painted surface. Wash it off immediately.

2. DISCONNECT BRAKE FLUID LEVEL SWITCH CONNECTOR

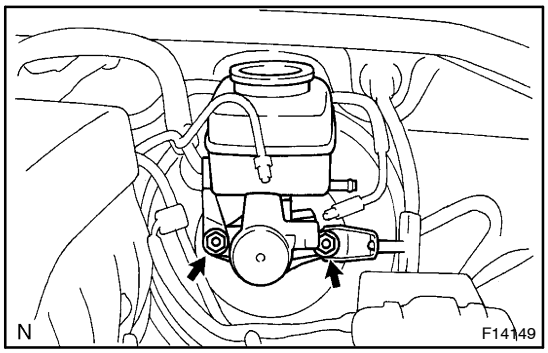


3. DISCONNECT BRAKE LINES

Using SST, disconnect the 2 brake lines.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



4. REMOVE MASTER CYLINDER

(a) 1G–FE engine RHD models:
Remove the bolt and cable bracket.
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

(b) Disconnect the brake hose.

(c) Remove the 2 nuts, and pull out the check valve bracket, clamp, master cylinder and gasket.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

BR1QX–01

DISASSEMBLY

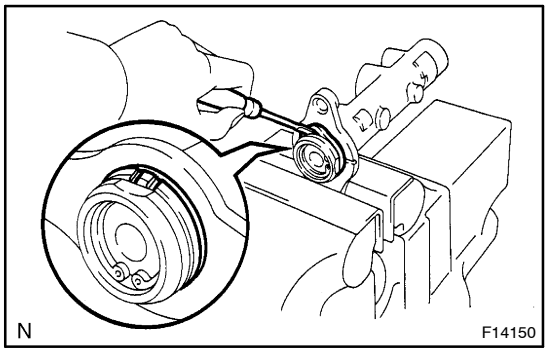
1. REMOVE RESERVOIR

Remove the set screw and pull out the reservoir.

Torque: 1.8 N·m (18 kgf·cm, 16 in.·lbf)

2. REMOVE 2 GROMMETS

3. PLACE CYLINDER IN VISE



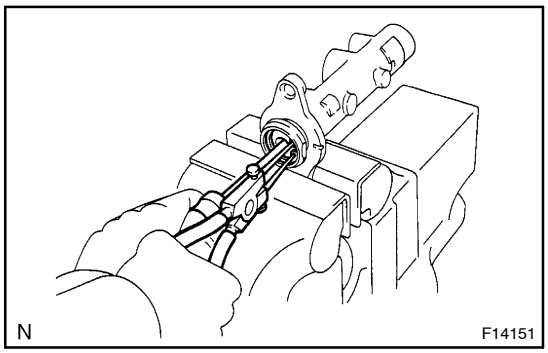
4. REMOVE MASTER CYLINDER BOOT

Using a screwdriver, remove the master cylinder boot.

HINT:

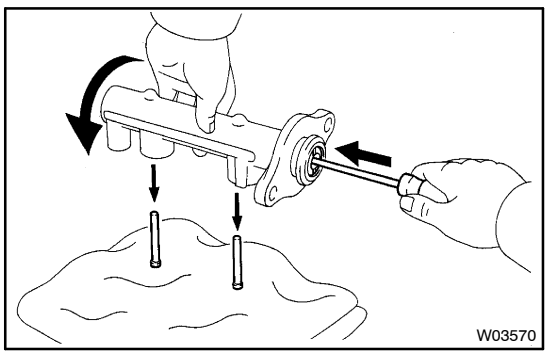
At the time of reassembly, please refer to the following item.

With the UP mark on the master cylinder boot facing upwards, install the cylinder boot on the master cylinder.



5. REMOVE 2 PISTONS AND SPRINGS

(a) Push in the piston with a screwdriver and remove the snap ring with snap ring pliers.

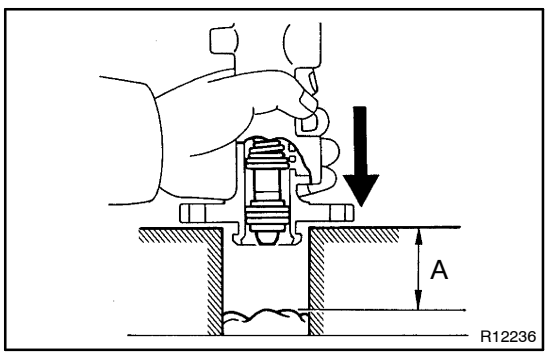


(b) Push in the piston with a screwdriver, and remove the 2 straight pins by turning over the cylinder body.

HINT:

Tape the screwdriver tip before use.

(c) Remove the 2 pistons and springs by hand, pulling straight out, not at angle.



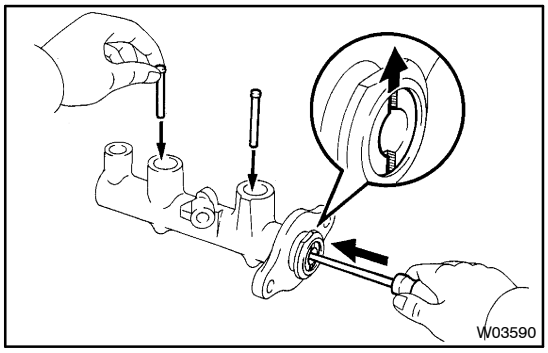
(d) Place a rag and 2 wooden blocks on the work table and lightly tap the cylinder flange against the block edges until the piston drops out of the cylinder.

HINT:

Make sure the distance (A) from the rag to the top of the blocks is at least 100 mm (3.94 in.).

NOTICE:

- **If pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.**
- **At the time of reassembly, be careful not to damage the rubber lips on the pistons.**



HINT:
At the time of reassembly, insert the pistons with elliptic hole facing vertically.

BR0MP–01

INSPECTION

HINT:

Clean the disassembled parts with compressed air.

1. INSPECT CYLINDER BORE FOR RUST OR SCORING

2. INSPECT CYLINDER FOR WEAR OR DAMAGE

If necessary, clean or replace the cylinder.

BR0MQ–02

REASSEMBLY

Reassembly is in the reverse order of disassmbly (See page BR–8).

HINT:

Apply lithium soap base glycol grease to the rubber parts indicated by the arrows (See page BR–5).

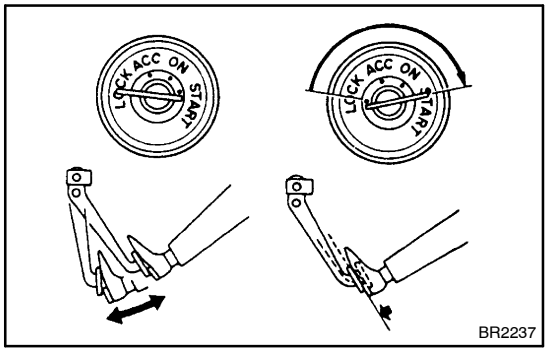
BR0MR–03

INSTALLATION

Installation is in the reverse order of removal (See page BR–7).

HINT:

- Before installation, adjust length of brake booster push rod (See page BR–18).
- After installation, fill the brake reservoir with brake fluid, bleed brake system (See page BR–1), and check for leaks.
- Check and adjust brake pedal (See page BR–3).



BRAKE BOOSTER ASSEMBLY

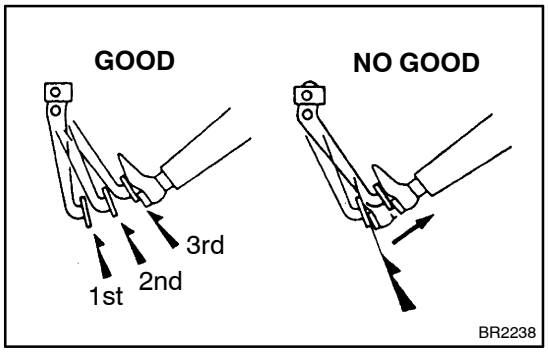
BR1QY–01

ON–VEHICLE INSPECTION

1. OPERATING CHECK

(a) Depress the bake pedal several times with the engine OFF and check that there is no change in the pedal reserve distance.

(b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.



2. AIR TIGHTNESS CHECK

(a) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly.

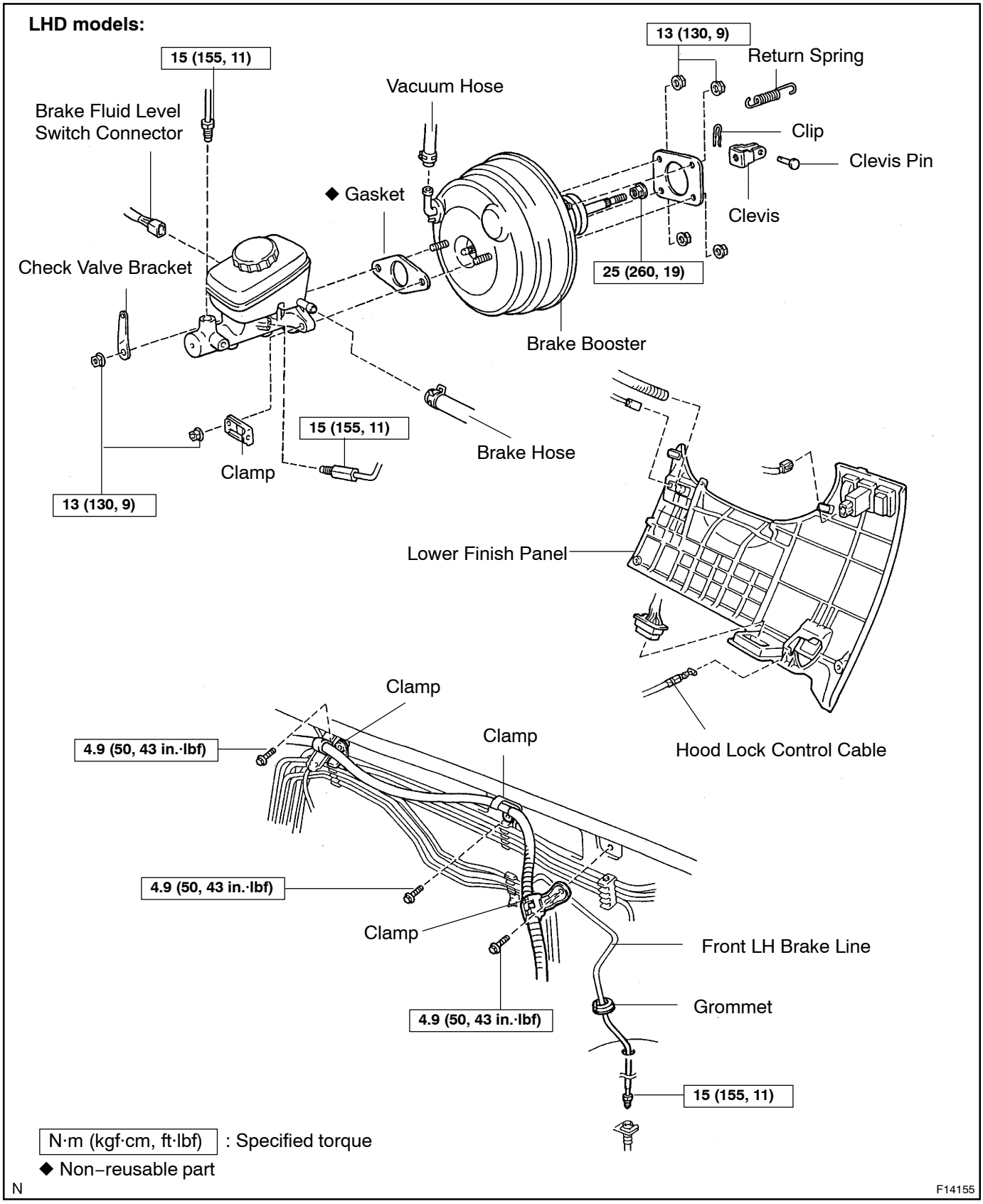
If the pedal goes down the farthest the 1st time, but gradually rises after the 2nd or 3rd time, the booster is air–tight.

(b) Depress the brake pedal while the engine is running, and stop the engine with the pedal depressed.

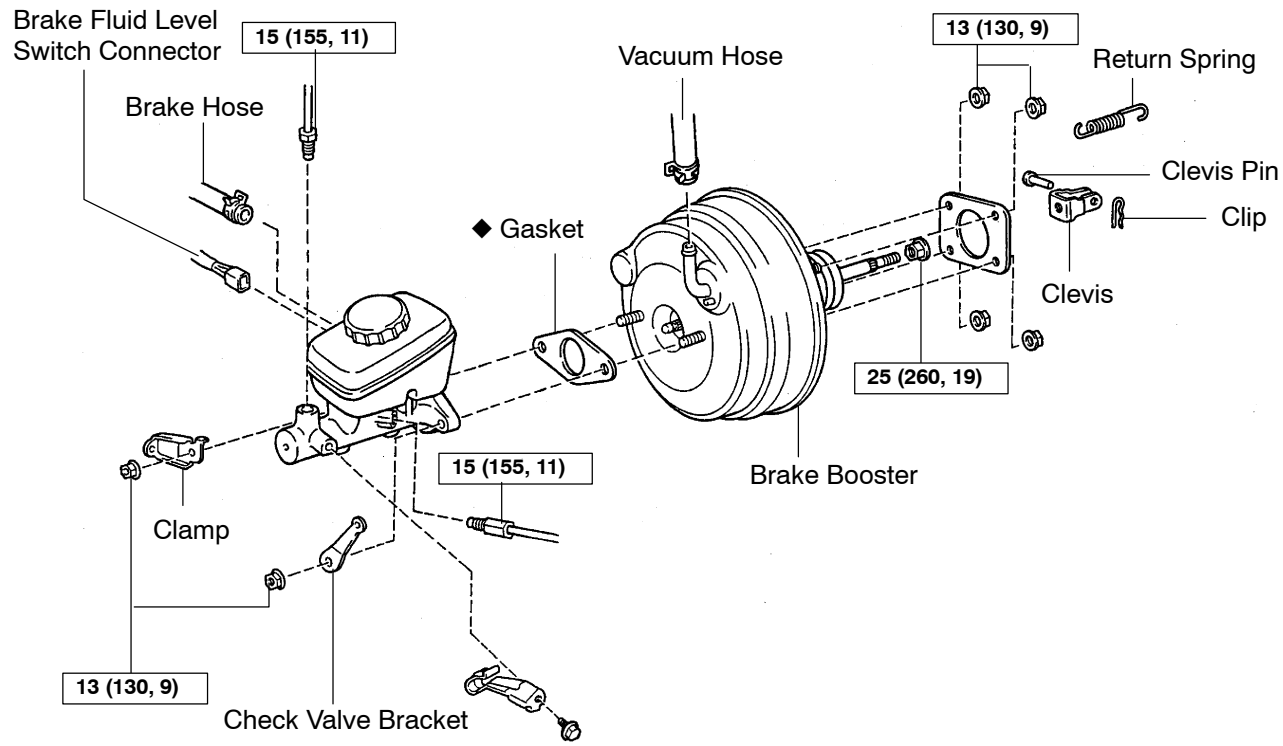
If there is no change in the pedal reserve travel after holding the pedal for 30 seconds, the booster is air–tight.

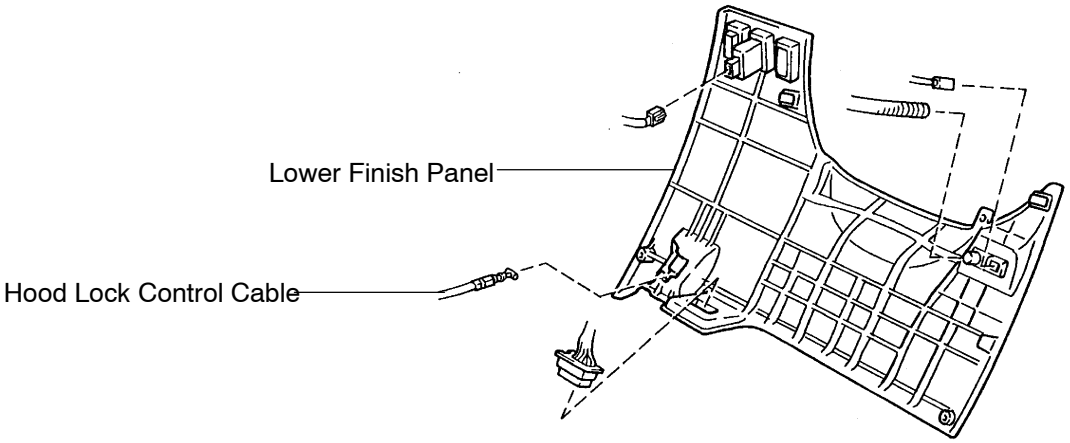
BR1QZ–01

COMPONENTS



RHD models:





N

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

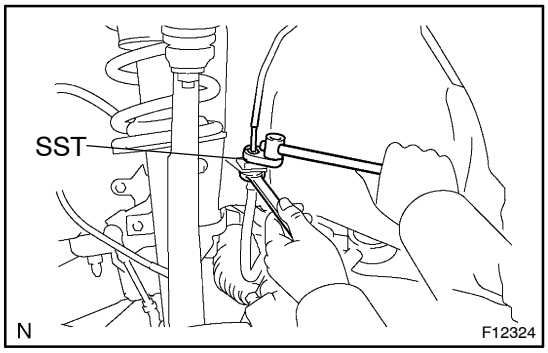
◆ Non–reusable part

F14156

BR1R0–01

REMOVAL

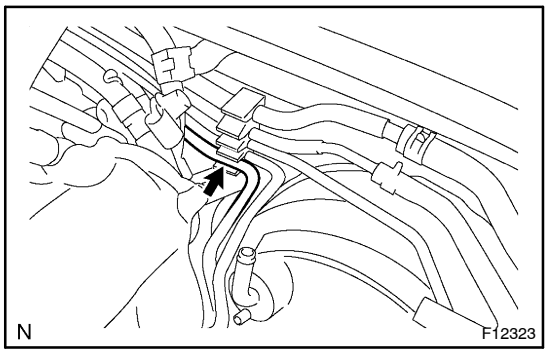
1. **REMOVE FRONT LH WHEEL**
   Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE MASTER CYLINDER (See page BR–7)**
3. **DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER**



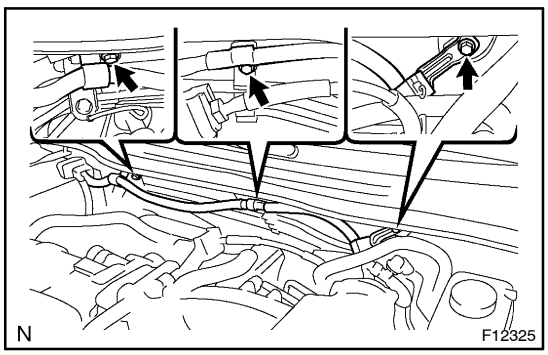
4. **LHD models:**
   DISCONNECT FRONT LH BRAKE LINE

(a) Using SST and spanner, disconnect the brake line from the flexible hose of front LH brake.
SST 09023–00100

(b) Separate the grommet from body through the brake line.



(c) Disconnect the front LH brake line from the clamp.

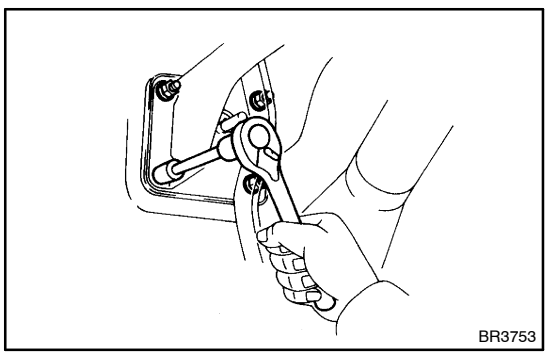


5. **REMOVE BRAKE BOOSTER**

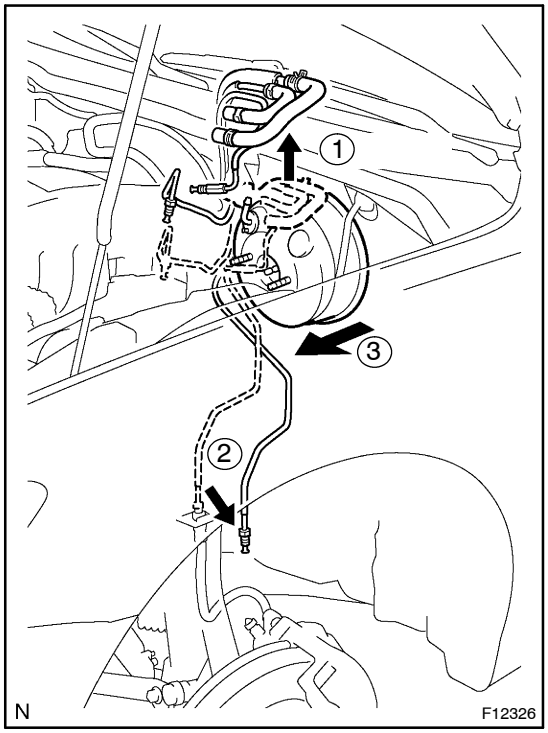
(a) LHD models:
Remove the 3 bolts and disconnect the 3 clamps.

(b) Remove the lower finish panel (See page BO–56).

(c) Remove the return spring, clip and clevis pin.



(d) Remove the clevis and 4 nuts.



(e) LHD models:
Move the brake line as illustrated and ensure sufficient space.

(f) Pull out the booster and gasket.

BR1R1–01

INSTALLATION

1. INSTALL BRAKE BOOSTER

(a) Install a new gasket to the booster.

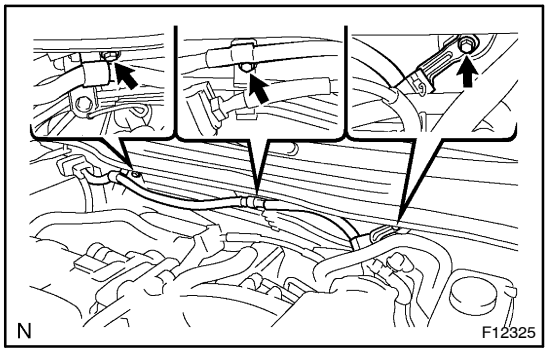
(b) Install the booster.

(c) Install and torque the booster installation nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

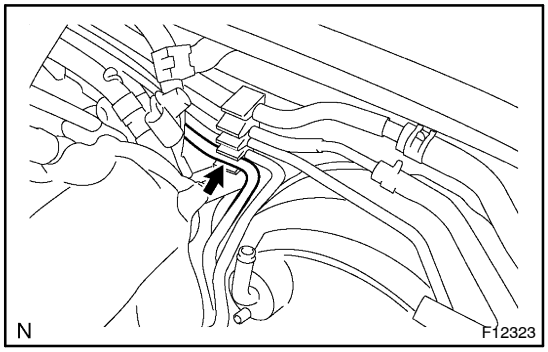
(d) Install the clevis to the operating rod.

(e) Insert the clevis pin into the clevis and brake pedal, and install the clip to the clevis pin.

(f) Install the pedal return spring.



(g) LHD models:
Install the 3 clamps with 3 bolts.
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



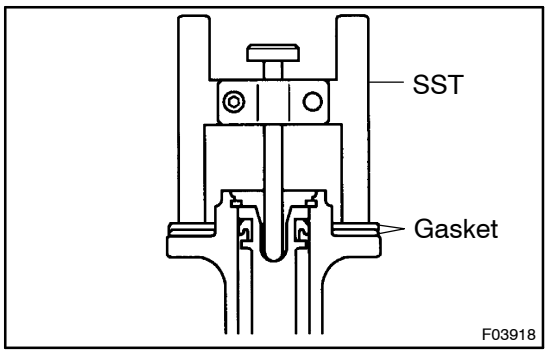
2. LHD models:
CONNECT FRONT LH BRAKE LINE

(a) Connect the front LH brake line to the clamp.

(b) Using SST and spanner, connect the brake line to the flexible hose of front LH brake.
SST 09023–00100
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

(c) Attach the grommet to body through the brake line.

3. CONNECT VACUUM HOSE TO BRAKE BOOSTER



4. ADJUST LENGTH OF BOOSTER PUSH ROD

NOTICE:

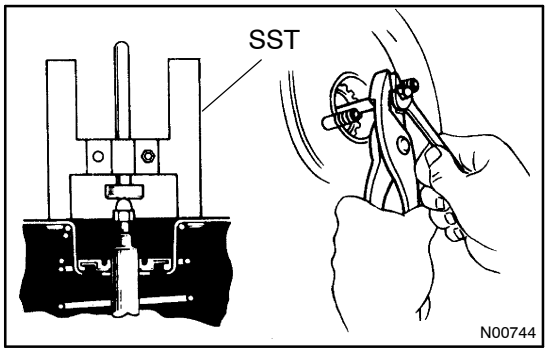
When adjusting the length of the booster push rod, install 2 new gaskets to the master cylinder. When installing the master cylinder, remove one gasket before installing the master cylinder.

(a) Install 2 new gaskets on the master cylinder.

(b) Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.
SST 09737–00011

(c) Turn the SST upside down, and set it on the booster.
SST 09737–00011

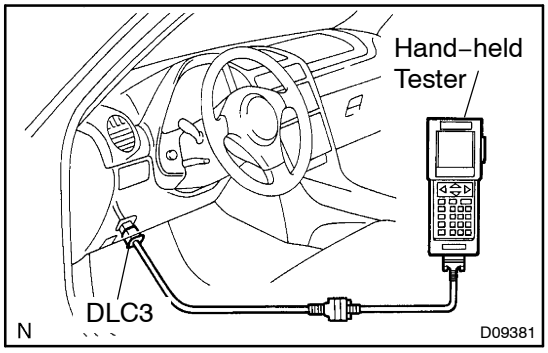
(d) Measure the clearance between the booster push rod and pin head (SST).
Clearance: 0 mm (0 in.)



(e) Adjust the booster push rod length until the push rod slightly touches the pin head.

HINT:
When adjusting the push rod, depress the brake pedal enough so that the push rod sticks out.

5. **INSTALL BRAKE MASTER CYLINDER (See page BR–12)**
6. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–1)**
7. **CHECK FOR FLUID LEAKAGE**
8. **CHECK AND ADJUST BRAKE PEDAL (See page BR–3)**
9. **INSTALL LOWER FINISH PANEL (See page BO–56)**
10. **DO OPERATIONAL CHECK (See page BR–13)**



BRAKE ACTUATOR

BR1R2–01

ON–VEHICLE INSPECTION

1. INSPECT ABS & TRC / VSC ACTUATOR OPERATION

(a) Connect the hand–held tester.
  (1) Connect the hand–held tester to the DLC3.
  (2) Start the engine and run it at idle.
  (3) Select the ACTIVE TEST mode on the hand–held tester.

HINT:
Please refer to the hand–held tester operator's manual for further details.

(b) Inspect the actuator motor operation.
  (1) With the motor relay ON, check the actuator motor operation noise.
  (2) Turn the motor relay OFF.
  (3) Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.
  (4) With the motor relay ON, check that the pedal does not pulsate.

NOTICE:
Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

  (5) Turn the motor relay OFF and release the brake pedal.

(c) Inspect the right front wheel operation.

NOTICE:
Never turn ON the solenoid which is not described below.

  (1) With the brake pedal depressed, perform the following operations.
  (2) Turn the SFRH and SFRR solenoid ON simultaneously, and check that the pedal cannot be depressed.

NOTICE:
Do not keep solenoid ON for more than 10 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

  (3) Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.
  (4) Turn the motor relay ON, and check that the pedal returns.

NOTICE:
Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

  (5) Turn the motor relay OFF and release the brake pedal.

(d) Inspect other wheel operation.
As in the same procedure, check the solenoids of other wheels.

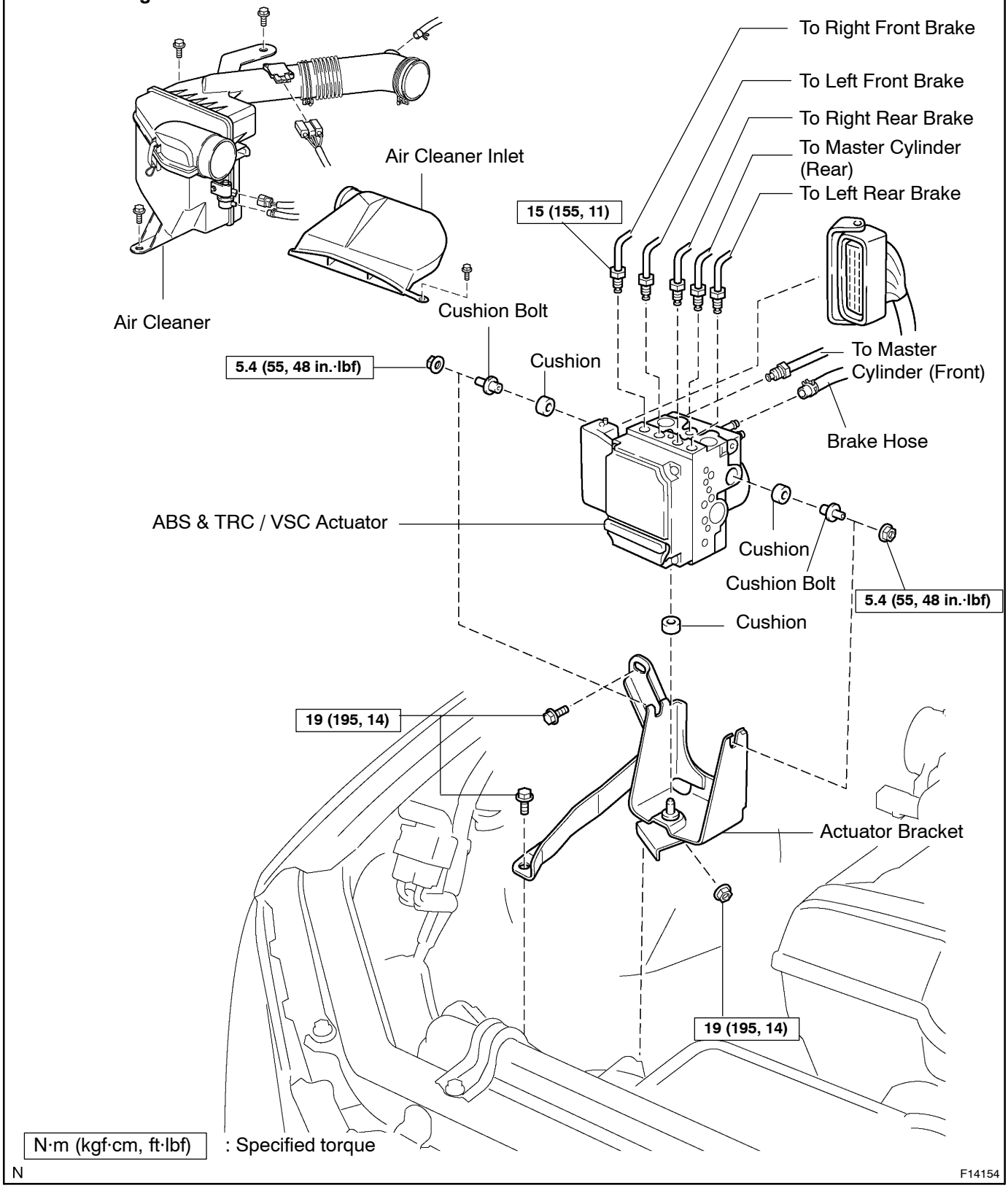
HINT:
Left front wheel: SFLH, SFLR
Right rear wheel: SRRH, SRRR
Left rear wheel: SRLH, SRLR

(e) Clear the DTC (See page DI–251 or DI–318).

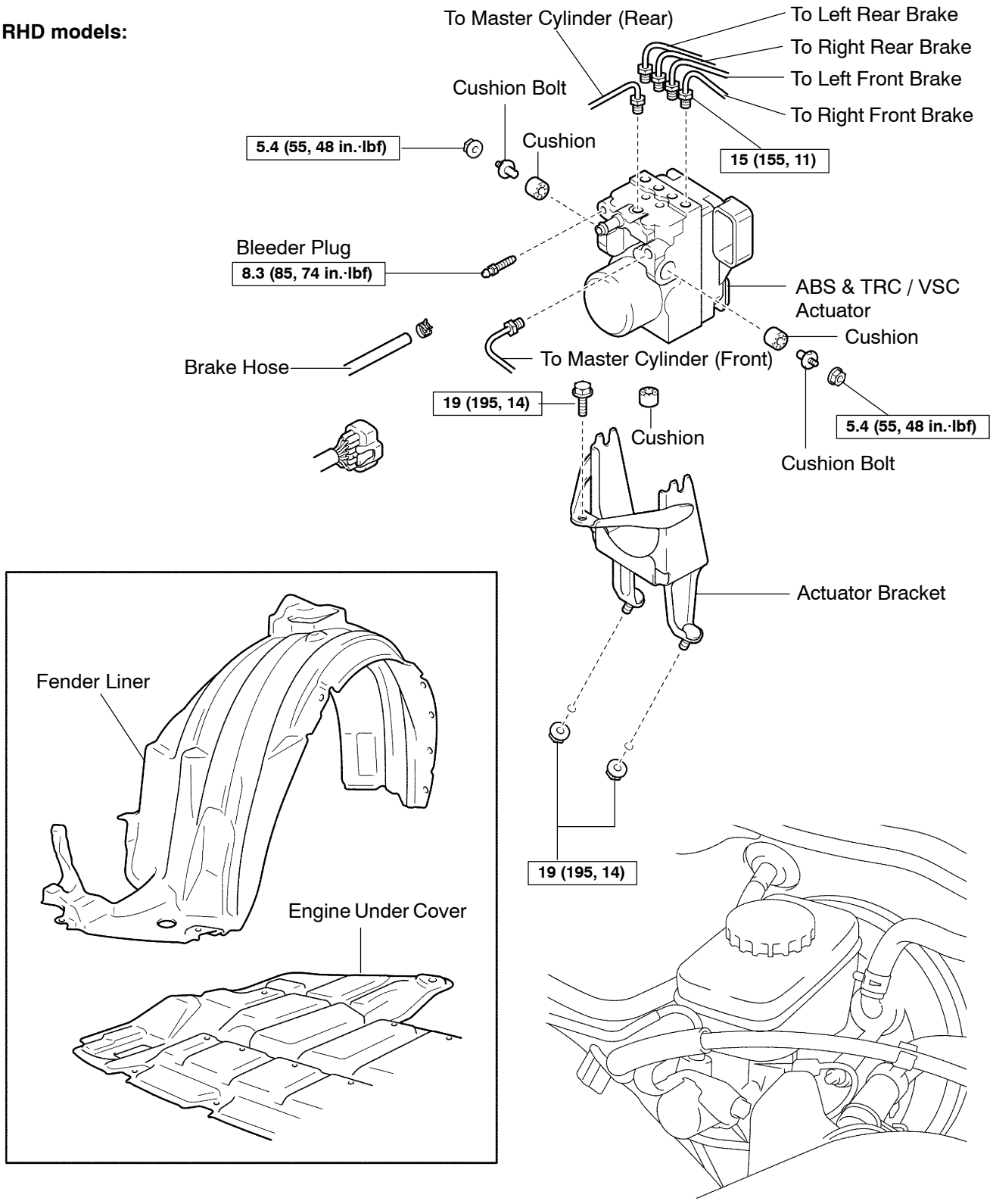
BR1R3–01

COMPONENTS

2JZ–GE engine LHD models:



RHD models:

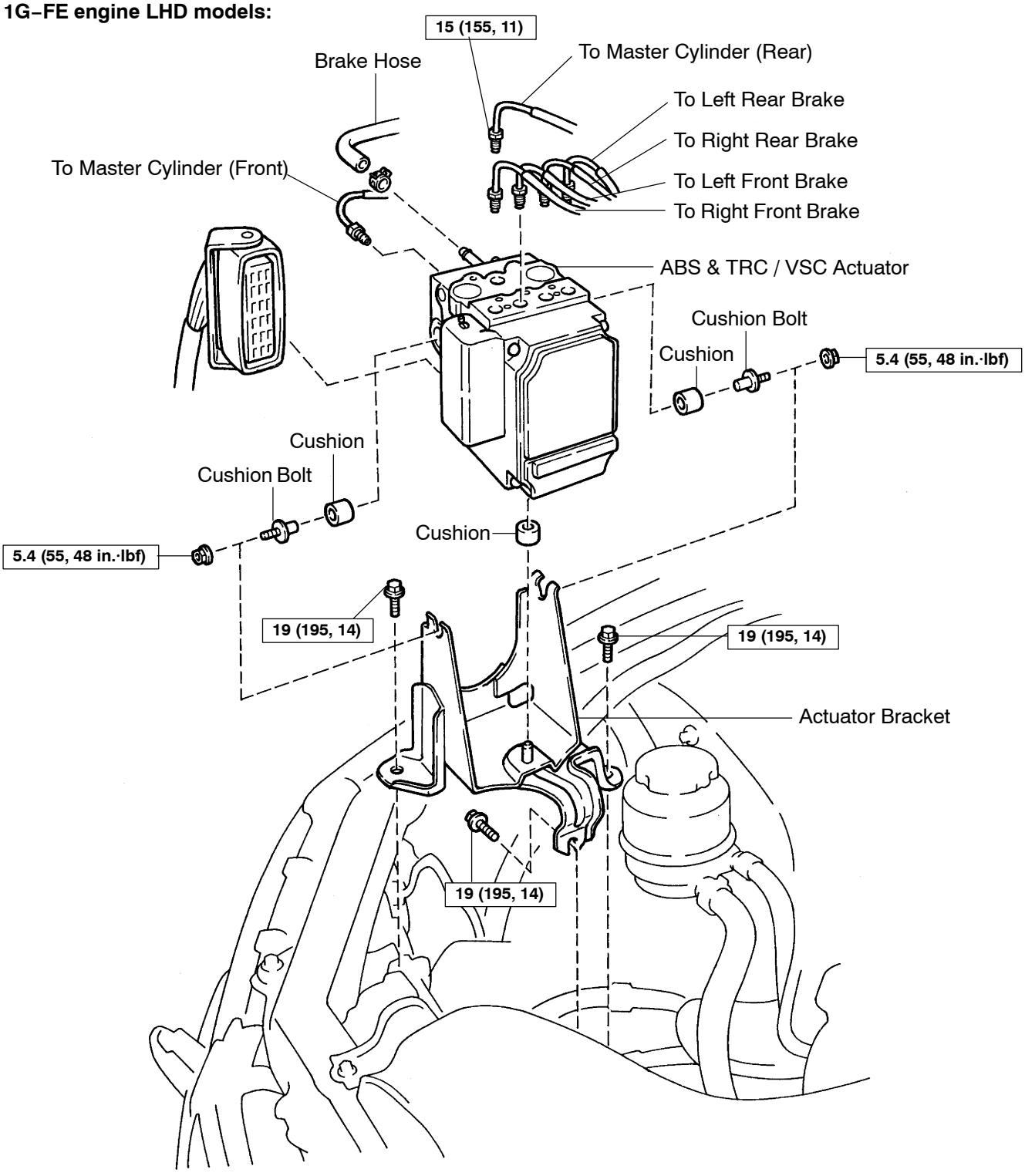


N·m (kgf·cm, ft·lbf) : Specified torque

P

F14152

1G–FE engine LHD models:



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

N

F14153

BR1R4–01

REMOVAL

1. 2JZ–GE engine LHD models:
REMOVE AIR CLEANER INLET AND AIR CLEANER (See page EM–30)

2. DISCONNECT BRAKE LINES

Using SST, disconnect the 6 brake lines from the ABS & TRC / VSC actuator.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

HINT:

- When disconnecting the brake lines, use tags or make a memo to identify the place to reconnect.
- At the time of installation, connect each brake line to the correct position (See page BR–22).

3. DISCONNECT BRAKE HOSE AND CONNECTOR

4. REMOVE ABS & TRC / VSC ACTUATOR ASSEMBLY

(a) RHD models:
Remove the engine under cover and fender liner.

(b) RHD models:
Remove the bolt, 2 nuts and ABS & TRC / VSC actuator assembly.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

(c) 2JZ–GE engine LHD models:
Remove the nut, 2 bolts and ABS & TRC / VSC actuator assembly.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

(d) 1G–FE engine LHD models:
Remove the 3 botls and ABS & TRC / VSC acutuator assembly.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

(e) Remove the 2 nuts and ABS & TRC / VSC actuator.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(f) Remove the 2 cushion bolts and 3 cushions.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

BR1R5–01

INSTALLATION

Installation is in the reverse order of removal (See page BR–25).

HINT:

- After installation, fill the brake reservoir with brake fluid, bleed brake system (See page BR–1).
- Check for leaks.

CHARGING SYSTEM

CH0J8–01

ON–VEHICLE INSPECTION

CAUTION:

- **Check that the battery cables are connected to the correct terminals.**
- **Disconnect the battery cables when the battery is given a quick charge.**
- **Do not perform tests with a high voltage insulation resistance tester.**
- **Never disconnect the battery while the engine is running.**
- **Check that the charging cable is tightened on terminal B of the alternator and the fuse box.**
- **Do not check whether the alternator generates or not with connecting terminal F to the other terminal.**

1. CHECK BATTERY ELECTROLYTE LEVEL

Check the electrolyte quantity of each cell.

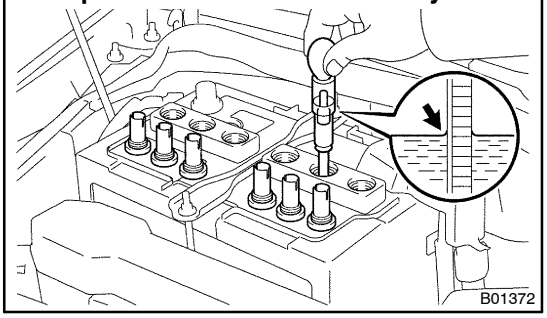
Maintenance–Free Battery:

If under the lower level, replace the battery (or add distilled water if possible). Check the charging system.

Except Maintenance–Free Battery:

If under the lower level, add distilled water.

Except Maintenance–Free Battery



2. Except Maintenance–Free Battery: CHECK BATTERY SPECIFIC GRAVITY

Check the specific gravity of each cell.

Standard specific gravity: 1.25 – 1.29 at 20°C (68°F)

If the specific gravity is less than specification, charge the battery.

3. Maintenance–Free Battery: CHECK BATTERY POSITIVE VOLTAGE

(a) After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlight, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.

(b) Turn the ignition switch OFF and turn off the electrical systems.

(c) Measure the battery positive voltage between the negative (–) and positive (+) terminals of the battery.

Standard voltage: 12.5 – 12.9 V at 20°C (68°F)

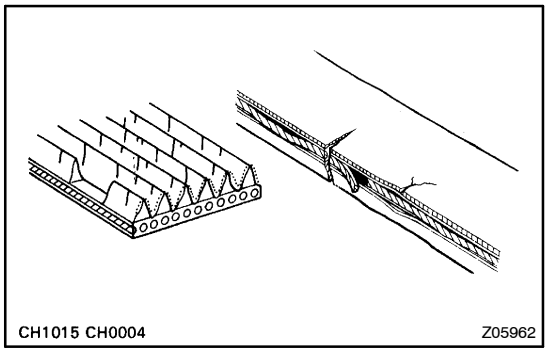
If the voltage is less than specification, charge the battery.

4. CHECK BATTERY TERMINALS AND FUSES

(a) Check that the battery terminals are not loose or corroded.

If the terminals are corroded, clean the terminals.

(b) Check the fusible link and fuses for continuity.



5. INSPECT DRIVE BELT

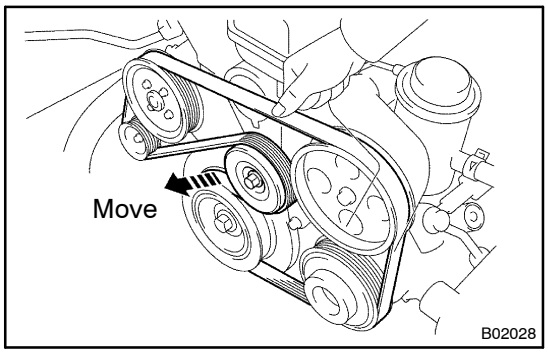
HINT:

(a) Check the drive belt for excessive wear, frayed cords, etc.

If necessary, replace the drive belt.

HINT:

Cracks on the rib side of a drive belt are considered acceptable. If the drive belt has chunks missing from the ribs, it should be replaced.

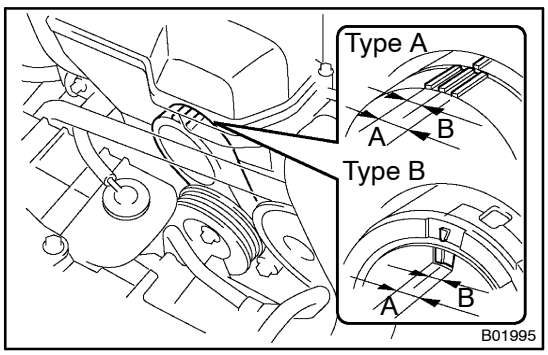


(b) Check the belt tensioner operation.

(1) Check that the belt tensioner moves downward when the drive belt is pressed down at the points indicated in the illustration with approx. 98 N (10 kgf, 22.0 lbf) of force.

(2) Check the alignment of the belt tensioner pulley to make sure the drive belt will not slip off the pulley.

If necessary, replace the belt tensioner.

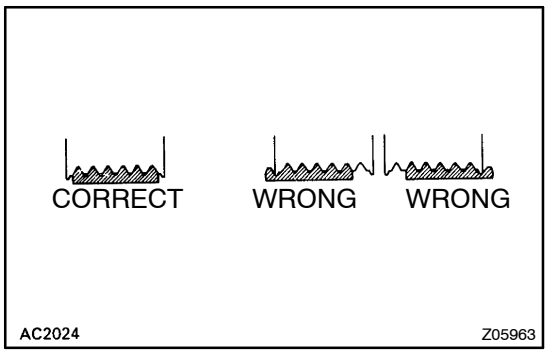


(3) Check that the arrow mark on the belt tensioner falls within area A of the scale.

If it is outside area A, replace the drive belt.

HINT:

When a new belt is installed, it should lie within area B. If not, the drive belt is not correct.



- After installing a drive belt, check that it fits properly in the ribbed grooves.
- Check by hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.

6. CHECK ALTERNATOR

Check that there is no abnormal noise from the alternator while the engine is running.

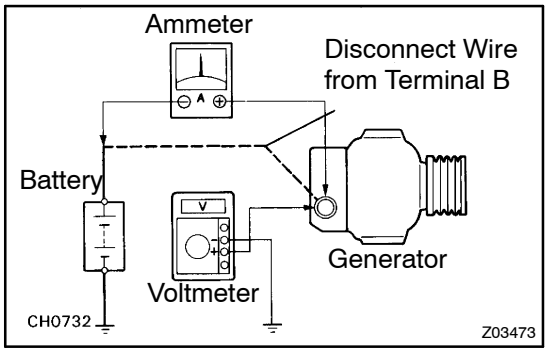
7. CHECK CHARGE INDICATOR

(a) When turning the ignition switch ON, check that the charge warning indicator turns on.

If the indicator does not turn on, check the combination meter.

(b) When starting the engine, check that the indicator goes off.

If the indicator does not go off, perform the steps 8 and 9.



8. INSPECT CHARGING CIRCUIT WITHOUT LOAD

HINT:

If a battery/alternator tester is available, connect the tester to the charging circuit as per manufacturer's instructions.

(a) Connect a voltmeter and ammeter to the charging circuit as follows.

(1) Disconnect the wire from terminal B of the alternator, and connect it to the negative probe of the ammeter.

(2) Connect the positive probe of the ammeter to terminal B of the alternator.

(3) Connect the positive probe of the voltmeter to terminal B of the alternator.

(4) Ground the negative probe of the voltmeter.

(b) Measure the amperage and voltage when the engine speed is 2,000 rpm.

Standard:

Amperage	Voltage
10 A or less	13.2 – 14.8 V

If the voltmeter reading is more than standard voltage, replace the voltage regulator.

If the voltmeter reading is less than standard voltage, check the voltage regulator.

9. INSPECT CHARGING CIRCUIT WITH LOAD

(a) Turn on the high beam, heater blower switch at HI.

(b) Check the reading on the ammeter when the engine speed is 2,000 rpm.

Standard amperage: 30 A or more

If the ammeter reading is less than the standard amperage, repair the alternator.

HINT:

If the battery is fully charged, the indication will sometimes be less than standard amperage.

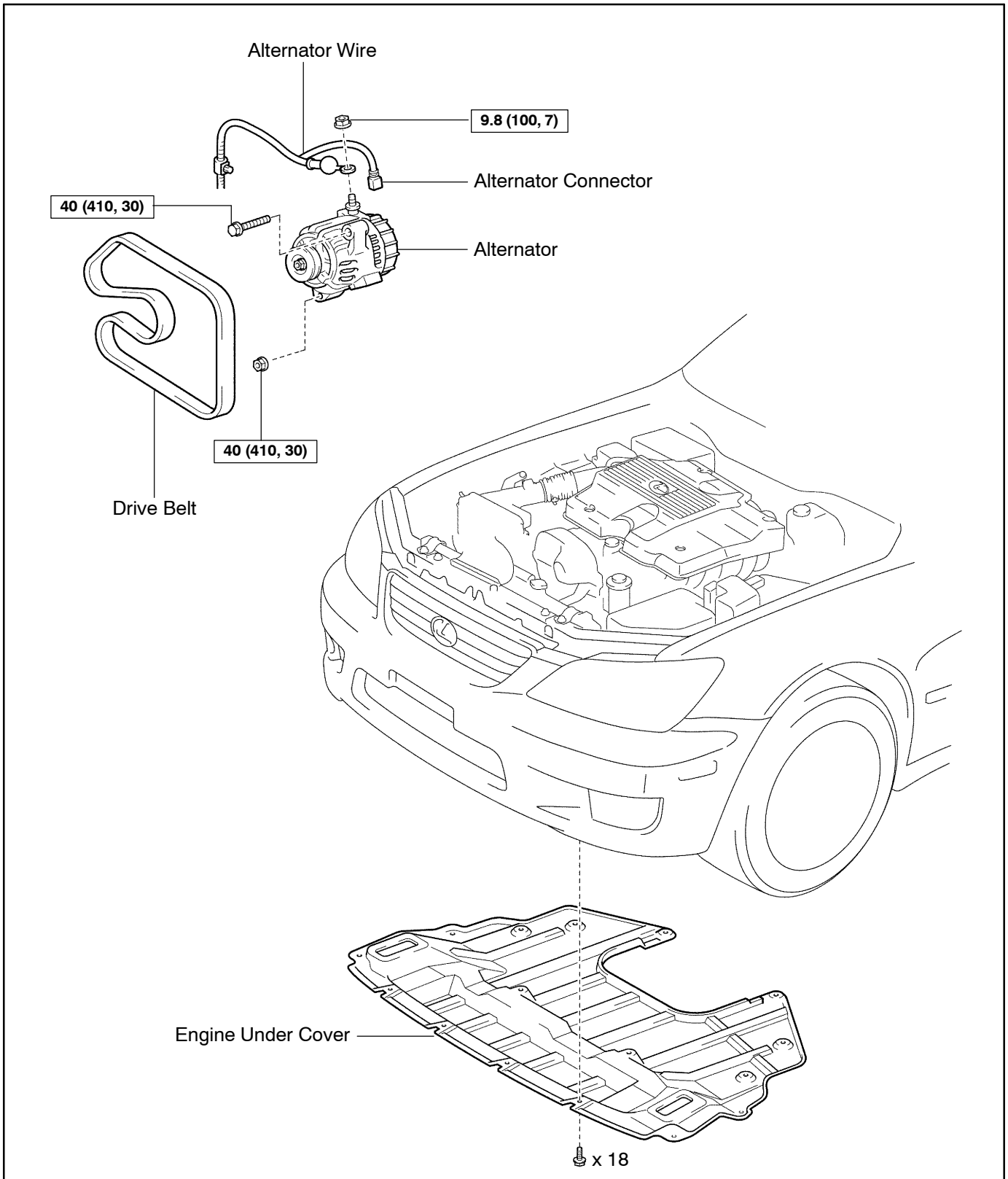
NOTICE:

The ammeter and voltmeter must be securely fixed so as not to be disconnected during the measurement.

ALTERNATOR

COMPONENTS

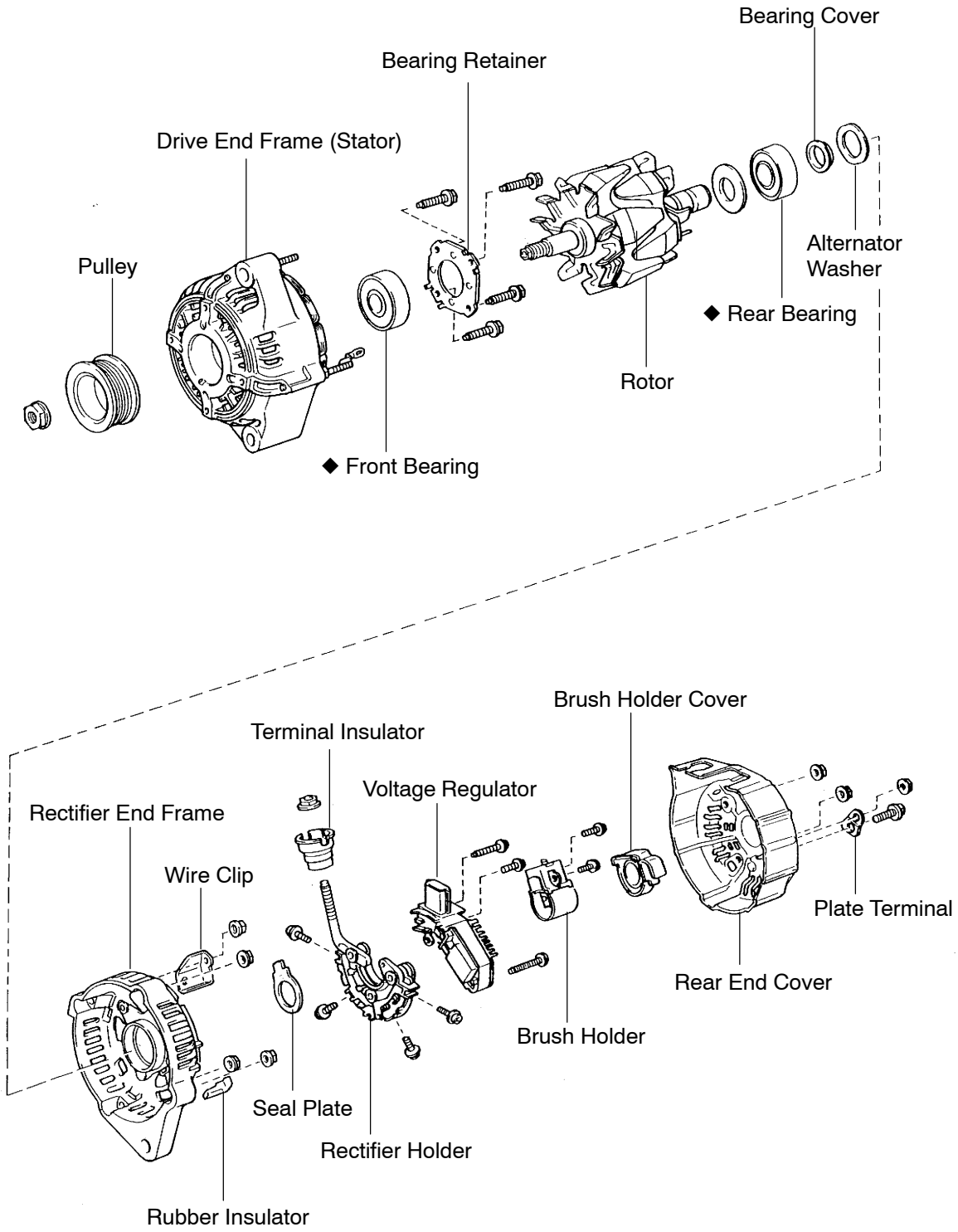
CH0JC–01



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

P

B14782



◆ Non–reusable part

B01642

CH0JD–01

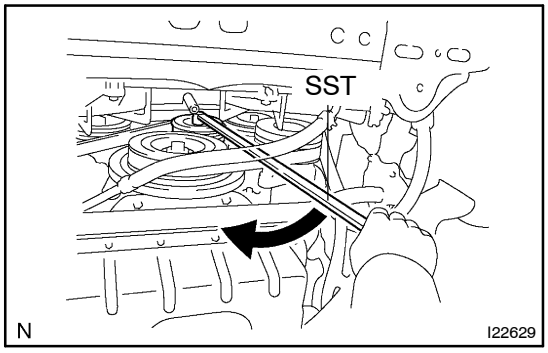
REMOVAL

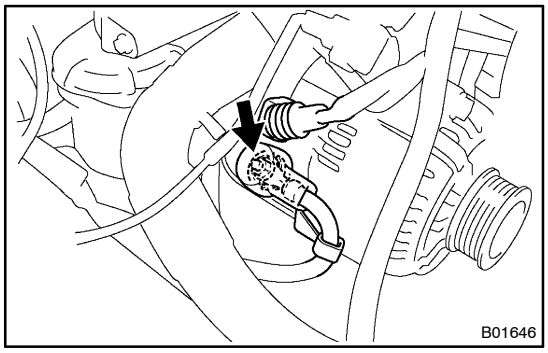
1. REMOVE ENGINE UNDER COVER

2. REMOVE DRIVE BELT

Using SST, loosen the belt tension by turning the drive belt tensioner clockwise from the bottom side, and remove the drive belt.

SST 09216–00041



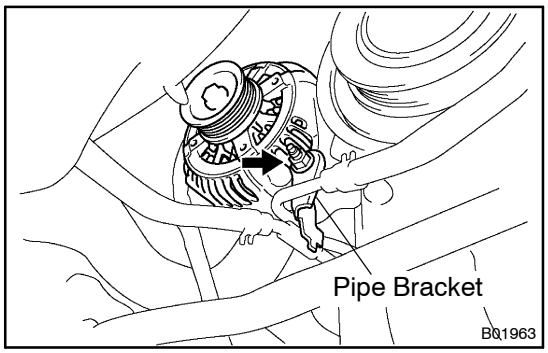


3. REMOVE ALTERNATOR

(a) Disconnect the alternator connector.

(b) Remove the rubber cap and nut, and disconnect the alternator wire.

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

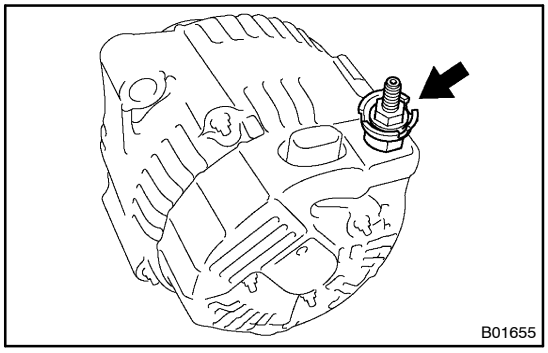


(c) Remove the bolt, nut and alternator.

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

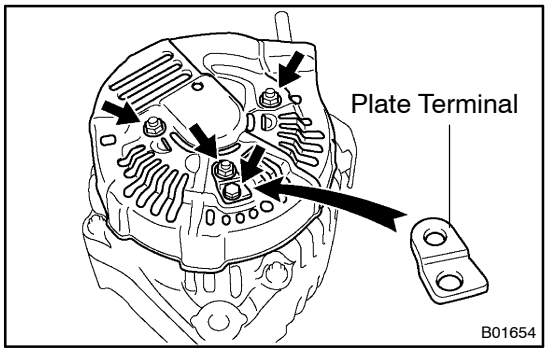
CH0JE–01

DISASSEMBLY

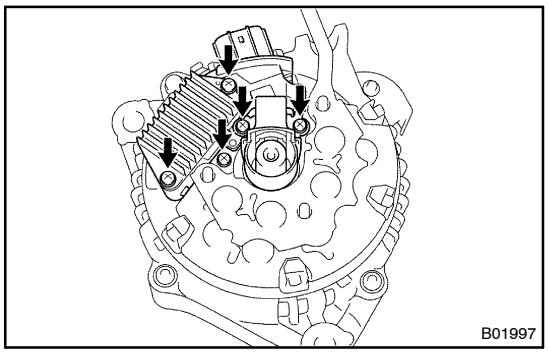


1. REMOVE REAR END COVER

(a) Remove the nut and terminal insulator.

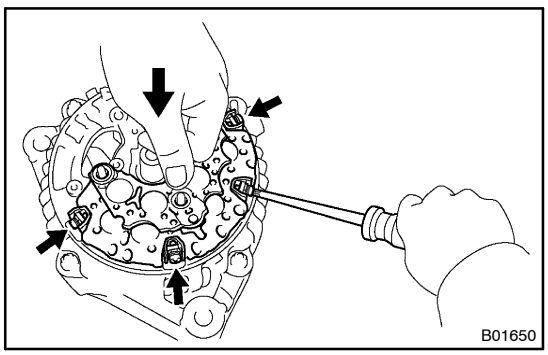


(b) Remove the bolt, 3 nuts, plate terminal and end cover.



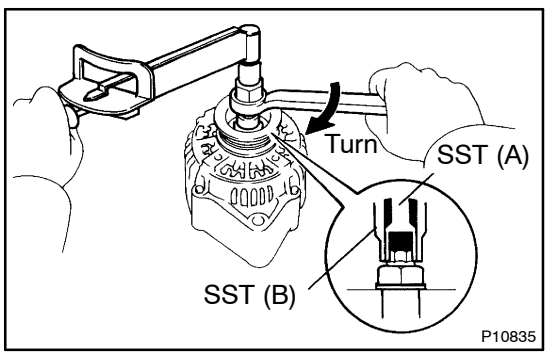
2. REMOVE BRUSH HOLDER AND VOLTAGE REGULATOR

(a) Remove the brush holder cover from the brush holder.
(b) Remove the 5 screws, brush holder and voltage regulator.
(c) Remove the seal plate from the rectifier end frame.



3. REMOVE RECTIFIER HOLDER

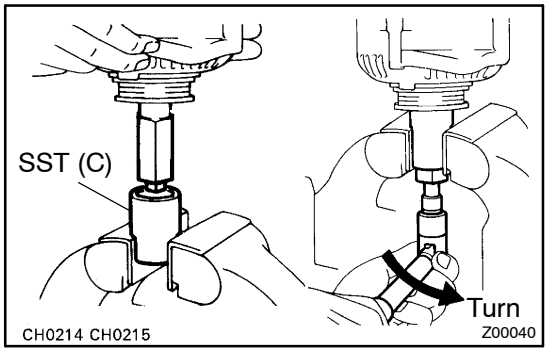
(a) Remove the 4 screws and rectifier holder.
(b) Remove the 4 rubber insulators.



4. REMOVE PULLEY

(a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820–63011
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

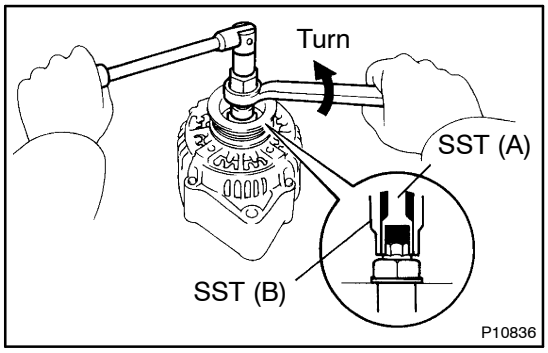
(b) Check that SST (A) is secured to the rotor shaft.



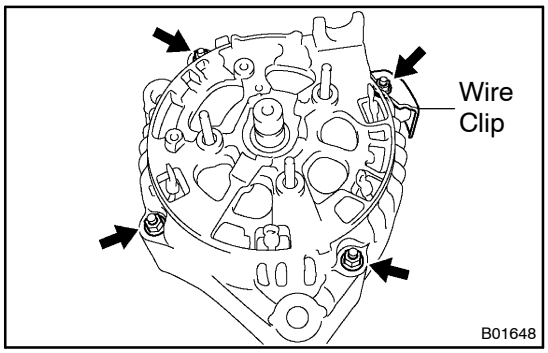
(c) Mount SST (C) in a vise.
(d) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).
(e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

NOTICE:
To prevent damage to the rotor shaft, do not loosen the pulley nut more than one–half of a turn.

(f) Remove the alternator from SST (C).

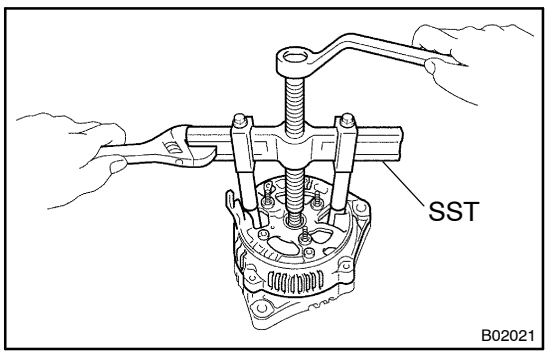


(g) Turn SST (B), and remove SST (A and B).
(h) Remove the pulley nut and pulley.



5. REMOVE RECTIFIER END FRAME

(a) Remove the 4 nuts and wire clip.



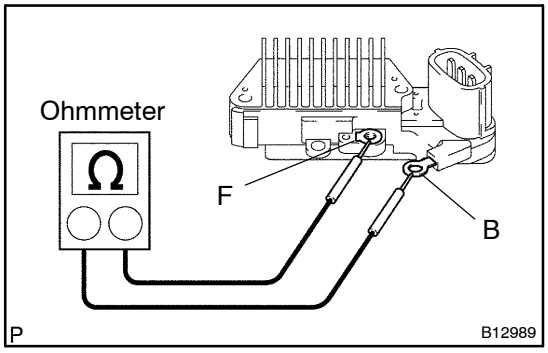
(b) Using SST, remove the rectifier end frame.
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04041)
(c) Remove the alternator washer.

6. REMOVE ROTOR FROM DRIVE END FRAME

CH0JF–01

INSPECTION

1. INSPECT VOLTAGE REGULATOR

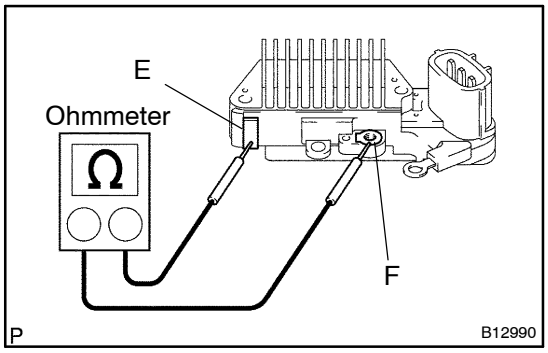


(a) Using an ohmmeter, check the continuity between terminals F and B.

Standard:

When the positive and negative poles between terminals F and B are exchanged, there is continuity in one way but no continuity in another way.

If the continuity is not standard, replace the voltage regulator.



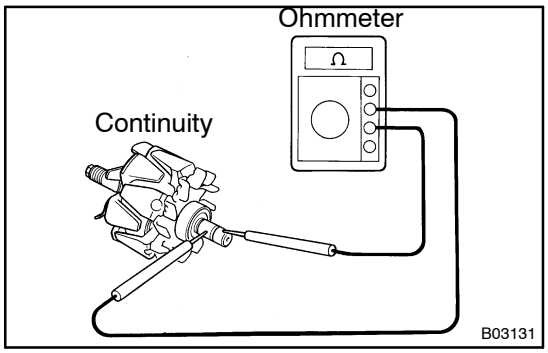
(b) Using an ohmmeter, check the continuity between terminals F and E.

Standard:

When the positive and negative poles between terminals F and E are exchanged, there is continuity in one way but no continuity in another way.

If the continuity is not standard, replace the voltage regulator.

2. INSPECT ROTOR

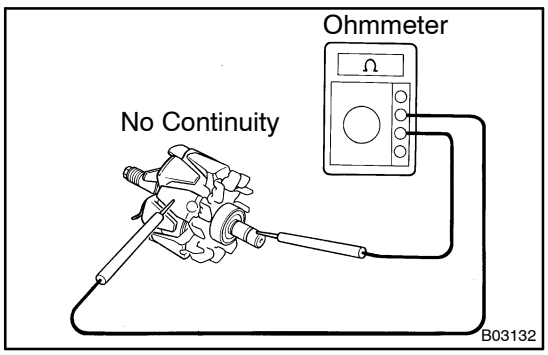


(a) Check rotor for open circuit.

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance: 2.1 – 2.5 Ω at 20°C (68°F)

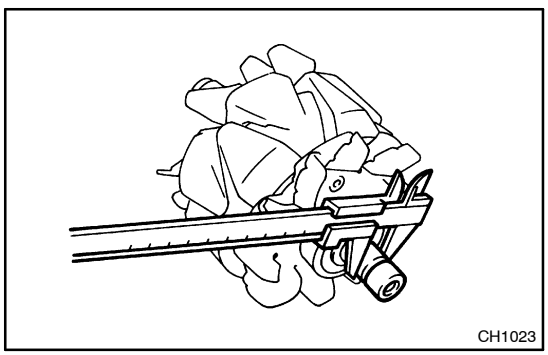
If there is no continuity, replace the rotor.



(b) Check the rotor ground.

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.



(c) Check that the slip rings are not rough or scored.

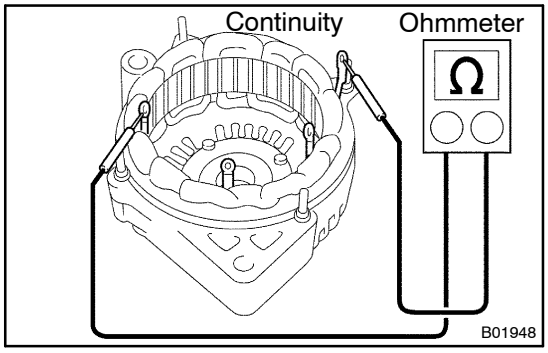
If rough or scored, replace the rotor.

(d) Using vernier calipers, measure the slip ring diameter.

Standard diameter: 14.2 – 14.4 mm (0.559 – 0.567 in.)

Minimum diameter: 12.8 mm (0.504 in.)

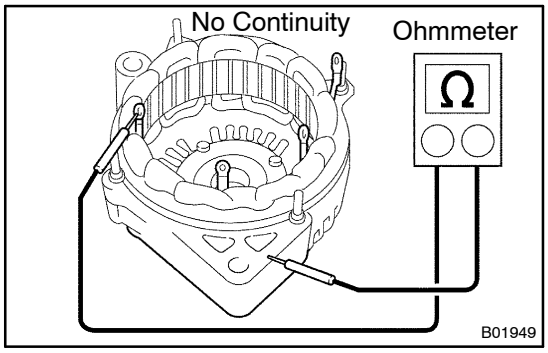
If the diameter is less than minimum, replace the rotor.



3. INSPECT STATOR (DRIVE END FRAME)

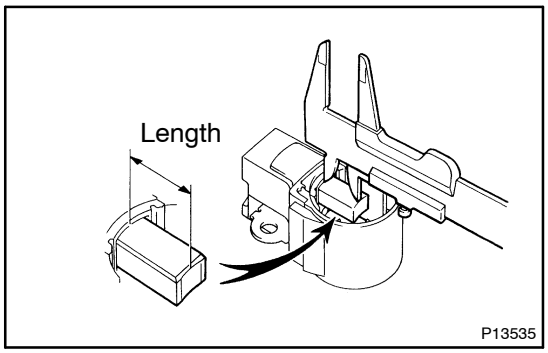
(a) Check the stator for open circuit.
Using an ohmmeter, check that there is continuity between the coil leads.

If there is no continuity, replace the drive end frame assembly.



(b) Check the stator for ground.
Using an ohmmeter, check that there is no continuity between the coil lead and drive end frame.

If there is continuity, replace the drive end frame assembly.

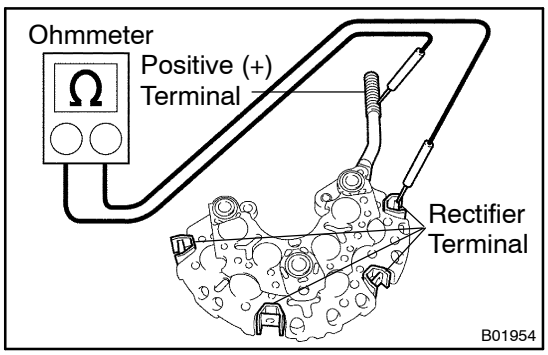


4. INSPECT BRUSHES

Using vernier calipers, measure the exposed brush length.

Standard exposed length:
9.5 – 11.5 mm (0.374 – 0.453 in.)
Minimum exposed length: 1.5 mm (0.059 in.)

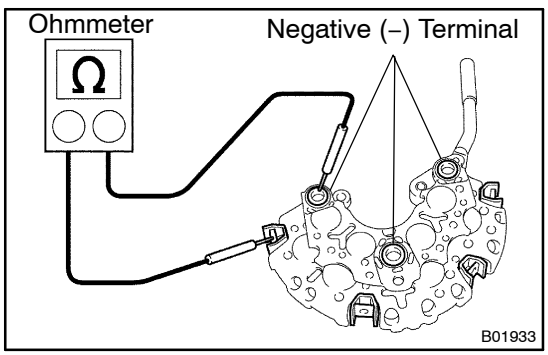
If the exposed length is less than minimum, replace the brush holder assembly.



5. INSPECT RECTIFIERS (RECTIFIER HOLDER)

(a) Check the positive (+) rectifier.
(1) Using an ohmmeter, connect one tester prob to the positive (+) terminal and the other to each rectifier terminal.
(2) Reverse the polarity of the tester probes and repeat step (a).
(3) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



(b) Check the negative (–) rectifier.
(1) Using an ohmmeter, connect one tester probe to each negative (–) terminal and the other to each rectifier terminal.
(2) Reverse the polarity of the tester probes and repeat step (a).
(3) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.

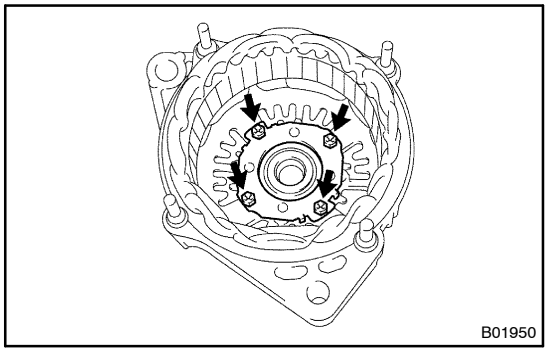
6. INSPECT BEARING

Check the bearing is not rough or worn.

If necessary, replace the bearing. (See page CH–12)

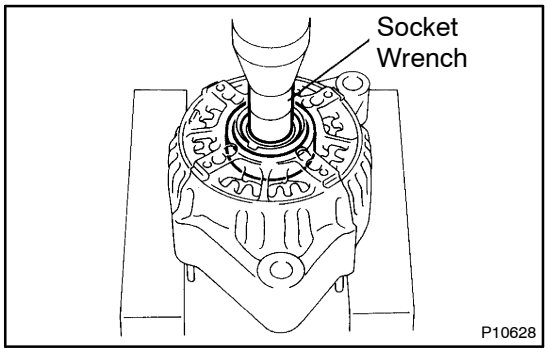
CH0JG–01

REPLACEMENT

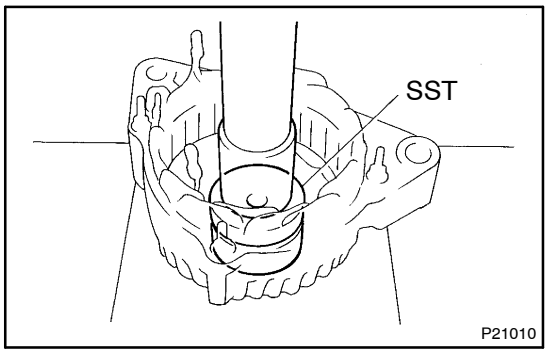


1. REPLACE FRONT BEARING

(a) Remove the 4 screws, bearing retainer and bearing.

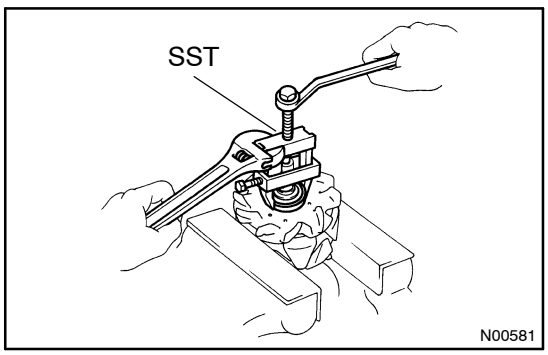


(b) Using a socket wrench and press, press out the bearing.



(c) Using SST and a press, press in a new bearing.
SST 09950–60010 (09951–00500)

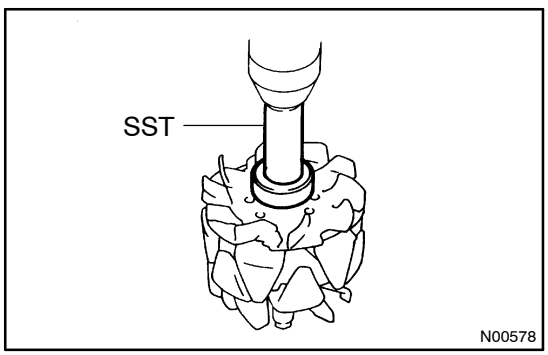
(d) Install the bearing retainer with the 4 screws.
Torque: 3.0 N·m (31 kgf·cm 27 in.·lbf)



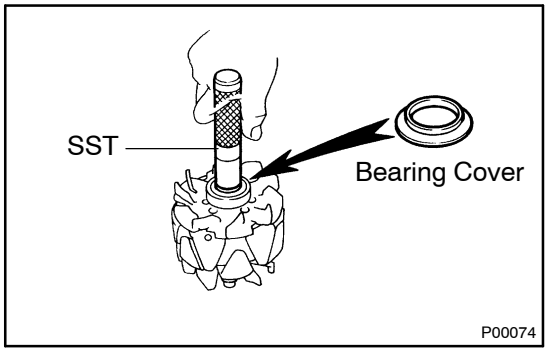
2. REPLACE REAR BEARING

(a) Using SST, remove the bearing cover (outside) and bearing.
SST 09820–00021

NOTICE:
Be careful not to damage the fan.



(b) Using SST and a press, press in a new bearing.
SST 09820–00031



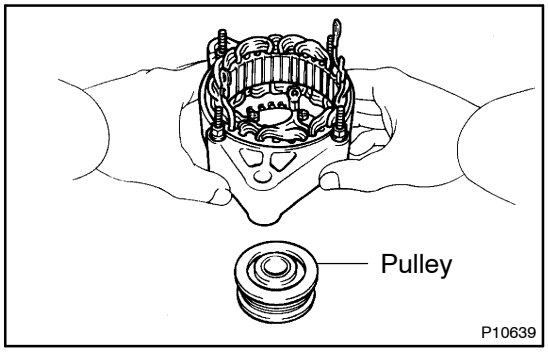
(c) Using SST, push in the bearing cover (outside).
SST 09285–76010

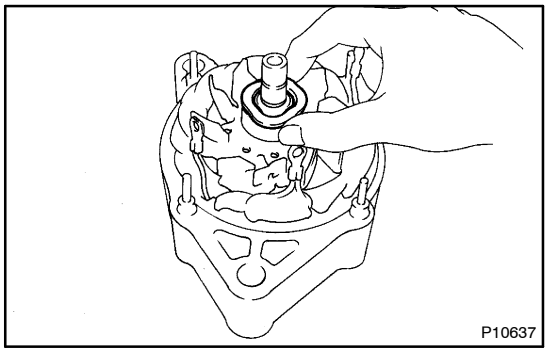
CH0JH–01

REASSEMBLY

1. PLACE DRIVE END FRAME ON PULLEY

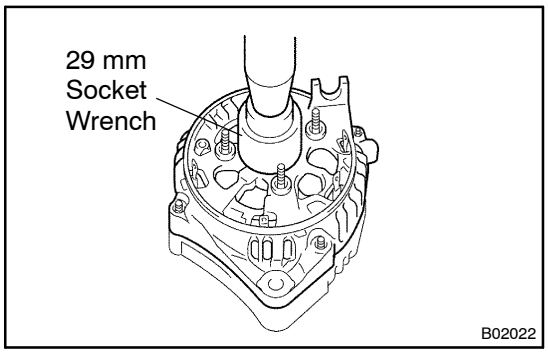
2. INSTALL ROTOR TO DRIVE END FRAME



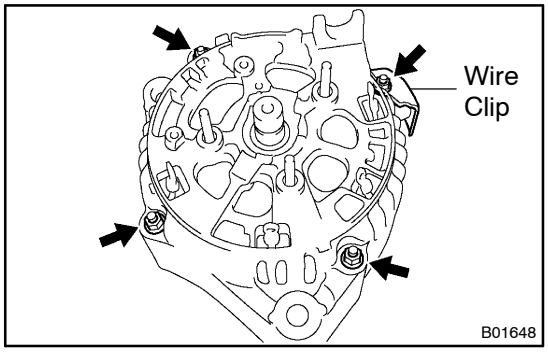


3. INSTALL RECTIFIER END FRAME

(a) Place the alternator washer on the rotor.

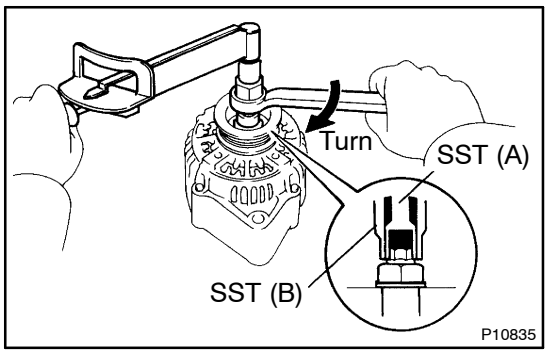


(b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.



(c) Install the 3 nuts.
Torque: 4.5 N·m (46 kgf·cm, 40 in.·lbf)

(d) Install the wire clip with the nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

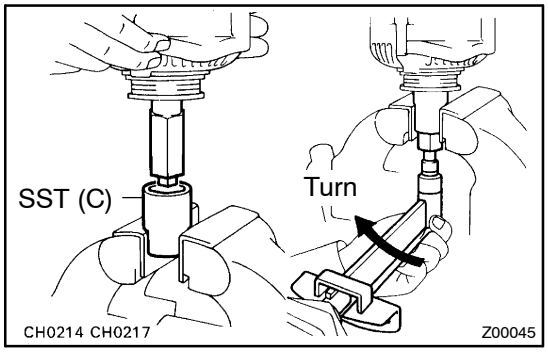


4. INSTALL PULLEY

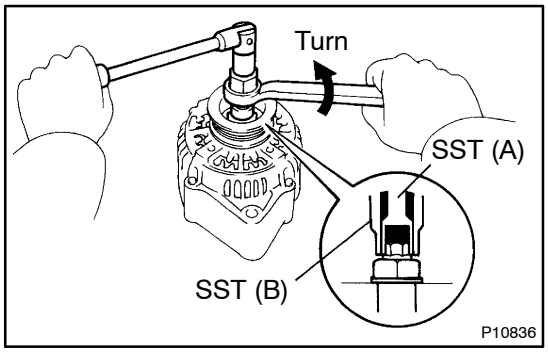
(a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

(b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820–63011
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

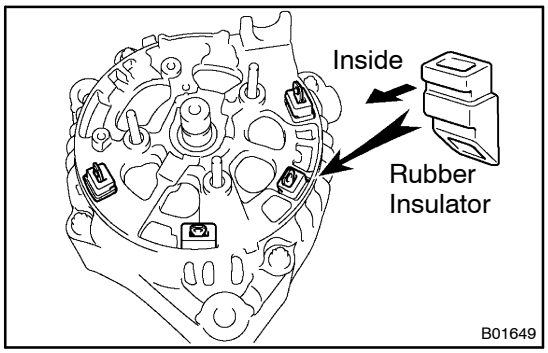
(c) Check that SST (A) is secured to the pulley shaft.



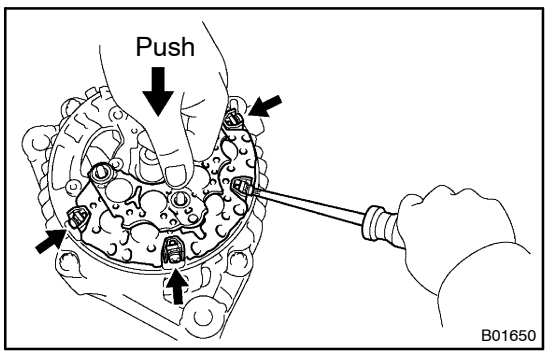
(d) Mount SST (C) in a vise.
(e) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).
(f) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 110.5 N·m (1,125 kgf·cm, 81 ft·lbf)
(g) Remove the alternator from SST (C).



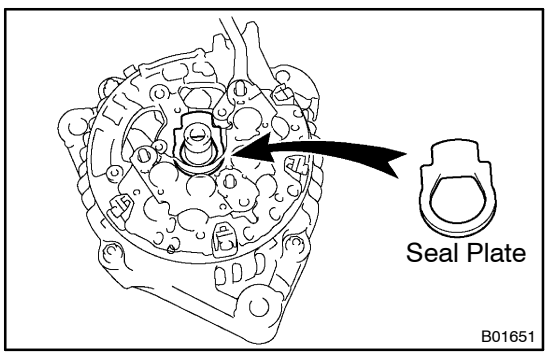
(h) Turn SST (B), and remove SST (A and B).



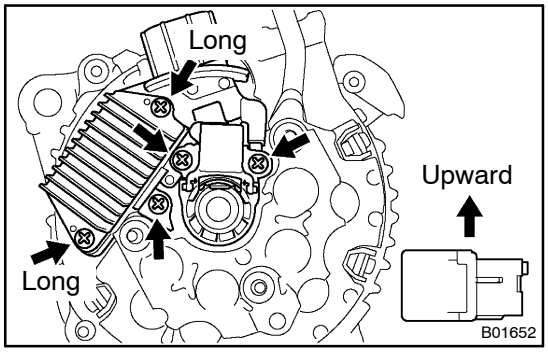
5. INSTALL RECTIFIER HOLDER
(a) Install the 4 rubber insulators on the lead wires.



(b) Install the rectifier holder while pushing it with the 4 screws.
Torque: 2.9 N·m (30 kgf·cm, 26 in.·lbf)



6. INSTALL VOLTAGE REGULATOR AND BRUSH HOLDER
(a) Place the seal plate on the rectifier end frame.



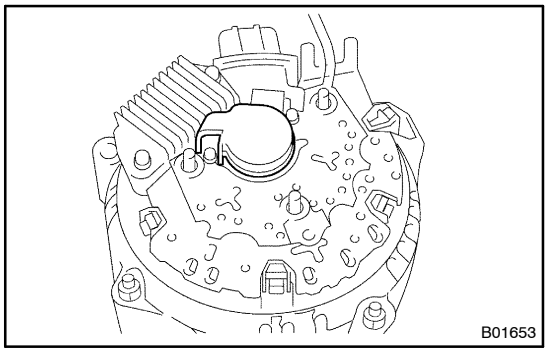
(b) Place the voltage regulator and brush holder on the rectifier end frame.

NOTICE:

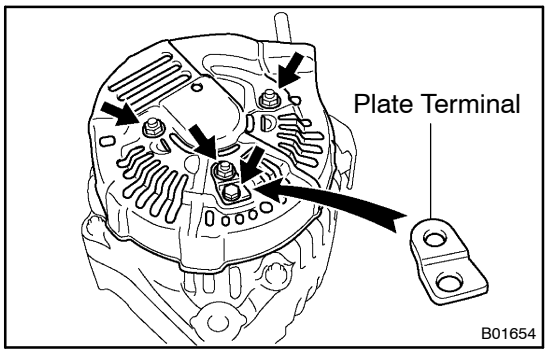
Be careful of the holder installation direction.

(c) Install the 5 screws.

Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)



(d) Place the brush holder cover on the brush holder.



7. INSTALL REAR END COVER

(a) Install the end cover and plate terminal with the bolt and 3 nuts.

Torque:

Nut 4.4 N·m (45 kgf·cm, 39 in.·lbf)

Bolt 3.9 N·m (39 kgf·cm, 35 in.·lbf)

(b) Install the terminal insulator with the nut.

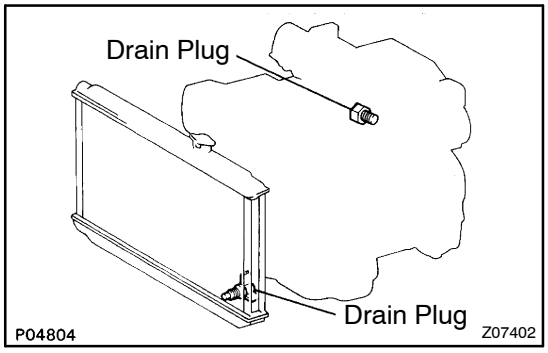
Torque: 6.5 N·m (67 kgf·cm, 58 in.·lbf)

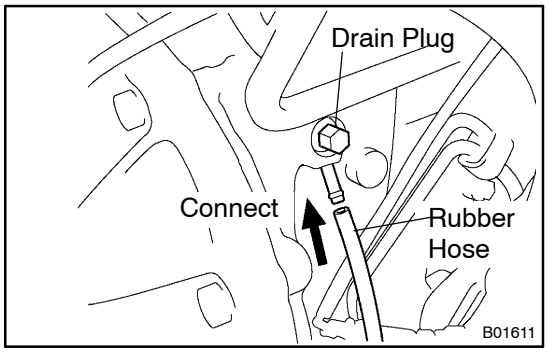
8. CHECK THAT ROTOR ROTATES SMOOTHLY

CH0JI–01

INSTALLATION

Installation is in the reverse order of removal. (See page CH–6)





COOLANT REPLACEMENT

CO09X–06

CAUTION:

Do not remove the radiator cap while the engine and radiator are hot.

1. DRAIN ENGINE COOLANT

(a) Remove the radiator cap.

(b) Loosen the 2 drain plugs (for the engine and radiator), and drain the coolant.

HINT:

To prevent the coolant from spraying over the cylinder block, connect the rubber hose (inside diameter 6 – 8 mm) in the market to the union pipe under the drain plug.

(c) Close the drain plugs.

Torque: 30 N·m (300 kgf·cm, 22 ft·lbf) for engine

2. FILL ENGINE COOLANT

(a) Slowly fill the system with coolant.

Coolant: TOYOTA Long Life Coolant or equivalent

Use of the coolant which includes more than 50% [freezing protection down to –35°C (–31°F)] or 60% [freezing protection down to –50°C (–58°F)] of ethylene –glycol is recommended, but not more than 70%.

NOTICE:

- **Use of improper coolant may damage the engine cooling system.**
- **Do not use an alcohol type coolant or plain water alone.**
- **The coolant should be mixed with plain water (preferable demineralized water or distilled water).**

Capacity: 7.7 liters (8.1 US qts, 6.8 Imp. qts)

(b) Install the radiator cap.

(c) Start the engine, and bleed the cooling system.

(d) Refill the reservoir with coolant until it reaches the FULL line.

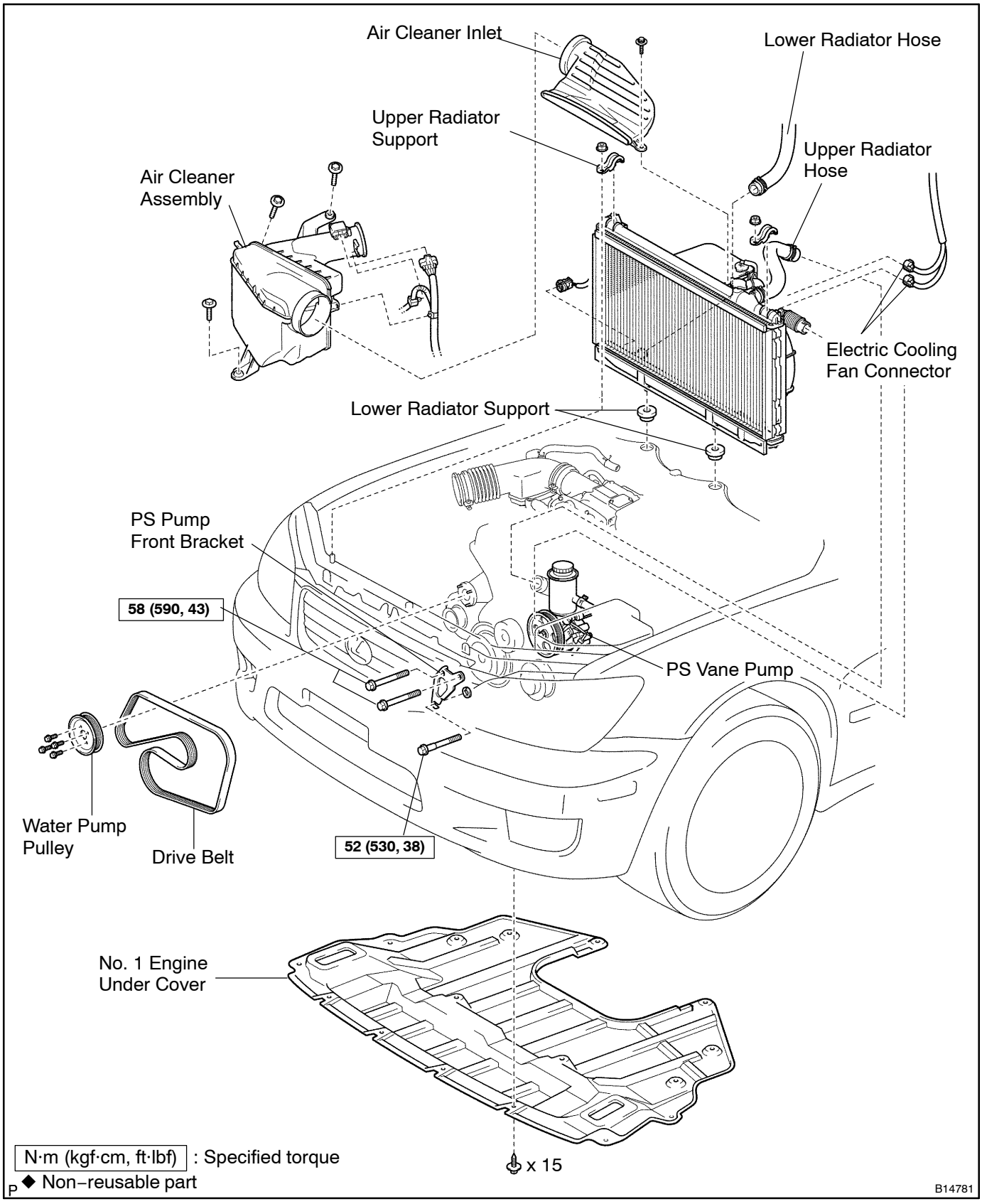
3. CHECK ENGINE COOLANT LEAK

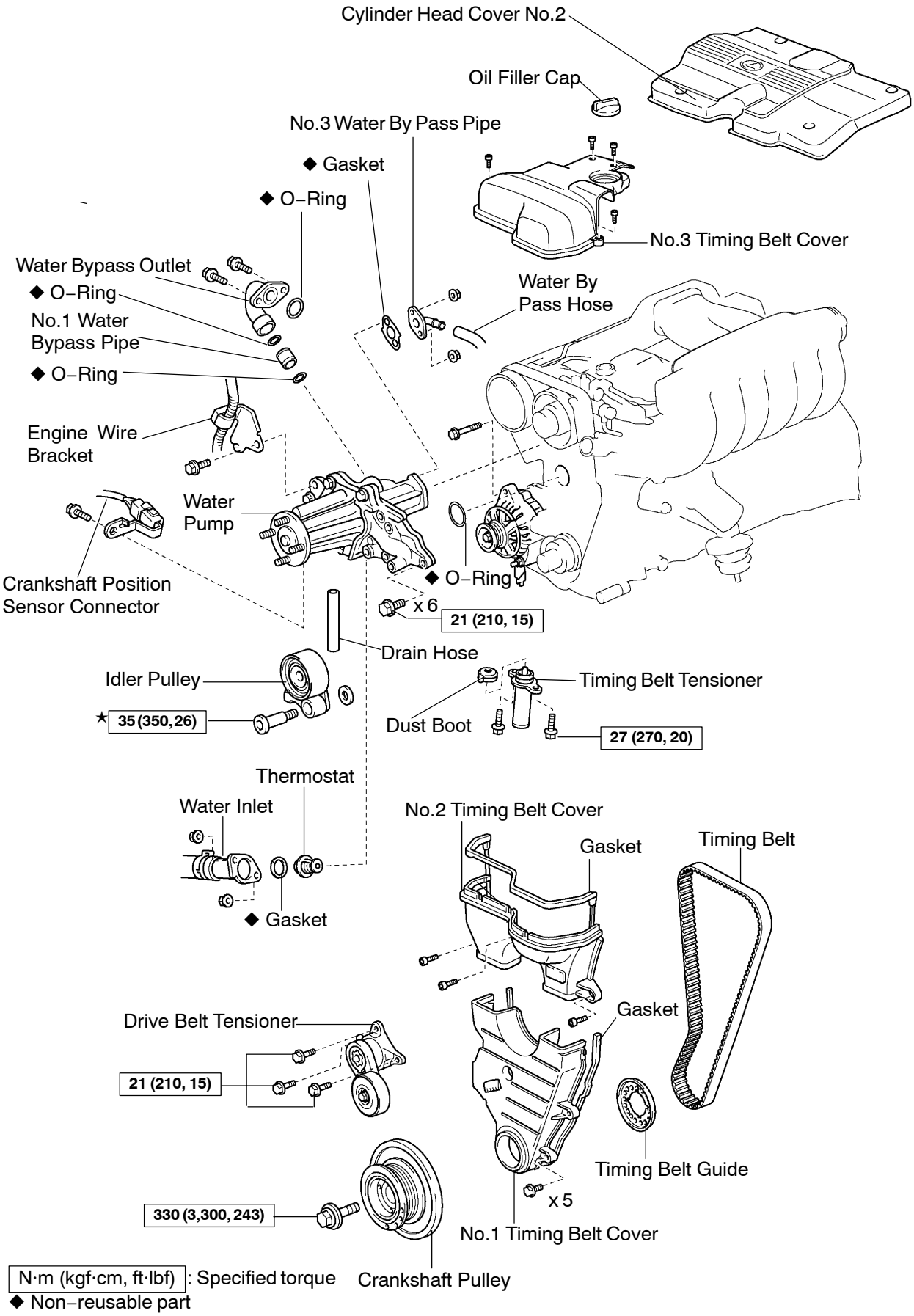
4. CHECK ENGINE COOLANT GRAVITY

WATER PUMP

COMPONENTS

CO09Y–06

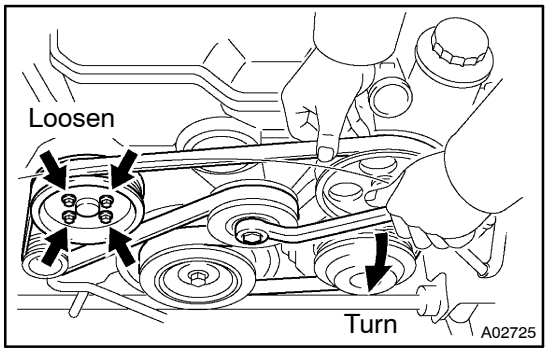



Cylinder Head Cover No.2
Oil Filler Cap
No.3 Water By Pass Pipe
◆ Gasket
◆ O–Ring
No.3 Timing Belt Cover
Water Bypass Outlet
◆ O–Ring
No.1 Water Bypass Pipe
◆ O–Ring
Water By Pass Hose
Engine Wire Bracket
Water Pump
Crankshaft Position Sensor Connector
◆ O–Ring
x 6
21 (210, 15)
Drain Hose
Idler Pulley
★ 35 (350, 26)
Timing Belt Tensioner
Dust Boot
27 (270, 20)
Thermostat
Water Inlet
◆ Gasket
No.2 Timing Belt Cover
Gasket
Timing Belt
Drive Belt Tensioner
21 (210, 15)
Gasket
Timing Belt Guide
x 5
330 (3,300, 243)
No.1 Timing Belt Cover
Crankshaft Pulley
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
B14769

CO09Z–05

REMOVAL

1. **REMOVE RADIATOR ASSEMBLY**
(See page CO–15)



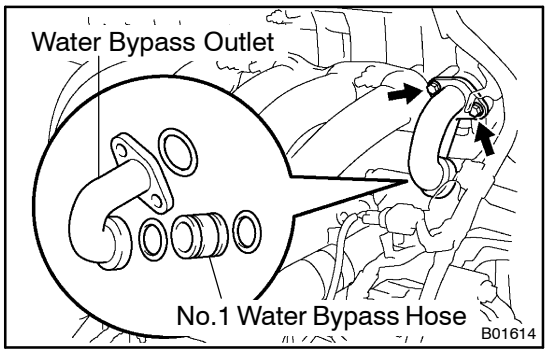
2. **REMOVE DRIVE BELT AND WATER PUMP PULLEY**

(a) At first, loosen the 4 nuts of the water pump pulley.

(b) Remove the drive belt.

(c) Remove the 4 nuts and water pump pulley.

3. **REMOVE TIMING BELT AND IDLER PULLEY**
(See page EM–17)

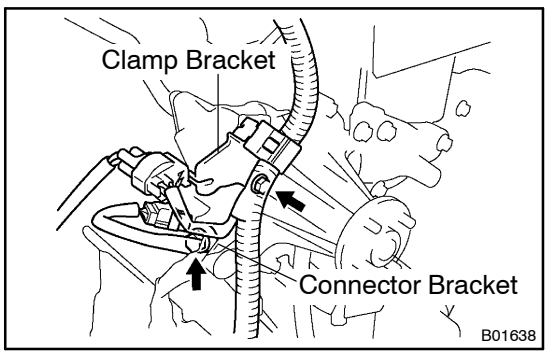


4. **REMOVE WATER BYPASS OUTLET AND NO.1 WATER BYPASS PIPE**

(a) Remove the 2 bolts, water bypass outlet and No.1 water bypass pipe.

(b) Remove the 3 O–rings from the water bypass outlet and No.1 water bypass pipe.

5. **REMOVE WATER INLET AND THERMOSTAT**
(See page CO–9)

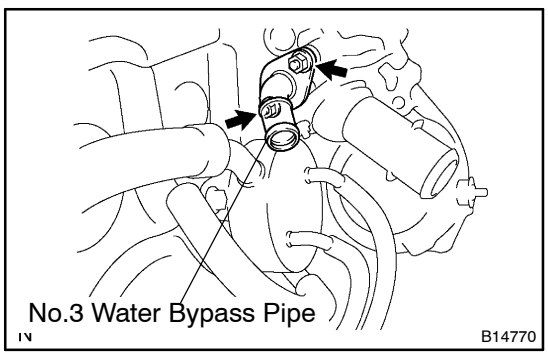


6. **REMOVE WATER PUMP**

(a) Loosen the nut and remove the bolt, slide the generator away from the water pump.

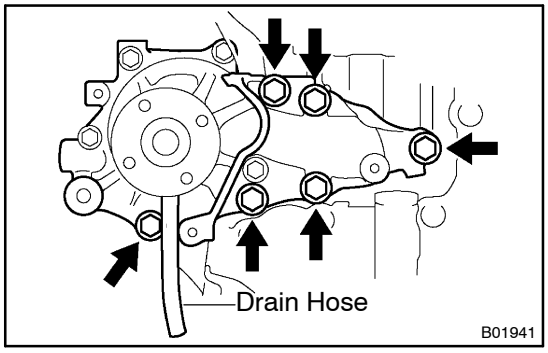
(b) Remove the bolt, and disconnect the clamp bracket (for engine wire).

(c) Remove the bolt, and disconnect the connector bracket (for crankshaft position sensor connector).



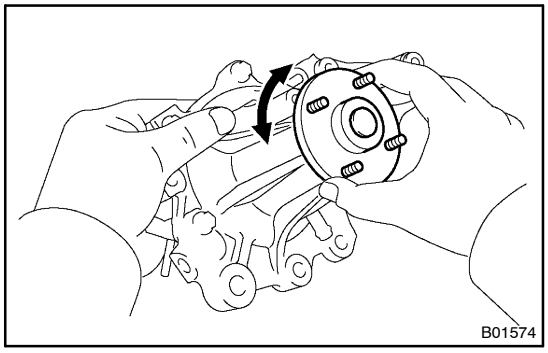
(d) Disconnect the water bypass hose from the No. 3 water bypass pipe.

(e) Remove the 2 nuts, gasket and No. 3 water bypass pipe from the water pump.



(f) Remove the 6 bolts, water pump and gasket.
(g) Remove the drain hose.
(h) Remove the O–ring from the cylinder block.

CO0A0–05



INSPECTION

INSPECT WATER PUMP

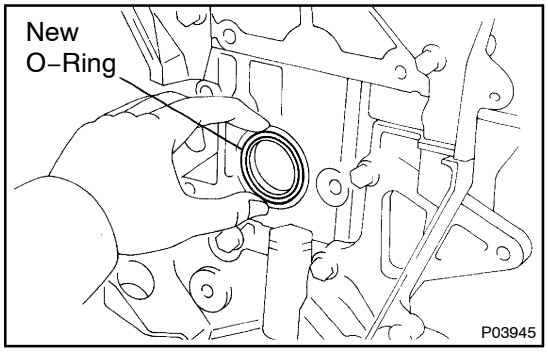
(a) Visually check the air hole and water hole for coolant leakage.

If necessary, replace the water pump.

(b) Turn the pulley seat, and check that the water pump bearing is not rough or noisy.

If necessary, replace the water pump.

CO1AO–01

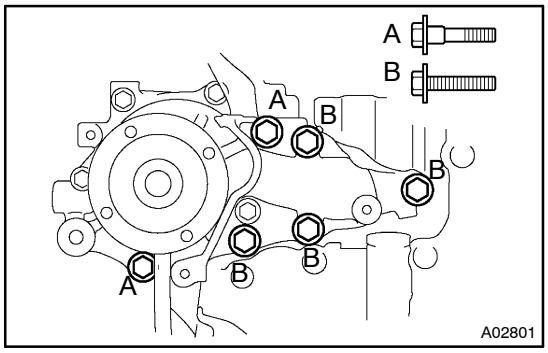


INSTALLATION

1. INSTALL WATER PUMP

(a) Install a new O–ring to the cylinder block.

(b) Install the drain hose.



(c) Install the water pump with the 2 bolts (A) and 4 bolts (B).

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

HINT:

At first, tighten the bolt A by hand.

(d) Install a new gasket and the No. 3 water bypass pipe with the 2 nuts.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(e) Connect the water bypass hose to the No. 3 water bypass pipe.

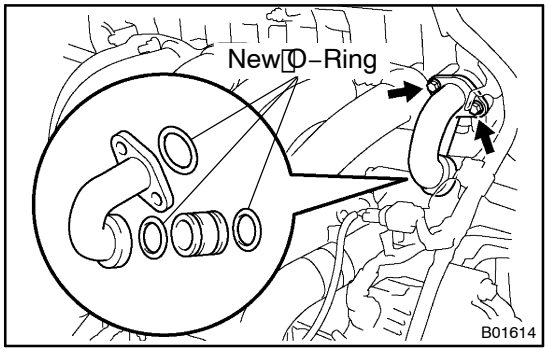
(f) Install the connector bracket (for crankshaft position sensor connector) with the bolt.

(g) Install the clamp bracket (for engine wire) with the bolt.

(h) Install the generator with the bolt and nut.

Torque: 39 N·m (400 kgf·cm, 30 ft·lbf)

2. INSTALL THERMOSTAT AND WATER INLET
(See page CO–11)



3. INSTALL NO.1 WATER BYPASS PIPE AND WATER BYPASS OUTLET

(a) Install 2 new O–rings to the No.1 water bypass pipe.

(b) Install a new O–ring and the water bypass outlet with the 2 bolts.

Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

4. INSTALL IDLER PULLEY AND TIMING BELT
(See page EM–24)

5. INSTALL WATER PUMP PULLEY AND DRIVE BELT

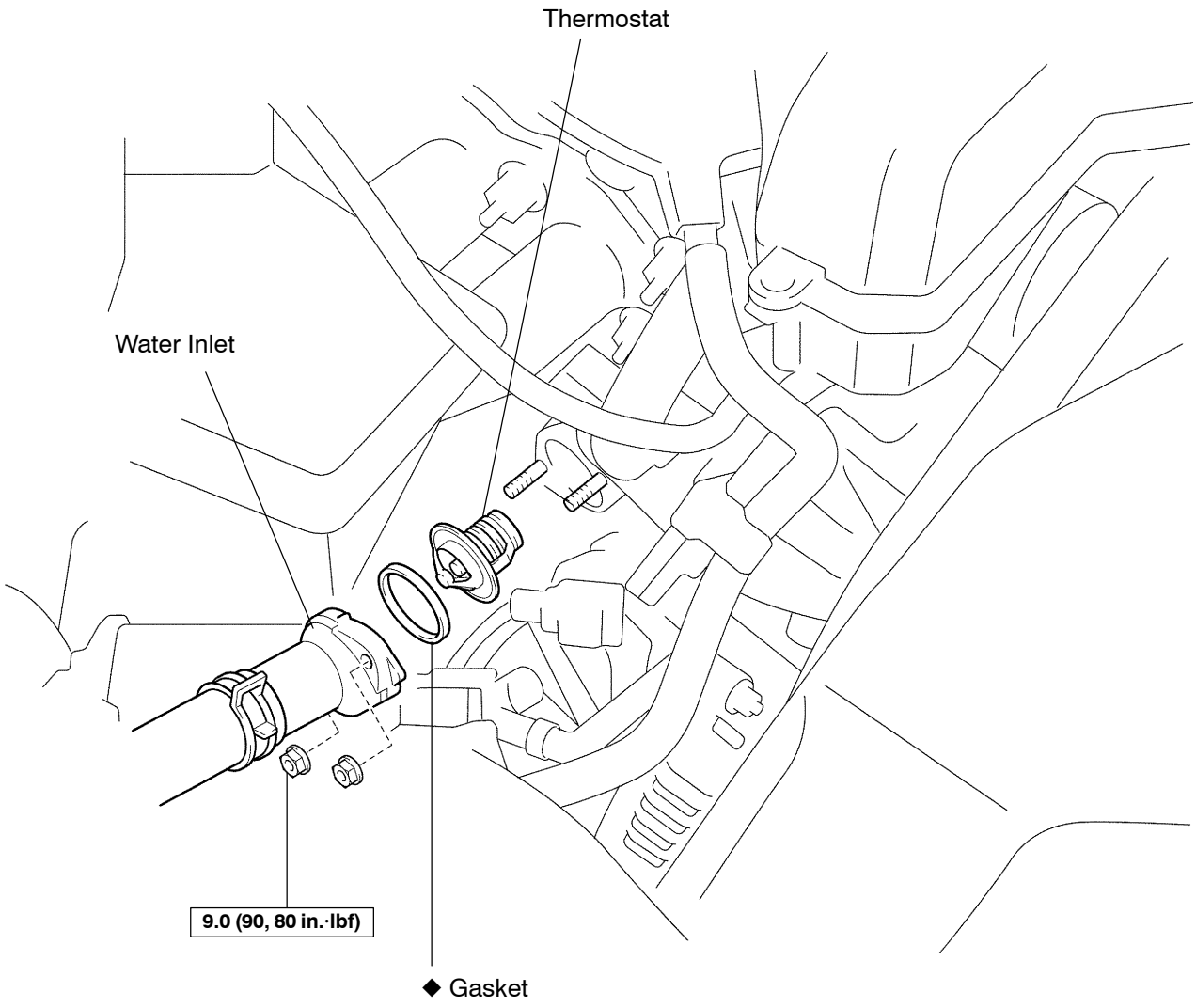
Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)

6. INSTALL RADIATOR ASSEMBLY
(See page CO–20)

THERMOSTAT

COMPONENTS

CO0A2–07



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

◆ Non–reusable part

P

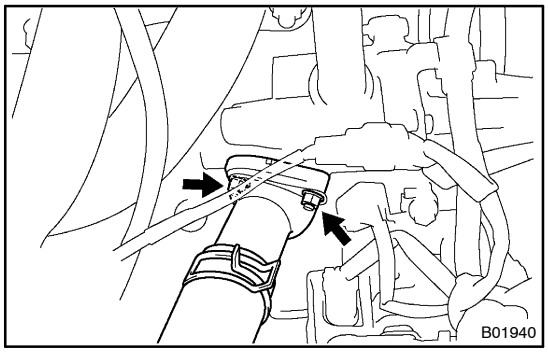
B11922

CO0A3–06

REMOVAL

HINT:
Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

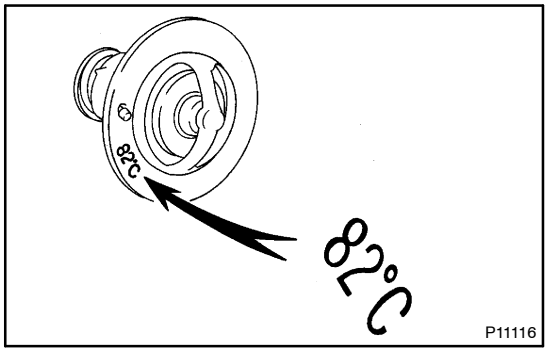
1. DRAIN ENGINE COOLANT



2. DISCONNECT WATER INLET FROM WATER PUMP, AND REMOVE THERMOSTAT

(a) Remove the 2 nuts holding the water inlet to the water pump, and disconnect the water inlet from the water pump.
(b) Remove the thermostat.
(c) Remove the gasket from the thermostat.

CO0A4–06

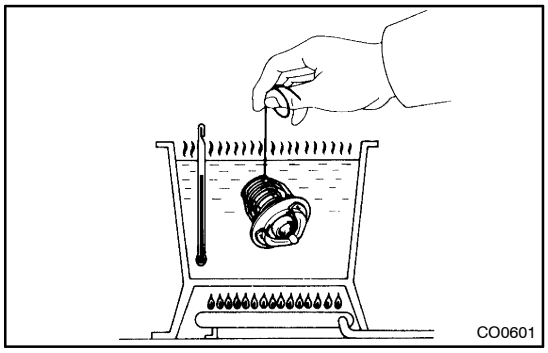


INSPECTION

INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.

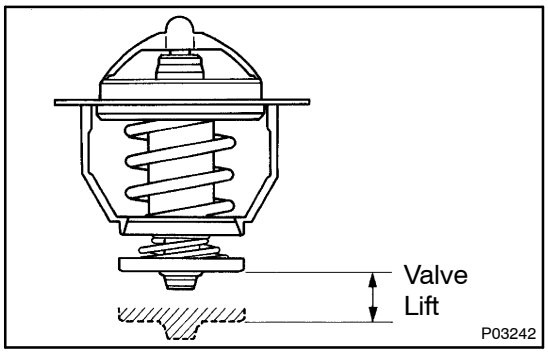


(a) Immerse the thermostat in water and gradually heat the water.

(b) Check the valve opening temperature.

Valve opening temperature: 80 – 84°C (176 – 183°F)

If the valve lift is not as specified, replace the thermostat.



(c) Check the valve lift.

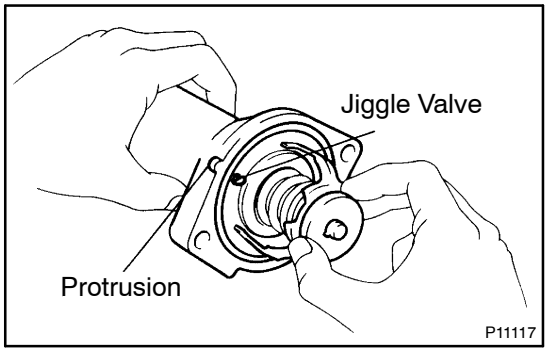
Valve lift: 8.5 mm (0.335 in.) or more at 95°C (203°F)

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 40°C (104°F)).

If not closed, replace the thermostat.

CO0A5–05



INSTALLATION

1. PLACE THERMOSTAT IN WATER INLET

(a) Install a new gasket to the thermostat.

(b) Align the jiggle valve of the thermostat with the protrusion of the water inlet.

2. INSTALL WATER INLET

Install the water inlet with the 2 nuts.

Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

3. FILL WITH ENGINE COOLANT

4. START ENGINE AND CHECK FOR COOLANT LEAKS

RADIATOR

CO0A7–05

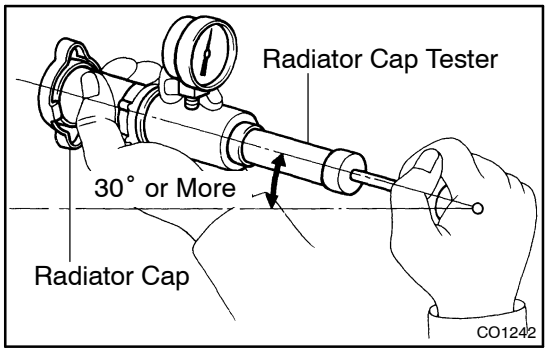
ON–VEHICLE INSPECTION

1. REMOVE RADIATOR CAP

Remove the radiator cap from the radiator.

CAUTION:

Do not remove the radiator cap while the engine and radiator are hot.



2. INSPECT RADIATOR CAP

NOTICE:

- **If the radiator cap has contaminations, always rinse it with water.**
- **Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.**
- **When performing steps (a) and (b) below, keep the tester at an angle of over 30° above the horizontal.**

(a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the vacuum valve.

Pump speed: 1 push/(3 seconds or more)

NOTICE:

Push the pump at a constant speed.

If air is not coming from the vacuum valve, replace the radiator cap.

(b) Pump the radiator cap tester, and measure the relief valve opening pressure.

Pump speed: 1 push within 1 second

NOTICE:

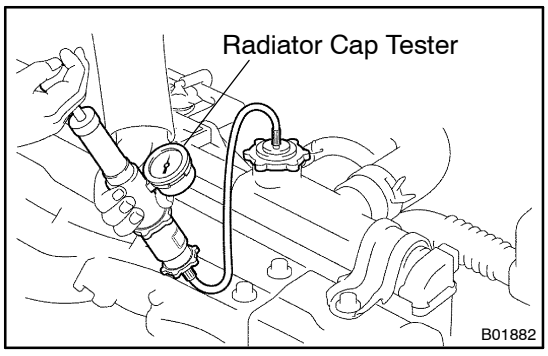
This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.

Standard opening pressure:
93 – 123 kPa (0.95 – 1.25 kgf/cm^2, 13.5 – 17.8 psi)
Minimum opening pressure:
78 kPa (0.8 kgf/cm^2, 11.4 psi)

HINT:

Use the tester's maximum reading as the opening pressure.

If the opening pressure is less than minimum, replace the radiator cap.



3. INSPECT COOLING SYSTEM LEAK

(a) Fill the radiator with coolant and attach a radiator cap tester.

(b) Warm up the engine.

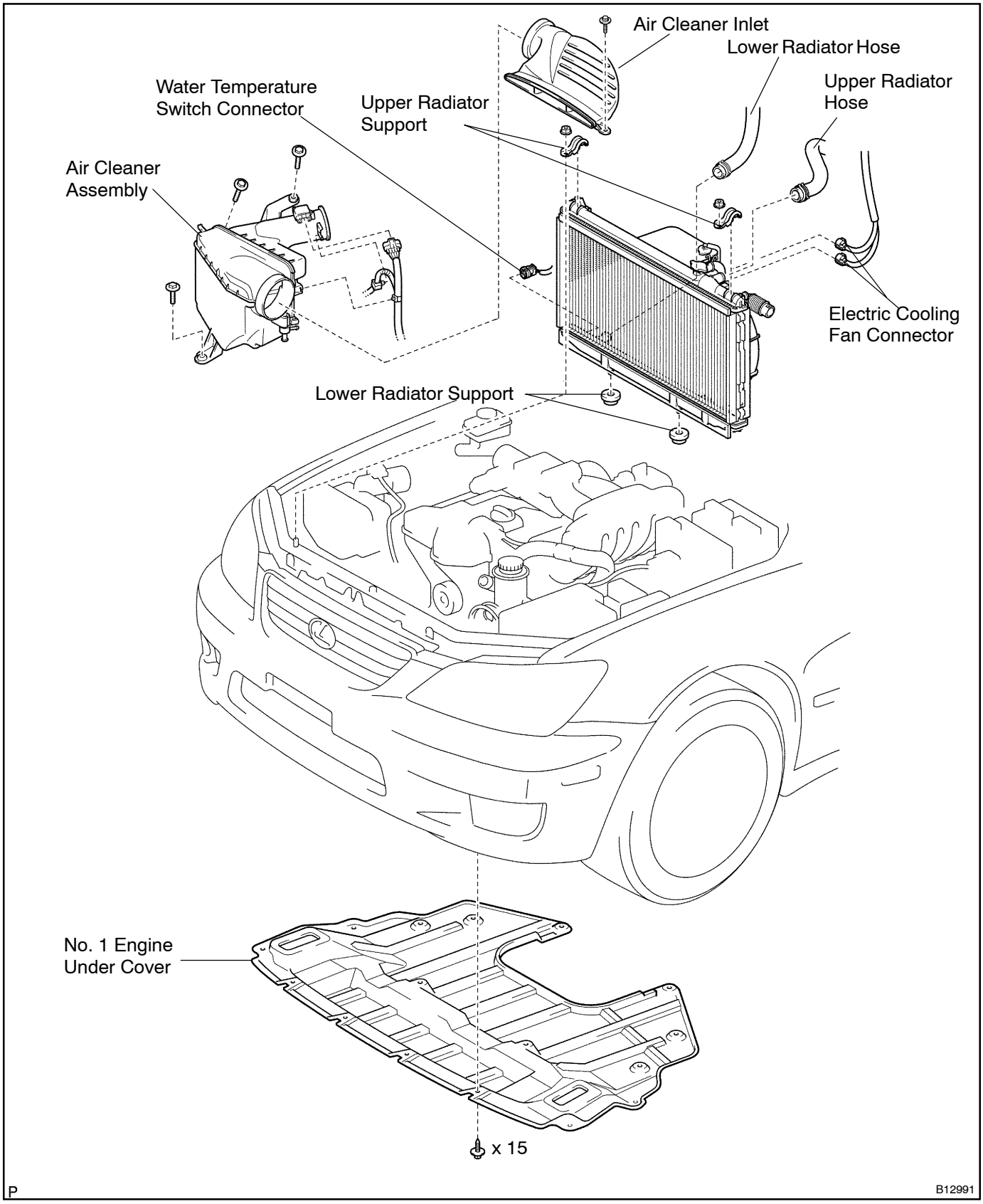
(c) Pump it to 118 kPa (1.2 kgf/cm^2, 17.1 psi), and check that the pressure does not drop.

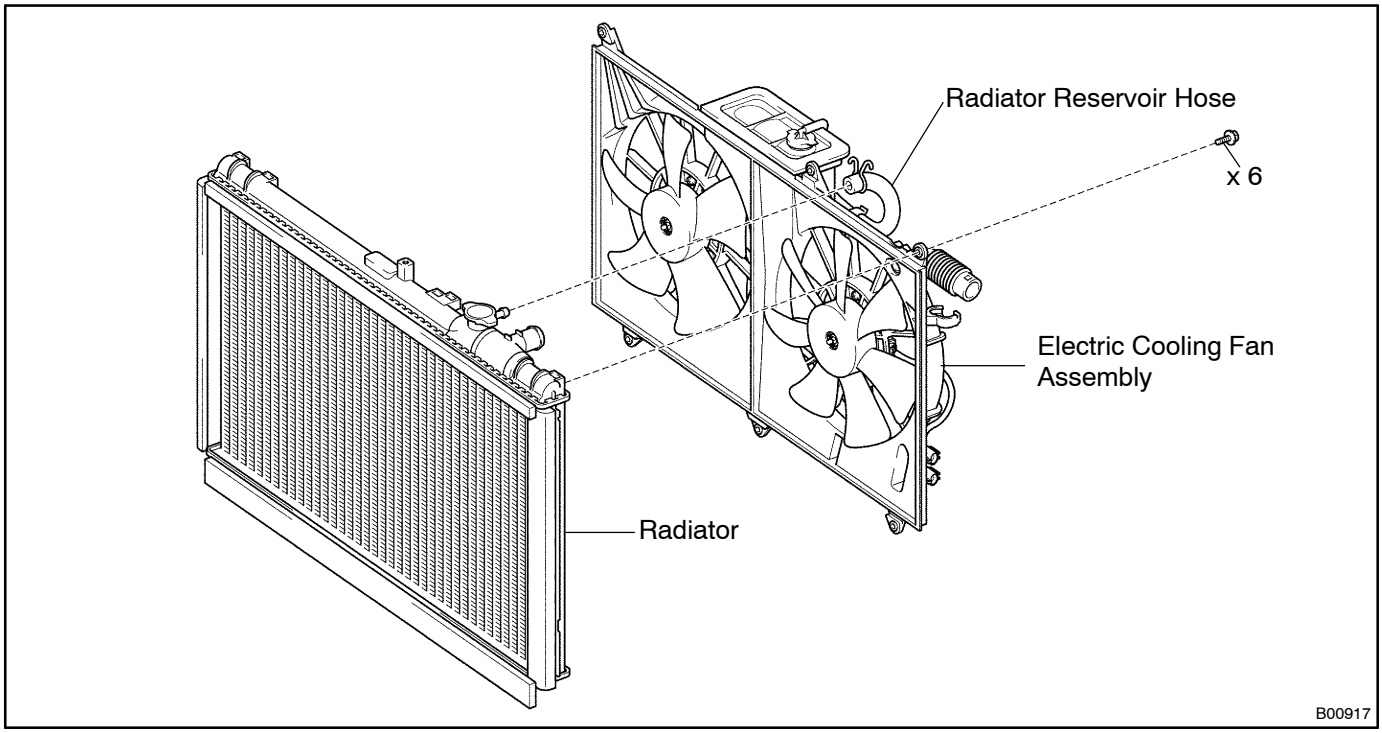
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

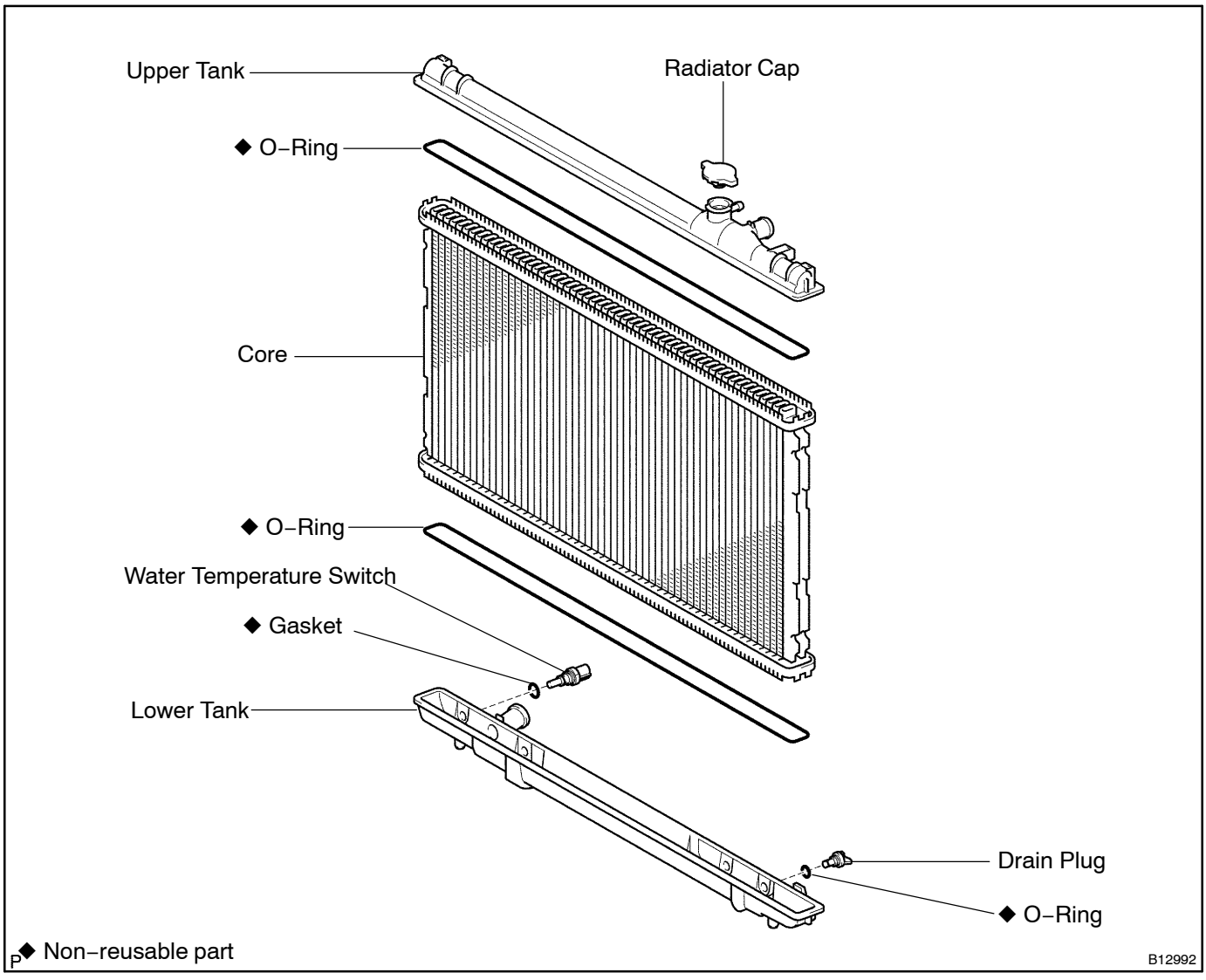
4. REINSTALL RADIATOR CAP

CO0A8–05

COMPONENTS




Radiator Reservoir Hose
x 6
Electric Cooling Fan Assembly
Radiator
B00917


Upper Tank
Radiator Cap
◆ O–Ring
Core
◆ O–Ring
Water Temperature Switch
◆ Gasket
Lower Tank
Drain Plug
◆ O–Ring
P◆ Non–reusable part
B12992

CO0A9–05

REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER

2. DRAIN ENGINE COOLANT

3. REMOVE AIR CLEANER INLET

4. REMOVE AIR CLEANER ASSEMBLY

5. REMOVE RADIATOR AND COOLING FAN ASSEMBLY

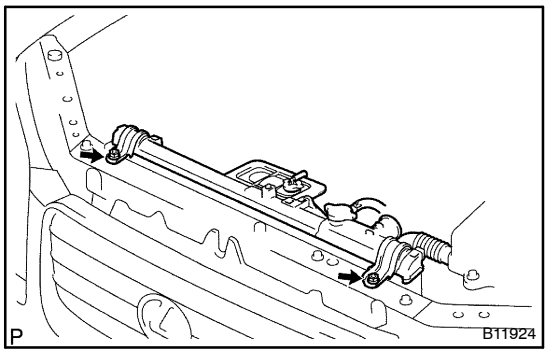
(a) Disconnect the upper and lower radiator hoses from the radiator.

(b) Disconnect the lower radiator hose from the radiator.

(c) Disconnect the ECU outlet duct.

(d) Disconnect the 2 electric cooling fan connectors.

(e) Disconnect the water temperature switch connector.



(f) Remove the 2 nuts and 2 upper radiator supports.

(g) Remove the radiator and cooling fan assembly.

(h) Remove the 2 lower radiator supports.

6. REMOVE ELECTRIC COOLING FAN ASSEMBLY

(a) Disconnect the radiator reservoir hose from the radiator.

(b) Remove the 6 bolts and cooling fan assembly.

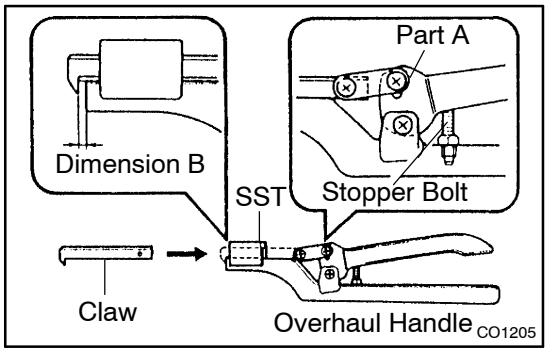
CO1AP–01

DISASSEMBLY

1. REMOVE DRAIN PLUG AND O–RING

2. REMOVE WATER TEMPERATURE SWITCH

(a) Remove the water temperature switch and O–ring.



3. ASSEMBLE SST

SST 09230–01010

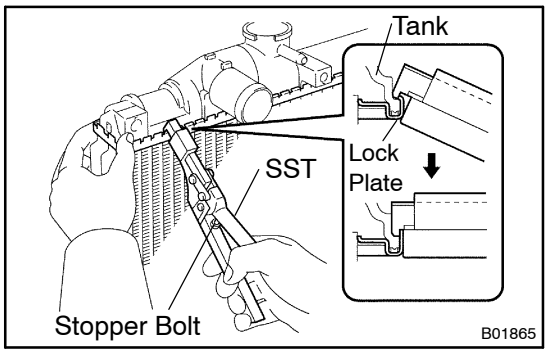
(a) Install the claw to the overhaul handle, inserting it in the hole in part A as shown in the diagram.

(b) While gripping the handle, adjust the stopper bolt so that dimension B is as shown in the illustration.

Dimension B: 0.2 – 0.3 mm (0.008 – 0.012 in.)

NOTICE:

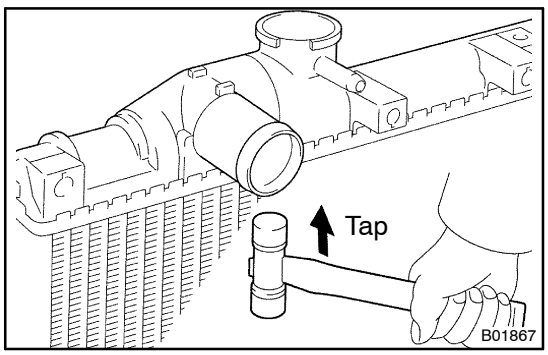
If this adjustment is not done the claw may be damaged.



4. UNCAULK LOCK PLATES

Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

SST 09230–01010



5. REMOVE TANKS AND O–RINGS

Lightly tap the bracket of the radiator (or radiator inlet or outlet) with a soft–faced hammer, and remove the tank and the O–ring.

CO1AQ–01

REASSEMBLY

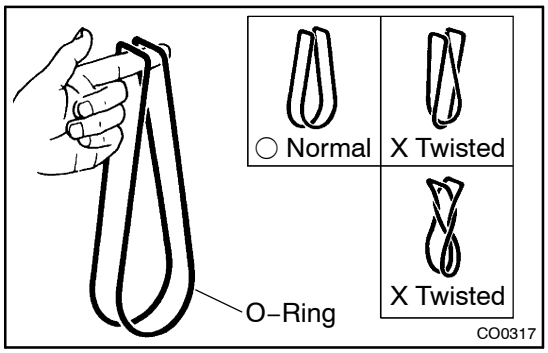
1. INSPECT LOCK PLATE FOR DAMAGE

HINT:

- If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.
- Therefore, first correct any deformation with pliers or similar object. Water leakage will result if the bottom of the lock plate groove is damaged or dented.

NOTICE:

The radiator can only be recaulked 2 times. After the 2nd time, the radiator core must be replaced.

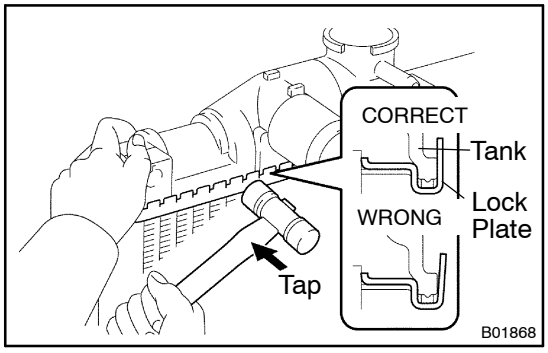


2. INSTALL NEW O–RINGS AND TANKS

(a) After checking that there are no foreign objects in the lock plate groove, install a new O–ring without twisting it.

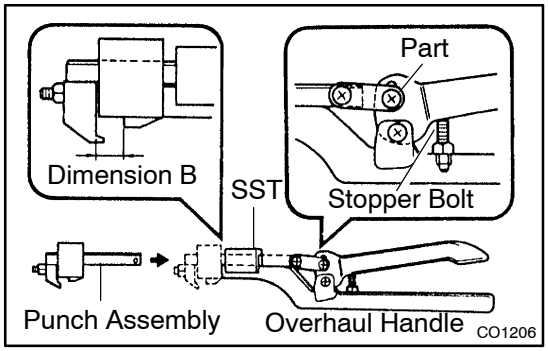
HINT:

When cleaning the lock plate groove, lightly rub it with sand paper without scratching it.



(b) Install the tank without damaging the O–ring.

(c) Tap the lock plate with a soft–faced hammer so that there is no gap between it and the tank.



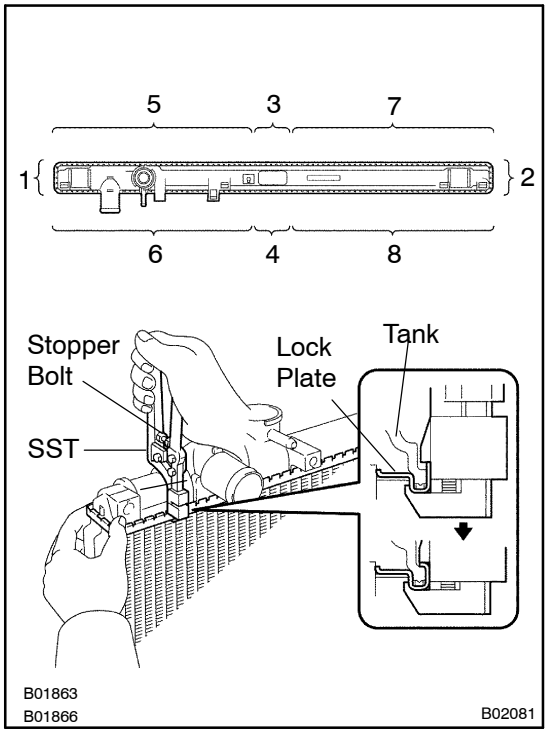
3. ASSEMBLE SST

SST 09230–01010, 09231–14010

(a) Install the punch assembly to the overhaul handle, inserting it in the hole in part A as shown in the illustration.

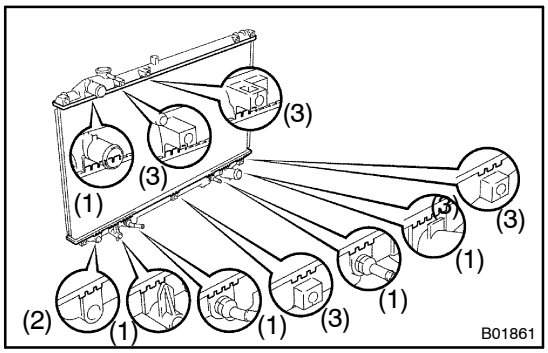
(b) While gripping the handle, adjust the stopper bolt so that dimension B is as shown in the illustration.

Dimension B: 8.4 mm (0.331 in.)



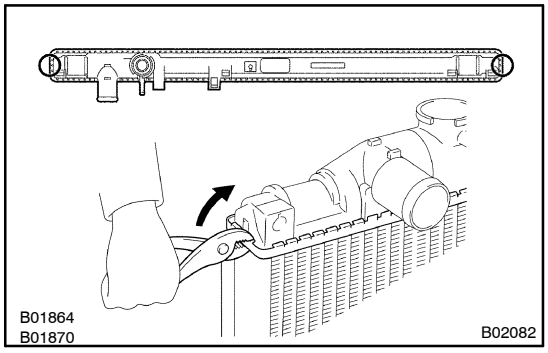
4. CAULK LOCK PLATE

(a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper plate.
SST 09230–01010

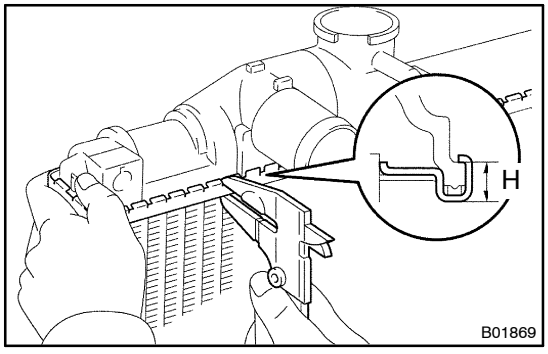


HINT:

- Do not stake the areas protruding around the ports (1), flange (2) and bracket (3).



- The points shown in the illustration cannot be staked with the SST. Use pliers or similar object and be careful not to damage the core plates.



(b) Check the lock plate height (H) after completing the caulking.
Plate height (H): 7.40 – 7.80 mm (0.2913 – 0.3071 in.)
If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

5. INSTALL WATER TEMPERATURE SWITCH

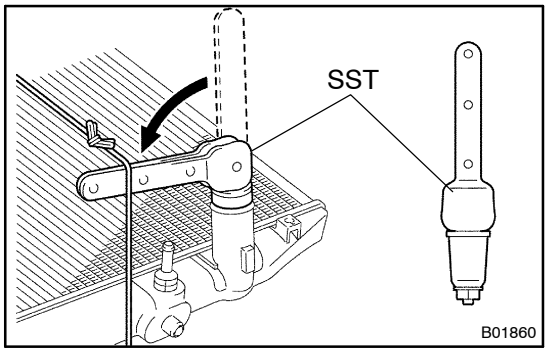
(a) Install a new O–ring to the water temperature switch.
(b) Install the water temperature switch.

6. INSTALL DRAIN PLUG

(a) Install a new O–ring to the drain plug.

(b) Install the drain plug.

7. INSTALL RADIATOR CAP



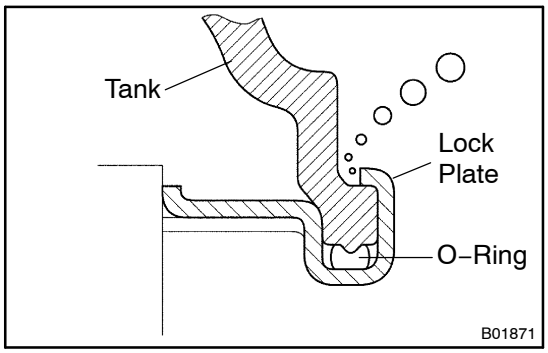
8. INSPECT WATER LEAK

(a) Tighten the drain plug.

(b) Plug the inlet pipes of the radiator with SST.
SST 09230–01010

(c) Using a radiator cap tester, apply pressure to the radiator.
Test pressure: 177 kPa (1.8 kgf/cm^2, 26 psi)

(d) Submerge the radiator in water.



(e) Check the leak.

HINT:

On radiators with resin tanks, there is a clearance between the tank and lock plate where a minute amount of air will remain, giving the appearance of an air leak when the radiator is submerged in water. Therefore, before doing the water leak test, first swish the radiator around in the water until all air bubbles disappear.

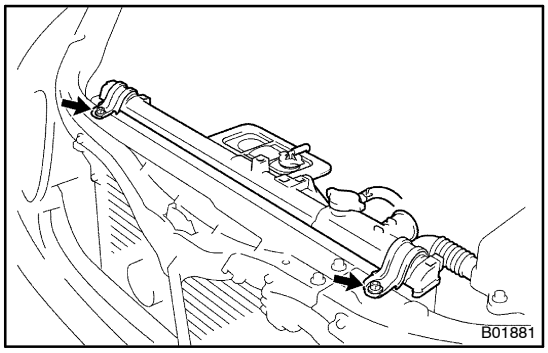
CO0AC–04

INSTALLATION

1. INSTALLCOOLING FAN ASSEMBLY

(a) Install the cooling fan assembly with the 6 bolts.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

(b) Connect the radiator reservoir hose to the radiator.



2. INSTALL RADIATOR AND COOLING FAN ASSEMBLY

(a) Install the 2 lower radiator supports to the radiator.

(b) Attach the 2 lower radiator supports on the radiator to the body bracket.

(c) Install the radiator and electric cooling fan assembly with the 2 upper radiator supports and 2 nuts.
Torque: 13.5 N·m (135 kgf·cm, 10 ft·lbf)

(d) Connect these parts:
- Upper radiator hose to radiator
- Lower radiator hose to radiator
- ECU outlet duct to ECU box
- 2 electric cooling fan connectors
- Water temperature switch connector

3. INSTALL AIR CLEANER ASSEMBLY

4. INSTALL AIR CLEANER INLET

5. FILL WITH ENGINE COOLANT

6. CHECK ENGINE COOLANT LEAK (See page CO–12)

7. INSTALL NO. 1 ENGINE UNDER COVER

ELECTRIC COOLING FAN

CO1AR–01

ON–VEHICLE INSPECTION

1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 83°C (181°F))

(a) Turn the ignition switch ON.

(b) Check that the cooling fan is stopping.

HINT:

If the cooling fan operates, check the water temperature switch and wiring.

(c) Disconnect the water temperature switch connector.

(d) Check that the cooling fan rotates.

If the cooling fan does not operate, check the fuses, relays, cooling fan motor and wiring.

(e) Reconnect the water temperature switch connector.

2. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 93°C (199°F))

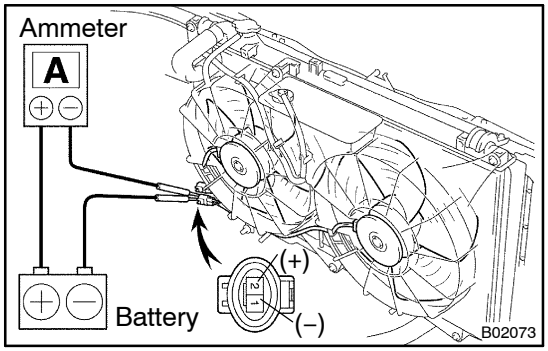
(a) Start the engine, and raise coolant temperature to above 93°C (199°F).

HINT:

Coolant temperature is the detected value by the water temperature switch on the radiator lower tank.

(b) Check that the cooling fan rotates.

If not, replace the water temperature switch.



3. INSPECT COOLING FANS

(a) Disconnect the cooling fan connector.

(b) Connect battery and ammeter to the cooling fan connector.

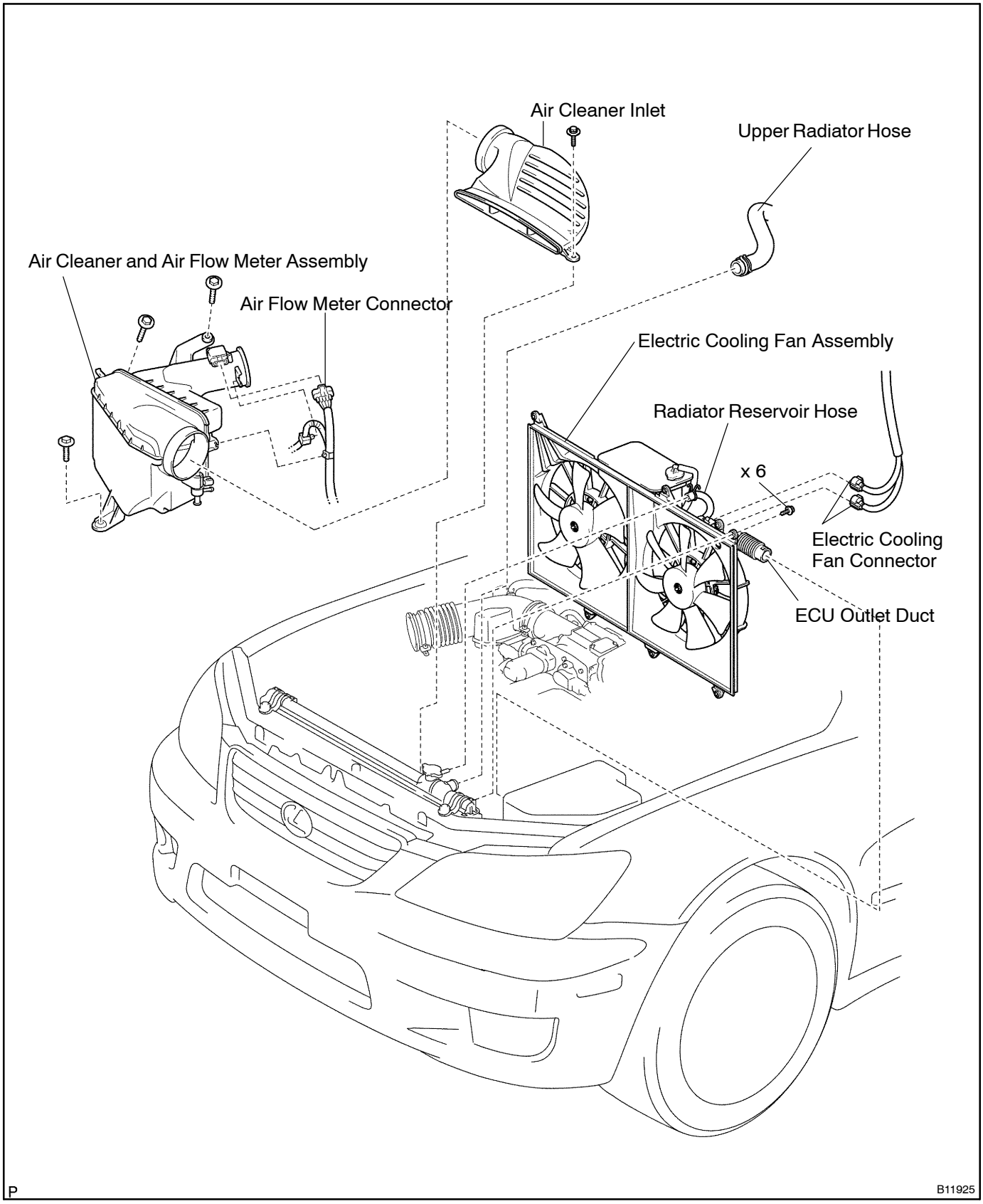
(c) Check that the cooling fan rotates smoothly, and check the reading on the ammeter.

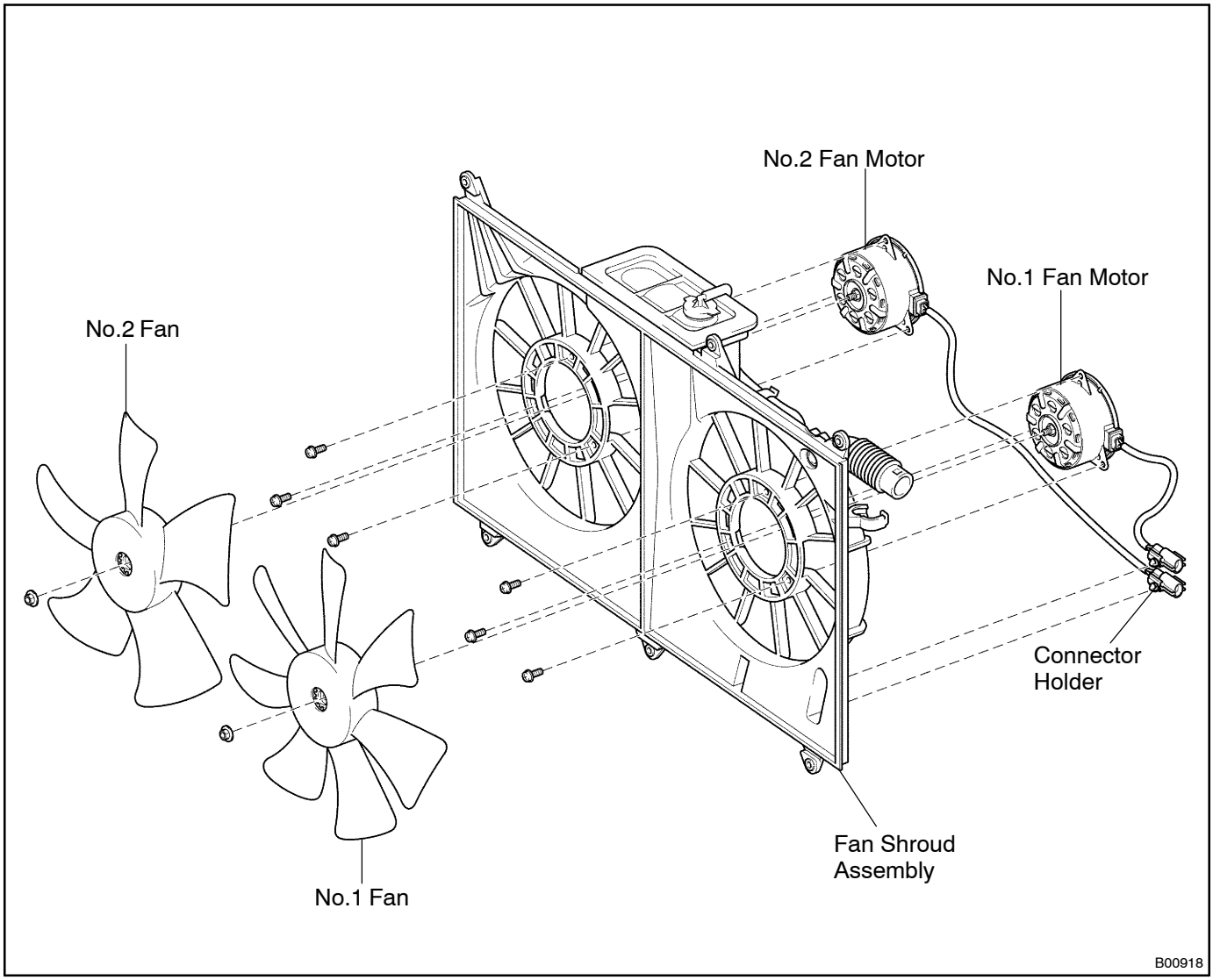
Standard amperage: 8.5 – 11.5 A at 20°C (68°F)

(d) Reconnect the cooling fan connector.

CO0AE–08

COMPONENTS




No.2 Fan Motor
No.1 Fan Motor
No.2 Fan
Connector Holder
Fan Shroud Assembly
No.1 Fan
B00918

CO0AF–08

REMOVAL

1. DRAIN ENGINE COOLANT

2. REMOVE AIR CLEANER INLET

3. REMOVE AIR CLEANER AND AIR FLOW METER ASSEMBLY

4. REMOVE ELECTRIC COOLING FAN

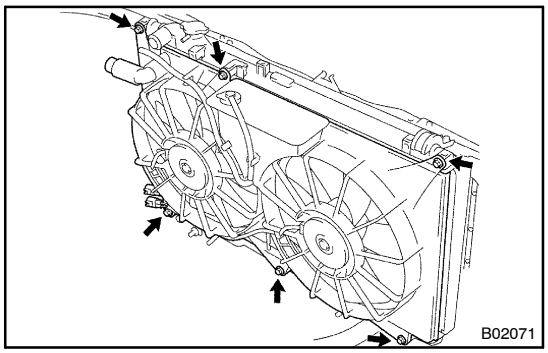
(a) Disconnect the upper radiator hose from the radiator.

(b) Disconnect the ECU outlet duct from the ECU box.

(c) Disconnect the wire for electric cooling fan from the clamp on the electric cooling fan.

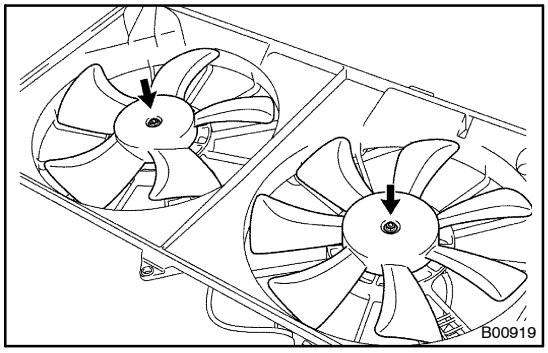
(d) Disconnect the 2 electric cooling fan connector.

(e) Disconnect the radiator reservoir hose from the radiator.



(f) Remove the 6 bolts and electric cooling fan.

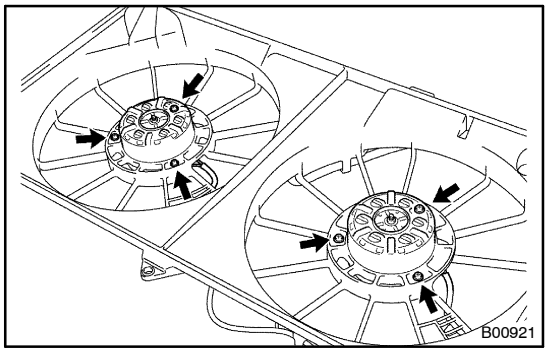
CO0AG–05



DISASSEMBLY

1. REMOVE FANS

Remove the nut and fan. Remove the 2 fans.



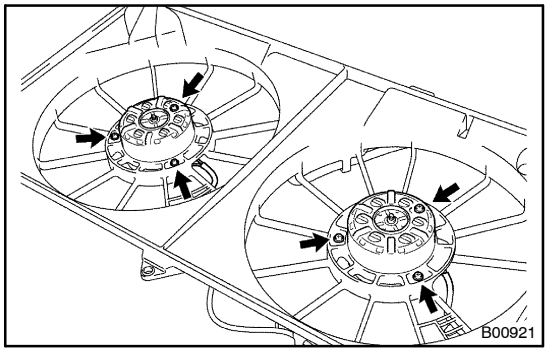
2. REMOVE FAN MOTORS

(a) Disconnect the wires and connector holders from the fan shroud.

(b) Remove the 3 screws and fan motor. Remove the 2 fan motors.

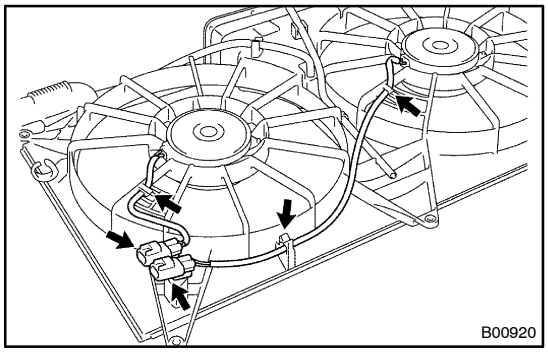
CO0AH–04

REASSEMBLY

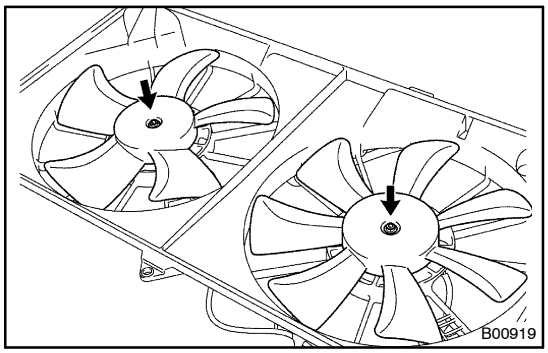


1. INSTALL FAN MOTORS

(a) Install the fan motor with the 3 screws. Install the 2 fan motors.



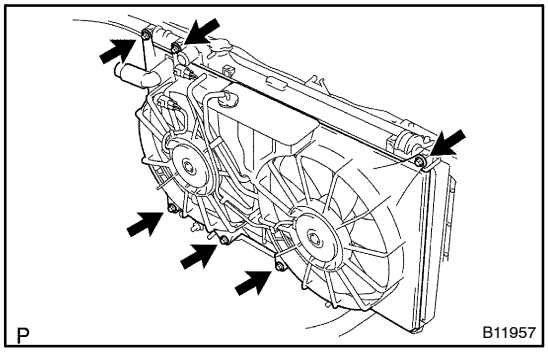
(b) Install the wires and connector holders to the fan shroud as shown in the illustration.



2. INSTALL FANS

Install the fan with the nut. Install the 2 fans.

CO0AI–06



INSTALLATION

1. INSTALL ELECTRIC COOLING FAN

(a) Install the electric cooling fan with the 6 bolts.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

(b) Connect the upper radiator hose to the radiator.

(c) Connect the ECU outlet duct to the ECU box.

(d) Connect the wire for electric cooling fan to clamp on the electric cooling fan.

(e) Connect the 2 electric cooling fan connectors.

(f) Connect the radiator reservoir hose to the radiator.

2. INSTALL AIR CLEANER AND AIR FLOW METER ASSEMBLY

3. INSTALL AIR CLEANER INLET

4. FILL WITH ENGINE COOLANT

5. START ENGINE AND CHECK FOR COOLANT LEAKS

WATER TEMPERATURE SWITCH

CO1AS–01

INSPECTION

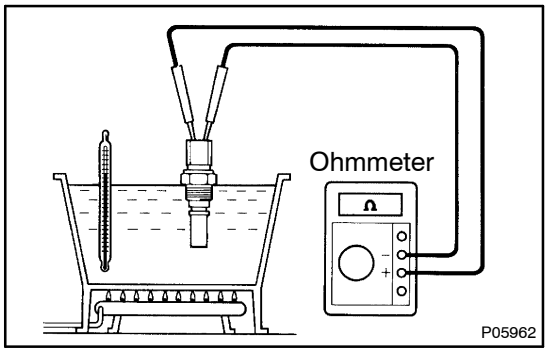
1. DRAIN ENGINE COOLANT

2. REMOVE WATER TEMPERATURE SWITCH

(a) Disconnect the connector.

(b) Remove the water temperature switch.

(c) Remove the O–ring from the water temperature switch.



3. INSPECT WATER TEMPERATURE SWITCH

Check the sensor terminals continuity.

Standard:

Water temperature	Continuity
above 90 °C (194 °F)	Continuity
below 83 °C (181 °F)	No Continuity

If the continuity is not standard, replace the switch.

4. REINSTALL WATER TEMPERATURE SWITCH

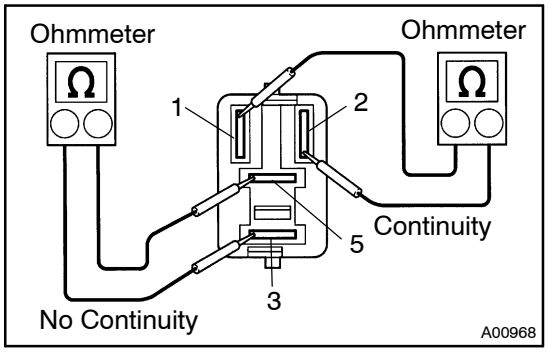
(a) Install a new O–ring to the water temperature switch.

(b) Install the water temperature switch.

(c) Connect the connector.

5. REFILL WITH ENGINE COOLANT

6. CHECK ENGINE COOLANT LEAK



COOLING FAN RELAY

CO1AT–01

INSPECTION

1. INSPECT NO.1 AND NO. 3 COOLING FAN RELAY (Marking: FAN NO. 1 and FAN NO. 3)

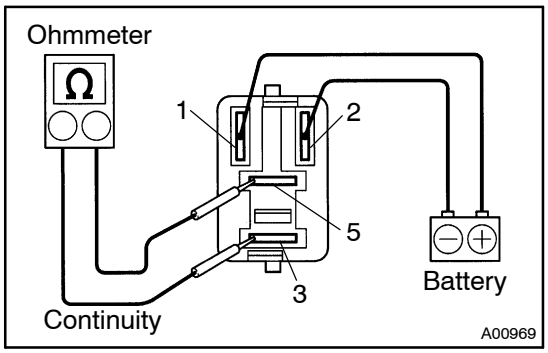
(a) Inspect the relay continuity.

(1) Check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.

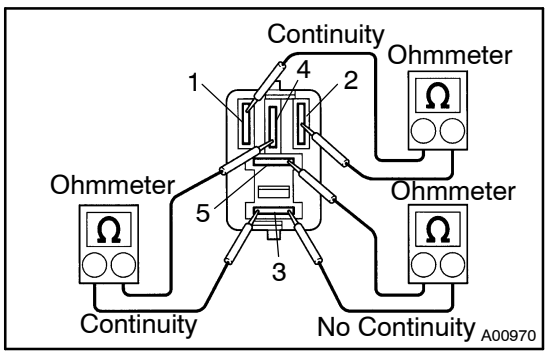


(b) Inspect the relay operation.

(1) Apply battery positive voltage to terminals 1 and 2.

(2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is continuity, replace the relay.



2. INSPECT NO. 2 COOLING FAN RELAY (Marking: FAN NO. 2)

(a) Inspect the relay continuity.

(1) Check that there is continuity between terminals 1 and 2.

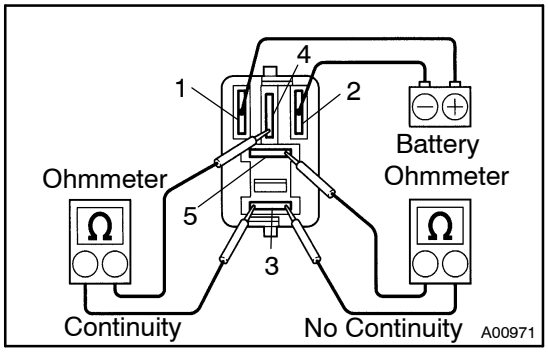
If there is no continuity, replace the relay.

(2) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.

(3) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



(b) Inspect the relay operation.

(1) Apply battery positive voltage to terminals 1 and 2.

(2) Check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.

(3) Check that there is continuity between terminals 3 and 5.

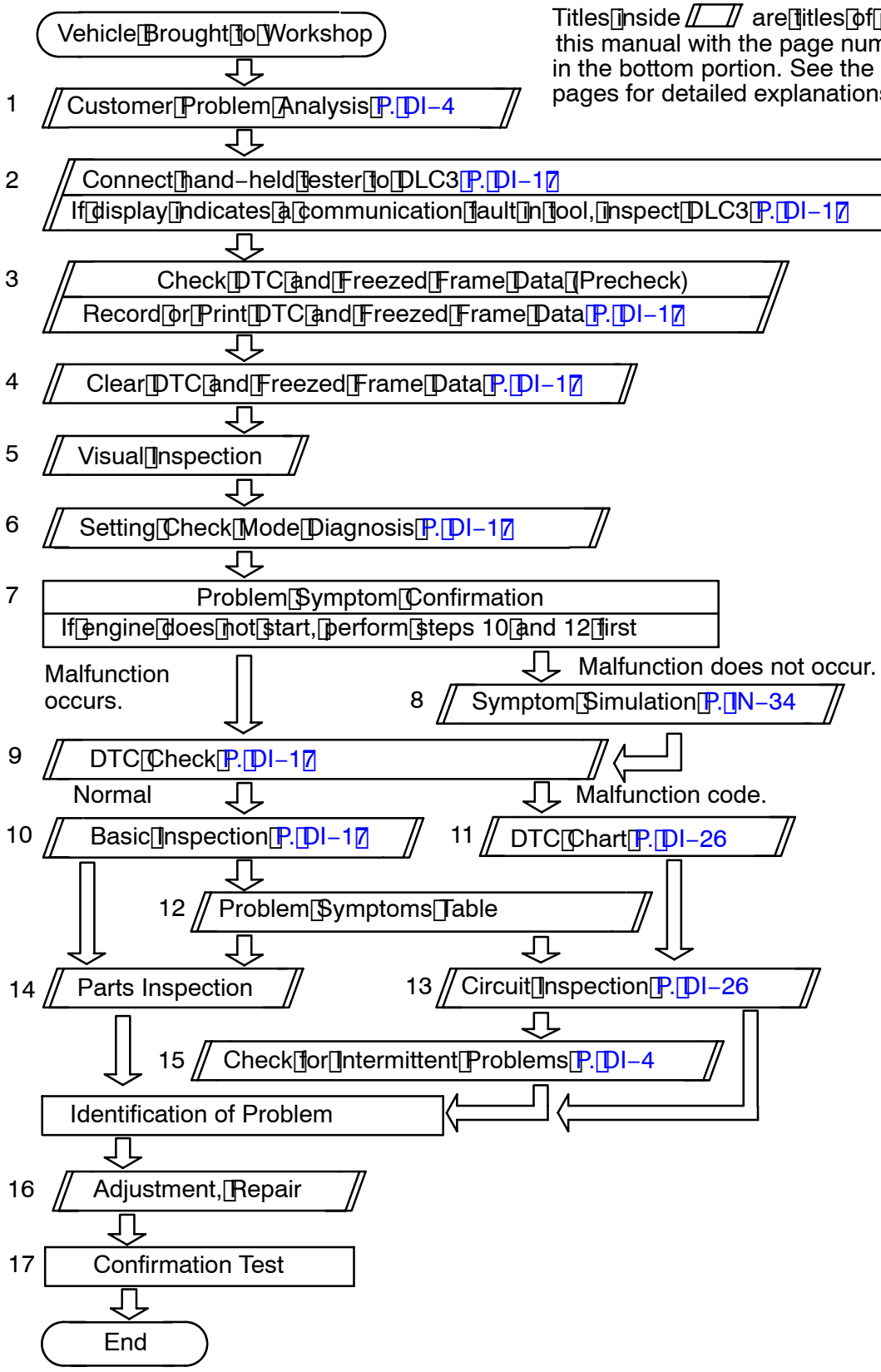
If there is no continuity, replace the relay.

ENGINE (2JZ–GE)

DI63H–08

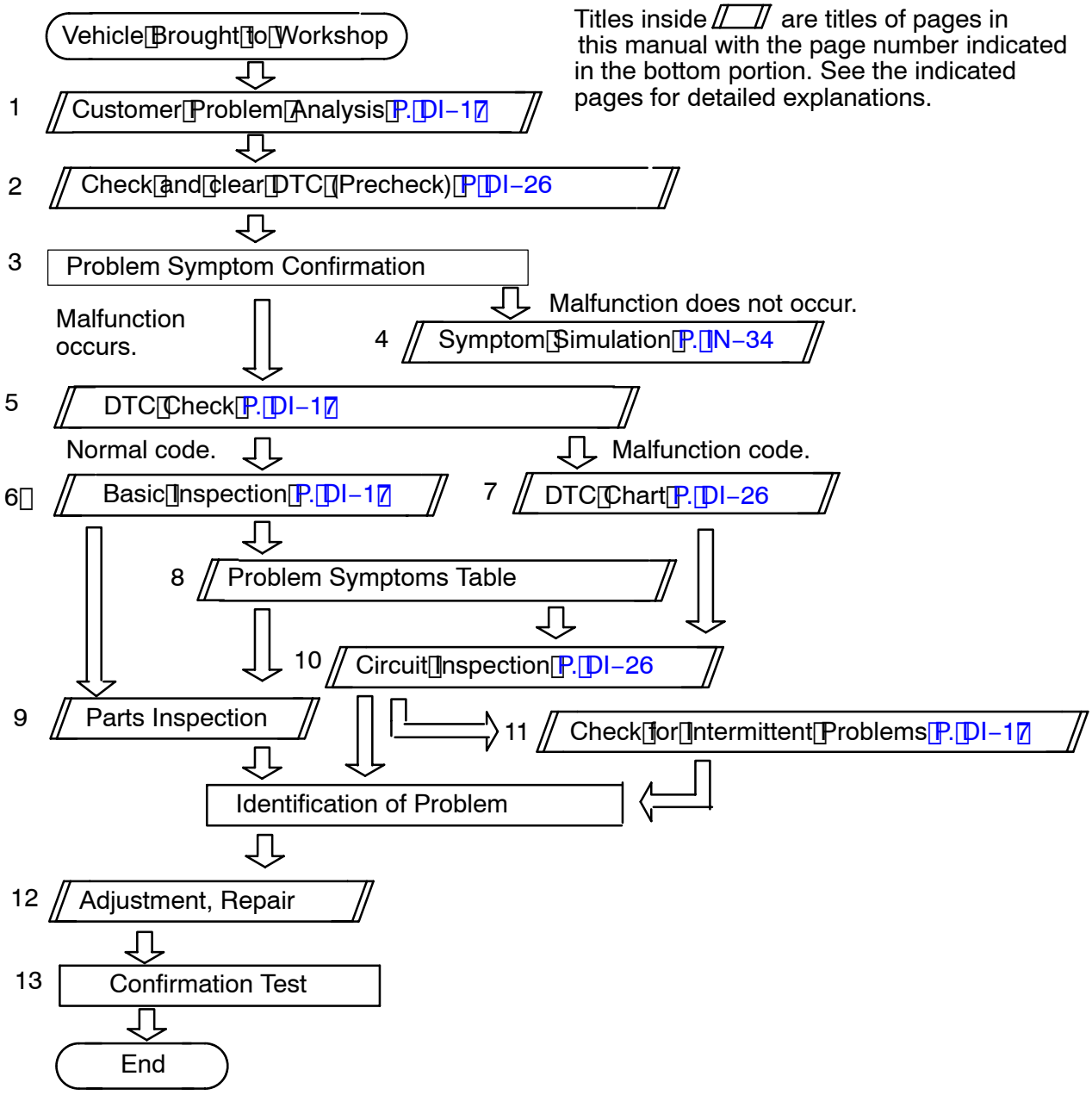
HOW TO PROCEED WITH TROUBLESHOOTING

When using hand–held tester, troubleshoot in accordance with the procedure on the following page.



Titles inside // // are titles of pages in this manual with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

When not using hand–held tester, troubleshoot in accordance with the procedure on the following page.



DI63I–01

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name _____

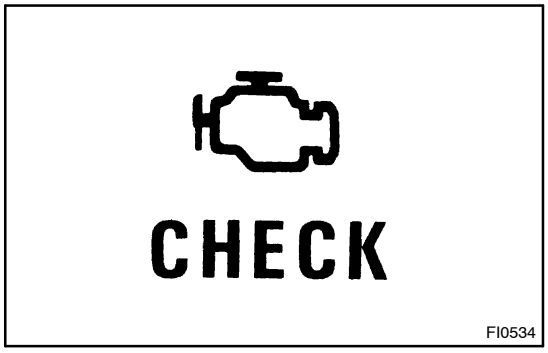
Customer's Name		Model and Model Year	
Driver's Name		Frame No.	
Date Vehicle Brought in		Engine Model	
License No.		Odometer Reading	km miles

Problem Symptoms	☐ Engine does not Start	☐ Engine does not crank ☐ No initial combustion ☐ No complete combustion
	☐ Difficult to Start	☐ Engine cranks slowly ☐ Other _____
	☐ Poor Idling	☐ Incorrect first idle ☐ Idling rpm is abnormal ☐ High (rpm) ☐ Low (rpm) ☐ Rough idling ☐ Other _____
	☐ Poor Driveability	☐ Hesitation ☐ Back fire ☐ Muffler explosion (after–fire) ☐ Surging ☐ Knocking ☐ Other _____
	☐ Engine Stall	☐ Soon after starting ☐ After accelerator pedal depressed ☐ After accelerator pedal released ☐ During A/C operation ☐ Shifting from N to D ☐ Other _____
	☐ Others	

Dates Problem Occurred		
Problem Frequency		☐ Constant ☐ Sometimes (times per day/month) ☐ Once only ☐ Other _____
Condition When Problem Occurs	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other _____
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (approx. ____ °F/____ °C)
	Place	☐ Highway ☐ Suburbs ☐ Inner city ☐ Uphill ☐ Downhill ☐ Rough road ☐ Other _____
	Engine Temp.	☐ Cold ☐ Warming up ☐ After warming up ☐ Any temp. ☐ Other _____
	Engine Operation	☐ Starting ☐ Just after starting (min.) ☐ Idling ☐ Racing ☐ Driving ☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ A/C switch ON/OFF ☐ Other _____

DTC Inspection	Normal Mode (Precheck)	☐ Normal	☐ Malfunction code(s) (code) ☐ Freezed frame data ( )
	Check (Test) Mode	☐ Normal	☐ Malfunction code(s) (code) ☐ Freezed frame data ( )

DI85I–02

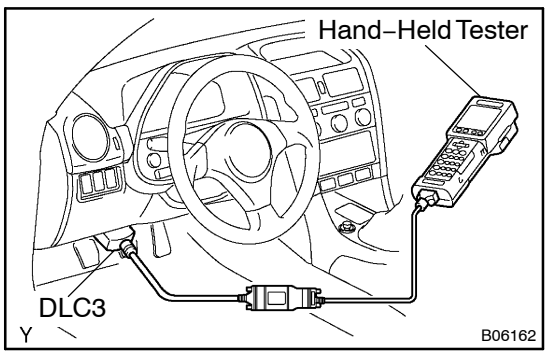


PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Description for EURO–OBD (European spec.)

- When troubleshooting Euro–OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031–4 or hand–held tester, and read off various data output from the vehicle's engine ECU.
  Euro–OBD regulations require that the vehicle's on–board computer lights up the check engine warning ignition the instrument panel when the computer detects a malfunction in the emission control system/components or in the powertrain control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light (CHK ENG) lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by ISO15031–6 are recorded in the engine ECU memory (See page DI–17). If the malfunction does not repaired in 3 consecutive trips, the (CHK ENG) goes off automatically but the DTCs remain recorded in the engine ECU memory.



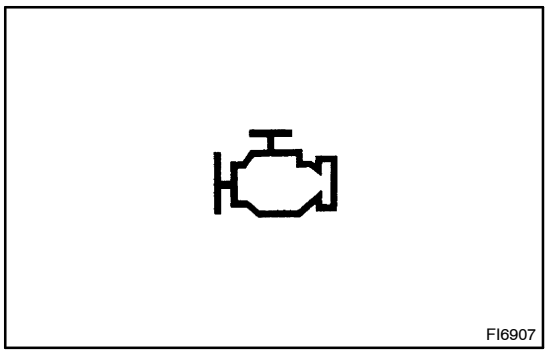
- To check the DTCs, connect the OBD scan tool or hand–held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or hand–held tester also enables you to erase the DTCs and check freezed frame data and various forms of engine data (For operating instructions, see the OBD scan tool's instruction book.).
  DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI–17).
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check mode when troubleshooting,

the technician can cause the check engine warning light to light up for a malfunction that is only detected once or momentarily (Hand–held tester only) (See step 2).

- *2 trip detection logic:
  When a malfunction is first detected, the malfunction is temporarily stored in the engine ECU memory. (1st trip) If the same malfunction is detected again during the second drive test, this second detection causes the (CHK ENG) to light up. (2nd trip) (However, the ignition switch must be turned OFF between the 1st trip and the 2nd trip.).
- Freeze frame data:
  Freeze frame data records the engine condition when a misfire (DTCs P0300 – P0306) or fuel trim malfunction (DTCs P0171, P0172, P0174 and P0175) or other malfunction (first malfunction only), is detected.
  Because freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected, when troubleshooting, it is useful to determine whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Priorities for troubleshooting:
If troubleshooting priorities for multiple DTCs are given in the applicable DTC chart, these should be followed.
If no instructions are given, troubleshoot DTCs according to the following priorities.

(1) DTCs other than fuel trim malfunction (DTCs P0171, P0172, P0174 and P0175) and misfire (DTCs P0300 – P0306).
(2) Fuel trim malfunction (DTCs P0171, P0172, P0174 and P0175).
(3) Misfire (DTCs P0300 – P0306).

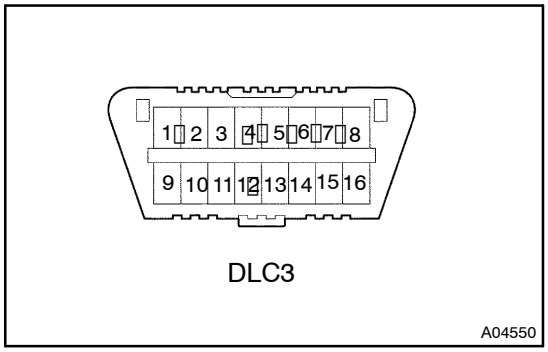

FI6907

(b) Description for M–OBD (Except European spec.)

- When troubleshooting Multiplex OBD (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the vehicle to the hand–held tester, and read off various data output from the vehicle's engine ECU.
- The vehicle's on–board computer indicates the check engine light (CHK ENG) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components.

In addition to an indication of the CHK ENG when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) recorded in the engine ECU memory (See page DI–17). When the malfunction does not reoccur, the CHK ENG is indicated until the ignition switch is turned off, and then the CHK ENG is not indicated when the ignition switch is turned on but the DTCs remain recorded in the engine ECU memory.

- To check the DTCs, connect the hand–held tester to Data Link Connector 3 (DLC3) on the vehicle or read the DTC which is indicated on the multi information display when TC and CG terminals on the DLC3 are connected. The hand–held tester also enables you to erase the DTCs and check freezed frame data and various forms of engine data. (For operating instructions, see the instruction book.)
- The diagnosis system operates in normal mode during normal vehicle use. It also has a check (test) mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the engine ECU to check (test) mode using hand–held tester when troubleshooting, the technician can cause the CHK ENG on the light up for a malfunction that is only detected once or momentarily (Hand–held tester only) (See step 2).
- * 2 trip detection logic:
  When a logic malfunction is fist detected, the malfunction is temporally stored in the engine ECU memory. If the same malfunction is detected again during the second drive test, this second detection cases the CHK ENG to light up.
  The 2 trip repeats the same mode for 2 times. (However, the ignition switch must be turned OFF between the 1st trip and 2nd trip)
- Freeze frame data:
  Freeze frame data records the engine condition when malfunction is detected.
  Because freeze frame data records the engine conditions (fuel system, calculator load, water temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected, when troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.



(c) Check the DLC3.
The vehicle's engine ECU uses the ISO 9141–2 (Euro–OBD)/ISO 14230 (M–OBD) communication protocol. The terminal arrangement of DLC3 complies with ISO 15031–3 and matches the ISO 9141–2/ISO 14230 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus ⊕ Line/Pulse generation	During transmission
4	Chassis Ground ↔ Body Ground/1 Ω or less	Always
16	Battery Positive ↔ Body Ground/9 – 14 V	Always

HINT:
- If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still not possible 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.

2. INSPECT DIAGNOSIS (Normal Mode)

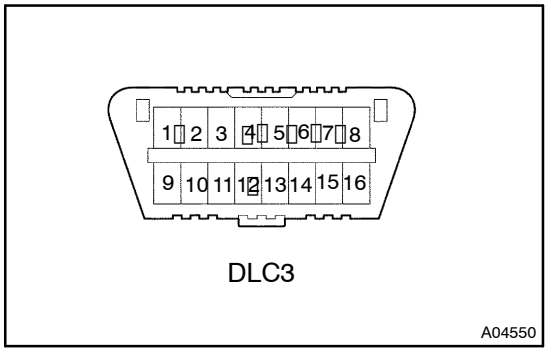
(a) Check the DTC using hand–held tester.

NOTICE:

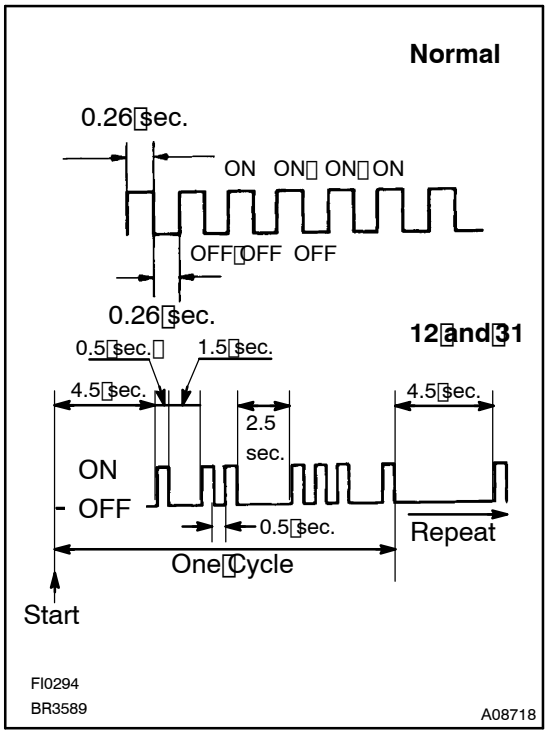
Hand–held tester only:

When the diagnosis system is switched from normal mode to check mode, it erases all DTCs and freezed frame data recorded in normal mode. So before switching modes, always check the DTCs and freezed frame data, and note them down.

(1) Prepare the hand–held tester.
(2) Connect the hand–held tester to DLC3.
(3) Turn the ignition switch ON and push the hand–held tester main switch ON.
(4) Use the hand–held tester to check the DTCs and freezed frame data, note them down. (For operating instructions, see the hand–held tester instruction book.)
(5) See page DI–17 to confirm the details of the DTCs.



(b) Except European spec.:
Check the DTC when not using hand–held tester.
(1) Turn the ignition switch ON.
(2) Using SST, connect between terminals 13 (TC) and 4 (CG) of the DLC3.
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(3) Read the DTC from the check engine warning light (CHK ENG).
As an example, the blinking patterns for codes, normal, 12 and 31 are as shown in the illustration.
(4) Check the details of the malfunction using the DTC chart on page DI–17.
(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn off the display.

HINT:
In the event of 2 or more malfunction cords, the indication will begin from the smaller numbered cord and continue in order to the larger.

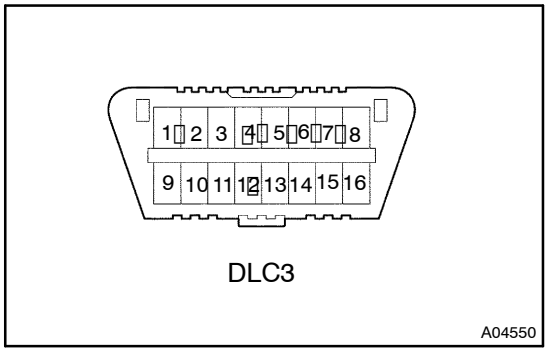
(6) Push the function key of the steering switch until EFI will be displayed on the instrument panel.
(7) Read the DTC on the instrument panel.

HINT:
- If a DTC is not indicated, check the TC terminal circuit.
- If a code No.89 is indicated, read the number of blinks of the ECT SNOW indication to get the DTC for the electric throttle control system (ETCS).

NOTICE:
- **When simulating symptoms with out a hand–held tester to check the DTCs, use normal mode. For code on the DTC chart subject to "2 trip detection logic", turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again. When the problem has been simulated twice, the CHECK ENG is indicated on the instrument panel and the DTCs are recorded in the engine ECU.**
- **Check the 1st trip DTC using Mode 7 for ISO 15031 (Continuous Test Results of Euro–OBD function in hand–held tester).**

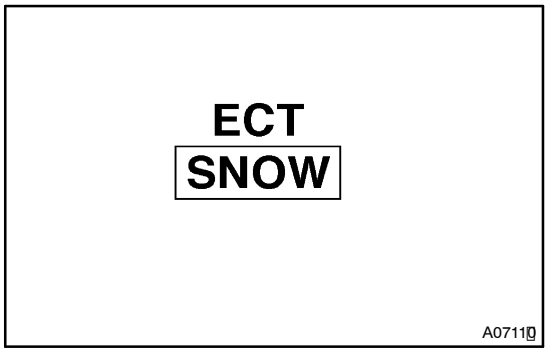
(c) Check the DTC for ETCS
(1) Turn the ignition switch ON.

HINT:
If the ECT SNOW indicator does not light up, troubleshoot the combination meter (See page BE–31).



(2) Using SST, connect between terminals 13 (TC) and 4 (CG) of the DLC3.

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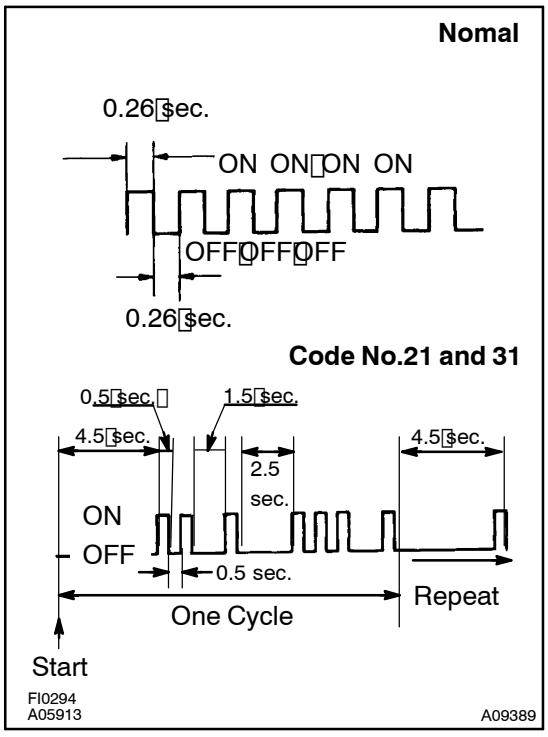
(3) Read the DTC from the ECT snow indicator the combination meter.

HINT:

If a DTC is not output, check the TC terminal circuit.

(4) Check details of the malfunction using the DTC chart on page DI–17.

(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn off the display.



HINT:

In the event of 2 or more malfunction codes, indication will begin from the smaller numbered code and continue in order to the lager.

(d) Clear the DTC.

The DTCs and freezed frame data will be erased by either actions.

(1) Operating the hand–held tester to erase the codes (See the hand–held tester's instruction book for operating instructions.).

(2) Disconnecting the battery terminals of EFI and ECTS fuses.

NOTICE:

If the hand–held tester switches the engine ECU from normal mode to check mode or vice–versa, or if the ignition switch is turned from ON to ACC or OFF during check mode, the DTCs and freezed frame data will be erased.

3. INSPECT DIAGNOSIS (Check (Test) Mode)

HINT:

Hand–held tester only:

Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions.

Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check (test) mode.

(a) Check the DTC.

(1) Initial conditions

- Battery voltage 11 V or more
- Throttle valve fully closed.
- Transmission in P or N position
- A/C switched OFF

(2) Turn the ignition switch OFF.
(3) Prepare the hand–held tester.
(4) Connect the hand–held tester to the DLC3.
(5) Turn the ignition switch ON and push the hand–held tester main switch ON.
(6) Switch the hand–held tester from the normal mode to the check (test) mode.

NOTICE:
If the hand–held tester switches the engine ECU from normal mode to check mode or vice–versa, or if the ignition switch is turned from ON to ACC or OFF during check mode, the DTCs and freezed frame data will be erased.

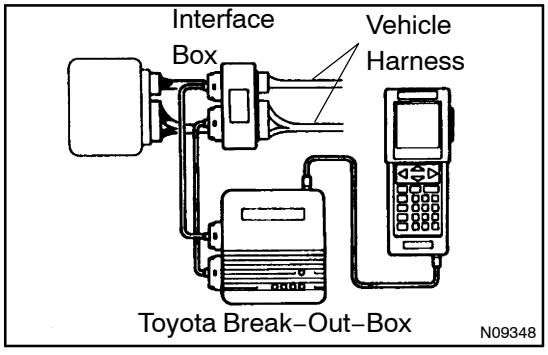
(7) Start the engine.
(8) Simulate the conditions of the malfunction described by the customer.

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

(9) After simulating the malfunction conditions, use the hand–held tester diagnosis selector to check the DTCs and freezed frame data, etc.

HINT:
Take care not to turn the ignition switch OFF. Turning the ignition switch OFF switches the diagnosis system from check (test) mode to normal mode. so all DTCs, etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.



(b) Engine ECU Terminal Values Measurement Using Break–Out–Box and Hand–Held Tester
(1) Hook up the break–out–box and hand–held tester to the vehicle.
(2) Read the engine ECU input/output values by following the prompts on the tester screen.

HINT:
- Hand–held tester has a ”Snapshot” function.
  This records the measured values and is effective in the diagnosis of intermittent problems.
- Please refer to the hand–held tester/break–out–box operator’s manual for further details.

4. FAIL–SAFE CHART

If any of the following codes is recorded, the engine ECU enters fail–safe mode.

DTC No.	Fail–Safe Operation	Fail–Safe Deactivation Conditions
P0100/31	From the amount of throttle valve opening and the engine rpm, estimate the amount of inhaled air.	Returned to normal condition
P0110/24	Intake air temperature is fixed at 20°C (68°F)	Returned to normal condition
P0115/22	Water temperature is fixed at 80°C (176°F)	Returned to normal condition

P0120/41	Saved driving mode	Ignition switch OFF
P0135/21 P0141/21 P0155/28 P0161/28	The heater circuit in which an abnormality is detected is turned off	Ignition switch OFF
P0325/52 P0330/53	Max. timing retardation	Ignition switch OFF
P1300/14 P1305/15 P1310/14 P1315/14 P1320/14 P1325/14 P1330/14 P1340/14	Fuel cut	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

HINT:

Hand–held tester only:

By putting the vehicle's engine ECU in the check (test) mode, 1 trip detection logic is possible instead of 2 trip detection logic and sensitivity to detect open circuits is increased. This makes it easier to detect intermittent problems.

(a) Clear the DTCs (See step 2).

(b) Set the check (Test) mode (See step 3).

(c) Perform a simulation test (See page IN–23).

(d) Check the connector and terminal (See page IN–34).

(e) Handle the connector (See page IN–34).

6. BASIC INSPECTION

When the malfunction code is not confirmed in the DTC check, troubleshooting should be performed in the order for all possible circuits to be considered as the causes of the problems. In many cases, by carrying out the basic engine check shown in the following flow chart, the location causing the problem can be found quickly and efficiently. Therefore, use of this check is essential in engine troubleshooting.

1	**Is battery voltage 11 V or more when engine is stopped?**

NO → **Charge or replace battery.**

YES

2	**Is engine cranked?**

NO → **Proceed to problems table (See page DI–24)**

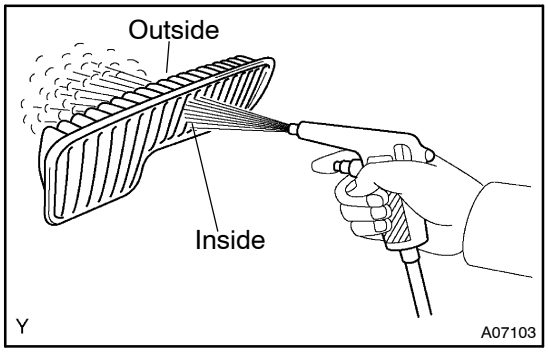
YES

3	**Does engine start?**

NO → **Go to step 7.**

YES

4	**Check air filter.**

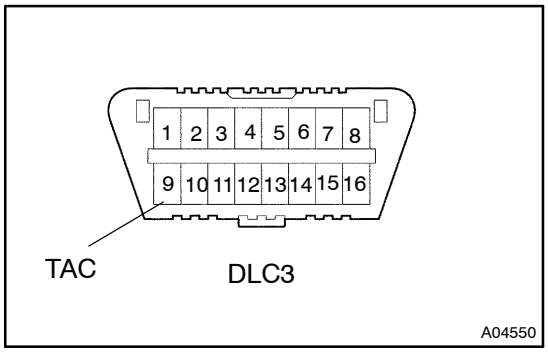


PREPARATION:
Remove the air filter.
CHECK:
Visually check that the air filter is not dirty or excessive oily.
HINT:
If necessary, clean the air filter with compressed air. First blow from inside thoroughly, then blow from outside of the air filter.

NG → **Repair or replace**

OK

5	**Check idle speed.**



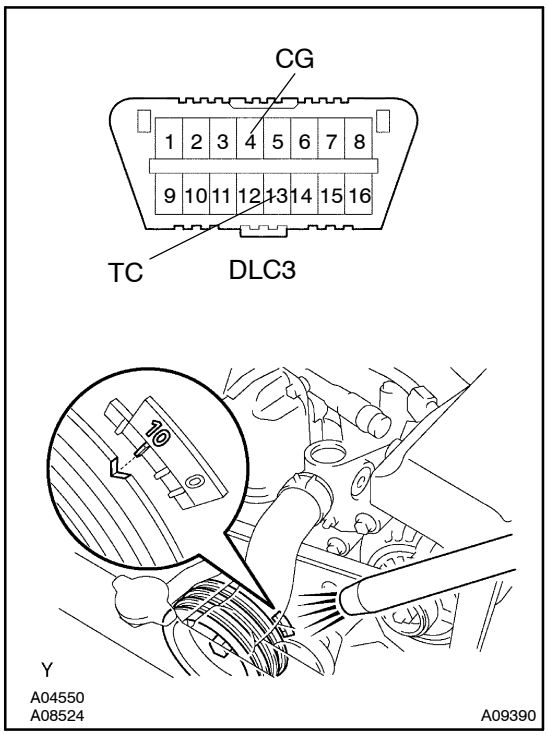
PREPARATION:
(a) Warm up the engine to normal operating temperature.
(b) Switch off all the accessories.
(c) Switch off the A/C.
(d) Shift the transmission into the N position.
(e) Connect the hand–held tester to the DLC3 on the vehicle.
(f) If you have no hand–held tester, connect tachometer test prove to terminal 9 (TAC) of the DLC3.
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NOTICE:
As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.
CHECK:
Check the idle speed.
OK:
Idle speed: 650 – 750 rpm

NG → **Proceed to problem symptoms table (See page DI–24).**

OK

6	Check ignition timing.



PREPARATION:

(a) Warm up the engine to normal operating temperature.
(b) Shift the transmission into the N position.
(c) Keep the engine speed at idle.
(d) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843–18040
(e) Using a timing light, connect the tester to the ignition coil connector wire (See page EM–12).

CHECK:

Check the ignition timing.

OK:

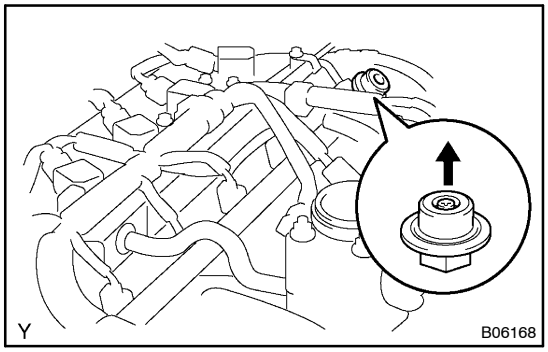
Ignition timing: 10° BTDC at idle

NG → **Proceed to page IG–1 and continue to trouble-shoot.**

OK

Proceed to problem symptoms table (See page DI–24).

7	Check fuel pressure.



PREPARATION:

(a) Be sure that enough fuel is in the tank.
(b) Connect the hand–held tester to the DLC3.
(c) Turn the ignition switch ON and push hand–held tester main switch ON.
(d) Use the ACTIVE TEST mode to operate the fuel pump.
(e) Please refer to the hand–held tester operator's manual for further details.
(f) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page FI–6).

CHECK:

Check that pulsation damper screw rises up when fuel pump operates.

HINT:

At this time, you will hear a fuel flowing noise.

NG	**Proceed to page FI–6 and continue to trouble-shoot.**

OK

8	**Check for spark.**

PREPARATION:

(a) Remove the ignition coil from the spark plug.
(b) Remove the spark plug.
(c) Install the spark plug to the ignition coil.
(d) Disconnect the injector connector.
(e) Ground the spark plug.

CHECK:

Check if spark occurs while engine is being cranked.

NOTICE:

To prevent excess fuel being from injected from the injectors during this test, don't crank the engine for more than 5 – 10 seconds at a time.

NG	**Proceed to page IG–1 and continue to trouble-shoot.**

OK

Proceed to problem symptoms table (See page DI–24).

7. ENGINE OPERATING CONDITION

NOTICE:

The values given below for "Normal Condition" are representative values, so a vehicle may still be normal even if its value varies differ from those listed here. So do not decide whether a part is faulty or not solely according to the "Normal Condition" here.

Hand–held tester display	Measurement Item	Normal Condition*
FUEL SYS #1	Fuel System Bank 1 OPEN: Air–fuel ratio feedback stopped CLOSED: Air–fuel ratio feedback operating	Idling after warming up: CLOSED
FUEL SYS #2	Fuel System Bank 2 OPEN: Air–fuel ratio feedback stopped CLOSED: Air–fuel ratio feedback operating	Idling after warming up: CLOSED

CALC LOAD	Calculator Load: Current intake air volume as a proportion of max. intake air volume	Idling: 19.7 – 50.4 % Racing without load (2,500rpm): 16.8 – 47.4 %
COOLANT TEMP	Water Temp. Sensor Value	After warming up: 80 – 95˚C (176 – 203˚F)
SHORT FT #1	Short–term Fuel Trim Bank 1	0 ± 20 %
LONG FT #1	Long–term Fuel Trim Bank 1	0 ± 20 %
SHORT FT #2	Short–term Fuel Trim Bank 2	0 ± 20 %
LONG FT #2	Long–term Fuel Trim Bank 2	0 ± 20 %
ENGINE SPD	Engine Speed	Idling: 650 – 750 rpm
VEHICLE SPD	Vehicle Speed	Vehicle stopped: 0 km/h (0 mph)
IGN ADVANCE	Ignition Advance: Ignition Timing of Cylinder No.1	Idling: BTDC 5 – 15˚
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to ambient temp.
MAF	Air Flow Rate Through Mass Air Flow Meter	Idling: 3.2 gm/ sec. Racing without load (2,500 rpm): 11.2 gm/sec.
THROTTLE POS	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0 V → 0 %, 5 V → 100 %	Throttle fully closed: 8 – 20 % Throttle fully open: 64 – 96 %
O2S B1 S1	Voltage Output of Oxygen Sensor Bank 1 Sensor 1	Idling: 0.1 – 0.9 V
O2S B1 S2	Voltage Output of Oxygen Sensor Bank 1 Sensor 2	Driving (50 km/h, 31 mph): 0.1 – 0.9 V
O2S B2 S1	Voltage Output of Oxygen Sensor Bank 2 Sensor 1	Idling: 0.1 – 0.9 V
O2S B2 S2	Voltage Output of Oxygen Sensor Bank 2 Sensor 2	Driving: (50 km/h, 31 mph): 0.1 – 1.0 V
O2FT B1 S1	Oxygen Sensor Fuel Trim Bank 1, Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
O2FT B2 S1	Oxygen Sensor Fuel Trim Bank 2, Sensor 1 (Same as SHORT FT #2)	0 ± 20 %
MIL ON RUN DIST	Distance since activation of check engine warning light	When there is no DTC: 0 km/h (0 mph)
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.9 ms
MISFIRE RPM	Engine RPM for first misfire range	Misfire 0: 0 rpm
MISFIRE LOAD	Engine load for first misfire range	Misfire 0: 0 g/r
STARTER SIG	Starter Signal	Cranking: ON
A/C SW	A/C Switch Signal	A/C ON: ON
PNP SW	Park/Neutral Position Switch Signal	P or N position: ON
ELE LOAD SIG	Electrical Load Signal	Defogger switch ON: ON
SW	Closed Throttle Position	Throttle fully closed: ON
STOP LIGHT SW	Stop Light Switch Signal	Stop light switch ON: ON
PS OIL PRESS SW	Power Steering Oil Pressure Switch Signal	Turn steering wheel: ON
FC IDL	Fuel Cut Idle: Fuel cut when throttle valve fully closed, during deceleration	Fuel cut operating: ON
FC TAU	Fuel Cut TAU: Fuel cut during very light load	Fuel cut operating: ON
CYL#1 – CYL#6	Abnormal revolution variation for each cylinder	0 %
IGNITION	Total number of ignition for every 1,000 revolutions	0 – 300
INTAKE CTRL VSV1	Intake Air Control Valve VSV Signal	VSV operating: ON

FUEL PUMP	Fuel Pump Signal	Idling: ON
EVAP VSV	EVAP VSV Signal	VSV operating: ON
THROTTLE POS #2	Throttle position sensor No.2 output voltage	Throttle fully closed: 2.0 – 2.9 V Throttle fully open: 4.6 – 5.0 V
ACCEL POS #1	Accelerator pedal position sensor No.1 output voltage	Accelerator pedal released: 0.25 – 0.9 V Accelerator pedal depressed: 3.2 – 4.8 V
ACCEL POS #2	Accelerator pedal position sensor No.2 output voltage	Accelerator pedal released: 1.8 – 2.7 V Accelerator pedal depressed: 4.7 – 5.0 V
THROTTLE TARGET	Target position of throttle valve	Idling: 0.4 – 1.1 V
THROTL OPN DUTY	Throttle motor opening duty ratio	Throttle fully closed: 0 % When accelerator pedal is depressed, duty ratio is increased
THROTL CLS DUTY	Throttle motor closed duty ratio	Throttle fully closed: 0 % When accelerator pedal is quick released, duty ratio is increased
THROTTLE MOT	Whether or not throttle motor control is permitted	Idling: ON
CLUTCH	Whether or not magnetic clutch control is permitted	Idling: ON
+BM	Whether or not electric throttle control system power is inputted	Idling: ON
ACCEL IDL POS	Whether or not accelerator pedal position sensor is detecting idle	Idling: ON
THROTTLE IDL POS	Whether or not throttle position sensor is detecting idle	Idling: ON
FAIL #1	Whether or not fail safe function is executed	ETCS is failed: ON
FAIL #2	Whether or not fail safe function is executed	ETCS is failed: ON
THROTTL INITAL	Throttle fully closed learning value	0.4 – 0.8 V
ACCEL LEARN VAL	Accelerator fully closed learning value	0.4 – 0.8 V
THROTTLE MOT	Throttle motor control current	Idling: 0 – 3.0 A
CLUTCH	Magnetic clutch control current	0.8 – 1.0 A
A/C MAG CLUTCH	A/C switch signal	A/C ON: ON
VVT CTRL	VVT control signal	VVT operation: ON
TOTAL FT B1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.5 – 1.4
TOTAL FT B2	Total Fuel Trim Bank 2: Average value for fuel trim system of bank 2	Idling: 0.5 – 1.4
O2 LR B1 S1	Oxygen Sensor Lean Rich Bank 1 Sensor 1: Response time for oxygen sensor output to switch from lean to rich	Idling after warming up: 0 – 1,000 msec.
O2 LR B2 S1	Oxygen Sensor Lean Rich Bank 2 Sensor 1: Response time for oxygen sensor output to switch from lean to rich	Idling after warming up: 0 – 1,000 msec.
O2 RL B1 S1	Oxygen Sensor Rich Lean Bank 1 Sensor 1: Response time for oxygen sensor output to switch from rich to lean	Idling after warming up: 0 – 1,000 msec.
O2 RL B2 S1	Oxygen Sensor Rich Lean Bank 1 Sensor 1: Response time for oxygen sensor output to switch from rich to lean	Idling after warming up: 0 – 1,000 msec.

*: If no conditions are specifically stated for "Idling", it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

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DIAGNOSTIC TROUBLE CODE CHART

HINT:

Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check in the check mode, check the circuit for the code listed in the table below. For details of each code, turn to the page referred to under the ”See page” for the respective ”DTC No.” in the DTC chart.

ENGINE TROUBLE CODES

DTC No. (See page)	Detection Item	Trouble Area	*1 CHK ENG	Memory
P0100/31 (DI–26)	Air Flow Meter Circuit Malfunction	• Open or short in Air Flow Meter circuit • Air Flow Meter • Engine ECU	○	○
P0110/24 (DI–30)	Intake Air Temp. Circuit Malfunction	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU	○	○
P0115/22 (DI–35)	Water Temp. Circuit Malfunction	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU	○	○
P0116/22*5 (DI–41)	Water Temp. Circuit Range/Performance Problem	• Water temp. sensor • Cooling system	○	○
P0120/41 (DI–42)	Throttle Position Sensor Circuit Malfunction	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU	○	○
P0121/41 (DI–48)	Throttle Position Sensor Circuit Range/Performance Problem	• Throttle position sensor	○	○
P0125/91*5 (DI–49)	Insufficient Coolant Temp. for Closed Loop Fuel Control	• Open or short in oxygen sensor (bank 1, 2 sensor 1) circuit • Oxygen Sensor (bank 1, 2 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • Engine ECU	○	○
P0130/21 (DI–57)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU	○*5	○
P0133/21*3 (DI–63)	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU	○*3	○
P0135/21 (DI–63)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	• Open or short in heater circuit of oxygen sensor • Oxygen sensor heater • Engine ECU	○*3	○
P0136/27 (DI–69)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Open or short in oxygen sensor circuit • Oxygen sensor	○*5	○
P0141/21 (DI–67)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	• Same as DTC No. P0135/21	○*3	○

P0150/28 (DI–57)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)	• Same as DTC No. P0130/21	○*3	○
P0153/28*3 (DI–63)	Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1)	• Same a DTC No. P0133/21	○*3	○
P0155/28 (DI–67)	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	• Same as DTC No. P0135/21	○*3	○
P0156/29 (DI–69)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 2)	• Same as DTC No. P0136/27	○*3	○
P0161/28 (DI–67)	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 2)	• Same as DTC No. P0135/21	○*3	○
P0171/25 (DI–71)	System too Lean (A/F Lean Malfunction, Bank 1)	• Air induction system • Injector blockage • Vacuum Sensor • Water temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank1, 2 sensor1) circuit • Oxygen sensor (bank1, 2 sensor1) • Engine ECU	○*3	○
P172/26*3 (DI–71)	System too Rich (A/F Rich Malfunction, Bank 1)	• Injector leak, blockage • Vacuum sensor • Water temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in oxygen sensor (bank1, 2 sensor1) circuit • Oxygen sensor (bank1, 2 sensor1) • Engine ECU	○	○
P0174/25 (DI–71)	System too Lean (A/F Lean Malfunction, Bank 2)	• Same as DTC No. P0171/25	○*3	○
P0175/26*3 (DI–71)	System too Rich (A/F Rich Malfunction, Bank 2)	• Same as DTC No. P0172/26	○	○
P0300/93*3 (DI–76)	Random/Multiple Cylinder Misfire Detected	• Open or short engine wire • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Vacuum sensor • Water temp. sensor • Compression pressure • Valve clearance • Valve timing • Engine ECU	○	○
P0301/93*3 (DI–76)	Cylinder 1 Misfire Detected			
P0302/93*3 (DI–76)	Cylinder 2 Misfire Detected			
P0303/93*3 (DI–76)	Cylinder 3 Misfire Detected			
P0304/93*3 (DI–76)	Cylinder 4 Misfire Detected			
P0305/93*3 (DI–76)	Cylinder 5 Misfire Detected			
P0306/93*3 (DI–76)	Cylinder 6 Misfire Detected			
P0325/52 (DI–81)	Knock Sensor 1 Circuit Malfunction (Bank 1)	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • Engine ECU	○	○
P0330/55 (DI–81)	Knock Sensor 2 Circuit Malfunction (Bank 2)	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • Engine ECU	○	○

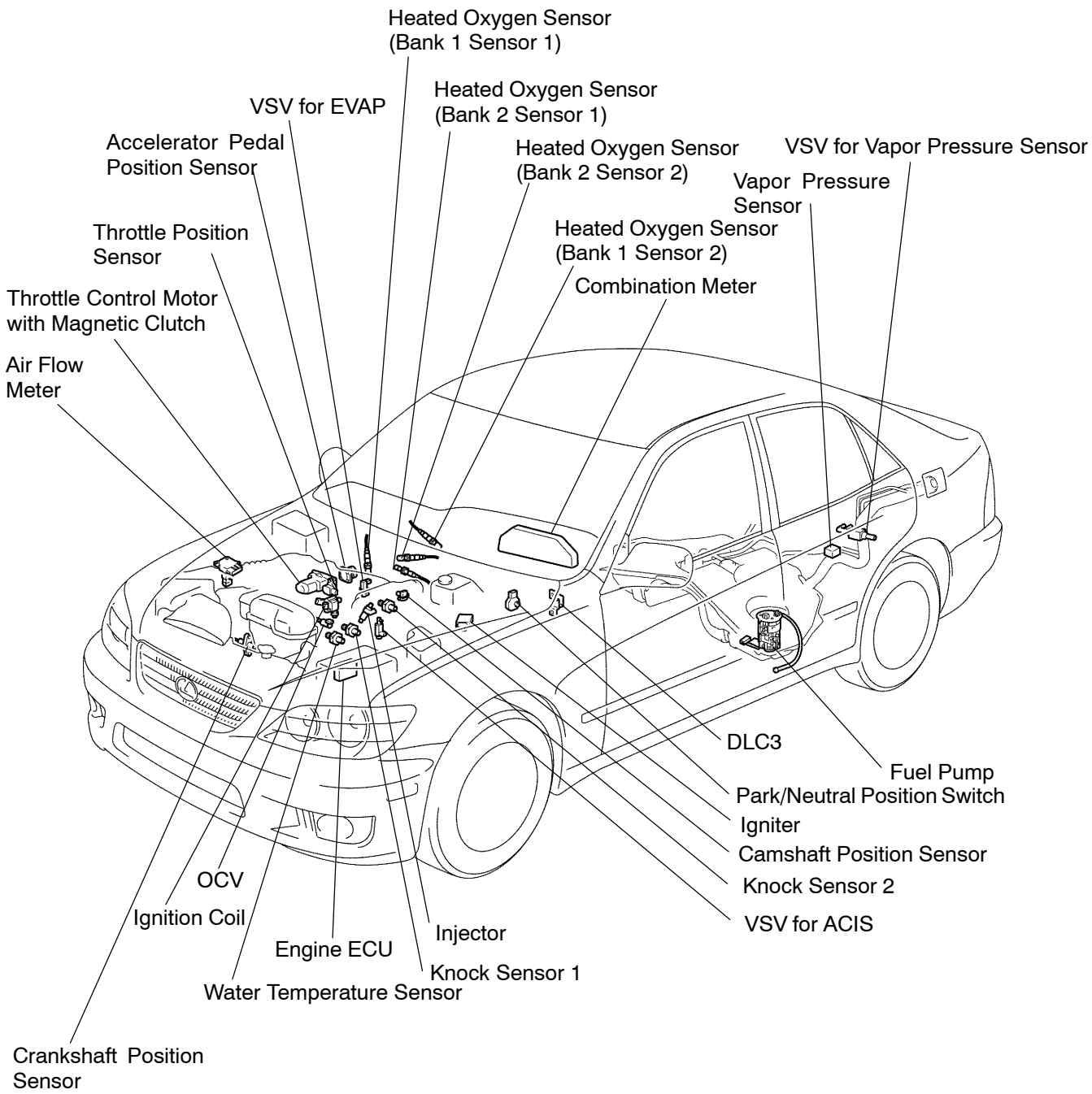
P0335/12, 13 (DI–84)	Crankshaft Position Sensor Circuit Malfunction (NE Signal)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU	○	○
P0340/12 (DI–86)	Camshaft Position Sensor Circuit Malfunction (G Signal)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Intake camshaft • Engine ECU	○	○
P0420/94*3 (DI–88)	Catalyst System Efficiency Below Threshold (Bank 1)	• Gas leakage on exhaust system • Oxygen sensor • Three–way catalytic converter	○	○
P0430/94*3 (DI–88)	Catalyst System Efficiency Below Threshold (Bank 2)	• Same as DTC P0420/94	○	○
P0443/94*3 (DI–91)	Evaporative Emission Control System Purge Control Vent Control Malfunction	• Open or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU	○	○
P0500/42 (DI–94)	Vehicle Speed Sensor Malfunction	• Open or short in vehicle speed sensor circuit • Transmission output speed sensor • Engine ECU	○	○
P0505/33*3 (DI–100)	Idle Control System Malfunction	• Air induction system • Electric throttle control system	○	○
P0550/75 (DI–101)	Power Steering Pressure Sensor Circuit Malfunction	• PS pressure sensor • Engine ECU	○	○
P1120/19 (DI–103)	Accelerator Pedal Position Sensor Circuit Malfunction	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • Engine ECU	○	○
P1121/19 (DI–109)	Accelerator Pedal Position Sensor Range/Performance Problem	• Accelerator pedal position sensor	○	○
P1125/89*2 (DI–110)	Throttle Control Motor Circuit Malfunction	• Open or short in throttle control motor circuit • Throttle control motor • Engine ECU	○	○
P1126/89*2 (DI–113)	Magnetic Clutch Circuit Malfunction	• Open or short in magnetic clutch circuit • Magnetic clutch • Engine ECU	○	○
P1127/89*2 (DI–116)	ETCS Actuator Power Source Circuit Malfunction	• Open in ETCS power source circuit • Engine ECU	○	○
P1128/89*2 (DI–118)	Throttle Control Motor Lock Malfunction	• Throttle control motor • Throttle body	○	○
P1129/89*2 (DI–120)	Electric Throttle Control System Malfunction	• Electric throttle control system • Engine ECU	○	○
P1200/78*4 (DI–121)	Fuel Pump Relay/Engine ECU Circuit Malfunction	• Open or short in fuel pump relay circuit • Fuel pump relay • Engine ECU	○	○
P1300/14 (DI–125)	Igniter Circuit Malfunction	• Ignition system • Open or short in IGF or IGT1 – 3 circuit from igniter to engine ECU • Igniter • Engine ECU	○	○
P1335/13 (DI–131)	Crankshaft Position Sensor Circuit Malfunction (During engine running)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • Engine ECU	–	○

P1346/18 (DI–132)	VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 1)	• Mechanical system (Jumping teeth of timing belt, belt stretched) • ECM	○	○
P1349/59 (DI–133)	VVT System Malfunction (Bank 1)	• Valve timing • OCV • VVT controller assembly • Engine ECU	○*5	○
P1520 (DI–140)	Stop Light Switch Signal Circuit	• Open or short in stop light switch signal circuit • Stop light switch • Engine ECU	○	○
P1633/89*2 (DI–143)	Engine ECU Malfunction (ETCS Circuit)	• Engine ECU	○	○
P1645/82 (DI–144)	Body ECU Malfunction	• Body ECU • A/C ECU • Communication bus	–	–
P1651/96*5 (DI–145)	VSV for ACIS Circuit Malfunction	• Open or short in VSV circuit for ACIS • VSV for ACIS • Engine ECU	○	○
P1656/39 (DI–149)	OCV Circuit Malfunction (Bank 1)	• Open or short in OCV circuit • OCV • Engine ECU	○	○
P1780/97 (DI–231)	Park/Neutral Position Switch Malfunction	• Short in neutral start switch circuit • Neutral start switch • Engine ECU	○	○

*1: ○ ... CHK ENG is indicated. – ... CHK ENG is not indicated.
*2: Except Europe if the DTC No.89 is indicated on the check engine warning light, read the DTC for ETCS from ECT SNOW indicator to get the detail of the DTC No.89. If using the hand–held tester, the detail DTC for ETCS is displayed on the hand–held tester.
*3: Europe.
*4: Except Europe.
*5: Except Australia.

DI2DI–09

PARTS LOCATION

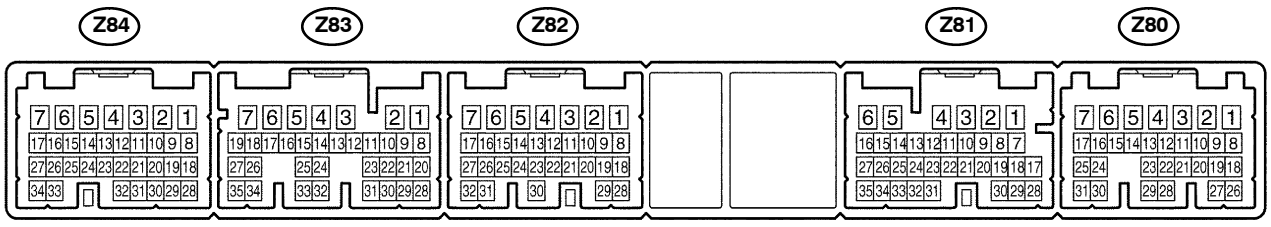


P A14020

A17198

TERMINALS OF ECU

DI2S1–05



D11582

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
BATT (Z80–4) – E1 (Z83–7)	B–Y ↔ BR	Always	9 – 14
+BM (Z80–7) – E1 (Z83–7)	V–Y ↔ BR		
IGSW (Z80–17) – E1 (Z83–7)	B –O ↔ BR	IG switch ON	9 – 14
+B (Z80–6) – E1 (Z83–7)	B–R ↔ BR		
+B2 (Z80–5) – E1 (Z83–7)	B–R ↔ BR		
VC (Z81–35) – E2 (Z81–34)	L–Y ↔ BR	IG switch ON	4.5 – 5.5
VTA (Z84 25) – E2 (Z81 34)	Y–G ↔ BR	IG switch ON Accelerator pedal released	0.4 – 1.0
		IG switch ON Accelerator pedal depressed	3.2 – 4.8
VTA2 (Z84 24) – E2 (Z81 34)	Y–R ↔ BR	IG switch ON Accelerator pedal released	2.0 – 2.9
		IG switch ON Accelerator pedal depressed	4.6 – 5.1
VPA (Z81 33) – E2 (Z81 34)	L ↔ BR	IG switch ON Accelerator pedal released	0.3 – 0.9
		IG switch ON Accelerator pedal depressed	3.2 – 4.8
VPA2 (Z81 32) – E2 (Z81 34)	L–R ↔ BR	IG switch ON Accelerator pedal released	1.8 – 2.7
		IG switch ON Accelerator pedal depressed	4.7 – 5.1
VG (Z82–27) – EVG (Z82–26)	R–L ↔ GR	Idling, P or N position, A/C switch OFF	1.1 – 1.5
THA (Z82–32) – E2 (Z81–34)	W–R ↔ BR	Idling, Intake air temp. 20°C (68°F)	0.5 ~ 3.4
THW (Z82–24) – E2 (Z81–34)	B–R ↔ BR	Idling, Engine coolant temp. 80°C (176°F)	0.2 ~ 1.0
STA (Z80–12) – E1 (Z83–7)	B ↔ BR	Shift lever position P or N position, ignition switch START	9 ~ 14
#10 (Z84–15) – E01 (Z82–2) #20 (Z82–17) – E01 (Z82–2) #30 (Z84–14) – E01 (Z82–2) #40 (Z82–16) – E01 (Z82–2) #50 (Z84–13) – E01 (Z82–2) #60 (Z82–15) – E01 (Z82–2)	Y ↔ W–B B–W ↔ W–B L ↔ W–B R ↔ W–B W ↔ W–B R–L ↔ W–B	IG switch ON	9 ~ 14
		Idling	Pulse generation (See page FI–22)
IGT (Z82–13) – E1 (Z83–7) IGT2 (Z84–27) – E1 (Z83–7) IGT3 (Z84–26) – E1 (Z83–7)	Y ↔ BR G–B ↔ BR R–W ↔ BR	Idling	Pulse generation (See page DI–125)
IGF (Z82–7) – E1 (Z83–7)	R–Y ↔ BR	IG switch ON	4.5 ~ 5.5
		Idling	Pulse generation (See page DI–125)

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
G2 (Z84–29) – NE– (Z84–32)	Y ↔ L	Idling	Pulse generation (See page DI–81)
NE (Z84–31) – NE– (Z84–32)	W ↔ L		
M–REL (Z80–13) – E1 (Z83–7)	B–Y ↔ BR	IG switch ON	9 ~ 14
STP (Z81–4) – E1 (Z83–7)	G–W ↔ BR	Brake pedal is depressed	7.5 ~ 14
		Brake pedal is released	Below 1.5
PRG (Z84–11) – E01 (Z82–2)	B–R ↔ W–B	IG switch ON	9 ~ 14
OX1A (Z83–28) – E2 (Z81–34) OX1B (Z81–28) – E2 (Z81–34) OX2A (Z82–28) – E2 (Z81–34) OX2B (Z81–17) – E2 (Z81–34)	B ↔ BR W ↔ BR W ↔ BR R ↔ BR	Maintain engine speed at 2,500 rpm for 2 minutes after warming up	Pulse generation (See page DI–49)
HT1A (Z83–9) – E01 (Z82–2) HT1B (Z81–7) – E01 (Z82–2) HT2A (Z82–30) – E01 (Z82–2) HT2B (Z81–8) – E01 (Z82–2)	R ↔ W–B G ↔ W–B Y ↔ W–B GR–B ↔ W–B	Idling	Below 3.0
		IG switch ON	9 ~ 14
KNK1 (Z83–1) – E1 (Z83–7)	B ↔ BR	Maintain engine speed at 4,000 rpm after warming up	Pulse generation (See page DI–81)
KNK2 (Z83–2) – E1 (Z83–7)	GR ↔ BR		
TC (Z81–3) – E1 (Z83–7)	P–B ↔ BR	IG switch ON	9 ~ 14
W (Z81–2) – E01 (Z82–2)	GR–R ↔ W–B	Idling	9 ~ 14
		IG switch ON	Below 3.0
ACMG (Z80–16) – E01 (Z82–2)	L–O ↔ W–B	A/C switch ON (At Idling)	Below 3.0
		A/C switch OFF	9 ~ 14
OCV+ (Z84–6) – OCV– (Z84–5)	W–R ↔ Y–B	IG switch ON	Pulse generation (See page DI–133)
ACIS (Z82–21) – E01 (Z82–2)	B–L ↔ W–B	IG switch ON	9 ~ 14
		Engine speed between 2.500 and 4,000 rpm	Below 3.0
CL+ (Z84–10) – CL– (Z84–9)	G–R ↔Y–R	Idling	Pulse generation (See page DI–110)
M+ (Z84–3) – ME01 (Z82–3) M– (Z84–2) – ME01 (Z82–3)	W ↔ BR R ↔ BR	Idling	Pulse generation (See page DI–110)
SIL (Z80–26) – E1 (Z83–7)	W ↔ BR	IG switch ON	9 ~ 14
SP2+ (Z83–23) – SP2– (Z83–22)	L–Y ↔ R–L	Vehicle is driving	Pulse generation (See page DI–94)

DI2T1–06

PROBLEM SYMPTOMS TABLE

When the malfunction is not confirmed in the diagnostic trouble code check and the problem still can not be confirmed in the basic inspection, proceed to this matrix chart and troubleshoot according to the numbered order given below.

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST–16
	2. Neutral start switch circuit	DI–231
	3. Body ECU	DI–549
No initial combustion (Does not start)	1. Engine ECU power source circuit	DI–156
	2. Ignition coil with igniter	DI–125
	3. Fuel pump control circuit	DI–121
	4. Injector circuit	DI–76
No complete combustion (Does not start)	1. Fuel pump control circuit	DI–121
	2. Ignition coil with igniter	DI–125
	3. Injector circuit	DI–76
Engine cranks normally (Difficult to start)	1. Starter signal circuit	DI–152
	2. Fuel pump control circuit	DI–121
	3. Ignition coil with igniter	DI–125
	4. Spark plug	IG–1
	5. Compression	EM–3
	6. Injector circuit	DI–76
Cold engine (Difficult to start)	1. Starter signal circuit	DI–152
	2. Fuel pump control circuit	DI–121
	3. Injector circuit	DI–76
	4. Ignition coil with igniter	DI–125
	5. Spark plug	IG–1
Hot engine (Difficult to start)	1. Starter signal circuit	DI–152
	2. Fuel pump control circuit	DI–121
	3. Injector circuit	DI–76
	4. Ignition coil	–
	5. Spark plug	IG–1
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit)	DI–612
	2. Engine ECU power source circuit	DI–156
	3. Neutral start switch circuit	DI–231
	4. Back up power source circuit	DI–165
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit)	DI–612
	2. Neutral start switch circuit	DI–231
	3. Fuel pump control circuit	DI–121
	4. Injector circuit	DI–76
	5. Air flow meter circuit	DI–26
	6. Back up power source circuit	DI–165
Rough idling (Poor idling)	1. Air flow meter circuit	DI–549
	2. Injector circuit	DI–76
	4. Ignition coil with igniter	DI–125
	5. Compression	EM–3
	6. Fuel pump control circuit	DI–121
	7. Back up power source circuit	DI–165
Hunting (Poor idling)	1. Air flow meter circuit	DI–549
	2. Engine ECU power source circuit	DI–156
	3. Fuel pump control circuit	DI–121

Hesitation/Poor acceleration (Poor driveability)	1. Air flow meter circuit 2. Injector circuit 3. Fuel pump control circuit 4 Ignition coil with igniter 5. A/T faulty	DI–549 DI–76 DI–121 DI–125 DI–167
Muffler explosion, after fire (Poor driveability)	1. Ignition coil 2. Spark plug 3. Injection circuit	DI–76 IG–1 DI–76
Surging (Poor driveability)	1. Fuel pump connector circuit 2. Spark plug 3. Injection circuit	DI–121 IG–1 DI–76
Engine stall (Soon after starting)	1. Fuel pump connector circuit 2. Air flow meter circuit	DI–121 DI–26
Engine stall (After accelerator pedal depressed)	1. Air flow meter circuit	DI–26
Engine stall (After accelerator pedal released)	1. Air flow meter circuit 2. Engine ECU	DI–26 IN–34
Engine stall (During A/C operation)	1. A/C signal circuit (Compressor circuit) 2. Engine ECU	DI–612 IN–34
Engine stall (When shifting N to D)	1. Neutral start switch circuit	DI–231

DI7GR–08

CIRCUIT INSPECTION

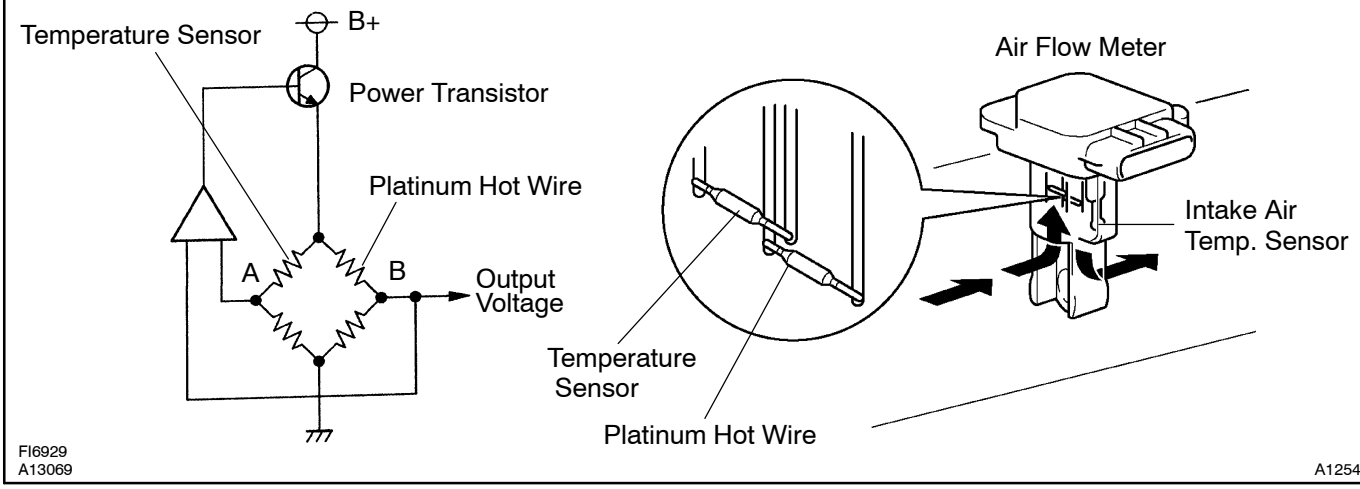
DTC	P0100/31	Air Flow Meter Circuit Malfunction

CIRCUIT DESCRIPTION

The air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a platinum hot wire, temperature sensor and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and temperature sensor located in the intake air bypass of the housing detect any changes in the intake air temperature.

The hot wire is maintained at the set temperature by controlling the current flow through the hot wire. This current flow is then measured as the output voltage of the air flow meter.

The circuit is constructed so that the platinum hot wire and temperature sensor provide a bridge circuit with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



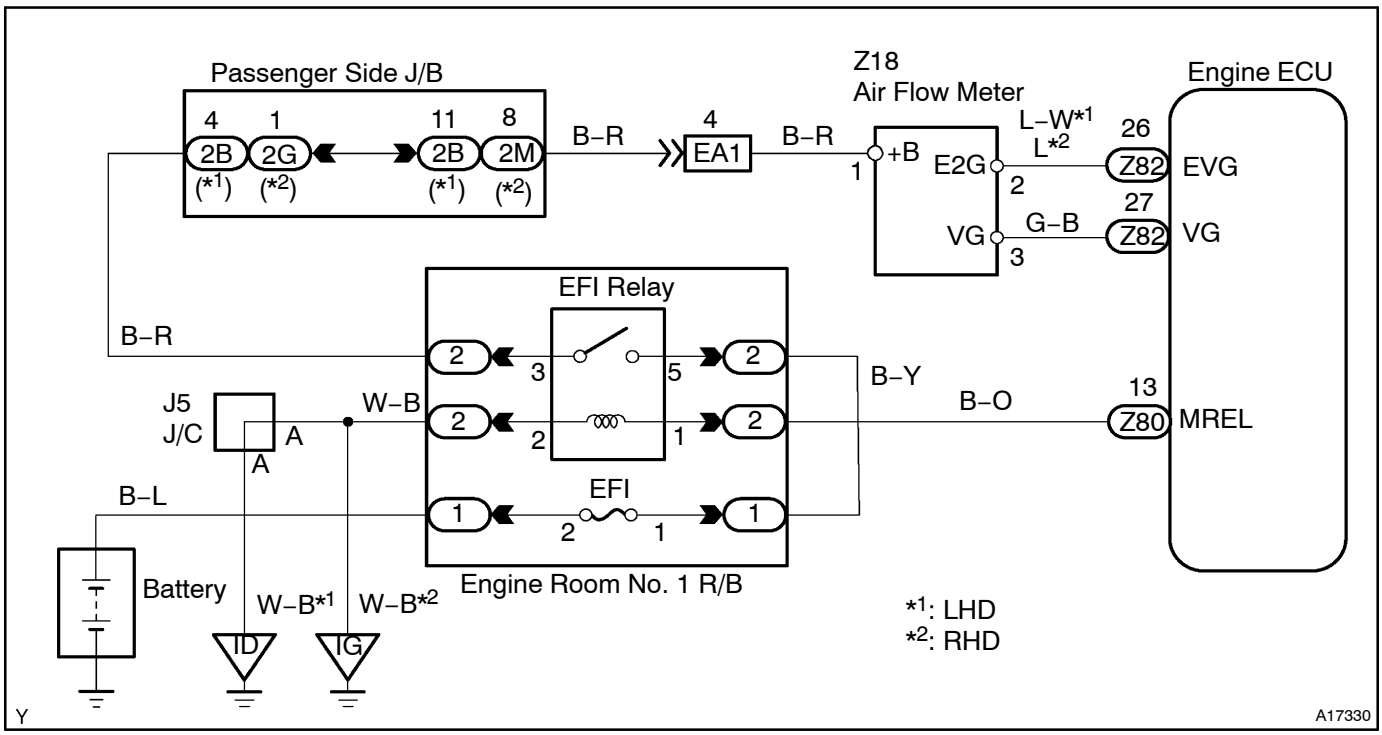
DTC No.	DTC Detection Condition	Trouble Area
P0100/31	Open or short in air flow meter circuit with more than 3 sec. and engine speed is less than 4,000 rpm	• Open or short in air flow meter circuit • Air flow meter • Engine ECU

HINT:

After confirming DTC P0100/31, use the hand–held tester to confirm the air flow ratio from the CURRENT DATA.

Air Flow Value (gm/sec.)	Malfunction
Approx. 0.0	• Air flow meter power source circuit open • VG circuit open or short
271.0 or more	• EVG circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester, and read value of air flow rate.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Start the engine.

CHECK:

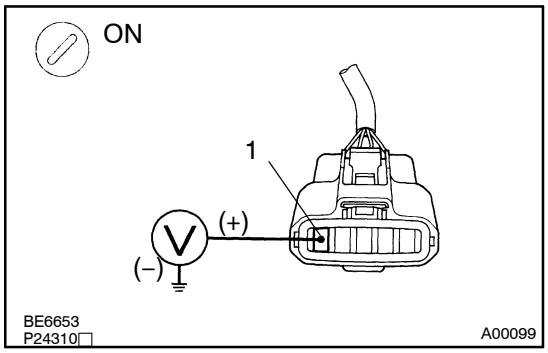
Read the air flow rate on the hand–held tester.

RESULT:

	Type I	Type II
Air Flow Rate (gm/sec.)	0.0	271.0 or more

Type I	**Go to step 2.**
Type II	**Go to step 5.**

2	**Check voltage of air flow meter power source.**



PREPARATION:

(a) Disconnect the air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal 1 of the air flow meter connector and body ground.

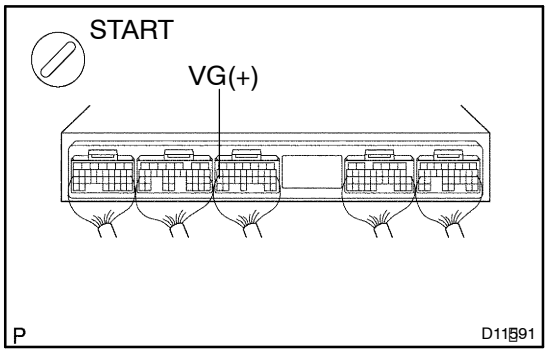
OK:

Voltage: 9 – 14 V

NG	**Check for open in harness and connector between EFI main relay (Marking: EFI MAIN) and air flow meter (See page IN–34).**

OK

3	**Check voltage between terminals VG of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine ECU hood and cover.

(b) Start the engine.

CHECK:

Measure the voltage between terminal VG of the engine ECU connector and body ground while the engine is idling.

OK:

Voltage:

0.2 – 4.9 V (P or N position and A/C switch OFF)

OK	**Check and replace engine ECU (See page IN–34).**

NG

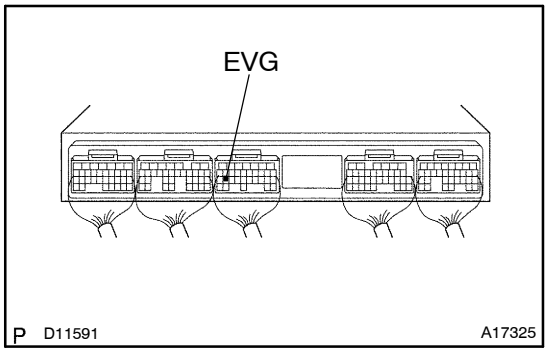
4	**Check for open and short in harness and connector between air flow meter and engine ECU (See page IN–34).**

NG	**Repair or replace harness or connector.**

OK

Replace air flow meter.

5	**Check continuity between terminal EVG of engine ECU connector and body ground.**



PREPARATION:
Remove the engine ECU hood and cover.
CHECK:
Check the continuity between terminal EVG of the engine ECU connector and body ground.
OK:
Continuity (1 Ω or less)

NG → **Check and replace engine ECU (See page IN–34).**

OK

6	**Check for open in harness and connector between air flow meter and engine ECU (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

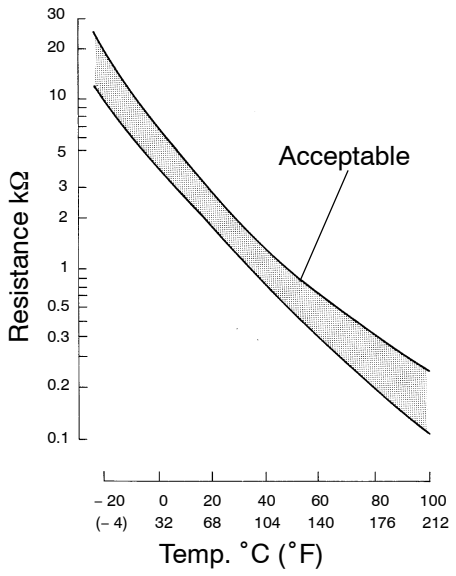
Replace air flow meter.

DI63Q–06

DTC	P0110/24	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

(Fig. 1)



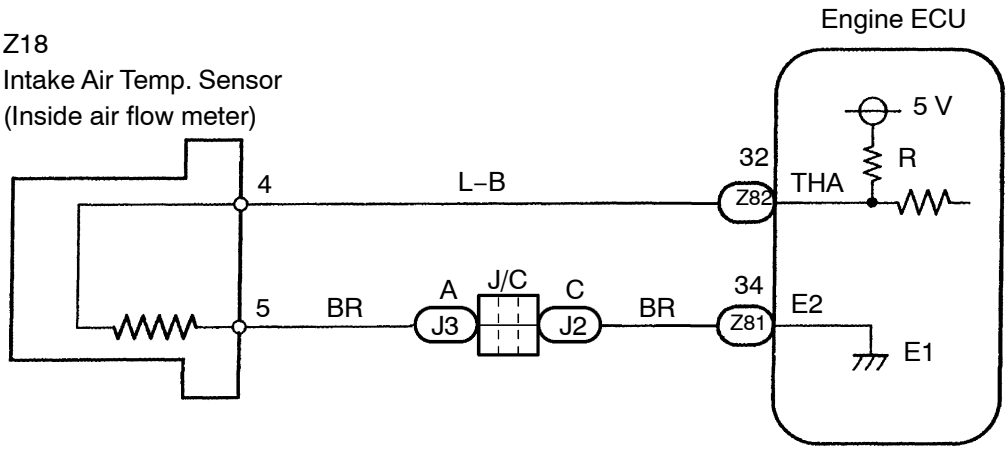
The intake air temperature sensor is built into the air cleaner and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See Fig. 1).
The intake air temperature sensor is connected to the engine ECU (See below). The 5 V power source voltage in the engine ECU is applied to the intake air temp. sensor from terminal THA via resistor R.
That is, resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the engine ECU increases the fuel injection volume to improve driveability during cold engine operation.

DTC No.	DTC Detecting Condition	Trouble Area
P0110/24	Open or short in intake air temp. sensor circuit	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor • Engine ECU

HINT:
After confirming DTC P0110/24, use the hand–held tester to confirm the intake air temperature from the CURRENT DATA.

Temperature Displayed	Malfunction
–40°C (–40°F)	Open circuit
140°C (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0100/31, P0101/31, P0110/24, P0115/22, P0120/41, P0121/41, P1120/19 and P1121/19 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	**Connect hand–held tester, and read value of intake air temperature.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Same as actual intake air temperature.

HINT:

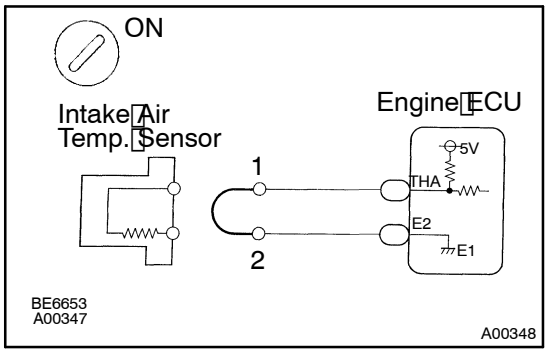
- If there is open circuit, hand–held tester indicates –40°C (–40°F).
- If there is short circuit, hand–held tester indicates 140°C (284°F) or more.

NG → **–40°C (–40°F) ... Go to step 2**
140°C (284°F) or more ... Go to step 4.

OK

Check for intermittent problems
(See page DI–17).

2	Check for open in harness or engine ECU.



PREPARATION:

(a) Disconnect the intake air temperature sensor connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

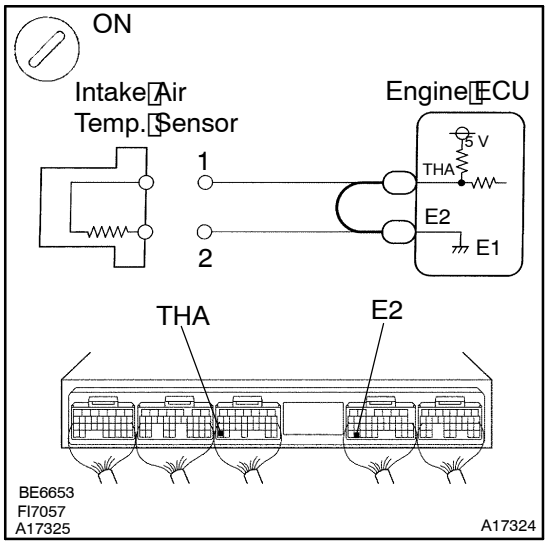
OK:

Temperature value: 140°C (284°F) or more

OK	Confirm good connection at sensor. If OK, replace intake air temperature sensor.

NG

3	Check for open in harness or engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood and cover.

(b) Connect between terminals THA and E2 of the engine ECU connector.

HINT:

The intake air temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–34).

CHECK:

Read the temperature value on the hand–held tester.

OK:

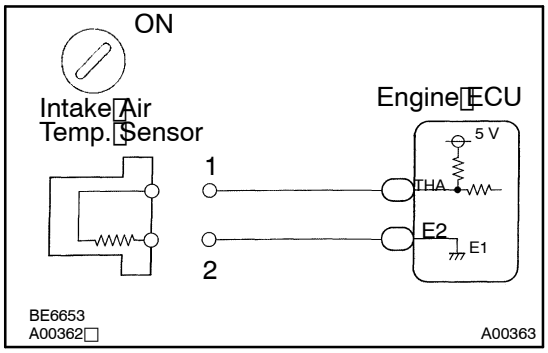
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminals E2 or THA, repair or replace harness.

NG

Confirm good connection at engine ECU. If OK, check and replace engine ECU (See page IN–34).

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the intake air temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

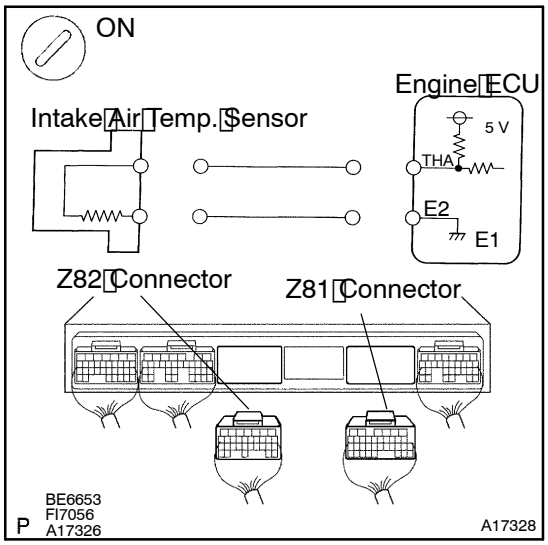
OK:

Temperature value: –40°C (–40°F)

OK	Replace intake air temperature sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the engine ECU hood.

(b) Disconnect the Z82 and Z81 connector from the engine ECU.

HINT:

The intake air temperature sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

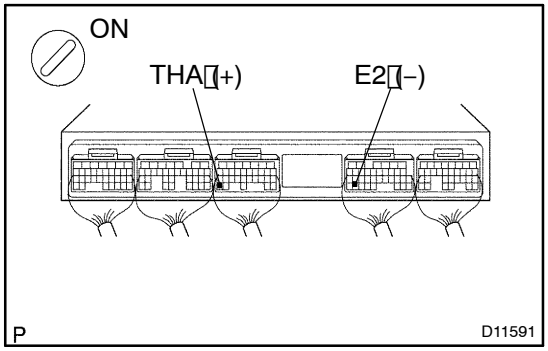
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–34).

When not using hand–held tester:

1	Check voltage between terminals THA and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals THA and E2 of the engine ECU connector.

OK:

Intake Air Temperature	Voltage
20°C (68°F)	0.5 – 3.4 V
60°C (140°F)	0.2 – 1.0 V

OK: Check for intermittent problems (See page DI–17).

NG

2	Check intake air temperature sensor (See page FI–31).

NG: Replace intake air temperature sensor.

OK

3	Check for open and short in harness and connector between engine ECU and intake air temperature sensor (See page IN–34).

NG: Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–34).

DI2S4–10

DTC	P0115/22	Water Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built into the water temp. sensor changes the resistance value according to the water temperature.

The structure of the sensor and connection to the engine ECU is the same as in the DTC P0110/24 (Intake Air Temp. Circuit Malfunction) shown on page DI–30.

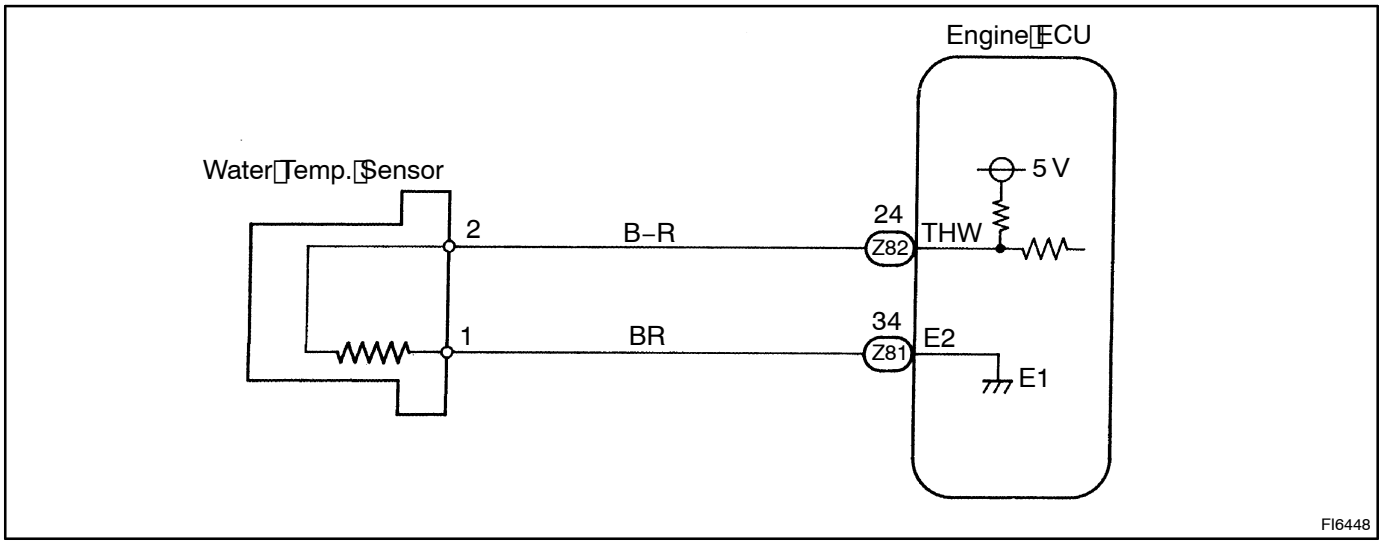
DTC No.	DTC Detecting Condition	Trouble Area
P0115/22	Open or short in water temp. sensor circuit	• Open or short in water temp. sensor circuit • Water temp. sensor • Engine ECU

HINT:

After confirming DTC P0115/22 use the hand–held tester to confirm the water temperature from CURRENT DATA.

Temperature Displayed	Malfunction
–40°C (–40°F)	Open circuit
140C° (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P0110/24 (Intake Air Temp. Circuit Malfunction), P0115/22 (Water Temp. Circuit Malfunction), P0120/41 (Throttle Position Sensor Circuit Malfunction), P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	**Connect hand–held tester, and read value of water temperature.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and switch the hand–held tester main switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

Same as actual water temperature

HINT:

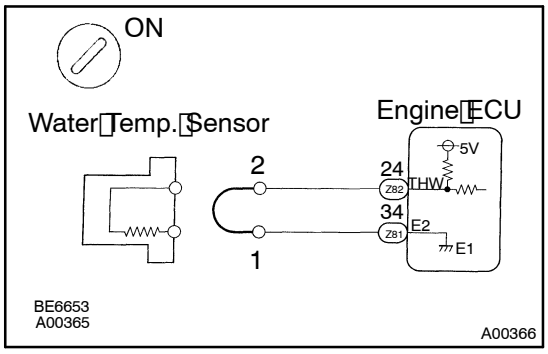
- If there is open circuit, Hand–held tester indicates –40°C (–40°F).
- If there is short circuit, Hand–held tester indicates 140°C (284°F) or more.

NG → **–40°C (–40°F)...Go to step 2.**
140°C (284°F) or more...Go to step 4.

OK

Check for intermittent problems (See page DI–24).

2	Check for open in harness or engine ECU.



PREPARATION:

(a) Disconnect the water temp. sensor connector.

(b) Connect sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

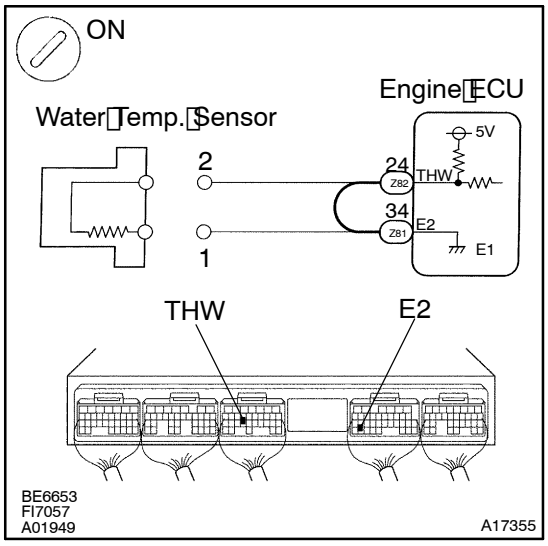
OK:

Temperature value: 140°C (284°F) or more

OK	Confirm good connection at sensor. If OK, replace water temp. sensor.

NG

3	Check for open in harness or engine ECU.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Connect between terminals THW and E2 of the engine ECU connector.

HINT:

Water temp. sensor connector is disconnected.

Before checking, do a visual and contact pressure check for the engine ECU connector (See page IN–34).

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

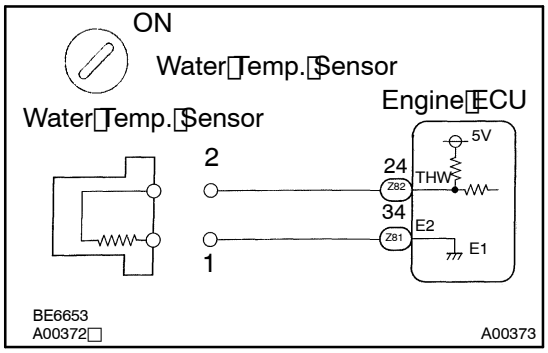
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminals E2 or THW, repair or replace harness.

NG

**Confirm good connection at engine ECU.
If OK, check and replace engine ECU.
(See page IN–34)**

4	Check for short in harness and engine ECU.



PREPARATION:

(a) Disconnect the water temp. sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

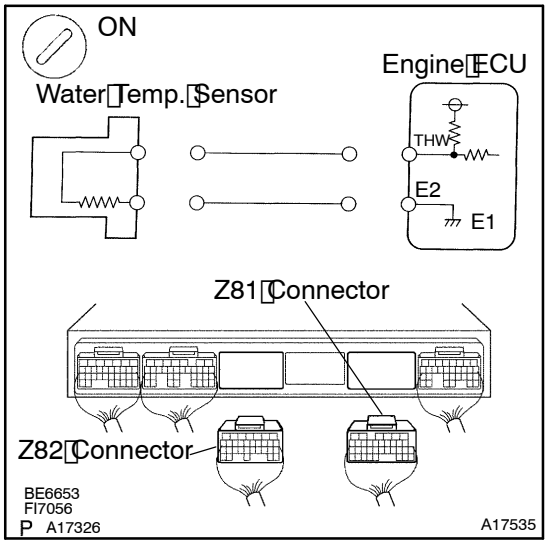
OK:

Temperature value: –40°C (–40°F)

OK	Replace water temp. sensor.

NG

5	Check for short in harness or engine ECU.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Disconnect the Z81 and Z82 connector of the engine ECU.

HINT:

Water temp. sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read temperature value on the hand–held tester.

OK:

Temperature value: –40°C (–40°F)

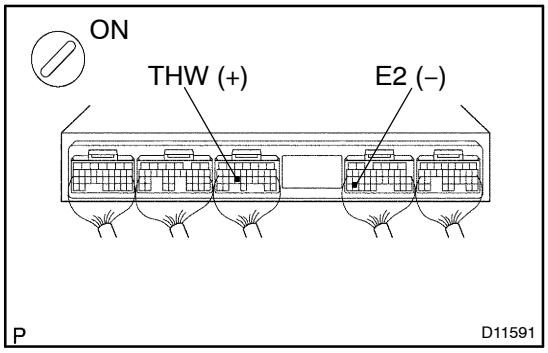
OK	Repair or replace harness or connector.

NG

Check and replace engine ECU (See page IN–34).

When not using hand–held tester

1	Check voltage between terminals THW and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Turn ignition switch ON.

CHECK:
Measure voltage between terminals THW and E2 of engine ECU connector.

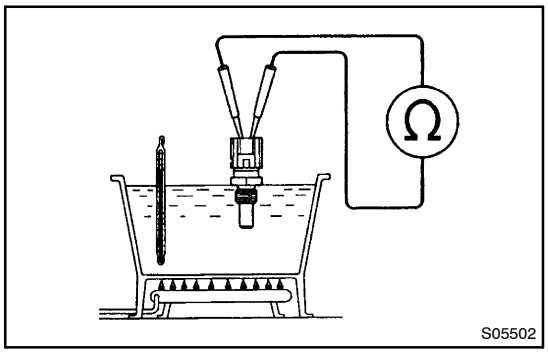
OK:

Water temp. °C (°F)	Voltage
20 (68)	0.5 – 3.4 V
60 (140)	0.2 – 1.0 V

OK → **Check for intermittent problems (See page DI–24).**

NG

2	Check water temp. sensor.



PREPARATION:
Disconnect the water temp. sensor connector.

CHECK:
Measure resistance between terminals.

OK:
Resistance is within acceptable zone on chart.

Water Temp.	Resistance
20°C (68°F)	2 – 3 kΩ
80°C (176°F)	0.2 – 0.4 kΩ

NG → **Replace water temp. sensor.**

OK

3	Check for open and short in harness and connector between engine ECU and water temp. sensor (See page IN–34).

NG → Repair or replace harness or connector.

OK →

Check and replace engine ECU.

DI07J–16

DTC	P0116/22	Water Temp. Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0115/22 on page DI–35.

DTC No.	DTC Detecting Condition	Trouble Area
P0116/22	When the fluctuations in the engine coolant temperature are within 3°C (37°F) before and after the following conditions are met: 1. IDL OFF time ≧ 250 sec. 2. Vehicle speed change of 28 km/h (17 mph) or more occurs 10 times or more. 3. −40°C (−40°F) ≦ Engine coolant temperature when the ignition switch is turned ON < 60°C (140°F) 4. Intake air temperature after starting the engine ≧ −6.7°C (20°F)	• Water temp. sensor • Cooling system

INSPECTION PROCEDURE

HINT:

- If DTC P0115/22 and P0116/22 are output simultaneously, engine coolant temp. sensor circuit may be open. Perform troubleshooting of DTC P0115 first.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0116/22) being output?

YES → Go to relevant DTC chart.

NO

2	Check thermostat (See page CO–10).

NG → Replace thermostat.

OK

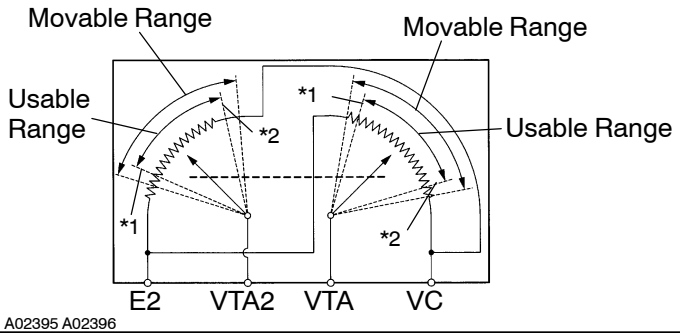
Replace water temp. sensor.

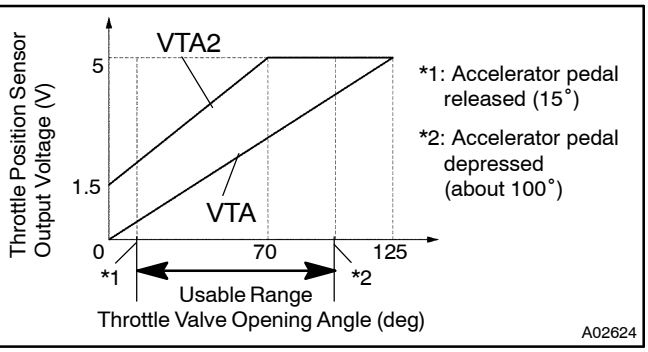
DI2S5–05

DTC	P0120/41	Throttle Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Throttle position sensor is mounted on the throttle body and it have the 2 sensors to detect the throttle opening angle and the malfunction of the throttle position sensor's own.
The voltage applied to the terminals VTA and VTA2 of the engine ECU changes between 0 V and 5 V in proportion to the opening angle of the throttle valve.
The engine ECU judges the current opening angle of the throttle valve from these signals input from terminals VTA and VTA2, and the engine ECU controls the throttle motor to make the throttle valve angle properly in response to driving condition.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the electromagnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.



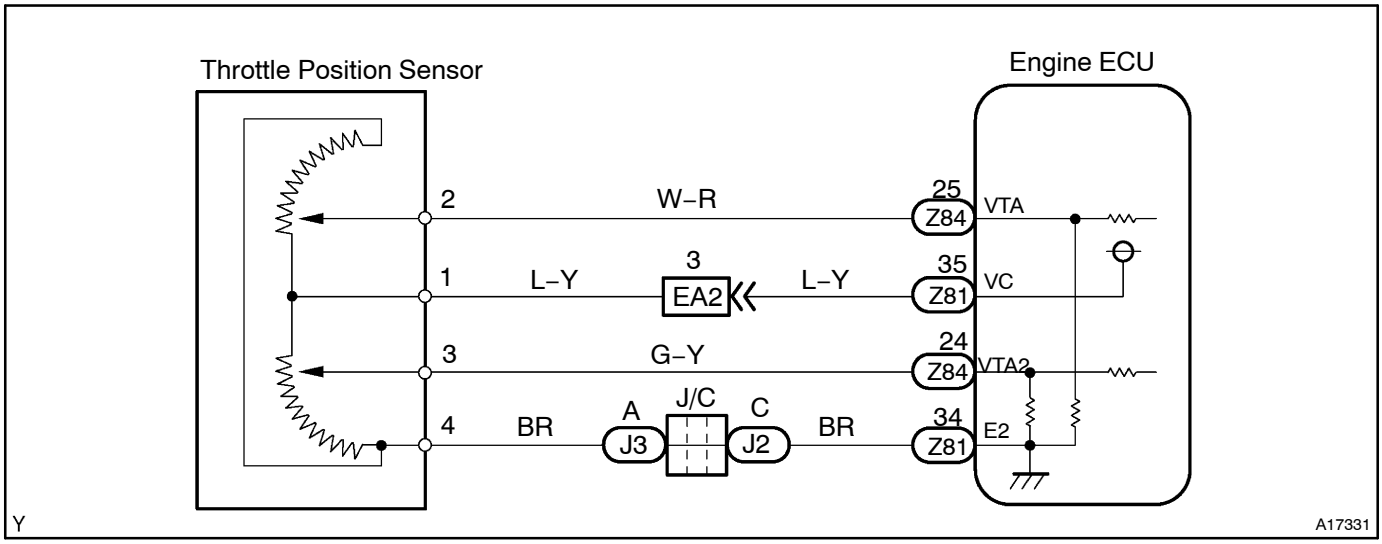


DTC No.	DTC Detecting Condition	Trouble Area
P0120/41	Condition (a), (b), (c) or (d) continues for 2.0 seconds: (a) VTA ≦ 0.2 V (b) VTA2 ≦ 0.5 V (c) VTA ≧ 4.8 V (d) When VTA ≧ 0.2 V and ≦ 2.0 V, and VTA2 ≧ 4.97 V (b) VTA–VTA2 ≦ 0.02 V	• Open or short in throttle position sensor circuit • Throttle position sensor • Engine ECU
	Condition (a) or (b) continues for 0.4 seconds: (a) VTA ≦ 0.2 V and VTA2 ≦ 0.5 V	

HINT:
After confirming DTC P0120/41 use the hand–held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

Accelerator pedal position expressed as percentage and voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
THROTTLE POS	THROTTLE POS #2	THROTTLE POS	THROTTLE POS #2	
0 %	0 V	0 %	0 V	VC line open
0 %	2.0 ~ 2.9 V	0 %	4.6 ~ 5.1 V	VTA line open or grand short
8 ~ 20 %	0 V	64 ~ 96 %	0 V	VTA2 line open or grand short
100 %	5 V	100 %	5 V	E2 line open

WIRING DIAGRAM



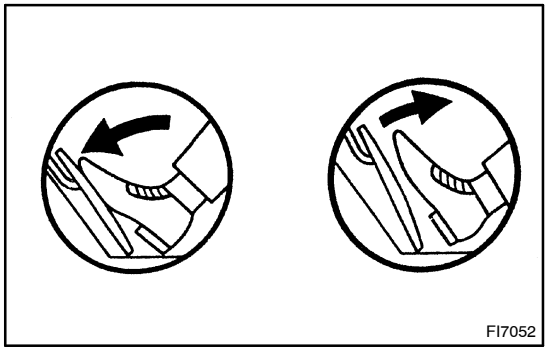
INSPECTION PROCEDURE

HINT:

- If DTC P0110/24 (Intake Air Temp. Circuit Malfunction), P0115/22 (Water Temp. Circuit Malfunction), P0120/41 (Throttle Position Sensor Circuit Malfunction), P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	Connect hand–held tester, read throttle valve opening percentage.



PREPARATION:

(a) Connect the hand–held tester to DLC3.

(b) Turn the ignition switch ON and switch the hand–held tester main switch ON.

CHECK:

Read the throttle valve opening percentage for VTA circuit and read the voltage for VTA2 circuit.

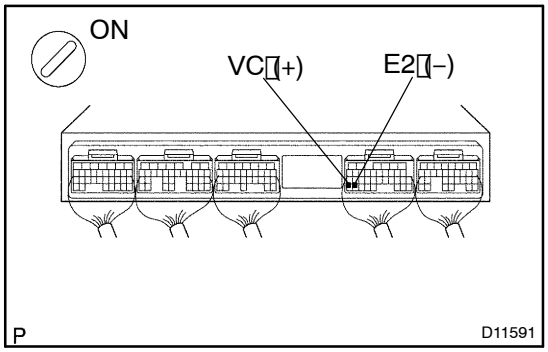
OK:

Accelerator pedal	Throttle valve opening position expressed as percentage (VTA)	Voltage (VTA2)
Released	8 – 20 %	2.0 – 2.9 V
Depressed	64 – 96 %	4.6 – 5.1 V

OK	Check and replace engine ECU (See page IN–34).

NG

2	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals VC and E2 of the engine ECU
connector.

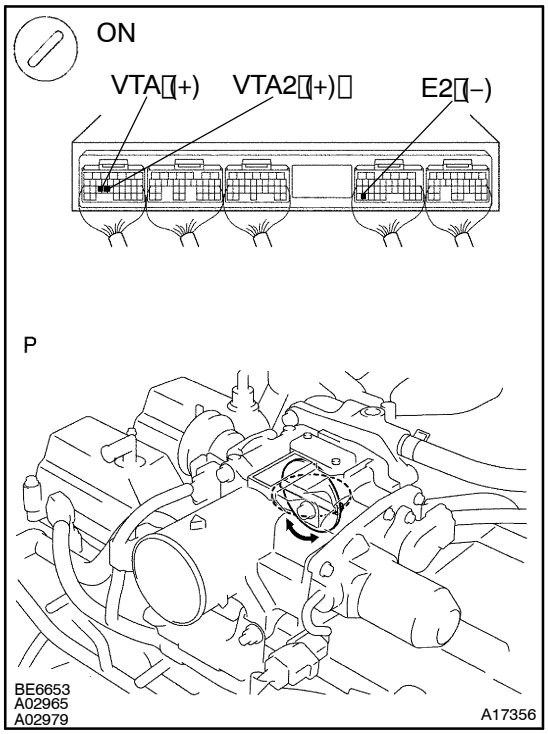
OK:

Voltage: 4.5 ~ 5.5 V

NG	Check and replace engine ECU (See page IN–34).

OK

3	Check voltage between terminals VTA, VTA2 and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals VTA, VTA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VTA	VTA2
Released	0.4 – 1.0 V	2.0 – 2.9 V
Depressed	3.2 – 4.8 V	4.6 – 5.1 V

OK: Check and replace engine ECU (See page IN–34).

NG

4	Check throttle position sensor (See page FI–32).

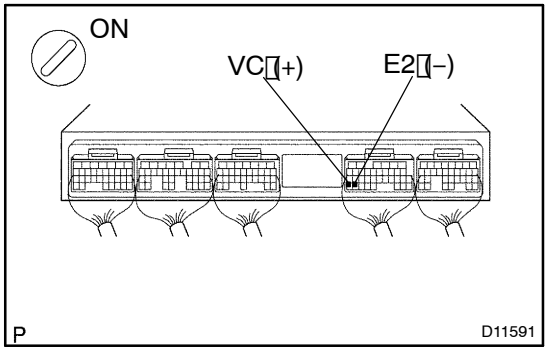
NG: Replace throttle position sensor (See page FI–37).

OK

Check for open and short in harness and connector between engine ECU and throttle position sensor (VC, VTA, VTA2, E2 line) (See page IN–34).

When not using hand–held tester

1	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Turn the ignition switch ON.

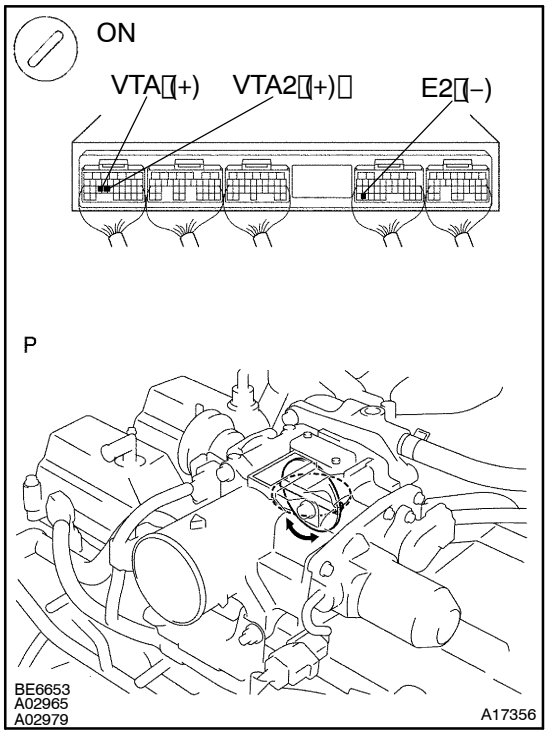
CHECK:
Measure voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 – 5.5 V

NG	Check and replace engine ECU (See page IN–34).

OK

2	Check voltage between terminals VTA, VTA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Turn the ignition switch ON.

CHECK:
Measure voltage between terminals VTA, VTA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VTA	VTA2
Released	0.4 ~ 1.0 V	2.0 ~ 2.9 V
Depressed	3.2 ~ 4.8 V	4.6 ~ 5.1 V

OK	Check and replace engine ECU (See page IN–34).

NG

3	Check throttle position sensor (See page FI–32).

NG → Replace throttle position sensor (See page FI–37).

OK →

Check for open and short in harness and connector between engine ECU and throttle position sensor (VC, VTA, VTA2, E2 line) (See page IN–34).

DI2T2–03

DTC	P0121	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0120 (Throttle/Pedal Position Sensor/Switch "A" Circuit Malfunction) on page DI–42.

DTC No.	DTC Detecting Condition	Trouble Area
P0121	Condition (a) continue for 2.0 seconds: (a) Difference between VTA and VTA2 is out of threshold	• Throttle position sensor • Engine ECU

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester or OBD scan tool. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

Replace throttle position sensor (See page FI–37).

DI85J–03

DTC	P0125/91	Insufficient Coolant Temp. for Closed Loop Fuel Control

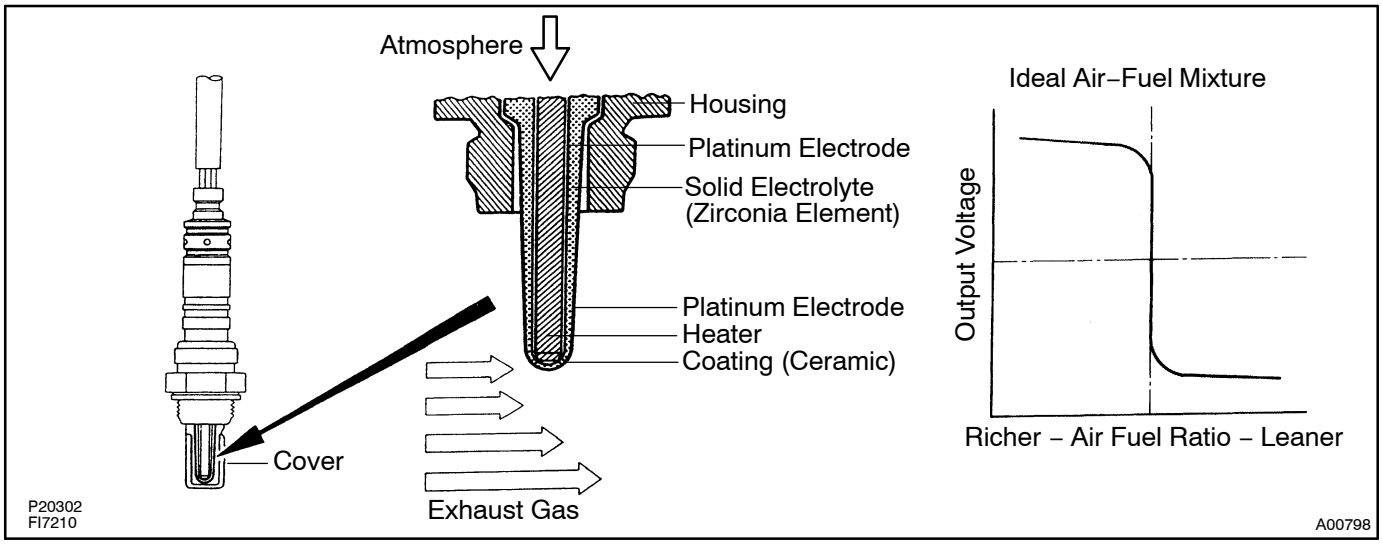
CIRCUIT DESCRIPTION

To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three–way catalytic converter is used, but for the most efficient use of the three–way catalytic converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel ratio.

The oxygen sensor (bank 1, 2 sensor 1) has the characteristic which its output voltage changes suddenly in the vicinity of the stoichiometric air–fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide the engine ECU with feedback to control of the air–fuel ratio.

When the air–fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the oxygen sensor informs the engine ECU of the LEAN condition (small electromotive force: < 0.45 V).

When the air–fuel ratio is RICHER than the stoichiometric air–fuel ratio the oxygen concentration in the exhaust gas is reduced and the oxygen sensor informs the engine ECU of the RICH condition (large electromotive force: > 0.45 V). The engine ECU judges by the electromotive force from the oxygen sensor whether the air–fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the oxygen sensor causes output of abnormal electromotive force, the engine ECU is unable to perform accurate air–fuel ratio control. The oxygen sensors include a heater which heats the zirconia element. The heater is controlled by the engine ECU. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.

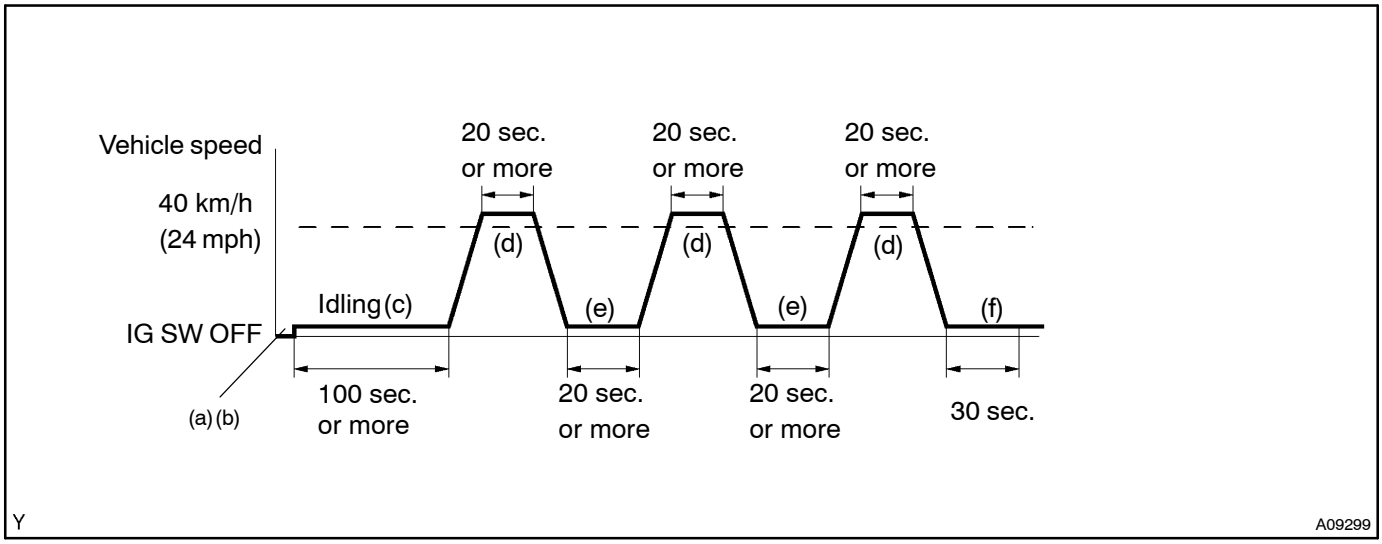


DTC No.	DTC Detecting Condition	Trouble Area
P0125/91	After engine is warmed up, heated oxygen sensors (bank 1, 2 sensor 1) output does not indicate RICH (≧0.45 V) even once when conditions (a), (b), (c) and (d) continue for at least 90 sec.: (a) Engine speed: 1,400 rpm or more (b) Vehicle speed: 40 – 100 km/h (25 – 62 mph) (c) Throttle valve does not fully closed (d) 180 sec. or more after starting engine	• Open or short in oxygen sensor (bank 1, 2 sensor 1) circuit • Oxygen sensor (bank 1, 2 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • Engine ECU

HINT:

After confirming DTC P0125, use the hand–held tester to confirm voltage output of the oxygen sensor (bank 1, 2 sensor 1) from the CURRENT DATA. If voltage output of the oxygen sensor is less than 0.1 V, oxygen sensor circuit may be open or short.

CONFIRMATION DRIVING PATTERN



(a) Connect the hand–held tester to the DLC3.
(b) Switch the hand–held tester from normal mode to check mode (See page DI–4).
(c) Start the engine and let the engine idle for 100 seconds or more.
(d) Drive the vehicle at 40 km/h (24 mph) or more for 20 seconds or more.
(e) Let the engine idle for 20 seconds or more.
(f) Let the engine idle for 30 seconds.

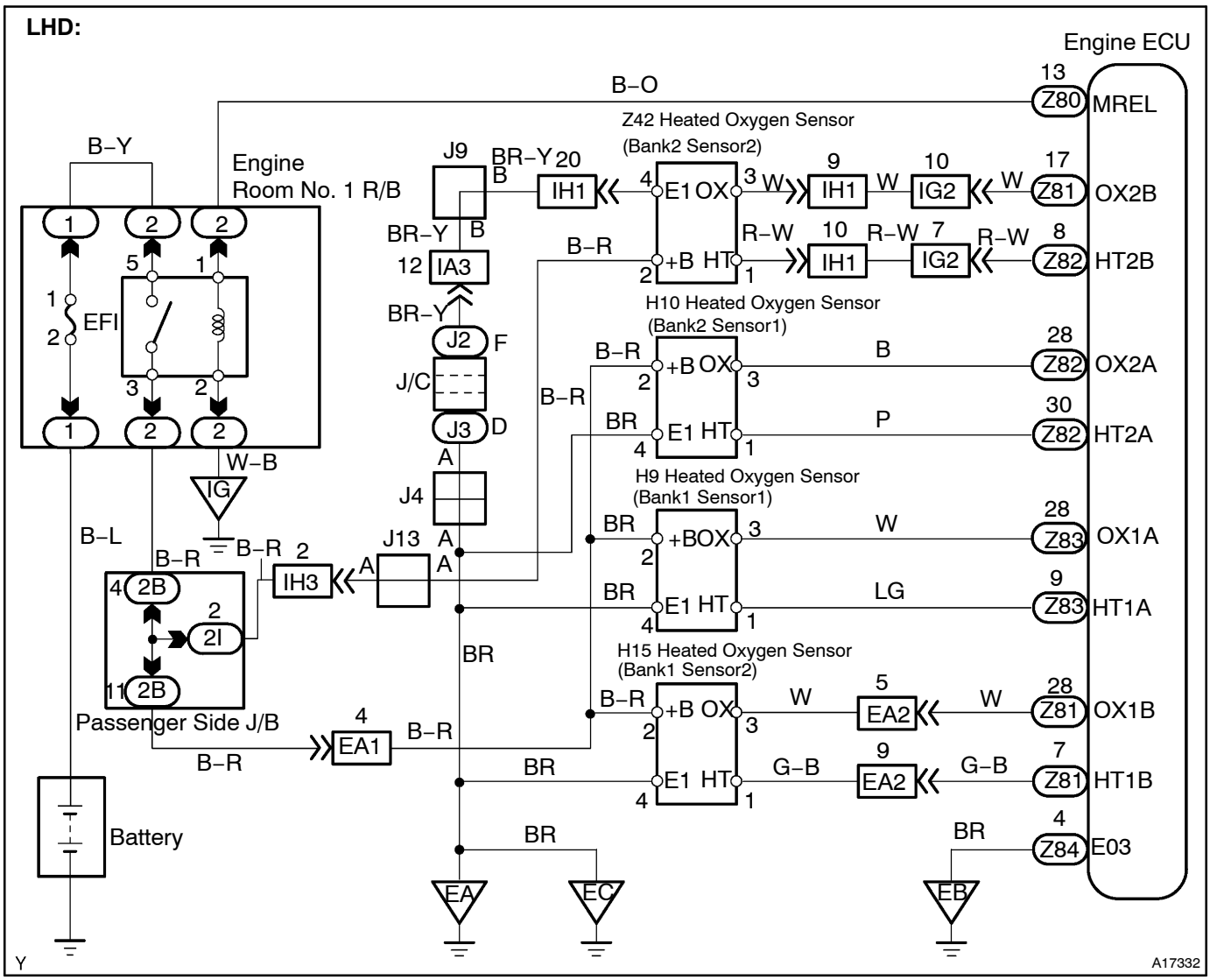
HINT:

If a malfunction exists, the MIL will light up during step (f).

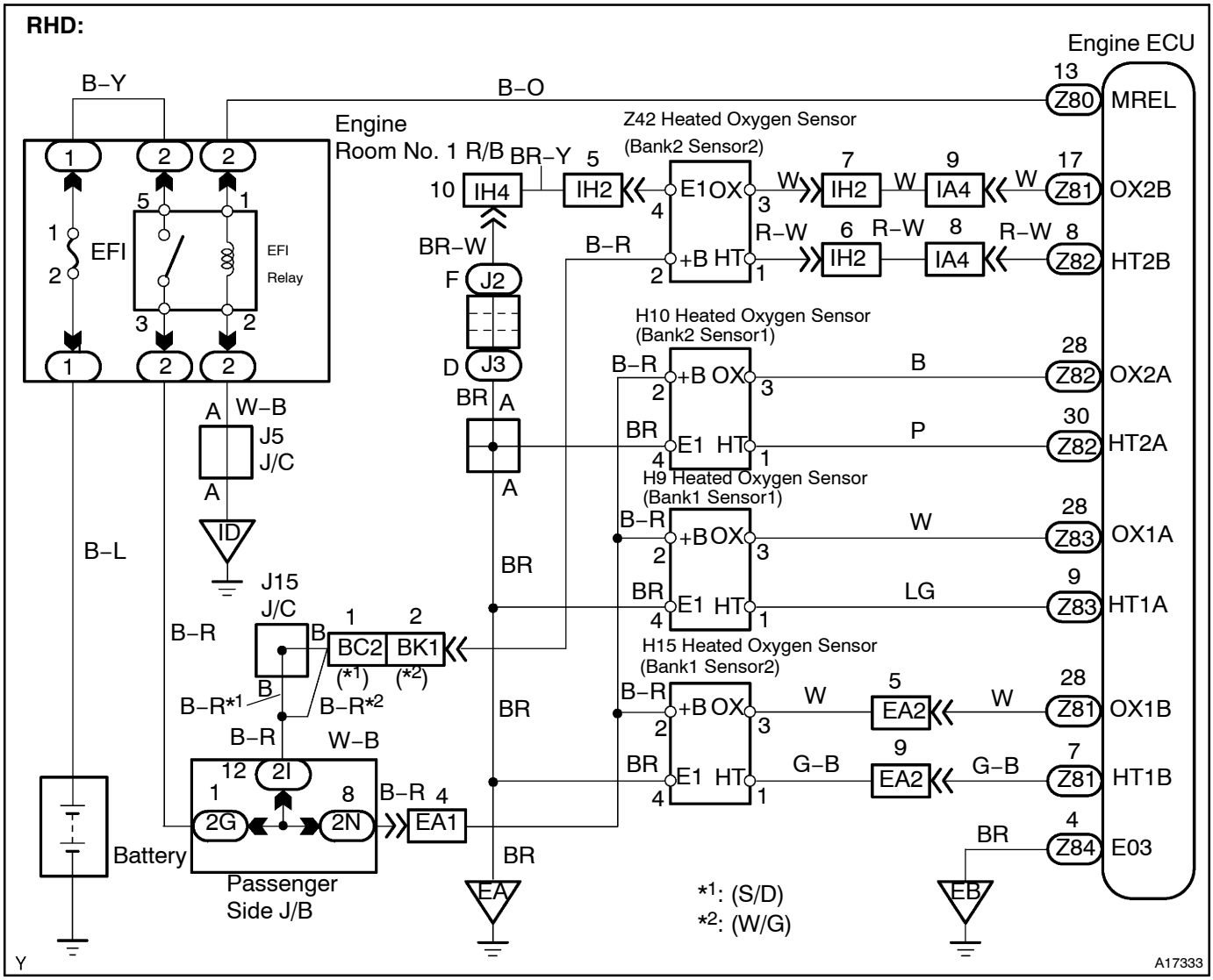
NOTICE:

If the conditions in this test are not strictly followed, detection of the malfunction will not be possible. If you do not have a hand–held tester, turn the ignition switch OFF after performing steps (c) to (f), then perform steps (c) to (f) again.

WIRING DIAGRAM



RHD:


Engine ECU
13
Z80
MREL
B–Y
B–O
Engine
Room No. 1 R/B
Z42 Heated Oxygen Sensor
(Bank2 Sensor2)
BR–Y
5
10
IH4
IH2
E1
OX
3
4
W
7
IH2
W
9
IA4
W
17
Z81
OX2B
R–W
6
R–W
8
R–W
8
Z82
HT2B
B–R
+B
HT
2
1
BR–W
F
J2
D
J3
H10 Heated Oxygen Sensor
(Bank2 Sensor1)
B–R
+B
OX
2
3
B
28
Z82
OX2A
BR
E1
HT
4
1
P
30
Z82
HT2A
H9 Heated Oxygen Sensor
(Bank1 Sensor1)
B–R
+B
OX
2
3
W
28
Z83
OX1A
BR
E1
HT
4
1
LG
9
Z83
HT1A
H15 Heated Oxygen Sensor
(Bank1 Sensor2)
B–R
+B
OX
2
3
W
5
EA2
W
28
Z81
OX1B
BR
E1
HT
4
1
G–B
9
EA2
G–B
7
Z81
HT1B
BR
4
Z84
E03
EB
EFI
EFI
Relay
A
W–B
J5
J/C
A
ID
B–L
J15
J/C
B–R
B
1
2
BC2
BK1
(*1)
(*2)
B
B–R*1
B–R*2
B–R
W–B
12
2I
1
8
2G
2N
B–R
4
EA1
BR
A
BR
A
EA
Battery
Passenger
Side J/B
*1: (S/D)
*2: (W/G)
Y
A17333

INSPECTION PROCEDURE

When not using hand–held tester:

HINT:

- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0125 will be recorded. The CHECK ENGINE (MIL) then comes on.

1	**Are there any other codes (besides DTC P0125) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	**Connect the hand–held tester, and read value for voltage output of oxygen sensors (bank 1, 2 sensor 1).**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Warm up the engine to normal operating temperature (above 75°C (169°F)).

CHECK:

Read voltage output of the oxygen sensors when the engine is suddenly raced.

HINT:

Perform quick racing to 4,000 rpm 3 times using the accelerator pedal.

OK:

Oxygen sensor output a RICH signal (0.45 V or more) at least once.

OK → **Go to step 9**

NG

3	Check for open and short in harness and connector between engine ECU and oxygen sensors (bank 1, 2 sensor 1) (See page IN–34).

NG → Repair or replace harness or connector.

OK

4	Check whether misfire is occurred or not by monitoring DTC and data list.

NG → Perform troubleshooting for misfire (See page DI–76).

OK

5	Check air induction system (See page FI–1).

NG → Repair or replace.

OK

6	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipeline and filter (See page FI–1).

OK

7	Check injector injection (See page FI–22).

NG → Replace injector.

OK

8	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

Replace oxygen sensor (bank 1, 2 sensor 1).

9	Perform confirmation driving pattern.

GO

10	Is there DTC P0125 being output again?

YES → Check and replace engine ECU (See page IN–34).

NO

11	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI–4).

YES

DTC P0125 is caused by running out of fuel.

When not using hand–held tester:

1	Are there any other codes (besides code 91) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor (bank 1, 2 sensor 1).

DI9HK–01

DTC	P0130/21	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)

DTC	P0150/58	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

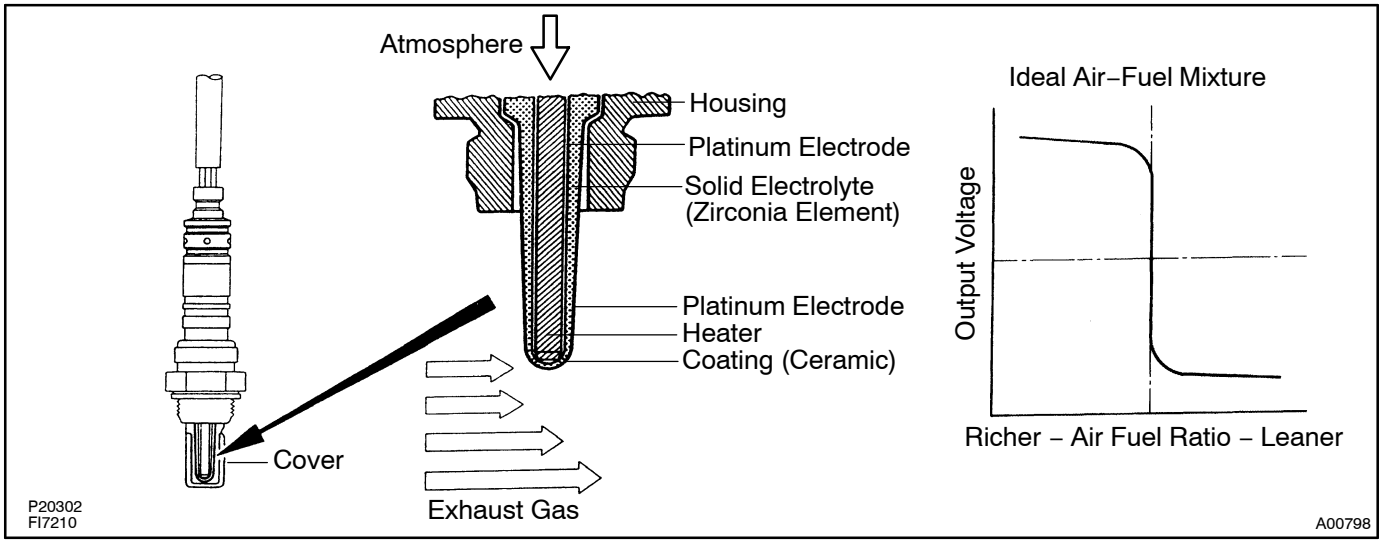
To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three–way catalytic converter is used, but for the most efficient use of the three–way catalytic converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel ratio.

The oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air–fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide feedback to the computer for control of the air–fuel ratio.

When the air–fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the oxygen sensor informs the engine ECU of the LEAN condition (small electromotive force: 0 V).

When the air–fuel ratio is RICHER than the stoichiometric air–fuel ratio the oxygen concentration in the exhaust gas is reduced and the oxygen sensor informs the engine ECU of the RICH condition (large electromotive force: 1 V). The engine ECU judges by the electromotive force from the oxygen sensor whether the air–fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the oxygen sensor causes output of abnormal electromotive force, the engine ECU is unable to perform accurate air–fuel ratio control.

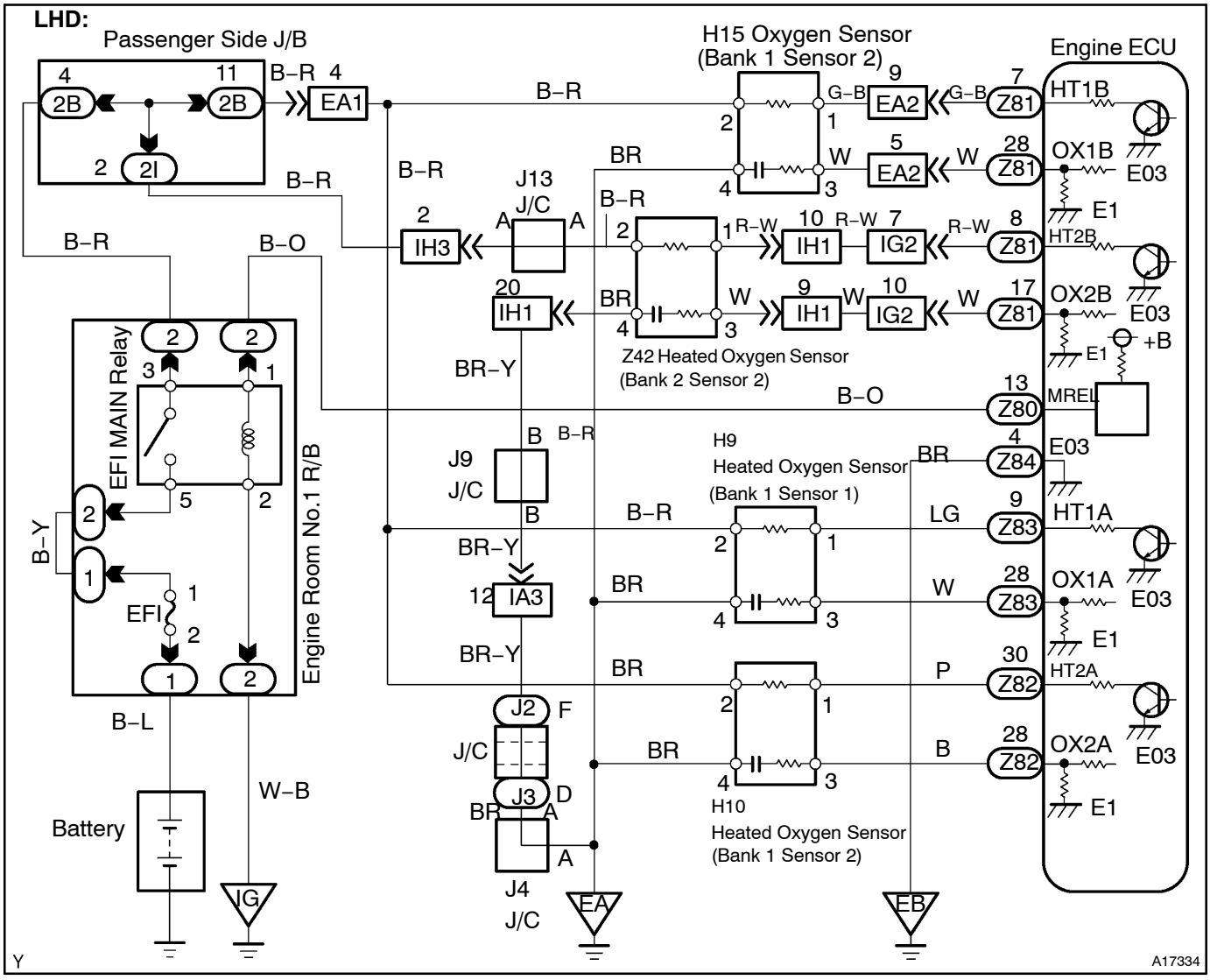
The oxygen sensors include a heater which heats the Zirconia element. The heater is controlled by the engine ECU. When the intake air volume is low (the temperature of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.

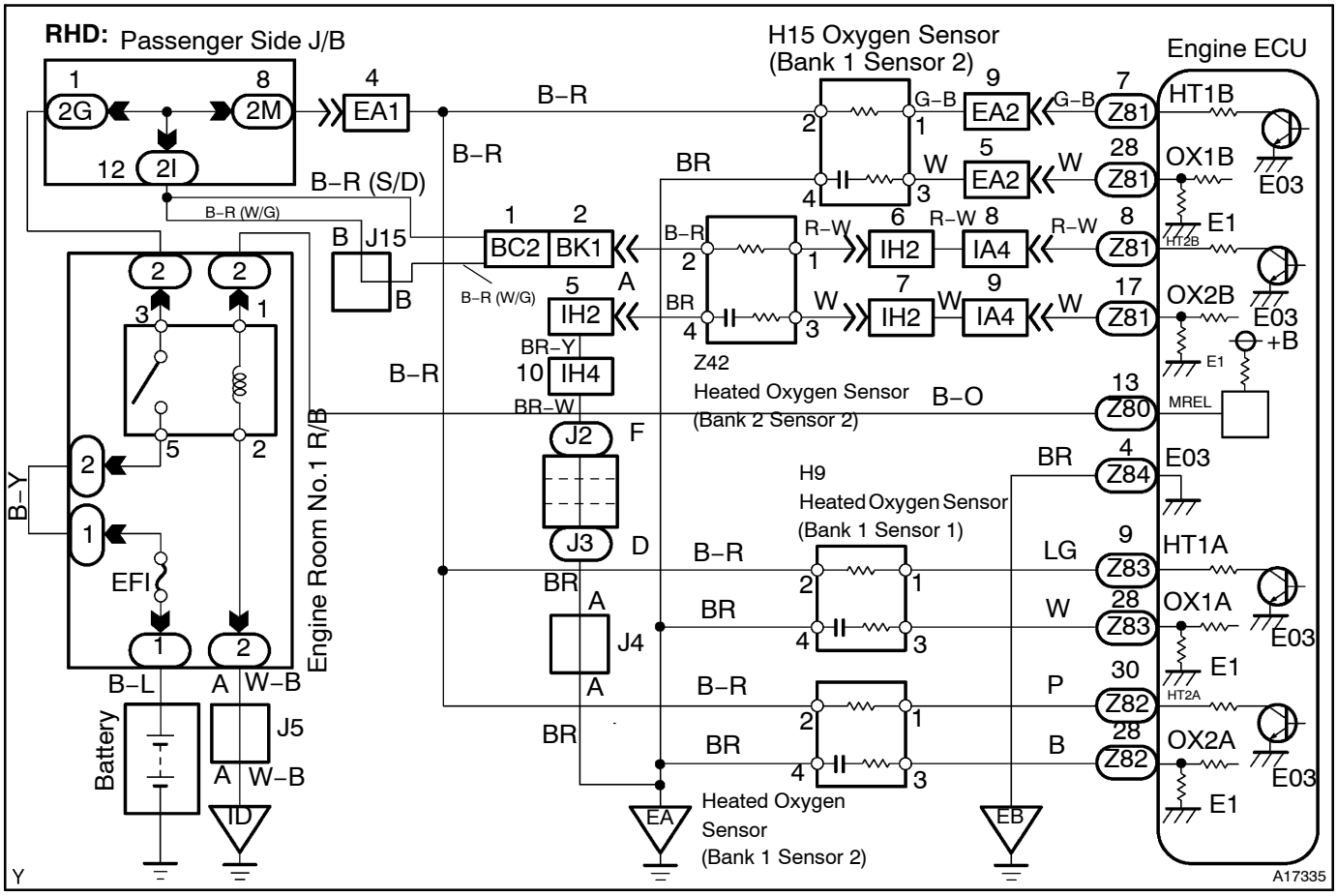


DTC No.	DTC Detecting Condition	Trouble Area
P0130/21 P0150/28	Voltage output of heated oxygen sensor remains at 0.4 V or more, or 0.55 V or less, at three times during idling after engine is warmed up (2 trip detection logic)	• Oxygen sensor • Fuel trim malfunction

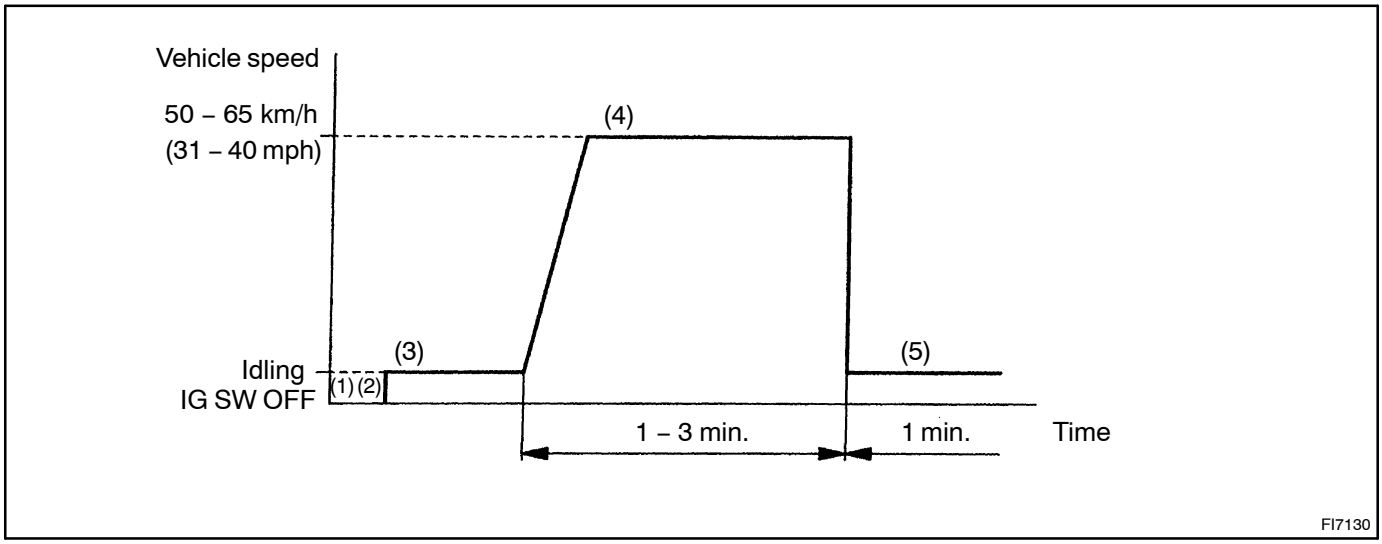
HINT:
Bank 1 refers to bank that includes cylinder No.1.
Bank 2 refers to bank that does not include cylinder No.1.
Sensor 1 refers to the sensor closer to the engine body.
The oxygen sensor's output voltage and the short–term fuel trim value can be read using the hand–held tester.

WIRING DIAGRAM





CONFIRMATION DRIVING PATTERN



(1) Connect the hand–held tester to the DLC3.
(2) Switch the hand–held tester from normal mode to check (test) mode (See page DI–4).
(3) Start the engine and warm it up with all accessory switches OFF.
(4) Drive the vehicle at 50 – 65 km/h (31 – 40 mph) for 1 – 3 min. to warm up the heated oxygen sensor.
(5) Let the engine idle for 1 min.
(6) Perfom steps (3) to (5) three times.

HINT:

If a malfunction exists, the CHECK ENG will be indicated on the multi information display during step (6).

NOTICE:
If the conditions in this test are not strictly followed, detection of the malfunction will not be possible. If you do not have a hand–held tester, turn the ignition switch OFF after performing steps (3) to (6), then perform steps (3) to (6) again.

INSPECTION PROCEDURE

When using hand–held tester

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

2	**Check for oxygen sensor data.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Warm up the engine to normal operating temp.
CHECK:
Read the oxygen sensor output voltage and short–term fuel trim.
RESULT:

Pattern	Heated oxygen sensor output voltage	Short–term fuel trim
1	Lean condition (Changes at 0.55 V or less)	Changes at about +20 %
2	Rich condition (Changes at 0.4 V or more)	Changes at about –20 %
3	Except 1 and 2	

1, 2 → **Check fuel trim system (See page DI–71).**

3

3	**Check output voltage of oxygen sensor during idling.**

PREPARATION:

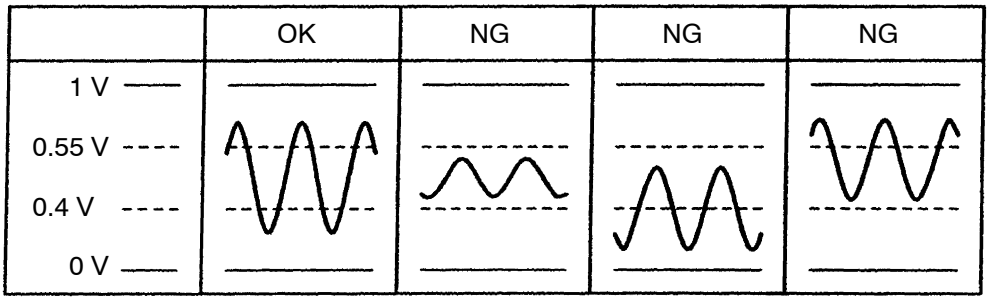
Warm up the oxygen sensor with the engine at 2,500 rpm for approx. 90 sec.

CHECK:

Use the hand–held tester read the output voltage of the oxygen sensor during idling.

OK:

Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.55 V (See the following table).



OK → **Perform confirmation driving pattern.**

NG

Replace oxygen sensor.

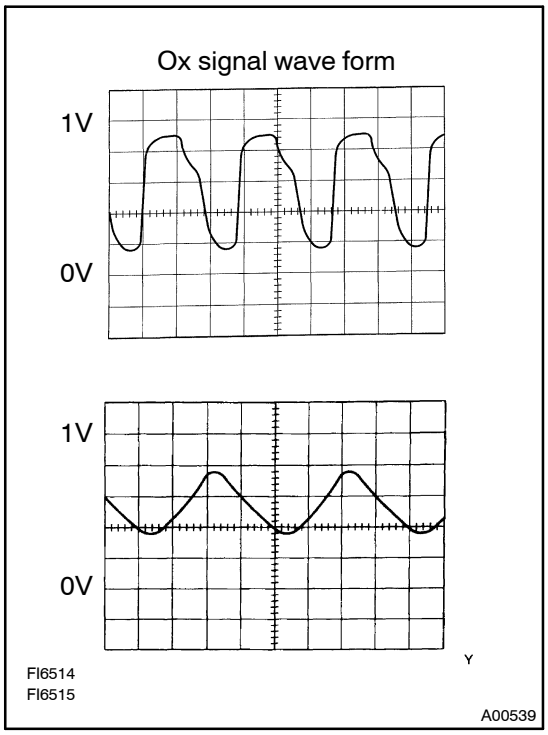
When not using hand–held tester

1	**Are there any other codes (besides code 21 and 28) being output?**

YES → **Go to relevant diagnostic trouble code chart (See page DI–17).**

NO

Replace heated oxygen sensor.



Reference: INSPECTION USING OSCILLOSCOPE

With the engine racing (4,000 rpm) measure waveform between terminals OXL1 and E1 of engine ECU.

HINT:

- The correct waveform is as shown oscillating between approx. 0.1 V and 0.9 V.
- If the oxygen sensor has deteriorated, the amplitude of the voltage will be reduced as shown on the left.

DTC	P0133/21	Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)

DTC	P0153/28	Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125/91 on page DI–49.

DTC No.	DTC Detecting Condition	Trouble Area
P0133/21 P0153/28	Response time for heated oxygen sensor voltage output to change from rich to lean, or from lean to rich, is 1.1 sec. or more at three times during idling after engine is warmed up (2 trip detection logic)	• Open or short in oxygen sensor circuit • Oxygen sensor • Air induction system • Fuel pressure • Injector • Engine ECU

HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to bank that does not include cylinder No.1.
- Sensor 1 refers to the sensor closer to the engine body.

WIRING DIAGRAM

Refer to DTC P0125/91 on page DI–49.

INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0133 or P0153) being output?**

YES ⟩ **Go to relevant DTC chart (See page DI–17).**

NO

2	**Check output voltage of oxygen sensor during idling.**

PREPARATION:

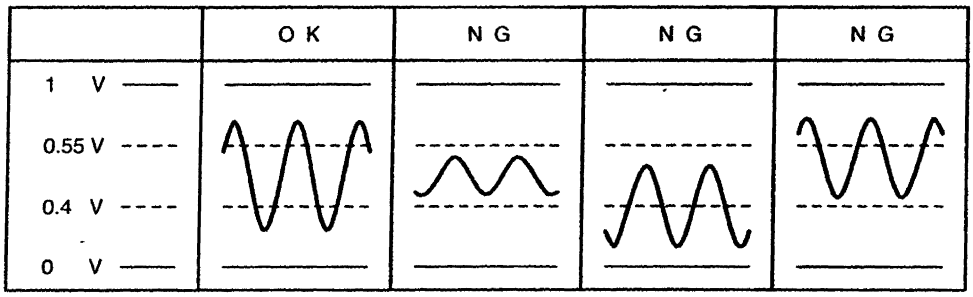
Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Use the hand–held tester to read the output voltage of the oxygen sensor during idling.

OK:

Oxygen sensor output voltage:
Alternates repeatedly between less than 0.4 V and more than 0.55 V (See the following table).



P18349

OK → **Go to step 7.**

NG

3	**Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

4	**Check air induction system (See page FI–1).**

NG → **Repair or replace.**

OK

5	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipeline and filter (See page FI–1).

OK

6	Check injector injection (See page FI–22).

NG → Replace injector.

OK

Replace oxygen sensor.

7	Perform confirmation driving pattern (See page DI–63).

GO

8	Is there DTC P0133 or P0153 being output again?

NO → Check for intermittent problems (See page DI–4).

YES

Check and replace engine ECU (See page IN–34).

When not using hand–held tester:

1	Are there any other codes (besides code 21 or 28) being output?

YES ⇒ Go to relevant DTC chart (See page DI–17).

NO

Replace oxygen sensor.

DI9HL–02

DTC	P0135/21	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)

DTC	P0141/21	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)

DTC	P0155/28	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)

DTC	P0161/28	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 2)

CIRCUIT DESCRIPTION

Refer to Oxygen Sensor Circuit Malfunction on page DI–49.

DTC No.	DTC Detecting Condition	Trouble Area
P0135/21 P0141/21 P0155/28 P0161/28	When the heater operates, heater current exceeds 2 A (1 trip detection logic)	• Open or short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • Engine ECU
	Heater current of 0.2 A or less when the heater operates (1 trip detection logic)	

HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to bank that does not include cylinder No.1.
- Sensor 1 refers to the sensor closer to the engine body.
- Sensor 2 refers to the sensor farther away from the engine body.

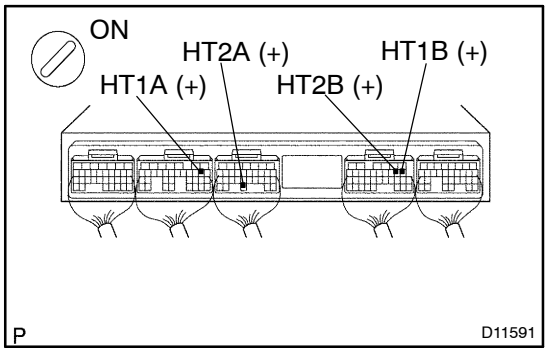
WIRING DIAGRAM

Refer to Oxygen Sensor Circuit Malfunction on page DI–49 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check voltage between terminals HT1A, HT2A, HT1B, HT2B of engine ECU connector and body ground.**



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Turn the ignition switch ON.

CHECK:
Measure voltage between terminals HT1A, HT2A, HT1B, HT2B of the engine ECU connector and body ground.
- Connect terminal HT1B to bank 2 sensor 1.
- Connect terminal HT2B to bank 2 sensor 2.
- Connect terminal HT1A to bank 1 sensor 1.
- Connect terminal HT2A to bank 1 sensor 2.

HINT:

OK:

Voltage: 9 ~ 14 V

OK	**Check and replace engine ECU (See page IN–34).**

NG

2	**Check resistance of oxygen sensor heater (See page FI–67).**

NG	**Replace oxygen sensor.**

OK

Check and repair harness or connector between main relay and oxygen sensor and engine ECU (See page IN–34).

DI2S7–04

DTC	P0136/27	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)

DTC	P0156/29	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 2)

CIRCUIT DESCRIPTION

Refer to DTC P0130 to on page DI–49.

DTC No.	DTC Detecting Condition	Trouble Area
P0136/27 P0156/29	Voltage output of the heated oxygen sensor (bank 1 sensor 2, bank 2 sensor 2) remains at 0.4 V or more or 0.5 V or less when the vehicle is driven at 30 km/h (19 mph) or more after the engine is warmed up. (2 trip detection logic)	• Heated oxygen sensor

HINT:

- Bank 1 refers to bank that includes cylinder No.1.
- Bank 2 refers to bank that does not include cylinder No.1.
- Sensor 2 refers to the sensor farther away from the engine body.

WIRING DIAGRAM

Refer to on page DI–49 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

When using hand–held tester

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0136 or P0156) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	Check for open and short in harness and connector between engine ECU and oxygen sensor (See page IN–34).

NG → Repair or replace harness or connector.

OK

3	Check the output voltage of oxygen sensor (bank 1, 2 sensor 2).

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) After warming up the engine, race engine at 2,500 rpm for 3 min.

CHECK:

Read voltage output of oxygen sensor (bank 1 sensor 2, bank 2 sensor 2) when engine suddenly raced.

HINT:

Perform quick racing to 4,000 rpm 3 min. using accelerator pedal.

OK:

Oxygen sensor output voltage: Alternates from 0.4 V or less to 0.5 V or more.

OK → Check that each connector is properly connected.

NG

Replace oxygen sensor.

When not using hand–held tester

1	Are there any other codes (besides code 27 or 29) being output?

YES → Go to relevant diagnostic trouble code chart (See page DI–17).

NO

Replace oxygen sensor.

DI9HM–01

DTC	P0171/25	Fuel Trim System too Lean (Air – Fuel Ratio Lean Malfunction, Bank1)

DTC	P0174/25	Fuel Trim System too Lean (Air – Fuel Ratio Lean Malfunction, Bank2)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared against the basic injection time. Fuel trim includes short–term fuel trim and long–term fuel trim.

Short–term fuel trim is the short–term fuel compensation used to maintain the air–fuel ratio at its ideal theoretical value. The signal from the heated oxygen sensor indicates whether the air–fuel ratio is RICH or LEAN compared to the ideal theoretical value, triggering a reduction in fuel volume if the air–fuel ratio is rich, and an increase in fuel volume if it is lean.

Long–term fuel trim is overall fuel compensation carried out long–term to compensate for continual deviation of the short–term fuel trim form the central value due to individual engine differences, wear over time and changes in the usage environment.

If both the short–term fuel trim and long–term fuel trim are LEAN or RICH beyond a certain value, it is detected as a malfunction and the CHECK ENG on the multi information display.

DTC No.	DTC Detecting Condition	Trouble Area
P0171/25	When the air fuel ratio feedback is stable after engine warming up, the fuel trim is considerably in error on the RICH side. (2 trip detection logic) Main oxygen sensor voltage is 0.45 or less (lean) for 90 sec under condition (a) and (b)	• Gas leakage on exhaust system • Air intake (hose loose) • Fuel line pressure • Injector blockage • Oxygen sensor (bank1 sensor1) malfunction • Air flow meter • Water temp. sensor
P0174/25		• Gas leakage on exhaust system • Fuel line pressure • Injector leak, blockage • Oxygen sensor (bank 2 sensor 1) malfunction • Air flow meter • Water temp. sensor

HINT:

- When DTC P0171/25 and DTC P0174/25 is recorded, the actual air–fuel ratio is on the LEAN side.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0171/25 and DTC P0174/25 is recorded. The CHECK ENG then comes on.
- If the total of the short–term fuel trim value and long–term fuel trim value is within ± 25 %, the system is functioning normally.

INSPECTION PROCEDURE

When using hand–held tester

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Ask customer whether vehicles runs out of fuel.**

YES → **DTC P0171 or P0174 was recorded because the vehicle runs out of fuel.**

NO

2	**Check air induction system (See page FI–1).**

NG → **Repair or replace.**

OK

3	**Check for oxygen sensor (bank 1, 2 sensor 1) data.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

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

CHECK:

Read the oxygen sensor (bank 1, 2 sensor 1) output voltage and short–term fuel trim.

HINT:

Read the values for the same bank.

RESULT:

Pattern	Oxygen sensor output voltage	Short–term fuel trim
1	Lean condition (Changes at 0.55 V or less)	Changes at about +20 %
2	Rich condition (Changes at 0.35 V or more)	Changes at about –20 %
3	Except 1 and 2	

3 → **Check for oxygen sensor (bank 1, 2 sensor 1) (See page FI–67).**

1, 2

4	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page FI–29).

OK →

5	Check injector injection (See page FI–22).

NG → Replace injector.

OK →

6	Check air flow meter and water temp. sensor (See page FI–31 and FI–61).

NG → Repair or replace.

OK →

7	Check for spark and ignition (See page IG–1).

NG → Repair or replace.

OK →

8	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–34).

When not using hand–held tester

1	Check air induction system (See page FI–1).

NG → Repair or replace.

OK

2	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, fuel pipe line and filter (See page FI–67).

OK

3	Check injector injection (See page FI–22).

NG → Replace injector.

OK

4	Check air flow meter (See page FI–31).

NG → Repair or replace.

OK

5	Check water temp. sensor (See page FI–61).

NG → Repair or replace.

OK

6	Check for spark and ignition (See page IG–1).

NG → Repair or replace.

OK

7	Does malfunction disappear when a good oxygen sensor installed?

YES → Repair oxygen sensor.

NO

Check and replace engine ECU.

DI63Z–06

DTC	P0300/93	Random/Multiple Cylinder Misfire Detected

DTC	P0301/93	Cylinder 1 Misfire Detected

DTC	P0302/93	Cylinder 2 Misfire Detected

DTC	P0303/93	Cylinder 3 Misfire Detected

DTC	P0304/93	Cylinder 4 Misfire Detected

DTC	P0305/93	Cylinder 5 Misfire Detected

DTC	P0306/93	Cylinder 6 Misfire Detected

CIRCUIT DESCRIPTION

Misfire: The engine ECU uses the crankshaft position sensor and camshaft position sensor to monitor changes in the crankshaft rotation for each cylinder.

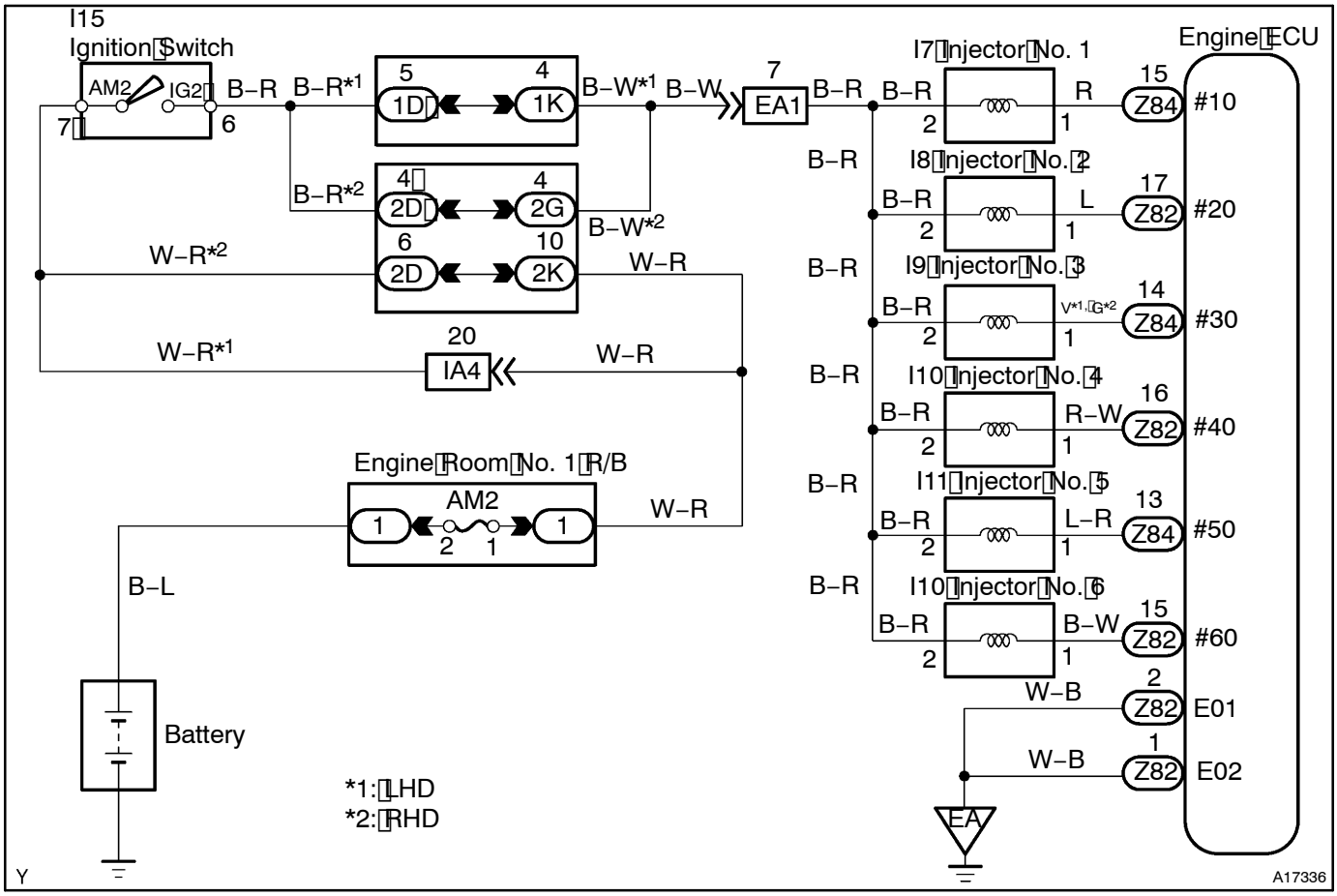
The engine ECU counts the number of times the engine speed change rate indicates that misfire has occurred. And when the misfire rate equals or exceeds the count indicating that the engine condition has deteriorated, the CHK ENG lights up.

If the misfire rate is high enough and the driving conditions will cause catalyst overheating, the CHK ENG blinks when misfiring occurs.

DTC No.	DTC Detecting Condition	Trouble Area
P0300/93	Misfiring of random cylinders is detected during any particular 200 or 1,000 revolutions 1 trip detection logic: CHK ENG to brink 2 trip detection logic: CHK ENG to light up	• Open or short in engine wire • Connector connection • Vacuum hose connection • Ignition system • Injector • Fuel pressure • Vacuum sensor • Water temp. sensor • Compression pressure • Valve clearance • Valve timing • Engine ECU
P0301/93 P0302/93 P0303/93 P0304/93 P0305/93 P0306/93	For any particular 200 revolutions of engine, misfiring is detected which can cause catalyst overheating (This causes CHK ENG to blink)	
	For any particular 1,000 revolutions of engine, misfiring is detected which causes a deterioration in emissions (2 trip detection logic)	

HINT:
When codes for a misfiring cylinder is recorded repeatedly but no random misfire code is recorded, it indicates that the misfires were detected and recorded at different times.

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN

(a) Connect the hand–held tester to the DLC3.
(b) Record DTC and the freeze frame data.
(c) Use the hand–held tester to set to the Check (Test) Mode (See page DI–17).
(d) Drive the vehicle several times with the engine speed, load and its surrounding range shown with ENGINE SPD, CALC LOAD in the freeze frame data or MISFIRE RPM, MISFIRE LOAD in the data list.

If you have no hand–held tester, turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again.

HINT:
In order to memorize DTC of misfire, it is necessary to drive around MISFIRE RPM, MISFIRE LOAD in the data list for the following period of time.

Engine Speed	Time
Idling	3 minutes 30 seconds or more
1,000 rpm	3 minutes or more
2,000 rpm	1 minute 30 seconds or more
3,000 rpm	1 minute or more

(e) Check whether there is misfire or not by monitoring DTC and the freeze frame data. After that, record them.
(f) Turn the ignition switch OFF and wait at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If it is the case that DTC besides misfire is memorized simultaneously, first perform the troubleshooting for them.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the vehicle is brought to the workshop and the misfire is not occurred, misfire can be confirmed by reproducing the condition of freeze frame data. Also, after finishing the repair, confirm that there is no misfire. (See confirmation driving pattern).
- When either of SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is besides the range of ± 20 %, there is a possibility that the air–fuel ratio is inclining either to RICH (–20 % or less) or LEAN (+20 % or more).
- When COOLANT TEMP in the freeze frame data is less than 80°C (176°F), there is a possibility of misfire only during warmed up.
- In the case that misfire cannot be reproduced, the reason may be because of the driving with lack of fuel, the use of improper fuel, a stain of the ignition plug, and etc.

1	**Check wire harness, connector and vacuum hose in engine room.**

CHECK:

(a) Check the connection conditions of wire harness and connector.

(b) Check the disconnection, piping and break of vacuum hose.

NG → **Repair or replace, then confirm that there is no misfire (See confirmation driving pattern).**

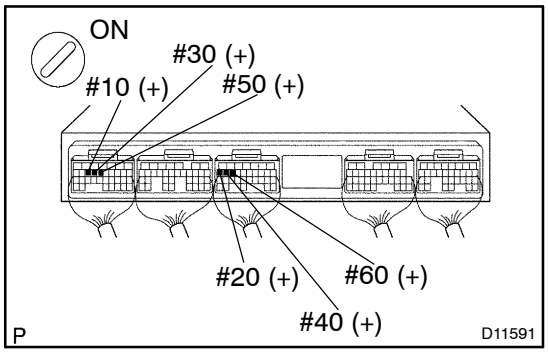
OK

2	**Check spark plug and spark of misfiring cylinder (See page IG–1).**

NG → **Replace or check ignition system (See page IG–1).**

OK

3	Check voltage of engine ECU terminals for injector of failed cylinder.



PREPARATION:

(a) Remove the engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between applicable terminals #10 – #60 of the engine ECU connectors and body ground.

OK:

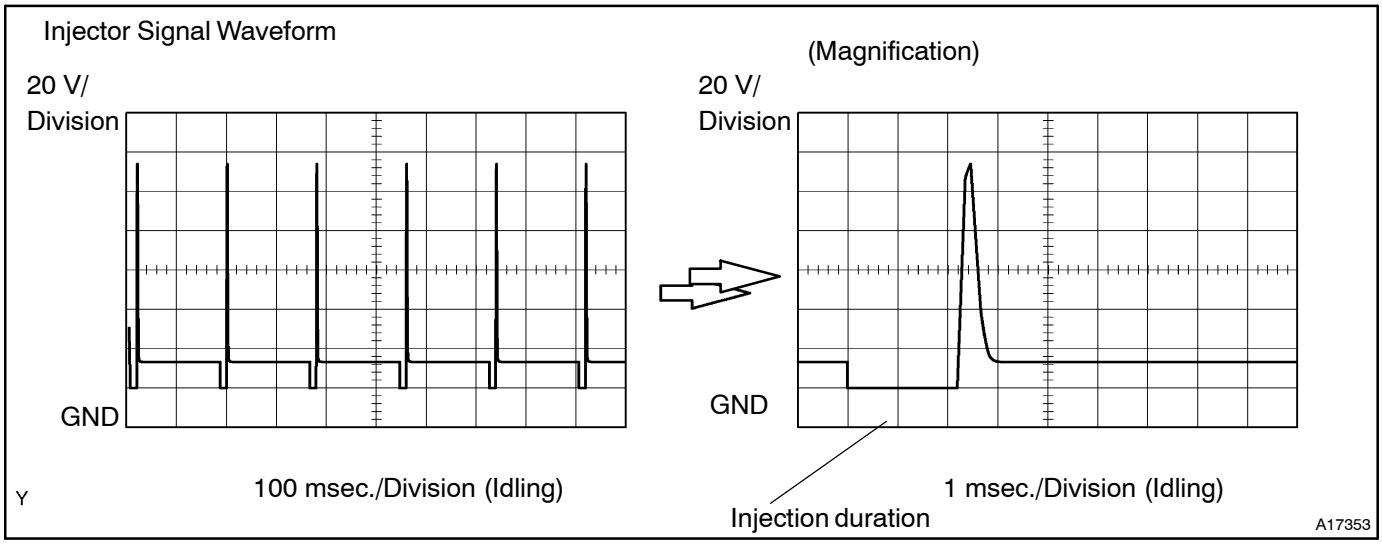
Voltage: 9 – 14 V

Reference: INSPECTION USING OSCILLOSCOPE

With the engine idling, check the waveform between terminals #10 – #60 and E01 of the engine ECU connectors.

HINT:

The correct waveform is as shown.



OK	Go to step 5.

NG

4	Check resistance of injector of misfiring cylinder (See page FI–1).

NG → Replace injector.

OK

Check for open and short in harness and connector between injector and engine ECU (See page IN–34).

5	Check fuel pressure (See page FI–6).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page FI–29).

OK

6	Check injector injection (See page FI–22).

NG → Replace injector.

OK

7	Check air flow meter (See page FI–31) and water temperature sensor (See page FI–61).

NG → Repair or replace.

OK

Check compression pressure (See page EM–3), valve clearance (See page EM–5) and valve timing (See page EM–24).

DI2SA–03

DTC	P0325/52	Knock Sensor 1 Circuit Malfunction

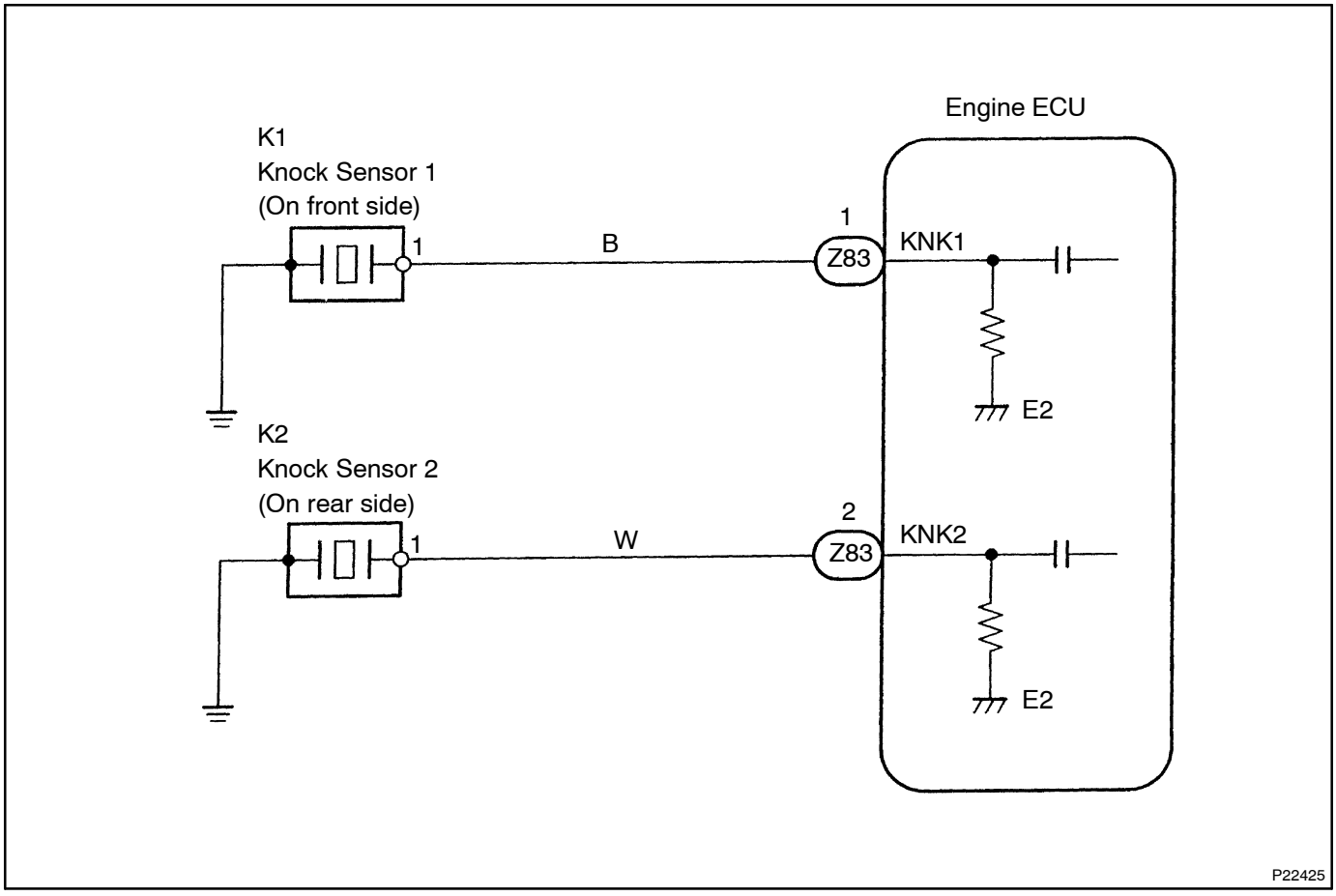
DTC	P0330/55	Knock Sensor 2 Circuit Malfunction

CIRCUIT DESCRIPTION

Knock sensors are fitted one to the right bank and left bank of the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325/52	No knock sensor 1 signal to engine ECU with engine speed between 1,600 rpm and 5,200 rpm	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • engine ECU
P0330/55	No knock sensor 2 signal to engine ECU with engine speed between 1,600 rpm and 5,200 rpm	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • engine ECU

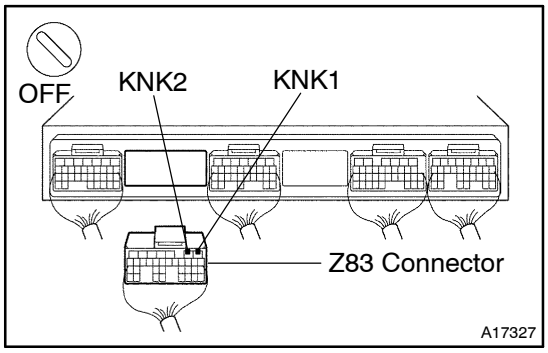
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

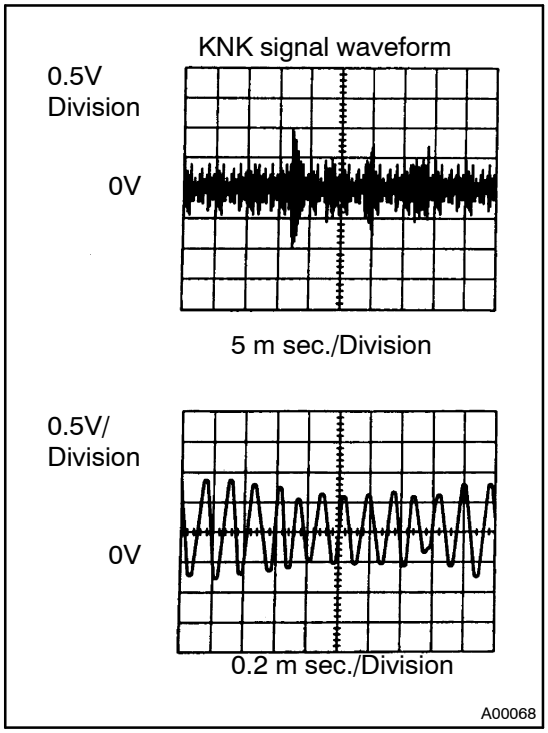
1	**Check continuity between terminal KNK1, KNK2 of engine ECU and body ground.**



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Disconnect the E2 connector from the engine ECU.

CHECK:
Measure resistance between terminal KNK1, KNK2 of the engine ECU and body ground.
HINT:
- Connect terminal KNK1 to knock sensor 1.
- Connect terminal KNK2 to knock sensor 2.

OK:
Resistance: 1 MΩ or higher



Reference: INSPECTION USING OSCILLOSCOPE
- With the engine racing (4,000 rpm) measure between terminal KNK1, KNK2 of the engine ECU connector and body ground.

HINT:
The correct waveforms are as shown.

- Spread the time on the horizontal axis, and confirm that period of the wave is 0.141m sec.
  (Normal mode vibration frequency of knock sensor: 7.1 kHz)

HINT:
If normal mode vibration frequency is not 7.1 kHz, the sensor is malfunctioning.

OK	**Go to step 3.**

NG

2	Check knock sensor (See page FI–63).

NG → Replace knock sensor.

OK

3	Check for open and short in harness and connector between engine ECU and knock sensor (See page IN–34).

NG → Repair or replace harness or connector.

OK

4	Does malfunction disappear when a good knock sensor is installed?

YES → Replace knock sensor.

NO

Check and replace engine ECU (See page IN–34).

DI2SB–04

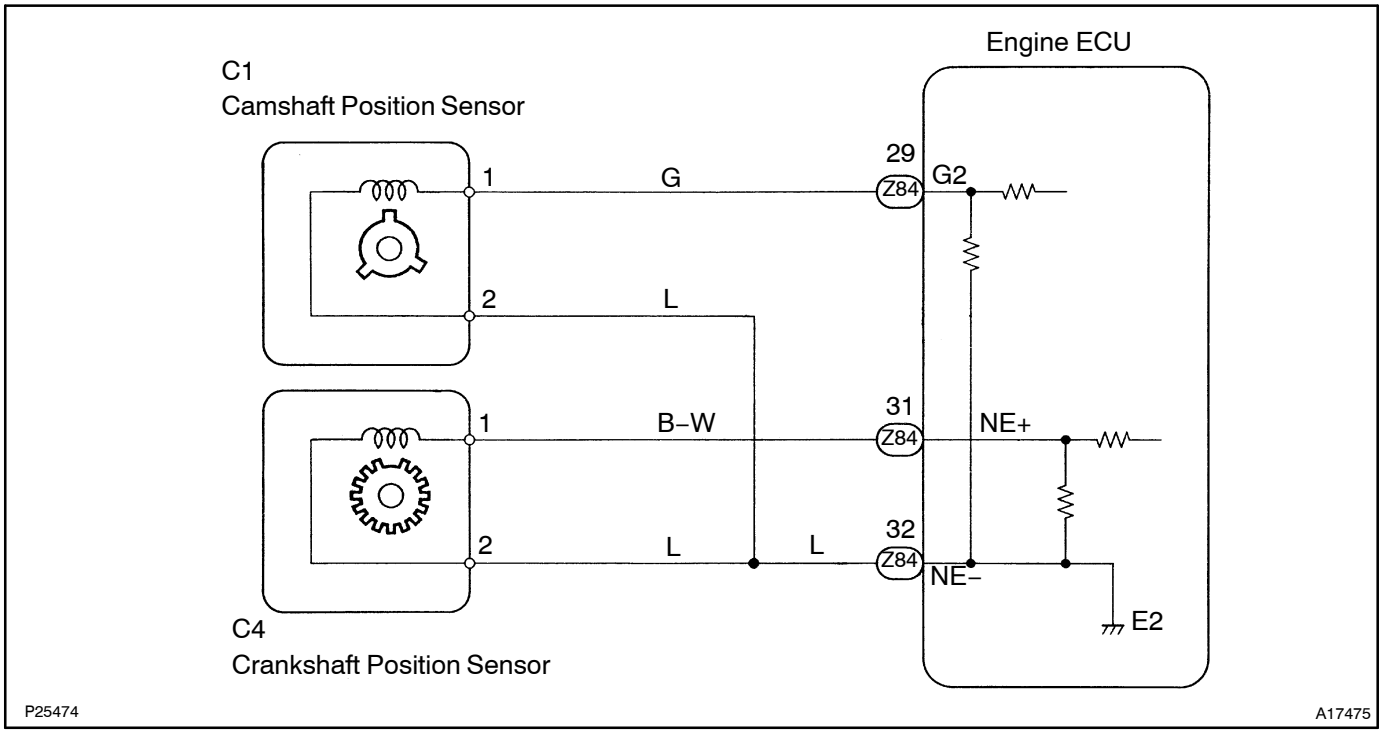
DTC	P0335/12, 13	Crankshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

The crankshaft position sensor, which detects the engine speed and crankshaft angle signal (NE signal), has been installed on the oil pump body.
The NE signal plate has 34 teeth. The NE signal sensor generates 34 signals of every engine revolution. The engine ECU detects the standard crankshaft angle based on the G2 signals, and the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0335/12, 13	No crankshaft position sensor signal to engine ECU during cranking.(2 trip detection logic)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Starter • Engine ECU
	No crankshaft position sensor signal to engine ECU with engine speed 600 rpm or more (2 trip detection logic)	

WIRING DIAGRAM

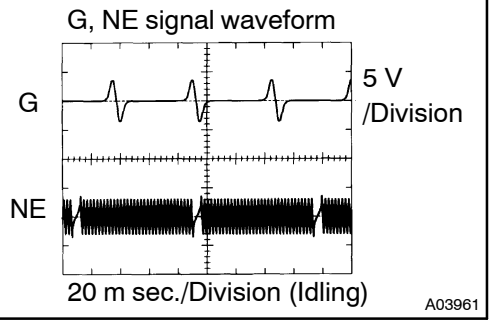


INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335/12, 13 first. If no trouble is found, troubleshoot the following mechanical systems.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check resistance of crankshaft position sensor (See page IG–1).**



Reference: INSPECTION USING OSCILLOSCOPE

During cranking or idling, check between terminals G2 and NE–, NE and NE– of the engine ECU connector.

HINT:

The correct waveforms are as shown.

NG → **Replace crankshaft position sensor.**

OK

2	**Check for open and short in harness and connector between engine ECU and crankshaft position sensor (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

3	**Inspect sensor installation and teeth of signal plate.**

NG → **Tighten sensor. Replace signal plate.**

OK

Check and replace engine ECU (See page IN–34).

DI2SC–05

DTC	P0340/12	Camshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Camshaft position sensor (G2 signal) consist of a signal plate and pickup coil.
The G2 signal plate has 3 tooth, on its outer circumference and is mounted on the left bank camshafts.
When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil change, causing fluctuations in the magnetic field and generating an electromotive force in the pickup coil.
The NE signal plate has 34 teeth and is mounted on the crankshaft. The NE signal sensor generates 34 signals for every engine revolution. The engine ECU detects the standard crankshaft angle based on the G2 signal and the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0340/12	No camshaft position sensor signal to engine ECU during cranking. (2 trip detection logic)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • Starter • engine ECU
	No camshaft position sensor signal to engine ECU with engine speed 600 rpm or more	

WIRING DIAGRAM

Refer to DTC P0335/12, 13 (Crankshaft Positio Sensor Circuit Malfunction) on page DI–841 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check resistance of camshaft position sensor (See page IG–1).**

Reference: INSPECTION USING OSCILLOSCOPE
Refer to DTC P0335/12, 13 (Crankshaft Position Sensor Circuit Malfunction) on page DI–841 for the Reference: INSPECTION USING OSCILLOSCOPE.

NG → **Replace camshaft position sensor.**

OK

2	Check for open and short in harness and connector between engine ECU and camshaft position sensor (See page IN–34).

NG → Repair or replace harness or connector.

OK

3	Inspect sensor installation.

NG → Tighten sensor.

OK

Check and replace engine ECU (See page IN–34).

DI643–05

DTC	P0420/94	Catalyst System Efficiency Below Threshold (Bank 1) (European spec. (Except Taiwan))

DTC	P0430/94	Catalyst System Efficiency Below Threshold (Bank 2) (European spec. (Except Taiwan))

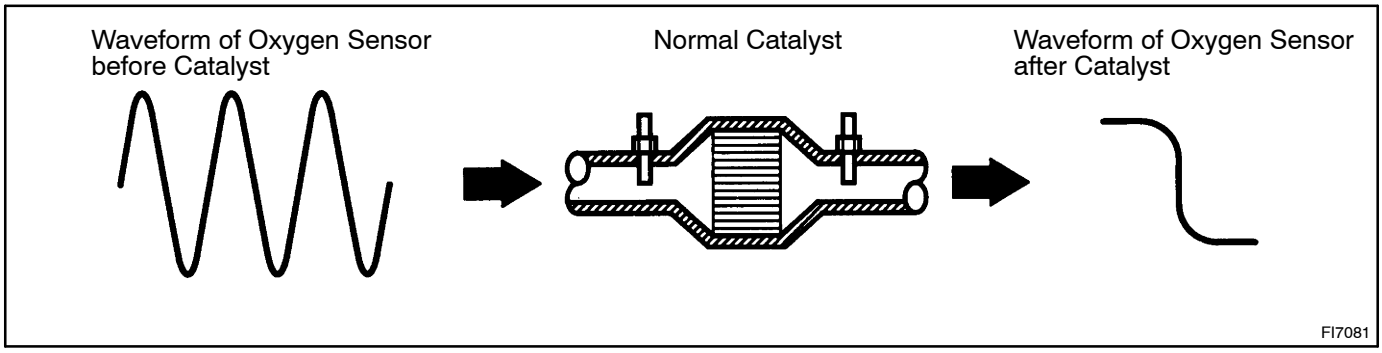
CIRCUIT DESCRIPTION

The engine ECU compares the waveform of the oxygen sensor located before the catalyst with the waveform of the oxygen sensor located after the catalyst to determine whether or not catalyst performance has deteriorated.

Air–fuel ratio feedback compensation keeps the waveform of the oxygen sensor before the catalyst repeatedly changing back and forth from rich to lean.

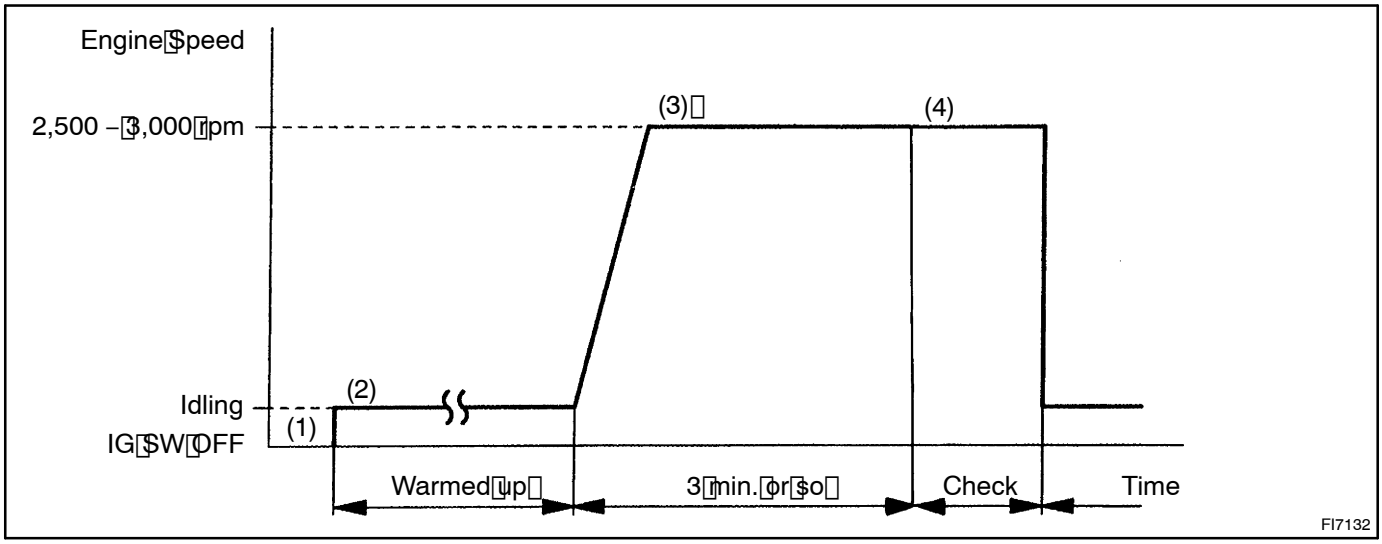
If the catalyst is functioning normally, the waveform of the oxygen sensor after the catalyst switches back and forth between rich and lean much more slowly than the waveform of the oxygen sensor before the catalyst.

But when both waveform change at a similar rate, it indicates that catalyst performance has deteriorated.

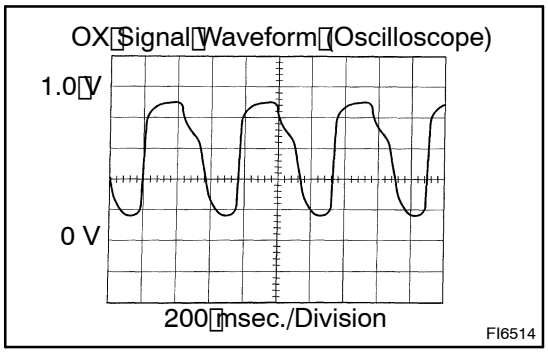


DTC No.	DTC Detecting Condition	Trouble Area
P0420/94 P0430/94	After engine and catalyst are warmed up, and while vehicle is driven within set vehicle and engine speed range, waveform of oxygen sensors have same amplitude (2 trip detection logic)	• Gas leakage on exhaust system • Oxygen sensor • Three–way catalytic converter

CONFIRMATION ENGINE RACING PATTERN



(1) Connect the hand–held tester to the DLC3, or connect the probe of the oscilloscope between terminals OX1A, OX1B, OX2A, and E1 of the engine ECU connectors.
(2) Start the engine and warm it up with all the accessories switched OFF until engine coolant temperature is stable.
(3) Race the engine at 2,500 – 3,000 rpm for about 3 min.
(4) After confirming that the waveform of the oxygen sensor (bank 1, 2 sensor 1) (OX1A, OX2A), oscillate around 0.5 V during feedback to the engine ECU, check the waveform of the oxygen sensor (bank 1 sensor 2) (OX1B).



HINT:
If there is a malfunction in the system, the waveform of the oxygen sensor (bank 1 sensor 2) (OX1B) is almost the same as that of the oxygen sensor (bank 1, 2 sensor 1) (OX1A, OX2A) on the left.
There are some cases where, even though a malfunction exists, the CHK ENG may either light up or not light up.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides P0420/94 or P0430/94) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO

2	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

3	Check oxygen sensor (bank 1, 2 sensor 1) (See page FI–67).

NG → Repair or replace.

OK

4	Check oxygen sensor (bank 1 sensor 2) (See page FI–67).

NG → Repair or replace.

OK

Replace three–way catalytic converter.

DI9HN–01

DTC	P0443/94	Evaporative Emission Control System Purge Control Vent Control Malfunction

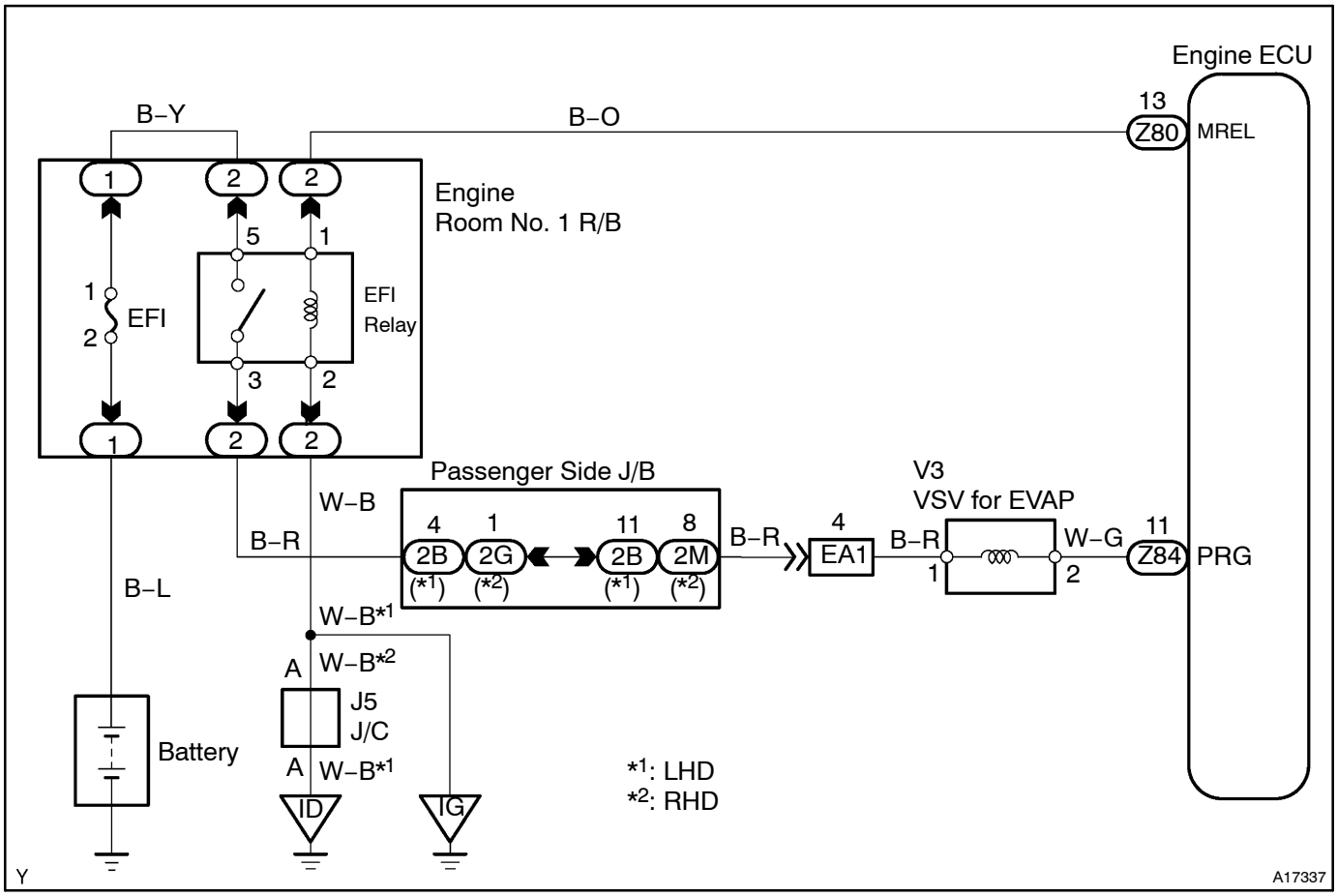
CIRCUIT DESCRIPTION

To reduce HC emissions, evaporated fuel from the fuel tank is routed through the charcoal canister to the intake manifold for combustion in the cylinders.

The engine ECU changes the duty signal to the VSV for the EVAP so that the intake quantity of HC emissions is appropriate for the driving conditions (engine load, engine speed, vehicle speed, etc.) after the engine is wamed up.

DTC No.	DTC Detecting Condition	Trouble Area
P0443/94	Proper response to engine ECU command does not occur	• Open or short in VSV circuit for EVAP • VSV for EVAP • Engine ECU

WIRING DIAGRAM



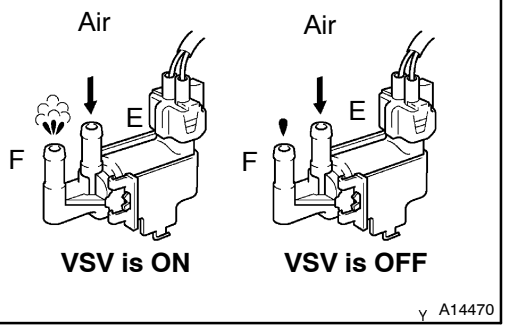
INSPECTION PROCEDURE

When using hand–held tester:

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester and check operation of VSV for EVAP.**



PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check the operation of the VSV when the VSV is operated by the hand–held tester.

OK:

VSV is ON:
Air from port E flows out through port F.
VSV is OFF:
Air from port E does not flows out through port F filter.

OK	**Check for intermittent problems (See page DI–4).**

NG

2	**Check VSV for EVAP (See page FI–56).**

NG	**Replace VSV for EVAP.**

OK

3	Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–34).

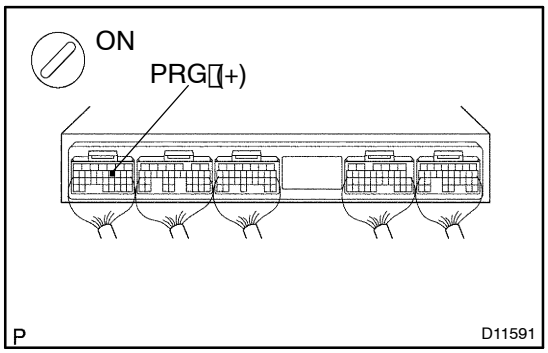
When not using hand–held tester:

1	Check VSV for EVAP (See page FI–56).

NG → Replace VSV for EVAP.

OK

2	Check voltage between terminal PRG of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal PRG of the engine ECU connector and body ground.

OK:

Voltage: 9 – 14 V

NG → Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–34).

OK

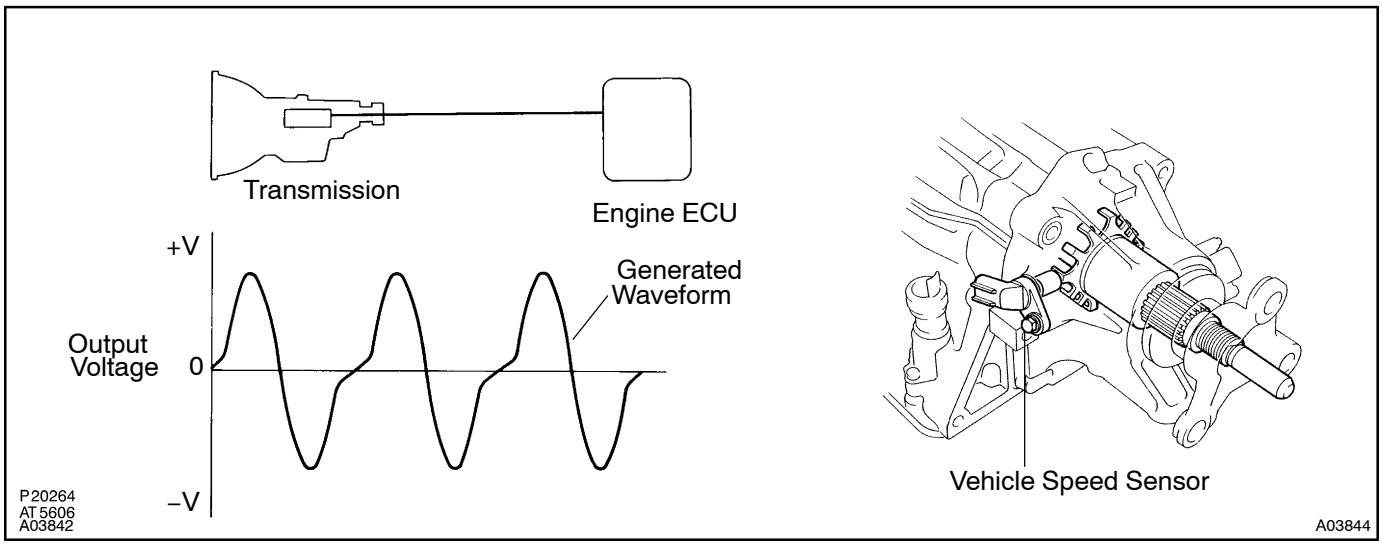
Check and replace engine ECU (See page IN–34).

DI2SD–04

DTC	P0500/42	Vehicle Speed Sensor Malfunction

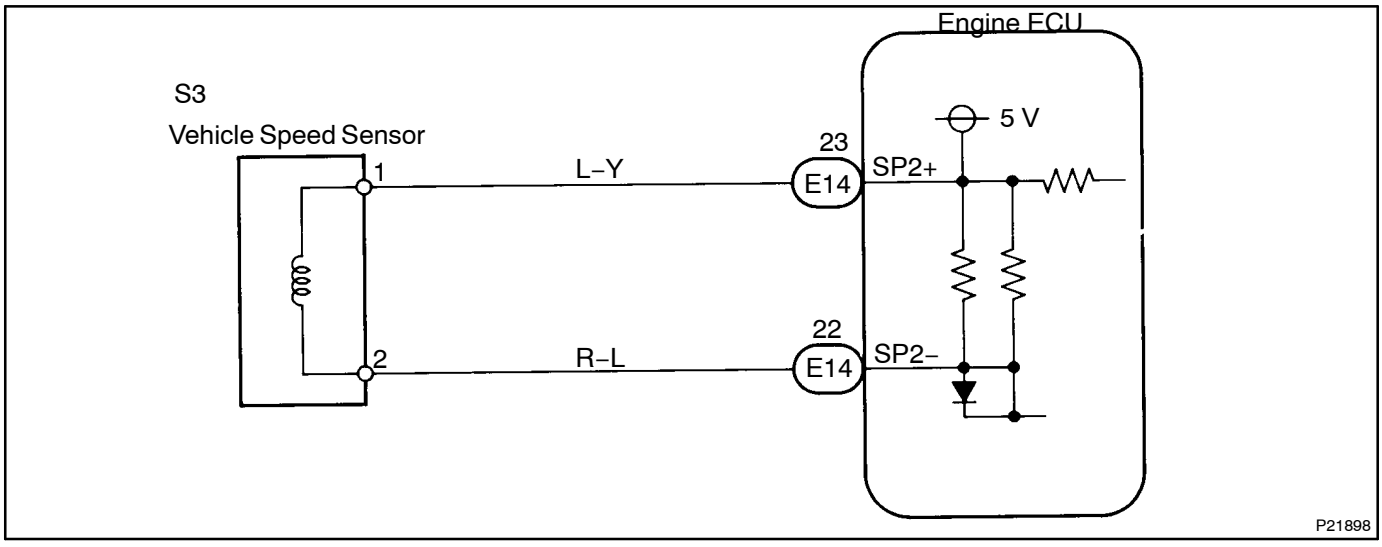
CIRCUIT DESCRIPTION

The vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the engine ECU. The engine ECU determines the vehicle speed based on these signals. An AC voltage is generated in the vehicle speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the engine ECU.



DTC No.	DTC Detecting Condition	Trouble Area
P0500/42	No vehicle speed sensor signal to engine ECU under conditions (a) and (b): (a) park/neutral position switch is OFF (b) Vehicle is being driven	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE
When using hand–held tester

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester and read value of vehicle speed value.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Start the engine and the hand–held tester main switch ON.

CHECK:
Drive the vehicle and read vehicle speed value.

OK:
Vehicle speed matches tester speed value

OK → **Check and replace engine ECU (See page IN–34).**

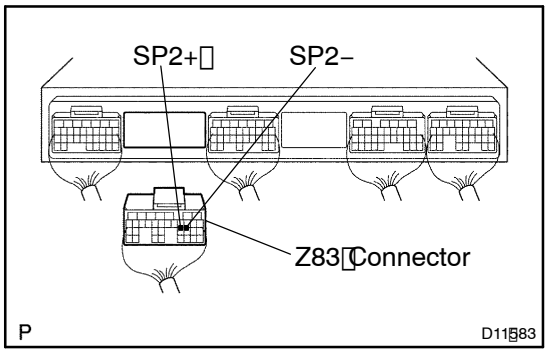
NG

2	**Check speedometer circuit (See page BE–35).**

NG → **Repair or replace speedometer circuit.**

OK

3	**Check resistance between terminals SP2+ and SP2– of engine ECU connector.**



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Disconnect the Z83 connector of the engine ECU.

CHECK:

Check resistance between terminals SP2+ and SP2– of the engine ECU connector.

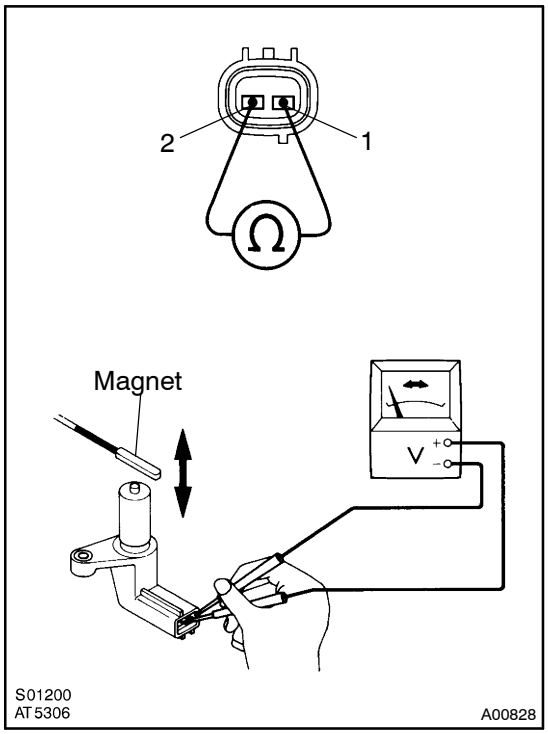
OK:

Resistance: 560 – 680 Ω

OK	**Check and replace engine ECU (See page IN–34).**

NG

4	**Check vehicle speed sensor.**



PREPARATION:

Remove the vehicle speed sensor from the transmission.

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor.

OK:

Resistance: 560 ~ 680 Ω

Reference

Check vehicle speed sensor's function

CHECK:

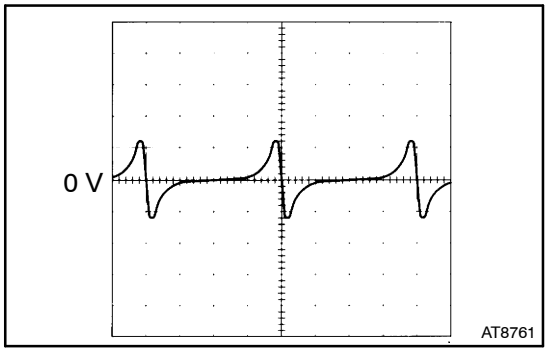
Check voltage between terminals 1 and 2 of the vehicle speed sensor when a magnet is put close to front end of the vehicle speed sensor then taken away quickly.

OK:

Voltage is generated intermittently

HINT:

Voltage generated is extremely low.



Reference INSPECTION USING OSCILLOSCOPE
Waveform between terminals SP2+ and SP2– When the vehicle speed is approx. 60 km/h (37 mph).

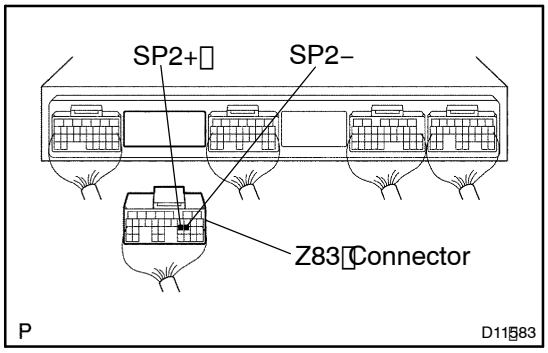
NG → **Replace vehicle speed sensor.**

OK

Check and repair harness and connector between engine ECU and vehicle speed sensor (See page IN–34).

When not using hand–held tester

1	Check resistance between terminals SP2+ and SP2– of engine ECU connector.



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Disconnect the Z83 connector of the engine ECU.

CHECK:
Check resistance between terminals SP2+ and SP2– of the engine ECU connector.

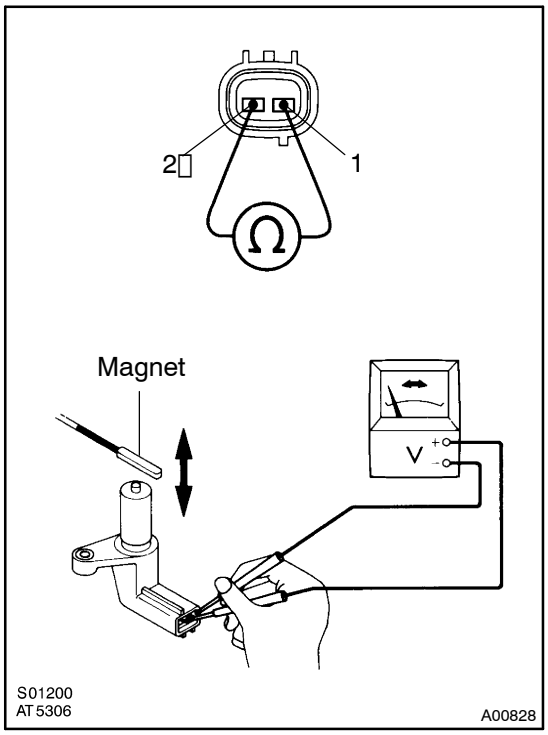
OK:

Resistance: 560 – 680 Ω

OK	Check and replace engine ECU (See page IN–34).

NG

2	Check vehicle speed sensor.



PREPARATION:
Remove the vehicle speed sensor from the transmission.

CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor.

OK:

Resistance: 560 ~ 680 Ω

Reference

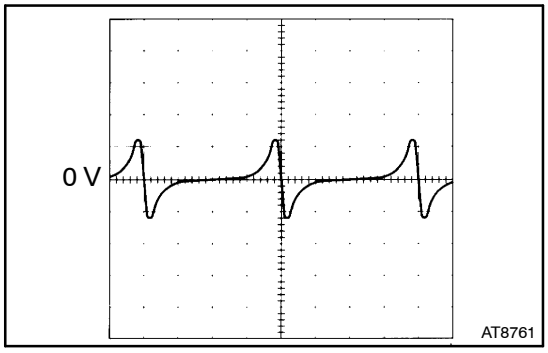
Check vehicle speed sensor's function

CHECK:
Check voltage between terminals 1 and 2 of the vehicle speed sensor when a magnet is put close to front end of the vehicle speed sensor then taken away quickly.

OK:

Voltage is generated intermittently

HINT:
Voltage generated is extremely low.



Reference: INSPECTION USING OSCILLOSCOPE
Waveform between terminals SP2+ and SP2– When the vehicle speed is approx. 60 km/h (37 mph).

NG → **replace vehicle speed sensor.**

OK

Check and repair harness and connector between engine ECU and vehicle speed sensor (See page IN–34).

DI2P2–08

DTC	P0505/33	Idle Control System Malfunction (European spec.)

CIRCUIT DESCRIPTION

The idle speed is controlled by the Electric Throttle Control System (ETCS).
ETCS is composed of the throttle motor to operate the throttle valve, the magnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the engine ECU to control the ETCS and the one valve type throttle body.
The engine ECU controls the throttle motor to make the throttle valve opening angle properly for the target idle speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505/33	Idle speed continues to vary greatly from target speed (2 trip detection logic)	• Air induction system • Electric throttle control system

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel was ratio lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides P0505/33) being output?

YES → Go to relevant DTC chart (See page DI–17).

NO

2	Check air induction system (See page FI–1).

NG → Repair or replace.

OK

Check electric throttle control system (See page FI–32).

DI6ZR–03

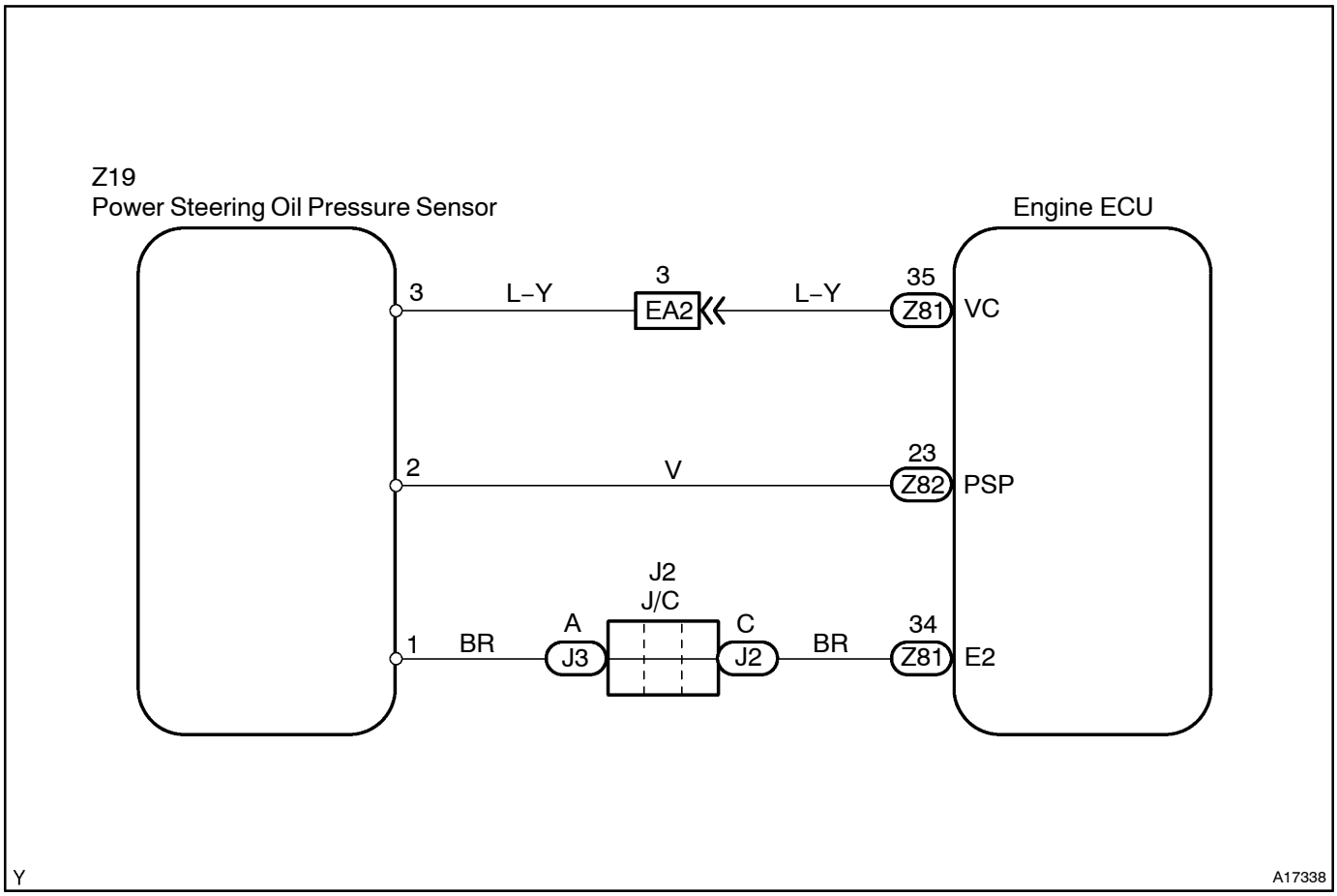
DTC	P0550/75	Power Steering Pressure Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Engine ECU controls the idle speed the most appropriate according to the signal from the power steering pressure sensor.

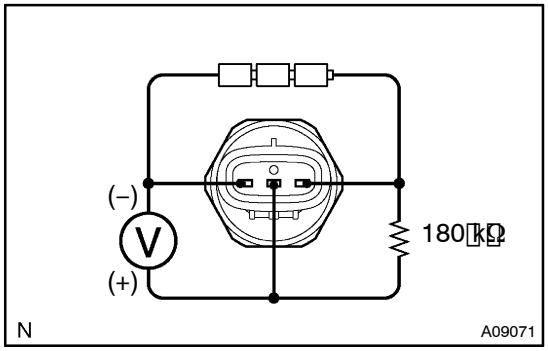
DTC No.	DTC Detecting Condition	Trouble Area
P0550/75	Condition (a) or (b) continues with more than 0.5 secs. (a) PNP < 0.28 V (b) PNP > 4.9 V	• Open in power steering pressure sensor circuit • Power steering oil pressure sensor • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check power steering oil pressure sensor.



PREPARATION:

(a) Connect the 3 dry batteries of 1.5 V in series.

(b) Connect the wire harness as shown in the illustration.

CHECK:

Measure voltage between terminals Vout and GND.

OK:

Power steering fluid pressure	Voltage (V)
0 kPa (0 kgf/cm², 0 psi)	Approx. 0.45
3,500 kPa (36 kgf/cm², 512 psi)	Approx. 2.25
7,000 kPa (71 kgf/cm², 1,010 psi)	Approx. 4.05

NG → Replace power steering oil pressure sensor.

OK

2	Check for open in harness and connector between engine ECU and power steering oil pressure sensor (See page IN–34).

NG → Repair or replace harness or connector.

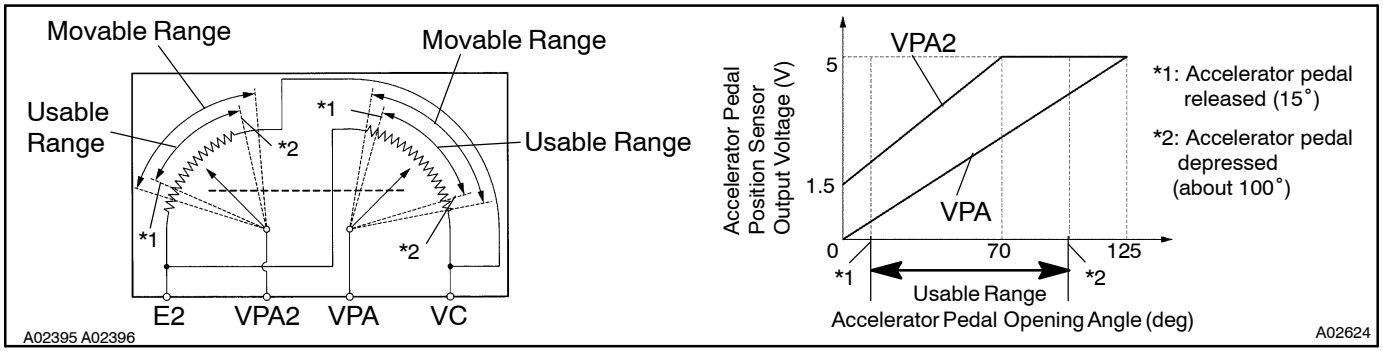
OK

Check and replace engine ECU.

DTC	P1120/19	Accelerator Pedal Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Accelerator pedal position sensor is mounted on the throttle body and it have the 2 sensors to detects the accelerator position and a malfunction of the accelerator position's own.
The accelerator pedal position sensor is connected with the accelerator pedal by the accelerator wire and the voltage applied to the terminals VPA and VPA2 of the ECU changes between 0 V and 5 V in proportion to the opening angle of the accelerator pedal.
The engine ECU judges the current opening angle of the accelerator pedal from these signals input from terminals VPA and VPA2 and the engine ECU controls the throttle motor based on these signals.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

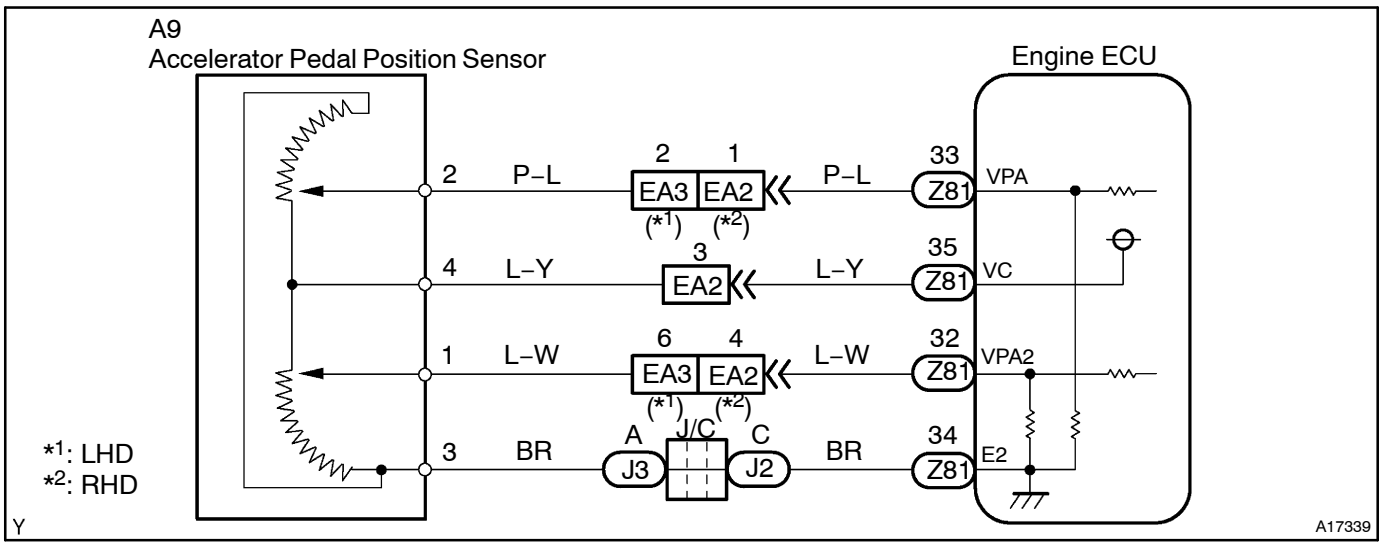


DTC No.	DTC Detecting Condition	Trouble Area
P1120/19	Condition (a), (b), (c) or (d) continues for 2.0 seconds: (a) VPA ≦ 0.2 V and VPAR20K ≧ 0.97 deg (b) VPA2 ≦ 0.5 V and VPAR10K ≧ 0.97 deg (c) VPA ≧ 4.7 V (d) When VPA ≧ 0.2 V and ≦ 1.8 V, and VPA2 ≧ 4.97 V (e) VPA–VPA2 ≦ 0.02 V	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • Engine ECU
	Condition (a) or (b) continues for 2.0 seconds: (a) VPA ≦ 0.2 V and VPA2 ≦ 0.5 V	

HINT:
After confirming DTC P1120/19 use the hand–held tester to confirm the accelerator pedal opening percentage.

Throttle valve position expressed as voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
ACCEL POS #1	ACCEL POS #2	ACCEL POS #1	ACCEL POS #2	
0 V	0 V	0 V	0 V	VC line open
0 V	1.8 ~ 2.7 V	0 V	4.7 ~ 5.1 V	VPA line open or grand short
0.3 ~ 0.9 V	0 V	3.2 ~ 4.8 V	0 V	VPA2 line open or grand short
5 V	5 V	5 V	5 V	E2 line open

WIRING DIAGRAM



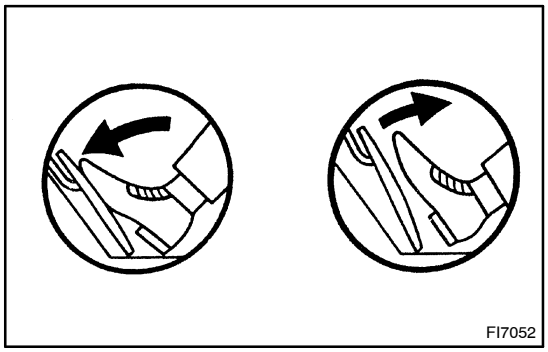
INSPECTION PROCEDURE

HINT:

- If DTC P0110/31 (Intake Air Temp. Circuit Malfunction), P0115/122 (Water Temp. Circuit Malfunction), P0120/41 (Throttle Position Sensor Circuit Malfunction), P1120/19 (Accelerator Pedal Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	**Connect hand–held tester, read the voltage for accelerator pedal position sensor data.**



PREPARATION:

(a) Connect the hand–held tester to DLC3.

(b) Turn the ignition switch ON and switch the hand–held tester main switch ON.

CHECK:

Read the voltage for the accelerator pedal position sensor data.

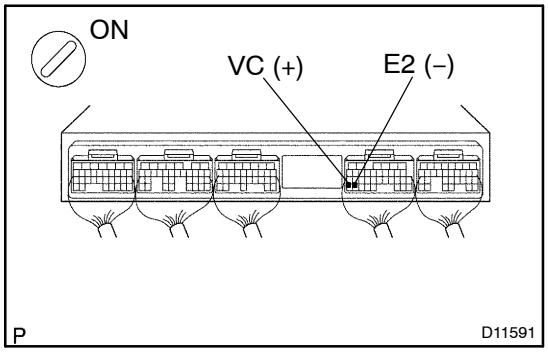
OK:

Accelerator pedal	VPA	VPA2
Released	0.3 ~ 0.9 V	1.8 ~ 2.7 V
Depressed	3.2 ~ 4.8 V	4.7 ~ 5.1 V

OK → **Check and replace engine ECU (See page IN–34).**

NG

2	**Check voltage between terminals VC and E2 of engine ECU connector.**



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals VC and E2 of the engine ECU connector.

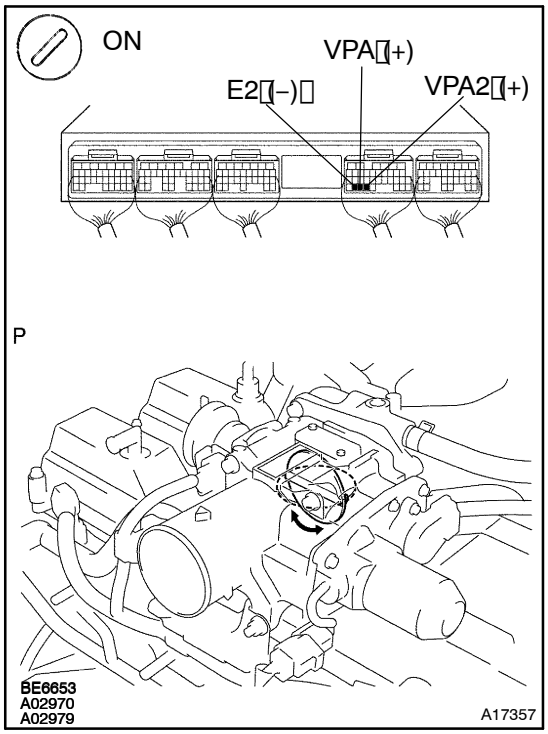
OK:

Voltage: 4.5 ~ 5.5 V

NG → **Check and replace engine ECU (See page IN–34).**

OK

3	Check voltage between terminals VPA, VPA2 and E2 of engine ECU connector.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals VPA, VPA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VPA	VPA2
Released	0.3 – 0.9 V	1.8 – 2.7 V
Depressed	3.2 – 4.8 V	4.7 – 5.1 V

OK → Check and replace engine ECU (See page IN–34).

NG

4	Check accelerator pedal position sensor (See page FI–32).

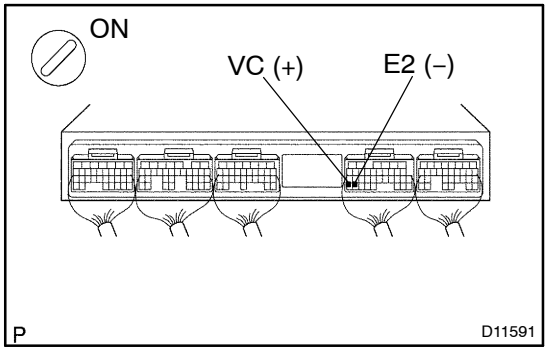
NG → Replace accelerator pedal position sensor (See page FI–37).

OK

Check for open and short in harness and connector between engine ECU and accelerator pedal position sensor (VC, VPA, VPA2, E2 line) (See page IN–34).

When not using hand–held tester

1	Check voltage between terminals VC and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Turn the ignition switch ON.

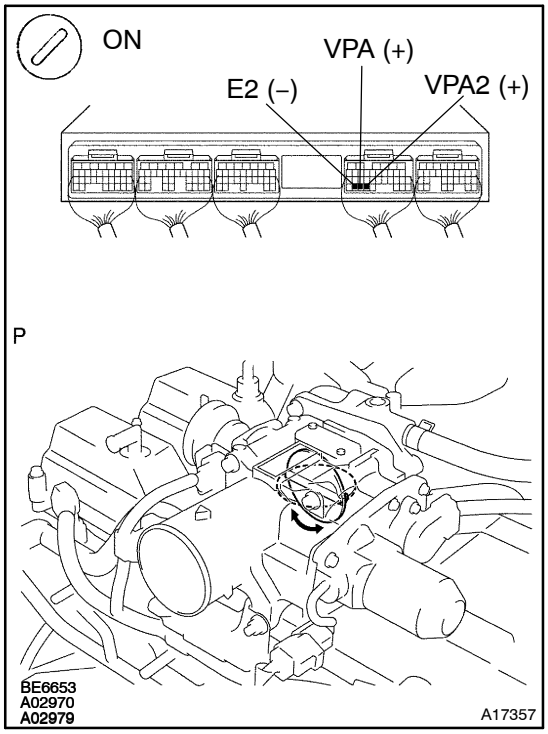
CHECK:
Measure voltage between terminals VC and E2 of the engine ECU connector.

OK:
Voltage: 4.5 ~ 5.5 V

NG → **Check and replace engine ECU (See page IN–34).**

OK

2	Check voltage between terminals VPA, VPA2 and E2 of engine ECU connector.



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Turn the ignition switch ON.

CHECK:
Measure voltage between terminals VPA, VPA2 and E2 of the engine ECU connector.

OK:

Accelerator pedal	Voltage	
	VPA	VPA2
Released	0.3 ~ 0.9 V	1.8 ~ 2.7 V
Depressed	3.2 ~ 4.8 V	4.7 ~ 5.1 V

OK → **Check and replace engine ECU (See page IN–34).**

NG

3	Check accelerator pedal position sensor (See page FI–32).

NG → Replace accelerator pedal position sensor (See page FI–37).

OK →

Check for open and short in harness and connector between engine ECU and accelerator pedal position sensor (VC, VPA, VPA2, E2 line) (See page IN–34).

DI2T3–03

DTC	P1121/19	Accelerator Pedal Position Sensor Range/ Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P1120/19 on page DI–103.

DTC No.	DTC Detecting Condition	Trouble Area
P1121/19	Condition (a) continues for 2.0 seconds: (a) Difference between VPA and VPA2 is out of threshold	• Accelerator pedal position sensor

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester or OBD scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace accelerator pedal position sensor (See page FI–37).

DI2SF–04

DTC	P1125/89*	Throttle Control Motor Circuit Malfunction

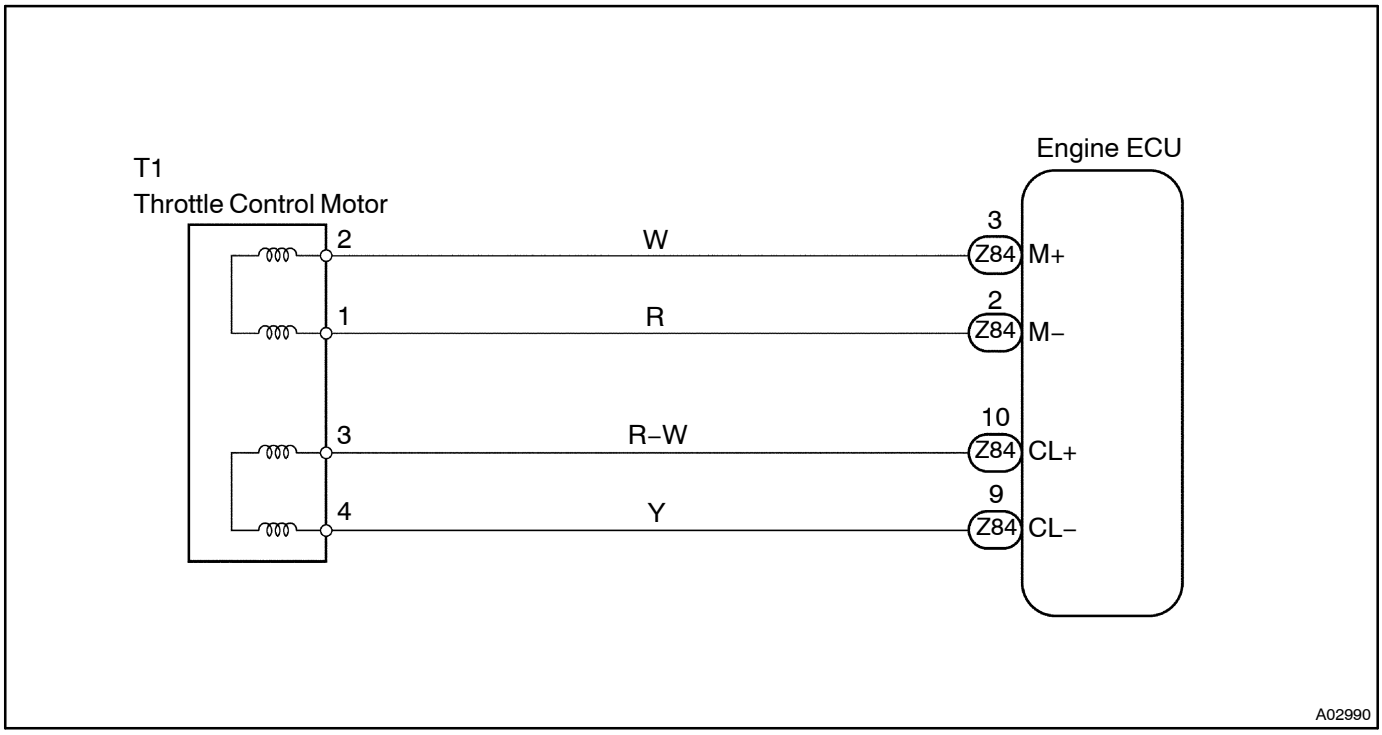
***: ETCS trouble code No. is 21.**

CIRCUIT DESCRIPTION

Throttle motor is operated by the engine ECU and it opens and closes the throttle valve.
The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body and it provides feedback to the engine ECU to control the throttle motor in order to the throttle valve opening angle properly in response to driving condition.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1125/89*	Condition (a) and (b) continues for 0.5 seconds: (a) Throttle control motor output duty ≧ 80 % (b) Throttle control motor current < 0.5 A	• Open or short in throttle control motor circuit • Throttle control motor • Engine ECU
	Throttle control motor current ≧ 16 A	
	Under condition continue for 0.6 seconds: Throttle control motor current ≧ 7 A	

WIRING DIAGRAM

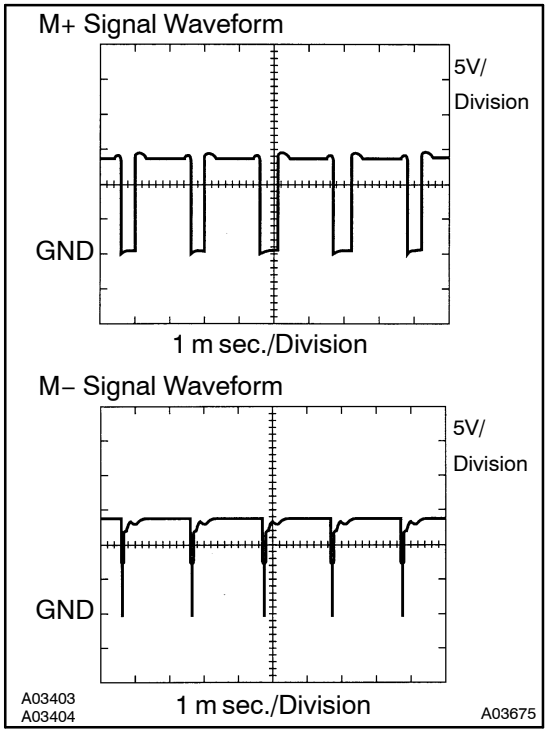


INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check throttle control motor circuit.**



PREPARATION:

(a) Connect the oscilloscope between terminals M+ or M– and E1 of the engine ECU.

(b) Start the engine.

CHECK:

Check the waveform between terminals M+ or M– and E1 of the engine ECU when engine is idling.

OK:

The correct waveforms are as shown.

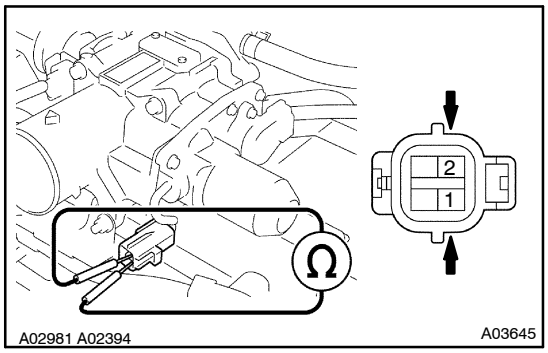
HINT:

The waveform frequency varies depending on the throttle opening.

OK → **Check and replace engine ECU (See page IN–34).**

NG

2	Check throttle control motor.



PREPARATION:

Disconnect the throttle control motor and magnetic clutch connector.

CHECK:

Measure resistance between terminals 1 and 2 of the throttle control motor and magnetic clutch.

OK:

Resistance: 0.3 – 100 Ω at 20°C (68°F)

NG → Replace throttle control motor (See page FI–37).

OK

3	Check for open and short in harness and connector between throttle control motor and engine ECU (See page IN–34).

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–34).

DI2SG–04

DTC	P1126/89*	Magnetic Clutch Circuit Malfunction

*: ETCS trouble code No. is 22.

CIRCUIT DESCRIPTION

Magnetic clutch is mounted between the throttle motor and the valve, and it connects the throttle motor with the throttle valve.
Therefore, the throttle motor opens and closes the throttle valve through the magnetic clutch.
If the electric throttle control system has a malfunction, the magnetic clutch separates the throttle motor from the throttle valve in order not to operate the throttle valve by the throttle motor.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1126/89	Condition (a) continue for 0.8 seconds: (a) Magnetic clutch current ≧ 1.4 A or ≦ 0.4 A	• Open or short in magnetic clutch circuit • Magnetic clutch • Engine ECU
	Condition (a) continues for 1.5 seconds: (a) Magnetic clutch current ≧ 1.0 A or ≦ 0.8 A	

WIRING DIAGRAM

Refer to DTC P1125/89 (Throttle Control Motor Circuit Malfunction) on page DI–110 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check magnetic clutch circuit.**

When using hand–held tester:

PREPARATION:

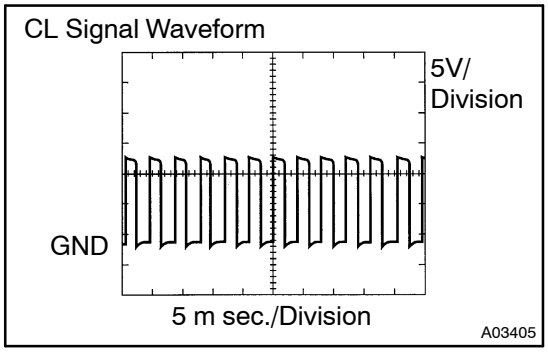
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:

Read the magnetic clutch current value on the hand–held tester.

OK:

Current: 0.8 – 1.0 A



When not using hand–held tester:

PREPARATION:

(a) Connect the oscilloscope between terminals CL+ and CL– of the engine ECU.

(b) Start the engine.

CHECK:

Check the waveform between terminals CL+ and CL– of the engine ECU when engine is idling.

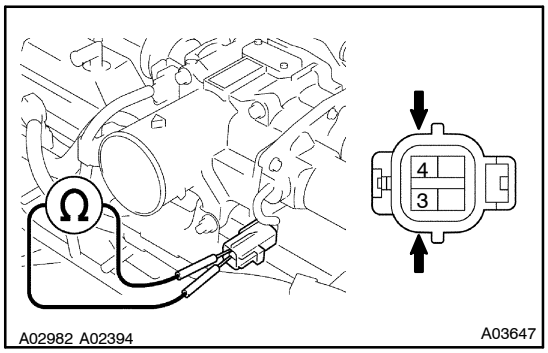
OK:

The correct waveform is as shown.

NG	**Go to step 4.**

OK

2	**Check magnetic clutch.**



PREPARATION:

Disconnect the throttle control motor and magnetic clutch connector.

CHECK:

Measure resistance between terminals 3 and 4 of the throttle control motor and magnetic clutch.

OK:

Resistance: 4.2 ~ 5.2 Ω at 20°C (68°F)

NG	**Replace throttle control motor (with magnetic clutch) (See page FI–37).**

OK

3	**Check for open and short in harness and connector between magnetic clutch and engine ECU (See page IN–34).**

NG	**Repair or replace.**

OK

4	Check operation of magnetic clutch.

CHECK:

(a) Clear the DTC.

(b) Perform the following steps and check the DTC.

(1) Turn the ignition switch ON.

(2) Start the engine.

(3) Turn the ignition switch OFF and wait 3 seconds.

(4) Turn the ignition switch ON.

OK:

DTC P1126/89 is not stored

NG → **Replace throttle control motor (with magnetic clutch) (See page FI–37).**

OK

Check and replace engine ECU (See page IN–34).

DI2SH–04

DTC	P1127/89*	ETCS Actuator Power Source Circuit Malfunction

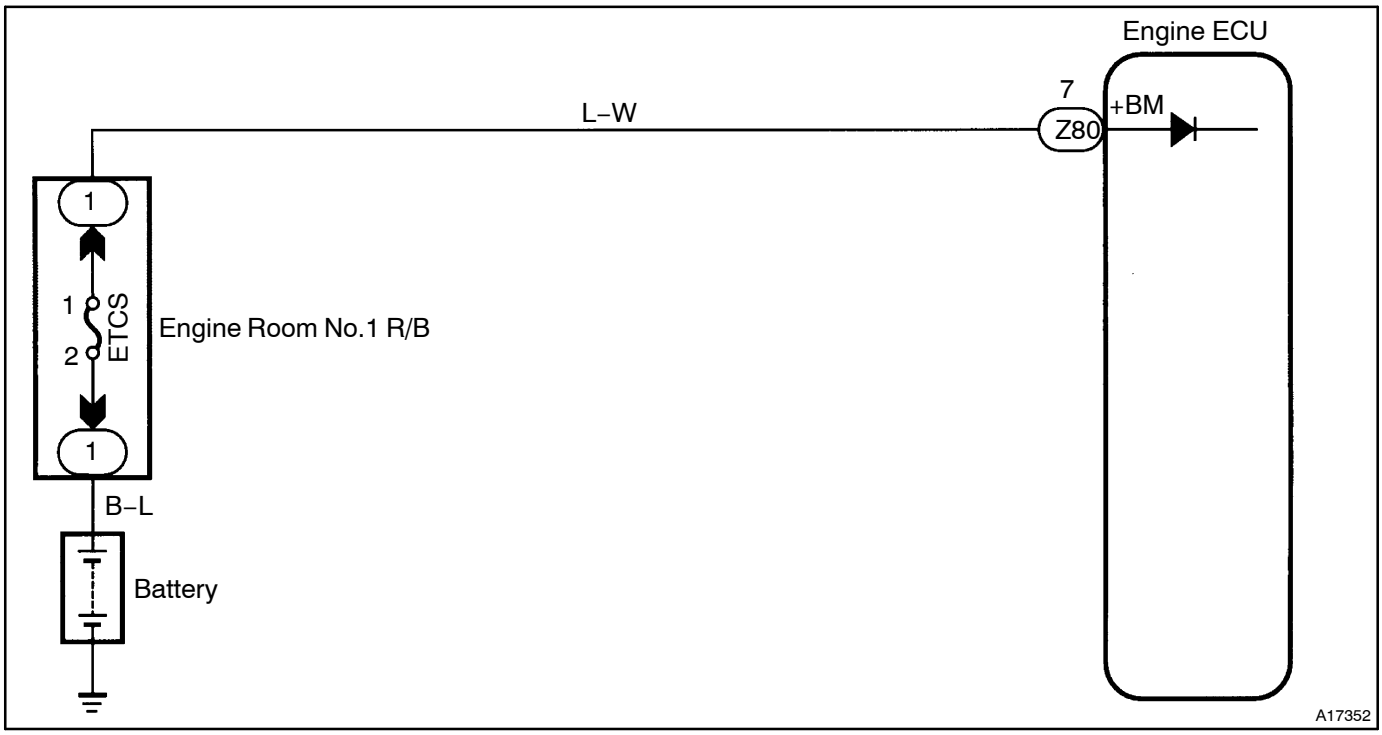
***: ETCS trouble code No. is 23.**

CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal +BM of the engine ECU even once when the ignition switch is OFF for the electric throttle control system.
If this DTC is stored, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1127/89	Open in ETCS power source circuit	• Open in ETCS power source circuit • Engine ECU

WIRING DIAGRAM

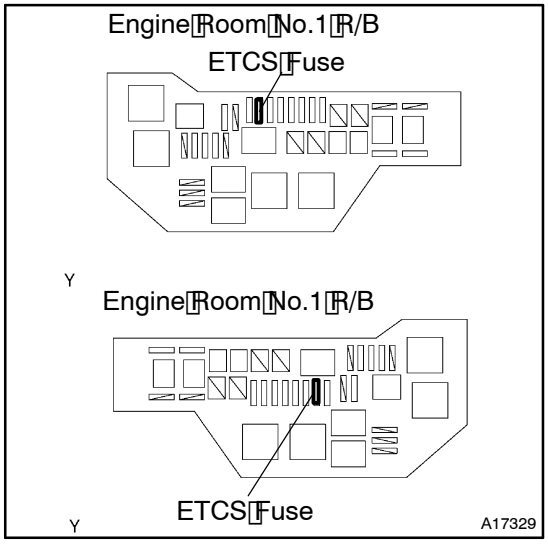


INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Check ETCS fuse.**



PREPARATION:

Remove the ETCS fuse from the engine room No.1 R/B.

CHECK:

Check continuity of the ETCS fuse.

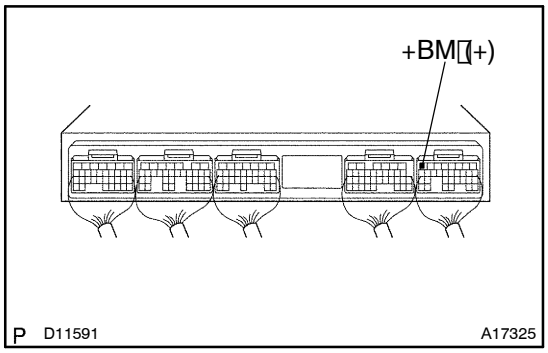
OK:

Continuity

NG → **Check for short in all harness and components connected to ETCS fuse.**

OK

2	**Check voltage between terminal +BM of engine ECU connector and body ground.**



PREPARATION:

Remove the engine room engine ECU hood and cover.

CHECK:

Measure voltage between terminal +BM of the engine ECU connector and body ground.

OK:

Voltage: 9 – 14 V

OK → **Check and replace engine ECU (See page IN–34).**

NG

Check and repair harness or connector between battery and ETCS fuse and engine ECU (See page IN–34).

DI2SI–04

DTC	P1128/89* Throttle Control Motor Lock Malfunction

*: ETCS trouble code No. is 31.

CIRCUIT DESCRIPTION

Throttle motor is operated by the ECU and it opens and closes the throttle valve.
The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body and it provides feedback to the engine ECM to control the throttle motor in order the throttle valve opening angle properly in response to driving condition.
If this DTC is stored, the engine ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1128/89	Lock throttle control motor during control throttle control motor	• Throttle control motor • Throttle body • Engine ECM

WIRING DIAGRAM

Refer to DTC P1125/89 (Throttle Control Motor Circuit Malfunction) on page DI–110 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

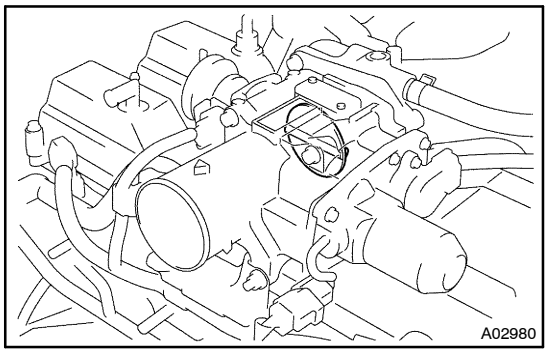
HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	Check throttle control motor (See page DI–110, step 2).

NG → Replace throttle control motor (See page FI–37).

OK

2	**Visualy check throttle valve.**



PREPARATION:
Remove the intake air duct.
CHECK:
Check whether or not a foreign body is caught between the throttle valve and the housing.

NG → **Remove a foreign body and clean throttle body.**

OK

Replace throttle body.

DI2SJ–04

DTC	P1129/89*	Electric Throttle Control System Malfunction

*: ETCS trouble code No. is 32.

CIRCUIT DESCRIPTION

Electric Throttle Control System (ETCS) is composed of the throttle motor to operate the throttle valve, the electromagnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the engine ECU to control the ETCS and the one valve type throttle body.
The engine ECU controls the throttle motor to make the throttle valve opening angle properly in response driving condition.
The throttle position sensor which is mounted on the throttle body detects the opening angle of the throttle valve, and it provides feedback to the engine ECU to control the throttle motor.
If the ETCS has a malfunction, the engine ECU shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1129/89	Throttle opening angle continues to vary great from target throttle opening angle	• Electric throttle control system • Engine ECU

WIRING DIAGRAM

Refer to DTC P1125/89 (Throttle Control Motor Circuit Malfunction) on page DI–110 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P1129) being output?**

YES → **Go to relevant DTC chart (See page DI–17).**

NO →

Replace engine ECU, and clear DTC. If DTC P1129 is memorized again, and then replace throttle body.

DI9HO–01

DTC	P1200/78	Fuel Pump Relay/ECU Circuit Malfunction

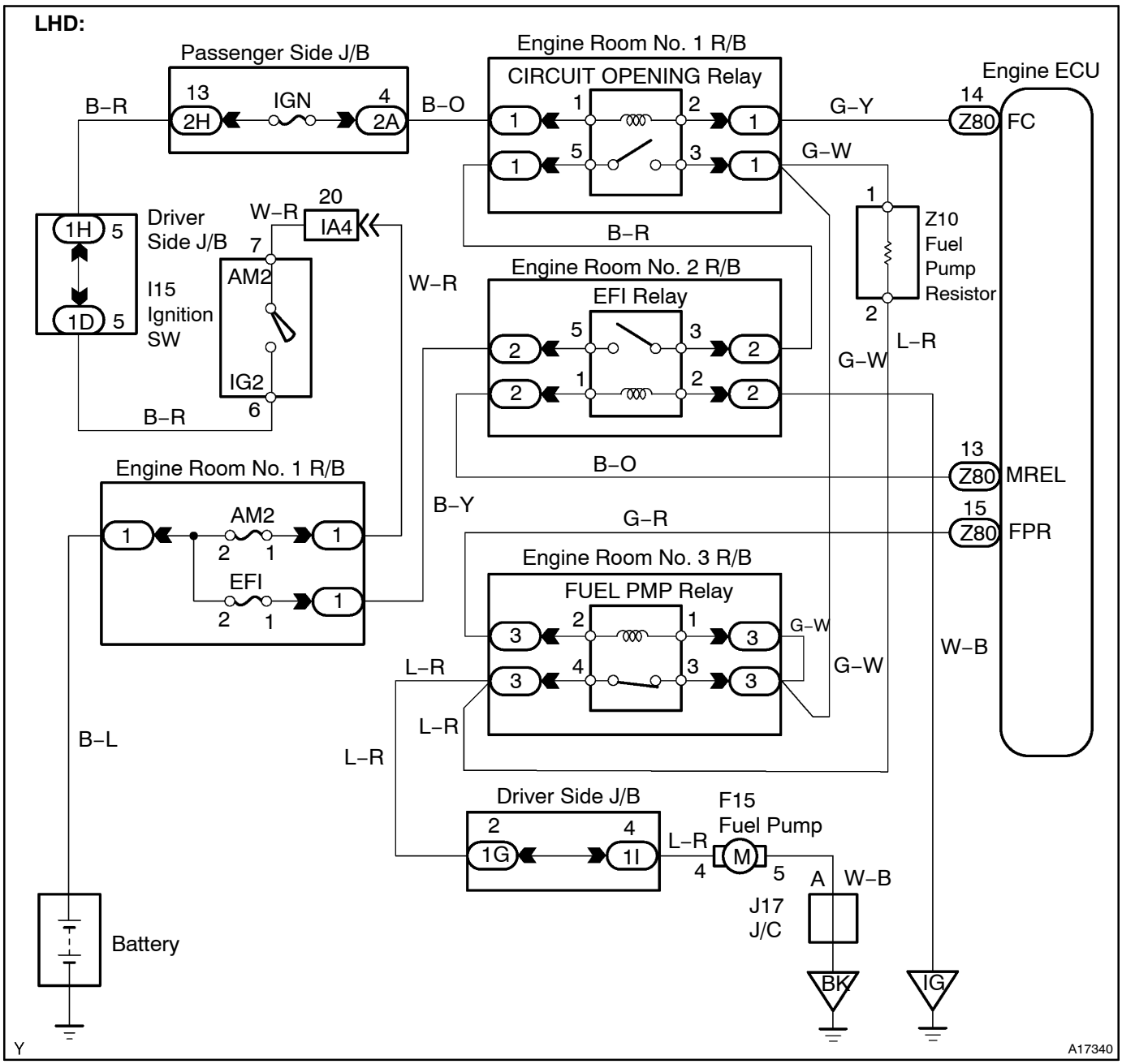
CIRCUIT DESCRIPTION

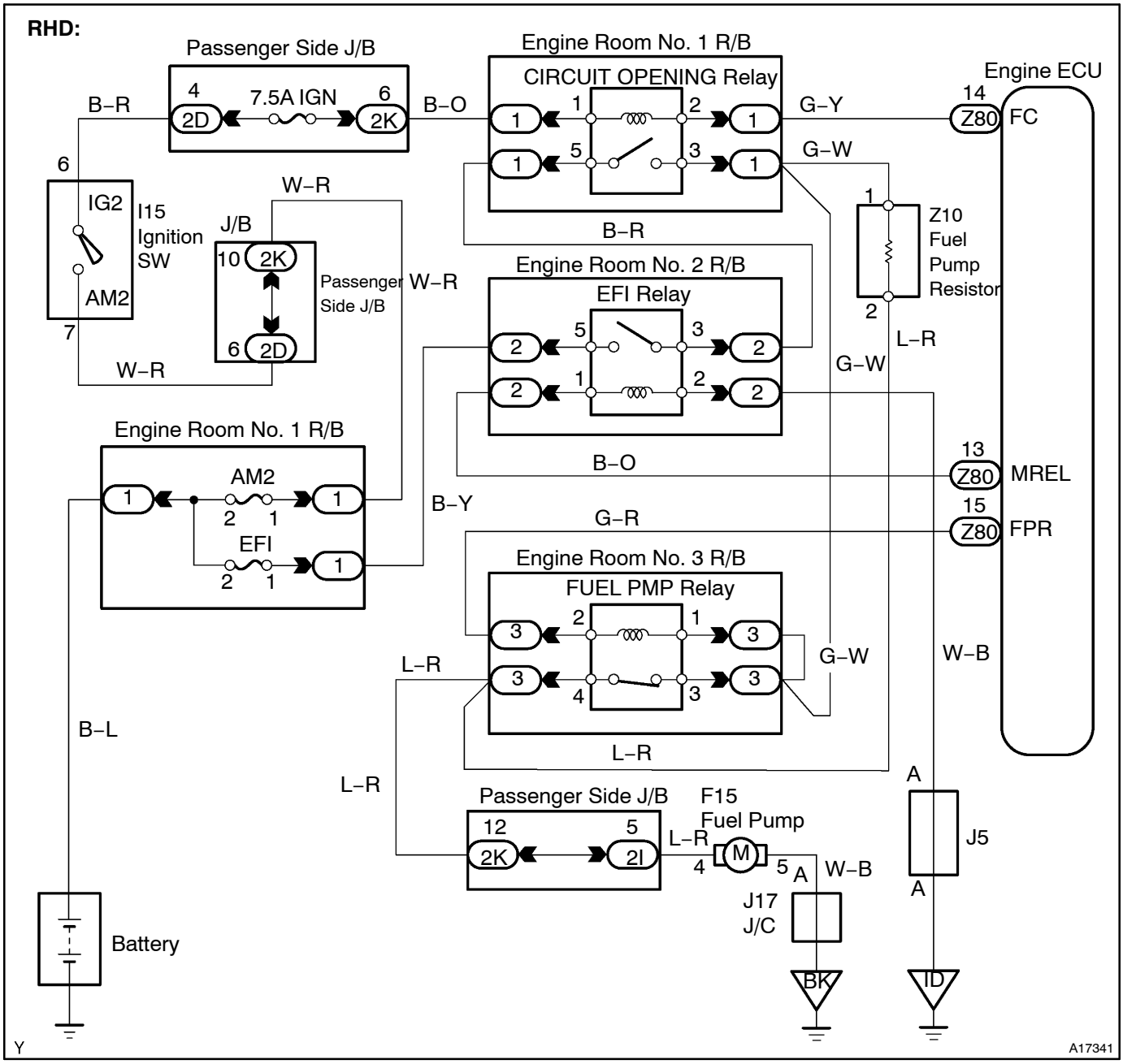
The fuel pump speed is controlled at 2 steps (high speed, low speed) according to the condition of the engine (starting, light load, heavy load).
When the engine starts, the engine ECU turns the fuel pump relay OFF to operate the fuel pump at high speed.
After the engine has started, during idling or when the load is light, the engine ECU turns the fuel pump relay ON to operate the fuel pump at low speed. When the intake air increases (heavy load), the engine ECU turns the fuel pump relay OFF to operate the fuel pump at high speed. There are two fuel pumps. The engine ECU switches from main to sub or sub to main every time the ignition switch is turned ON and OFF.

DTC No.	DTC Detecting Condition	Trouble Area
P1200/78	When open or short is detected in the fuel pump relay circuit for 0.5 sec. or more during cranking.	• Open or short in fuel pump relay circuit • Fuel pump relay • Engine ECU

HINT:
This diagnostic chart is based on premise that engine is started. If the engine is not started, proceed to problem symptoms table on DI–24.

WIRING DIAGRAM




RHD:
Passenger Side J/B
4
2D
7.5A IGN
6
2K
B–R
B–O
Engine Room No. 1 R/B
CIRCUIT OPENING Relay
1
2
1
5
3
1
G–Y
G–W
Engine ECU
14
Z80
FC
6
IG2
I15
Ignition
SW
AM2
7
W–R
J/B
10
2K
6
2D
Passenger
Side J/B
W–R
B–R
Engine Room No. 2 R/B
EFI Relay
5
3
2
1
2
2
2
2
1
Z10
Fuel
Pump
Resistor
2
L–R
G–W
Engine Room No. 1 R/B
AM2
EFI
2
1
B–Y
B–O
13
Z80
MREL
G–R
15
Z80
FPR
Engine Room No. 3 R/B
FUEL PMP Relay
2
1
3
3
4
3
G–W
W–B
L–R
L–R
B–L
L–R
Passenger Side J/B
12
2K
5
2I
F15
Fuel Pump
L–R
M
4
5
A
W–B
A
J5
A
J17
J/C
Battery
BK
ID
Y
A17341

INSPECTION PROCEDURE

HINT:
Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	Check fuel pump relay (See page FI–52).

NG → Replace fuel pump relay.

OK

2	Check fuel pump resister (See page FI–52).

NG → Replace fuel pump resister.

OK

3	Check for open and short in harness and connector between terminal FPR of engine ECU and fuel pump relay (See page IN–34).

NG → Repair or replace harness and connector.

OK

Check and replace engine ECU (See page IN–34).

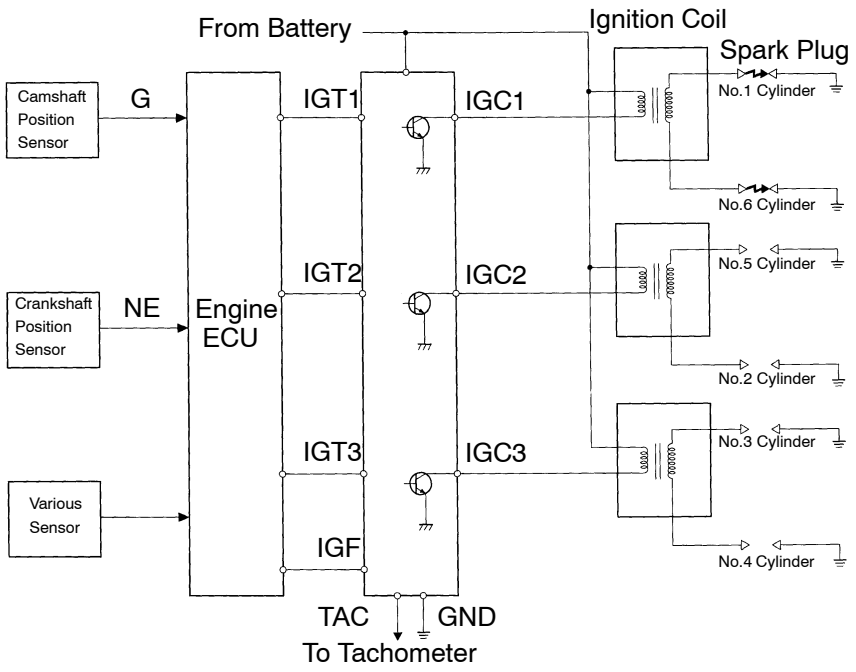
DI9HP–01

DTC	P1300/14	Igniter Circuit Malfunction

CIRCUIT DESCRIPTION

A DIS (Direct Ignition System) has been adopted. The DIS improves the ignition timing accuracy, reduces high–voltage loss, and enhances the the overall reliability of the ignition system by eliminating the distributor. The DIS is a 1–cylinder ignition system which ignites one cylinder with one ignition coil. In the 1–cylinder ignition system, the one spark plug is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plug. The spark of the spark plug pass from the center elecrtode to the ground electrode.

The engine ECU determines ignition timing and outputs the ignition signals (IGT) for each cylinder. Based on IGT signals, the power transistors in the igniter cuts off the current to the primary coil in the ignition coil is supplied to the spark plug that are connected to the end of the secondary coil. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail–safe measure to the engine ECU.

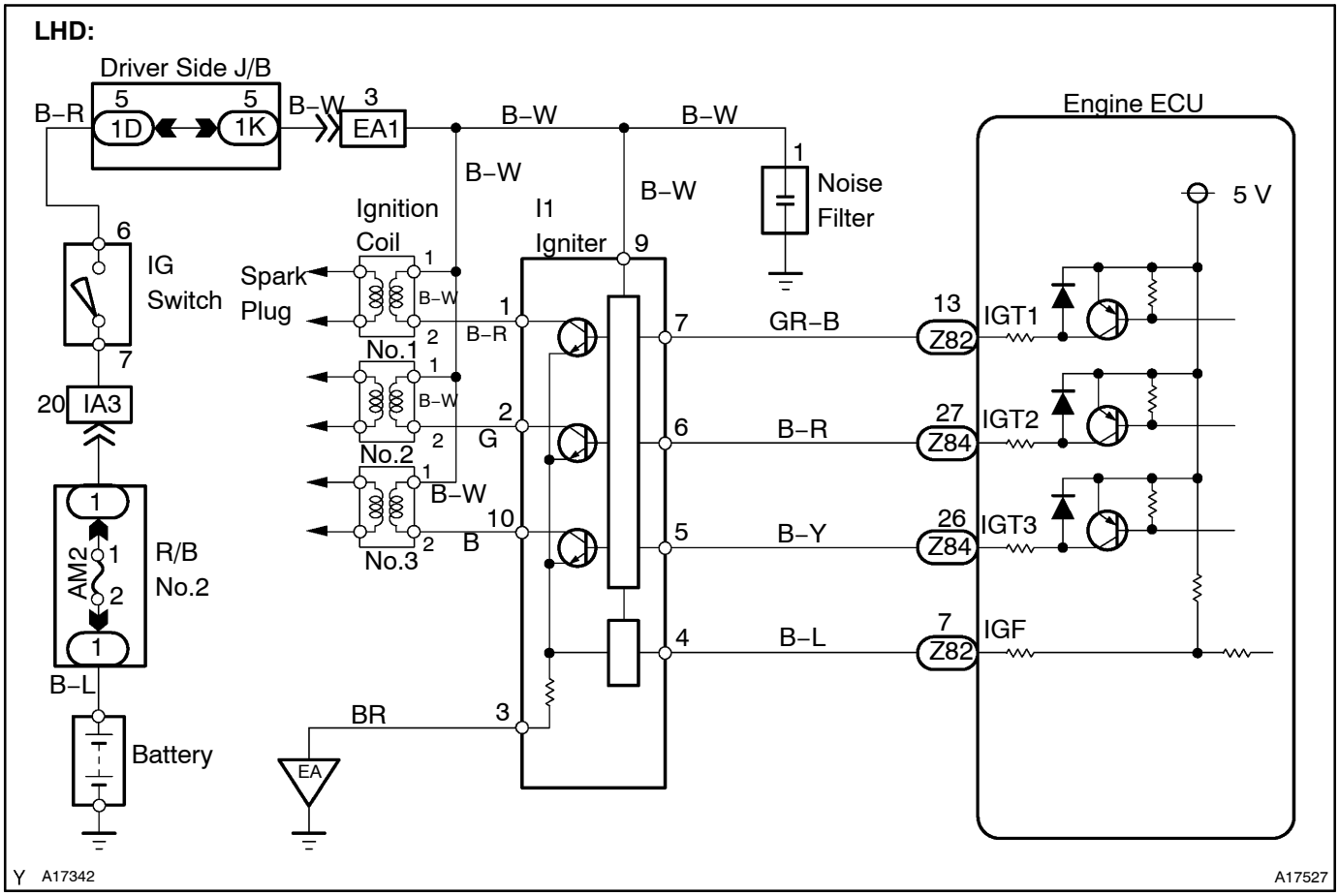


S00251

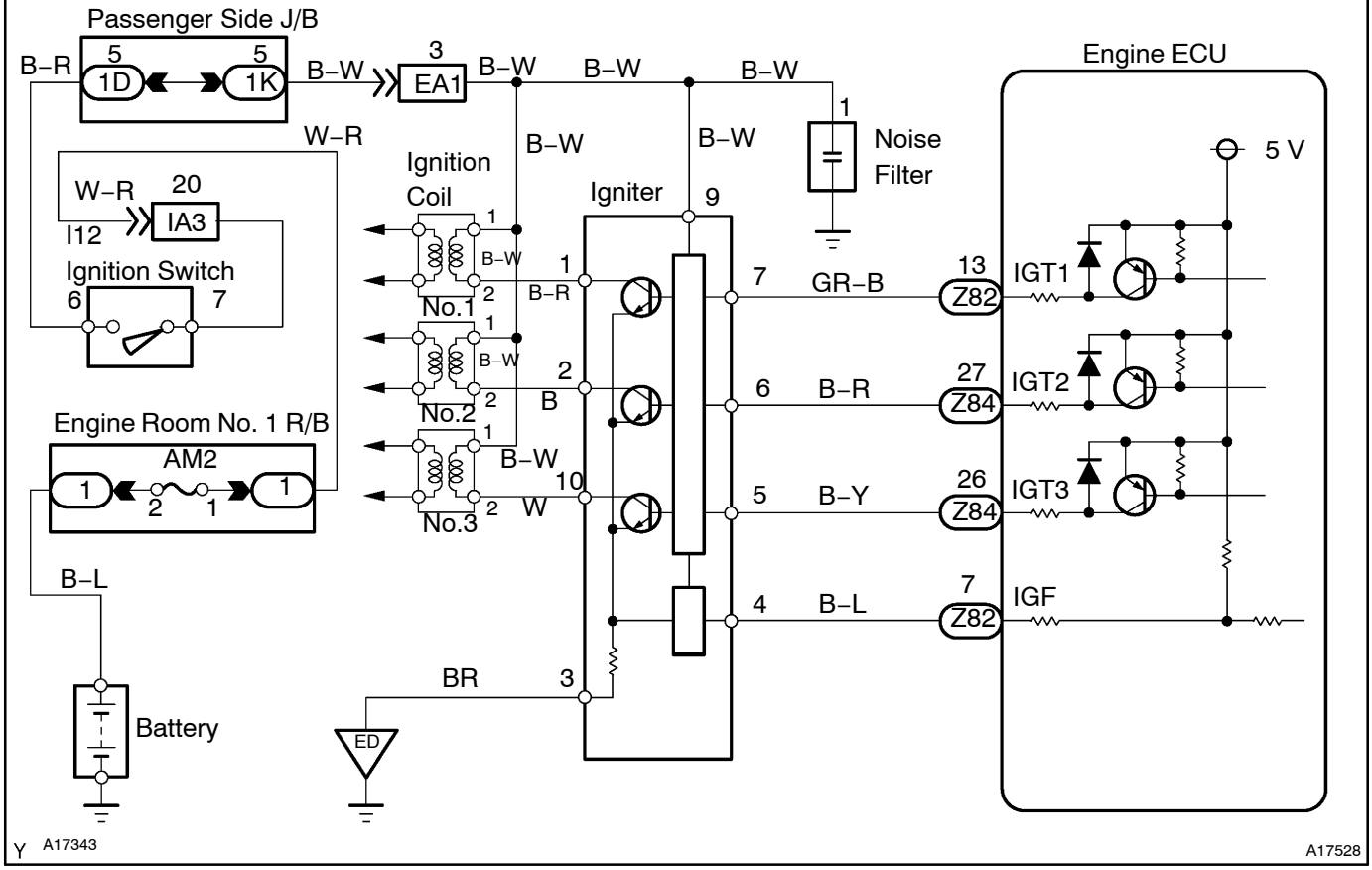
DTC No.	DTC Detecting Condition	Trouble Area
P1300/14	No IGF signals to engine ECU while engine is running	• Open or short in IGF or IGT circuit from igniter to engine ECU • Igniter • Engine ECU

WIRING DIAGRAM

LHD:



RHD:



INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	Check spark plug and spark (See page IG–1).

NG → Go to step 4.

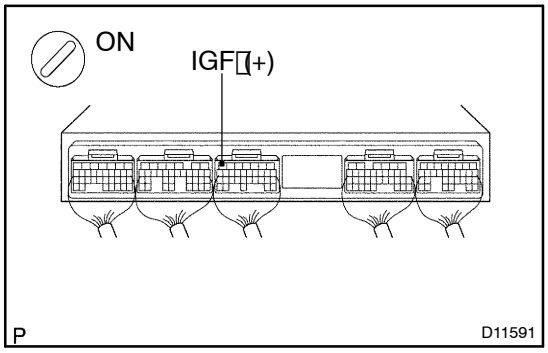
OK

2	Check for open and short in harness and connector in IGF signal circuit between engine ECU and ignition coil with igniter (See page IN–34).

NG → Repair or replace harness or connector.

OK

3	Disconnect ignition coil with igniter connector and check voltage between terminals IGF of engine ECU connector and body ground.



PREPARATION:

(a) Disconnect the igniter connector.
(b) Remove the enigne room engine ECU hood and cover.
(c) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals IGF of the engine ECU connector and body ground.

OK:

Voltage: 4.5 – 5.5 V

OK → Replace igniter.

NG

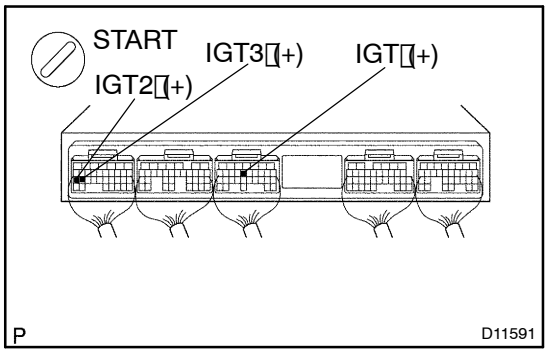
Check and replace engine ECU (See page IN–34).

4	Check for open and short in harness and connector in IGT1 – 3 signal circuit between engine ECU and ignition coil with igniter (See page IN–34).

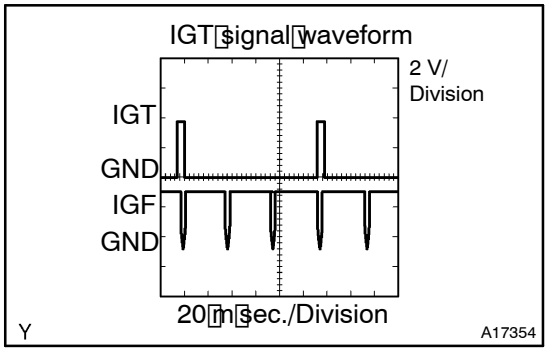
NG → Repair or replace harness or connector.

OK

5	Check voltage between terminals IGT1 – 3 of engine ECU connector and body ground.



PREPARATION:
Remove the engine room engine ECU hood and cover.
CHECK:
Measure voltage between terminals IGT1 ~ 3 of the engine ECU connector and body ground when engine is cranked.
OK:
Voltage: More than 0.1 V and less than 4.5 V

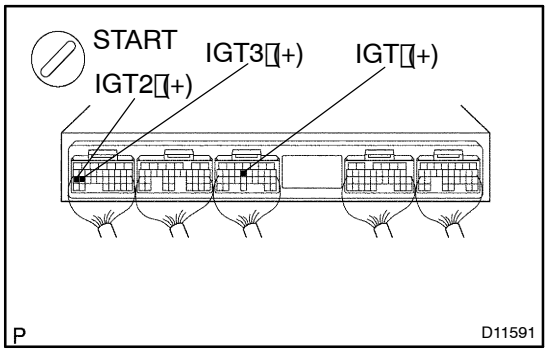


Reference: INSPECTION USING OSCILLOSCOPE
During cranking or idling, check waveform between terminals IGT1 – 3 and E1 of the engine ECU connector.
HINT:
Correct waveform appears as shown, with rectangle waves.

NG → Check and replace engine ECU (See page IN–34).

OK

6	**Disconnect connector and check voltage between terminals IGT1 – 3 of engine ECU connector and body ground.**



PREPARATION:

(a) Remove the engine room engine ECU hood and cover..

(b) Disconnect the igniter connector.

CHECK:

Measure voltage between terminals IGT1 ~ 3 of the engine ECU connector and body ground when engine is cranked.

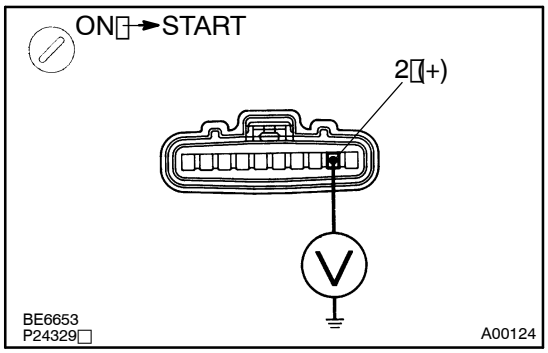
OK:

Voltage: More than 0.1 V and less than 4.5 V

NG	**Check and replace engine ECU (See page IN–34).**

OK

7	**Check voltage between terminal 2 of igniter connector and body ground.**



PREPARATION:

Disconnect the igniter connector.

CHECK:

Measure voltage between terminal 1 of igniter connector and body ground, when ignition switch is turned to "ON" and "START" position.

OK:

Voltage: 9 – 14 V

OK	**Repair igniter power source circuit.**

NG

8	**Check for open and short in harness and connector between ignition switch and igniter (See page IN–34).**

NG	**Repair or replace harness or connector.**

OK

9	Check EFI main relay (Marking: EFI) (See page FI–50).

NG → Replace EFI main relay (marking: EFI).

OK

Replace igniter.

DI9HQ–01

DTC	P1335/12,13	Crankshaft Position Sensor Circuit Malfunction (during engine running)

CIRCUIT DESCRIPTION

Refer to DTC P0335/12, 13 (Crankshaft Position Sensor Circuit Malfunction) on page DI–84.

DTC No.	DTC Detecting Condition	Trouble Area
P1335/13	No crankshaft position sensor signal to engine ECU with engine speed 1,000 rpm or more	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Starter • Engine ECU

WIRING DIAGRAM

Refer to DTC P0335/12, 13 (Crankshaft Position Sensor Circuit Malfunction) on page DI–84 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

HINT:

Refer to DTC P0335/12, 13 (Crankshaft Position Sensor Circuit Malfunction) on page DI–84.

DI64F–05

DTC	P1346/18	VVT Sensor/Camshaft Position Sensor Circuit Range/Performance Problem (Bank 1)

CIRCUIT DESCRIPTION

Refer to DTC P0335/12, 13 on page DI–84.

DTC No.	DTC Detecting Condition	Trouble Area
P1346	Deviation in crankshaft position sensor signal and camshaft position sensor signal (2 trip detection logic)	• Mechanical system (Jumping teeth of timing belt, belt stretched) • Engine ECU

WIRING DIAGRAM

Refer to DTC P0335/12, 13 on page DI–84.

INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335/12, 13 first. If no trouble is found, troubleshoot the following mechanical systems.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check valve timing (Check for loose and jumping teeth of timing belt) (See page EM–22).**

NG → **Adjust valve timing (Repair or replace timing belt).**

OK

Check and replace engine ECU (See page IN–34).

DI2SN–04

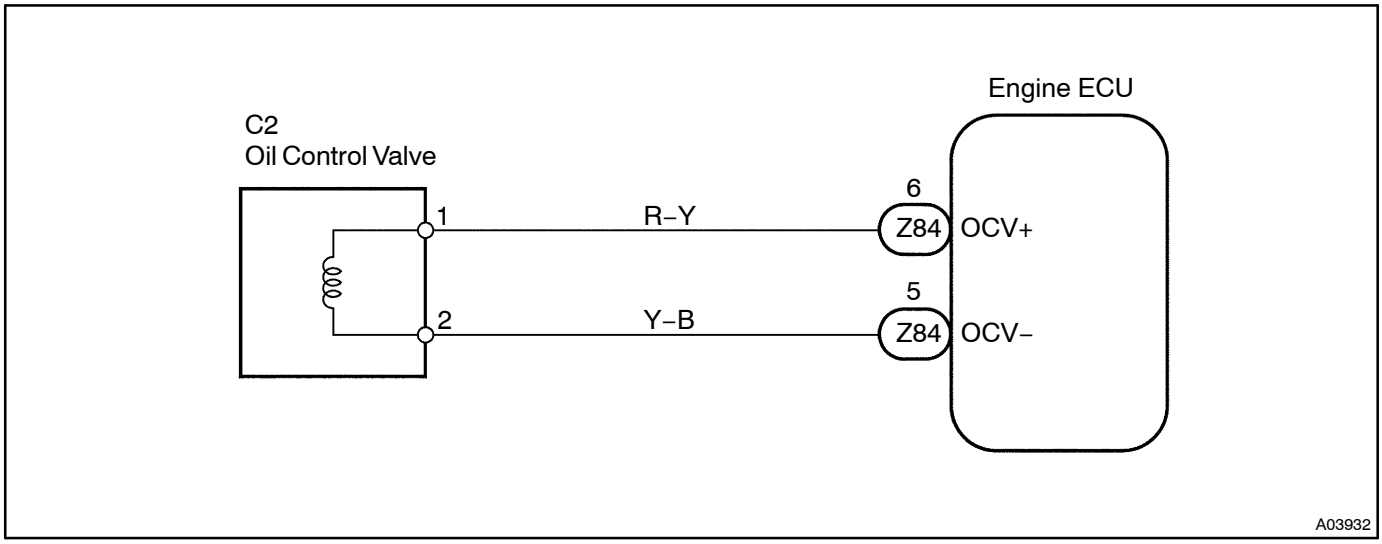
DTC	P1349/59	VVT System Malfunction

CIRCUIT DESCRIPTION

VVT system controls the intake valve timing to proper timing in response to driving condition.
ECU controls OCV (Oil Control Valve) to make the intake valve timing properly, and, oil pressure controlled with OCV is supplied to the VVT controller, and then, VVT controller changes relative position between the camshaft and the crankshaft.

DTC No.	DTC Detecting Condition	Trouble Area
P1349/59	Condition (a) or (b) continues for after the engine is warmed up and engine speedat 400 ~ 4,000 rpm : (a) Valve timing does not change from of current valve timing (b) Current valve timing is fixed.	• Valve timing • Oil control valve • VVT controller assembly • Engine ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTC P1349/59 is displayed, check left bank VVT system circuit.
- Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	**Check valve timing (See page EM–22).**

NG → **Repair valve timing.**

OK

2	**Check operation of OCV.**

PREPARATION:

(a) Start the engine and warmed it up.

(b) Connect the hand–held tester and select VVT from ACTIVE TEST menu.

CHECK:

Check the engine speed when operate the OCV by the hand–held tester.

OK:

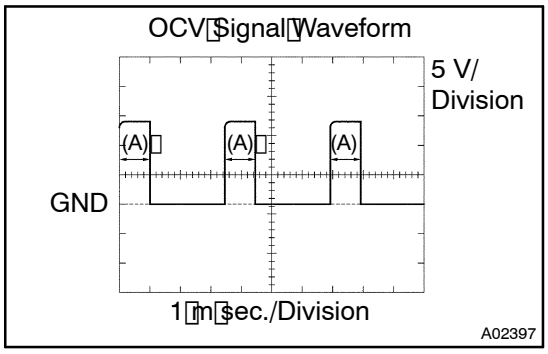
OCV is OFF:
Normal engine speed
OCV is ON:
Rough idle or engine stall

OK → **VVT system is OK.***

*: DTC P1349 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As engine ECU controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

3	**Check voltage between terminals OCV+ and OCV– of engine ECU connector.**

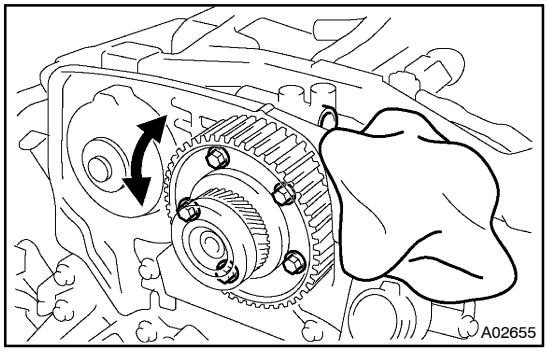


Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, check waveform between terminals OCV+ and OCV– of the engine ECU connector.
HINT:
- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

NG → **Check and replace engine ECU (See page IN–34).**

OK

4	**Check VVT controller assembly.**



PREPARATION:
(a) Remove the timing belt cover.
(b) Remove the timing belt (See page EM–17).
(c) Remove the oil control valve.
(d) Drain oil into the VVT controller assembly (See page EM–17).

CHECK:
Check whether the oil into VVT controller assembly is drained or not.

OK:
The oil into VVT controller assembly is drained.

NG → **Replace VVT controller assembly, and then go to step 5.**

OK

5	**Check oil control valve (See page EM–41).**

NG → **Replace oil control valve, and then go to step 6.**

OK

6	Check blockage of oil control valve, oil check valve and oil pipe No.1.

NG → Repair or replace.

OK

7	Check whether or not DTC P1349 is stored.

PREPARATION:

(a) Clear the DTC (See page DI–4).

(b) Perform simulation test.

CHECK:

Check whether or not DTC P1349 is stored (See page DI–133).

OK:

DTC P1349 is not stored

OK → VVT system is OK.*

*: DTC P1349 is also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As engine ECU controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

Replace engine ECU

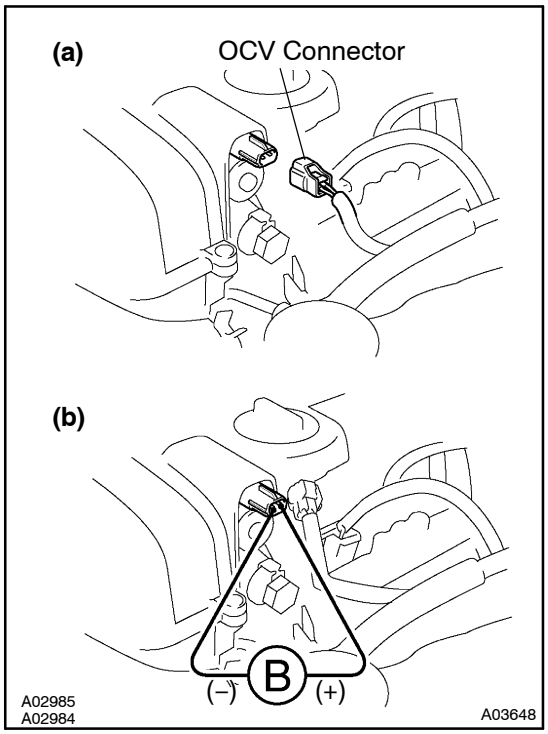
When not using hand–held tester

1	Check valve timing (See page EM–22).

NG → Repair valve timing.

OK

2	Check operation of OCV.



PREPARATION:

Start the engine.

CHECK:

(a) Check the engine speed when disconnect the OCV connector.

(b) Check the engine speed when apply battery positive voltage between terminals of OCV.

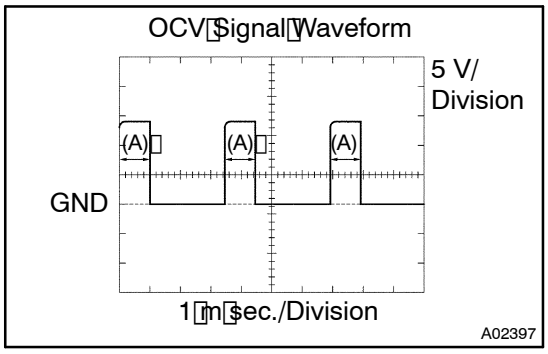
RESULT:

Result	Check (a)	Check (b)
1	Normal engine speed	Rough idle or engine stall
2	Except 1	

1

2	Go to step 4.

3	Check voltage between terminals OCV+ and OCV– of engine ECU connector.



Reference: INSPECTION USING OSCILLOSCOPE
Turn the ignition switch ON, check waveform between terminals OCV+ and OCV– of the engine ECU connector.
HINT:
- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

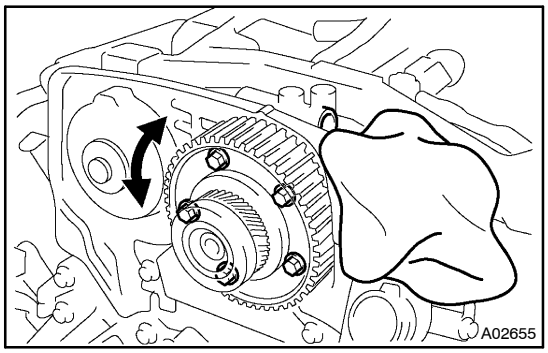
OK	VVT system is OK.*

*: DTC P1349 are also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As engine ECU controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

Check and replace engine ECU (See page IN–34).

4	Check VVT controller assembly.



PREPARATION:
(a) Remove the timing belt cover.
(b) Remove the timing belt (See page EM–17).
(c) Remove the oil control valve.
(d) Drain oil into the VVT controller assembly (See page EM–17).

CHECK:
Check whether the oil into VVT controller assembly is drained or not.

OK:
The oil into VVT controller assembly is drained.

NG	Replace VVT controller assembly, and then go to step 5.

OK

5	Check oil control valve (See page EM–41).

NG → Replace oil control valve, and then go to step 6.

OK

6	Check for blockage of oil control valve, oil check valve and oil pipe No.1.

NG → Repair or replace.

OK

7	Check whether or not DTC P1349 is stored.

PREPARATION:

(a) Clear the DTC (See page DI–4).

(b) Perform simulation test.

CHECK:

Check whether or not DTC P1349 is stored (See page DI–133).

OK:

DTC 59 is not stored

OK → **VVT system is OK.***

*: DTC P1349 are also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As engine ECU controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

NG

Replace engine ECU

DI9HR–01

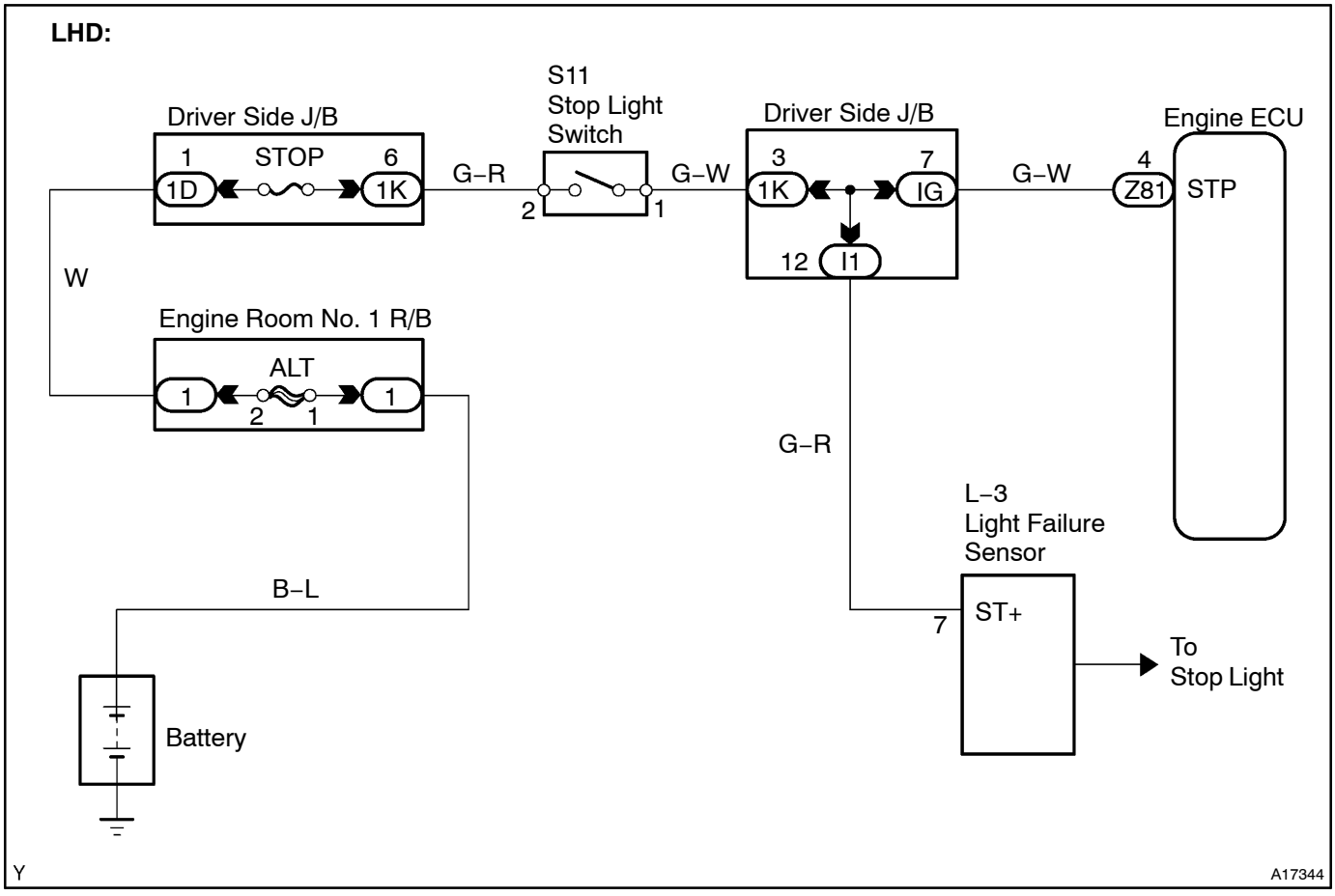
DTC	P1520	Stop Light Switch Signal Malfunction

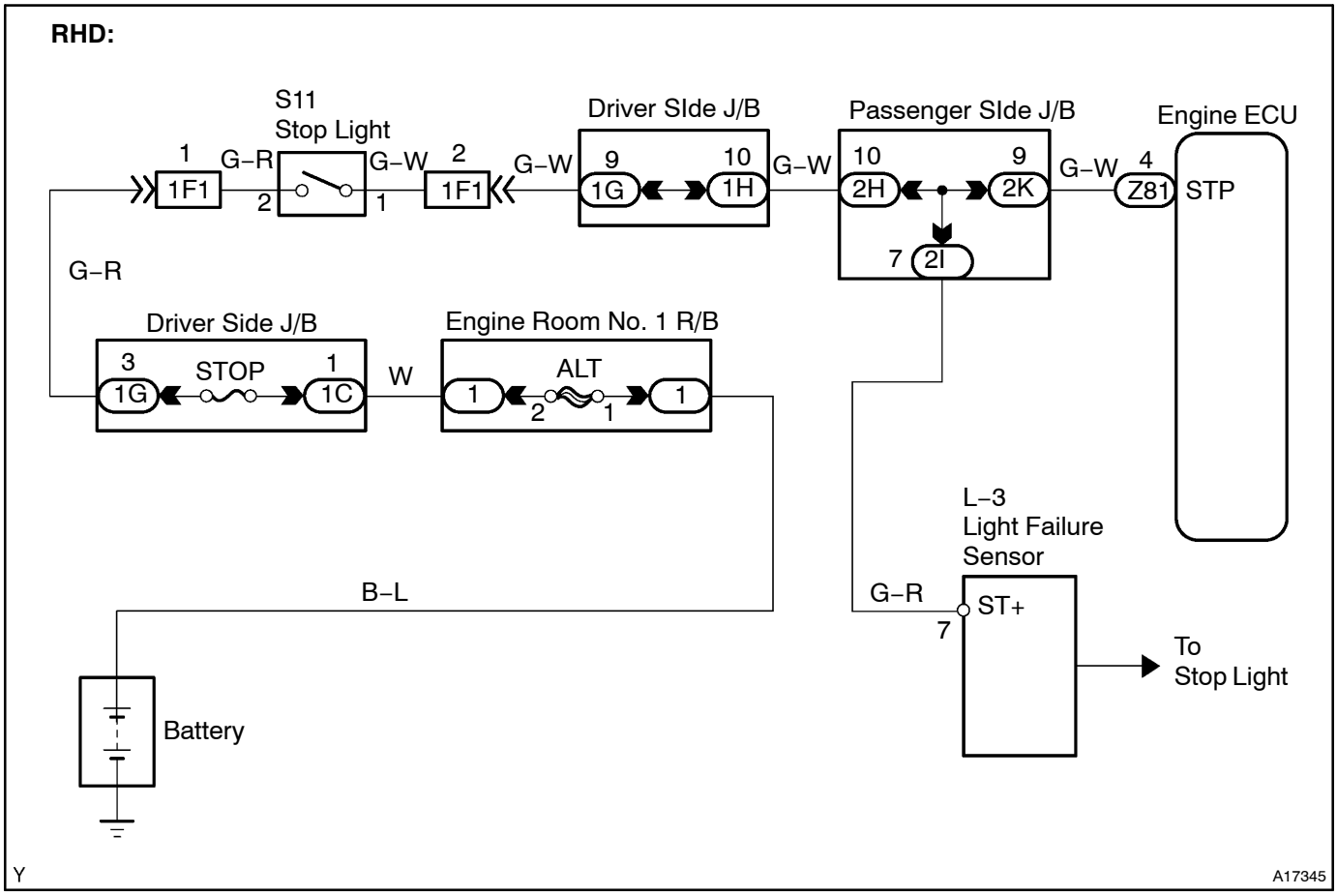
CIRCUIT DESCRIPTION

This signal is used to detect when the brakes have been applied. The STP signal voltage is the same as the voltage supplied to the stop lights.
The STP signal is used mainly to control the fuel cut–off engine speed (The fuel cut–off engine speed is reduced slightly when the vehicle is braking.).

DTC No.	DTC Detecting Condition	Trouble Area
P1520	The stop light switch does not turn off even once the vehicle is driven (2 trip detection logic)	• Short in stop light switch signal circuit • Stop light switch • Engine ECU

WIRING DIAGRAM





INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check operation of stop light.**

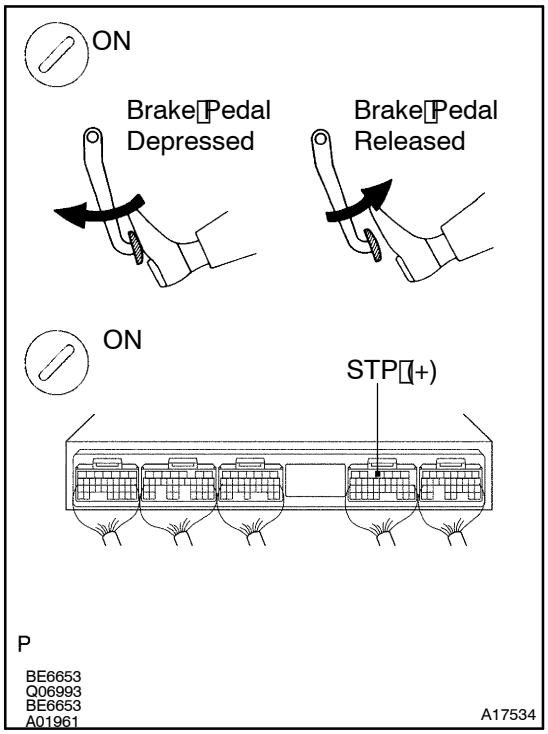
CHECK:

Check if the stop lights go on and off normally when the brake pedal is operated and released.

NG → **Check and repair stop light circuit.**

OK

2	**Check STP signal.**



When using hand–held tester:

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:

Read the STP signal on the hand–held tester.

OK:

Brake pedal is depressed: STP ... ON

Brake pedal is released: STP ... OFF

When not using TOYOTA hand–held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Check voltage between terminal STP of the engine ECU and body ground.

OK:

Brake pedal	Voltage
Depressed	7.5 – 14 V
Released	Below 1.5 V

OK → **Check for intermittent problems (See page DI–4).**

NG

3	**Check harness and connector between engine ECU and stop light switch (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

Check and replace engine ECU (See page IN–34).

DI2SO–04

DTC	P1633/89	ECU Malfunction (ETCS Circuit)

CIRCUIT DESCRIPTION

Refer to DTC P1125 (Electric Throttle Control System Malfunction) on page DI–110.

DTC No.	DTC Detecting Condition	Trouble Area
P1633/89	Engine ECU malfunction	• Engine ECU

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

Replace engine ECU.

DI2SP–04

DTC	P1645/82	Body ECU Malfunction

CIRCUIT DESCRIPTION

ECU receives the operating condition (ON/OFF) of A/C from A/C ECU and it also receives the electrical load information from the body ECU.
ECU uses these information to control the engine (idle up, etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P1645/82	Condition (a) or (b) continues for 5.0 seconds or more. (a) No communication from body ECU (b) No communication from A/C ECU	• Body ECU • A/C ECU • Communication bus

INSPECTION PROCEDURE

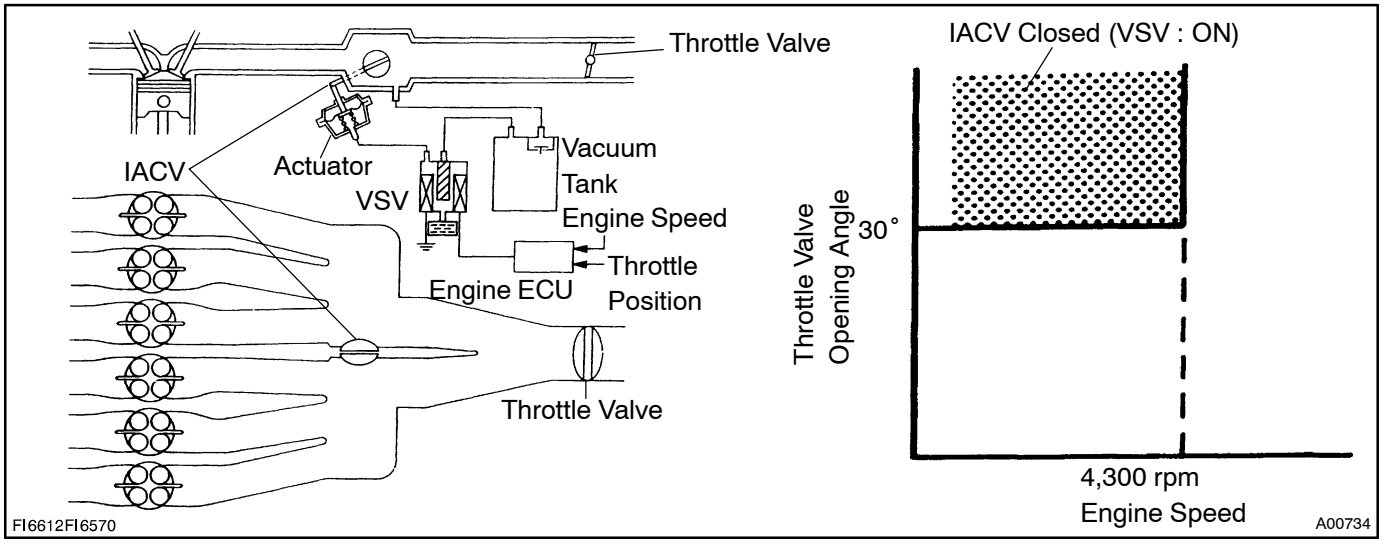
Perform troubleshooting the Multiplex Communication System (See page DI–565).

DI64K–07

DTC	P1651/96	VSV for ACIS Circuit Malfunction

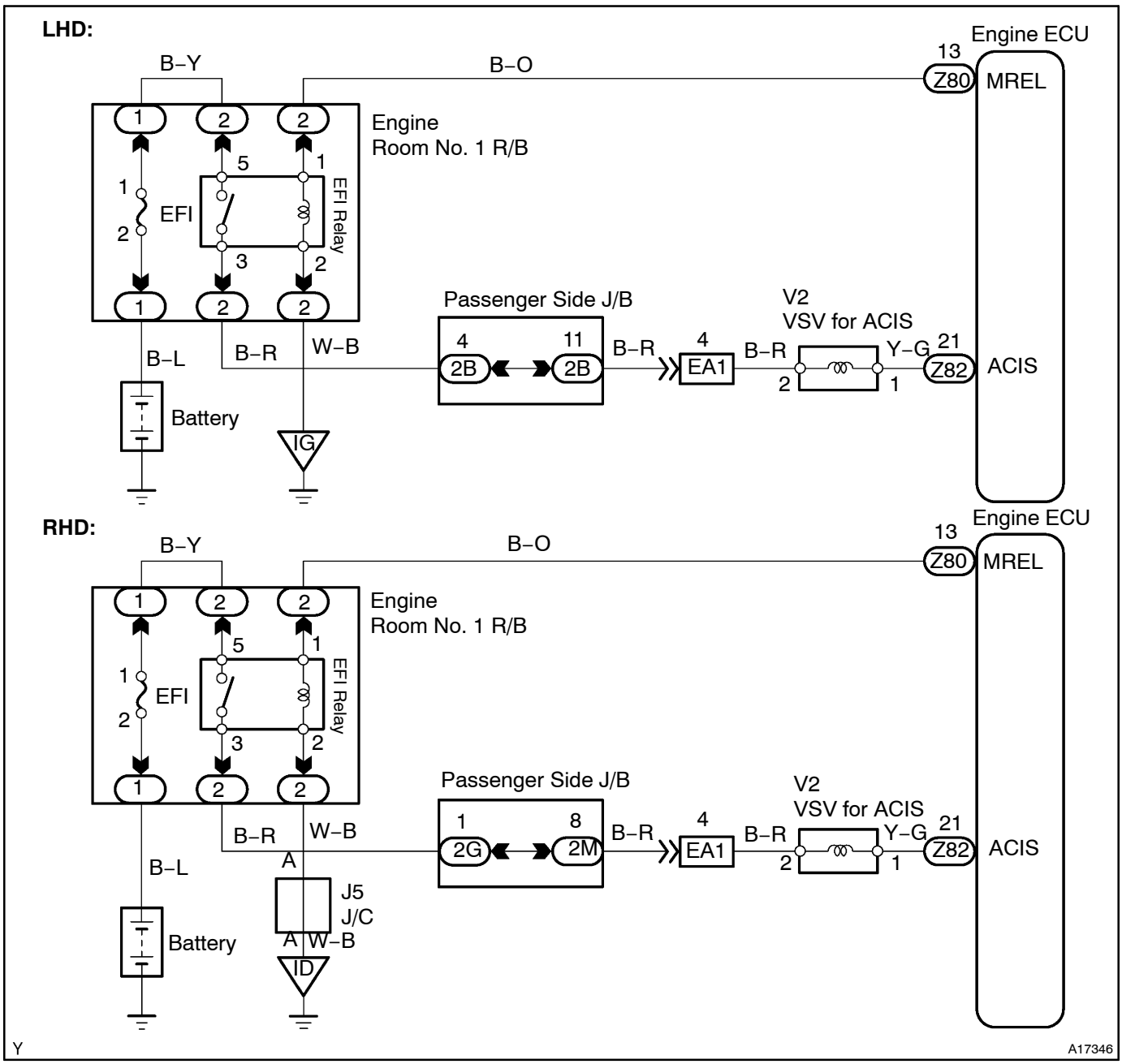
CIRCUIT DESCRIPTION

This circuit opens and closes the Intake Air Control Valve (IACV) in response to the engine load in order to increase the intake efficiency (ACIS: Acoustic Control Induction System).
When the engine speed is 4,300 rpm or less and the throttle valve opening angle is 30° or more, the engine ECU turns the VSV ON and closes the IACV. At all other times, the VSV is OFF, so the IACV is open.



DTC No.	DTC Detecting Condition	Trouble Area
P1651/96	Proper response to engine ECU command does not occur (2 trip detection logic)	• Open or short in VSV circuit for ACIS • VSV for ACIS • Engine ECU

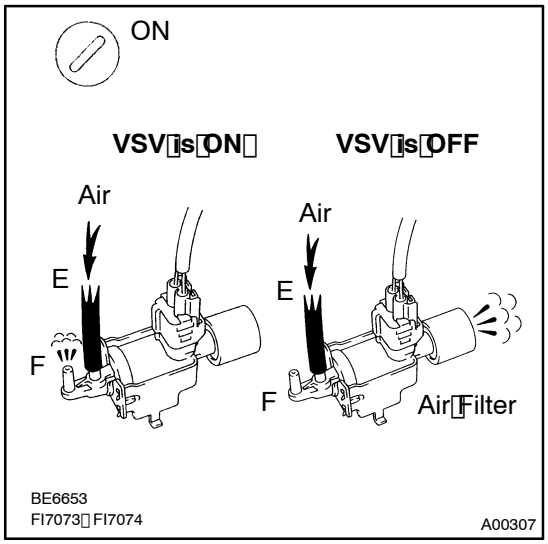
WIRING DIAGRAM



INSPECTION PROCEDURE

When using hand–held tester

1	Connect hand–held tester, and check operation of VSV for ACIS.



PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check the operation of the the VSV when the VSV is operated by the hand–held tester.

OK:

VSV is ON:
Air from port E flows out through port F.
VSV is OFF:
Air from port E flows out through air filter.

OK	Check for vacuum tank.

NG

2	Check VSV for ACIS (See page FI–58).

NG	Replace VSV for ACIS.

OK

3	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and engine ECU (See page IN–34).

NG	Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–34).

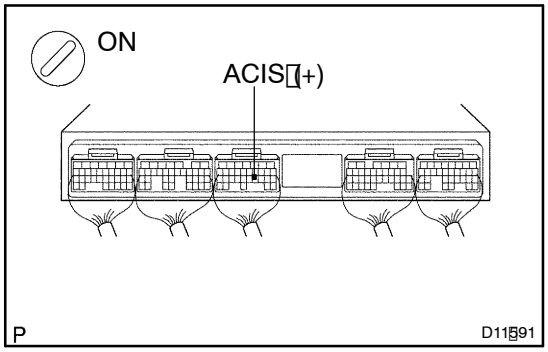
When not using hand–held tester

1	Check VSV for ACIS (See page FI–58).

NG → Replace VSV for ACIS.

OK

2	Check voltage between terminal ACIS of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine room engine ECU cover and hood.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal ACIS of the engine ECU connector and body ground.

OK:

Voltage: 9 – 14 V

NG → Check for open and short in harness and connector between EFI main relay (Marking: EFI) and engine ECU (See page IN–34).

OK

3	Check for vacuum tank.

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–34).

DI2SQ–04

DTC	P1656/39	OCV Circuit Malfunction (bank 1)

CIRCUIT DESCRIPTION

Refer to DTC P1349/39 (VVT System Malfunction) on page DI–133.

DTC No.	DTC Detecting Condition	Trouble Area
P1656/39	Open or short in oil control valve circuit	• Open or short in oil control valve circuit • Oil control valve • Engine ECU

WIRING DIAGRAM

Refer to DTC P1349/39 (VVT System Malfunction) on page DI–133.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand–held tester

1	**Check OCV circuit.**

PREPARATION:

(a) Start the engine and warmed it up.

(b) Connect the hand–held tester and select VVT from ACTIVE TEST menu.

CHECK:

Check the engine speed when operate the OCV by the hand–held tester.

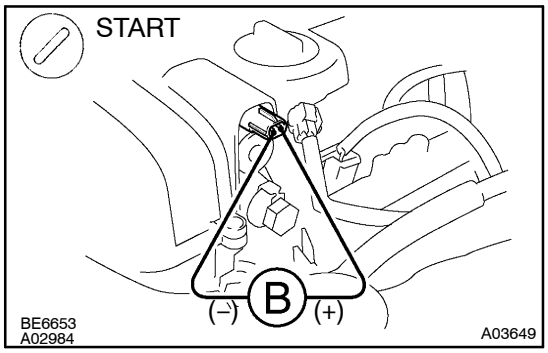
OK:

VVT system is OFF (OCV is OFF):
Normal engine speed
VVT system is ON (OCV is ON):
Rough idle or engine stalled

OK	**Check for intermittent problems (See page DI–4).**

NG

2	Check operation of OCV.



PREPARATION:

(a) Start the engine and warmed it up.
(b) Disconnect the OCV connector.
(c) Apply battery positive voltage between terminals of the OCV.

CHECK:

Check the engine speed.

OK:

Rough idle or engine stalled.

NG → Replace OCV.

OK

3	Check voltage between terminals OCV+ and OCV– of engine ECU connector (See page DI–133, step 3).

NG → Check and replace engine ECU (See page IN–34).

OK

4	Check for open and short in harness and connector between OCV and engine ECU (See page IN–34).

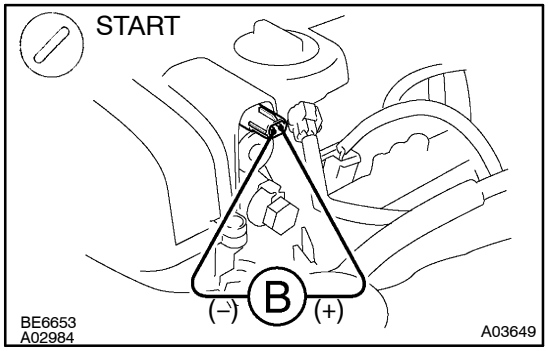
NG → Repair or replace.

OK

Check for intermittent problems (See page DI–4).

When not using hand-held tester

1	Check operation of OCV.



PREPARATION:
(a) Start the engine and warmed it up.
(b) Disconnect the OCV connector.
(c) Apply battery positive voltage between terminals of the OCV.

CHECK:
Check the engine speed.

OK:
Rough idle or engine stalled

NG → Replace OCV.

OK

2	Check voltage between terminals OCV+ and OCV– of engine ECU connector (See page DI–133, step 3).

NG → Check and replace engine ECU (See page IN–34).

OK

3	Check for open and short in harness and connector between OCV and engine ECU (See page IN–34).

NG → Repair or replace.

OK

Check for intermittent problems (See page DI–4).

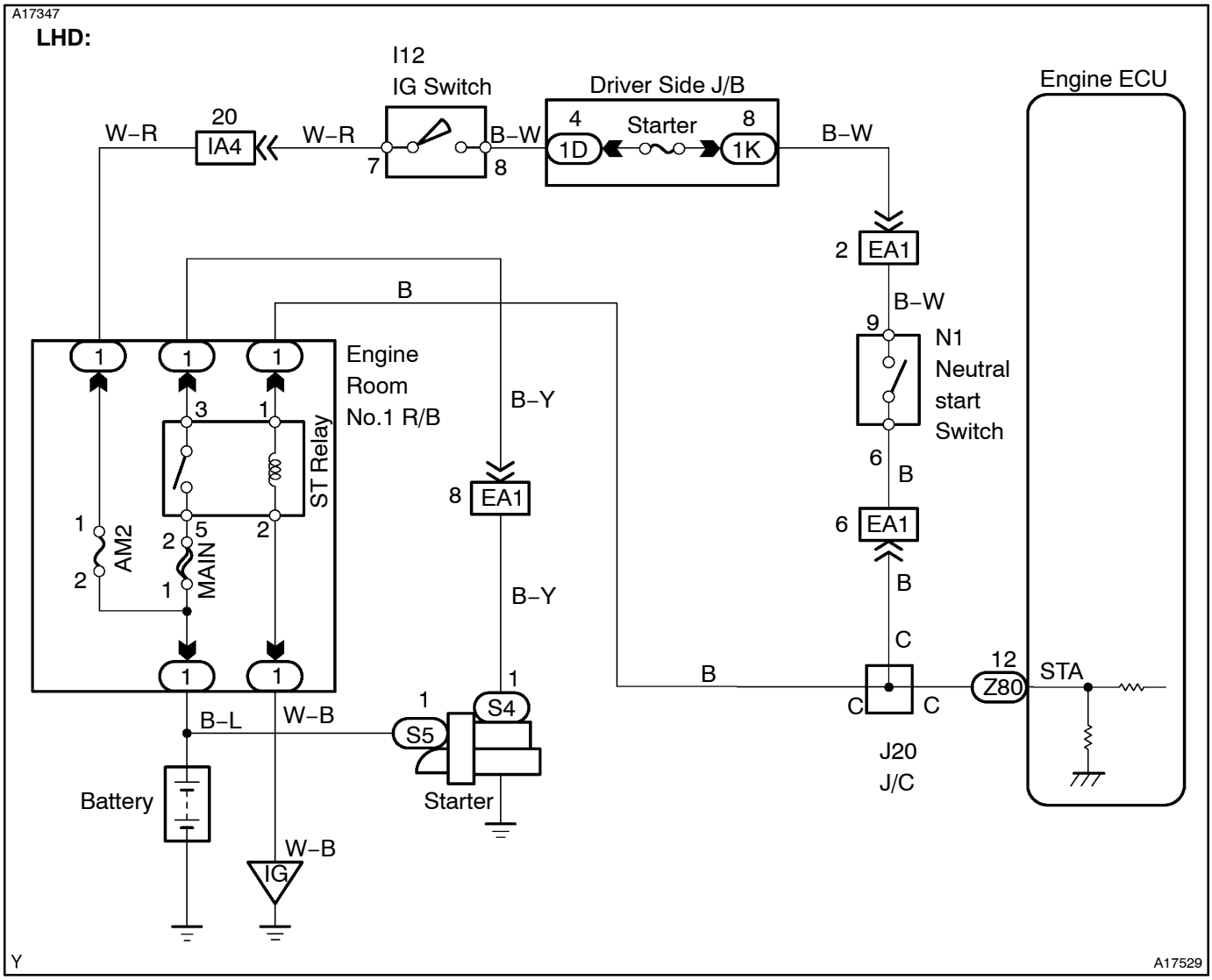
DI9HS–01

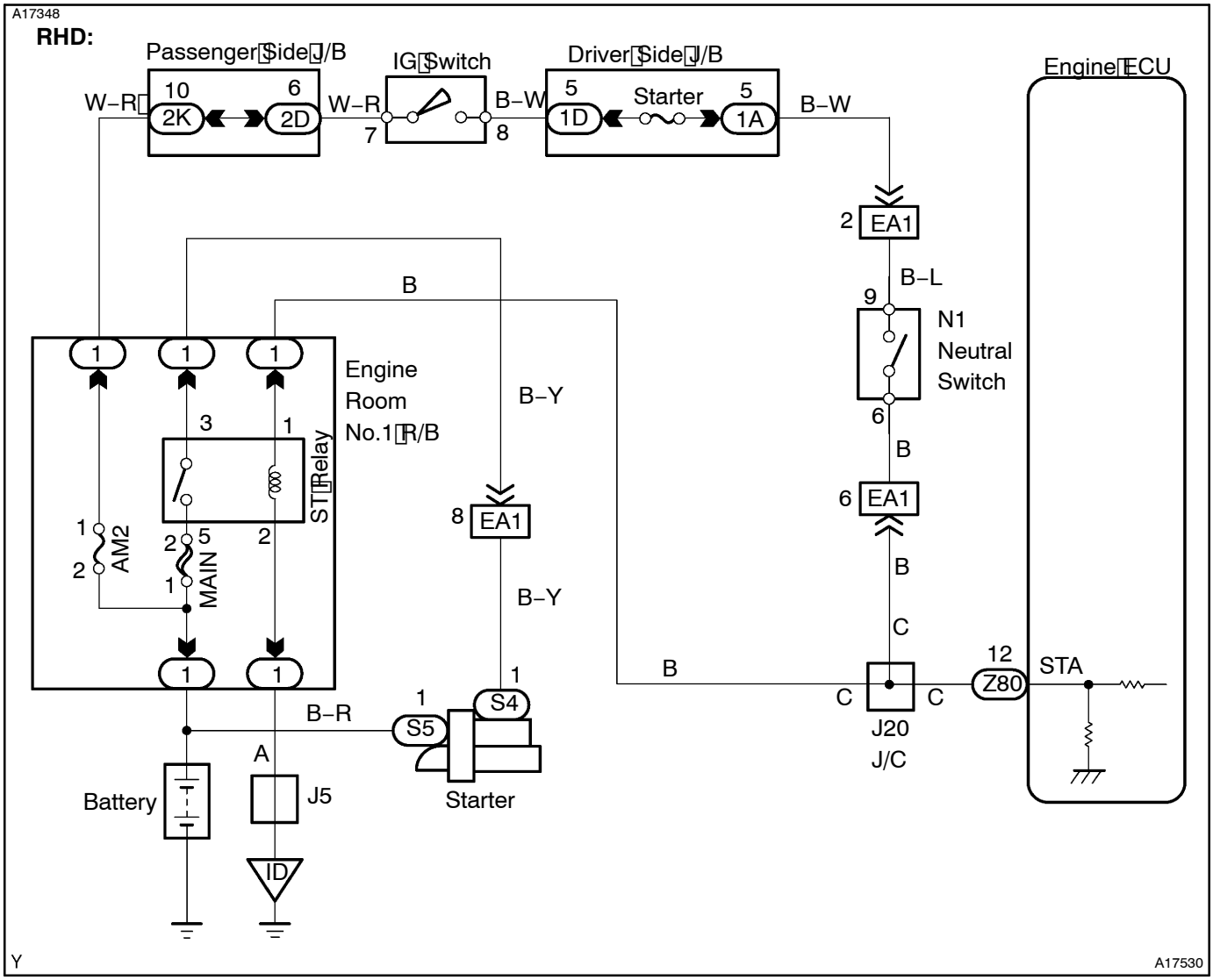
Starter Signal Circuit

CIRCUIT DESCRIPTION

When the engine is cranked, the intake air flow is slow, so fuel vaporization is poor. A rich mixture is therefore necessary in order to achieve good startability. While the engine is being cranked, the battery positive voltage is applied to terminal STA of the engine ECU. The starter signal id mainly used to increase the fuel injection volume for the starting injection control and after–start injection control.

WIRING DIAGRAM





INSPECTION PROCEDURE

HINT:

This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page DI–24.

When using hand–held tester

1	**Connect hand–held tester and check STA signal.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

CHECK:

Read STA signal on the hand–held tester while starter operates.

OK:

Ignition Switch Position	ON	START
STA signal	OFF	ON

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–24).**

NG

2	Check for open in harness and connector between engine ECU and starter relay (Marking: STARTER) (See page IN–34).

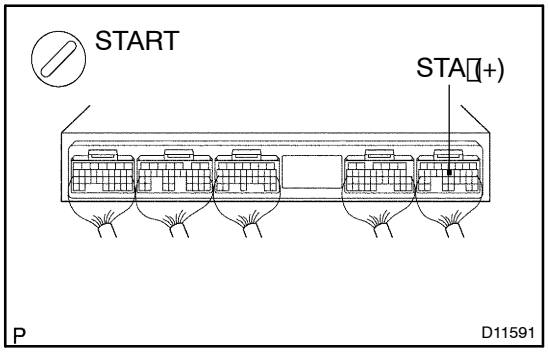
NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–34).

When not using hand–held tester

1	Check voltage between terminal STA of engine ECU connector and body ground.



PREPARATION:
(a) Remove the engine room engine ECU hood and cover.
(b) Turn the ignition switch ON.

CHECK:
Measure voltage between terminal STA of the engine ECU connector and body ground, during engine cranking.

OK:
Voltage: 6 V or more

OK → Proceed to next circuit inspection shown on problem symptoms table (See page DI–24).

NG

2	Check for open in harness and connector between engine ECU and starter relay (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–34).

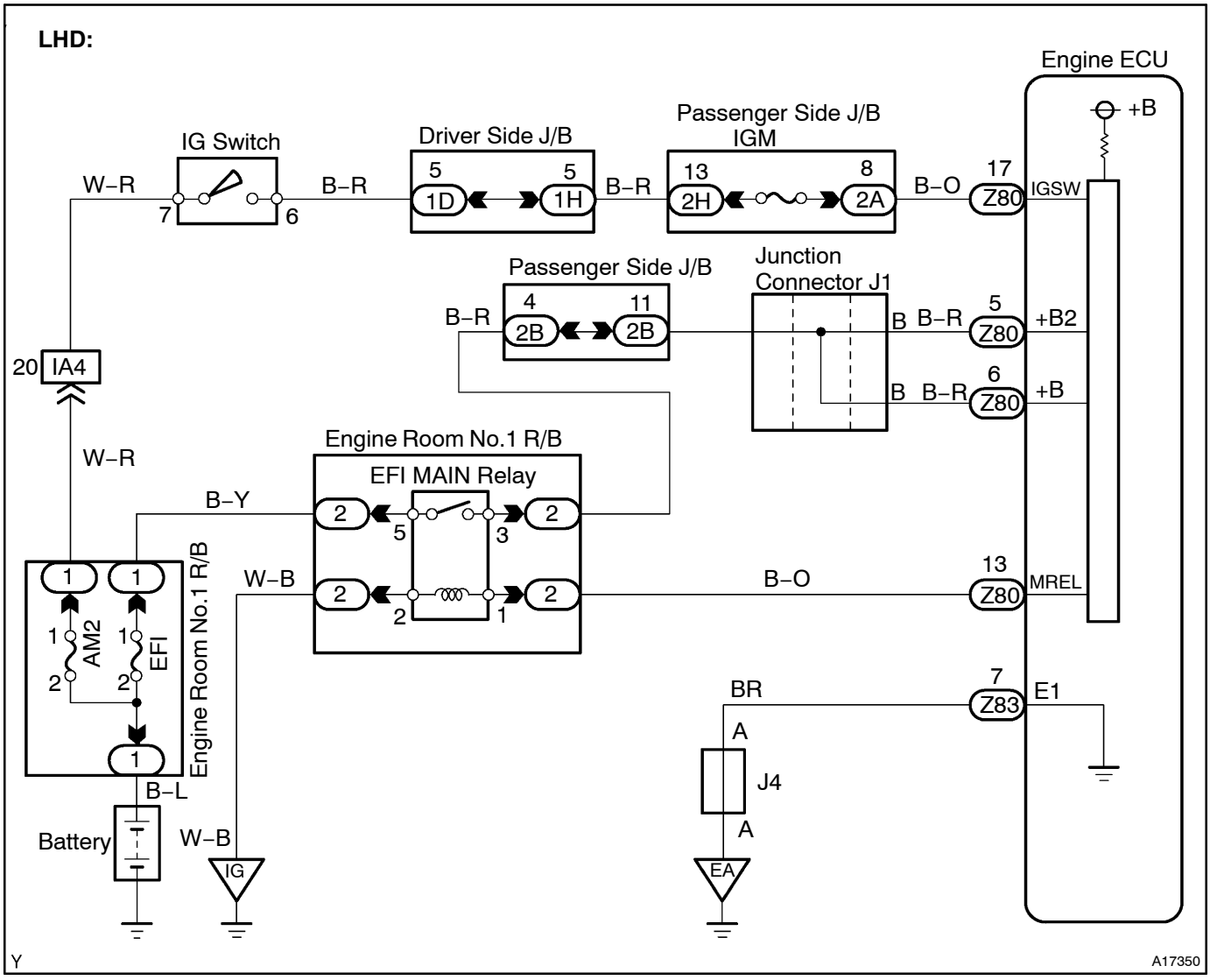
DI9HT–01

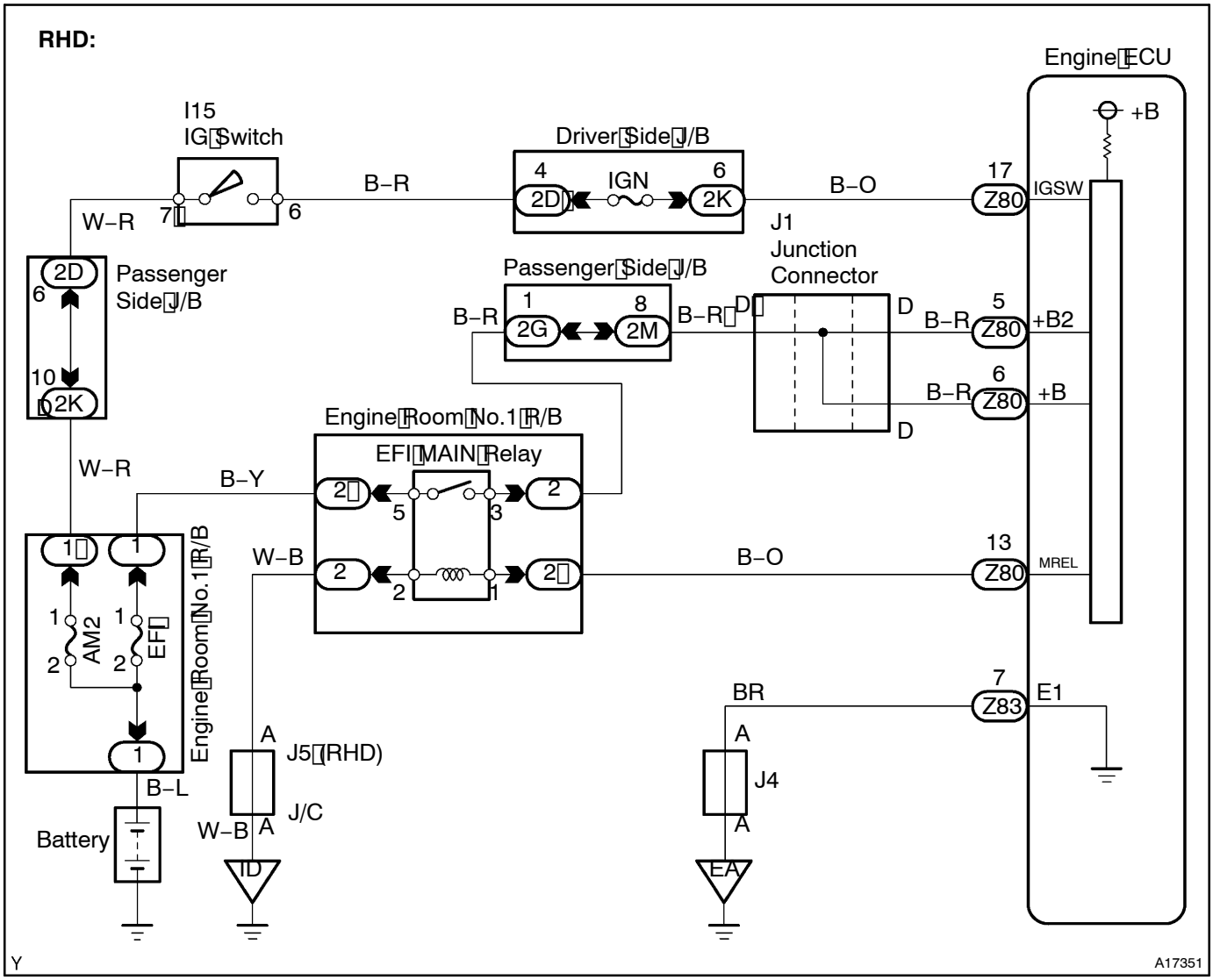
ECU Power Source Circuit

CIRCUIT DESCRIPTION

When the ignition switch is turned ON, battery positive voltage is applied to the terminal IGSW of the engine ECU and the EFI main relay (Making: EFI) control circuit in the engine ECU sends a signal to the terminal MREL of the engine ECU switching on the EFI main relay.
This signal causes current to flow to the coil, closing the contacts of the EFI main relay and supplying power to the terminals +B of the engine ECU.
If the ignition switch is turned off, the engine ECU continues to switch on the EFI main relay for a maximum of 2 seconds for the initial setting of the ISC valve.

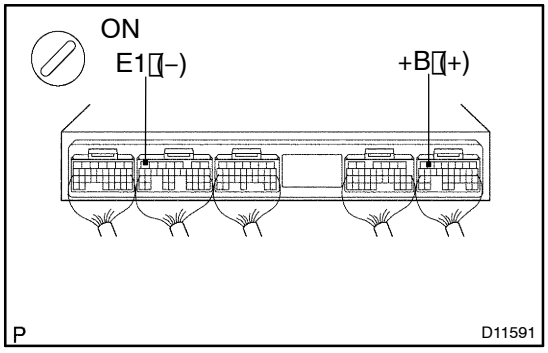
WIRING DIAGRAM





INSPECTION PROCEDURE

1	**Check voltage between terminals +B and E1 of engine ECU connector.**



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals +B and E1 of the engine ECU connector.

OK:

Voltage: 9 – 14 V

OK	**Proceed to next circuit inspection shown on Problem symptoms table (See page DI–24).**

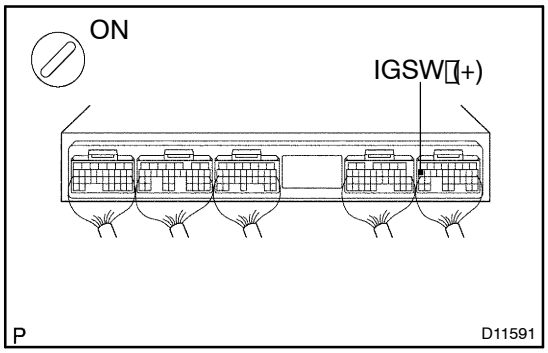
NG

2	Check for open in harness and connector between terminal E1 of engine ECU and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

3	Check voltage between terminal IGSW of engine ECU connector and body ground.

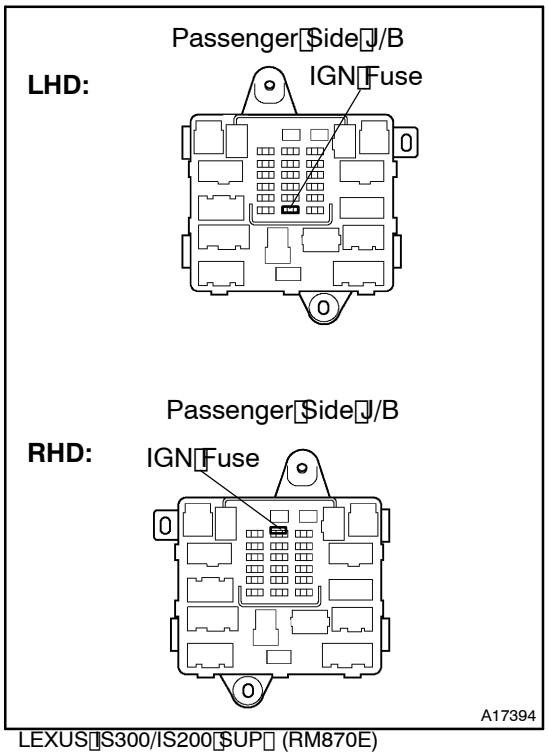


PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure voltage between terminal IGSW of the engine ECU and body ground.
OK:
Voltage: 9 ~ 14 V

OK → Go to step 6.

NG

4	Check IGN fuse.



PREPARATION:
Remove the IGN fuse from the driver side J/B.
CHECK:
Check continuity of the IGN fuse.
OK:
Continuity

NG → Check for short in all harness and components connected to IGN fuse.

OK

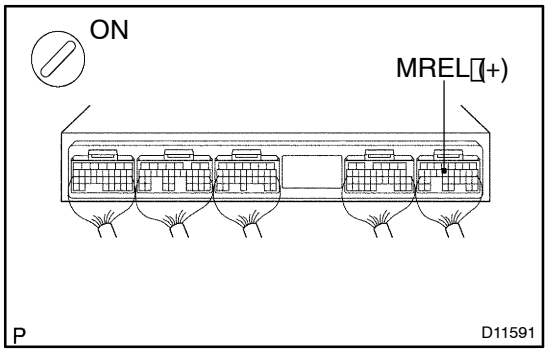
5	Check ignition switch (See page BE–1).

NG → Replace ignition switch.

OK

Check and repair harness and connector between battery and ignition switch, ignition switch and engine ECU.

6	Check voltage between terminal MREL of engine ECU connector and body ground.



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure voltage between terminal MREL of the engine ECU connector and body ground.
OK:
Voltage: 9 – 14 V

NG → Check and replace engine ECU (See page IN–34).

OK

7	Check EFI fuse of engine room J/B (See page DI–156).

NG → Check for short in all harness and components connected to EFI fuse.

OK

8	Check EFI main relay (See page FI–50).

NG → Replace EFI main relay.

OK

9	Check for open and short in harness and connector between terminal MREL of engine ECU and body ground (See page IN–34).

NG → Repair and replace harness or connector.

OK

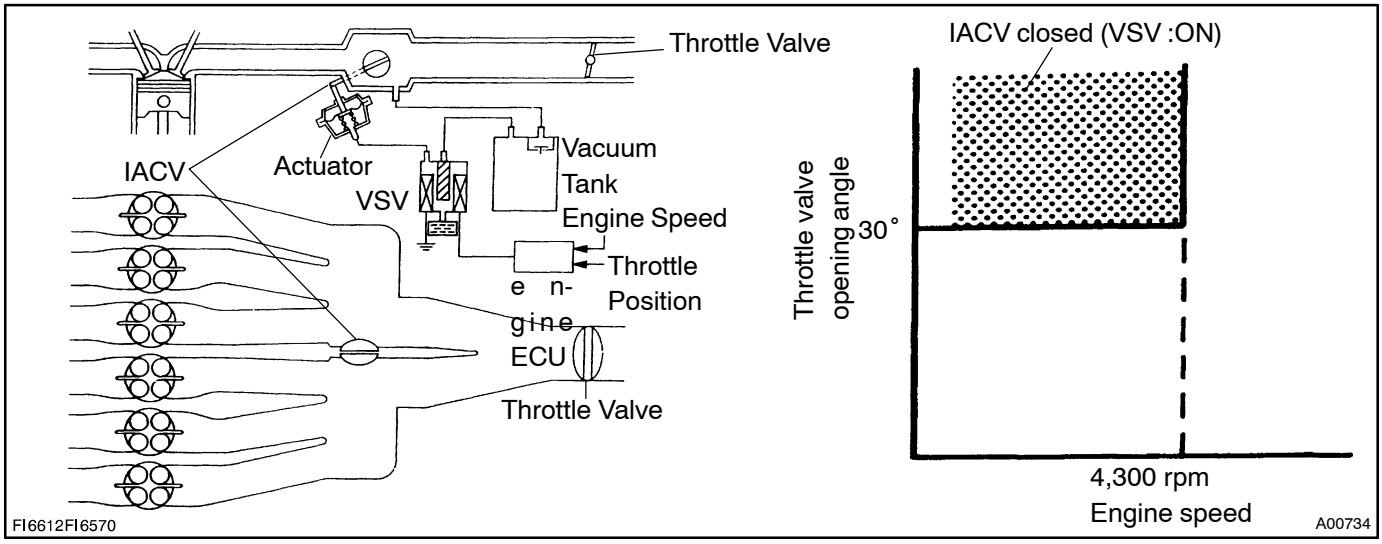
Check and repair harness or connector between EFI fuse and battery.

DI2ER–08

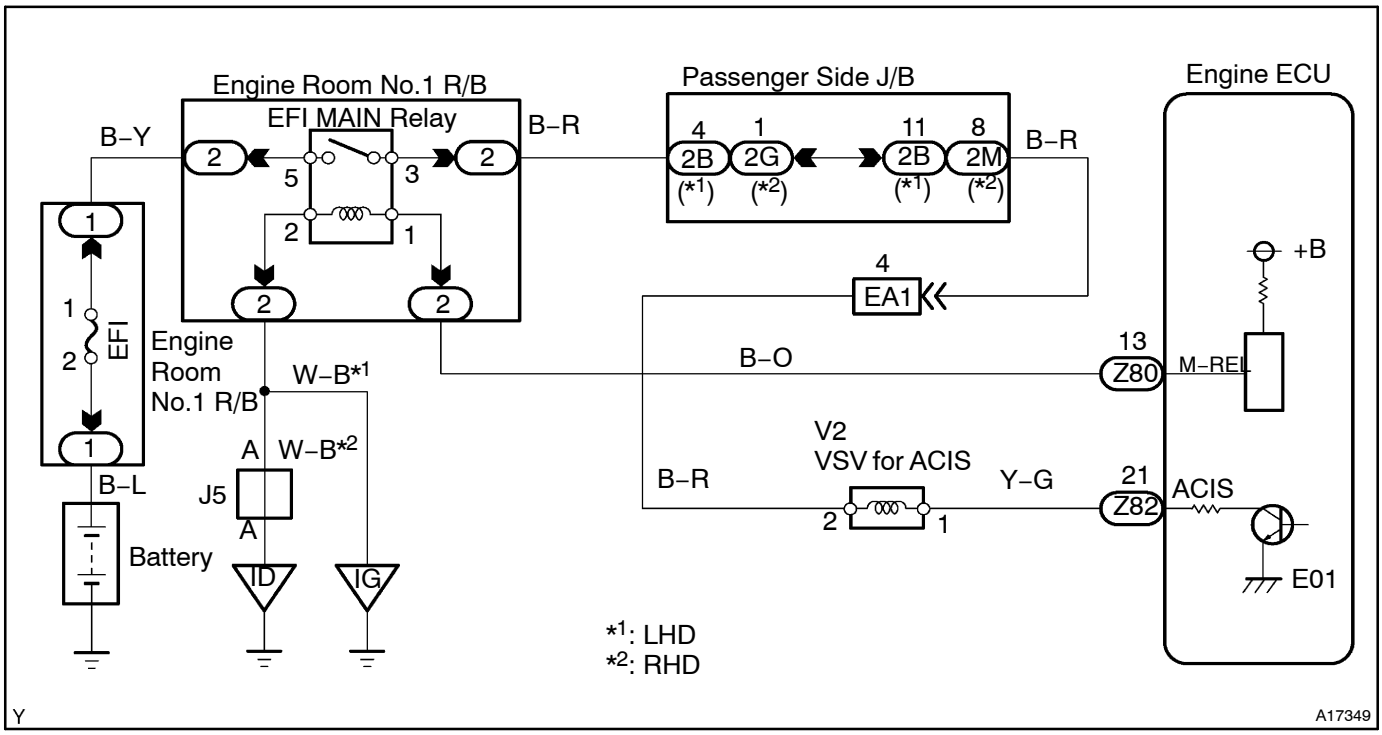
IACV Control VSV Circuit

CIRCUIT DESCRIPTION

This circuit opens and closes the IACV (Intake Air Control Valve) in response to the engine load in order to increase the intake efficiency (ACIS: Acoustic Control Induction System).
When the engine speed is 4,300 rpm or less and the throttle valve opening angle is 30° or more, the engine ECU turns the VSV ON and closes the IACV. At all other times, the VSV is OFF, so the IACV is open.



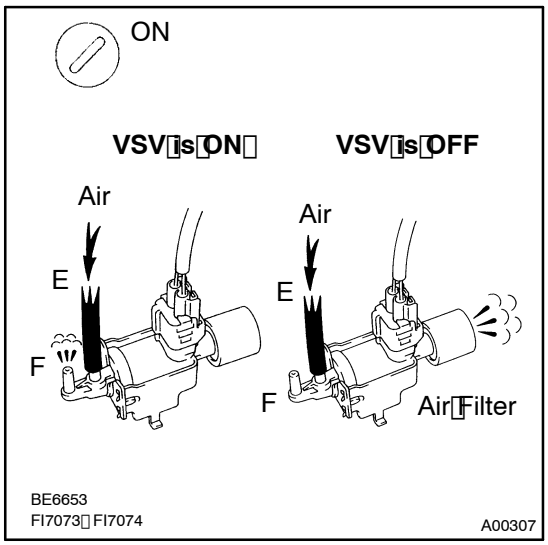
WIRING DIAGRAM



INSPECTION PROCEDURE

When using hand–held tester

1	Connect hand–held tester and check operation of VSV for ACIS.



PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and hand–held tester main switch ON.

(c) Select ACTIVE TEST mode on the hand–held tester.

CHECK:

Check operation of the VSV when VSV is operated by the hand–held tester.

OK:

VSV is ON:
Air from pipe E is flowing out through pipe F.
VSV is OFF:
Air from pipe E is flowing out through the air filter.

OK	Check for vacuum tank (See page FI–48).

NG

2	Check VSV for ACIS (See page FI–58).

NG	Replace VSV for ACIS.

OK

3	Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU (See page IN–34).

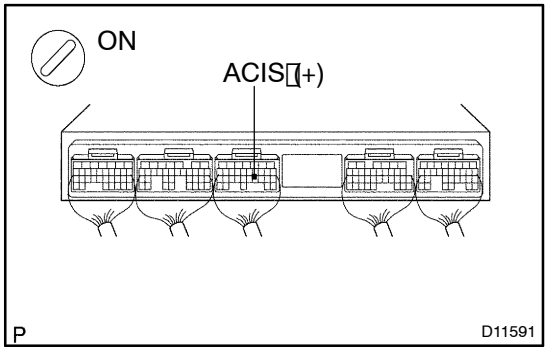
When not using hand–held tester

1	Check VSV for ACIS (See page FI–58).

NG → Replace VSV for ACIS.

OK

2	Check voltage between terminal ACIS of engine ECU connector and body ground.



PREPARATION:

(a) Remove the engine room engine ECU hood and cover.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal ACIS of the engine ECU connector and body ground.

OK:

Voltage: 9 – 14 V

NG → Check for open and short in harness and connector between EFI main relay and engine ECU (See page IN–34).

OK

3	Check for vacuum tank (See page FI–48)

NG → Repair or replace.

OK

Check and replace engine ECU (See page IN–34).

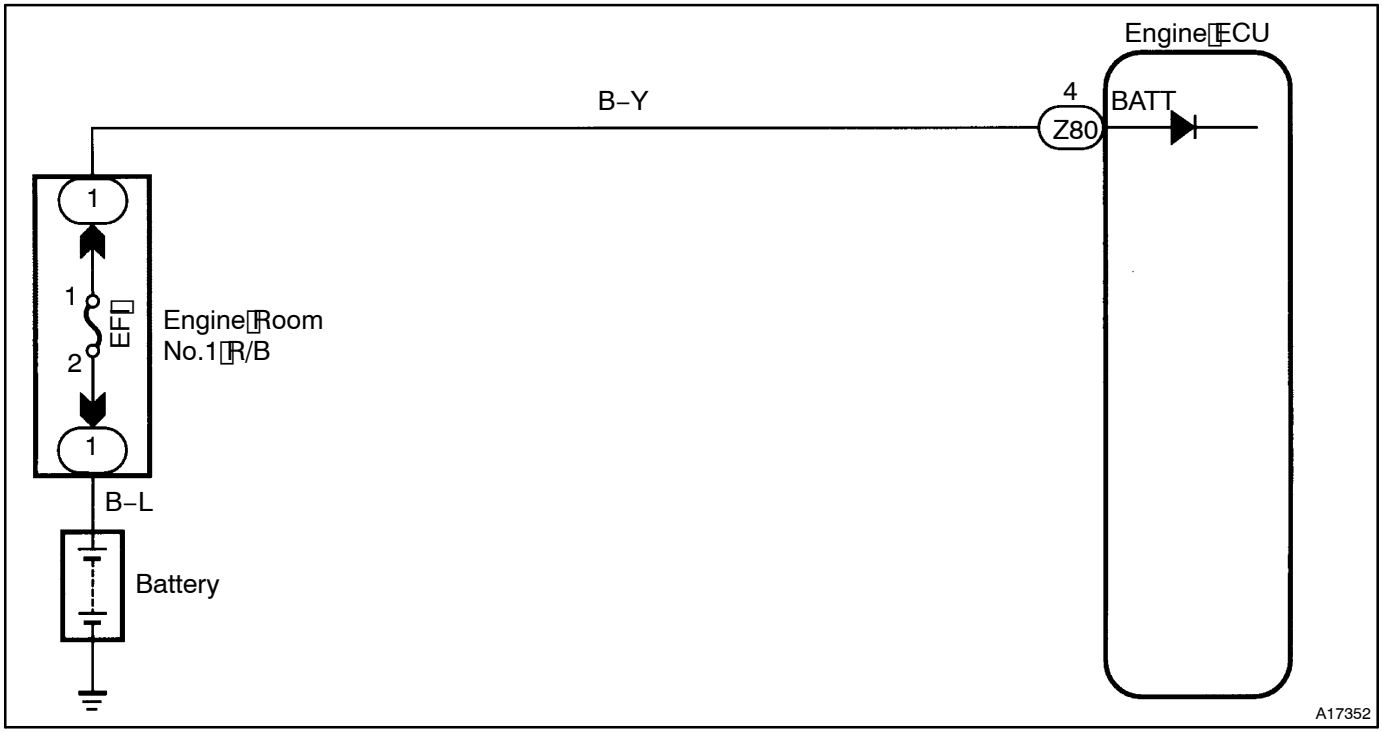
DI2SW–04

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

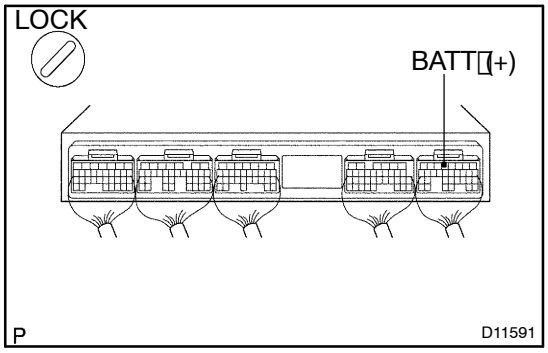
Battery positive voltage is supplied to terminal BATT of the engine ECU even when the ignition switch is OFF for use by the diagnostic trouble code memory, air–fuel ratio adaptive control value memory, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal BATT of engine ECU connector and body ground.**



PREPARATION:

Remove the engine room engine ECU hood and cover.

CHECK:

Measure voltage between terminal BATT of engine ECU connector and body ground.

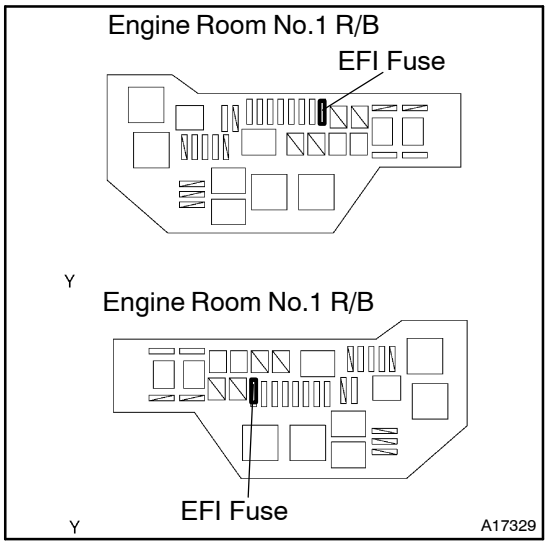
OK:

Voltage: 9 – 14 V

OK	**Check and replace engine ECU (See page IN–34).**

NG

2	**Check EFI fuse of engine rooom No.1 R/B.**



PREPARATION:

Remove the EFI fuse from the engine room No.1 J/B.

CHECK:

Check continuity of EFI fuse.

OK:

Continuity

NG → **Check for short in all harness and components connected to EFI fuse.**

OK

Check and repair harness or connector between battery, EFI fuse and engine ECU.

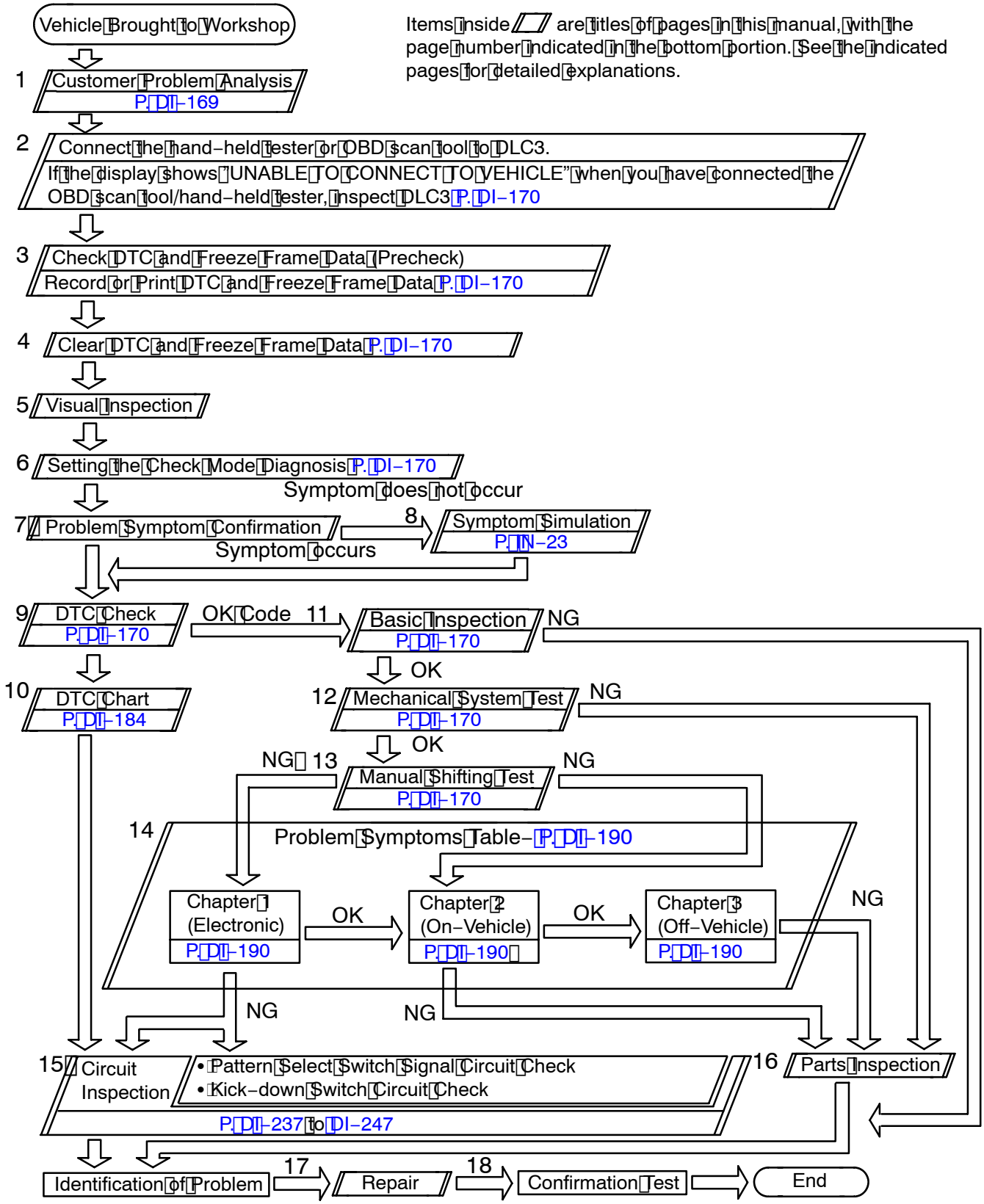
AUTOMATIC TRANSMISSION (A650E)

DI61K–04

HOW TO PROCEED WITH TROUBLESHOOTING

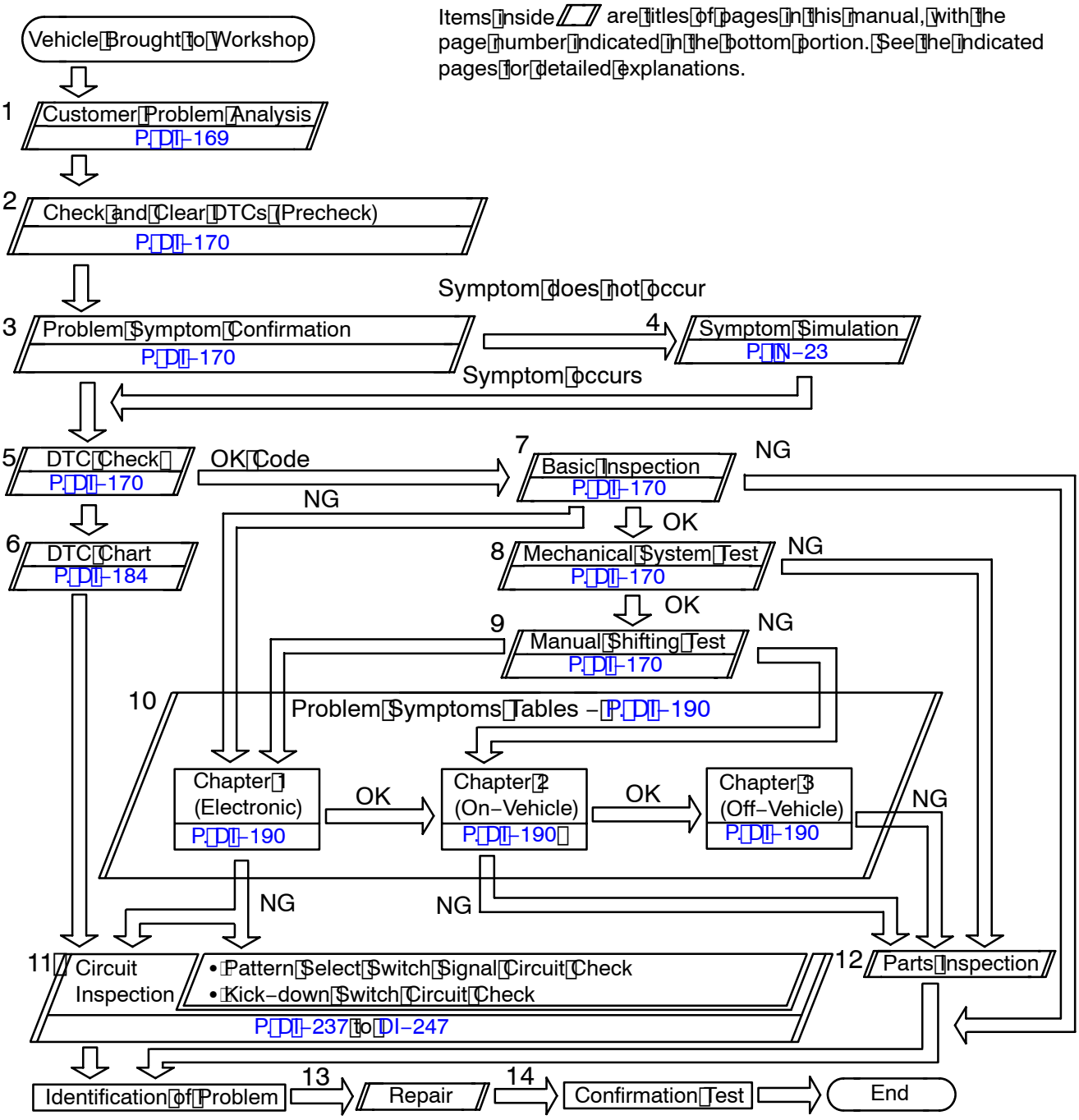
When using hand–held tester, troubleshoot in accordance with the procedure on the following pages.

Items inside // are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.



When not using hand–held tester, troubleshoot in accordance with the procedure on the following pages.

Items inside // are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.



DI61L–03

CUSTOMER PROBLEM ANALYSIS CHECK

Automatic Transmission System Check Sheet

Inspector's Name :

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

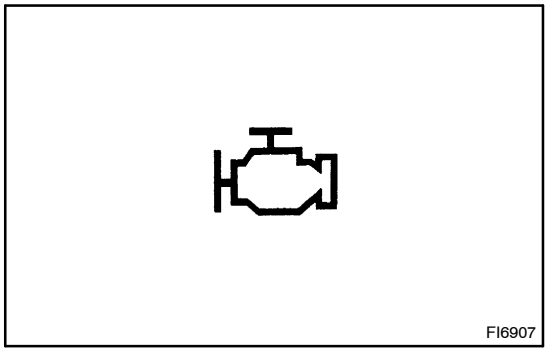
Date Problem Occurred	/ /
Frequency Problem Occurs?	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Vehicle does not move (☐ Any range ☐ particular range)
	☐ No up–shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → 4th ☐ 4th → 5th)
	☐ No down–shift (☐ 5th → 4th ☐ 4th → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)
	☐ Lock–up malfunction
	☐ Shift point too high or too low
	☐ Harsh engagement (☐ N → D ☐ Lock–up ☐ Any drive range)
	☐ Slip or shudder
	☐ No kick–down
	☐ Others ( )

Check Item	Check Engine Warning Light	☐ Normal ☐ Remains ON

DTC Check	1st Time	☐ Normal code ☐ Malfunction code (DTC)
	2nd Time	☐ Normal code ☐ Malfunction code (DTC)

DI9H9–01

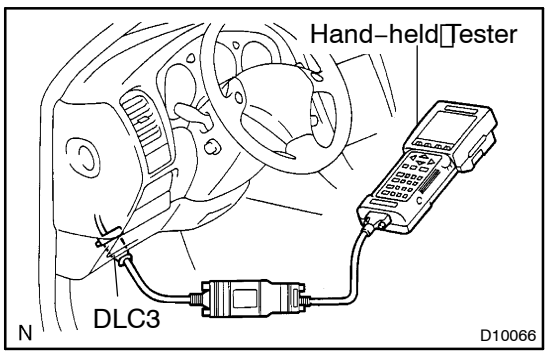

FI6907

PRE–CHECK

1. DIAGNOSIS SYSTEM

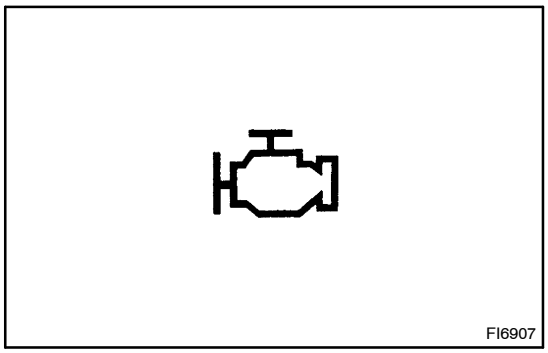
(a) Description for EURO–OBD

- When troubleshooting Euro–OBD vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD scan tool complying with ISO 15031–4 or hand–held tester, and read off various data output from the vehicle's Engine and ECT ECU.
  Euro–OBD regulations require that the vehicle's on–board computer lights up the check engine warning light on the instrument panel when the computer detects a malfunction in the emission control system/components or in the power–train control components which affect vehicle emissions, or a malfunction in the computer. In addition to the check engine warning light (CHK ENG) lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by ISO15031–6 are recorded in the Engine and ECT ECU memory (See page DI–17). If the malfunction does not reoccur in 3 consecutive trips, the (CHK ENG) goes off automatically but the DTCs remain recorded in the Engine and ECT ECU memory.



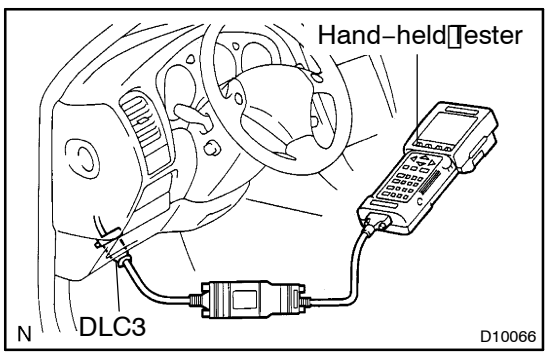
- To check the DTCs, connect the OBD scan tool or hand–held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD scan tool or hand–held tester also enables you to erase the DTCs and check freezed frame data and various forms of engine data. (For operating instructions, see the OBD scan tool's instruction book.)
  DTCs include ISO controlled codes and manufacturer controlled codes. ISO controlled codes must be set as prescribed by the ISO, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI–17).

- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTCs use 2 trip detection logic*1 to prevent erroneous detection, and ensure thorough malfunction detection. By switching the Engine and ECT ECU to check mode when troubleshooting, the technician can cause the CHK ENG to light up for a malfunction that is only detected once or momentarily. (Hand–held tester only) (See step 2).
- *2 Trip detection logic:
  When a malfunction is first detected, the malfunction is temporarily stored in the Engine and ECT ECU memory (1st trip). If the same malfunction is detected again during the second drive test, this second detection causes the CHK ENG to light up (2nd trip).
  (However, the ignition switch must be turned OFF between the 1st trip and the 2nd trip.)


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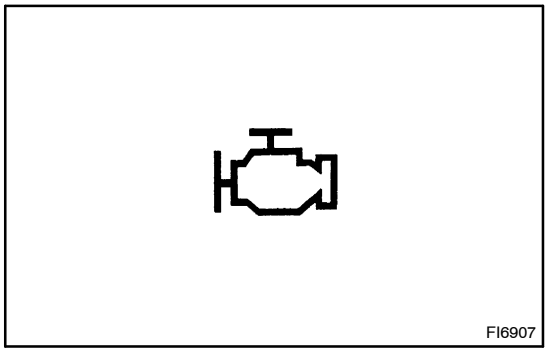
(b) Description for M–OBD

- When troubleshooting Multiplex (M–OBD) vehicles, the only difference from the usual troubleshooting procedure is that you connect the hand–held tester to the vehicle, and read off various data output from the vehicle's Engine and ECT ECU.
  The vehicle's on–board computer lights up the check engine warning light (CHK ENG) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components. In addition to the CHK ENG lighting up when a malfunction is detected, the applicable DTCs are recorded in the Engine and ECT ECU memory (See page DI–17).
  If the malfunction only occurs in 3 trips, the CHK ENG goes off but the DTCs remain recorded in the Engine and ECT ECU memory.



- To check the DTCs, connect a hand–held tester to DLC3 on the vehicle or read the number of blinks of the CHK ENG when Tc and CG terminals on the DLC3 are connected. The hand–held tester also enables you to erase the DTCs and activate the several actuators and check freeze frame data and various forms of engine data (For instruction book).

- The diagnosis system operates in normal mode during normal vehicle use, and also has a check (test) mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2–trip detection logic (*) to prevent erroneous detection and ensure thorough malfunction detection. By switching the Engine and ECT ECU to check (test) mode using hand–held tester when troubleshooting, the technician can cause the CHK ENG to light up for a malfunction that is only detected once or momentarily.
- *2 trip detection logic:
  When a logic malfunction is first detected, the malfunction is temporarily stored in the Engine and ECT ECU memory.
  If the same malfunction is detected again during the 2nd test drive, this 2nd detection causes the CHK ENG to light up.


FI6907

2. INSPECT DIAGNOSIS (NORMAL MODE)

(a) Check the CHK ENG.

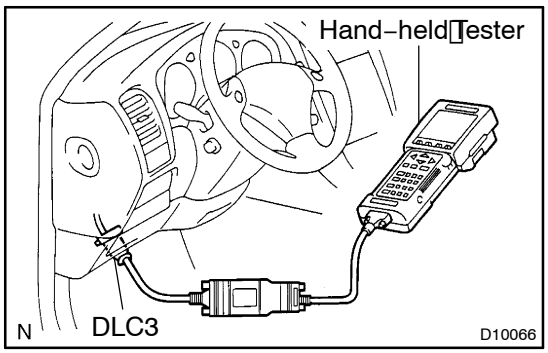
(1) The CHK ENG comes on when the ignition switch is turned ON and the engine is not running.

HINT:
If the CHK ENG does not light up, troubleshoot the combination meter (See page BE–35).

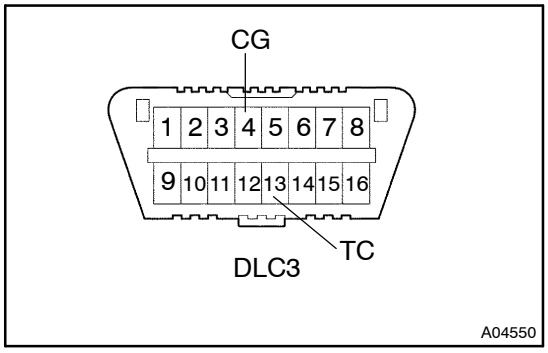
(2) When the engine is started, the CHK ENG should go off. If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

(b) Check the DTC (Using hand–held tester).

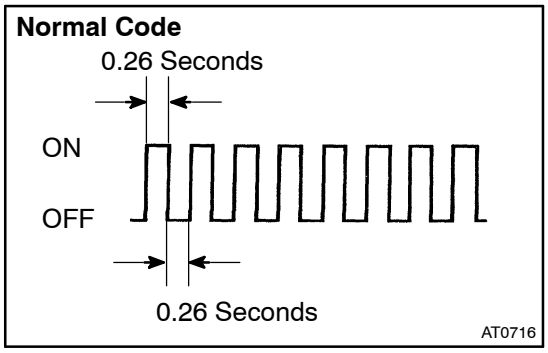
NOTICE:
When the diagnostic system is switched from normal mode to check (test) mode, it erases all DTCs and freeze frame data recorded in normal mode. So before switching modes, always check the DTCs and freeze frame data, and note them down.



(1) Prepare hand–held tester.
(2) Connect the hand–held tester to DLC3 at the lower part of the instrument panel.
(3) Turn the ignition switch ON and turn the hand–held tester switch ON.
(4) Use the hand–held tester to check the DTCs and instructions, see the hand–held tester instruction book.
(5) See page DI–170 to confirm the details of the DTCs.

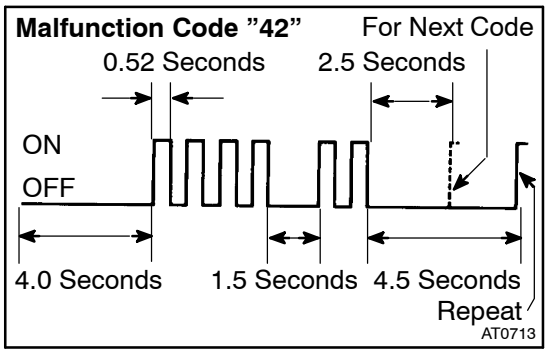


(c) M–OBD only:
Check the DTC (Not using hand–held tester).
(1) Turn the ignition switch ON, but do not start the engine.
(2) Using SST, connect terminals 13 (Tc) and 4 (CG) of DLC3.
SST 09843–18040



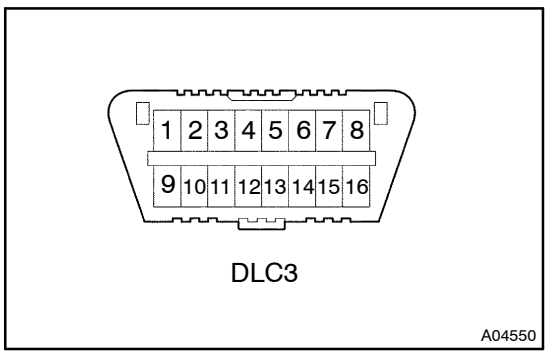
(3) Read the DTC indicated by the number of times the CHK ENG blinks.

HINT:
If the system is operating normally, the light will blink 2 times per second.



(4) The malfunction code is indicated, as shown in the chart on the left (DTC ”42” is shown as an example).

HINT:
When 2 or more malfunction codes are stored in memory, the lower–numbered code is displayed first.



(d) Inspect the DLC3.
(1) The vehicle’s Engine and ECT ECU uses ISO 9141–2 (Euro–OBD)/ISO 14230 (M–OBD) for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141–2/ISO 14230 format.

Terminal No.	Connection	Voltage or Resistance	Condition
7	Bus ⊕ Line	Pulse generation	During transmission
4	Chassis Ground	↔ Body Ground / 1 Ω or less	Always
16	Battery Positive	↔ Body Ground / 9 – 14 V	Always

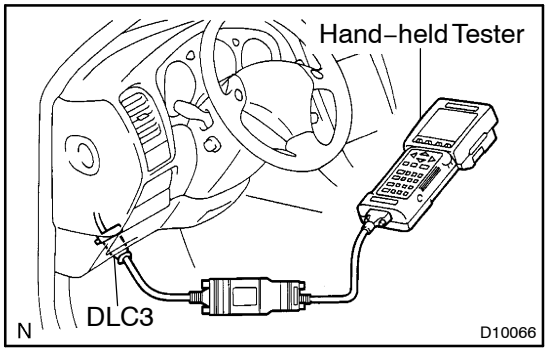
HINT:
If your display shows ”UNABLE TO CONNECT TO VEHICLE” when you have connected the cable of the OBD scan tool or hand–held tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still not possible 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.

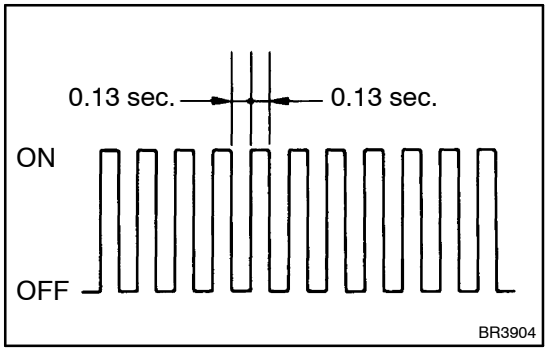
3. INSPECT DIAGNOSIS (CHECK MODE)

HINT:
Hand–held tester only: Compared to the Normal mode, the Check mode has high sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in normal mode can also be detected in Check mode.

(a) Check the DTC.
  (1) Check the initial conditions.
    - Battery positive voltage 11 V or more
    - Throttle valve fully closed
    - Transmission in P range
    - Air conditioning switched off
  (2) Turn the ignition switch OFF.
  (3) Prepare a hand–held tester.



  (4) Connect the hand–held tester to DLC3 at the lower part of the instrument panel.
  (5) Turn the ignition switch ON and switch the hand–held tester ON.



  (6) Switch the hand–held tester from Normal mode to Check mode (Check that the CHK ENG flashes).
  (7) Start the engine (CHK ENG goes out after the engine starts).
  (8) Simulate the conditions of the malfunction described by the customer.

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

(9) After simulating the malfunction conditions, use the hand–held tester diagnosis selector to check the DTCs and freeze frame data, etc.

HINT:
Take care not to turn the ignition switch OFF, as turning it off switches the diagnosis system from Check mode to Normal mode, all DTCs etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.

(b) When using hand–held tester:
Clear the DTC.
The following actions will erase the DTC and freeze frame data. Operate a hand–held tester to erase the codes.

(c) When not using hand–held tester:
Clear the DTC.
Disconnecting the battery terminals or EFI fuse and ETCS fuse for 60 seconds or more.

4. PROBLEM SYMPTOM CONFIRMATION

Taking into consideration the results of the customer problem analysis, try to reproduce the symptoms of the trouble. If the problem is that the transmission 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.

5. ROAD TEST

NOTICE:

Conduct the test at normal operating ATF temperature 50 – 80°C (122 – 176°F).

(a) D range test (NORM and PWR pattern):
Shift into the D range and fully depress the accelerator pedal and check the following points.

(1) Check up–shift operation.
Check to see that 1 → 2, 2 → 3, 3 → 4 and 4 → 5 up–shift take place, at that the shift point conform to the automatic shift schedule (See page SS–22).

HINT:

- 5th Gear Up–shift Prohibition Control (Coolant temp. is 60 °C (140 °F) or less.)
- 5th Gear Lock–up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60 °C (140 °F) or less)

(2) Check for shift shock and slip.
Check for shock and slip at the 1 → 2, 2 → 3, 3 → 4 and 4 → 5 up–shifts.

(3) Check for abnormal noises and vibration.
Run at the D range lock–up or 5th gear and check for abnormal noises and vibration.

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

(4) Check kick–down operation.
While running in the D range, 2nd, 3rd and 5th gears, check to see that the possible kick–down vehicle speed limits for 2 → 1, 3 → 2, 4 → 3 and 5 → 4 kick–downs conform to those indicated in the automatic shift schedule (See page SS–22).

(5) Check abnormal shock and slip at kick–down.

(6) Check the lock–up mechanism.

- Drive in D range, 5th gear, at a steady speed (lock–up ON) of about 70 km/h (43 mph).
- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

If there is a big jump in engine speed, there is no lock–up.

(b) 4 range test:
Shift into the 4 range and fully depress the accelerator pedal and check the following points.

(1) Check up–shift operation.
Check to see that the 1 → 4 up–shift takes place and that the shift point conforms to the automatic shift schedule (See page SS–22).

HINT:
There is no 5th up–shift in the 4 range.

(2) Check engine braking.
While running in the 4 range and 4th gear, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration, and for shock at up–shift and down–shift.

(c) 3 range test:
Shift into the 3 range and fully depress the accelerator pedal and check the following points.

(1) Check up–shift operation.
Check to see that the 1 → 3 up–shift takes place and that the shift point conforms to the automatic

(2) Check engine braking.
While running in the 3 range and 3rd gear, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration, and for shock at up–shift and down–shift.

(d) 2 range test:
Shift into the 2 range and fully depress the accelerator pedal and check the following points.

(1) Check up–shift operation.
Check to see that the 1 → 2 up–shift takes place and that the shift point conforms to the automatic

(2) Check engine braking.
While running in the 2 range and 2nd gear, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration, and for shock at up–shift and down–shift.

(e) L range test:
Shift into the L range and fully depress the accelerator pedal and check the following points.

(1) Check no up–shift.
While running in the L range, check that there is no up–shift to 2nd gear.

(2) Check engine braking.
While running in the L range, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration.

(f) R range test:
Shift into the R range and fully depress the accelerator pedal and check for slipping.

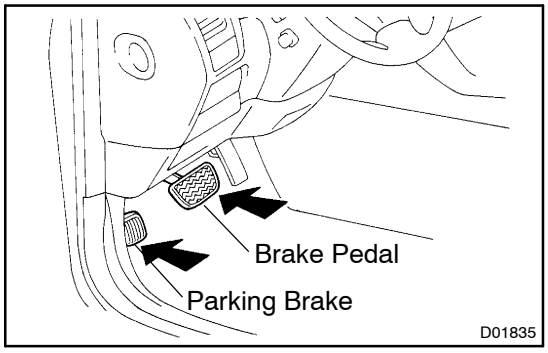
CAUTION:
Before conducting this test ensure that the test area is free from people and obstruction.

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

6. ACTIVE TEST

You are able to set the A/T gear position as you like by operating each solenoid value forcibly using hand–held tester.
However, the condition that you can set the gear position differs in the setting gear position, so conduct the ACTIVE TEST following the table below.

No.	Indication Gear Condition	Starting Condition	Canceling Condition
1	1st, 2nd	Vehicle speed: 0 km/h (0 mph)	Vehicle speed: 0 km/h (0 mph)
2	3rd	Vehicle speed: 0 km/h (0 mph) or vehicle running at 4th or 5th gear	Vehicle speed: less than 50 km/h (31 mph)
3	4th	• Vehicle running at 3rd or 5th gear • Vehicle speed: 50 km/h (31 mph)	Vehicle speed: less than 50 km/h (31 mph)
4	5th	• Vehicle speed: more than 60 km/h (37 mph) • Vehicle running at 4th gear • Throttle value opening angle: less than 50 %	• Vehicle speed: less than 60 km/h (37 mph) • Throttle value opening angle: more than 50 %



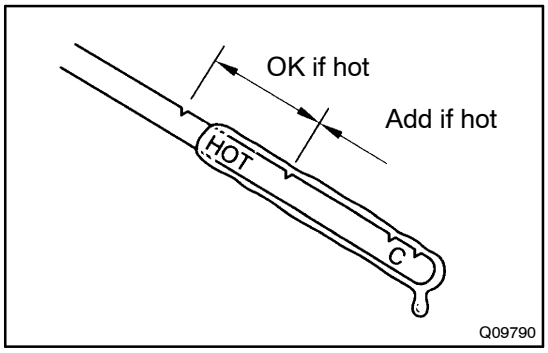
7. BASIC INSPECTION

(a) Check the fluid level.

HINT:

Drive the vehicle so that the engine and transmission are at normal operating temperature.

Fluid temperature: 70 – 80 °C (158 – 176 °F)



(1) Park the vehicle on a level surface and set the parking brake.
(2) With the engine idling and the brake pedal depressed, shift the shift lever into all ranges from P to L range and return to P range.
(3) Pull out the dipstick and wipe it clean.
(4) Push it back fully into the pipe.
(5) Pull it out and check that the fluid level is in the HOT range.

If the level is not within the range, add new fluid.

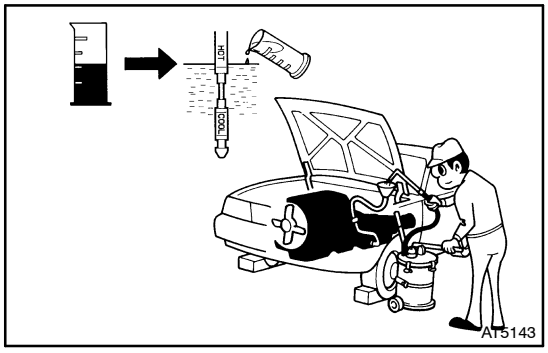
Fluid type: ATF TYPE T–IV

NOTICE:

Do not overfill.

(b) Check the fluid condition.

If the fluid smells burnt or is black, replace it.

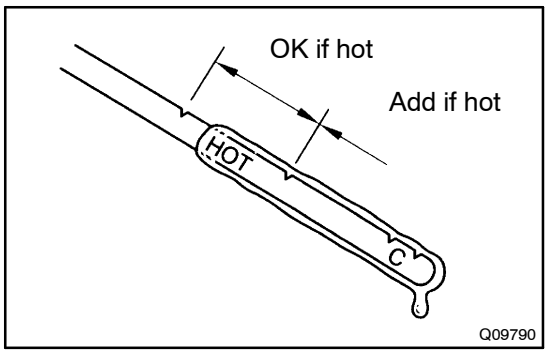


(c) Replace the ATF.
(1) Remove the drain plug and drain the fluid.
(2) Reinstall the drain plug securely.
(3) With the engine OFF add new fluid through the oil filler pipe.

Fluid type: ATF TYPE T–IV

Capacity: 2.0 liters (2.1 US qts, 1.8 Imp.qts)

(4) Start the engine and shift the shift lever into all ranges from P to L range and then shift into P range.



(5) With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.
(6) Check the fluid level at the normal operating temperature, 70 – 80 °C (158 – 176 °F), and add as necessary.

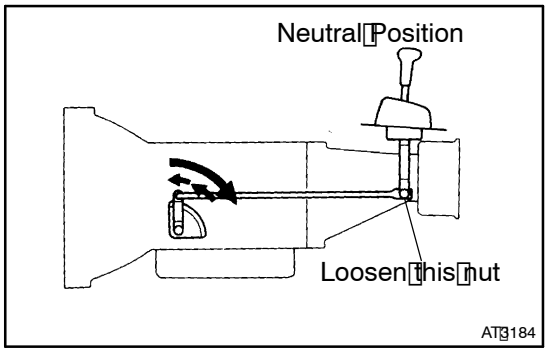
NOTICE:

Do not overfill.

(d) Check the fluid leaks.

Check for leaks in the transmission.

If there are leaks, it is necessary to repair or replace O–rings, FIPGs, oil seals, plugs or other parts.



(e) Inspect and adjust the shift lever position.

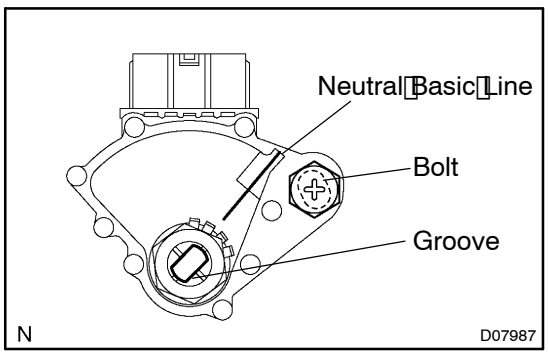
- When shifting the shift lever from the N range to other ranges, check that the lever can be shifted smoothly and accurately to each range and that the position indicator is not aligned with the correct position.

If the indicator is not aligned with the correct position, carry out the following adjustment procedures.

- Loosen the nut on the shift lever.
- Push the control shaft fully rearward.
- Return the control shaft lever 2 notches to N range.
- Set the shift lever to N range.
- While holding the shift lever lightly toward the R range side, tighten the shift lever nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

- Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D range and reverses when shifting it to the R range.



(f) Inspect and adjust the neutral start switch.

Check that the engine can be started with the shift lever only in the N or P range, but not in other ranges.

If it is not as stated above, carry out the following adjustment procedures.

- Loosen the neutral start switch bolt and set the shift lever to the N range.
- Align the groove and neutral basic line.
- Hold the switch in position and tighten the bolt.

Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)

- For continuity inspection of the neutral start switch, see page DI–231.

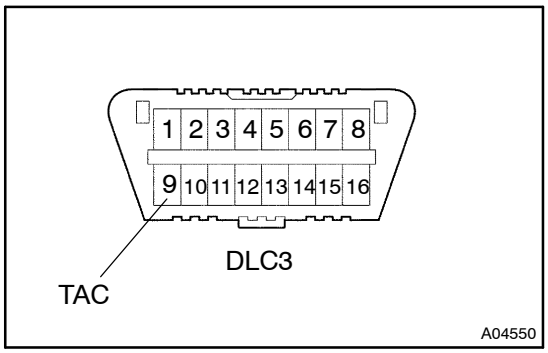
8. MECHANICAL SYSTEM TESTS

(a) Measure the stall speed.

The object of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D ranges.

NOTICE:

- **Do the test at normal operating ATF temperature 50 – 80 °C (122 – 176 °F).**
- **Do not continuously run this test for longer than 5 seconds.**
- **To ensure safety, do this test in a wide, clear level area which provides good traction.**
- **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**



- Chock the 4 wheels.
- Connect a hand–held tester to DLC3 or tachometer to terminal TAC of DLC3 with SST.

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- Fully apply the parking brake.
- Keep your left foot pressing firmly on the brake pedal.
- Start the engine.
- Shift into the D range. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed: 2,700 ± 150 rpm

Evaluation:

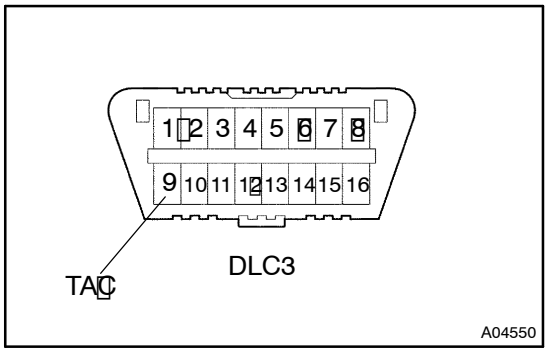
Problem	Possible cause
(a) Stall speed low in D ranges	• Engine output may be insufficient • Stator one–way clutch is operating properly HINT: If more than 600 rpm below the specified value, the torque converter could be faulty.
(b) Stall speed high in D range	• Line pressure too low • Forward clutch slipping • No. 2 one–way clutch not operating properly • O/D one–way clutch not operating properly

(b) Measure the time lag.

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 O/D direct clutch, forward clutch, and 1st & reverse brake.

NOTICE:

- **Do the test at normal operating ATF temperature: 50 – 80°C (122 – 176°F).**
- **Be sure to allow 1 minute interval between tests.**
- **Take 3 measurements and take the average value.**



- Chock the 4 wheels.
- Connect a hand–held tester to DLC3 or tachometer to terminal TAC of DLC3 with SST.

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- Start engine and check idle speed.

Idle speed: 700 ± 50 rpm (In N range and A/C OFF)

- Shift the lever from N to D range. 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

- In the same way, measure the time lag for N → R.

Time lag: N → R less than 1.5 seconds

Evaluation (If N → D time or N → R time lag is longer than the specified):

Problem	Possible cause
N → D time lag is longer	• Line pressure too low • Forward clutch worn • O/D one–way clutch not operating properly
N → R time lag is longer	• Line pressure too low • Direct clutch worn • 1st & reverse brake worn • O/D one–way clutch not operating properly

9. HYDRAULIC TEST

Measure the line pressure.

NOTICE:

- **Do the test at normal operation ATF temperature: 50 – 80°C (122 – 176°F).**
- **The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stopper outside the vehicle while the other is doing the test.**
- **Be careful to prevent SST's hose from interfering with the exhaust pipe.**

(1) Warm up the ATF.

(2) Remove the test plug on the right side of the transmission case and connect SST.
(See page AT–331 for the location to connect SST)

SST 09992–00095 (09992–00231, 09992–00271)

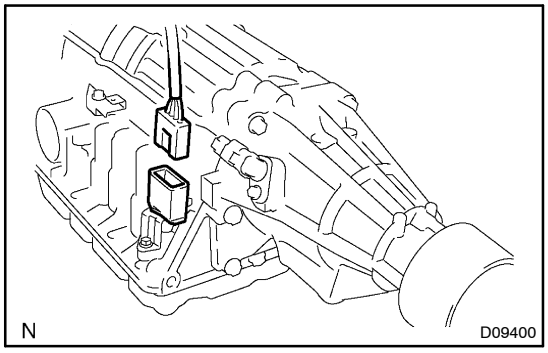
(3) Fully apply the parking brake and chock the 4 wheels.
(4) Connect a hand–held tester to DLC3.
(5) Start the engine and check idling speed.
(6) Keep your left foot pressing firmly on the brake pedal and shift into D range.
(7) Measure the line pressure when the engine is idling.
(8) Depress the accelerator 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 range.

Specified line pressure:

Condition	D range kPa (kgf / cm^2, psi)	R range kPa (kgf / cm^2, psi)
Idling	390 – 460 (4.0 – 4.7, 57 – 67)	0
Stall	1,200 – 1,360 (12.2 – 13.8, 174 – 196)	1,640 – 1,960 (16.7 – 20.0, 238 – 282)

Evaluation:

Problem	Possible cause
If the measured values at all ranges are higher	• SLT solenoid valve defective • Regulator valve detective
If the measured values at all ranges are lower	• SLT solenoid valve defective • Regulator valve defect • Oil pump defect • O/D direct clutch defect
If pressure is low in the D range only	• D range circuit fluid leakage • Forward clutch defect
If pressure is low in the R range only	• R range circuit fluid leakage • Direct clutch defect • 1st & reverse brake defect



10. MANUAL SHIFTING TEST

HINT:

By this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the transmission.

(a) Disconnect the solenoid wire.

(b) Inspect the manual driving operation.

Check that the shift and gear positions correspond to the table below.

While driving, shift through the L, 2, 3, 4 and D ranges.

Check that the gear change corresponds to the shift range.

Shift range	Gear position
D	5th
4	5th
3	4th
2	3rd
L	3rd
R	Reverse
P	Pawl Lock

HINT:

If the L, 2, 3, 4 and D range gear positions are difficult to distinguish, do the following read test.

If any abnormality is found in the above test, the problem is in the transmission itself.

(c) Connect the solenoid wire.

(d) Cancel out DTC.

DI1G9–04

DIAGNOSTIC TROUBLE CODE CHART

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

Euro OBD:

DTC No. (See Page)	Detection Item	Trouble Area	*1CHK ENG	*2Memory
P0500 (DI–195)	Vehicle Speed Sensor Malfunction	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Engine and ECT ECU • Automatic transmission assembly	●	○
P0710 (DI–199)	Transmission Fluid Temperature Sensor Circuit Malfunction (ATF Temperature Sensor)	• Open or short in ATF temperature sensor circuit • ATF temperature sensor circuit • Engine and ECT ECU	●	○
P0711 (DI–201)	Transmission Fluid Temperature Sensor Circuit Range/Performance problem	ATF temperature sensor	●	○
P0715 (DI–202)	Input/Turbine Speed Sensor Circuit Malfunction (O/D Direct Clutch Speed Sensor)	• Open or short in O/D direct clutch speed sensor circuit • O/D direct clutch speed sensor • Engine and ECT ECU • Automatic transmission assembly	●	○
P0750 (DI–205)	Shift Solenoid ”A” Malfunction (No. 1 Solenoid Valve)	• No. 1 solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Automatic transmission assembly	●	○
P0753 (DI–208)	Shift Solenoid ”A” Electrical Malfunction (No. 1 Solenoid Valve)	• Open or short in No. 1 solenoid valve circuit • No. 1 solenoid valve • Engine and ECT ECU	●	○
P0755 (DI–205)	Shift Solenoid ”B” Malfunction (No. 2 Solenoid Valve)	• No. 2 solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Automatic transmission assembly	●	○
P0758 (DI–208)	Shift Solenoid ”B” Electrical Malfunction (No. 2 Solenoid Valve)	• Open or short in No. 2 solenoid valve circuit • No. 2 solenoid valve • Engine and ECT ECU	●	○
P0760 (DI–205)	Shift Solenoid ”C” Malfunction (No. 3 Solenoid Valve)	• No. 3 solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Automatic transmission assembly	●	○
P0763 (DI–208)	Shift Solenoid ”C” Electrical Malfunction (No. 3 Solenoid Valve)	• Open or short in No. 3 solenoid valve circuit • No. 3 solenoid valve • Engine and ECT ECU	●	○
P0768 (DI–213)	Shift Solenoid ”D” Electrical Malfunction (No. 4 Solenoid Valve)	• Open or short in No. 4 solenoid valve circuit • No. 4 solenoid valve • Engine and ECT ECU	●	○
P0770 (DI–216)	Shift Solenoid ”E” Malfunction (SLU Solenoid Valve)	• SLU solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Lock–up clutch • Automatic transmission assembly • Torque converter	●	○
P1520 (DI–218)	Stop Light Switch Signal Malfunction	• Short stop light switch signal circuit • Stop light switch • Engine and ECT ECU	●	○
P1755 (DI–219)	Linear Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU • Automatic transmission assembly	●	○

P1760 (DI–223)	Linear Solenoid for Line Pressure Control Circuit Malfunction (SLT Solenoid Valve)	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU	●	○
P1765 (DI–223)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (SLN Solenoid Valve)	• Open or short in SLN solenoid valve circuit • SLN solenoid valve • Engine and ECT ECU	●	○
P1780 (DI–231)	Neutral Start Switch Malfunction	• Short in neutral start switch circuit • Neutral start switch • Engine and ECT ECU	●	○

*1: "●" mark means check engine waning light (CHK ENG) blinks once every 2 seconds.
*2: "○" mark means Engine and ECT ECU memorizes the malfunction code if the Engine and ECT ECU detects the DTC detection condition.
HINT:
This DTC may be output when the clutch, brake and gear components etc. inside the automatic transmission are damaged.

M–OBD (Except European spec.):

DTC No. (See Page)	Detection Item	Trouble Area	*CHK ENG	*2Memory
P0500/42 (DI–195)	Vehicle Speed Sensor Malfunction	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Engine and ECT ECU • Automatic Transmission Assembly	●	○
P0710/38 (DI–199)	Transmission Fluid Temperature Sensor Circuit Malfunction (ATF Temperature Sensor)	• Open or short in ATF temperature sensor circuit • ATF temperature sensor circuit • Engine and ECT ECU	●	○
P0715/67 (DI–202)	Input/Turbine Speed Sensor Circuit Malfunction (O/D Direct Clutch Speed Sensor)	• Open or short in O/D direct clutch speed sensor circuit • O/D direct clutch speed sensor • Engine and ECT ECU • Automatic Transmission Assembly	●	○
P0753/62 (DI–208)	Shift Solenoid "A" Electrical Malfunction (No. 1 Solenoid Valve)	• Open or short in No. 1 solenoid value circuit • No. 1 solenoid valve • Engine and ECT ECU	●	○
P0758/63 (DI–208)	Shift Solenoid "B" Electrical Malfunction (No. 2 Solenoid Valve)	• Open or short in No. 2 solenoid valve circuit • No. 2 solenoid valve • Engine and ECT ECU	●	○
P0763/76 (DI–208)	Shift Solenoid "C" Electrical Malfunction (No. 3 Solenoid Valve)	• Open or short in No. 3 solenoid valve circuit • No. 3 solenoid valve • Engine and ECT ECU	●	○
P0768/65 (DI–213)	Shift Solenoid "D" Electrical Malfunction (No. 4 Solenoid Valve)	• Open or short in No. 4 solenoid valve circuit • No. 4 solenoid valve • Engine and ECT ECU	●	○
P1755/68 (DI–219)	Linear Solenoid for Line Pressure Control Circuit Malfunction (SLU Solenoid Valve)	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU	X	○
P1760/77 (DI–223)	Linear Solenoid for Line Pressure Control Circuit Malfunction (SLT Solenoid Valve)	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU	X	○

P1765/46 (DI–227)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (SLN Solenoid Valve)	• Open or short in SLN solenoid valve circuit • SLN solenoid valve • Engine and ECT ECU	X	○
P1780/97 (DI–231)	Neutral Start Switch Malfunction	• Short in neutral start switch circuit • Neutral start switch • Engine and ECT ECU	●	○

*1: "●" mark means check engine warning light (CHK ENG) blinks once every 2 seconds.
"X" mark means CHK ENG never blinks.

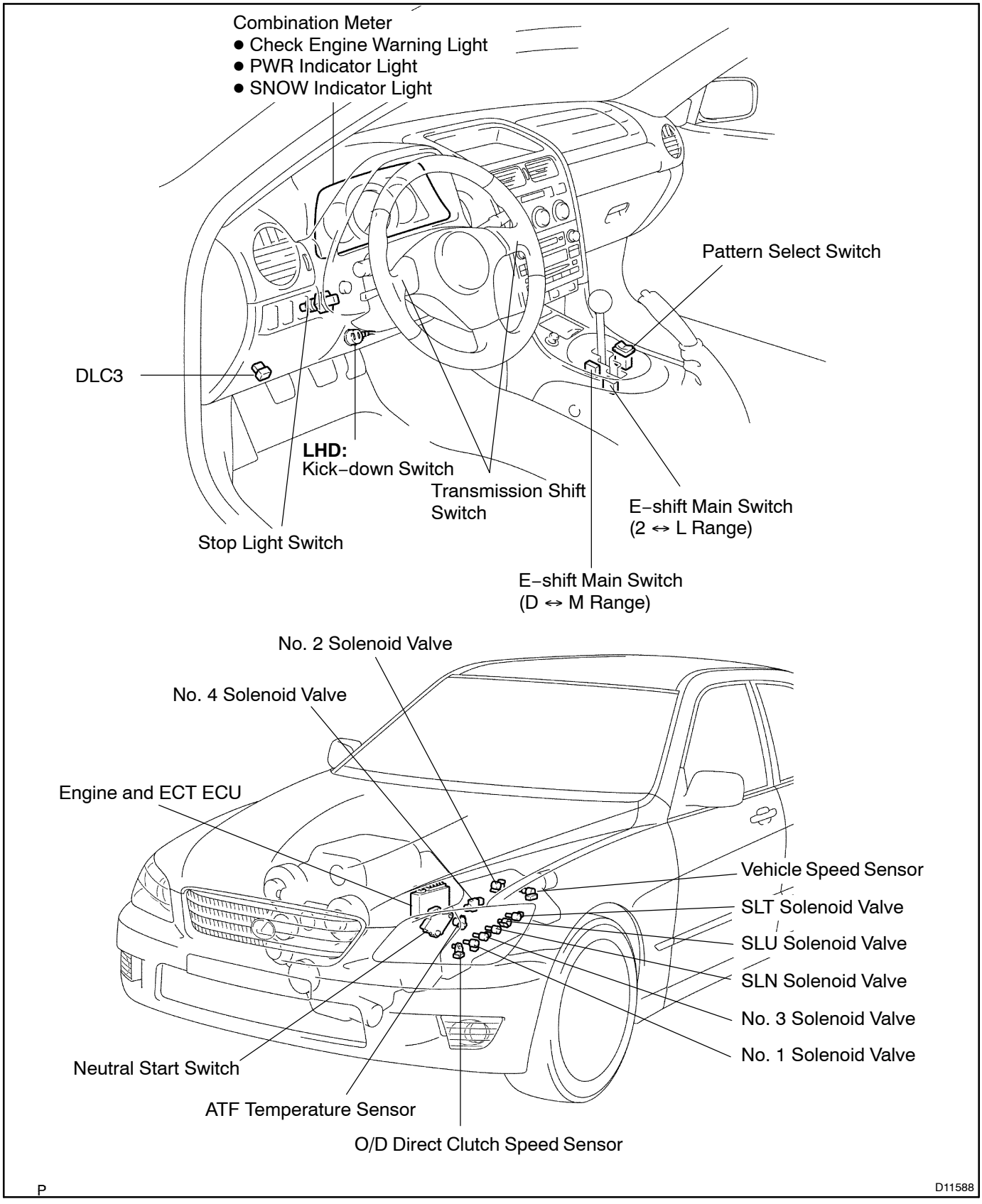
*2: "○" mark means Engine and ECT ECU memorizes the malfunction code if the Engine and ECT ECU detects the DTC detection condition.

HINT:

This DTC may be output when the clutch, brake and gear components etc. inside the automatic transmission are damaged.

DI25K–03

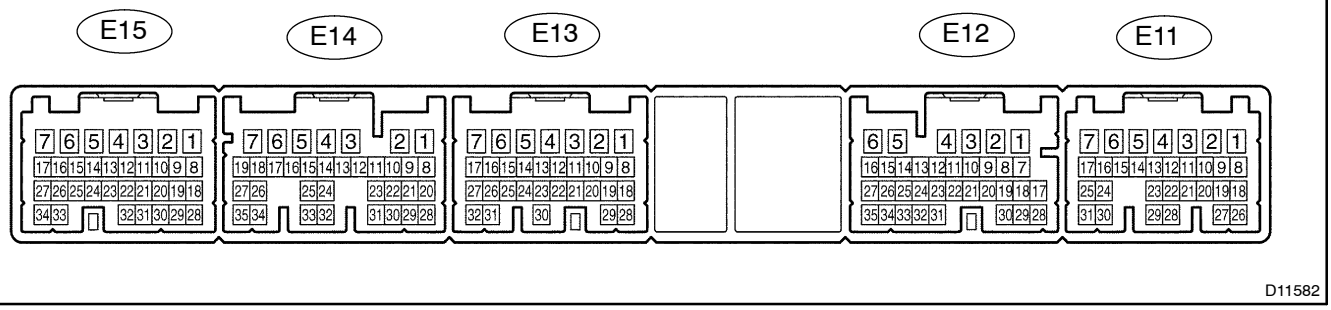
PARTS LOCATION



DI1GB–13

TERMINALS OF ECU

Engine and ECT ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
*1 KD ↔ E1 (E11–9 ↔ E14–7)	GR–L ↔ BR	IG ON and accelerator pedal depressed	9 – 14
		IG ON and accelerator pedal released	Below 1.5
STP ↔ E1 (E12–4 ↔ E14–7)	G–W ↔ BR	IG ON and brake pedal depressed	7.5 – 14
		IG ON and brake pedal released	Below 1.5
SFTD ↔ E1 (E12–5 ↔ E14–7)	*2 GR–R ↔ BR *3 GR–G ↔ BR	IG ON and ”Down” transmission shift switch pressed	Below 3
		IG ON and ”Down” transmission shift switch released	7 – 12
SFTU ↔ E1 (E12–6 ↔ E14–7)	*2 GR–G ↔ BR *3 GR–R ↔ BR	IG ON and ”Up” transmission shift switch pressed	Below 3
		IG ON and ”Up” transmission shift switch released	7 – 12
2 ↔ E1 (E12–12 ↔ E14–7)	Y–G ↔ BR	IG ON and shift lever 2 or L range	7.5 – 14
		IG ON and shift lever other than 2 and L range	Below 1.5
D ↔ E1 (E12–13 ↔ E14–7)	GR–B↔ BR	IG ON and shift lever D or M range	7.5 – 14
		IG ON and shift lever other than D and M range	Below 1.5
4 ↔ E1 (E12–14 ↔ E14–7)	LG–B ↔ BR	IG ON and shift lever M range	7.5 – 14
		IG ON and shift lever other than M range	Below 1.5
L ↔ E1 (E12–15 ↔ E14–7)	G–Y ↔ BR	IG ON and shift lever L range	7.5 – 14
		IG ON and shift lever other than L range	Below 1.5
N ↔ E1 (E14–3 ↔ E14–7)	G–R ↔ BR	IG ON and shift lever N range	7.5 – 14
		IG ON and shift lever other than N range	Below 1.5
3 ↔ E1 (E14–4 ↔ E14–7)	G–W ↔ BR	IG ON and shift lever 3 range	7.5 – 14
		IG ON and shift lever other than 3 range	Below 1.5
R ↔ E1 (E14–5 ↔ E14–7)	R–B ↔ BR	IG ON and shift lever R range	7.5 – 14
		IG ON and shift lever other than R range	Below 1.5
P ↔ E1 (E14–6 ↔ E14–7)	G ↔ BR	IG ON and shift lever P range	7.5 – 14
		IG ON and shift lever other than P range	Below 1.5
SLU^+ ↔ SLU^- (E14–11 ↔ E14–10)	G–W ↔ *2 LG–B G–W ↔ *3 L–R	IG ON	Below 3
		Engine is idling	Pulse signal is output below 1.5 ↔ 9 – 14
SLN^+ ↔ SLN^- (E14–13 ↔ E14–12)	Y–R ↔ R–W	IG ON	Below 3
		Engine is idling	Pulse signal is output below 1.5 ↔ 9 – 14
S4 ↔ E1 (E14–16 ↔ E14–7)	B–R ↔ BR	IG ON	Below 1.5
		1st, 2nd, 3rd or 4th gear	Below 1.5
		5th gear	9 – 14

S3 ↔ E1 (E14–17 ↔ E14–7)	W–L ↔ BR	IG ON	Below 1.5
		1st, 2nd, 3rd or 5th gear	Below 1.5
		4th gear	9 – 14
S2 ↔ E1 (E14–18 ↔ E14–7)	G–Y ↔ BR	IG ON	Below 1.5
		1st, 4th or 5th gear	Below 1.5
		2nd or 3rd gear	9 – 14
S1 ↔ E1 (E14–19 ↔ E14–7)	Y ↔ BR	IG ON	Below 1.5
		3rd, 4th or 5th gear	Below 1.5
		1st or 2nd gear	9 – 14
$NC0^+$ ↔ $NC0^-$ (E14–21 ↔ E14–20)	R ↔ G	Engine is idling	Pulse signal is output below 1.5 ↔ 4 – 6
$SP2^+$ ↔ $SP2^-$ (E14–23 ↔ E14–22)	L–Y ↔ R–L	Engine is idling	Pulse signal is output below 1.5 ↔ 4 – 6
OIL ↔ E2 (E14–27 ↔ E12–34)	GR ↔ BR	IG ON and ATF temperature 110 °C (176 °F)	Below 1
SLT^+ ↔ SLT^- (E14–35 ↔ E14–34)	B–Y ↔ R–B	IG ON	Below 3
		Engine is idling	Pulse signal is output below 1.5 ↔ 9 – 14

*1: LHD Only
*2: LHD
*3: RHD

DI1GC–15

PROBLEM SYMPTOMS TABLE

HINT:

If a normal code is displayed during the DTC check but the trouble still occurs, check the circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for trouble-shooting.

The Matrix Chart is divided into 3 chapters.

- If the instruction "Proceed to next circuit inspection shown on matrix chart" is given in the flow chart for 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, then check and replace the Engine and ECT ECU.

1. CHAPTER 1: ELECTRONIC CIRCUIT MATRIX CHART

Symptom	Suspect Area	See page
No up–shift (A particular gear, from 1st to 4th gear, is not up–shifted)	Engine and ECT ECU	IN–34
No up–shift (4th → 5th)	1. E–shift main switch circuit 2. Engine and ECT ECU	DI–240 IN–34
No down–shift (5th → 4th)	1. E–shift main switch circuit 2. Engine and ECT ECU	DI–240 IN–34
No down–shift (A particular gear, from 1st to 4th gear, is not up–shifted)	Engine and ECT ECU	IN–34
No lock–up	1. Stop light switch signal circuit 2. Engine and ECT ECU	DI–218 IN–34
No lock–up off	Engine and ECT ECU	IN–34
Shift point too high or too low	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–237 IN–34
Up–shift to 5th from 4th while shift lever is M position	1. E–shift main switch circuit 2. Engine and ECT ECU	DI–240 IN–34
Up–shift to 5th from 4th while engine is cold	Engine and ECT ECU	IN–34
No kick–down	1. Kick–down switch circuit 2. Engine and ECT ECU	DI–247 IN–34
No pattern select	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–237 IN–34
Engine stalls when starting off or stopping	1. Stop light switch signal circuit 2. Engine and ECT ECU	DI–218 IN–34
No 2nd start	1. Pattern select switch circuit 2. Engine and ECT ECU	DI–237 IN–34
No E–shift system	1. E–shift main switch circuit 2. Transmission shift switch circuit 3. Engine and ECT ECU	DI–240 DI–243 IN–34

2. CHAPTER 2: ON–VEHICLE REPAIR
(★: A650E AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM780U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. Transmission control rod 2. Manual valve 3. Parking lock pawl 4. Off–vehicle repair matrix chart	DI–170 ★ ★ –
Vehicle does not move in R range	1. Reverse control valve 2. Off–vehicle repair matrix chart	★ –
Vehicle does not move in particular range or ranges (Except R range)	Off–vehicle repair matrix chart	–
No up–shift (1st → 2nd)	1. 1–2 shift valve 2. Off–vehicle repair matrix chart	★ –
No up–shift (2nd → 3rd)	1. 2–3 shift valve 2. Off–vehicle repair matrix chart	★ –
No up–shift (3rd → 4th)	1. 3–4 shift valve 2. Off–vehicle repair matrix chart	★ –
No up–shift (4th → 5th)	1. 4–5 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (5th → 4th)	1. 4–5 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (4th → 3rd)	1. 3–4 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (3rd → 2nd)	1. 2–3 shift valve 2. Off–vehicle repair matrix chart	★ –
No down–shift (2nd → 1st)	1. 1–2 shift valve 2. Off–vehicle repair matrix chart	★ –
No lock–up or No lock–up off	1. Lock–up control valve 2. Lock–up relay valve 3. Off–vehicle repair matrix chart	★ ★ –
Harsh engagement (N → D)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_1 accumulator 4. Orifice control valve 5. Off–vehicle repair matrix chart	★ ★ ★ ★ –
Harsh engagement (Lock–up)	1. Lock–up control valve 2. Lock–up relay valve 3. Solenoid relay valve 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (N → R)	1. Accumulator control valve 2. C_2 accumulator 3. Solenoid modulator valve 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (2 → L)	Coast brake control valve	★
Harsh engagement (2nd → 3rd → 4th → 5th)	1. Accumulator control valve 2. Solenoid modulator valve	★ ★
Harsh engagement (1st → 2nd)	1. Solenoid modulator valve 2. B_3 control valve 3. B_2 release control valve 4. Solenoid relay valve 5. Off–vehicle repair matrix chart	★ ★ ★ ★ –

Harsh engagement (2nd → 3rd)	1. Accumulator control valve 2. Solenoid modulator valve 3. B_{2R} accumulator 4. B_{3R} control valve 5. B_{2R} release control valve 6. Solenoid relay valve 7. Off–vehicle repair matrix chart	★ ★ ★ ★ ★ ★ –
Harsh engagement (3rd → 4th)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_{2R} accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (4th → 5th)	1. Accumulator control valve 2. Solenoid modulator valve 3. B_{0R} accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Harsh engagement (5th → 4th)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_{0R} accumulator 4. Off–vehicle repair matrix chart	★ ★ ★ –
Slip or shudder (Forward and reverse)	1. Transmission control rod 2. Oil strainer 3. Pressure relief valve 4. Off–vehicle repair matrix chart	DI–170 ★ ★ –
Slip or shudder (Particular range)	1. Transmission control rod 2. Off–vehicle repair matrix chart	DI–170 –
No engine braking (1st: L range)	1. Coast brake control valve 2. Off–vehicle repair matrix chart	★ –
No engine braking (2nd: 2 range)	1. Coast brake control valve 2. Off–vehicle repair matrix chart	★ –
No kick–down	1. 1–2 shift valve 2. 2–3 shift valve 3. 3–4 shift valve	★ ★ ★

3. CHAPTER 3: OFF–VEHICLE REPAIR (★: A650E AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM780U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward range and reverse range	1. O/D one–way clutch (F_0) 2. O/D direct clutch (C_0) 3. O/D planetary gear unit 4. Torque converter	★ ★ ★ AT–39
Vehicle does not move in R range	1. Center and rear planetary gear unit 2. Direct clutch (C_2) 3. 1st & reverse brake (B_4) 4. O/D brake (B_0)	★ ★ ★ ★
No up–shift (1st → 2nd)	2nd brake (B_3)	★
No up–shift (2nd → 3rd)	1. 3rd brake (B_2) 2. One–way clutch No. 1 (F_1)	★ ★
No up–shift (3rd → 4th)	Direct clutch	★
No up–shift (4th → 5th)	O/D brake (B_0)	★
No lock–up or No lock–up off	Torque converter	AT–39
Harsh engagement (N → D)	1. Forward clutch (C_1) 2. O/D one–way clutch (F_0) 3. One–way clutch No. 2 (F_2)	★ ★ ★
Harsh engagement (N → R)	1. Direct clutch (C_2) 2. O/D brake (B_0) 3. 1st & reverse brake (B_4)	★ ★ ★
Harsh engagement (1st → 2nd)	2nd brake (B_3)	★
Harsh engagement (2nd → 3rd)	1. 3rd brake (B_2) 2. 2nd brake (B_3) 3. One–way clutch No. 1 (F_1)	★ ★ ★
Harsh engagement (3rd → 4th)	Direct clutch (C_2)	★
Harsh engagement (4th → 5th)	1. O/D brake (B_0) 2. O/D direct clutch (C_0)	★ ★
Harsh engagement (Lock–up)	Torque converter	AT–39
Slip or shudder (Forward and reverse: After warm–up)	1. Torque converter 2. O/D one–way clutch (F_0) 3. O/D direct clutch (C_0)	AT–39 ★ ★
Slip or shudder (Particular range: Just after engine starts)	Torque converter	AT–39
Slip or shudder (R range)	1. Direct clutch (C_2) 2. O/D brake (B_0) 3. 1st & reverse brake (B_4)	★ ★ ★
Slip or shudder (1st)	1. Forward clutch (C_1) 2. No. 2 one–way clutch (F_2)	★ ★
Slip or shudder (2nd)	2nd brake (B_3)	★
Slip or shudder (3rd)	1. 3rd coast brake (B_1) 2. 3rd brake (B_2) 3. One–way clutch No. 1 (F_1)	★ ★ ★
Slip or shudder (4th)	Direct clutch	★
Slip or shudder (5th)	O/D brake (B_0)	★
No engine braking (1st – 4th: D range)	O/C direct clutch (C_0)	★
No engine braking (1st: L range)	1st & reverse brake (B_4)	★
No engine braking (2nd: 2 range)	2nd brake (B_3)	★
No engine braking (3rd: 3 range)	3rd coast brake (B_1)	★

Poor acceleration (All ranges)	Torque converter	AT–39
Poor acceleration (5th)	1. O/D brake (B_0) 2. O/D planetary gear unit	★ ★
Engine stalls when starting off or stopping	Torque converter	AT–39

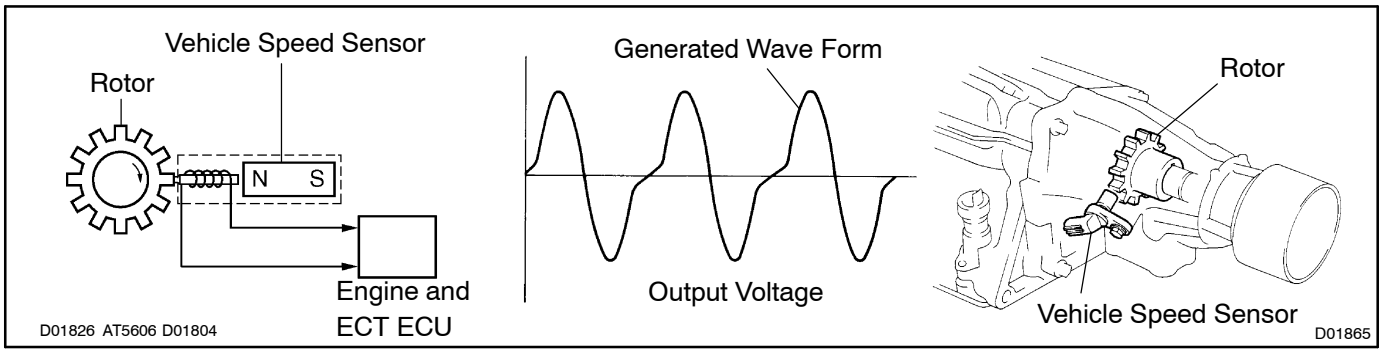
DI2L8–07

CIRCUIT INSPECTION

DTC	P0500/42	Vehicle Speed Sensor Malfunction

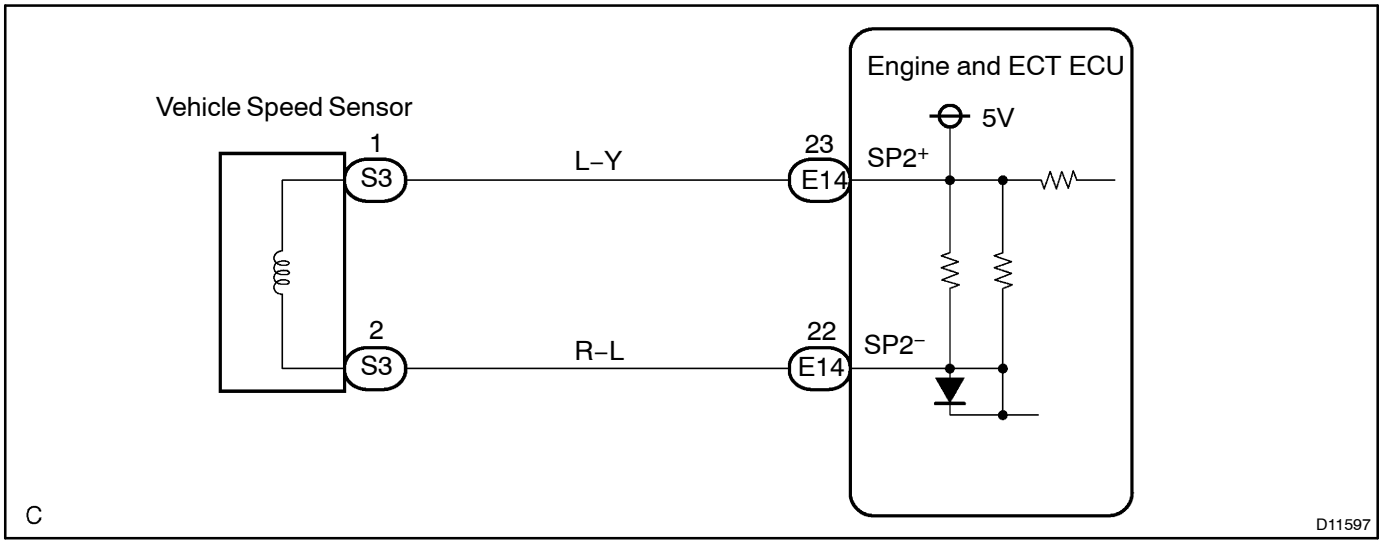
CIRCUIT DESCRIPTION

The vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the Engine and ECT ECU. The Engine & ECT ECU determines the vehicle speed based on these signals. An AC voltage is generated in the vehicle speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the Engine and ECT ECU.



DTC No.	DTC Detecting Condition	Trouble Area
P0500/42	No vehicle speed sensor signal to Engine and ECT ECU under conditions (a) and (b): (a) Neutral start switch is OFF (b) Vehicle is being driven	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • Engine and ECT ECU • Automatic transmission assembly
	Clutch or brake slips or gear broken	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester. Because freeze frame records the engine conditions when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.

1	**Connect hand–held tester and read value of vehicle speed value.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Start the engine and the hand–held tester main switch ON.

CHECK:

Drive the vehicle and read vehicle speed value.

OK:

Vehicle speed matches tester speed value.

OK → **Check and replace Engine and ECT ECU (See page IN–34).**

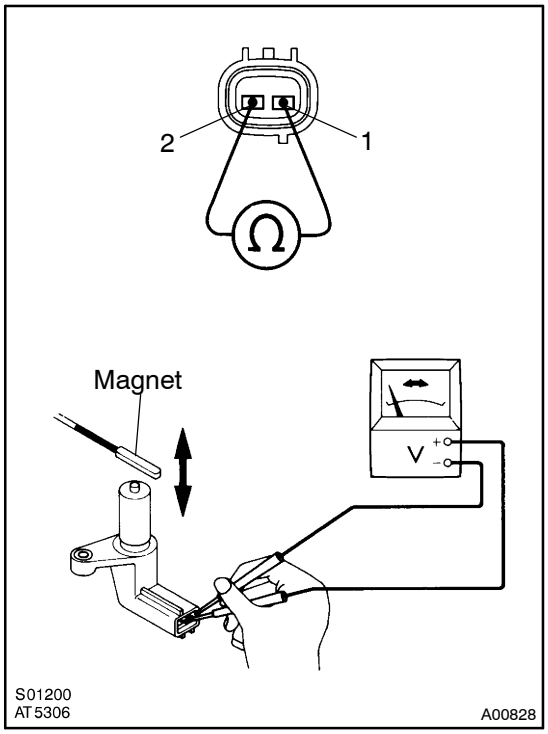
NG

2	**Check speedometer circuit (See page BE–2).**

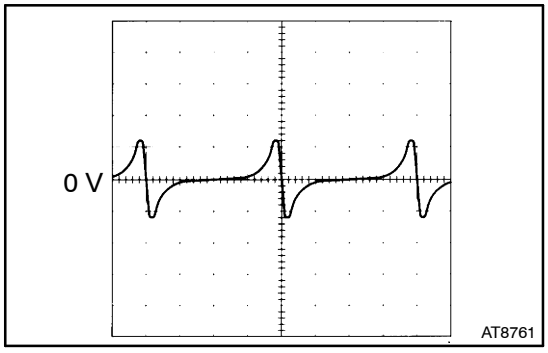
NG → **Repair or replace speedometer circuit.**

OK

3	Check vehicle speed sensor.



PREPARATION:
Remove the vehicle speed sensor from the transmission (See page AT–7).
CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor.
OK:
Resistance: 560 – 680 Ω at 20°C (68°F)
Reference:
Check vehicle speed sensor's function
CHECK:
Check voltage between terminals 1 and 2 of the vehicle speed sensor when a magnet is put close to front end of the vehicle speed sensor then taken away quickly.
OK:
Voltage is generated intermittently
HINT:
The generated voltage is extremely low.

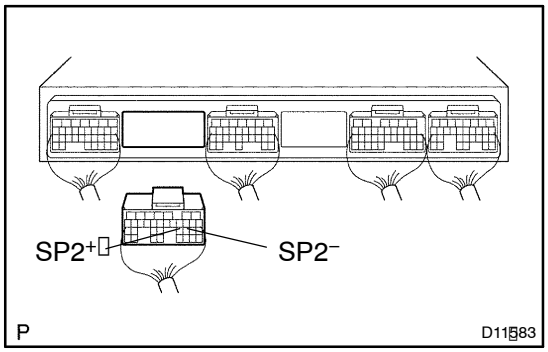


Reference:
INSPECTION USING OSCILLOSCOPE
Refer to the chart for wave form between terminals SP2+ and SP2–. When the vehicle speed is approx. 60 km/h (37 mph).

NG	Replace the vehicle speed sensor (See page AT–7).

OK

4	**Measure resistance between terminals SP2+ and SP2– of Engine and ECT connector.**



PREPARATION:

(a) Remove the Engine and ECT ECU hood.

(b) Disconnect the connector of the Engine and ECT ECU.

CHECK:

Measure resistance between terminals SP2+ and SP2– of the Engine and ECT ECU connector.

OK:

Resistance: 560 – 680 Ω at 20°C (68°F)

OK	**Check and replace the Engine and ECT ECU (See page IN–34).**

NG

5	**Check and repair harness and connector between Engine and ECT ECU and vehicle speed sensor (See page IN–34)**

NG	**Replace or repair the wire harness or connector.**

OK

Check and repair the transmission (clutch, brake or gear etc.).

DI9HA–01

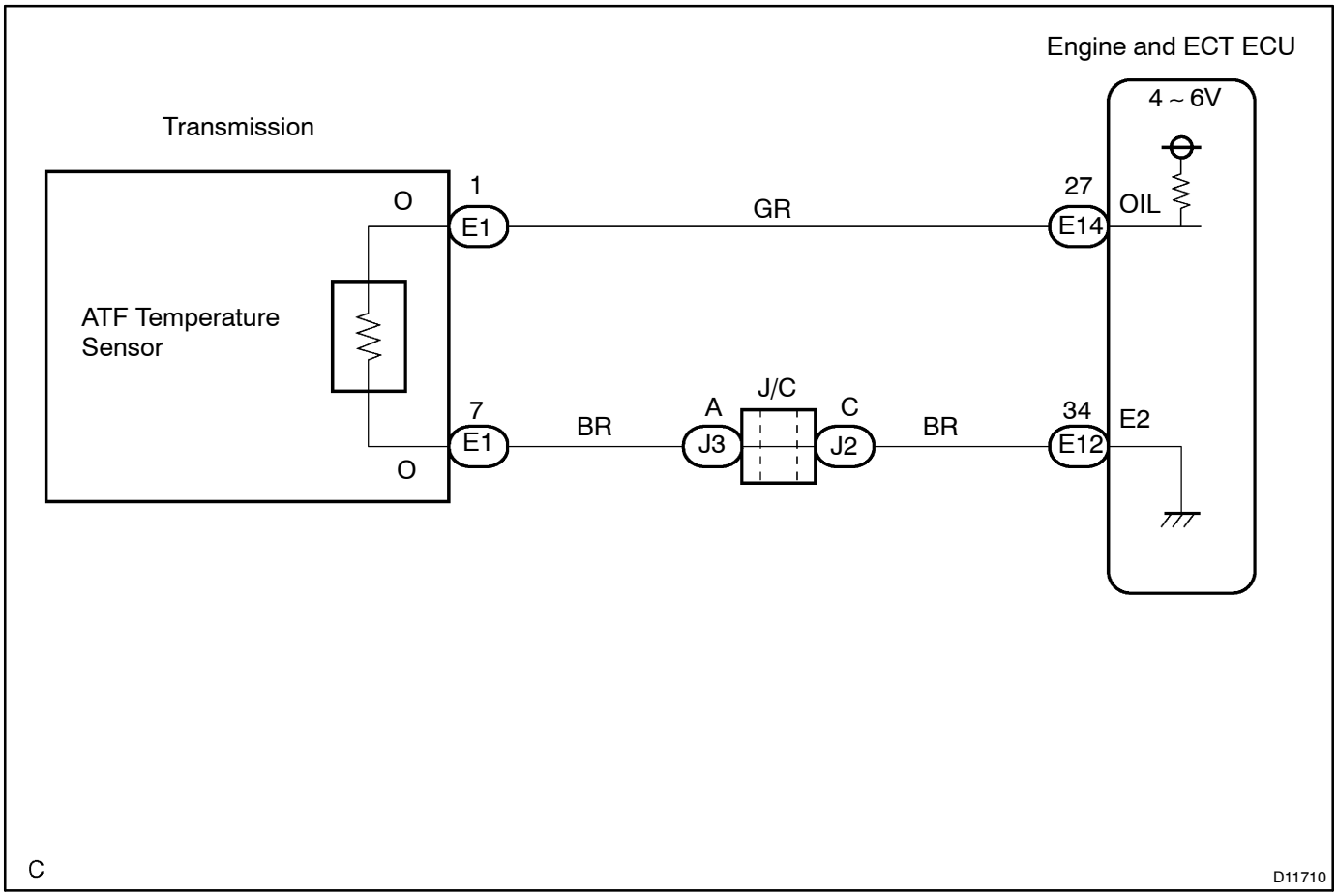
DTC	P0710/38	Transmission Fluid Temperature Sensor Malfunction (ATF Temperature Sensor)

CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the Engine and ECT ECU.

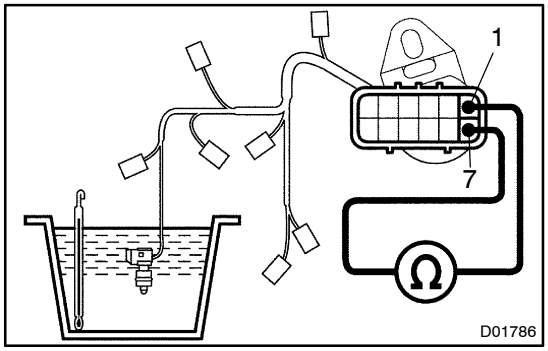
DTC No.	DTC Detecting Condition	Trouble Area
P0710/38	Either (a) or (b) is detected for 0.5 sec. or more. (2–trip detection logic) (a) Temperature sensor resistance is less than 79 Ω (b) After the engine has been operating for 15 minutes or more, the resistance at the temp. sensor is more than 156 kΩ	• Open or short in ATF temperature sensor • ATF temperature sensor • Engine and ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ATF temperature sensor.



PREPARATION:

(a) Disconnect the solenoid wire connector.
(b) Remove the oil pan.
(c) Disconnect all solenoid valve connectors.
(d) Disconnect the ATF temperature sensor.

CHECK:

Measure resistance between terminals 1 and 7 of transmission wire connector at 25°C (77°F) and 110°C (230°F).

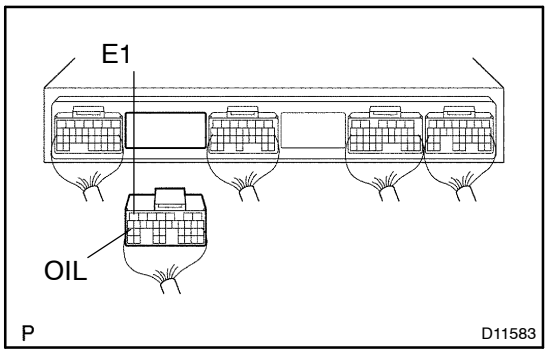
OK:

Resistance (Approx.):
25°C (77°F): 3.5 kΩ
110°C (230°F): 231 – 263 Ω

NG	Replace the ATF temperature sensor (transmission wire) (See page AT–9).

OK

2	Measure resistance between terminals OIL and E1 of Engine and ECT ECU connector.



PREPARATION:

(a) Remove the Engine and ECT ECU hood.
(b) Disconnect the connector of the Engine and ECT ECU.

CHECK:

Measure resistance between terminals OIL and E1 of Engine and ECT ECU connector.

OK:

Resistance (Approx.):
25°C (77°F): 3.5 kΩ
110°C (230°F): 231 – 263 Ω

NG	Repair or replace the harness or connector. (See page IN–34).

OK

Check and replace the Engine and ECT ECU (See page IN–34).

DTC	P0711	Transmission Fluid Temperature Sensor Circuit Range / Performance

CIRCUIT DESCRIPTION

Refer to DTC P0710 on See page DI–199.

DTC No.	DTC Detecting Condition	Trouble Area
P0711	Both (a) and (b) detected. (a) After 12 seconds of the engine start, the temp. of the atmosphere and that of the engine coolant is more than –10°C. (b) After a normal driving for over 20 minutes and 6.2 miles (10 km), the ATF temp. is less than 10°C.	ATF temperature sensor

INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester or OBD scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0711) being output?

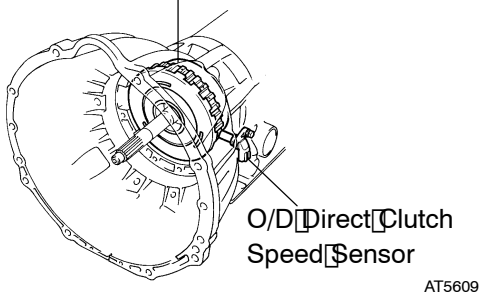
YES → Go to relevant DTC chart (See page DI–184).

NO →

Replace the ATF temperature sensor (transmission wire) (See page AT–9).

DTC	P0715/67	Input/Turbine Speed Sensor Circuit Malfunction (O/D Direct Clutch Speed Sensor)

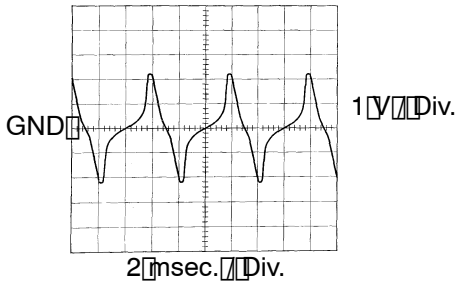
CIRCUIT DESCRIPTION



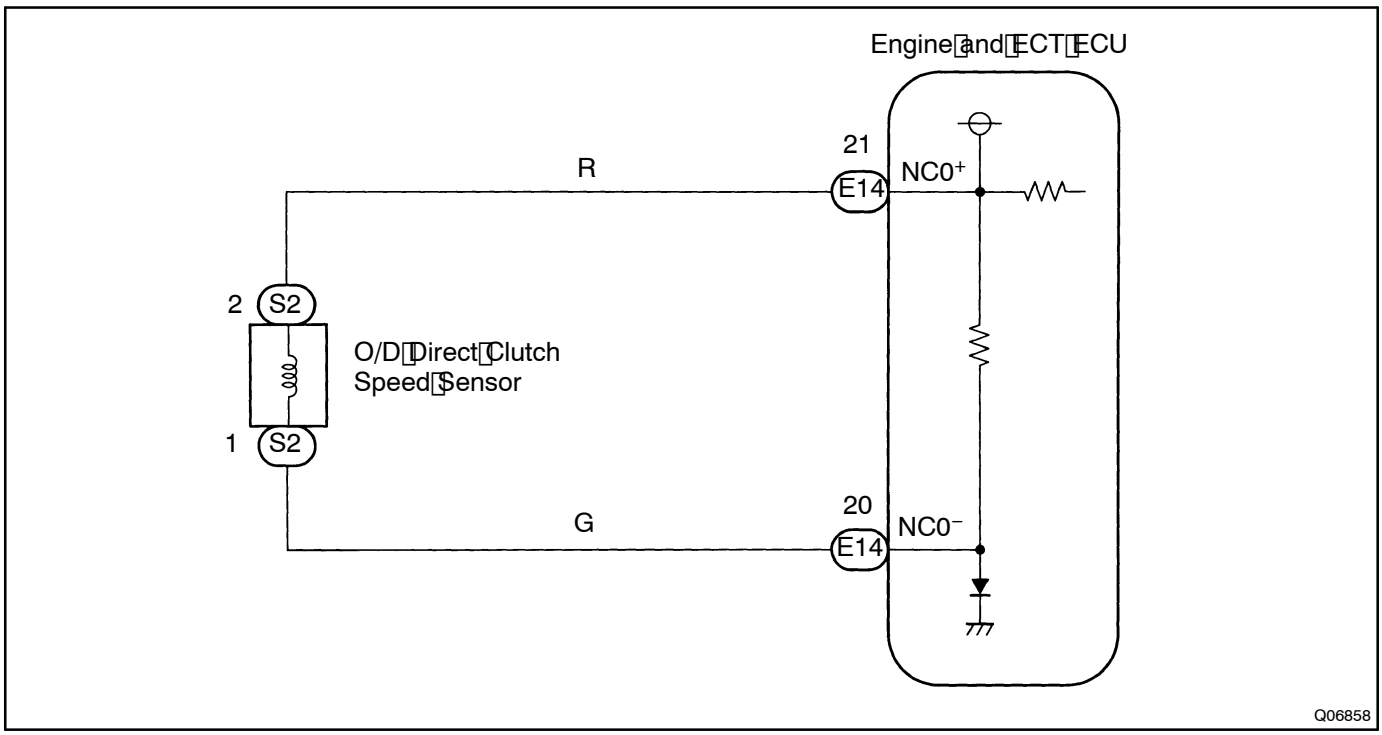
This sensor detects the rotation speed of the O/D input shaft from the rotation of the O/D direct clutch drum.
Its construction is the same as that of the vehicle speed sensor (See page DI–195).
By comparing the O/D direct clutch speed signal and vehicle speed sensor signal, the Engine and ECT ECU detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure in response to various conditions, thus doing smooth gear shift.

DTC No.	DTC Detection Condition	Trouble Area
P0715/67	All conditions below are detected for 5 secs. or more (2–trip detection logic) (a) Gear change not being performed (b) Gear position: 1st, 2nd, 3rd or 4th (c) T/M input shaft rpm: 300 rpm or less (d) T/M output shaft rpm: 1,000 rpm or more (e) Neutral start switch: OFF (f) No.1, No.2, No.3, No.4, SLU solenoid valves and vehicle speed sensor are in normal operation	• Open or short in O/D direct clutch speed sensor circuit • O/D direct clutch speed sensor • Engine and ECT ECU • Automatic transmission assembly

Refer to the chart for the wave form between terminals NC0+ and NC0– during engine idling.



WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Using hand–held tester, check O/D direct clutch speed signal.**

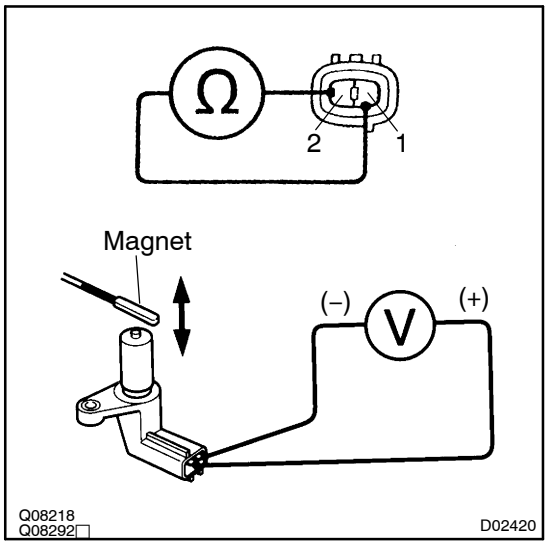
PREPARATION:
Remove the DLC3 cover.
Connect a hand–held tester to the DLC3.
Start the engine (Shift range: P).
Turn the hand–held tester main switch ON.
CHECK:
Read O/D direct clutch speed at engine idling.
OK:

700 ± 50 rpm at engine idling

OK → **Check and replace Engine and ECT ECU (See page IN–34).**

NG

2	Check O/D direct clutch speed sensor.



PREPARATION:

Remove the O/D direct clutch speed sensor from the transmission (See page AT–8).

CHECK:

(a) Measure resistance between terminals 1 and 2 of O/D direct clutch speed sensor.

(b) Check voltage between terminals 1 and 2 of the speed sensor when a magnet is put close to the front end of the speed sensor then kept away quickly.

OK:

(a): Voltage is generated intermittently

(b): Resistance: 560 – 680 Ω at 20°C (68°F)

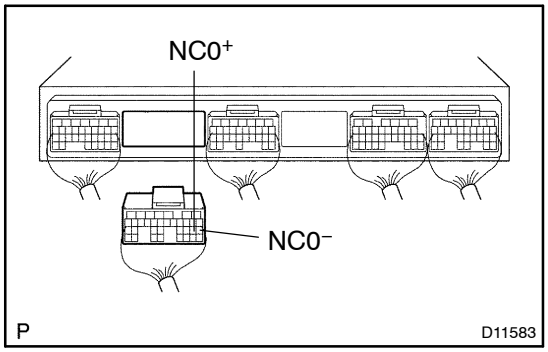
HINT:

The generated voltage is extremely low.

NG	Replace the O/D direct clutch speed sensor (See page AT–8).

OK

3	Measure resistance between terminals NC0+ and NC0– of Engine and ECT connector.



PREPARATION:

(a) Remove the Engine and ECT ECU hood.

(b) Disconnect the connector of the Engine and ECT ECU.

CHECK:

Measure resistance between terminals NC0+ and NC0– of the Engine and ECT ECU connector.

OK:

Resistance: 560 – 680 Ω at 20°C (68°F)

OK	Check and replace the Engine and ECT ECU (See page IN–34).

NG

Repair or replace the harness or connector (See page IN–34).

DI87R–02

DTC	P0750	Shift Solenoid ”A” Malfunction (No. 1 Solenoid Valve)

DTC	P0755	Shift Solenoid ”B” Malfunction (No. 2 Solenoid Valve)

DTC	P0760	Shift Solenoid ”C” Malfunction (No. 3 Solenoid Valve)

SYSTEM DESCRIPTION

The Engine and ECT ECU uses signals from the vehicle speed sensor and input/turbine speed sensor to detect the actual gear position (1st, 2nd, 3rd, 4th or 5th gear). The Engine and ECT ECU then compares the actual gear with the shift schedule in the Engine and ECT ECU memory to detect mechanical trouble of the solenoid valves, valve body and automatic transmission (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755 P0760	During normal driving, the gear required by the Engine & ECT ECU does not match the actual gear (2–trip detection logic)	• No. 1/No. 2/No. 3 solenoid valve is stuck open or closed • Valve body is blocked up or stuck • Automatic transmission assembly

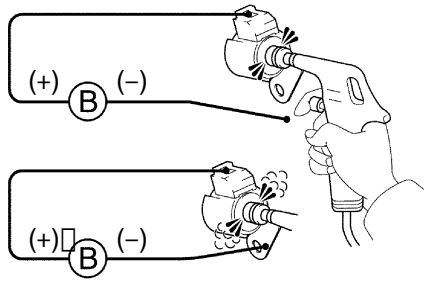
HINT:

Check the No. 1 solenoid valve when DTC P0750 is output, check No. 2 solenoid valve when DTC P0755 is output and check the No. 3 solenoid valve when DTC P0760 is output.

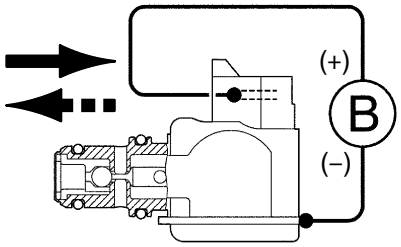
INSPECTION PROCEDURE

1	Check No. 1, No. 2, or No. 3 solenoid valve operation.

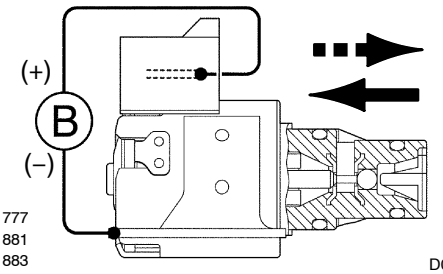
Shift Solenoid Valve No. 2



Shift Solenoid Valve No. 1



Shift Solenoid Valve No. 3



D01777
D01881
D01883
D02230

PREPARATION:

(a) Remove the oil pan.

(b) Remove the No. 1, No. 2 or No. 3 solenoid valve (See page AT–14).

CHECK:

No. 2 solenoid valve:

(a) Applying 490 kPa (5 kgf/cm², 71 psi) of compressed air, check that the solenoid valves do not leak air.

(b) When battery positive voltage is supplied to the shift solenoid valves, check that the solenoid valves are open.

No. 1 and No. 3 solenoid valve:

Connect the positive (+) lead with 3 – 10 W bulb to terminal 2 and the negative (–) lead to terminal 1, then check the movement of the valve.

OK:

When B^+ is applied.	Valve moves in ◀ direction in illustration on the left.
When B^+ is cut off.	Valve moves in ■■■▶ direction in illustration on the left.

NG → Replace the No. 1, No. 2 or No. 3 solenoid valve (See page AT–14).

OK

2	Check valve body (See page DI–190).

NG → Replace the valve body (See page AT–144).

OK

Replace the transmission (See page AT–33).

DI9HC–01

DTC	P0753/62	Shift Solenoid A Electrical Malfunction (No. 1 Solenoid Valve)

DTC	P0758/63	Shift Solenoid B Electrical Malfunction (No. 2 Solenoid Valve)

DTC	P0763/76	Shift Solenoid C Electrical Malfunction (No. 3 Solenoid Valve)

CIRCUIT DESCRIPTION

Shifting from 1st to 5th is performed in combination with ON and OFF of the No. 1, No. 2 and No. 3 solenoid valves controlled by Engine and ECT ECU. If an open or short circuit occurs in either of the solenoid valves, the Engine and ECT ECU controls the remaining normal solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

HINT:

Check the No. 1 solenoid valve when DTC P0753/62 is output, check the No. 2 solenoid valve when DTC P0758/63 is output and check the No. 3 solenoid valve when DTC P0763/76 is output.

DTC No.	DTC Detecting Condition	Trouble Area
P0753/62 P0758/63 P0763/76	The Engine and ECT ECU checks for an open or short circuit in the No. 1, No. 2 or No. 3 solenoid valve circuit when it changes. The Engine and ECT ECU records DTC P0753/62, P0758/63 or P0763/76 if condition (a) or (b) is detected once, but it does not light up CHK ENG. After Engine and ECT ECU detects condition (a) or (b) continuously 8 times or more in 1 trip, it causes the CHK ENG lights up until condition (a) or (b) disappears. After that, if the Engine and ECT ECU detects condition (a) or (b) once, it starts lighting up CHK ENG again. (a) Solenoid resistance is 8 Ω or less (short circuit) when the solenoid is energized. (b) Solenoid resistance is 100 kΩ or more (open circuit) when the solenoid is not energized.	• Open or short in No. 1/No. 2/No. 3 solenoid valve circuit • No. 1/No. 2/No. 3 solenoid valve • Engine and ECT ECU

Fail Safe Function:

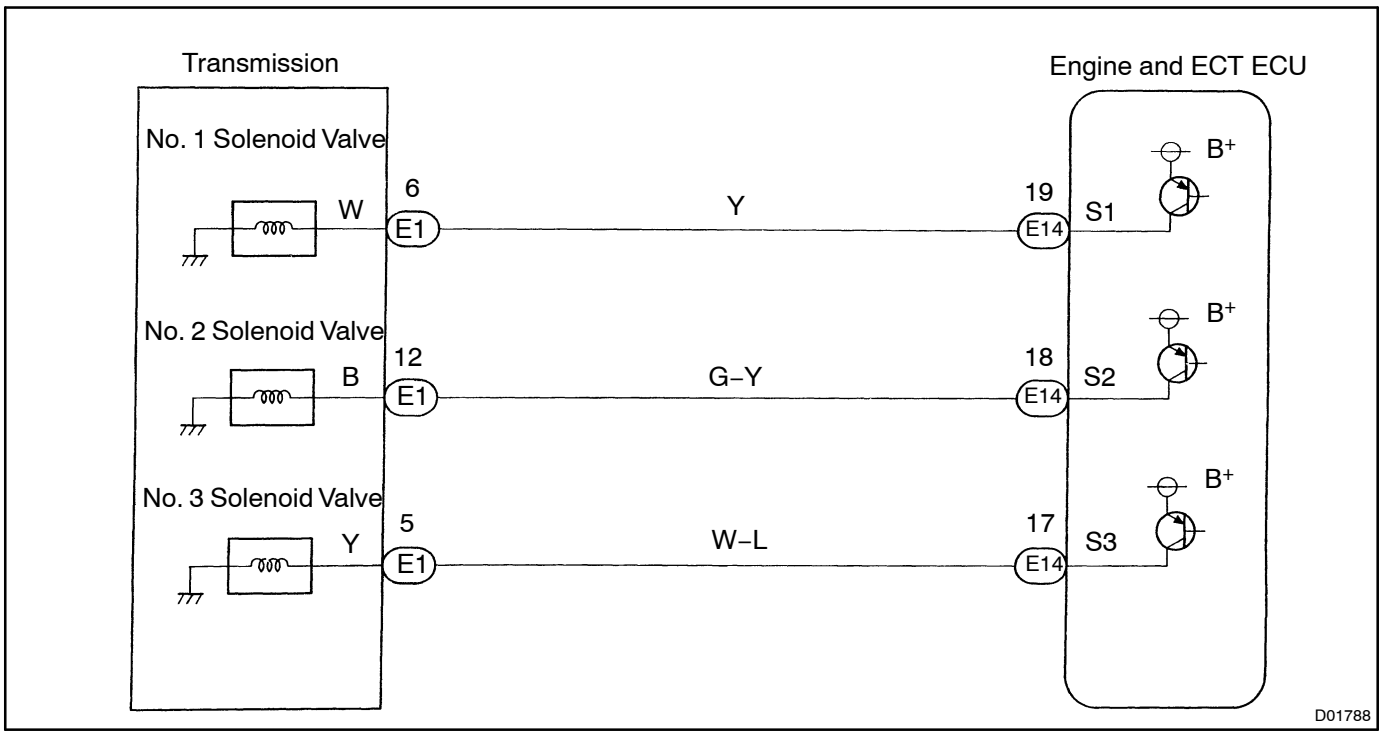
If either of the shift solenoid valve circuits develops an open or short, the Engine and ECT ECU turns the other solenoid valve ON and OFF to shift to the gear positions shown in the table below. The Engine and ECT ECU also turns the SLU solenoid valve OFF at the same time. If both solenoids are malfunctioning, hydraulic control cannot be performed electronically and must be done manually.

Manual shifting as shown in the following table must be done (In the case of a short circuit, the Engine and ECT ECU stops sending current to the short circuited solenoid).

Range	Normal				No. 1 Solenoid Valve Malfunction				No. 2 Solenoid Valve Malfunction				No. 3 Solenoid Valve Malfunction			
	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear
	No. 1	No. 2	No. 3		No. 1	No. 2	No. 3		No. 1	No. 2	No. 3		No. 1	No. 2	No. 3	
D	ON	OFF	OFF	1	X	OFF→ON	OFF	5→3	ON	X	OFF	1	ON	OFF	X	1
	OFF	ON	OFF	3	X	ON	OFF	3	OFF	X	OFF→ON	5→4	OFF	ON	X	3
	OFF	OFF	ON	4	X	OFF	ON	4	OFF	X	ON	4	OFF	OFF	X	5
	OFF	OFF	OFF	5	X	OFF	OFF	5	OFF	X	OFF	5	OFF	OFF	X	5
4	ON	OFF	OFF	1	X	OFF→ON	OFF	5→3	ON	X	OFF	1	ON	OFF	X	1
	OFF	ON	OFF	3	X	ON	OFF	3	OFF	X	OFF→ON	5→4	OFF	ON	X	3
	OFF	OFF	ON	4	X	OFF	ON	4	OFF	X	ON	4	OFF	OFF	X	5
3	ON	OFF	OFF	1	X	OFF→ON	OFF→ON	4→3	ON	X	OFF	1	ON	OFF	X	1
	OFF	ON	ON	3	X	ON	ON	3	OFF	X	ON	4	OFF	ON	X	3
	OFF	OFF	ON	4	X	OFF	ON	4	OFF	X	ON	4	OFF	OFF	X	4
2	ON	OFF	ON	1	X	OFF→ON	ON	3	ON	X	ON	1	ON	OFF	X	1
	OFF	ON	ON	3	X	ON	ON	3	OFF	X	ON	3	OFF	ON	X	3
L	ON	OFF	OFF	1	X	OFF→ON	OFF→ON	3	ON	X	OFF	1	ON	OFF	X	1

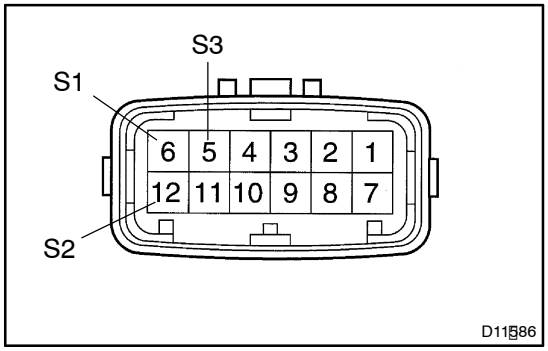
Range	No. 1 and No. 2 Solenoid Valve Malfunction				No. 1 and No. 3 Solenoid Valve Malfunction				No. 2 and No. 3 Solenoid Valve Malfunction				No. 1, No. 2 and No. 3 Solenoid Valve Malfunction			
	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear	Solenoid Valve			Gear
	No. 1	No. 2	No. 3		No. 1	No. 2	No. 3		No. 1	No. 2	No. 3		No. 1	No. 2	No. 3	
D	X	X	OFF→ON	5→4	X	OFF→ON	X	5→3	ON	X	X	1	X	X	X	5
	X	X	OFF→ON	5→4	X	ON	X	3	OFF	X	X	5	X	X	X	5
	X	X	ON	4	X	OFF	X	5	OFF	X	X	5	X	X	X	5
	X	X	OFF	5	X	OFF	X	5	OFF	X	X	5	X	X	X	5
4	X	X	OFF→ON	5→4	X	OFF→ON	X	5→3	ON	X	X	1	X	X	X	5
	X	X	OFF→ON	5→4	X	ON	X	3	OFF	X	X	5	X	X	X	5
	X	X	ON	4	X	OFF	X	5	OFF	X	X	5	X	X	X	5
3	X	X	OFF→ON	4	X	OFF→ON	X	4→3	ON	X	X	1	X	X	X	4
	X	X	ON	4	X	ON	X	3	OFF	X	X	4	X	X	X	4
	X	X	ON	4	X	OFF	X	4	OFF	X	X	4	X	X	X	4
2	X	X	OFF→ON	3	X	OFF→ON	X	3	ON	X	X	1	X	X	X	3
	X	X	ON	3	X	ON	X	3	OFF	X	X	3	X	X	X	3
L	X	X	OFF→ON	3	X	OFF→ON	X	3	ON	X	X	1	X	X	X	3

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transmission wire.

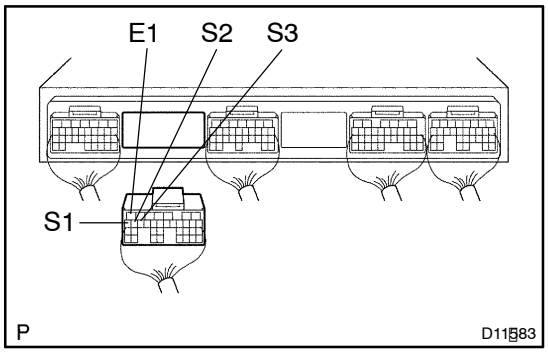


PREPARATION:
Disconnect the transmission wire connector.
CHECK:
Measure resistance between S1, S2 or S3 of transmission wire and body ground.
OK:
Resistance: 11 – 15 Ω at 20°C (68°F)

NG → Go to step 3.

OK

2	Measure resistance between terminal S1, S2 or S3 of Engine and ECT ECU and body ground.



PREPARATION:
(a) Remove the Engine and ECT ECU hood.
(b) Disconnect the connector from Engine and ECT ECU.
CHECK:
Measure resistance between terminal S1, S2 or S3 and E1 of Engine and ECT ECU.
OK:
Resistance: 11 – 15 Ω at 20°C (68°F)

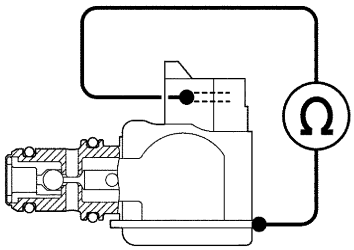
OK → Check and replace the Engine and ECT ECU (See page IN–34).

NG

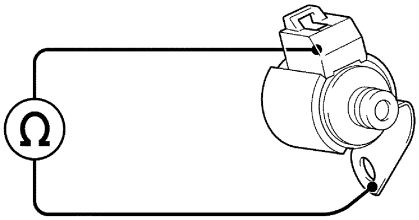
Repair or replace the harness or connector (See page IN–34).

3	Check No. 1, No. 2 or No. 3 solenoid valve.

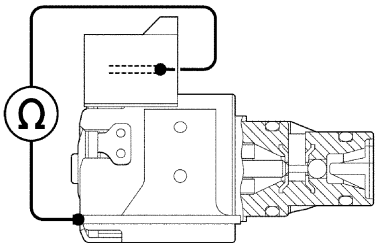
Shift Solenoid Valve No. 1



Shift Solenoid Valve No. 2



Shift Solenoid Valve No. 3



D01882
D01890
D01884

D02236

PREPARATION:

Remove the No. 1, No. 2 or No. 3 solenoid valve (See page AT–144).

CHECK:

(a) Measure resistance between solenoid connector and body ground.

(b) Connect positive ⊕ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK:

(a) Resistance: 11 – 15 Ω at 20°C (68°F)

(b) The solenoid makes an operating noise.

NG → **Replace the solenoid valve (See page AT–144).**

OK

Repair or replace the transmission wire (See page AT–9).

DI2LC–05

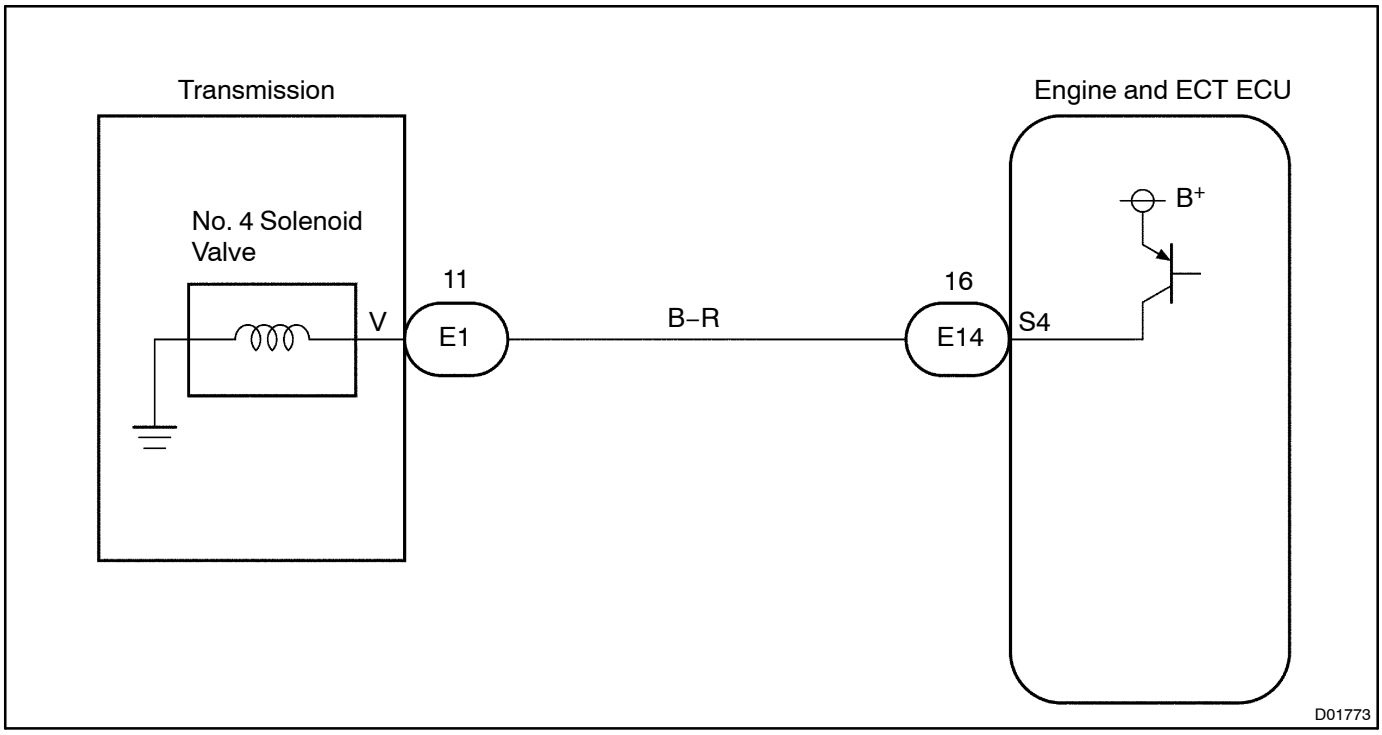
DTC	P0768/65	Shift Solenoid D Electrical Malfunction (No. 4 Solenoid Valve)

CIRCUIT DESCRIPTION

No. 4 solenoid valve is controlled by Engine and ECT ECU and it switches ON and OFF of the O/D direct switch.

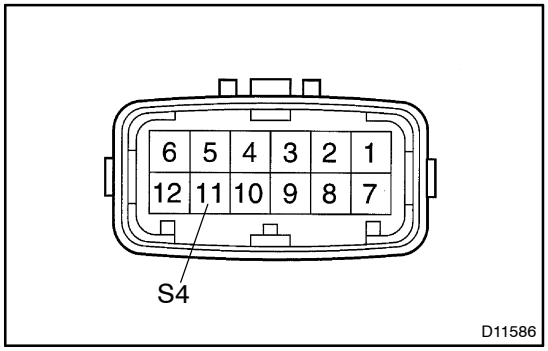
DTC No.	DTC Detecting Condition	Trouble Area
P0768/65	The Engine and ECT ECU checks for an open or short circuit in the No. 4 solenoid valve circuit when it changes. The Engine and ECT ECU records DTC P0768/65 if condition (a) or (b) is detected once, but it does not light up CHK ENG. After Engine and ECT ECU detects condition (a) or (b) continuously 8 times or more in 1 trip, it causes the CHK ENG lights up until condition (a) or (b) disappears. After that, if the Engine and ECT ECU detects condition (a) or (b) once, it starts lighting up CHK ENG again. (a) Solenoid resistance is 8 Ω or less (short circuit) when the solenoid is energized. (b) Solenoid resistance is 100 kΩ or more (open circuit) when the solenoid is not energized.	• Open or short in No. 4 solenoid valve circuit • No. 4 solenoid valve • Engine and ECT ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transmission wire.

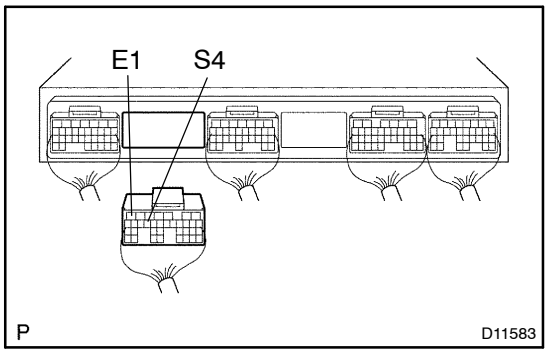


PREPARATION:
Disconnect the transmission wire connector.
CHECK:
Measure resistance between S4 of transmission wire and body ground.
OK:
Resistance: 11 – 15 Ω at 20°C (68°F)

OK	Go to step 3.

NG

2	Measure resistance between terminals S4 of Engine and ECT ECU and body ground.



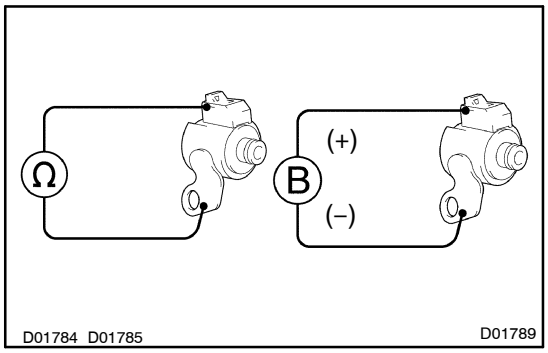
PREPARATION:
(a) Remove the Engine and ECT ECU hood.
(b) Disconnect the connector from Engine and ECT ECU.
CHECK:
Measure resistance between terminals S4 and E1 of Engine and ECT ECU.
OK:
Resistance: 11 – 15 Ω at 20°C (68°F)

OK	Check and replace the Engine and ECT ECU (See page IN–34).

NG

Repair or replace the harness or connector (See page IN–34).

3	Check No. 4 solenoid valve.



PREPARATION:

Remove the No. 4 solenoid valve (See page AT–14).

CHECK:

(a) Measure resistance between terminal and solenoid body.

(b) Connect positive (+) lead to terminal of solenoid connector and negative (–) lead to solenoid body.

OK:

(a) Resistance: 11 – 15 Ω at 20 °C (68 °F)

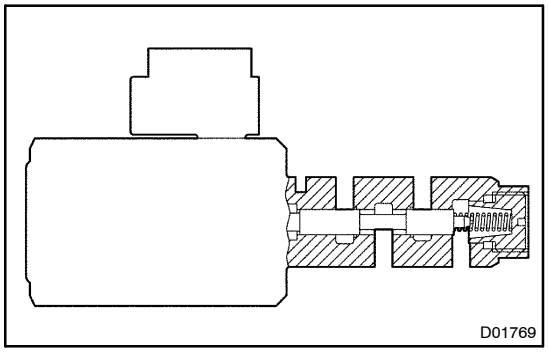
(b) The solenoid makes an operating noise.

NG → **Replace the No. 4 solenoid valve. (See page AT–14).**

OK

Repair or replace the transmission wire (See page AT–9).

DTC	P0770	Shift Solenoid "E" Malfunction (SLU Shift Solenoid Valve)



SYSTEM DESCRIPTION

The Engine and ECT ECU uses the signals from the Throttle Position Sensor and Air–flow Meter to monitor the engagement condition of the lock–up clutch.
Then the Engine and ECT ECU compares the engagement condition of the lock–up clutch with the lock–up schedule in the Engine and ECT ECU memory to detect mechanical trouble of the SLU solenoid valve, valve body, torque converter and automatic transmission assembly (clutch, brake or gear etc.).

DTC No.	DTC Detecting Condition	Trouble Area
P0770	Lock–up does not occur when driving in the lock–up range (normal driving at 80 km/h [50 mph]), or lock–up remains ON in the lock–up OFF range. (2–trip detection logic)	• SLU solenoid valve is stuck open or closed • Valve body blocked up or stuck • Lock–up clutch • Automatic transmission assembly • Torque converter

INSPECTION PROCEDURE

HINT:
In case of using hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

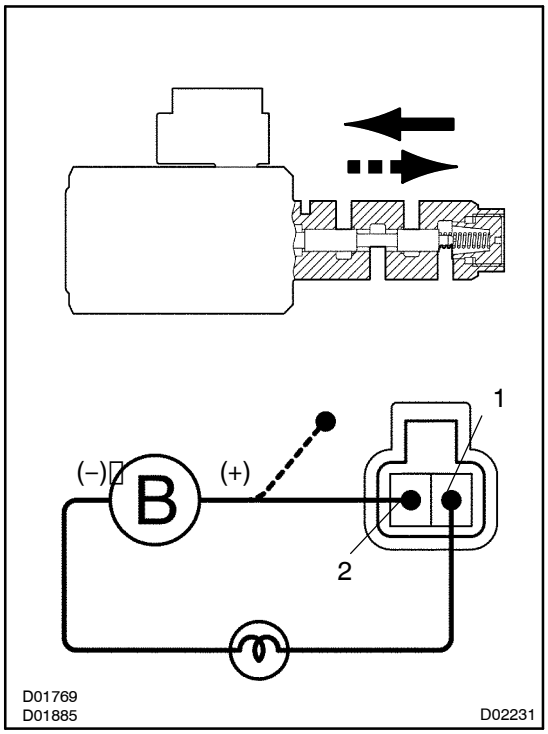
1	Active test.

PREPARATION:
(a) Remove the DLC3 cover.
(b) Connect a hand–held tester.
(c) Turn the ignition switch ON and hand–held tester main switch ON.
CHECK:
Using active test, check the lock–shift operation.
OK:
Lock–up ON

NG → **Replace the torque converter (See page AT–33).**

OK

2	Check SLU solenoid valve operation.



PREPARATION:

(a) Remove the oil pan.

(b) Remove the SLU solenoid valve.

CHECK:

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.

OK:

When B^+ is applied.	Valve moves in → direction in illustration on the left.
When B^+ is cut off.	Valve moves in ← direction in illustration on the left.

NG → **Replace the SLU solenoid valve (See page AT–14).**

OK

3	Check valve body (See page DI–190).

NG → **Replace the valve body (See page AT–14).**

OK

Replace the torque converter (See page AT–33).

DI25S–05

DTC	P1520	Stop Light Switch Signal Malfunction

CIRCUIT 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 signal to Engine and ECT ECU. Then the Engine and ECT ECU cancels operation of the lock–up clutch while braking is in progress.

DTC No.	DTC Detecting Condition	Trouble Area
P1520	The stop light switch does not turn off even once the vehicle is driven. (2–trip detection logic)	• Short in stop light switch signal circuit • Stop light switch • Engine and ECT ECU

WIRING DIAGRAM

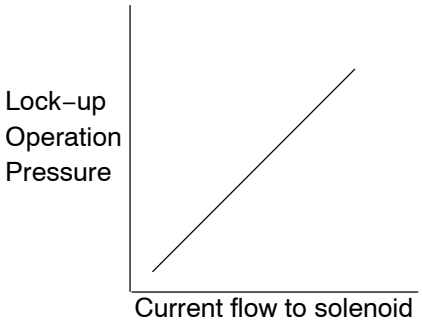
See page DI–218.

INSPECTION PROCEDURE

See page DI–218.

DI9HE–01

DTC	P1755/68	Linear Solenoid for Lock–up Control Circuit Malfunction (SLU Solenoid Valve)

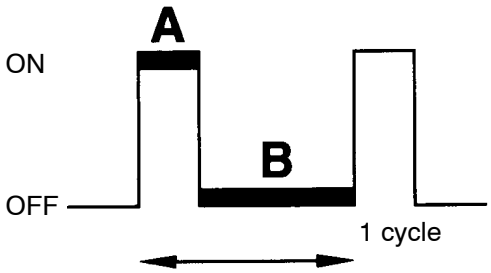


CIRCUIT DESCRIPTION

The amount of current flow to the solenoid is controlled by the (*) duty ratio of the Engine and ECT ECU output signal. The higher the duty ratio becomes, the higher the lock–up hydraulic pressure becomes during the lock–up operation.

(*) 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



BE4056

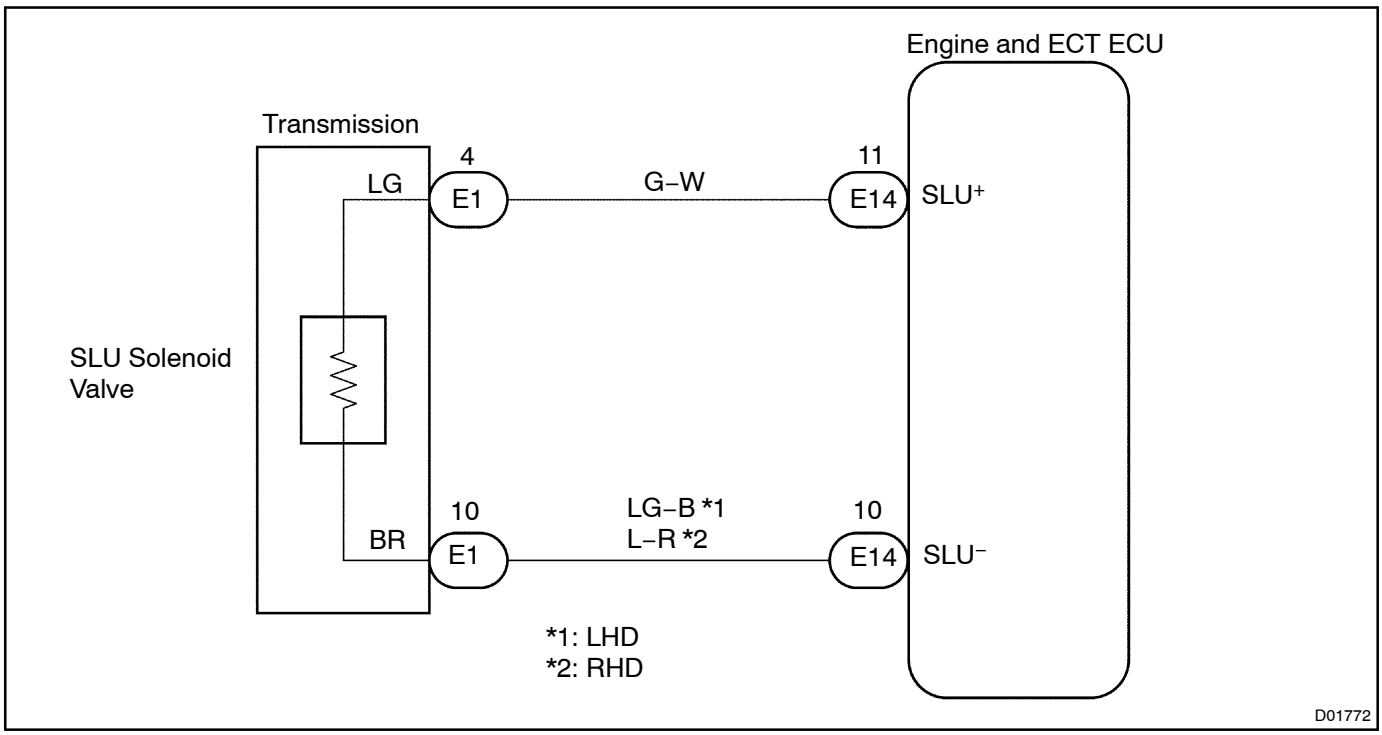
(*)

$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

D00160

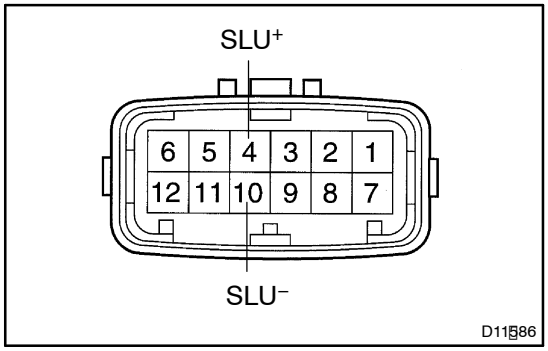
DTC No.	DTC detection condition	Trouble Area
P1755/68	The following condition is detected. (2–trip detection logic) Signal output from SLU is ON for 3.3 msecs. or more and duty ratio is at least 95 % for 1 second.	• Open or short in SLU solenoid valve circuit • SLU solenoid valve • Engine and ECT ECU • Automatic transmission assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transmission wire.

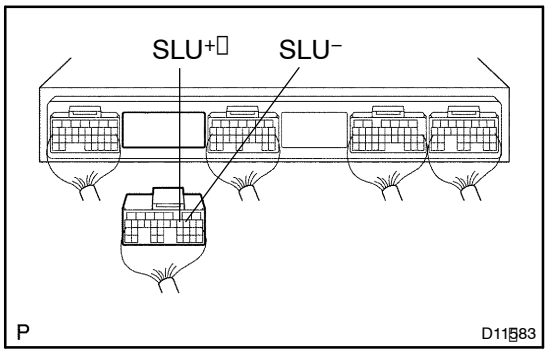


PREPARATION:
Disconnect the transmission wire connector.
CHECK:
Measure resistance between SLU+ and SLU– of transmission wire.
OK:
Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

NG	Go to step 3.

OK

2	Measure resistance between terminal SLU+ and SLU– of Engine and ECT ECU connector.



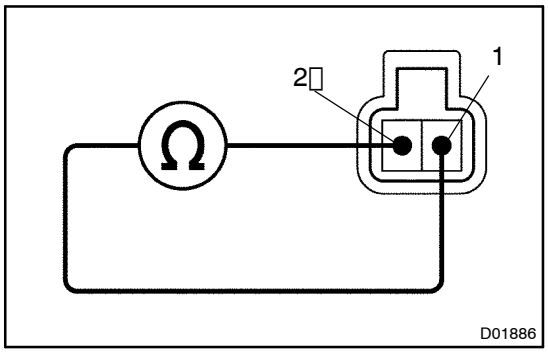
PREPARATION:
(a) Remove the Engine and ECT ECU hood.
(b) Disconnect the connector of the Engine and ECT ECU.
CHECK:
Measure resistance between terminals SLU+ and SLU– of Engine and ECT ECU connector.
OK:
Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

NG	Repair or replace the harness or connector (See page IN–34).

OK

Check and replace the Engine and ECT ECU (See page IN–34).

3	Check SLU solenoid valve.



PREPARATION:

(a) Remove the oil pan.

(b) Disconnect the solenoid valve connector.

CHECK:

Measure the resistance between terminals 1 and 2.

OK:

Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

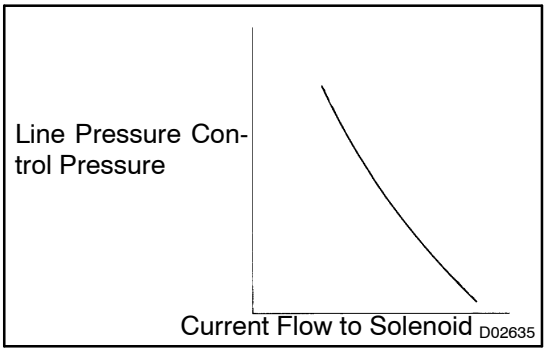
NG → **Replace the SLU solenoid valve (See page AT–144).**

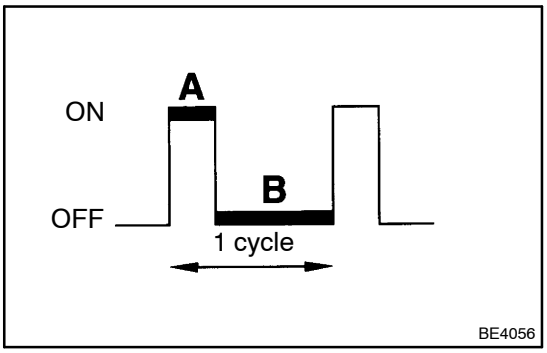
OK

Repair or replace the transmission wire (See page AT–9).

DI9HF–01

DTC	P1760/77	Linear Solenoid for Line Pressure Control Circuit Malfunction (SLT Solenoid Valve)



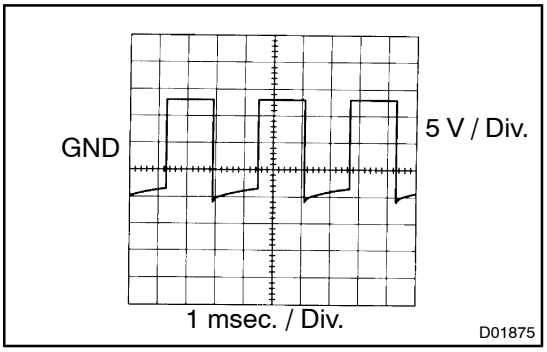


CIRCUIT DESCRIPTION

The throttle pressure that is applied to the primary regulator valve (which modulates line pressure) causes the SLT solenoid valve, under electronic control, to precisely and minutely modulates and generates line pressure according to the accelerator pedal effort, or engine power output detected.
This reduces the function of line pressure and provides smooth shifting characteristics.
Upon receiving the throttle valve opening angle signal, Engine and ECT ECU controls the line pressure by sending a predetermined (*) duty ratio to the solenoid valve, modulating the line pressure, generating throttle pressure.
(*) 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

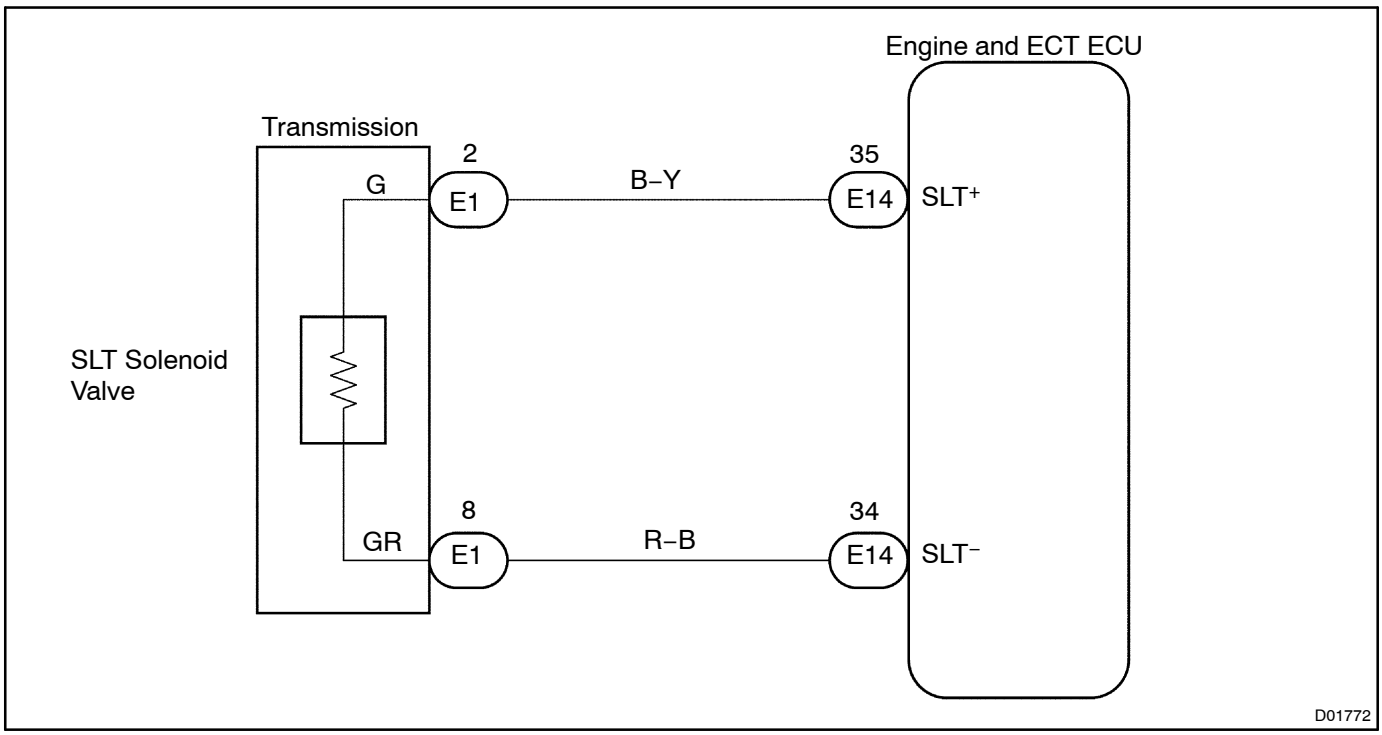
$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

DTC No.	DTC Detecting Condition	Trouble Area
P1760/77	(a) or (b) condition below is detected for 1 second or more. (a) SLT⁻ terminal: 0V (b) SLT⁻ terminal: 12V	• Open or short in SLT solenoid valve circuit • SLT solenoid valve • Engine and ECT ECU



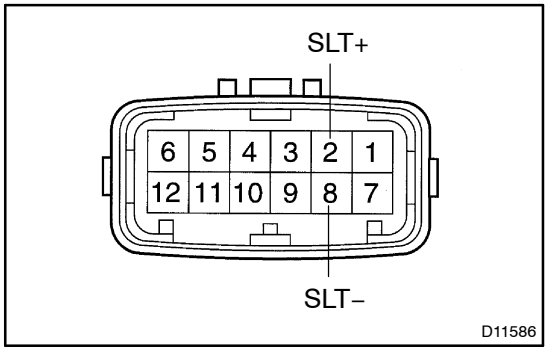
Reference:
Refer to the chart for the wave form between terminals SLT+ and SLT⁻during engine idling.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transmission wire.

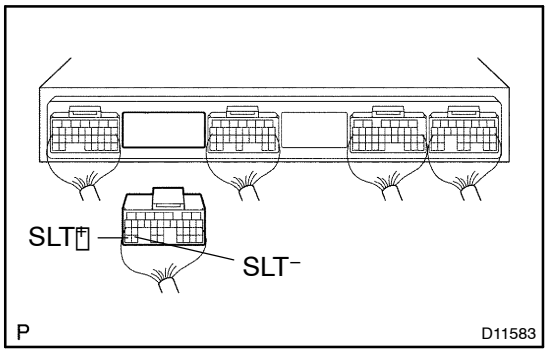


PREPARATION:
Disconnect the transmission wire connector.
CHECK:
Measure resistance between SLT+ and SLT– of transmission wire.
OK:
Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

NG → **Go to step 3.**

OK

2	Measure resistance between terminals SLT+ and SLT– of Engine and ECT ECU connector.



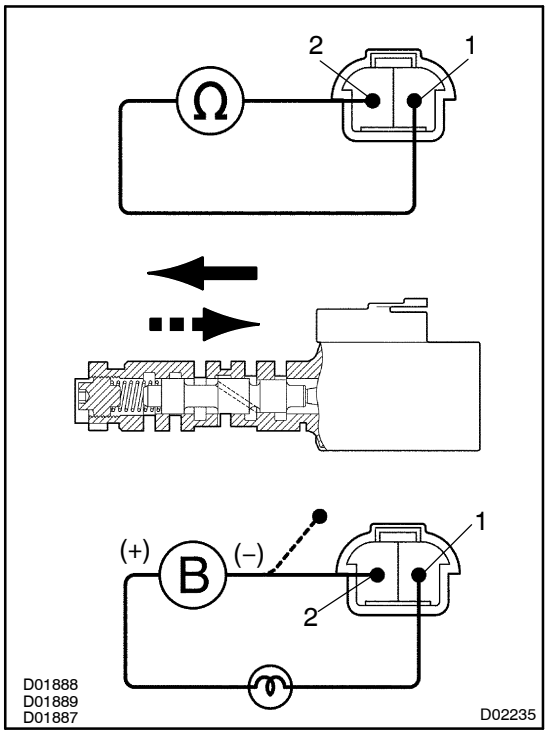
PREPARATION:
(a) Remove the Engine and ECT ECU hood.
(b) Disconnect the connector of the Engine and ECT ECU.
CHECK:
Measure resistance between terminals SLT+ and SLT– of Engine and ECT ECU connector.
OK:
Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

NG → **Repair or replace the harness or connector (See page IN–34).**

OK

Check and replace the Engine and ECT ECU (See page IN–34).

3	Check SLT solenoid valve.



PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.

Check solenoid resistance:

CHECK:

Measure resistance between terminals 1 and 2 of solenoid connector.

OK:

Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

Check solenoid operation:

CHECK:

Connect positive (+) lead with an 8 – 10 W bulb to terminal 1 of solenoid connector and negative (–) lead to terminal 2, then check the movement of the valve.

OK:

When battery positive voltage is applied.	Valve moves in ← direction in the illustration on the left.
When battery positive voltage is cut off.	Valve moves in ■ ■ → direction in the illustration on the left.

NG → **Replace the SLT solenoid valve (See page AT–144).**

OK

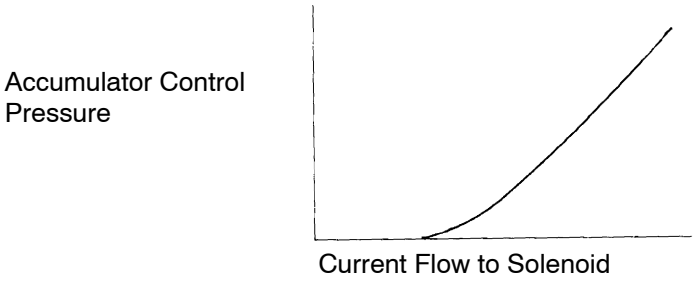
Repair or replace the transmission wire (See page AT–9).

DI9HG–01

DTC	P1765/46	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (SLN Solenoid)

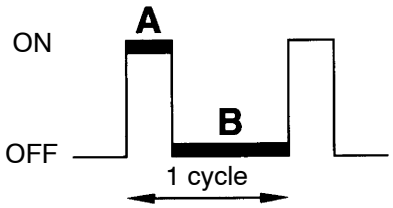
CIRCUIT DESCRIPTION

The SLN solenoid valve controls the hydraulic pressure acting on the accumulator control valve when gears are shifted and performs smooth gear shifting. The Engine and ECT ECU determines optimum operating pressure according to the signals from the throttle position sensor, vehicle speed sensor and O/D direct clutch speed sensor and controls the volume of current flow to the solenoid valve. The amount of current to the solenoid is controlled by the (*) duty ratio of Engine and ECT ECU output signals, causing a momentary charge to the hydraulic pressure acting on the clutches during gear shifting.
When the duty ratio is high, the hydraulic pressure acting on the clutches is low.



D02636

(*) 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

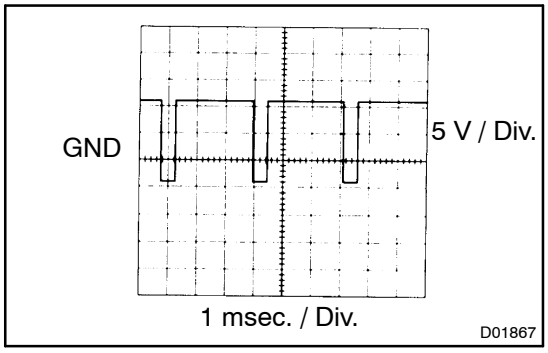


$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

BE4056

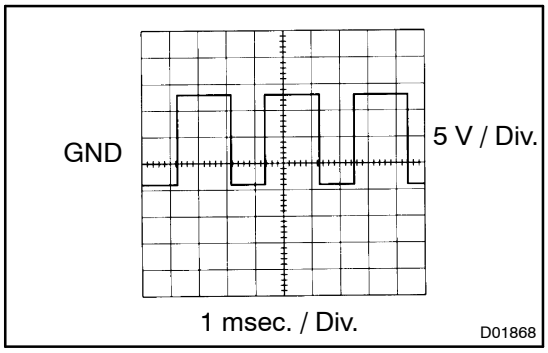
D02292

DTC No	DTC Detecting Condition	Trouble Area
P1765/46	All conditions below are detected for 1 second or more. (2–trip detection logic) (a) Engine and ECT ECU outputs duty signal to SLN solenoid valve at 90 % or higher duty ratio (b) Current to shift solenoid valve SLN: 230 ~ 430 mA or less	• Open or short in SLN solenoid valve circuit • SLN solenoid valve • Engine and ECT ECU



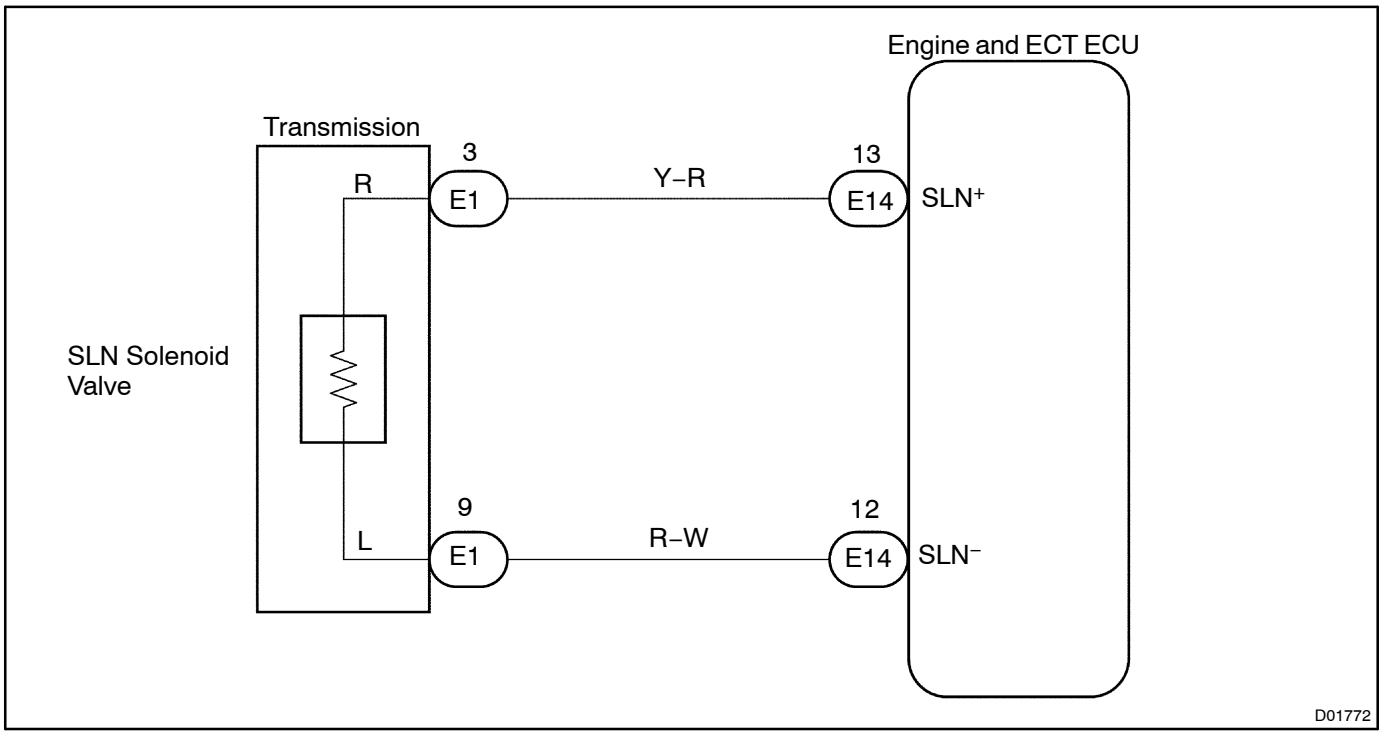
Reference:

- Refer to the chart for the wave form between terminals SLN– and E1 when engine is idling.



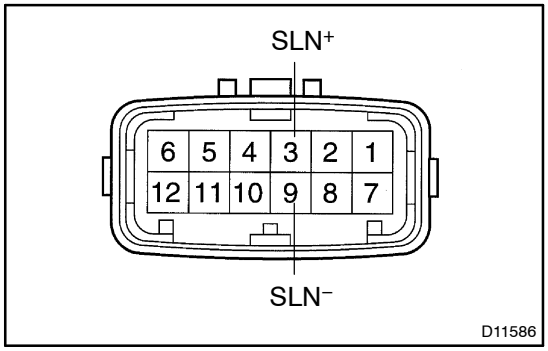
- Refer to the chart for the wave form between terminals SLN– and E1 during shift change.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transmission wire.

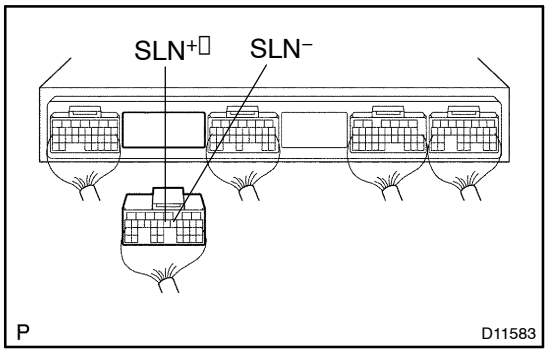


PREPARATION:
Disconnect the transmission wire connector.
CHECK:
Measure resistance between SLN+ and SLN– of transmission wire.
OK:
Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

NG → **Go to step 3.**

OK

2	Measure resistance between terminals SLN+ and SLN– of Engine and ECT ECU connector.



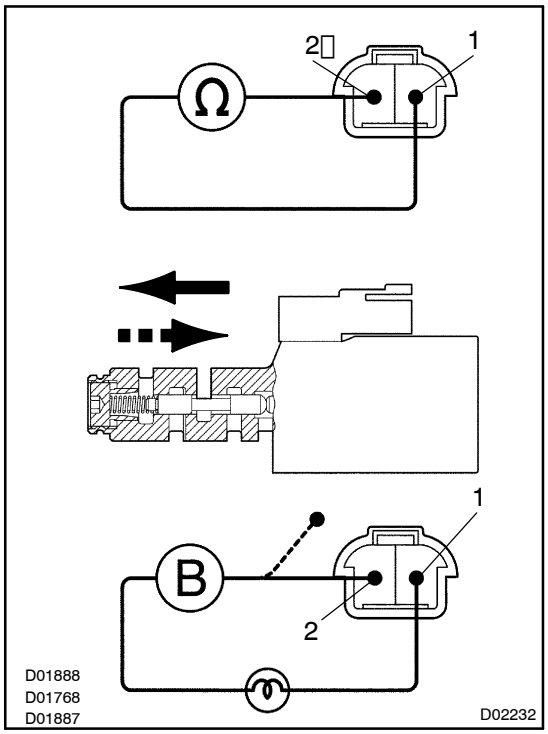
PREPARATION:
(a) Remove the Engine and ECT ECU hood.
(b) Disconnect the connector of the Engine and ECT ECU.
CHECK:
Measure resistance between terminals SLN+ and SLN– of Engine and ECT ECU connector.
OK:
Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

NG → **Repair or replace the harness or connector (See page IN–34).**

OK

Check and replace the Engine and ECT ECU (See page IN–34).

3	Check SLN solenoid valve.



PREPARATION:

(a) Jack up the vehicle.

(b) Remove the oil pan.

(c) Disconnect the solenoid connector.

Check solenoid resistance:

CHECK:

Measure resistance between terminals 1 and 2 of solenoid connector.

OK:

Resistance: 5.0 – 5.6 Ω at 20°C (68°F)

Check solenoid operation:

CHECK:

Connect positive (+) lead with an 8 – 10 W bulb to terminal 1 of solenoid connector and negative (–) lead to terminal 2, then check the movement of the valve.

OK:

When battery positive voltage is applied.	Valve moves in ◀ direction in the illustration on the left.
When battery positive voltage is cut off.	Valve moves in ■■▶ direction in the illustration on the left.

NG → **Replace the SLN solenoid valve (See page AT–144).**

OK

Repair or replace the transmission wire (See page AT–9).

DI9HH–01

DTC	P1780/97	Neutral Start Switch Circuit

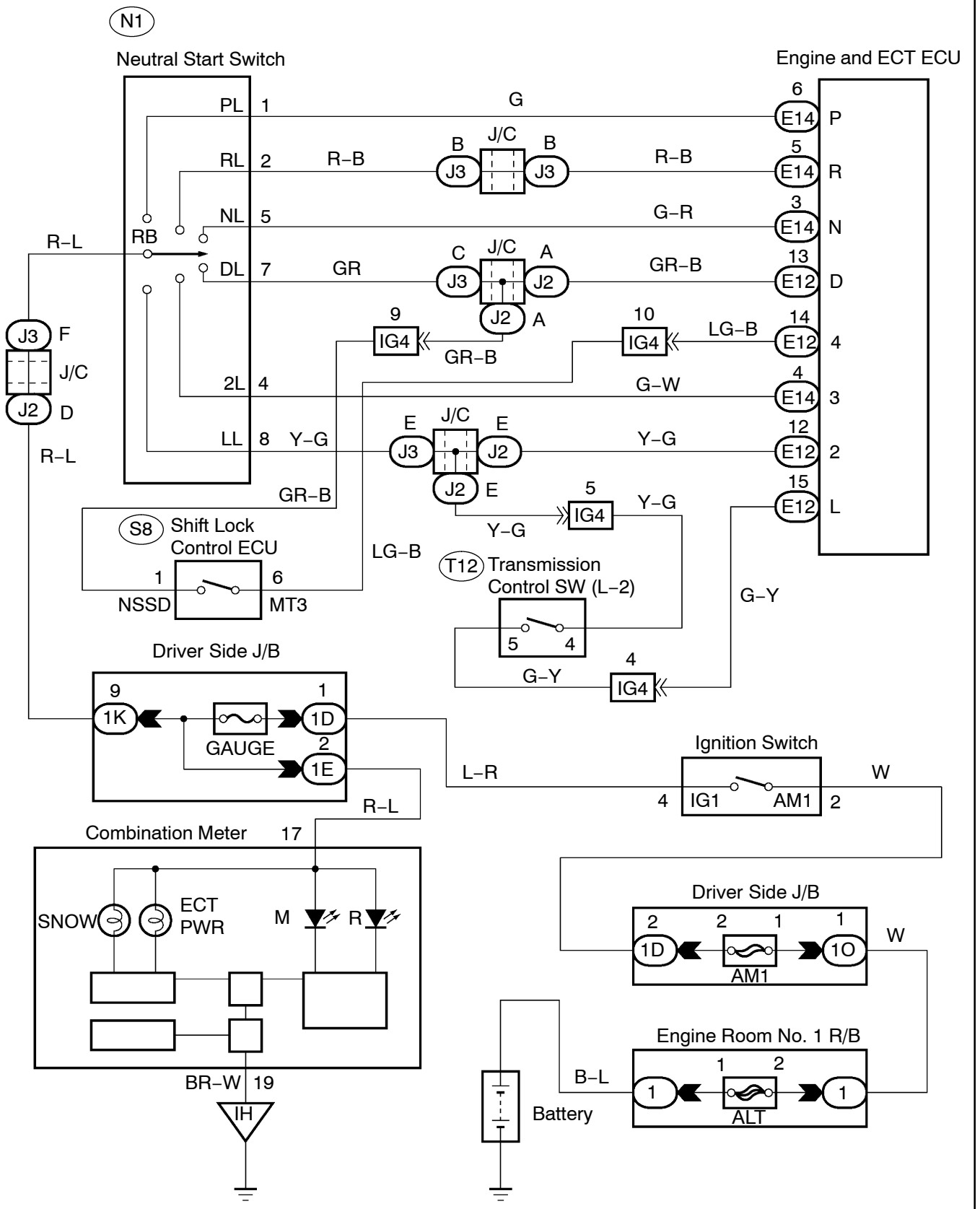
CIRCUIT DESCRIPTION

The neutral start switch detects the shift lever range and sends signals to the Engine and ECT ECU.
The Engine and ECT ECU receives signals (P, R, N, D, 4, 3, 2 and L) from the neutral start switch. When the signal is not sent to the Engine and ECT ECU from the neutral start switch, the Engine and ECT ECU judges that the shift lever is in D range.

DTC No.	DTC Detection Condition	Trouble Area
P1780/97	2 or more switches are ON simultaneously for P, R, N, D, 4, 3, 2 and L ranges. (2–trip detection logic)	• Short in neutral start switch circuit • Neutral start switch • Engine and ECT ECU
	When driving under conditions (a) and (b) for 30 seconds or more, the neutral start switch is ON (N position). (2–trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 – 2,500 rpm	

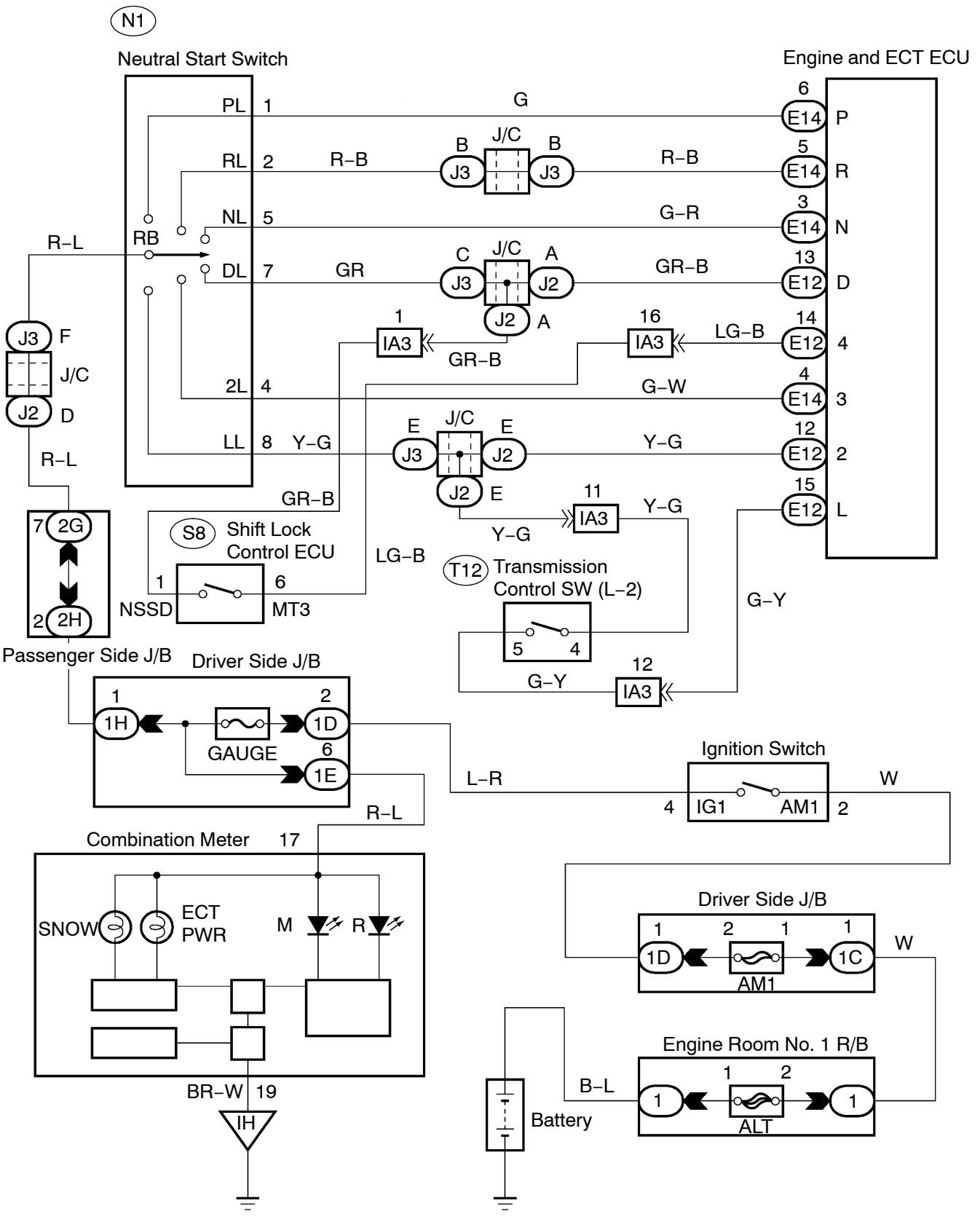
WIRING DIAGRAM

LHD:



D11596

RHD:


N1
Neutral Start Switch
Engine and ECT ECU
PL 1
RL 2
NL 5
DL 7
2L 4
LL 8
RB
R–L
G
R–B
G–R
GR
GR–B
G–W
Y–G
LG–B
J/C
J3
J2
E14
E12
P
R
N
D
4
3
2
L
IA3
S8
Shift Lock Control ECU
NSSD
MT3
T12
Transmission Control SW (L–2)
G–Y
Passenger Side J/B
Driver Side J/B
1H
1D
1E
2G
2H
GAUGE
Ignition Switch
IG1
AM1
W
L–R
Combination Meter
17
SNOW
ECT PWR
M
R
BR–W
19
IH
Battery
B–L
Engine Room No. 1 R/B
ALT
AM1
1C

C

D11711

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Read PNP, REVERSE, DRIVE, 4TH, 3RD, 2ND and LOW signals.**

PREPARATION:

(a) Remove the DLC3 cover.
(b) Connect a hand–held tester to the DLC3.
(c) Turn the ignition switch ON and hand–held tester main switch ON.

CHECK:

Shift lever into the P, R, N, D, M, 3, 2 and L ranges, and read the PNP, REVERSE, DRIVE, 4TH, 3RD, 2ND and LOW signals on the hand–held tester.

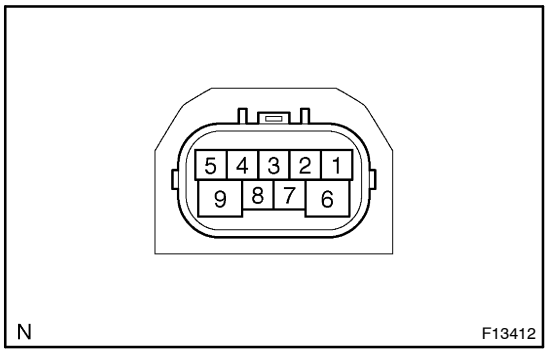
OK:

Shift range	Signal
P, N	PNP: OFF → ON
R	REVERSE: OFF → ON
D	DRIVE: OFF → ON
M	4TH: OFF → ON
3	3RD: OFF → ON
2	2ND: OFF → ON
L	LOW: OFF → ON

NG → **Check the combination meter (See page BE–2).**

OK

2	Check neutral start switch.



PREPARATION:

(a) Jack up the vehicle.

(b) Remove the neutral start switch connector.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each range.

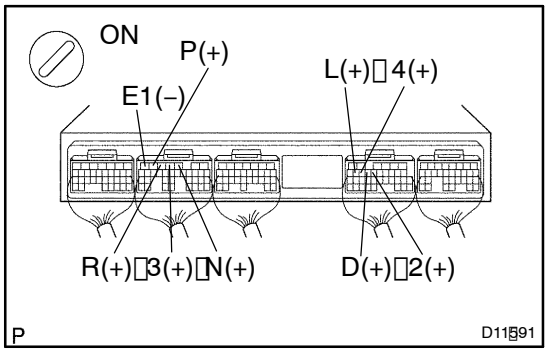
OK:

Shift range	Terminal No. to continuity	Terminal No. to continuity
P	1 – 3	6 – 9
R	2 – 3	–
N	3 – 5	6 – 9
D, M	3 – 7	–
3	3 – 4	–
2, L	3 – 8	–

NG → **Replace the neutral start switch (See page AT–13).**

OK →

3	**Measure voltage between each terminals of P, R, N, D, 4, 3, 2, L and E1 of Engine and ECT ECU.**



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between each terminals P, R, N, D, 4, 3, 2 and L, E1 of Engine and ECT ECU when the shift lever is shifted to the following ranges.

OK:

Tester connection	Condition	Specified condition
P – Body ground	Shift lever range: P	Battery voltage
R – Body ground	Shift lever range: R	Battery voltage*
N – Body ground	Shift lever range: N	Battery voltage
D – Body ground	Shift lever range: D E-shift main SW (for D and 4) : OFF	Battery voltage
4 – Body ground	Shift lever range: M E-shift main SW (for D and 4) : ON	Battery voltage
3 – Body ground	Shift lever range: 3	Battery voltage
2 – Body ground	Shift lever range: 2 E-shift main SW (for 2 and L) : OFF	Battery voltage
L – Body ground	Shift lever range: L E-shift main SW (for 2 and L) : ON	Battery voltage

HINT:

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

OK → **Check and replace the Engine and ECT ECU (See page IN-34).**

NG

Repair or replace the harness or connector (See page IN-34).

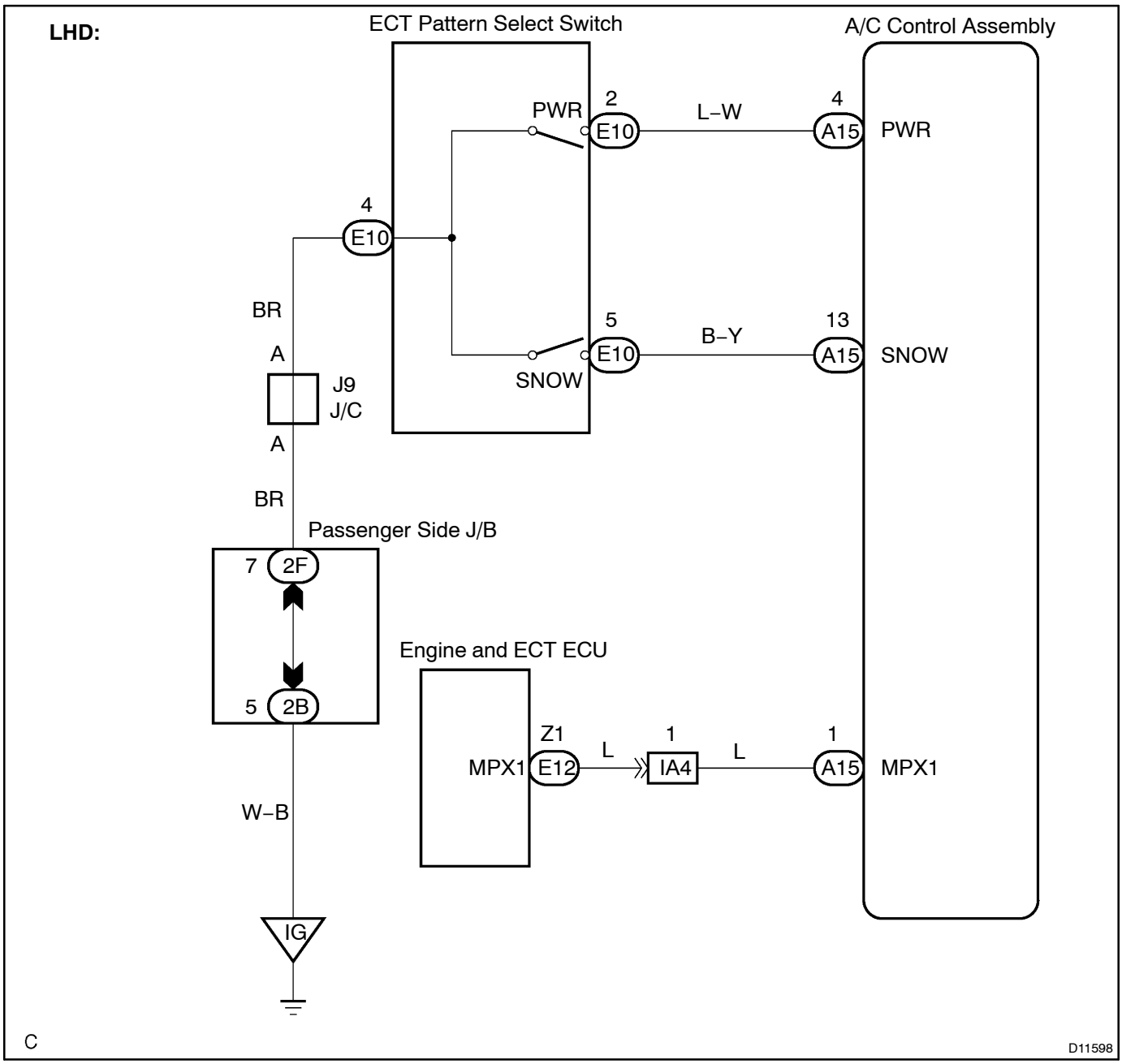
DI9HI–01

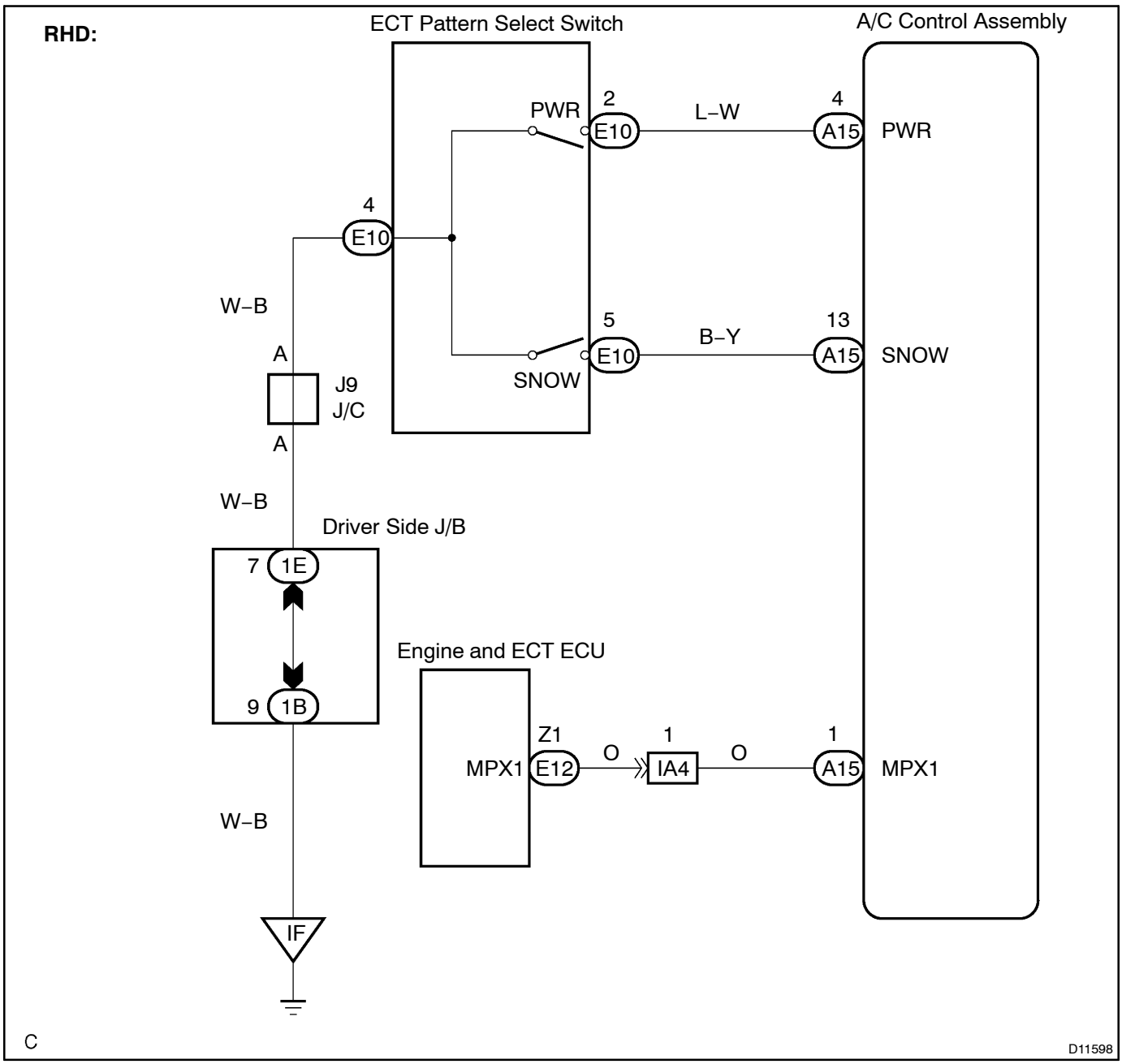
Pattern Select Switch Circuit

CIRCUIT DESCRIPTION

The Engine and ECT ECU memory contains the shift programs for the NORMAL, POWER and SNOW patterns, 2 range, L range and the lock–up patterns. By following the programs corresponding to the signals from the pattern select switch, the nuetral range and other various sensors, the Engine and ECT ECU switchs the solenoid valves ON and OFF, and controls the transmission gear change and the lock–up clutch operation.

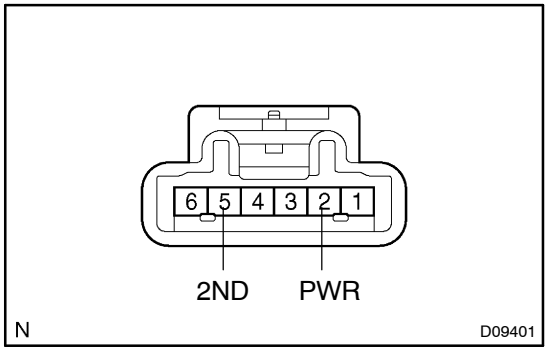
WIRING DIAGRAM




RHD:
ECT Pattern Select Switch
A/C Control Assembly
PWR
2
E10
L–W
4
A15
PWR
4
E10
W–B
5
E10
B–Y
13
A15
SNOW
A
SNOW
J9
J/C
A
W–B
Driver Side J/B
7
1E
9
1B
Engine and ECT ECU
Z1
MPX1
E12
O
1
IA4
O
1
A15
MPX1
W–B
IF
C
D11598

INSPECTION PROCEDURE

1	**Check pattern select switch.**



PREPARATION:

Disconnect the pattern select switch connector.

CHECK:

Check continuity between each terminal of pattern select switch connector when the select switch is set to PWR, NORM and SNOW positions.

OK:

Switch condition	Tester connection	Specified condition
PWR	2 – 3, 2 – 4	Continuity
NORM	3 – 4	No continuity
SNOW	3 – 4, 3 – 5	Continuity

If the continuity is not as specified, replace the switch.

DI7W2–03

E–shift Main Switch Circuit

CIRCUIT DESCRIPTION

When the shift lever is in the M range (with E–shift main switch for D and M pressed), "M" in the shift position indicator light will come on and when the shift lever is in the D range (with E–shift main switch for D and M released), "D" in the shift position indicator light will come on.
When the shift lever is in the L range (with E–shift main switch for 2 and L pressed), "L" in the shift position indicator light will come on and when the shift lever is in the 2 range (with E–shift main switch for 2 and L released), "2" in the shift position indicator light will come on.
When the shift lever is in M range, the Engine and ECT ECU prohibits shifting to 5th.

WIRING DIAGRAM

See page DI–231.

INSPECTION PROCEDURE

1	**Check operation of E–shift main switch.**

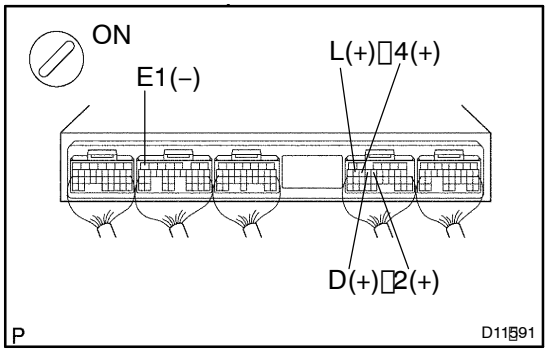
PREPARATION:
Turn the ignition switch ON.
CHECK:
Check the shift indicator light when the shift lever is in the each range.
OK:

Shift Lever Range	Specified Condition
D	"D" indicator light comes on
Except D	"D" indicator light goes off
M	"M" indicator light comes on
Except M	"M" indicator light goes off
2	"2" indicator light comes on
Except 2	"2" indicator light goes off
L	"L" indicator light comes on
Except L	"L" indicator light goes off

NG → **Check the combination meter (See page BE–2).**

OK

2	**Check voltage between each terminals of D, 4, 2, L and E1 of Engine and ECT ECU and body ground.**



PREPARATION:

Remove the Engine and ECT ECU with connectors still connected.

CHECK:

(a) Turn ignition switch ON.

(b) Check voltage between each of terminals of D, 4, 2, L, and E1 of Engine and ECT ECU.

OK:

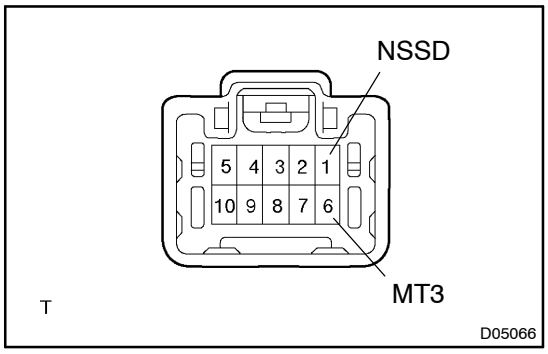
Tester connection	Shift lever range	Specified condition
D – Body ground	D or M	7.5 – 14 V
	Except D and M	Below 1.5 V
4 – Body ground	M	7.5 – 14 V
	Except M	Below 1.5 V
2 – Body ground	2 or L	7.5 – 14 V
	Except 2 and L	Below 1.5 V
L – Body ground	L	7.5 – 14 V
	Except L	Below 1.5 V

OK

Proceed to next circuit inspection shown in problem symptom table (See page DI–190).

NG

3	**Check E–shift main switch.**



PREPARATION:

Disconnect the shift lock control computer connector and E–shift main switch connector.

CHECK:

Check continuity between each terminal of shift lock control computer and E–shift main switch.

OK:

Shift range	Tester connection	Specified valve
P	1 – 6 (NSSD – MT3)	No continuity
M		Continuity
2	4 – 5 (NSSL – MTL)	No continuity
L		Continuity

NG → **Replace the E–shift main switch (See page AT–24).**

OK →

Repair or replace the harness or connector (See page IN–34).

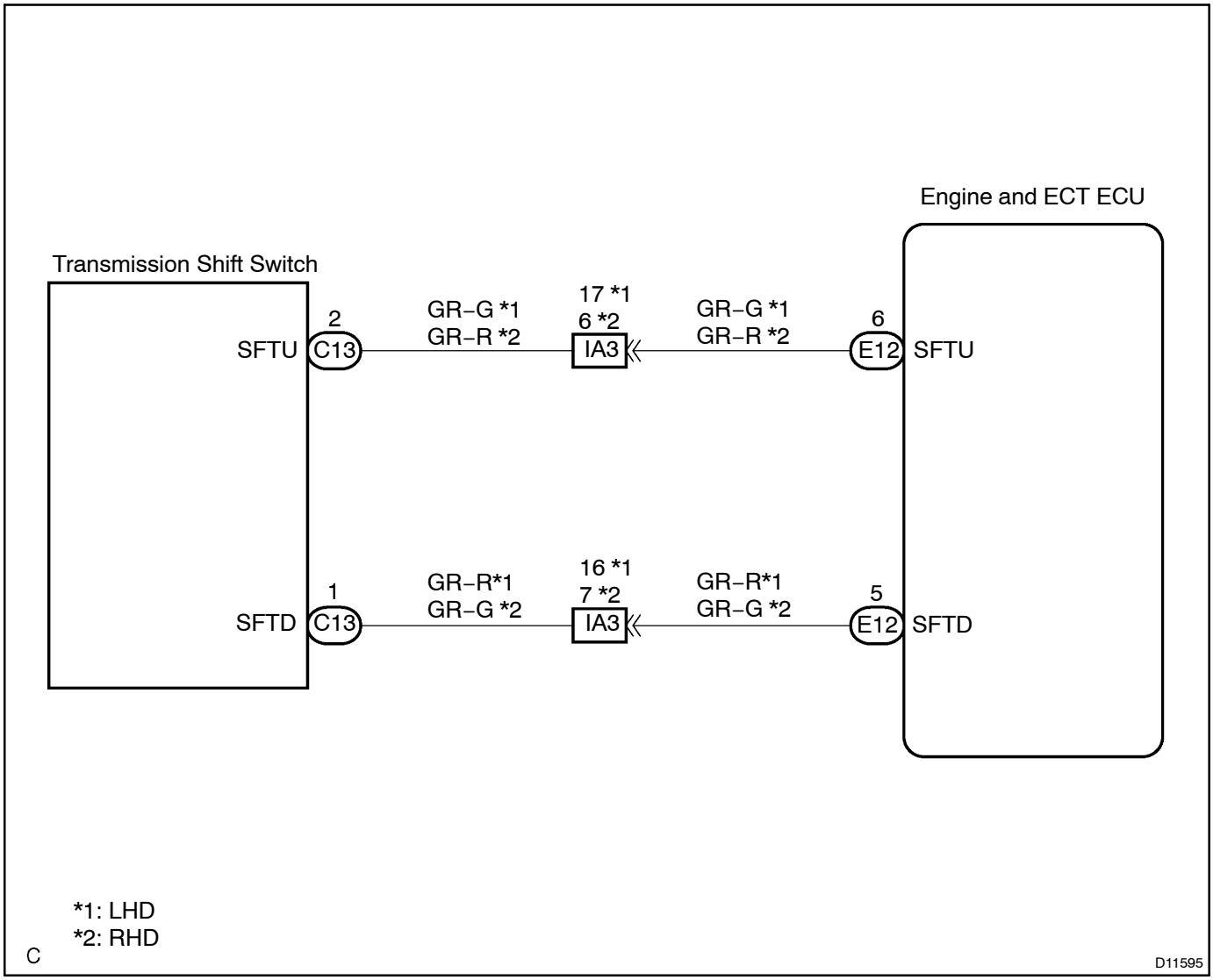
DI25Z–06

Transmission Shift Switch Circuit

CIRCUIT DESCRIPTION

When shifting the shift lever in M range, using the transmission shift switch, it is possible to shift in 2 – 5 ranges.
Pressing ”Up switch” once shifts up 1 range, ”Down switch” once shifts down 1 range respectively.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check the E–shift main switch (See page DI–240).

NG → Replace the E–shift main switch (See page AT–24).

OK

2	Check operation of transmission shift switch.

PREPARATION:

(a) Turn the ignition switch ON.

(b) Shift the shift lever into the M range.

CHECK:

Check the odo/trip display panel when the transmission shift switch is pressed.

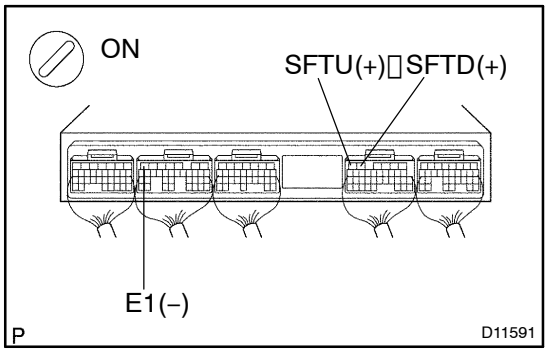
OK:

Switch condition	Odo/trip display panel
"Up" switch press	Shift up
"Down" switch press	Shift down

OK → Check and replace the Engine and ECT ECU (See page IN–34).

NG

3	**Check voltage between each of terminals SFTU, SFTD and E1 of Engine and ECT ECU.**



PREPARATION:

(a) Turn ignition switch ON.

(b) Remove the Engine and ECT ECU with connectors still connected.

CHECK:

Check voltage between each terminals of SFTU or SFTD and E1 of Engine and ECT ECU.

OK:

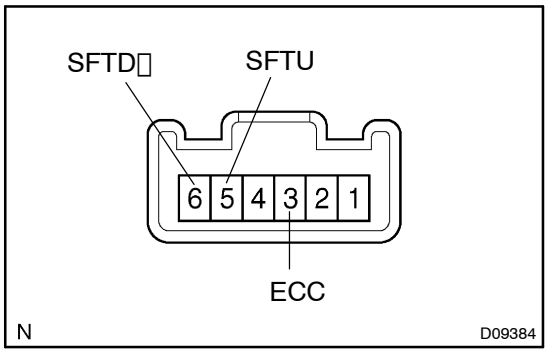
Switch condition	Tester connection	Specified condition
"Up" switch held pressing	SFTU – E1	7 – 14 V
"Up" switch released		Below 1.5 V
"Down" switch held pressing	SFTD – E1	7 – 14 V
"Down" switch released		Below 1.5 V

OK

Proceed to next circuit inspection shown in problem symptoms table (See page DI–190).

NG

4	Check transmission shift switch.



PREPARATION:

(a) Remove the steering wheel pad.

(b) Disconnect the transmission shift switch connector.

CHECK:

Check continuity between each terminal of transmission shift switch connector.

OK:

Switch condition	Tester connection	Specified value
"Up" switch pressed	3 – 5	No continuity
"Up" switch released		Continuity
"Down" switch pressed	3 – 6	No continuity
"Down" switch released		Continuity

NG → Replace the steering wheel (See page SR–7).

OK →

Repair or replace harness or connector (See page IN–34).

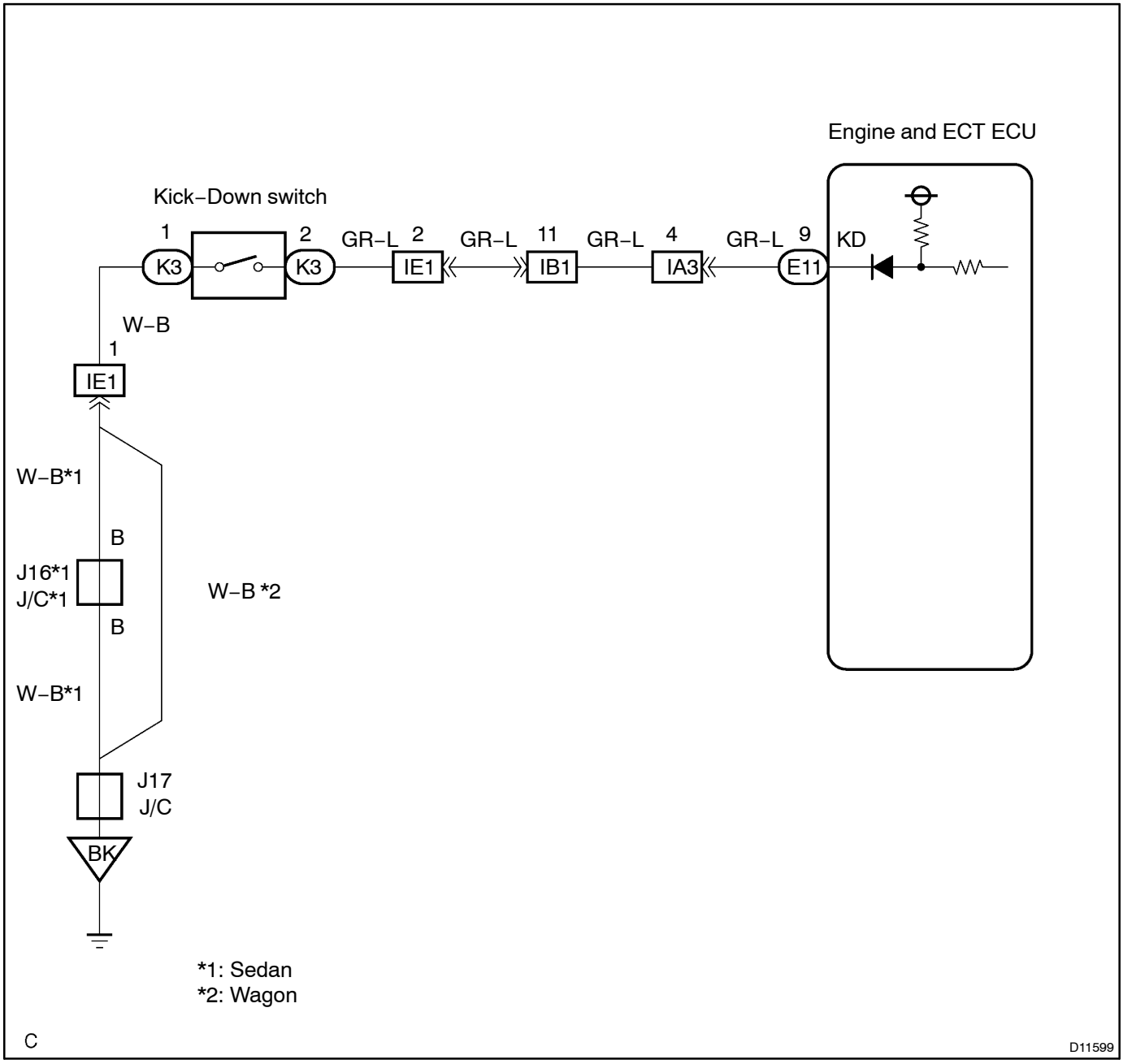
DI9HJ–01

Kick–down Switch Circuit

CIRCUIT DESCRIPTION

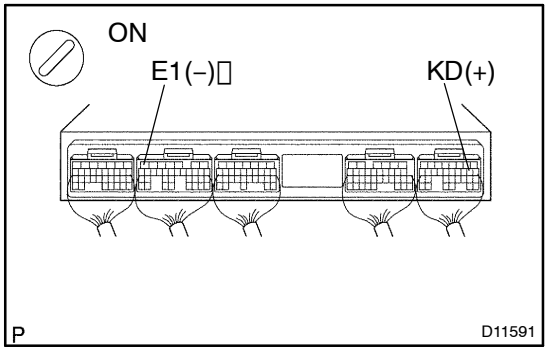
The kick–sown switch is turned ON when the accelerator pedal is depressed to the full throttle and sends signals to Engine and ECT ECU.
When the kick–down switch is turned ON, the Engine and ECT ECU controls gear shifting according to the programmed shift diagrams.
If a short circuit develops in the kick–down switch, the Engine and ECT ECU disregards the kick–down signals and controls shifting at the normal shift points.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal KD and E1 of Engine and ECT ECU.



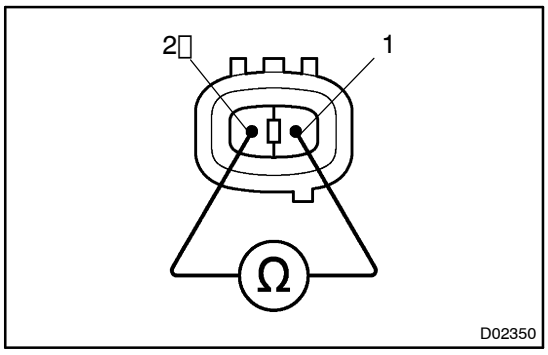
PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure voltage between terminal KD and E1 of Engine and ECT ECU when accelerator pedal is fully depressed or not.
OK:

Accelerator pedal	Voltage
Fully depressed (Kick–down switch is ON)	Below 1 V
Released (Kick–down switch is OFF)	10 – 14 V

OK: **Proceed to next circuit inspection shown in problem symptoms table (See page DI–190).**

NG

2	Check kick–down switch.



PREPARATION:
Disconnect the kick–down switch connector.
CHECK:
Check continuity between terminals 1 and 2 of the kick–down switch connector when kick–down switch is ON and OFF.
OK:

Kick–down switch	Continuity
ON	Continuity
OFF	No continuity

NG: **Replace the kick–down switch.**

OK

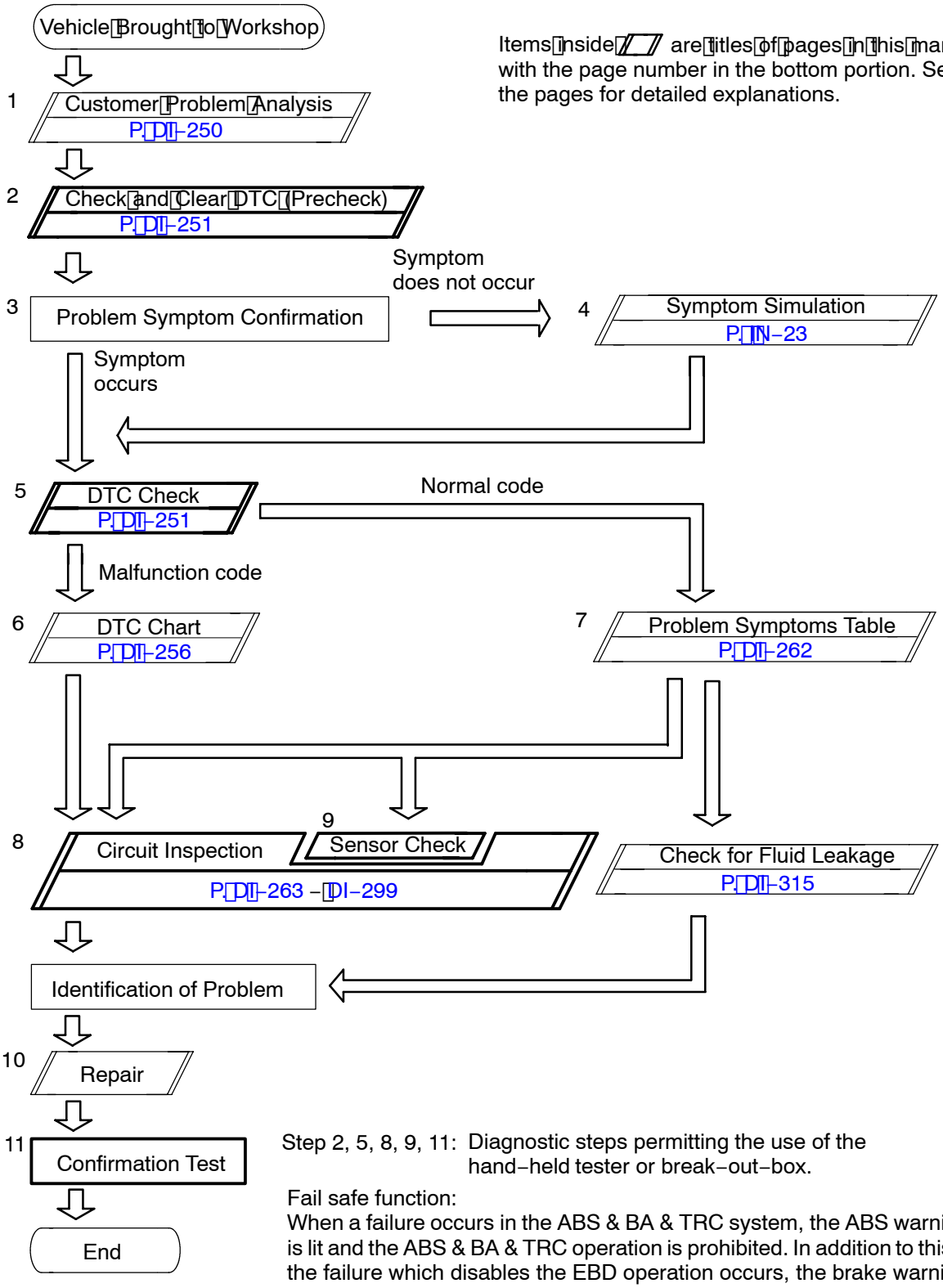
Repair or replace the harness or connector (See page IN–34).

ABS WITH EBD & BA & TRC SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI7UD–02

Troubleshoot in accordance with the procedure on the following pages.



Items inside // are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.

Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand–held tester or break–out–box.

Fail safe function:
When a failure occurs in the ABS & BA & TRC system, the ABS warning light is lit and the ABS & BA & TRC operation is prohibited. In addition to this, when the failure which disables the EBD operation occurs, the brake warning light is lit as well and the EBD operation is prohibited.

DI7UE–02

CUSTOMER PROBLEM ANALYSIS CHECK

ABS & TRC Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Frequency the Problem Occurs	☐ Continuously ☐ Intermittently (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	☐ TRC does not operate. (Wheels spin when starting rapidly.)	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	TRC OFF Indicator Light Abnormal	☐ Remains ON ☐ Blinks ☐ Does not Light Up
	SLIP Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	BRAKE Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**ABS Warning Light**	☐ Normal ☐ Malfunction Code (Code)
	Malfunction Indicator Light	☐ Normal ☐ Malfunction Code (Code)

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI9I5-01

PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) Release the parking brake lever.

(b) Check the indicator.

When the ignition switch is turned ON, check that the ABS warning light, BRAKE warning light, TRC OFF indicator light and SLIP indicator light go on for 3 seconds.

HINT:

- When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light is lit.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit, BRAKE warning light circuit, TRC OFF indicator light circuit and SLIP indicator light circuit.

Trouble Area	See page
ABS warning light circuit	DI–303
BRAKE warning light circuit	DI–311
TRC OFF indicator light circuit	DI–306
SLIP indicator light circuit	DI–309

(c) In case of not using hand–held tester:

Check the DTC.

(1) Using SST, connect terminals Tc and CG of DLC3.

SST 09843–18040

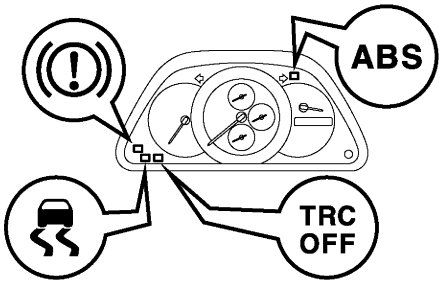
(2) Turn the ignition switch ON.

(3) Read the DTC from the ABS warning light and TRC OFF indicator light on the combination meter.

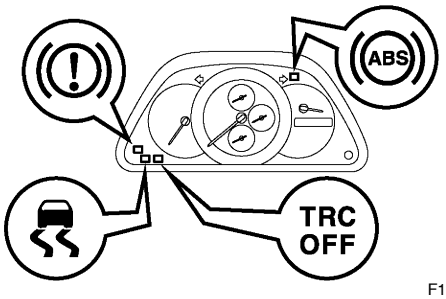
HINT:

- If no code appears, inspect the ABS warning light circuit or TRC OFF indicator light circuit (See page DI–303, DI–306).

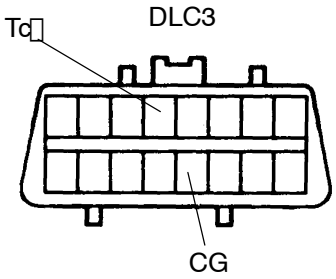
Australia:



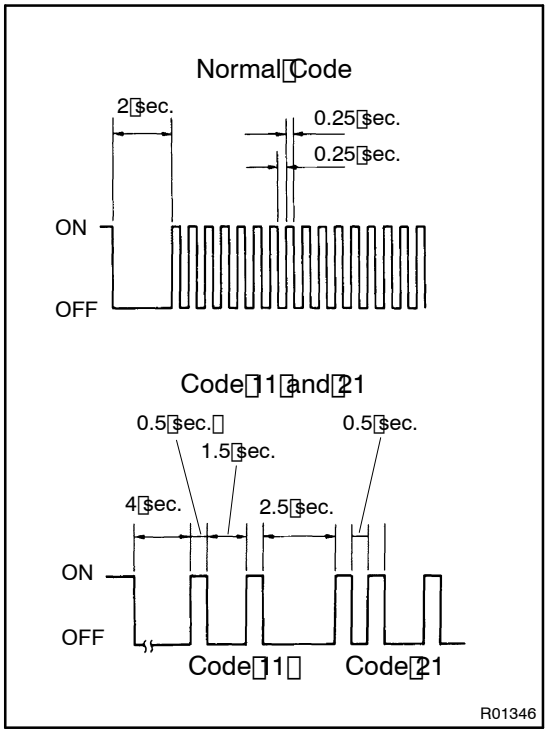
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N F10770



F09750

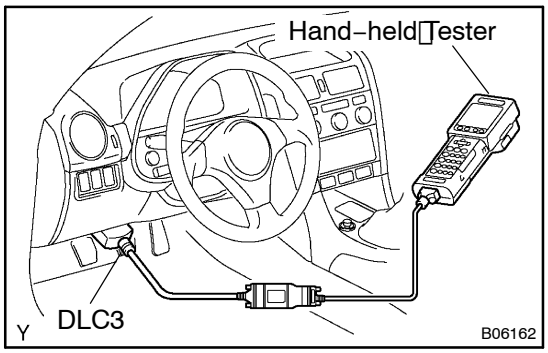


• As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

(4) Codes are explained in the code table on page DI–256.

(5) After completing the check, disconnect terminals Tc and CG of DLC3 and turn off the display.

If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.



(d) In case of using hand–held tester:

Check the DTC.

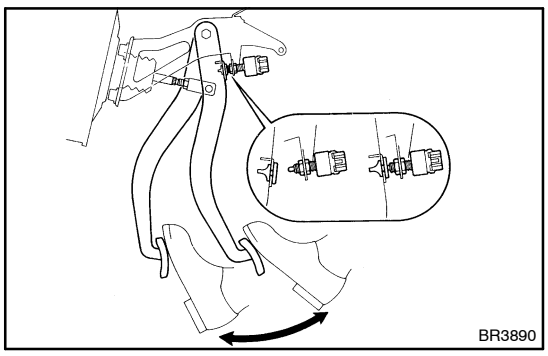
(1) Hook up the hand–held tester to the DLC3.

(2) Turn the ignition switch ON.

(3) Read the DTC by following the prompts on the tester screen.

HINT:

Please refer to the hand–held tester operator's manual for further details.



(e) In case of not using hand–held tester:

Clear the DTC.

(1) Using SST, connect terminals Tc and CG of DLC3.

SST 09843–18040

(2) Turn the ignition switch ON.

(3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 5 seconds.

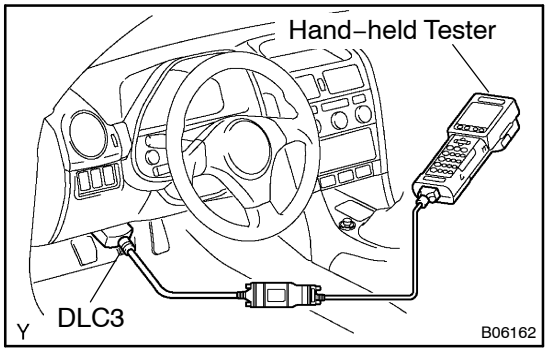
(4) Check that the warning light shows the normal code.

(5) Remove the SST from the terminals of DLC3.

SST 09843–18040

HINT:

The DTC stored in the ECU will be erased when the battery terminal is disconnected for the troubleshooting.



(f) In case of using hand–held tester:
Clear the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand–held tester to erase the codes. (See hand–held tester operator's manual.)

2. FREEZE FRAME DATA

(a) The vehicle (sensor) status at the occurrence of abnormality of the diagnosis code and during the ABS operating can be memorized and displayed using the hand–held tester.

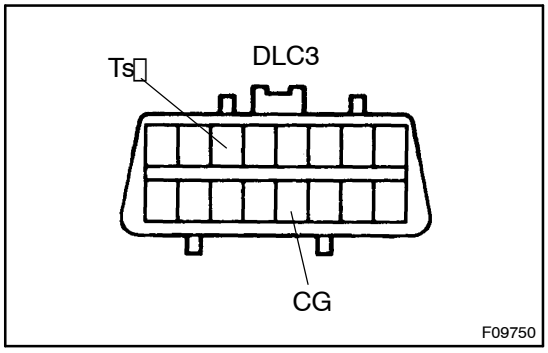
(b) Only one record of freeze frame data is stored, however, freeze frame data during the ABS operating is always up–dated. After the storage of freeze frame data, up to 31 ignition "ON" operations are stored and displayed.

HINT:
If the ignition switch "ON" operation exceeds 31 times, "31" appears on the display.

(c) If the diagnosis code abnormality occurs, the freeze frame data at the occurrence of the abnormality is stored but the ABS actuation data is deleted.

Hand–held tester display	Measurement Item	Reference Value*
VEHICLE SPD	Vehicle speed	Speed indication of a meter
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 – 31
MAS CYL PRESS	Master cylinder pressure sensor output voltage	Release brake pedal: 0.3 – 0.9 V Depress brake pedal: 3.2 – 4.5 V
MASS PRESS GRADE	Master cylinder pressure sensor changing declivity	–30 – 200 MPa/s
SYSTEM	Operate system	ABS operate: ABS BA operate: BA
YAW RATE	Yaw rate angle sensor output value	–70 – 70
STEERING ANG	Steering angle sensor output value	Left turn: Increase Right turn: Drop
G (RIGHT & LEFT)	Right and left G	–1.5 – 1.5
G (BACK & FORTH)	Back and forth G	–1.5 – 1.5
VSC / TRC OFF SW	TRAC OFF switch signal	TRAC OFF SW ON: ON OFF: OFF
SHIFT POSITION	Shift lever position	P: P R: R N: N D: D 2: 2 L: L

If no conditions are specifically stated for "Idling", it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.



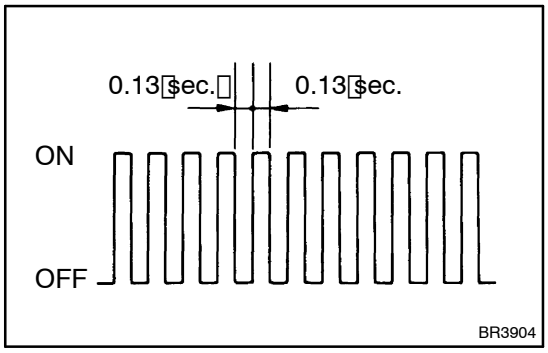
3. In case of not using hand-held tester: ABS SENSOR SIGNAL CHECK

(a) Procedures for test mode:

(1) Turn the ignition switch OFF.

(2) Using SST, connect terminals Ts and CG of DLC3.
SST 09843–18040

(3) Start the engine.



(4) Check that the ABS warning light blinks.

HINT:
If the ABS warning light does not blink, inspect the ABS warning light circuit (See page DI–303).

(b) Check the master cylinder pressure sensor.

(1) Leaving the vehicle in a stationary condition and the brake pedal in free condition for 1 sec. or more, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 sec. or more.

(2) While the vehicle is stopped, release the brake pedal.

(3) While the vehicle is stopped, quickly depress the brake pedal once or more and check the ABS warning light is lit for 3 sec.

HINT:
Repeat the operation until the ABS warning light is lit.

(c) Check the speed sensor signal.
Drive vehicle straight forward.
Drive vehicle faster than 45 km/h (28 mph) for several seconds.

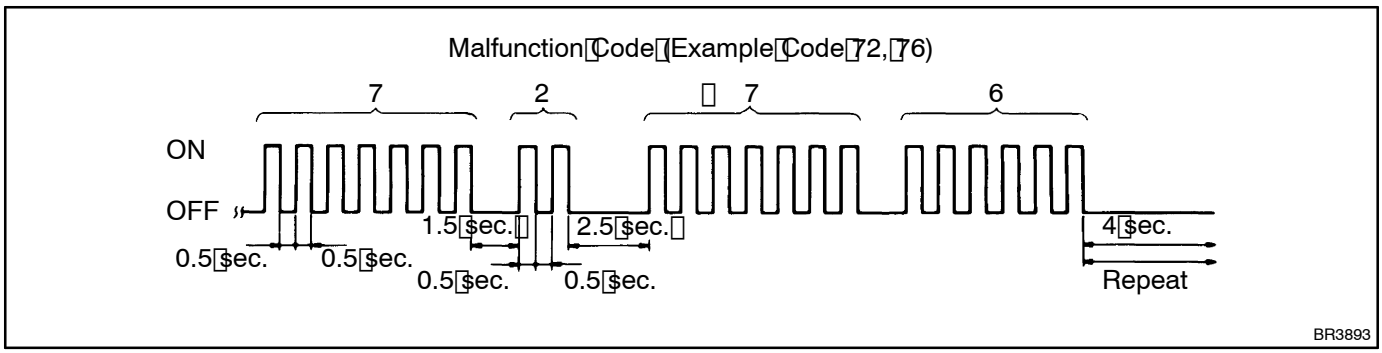
(d) Stop the vehicle.

(e) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040

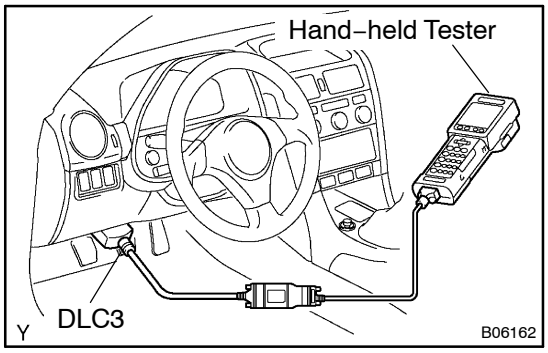
(f) Read the number of blinks of the ABS warning light.

HINT:

- See the list of DTC shown on the next page.
- If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.



After doing the check, disconnect the SST from terminals Ts and CG, Tc and CG of DLC3, and turn ignition switch OFF.
SST 09843–18040



4. In case of using hand–held tester:
ABS SENSOR SIGNAL CHECK

Check the speed sensor signal.

(1) Hook up the hand–held tester to the DLC3.
(2) Do step (b) to (c) on the previous page and this page.
(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

DTC of speed sensor check function:

Code No.	Diagnosis	Trouble Area
C1271/71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Right front speed sensor rotor • Right front speed sensor circuit
C1272/72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Left front speed sensor rotor • Left front speed sensor circuit
C1273/73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Right rear speed sensor rotor • Right rear speed sensor circuit
C1274/74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Left rear speed sensor rotor • Left rear speed sensor circuit
C1275/75	Abnormal change in output voltage of right front speed sensor	• Right front speed sensor rotor • Right front speed sensor
C1276/76	Abnormal change in output voltage of left front speed sensor	• Left front speed sensor rotor • Left front speed sensor
C1277/77	Abnormal change in output voltage of right rear speed sensor	• Right rear speed sensor rotor • Right rear speed sensor
C1278/78	Abnormal change in output voltage of left rear speed sensor	• Left rear speed sensor rotor • Left rear speed sensor
C1281/81	Master cylinder pressure sensor output signal is faulty	• Master cylinder pressure sensor

DI7UG–02

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- Using SST 09843–18040, connect the terminals Tc and CG of DLC3.
- If any abnormality is not found when inspecting parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed for the code. For details of each code, turn to the page referred to under the "See page" for respective "DTC No." in the DTC chart.

DTC chart of anti–lock brake system:

DTC No. (See Page)	Detection Item	Trouble Area
C0278/11 (DI–275)	Open circuit of ABS solenoid relay circuit	• ABS solenoid relay • ABS solenoid relay circuit
C0279/12 (DI–275)	Short circuit of ABS solenoid relay circuit	
C0273/13 *1 (DI–271)	Open circuit of ABS motor relay circuit	• ABS motor relay • ABS motor relay circuit
C0274/14 (DI–271)	Short circuit of ABS motor relay circuit	
C0226/21 (DI–269)	Open or short circuit of right front solenoid circuit	• Brake actuator • SFRR or SFRH circuit
C0236/22 (DI–269)	Open or short circuit of left front solenoid circuit	• Brake actuator • SFLR or SFLH circuit
C0246/23 (DI–269)	Open or short circuit of right rear solenoid circuit	• Brake actuator • SRRR or SRRH circuit
C0256/24 (DI–269)	Open or short circuit of left rear solenoid circuit	• Brake actuator • SRLR or SRLH circuit
C1225/25 (DI–287)	Open or short circuit of SM circuit	• Brake actuator • SM1 or SM2 circuit
C1226/26 (DI–287)	Open or short circuit of SRM circuit	• Brake actuator • SRM1 or SRM2 circuit
C1227/27 (DI–287)	Open or short circuit of SRC circuit	• Brake actuator • SRC1 or SRC2 circuit
C0200/31 *1 (DI–263)	Right front wheel speed sensor signal malfunction	• Right front, left front, right rear, left rear speed sensor • Each speed sensor circuit • Speed sensor rotor
C0205/32 *1 (DI–263)	Left front wheel speed sensor signal malfunction	
C0210/33 *1 (DI–263)	Right rear wheel speed sensor signal malfunction	
C0215/34 *1 (DI–263)	Left rear wheel speed sensor signal malfunction	
C1235/35 (DI–263)	Foreign matter is attached on the tip of the right front sensor	• Right front, left front, right rear, left rear speed sensor • Speed sensor rotor
C1236/36 (DI–263)	Foreign matter is attached on the tip of the left front sensor	
C1238/38 (DI–263)	Foreign matter is attached on the tip of the right rear sensor	
C1239/39 (DI–263)	Foreign matter is attached on the tip of the left rear sensor	

C1241/41 (DI–289)	Low battery positive voltage	• Battery • Charging system • Power source circuit
C1246/46*2 (DI–293)	Malfunction in master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C1249/49 (DI–296)	Open circuit of stop light switch circuit	• Stop light switch • Stop light switch circuit
C1251/51*1 (DI–299)	Pump motor is locked	• Brake actuator • Brake actuator circuit
Always ON (DI–301)	Malfunction in ECU	• Combination meter • Combination meter circuit • Battery • Skid control ECU

*1, *2:
Even after the troubled areas are repaired, ABS warning light will not go OFF unless the following operations are performed.

- *1:
  (1) Drive the vehicle at 20 km/h (12 mph) for 30 seconds or more and check that the ABS warning light goes off.
  (2) Clear the DTC (See page DI–251).
- *2:
  (1) Keep the vehicle in the stationary condition for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
  (2) Drive the vehicle at the vehicle speed 50 km/h (31 mph) and keep depressing the brake pedal strongly for about 3 seconds.
  (3) Repeat the above operation 3 times or more and check that the ABS warning light goes off.
  (4) Clear the DTC (See page DI–251).

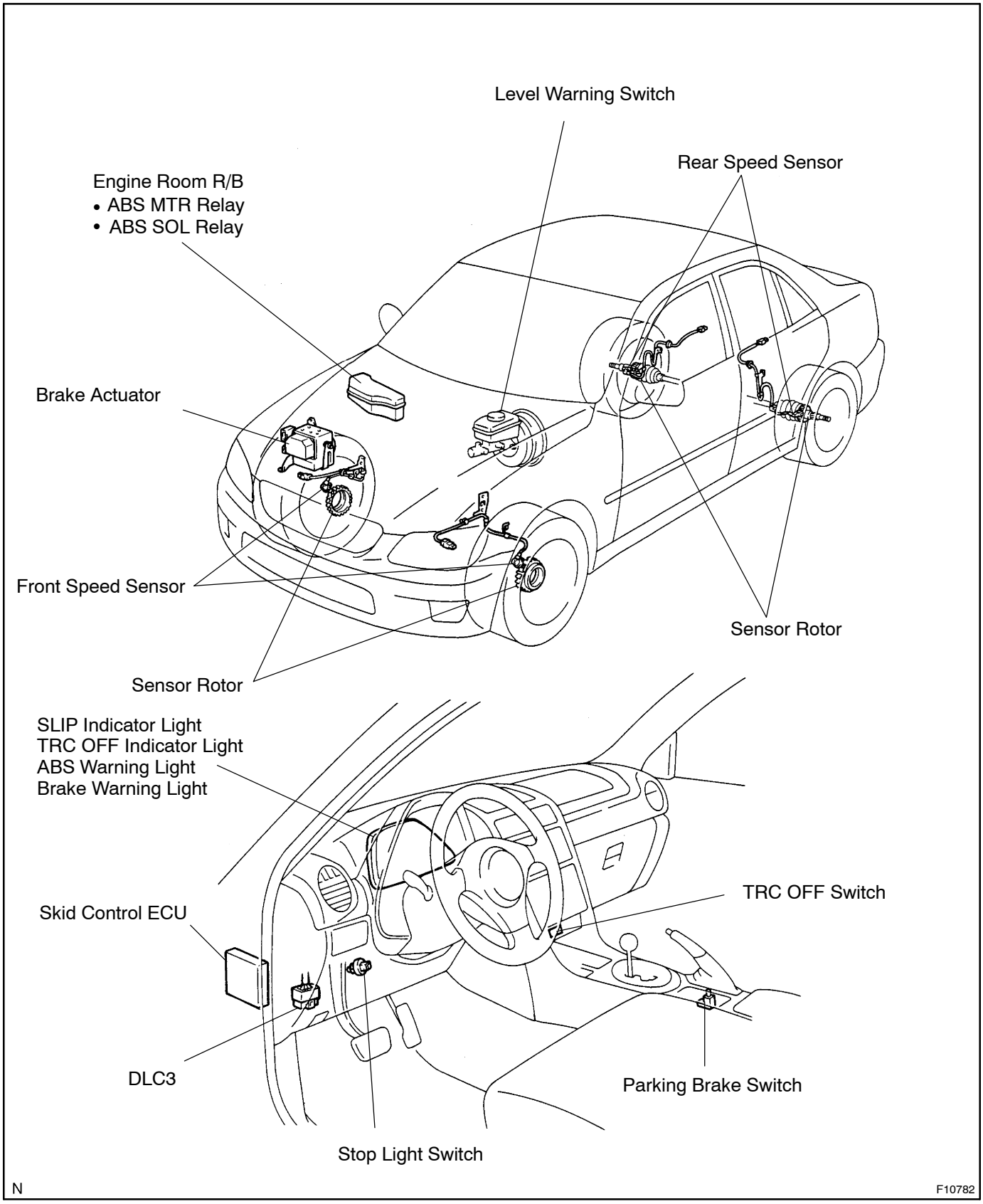
HINT:
There is a case that hand–held tester cannot be used when ABS warning light is always on.

DTC chart of traction control system:

C1223/43 (DI–284)	Malfunction in ABS control system	ABS control system
C1224/44 (DI–285)	Open or short circuit of NE signal circuit	• NEO circuit • Engine ECU
C1201/51 (DI–279)	Malfunction in engine control system	Engine control system
C1202/52 (DI–280)	Brake fluid level low Open circuit in brake fluid level warning switch circuit	• Brake fluid level • Brake fluid warning switch • Brake fluid level warning switch circuit
C1203/53 (DI–282)	Malfunction in engine ECU communication circuit	• TRC+ or TRC – circuit • ENG+ or ENG– circuit • Engine ECU

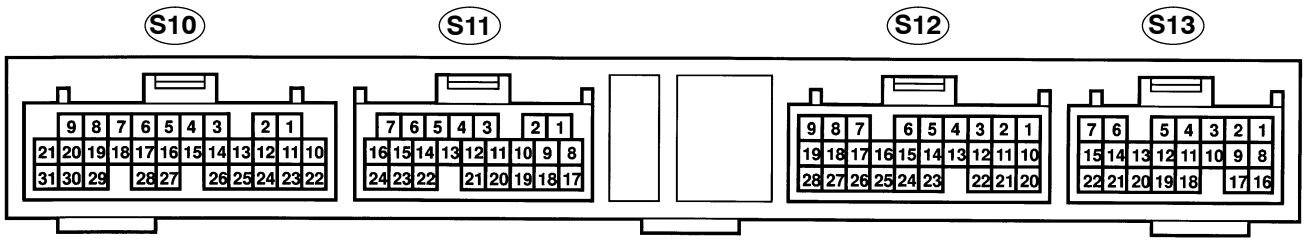
DI7UH–02

PARTS LOCATION



DI7UI–02

TERMINALS OF ECU



F02094

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SRLR (S23 – 1) – GND (S23 – 15, 22, S20 – 2, 3)	B ↔ W–B*1 R ↔ W–B*2	IG switch ON, ABS warning light OFF	10 – 14
SM1– (S23 – 2) – GND (S23 – 15, 22, S20 – 2, 3)	B–L ↔ W–B*1 L ↔ W–B*2	IG switch OFF	Continuity
SM1+ (S23 – 3) – GND (S23 – 15, 22, S20 – 2, 3)	B–R ↔ W–B*1 R–L ↔ W–B*2	IG switch ON, ABS warning light OFF	Below 1.0
SM2– (S23 – 4) – GND (S23 – 15, 22, S20 – 2, 3)	L–B ↔ W–B	IG switch OFF	Continuity
SM2+ (S23 – 5) – GND (S23 – 15, 22, S20 – 2, 3)	G–B ↔ W–B*1 W–R ↔ W–B*2	IG switch ON, ABS warning light OFF	Below 1.0
AST (S23 – 6) – GND (S23 – 15, 22, S20 – 2, 3)	Y–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRLH (S23 – 7) – GND (S23 – 15, 22, S20 – 2, 3)	G–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFRR (S23 – 8) – GND (S23 – 15, 22, S20 – 2, 3)	G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
E3 (S23 – 12) – GND (S23 – 15, 22, S20 – 2, 3)	Y ↔ W–B	IG switch OFF	Continuity
FSS (S23 – 13) – GND (S23 – 15, 22, S20 – 2, 3)	Shielded ↔ W–B	IG switch OFF	Continuity
MT (S23 – 14) – GND (S23 – 15, 22, S20 – 2, 3)	L–Y ↔ W–B	IG switch ON (Motor relay is OFF)	Below 1.5
SFRH (S23 – 16) – GND (S23 – 15, 22, S20 – 2, 3)	B–W ↔ W–B*1 W–R ↔ W–B*2	IG switch ON, ABS warning light OFF	10 – 14
PMC2 (S23 – 18) – E3 (S23 – 12)	L ↔ Y	IG switch ON, stop light switch OFF	0.3 – 0.8
VCM2 (S23 – 21) – GND (S23 – 15, 22, S20 – 2, 3)	G ↔ W–B	IG switch ON	4.5 – 5.5
CSW (S22 – 7) – GND (S23 – 15, 22, S20 – 2, 3)	LG–R ↔ W–B	IG switch ON, CSW is OFF	10 – 14
NEO (S22 – 26) – GND (S23 – 15, 22, S20 – 2, 3)	G ↔ W–B	Engine idling	Pulse generation
D/G (S22 – 28) – GND (S23 – 15, 22, S20 – 2, 3)	W–R ↔ W–B*1 W ↔ W–B*2	IG switch ON	10 – 14
WA (S21 – 1) – GND (S23 – 15, 22, S20 – 2, 3)	W–L ↔ W–B	IG switch ON, ABS warning light ON	10 – 14
		IG switch ON, ABS warning light OFF	Below 2.0
SP1 (S21 – 2) – GND (S23 – 15, 22, S20 – 2, 3)	R–Y ↔ W–B*1 V–W ↔ W–B*2	Vehicle drives at about 20 km/h (12 mph)	Pulse generation

STP (S21 – 3) – GND (S23 – 15, 22, S20 – 2, 3)	G–R ↔ W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
WT (S21 – 4) – GND (S23 – 15, 22, S20 – 2, 3)	LG ↔ W–B	IG switch ON, TRC OFF indicator light ON	Below 2.0
		IG switch ON, TRC OFF indicator light OFF	10 – 14
IND (S21 – 6) – GND (S23 – 15, 22, S20 – 2, 3)	L–Y ↔ W–B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 – 14
IG1 (S21 – 7) – GND (S23 – 15, 22, S20 – 2, 3)	B–R ↔ W–B	IG switch ON	10 – 14
BRL (S21 – 8) – GND (S23 – 15, 22, S20 – 2, 3)	Y–G ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level and parking brake switch is OFF (Brake warning light is OFF)	Below 2.0
		IG switch ON, fluid in master cylinder reservoir below MIN level or parking brake switch is ON (Brake warning light ON)	10 – 14
ENG+ (S21 – 9) – ENG– (S21 – 18)	L–B ↔ P	IG switch ON	Pulse generation
Ts (S21 – 10) – GND (S23 – 15, 22, S20 – 2, 3)	W–L ↔ W–B	IG switch ON	10 – 14
TRC+ (S21 – 11) – TRC– (S21 – 20)	R–Y ↔ W–G	IG switch ON, ABS warning light OFF	Pulse generation
FRO (S21 – 13) – GND (S23 – 15, 22, S20 – 2, 3)	W–R ↔ W–B	Vehicle drives at about 20 km/h (12 mph)	Pulse generation
RR+ (S21 – 16) – RR– (S21 – 15)	GR ↔ B*1 W ↔ B*2	IG switch ON, slowly turn right rear wheel	Pulse generation
PKB (S21 – 21) – GND (S23 – 15, 22, S20 – 2, 3)	Y–R ↔ W–B	IG switch ON, parking brake switch ON	Below 1.5
		IG switch ON, parking brake switch OFF	10 – 14
RL+ (S21 – 22) – RL– (S21 – 23)	R ↔ L	IG switch ON, slowly turn left rear wheel	Pulse generation
R+ (S20 – 1) – GND (S23 – 15, 22, S20 – 2, 3)	L–B ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRM1 (S20 – 4) – GND (S23 – 15, 22, S20 – 2, 3)	B–Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRC2 (S20 – 5) – GND (S23 – 15, 22, S20 – 2, 3)	G–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFLH (S20 – 6) – GND (S23 – 15, 22, S20 – 2, 3)	L–R ↔ W–B*1 W–G ↔ W–B*2	IG switch ON, ABS warning light OFF	10 – 14
SFLR (S20 – 7) – GND (S23 – 15, 22, S20 – 2, 3)	L–Y ↔ W–B*1 W ↔ W–B*2	IG switch ON, ABS warning light OFF	10 – 14
SRRH (S20 – 8) – GND (S23 – 15, 22, S20 – 2, 3)	L–O ↔ W–B*1 R–W ↔ W–B*2	IG switch ON, ABS warning light OFF	10 – 14
SRRR (S20 – 9) – GND (S23 – 15, 22, S20 – 2, 3)	G–Y ↔ W–B*1 W–L ↔ W–B*2	IG switch ON, ABS warning light OFF	10 –14
SR (S20 – 10) – R1+ (S10 – 1)	L–R ↔ L–B	IG switch ON, ABS warning light OFF	10 – 14
FR+ (S20 – 13) – FR– (S20 – 12)	O ↔ B	IG switch ON, slowly turn right front wheel	Pulse generation
SRM2 (S20 – 21) – GND (S23 – 15, 22, S20 – 2, 3)	B–O ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
MR (S20 – 23) – GND (S23 – 15, 22, S20 – 2, 3)	W–L ↔ W–B	IG switch ON, ABS motor stops	10 – 14
MRF (S20 – 24) – GND (S23 – 15, 22, S20 – 2, 3)	R–Y ↔ W–B	IG switch ON, ABS warning light OFF	Below 2.0

LBL (S20 – 25) – GND (S23 – 15, 22, S20 – 2, 3)	Y–R ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level	4 – 10
FL+ (S20 – 28) – FL– (S20 – 27)	LG ↔ V	IG switch ON, slowly turn left front wheel	Pulse generation
SRC1 (S20 – 31) – GND (S23 – 15, 22, S20 – 2, 3)	G–O ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14

*1: LHD
*2: RHD

DI7UJ–02

PROBLEM SYMPTOMS TABLE

If a normal 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.

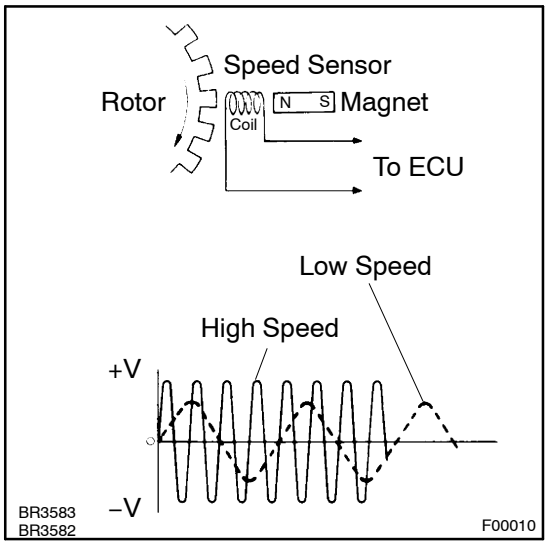
Symptom	Suspect Area	See page
ABS does not operate	Only when 1. to 4. are all normal and the problem is still occurring, replace the Skid control ECU. 5. Check the DTC reconfirming that the normal code is output. 6. IG power source circuit 7. Speed sensor circuit 8. Check the brake actuator with hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–315).	 DI–251 DI–289 DI–263
ABS does not operate efficiently	Only when 1. to 4. are all normal and the problem is still occurring, replace the Skid control ECU. 1. Check the DTC reconfirming that the normal code is output 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the brake actuator with hand–held tester. If abnormal, check the hydraulic circuit for leakage (See page DI–315).	 DI–251 DI–263 DI–296
ABS warning light abnormal	1. ABS warning light circuit 2. Skid control ECU	DI–303 IN–34
BRAKE warning light abnormal	1. BRAKE warning light circuit 2. Skid control ECU	DI–311 IN–34
DTC check cannot be done	Only when 1. and 2. are all normal and the problem is still occurring, replace the Skid control ECU. 1. ABS warning light circuit 2. TRC OFF indicator light circuit	 DI–303 DI–306
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. Skid control ECU	DI–313 IN–34
TRC does not operate	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the Skid control ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit	 DI–251 DI–289 DI–315 DI–263
SLIP indicator light abnormal	SLIP indicator light circuit	DI–309
TRC OFF indicator light abnormal	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the Skid control ECU. 1. TRC OFF indicator light circuit 2. TRC cut switch circuit	 DI–306 DI–306

DI9I6–01

CIRCUIT INSPECTION

DTC	C0200 / 31 – C1239 / 39	Speed Sensor Circuit

CIRCUIT DESCRIPTION



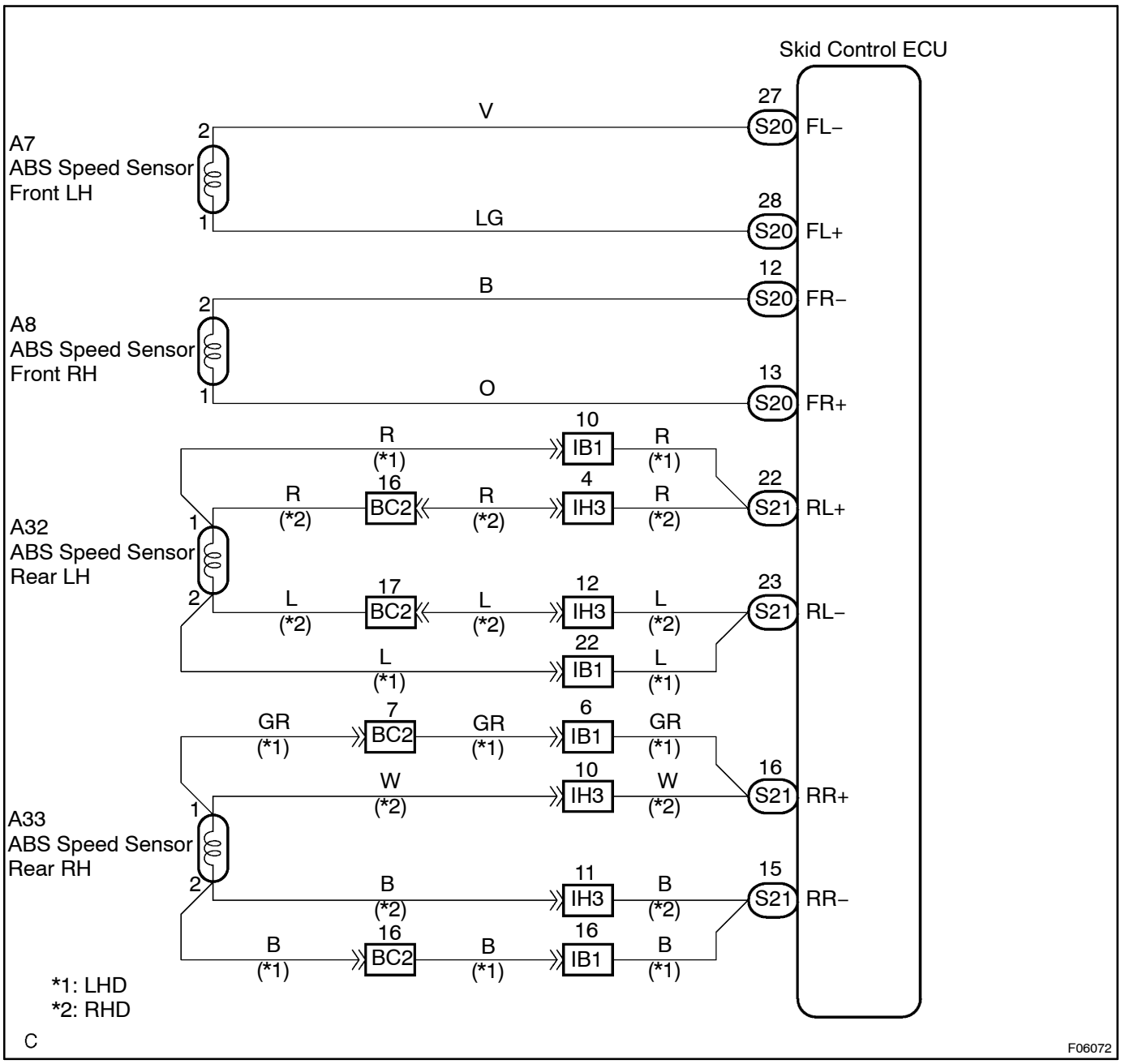
The speed sensor measures wheel speed and sends the corresponding signals to the ECU. These signals are used for control of both the ABS & TRC control system. Both the front and rear rotors have 48 serrations.
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an 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 measure the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions 1. through 3.: 1. At vehicle speed of 10 km/h (6 mph) or more, open or short circuit of the speed sensor signal circuit continues for 15 sec. 2. Momentary interruption of the speed sensor signal occurs 7 times or more. 3. Open circuit of the speed sensor signal circuit continues for 0.5 sec. or more.	• Right front, left front, right rear, left rear speed sensor • Each speed sensor circuit • Sensor rotor
C1235 / 35 C1236 / 36 C1238 / 38 C1239 / 39	Nose have been counted 75 times in 5 sec.	• Right front, left front, right rear, left rear speed sensor • Sensor rotor

HINT:

- DTC No. C0200 / 31 and C1235 / 35 are for the right front speed sensor.
- DTC No. C0205 / 32 and C1236 / 36 are for the left front speed sensor.
- DTC No. C0210 / 33 and C1238 / 38 are for the right rear speed sensor.
- DTC No. C0215 / 34 and C1239 / 39 are for the left rear speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of speed sensor.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:
Check that there is no difference between the speed value output from the speed sensor observed in the hand–held tester and the speed value displayed by the speedometer when the vehicle is in motion.

OK:

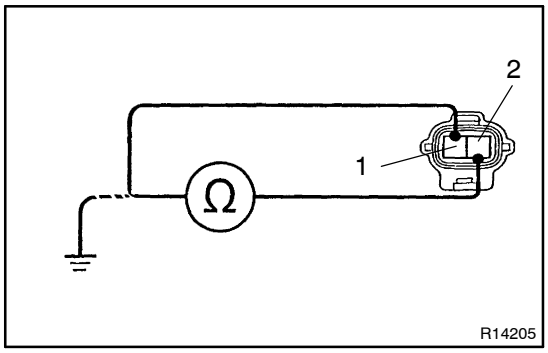
There is almost no difference in the displayed speed values.

HINT:
There is tolerance of ± 10 % in the speedometer indication.

OK → **Go to step 4.**

NG

2	**Check speed sensor.**



Front:

PREPARATION:
(a) Make sure that the speed sensor connector and the wire harness side connector are securely connected.
(b) Disconnect the speed sensor connector.

CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor connector.

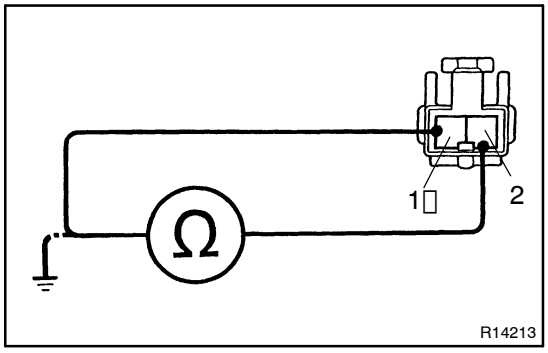
OK:

Resistance: 1.4 – 1.8 kΩ at 20°C

CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher



Rear:

PREPARATION:

(a) Remove the rear seat cushion and the seatback.

(b) Make sure that the speed sensor connector and the wire harness side connector are securely connected.

(c) Disconnect the speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor connector.

OK:

Resistance: 0.9 – 1.3 kΩ at 25 ± 5°C

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG	**Replace speed sensor.**

NOTICE:

Check the speed sensor signal (See page DI–251).

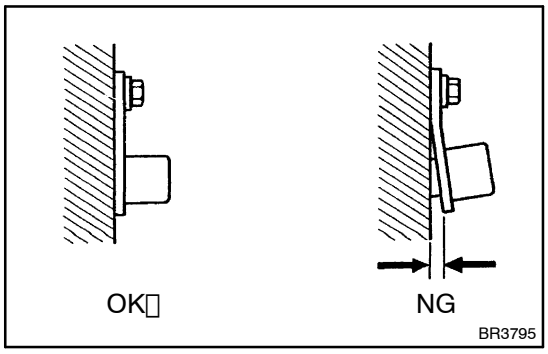
OK

3	**Check for open and short circuit in harness and connector between each speed sensor and skid control ECU (See page IN–34).**

NG	**Repair or replace harness or connector.**

OK

4	Check sensor installation.



CHECK:

Check the speed sensor installation.

OK:

The installation bolt is tightened properly and there is no clearance between the sensor and front steering knuckle or rear axle carrier.

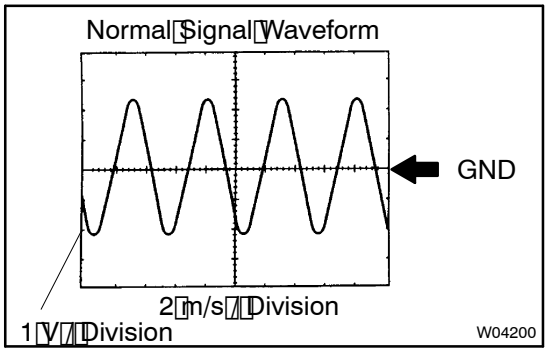
NG	Replace speed sensor.

NOTICE:

Check the speed sensor signal first (See page DI–251).

OK

5	Check speed sensor and sensor rotor serrations.



(REFERENCE) INSPECTION USING OSCILLOSCOPE

PREPARATION:

(a) Remove the skid control ECU with the connector still connected.

(b) Connect the oscilloscope to the terminals FR+ – FR–, FL+ – FL–, RR+ – RR– and RL+ – RL– of the skid control ECU.

CHECK:

Drive the vehicle at the speed of about 20 km/h (12 mph), and check the signal waveform.

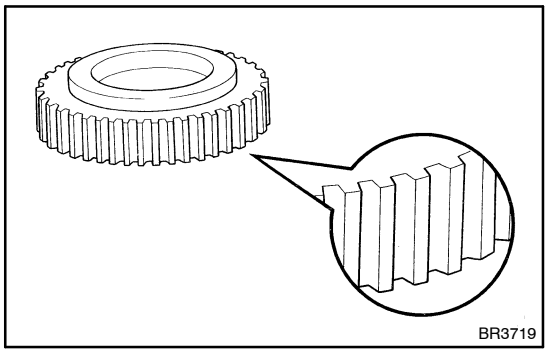
HINT:

- As the vehicle speed (rpm of the wheels) increases, a cycle of the waveform becomes shorter 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 deposited on it.

OK	Check and replace skid control ECU.

NG

6	Check sensor rotor and sensor tip.



Front:

PREPARATION:

Remove the front axle hub and the speed sensor.

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects on the sensor rotor.

CHECK:

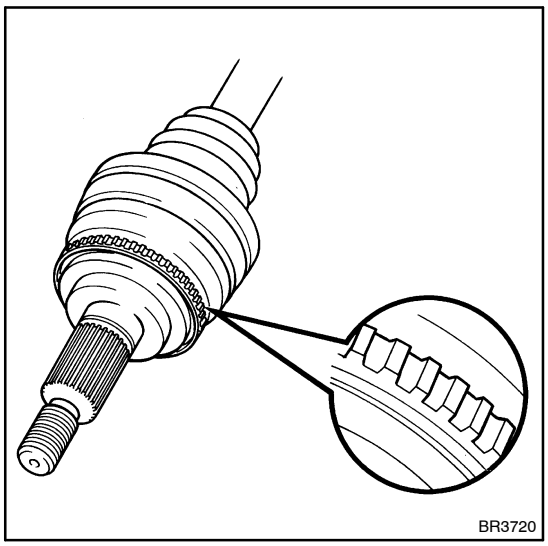
Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.



Rear:

PREPARATION:

Remove the drive shaft.

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove the rear speed sensor.

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.

NG	Replace speed sensor or rotor.

NOTICE:

Check the speed sensor signal last (See page DI–251).

OK

Check and replace skid control ECU.

DI1GI–09

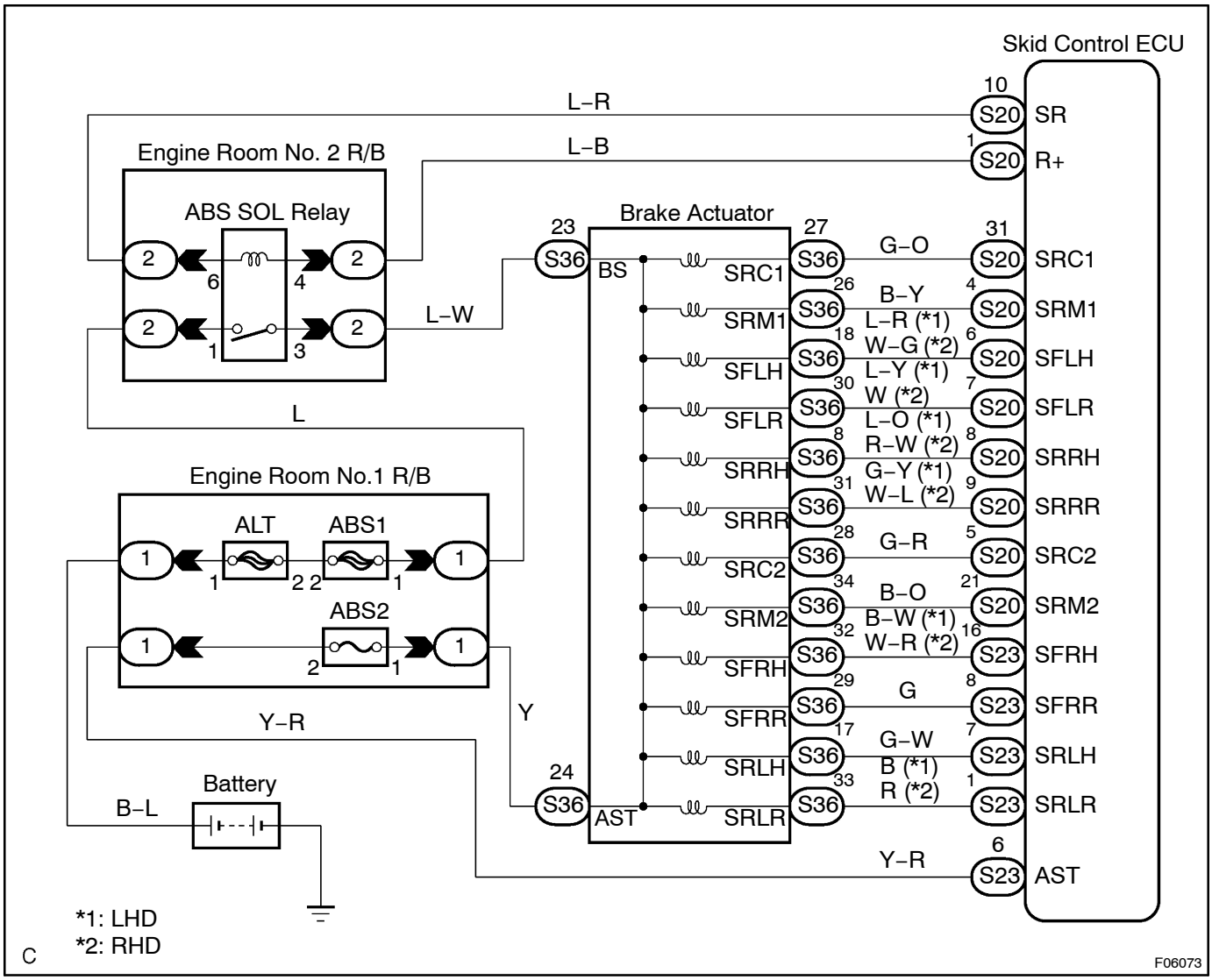
DTC	C0226 / 21 – C0256 / 24	ABS–Related Solenoid Circuits

CIRCUIT DESCRIPTION

ABS–related solenoids operate when signals are received from the ECU, and control the pressure acting on the wheel cylinders thus controlling the braking force.

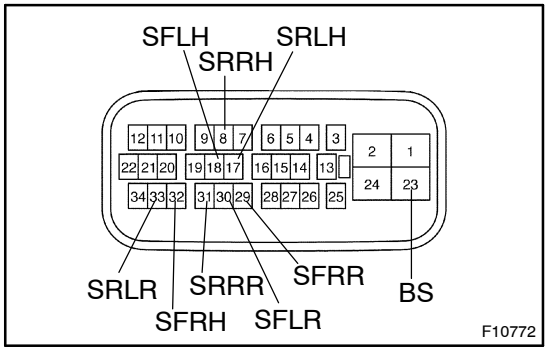
DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit for SFRH or SFRR circuit continues for 0.05 sec. or more.	• Brake actuator • SFRH or SFRR circuit
C0236 / 22	Open or short circuit for SFLH or SFLR circuit continues for 0.05 sec. or more.	• Brake actuator • SFLH or SFLR circuit
C0246 / 23	Open or short circuit for SRRH or SRRR circuit continues for 0.05 sec. or more.	• Brake actuator • SRRH or SRRR circuit
C0256 / 24	Open or short circuit for SRLH or SRLR circuit continues for 0.05 sec. or more.	• Brake actuator • SRLH or SRLR circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check brake actuator solenoid.**



PREPARATION:
Disconnect the brake actuator connector.
CHECK:
Check continuity between terminal BS and terminals SFRH, SFLH, SRRH, SRLH, SFRR, SFLR, SRRR and SRLR of brake actuator.
OK:

Continuity

HINT:
Resistance of each solenoid at 25°C
SFRH, SFLH, SRRH, SRLH: 8.1 – 9.1 Ω
SFRR, SFLR, SRRR, SRLR: 4.0 – 4.6 Ω

NG	**Replace brake actuator.**

OK

2	**Check for open and short circuit in harness and connector between skid control ECU and brake actuator (See page IN–34).**

NG	**Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GJ–14

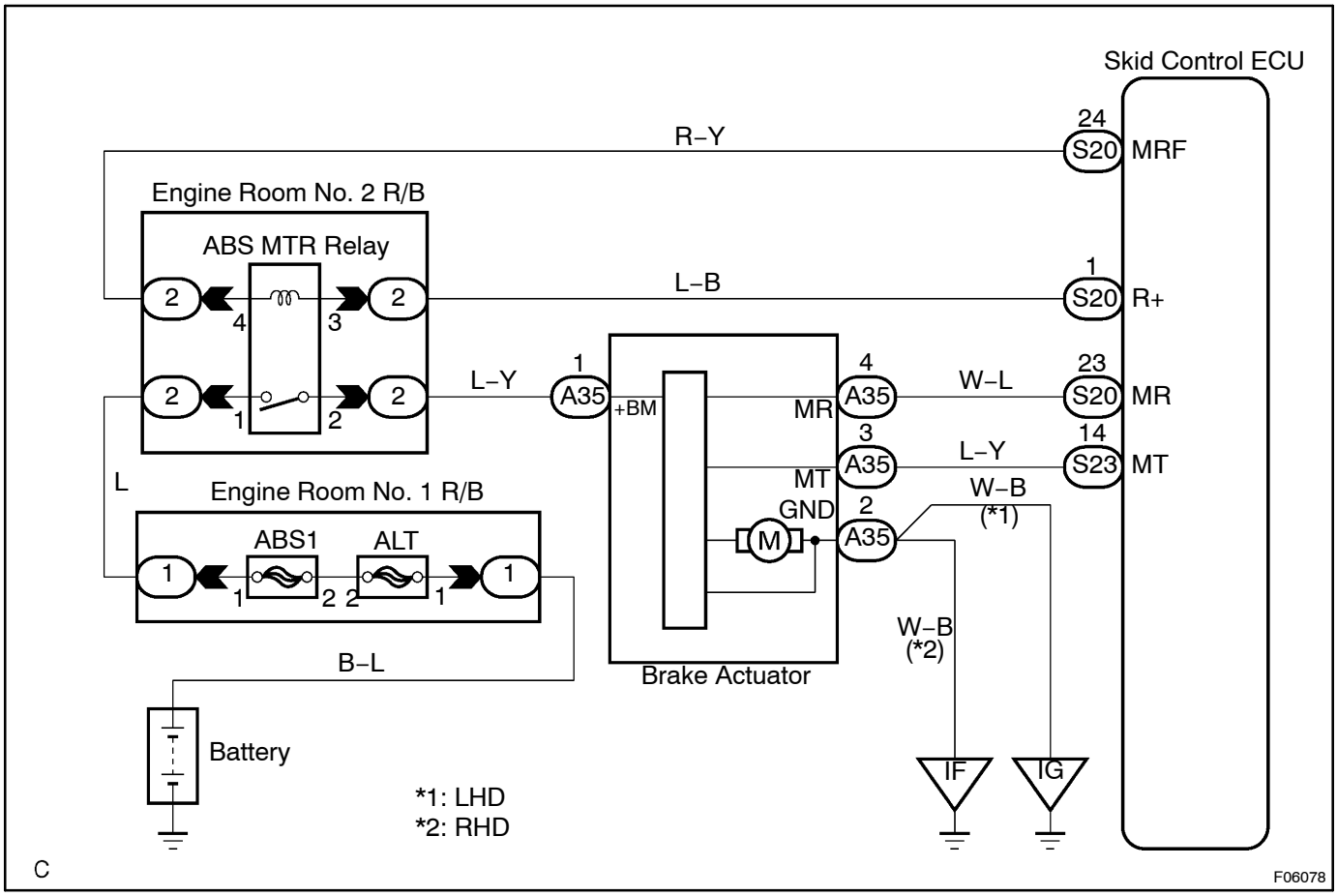
DTC	C0273 / 13, C0274 / 14	ABS Motor Relay Circuit

CIRCUIT DESCRIPTION

The ABS motor relay supplies power to the ABS pump motor. While the ABS & TRC are activated, the ECU switches the motor relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Conditions 1. and 2. continued for 0.12 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V in the initial check or ABS, TRC are in operation, and when the motor relay is ON, however, the contact point of the motor relay is OFF. 2. ECU terminal IG1 is 9.5 V or less, and when the motor relay is ON, but the contact point of the motor relay does not become ON.	• ABS motor relay • ABS motor relay circuit • Skid control ECU
C0274 / 14	When the motor relay is OFF, the condition that the contact point of motor relay is ON continues for 4 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

1	**Check ABS motor relay operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

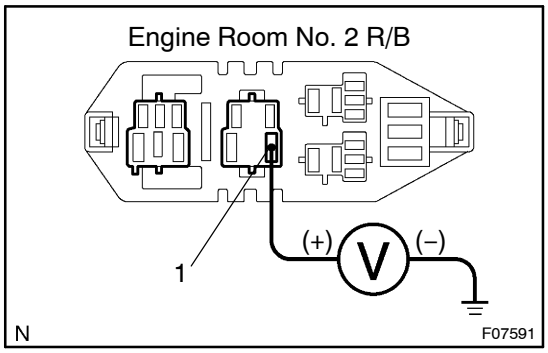
CHECK:
Check the operation sound of the ABS motor relay when operating it with the hand–held tester.

OK:
The operation sound of the ABS motor relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminal 1 of engine room No. 2 R/B (for ABS motor relay) and body ground.**



PREPARATION:
Remove the ABS motor relay from the engine room No. 2 R/B.

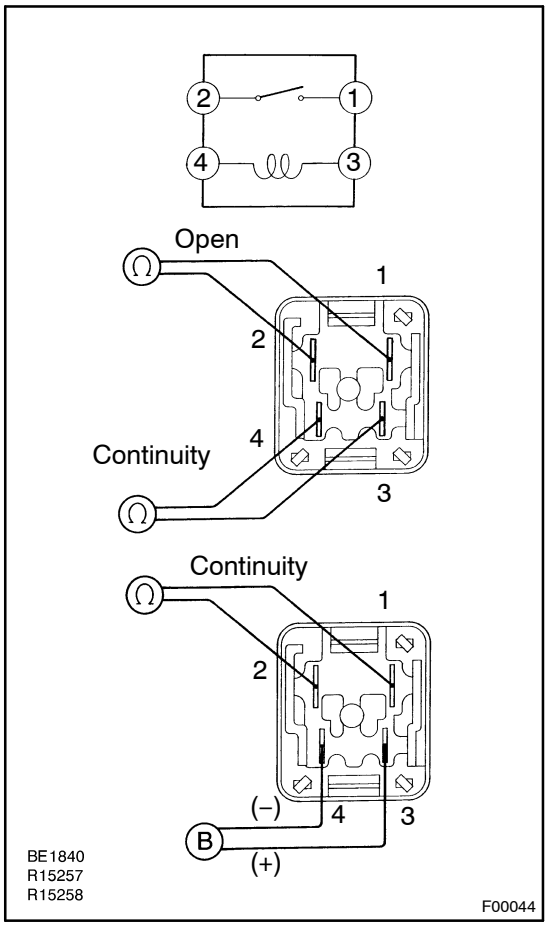
CHECK:
Measure voltage between terminal 1 of engine room No. 2 R/B (for ABS motor relay) and body ground.

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS motor relay.



CHECK:

Check continuity between each pair of terminal of motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

CHECK:

(a) Apply battery voltage between terminals 3 and 4.

(b) Check continuity between terminals.

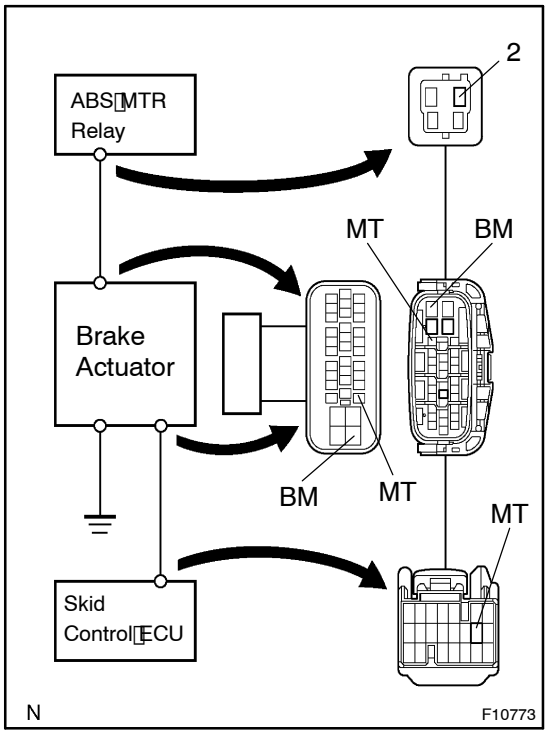
OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS motor relay.**

OK

4	**Check continuity between terminals 2 of engine room No. 2 R/B (for ABS motor relay) and terminal MT of skid control ECU.**



PREPARATION:

(a) Remove the ABS motor relay from the engine room No. 2 R/B.

(b) Disconnect the connector from the skid control ECU.

CHECK:

Check continuity between terminals 2 of engine room No. 2 R/B (for ABS motor relay) and terminal MT of skid control ECU harness side connector.

OK:

Continuity

HINT:

There is a no continuity between terminals BM and MT of brake actuator.

NG → **Repair or replace harness or brake actuator.**

OK

5	**Check for open and short circuit in harness and connector between ABS motor relay and skid control ECU (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GK–09

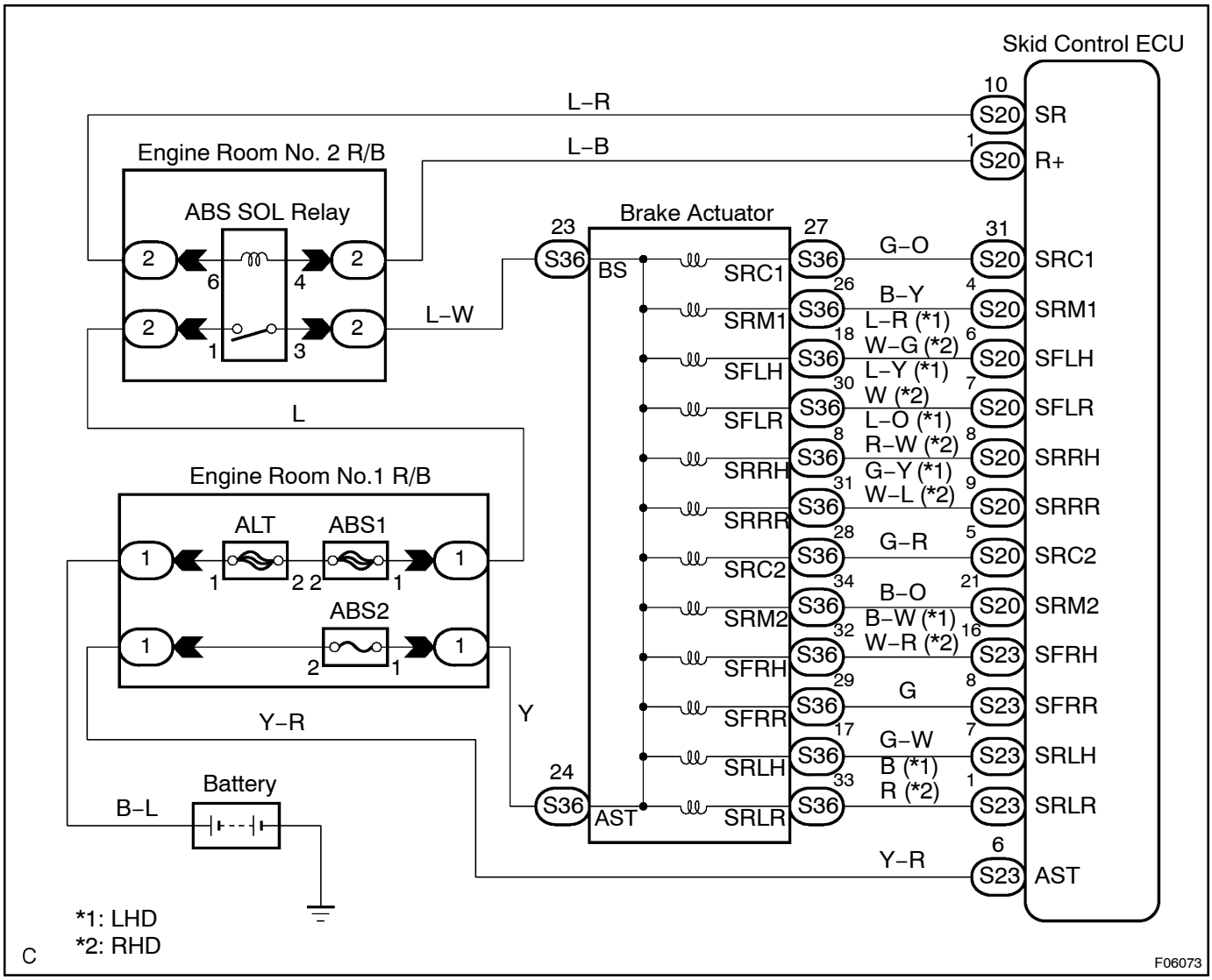
DTC	C0278 / 11, C0279 / 12	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V and the solenoid relay is ON, however, the contact point of the solenoid relay is OFF. 2. With solenoid relay ON driving, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the solenoid relay does not become ON.	• ABS solenoid relay • ABS solenoid relay circuit • Skid control ECU
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, and solenoid relay is OFF, however, when the condition that the contact point of the solenoid relay is ON continues for 0.2 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check ABS solenoid relay operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

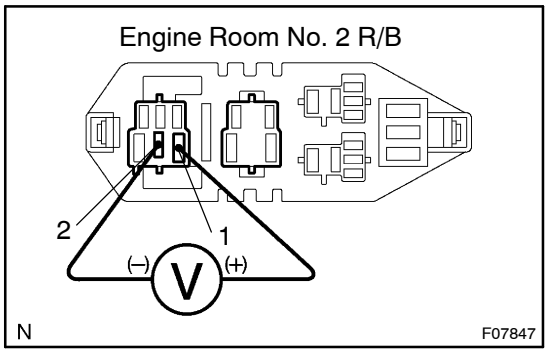
CHECK:
Check the operation sound of the ABS solenoid relay when operating it with the hand–held tester.

OK:
The operation sound of the ABS solenoid relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminals 1 and 2 of engine room No. 2 R/B (for ABS solenoid relay).**



PREPARATION:
Remove the ABS solenoid relay from the engine room No. 2 R/B.

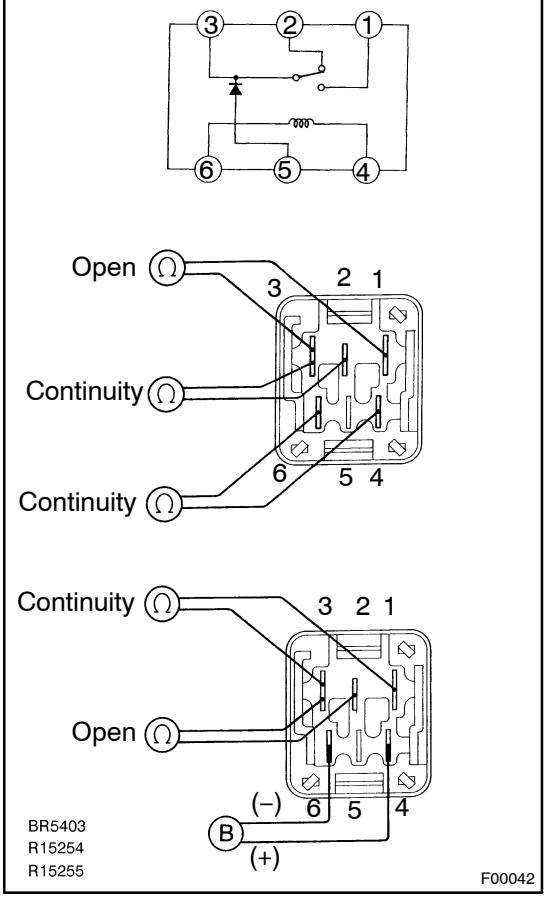
CHECK:
Measure the voltage between terminals 1 and 2 of engine room No. 2 R/B (for ABS solenoid relay).

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS solenoid relay.



CHECK:

Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS solenoid relay.

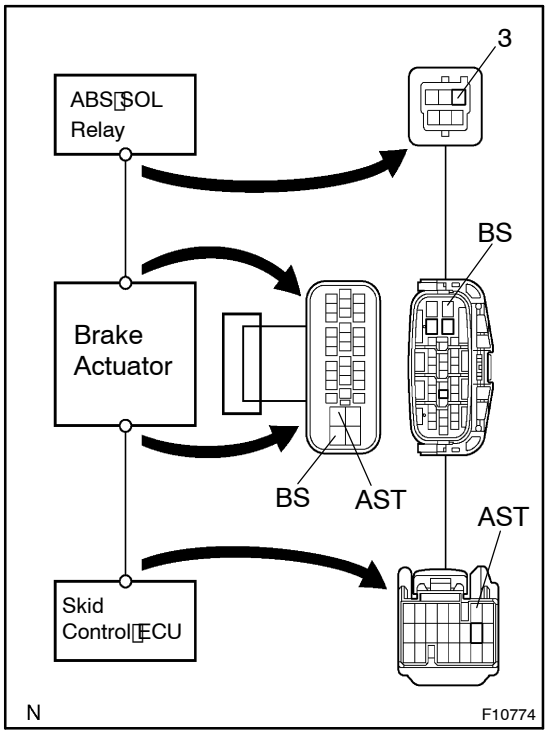
OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS solenoid relay.**

OK

4	Check continuity between terminals 3 of engine room No. 2 R/B (for ABS solenoid relay) and terminal AST of skid control ECU.



PREPARATION:

(a) Remove the ABS solenoid relay from the engine room No. 2 R/B.

(b) Disconnect the connector from the skid control ECU.

CHECK:

Check continuity between terminals 3 of engine room No. 2 R/B (for ABS solenoid relay) and terminal AST of skid control ECU harness side connector.

OK:

Continuity

NG → **Repair or replace harness or brake actuator.**

OK

5	Check for open and short circuit in harness and connector between ABS solenoid relay and skid control ECU (See page IN–34).

NG → **Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GY–14

CIRCUIT INSPECTION

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If any trouble occurs in the engine control system, the ECU prohibits TRC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	Conditions 1. and 2. continue for 5 sec.: 1. Engine speed: 500 rpm or more. 2. A trouble signal in the engine control system is input.	• Engine control system

INSPECTION PROCEDURE

1	**Check the DTC for the engine (See page 1G–FE: DI–4 of Pub. No. RM684E, 2JZ–GE: DI–4).**

***1** → **Repair engine control system according to the code output.**

***2**

Check for engine ECU connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

DI1GZ–16

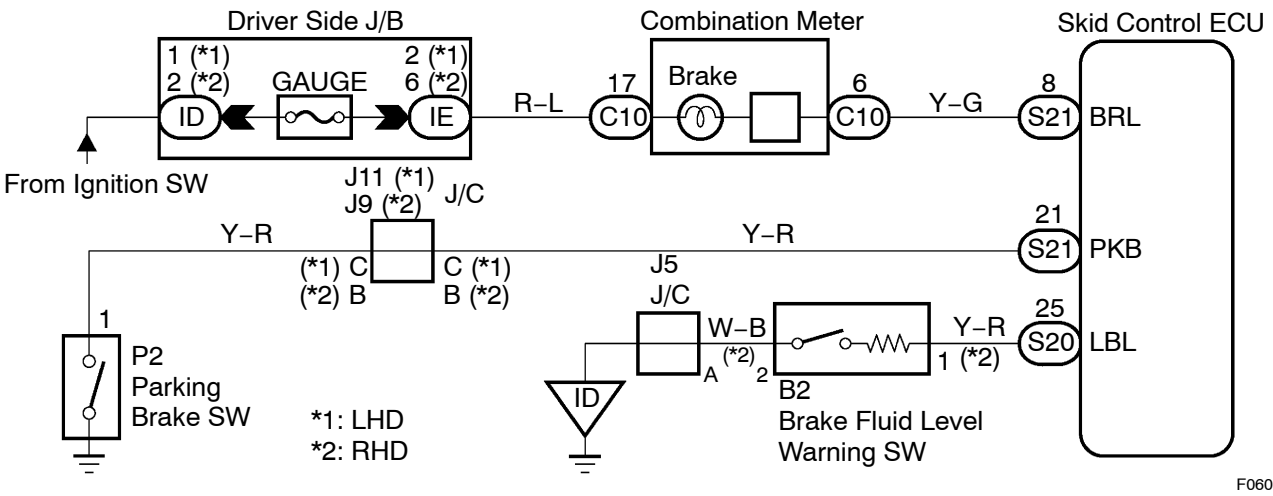
DTC	C1202 / 52	Brake Fluid Warning Switch Circuit

CIRCUIT DESCRIPTION

The brake fluid level warning switch sends the appropriate signal to the ECU when the brake fluid level drops.
HINT:
Pull the parking brake lever also turns on the brake warning light but does not diagnose DTC No. C1202 / 52.

DTC No.	DTC Detecting Condition	Trouble Area
C1202 / 52	When any of the following 1. or 2. is detected: 1. Low fluid level condition in the brake master cylinder reservoir tank continues for 10 sec. or more. 2. With ECU terminal IG1 voltage is 9.5 V to 17.2 V and open circuit for the brake fluid level warning switch circuit continues for 2 sec. or more.	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check brake fluid level.**

CHECK:
Check the amount of fluid in the brake reservoir.

NG	**Check and repair brake fluid leakage and add fluid.**

OK

2	Check brake fluid level warning switch (See Pub. No. RM684E on page BE–83).

NG → Replace brake fluid level warning switch.

OK

3	Check for open circuit in all the harness and components connected to brake fluid level warning light (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

DI1H0–16

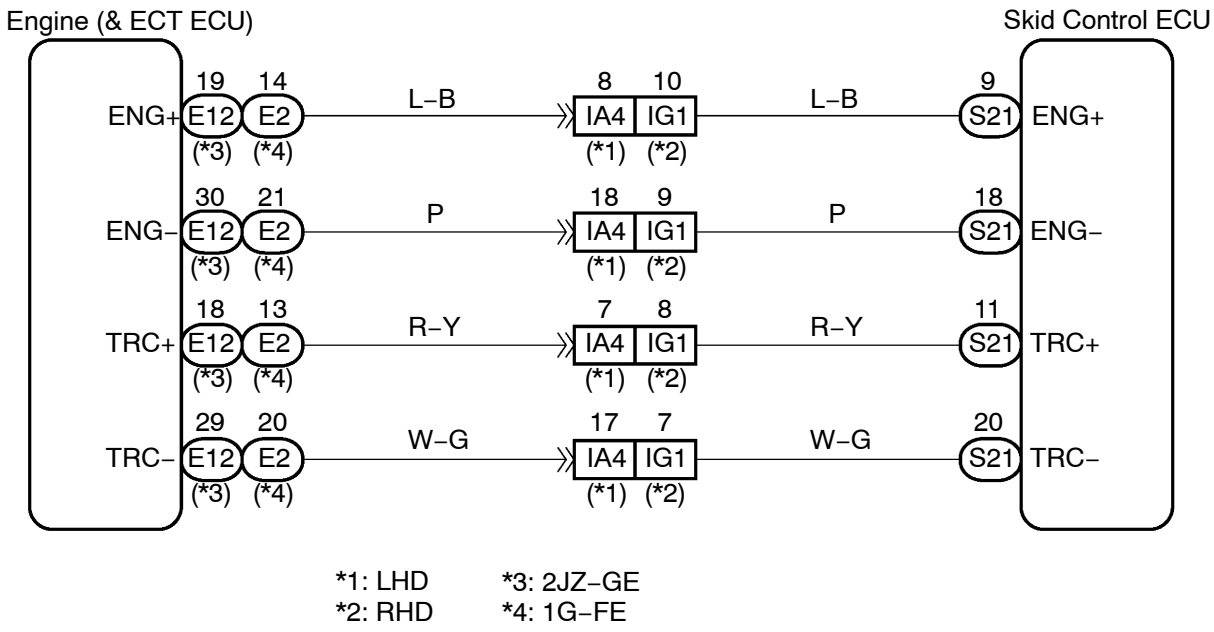
DTC	C1203 / 53	Enmgine ECU Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The circuit is used to send TRC control information from the skid control ECU to the engine ECU (TRC+, TRC–), and engine control information from the engine ECU to the skid control ECU (ENG+, ENG–).

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	1. Either of the following (a),or (b) continues for 5 sec.: (a) When ECU terminal IG1 voltage is 9.5 V or more, the condition that the data is not transmitted to engine ECU continues for more than 5 sec. (b) When ECU terminal IG1 voltage is 9.5 V or more, engine speed is 500 rpm or more and data receipt from engine ECU is impossible. 2. The condition that the data sent from engine ECU becomes repeatedly normal and abnormal occurs 10 times or more for 60 sec. 3. The condition that TRC ± communication is normal ↔ abnormal has been repeated more than 10 times in 60 sec.	• TRC+ or TRC– circuit • ENG+ or ENG– circuit • Engine ECU • Skid control ECU

WIRING DIAGRAM



C

F06075

INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals ENG+, ENG–, TRC+, TRC– of skid control ECU and engine ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace engine ECU or skid control ECU.

DI1H3-12

DTC	C1223/43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223/43	ABS control system is abnormal.	• ABS control system

INSPECTION PROCEDURE

1	Check the DTC for the ABS (See page DI–251).

*1 → Repair ABS control system according to the code output.

*2

Check for ECU connected to malfunction indicator lamp.

*1: Output NG code
*2: Malfunction indicator lamp remains ON

DI1H4–15

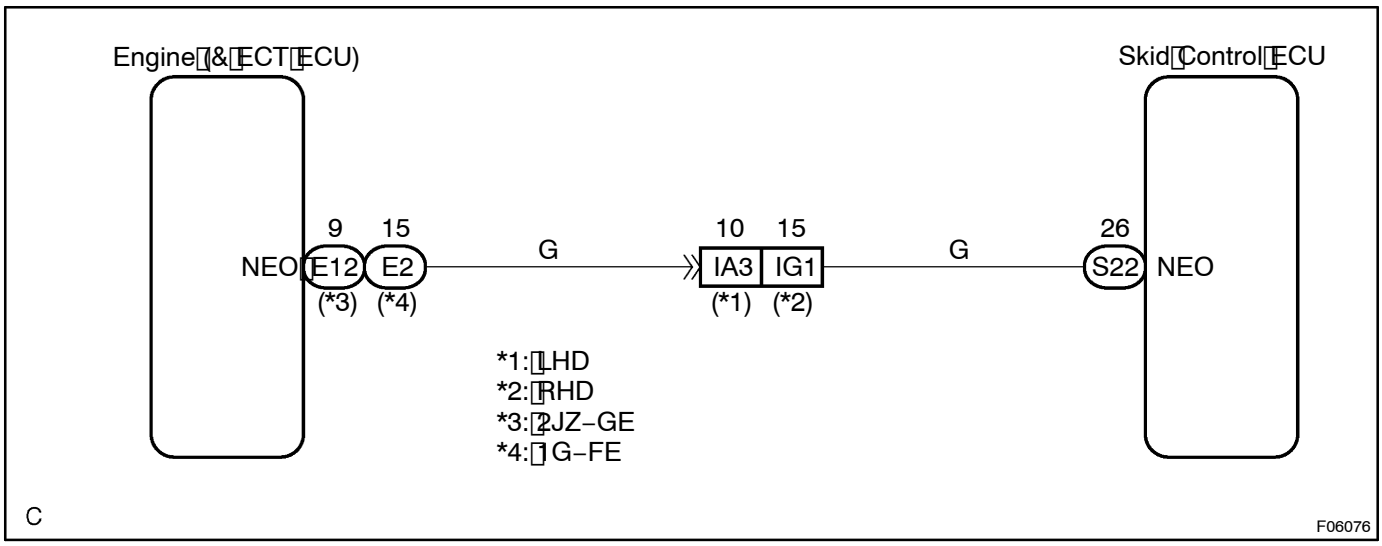
DTC	C1224/44	NE Signal Circuit

CIRCUIT DESCRIPTION

The skid contorl ECU receives engine revolution speed signals (NE signals) from the engine ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1224/44	When any of the following 1. through 2. is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, and when data receiving from the engine ECU is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRC is operating and when open or short circuit for engine revolution signal circuit continues for 0.24 sec. or more.	• NEO circuit • Engine ECU • Skid control ECU

WIRING DIAGRAM



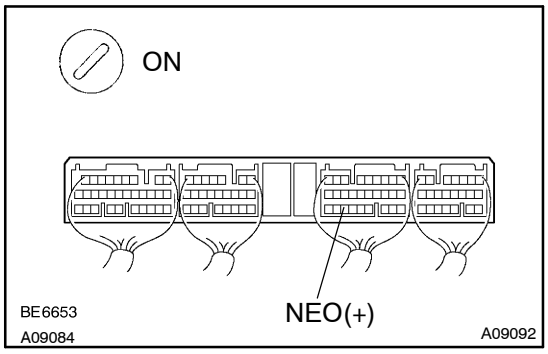
INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals NEO of skid control ECU and terminal NEO of engine ECU (See page IN–34).

NG → Repair or replace harness and connector.

OK

2	Check voltage between terminals NEO of skid control ECU and body ground.



PREPARATION:

(a) Remove the skid control ECU with connectors still connected.

(b) Turn the ignition switch ON.

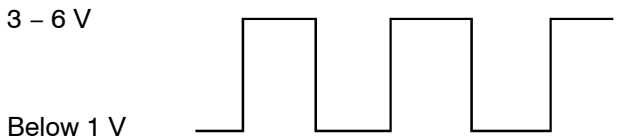
CHECK:

Measure voltage between terminal NEO of skid control ECU and body ground for the engine conditions below.

OK:

Engine condition	Voltage
OFF (IG ON)	3 – 6 V or below 1 V
ON (Idling)	3 – 6 V ↔ below 1 V (Pulse)

(Reference)



NG → **Check and replace skid control ECU or engine ECU.**

OK

If the same codes is still output after the DTC is deleted, check the contact condition of each connection.

DI9I7–01

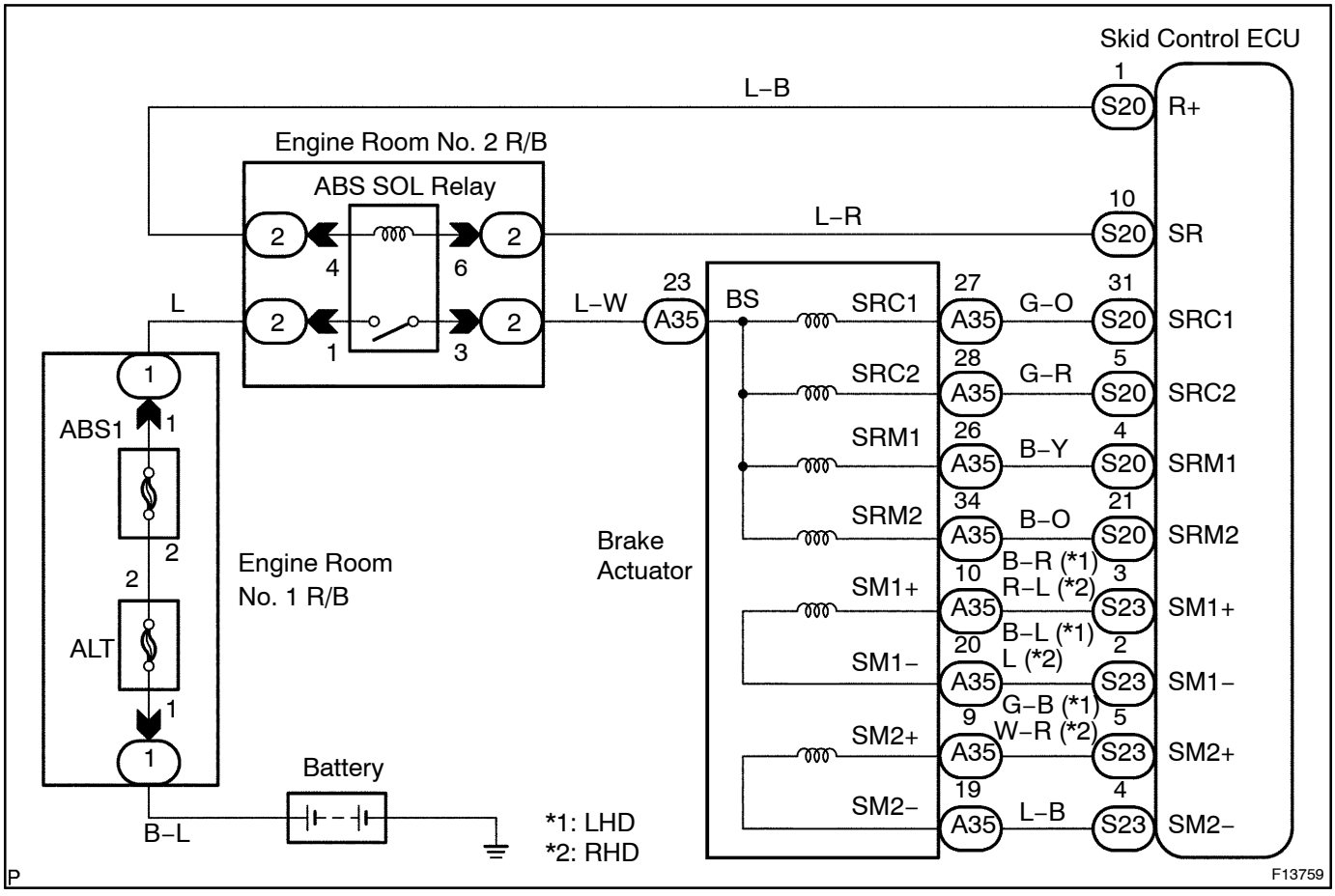
DTC	C1225 / 25 – C1227 / 27	TRC–Related Solenoid Circuits

CIRCUIT DESCRIPTION

The TRC solenoids operate in accordance with signals from the ECU and raise the fluid pressure in and release it from the brake cylinders.

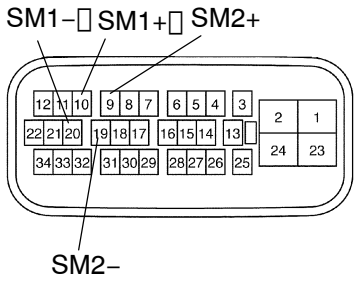
DTC No.	DTC Detecting Condition	Trouble Area
C1225 / 25	Detection of any of conditions 1. through 4.: 1. When SM1 or SM2 is ON, excessive electric current on SM1 or SM2 continues for 0.05 sec. or more. 2. When SM1 or SM2 is OFF, open circuit of SM1 or SM2 continues for 0.05 sec. or more. 3. When SM1 or SM2 is ON, open circuit of SM1 or SM2 continues for 0.1 sec. or more. 4. When SM1 or SM2 is OFF, electric current application on SM1 or SM2 continues for 0.1 sec. or more.	• Brake actuator • SM1 or SM2 circuit
C1226 / 26	Open or short circuit of SRM1 or SRM2 continues for 0.05 sec. or more.	• Brake actuator • SRM1 or SRM2 circuit
C1227 / 27	Open or short circuit of SRC1 or SRC2 continues for 0.05 sec. or more.	• Brake actuator • SRC1 or SRC2 circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check brake actuator solenoid.



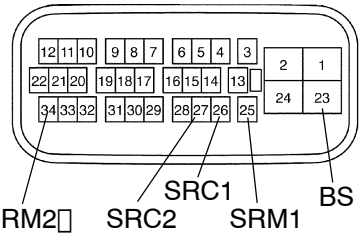
PREPARATION:
Disconnect the brake actuator connector.
CHECK:
Check continuity between terminals SM1+ – SM1–, and terminals SM2+ – SM2– of brake actuator.
OK:

Continuity

HINT:
Resistance of each solenoid: 8.1 – 9.1 Ω at 25°C
CHECK:
Check continuity between terminal BS and terminals SRC1, SRC2, SRM1 and SRM2 of brake actuator.
OK:

Continuity

HINT:
Resistance of each solenoid at 25°C
SRC1, SRC2: 8.1 – 9.1 Ω
SRM1, SRM2: 4.9 – 5.5 Ω



NG → Replace brake actuator.

OK

2	Check for open and short circuit in harness and connector between skid control ECU and brake actuator (See page IN–34).

NG → Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

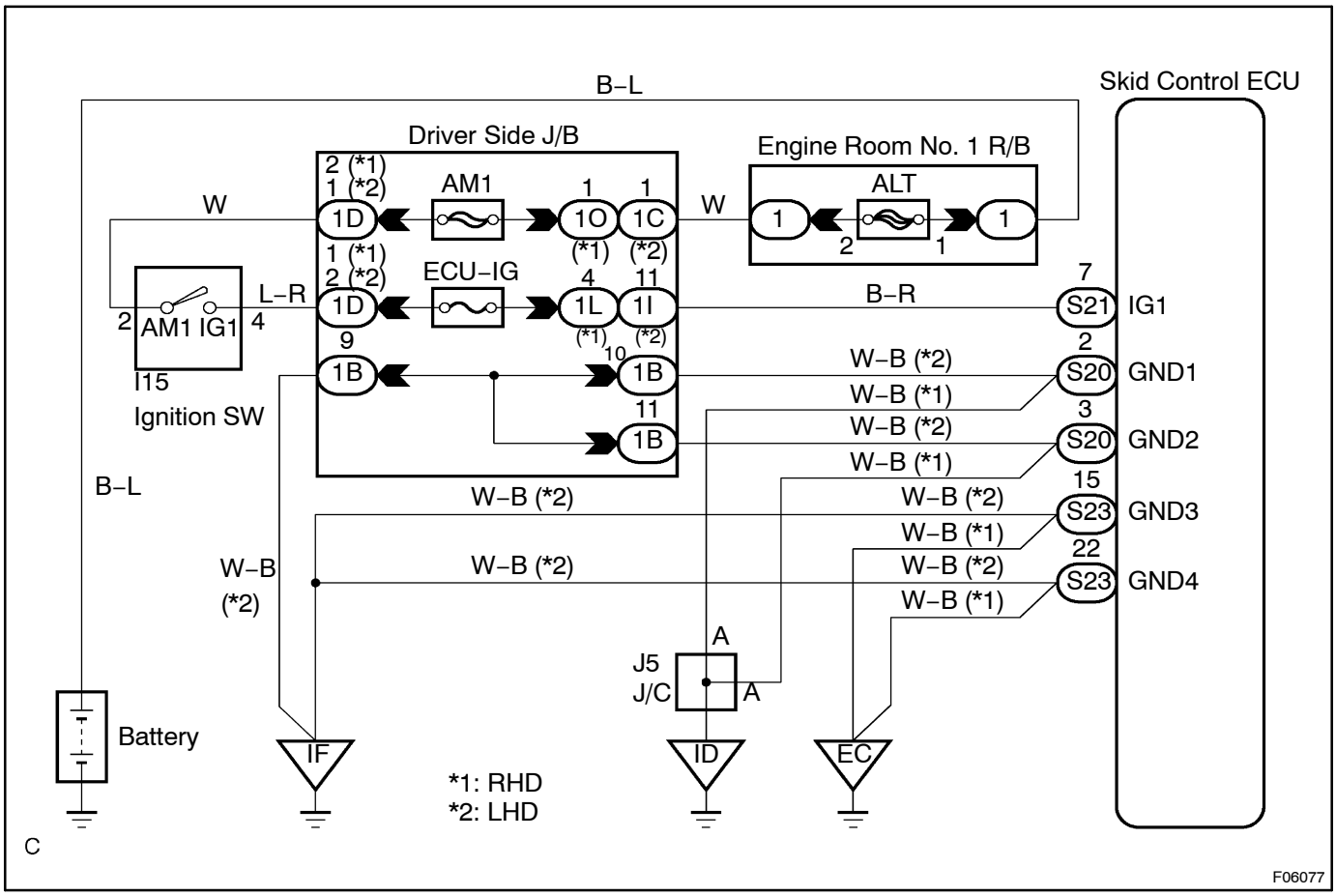
DI9I8–01

DTC	C1241 / 41	IG Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any of conditions 1. through 2.: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains at below 9.5 V for more than 10 sec. 2. While the condition that the solenoid relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more.	• Battery • Charging system • Power source circuit • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**

PREPARATION:
Remove ECU–IG fuse from driver side J/B.
CHECK:
Check continuity of ECU–IG fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

2	**Check battery voltage.**

OK:
Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page 1G–FE: CH–1 of Pub. No. RM684E, 2JZ–GE: CH–1).**

OK

3	Check voltage of the ECU IG power souce.

In case of using the hand–held tester.

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

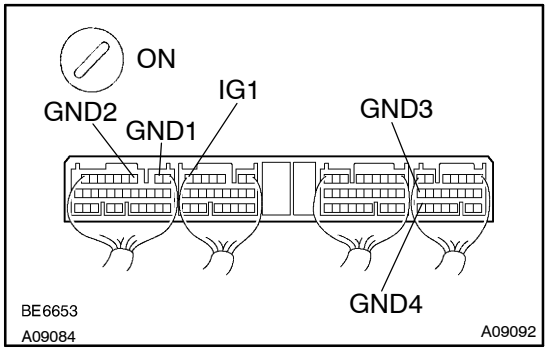
CHECK:

Check the voltage condition output from the ECU displayed by the hand–held tester.

OK:

"Normal" is displayed.

In case of not using the hand–held tester.



PREPARATION:

Remove the skid control ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG1 and GND of skid control ECU.

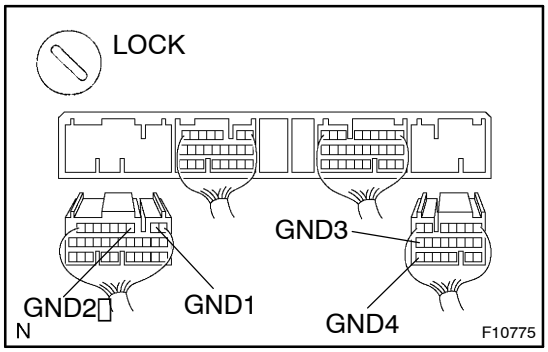
OK:

Voltage: 10 – 14 V

OK	Ignition switch OFF, check and replace skid control ECU.

NG

4	**Check continuity between terminal GND of skid control ECU connector and body ground.**



CHECK:

(a) Disconnect the 2 connector from the skid control ECU.

(b) Measure resistance between terminal GND of skid control ECU connector and body ground.

OK:

Resistance: 1 Ω or less

NG → **Repair or replace harness or connector.**

OK

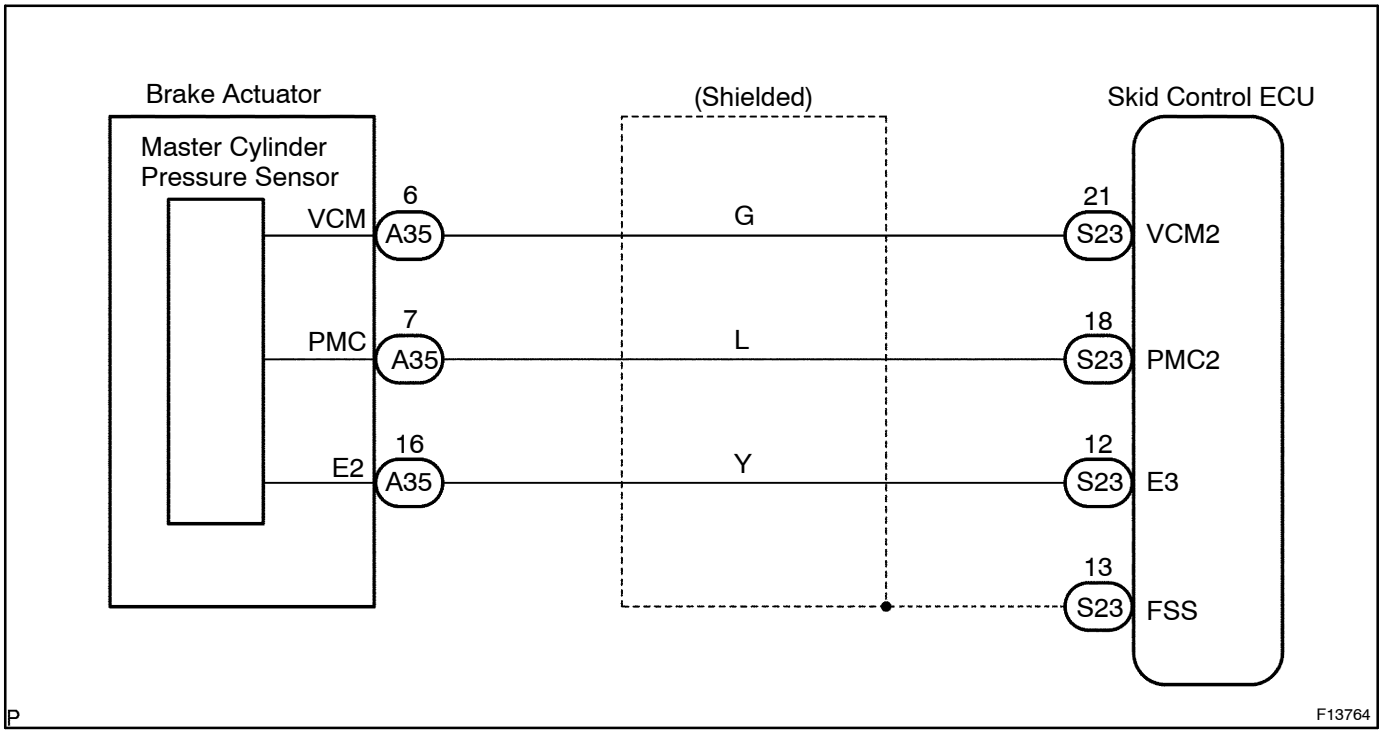
Check for open circuit in harness and connector between skid control ECU and battery (See page IN–34).

DTC	C1246 / 46	Master Cylinder Pressure Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	Detection of any of conditions 1. through 5.: 1. When the vehicle speed is 7 km/h (4 mph) or more and ECU PMC2 terminal voltage exceeds 0.86 V, the condition that the voltage does not change 0.005 V or more continues for 30 sec. 2. Noise in ECU PMC2 terminal occurs 7 times or more in 5 sec. 3. When the ECU STP terminal is OFF, the condition that ECU PMC2 terminal voltage is 0.86 V or more, or less than 0.3 V continues for 5 sec. or more. 4. When IG1 terminal voltage is 9.5 to 17.2 V, the condition that ECU VCM terminal voltage is out of the range from 4.4 to 5.6 V continues for 1.2 sec. or more. 5. When ECU VCM terminal voltage is 4.4 to 5.6 V, the condition that the ECU PMC2 terminal voltage is out of the range from 0.14 to 4.85 V continues for 1.2 sec. or more.	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of the master cylinder pressure sensor.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:

Check that the brake fluid pressure value of the master cylinder pressure sensor observed in the hand–held tester is changing when the brake pedal is being depressed.

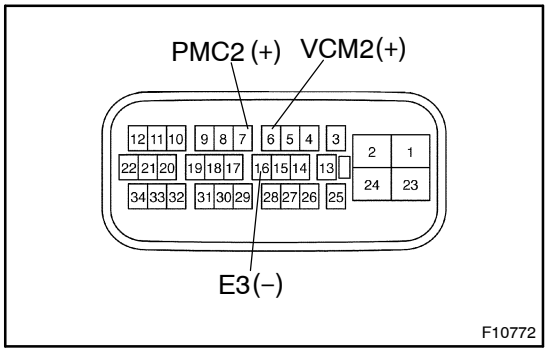
OK:

Brake fluid pressure value must be changing.

OK → **Go to step 4.**

NG

2	**Check master cylinder pressure sensor.**



PREPARATION:

Install LSPV gauge to the front caliper bleeder plug portion, and bleed air from LSPV gauge.

SST 09709–29018

CHECK:

Start the engine and depress the brake pedal, then check how the fluid pressure affects voltage of PMC2 and E3 terminals of the master cylinder pressure sensor with the connector still connected to it.

OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 kgf/cm^2, 0 psi)	0.37 – 0.63 V
5,883 kPa (60 kgf/cm^2, 853 psi)	1.57 – 1.83 V
11,768 kPa (120 kgf/cm^2, 1,706 psi)	2.77 – 3.03 V

HINT:
Voltage of between terminals VCM2 and E3: 4.7 – 5.3 V

NG → **Replace brake actuator.**

OK

3	Check for open and short circuit in harness and connector between master cylinder pressure sensor and skid control ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK

4	Check whether or not the ECU terminal STP input voltage is changes when the stop light switch is turned on and off.

NO → Check stop light switch circuit (See page BE–2).

YES

Check and replace skid control ECU.

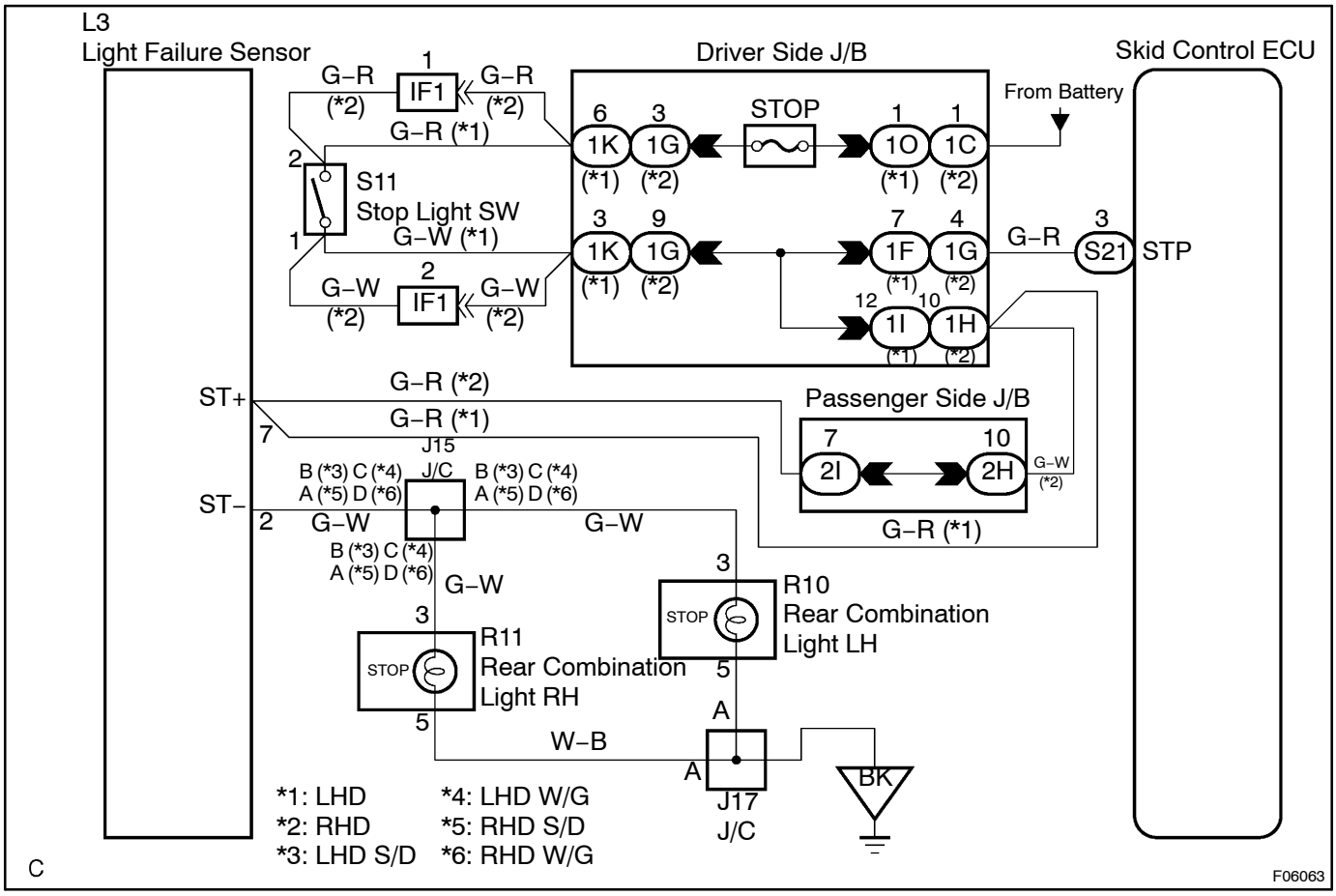
DI0WX–16

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non–operation, the open circuit of stop light switch circuit continues for 0.3 sec. or more.	• Stop light switch • Stop light switch circuit • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of the stop light switch.

CHECK:

Check that the stop light lights up when brake pedal is depressed and turns off when the brake pedal is released.

OK	Go to step 3.

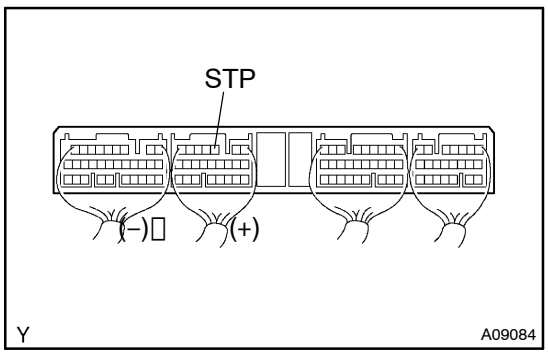
NG

2	Check stop light circuit (See page BE–25).

NG	Repair or replace stop light circuit.

OK

3	Check voltage between terminal STP of skid control ECU and body ground.



PREPARATION:

Remove skid control ECU with connectors still connected.

CHECK:

Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is depressed.

OK:

Voltage: 8 – 14 V

OK	Check and replace skid control ECU.

NG

4	Check for open circuit in harness and connector between skid control ECU and stop light switch (See page IN–34).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–262).

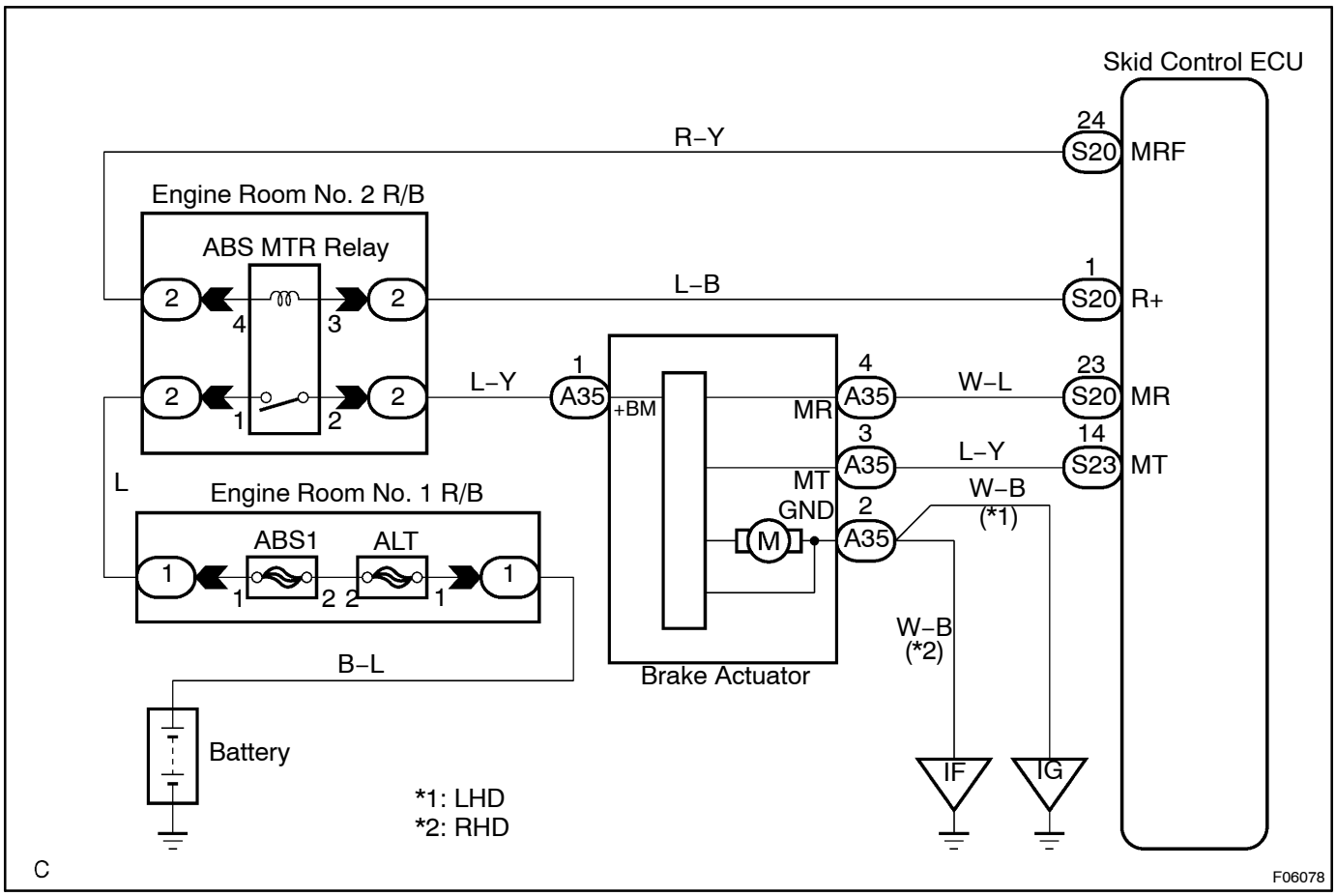
DI9I9–01

DTC	C1251 / 51	ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the following 1. or 2. is detected: 1. Actuator drive motor is not operating normally. 2. Open circuit condition of actuator drive motor continues for 2 sec. or more.	• Brake Actuator • Brake Actuator Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

1	**Check ABS motor operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:
Check the operation sound of the ABS motor when operating it with the hand–held tester.

OK:
The operation sound of the ABS motor should be heard.

NG → **Replace brake actuator.**

OK ↓

2	**Is there DTC C1251/51 being output again?**

YES → **Check and replace skid control ECU (See page IN–34).**

NO ↓

No problem.

DI0CG–07

DTC	Always ON	Skid Control ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Skid control ECU internal malfunction is detected.	• Skid control ECU

INSPECTION PROCEDURE

1	Is DTC output?

Check DTC on page DI–251.

YES → Repair circuit indicated by the code output.

NO

2	Is normal code displayed?

YES → Check solenoid relay. Check for short circuit in harness and connector between solenoid relay and check connector (See page IN–34).

NO

3	Does ABS warning light go off?

YES → Check for open or short circuit in harness and connector between ECU–IG fuse and skid control ECU (See page IN–34).

NO

4	**Check battery voltage.**

CHECK:

Check the battery voltage.

OK:

10 – 14 V

NG → **Check and repair the charging system.**

OK

5	**Check ABS warning light.**

PREPARATION:

(a) Turn the ignition switch OFF.

(b) Disconnect the connector from the skid control ECU.

(c) Turn the ignition switch ON.

CHECK:

Check the ABS warning light goes off.

OK → **Check and replace skid control ECU.**

NG

Check for short circuit in harness and connector between ABS warning light, DLC3 and skid control ECU (See page IN–34).

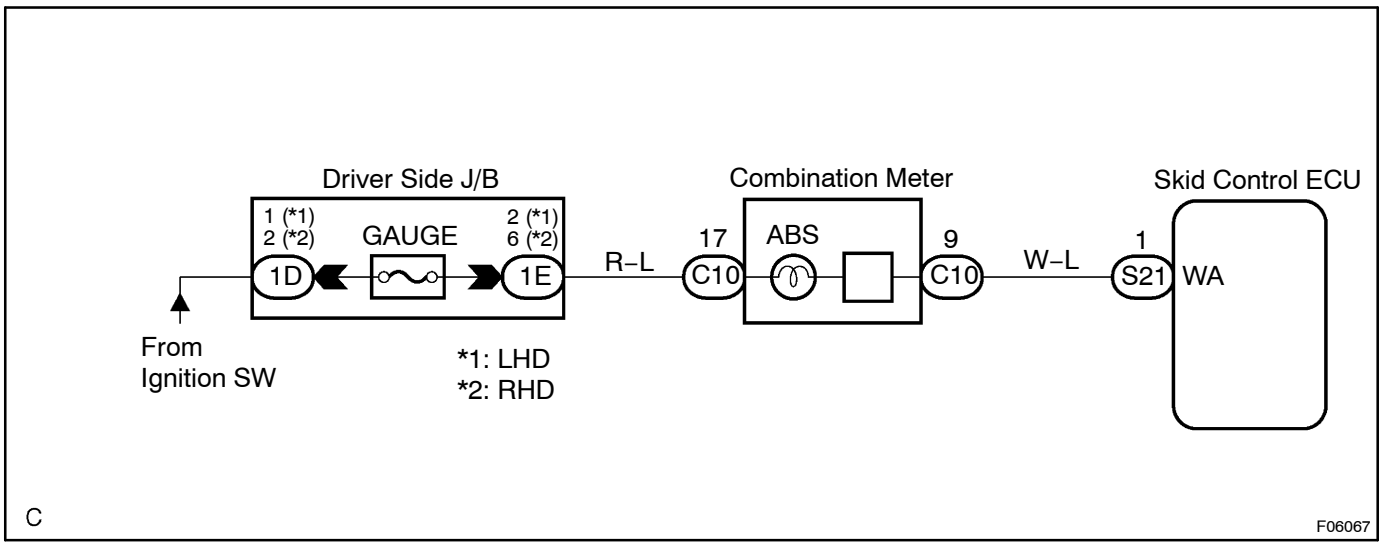
DI9IA–01

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects a trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.
Connect terminals Tc and CG of the DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Troubleshooting in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	*1
ABS warning light remains on	*2

*1: Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

*2: After inspection with step 3, start the inspection from step 4 in case of using the hand–held tester and start from step 5 in case of not using hand–held tester.

1	**Check operation of the ABS warning light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that "ON" and "OFF" of the ABS warning light can be shown on the combination meter by the hand–held tester.

HINT:

ABS warning light turns "OFF" automatically 2 sec. after is turned "ON".

OK → **Check and replace skid control ECU.**

NG

2	**Check ABS warning light.**

See combination meter troubleshooting (See page BE–2).

NG → **Repair bulb or combination meter assembly.**

OK

Repair or replace and check for open circuit in harness and connector between combination meter and skid control ECU (See page IN–34).

3	Check that the skid control ECU connectors are securely connected to the skid control ECU.

NO → Connect the connector to the skid control ECU.

YES

4	Check operation of the ABS warning light (See step 1).

OK → Check and replace skid control ECU.

NG

5	Is DTC output?

Check DTC on page DI–251.

YES → Repair circuit indicated by the output code.

NO

6	Check ABS solenoid relay (See step 3).

NG → Ignition switch OFF, replace ABS solenoid relay.

OK

Check for short circuit in harness and connector between DLC3 and ABS solenoid relay (See page IN–34).

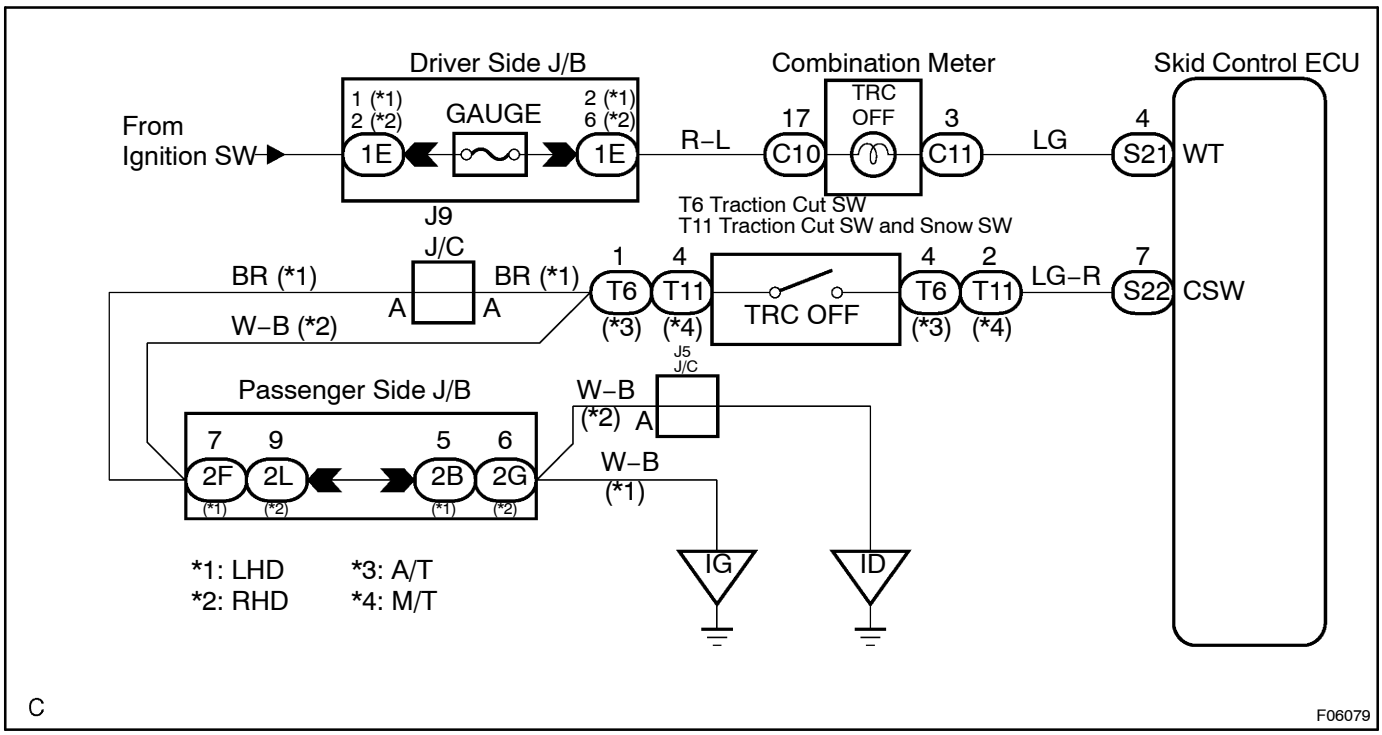
DI559–07

TRC OFF Indicator, TRC Cut Switch Circuit

CIRCUIT DESCRIPTION

This is the TRC control main switch. When the TRC cut switch is pushed on, TRC control goes off and the TRC OFF indicator lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the TRC OFF indicator light.**

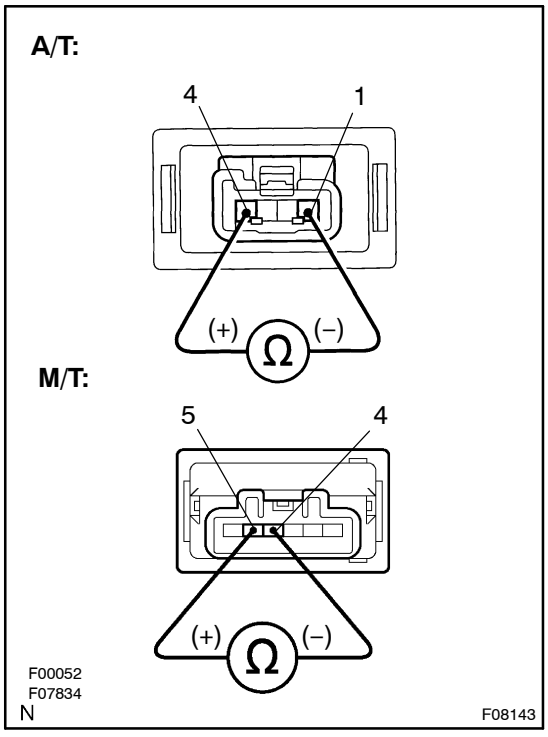
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:
Check that ”ON” and ”OFF” of the TRC OFF indicator light can be shown on the combination meter by the hand–held tester.

NG → **Go to step 4.**

OK

2	**Check TRC OFF switch.**



PREPARATION:
Remove the TRC OFF switch and disconnect the connector from the TRC OFF switch.

CHECK:
Measure resistance between terminals 1 and 4 (A/T) or 4 and 5 (M/T) of TRC OFF switch when TRC OFF switch is on and off.

OK:

TRC OFF switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG → **Replace TRC OFF switch.**

OK

3	Check for open and short circuit in harness and connector between terminal CSW of skid control ECU and TRC OFF switch and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

4	Check TRC OFF indicator light.

See combination meter troubleshooting on page BE–2.

NG → Repair bulb or combination meter assembly.

OK

5	Check for open and short circuit in harness and connector between terminal WT of skid control ECU and TRC OFF indicator light (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

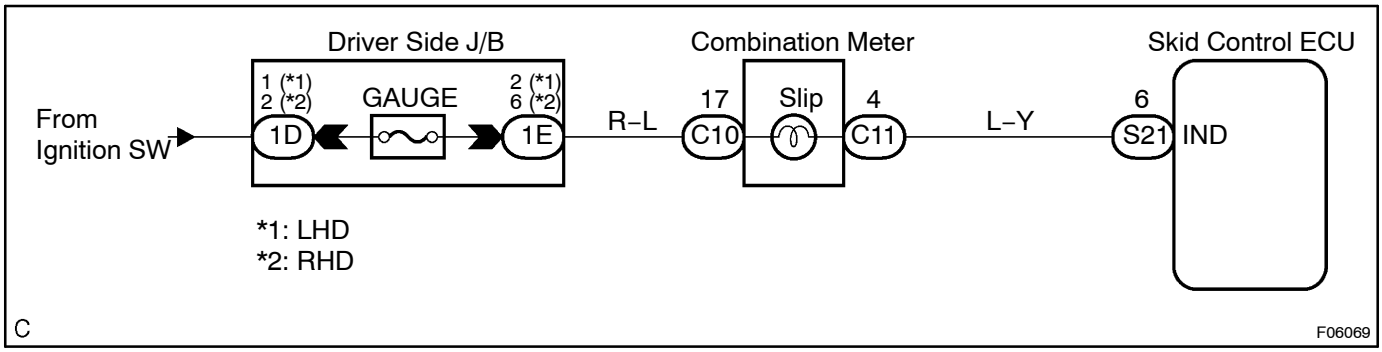
DI55A–04

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the SLIP indicator light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that ”ON” and ”OFF” of the SLIP indicator light can be shown on the combination meter by the hand–held tester.

OK → **Go to step 4.**

NG

2	**Check that the SLIP indicator light is ON for 3 seconds soon after ignition switch is turned ON.**

OK → **Check and replace skid control ECU.**

NG

3	**Check SLIP indicator light.**

See combination meter troubleshooting on page BE–2.

NG → **Repair bulb or combination meter assembly.**

OK

4	**Check for open and short circuit in harness and connector between skid control ECU and SLIP indicator light (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

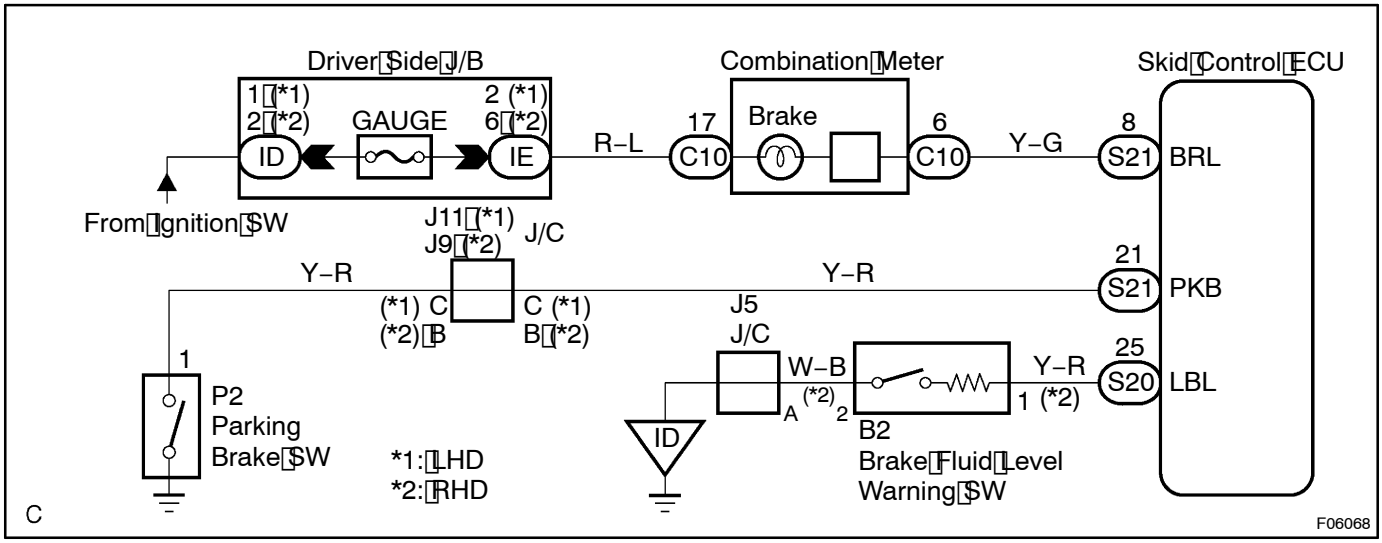
DI6QP–09

BRAKE Warning Light Circuit

CIRCUIT DESCRIPTION

The BRAKE warning light lights up when the brake fluid is insufficient, the parking brake is applied or the EBD is defective.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check parking brake switch circuit (See page BE–2).

NG → Repair or replace parking brake switch circuit.

OK

2	Check brake fluid level warning switch circuit (See page BE–2).

NG → Repair or replace brake fluid level warning switch circuit.

OK

3	**Is DTC output for ABS?**

Check DTC on page DI–251.

Yes → **Repair circuit indicated by the output code.**

No

4	**Check BRAKE warning light.**

See combination meter troubleshooting on page BE–2.

NG → **Repair or replace combination meter.**

OK

Check and replace skid control ECU.

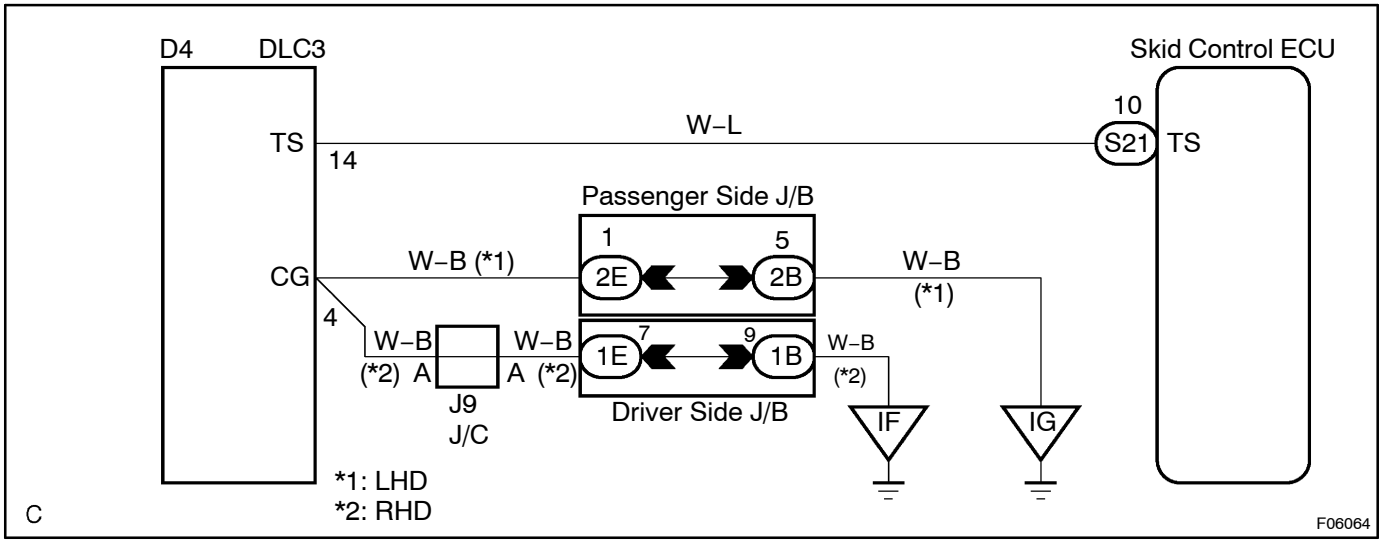
DI0CM–09

Ts Terminal Circuit

CIRCUIT DESCRIPTION

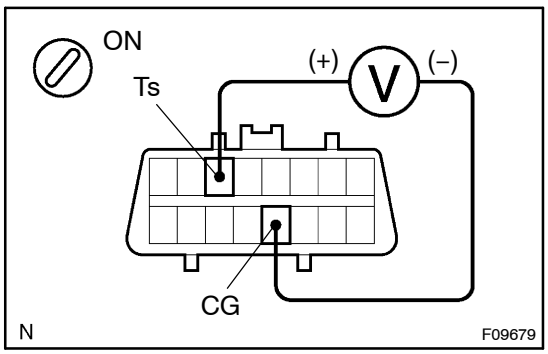
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check. Connecting terminals Ts and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Ts and CG of DLC3.**



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and CG of DLC3.

OK:

Voltage: 10 – 14 V

OK	**If ABS warning light does not blink even after Ts and CG have been connected, the ECU may be defective.**

NG

2	Check for open and short circuit in harness and connector between skid control ECU and DLC3, DLC3 and body ground (See page IN–34).

NG → Repair or replace harness or connector.

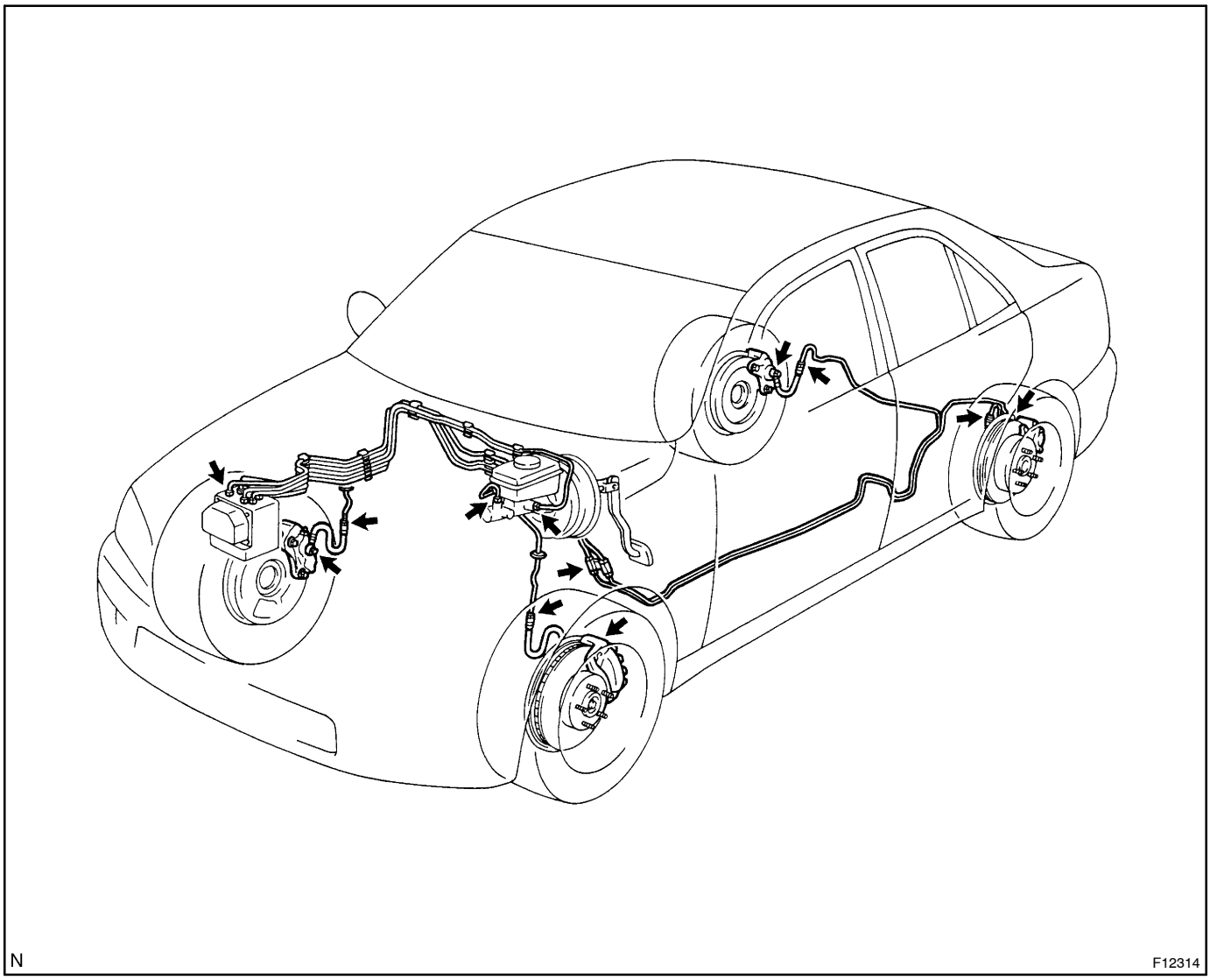
OK

Check and replace skid control ECU.

DI7V2–02

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



N

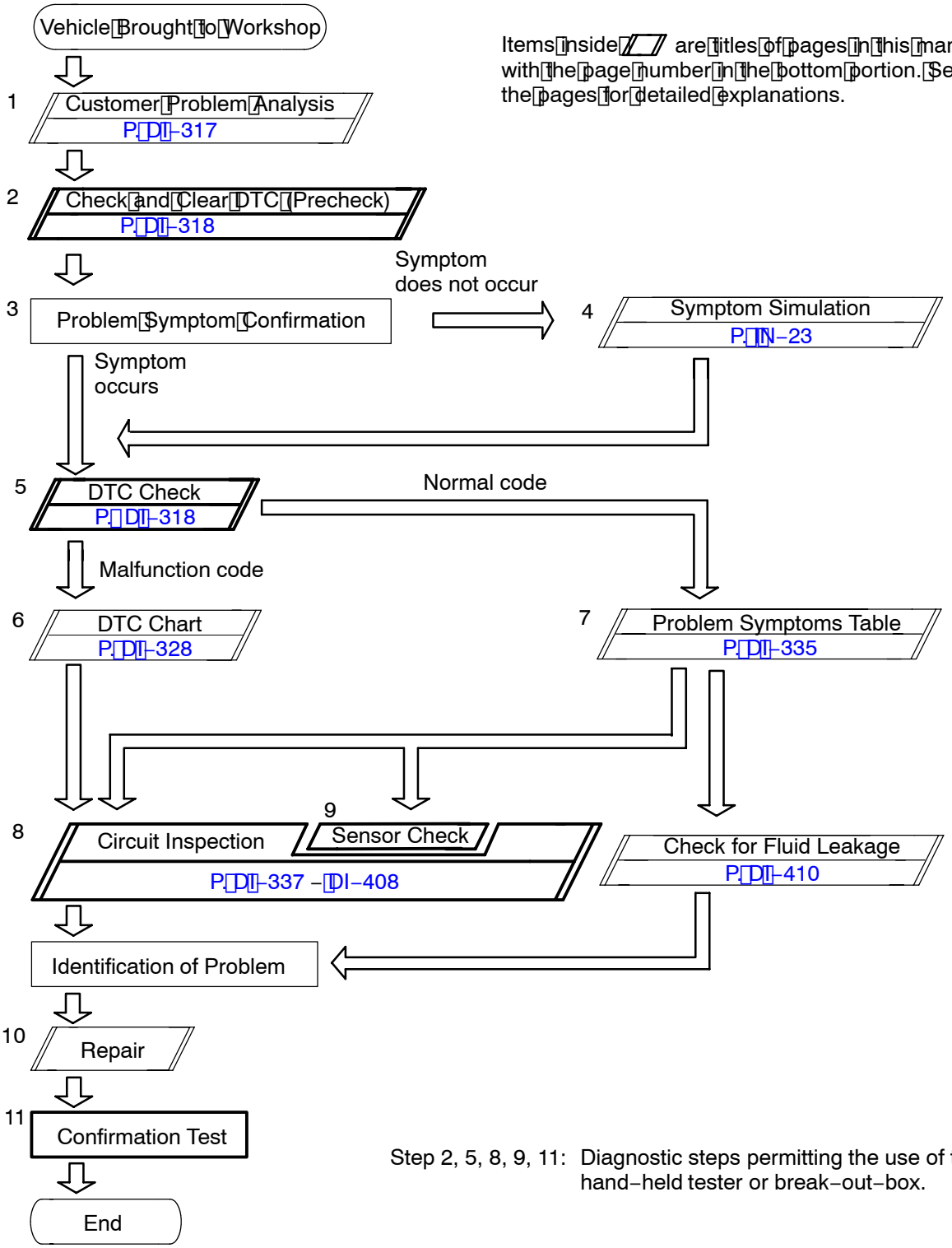
F12314

ABS WITH EBD & BA & TRC & VSC SYSTEM

DI7ZB–02

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following pages.



Items inside // // are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.

Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand–held tester or break–out–box.

Fail safe function:
When a failure occurs in the ABS & BA & TRC & VSC system, the respective warning light (ABS,TRC OFF, BRAKE VSC) is lit and the operation of ABS & BA & TRC & VSC is prohibited. In addition to this, when the failure which disables the EBD operation occurs, the brake warning light is lit as well and the EBD operation is prohibited.

DI7ZC–01

CUSTOMER PROBLEM ANALYSIS CHECK

ABS & BA & TRC & VSC Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Data	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

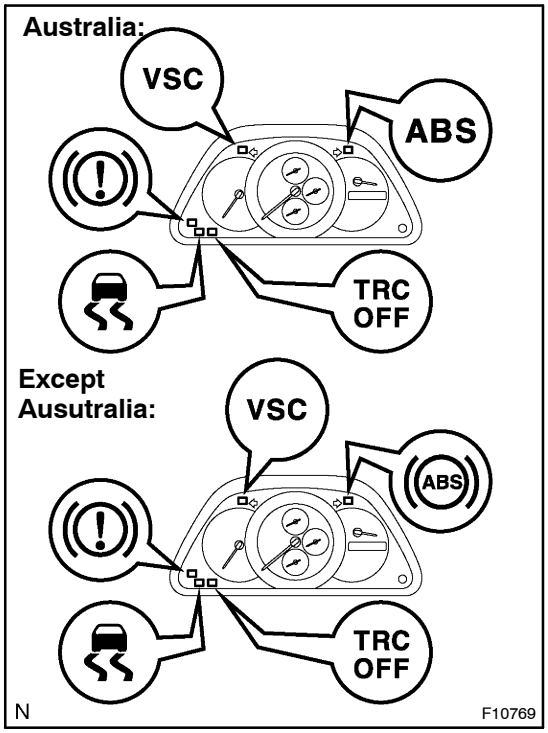
Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	☐ TRC does not operate.	
	☐ VSC does not operate. (Wheels spin when starting rapidly.)	
	☐ BA does not operate.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC OFF Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	SLIP Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	BRAKE Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**Malfunction Indicator Light**	☐ Normal ☐ Does not Light Up

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI9IB–01



PRE–CHECK

1. DIAGNOSIS SYSTEM

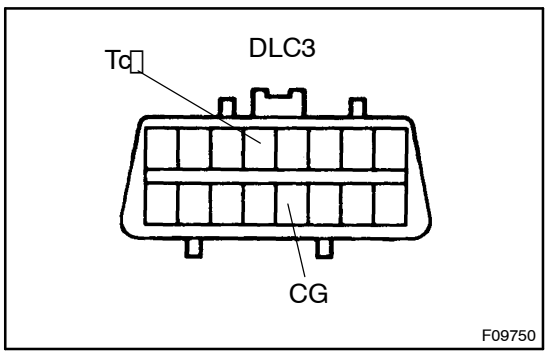
(a) Inspect the battery voltage.
Battery voltage: 10 – 14 V

(b) Check the warning lights and indicator lights.
(1) Release the parking brake pedal.
(2) When the ignition switch is ON, check that the ABS warning light, BRAKE warning light, TRC OFF indicator light and SLIP indicator light, VSC warning light go on for 3 sec.

HINT:

- If the ECU stores DTC, VSC warning light, ABS warning light, BRAKE warning light and TRC OFF indicator light are ON.
- If the check result is not normal, proceed to troubleshooting for the light circuit.

Trouble Area	See Page
ABS warning light circuit	DI–393
BRAKE warning light circuit	DI–401
VSC warning light circuit	DI–405
TRC OFF indicator light circuit	DI–396
SLIP indicator light circuit	DI–399

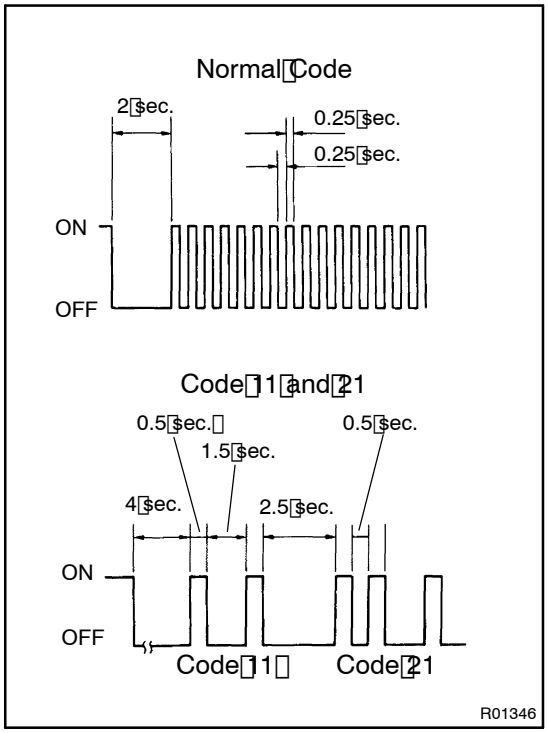


(c) In case of not using the hand–held tester:
Check the DTC of ABS system.
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(2) Turn the ignition switch ON.
(3) Read the DTC from the ABS warning light and VSC warning light on the combination meter.

HINT:

- If no code appears, inspect the diagnostic circuit, ABS warning light circuit and VSC warning light circuit.

Trouble Area	See page
ABS warning light circuit	DI–393
VSC warning light circuit	DI–403

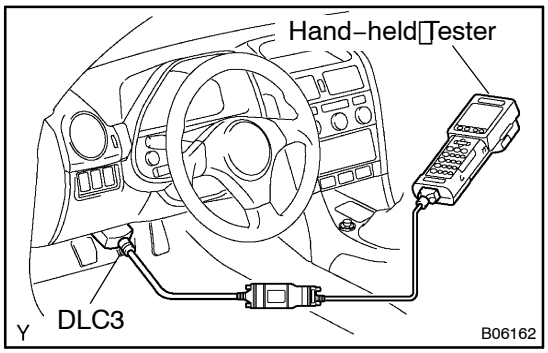


• As an example, the blinking patterns for the normal code and codes 11 and 21 are shown on the left.

(4) Codes are examples in the code table on page DI–328.

(5) After completing the check, disconnect terminal Tc and CG of DLC3, and turn off the display.

If 2 or more malfunctions are detected at the same time, the lowest numbered DTC will be displayed 1st.



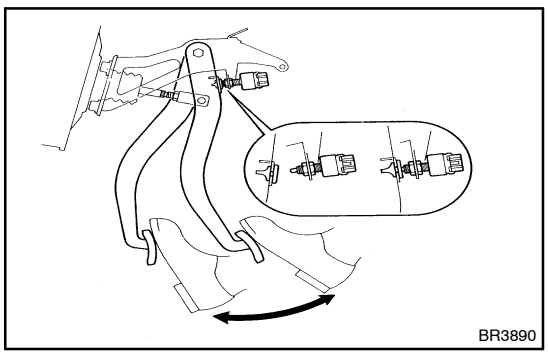
(d) In case of using the hand–held tester:
Check the DTC.

(1) Hook up the hand–held tester to the DLC3.

(2) Turn the ignition switch ON.

(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.



(e) In case of not using the hand–held tester:
Clear the DTC.

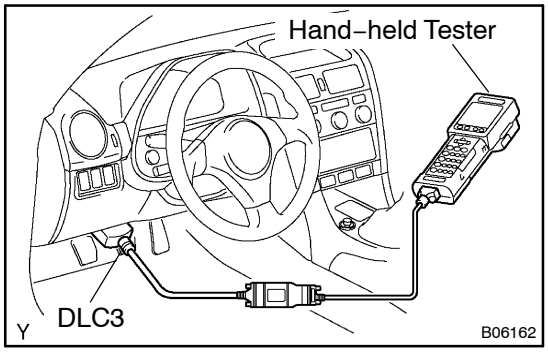
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040

(2) Turn the ignition switch ON.

(3) Clear the DTC stored in ECU by depressing the brake pedal 8 times or more within 5 sec.

(4) Check that the warning light show the normal code.

(5) Remove the SST from the terminals of DLC3.
SST 09843–18040



(f) In case of using the hand–held tester:
Clear the DTC.
(1) Hook up the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand–held tester to erase the codes.

HINT:
Please refer to the hand–held tester operator's manual for further details.

2. FREEZE FRAME DATA

(a) The vehicle (sensor) status at the occurrence of abnormality of the diagnosis code and during the ABS operating can be memorized and displayed using the hand–held tester.
(b) Only one record of freeze frame data is stored, however, freeze frame data during the ABS operating is always up–dated. After the storage of freeze frame data, up to 31 ignition "ON" operations are stored and displayed.

HINT:
If the ignition switch "ON" operation exceeds 31 times, "31" appears on the display.

(c) If the diagnosis code abnormality occurs, the freeze frame data at the occurrence of the abnormality is stored but the ABS actuation data is deleted.

Hand–held tester display	Measurement Item	Reference Value*
VEHICLE SPD	Vehicle speed	Speed indication of a meter
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 – 31
MAS CYL PRESS	Master cylinder pressure sensor output voltage	Release brake pedal: 0.3 – 0.9 V Depress brake pedal: 3.2 – 4.5 V
MASS PRESS GRADE	Master cylinder pressure sensor changing declivity	–30 – 200 MPa/s
SYSTEM	Operate system	ABS operate: ABS BA operate: BA
YAW RATE	Yaw rate angle sensor output value	–70 – 70
STEERING ANG	Steering angle sensor output value	Left turn: Increase Right turn: Drop
G (RIGHT & LEFT)	Right and left G	–1.5 – 1.5
G (BACK & FORTH)	Back and forth G	–1.5 – 1.5
VSC / TRC OFF SW	TRAC OFF switch signal	TRAC OFF SW ON: ON OFF: OFF
SHIFT POSITION	Shift lever position	P: P R: R N: N D: D 2: 2 L: L

If no conditions are specifically stated for "Idling", it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

3. In case of not using the hand-held tester: ABS SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:

When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.).

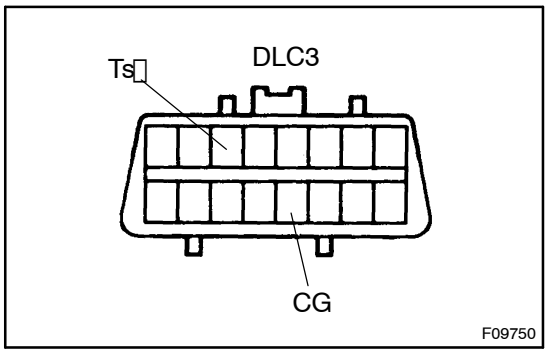
HINT:

If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.

(a) Procedures for test mode:

(1) Turn the ignition switch OFF.

(2) Set the shift lever to P range.



(3) Using SST, connect terminals Ts and CG of DLC3.
SST 09846–18040

(4) Check that the steering wheel is in the straight-ahead position.

(5) Turn the ignition switch ON.

(6) Check that the ABS warning light blinks.

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit or Ts terminal circuit.

Trouble Area	See page
Ts terminal circuit	DI–408
ABS warning light circuit	DI–393

(b) Check the deceleration sensor.
Keep the vehicle in a stationary condition on a level place for 1 sec. or more.

(c) Check the master cylinder pressure sensor.

(1) Leaving the vehicle in a stationary condition and the brake pedal in free condition for 1 sec. or more, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 sec. or more.

(2) While the vehicle is stopped, release the brake pedal.

(3) While the vehicle is stopped, quickly depress the brake pedal once or more and check the ABS warning light is lit for 3 sec.

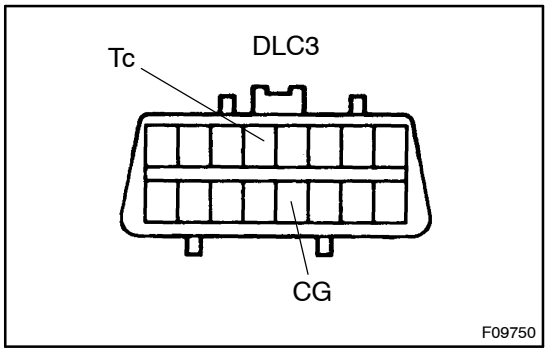
HINT:

Repeat the operation until the ABS warning light is lit.

(d) Check the speed sensor signal.
Drive the vehicle straightforward.
Drive the vehicle with the speed faster than 45 km/h (28 mph) for several seconds and check that the ABS warning light comes off.

HINT:
The sensor check may not be completed if the wheels spin or the steering wheel is steered during this check.

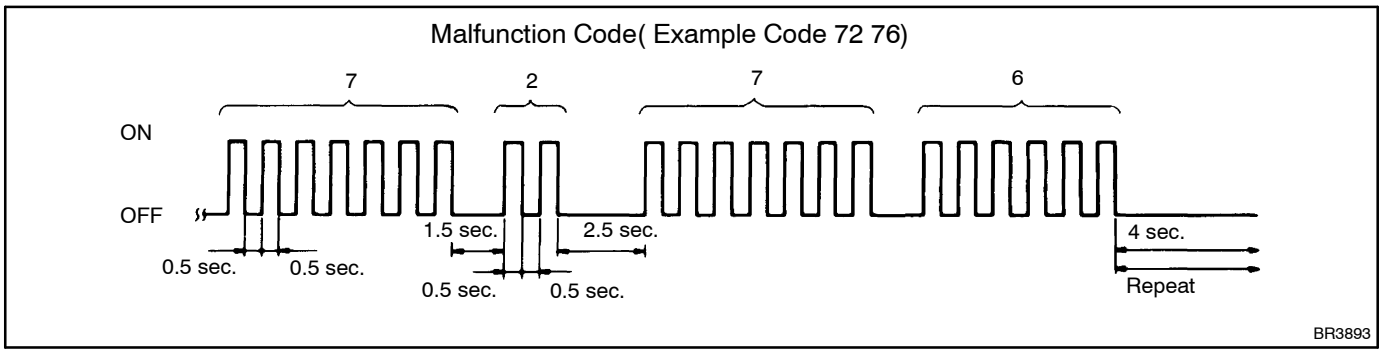
(e) Stop the vehicle.



(f) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040

(g) Read the number of blinks of the ABS warning light.

HINT:
- See the list of DTC on the next page.
- If every sensor is normal, the normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).
- If 2 or more malfunctions are detected at the same time, the lowest numbered will be displayed 1st.

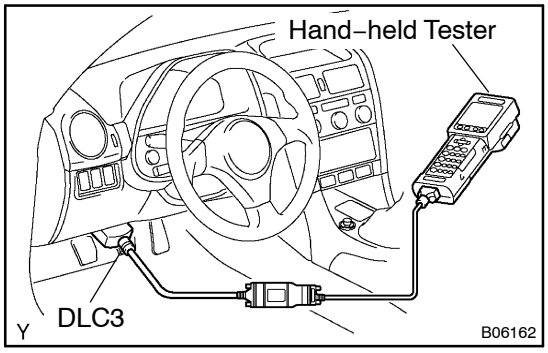


(h) After doing the check, disconnect the SST from terminals Ts and CG, Tc and CG of DLC3 and turn the ignition switch OFF.
SST 09843–18040

4. In case of using the hand–held tester:
ABS SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:
When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.). Make sure that this operation should be done before starting the following.

HINT:
If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.



(a) Hook up the hand–held tester to the DLC3.
(b) Do steps 3.–(a)–(2), (4) and (5) and from (b) to (e) on the previous pages.
(c) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

DTC of ABS sensor check function:

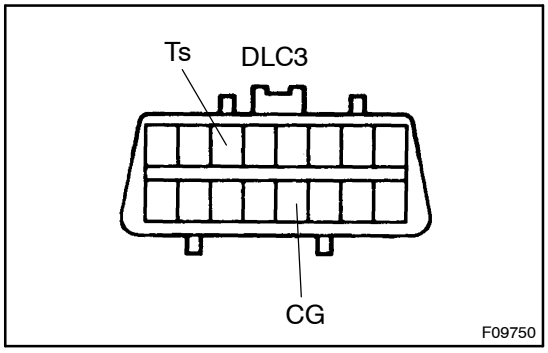
Code No.	Diagnosis	Trouble Area
C1271 / 71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Sensor rotor
C1272 / 72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Sensor rotor
C1273 / 73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Sensor rotor
C1274 / 74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Sensor rotor
C1275 / 75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276 / 76	Abnormal change in output voltage of Left front speed sensor	Left front speed sensor rotor
C1277 / 77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278 / 78	Abnormal change in output voltage of Left rear speed sensor	Left rear speed sensor rotor
C1279 / 79	Deceleration sensor is faulty	• Deceleration sensor • Sensor installation
C1281 / 81	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor

5. In case of not using the hand–held tester: VSC SENSOR SIGNAL CHECK (TEST MODE)

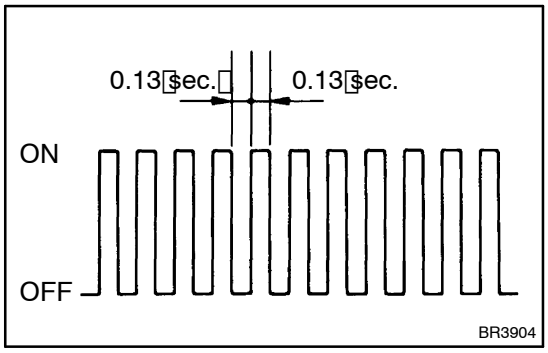
NOTICE:

When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.).

HINT:
If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.

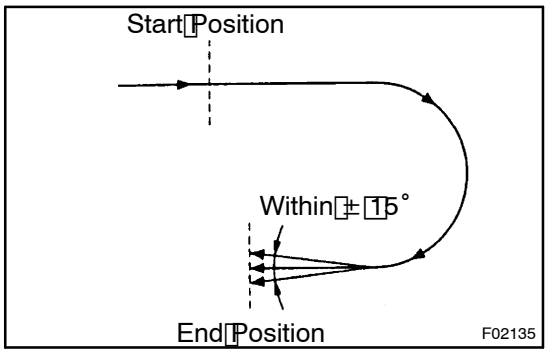


(a) Procedures for test mode:
(1) Turn the ignition switch OFF.
(2) Check that the shift lever position is at P range. Turn the steering wheel to the straight–ahead position.
(3) Using SST, connect terminals Ts and CG of DLC3.
SST 09843–18040
(4) Start the engine.



(5) Check that the VSC warning light blinks.

HINT:
If the VSC warning light does not blink, inspect the VSC warning light circuit and Ts terminal circuit (See page DI–290, DI–307).



(b) Check the yaw rate sensor.
(1) Shift the shift lever to the D range and drive the vehicle at the vehicle speed of approx. 50 km/h (30 mph). Turn the steering wheel either to left or right for 90° or more, and maintain 180° circular drive for the vehicle.
Stop the vehicle and shift the shift lever to the P range. Check that the VSC warning buzzer sounds for 3 sec.

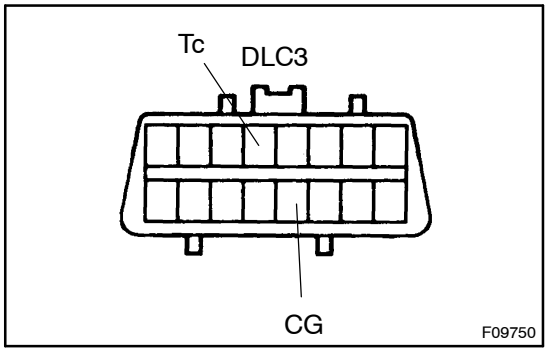
If the VSC warning buzzer sounds, the sensor check is in normal completion.
If the VSC warning buzzer does not sound, check the VSC warning buzzer circuit, then do the sensor check again.

Trouble Area	See page
VSC warning buzzer circuit	DI–405

If the VSC warning buzzer still does not sound, there is malfunction in the VSC sensor, so check the DTC.

HINT:
- Drive the vehicle circularly by 180°. At the end of the turn, the direction of the vehicle should be within 180° ± 15° from its start position.
- Do not spin the wheels.

(2) Check the steering angle sensor.
Turn the steering wheel to either left or right to the full lock position, from the vehicle stationary condition, and turn back the steering wheel to the neutral position.



(c) Read the DTC.
(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(2) Using SST, connect terminals Tc and CG of DLC3.
SST 09843–18040
(3) Read the number of blinks of the VSC warning light.

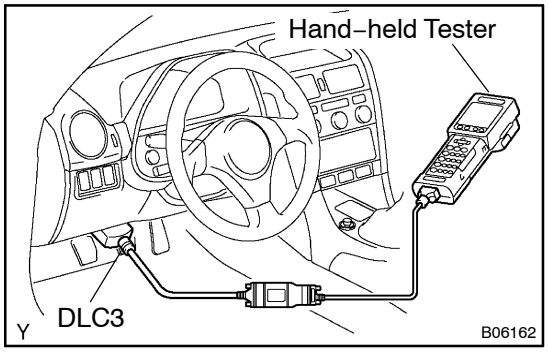
HINT:
- See the list of DTC shown in the next page.
- If every sensor is normal, a normal code is output. (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated.)

(4) After doing the check, disconnect the SST from terminals Ts and CG ,Tc and CG of DLC3 and turn the ignition switch OFF.
SST 09843–18040

6. In case of using the hand–held tester:
VSC SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:
When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.). Make sure that this operation should be done before starting the following.

HINT:
If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.



(a) Hook up the hand–held tester to the DLC3.
(b) Do steps 5.–(a)–(2), (a)–(4) and (b) on the previous pages.
(c) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

DTC of VSC sensor check function:

Code No.	Diagnosis	Trouble Area
C0371 / 71	Yaw rate sensor output signal malfunction	• Yaw rate sensor • Yaw rate sensor circuit

7. IF NECESSARY, PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSORS

HINT:

- When having replaced the yaw rate sensor, deceleration sensor or the ECU, make sure to perform yaw rate and deceleration sensors' zero point calibration. Be sure to complete this step 6. once it is started.
- During step 6., a not–replaced sensor also requires zero point calibration.

NOTICE:

- **While obtaining the zero point, do not give any vibration to the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)**
- **Be sure to do this on a level surface (within an inclination of 1 %).**

(a) Clear the zero points of the yaw rate and deceleration sensors.

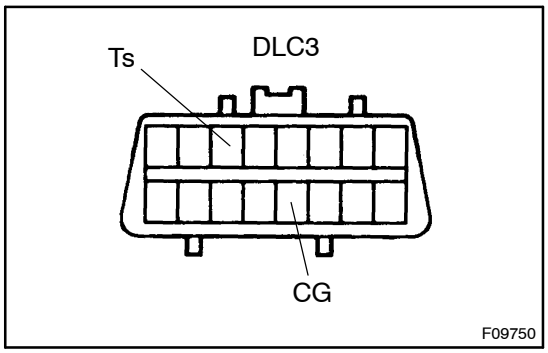
(1) Shift the shift lever to P range.

(2) Turn the ignition switch ON in a stationary condition.

(3) With the lit switch ON, using SST, repeat a cycle of short and open between terminals Ts and CG of DLC3 4 times or more within 8 sec. Check that the TRC OFF indicator light and VSC warning light is lit indicating the recorded zero point is erased.

SST 09843–18040

(4) Turn the ignition switch OFF.



(b) Obtain zero point of the yaw rate sensor.

(1) Make the terminals Ts and CG of DLC3 disconnected.

(2) Turn the ignition switch ON.

HINT:

The vehicle should be in a stationary condition with the shift lever in P range.

(3) Check that the lit TRC OFF indicator light and VSC warning light goes off about 15 sec. after the ignition switch is turned ON.

HINT:

Even if the ignition is not turned OFF in step (a)–(4) and remains ON, the yaw rate sensor zero point calibration can be completed. In this case, the TRC OFF indicator light and VSC warning light is lit for about 15 sec. and then VSC warning light starts blinling.

(4) After ensuring that the TRC OFF indicator light and VSC warning light remains OFF for 2 sec., turn the ignition switch OFF.

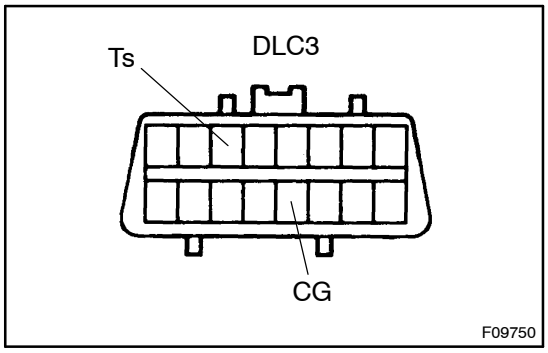
HINT:

If the ignition switch is not turned OFF in step (a)–(4), make sure that the VSC warning light light blinks for 2 sec. Then turn the ignition switch OFF.

(c) Perform deceleration sensor zero point calibration.

NOTICE:

After step (b) (the yaw rate sensor zero point calibration), the VSC warning light goes off. At this time, if the vehicle is driven without performing step (c) (deceleration sensor zero point calibration), deceleration sensor zero point calibration malfunction will be detected and the TRC OFF indicator light and VSC warning light will light up. Therefore, perform step (c) right after step (b).



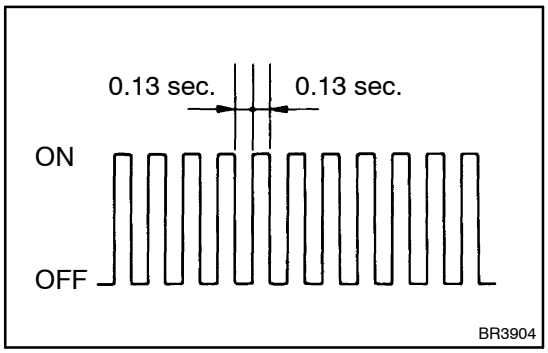
(1) Using SST, connect the terminals Ts and CG of DLC3.

SST 09843–18040

(2) Turn the ignition switch ON.

HINT:

Place the vehicle in a stationary condition with the shift lever in P range.



(3) After turning the ignition switch ON, check that the VSC warning light is lit for about 4 sec. and then starts quick blinking at 0.13 sec. intervals.

(4) After ensuring the blinking of the VSC warning light for 2 sec., turn the ignition switch OFF.

(5) Remove the SST and make the terminals Ts and CG of DLC3 disconnected.

SST 09843–18040

DI0WA–15

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

Before replacing or removing the part, turn the ignition switch OFF.

HINT:

- Using SST 09843–18040, connect the terminals Tc and CG of DLC3.
- If any abnormality is not found on inspected parts, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit indicated by DTC. For details of each code, turn to the pages in the "See page" for respective "DTC No." in the DTC chart.

DTC chart of ABS:

DTC No. (See Page)	Detection Item	Trouble Area
C0200 / 31*1 (DI–337)	Right front wheel speed sensor signal malfunction	• Right front, left front, right rear, left rear speed sensor • Each speed sensor circuit • Sensor rotor
C0205 / 32*1 (DI–337)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (DI–337)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (DI–337)	Left rear wheel speed sensor signal malfunction	
C0226 / 21 (DI–343)	Open or short circuit in brake actuator solenoid circuit (SFR circuit)	• Brake actuator • SFRH or SFRR circuit
C0236 / 22 (DI–343)	Open or short circuit in brake actuator solenoid circuit (SFL circuit)	• Brake actuator • SFLH or SFLR circuit
C0246 / 23 (DI–343)	Open or short circuit in brake actuator solenoid circuit (SRR circuit)	• Brake actuator • SRRH or SRRR circuit
C0256 / 24 (DI–343)	Open or short circuit in brake actuator solenoid circuit (SRL circuit)	• Brake actuator • SRLH or SRLR circuit
C0273 / 13*1 (DI–345)	Open circuit in ABS MTR relay circuit	• ABS MTR relay • ABS MTR relay circuit
C0274 / 14 (DI–345)	Short circuit in ABS MTR relay circuit	
C0278 / 11 (DI–349)	Open circuit in ABS SOL relay circuit	• ABS SOL relay • ABS SOL relay circuit
C0279 / 12 (DI–349)	Short circuit in ABS SOL relay circuit	
C1225 / 25 (DI–361)	Open or short circuit in brake actuator solenoid circuit (SM circuit)	• Brake actuator • SMF or SMR circuit
C1226 / 26 (DI–361)	Open or short circuit in brake actuator solenoid circuit (SRM circuit)	• Brake actuator • SRMF or SRMR circuit
C1227 / 27 (DI–361)	Open or short circuit in brake actuator solenoid circuit (SRC circuit)	• Brake actuator • SRCF or SRCR circuit
C1235 / 35 (DI–337)	Foreign matter is attached on the tip of the right front sensor	• Right front, left front, right rear, left rear speed sensor • Sensor rotor
C1236 / 36 (DI–337)	Foreign matter is attached on the tip of the left front sensor	
C1238 / 38 (DI–337)	Foreign matter is attached on the tip of the right rear sensor	
C1239 / 39 (DI–337)	Foreign matter is attached on the tip of the left rear sensor	

C1241 / 41 (DI–370)	Low battery voltage	• Battery • Charging system • Power source circuit
C1243 / 43*1 (DI–373)	Malfunction in deceleration sensor (constant output)	• Deceleration sensor • Wire harness for deceleration sensor system
C1244 / 44 (DI–373)	Open or short circuit in deceleration sensor circuit	• Deceleration sensor • Deceleration sensor circuit
C1245 / 45*1 (DI–373)	Malfunction in deceleration sensor (output error)	• Deceleration sensor • Wire harness for deceleration sensor system
C1246 / 46*2 (DI–377)	Malfunction in master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C1249 / 49 (DI–381)	Open circuit in stop light switch circuit	• Stop light bulb • Stop light switch circuit
C1251 / 51*1 (DI–384)	ABS pump motor is locked Open circuit in pump motor circuit	ABS pump motor
C1360 / 61 (DI–377)	Malfunction in comparative master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
Always ON (DI–386)	Malfunction in skid control ECU	• Power source circuit • ABS warning light circuit • Multiplex communication circuit • Skid control ECU

*1, *2:

Even after the troubled areas are repaired, ABS warning light will not go OFF unless the following operations are performed.

- *1:
  (1) Drive the vehicle at 20 km/h (12 mph) for 30 seconds or more and check that the ABS warning light goes off.
  (2) Clear the DTC (See page DI–318).
- *2:
  (1) Keep the vehicle in the stationary condition for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
  (2) Drive the vehicle at the vehicle speed 50 km/h (31 mph) and keep depressing the brake pedal strongly for about 3 seconds.
  (3) Repeat the above operation 3 times or more and check that the ABS warning light goes off.
  (4) Clear the DTC (See page DI–318).

HINT:

There is a case that hand–held tester cannot be used when ABS warning light is always on.

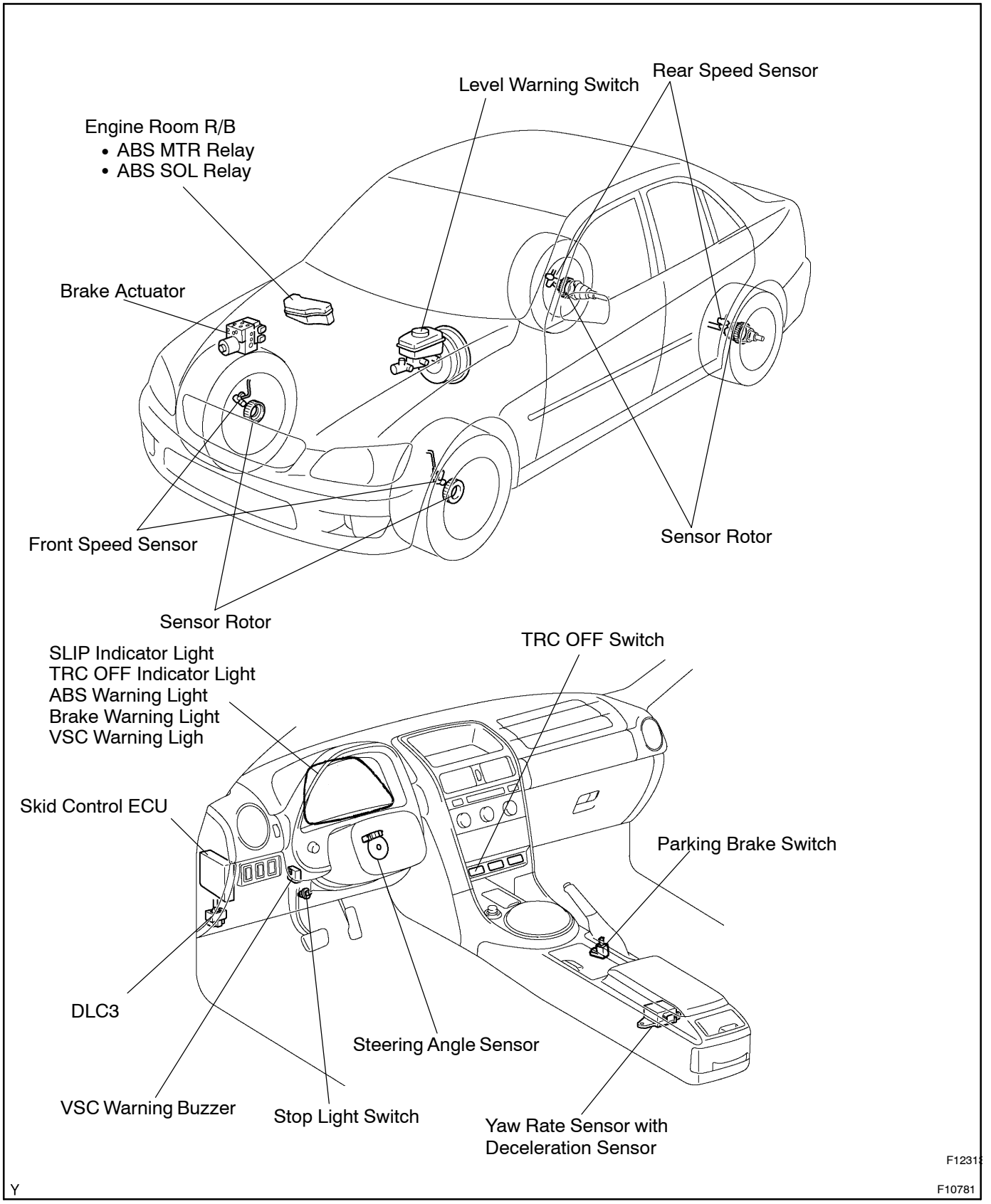
DTC chart of VSC:

DTC No. (See Page)	Detection Item	Trouble Area
C1201 / 51 (DI–353)	Malfunction in engine and ECT ECU	Engine control system
C1202 / 52 (DI–354)	Brake fluid level low Open circuit in brake fluid level warning switch circuit	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit
C1203 / 53 (DI–356)	Malfunction in engine and ECT ECU communication circuit	• TRC+ or TRC– circuit • ENG+ or ENG– circuit • Engine and ECT ECU
C1223 / 43 (DI–358)	Malfunction in ABS control system	ABS control system
C1224 / 44 (DI–359)	Open or short circuit in NEO signal circuit	• NEO circuit • Engine and ECT ECU
C1231 / 31 (DI–363)	Malfunction in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit
C1233 / 33 (DI–367)	Open or short circuit in yaw rate sensor circuit	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34 (DI–367)	Malfunction in yaw rate sensor	
C1335 / 35 (DI–363)	Open circuit in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit
Always ON (DI–390)	Malfunction in skid control ECU Open circuit in VSC warning indicator circuit	• Power source circuit • Skid control ECU

HINT:
In some cases hand–held tester cannot be used when VSC warning light is always on.

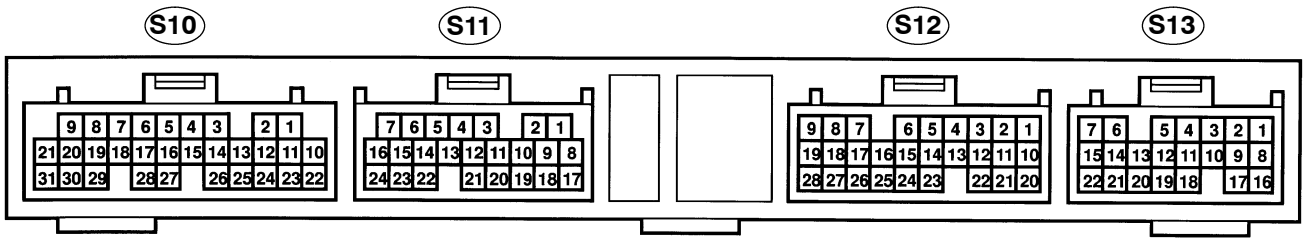
DI9IC–01

PARTS LOCATION



DI1GG–10

TERMINALS OF ECU



F02094

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SRLR (S23 – 1) – GND (S23 – 15, 22, S20 – 2, 3)	B*1 ↔ W–B R*2 ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SM1– (S23 – 2) – GND (S23 – 15, 22, S20 – 2, 3)	B–L*1 ↔ W–B L*2 ↔ W–B	IG switch OFF	Continuity
SM1+ (S23 – 3) – GND (S23 – 15, 22, S20 – 2, 3)	B–R*1 ↔ W–B R–L*2 ↔ W–B	IG switch ON, ABS warning light OFF	Below 1.0
SM2– (S23 – 4) – GND (S23 – 15, 22, S20 – 2, 3)	L–B ↔ W–B	IG switch OFF	Continuity
SM2+ (S23 – 5) – GND (S23 – 15, 22, S20 – 2, 3)	G–B*1 ↔ W–B W–R*2 ↔ W–B	IG switch ON, ABS warning light OFF	Below 1.0
AST (S23 – 6) – GND (S23 – 15, 22, S20 – 2, 3)	Y–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRLH (S23 – 7) – GND (S23 – 15, 22, S20 – 2, 3)	G–W ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFRR (S23 – 8) – GND (S23 – 15, 22, S20 – 2, 3)	G ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
PMC (S23 – 10) – E2 (S23 – 19)	R ↔ W	IG switch ON, stop light switch OFF	0.3 – 0.8
E3 (S23 – 12) – GND (S23 – 15, 22, S20 – 2, 3)	Y ↔ W–B	IG switch OFF	Continuity
FSS (S23 – 13) – GND (S23 – 15, 22, S20 – 2, 3)	Shielded ↔ W–B	IG switch OFF	Continuity
MT (S23 – 14) – GND (S23 – 15, 22, S20 – 2, 3)	L–Y ↔ W–B	IG switch ON (Motor relay is OFF)	Below 1.5
SFRH (S23 – 16) – GND (S23 – 15, 22, S20 – 2, 3)	LG ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
PMC2 (S23 – 18) – E3 (S23 – 12)	L ↔ Y	IG switch ON, stop light switch OFF	0.3 – 0.8
E2 (S23 – 19) – GND (S23 – 15, 22, S20 – 2, 3)	W ↔ W–B	IG switch OFF	Continuity
VCM (S23 – 20) – GND (S23 – 15, 22, S20 – 2, 3)	B ↔ W–B	IG switch ON	4.5 – 5.5
VCM2 (S23 – 21) – GND (S23 – 15, 22, S20 – 2, 3)	G ↔ W–B	IG switch ON	4.5 – 5.5
VYS (S22 – 1) – GND (S23 – 15, 22, S20 – 2, 3)	L ↔ W–B	IG switch ON	4.5 – 5.5
YSS (S22 – 3) – GND (S23 – 15, 22, S20 – 2, 3)	Shielded ↔ W–B	IG switch OFF	Continuity

TRIG (S22 – 6) – GND (S23 – 15, 22, S20 – 2, 3)	W–L ↔ W–B	IG switch ON	Above 3.5
CSW (S22 – 7) – GND (S23 – 15, 22, S20 – 2, 3)	LG–R ↔ W–B	IG switch ON, TRC OFF switch OFF	10 – 14
YAW2 (S22 – 10) – GND (S23 – 15, 22, S20 – 2, 3)	R*1 ↔ W–B BR*2 ↔ W–B	IG switch ON, yawrate sensor is stationary	2 – 3
GSS (S22 – 12) – GND (S23 – 15, 22, S20 – 2, 3)	Shielded ↔ W–B	IG switch OFF	Continuity
YD (S22 – 16) – GND (S23 – 15, 22, S20 – 2, 3)	G ↔ W–B	IG switch ON, VSC warning light OFF	Above 4.5
SS1+ (S22 – 18) – SS1– (S22 – 27)	LG–B ↔ LG	Engine idling, slowly tun steering wheel	Pulse generation
GYAW (S12 – 20) – GND (S23 – 15, 22, S20 – 2, 3)	Y ↔ W–B	IG switch OFF	Continuity
GL1 (S22 – 21) – GND (S23 – 15, 22, S20 – 2, 3)	W ↔ W–B	IG switch ON, vehicle is stopped	0.5 – 4.5
GL2 (S22 – 22) – GND (S23 – 15, 22, S20 – 2, 3)	BR*1 ↔ W–B R*2 ↔ W–B	IG switch ON, vehicle is stopped	0.5 – 4.5
NEO (S22 – 26) – GND (S23 – 15, 22, S20 – 2, 3)	G ↔ W–B	Engine idling	Pulse generation
D/G (S22 – 28) – GND (S23 – 15, 22, S20 – 2, 3)	W–R*1 ↔ W–B W*2 ↔ W–B	IG switch ON	10 – 14
WA (S21 – 1) – GND (S23 – 15, 22, S20 – 2, 3)	W–L ↔ W–B	IG switch ON, ABS warning light ON	4 – 8
		IG switch ON, ABS warning light OFF	Below 2.0
SP1 (S21 – 2) – GND (S23 – 15, 22, S20 – 2, 3)	R–Y*1 ↔ W–B V–W*2 ↔ W–B	Vehicle drives at about 20 km/h (12 mph)	Pulse generation
STP (S21 – 3) – GND (S23 – 15, 22, S20 – 2, 3)	G–R ↔ W–B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 – 14
WT (S21 – 4) – GND (S23 – 15, 22, S20 – 2, 3)	LG ↔ W–B	IG switch ON, TRAC OFF indicator light ON	Below 2.0
		IG switch ON, TRAC OFF indicator light OFF	10 – 14
BZ (S21 – 5) – GND (S23 – 15, 22, S20 – 2, 3)	L–R ↔ W–B	IG switch ON, VSC buzzer is sounded	Below 1.0 ↔ 10 – 14
		IG switch ON, VSC buzzer is not sounded	10 – 14
IND (S21 – 6) – GND (S23 – 15, 22, S20 – 2, 3)	L–Y ↔ W–B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 – 14
IG1 (S21 – 7) – GND (S23 – 15, 22, S20 – 2, 3)	B–R ↔ W–B	IG switch ON	10 – 14
BRL (S21 – 8) – GND (S23 – 15, 22, S20 – 2, 3)	Y–G ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level and parking brake switch is OFF (Brake warning light is OFF)	Below 2.0
		IG switch ON, fluid in master cylinder reservoir below MIN level or parking brake switch is ON (Brake warning light ON)	10 – 14
ENG+ (S21 – 9) – ENG– (S21 – 18)	L–B ↔ P	IG switch ON	Pulse generation
Ts (S21 – 10) – GND (S23 – 15, 22, S20 – 2, 3)	W–L ↔ W–B	IG switch ON	10 – 14
TRC+ (S21 – 11) – TRC– (S21 – 20)	R–Y ↔ W–G	IG switch ON	Pulse deneration
FRO (S21 – 13) – GND (S23 – 15, 22, S20 – 2, 3)	W–R ↔ W–B	Vehicle drives at about 20 km/h (12 mph)	Pulse generation

VSCW (S21 – 4) – GND (S23 – 15, 22, S20 – 2, 3)	Y–B ↔ W–B	IG switch ON, VSC warning light ON	Below 2.0
		IG switch ON, VSC warning light OFF	10 – 14
RR+ (S21 – 16) – RR– (S21 – 15)	G*1 ↔ B W*2 ↔ B	IG switch ON, slowly turn right rear wheel	Pulse generation
PKB (S21 – 21) – GND (S23 – 15, 22, S20 – 2, 3)	Y–R ↔ W–B	IG switch ON, parking brake switch ON	Below 1.5
		IG switch ON, parking brake switch OFF	10 – 14
RL+ (S21 – 22) – RL– (S21 – 23)	R ↔ L	IG switch ON, slowly turn left rear wheel	Pulse generation
+BO (S21 – 24) – GND (S23 – 15, 22, S20 – 2, 3)	W ↔ W–B	Always	10 – 14
R+ (S20 – 1) – GND (S23 – 15, 22, S20 – 2, 3)	L–B ↔ W–B	IG switch ON	10 – 14
SRM1 (S20 – 4) – GND (S23 – 15, 22, S20 – 2, 3)	B–Y ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRC2 (S20 – 5) – GND (S23 – 15, 22, S20 – 2, 3)	G–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFLH (S20 – 6) – GND (S23 – 15, 22, S20 – 2, 3)	L–R*1 ↔ W–B W–G*2 ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SFLR (S20 – 7) – GND (S23 – 15, 22, S20 – 2, 3)	L–Y*1 ↔ W–B W*2 ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRH (S20 – 8) – GND (S23 – 15, 22, S20 – 2, 3)	L–O*1 ↔ W–B R–W*2 ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
SRRR (S20 – 9) – GND (S23 – 15, 22, S20 – 2, 3)	G–Y*1 ↔ W–B W–L*2 ↔ W–B	IG switch ON, ABS warning light OFF	10 –14
SR (S20 – 10) – R+ (S10 – 1)	L–R ↔ L–B	IG switch ON, ABS warning light OFF	Below 1.0
FR+ (S20 – 13) – FR– (S20 – 12)	O ↔ B	IG switch ON, slowly turn right front wheel	Pulse generation
SRM2 (S20 – 21) – GND (S23 – 15, 22, S20 – 2, 3)	B–O ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
+BI (S20 – 22) – GND (S23 – 15, 22, S20 – 2, 3)	W–R ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14
MR (S20 – 23) – GND (S23 – 15, 22, S20 – 2, 3)	W–L ↔ W–B	IG switch ON, ABS motor stops	10 – 14
MRF (S20 – 24) – GND (S23 – 15, 22, S20 – 2, 3)	R–Y ↔ W–B	IG switch ON	10 – 14
LBL (S20 – 25) – GND (S23 – 15, 22, S20 – 2, 3)	Y–R ↔ W–B	IG switch ON, fluid in master cylinder reservoir above MIN level	4 – 8
FL+ (S20 – 28) – FL– (S20 – 27)	LG ↔ V	IG switch ON, slowly turn left front wheel	Pulse generation
SRC1 (S20 – 31) – GND (S23 – 15, 22, S20 – 2, 3)	G–O ↔ W–B	IG switch ON, ABS warning light OFF	10 – 14

DI0WG–15

PROBLEM SYMPTOMS TABLE

If a normal 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.

NOTICE:

When replacing skid control ECU, sensor or etc., turn the ignition switch OFF.

Symptom	Suspect Area	See page
ABS does not operate BA does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 3. Check the DTC again and make sure that the normal code is output. 4. IG power source circuit 5. Speed sensor circuit 6. Check the brake actuator with a hand–held tester. If abnormal, check the hydraulic circuit for leakage. (See page DI–410)	 DI–318 DI–370 DI–337 BR–20
ABS does not operate efficiently BA does not operate efficiently	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the brake actuator with a hand–held tester. If abnormal, check the hydraulic circuit for leakage. (See page DI–410)	 DI–318 DI–337 DI–381 BR–20
ABS warning light abnormal	1. ABS warning light circuit 2. Skid control ECU	DI–393 IN–34
DTC of ABS check cannot be done	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output.	 DI–318
Sensor signal check cannot be done	1. Ts terminal circuit 2. Skid control ECU	DI–408 IN–34
TRC does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit	 DI–318 DI–370 DI–410 DI–337
VSC does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit 5. Deceleration sensor circuit 6. Yaw rate sensor circuit 7. Steering angle sensor circuit	 DI–318 DI–370 DI–410 DI–337 DI–373 DI–367 DI–363

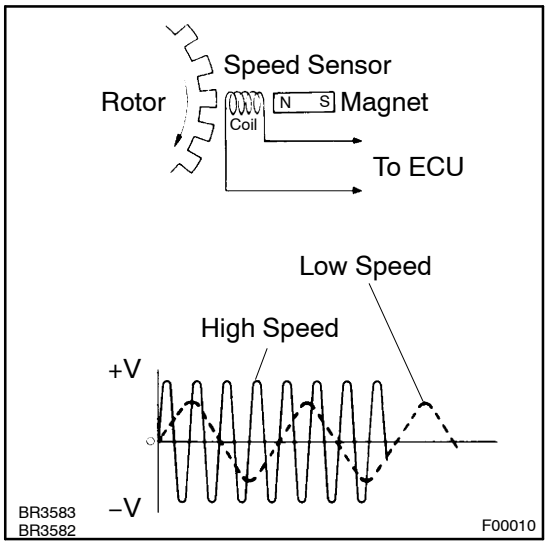
SLIP indicator light abnormal	1. SLIP indicator light circuit 2. Skid control ECU	DI–399 IN–34
TRC OFF indicator abnormal	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. TRC OFF switch circuit	 DI–318 DI–396
DTC of VSC check cannot be done	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output.	 DI–318
VSC warning indicator abnormal	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved to be normal, replace the skid control ECU. 1. Check the DTC again and make sure that the normal code is output. 2. VSC warning indicator circuit	 DI–318 DI–403

DI9ID–01

CIRCUIT INSPECTION

DTC	C0200 / 31 – C1239 / 39	Speed Sensor Circuit

CIRCUIT DESCRIPTION



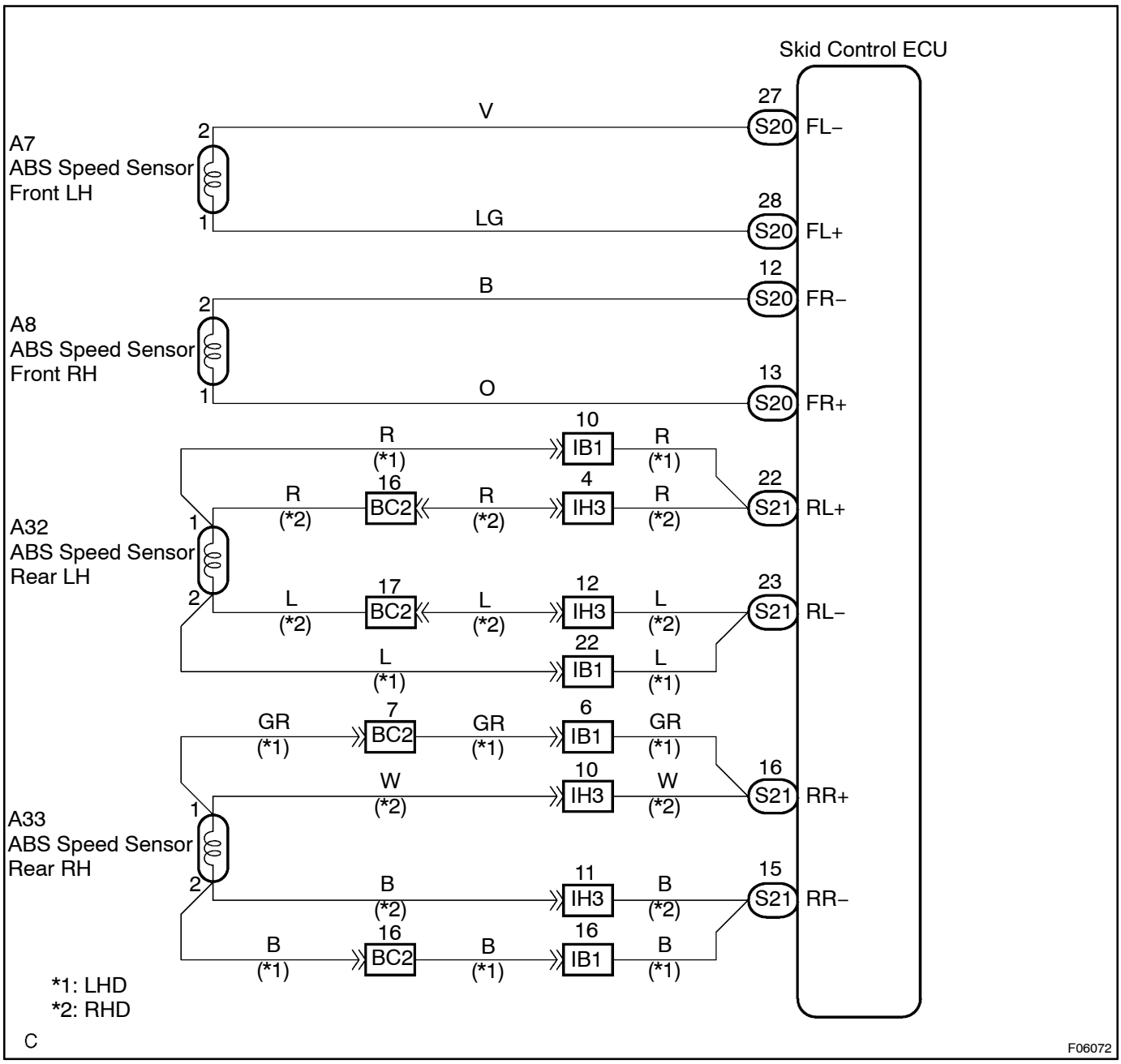
The speed sensor measures wheel speed and sends the corresponding signals to the ECU. These signals are used for control of both the ABS & TRC & VSC control system. Both the front and rear rotors have 48 serrations.
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an 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 measure the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions 1. through 3.: 1. At vehicle speed of 10 km/h (6 mph) or more, open or short circuit of the speed sensor signal circuit continues for 15 sec. 2. Momentary interruption of the speed sensor signal occurs 7 times or more. 3. Open circuit of the speed sensor signal circuit continues for 0.5 sec. or more.	• Right front, left front, right rear, left rear speed sensor • Each speed sensor circuit • Sensor rotor
C1235 / 35 C1236 / 36 C1238 / 38 C1239 / 39	Nose have been counted 75 times in 5 sec.	• Right front, left front, right rear, left rear speed sensor • Sensor rotor

HINT:

- DTC No. C0200 / 31 and C1235 / 35 are for the right front speed sensor.
- DTC No. C0205 / 32 and C1236 / 36 are for the left front speed sensor.
- DTC No. C0210 / 33 and C1238 / 38 are for the right rear speed sensor.
- DTC No. C0215 / 34 and C1239 / 39 are for the left rear speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of speed sensor.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:
Check that there is no difference between the speed value output from the speed sensor observed in the hand–held tester and the speed value displayed by the speedometer when the vehicle is in motion.

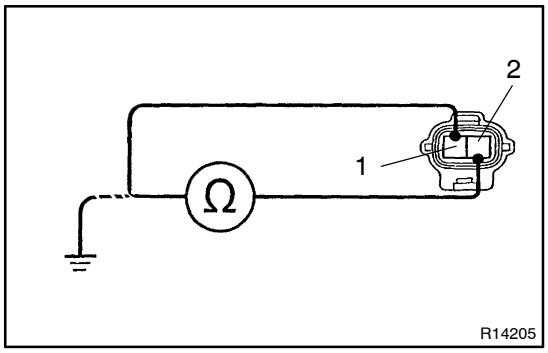
OK:
There is almost no difference in the displayed speed values.

HINT:
There is tolerance of ± 10 % in the speedometer indication.

OK → **Go to step 4.**

NG

2	**Check speed sensor.**



Front:

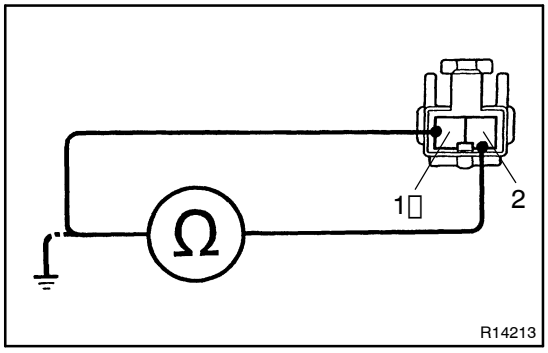
PREPARATION:
(a) Make sure that the speed sensor connector and the wire harness side connector are securely connected.
(b) Disconnect the speed sensor connector.
(c) Turn the ignition switch OFF.

CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor connector.

OK:
Resistance: 1.6 – 1.8 kΩ at 20°C

CHECK:
Measure resistance between terminals 1 and 2 of the speed sensor connector and body ground.

OK:
Resistance: 1 MΩ or higher



Rear:

PREPARATION:

(a) Remove the rear seat cushion and the seatback.
(b) Make sure that the speed sensor connector and the wire harness side connector are securely connected.
(c) Disconnect the speed sensor connector.
(d) Turn the ignition switch OFF.

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor connector.

OK:

Resistance: 0.9 – 1.3 kΩ at 25 ± 5°C

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG	**Replace speed sensor or sub–wire harness.**

NOTICE:

Check the speed sensor signal (See page DI–318).

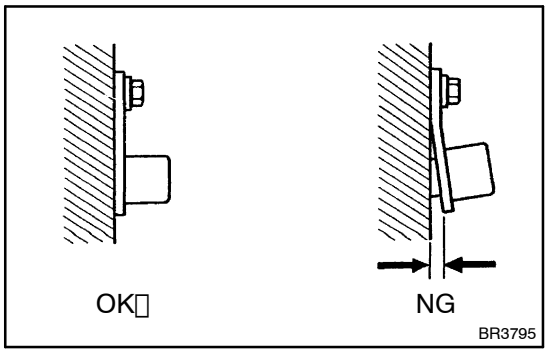
OK

3	**Check for open and short circuit in harness and connector between each speed sensor and skid control ECU (See page IN–34).**

NG	**Repair or replace harness or connector.**

OK

4	Check sensor installation.



CHECK:

Check the speed sensor installation.

OK:

The installation bolt is tightened properly and there is no clearance between the sensor and front steering knuckle or rear axle carrier.

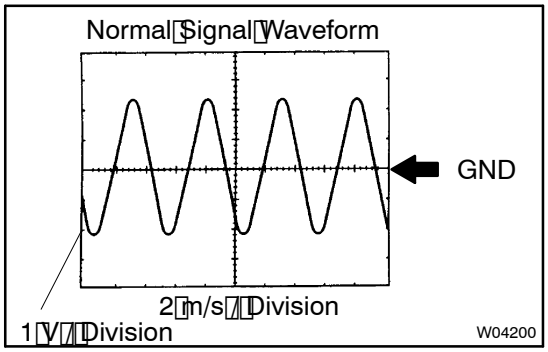
NG	Replace speed sensor.

NOTICE:

Check the speed sensor signal (See page DI–318).

OK

5	Check speed sensor and sensor rotor serrations.



(REFERENCE) INSPECTION USING OSCILLOSCOPE

PREPARATION:

(a) Remove the skid control ECU with the connector still connected.

(b) Connect the oscilloscope to the terminals FR+ – FR–, FL+ – FL–, RR+ – RR– and RL+ – RL– of the skid control ECU.

CHECK:

Drive the vehicle at the speed of about 20 km/h (12 mph), and check the signal waveform.

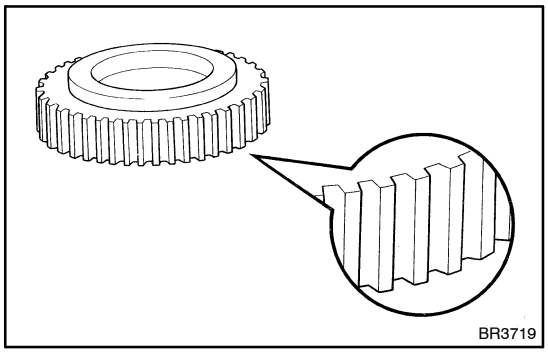
HINT:

- As the vehicle speed (rpm of the wheels) increases, a cycle of the waveform becomes shorter 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 deposited on it.

OK	Check and replace skid control ECU.

NG

6	Check sensor rotor and sensor tip.


BR3719

Front:

PREPARATION:

Remove the front axle hub and the speed sensor.

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects on the sensor rotor.

CHECK:

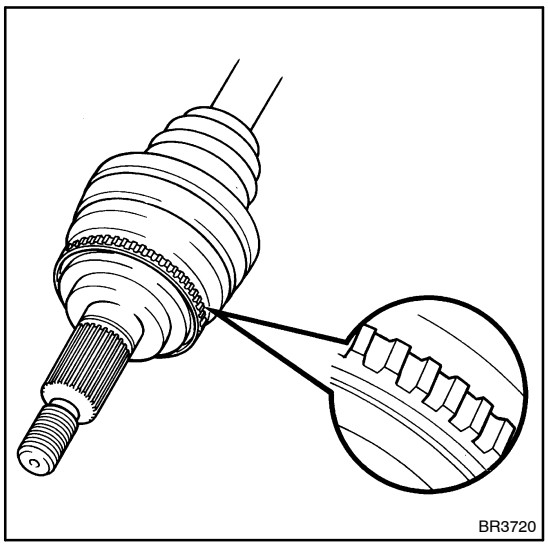
Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.


BR3720

Rear:

PREPARATION:

Remove the drive shaft.

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove the rear speed sensor.

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.

NG	Replace speed sensor or rotor.

NOTICE:

Check the speed sensor signal last (See page DI–318).

OK

Check and replace skid control ECU.

DI1GI–10

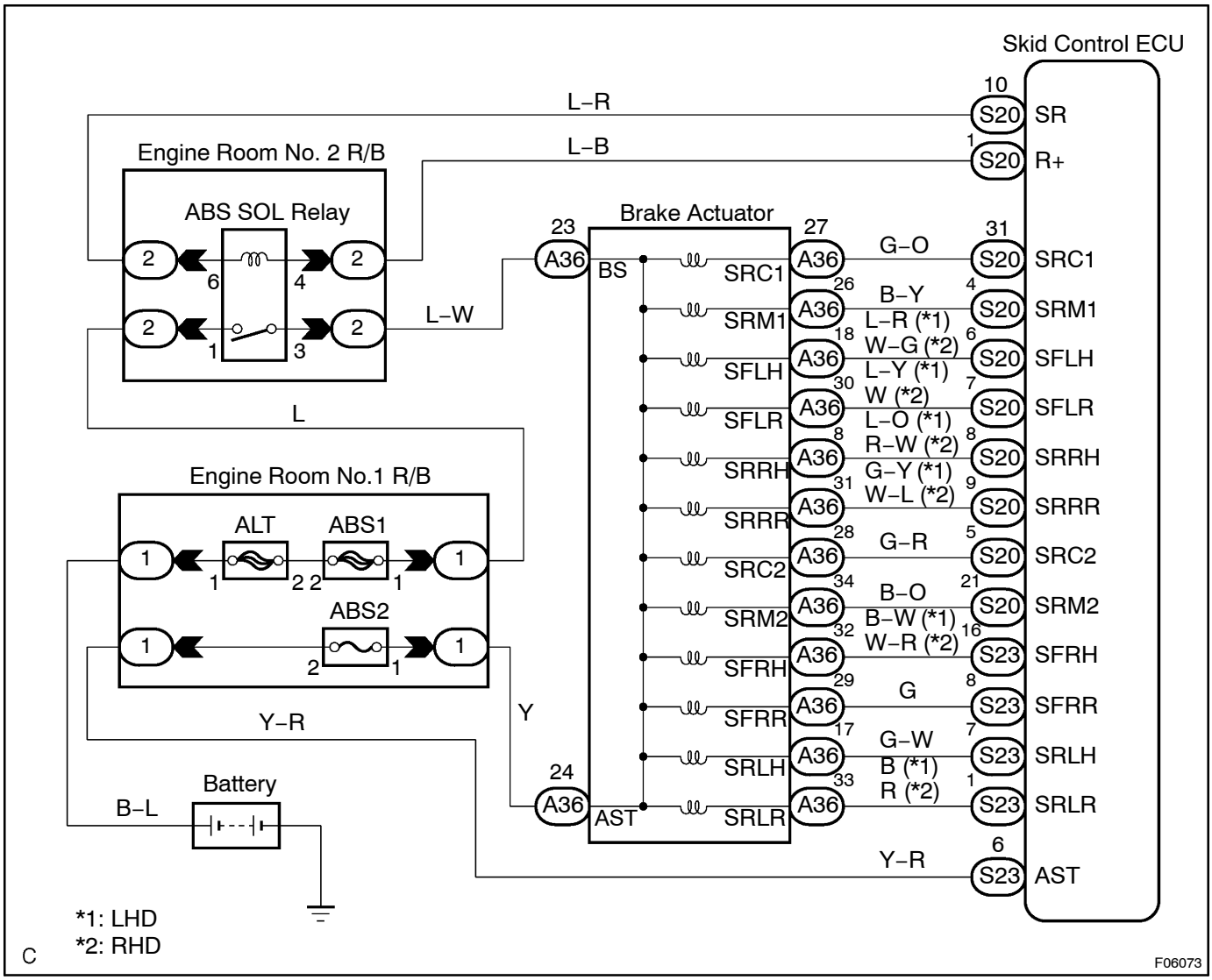
DTC	C0226 / 21 – C0256 / 24	ABS–Related Solenoid Circuits

CIRCUIT DESCRIPTION

ABS–related solenoids operate when signals are received from the ECU, and control the pressure acting on the wheel cylinders thus controlling the braking force.

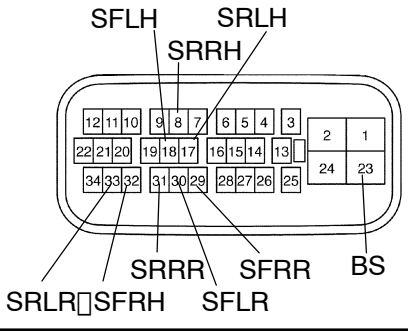
DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit for SFRH or SFRR circuit continues for 0.05 sec. or more.	• Brake actuator • SFRH or SFRR circuit
C0236 / 22	Open or short circuit for SFLH or SFLR circuit continues for 0.05 sec. or more.	• Brake actuator • SFLH or SFLR circuit
C0246 / 23	Open or short circuit for SRRH or SRRR circuit continues for 0.05 sec. or more.	• Brake actuator • SRRH or SRRR circuit
C0256 / 24	Open or short circuit for SRLH or SRLR circuit continues for 0.05 sec. or more.	• Brake actuator • SRLH or SRLR circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check brake actuator solenoid.**



PREPARATION:

(a) Turn the ignition switch OFF.

(b) Disconnect the brake actuator connector.

CHECK:

Check continuity between terminal BS and terminals SFRH, SFLH, SRRH, SRLH, SFRR, SFLR, SRRR and SRLR of brake actuator.

OK:

Continuity

HINT:

Resistance of each solenoid at 25°C

SFRH, SFLH, SRRH, SRLH: 8.1 – 9.1 Ω

SFRR, SFLR, SRRR, SRLR: 4.0 – 4.6 Ω

NG	**Replace brake actuator.**

OK

2	**Check for open and short circuit in harness and connector between skid control ECU and brake actuator (See page IN–34).**

NG	**Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GJ–15

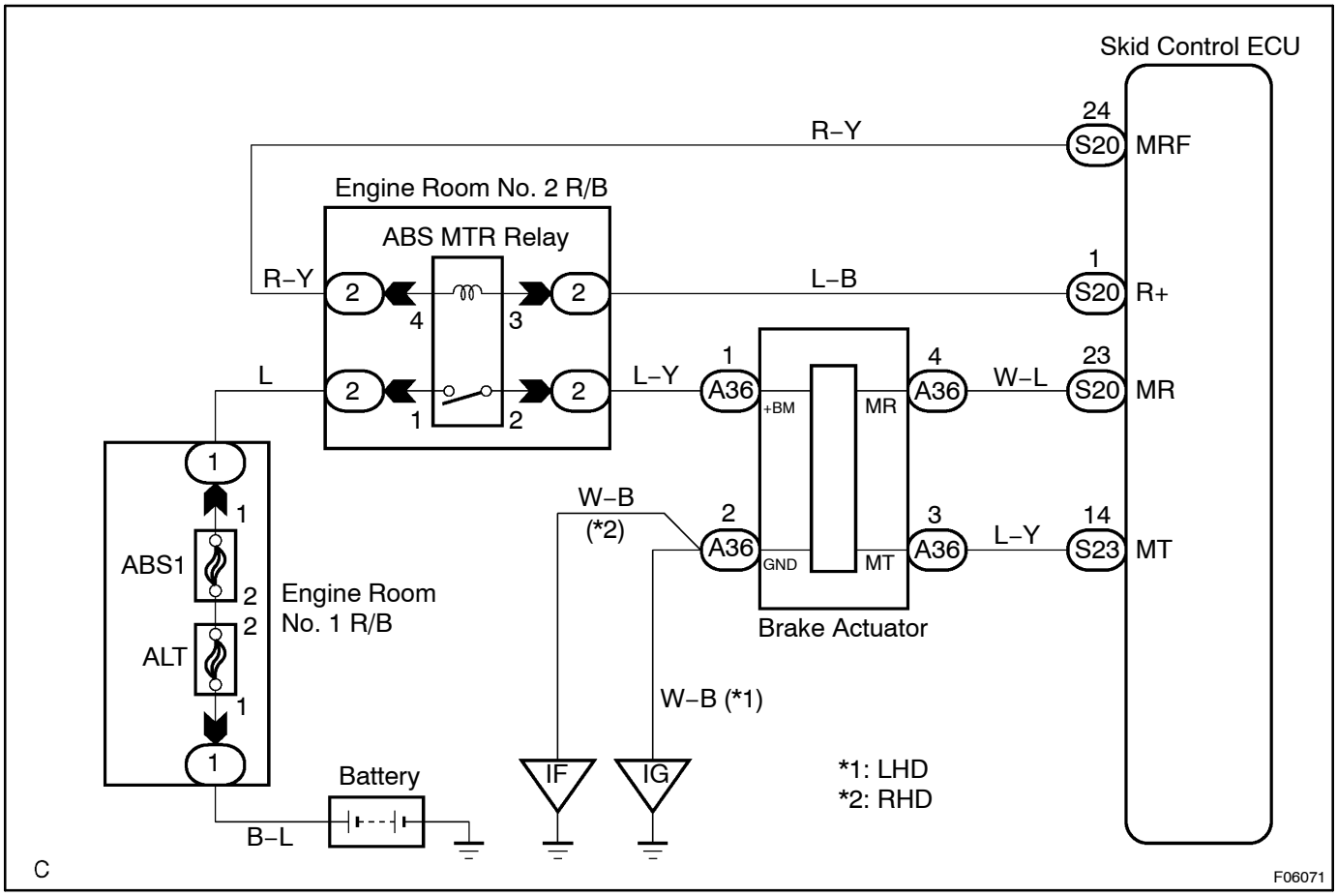
DTC	C0273 / 13, C0274 / 14	ABS Motor Relay Circuit

CIRCUIT DESCRIPTION

The ABS motor relay supplies power to the ABS pump motor. While the ABS & TRC are activated, the ECU switches the motor relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C0273 / 13	Conditions 1. and 2. continued for 0.12 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V in the initial check or ABS, TRC and VSC are in operation, and when the motor relay is ON, however, the contact point of the motor relay is OFF. 2. ECU terminal IG1 is 9.5 V or less, and when the motor relay is ON, but the contact point of the motor relay does not become ON.	• ABS motor relay • ABS motor relay circuit • Skid control ECU
C0274 / 14	When the motor relay is OFF, the condition that the contact point of motor relay is ON continues for 4 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

1	**Check ABS motor relay operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

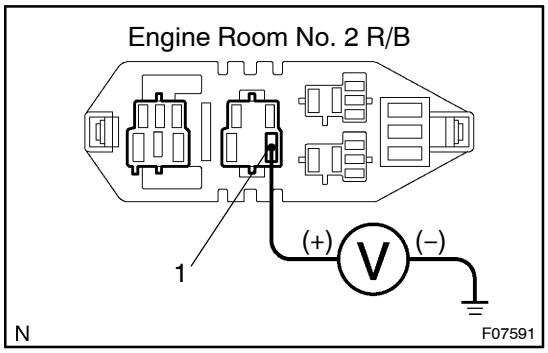
CHECK:
Check the operation sound of the ABS motor relay when operating it with the hand–held tester.

OK:
The operation sound of the ABS motor relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminal 1 of engine room No. 2 R/B (for ABS motor relay) and body ground.**



PREPARATION:
Remove the ABS motor relay from the engine room No. 2 R/B.

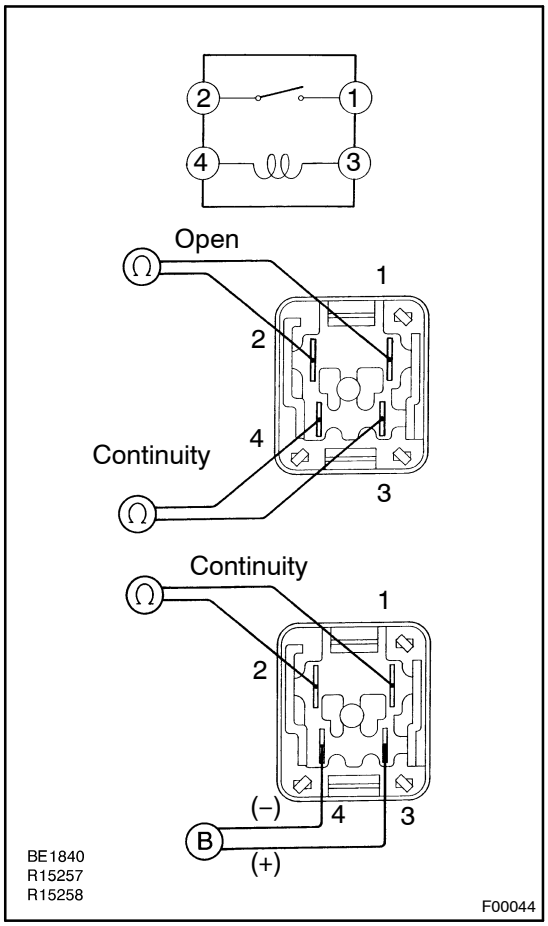
CHECK:
Measure voltage between terminal 1 of engine room No. 2 R/B (for ABS motor relay) and body ground.

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS motor relay.



CHECK:

Check continuity between each pair of terminal of motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

CHECK:

(a) Apply battery voltage between terminals 3 and 4.

(b) Check continuity between terminals.

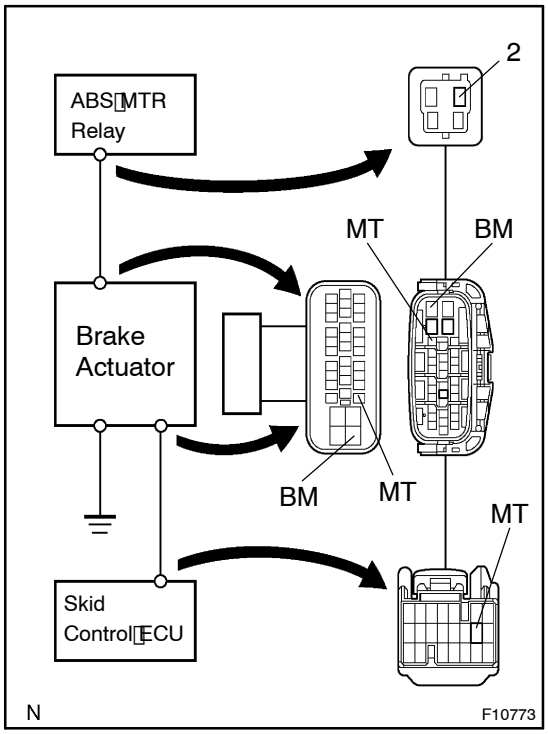
OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS motor relay.**

OK

4	**Check continuity between terminals 2 of engine room No. 2 R/B (for ABS motor relay) and terminal MT of skid control ECU.**



PREPARATION:

(a) Remove the ABS motor relay from the engine room No. 2 R/B.

(b) Disconnect the connector from the skid control ECU.

CHECK:

Check continuity between terminals 2 of engine room No. 2 R/B (for ABS motor relay) and terminal MT of skid control ECU harness side connector.

OK:

Continuity

HINT:

There is a no continuity between terminals BM and MT of brake actuator.

NG → **Repair or replace harness or brake actuator.**

OK

5	**Check for open and short circuit in harness and connector between ABS motor relay and skid control ECU (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GK–10

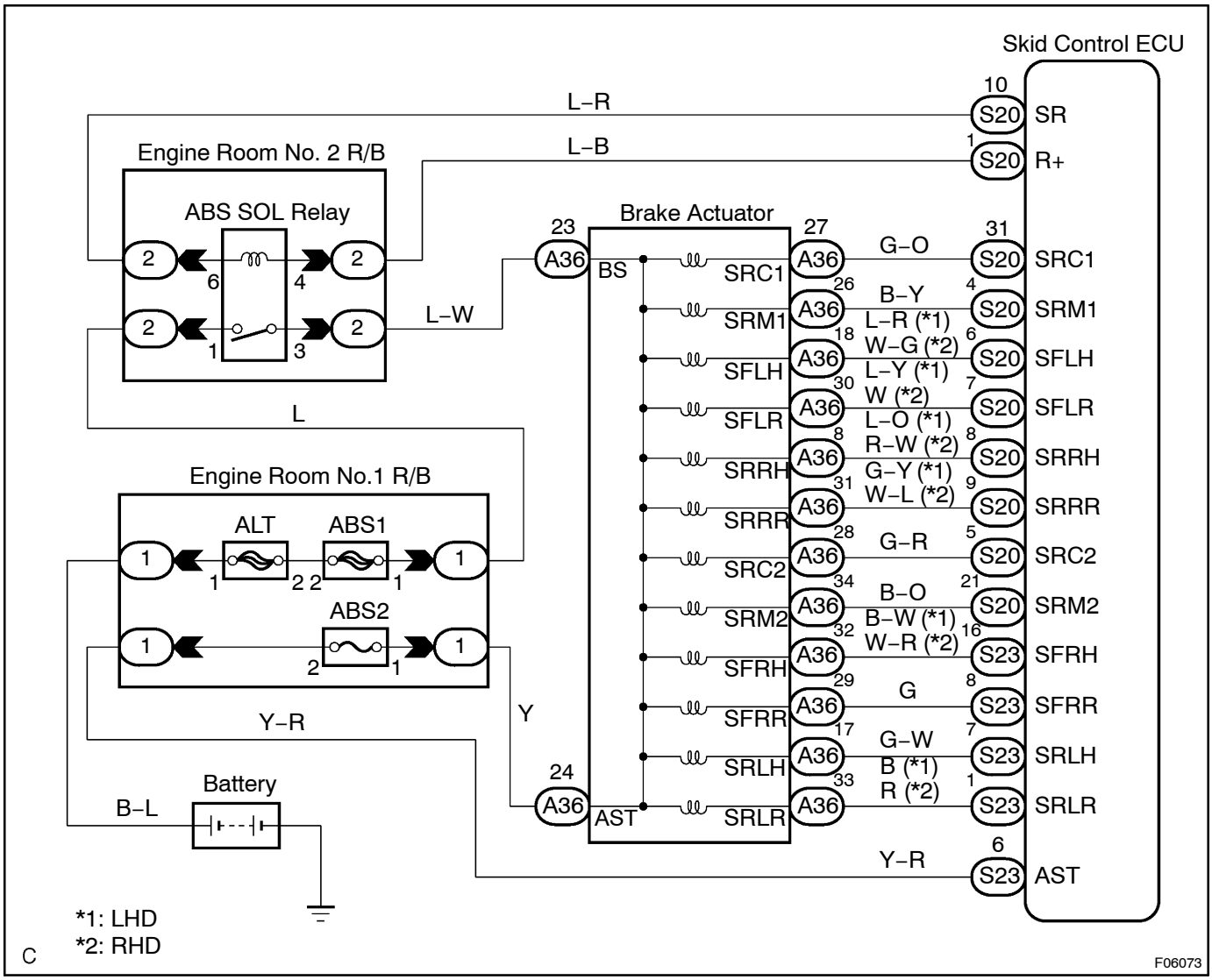
DTC	C0278 / 11, C0279 / 12	ABS Solenoid Relay Circuit

CIRCUIT DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.2 V and the solenoid relay is ON, however, the contact point of the solenoid relay is OFF. 2. With solenoid relay ON driving, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the solenoid relay does not become ON.	• ABS solenoid relay • ABS solenoid relay circuit • Skid control ECU
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, and solenoid relay is OFF, however, when the condition that the contact point of the solenoid relay is ON continues for 0.2 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check ABS solenoid relay operation.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

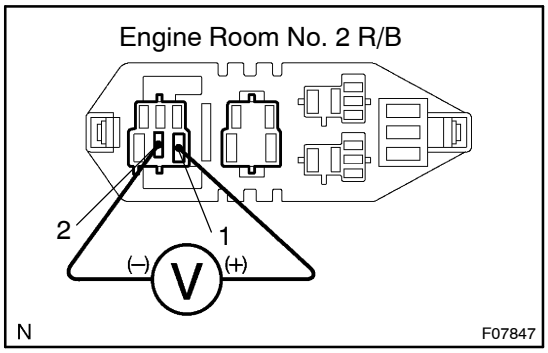
CHECK:
Check the operation sound of the ABS solenoid relay when operating it with the hand–held tester.

OK:
The operation sound of the ABS solenoid relay should be heard.

OK → **Go to step 4.**

NG

2	**Check voltage between terminals 1 and 2 of engine room No. 2 R/B (for ABS solenoid relay).**



PREPARATION:
Remove the ABS solenoid relay from the engine room No. 2 R/B.

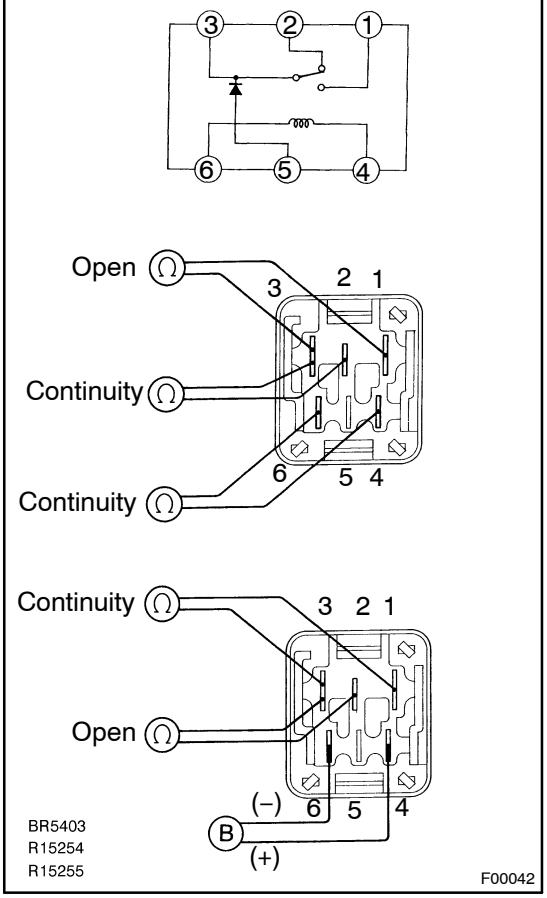
CHECK:
Measure the voltage between terminals 1 and 2 of engine room No. 2 R/B (for ABS solenoid relay).

OK:
Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS solenoid relay.



CHECK:

Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS solenoid relay.

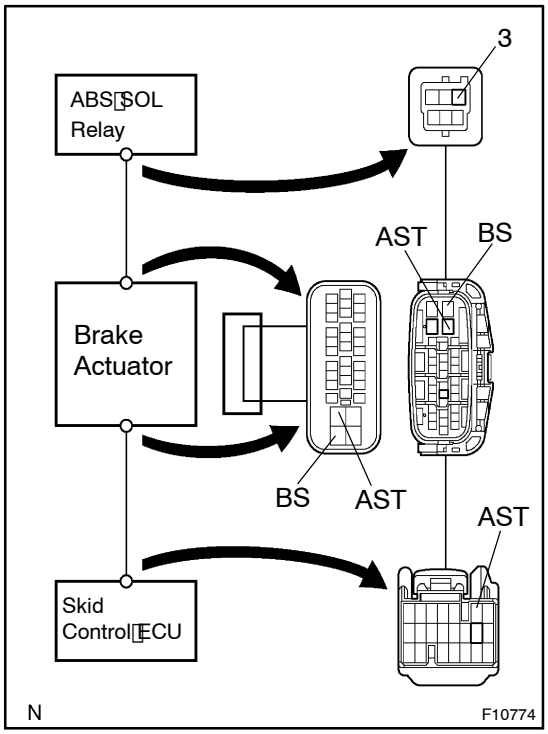
OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS solenoid relay.**

OK

4	**Check continuity between terminals 3 of engine room No. 2 R/B (for ABS solenoid relay) and terminal AST of skid control ECU.**



PREPARATION:

(a) Remove the ABS solenoid relay from the engine room No. 2 R/B.

(b) Disconnect the connector from the skid control ECU.

CHECK:

Check continuity between terminals 3 of engine room No. 2 R/B (for ABS solenoid relay) and terminal AST of skid control ECU harness side connector.

OK:

Continuity

NG → **Repair or replace harness or brake actuator.**

OK

5	**Check for open and short circuit in harness and connector between ABS solenoid relay and skid control ECU (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DI1GY–15

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If any trouble occurs in the engine control system, the ECU prohibits TRC and VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	Conditions 1. and 2. continue for 5 sec.: 1. Engine speed: 500 rpm or more. 2. A trouble signal in the engine control system is input.	• Engine control system

INSPECTION PROCEDURE

1	**Check the DTC for the engine (See page 1G–FE: DI–4 of Pub. No. RM684E, 2JZ–GE: DI–4).**

***1** → **Repair engine control system according to the code output.**

***2**

Check for engine ECU connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

DI1GZ–17

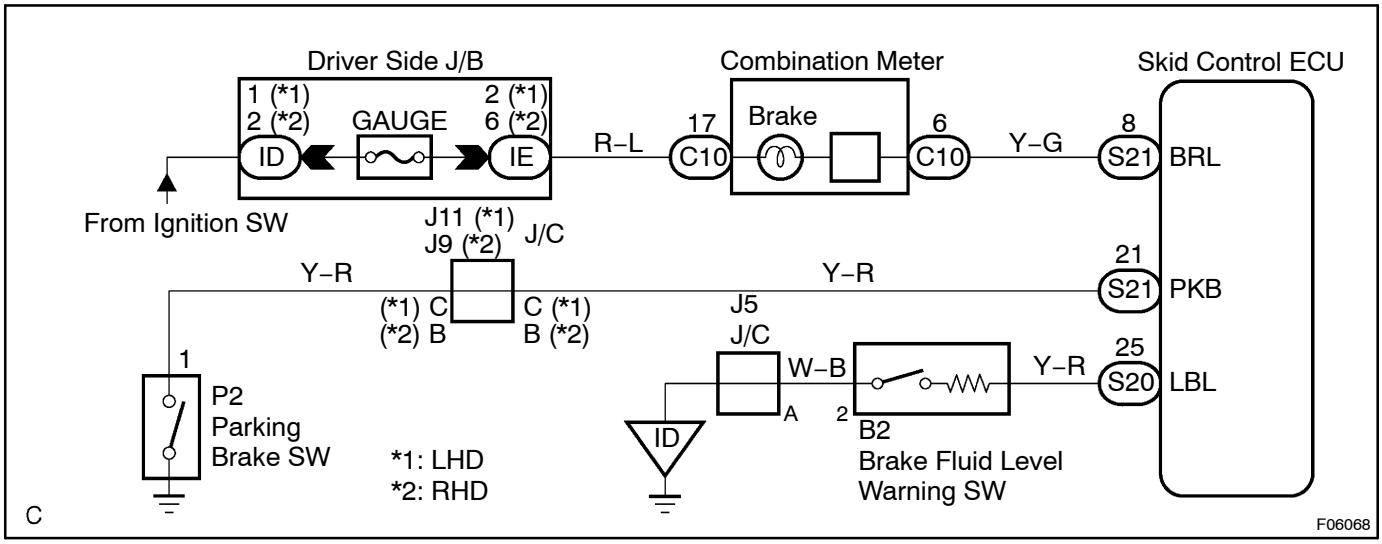
DTC	C1202 / 52	Brake Fluid Warning Switch Circuit

CIRCUIT DESCRIPTION

The brake fluid level warning switch sends the appropriate signal to the ECU when the brake fluid level drops.
HINT:
Pull the parking brake lever also turns on the brake warning light but does not diagnose DTC No. C1202 / 52.

DTC No.	DTC Detecting Condition	Trouble Area
C1202 / 52	When any of the following 1. or 2. is detected: 1. Low fluid level condition in the brake master cylinder reservoir tank continues for 30 sec. or more when vehicle stops, or for 60 sec. or more when driving. 2. With ECU terminal IG1 voltage is 9.5 V to 17.2 V and open circuit for the brake fluid level warning switch circuit continues for 2 sec. or more.	• Brake fluid level • Brake fluid level warning switch • Brake fluid level warning switch circuit • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check brake fluid level.**

CHECK:
Check the amount of fluid in the brake reservoir.

NG → **Check and repair brake fluid leakage and add fluid.**

OK

2	Check brake fluid level warning switch.

NG → Replace brake fluid level warning switch.

OK

3	Check for open circuit in all the harness and components connected to brake fluid level warning light (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

DI1H0–17

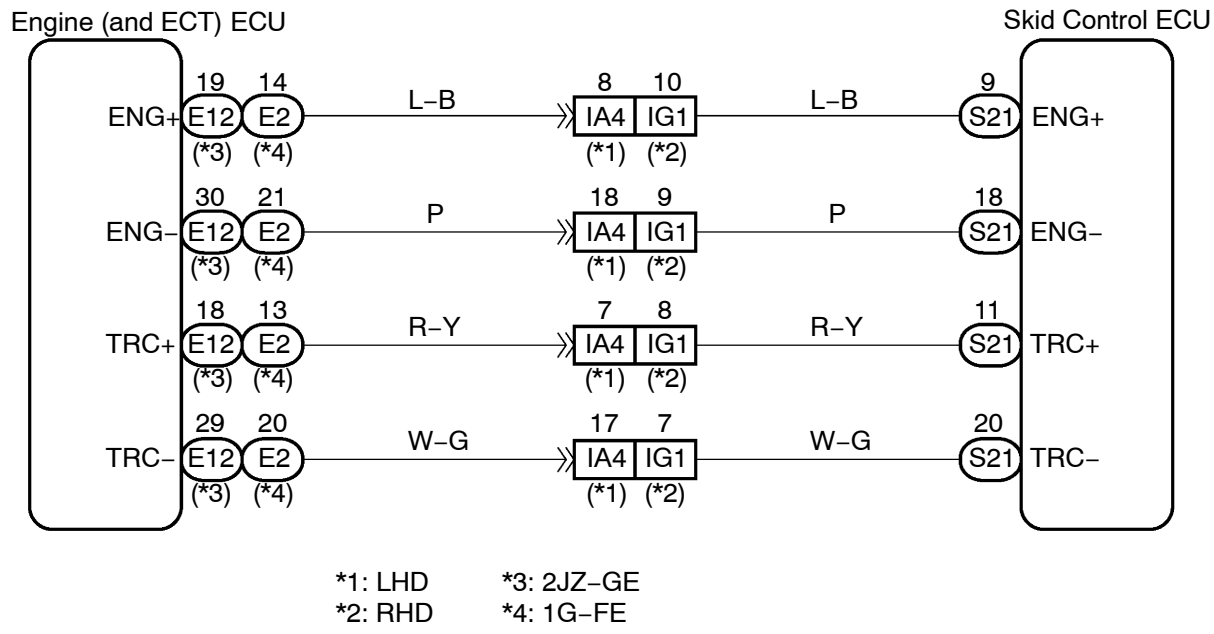
DTC	C1203 / 53	Engine ECU Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The circuit is used to send TRC and VSC control information from the skid control ECU to the engine and ECT ECU (TRC+, TRC–), and engine control information from the engine and ECT ECU to the skid control ECU (ENG+, ENG–).

DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	1. Either of the following (a),or (b) continues for 5 sec.: (a) When ECU terminal IG1 voltage is 9.5 V or more, the condition that the data is not transmitted to engine ECU continues for more than 5 sec. (b) When ECU terminal IG1 voltage is 9.5 V or more, engine speed is 500 rpm or more and data receipt from engine ECU is impossible. 2. The condition that the data sent from engine ECU becomes repeatedly normal and abnormal occurs 10 times or more for 60 sec. 3. The condition that TRC ± communication is normal ↔ abnormal has been repeated more than 10 times in 60 sec.	• TRC+ or TRC– circuit • ENG+ or ENG– circuit • Engine ECU • Skid control ECU

WIRING DIAGRAM



C

F06075

INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals ENG+, ENG–, TRC+, TRC– of skid control ECU and engine ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK →

Check and replace engine ECU or skid control ECU.

DI1H3-13

DTC	C1223/43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223/43	ABS control system is abnormal.	• ABS control system

INSPECTION PROCEDURE

1	Check the DTC for the ABS (See page DI–318).

*1 → Repair ABS control system according to the code output.

*2 →

Check for ECU connected to malfunction indicator lamp.

*1: Output NG code
*2: Malfunction indicator lamp remains ON

DI9IE–01

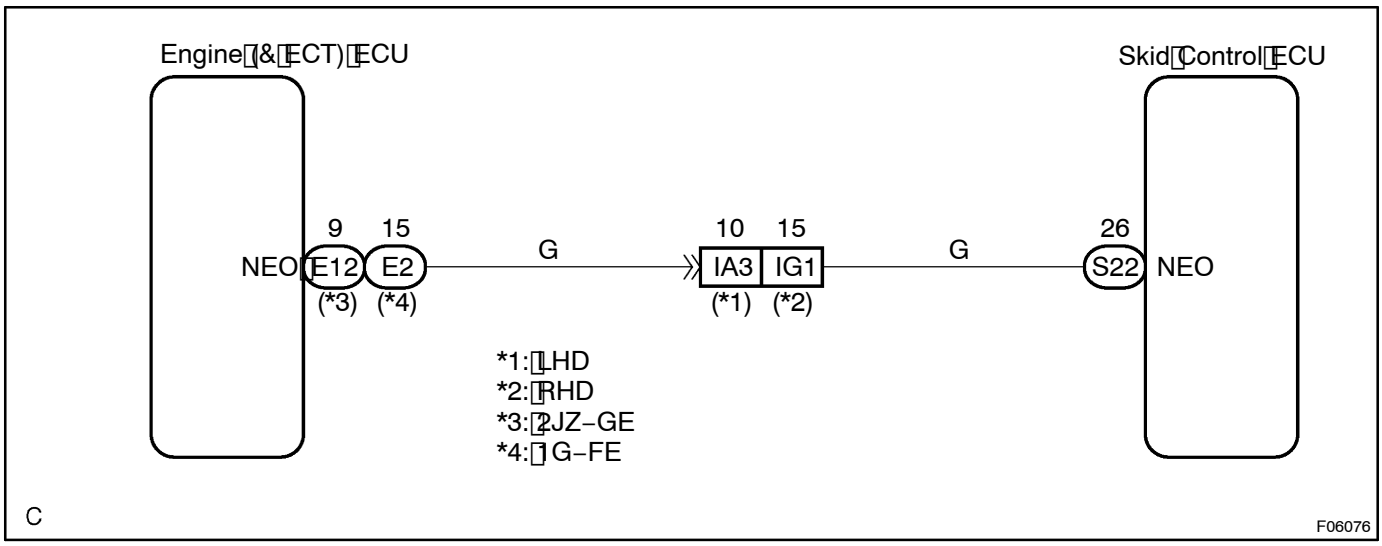
DTC	C1224/44	NE Signal Circuit

CIRCUIT DESCRIPTION

The skid control ECU receives engine revolution speed signals (NE signals) from the engine ECU.

DTC No.	DTC Detecting Condition	Trouble Area
C1224/44	When any of the following 1. through 2. is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, and when data receiving from the engine ECU is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRC is operating and when open or short circuit for engine revolution signal circuit continues for 0.24 sec. or more.	• NEO circuit • Engine ECU • Skid control ECU

WIRING DIAGRAM



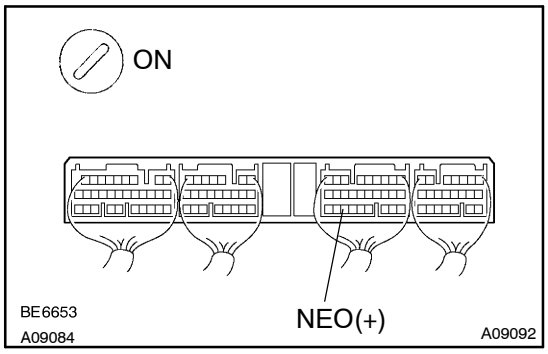
INSPECTION PROCEDURE

1	Check for open and short circuit in harness and connector between terminals NEO of skid control ECU and terminal NEO of engine ECU (See page IN–34).

NG → Repair or replace harness and connector.

OK

2	Check voltage between terminals NEO of skid control ECU and body ground.



PREPARATION:

(a) Remove the skid control ECU with connectors still connected.

(b) Turn the ignition switch ON.

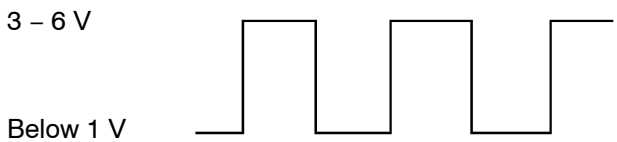
CHECK:

Measure voltage between terminal NEO of skid control ECU and body ground for the engine conditions below.

OK:

Engine condition	Voltage
OFF (IG ON)	3 – 6 V or below 1 V
ON (Idling)	3 – 6 V ↔ below 1 V (Pulse)

(Reference)



NG → **Check and replace skid control ECU or engine ECU.**

OK

If the same codes is still output after the DTC is deleted, check the contact condition of each connection.

DI9IF–01

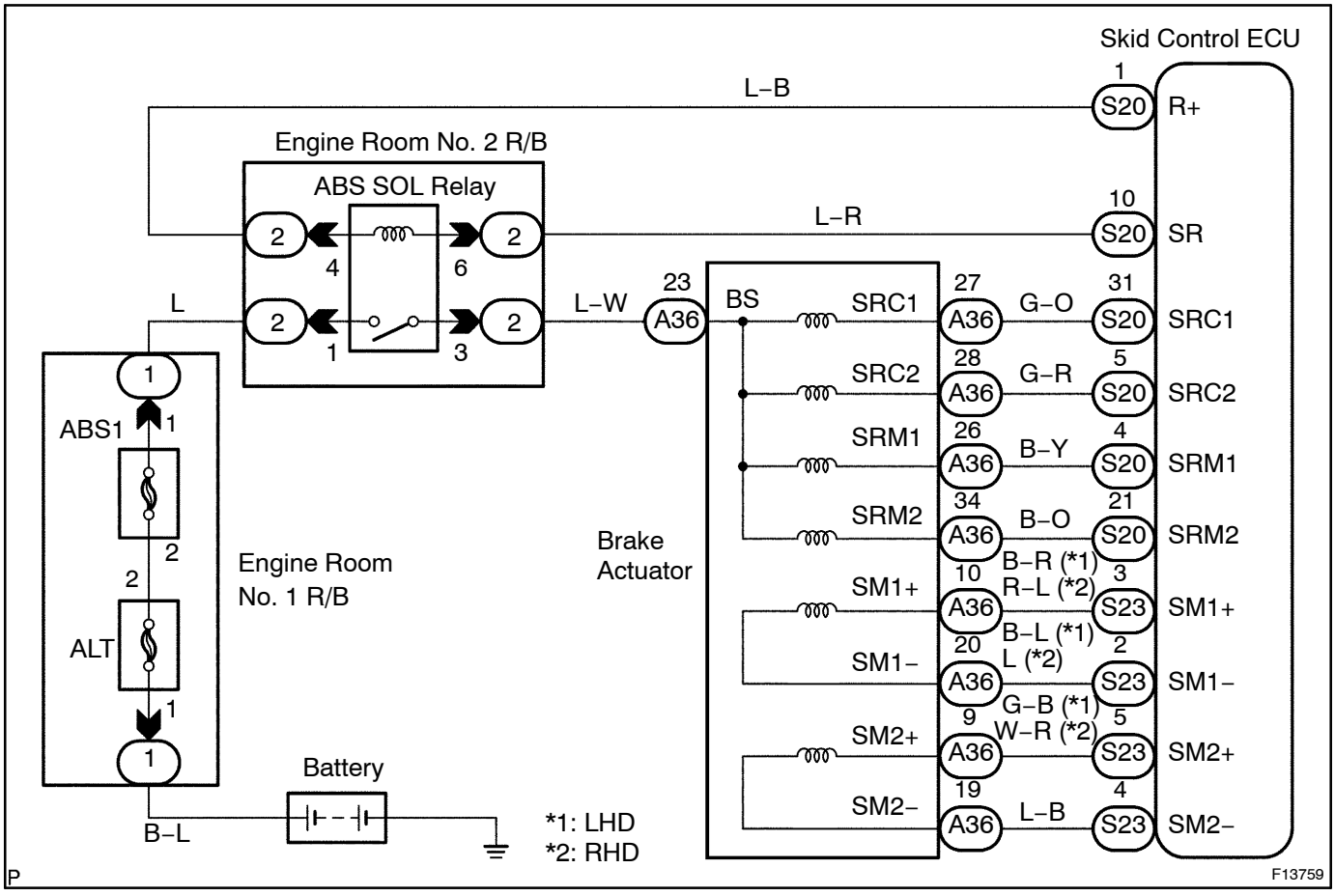
DTC	C1225 / 25 – C1227 / 27	TRC & VSC–Related Solenoid Circuits

CIRCUIT DESCRIPTION

The TRC & VSC solenoids operate in accordance with signals from the ECU and raise the fluid pressure in and release it from the brake cylinders.

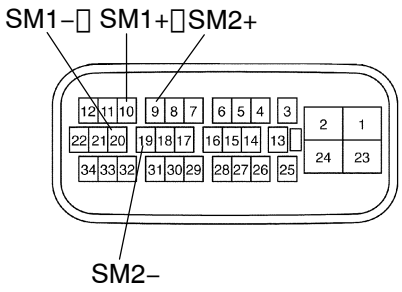
DTC No.	DTC Detecting Condition	Trouble Area
C1225 / 25	Detection of any of conditions 1. through 4.: 1. When SM1 or SM2 is ON, excessive electric current on SM1 or SM2 continues for 0.05 sec. or more. 2. When SM1 or SM2 is OFF, open circuit of SM1 or SM2 continues for 0.05 sec. or more. 3. When SM1 or SM2 is ON, open circuit of SM1 or SM2 continues for 0.1 sec. or more. 4. When SM1 or SM2 is OFF, electric current application on SM1 or SM2 continues for 0.1 sec. or more.	• Brake actuator • SM1 or SM2 circuit
C1226 / 26	Open or short circuit of SRM1 or SRM2 continues for 0.05 sec. or more.	• Brake actuator • SRM1 or SRM2 circuit
C1227 / 27	Open or short circuit of SRC1 or SRC2 continues for 0.05 sec. or more.	• Brake actuator • SRC1 or SRC2 circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check brake actuator solenoid.**



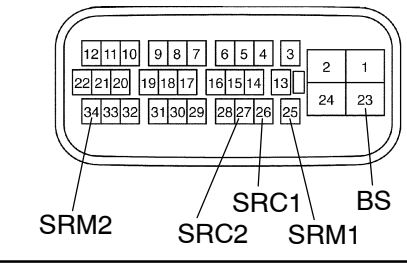
PREPARATION:
Disconnect the brake actuator connector.
CHECK:
Check continuity between terminals SM1+ – SM1–, and terminals SM2+ – SM2– of brake actuator.
OK:

Continuity

HINT:
Resistance of each solenoid: 8.1 – 9.1 Ω at 25°C
CHECK:
Check continuity between terminal BS and terminals SRC1, SRC2, SRM1 and SRM2 of brake actuator.
OK:

Continuity

HINT:
Resistance of each solenoid at 25°C
SRC1, SRC2: 8.1 – 9.1 Ω
SRM1, SRM2: 4.9 – 5.5 Ω



NG → **Replace brake actuator.**

OK

2	**Check for open and short circuit in harness and connector between skid control ECU and brake actuator (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

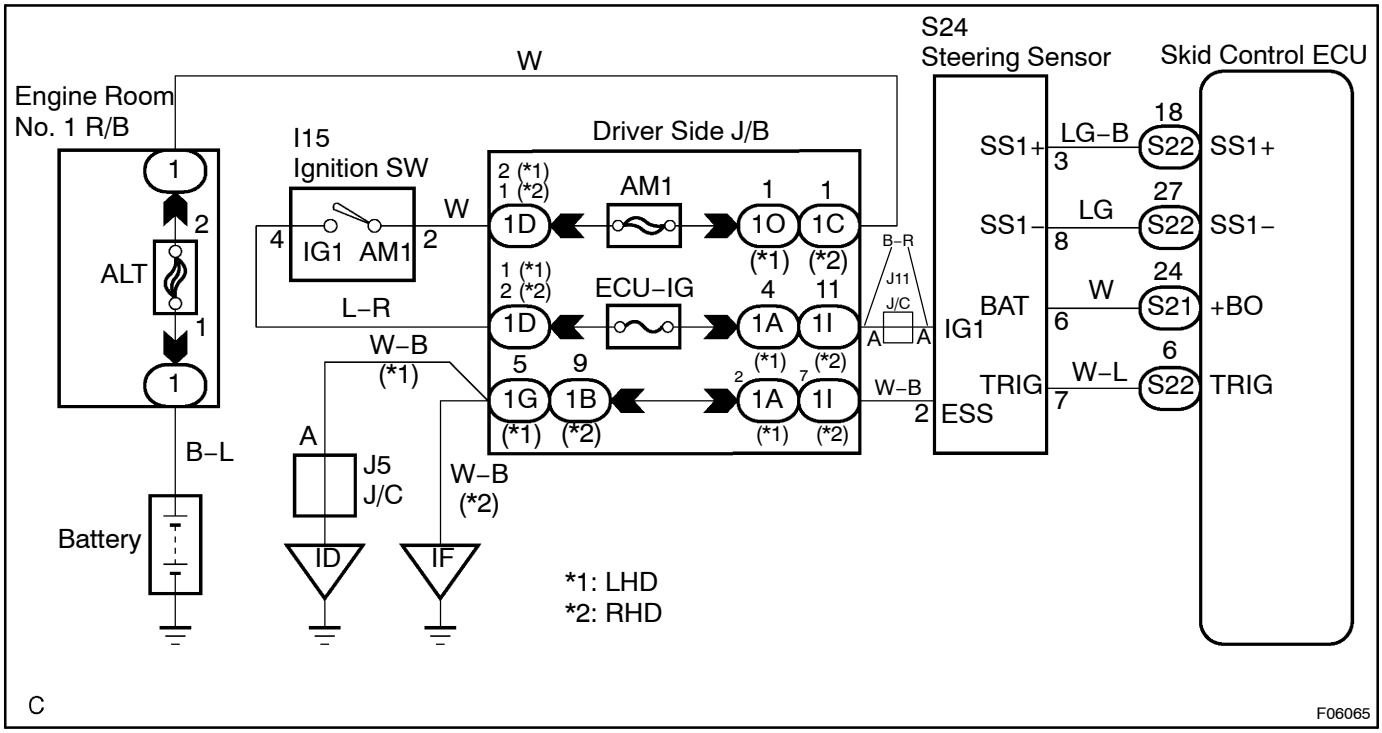
DI1H5–11

DTC	C1231 / 31, C1335 / 35	Steering Angle Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1231 / 31	When detecting the abnormality.	• Steering angle sensor • Steering angle sensor circuit • +BI circuit
C1335 / 35	Detection of either condition 1. or 2.: 1. When the ECU IG1 terminal voltage is 9.5 V or more, data transmission from the steering angle sensor is impossible for 1 sec. or more. 2. Immediately after the terminal BAT is connected and when IG1 terminal voltage is 9.5 V or more, open circuit of terminal TRIG continues for 15 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of the steering angle sensor.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

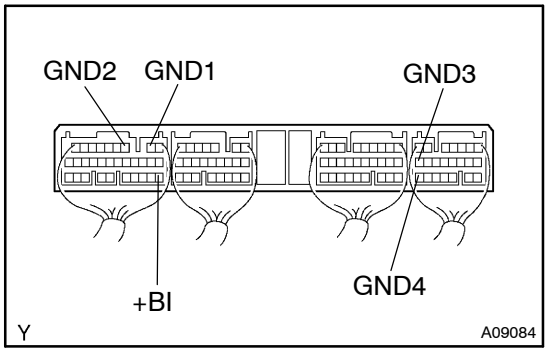
CHECK:
Check that the steering wheel turning angle value of the steering angle sensor observed in the hand–held tester is changing as the steering wheel is turned.

OK:
Steering wheel turning angle value must be changing.

OK → **Go to step 5.**

NG

2	**Check voltage between terminals +BI and GND of skid control ECU.**



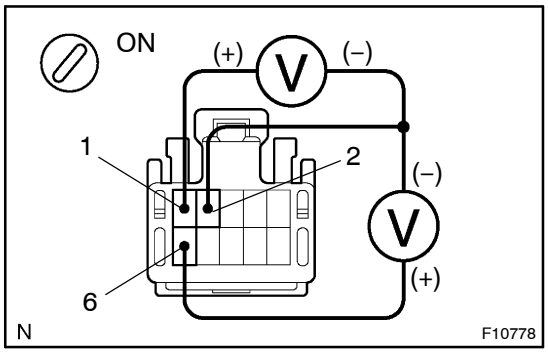
PREPARATION:
(a) Remove the skid control ECU with the connector still connected.
(b) Turn the ignition switch ON.
(c) Measure voltage between terminal +BI and GND of skid control ECU.

OK:
Voltage: 10 – 14 V

NG → **Check and replace harness and connector.**

OK

3	Check input voltage of the steering angle sensor.



PREPARATION:

(a) Remove the steering wheel and column lower cover.
(b) Disconnect the steering angle sensor connector.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals 1 and 2, 2 and 6 of the steering angle sensor harness side connector.

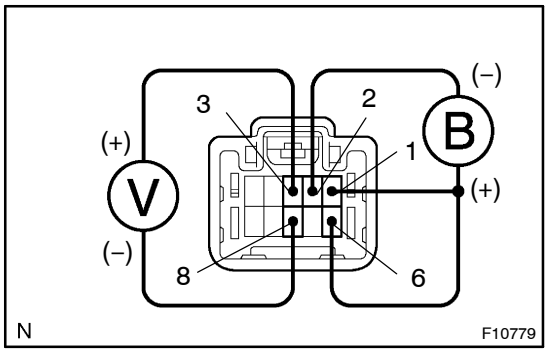
OK:

Voltage: 10 – 14 V

NG	Check and replace harness and connector.

OK

4	Check steering angle sensor.



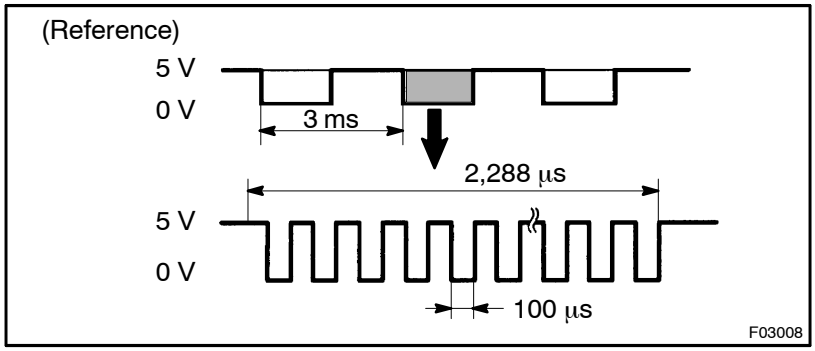
PREPARATION:

(a) Apply battery voltage between terminals 1 and 2, 2 and 6 of the steering angle sensor.
(b) Connect the oscilloscope to the terminals 3 and 8 of the steering angle sensor.

CHECK:

Turn the steering wheel slowly and check the signal waveform.

OK:



HINT:

The above signal wave form does not repeat ON and OFF regularly and this ON–OFF interval changes case by case according to the data.

NG → Replace steering angle sensor.

OK

Check and replace skid control ECU.

5	Check DTC for ABS.

NG → Check and replace skid control ECU.

OK

No problem.

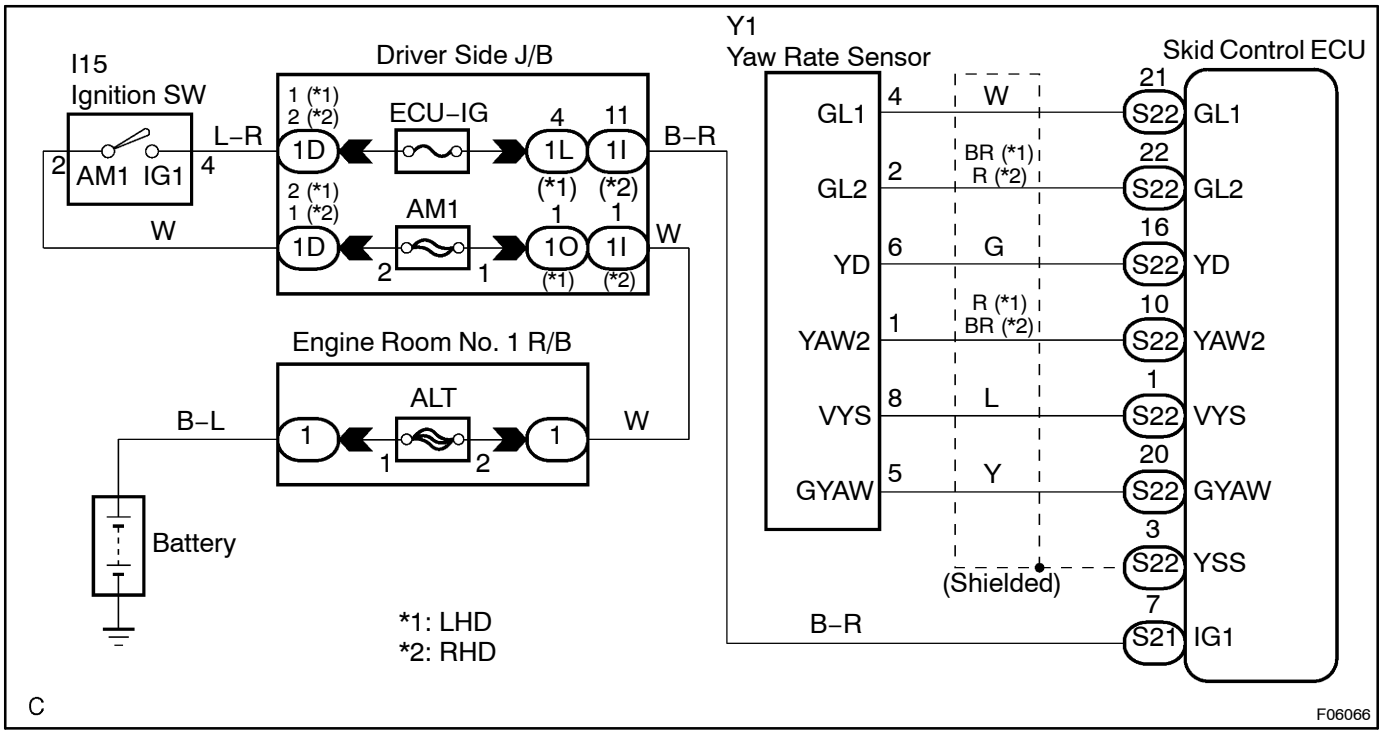
DI8DW–03

DTC	C1233 / 33, C1234 / 34	Yaw Rate Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1233 / 33	Detection of any of conditions 1. through 4.: 1. When the ECU IG1 terminal voltage is 9.5 to 17.2 V, the yaw rate sensor voltage is out of the range from 0.25 to 4.75 V for 1 sec. or more. 2. The yaw rate sensor open circuit detect signal is ON for 1 sec. or more. 3. The yaw rate sensor power source voltage is out of the range from 4.4 to 5.6 V for 1 sec. or more. 4. Momentary open circuit of the yaw rate sensor signal occurs 10 times or more.	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34	When the yaw rate sensor VYS terminal voltage is 4.4 to 5.6 V, YD malfunction signal of the yaw rate sensor is ON for 5 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Perform zero point calibration of the yaw rate sensor (See page DI–318).

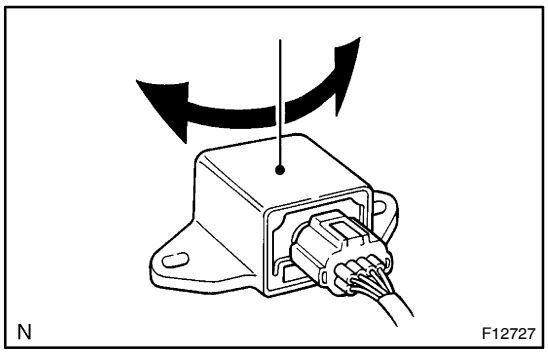
2	Is DTC still output?

Check DTC on page DI–318.

NO → No problem.

YES

3	Check output value of the yaw rate sensor.



In case of using the hand–held tester:

PREPARATION:

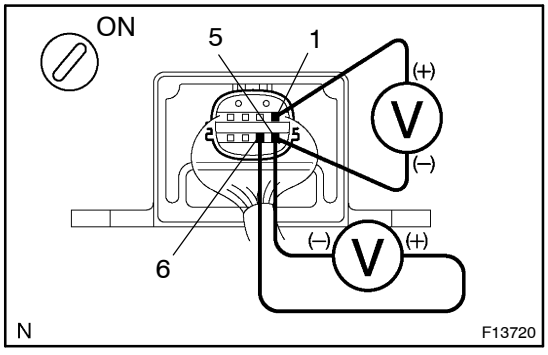
(a) Remove the consol box.
(b) Remove the 2 nuts and the yaw rate sensor with the connector still connected to it.
(c) Connect the hand–held tester to the DLC3.
(d) Turn the ignition switch ON and push the hand–held tester main switch ON.
(e) Select the DATALIST mode on the hand–held tester.

CHECK:

Check that the yaw rate value of the yaw rate sensor observed in the hand–held tester is changing: Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

OK:

Yaw rate value must be changing.
(Reference)
When the yaw rate sensor is stationary
output value: ± 4 deg/s



In case of not using the hand–held tester:

PREPARATION:

(a) Remove the consol box then remove the yaw rate sensor with the connector still connected to it.
(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals YAW (1) – GYAW (5), and terminals YD (6) – GYAW (5) of the yaw rate sensor.

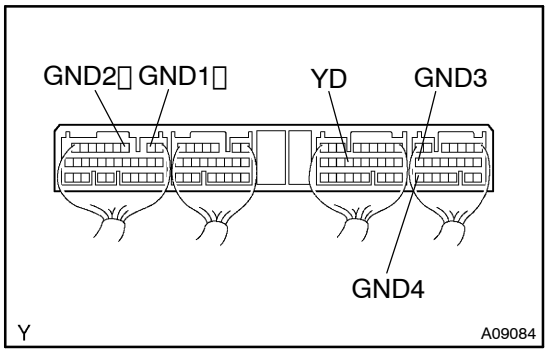
OK:

Terminals 1 and 5 (YAW – GYAW)	About 2.42 – 2.58 V
Terminals 6 and 5 (YD – GYAW)	About 4.5 V – 5.3 V

NG → **Replace yaw rate sensor.**

OK

4 **Check voltage between terminals YD and GND of skid control ECU.**



PREPARATION:

Remove the skid control ECU with the connector still connected to it.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals YD and GND of skid control ECU.

OK:

Voltage: 4.5 – 5.3 V

OK → **Check and replace skid control ECU.**

NG

5 **Check for open and short circuit in harness and connector between yaw rate sensor and skid contorl ECU (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

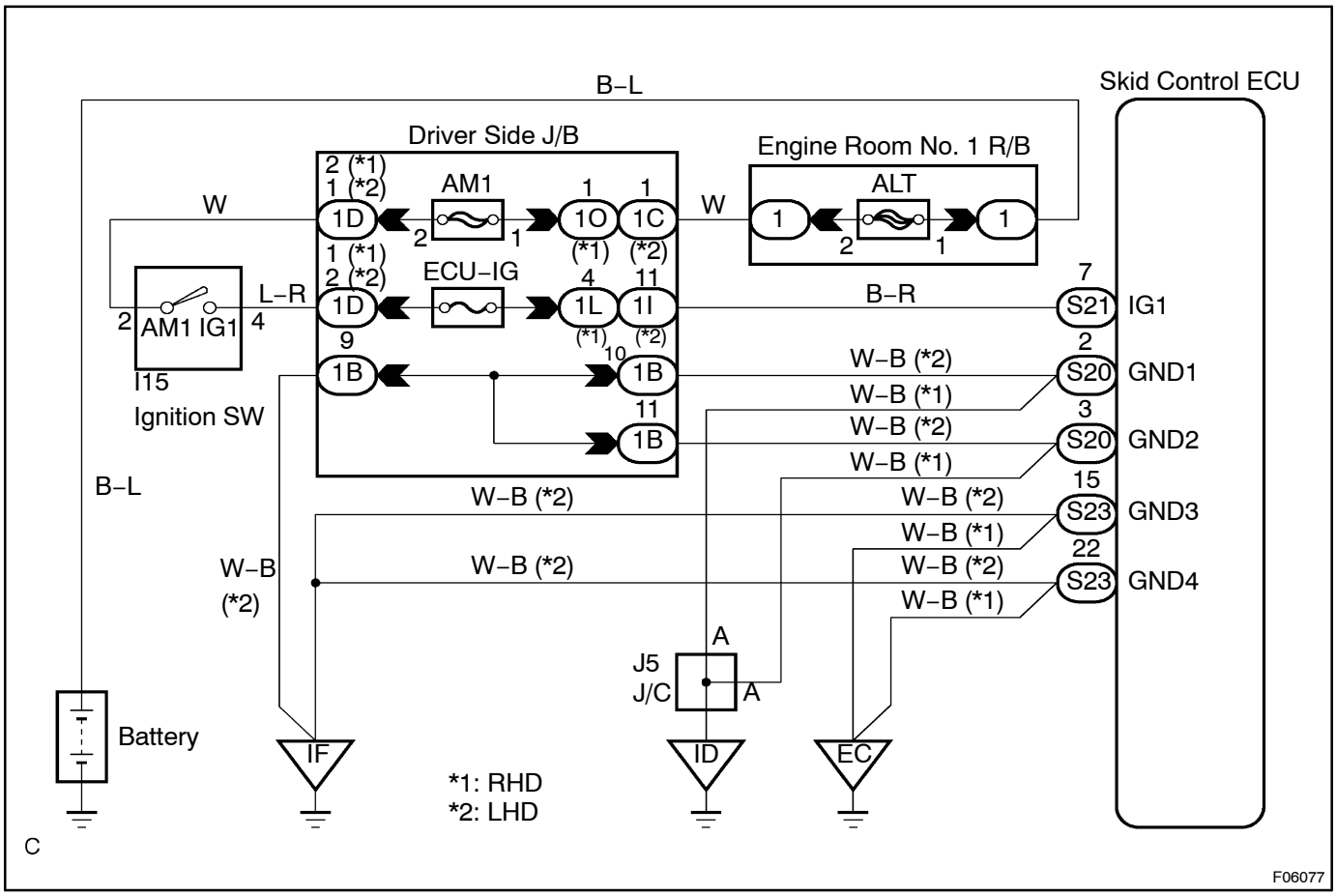
DI9IG–01

DTC	C1241 / 41	IG Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any of conditions 1. through 2.: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains at below 9.5 V for more than 10 sec. 2. While the condition that the solenoid relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the solenoid relay is OFF continues for 0.2 sec. or more.	• Battery • Charging system • Power source circuit • Skid Control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**

PREPARATION:
Remove ECU–IG fuse from driver side J/B.
CHECK:
Check continuity of ECU–IG fuse.
OK:
Continuity

NG → **Check for short circuit in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

2	**Check battery voltage.**

OK:
Voltage: 10 – 14 V

NG → **Check and repair the charging system (See page 1G–FE: CH–1 of Pub. No. RM684E, 2JZ–GE: CH–1).**

OK

3	**Check voltage of the ECU IG power souce.**

In case of using the hand–held tester.

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the DATALIST mode on the hand–held tester.

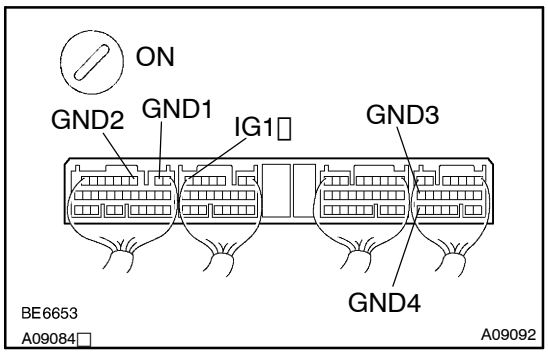
CHECK:

Check the voltage condition output from the ECU displayed by the hand–held tester.

OK:

"Normal" is displayed.

In case of not using the hand–held tester.



PREPARATION:

Remove the skid control ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals IG1 and GND of skid control ECU.

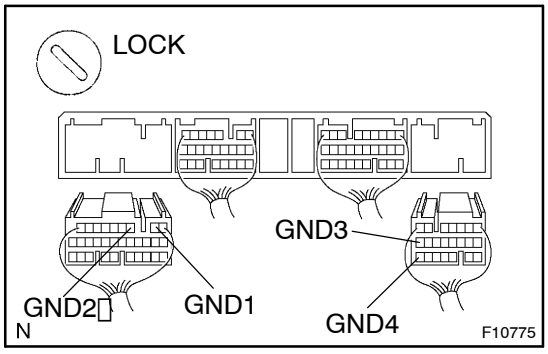
OK:

Voltage: 10 – 14 V

OK	**Ignition switch OFF, check and replace skid control ECU.**

NG

4	**Check continuity between terminal GND of skid control ECU connector and body ground.**



CHECK:

(a) Disconnect the 2 connector from the skid control ECU.

(b) Measure resistance between terminal GND of skid control ECU connector and body ground.

OK:

Resistance: 1 Ω or less

NG	**Repair or replace harness or connector.**

OK

Check for open circuit in harness and connector between skid control ECU and battery (See page IN–34).

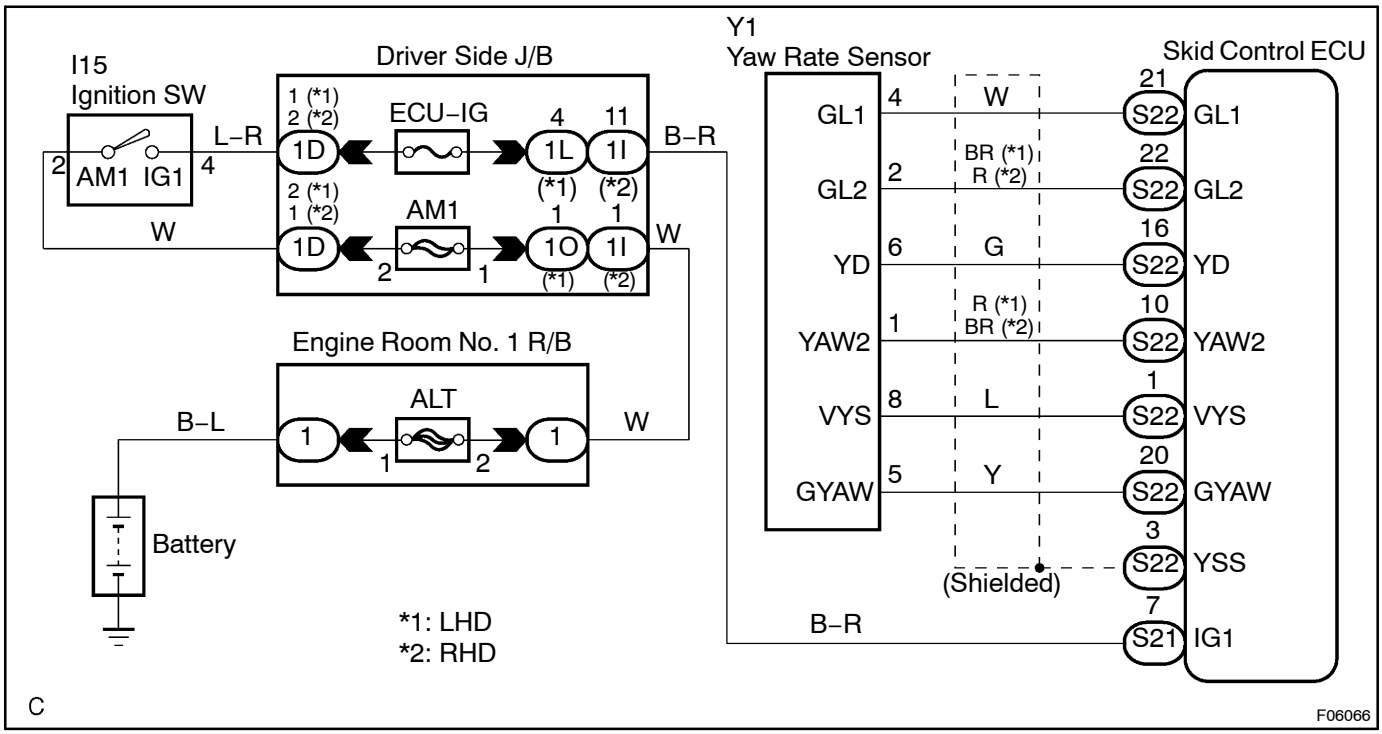
DI8DX–03

DTC	C1243 / 43 – C1245 / 45	Malfunction in Deceleration Sensor

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1243 / 43	While vehicle speed becomes 0 km/h (0 mph) from 30 km/h (18 mph) or more, the condition that both GL1 and GL2 signals of ECU terminals do not change 10 mV or more occurs 16 times continuously.	• Deceleration sensor • Wire harness for deceleration sensor system
C1245 / 45	At the vehicle speed of 30 km/h (18 mph), the acceleration and deceleration values calculated from the deceleration sensor values and from vehicle speed are different, and the condition that the difference exceeds 0.35 G continues for 60 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
After step 1 and 2, go to step 3 in case of using the hand–held tester, and go to step 5 in case of not using the hand–held tester.

1	**Perform zero point calibration of the Deceleration sensor (See page DI–318).**

2	**Is DTC still output?**

Check DTC on page DI–318.

NO → **No problem.**

YES

3	**Check output value of the deceleration sensor.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:

Check that the deceleration value of the deceleration sensor observed in the hand–held tester is changing when the vehicle is tilted.

OK:

Deceleration value must be changing.

OK → **Go to step 5.**

NG

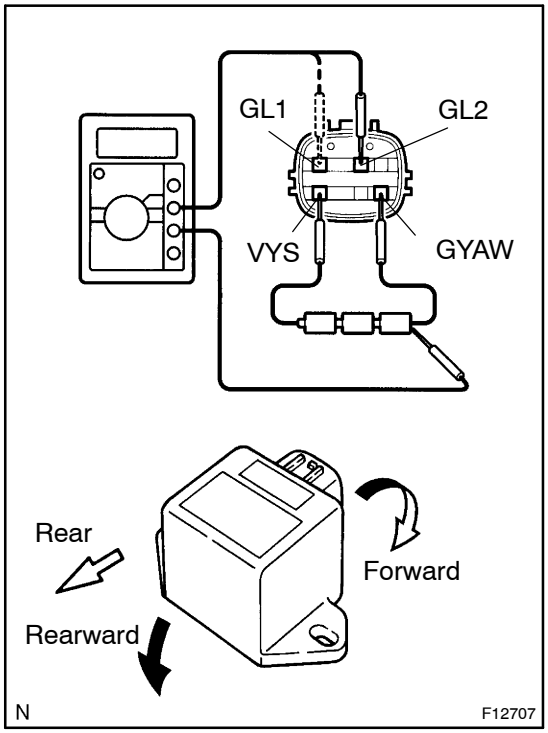
4	Check for open or short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK

Replace deceleration sensor.

5	Check deceleration sensor.



PREPARATION:

(a) Remove the consol box.

(b) Connect 3 dry batteries of 1.5 V in series.

(c) Connect VYS terminal to the batteries' positive (+) terminal, and GYAW terminal to the batteries' negative (–) terminal. Apply about 4.5 V between VYS and GYAW terminals.

NOTICE:

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

CHECK:

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

OK:

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean rearward	0.4 V – about 2.3 V
GL1	Lean forrward	About 2.3 V – 4.1 V
GL2	Horizontal	About 2.3 V
GL2	Lean rearward	About 2.3 V – 4.1 V
GL2	Lean forward	0.4 V – about 2.3 V

HINT:

- If the sensor is tilted too much it may show the wrong value.
- If dropped, the sensor should be replaced with a new one.
- The sensor removed from the vehicle should not be placed upside down.

NG → Replace deceleration sensor.

OK

6	Check for open or short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK →

Check and replace skid control ECU.

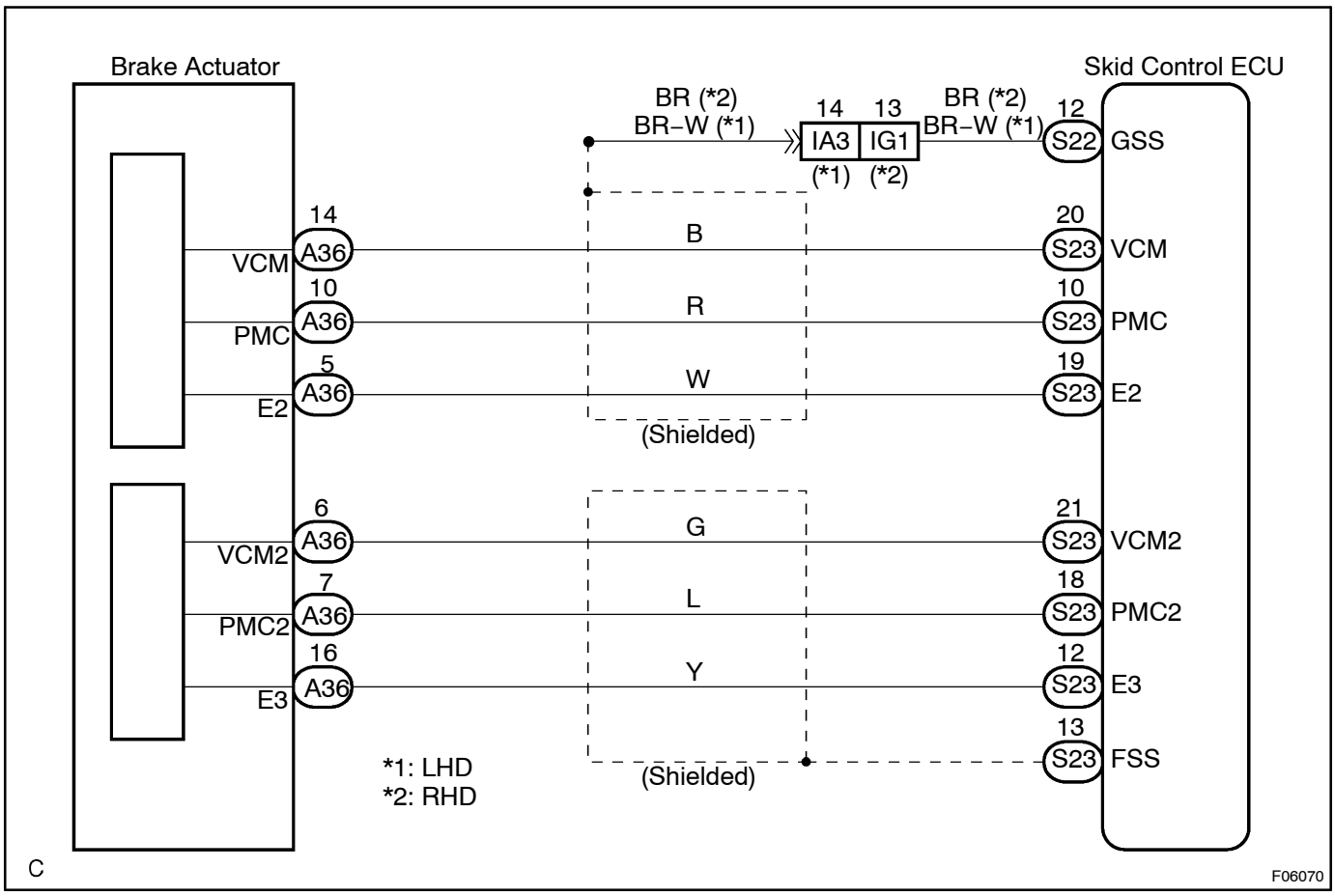
DTC	C1246 / 46	Master Cylinder Pressure Sensor Circuit

DTC	C1360 / 61	Malfunction in comparative master cylinder pressure sensor

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	Detection of any of conditions 1. through 5.: 1. When the vehicle speed is 7 km/h (4 mph) or more and ECU PMC terminal voltage exceeds 0.86 V, the condition that the voltage does not change 0.005 V or more continues for 30 sec. 2. Noise in ECU PMC terminal occurs 7 times or more in 5 sec. 3. When the ECU STP terminal is OFF, the condition that ECU PMC terminal voltage is 0.86 V or more, or less than 0.3 V continues for 5 sec. or more. 4. When IG1 terminal voltage is 9.5 to 17.2 V, the condition that ECU VCM terminal voltage is out of the range from 4.4 to 5.6 V continues for 1.2 sec. or more. 5. When ECU VCM terminal voltage is 4.4 to 5.6 V, the condition that the ECU PMC terminal voltage is out of the range from 0.14 to 4.85 V continues for 1.2 sec. or more.	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C1360 / 61	Condition that the vehicle is driving 5 km/h (3 mph) or more and that the difference between terminal PMC and PMC2 voltage becomes at least 0.37 V continues for 1.2 sec. or more.	
	Condition that VCM terminal voltage is 4.4 – 5.6 V and that PMC terminal voltage is out of the range of 0.14 – 4.85 V continues for more than 1.2 sec.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check output value of the master cylinder pressure sensor.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.

(c) Select the DATALIST mode on the hand–held tester.

CHECK:

Check that the brake fluid pressure value of the master cylinder pressure sensor observed in the hand–held tester is changing when the brake pedal is being depressed.

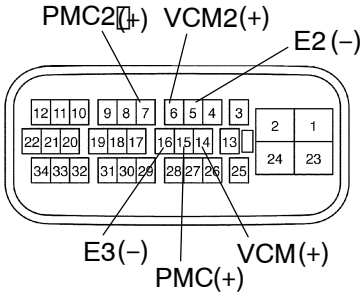
OK:

Brake fluid pressure value must be changing.

OK	**Go to step 4.**

NG

2	Check master cylinder pressure sensor.



PREPARATION:

Install LSPV gauge to the front caliper bleeder plug portion, and bleed air from LSPV gauge.

SST 09709–29018

CHECK:

Start the engine and depress the brake pedal, then check how the fluid pressure affects voltage of PMC and E2, PMC2 and E3 terminals of the master cylinder pressure sensor with the connector still connected to it.

OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 kgf/cm², 0 psi)	0.37 – 0.63 V
5,883 kPa (60 kgf/cm², 853 psi)	1.57 – 1.83 V
11,768 kPa (120 kgf/cm², 1,706 psi)	2.77 – 3.03 V

HINT:

Voltage of between terminals VCM and E2, VCM2 and E3: 4.7 – 5.3 V

NG → **Replace brake actuator.**

OK

3	Check for open and short circuit in harness and connector between each master cylinder pressure sensor and skid control ECU (See page IN–34).

NG → **Repair or replace harness or connector.**

OK

4	**Check whether or not the ECU terminal STP input voltage is changes when the stop light switch is turned on and off.**

NO → **Check stop light switch circuit.**

YES

Check and replace skid control ECU.

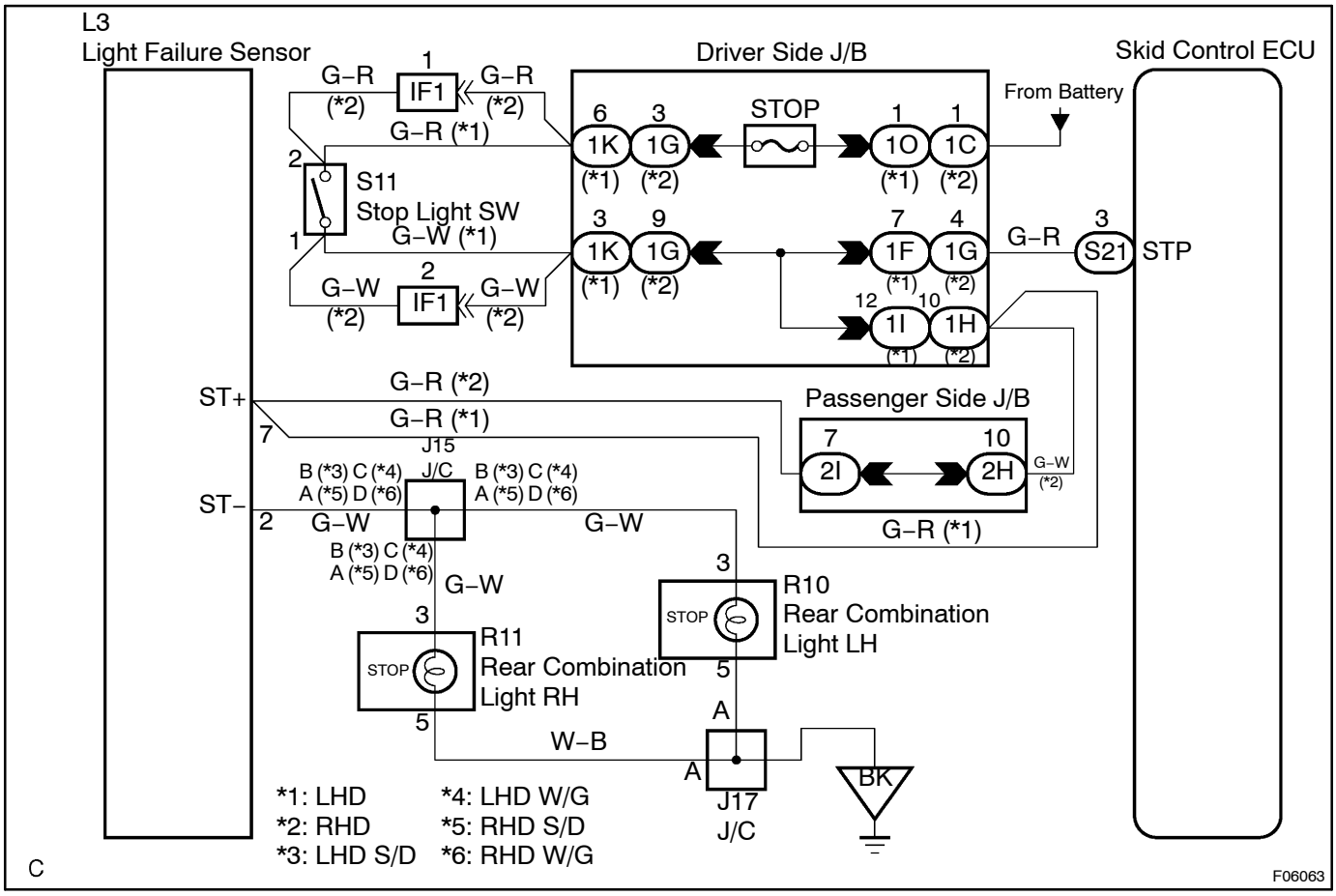
DI0WX–17

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non–operation, the open circuit of stop light switch circuit continues for 0.3 sec. or more.	• Stop light switch • Stop light switch circuit • Skid Control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of the stop light switch.**

CHECK:
Check that the stop light lights up when brake pedal is depressed and turns off when the brake pedal is released.

OK → **Go to step 3.**

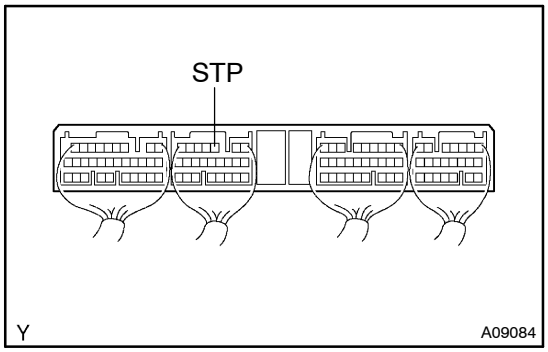
NG

2	**Check stop light circuit.**

NG → **Repair or replace stop light circuit.**

OK

3	**Check voltage between terminal STP of skid control ECU and body ground.**



PREPARATION:
Remove skid control ECU with connectors still connected.
CHECK:
Measure voltage between terminal STP of skid control ECU and body ground when brake pedal is depressed.
OK:
Voltage: 8 – 14 V

OK → **Check and replace skid control ECU.**

NG

4	Check for open circuit in harness and connector between skid control ECU and stop light switch (See page IN–34).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–335).

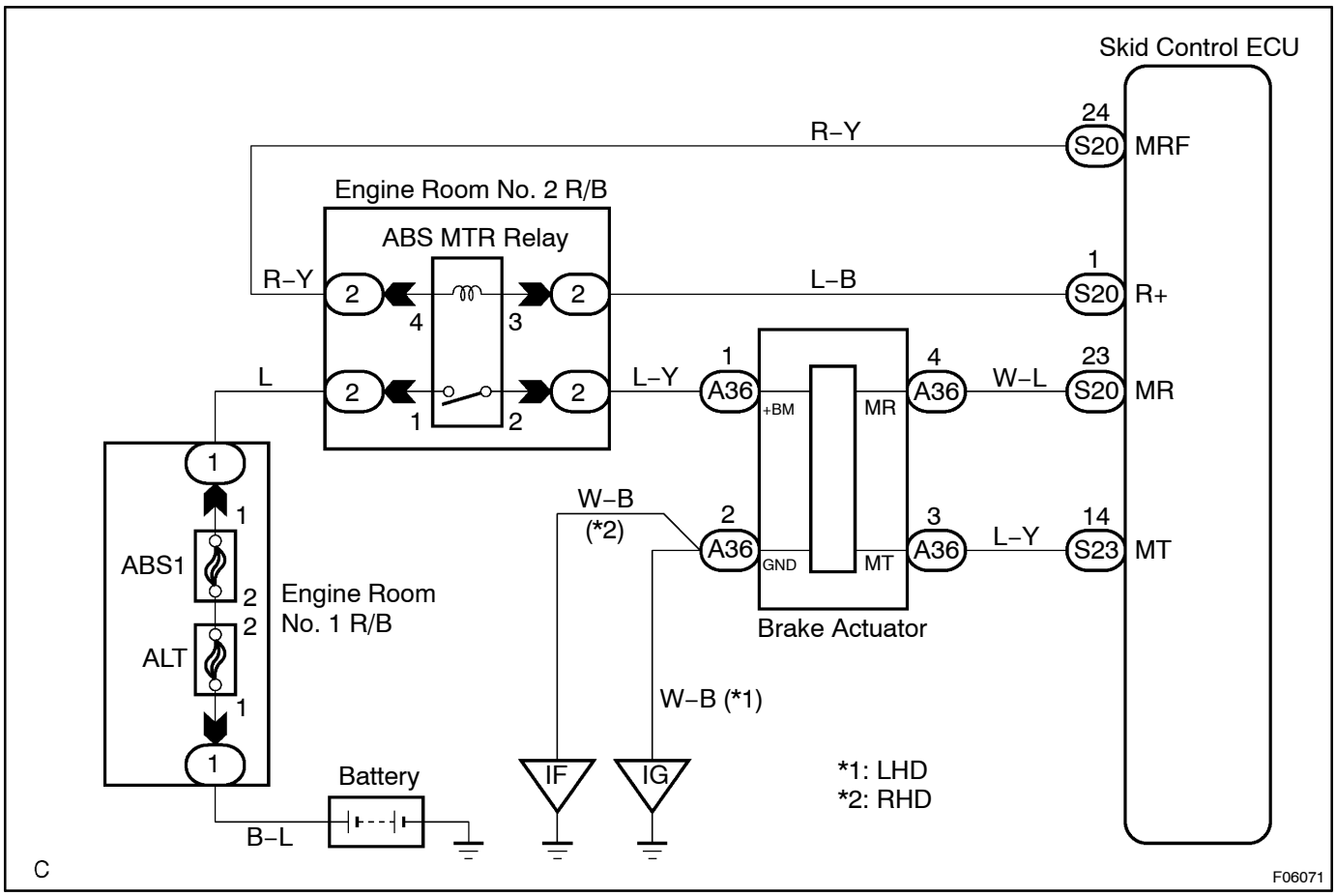
DI9IH–01

DTC	C1251 / 51	ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the following 1. or 2. is detected: 1. Actuator drive motor is not operating normally. 2. Open circuit condition of actuator drive motor continues for 2 sec. or more.	• Brake Actuator • Brake Actuator Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.

1	**Check ABS motor operation.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check the operation sound of the ABS motor when operating it with the hand–held tester.

OK:

The operation sound of the ABS motor should be heard.

NG → **Replace brake actuator.**

OK ↓

2	**Is there DTC C1251/51 being output again?**

YES → **Check and replace skid control ECU (See page IN–30).**

NO ↓

No problem.

DI8E1–03

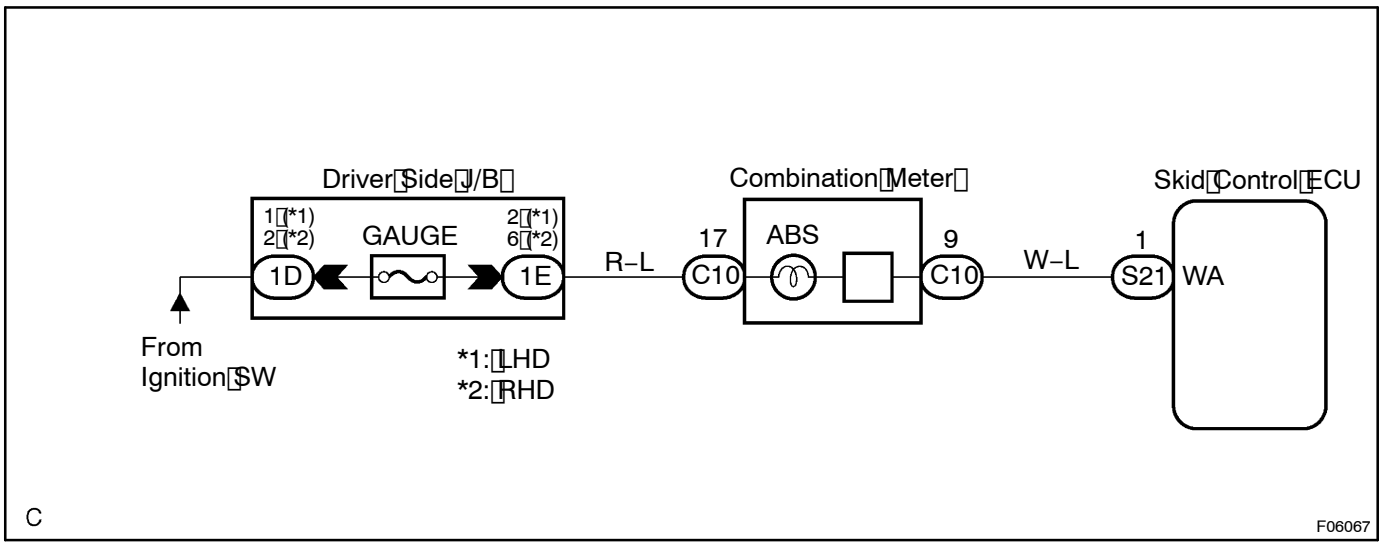
DTC	Always ON	Malfunction in ECU ABS Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Malfunction in skid control ECU	• Power source circuit • ABS warming light circuit • Multiplex communication circuit • Skid control ECU

HINT:
In some cases the hand–held tester cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC output?

Check DTC on page DI–318.

YES → Repair circuit indicated by the code output.

NO

2	**Check that the skid control ECU connectors are securely connected to the skid control ECU.**

NO → **Connect the connector to the skid control ECU.**

YES

3	**Check voltage of the ECU IG power source.**

In case of using the hand–held tester:

PREPARATION:

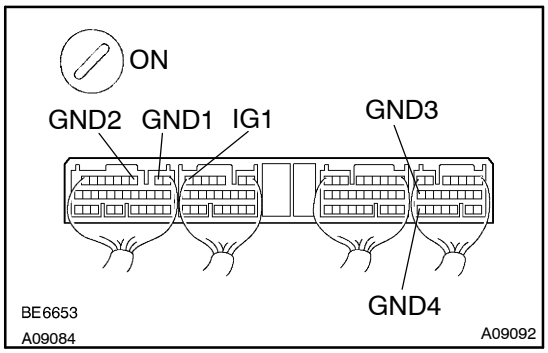
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the DATALIST mode on the hand–held tester.

CHECK:

Check the voltage condition output from the ECU observed in the hand–held tester.

OK:

"Normal" is displayed.



In case of not using the hand–held tester:

PREPARATION:

Remove the skid control ECU with the connectors still connected to it.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between the terminals IG1 and GND of the skid control ECU.

OK:

Voltage: 10 – 14 V

OK → **Check and replace skid control ECU.**

NG

4	**Check battery voltage.**

CHECK:

Check the battery voltage.

OK:

Voltage: 10 – 14 V

NG → Check and repair the charging system.

OK

5	Check for open and short circuit in harness and connector between terminals Tc of DLC3 to skid control ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK

6	Check operation of the ABS warning light.

In case of using the hand–held tester:

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that ”ON” and ”OFF” of the ABS warning light can be shown on the combination meter by the hand–held tester.

In case of not using the hand–held tester:

PREPARATION:

(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the skid control ECU.
(c) Turn the ignition switch ON.

CHECK:

Check that the ABS warning light lights up.

OK → Check and replace skid control ECU.

NG

7	Check for short circuit in harness and connector between skid control ECU and combination meter (See page IN–34).

NG → Repair or replace harness or connector.

OK

Repair or replace combination meter.

DI9II–01

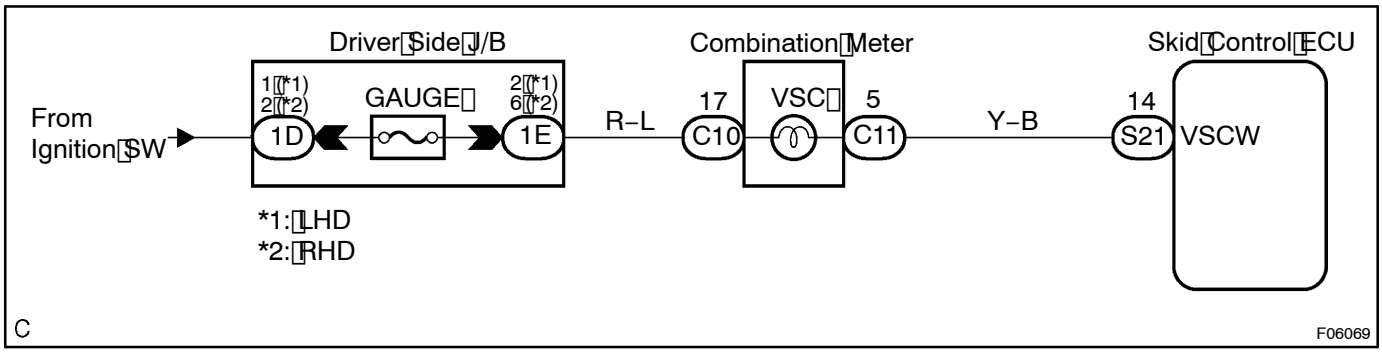
DTC	Always ON	Malfunction in ECU VSC Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	There is a malfunction in the ECU internal circuit.	• Power source circuit • VSC warning light circuit • Skid control ECU

HINT:
If fail safe function is activated in VSC system, "TRC OFF" indicator light lights up.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC output for VSC?

Check DTC on page DI–318.

YES	Repair circuit indicated by the output code.

NO

2	Is normal code displayed?

YES → Check for short circuit in harness and connector between engine & ECT ECU and DLC3 (See page IN–34).

NO

3	Does VSC warning light go off?

YES → Check for open or short circuit in harness and connector between ECU–IG fuse and ECU (See page IN–34).

NO

4	Check battery voltage.

PREPARATION:

Start the engine.

CHECK:

Check the battery voltage.

OK:

Voltage: 10 – 16 V

NG → Check and repair the charging system.

OK

5	**Check operation of the VSC warning light.**

In case of using the hand–held tester.

PREPARATION:

(a) Connect the hand–held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand–held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that "ON" and "OFF" of the VSC warning light can be shown on the combination meter with the hand–held tester.

In case of not using the hand–held tester.

PREPARATION:

(a) Turn the ignition switch OFF.

(b) Disconnect the connector from the skid control ECU.

(c) Turn the ignition switch ON.

CHECK:

Check the VSC warning light goes off.

OK → **Check and replace skid control ECU.**

NG

Check for short circuit in harness and connector between combination meter and skid control ECU, combination meter and DLC3 (See page IN–34).

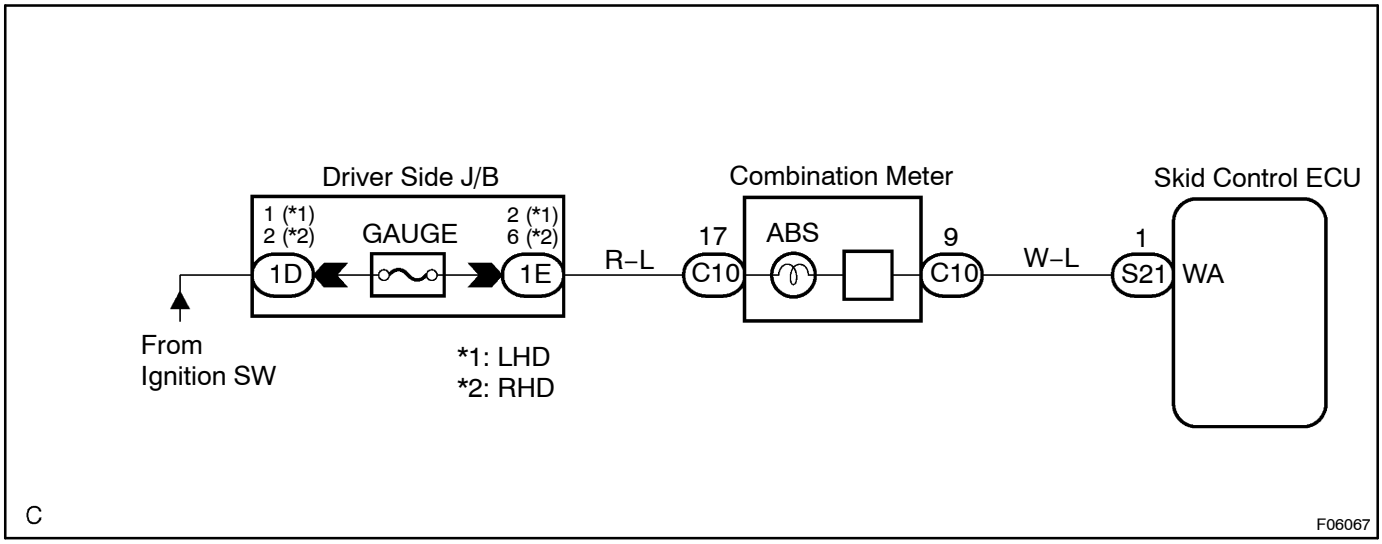
DI9IJ–01

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects a trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.
Connect terminals Tc and CG of the DLC3 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Troubleshooting in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	*1
ABS warning light remains on	*2

*1: Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using hand–held tester.
*2: After inspection with step 3, start the inspection from step 4 in case of using the hand–held tester and start from step 5 in case of not using hand–held tester.

1	**Check operation of the ABS warning light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that ”ON” and ”OFF” of the ABS warning light can be shown on the combination meter by the hand–held tester.
HINT:
ABS warning light turns ”OFF” automatically 2 sec. after is turned ”ON”.

OK → Check and replace skid control ECU.

NG

2	Check ABS warning light.

See combination meter troubleshooting.

NG → Repair bulb or combination meter assembly.

OK

Repair or replace and check for open circuit in harness and connector between combination meter and skid control ECU (See page IN–34).

3	Check that the skid control ECU connectors are securely connected to the skid control ECU.

NO → Connect the connector to the skid control ECU.

YES

4	Check operation of the ABS warning light (See step 1).

OK → Check and replace skid control ECU.

NG

5	**Is DTC output?**

Check DTC on page DI–318.

YES → **Repair circuit indicated by the output code.**

NO

Check for short circuit in harness and connector between check connector and ABS solenoid relay (See page IN–34).

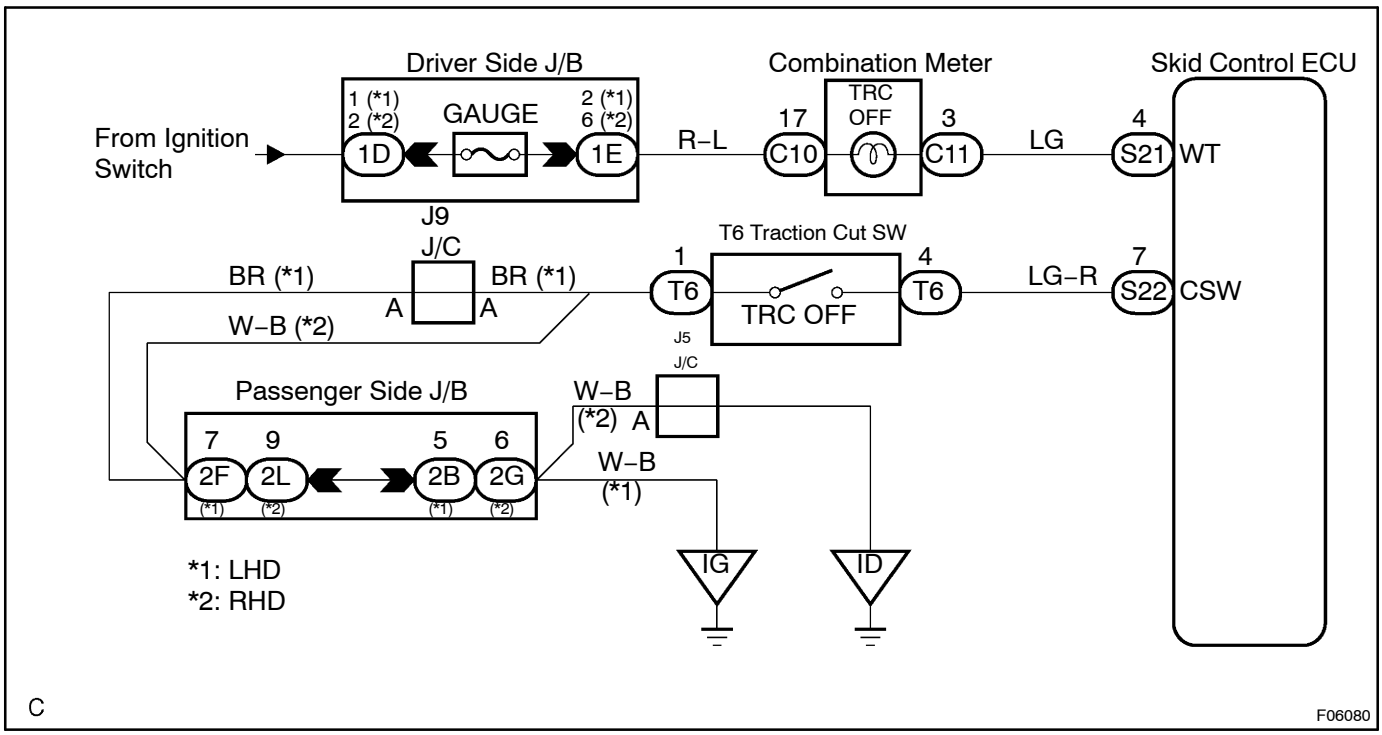
DI559–08

TRC OFF Indicator, TRC Cut Switch Circuit

CIRCUIT DESCRIPTION

This is the TRC control main switch. When the TRC cut switch is pushed on, TRC control goes off and the TRC OFF indicator lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the TRC OFF indicator light.**

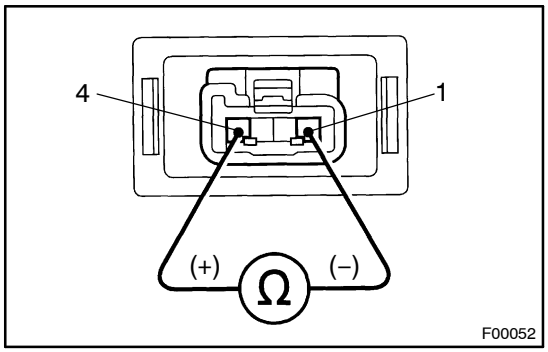
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:
Check that ”ON” and ”OFF” of the TRC OFF indicator light can be shown on the combination meter by the hand–held tester.

NG → **Go to step 4.**

OK

2	**Check TRC OFF switch.**



PREPARATION:
Remove the TRC OFF switch and disconnect the connector from the TRC OFF switch.

CHECK:
Measure resistance between terminals 1 and 4 TRC OFF switch when TRC OFF switch is on and off.

OK:

TRC OFF switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG → **Replace TRC OFF switch.**

OK

3	Check for open and short circuit in harness and connector between terminal CSW of skid control ECU and TRC OFF switch and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

4	Check TRC OFF indicator light.

See combination meter troubleshooting.

NG → Repair bulb or combination meter assembly.

OK

5	Check for open and short circuit in harness and connector between terminal WT of skid control ECU and TRC OFF indicator light (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

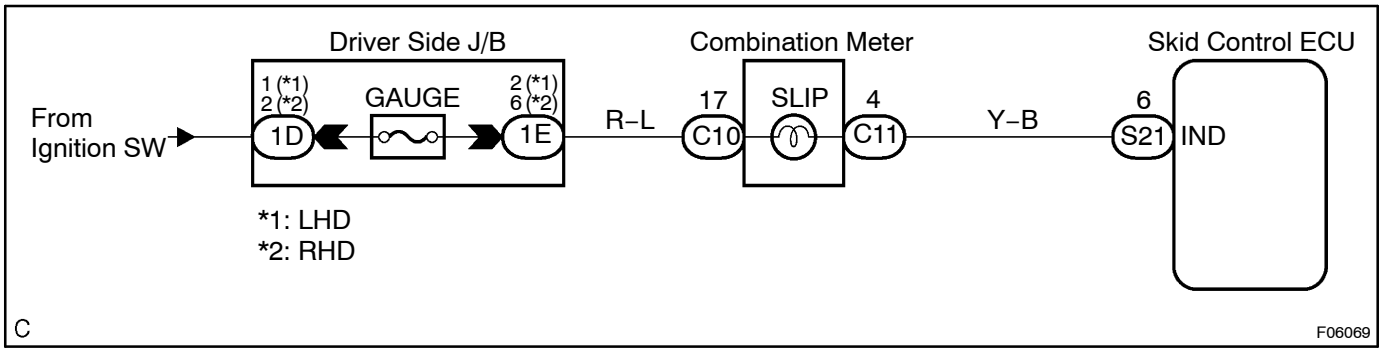
DI55A–05

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the SLIP indicator light.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that ”ON” and ”OFF” of the SLIP indicator light can be shown on the combination meter by the hand–held tester.

OK → **Go to step 4.**

NG

2	**Check that the SLIP indicator light is ON for 3 seconds soon after ignition switch is turned ON.**

OK → **Check and replace skid control ECU.**

NG

3	**Check SLIP indicator light.**

See combination meter troubleshooting.

NG → **Repair bulb or combination meter assembly.**

OK

4	**Check for open and short circuit in harness and connector between skid control ECU and SLIP indicator light (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

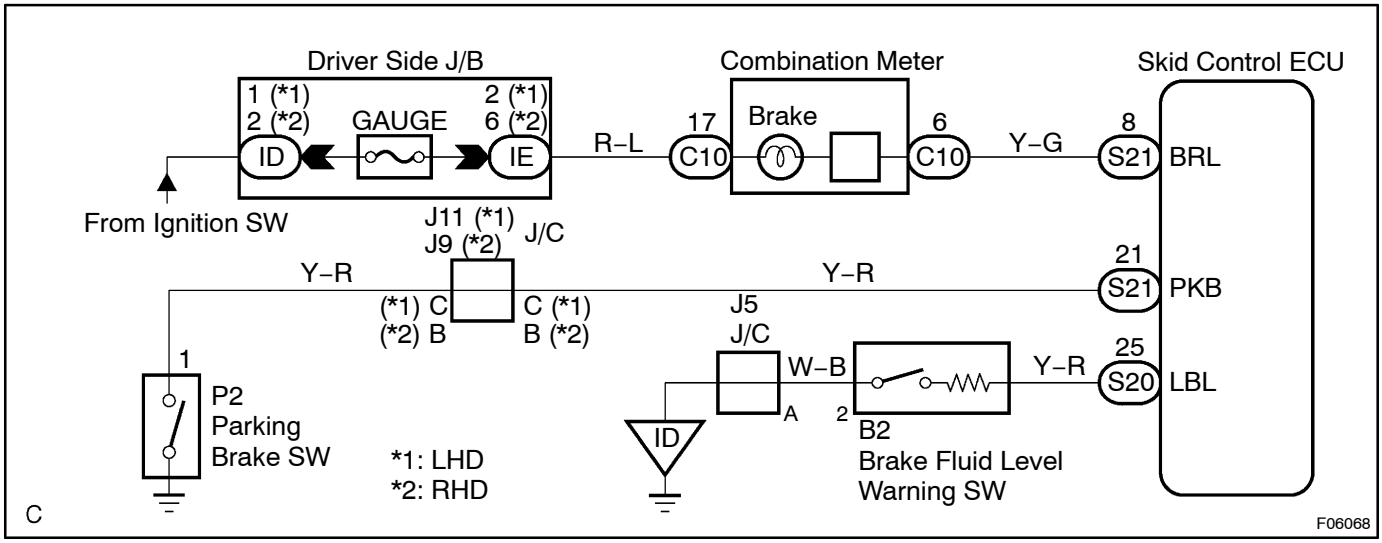
DI6QP–10

BRAKE Warning Light Circuit

CIRCUIT DESCRIPTION

The brake warning light lights up when the brake fluid is insufficient, the parking brake is applied or the EBD is defective.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check parking brake switch circuit.**

NG → **Repair or replace parking brake switch circuit.**

OK

2	**Check brake fluid level warning switch circuit.**

NG → **Repair or replace brake fluid level warning switch circuit.**

OK

3	**Is DTC output for ABS?**

Check DTC on page DI–318.

YES → **Repair circuit indicated by the output code.**

NO

4	**Check the brake warning light.**

See combination meter troubleshooting.

NG → **Repair or replace combination meter.**

OK

Check and replace skid control ECU.

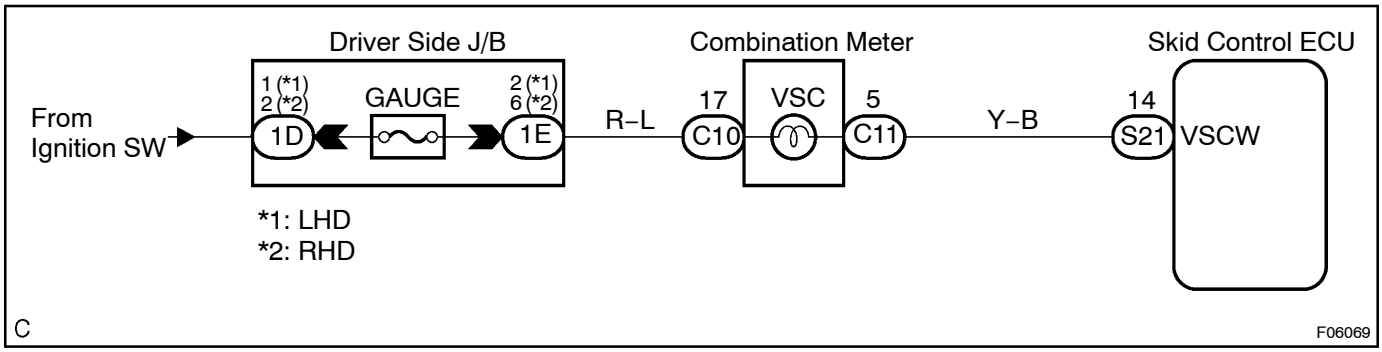
DI28M–06

VSC Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU stores DTC, the VSC warning light lights on the combination meter.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the VSC warning indicator.**

PREPARATION:

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check that ”ON” and ”OFF” of the VSC warning light can be shown on the combination meter with the hand–held tester.

OK → **Check and replace skid control ECU.**

NG

2	**Is DTC output for VSC?**

YES → **Repair circuit indicated by the output code.**

NO

3	Check for open and short circuit in harness and connector between skid control ECU and VSC warning light (See page IN–34).

NG → Repair or replace harness or connector.

OK

4	Check VSC warning light.

See combination meter troubleshooting.

NG → Repair or replace combination meter.

OK

Check and replace skid control ECU.

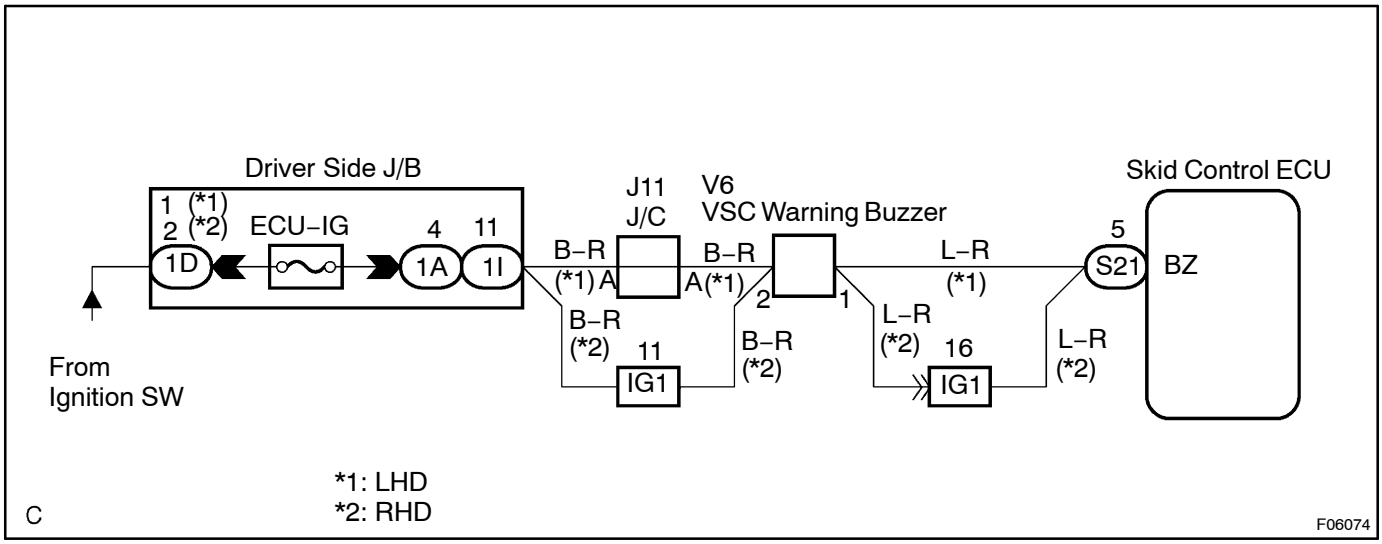
DI1HB–11

VSC Warning Buzzer Circuit

CIRCUIT DESCRIPTION

The VSC warning buzzer sounds during VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Start inspection from step 1 in case of using the hand–held tester and start from step 2 in case of not using the hand–held tester.

1	**Check operation of the VSC warning buzzer.**

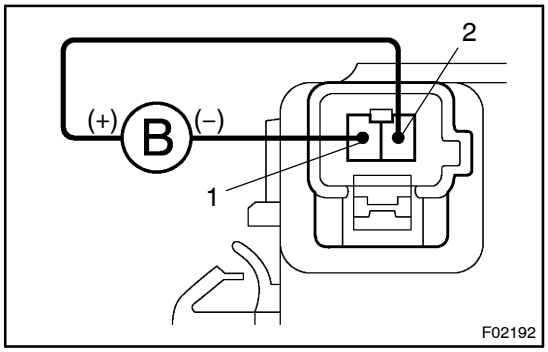
PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and turn the hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:
Check ”beep, beep” sound of the VSC warning buzzer by the hand–held tester.

OK → **Check and replace skid control ECU.**

NG

2	**Check VSC warning buzzer.**



PREPARATION:
Disconnect the VSC warning buzzer connector.

CHECK:
Apply battery voltage to the terminals 1 and 2 of VSC warning buzzer connector. Check that the VSC warning buzzer sound.

NG → **Replace the VSC warning buzzer.**

OK

3	Check for open and short circuit in harness and connector between skid control ECU and the VSC warning buzzer (See page IN–34).

NG → Repair or replace harness or connector.

OK →

Check and replace skid control ECU.

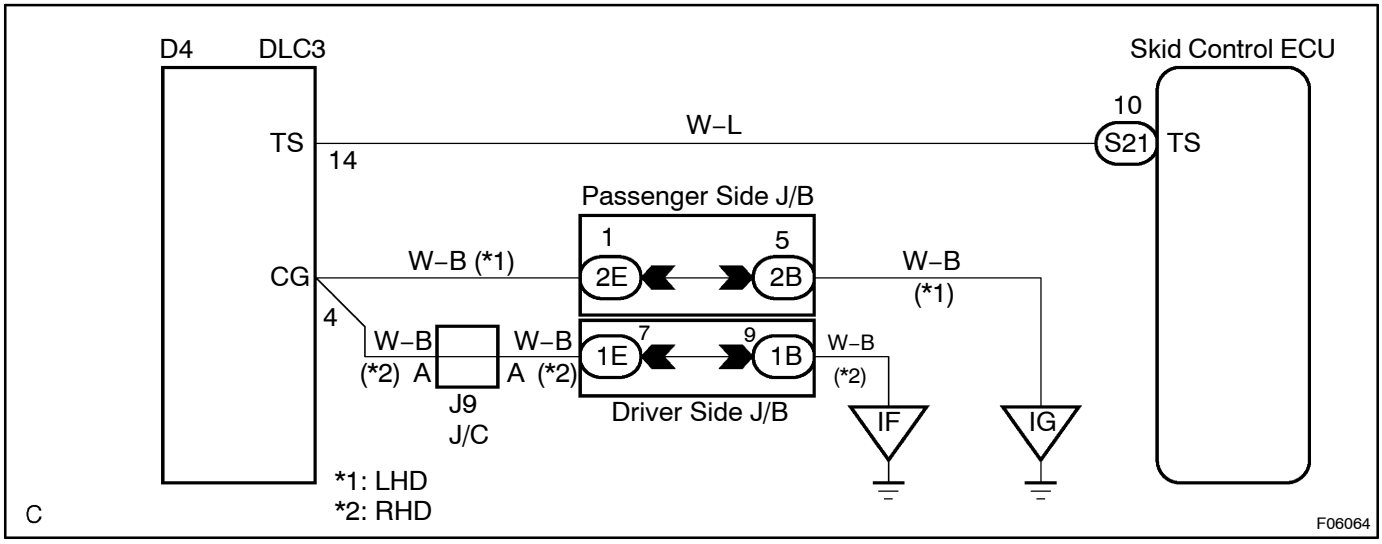
DI0CM–10

Ts Terminal Circuit

CIRCUIT DESCRIPTION

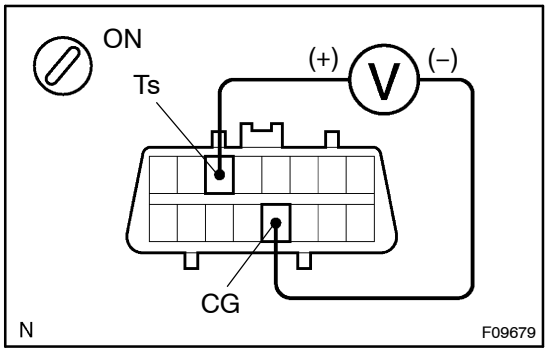
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check. Connecting terminals Ts and CG of the DLC3 starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals Ts and CG of DLC3.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and CG of DLC3.

OK:

Voltage: 10 – 14 V

OK	If ABS warning light does not blink even after Ts and CG have been connected, the ECU may be defective.

NG

2	Check for open and short circuit in harness and connector between skid control ECU and DLC3, DLC3 and body ground (See page IN–34).

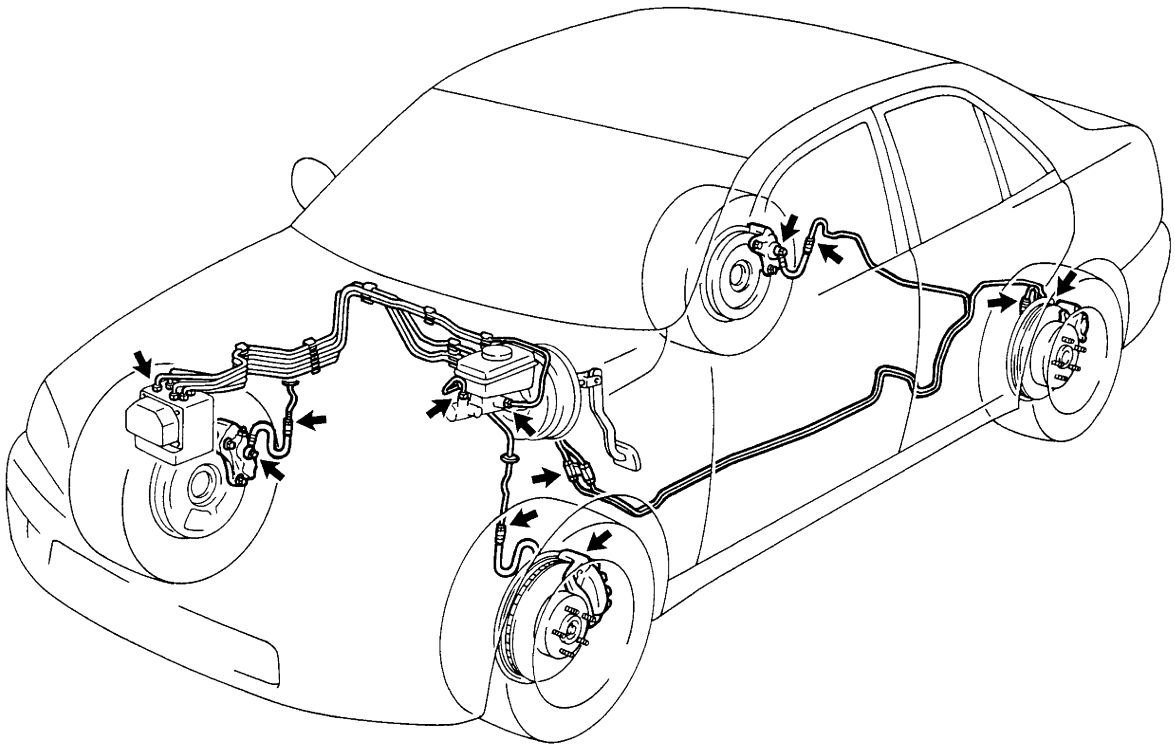
NG	Repair or replace harness or connector.

OK

Check and replace skid control ECU.

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



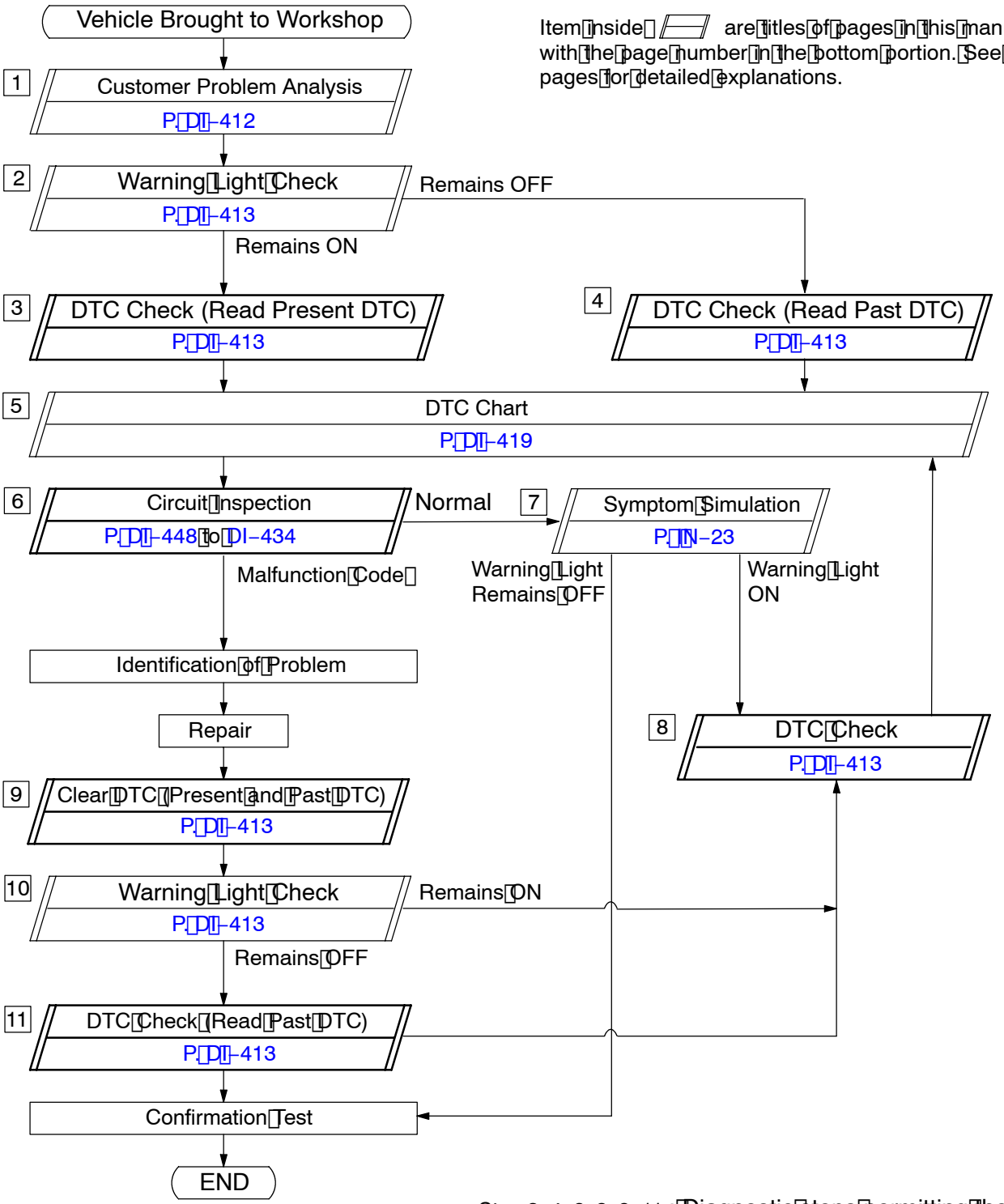
N

F12314

SUPPLEMENTAL RESTRAINT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI4Z2–05



Step 3, 4, 6, 8, 9, 11 : Diagnostic steps permitting the use of the hand–held tester.

DI15Z–12

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet

Inspector's Name _____

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	**km Miles**

Date Problem Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	**Approx.**

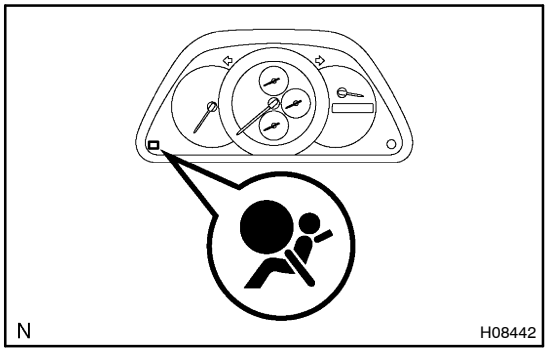
Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Conditions	
Details Of Problem	

Vehicle Inspection, Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	

Diagnosis System Inspection

SRS Warning Light Inspection	**1st Time**	☐ Remains ON ☐ Sometimes Light Up ☐ Does Not Light Up
	2nd Time	☐ Remains ON ☐ Sometimes Light Up ☐ Does Not Light Up
DTC Inspection	**1st Time**	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]

DI4L1–15



PRE–CHECK

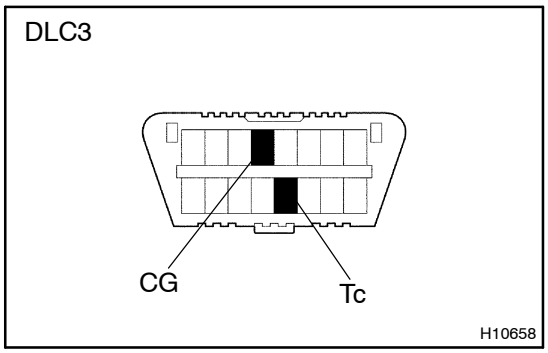
1. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to the ON position and check that the SRS warning light lights up.

(b) Check that the SRS warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ON and the SRS warning light remains on or flashes, the airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the SRS warning light sometimes lights up or the SRS warning light lights up even when the ignition switch is OFF, a short in the SRS warning light circuit can be considered likely. Proceed to "SRS warning light circuit malfunction" (See Pub. No. RM776E on page DI–43).



2. DTC CHECK (Using diagnosis check wire)

(a) Present troubles codes:
Output the DTC.
(1) Turn the ignition switch to the ON position and wait for approx. 20 seconds.
(2) Using SST, connect terminals Tc and CG of the DLC3.
SST 09843–18040

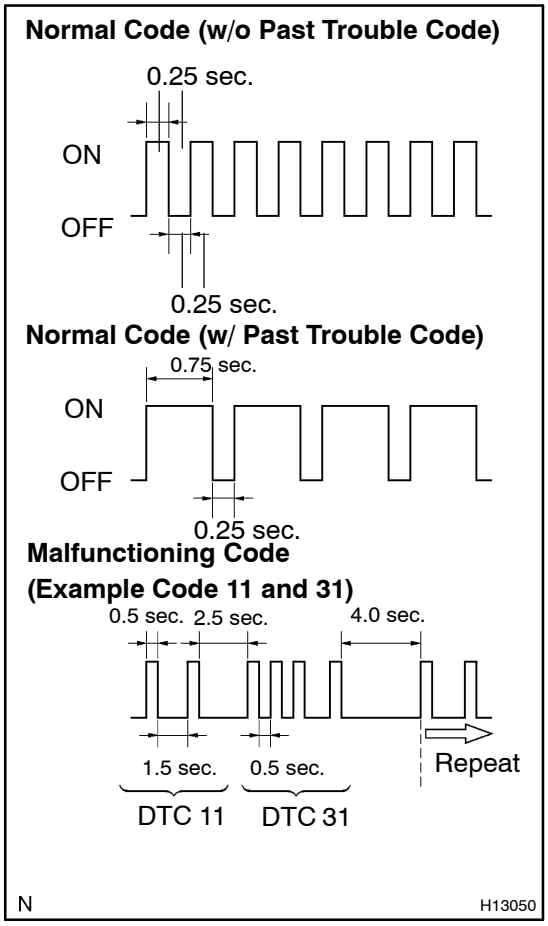
NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

(b) Past troubles codes:
Output the DTC.
(1) Using a service wire, connect Terminals Tc and CG of the DLC3.
SST 09843–18040
(2) Turn the ignition switch to the ON position and wait for approx. 20 seconds.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

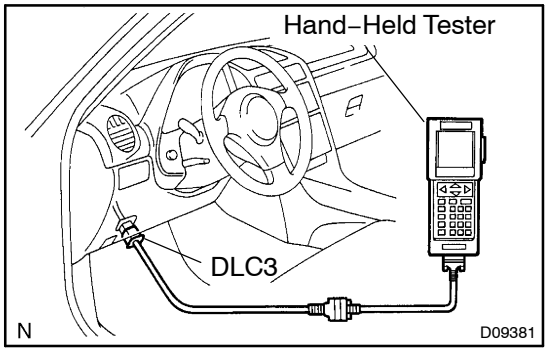


(c) Read the DTC.
Read the 2–digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.

- Normal code indication (w/o past trouble code)
  The light will blink 2 times per second.
- Normal code indication (w/ past trouble code)
  When the past troubles code is stored in the airbag sensor assy, the light blinks only ones a second.
- Malfunction code indication
  The first blinking output indicates the first digit of a 2–digit DTC. After a 1.5–second pause, the second blinking output will indicate the second digit.

If there are 2 or more codes, there will be a 2.5–second pause between each code. After all the codes have been output, there will be a 4.0–second pause and they will all be repeated.
HINT:

- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If a DTC is not output or a DTC is output without terminal connecting, proceed to "Tc terminal circuit" (See Pub. No. RM776E on page DI–48).



3. DTC CHECK (Using hand–held tester)

(a) Hook up the hand–held tester to the DLC3.
(b) Read the DTCs by following the prompts on the tester screen.

HINT:
Please refer to the hand–held tester operator's manual for further details.

4. DTC CLEARANCE (Not using diagnosis check wire)

When the ignition switch is turned off, the diagnostic trouble code is cleared.
HINT:
DTC might not be cleared by turning the ignition switch OFF. In this case, proceed to the next step.

5. DTC CLEARANCE (Using diagnosis check wire)

(a) Using SST, connect the terminals Tc and CG of the DLC3.
SST 09843–18040
(b) Turn the ignition switch to ON and wait for approx. 6 seconds.

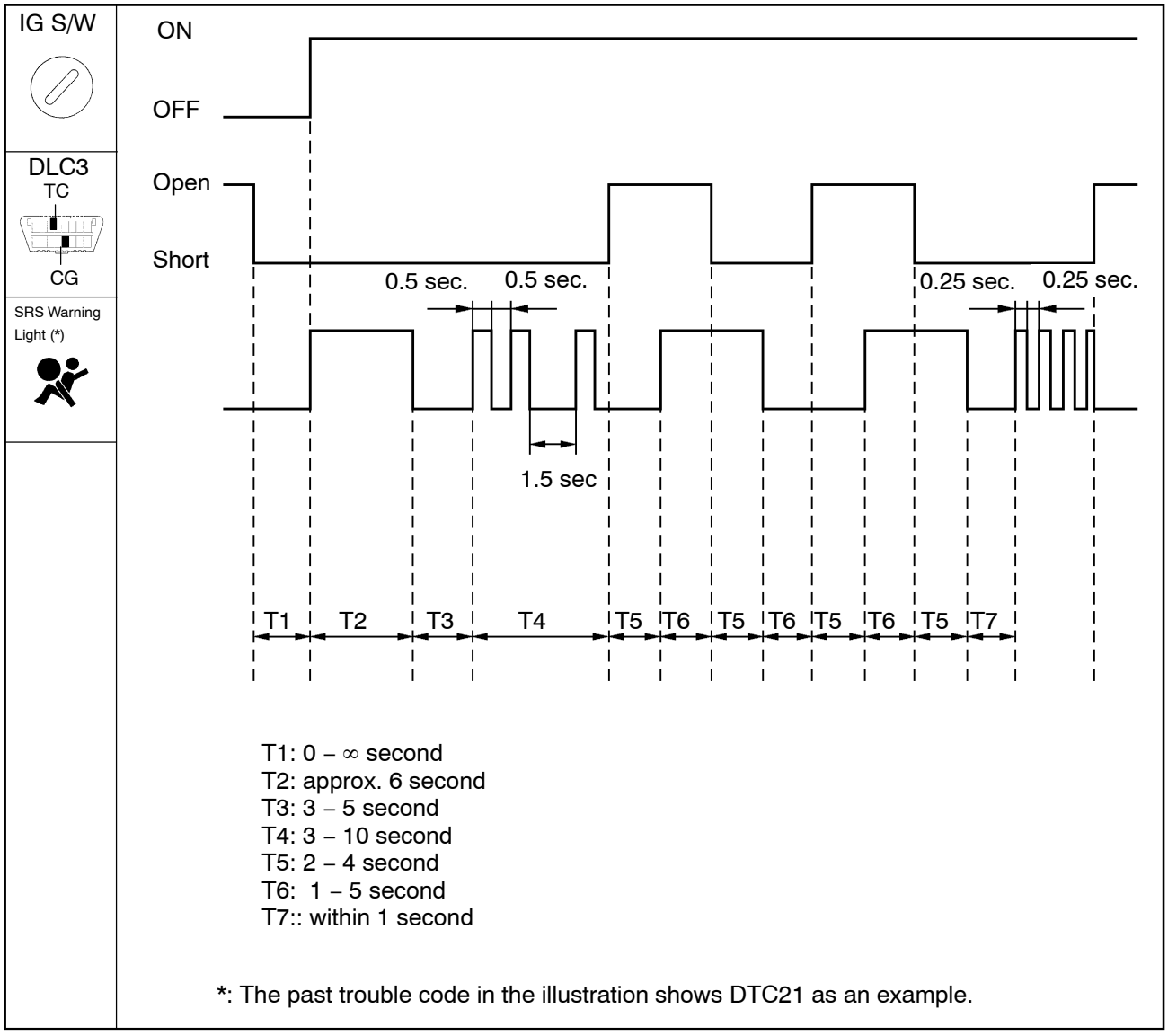
(c) The SRS warning light lights up 2 to 4 sec. later. Within 1 to 5 sec. after that, ground terminal Tc of the DLC3.

(d) The SRS warning light goes off 2 to 4 sec. after grounding terminal Tc. Within 1 to 5 sec. after that, release ground from terminal Tc again.

(e) The SRS warning light lights up again 2 to 4 sec. later. Within 1 to 5 sec. after that, ground terminal Tc of the DLC3 again.

(f) The SRS warning light goes off 2 to 4 sec. later. Within 1 sec. after that, normal code is output indicating that DTC deletion is completed.

If DTCs are to cleared, repeat the above procedure until the codes are cleared.

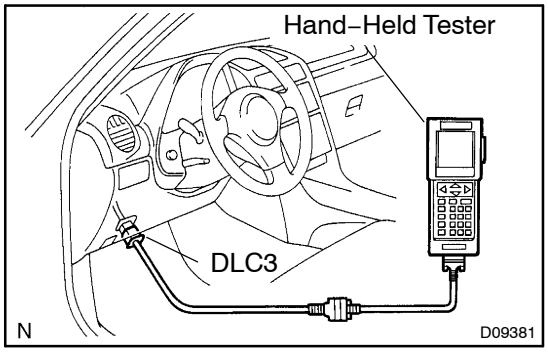


T1: 0 – ∞ second
T2: approx. 6 second
T3: 3 – 5 second
T4: 3 – 10 second
T5: 2 – 4 second
T6: 1 – 5 second
T7:: within 1 second

*: The past trouble code in the illustration shows DTC21 as an example.

N

H13049



6. DTC CLEARANCE (Using hand–held tester)

(a) Hook up the hand–held tester to the DLC3.

(b) Clear the DTCs by following the prompts on the tester screen.

HINT:

Please refer to the hand–held tester operation's manual for further details.

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

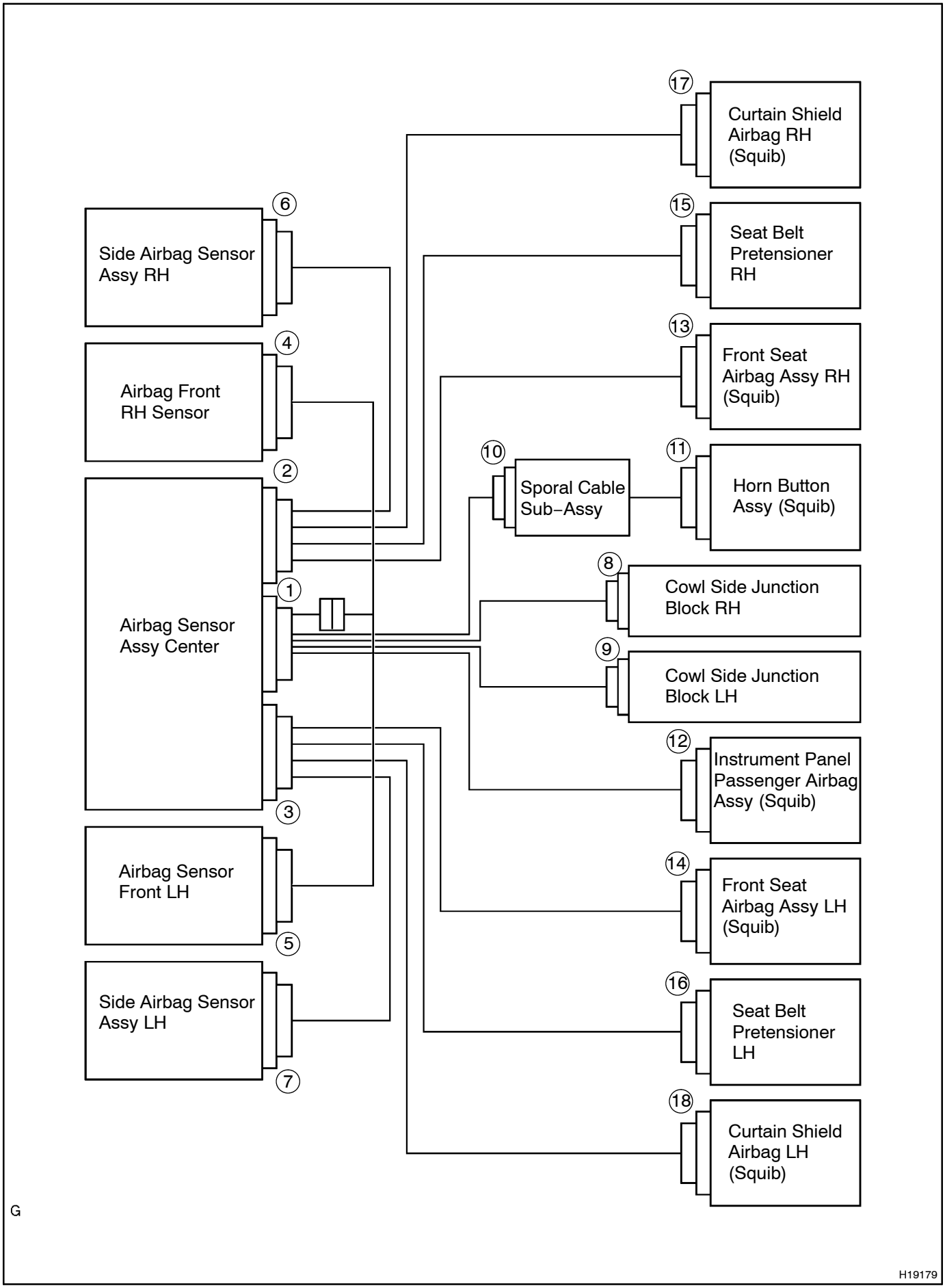
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure as shown in the illustration of the connectors on the next pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

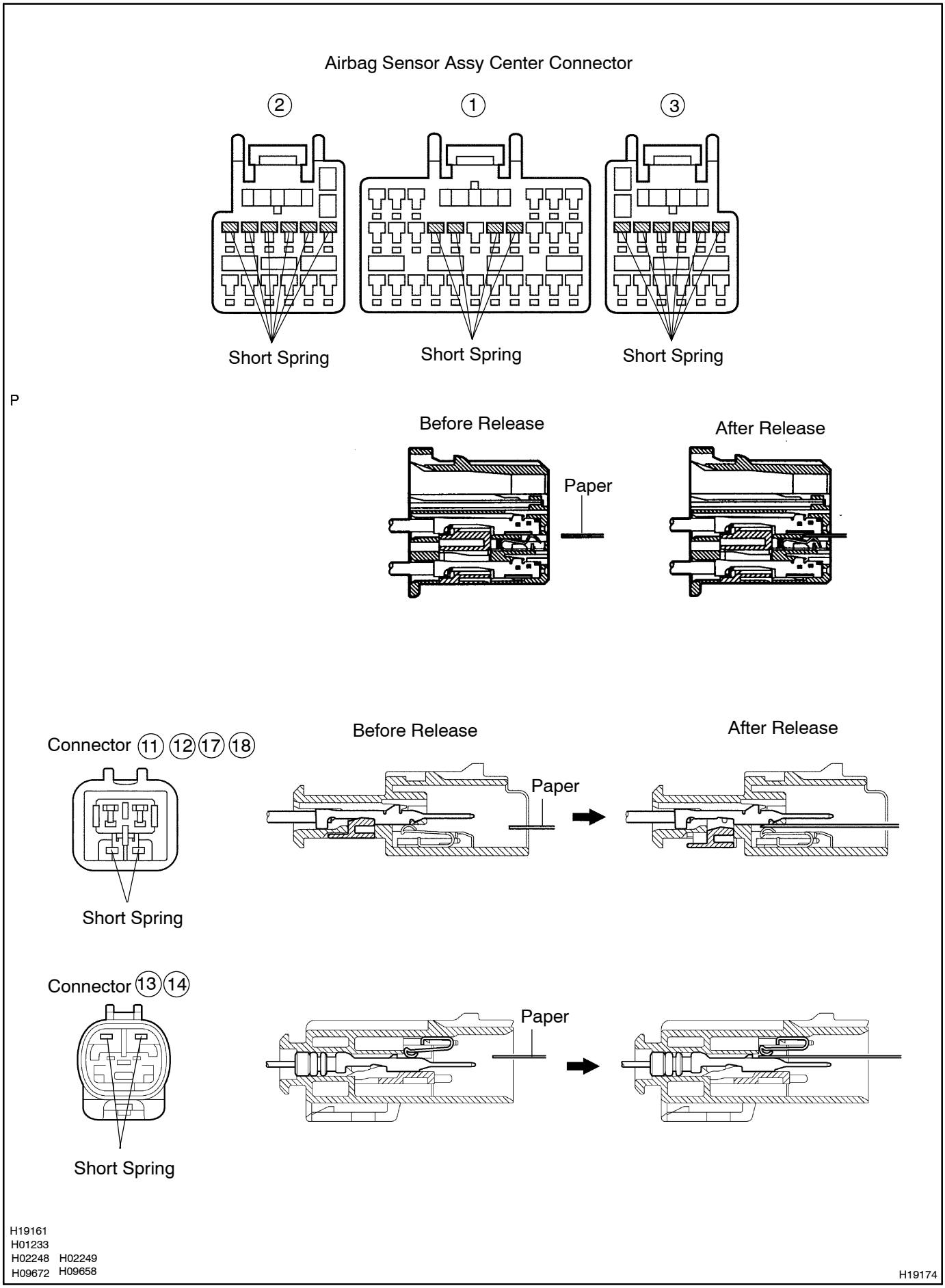
CAUTION:

Never release the airbag activation prevention mechanism on the squib connector.

NOTICE:

- **Do not release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.**
- **If the inserted paper is too thick the terminal and short spring may be damaged, so always use paper with the same thickness as the male terminal.**


17
Curtain Shield Airbag RH (Squib)
6
Side Airbag Sensor Assy RH
15
Seat Belt Pretensioner RH
4
Airbag Front RH Sensor
13
Front Seat Airbag Assy RH (Squib)
10
Sporal Cable Sub–Assy
11
Horn Button Assy (Squib)
2
Airbag Sensor Assy Center
8
Cowl Side Junction Block RH
1
9
Cowl Side Junction Block LH
12
Instrument Panel Passenger Airbag Assy (Squib)
3
Airbag Sensor Front LH
14
Front Seat Airbag Assy LH (Squib)
5
Side Airbag Sensor Assy LH
16
Seat Belt Pretensioner LH
7
18
Curtain Shield Airbag LH (Squib)
G
H19179



H19161
H01233
H02248 H02249
H09672 H09658

H19174

DI1AZ-20

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below. (Proceed to the page given for that circuit.).

DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B1135/24 (DI–424)	• Half connection in airbag sensor assy center malfunction	• Airbag sensor assy center • Wire harness	Blink
B1140/32 (DI–428)	• Side airbag sensor assy (RH) malfunction	• Side airbag sensor assy (RH) • Airbag sensor assy center • Wire harness	Blink
B1141/33 (DI–434)	• Side airbag sensor assy (LH) malfunction	• Side airbag sensor assy (LH) • Airbag sensor assy center • Wire harness	Blink
B1160/83 (DI–448)	• Short in curtain shield airbag (RH) squib circuit	• Curtain shield airbag assy RH (squib) • Airbag sensor assy center • Floor wire	Blink
B1161/84 (DI–452)	• Open in curtain shield airbag (RH) squib circuit	• Curtain shield airbag assy RH (squib) • Airbag sensor assy center • Floor wire	Blink
B1162/81 (DI–455)	• Short in curtain shield airbag (RH) circuit (to ground)	• Curtain shield airbag assy RH (squib) • Airbag sensor assy center • Floor wire	Blink
B1163/82 (DI–458)	• Short in curtain shield airbag (RH) circuit (to B+)	• Curtain shield airbag assy RH (squib) • Airbag sensor assy center • Floor wire	Blink
B1165/87 (DI–461)	• Short in curtain shield airbag (LH) squib circuit	• Curtain shield airbag assy LH (squib) • Airbag sensor assy center • Floor wire No. 2	Blink
B1166/88 (DI–465)	• Open in curtain shield airbag (LH) squib circuit	• Curtain shield airbag assy LH (squib) • Airbag sensor assy center • Floor wire No. 2	Blink
B1167/85 (DI–468)	• Short in curtain shield airbag (LH) circuit (to ground)	• Curtain shield airbag assy LH (squib) • Airbag sensor assy center • Floor wire No. 2	Blink
B1168/86 (DI–471)	• Short in curtain shield airbag (LH) circuit (to B+)	• Curtain shield airbag assy LH (squib) • Airbag sensor assy center • Floor wire No. 2	Blink

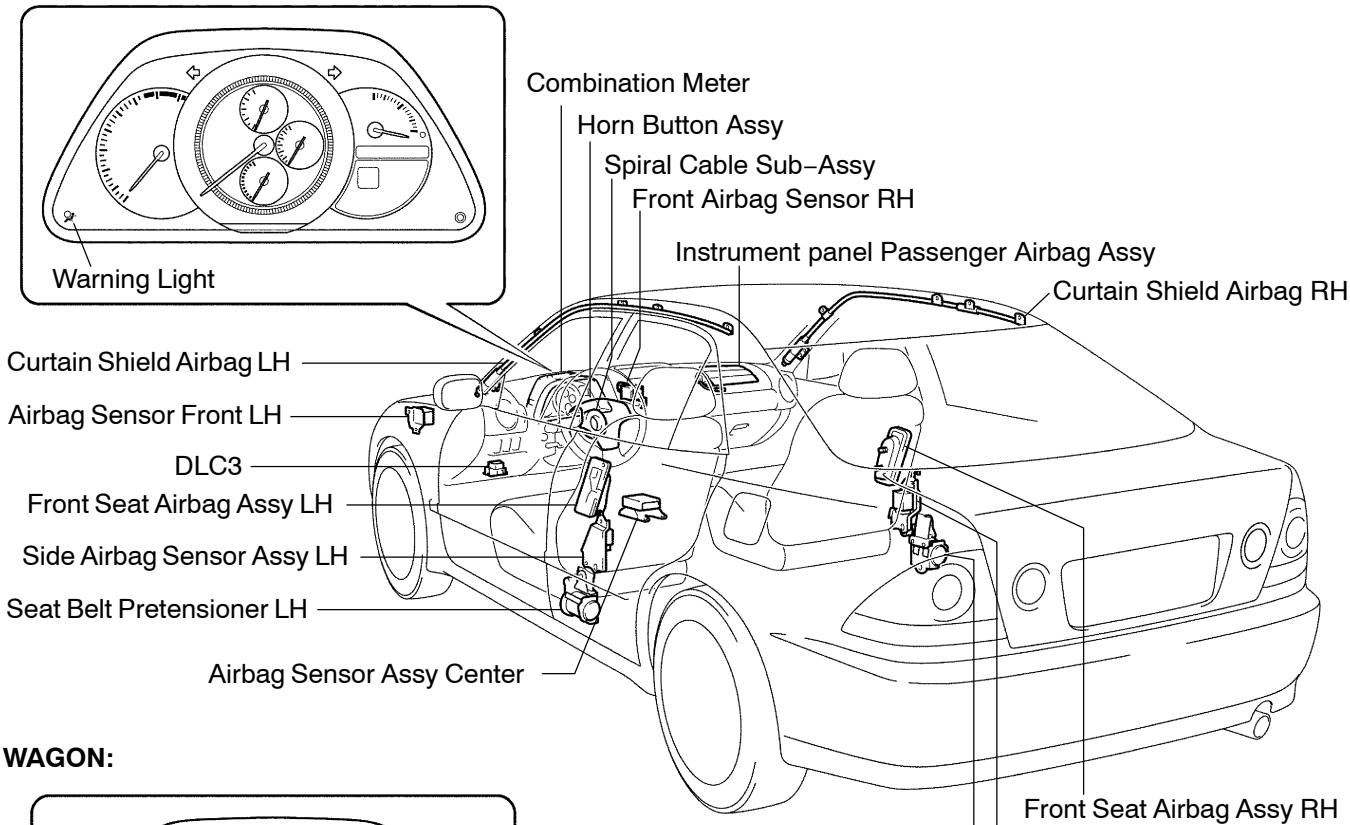
HINT:

- When the SRS warning light remains lit up and the DTC is the normal code, this means a voltage source drops.
  This malfunction is not stored in memory by the airbag sensor assembly and if the power source voltage returns to normal, the SRS warning light will automatically go out.
- When 2 or more codes are indicated, the codes will be displayed in numeral order starting from the lowest numbered code.
- If a code not listed on the chart is displayed, the airbag sensor assembly is faulty.

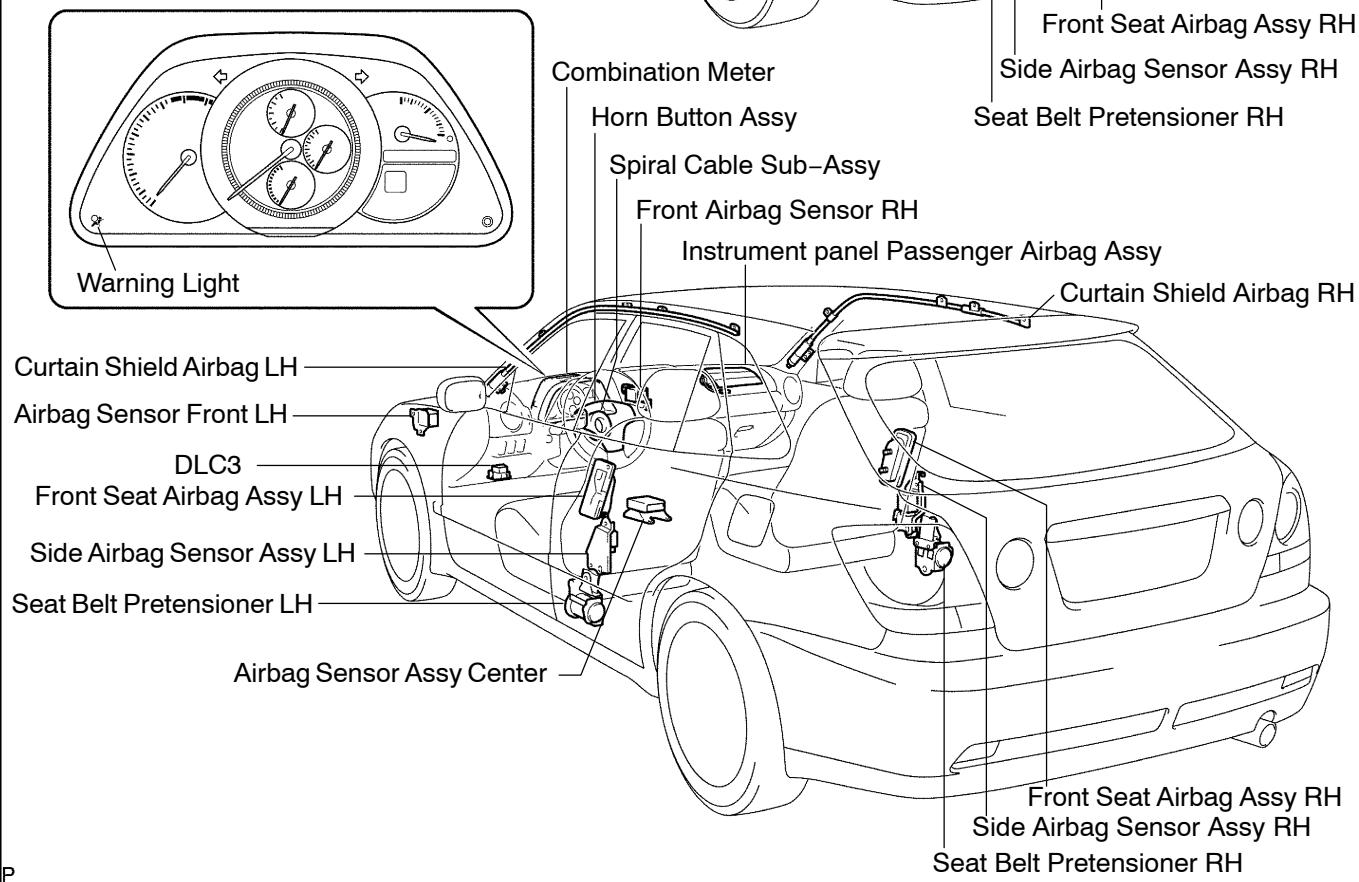
DI1B0–21

PARTS LOCATION

SEDAN:



WAGON:

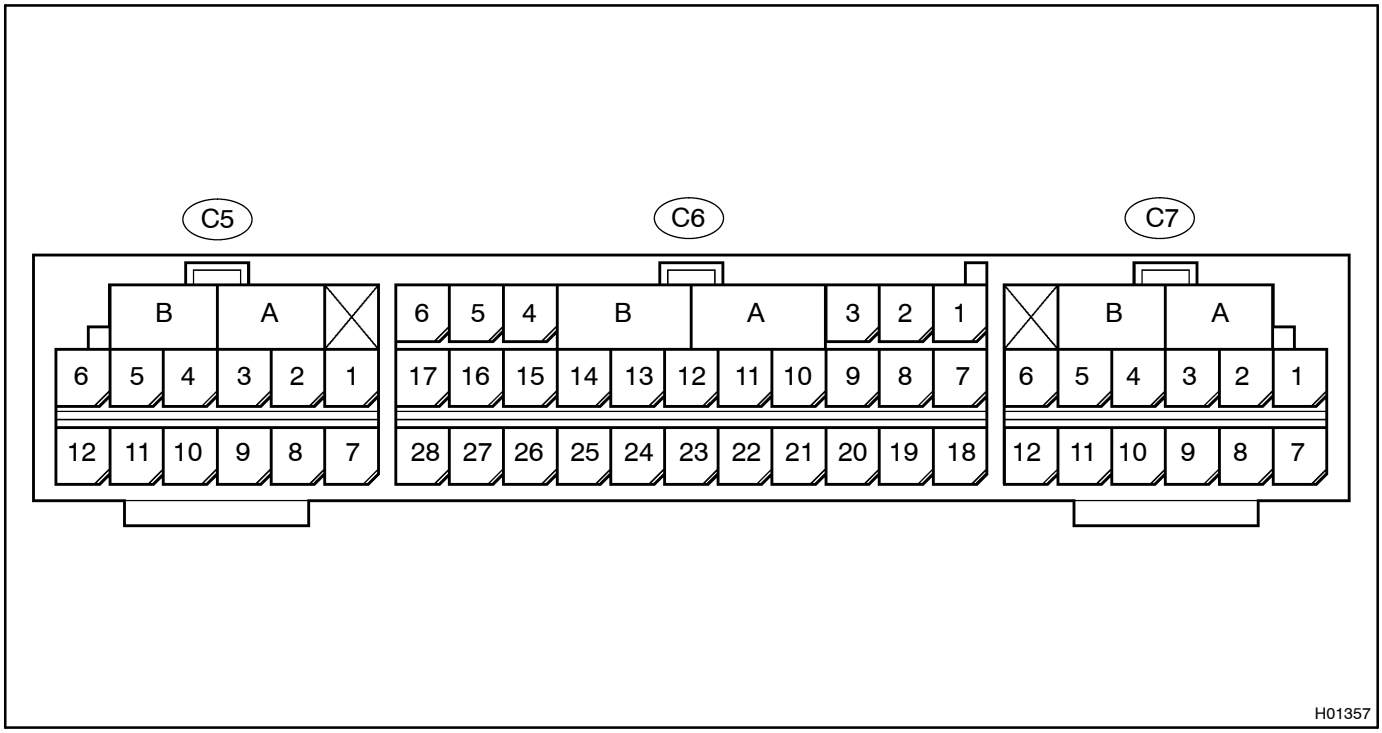


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H19178

DI1B1–29

TERMINALS OF ECU



No.	Symbol	Terminal Name
A	–	Electrical Connector Check Mechanism
B	–	Electrical Connector Check Mechanism
C6 – 3	LA	SRS Warning Light
C6 – 5	IG2	Power Source (IGN Fuse)
C6 – 6	ACC	Power Source (CIG Fuse)
C6 – 9	+SR	Front Airbag Sensor (RH)
C6 – 10	P+	Squib (Instrument Panel Passenger Airbag Assy)
C6 – 11	P–	Squib (Instrument Panel Passenger Airbag Assy)
C6 – 12	SIL	Diagnosis
C6 – 13	D–	Squib (Horn Button Assy)
C6 – 14	D+	Squib (Horn Button Assy)
C6 – 15	+SL	Front Airbag Sensor (LH)
C6 – 19	Tc	Diagnosis
C6 – 20	–SR	Front Airbag Sensor (RH)
C6 – 23	GSW2	ECM
C6 – 26	–SL	Front Airbag Sensor (LH)
C6 – 27	E1	Ground
C6 – 28	E2	Ground
C5 – 1	PL–	Squib (Seat Belt Pretensioner, LH)
C5 – 2	PL+	Squib (Seat Belt Pretensioner, LH)
C5 – 3	ICL+	Squib (Curtain Shield Airbag Assy (LH))
C5 – 4	ICL–	Squib (Curtain Shield Airbag Assy (LH))
C5 – 5	SFL–	Squib (Front seat Airbag Assy LH)
C5 – 6	SFL+	Squib (Front seat Airbag Assy LH)
C5 – 7	VUPL	Side Airbag Sensor Assy (LH)

No.	Symbol	Terminal Name
C5 – 9	ESL	Side Airbag Sensor Assy (LH)
C5 – 10	SSL+	Side Airbag Sensor Assy (LH)
C5 – 12	SSL–	Side Airbag Sensor Assy (LH)
C7 – 1	SFR+	Squib (Front Seat Airbag Assy RH)
C7 – 2	SFR–	Squib (Front Seat Airbag Assy RH)
C7 – 3	ICR–	Squib (Curtain Shield Airbag Assy (RH))
C7 – 4	ICR+	Squib (Curtain Shield Airbag Assy (RH))
C7 – 5	PR+	Squib (Pretensioner, RH)
C7 – 6	PR–	Squib (Pretensioner, RH)
C7 – 7	SSR–	Side Airbag Sensor Assy (RH)
C7 – 9	SSR+	Side Airbag Sensor Assy (RH)
C7 – 10	ESR	Side Airbag Sensor Assy (RH)
C7 – 12	VUPR	Side Airbag Sensor Assy (RH)

DI164–37

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
• With the ignition switch in ON position, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed.	• SRS warning light circuit (Always lights up when ignition switch is in LOCK position.)	*1DI–43
• SRS warning light is always lit up even when ignition switch is in the LOCK position.		
• With the ignition switch in ON position, the SRS warning light does not light up.	• SRS warning light circuit (Does not light up when ignition switch is turned to ON.)	*1DI–43
• DTC is not displayed.	• Tc terminal circuit	*1DI–48
• SRS warning light is always lit up at the time of DTC check procedure.		
• DTC is displayed without Tc and CG terminal connection.		

*1 See Pub. No. RM776E

DI7IA–07

CIRCUIT INSPECTION

DTC	B1135/24	Harf Connection in Airbag Sensor Assy Center Connector

CIRCUIT DESCRIPTION

The airbag sensor assy center detects partial connection of connector.
For details of the function of each component, see OPERATION on page RS–2.
DTC B1135/24 is recorded when the airbag sensor assy center detects an open in the electrical connection chech mechanism of the airbag sensor connector or in the airbag sensor assy center circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1135/24	• Malfunction of electrical connection check mechanism of airbag sensor assy center connector • Airbag sensor assy center malfunction	• Electrical connection check mechanism • Airbag sensor assy center

INSPECTION PROCEDURE

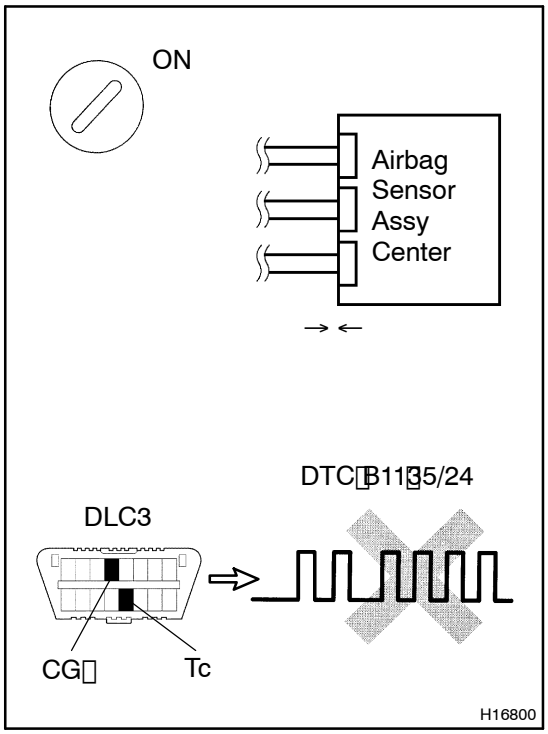
1	Are connector of the airbag sensor assy center properly connected?

NG → Connect connectors.

OK ↓

2	Prepare for inspection (See Pub. No. RM776E on page DI–40).

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connectors to the airbag sensor assy center.
(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(b) Turn the ignition switch to ON, and wait at least for 20 seconds.
(c) Clear the DTC stored in memory (See page DI–413).
(d) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn the ignition switch to ON, and wait at least for 20 seconds.
(f) Check the DTC (See page DI–413).

OK:

DTC B1135/24 is not output.

HINT:

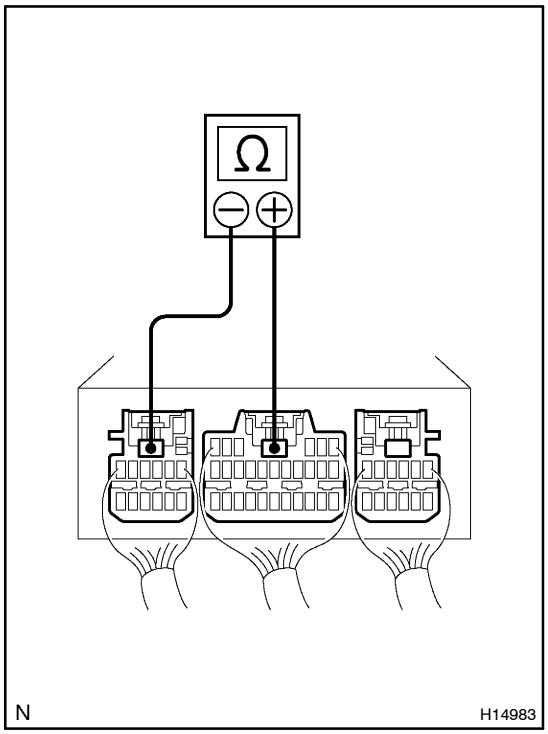
Codes other than code B1135/24 may be output at this time, but they are not relevant to this check.

NG	Go to the next step.

OK

From the results of the inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

4	Check disconnection detection pin in the airbag sensor assy center connector.



CHECK:

With 3 connectors connected to the airbag sensor assy center, place tester leads onto any 2 of 3 disconnection detection pins and check for continuity.

OK:

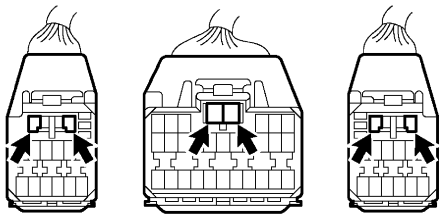
Continuity

NG → **Go to the next step.**

OK

From the results of the inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	**Perform a visual check of the disconnection detection pin.**


H15243

OK:
No deformation is identified.
HINT:
Compare it with the other 2 connector pins.

NG → **Repair or replace airbag sensor assy center connector.**

OK

Replace airbag sensor assy center.

DI9HU–01

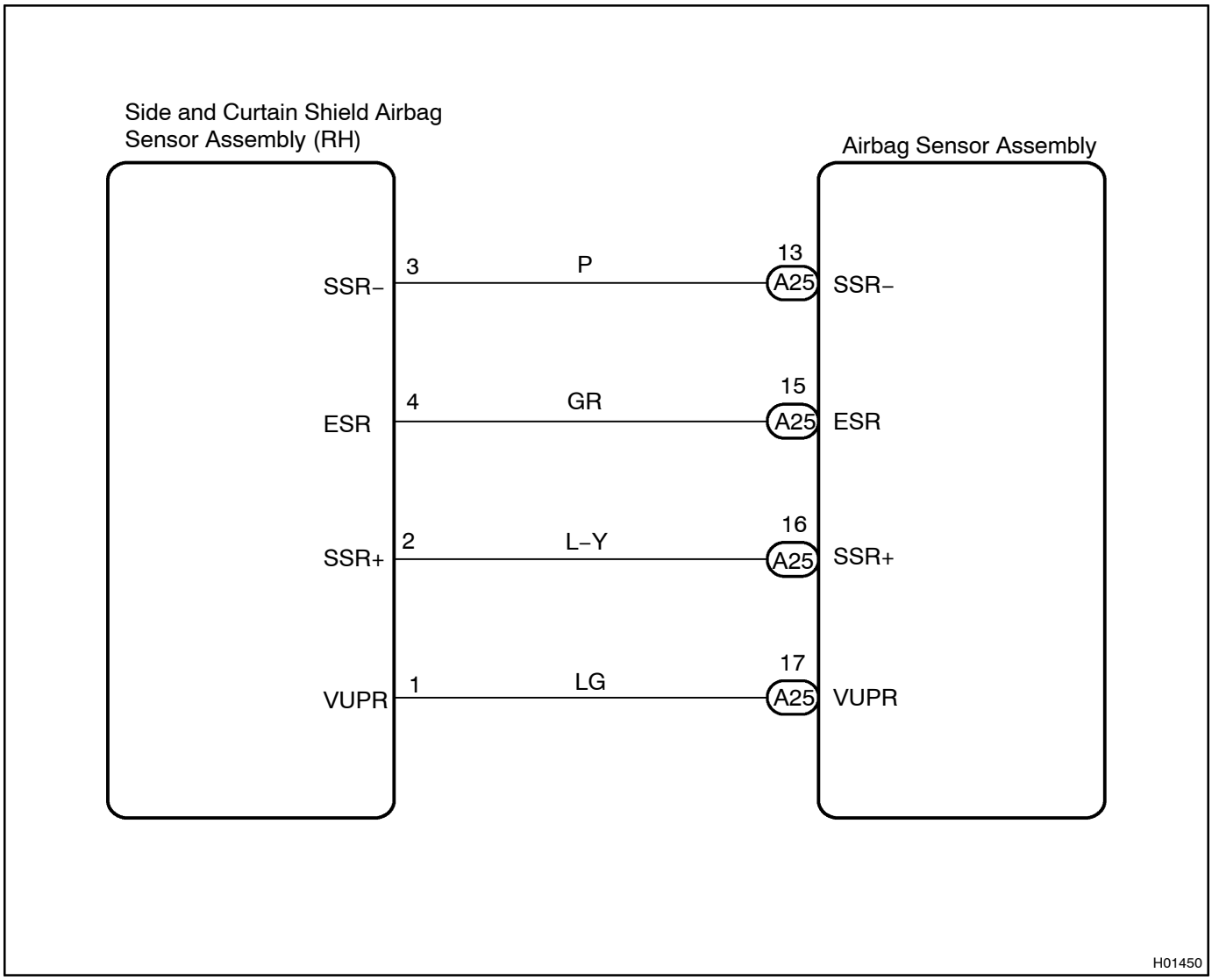
DTC	B1140/32	Side Airbag Sensor Assy (RH) Malfunction

CIRCUIT DESCRIPTION

The side airbag sensor assy (RH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.
It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.
DTC B1140/32 is recorded when occurrence of a malfunction in the side airbag sensor assy (RH) is detected.

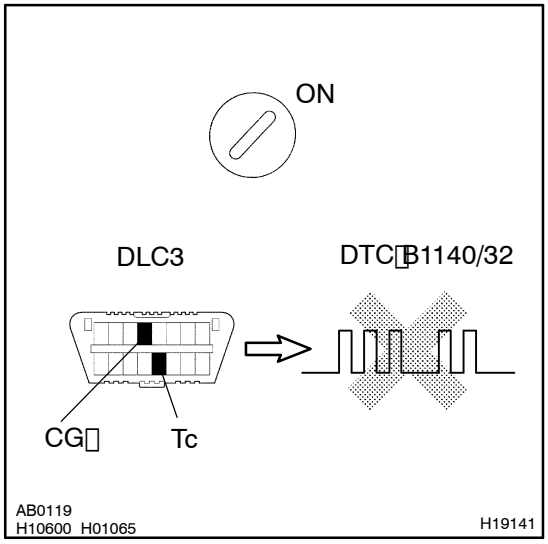
DTC No.	DTC Detecting Condition	Trouble Area
B1140/32	• Side airbag sensor assy (RH) malfunction	• Side airbag sensor assy (RH) • Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC B1140/32 output?



CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1140/32 is not output.

HINT:

Codes other than code B1140/32 may be output at this time, but they are not relevant to this check.

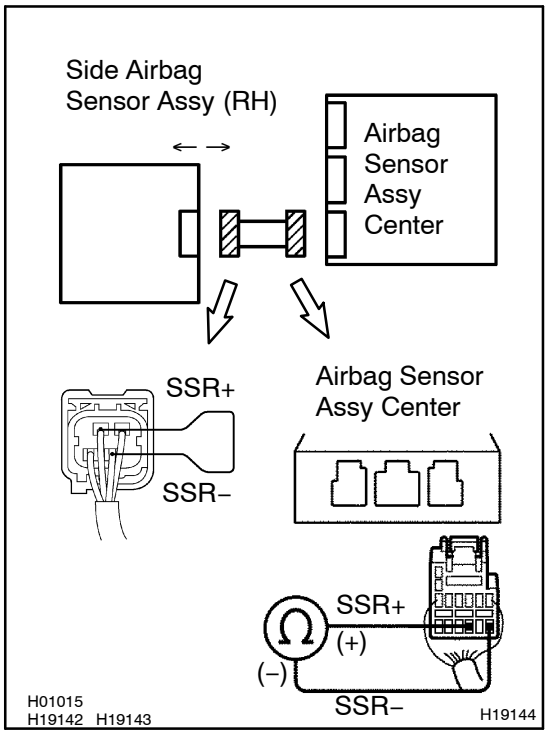
YES → **The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

NO

2	Is connector of side airbag sensor assy (RH) properly connected?

3	Prepare for inspection (See Pub. No. RM776E on page DI–40).

4	**Check wire harness.**



PREPARATION:

(a) Disconnect the side airbag sensor assy (RH) connector.

(b) Using a service wire, connect SSR+ and SSR– of the connector (on the side airbag sensor assy side) between the side airbag sensor assy (RH) and airbag sensor assy center.

CHECK:

For the connector (on the airbag sensor assy center side) between the side airbag sensor assy (RH) and the airbag sensor assy center, measure the resistance between SSR+ and SSR–.

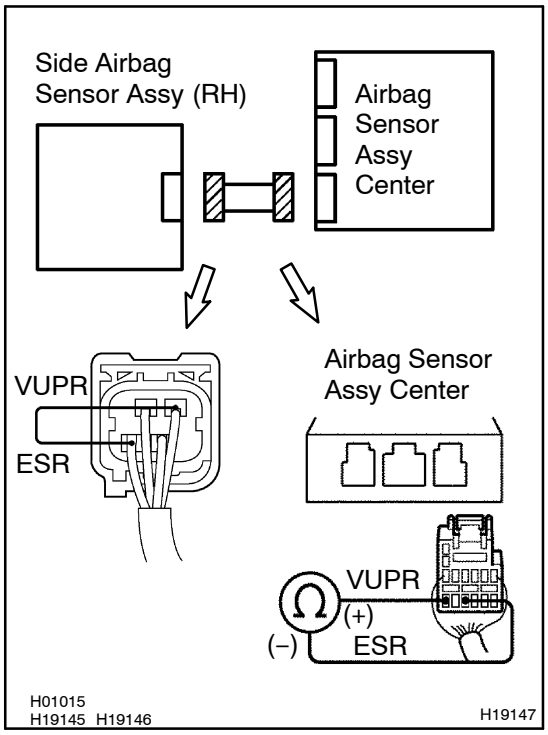
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assy (RH) and airbag sensor assy center.**

OK

5	**Check wire harness.**



PREPARATION:

Using a service wire, connect VUPR and ESR of the connector (on the side airbag sensor assy side) between the side airbag sensor assy (RH) and airbag sensor assy center.

CHECK:

For the connector (on the airbag sensor assy center side) between the airbag sensor assy (RH) and the airbag sensor assy center, measure the resistance between VUPR and ESR.

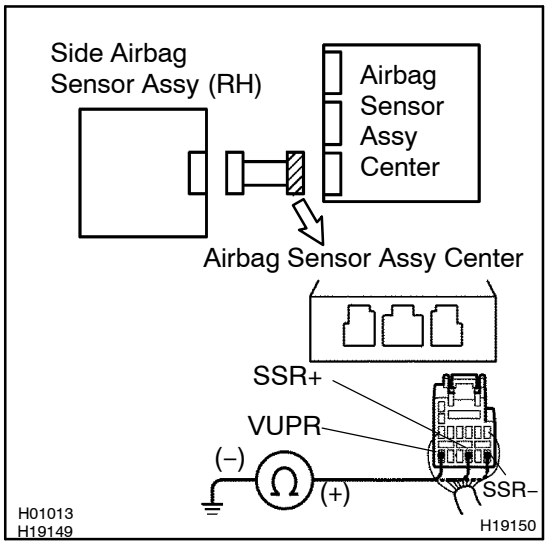
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assy (RH) and airbag sensor assy center.**

OK

6	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assy center side) between the side airbag sensor assy (RH) and the airbag sensor assy center, measure the resistance between body ground and each of SSR+, VUPR and SSR–.

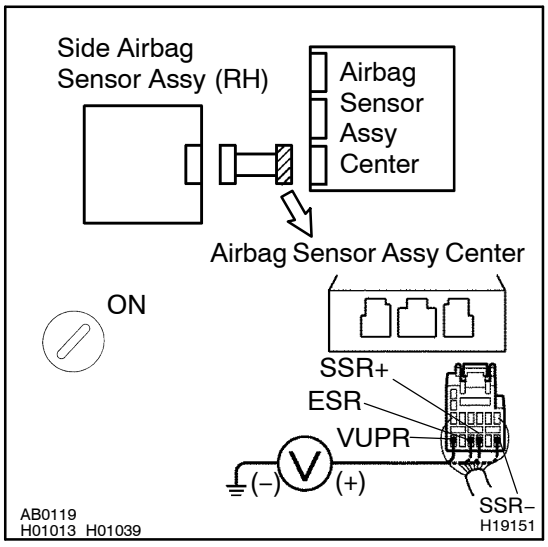
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag sensor assy (RH) and airbag sensor assy center.**

OK

7	Check wire harness (to B+).



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the airbag sensor assy center side) between the side airbag sensor assy (RH) and the airbag sensor assy center, measure the voltage between the body ground and each of SSR+, VUPR, SSR– and ESR.

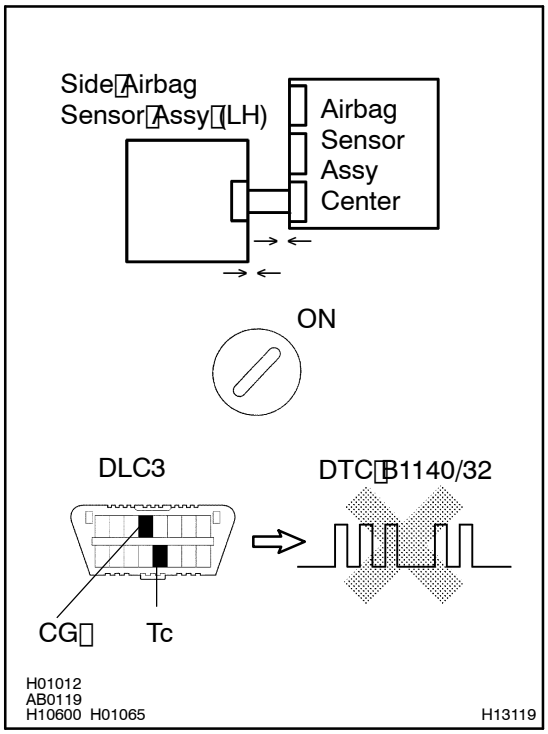
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between side airbag sensor assy (RH) and airbag sensor assy center.**

OK

8	Check side airbag sensor assy (RH).



PREPARATION:

(a) Disconnect the negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(b) Connect the airbag sensor assy center connector.

(c) Interchange the side airbag sensor assy RH and LH and connect the connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 60 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1140/32 is not output with the right and left sides interchanged.

NG	Replace side airbag sensor assy (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI9HV–01

DTC	B1141/33	Side Airbag Sensor Assy (LH) Malfunction

CIRCUIT DESCRIPTION

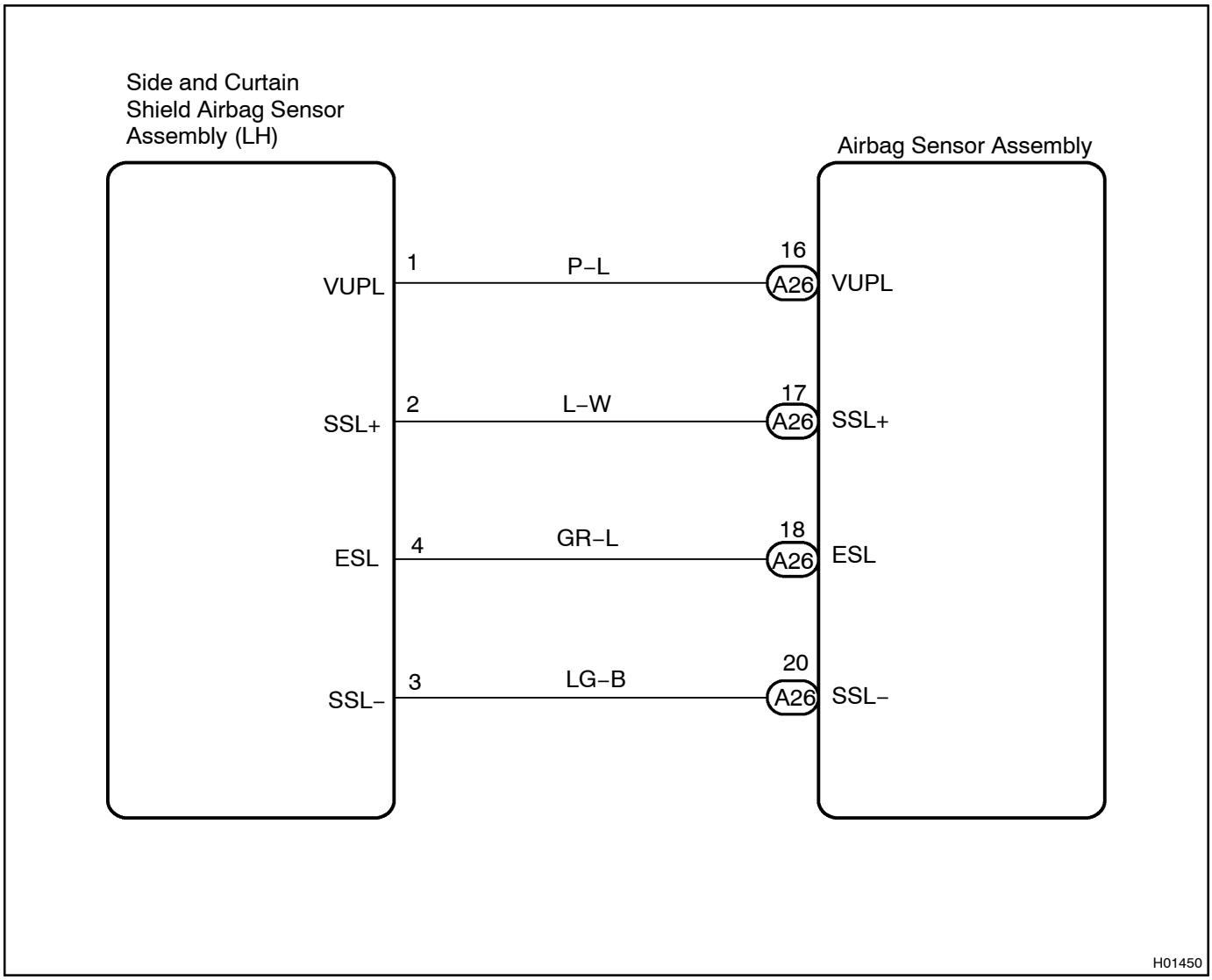
The side airbag sensor assy (LH) consists of the safing sensor, diagnosis circuit and lateral deceleration sensor, etc.

It receives signals from the lateral deceleration sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.

DTC B1141/33 is recorded when occurrence of a malfunction in the side airbag sensor assy (LH) is detected.

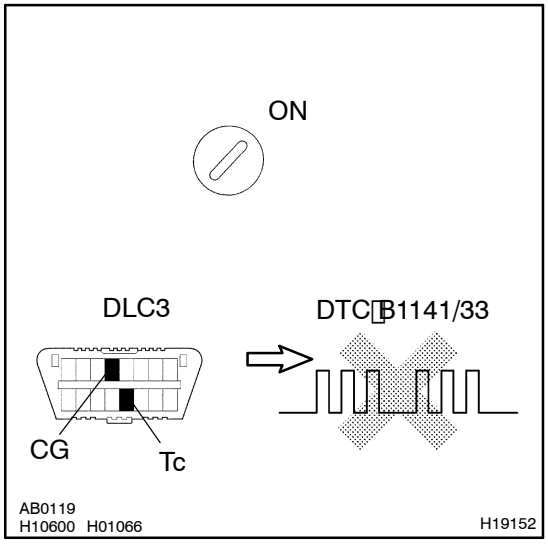
DTC No.	DTC Detecting Condition	Trouble Area
B1141/33	• Side airbag sensor assy (LH) malfunction	• Side airbag sensor assy (LH) • Wire harness

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Is DTC B1141/33 output?



CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1141/33 is not output.

HINT:

Codes other than code B1141/33 may be output at this time, but they are not relevant to this check.

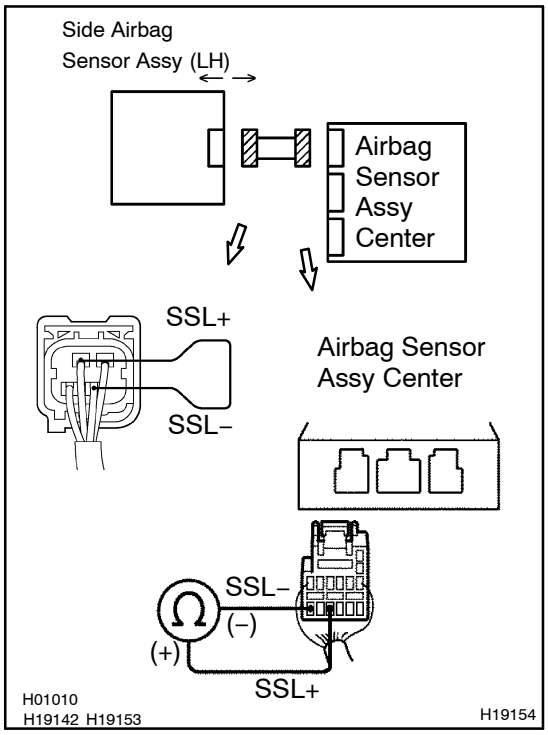
YES → **The malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.**

NO

2	Is connector of side airbag sensor assy (LH) properly connected?

3	Prepare for inspection (See Pub. No. RM776E on page DI–40).

4	**Check wire harness.**



PREPARATION:

(a) Disconnect the side airbag sensor assy (LH).

(b) Using a service wire, connect SSL+ and SSL– of the connector (on the side airbag sensor assy side) between the side airbag sensor assy (LH) and the airbag sensor assy center.

CHECK:

For the connector (on the airbag sensor assy center side) between the side airbag sensor assy (LH) and the airbag sensor assy center, measure the resistance between SSL+ and SSL–.

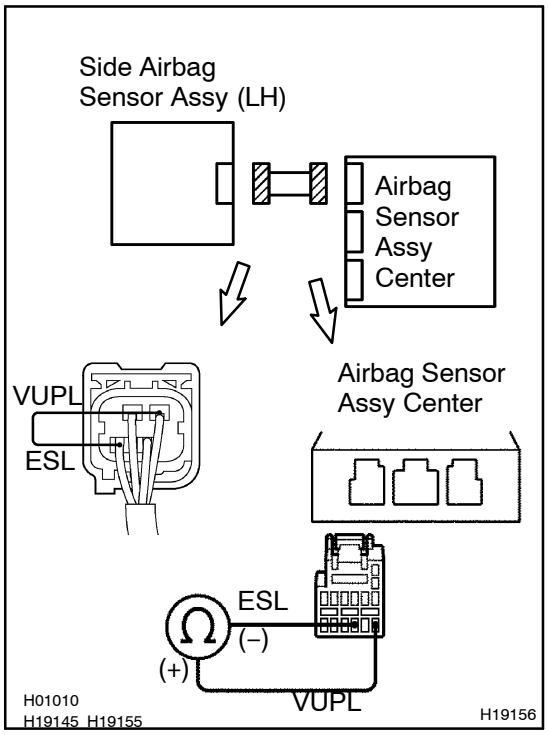
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assy (LH) and airbag sensor assy center.**

OK

5	**Check wire harness.**



PREPARATION:

Using a service wire, connect VUPL and ESL of the connector (on the side airbag sensor assy side) between the side airbag sensor assy (LH) and the airbag sensor assy center.

CHECK:

For the connector (on the airbag sensor assy center side) between the side airbag sensor assy (LH) and the airbag sensor assy center, measure the resistance between VUPL and ESL.

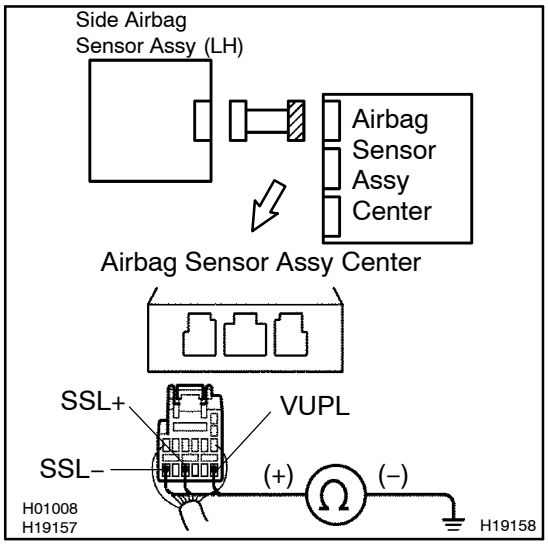
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between side airbag sensor assy (LH) and airbag sensor assy center.**

OK

6	Check wire harness (to ground).



CHECK:

For the connector (on the airbag sensor assy center side) between the side airbag sensor assy (LH) and the airbag sensor assy center, measure the resistance between body ground and each of SSL+, VUPL and SSL–.

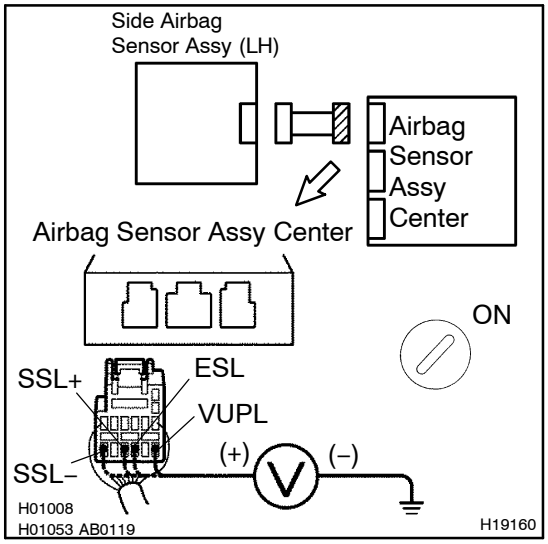
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between side airbag sensor assy (LH) and airbag sensor assy center.**

OK

7	Check wire harness (to B+).



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the airbag sensor assy center side) between the side airbag sensor assy (LH) and the airbag sensor assy center, measure the voltage between body ground and each of ESL, VUPL, SSL– and SSL+.

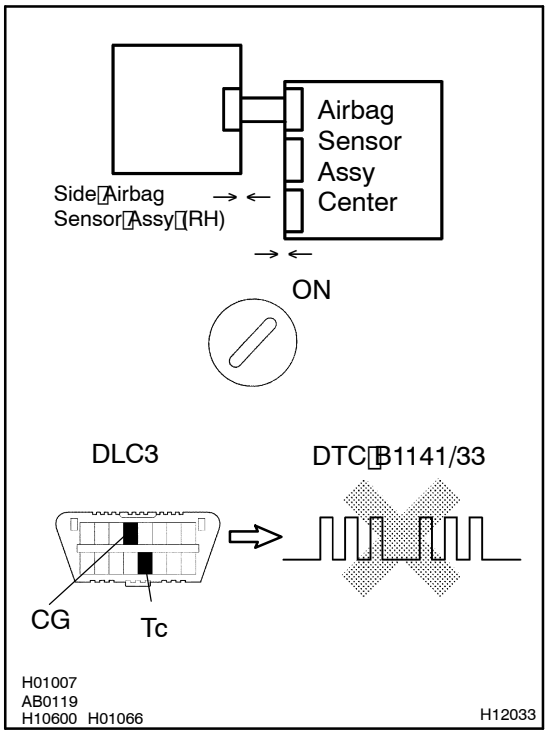
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between side airbag sensor assy (LH) and airbag sensor assy center.**

OK

8	Check side airbag sensor assy (LH).



PREPARATION:

(a) Disconnect the negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(b) Connect the airbag sensor assy center connector.

(c) Interchange the side airbag sensor assy LH and RH connect the connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1141/33 is not output, with the right and left sides interchanged.

NO	Replace side airbag sensor assy (LH).

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI6PX–11

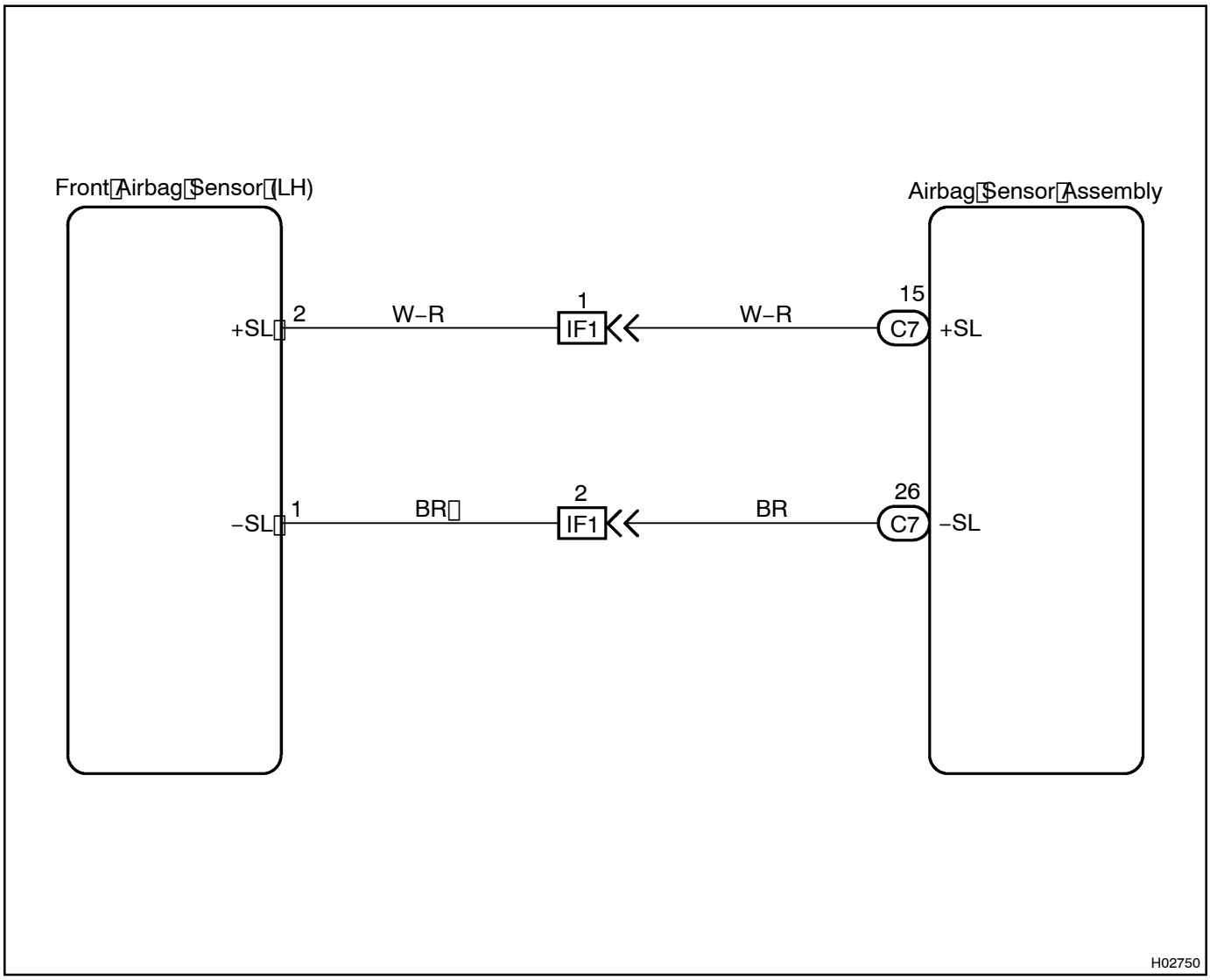
DTC	B1158/B1159/16	Front Airbag Sensor (LH) Malfunction

CIRCUIT DESCRIPTION

The front airbag sensor (LH) circuit consists of the airbag sensor assembly and front airbag sensor (LH).
For details of the function of each component, see OPERATION on page RS–2.
DTC B1158/B1159/16 is recorded when malfunction is detected in the front airbag sensor (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1158/B1159/16	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Airbag sensor assembly • Wire harness • Engine room main wire harness

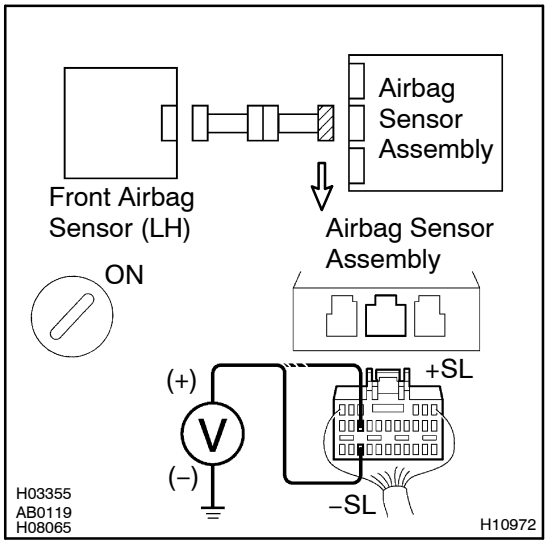
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection (See Pub. No. RM776E on page DI–40).**

2	**Check wire harness (to B+).**



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the voltage between body ground and each of +SL and –SL.

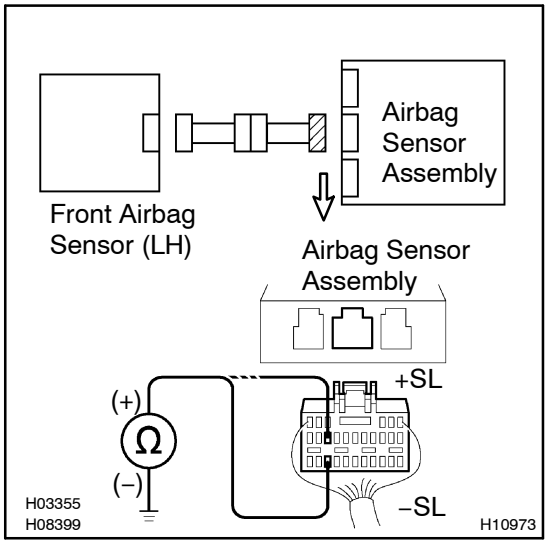
OK:

Voltage: Below 1 V

NG → **Go to step 8.**

OK

3	**Check wire harness (to ground).**



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between body ground and each of +SL and –SL.

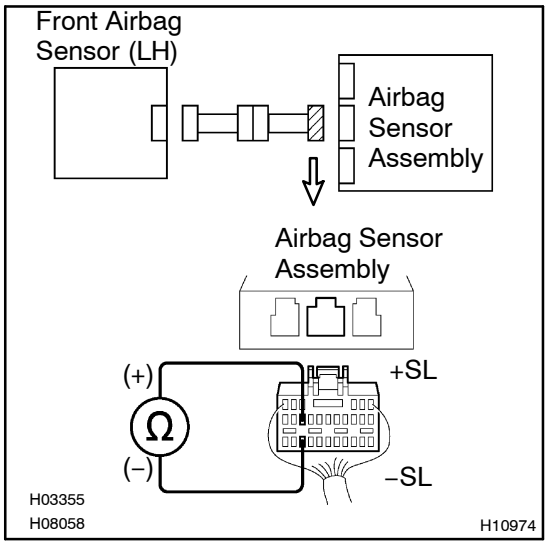
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 9.**

OK

4	Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between +SL and –SL.

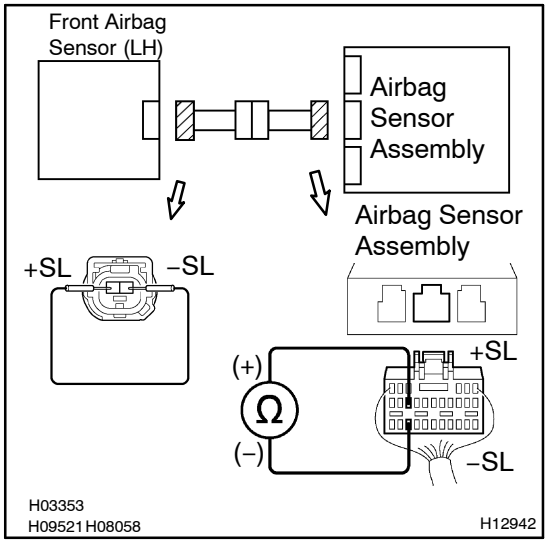
OK:

Resistance: 1 MΩ or Higher

NG	Go to step 10.

OK

5	Check wire harness.



PREPARATION:

Using a service wire, connect +SL and –SL of the connector (on the front airbag sensor (LH) side) between the airbag sensor assembly and the front airbag sensor (LH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between +SL and –SL.

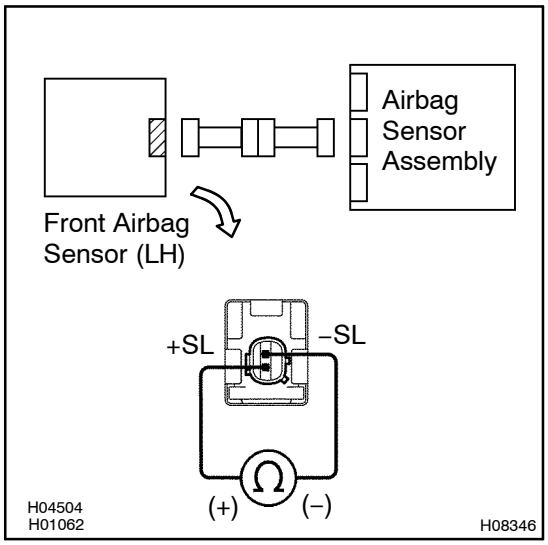
OK:

Resistance: Below 1 Ω

NG	Go to step 11.

OK

6	**Check front airbag sensor (LH).**



CHECK:

For the connector (on the front airbag sensor (LH)), measure the resistance between +SL and –SL.

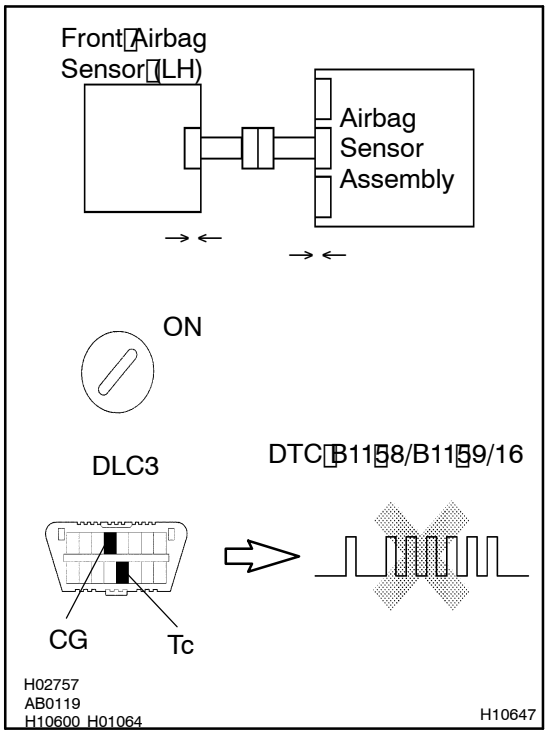
OK:

Resistance: 300 – 1500 Ω

NG → **Replace front airbag sensor (LH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn the ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the front airbag sensor (LH) connector and airbag sensor assembly connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1158/B1159/16 is not output.

HINT:

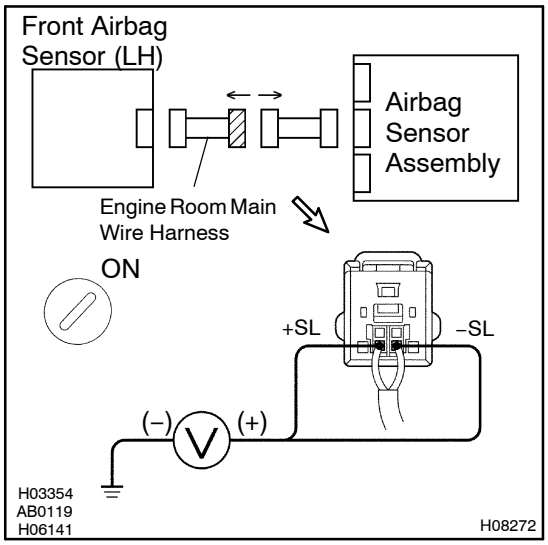
Codes other than code B1158/B1159/16 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8	Check engine room main wire harness (to B+).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the LH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of +SL and –SL.

OK:

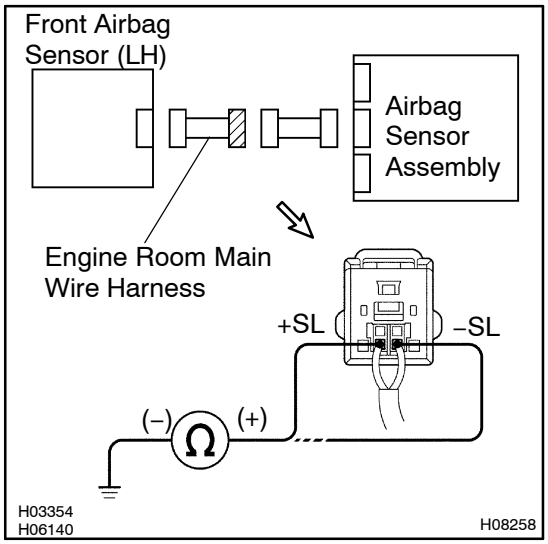
Voltage: Below 1 V

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9	Check engine room main wire harness (to ground).



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of +SL and –SL.

OK:

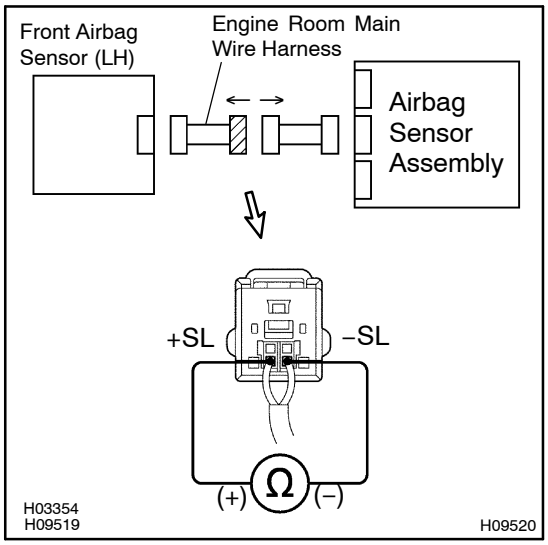
Resistance: 1 MΩ or Higher

NG	Repair or replace engine room main wire harness.

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between +SL and –SL.

OK:

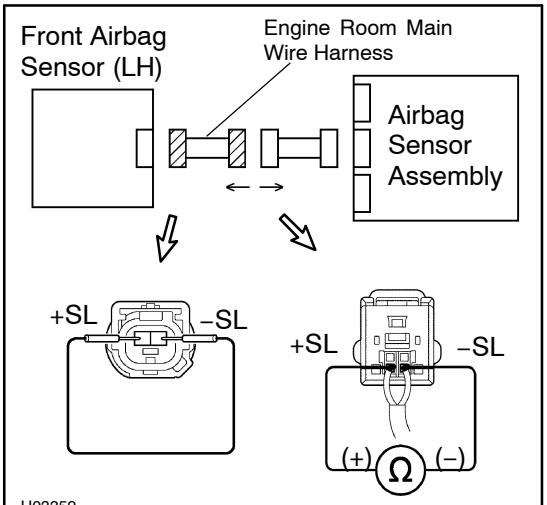
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	Check engine room main wire harness.



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect +SL and –SL of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (LH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between +SL and –SL.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

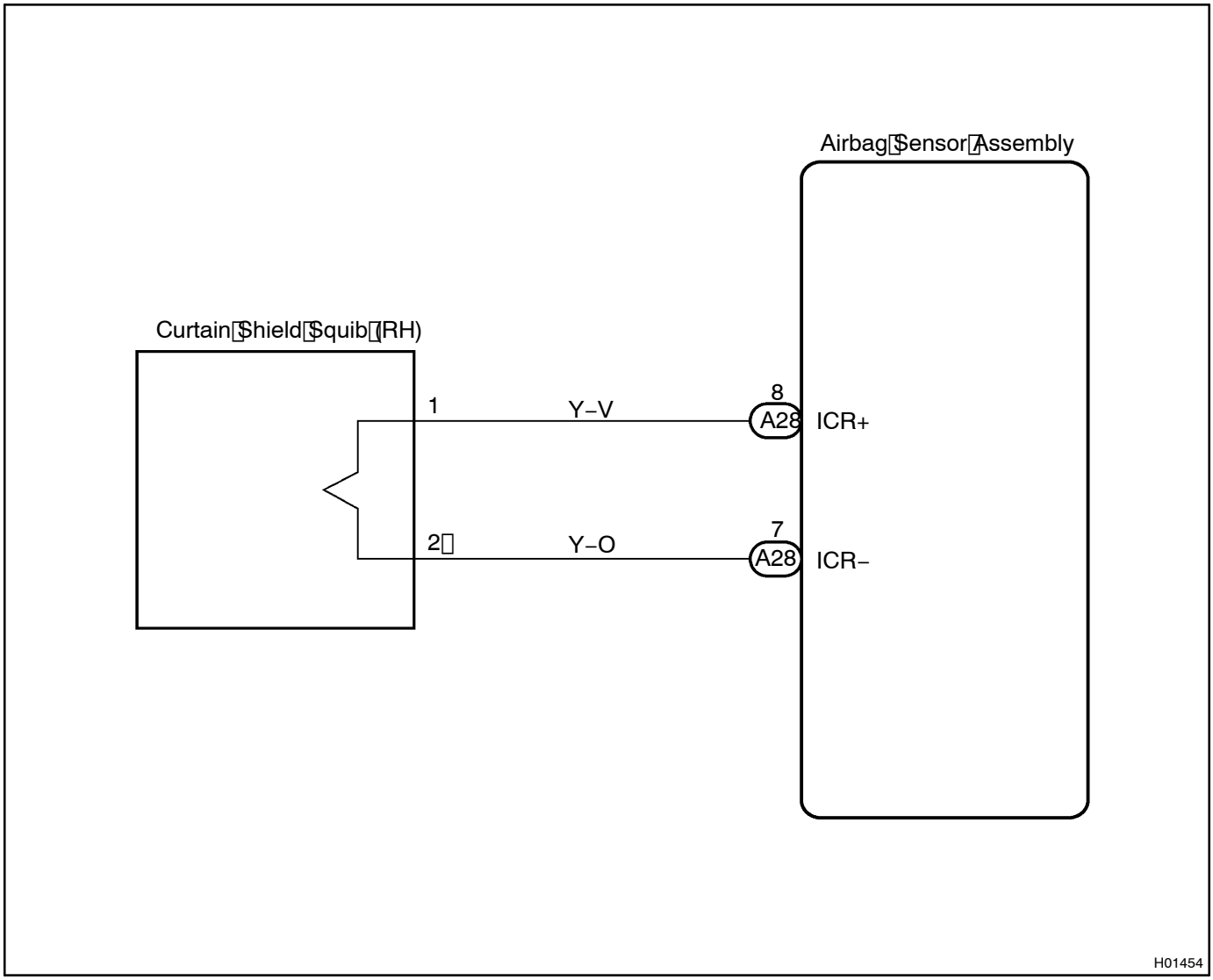
DTC	B1160/83	Short in Curtain Shield Squib (RH) Circuit

CIRCUIT DESCRIPTION

The curtain shield squib (RH) circuit consists of the airbag sensor assy center and curtain shield airbag assy (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B1160/83 is recorded when a short is detected in the curtain shield squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1160/83	• Short circuit between ICR+ wire harness and ICR– wire harness of squib • Curtain shield squib (RH) malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy (RH) • Airbag sensor assy center • Wire harness

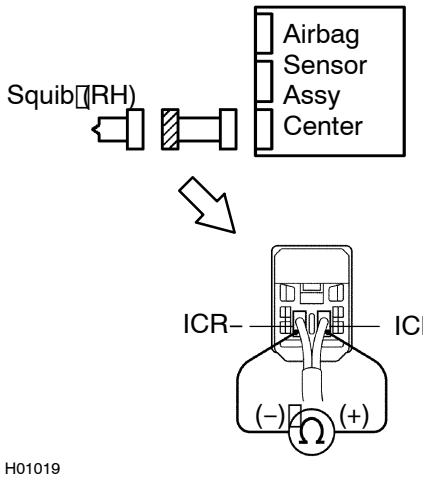
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection (See Pub. No. RM776E on page DI–40).

2	Check curtain shield squib (RH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assy center side) between the airbag sensor assy center and the curtain shield airbag assy (RH) (See page DI–413).

CHECK:

For the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (RH) and the airbag sensor assy center, measure the resistance between ICR+ and ICR–.

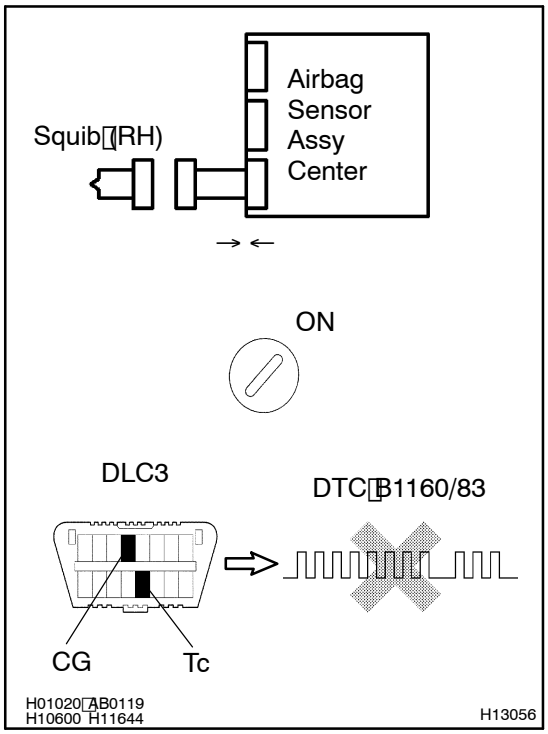
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between curtain shield airbag assy (RH) and airbag sensor assy center.**

OK

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connector to the airbag sensor assy center.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1160/83 is not output.

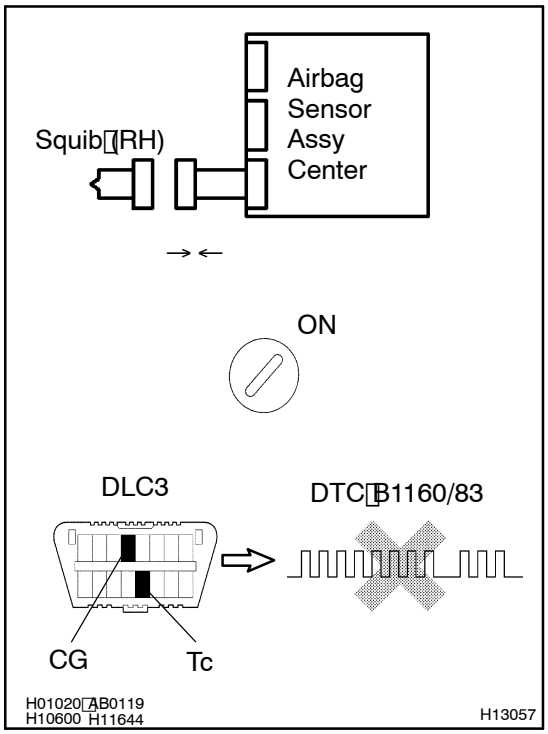
HINT:

Codes other than code B1160/83 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assy center.

OK

4	Check curtain shield squib (RH).



PREPARATION:

(a) Turn the ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the curtain shield airbag assy (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–413).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–413).

OK:

DTC B1160/83 is not output.

HINT:

Codes other than code B1160/83 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag assy (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B1161/84	Open in Curtain Shield Squib (RH) Circuit

CIRCUIT DESCRIPTION

The curtain shield squib (RH) circuit consists of the airbag sensor assy center and curtain shield airbag assy (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B1161/84 is recorded when an open is detected in the curtain shield squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1161/84	• Open circuit in ICR+ wire harness or ICR– wire harness of squib • Curtain shield squib (RH) malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy (RH) • Airbag sensor assy center • Wire harness

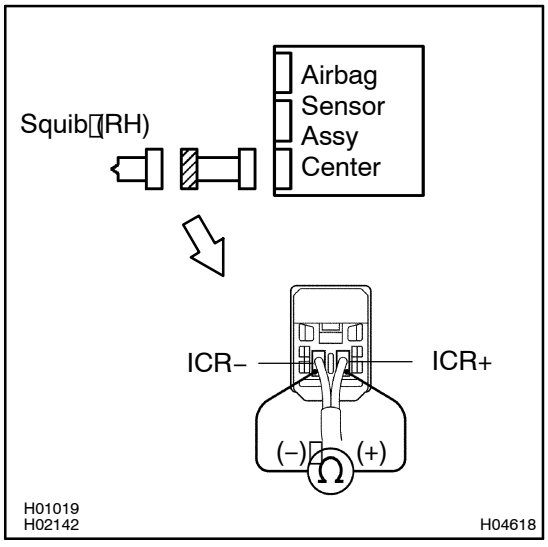
WIRING DIAGRAM

See page DI–448.

INSPECTION PROCEDURE

1	Prepare for inspection (See Pub. No. RM776E on page DI–40).

2	Check curtain shield squib (RH) circuit.

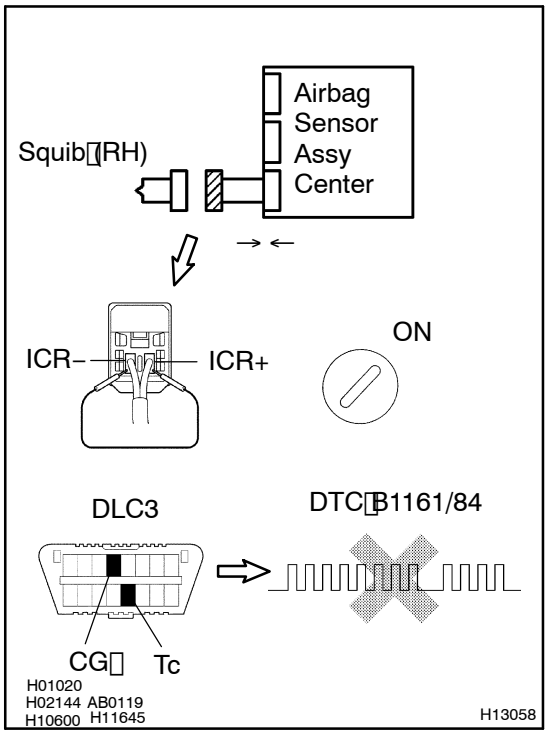


CHECK:
For the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (RH) and the airbag sensor assy center, measure the resistance between ICR+ and ICR–.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between curtain shield airbag assy (RH) and airbag sensor assy center.**

OK

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connector to the airbag sensor assy center.

(b) Using a service wire, connect ICR+ and ICR– of the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (RH) and the airbag sensor assy center.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1161/84 is not output.

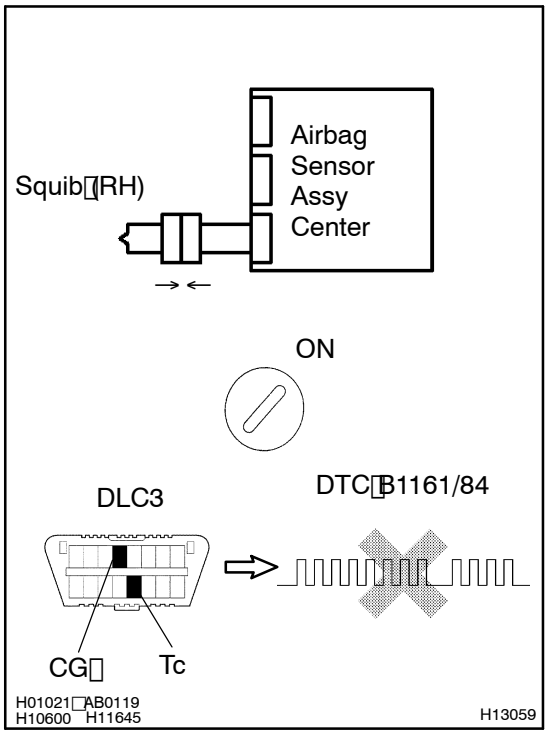
HINT:

Codes other than code B1161/84 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assy center.

OK

4	Check curtain shield squib (RH).



PREPARATION:

(a) Turn the ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the curtain shield airbag assy (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–413).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–413).

OK:

DTC B1161/84 is not output.

HINT:

Codes other than code B1161/84 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag assy (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B1162/81	Short in Curtain Shield Squib (RH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The curtain shield squib (RH) circuit consists of the airbag sensor assy center and curtain shield airbag assy (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B1162/81 is recorded when ground short is detected in the curtain shield squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1162/81	• Short circuit in curtain shield squib (RH) wire harness (to ground) • Curtain shield squib (RH) malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy (RH) • Airbag sensor assy center • Wire harness

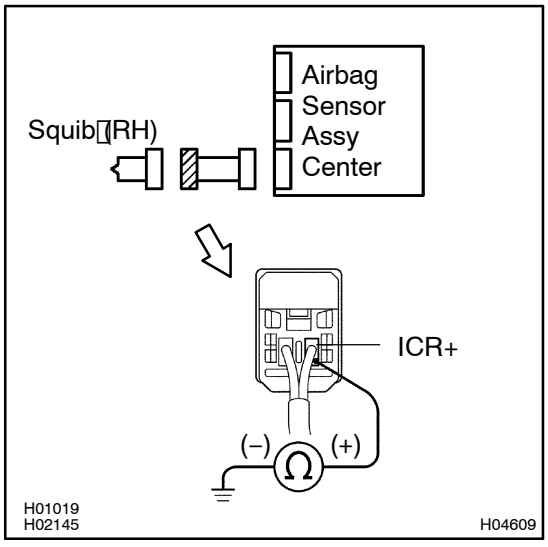
WIRING DIAGRAM

See page DI–448.

INSPECTION PROCEDURE

1	Prepare for inspection (See Pub. No. RM776E on page DI–40).

2	Check curtain shield squib (RH) circuit.

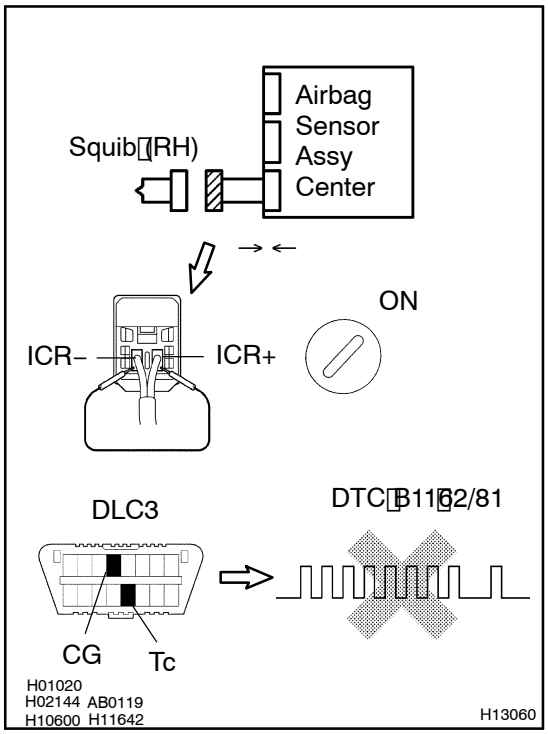


CHECK:
For the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (RH) and the airbag sensor assy center, measure the resistance between ICR+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between curtain shield airbag assy (RH) and airbag sensor assy center.**

OK

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connector to the airbag sensor assy center.

(b) Using a service wire, connect ICR+ and ICR– of the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (RH) and the airbag sensor assy center.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1162/81 is not output.

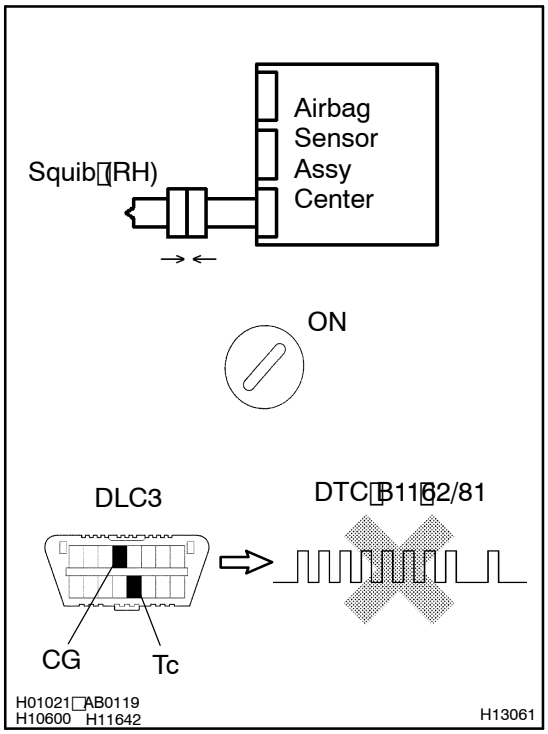
HINT:

Codes other than code B1162/81 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assy center.

OK

4	Check curtain shield squib (RH).



PREPARATION:

(a) Turn the ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.

(c) Connect the curtain shield airbag assy (RH) connector.

(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1162/81 is not output.

HINT:

Codes other than code B1162/81 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag assy (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B1163/82	Short in curtain shield Squib (RH) Circuit (to B+)

CIRCUIT DESCRIPTION

The curtain shield squib (RH) circuit consists of the airbag sensor assy center and curtain shield airbag assy (RH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B1163/82 is recorded when a B+ short is detected in the curtain shield squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1163/82	• Short circuit in curtain shield squib (RH) wire harness (to B+) • Curtain shield squib (RH) malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy (RH) • Airbag sensor assy center • Wire harness

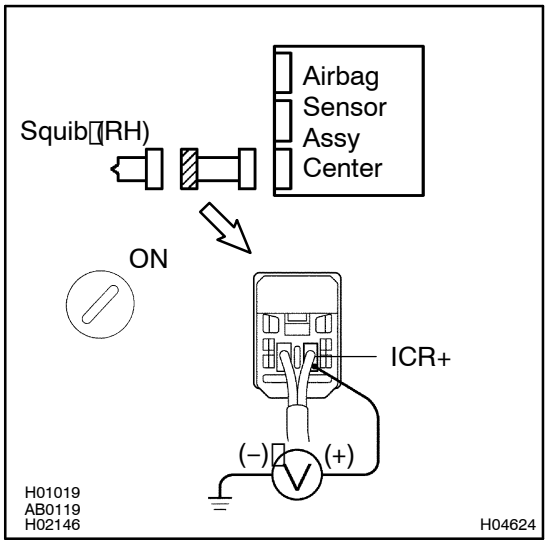
WIRING DIAGRAM

See page DI–448.

INSPECTION PROCEDURE

1	Prepare for inspection (See Pub. No. RM776E on page DI–40).

2	Check curtain shield squib (RH) circuit.



CHECK:

(a) Turn the ignition switch to ON.
(b) For the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (RH) and the airbag sensor assy center, measure the voltage between ICR+ and body ground.

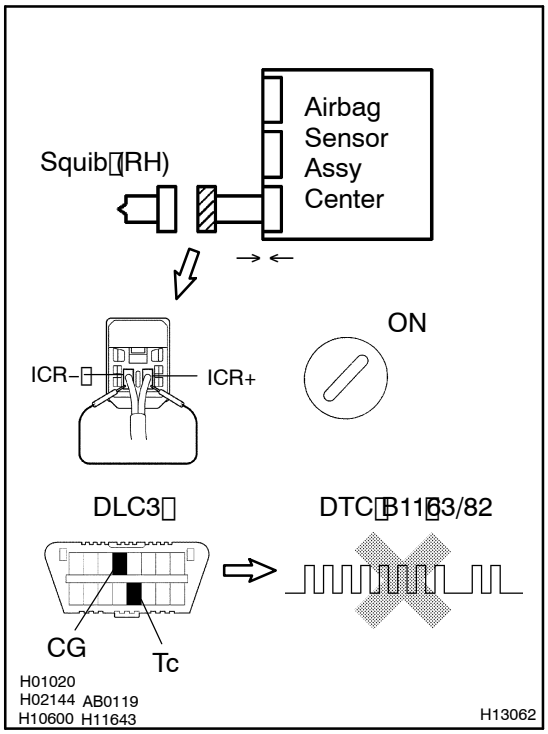
OK:

Voltage: 0 V

NG	Repair or replace harness or connector between curtain shield airbag assy (RH) and airbag sensor assy center.

OK

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connector to the airbag sensor assy center.

(b) Using a service wire, connect ICR+ and ICR– of the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (RH) and the airbag sensor assy center.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1163/82 is not output.

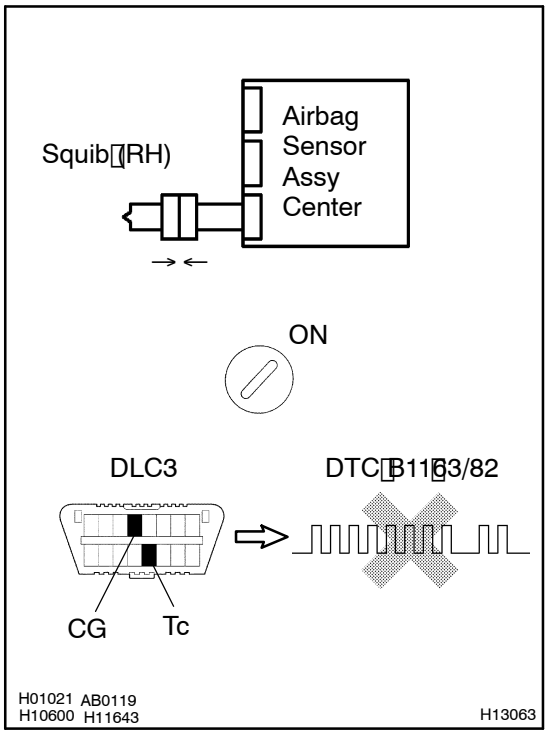
HINT:

Codes other than code B1163/82 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assy center.

OK

4	Check curtain shield squib (RH).



PREPARATION:

(a) Turn the ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the curtain shield airbag assy (RH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–413).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–413).

OK:

DTC B1163/82 is not output.

HINT:

Codes other than code B1163/82 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag assy (RH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI6PF–16

DTC	B1165/87	Short in Curtain Shield Squib (LH) Circuit

CIRCUIT DESCRIPTION

The curtain shield squib (LH) circuit consists of the airbag sensor assy center and curtain shield airbag assy (LH).

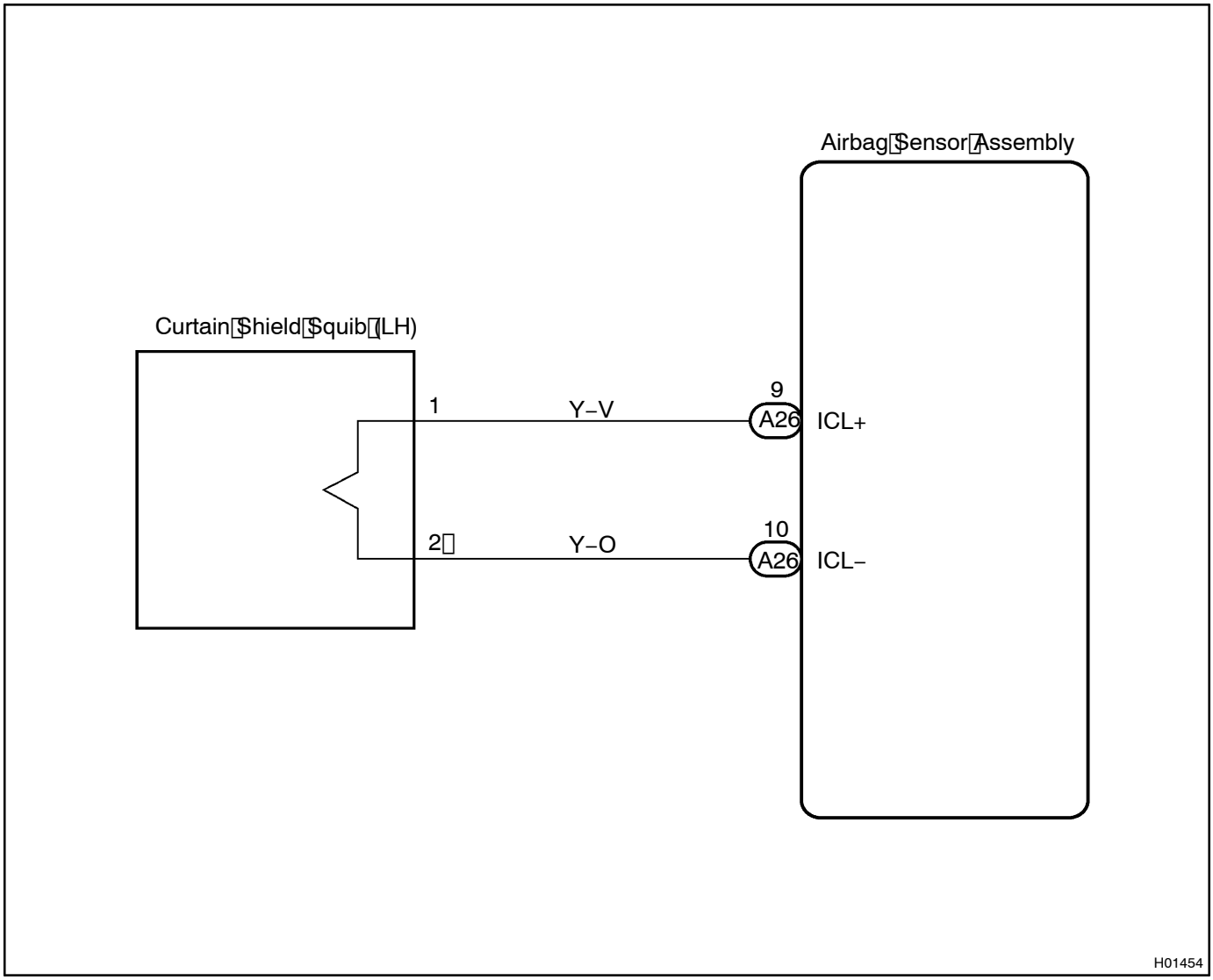
It causes the SRS to deploy when the SRS deployment conditions are satisfied.

For details of the function of each component, see OPERATION on page RS–2.

DTC B1165/87 is recorded when a short is detected in the curtain shield squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1165/87	• Short circuit between ICL+ wire harness and ICL– wire harness of squib • Curtain shield squib (LH) malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy (LH) • Airbag sensor assy center • Wire harness

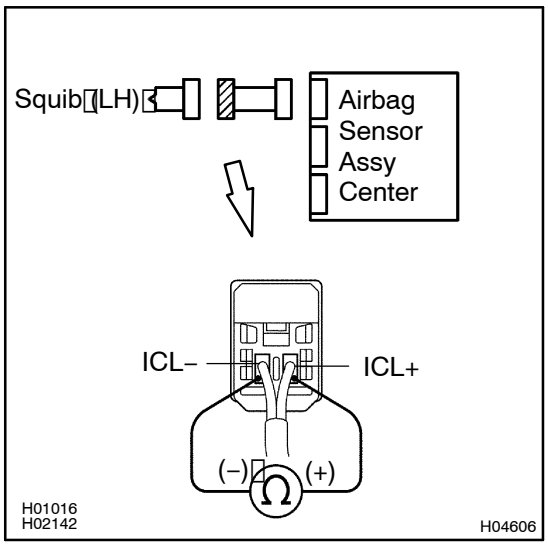
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Prepare for inspection (See Pub. No. RM776E on page DI–40).

2	Check curtain shield squib (LH) circuit.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assy center side) between the airbag sensor assy center and the curtain shield airbag assy (LH) (See page DI–413).

CHECK:

For the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (LH) and the airbag sensor assy center, measure the resistance between ICL+ and ICL–.

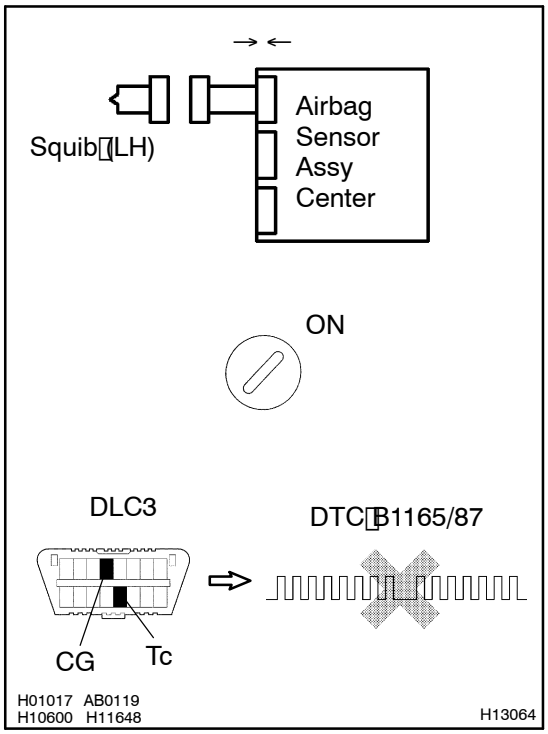
OK:

Resistance: 1 MΩ or Higher

NG	**Repair or replace harness or connector between curtain shield airbag assy (LH) and airbag sensor assy center.**

OK

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connector to the airbag sensor assy center.

(b) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1165/87 is not output.

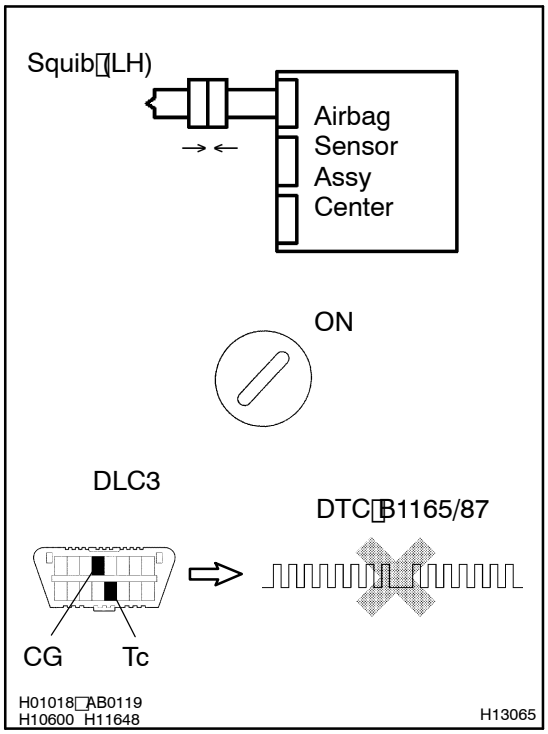
HINT:

Codes other than code B1165/87 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assy center.

OK

4	Check curtain shield squib (LH).



PREPARATION:

(a) Turn the ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the curtain shield airbag assy (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–413).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–413).

OK:

DTC B1165/87 is not output.

HINT:

Codes other than code B1165/87 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag assy (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B1166/88	Open in Curtain Shield Squib (LH) Circuit

CIRCUIT DESCRIPTION

The curtain shield squib (LH) circuit consists of the airbag sensor assy center and curtain shield airbag assy (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B1166/88 is recorded when an open is detected in the curtain shield squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1166/88	• Open circuit in ICL+ wire harness or ICL– wire harness of squib • Curtain shield squib (LH) malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy (LH) • Airbag sensor assy center • Wire harness

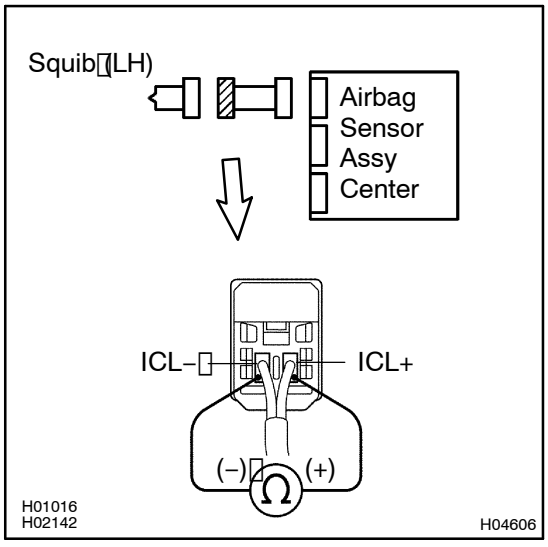
WIRING DIAGRAM

See page DI–461.

INSPECTION PROCEDURE

1	Prepare for inspection. (See Pub. No. RM776E on page DI–40)

2	Check curtain shield squib (LH) circuit.

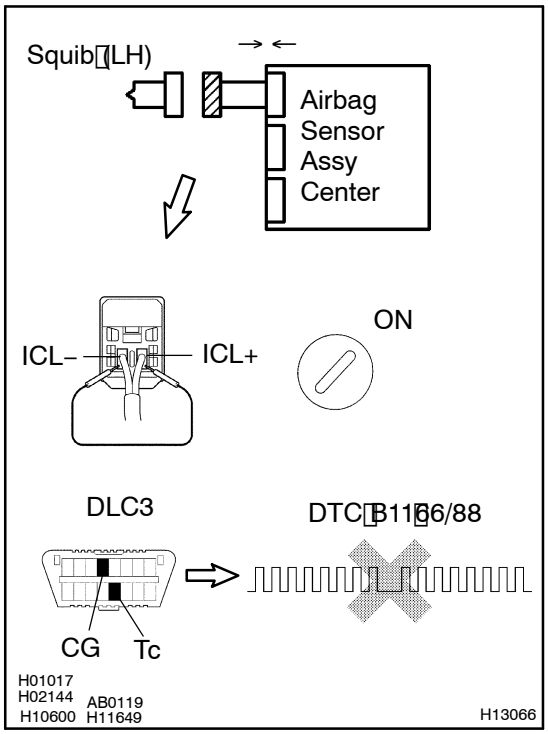


CHECK:
For the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (LH) and the airbag sensor assy center, measure the resistance between ICL+ and ICL–.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between curtain shield airbag assy (LH) and airbag sensor assy center.**

OK

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connector to the airbag sensor assy center.

(b) Using a service wire, connect ICL+ and ICL– of the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (LH) and the airbag sensor assy center.

(c) Connect negative (–) terminal cable to the battery, and wait at least 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1166/88 is not output.

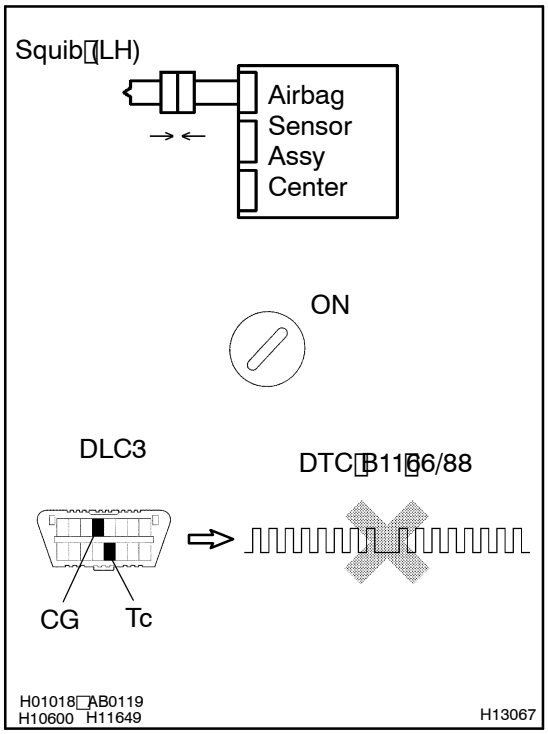
HINT:

Codes other than code B1166/88 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag sensor assy center.

OK

4	Check curtain shield squib (LH).



PREPARATION:

(a) Turn the ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the curtain shield airbag assy (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–413).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–413).

OK:

DTC B1166/88 is not output.

HINT:

Codes other than code B1166/88 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag assy (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DTC	B1167/85	Short in Curtain Shield Squib (LH) Circuit (to Ground)

CIRCUIT DESCRIPTION

The curtain shield squib (LH) circuit consists of the airbag sensor assy center and curtain shield airbag assy (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B1167/85 is recorded when ground short is detected in the curtain shield squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1167/85	• Short circuit in curtain shield squib (LH) wire harness (to ground) • Curtain shield squib (LH) malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy (LH) • Airbag sensor assy center • Wire harness

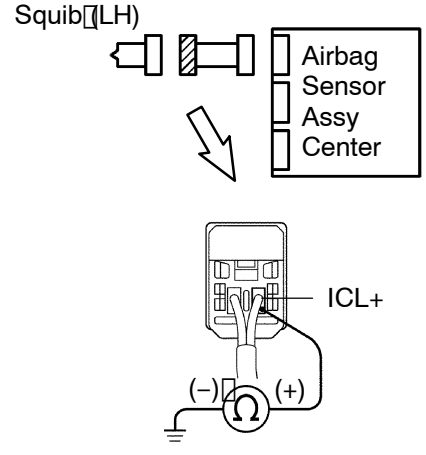
WIRING DIAGRAM

See page DI–448.

INSPECTION PROCEDURE

1	Prepare for inspection (See Pub. No. RM776E on page DI–40).

2	Check curtain shield squib (LH) circuit.

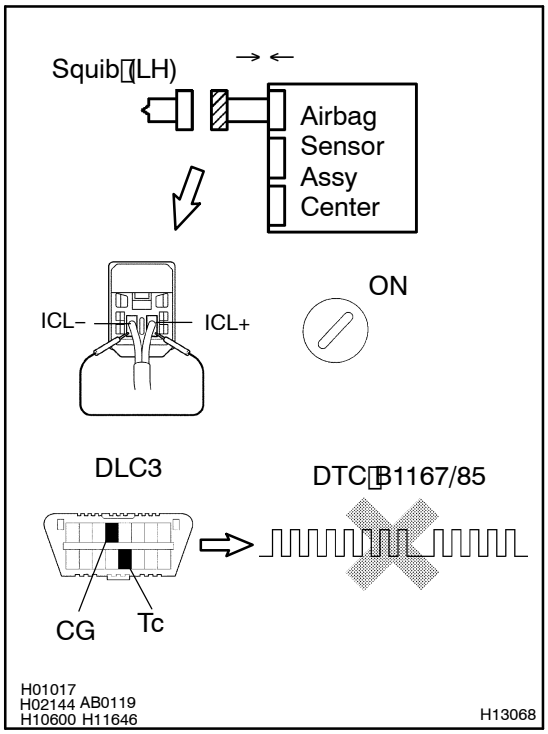


CHECK:
For the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (LH) and the airbag sensor assy center, measure the resistance between ICL+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between curtain shield airbag assy (LH) and airbag sensor assy center.**

OK

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connector to the airbag sensor assy center.

(b) Using a service wire, connect ICL+ and ICL– of the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (LH) and the airbag sensor assy center.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1167/85 is not output.

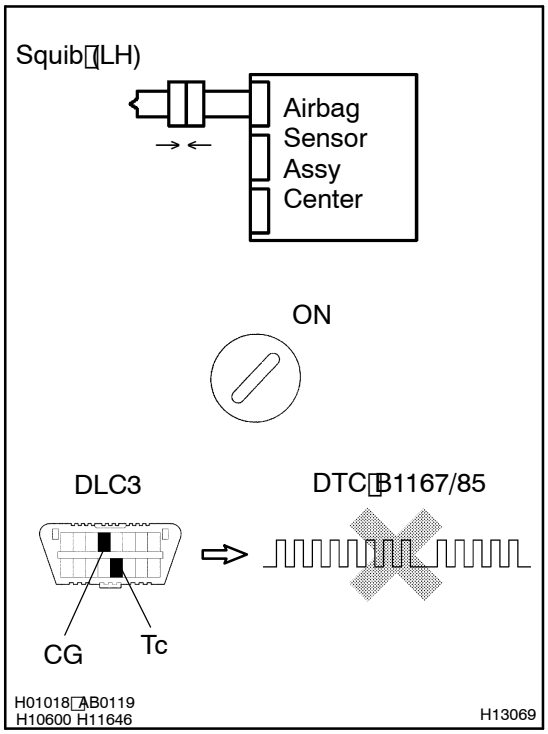
HINT:

Codes other than code B1167/85 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assy center.

OK

4	Check curtain shield squib (LH).



PREPARATION:

(a) Turn the ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the curtain shield airbag assy (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–413).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–413).

OK:

DTC B1167/85 is not output.

HINT:

Codes other than code B1167/85 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag assy (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DTC	B1168/86	Short in Curtain Shield Squib (LH) Circuit (to B+)

CIRCUIT DESCRIPTION

The curtain shield squib (LH) circuit consists of the airbag sensor assy center and curtain shield airbag assy (LH).
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC B1168/86 is recorded when a B+ short is detected in the curtain shield squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1168/86	• Short circuit in curtain shield squib (LH) wire harness (to B+) • Curtain shield squib (LH) malfunction • Airbag sensor assy center malfunction	• Curtain shield airbag assy (LH) • Airbag sensor assy center • Wire harness

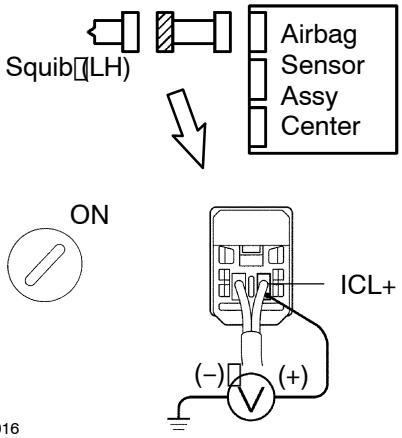
WIRING DIAGRAM

See page DI–461.

INSPECTION PROCEDURE

1	Prepare for inspection (See Pub. No. RM776E on page DI–40).

2	Check curtain shield squib (LH) circuit.



CHECK:

(a) Turn the ignition switch to ON.

(b) For the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (LH) and the airbag sensor assy center, measure the voltage between ICL+ and body ground.

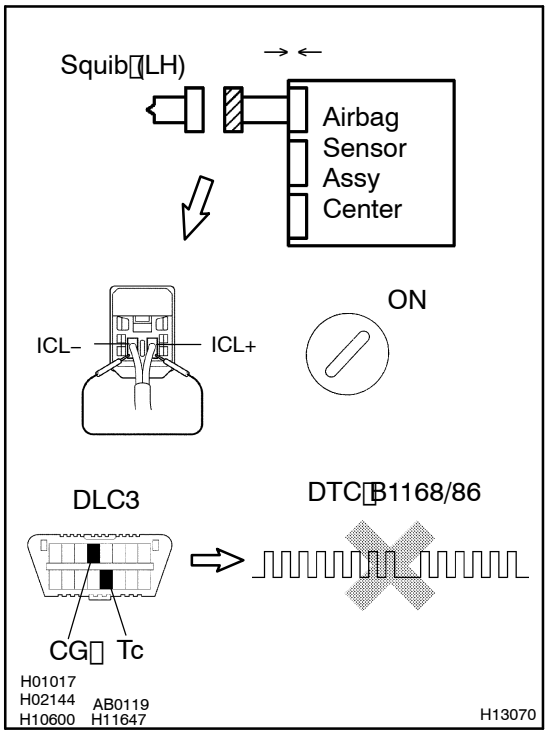
OK:

Voltage: 0 V

NG	Repair or replace harness or connector between curtain shield airbag assy (LH) and airbag sensor assy center.

OK

3	Check airbag sensor assy center.



PREPARATION:

(a) Connect the connector to the airbag sensor assy center.

(b) Using a service wire, connect ICL+ and ICL– of the connector (on the curtain shield airbag assy side) between the curtain shield airbag assy (LH) and the airbag sensor assy center.

(c) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON and wait at least for 20 seconds.

(b) Clear the DTC stored in memory (See page DI–413).

(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn the ignition switch to ON, and wait at least for 20 seconds.

(e) Check the DTC (See page DI–413).

OK:

DTC B1168/86 is not output.

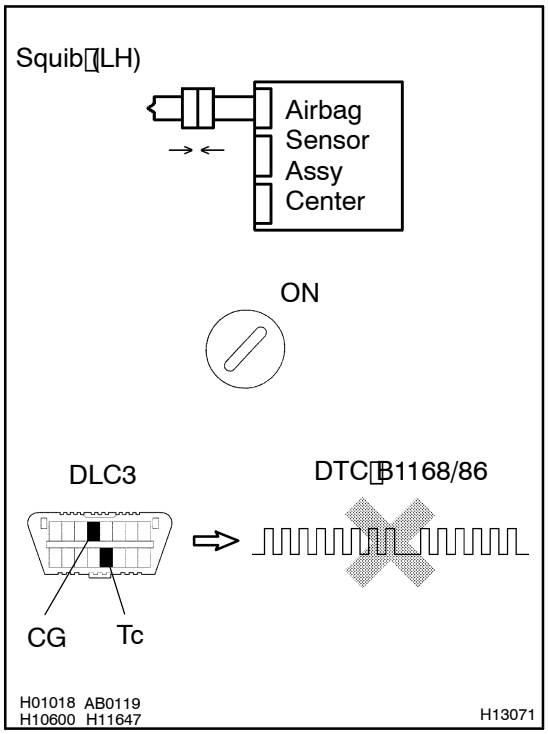
HINT:

Codes other than code B1168/86 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assy center.

OK

4	Check curtain shield squib (LH).



PREPARATION:

(a) Turn the ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the curtain shield airbag assy (LH) connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn the ignition switch to ON, and wait at least for 20 seconds.
(b) Clear the DTC stored in memory (See page DI–413).
(c) Turn the ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn the ignition switch to ON, and wait at least for 20 seconds.
(e) Check the DTC (See page DI–413).

OK:

DTC B1168/86 is not output.

HINT:

Codes other than code B1168/86 may be output at this time, but they are not relevant to this check.

NG	Replace curtain shield airbag assy (LH).

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI611–06

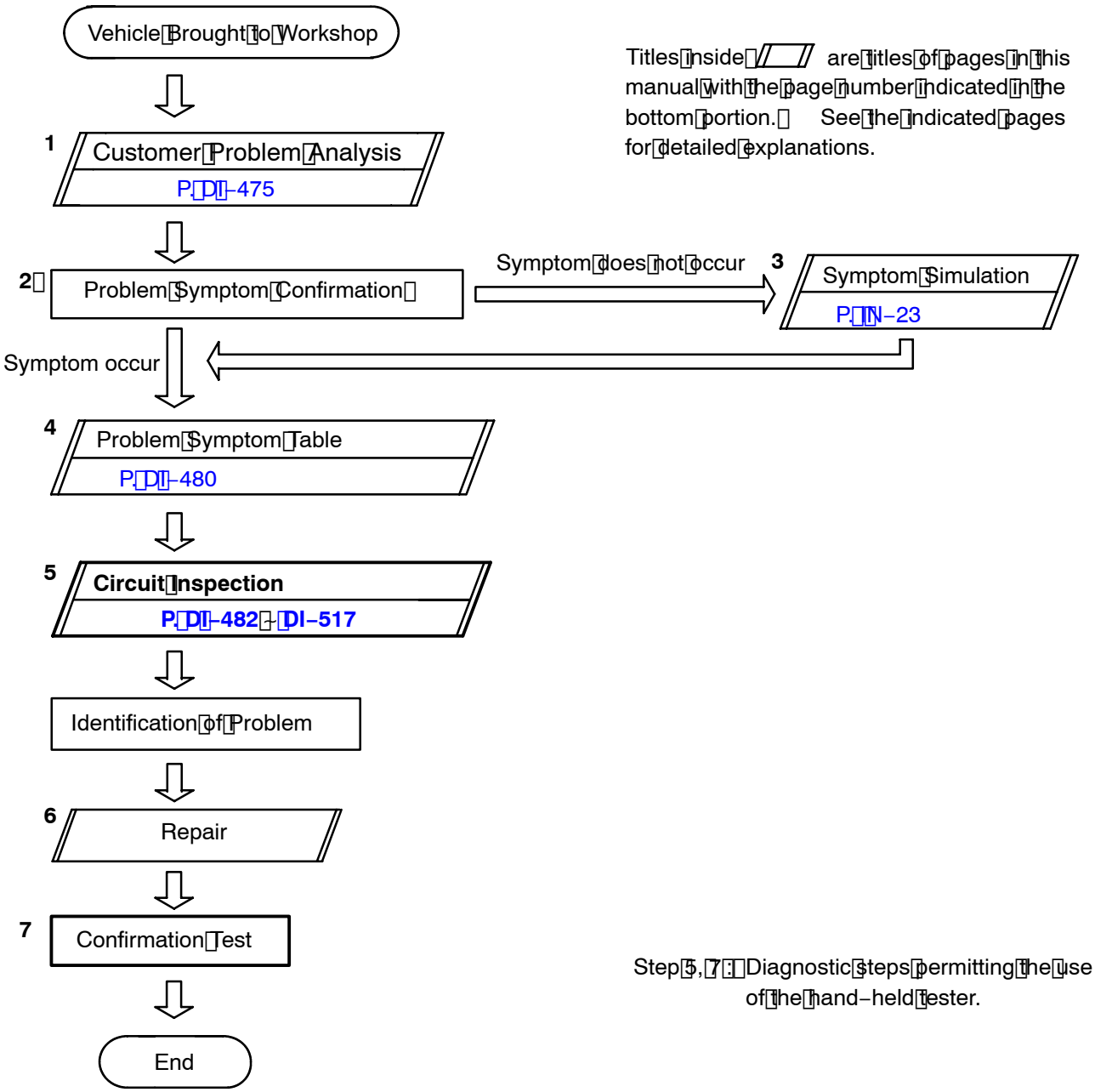
HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

For troubleshooting use a volt/ohm meter.

Be sure to use troubleshooting procedure appropriate to the diagnostic tool being used.

Perform troubleshooting in accordance with the procedure on the following page.



DI612–01

CUSTOMER PROBLEM ANALYSIS CHECK

THEFT DETERRENT SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

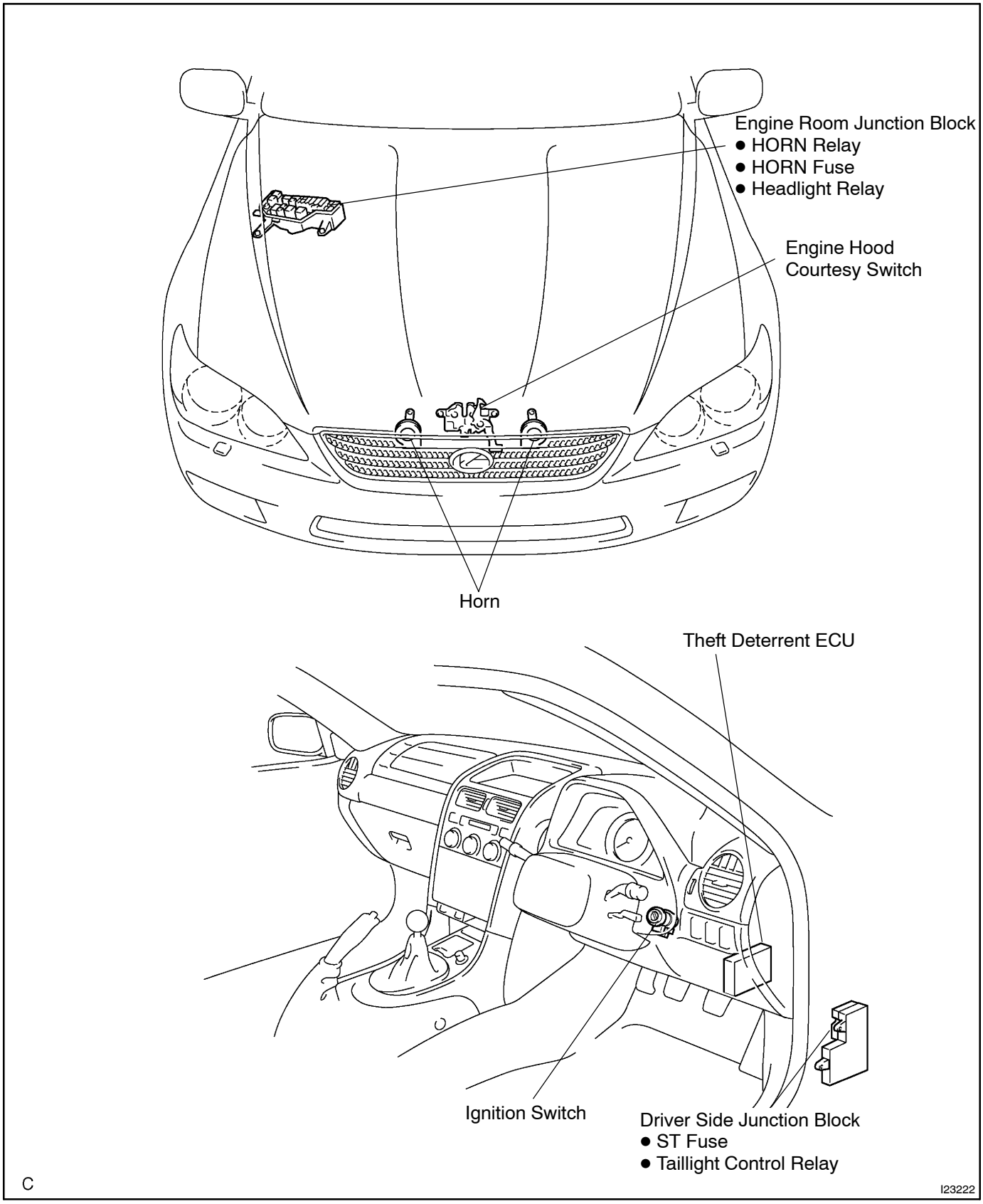
Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (Times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Problem Symptom

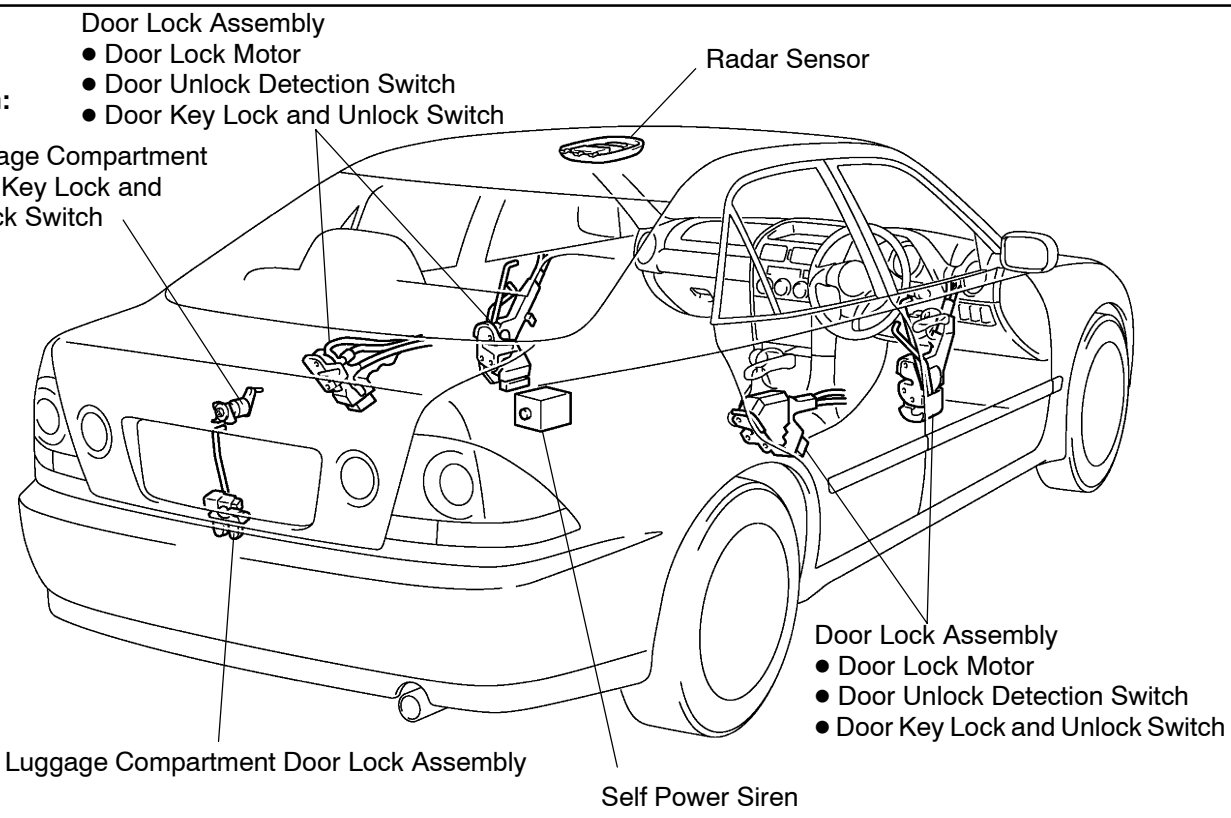
☐ Theft deterrent system cannot be set.		
☐ Indicator light does not flash when the theft deterrent system is set. (It stays ON or does not light at all.)		
☐ Theft deterrent system does not operate.	☐ When unlocked using the door lock knob. ☐ When the engine hood is opened.	Malfunction ☐ Horns only ☐ Theft deterrent horn only ☐ Headlights only ☐ Taillights only ☐ Door lock operation only
☐ System cannot be canceled once set.	☐ When door is unlocked using key or wireless door lock control system. ☐ When the key is inserted in the ignition key cylinder and turned to ACC or ON position. (However, only when the system has never operated) ☐ When the luggage compartment door is opened with the key.	
☐ System cannot be canceled during warning operation.	☐ When door is unlocked using key or wireless door lock control system. ☐ When the key is inserted in the ignition key cylinder and turned to ACC or ON position.	
☐ Warning operation starts when the system is set and the door or luggage compartment door is opened with the key.		
☐ Others.		

DI9HW–01

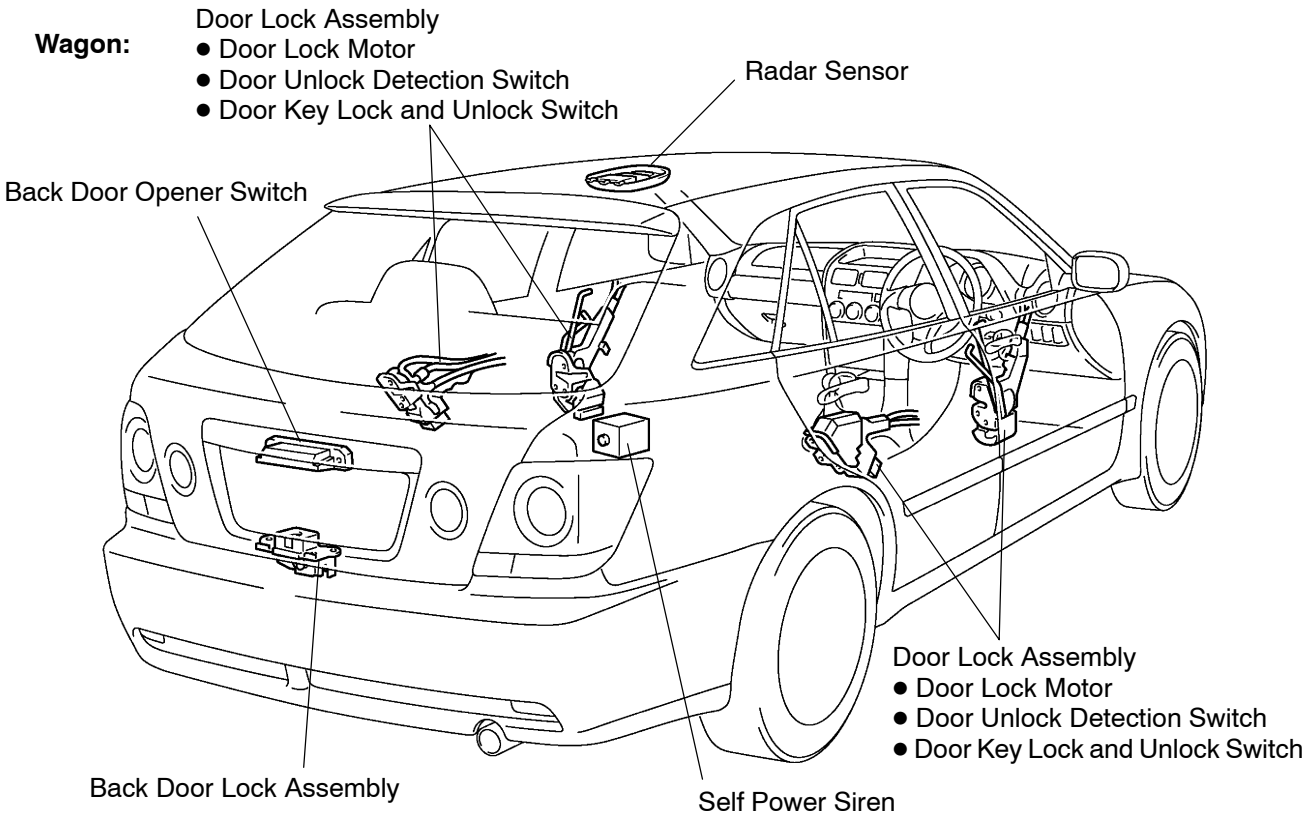
PARTS LOCATION



Sedan:



Wagon:

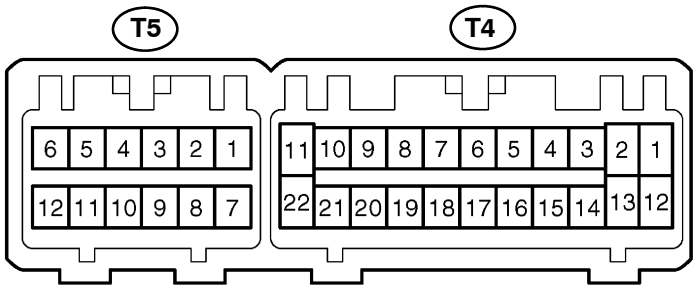


C

I23223

DI615–05

TERMINALS OF ECU



I01920

Symbols (Terminals No.)	Wiring Color	Condition	STD Value
HEAD ↔ E (T4–1 ↔ T4–22)	R–B ↔ W–B	Light control switch position is HEAD.	Below 1 V
		Light control switch position is OFF or TAIL.	10 – 14 V
TAIL ↔ E (T4–2 ↔ T4–22)	R–W ↔ W–B	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
DSWH ↔ E (T4–4 ↔ T4–22)	L–R ↔ W–B	Engine hood courtesy switch position is ON. (Engine hood opened)	Below 1 V
		Engine hood courtesy switch position is OFF. (Engine hood closed)	7 – 8 V
LUG ↔ E (T4–5 ↔ T4–22)	B–W ↔ W–B	Luggage compartment door key lock and unlock switch position is ON.	Below 1 V
		Luggage compartment door key lock and unlock switch position is OFF.	7 – 8 V
NAVI1(T4–6)	G–W	Navigation system checking.	–
S+B ↔ E (T4–8 ↔ T4–22)	G ↔ W–B	Constant	10 – 14 V
CLTB ↔ E (T4–9 ↔ T4–22)	R ↔ W–B	Ignition switch position is LOCK.	Below 1 V
		Ignition switch position is ACC or ON.	10 – 14 V
IG ↔ E (T4–10 ↔ T4–22)	B–R ↔ W–B	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
+B1 ↔ E (T4–11 ↔ T4–22)	W–R ↔ W–B	Constant	10 – 14 V
H ↔ E (T4–12 ↔ T4–22)	R–Y ↔ W–B	Light control switch position is HEAD.	Below 1 V
		Light control switch position is OFF or TAIL.	10 – 14 V
T ↔ E (T4–13 ↔ T4–22)	R ↔ W–B	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
A ↔ E (T4–14 ↔ T4–22)	G–Y ↔ W–B	Light control switch position is AUTO.	Below 1 V
		Light control switch position is OFF, TAIL or HEAD.	10 – 14 V
FOG ↔ E (T4–17 ↔ T4–22)	W–R ↔ W–B	Fog light switch position is ON.	Below 1 V
		Fog light switch position is OFF.	10 – 14 V
IOUT ↔ E (T4–18 ↔ T4–22)	G–O ↔ W–B	Radar sensor detection invader	Below 1 V
		Constant	10 – 14 V
KSW ↔ E (T4–19 ↔ T4–22)	B–Y ↔ W–B	Key is inserted.	Below 1 V
		Key is not inserted.	10 – 14 V
CLTS ↔ E (T4–20 ↔ T4–22)	Y ↔ W–B	Ignition switch position is LOCK.	Below 1 V
		Ignition switch position is ACC or ON.	10 – 14 V

CLTE ↔ E (T4–21 ↔ T4–22)	BR ↔ W–B	Constant	Below 1 V
E ↔ Body ground (T4–22 ↔ Body ground)	W–B ↔ Body ground	Constant	Below 1 V
HORN ↔ E (T5–4 ↔ T4–22)	G–W ↔ W–B	Horn switch position is ON.	Below 1 V
		Horn switch position is OFF.	10 – 14 V
MPX1(T5–7)	O	Multiplex communication circuit.	–
MPX2(T5–8)	L	Multiplex communication circuit.	–
CLTS ↔ E (T5–9 ↔ T4–22)	L–Y ↔ W–B	Theft deterrent system change condition.	One time
		Constant	2 – 4 V
TRIG ↔ E (T5–10 ↔ T4–22)	L–O ↔ W–B	Theft deterrent system is alarming condition.	Below 1 V
		Constant	10 – 14 V
IND ↔ E (T5–12 ↔ T4–22)	L–B ↔ W–B	During set preparation.	3 – 5 V

DI616–06

PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the matrix chart below for each malfunction symptom and trouble-shoot for each circuit.

HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

Symptom	Suspect Area	See page
The theft deterrent system cannot be set	3. Indicator light circuit 4. ECU power source circuit 5. Key unlock warning switch circuit 6. Luggage compartment door key lock and unlock switch circuit 7. Luggage compartment door courtesy switch circuit 8. Door key lock and unlock switch circuit 9. Door courtesy switch circuit 10. Door unlock detection switch circuit 11. Engine hood courtesy switch circuit	DI–482 DI–484 DI–507 DI–509 DI–577* DI–589* DI–574* DI–586* DI–517
The indicator light does not blink when system is set.	Indicator light circuit	DI–482
When the system is set (The system does not operate when the rear door is unlocked).	Door unlock detection switch circuit	DI–586*
When the system is set (The system does not operate when the luggage compartment door is opened by a method other than the key).	Luggage compartment door courtesy switch circuit	DI–577*
When the system is set (The system does not operate when the engine hood is opened).	Engine hood courtesy switch circuit	DI–517
When the system is set (It is not canceled when the ignition key is turned to ACC or ON position (Except Europe Models)).	Ignition switch circuit	DI–487
When the system is set (It still operates when the luggage compartment door is opened with the key (Except Europe Models)).	Luggage compartment door key lock and unlock switch circuit	DI–509
When the system is set (The system does not operate when after 30 seconds put your hand through the window and shake it near the sensor).	Radar sensor circuit	DI–515
While the system is in warning operation (Horns do not sound).	Horn relay circuit	DI–490
While the system is in warning operation (Siren does not sound).	Self power siren circuit	DI–512
While the system is in warning operation (When the siren does not sound or stops soon after it starts).	Self power siren battery	BE–124*
While the system is in warning operation (Headlights do not flash).	Headlight control relay circuit	DI–500
While the system is in warning operation (Taillights do not flash).	Taillight control relay circuit	DI–503
While the system is in warning operation (Hazard lights do not flash).	Hazard switch circuit	DI–559*
While the system is in warning operation (The door lock is not locked).	Door unlock detection switch circuit	DI–586*
System is still set even when a rear door is open	Door courtesy switch circuit	DI–574*
Even when the system is not set (Horns sound).	Horn relay circuit	DI–490

Even when the system is not set (Siren sounds).	Self power siren circuit	DI–512
Even when the system is not set (when the siren does not sound or stops soon after it starts).	Self power siren battery	BE–124*
Even when the system is not set (Headlights stay on).	Headlight control relay circuit	DI–500
Even when the system is not set (Taillights stay on).	Taillight control relay circuit	DI–503
Even when the system is not set (Hazard lights do not flash).	Hazard switch circuit	DI–559*

* : See Pub No. RM684E

DI617–05

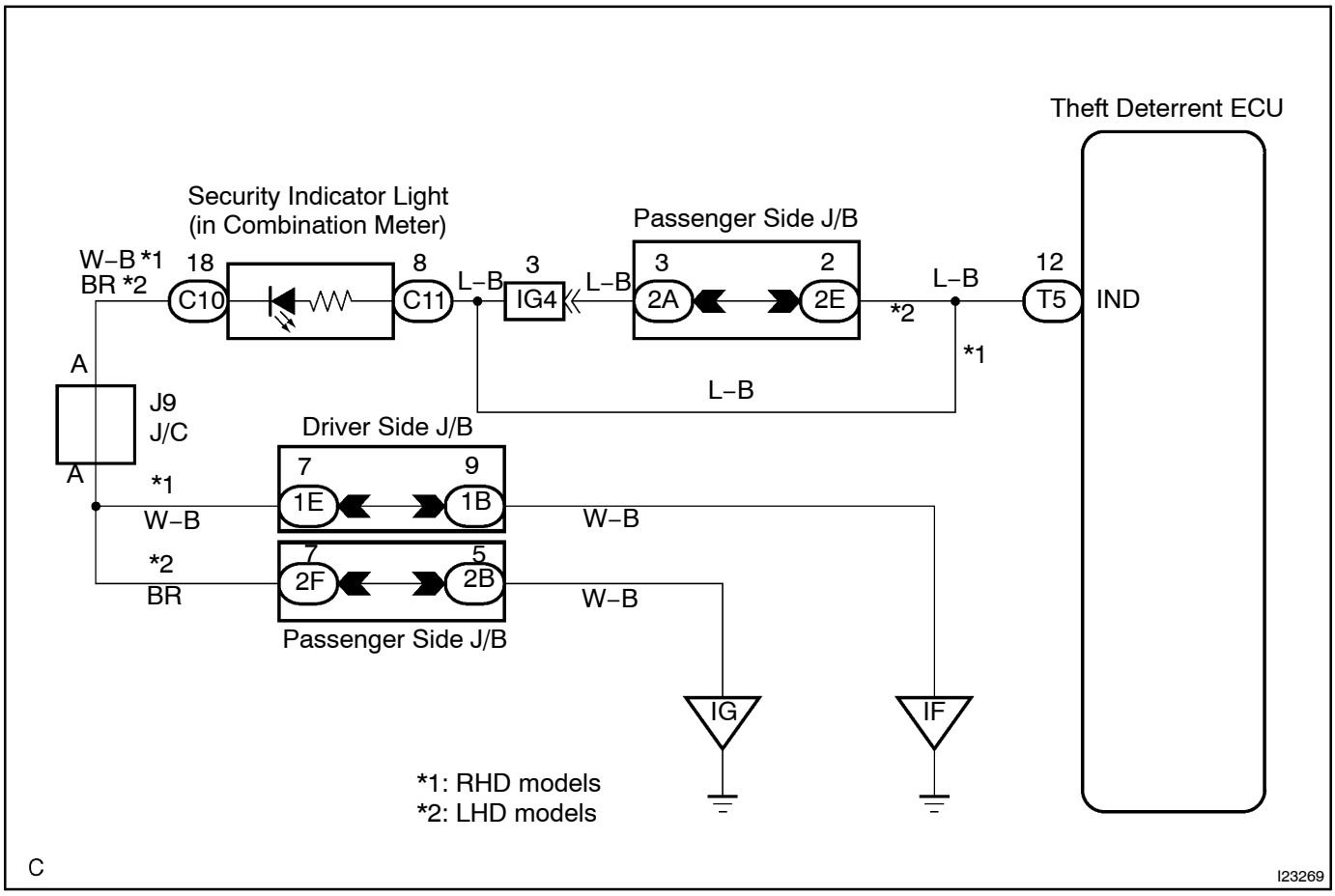
CIRCUIT INSPECTION

Indicator Light Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is preparing to set, this circuit lights up the indicator light. When the system has been set, it continually turns the indicator light ON for 0.2 second and turns it OFF for 1.8 second, thus blinking the indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check theft deterrent indicator using hand–held tester.**

PREPARATION:
(a) Connect the hand–held tester to the DLC3.
(b) Connect terminals Tc and E1 of DLC1.

CHECK:
Check that the theft deterrent indicator can light in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–480).**

NG

2	**Check indicator light (See Pub No. RM684E on page BE–124).**

NG → **Replace the bulb or meter wire harness.**

OK

3	**Check harness and connector between theft deterrent ECU and indicator light, indicator light and body ground (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–480).

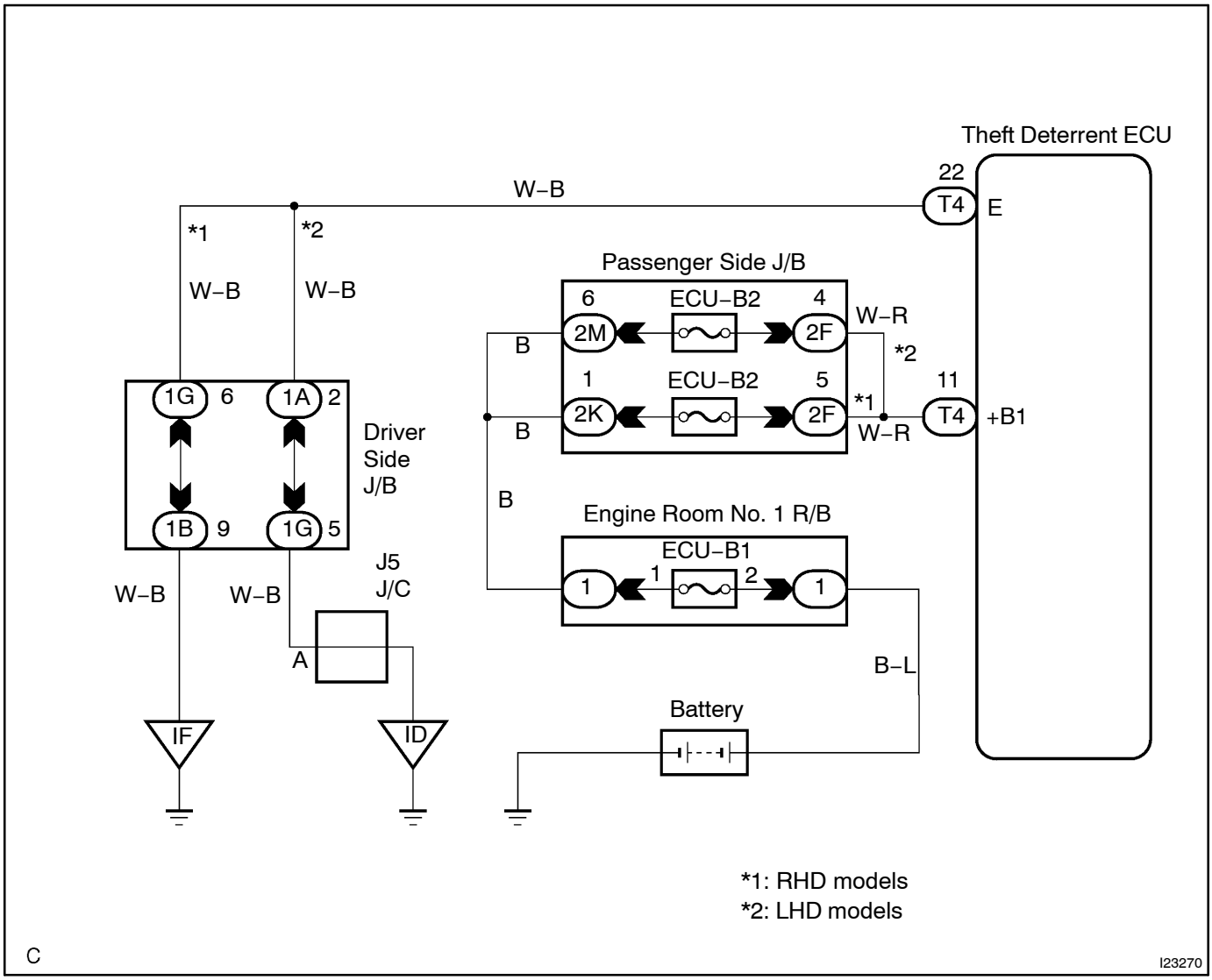
DI618–04

ECU Power Source Circuit

CIRCUIT DESCRIPTION

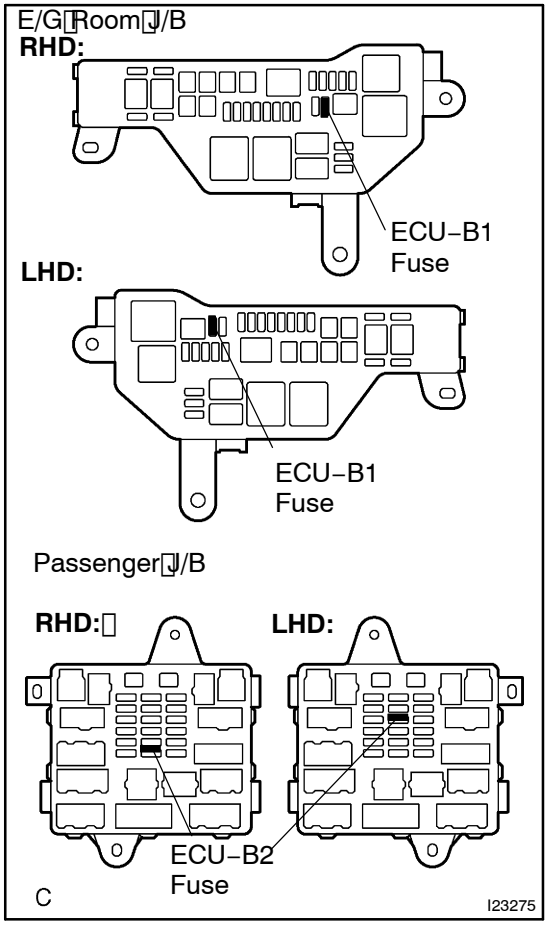
This circuit provides power to operate the theft deterrent ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ECU–B2 and ECU–B1



PREPARATION:

Remove ECU–B2 and ECU–B1 fuse from engine room junction block No. 2.

CHECK:

Check continuity of ECU–B2 and ECU–B1 fuse.

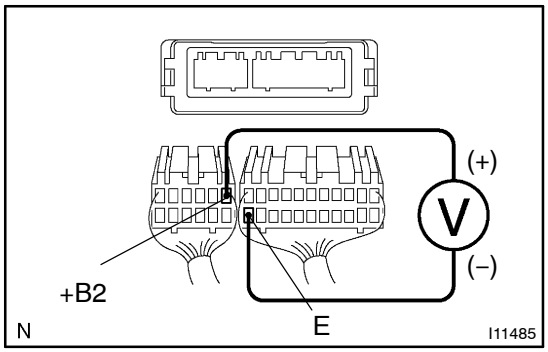
OK:

Continuity

NG → **Check for short in all the harness and components connected to the ECU–B2 and ECU–B1 fuse (See attached wiring diagram).**

OK

2	Check voltage between terminals +B2 and E of theft deterrent ECU connector.



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminals +B2 and E of theft deterrent ECU connector.

OK:

Voltage: 10~14V

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–480).**

NG

3	Check for open in harness and connector between ECU and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and repair harness and connector between ECU and battery.

DI9HX–01

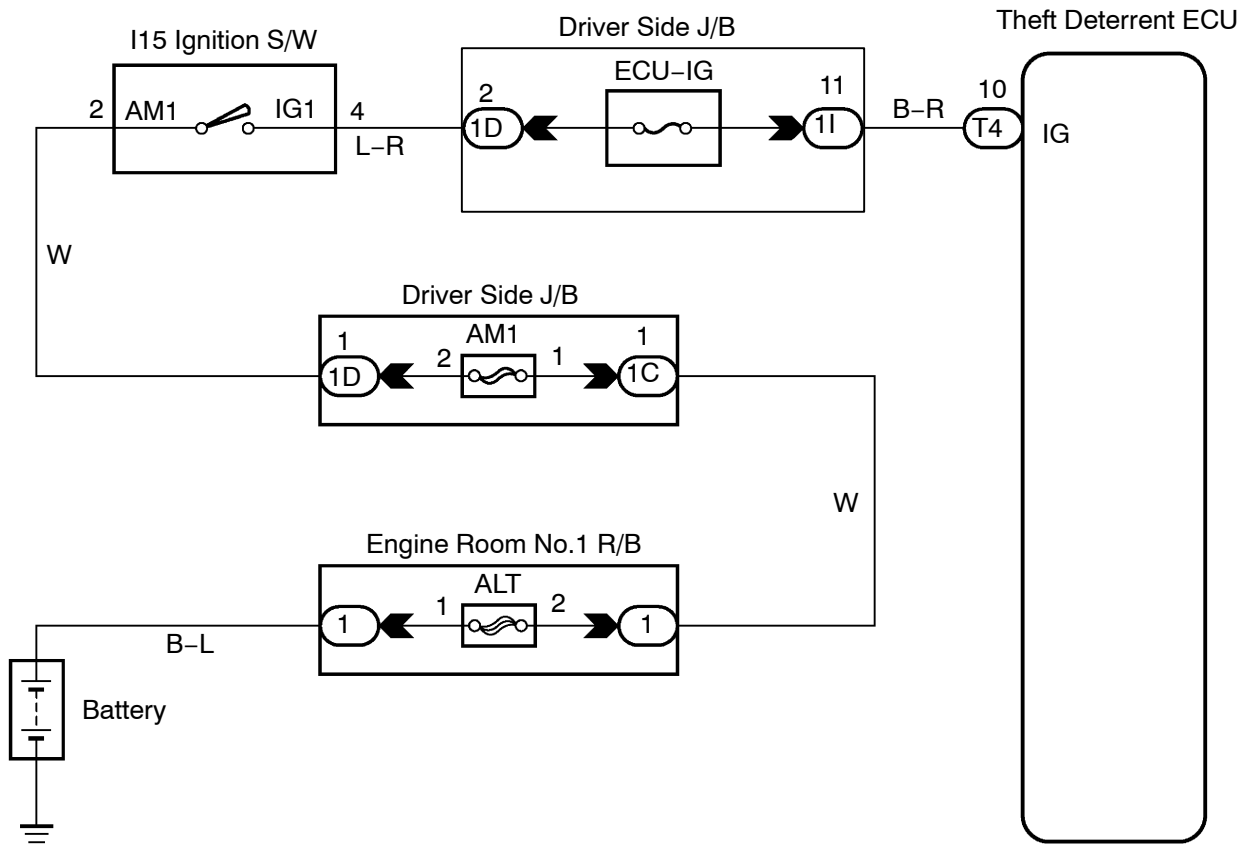
Ignition Switch Circuit

CIRCUIT DESCRIPTION

If the ignition switch is turned to the ON position, battery positive voltage is applied to the terminals IG of the ECU. Furthermore, power supplied from the terminals IG of the ECU is used as power for the door courtesy switch, and position switch, etc.

WIRING DIAGRAM

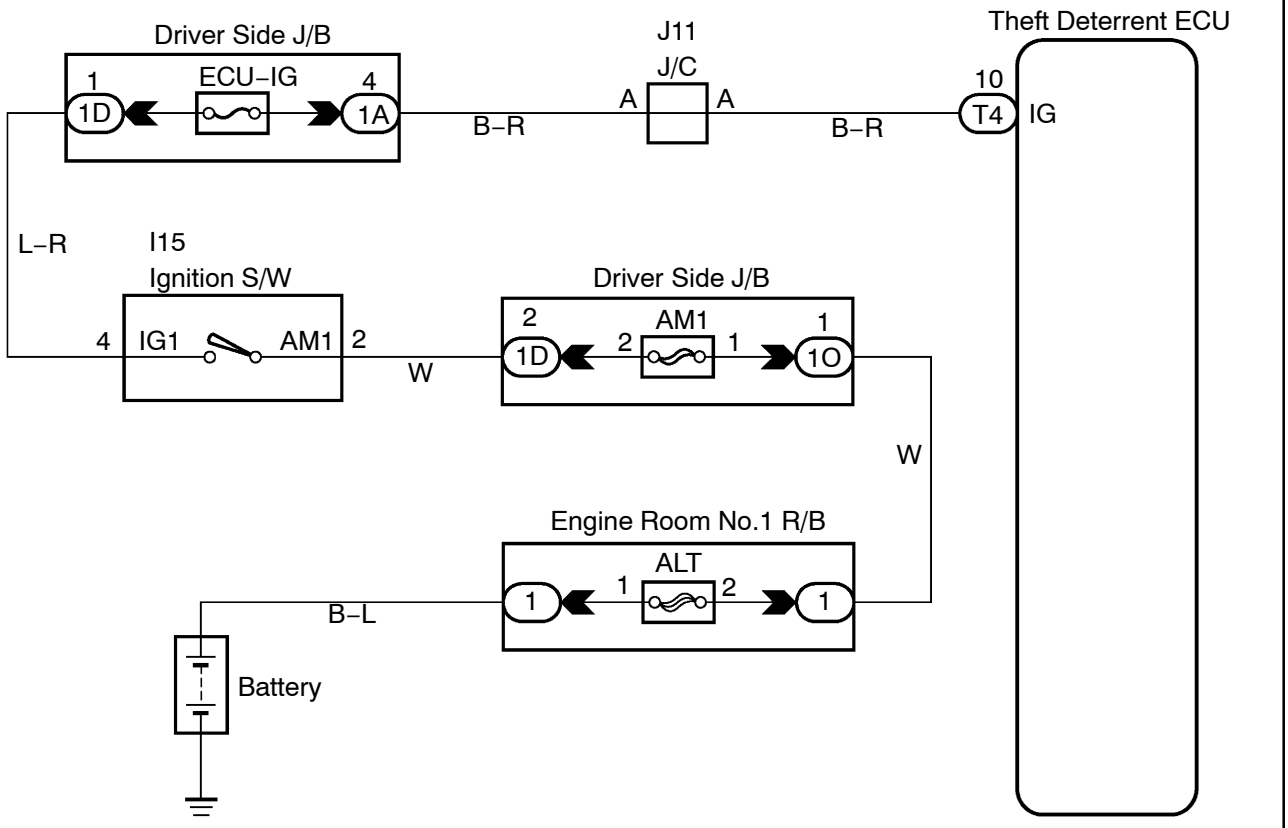
RHD models



N

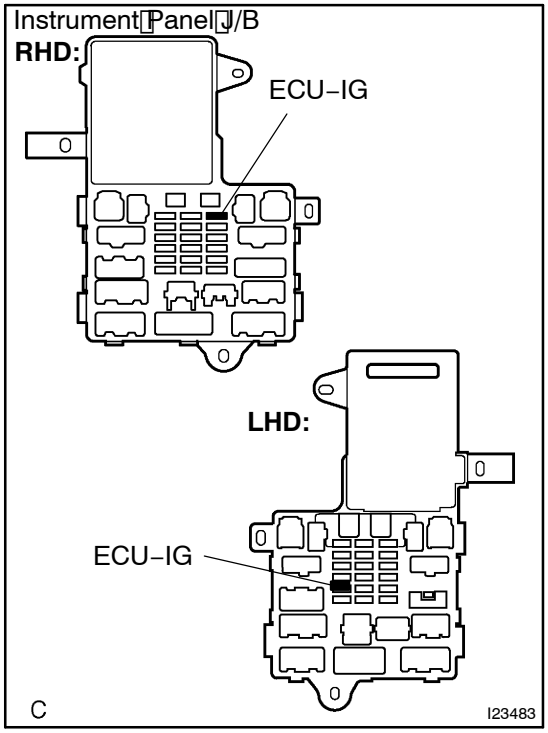
I11439

LHD models


Driver Side J/B
1
ECU–IG
4
1D
1A
B–R
J11
J/C
A
A
B–R
Theft Deterrent ECU
10
T4
IG
L–R
I15
Ignition S/W
4
IG1
AM1
2
W
Driver Side J/B
2
AM1
1
1D
2
1
1O
W
Engine Room No.1 R/B
ALT
1
1
2
1
B–L
Battery
N
I15559

INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**



PREPARATION:

(a) Remove the fuse box opening cover.

(b) Remove ECU–IG fuse from instrument panel junction block.

CHECK:

Check continuity of ECU–IG fuses.

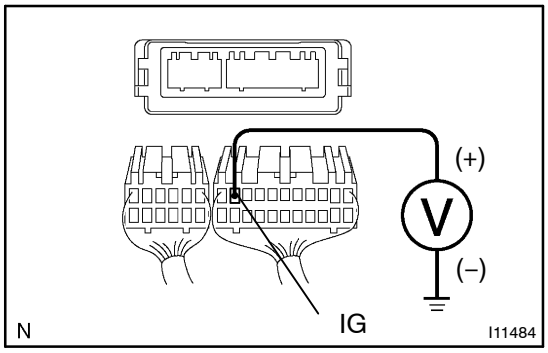
OK:

Continuity

NG → **Check for short in all the harness and components connected to the ECU–IG fuse (See attached wiring diagram).**

OK

2	**Check voltage between terminals IG of theft deterrent ECU and body ground.**



PREPARATION:

(a) Disconnect the theft deterrent ECU connectors.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals IG of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and battery (See page IN–34).**

OK

Check and replace theft deterrent ECU.

DI9HY–01

Horn Relay Circuit

CIRCUIT DESCRIPTION

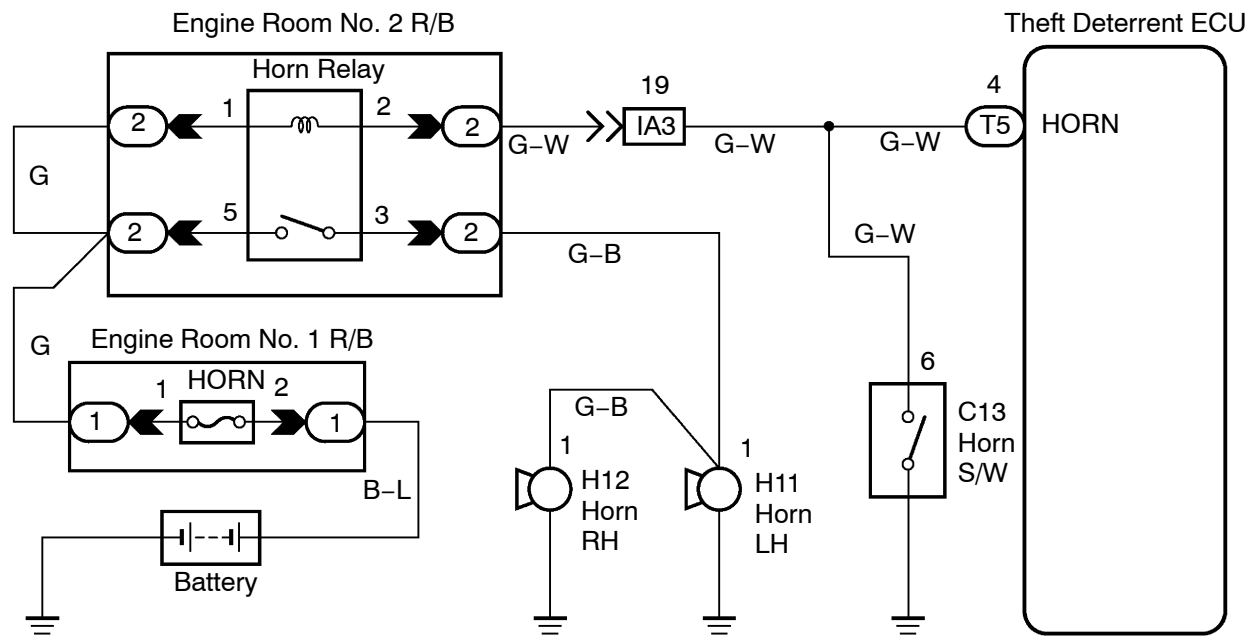
When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF in approximately 0.4 sec. cycles. This switches the horn relay ON and OFF, thus the horns blow (See the wiring diagram below).

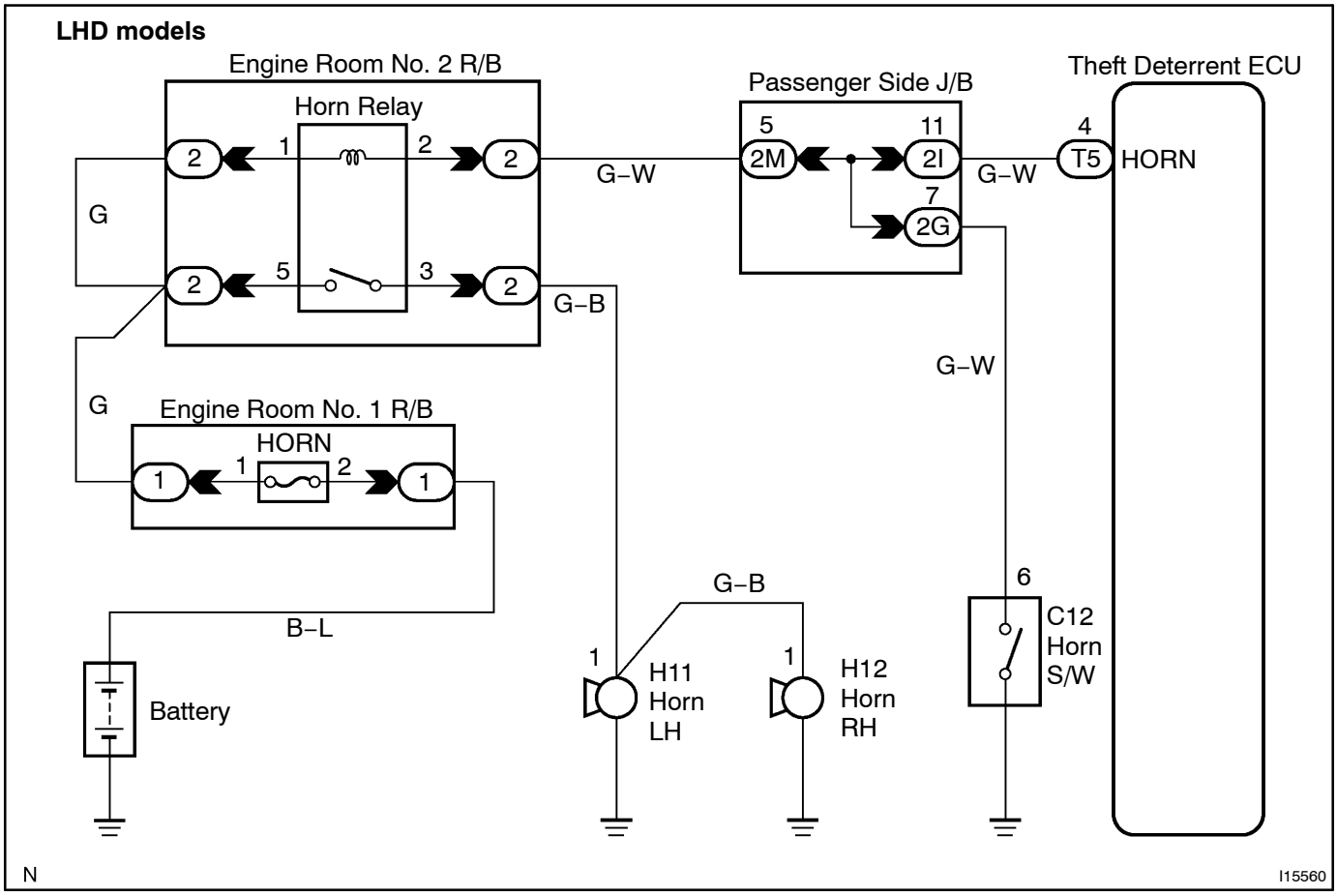
In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the horn relay switches OFF, thus stopping the horns from blowing:

(1) Unlock the front LH or RH door with key. (Except Europe Models)
(2) Turn the ignition switch to ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 60 seconds.

WIRING DIAGRAM

RHD models



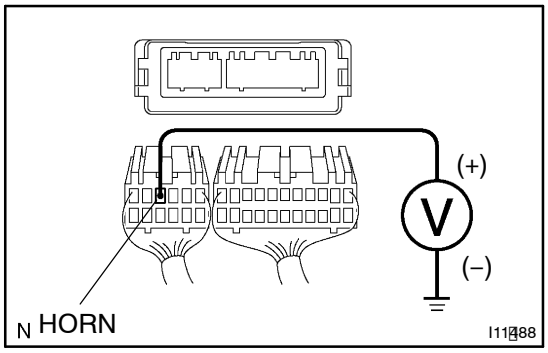

LHD models
Engine Room No. 2 R/B
Horn Relay
Passenger Side J/B
Theft Deterrent ECU
2
1
2
2
G–W
5
11
4
2M
2I
T5
HORN
G–W
7
2G
G
5
3
2
G–B
G–W
G
Engine Room No. 1 R/B
HORN
1
1
2
1
6
G–B
B–L
C12
Horn
S/W
1
H11
Horn
LH
1
H12
Horn
RH
Battery
N
I15560

INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the horns blow normally whenever the horn switch is operated. If horn operation is not normal when the horn switch is operated, check the horn switch.

1	**Check voltage between terminal HORN of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connectors.

CHECK:

Measure voltage between terminal HORN of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and horn relay (See page IN–34).**

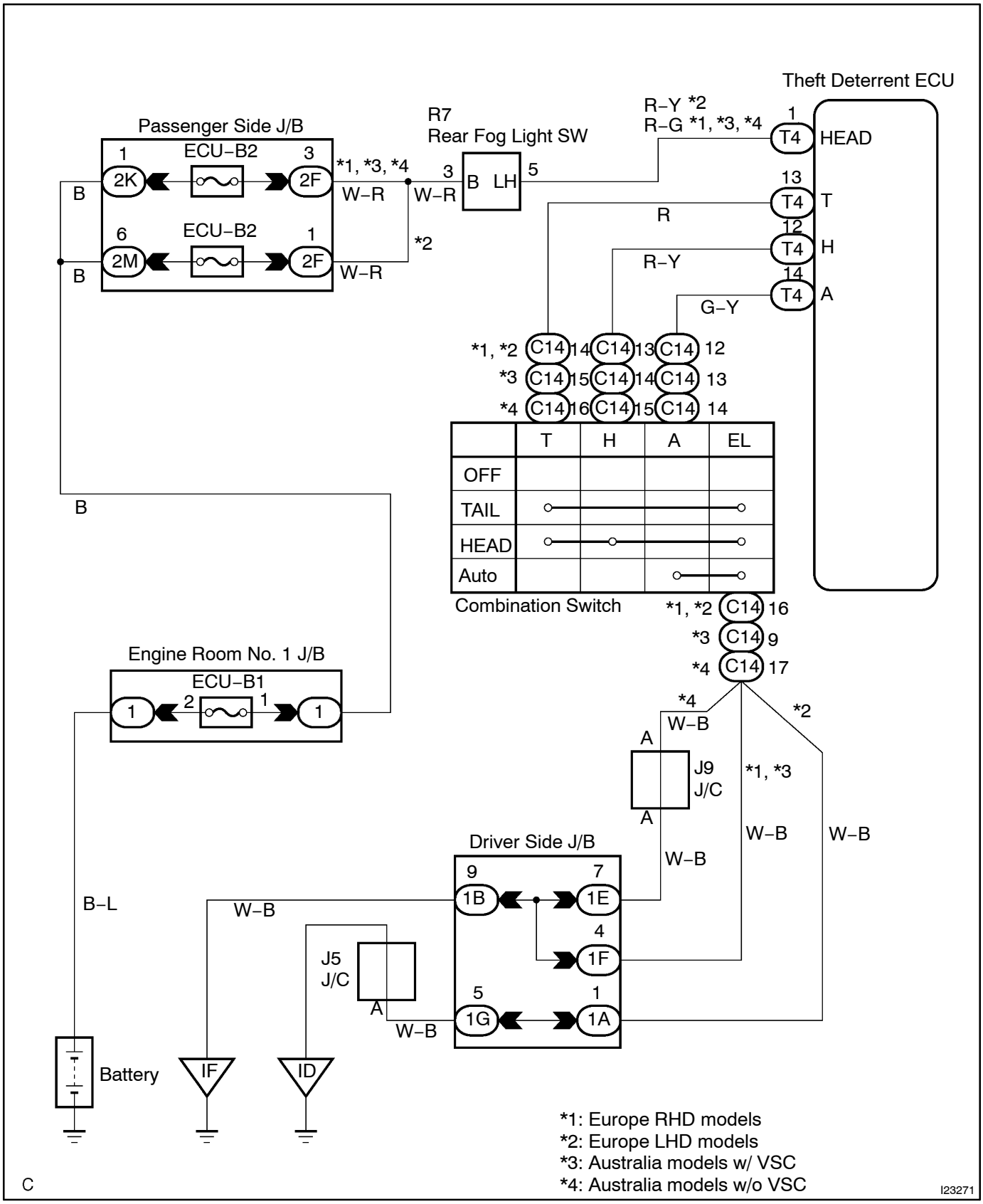
OK

Check and replace theft deterrent ECU (See page IN–34).

DI61B–03

Light control switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check headlight control switch using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the headlight control switch using DATA LIST.
OK:

Terminal (tester display) / Switch position	Headlight Switch (Tail)	Headlight Switch (Head)	Auto light switch
OFF	OFF	OFF	OFF
TAIL	ON	OFF	OFF
HEAD	ON	ON	OFF
AUTO	OFF	OFF	ON

OK → **Proceed to next circuit inspection shown in problem symptoms table.(See page DI–480).**

NG

2	**Check headlight control switch (See Pub No. RM684E on page BE–30).**

NG → **Replace the headlight control switch.**

OK

3	Check wire harness and connector between headlight control switch and Body ECU (See page IN–34).

NG → Repair or replace wire harness or connector.

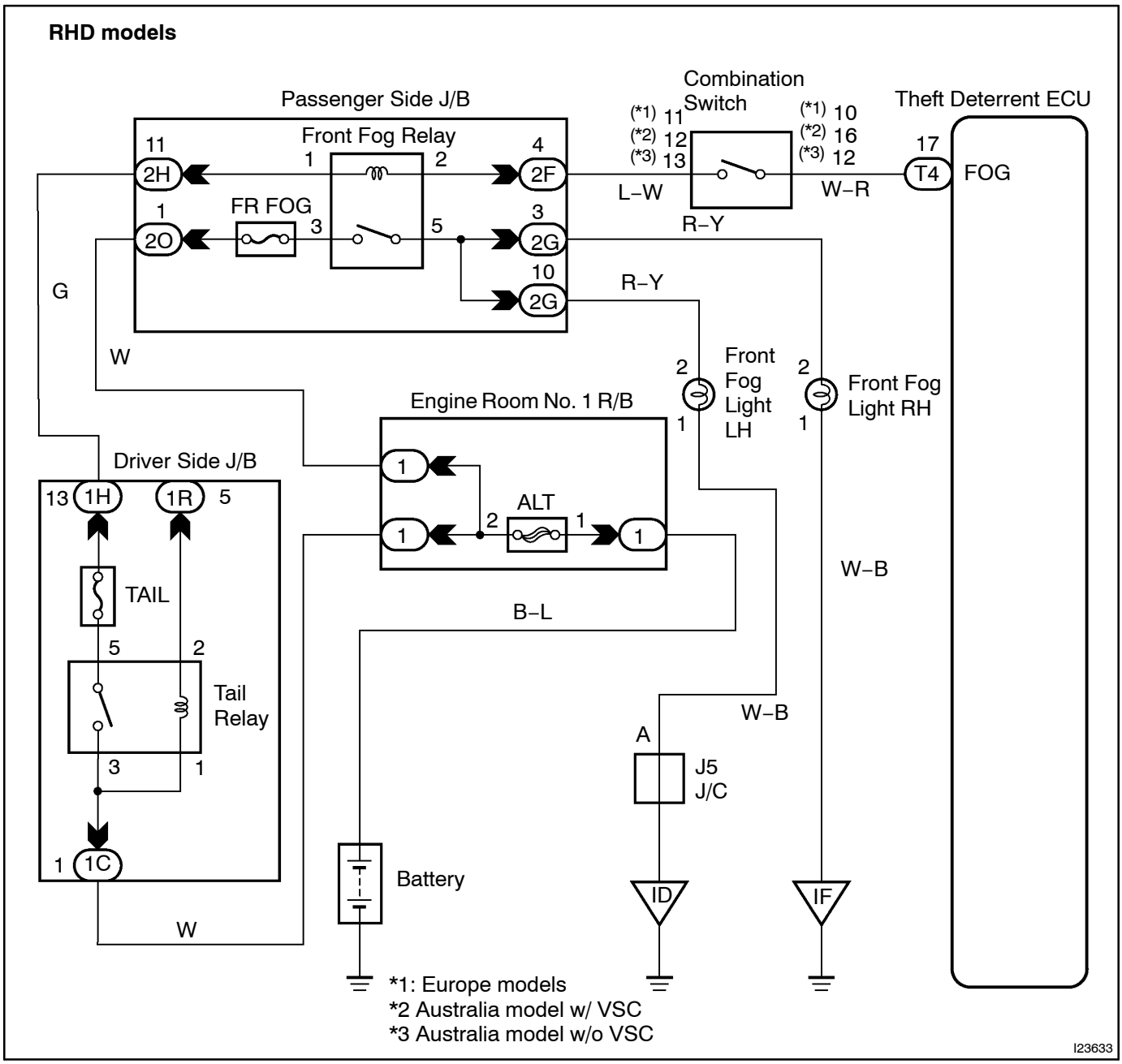
OK

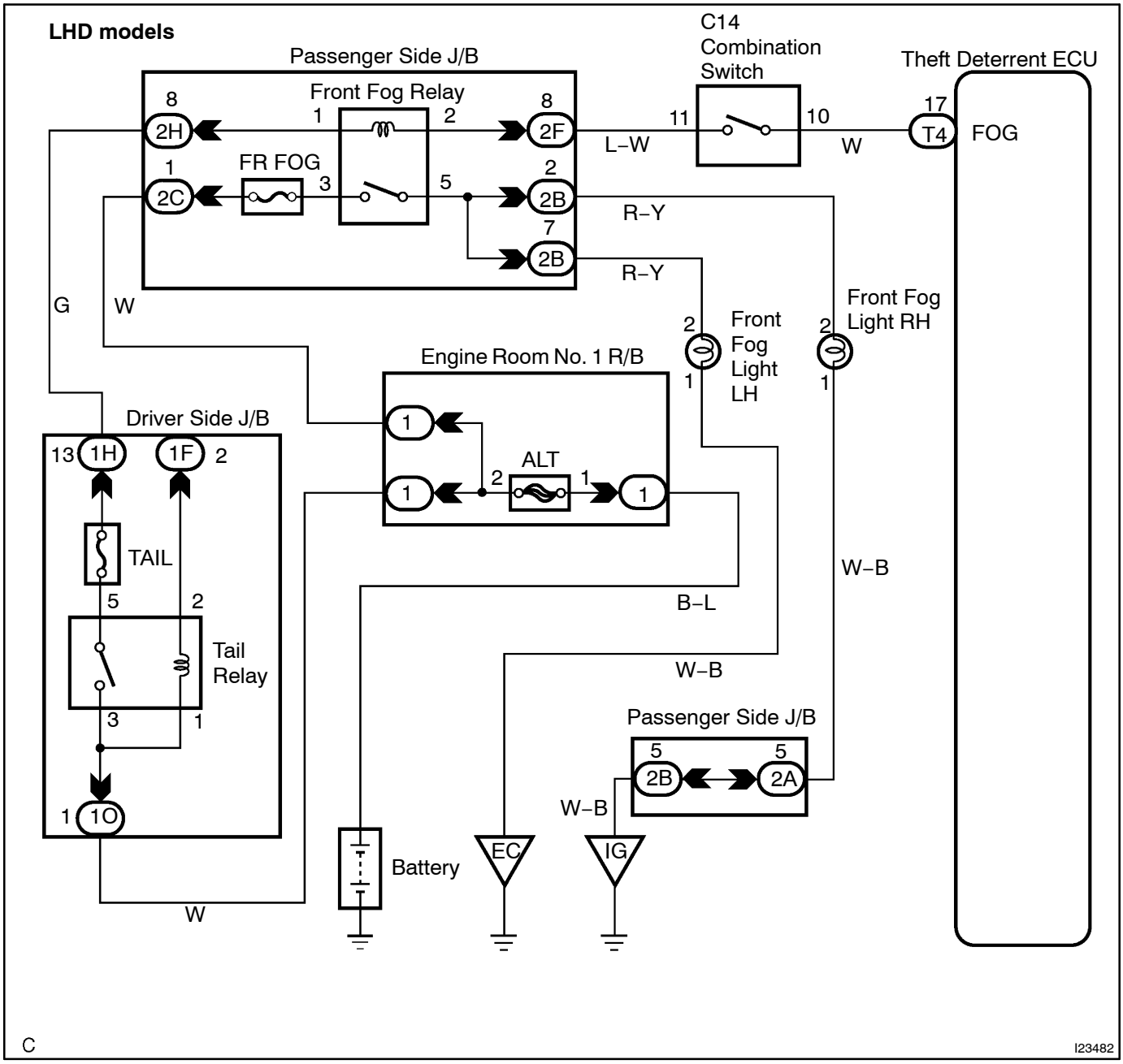
Proceed to next circuit inspection shown on problem symptoms table (See page DI–480).

DI9I1–01

Front fog light switch and relay circuit

WIRING DIAGRAM




LHD models
Passenger Side J/B
Front Fog Relay
FR FOG
C14
Combination
Switch
Theft Deterrent ECU
FOG
Front Fog
Light LH
Front Fog
Light RH
Engine Room No. 1 R/B
ALT
Driver Side J/B
TAIL
Tail
Relay
Passenger Side J/B
Battery
EC
IG
L–W
W
R–Y
G
W–B
B–L
C
I23482

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check front fog light relay using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the front fog light relay can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–480).**

NG

2	**Check front fog light relay (See Pub No. RM684E on page BE–45).**

NG → **Replace the front fog light relay.**

OK

3	**Check front fog light switch (See Pub No. RM684E on page BE–45).**

NG → **Replace the front fog light switch.**

OK

4	**Check wire harness and connector between front fog light relay and theft deterrent ECU, battery and front fog light relay (See page IN–34).**

NG → **Repair or replace wire harness or connector.**

OK

5	Check wire harness and connector between front fog light switch and theft deterrent ECU, battery and front fog light switch (See page IN–34).

NG → Repair or replace wire harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–480).

DI61D–03

Headlight Control Relay Circuit

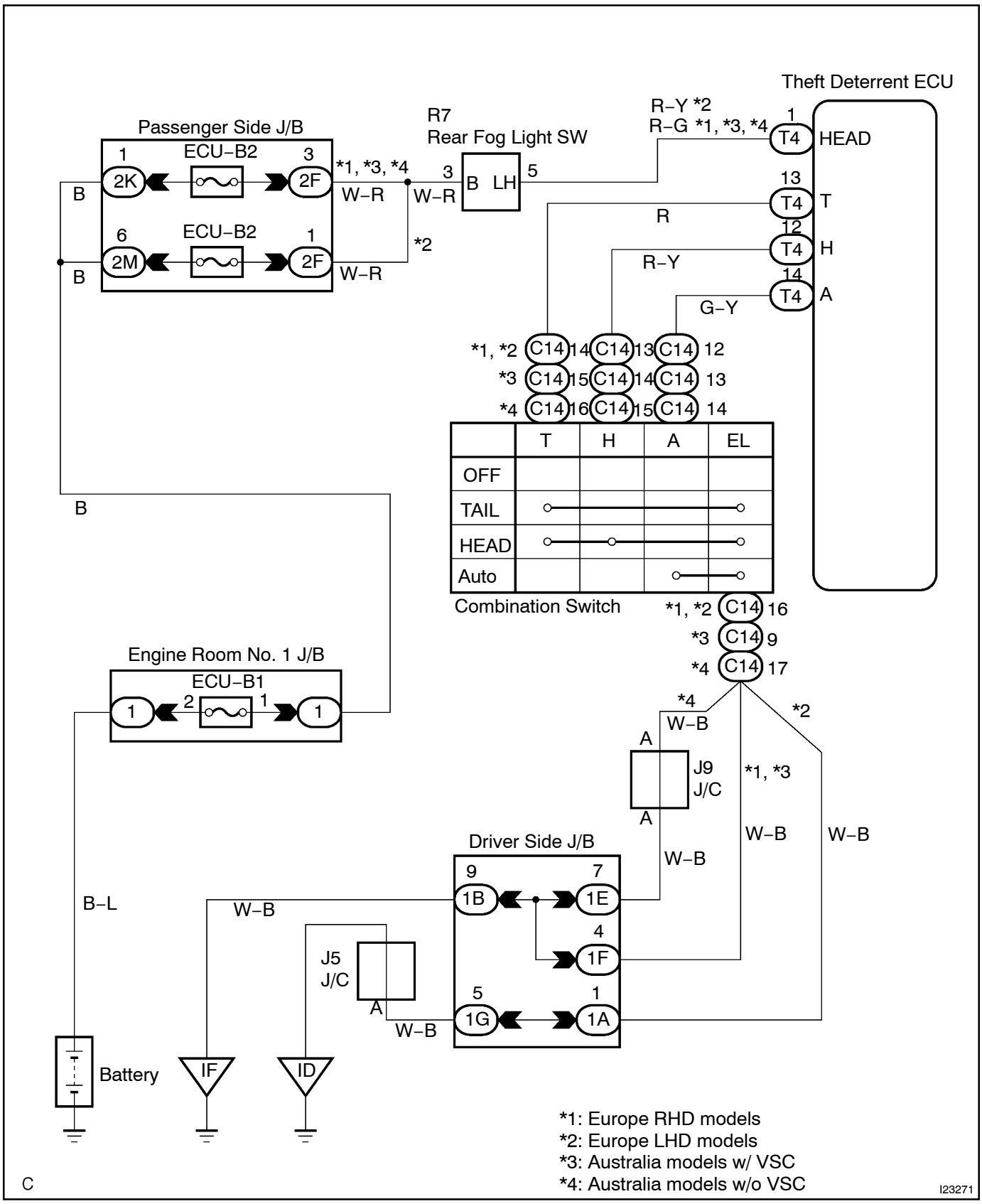
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF at approximately 0.4 sec. intervals. This switches the headlight control relay ON and OFF, thus flashing the headlights (See the wiring diagram below).

In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the headlight control relay switches OFF, thus stopping the headlights flashing:

(1) Unlock the front LH or RH door with a key. (Except Europe Models)
(2) Turn the ignition switch to ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 60 seconds.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the headlights light up normally whenever the light control switch is operated. If headlight operation is not normal when the light control switch is operated, proceed to troubleshooting on page BE–2.

In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check headlight relay using hand–held tester.**

PREPARATION:

Connect the hand–held tester to the DLC3.

CHECK:

Check that the headlight relay can operate in an ACTIVE TEST.

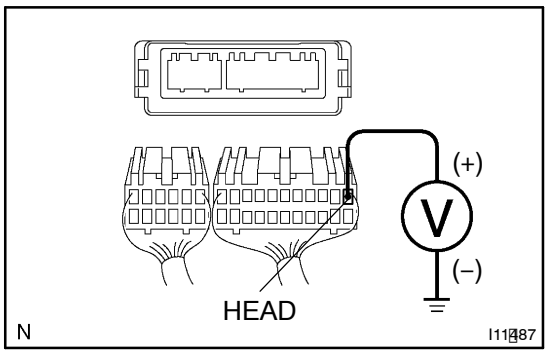
HINT:

If the headlight relay is normal, the headlight comes "ON". In the case that the headlight relay activates but the headlight will not come on, check the headlight circuit.

OK: Proceed to next circuit inspection shown in problem symptoms table (See page DI–480).

NG

2	**Check voltage between terminal HEAD of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal HEAD of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG: Check and repair harness and connector between theft deterrent ECU and headlight control relay (See page IN–34).

OK

Check and replace theft deterrent ECU (See page IN–34).

DI9HZ–01

Taillight Control Relay Circuit

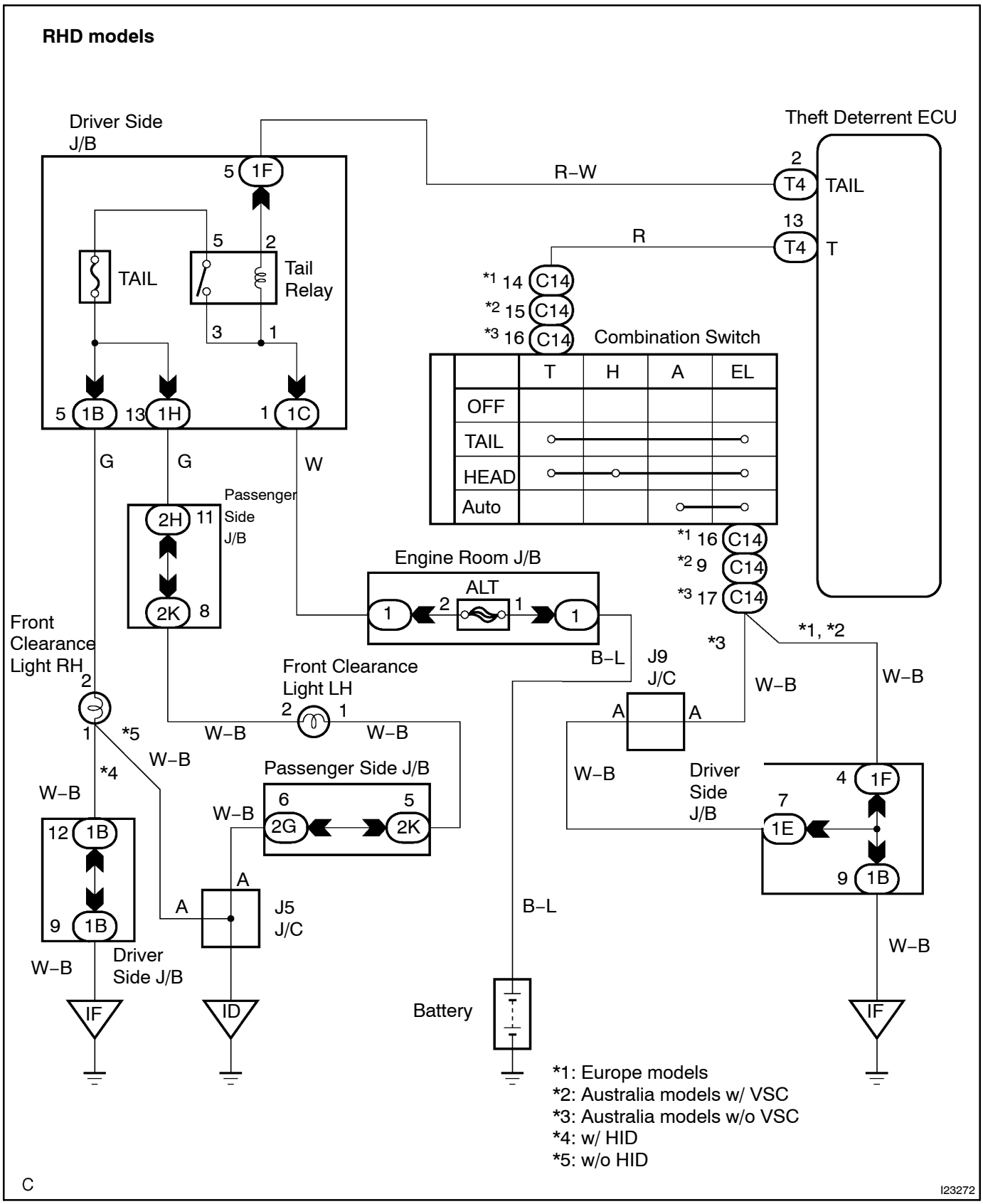
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the transistor in the ECU to switch ON and OFF at approximately 0.4 sec. intervals. This switches the taillight control relay ON and OFF, thus flashing the taillights (See the wiring diagram below).

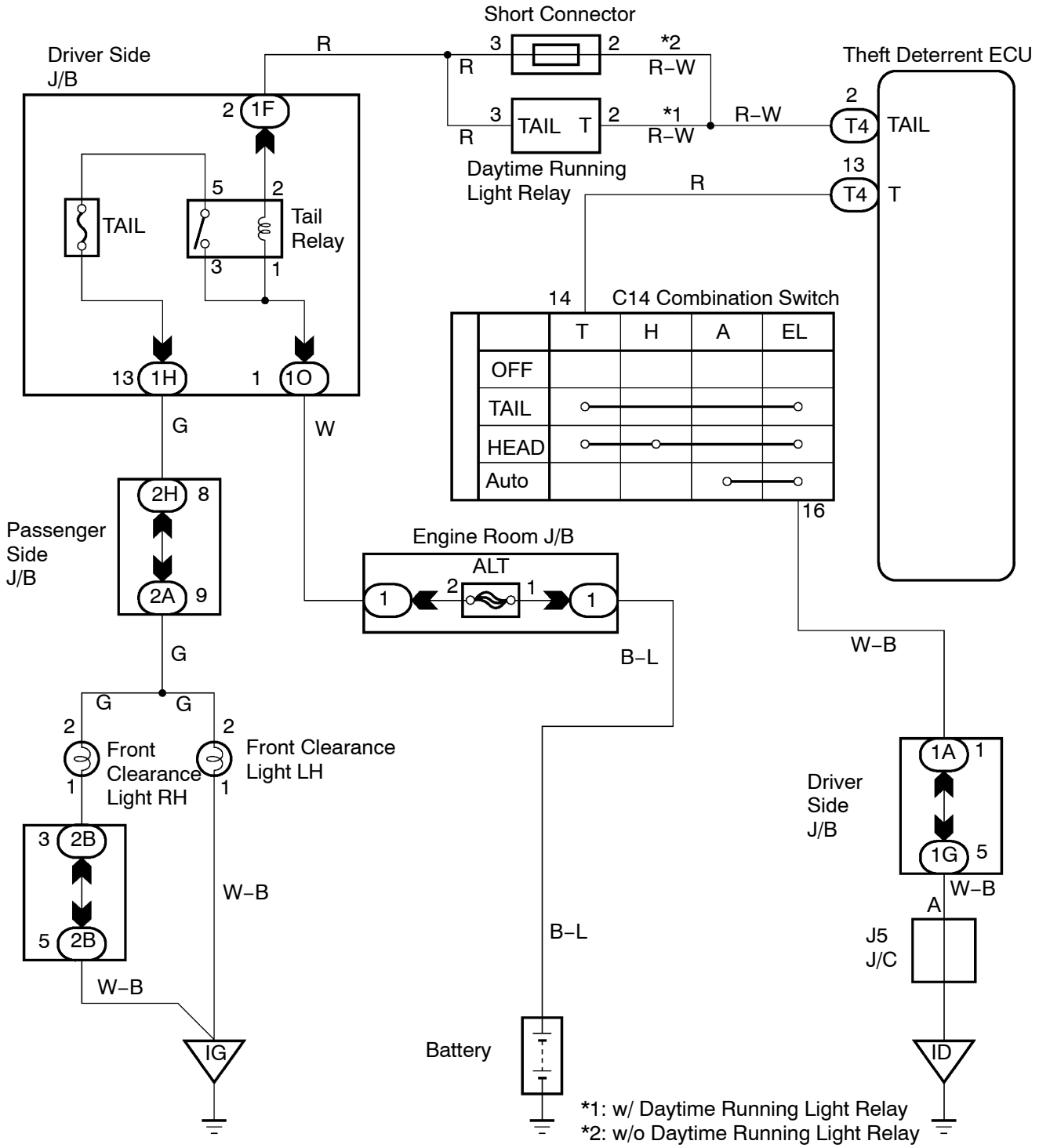
In this condition, if any of the following operations is done, the transistor in the ECU goes OFF and the taillight control relay switches OFF, thus stopping the taillights flashing:

(1) Unlock the front LH or RH door with a key. (Except Europe Models)
(2) Turn the ignition switch to ON position. (Except Europe Models)
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 60 seconds.

WIRING DIAGRAM



LHD models


Short Connector
Driver Side J/B
Theft Deterrent ECU
Daytime Running Light Relay
TAIL
Tail Relay
C14 Combination Switch
OFF
TAIL
HEAD
Auto
Passenger Side J/B
Engine Room J/B
ALT
Front Clearance Light RH
Front Clearance Light LH
Driver Side J/B
J5 J/C
Battery
IG
ID
*1: w/ Daytime Running Light Relay
*2: w/o Daytime Running Light Relay
I23273

INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the taillights light up normally whenever the light control switch is operated. If taillight operation is not normal when the light control switch is operated, proceed to troubleshooting on page BE–2.

In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check tail light relay using hand–held tester.**

PREPARATION:

Connect the hand–held tester to the DLC3.

CHECK:

Check that the taillight relay can operate in an ACTIVE TEST.

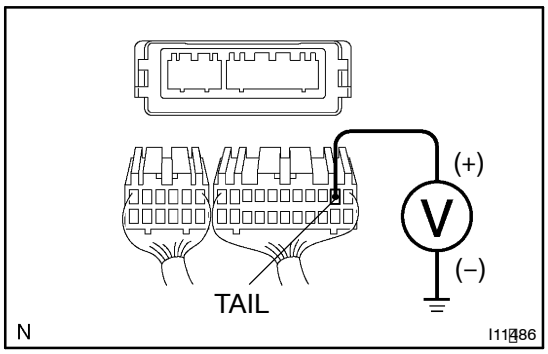
HINT:

If the headlight relay is normal, the headlight comes "ON". In the case that the headlight relay activates but the headlight will not come on, check the headlight circuit.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–480).**

NG

2	**Check voltage between terminal TAIL of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal TAIL of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and taillight control relay (See page IN–34).**

OK

Check and replace theft deterrent ECU (See page IN–34).

DI9I0-01

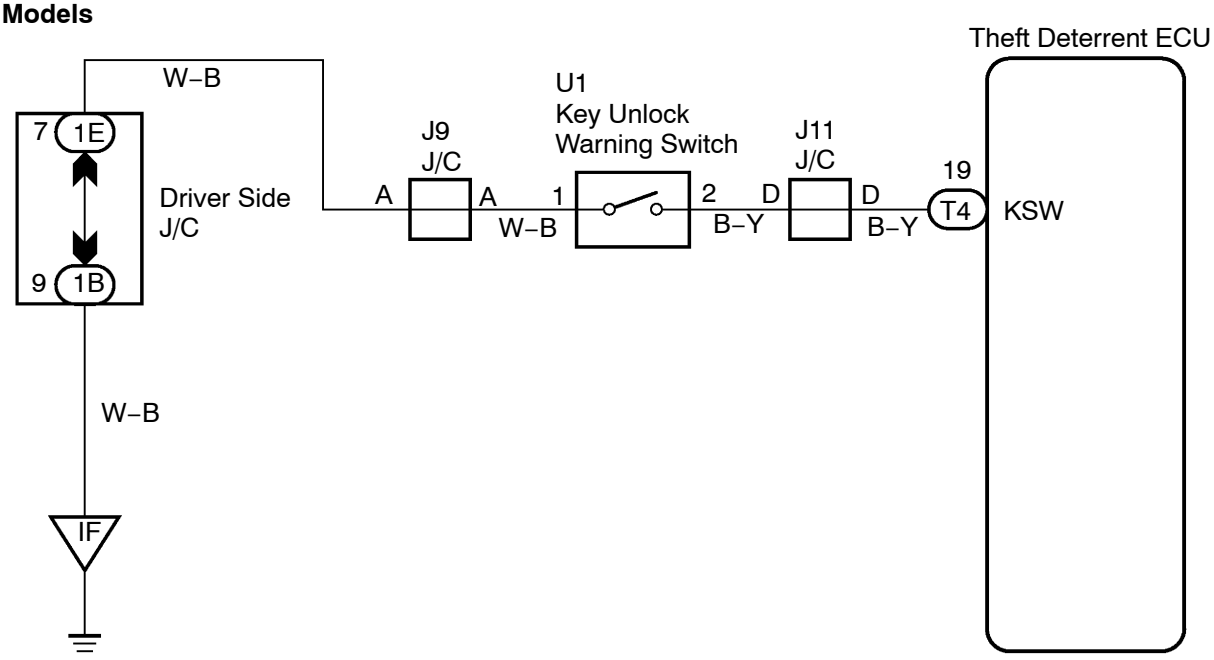
Key Unlock Warning Switch Circuit

CIRCUIT DESCRIPTION

The key unlock warning switch goes ON when the ignition key is inserted in the key cylinder and goes OFF when the ignition key is removed.
The ECU operates the key confinement prevention function while the key unlock warning switch is ON.

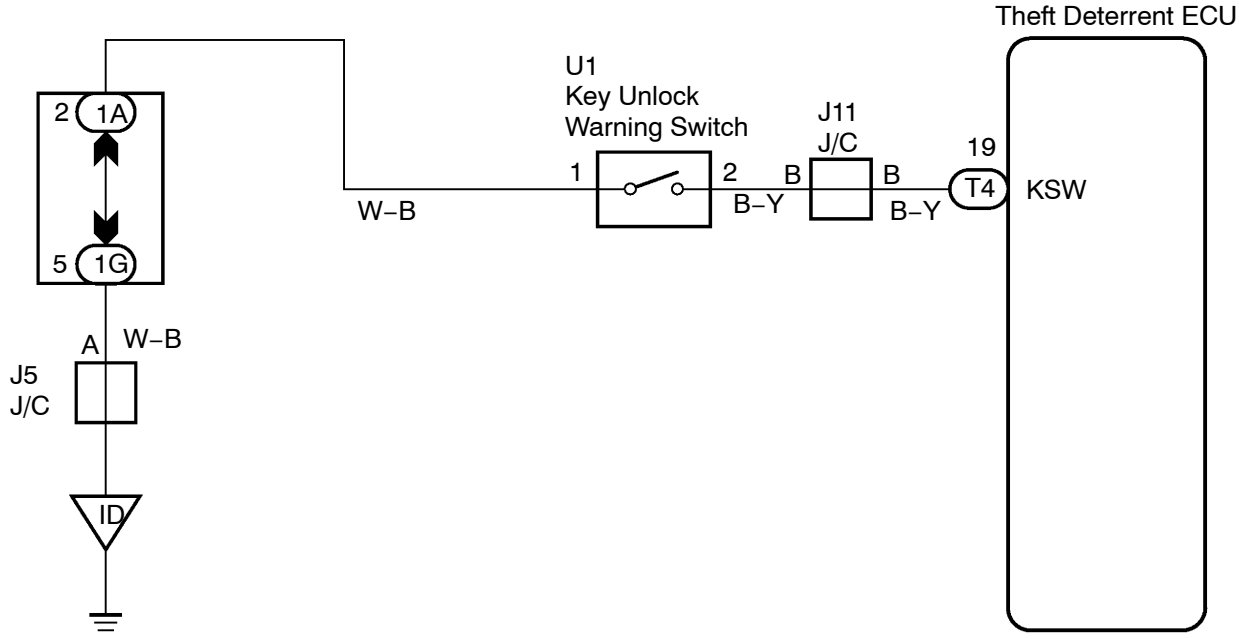
WIRING DIAGRAM

RHD Models



I23485

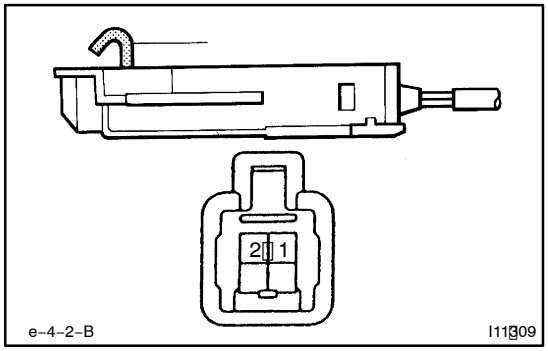
LHD Models



I23486

INSPECTION PROCEDURE

1	Check key unlock warning switch.



PREPARATION:
Disconnect key unlock warning switch connector.
CHECK:
Check continuity between terminal 1 and 2 of key unlock warning switch connector, when the key is inserted into the key cylinder or removed.
OK:

Switch position	Tester connection	Specified condition
ON (Key inserted)	1 – 2	Continuity
OFF (Key removed)	–	No continuity

NG → Replace key unlock warning switch.

OK

2	Check harness and connectors between ECU and key unlock warning switch, key unlock warning switch and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–480).

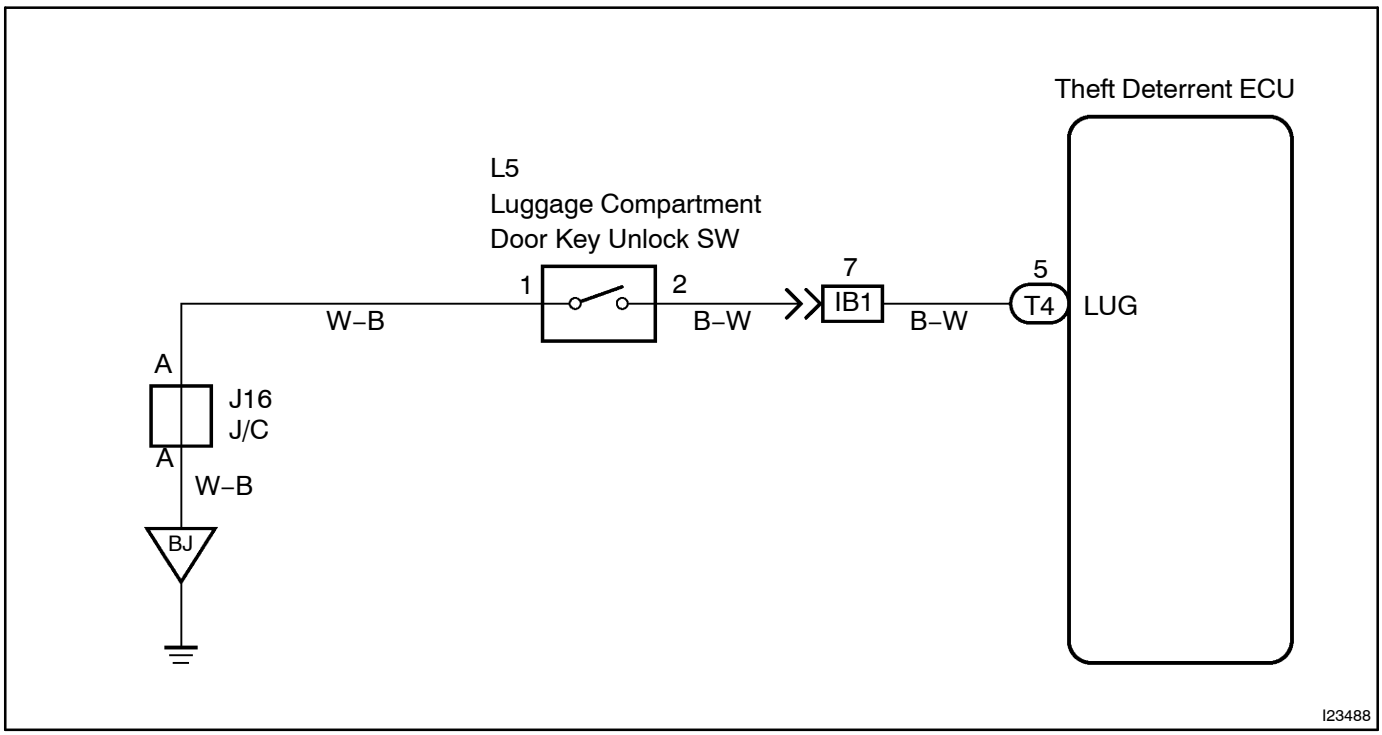
DI61G-03

Luggage Compartment Door Key Lock and Unlock Switch Circuit (Except Europe Models)

CIRCUIT DESCRIPTION

The luggage compartment door key lock and unlock switch goes ON when the luggage compartment door key cylinder is turned to the unlock side with the key.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

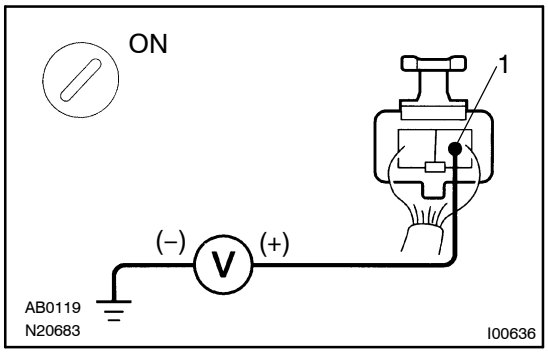
1	**Check luggage compartment door lock and unlock switch using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the luggage compartment door lock and unlock switch using DATA LIST.

OK	**Proceed to next circuit inspection shown in problem symptoms table (See page DI–480).**

NG

2	**Check voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground.**



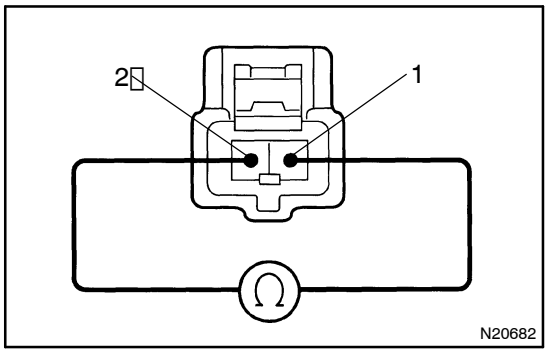
PREPARATION:
(a) Remove luggage compartment door trim.
(b) Turn ignition switch ON.
CHECK:
Measure voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground, when the key is turned to the unlock side and not turned.
OK:

Key operation	Voltage
Turned to the unlock side	0 V
Not turned	Battery positive voltage

OK	**Check and replace theft deterrent ECU.*1**

NG

3	**Check luggage compartment door key lock and unlock switch.**



PREPARATION:

Disconnect luggage compartment door key lock and unlock switch connector.

CHECK:

Check continuity between terminals 1 and 2, when the key is turned to the unlock side and not turned.

OK:

Key operation	Tester connection	Specified condition
Turned to unlock	1 – 2	Continuity
Not turned	–	No continuity

NG → **Repair or replace luggage compartment door key lock and unlock switch.**

OK

4	**Check harness and connector between theft deterrent ECU and key lock and unlock switch, key lock and unlock switch and body ground (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–480).

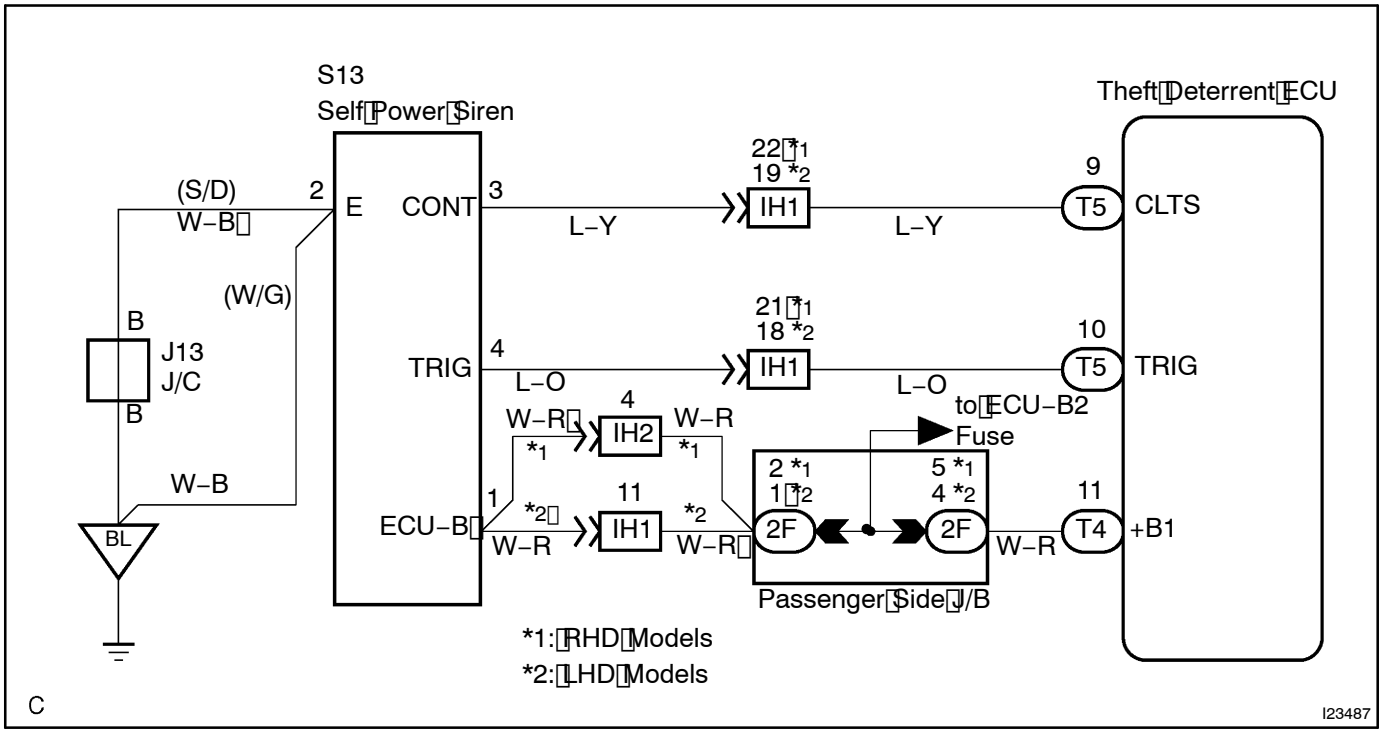
DI61I–03

Self Power Siren

CIRCUIT DESCRIPTION

A radio transmitter is integrated into the dome light.
This creates a spherical electric field inside the vehicle, detects intrusion using the Doppler effect caused by movement of an object in the vehicle, and outputs a warning trigger signal to the theft deterrent ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

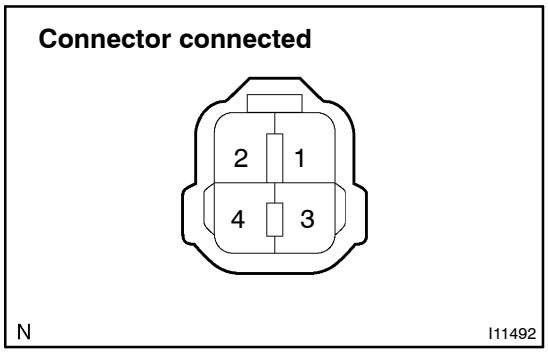
1	**Check self power siren using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the self power alarm can operated in an ACTIVE TEST.
OK:
The self power alarm should sound.

OK	**Proceed to next circuit inspection shown in problem symptoms table (See page DI–480).**

NG

2	Check self power siren.



PREPARATION:

(a) Remove the self power siren.

(b) Disconnect the self power siren connector.

CHECK:

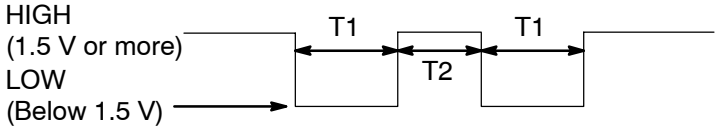
(a) Case 1:
Check terminal 3 in case of the system set signal is not input to the siren.

(b) Case 2:
Check terminal 4 in case of the siren drive signal is not input when the alarm is triggered.

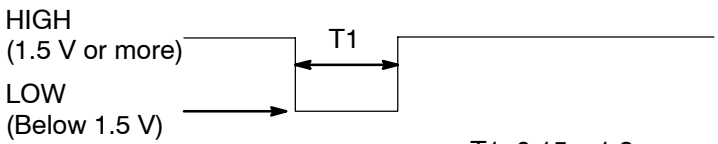
OK:

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery voltage
2 – Ground	Constant	No voltage
3 – Ground	When transforming from armed or arming preparation state to disarmed state.	Using an oscilloscope *1
	When transforming from the arming preparation state to armed state.	Using an oscilloscope *2
	Normal condition	Approx. 1.4 V
4 – Ground	Normal condition	Battery voltage
	Arming condition	Below 1 V

*1: wave pattern



*2: wave pattern



T1: 0.15 – 1.3 secs
T2: 0.15 – 0.25 secs

OK	Replace self power siren.

NG

3	Check harness and connector between ECU and alarm, alarm and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK →

Proceed to next circuit inspection shown in problem symptom table (See page DI–480).

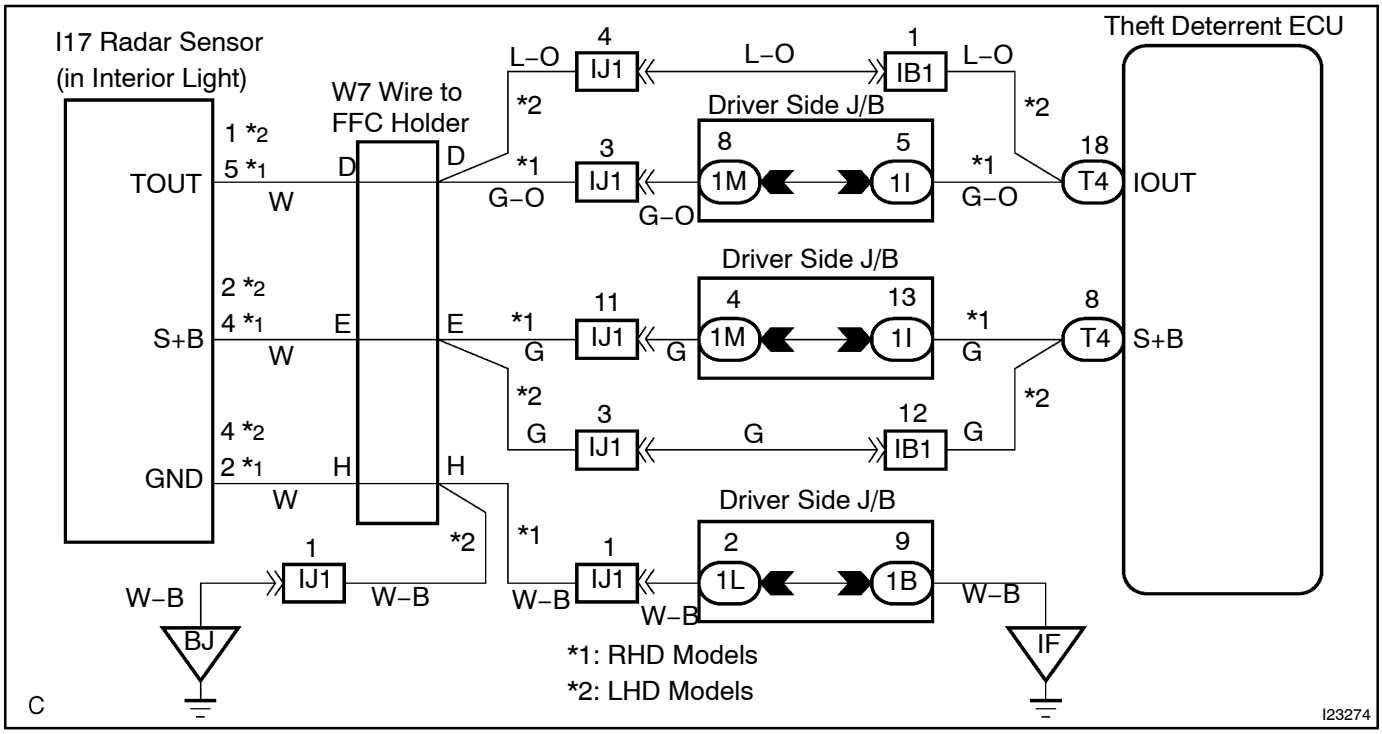
DI61J–03

Radar Sensor (Except Singapore)

CIRCUIT DESCRIPTION

Based on the alarm sounding state input from the theft deterrent ECU (to the TRIG terminal) an alarm is issued.
However, the armed/disarmed state is determined by the CONT terminal, which monitors vehicle status, and input to the TRIG terminal is only accepted from the ECU while armed state is ON.
Moreover, open circuit detection is only carried out while armed state is ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check radar sensor operation.**

CHECK:

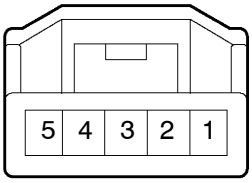
Set the system with a window open, and after 30 seconds put your hand through the window and shake it near the sensor to check if the alarm is triggered.

OK	**No problem.**

NG

2	Check radar sensor.

Connector connected



N I11491

PREPARATION:
Remove the room light assembly.
CHECK:
Measure the voltage and continuity at terminals.
OK:

Tester connection	Condition	Specified condition
RHD: 5 – Ground LHD: 5 – Ground	Arming preparation state or armed state.	Battery voltage
	Disarmed state.	Below 1 V
RHD: 4 – Ground LHD: 2 – Ground	When the sensor does not detect any movement.	6.8 V ± 2 V
	When the sensor detects movement when in arming preparation or armed state.	Below 1 V
RHD: 2 – Ground LHD: 4 – Ground	Constant	Continuity

NG → Replace radar sensor. (in Room light assembly)

OK

3	Check harness and connector between ECU and sensor, sensor and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown in problem symptom table (See page DI–480).

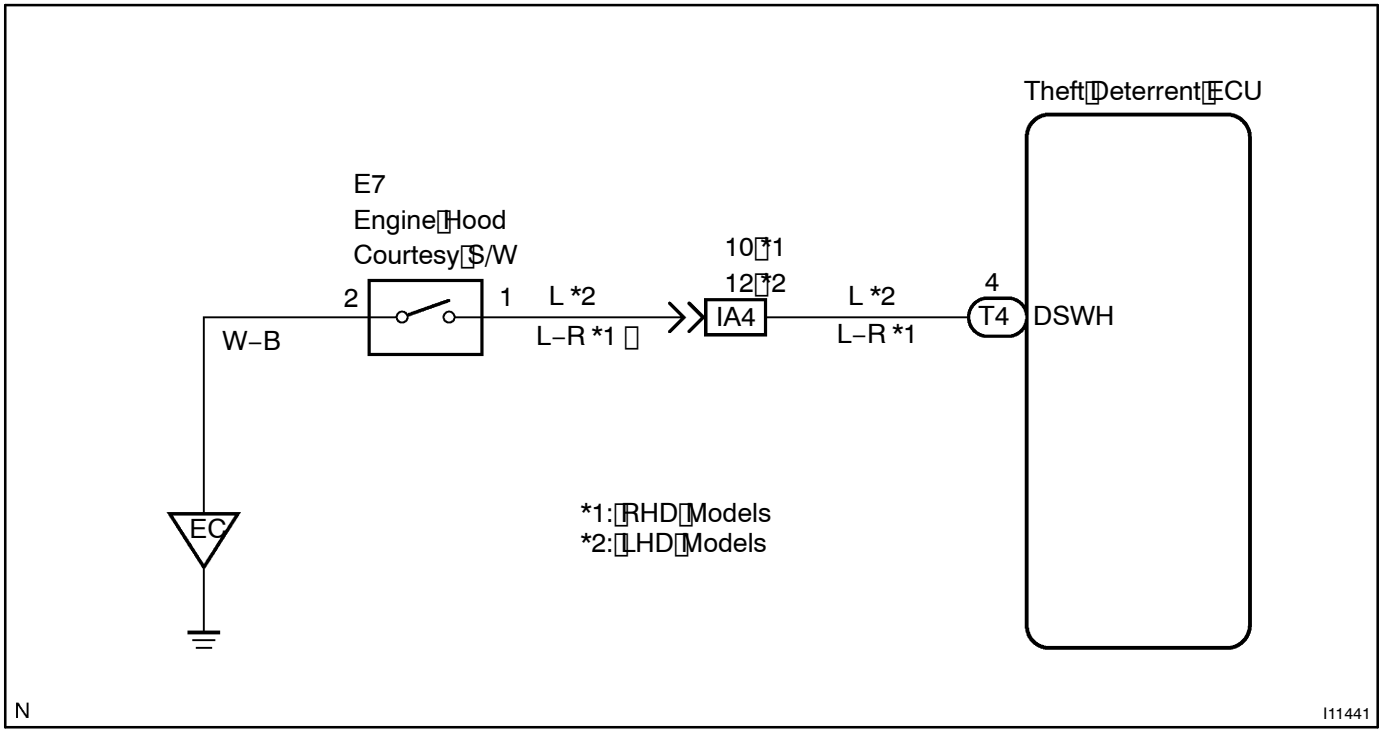
DI61H–05

Engine Hood Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The engine hood courtesy switch is built into the engine hood lock assembly and goes ON when the engine hood is opened and goes OFF when the engine hood is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check hood courtesy switch using hand–held tester.**

PREPARATION:

Connect the hand–held tester to the DLC3.

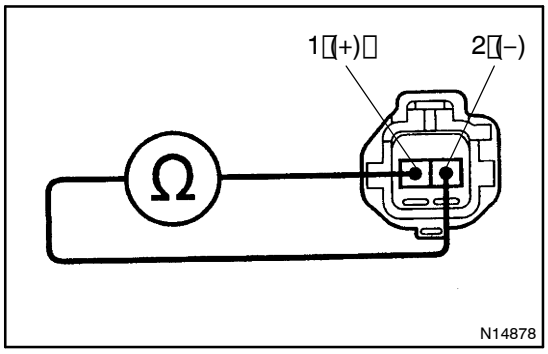
CHECK:

Check the hood courtesy switch using DATA LIST.

OK	**Proceed to next circuit inspection shown in problem symptoms table (See page DI–480).**

NG

2	Check engine hood courtesy switch.



PREPARATION:

(a) Remove engine hood lock assembly.

(b) Disconnect engine hood courtesy switch connector.

CHECK:

Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

OK:

Engine hood lock	Tester connection	Specified condition
LOCK	–	No continuity
UNLOCK	1 – 2	Continuity

NG → Replace engine hood courtesy switch.

OK

3	Check harness and connector between theft deterrent ECU and switch, switch and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

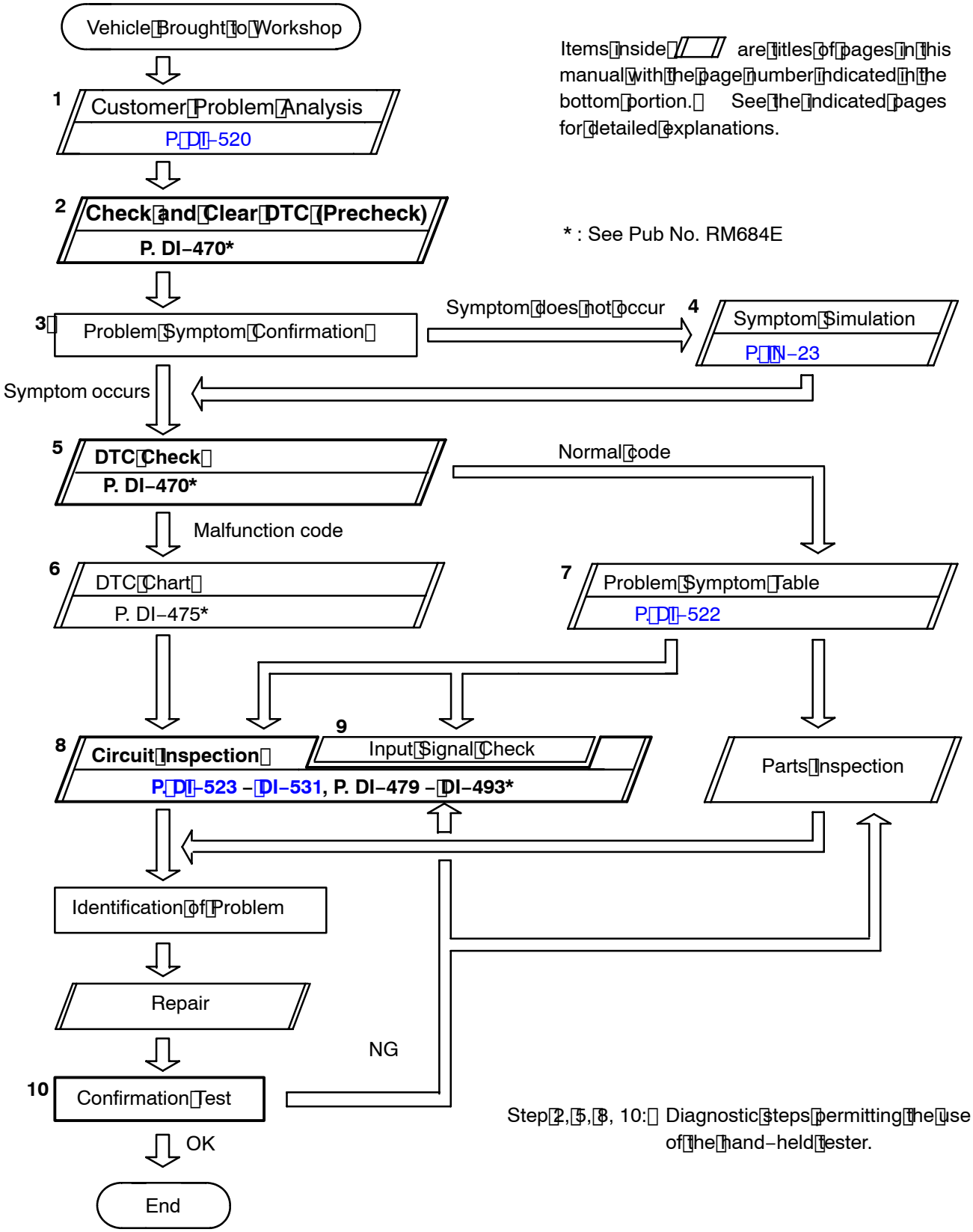
Check and replace theft deterrent ECU (See page IN–34).

CRUISE CONTROL SYSTEM

DI26R–25

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following page.



Items inside // are titles of pages in this manual with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

* : See Pub No. RM684E

Step 2, 5, 8, 10: Diagnostic steps permitting the use of the hand–held tester.

DI26S–16

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Condition of Problem Occurrence	**Date of Problem Occurrence**	/ /
	Frequency Problem Occurs?	☐ Continuous ☐ Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	**km Mile**

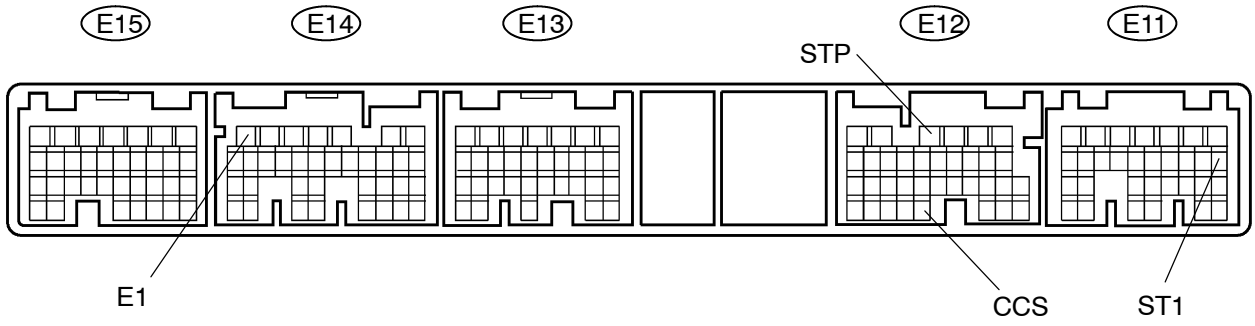
Symptoms	☐ Auto cancel occurs	● Driving condition ☐ City driving ☐ Freeway ☐ Up hill ☐ Down hill ● After cancel occurred, did the driver activate cruise control again? ☐ Yes ☐ No
	☐ Cancel does not occur	☐ With brake ON ☐ Except D position shift ☐ When control SW turns to CANCEL position
	☐ Cruise control malfunction	☐ Slip to acceleration side ☐ Slip to deceleration side ☐ Hunting occurs ☐ O/D cut off does not occur ☐ O/D does not return
	☐ Switch malfunction	☐ SET ☐ ACCEL ☐ COAST ☐ RESUME ☐ CANCEL
	☐ Cruise MAIN indicator light	☐ Remains ON ☐ Does not light up ☐ Blinks

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI3MK–08

TERMINALS OF ECU

2JZ–GE:



C

I23299

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
STP ↔ E1 (E12–4 ↔ E6–7)	G–W ↔ BR	Depress brake pedal	10 – 16 V
		Release brake pedal	Below 1 V
CCS ↔ E1 (E12–31 ↔ E6–7)	L–R ↔ BR	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch hold ON	6.9 – 9.8 V
		Ignition switch ON SET/COAST switch hold ON	4.7 – 6.9 V
		Ignition switch ON RES/ACC switch hold ON	2.4 – 3.8 V
		Ignition switch ON MAIN switch hold ON	Below 1 V
ST1– ↔ E1 (E11–8 ↔ E6–7)	B–L ↔ BR	Depress brake pedal	Below 1 V
		Release brake pedal	10 – 14 V

DI26X–25

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
SET not occurring or CANCEL occurring. (DTC is Normal)	1. Input Signal Circuit 2. Vehicle Speed Sensor Circuit 3. Stop Light Switch Circuit 4. Neutral Start Switch Circuit 5. Engine and ECT ECU	DI–485* DI–479* DI–523 DI–195* IN–34
SET not occurring or CANCEL occurring. (DTC is not output)	1. Engine and ECT ECU	IN–34
Actual vehicle speed deviates above or below the set speed.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–485* IN–34
Gear shifting occurs frequently between 3rd and O/D when driving on uphill road. (Hurting)	1. Engine and ECT ECU	IN–34
Cruise control not cancelled, even when brake pedal is depressed.	1. Stop Light Switch Circuit 2. Engine and ECT ECU	DI–523 IN–34
Cruise control not cancelled, even when transmission is shifted to ”N” position.	1. Neutral Start Switch Circuit 2. Engine and ECT ECU	DI–195* IN–34
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise Control Switch Circuit 2. Engine and ECT ECU	DI–531 IN–34
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–485* IN–34
Poor response is ACCEL and RESUME modes.	1. Engine and ECT ECU	IN–34
O/D does not resume, even though the road is not uphill.	1. Engine and ECT ECU	IN–34
DTC memory is erased.	1. Engine and ECT ECU	IN–34
DTC is not output, or is output when should not be.	1. Diagnosis Circuit 2. Engine and ECT ECU	– IN–34
Cruise MAIN indicator light remains ON or falls to light up.	1. Input Signal Circuit 2. Engine and ECT ECU	DI–485* IN–34

* : See Pub No. RM684E

DI623–02

CIRCUIT INSPECTION

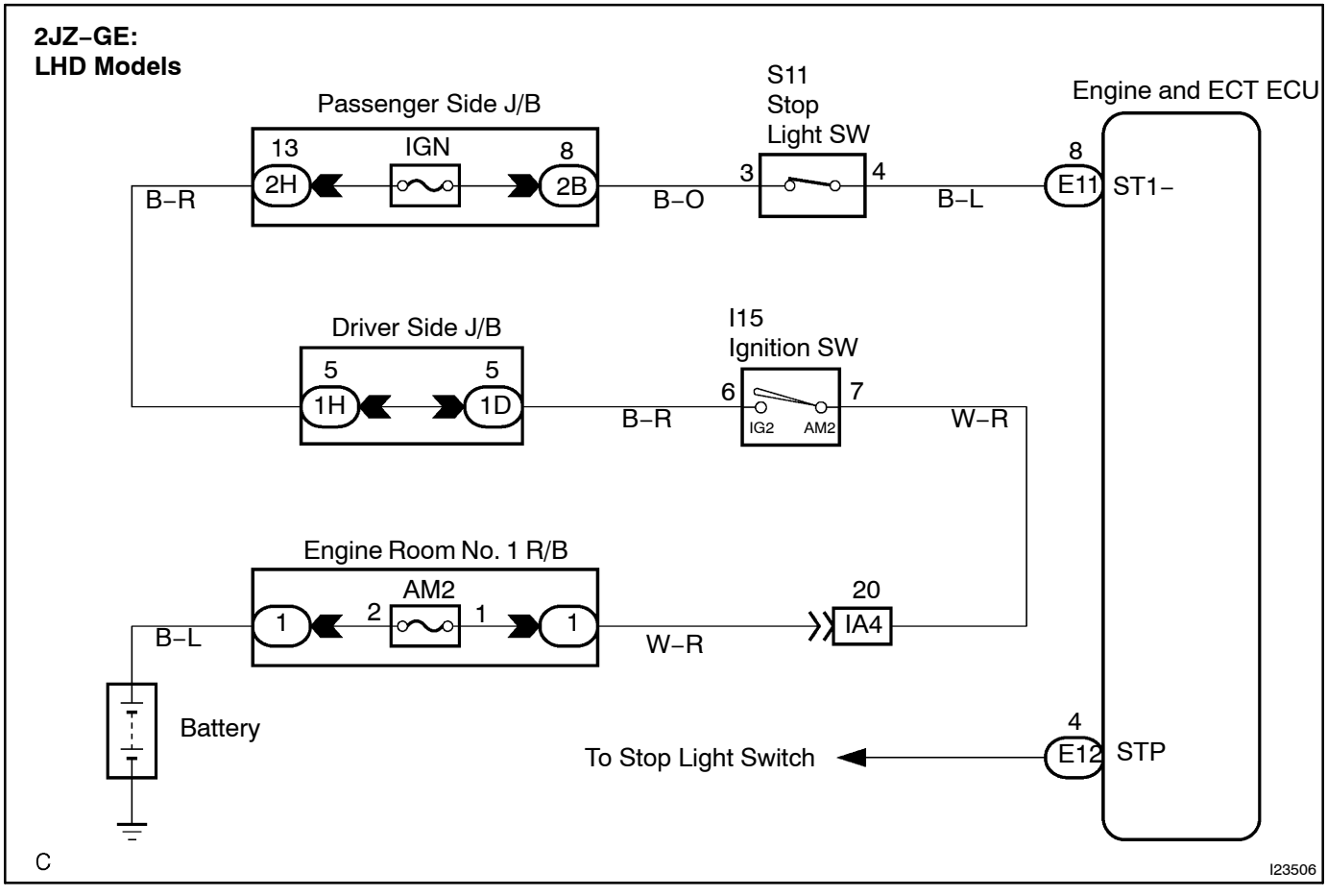
DTC	P1520/52	Stop light switch circuit

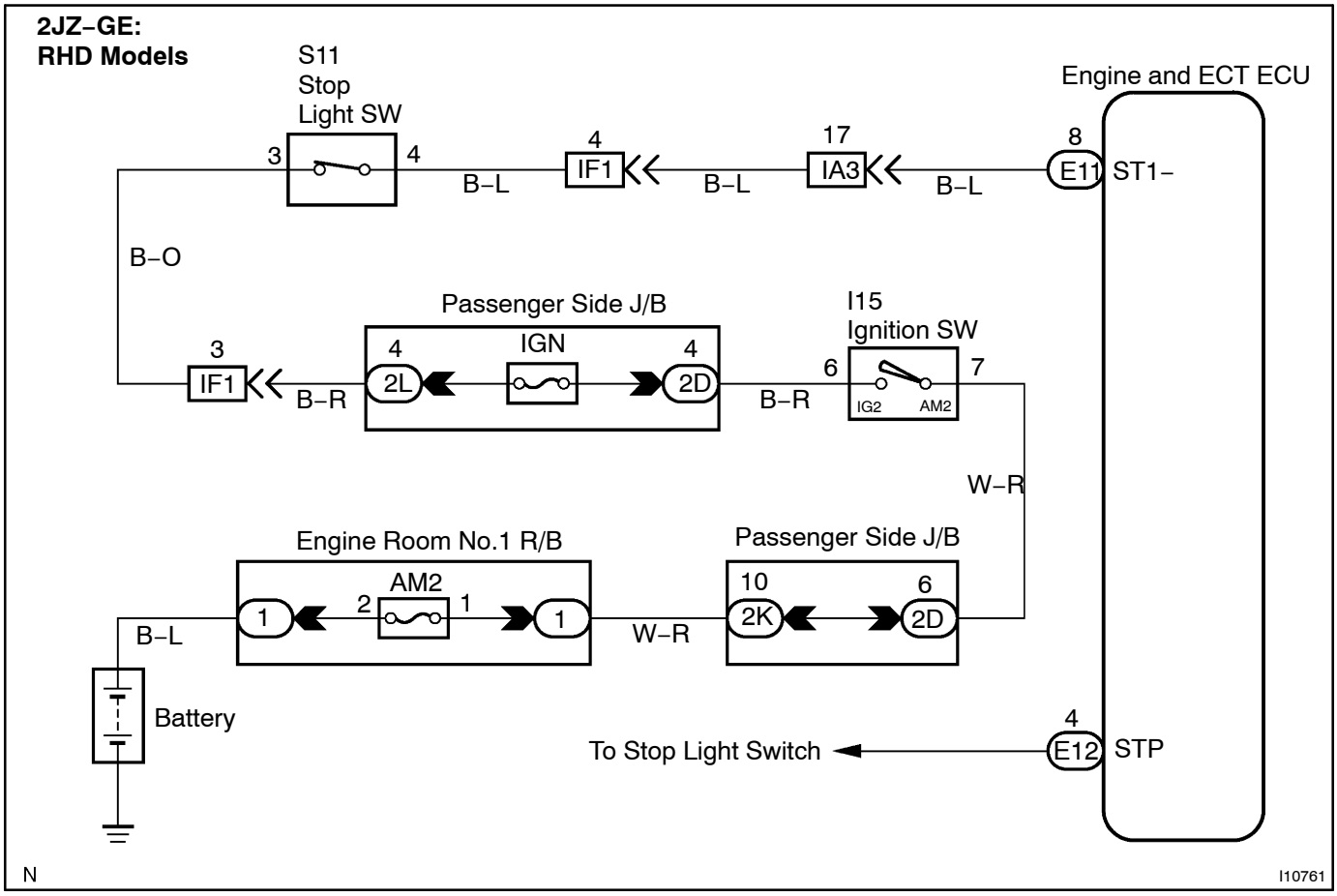
CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the Engine and ECT ECU. When the Engine and ECT ECU receives this signal, it cancels the cruise control.
A fail–safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.
The cancel condition is that battery voltage is supplied to terminal STP.
When the brake is on, battery voltage is normally applied through the STOP fuse and stop light switch to terminal STP of the Engine and ECT ECU, and the Engine and ECT ECU turns the cruise control OFF.
If the harness connected to terminal STP has an open circuit, terminal STP will have battery voltage and the cruise control will be turned OFF.

DTC No.	Detection Item	Trouble Area
52	Stop light switch circuit.	• Stop light switch • Harness or connector between Engine and ECT ECU and stop light switch circuit • Engine and ECT ECU

WIRING DIAGRAM




2JZ–GE:
RHD Models
S11
Stop
Light SW
Engine and ECT ECU
3
4
B–L
4
IF1
B–L
17
IA3
B–L
8
E11
ST1–
B–O
Passenger Side J/B
I15
Ignition SW
3
IF1
B–R
4
2L
IGN
4
2D
B–R
6
7
IG2
AM2
W–R
Engine Room No.1 R/B
Passenger Side J/B
AM2
2
1
1
10
2K
6
2D
B–L
W–R
Battery
4
To Stop Light Switch
E12
STP
N
I10761

INSPECTION PROCEDURE

HINT:

In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check stop light switch using hand–held tester.**

PREPARATION:

Connect the hand–held tester to the DLC3.

CHECK:

Check the stop light switch using DATALIST.

OK:

Condition	Stop light switch 1 (Sub CPU)	Stop light switch 2 (Sub CPU)	Stop light switch 2 (Main CPU)
Depressed	ON	ON	ON
Released	OFF	OFF	OFF

HINT:

- Stop light SW 1 has a function to disconnect the connection (OFF) when depressing the pedal, however, Engine and ECT ECU controls by the logic rivers, so with the hand–held tester, it displays ON.
- Stop light SW 1 indicates the input of ST1– terminal and Stop light SW 2 indicates the input of STP terminal.

OK → **Proceed to next circuit inspection shown in problem symptom table (See page DI–522).**

NG

2	**Check operation of stop light.**

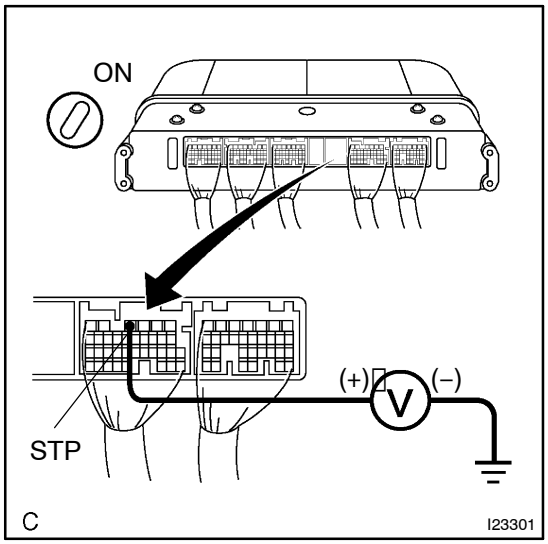
CHECK:

Check that stop light comes on when brake pedal is depressed, and turns off when brake pedal is released.

NG → **Check stop light system (See page BE–25).**

OK

3	**Check voltage between terminal STP of Engine and ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine and ECT ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal STP of Engine and ECT ECU connector and body ground, when the brake pedal is depressed and released.

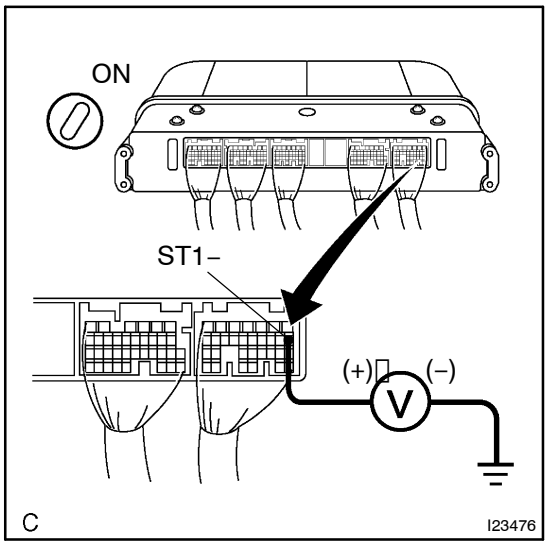
OK:

Depressed	10 – 14 V
Released	Below 1 V

OK: **Proceed to next circuit inspection shown in problem symptom table (See page DI–522).**

NG

4	**Check voltage between terminal ST1– of Engine and ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine and ECT ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal ST1– of Engine and ECT ECU connector and body ground, when the brake pedal is depressed and released.

OK:

Depressed	Below 1 V
Released	10 – 14 V

OK: **Proceed to next circuit inspection shown in problem symptoms table (See page DI–522).**

NG

5	Check wire harness and connector between terminal STP of Engine and ECT ECU and stop light switch, and terminal ST1– of Engine and ECT ECU and stop light switch (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace Engine and ECT ECU (See page IN–34).

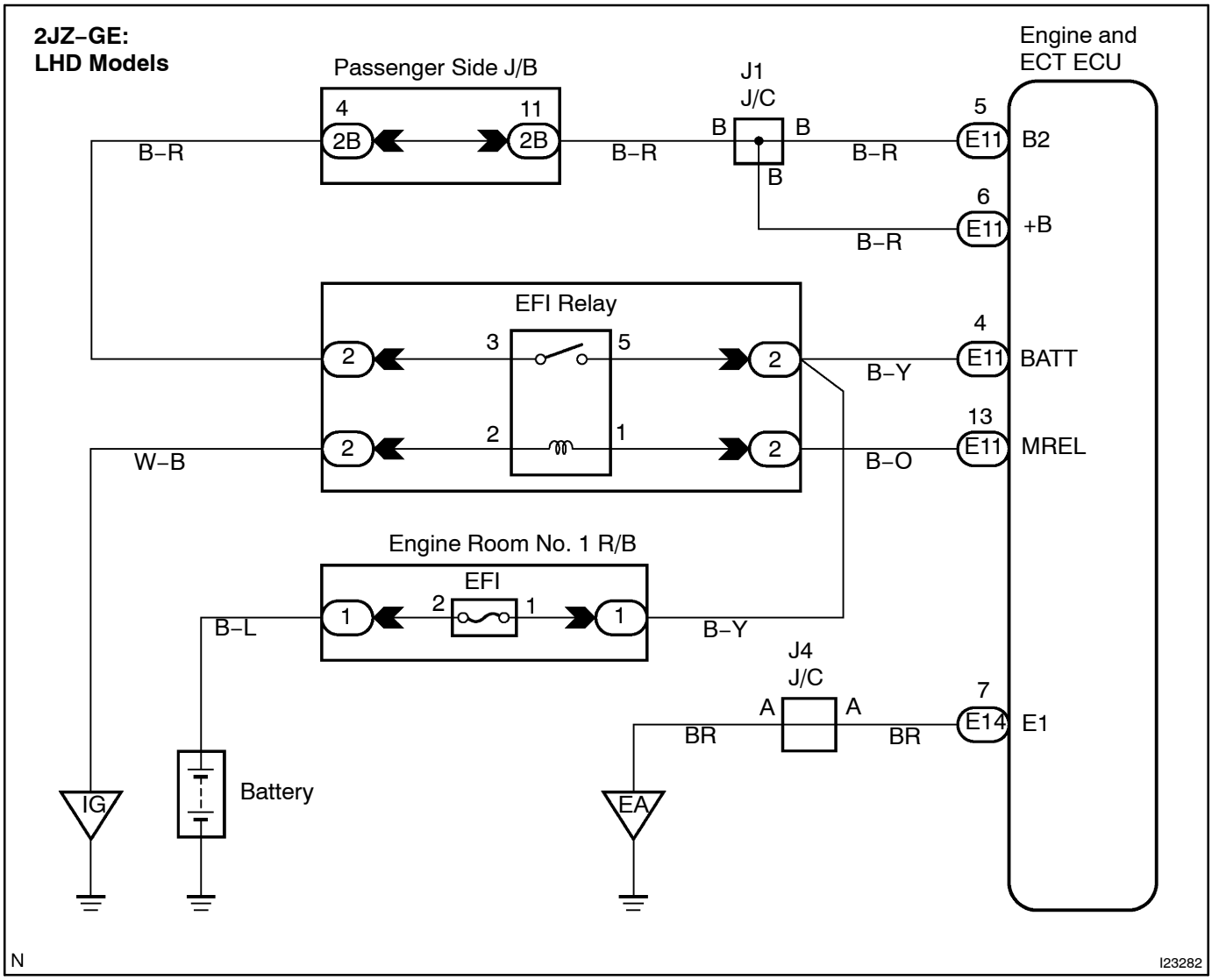
DI624–02

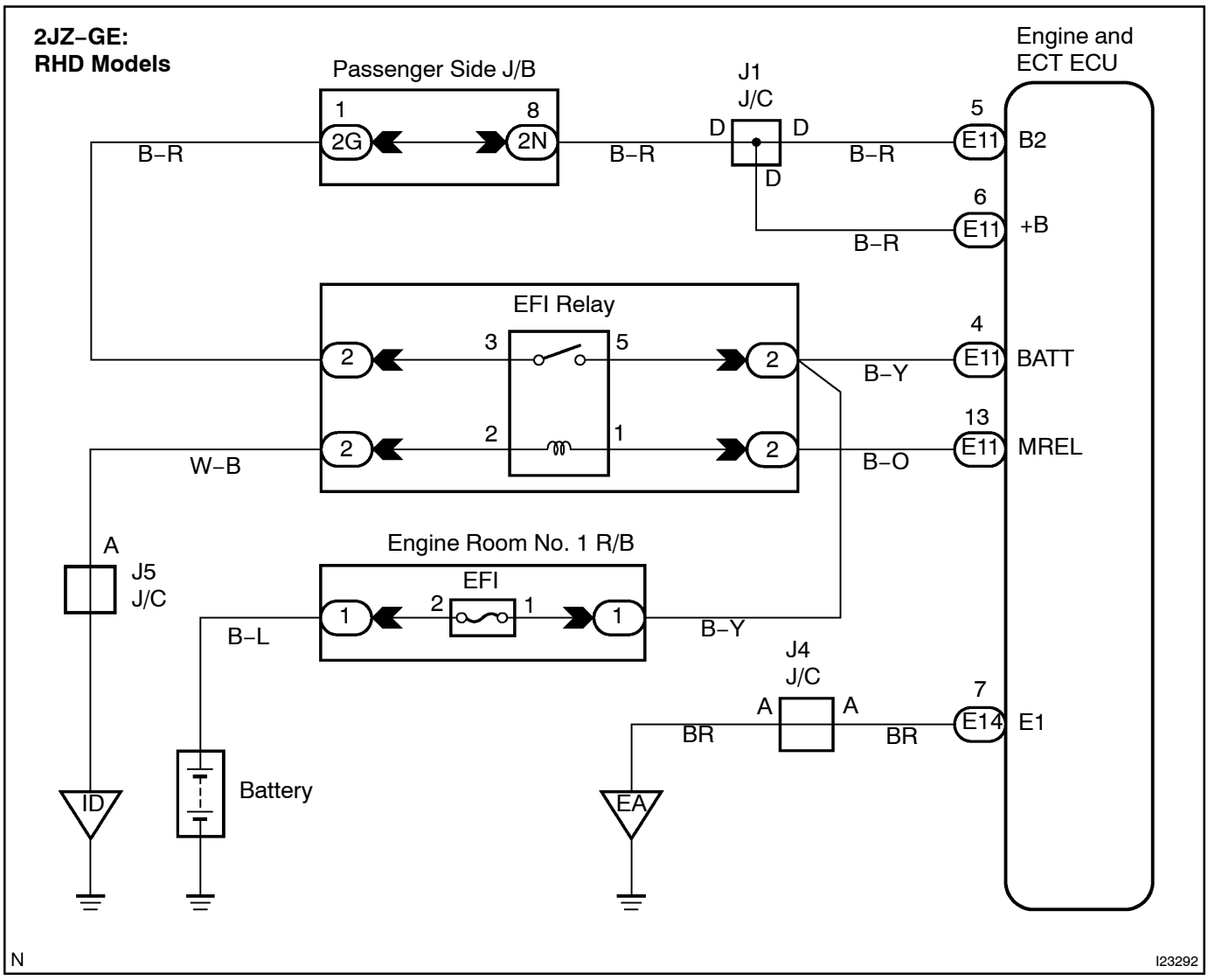
Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the Engine and ECT ECU.

WIRING DIAGRAM




2JZ–GE:
RHD Models
Engine and
ECT ECU
Passenger Side J/B
J1
J/C
1
8
2G
2N
B–R
B–R
D
D
D
B–R
5
E11
B2
6
E11
+B
B–R
EFI Relay
3
5
2
2
4
E11
BATT
B–Y
2
1
2
2
13
E11
MREL
W–B
B–O
A
J5
J/C
Engine Room No. 1 R/B
EFI
2
1
1
1
B–L
B–Y
J4
J/C
A
A
7
E14
E1
BR
BR
Battery
ID
EA
N
I23292

INSPECTION PROCEDURE

1	**Check IGN and EFI fuse.**

CHECK:
Check continuity of IGN and EFI fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK

2	**Check voltage between terminals IGSW, BATT and GND of Engine and ECT ECU connector (See page IN–34).**

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the Engine and ECT ECU connector.
CHECK:
Measure voltage between terminals IGSW, BATT and GND
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–522).**

NG

3	**Check wire harness and connector between Engine and ECT ECU and body ground (See page IN–34).**

NG → **Repair or replace wire harness or connector.**

OK

Check and repair wire harness and connector between Engine and ECT ECU and battery (See page IN–34).

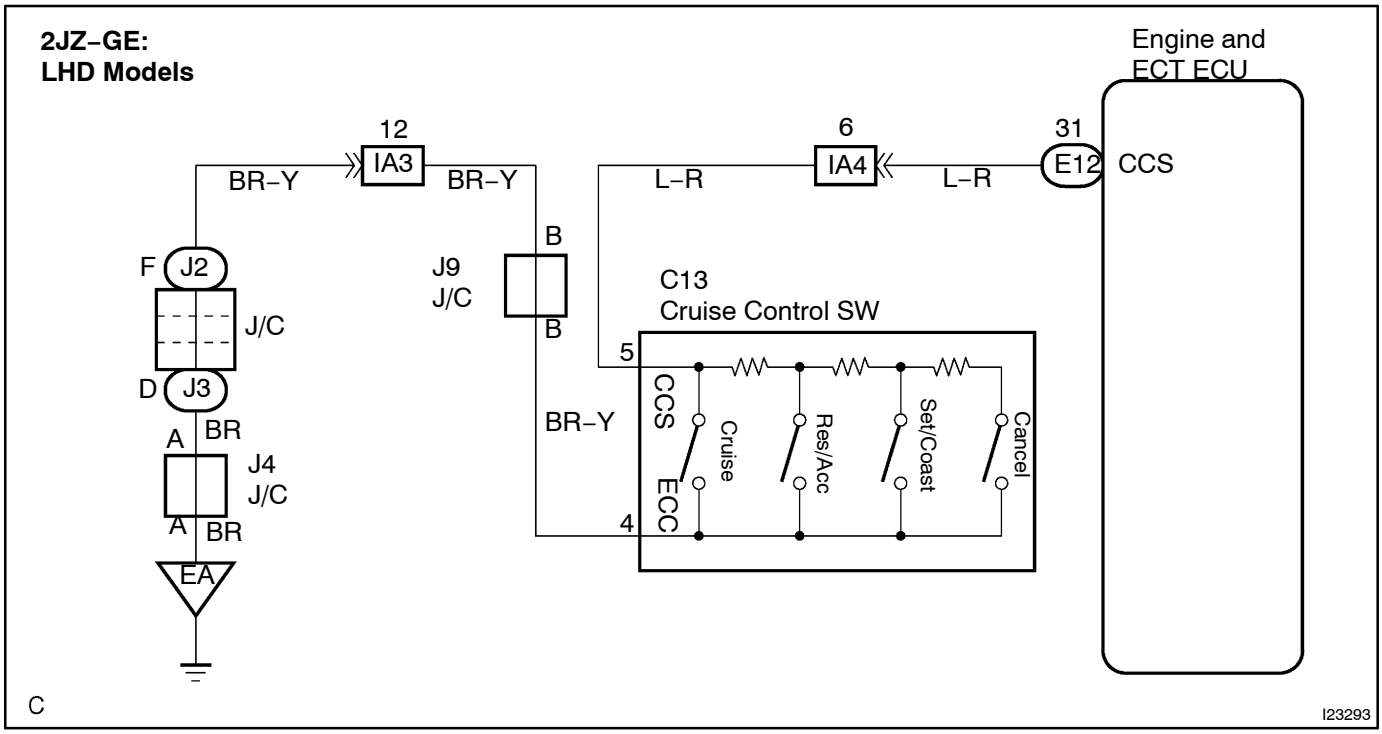
DI625–02

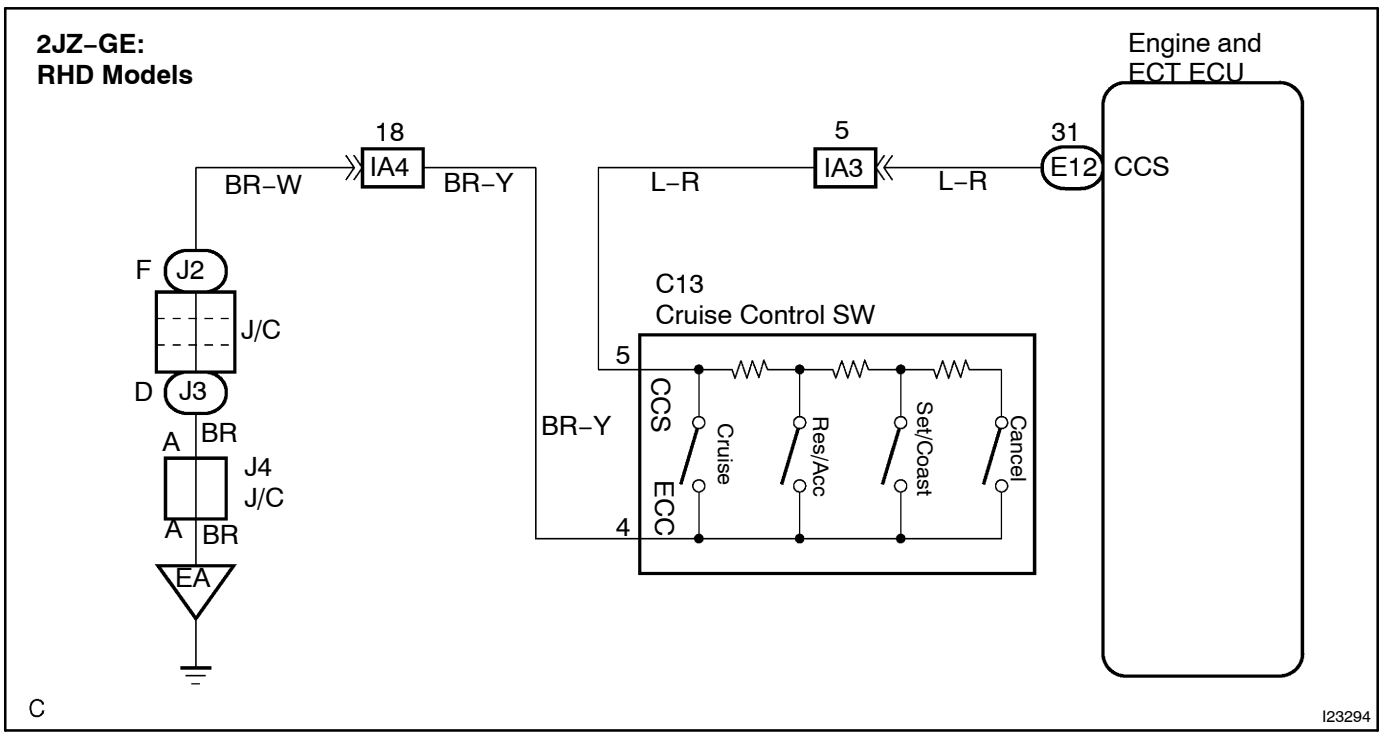
Cruise Control Switch Circuit

CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signal (each voltage) to the ECU.

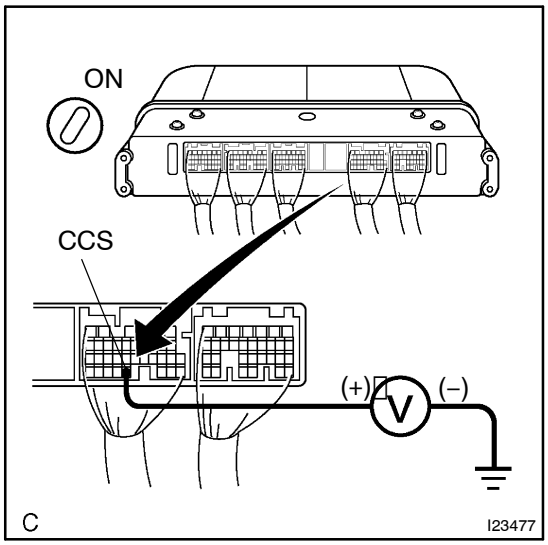
WIRING DIAGRAM





INSPECTION PROCEDURE

1	**Check voltage between terminals CCS of Engine & ECT ECU connector and body ground.**



PREPARATION:

(a) Remove the Engine & ECT ECU with connector still connected.

(b) Turn ignition switch ON.

CHECK:

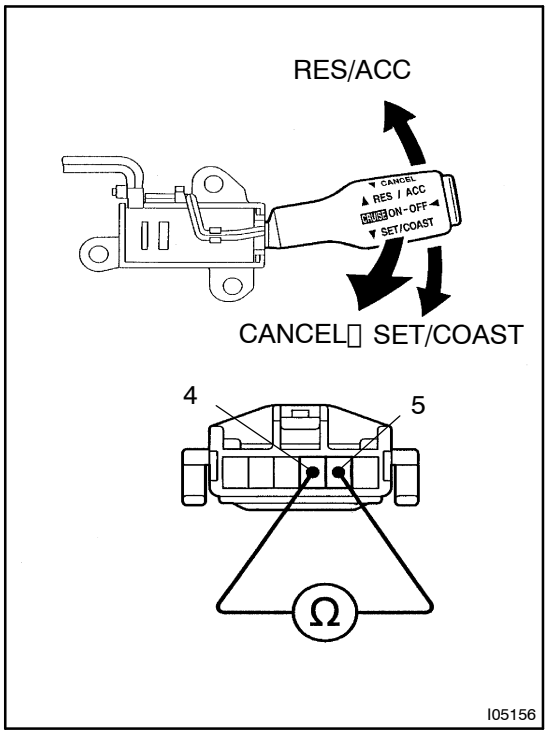
Measure voltage between terminals CCS of Engine & ECT ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

Switch position	Resistance (V)
Neutral	10 – 16 V
RES/ACC	2.4 – 3.8 V
SET/COAST	4.7 – 6.9 V
CANCEL	6.9 – 9.8 V

NG → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–522).**

OK

2	Check control switch continuity.



PREPARATION:

(a) Remove steering wheel center pad.

(b) Disconnect the control switch connector.

CHECK:

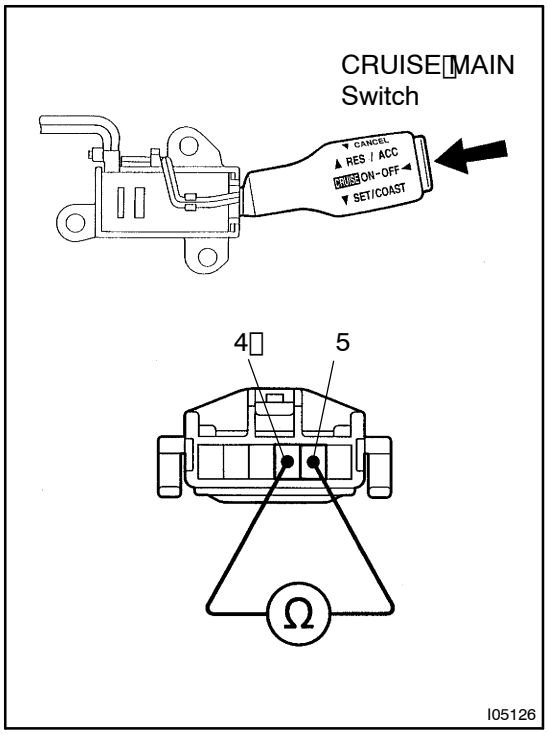
Measure resistance between terminals 4 and 5 of control switch connector when control switch is operated.

Switch position	Resistance (Ω)
Neutral	∞ (No continuity)
RES/ACC	220 – 260
SET/COAST	600 – 660
CANCEL	1,500 – 1,600

NG → **Replace control switch.**

OK

3	Check main switch continuity.



PREPARATION:

(a) Remove steering wheel center pad. (See Pub No. RM684E on page SR–12)

(b) Disconnect the control switch connector.

CHECK:

Check continuity between terminals 4 and 5 of control switch connector when main switch is held ON and OFF.

OK:

Switch position	Tester connection	Specified condition
OFF	–	No continuity
Hold ON	4 – 5	Continuity

NG → **Replace control switch.**

OK

4	Check harness and connector between Engine & ECT ECU and cruise control switch, cruise control switch and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

5	Check cruise control indicator light (See combination meter).

NG → Replace combination meter.

OK

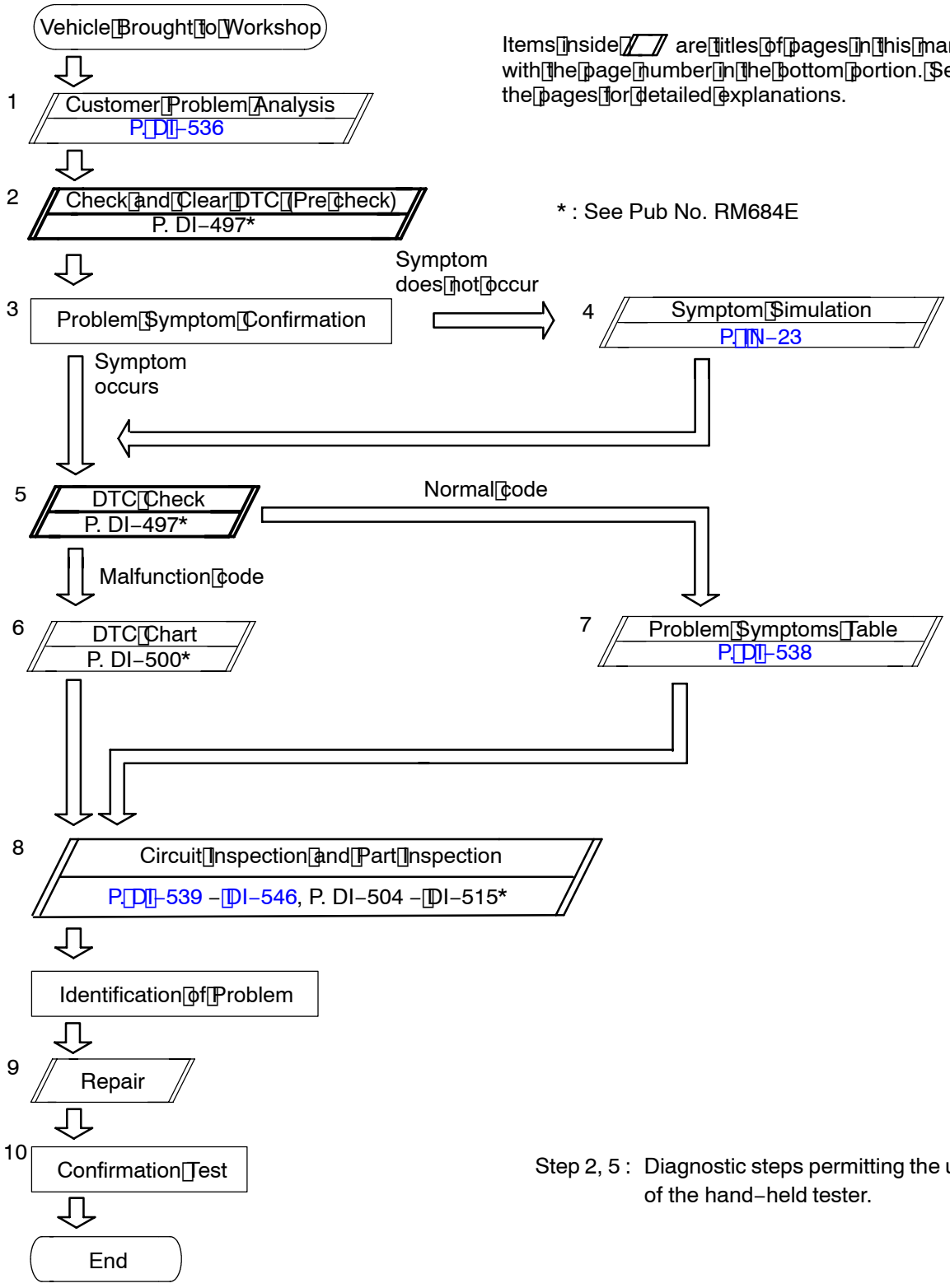
Check and replace Engine and ECT ECU (See page IN–34).

ENGINE IMMOBILISER SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI1AJ–31

Troubleshoot in accordance with the procedure on the following pages.



Items inside // // are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.

* : See Pub No. RM684E

Step 2, 5 : Diagnostic steps permitting the use of the hand–held tester.

DI1AK–16

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBILISER Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Immobiliser is not set. (Engine starts with key codes other than the registered key code.)
	☐ Engine does not start.

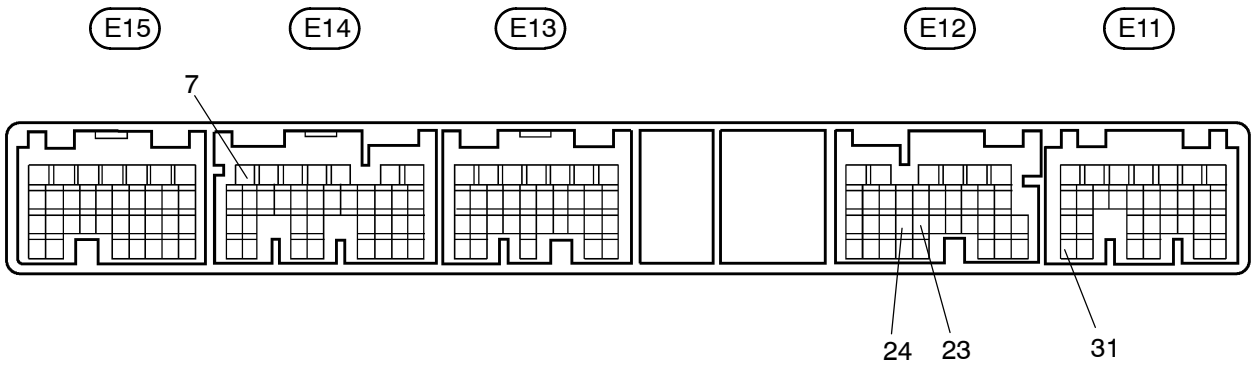
Check Item	**Malfunction Indicator Lamp**	☐ Normal ☐ Remains ON ☐ Does not Light Up

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI3ML–06

TERMINALS OF ECU

2JZ–GE:



C

I23299

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CODE – E1 (E11 – 31 ↔ E14 – 17)	LHD: G–B ↔ BR RHD: G ↔ BR	Ignition Switch ON	10 – 14
TXCT – E1 (E12 – 23 ↔ E14 – 17)	LHD: P–B ↔ BR RHD: P ↔ BR	Ignition Switch ON	10 – 14
RXCK – E1 (E12 – 24 ↔ E14 – 17)	V ↔ BR	Ignition Switch ON	10 – 14

DI1AP–28

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Immobiliser is not set. (Engine starts with key codes other than the registered key code.)	1. Engine and ECT ECU	IN–34
Engine does not start.	1. Key 2. Wire harness 3. Transponder key coil 4. Amplifier 5. Engine and ECT ECU	*1 IN–34 BE–201*3 IN–34
Security indicator is always ON.	1. Security indicator 2. Wire harness 3. Engine and ECT ECU	*2 IN–34 IN–34
Security indicator is always ON. (Although code has been registered in the automatic registration mode, indicator is not OFF.)	1. Wire harness 2 Transponder key coil 3. Amplifier 4. Engine and ECT ECU	IN–34 BE–201*3 IN–34
Security indicator is OFF. (When DTC of immobiliser is output)	1. Wire harness 2 Transponder key coil 3. Amplifier 4. Engine and ECT ECU	IN–34 BE–201*3 IN–34
Security indicator is OFF. (When DTC of immobiliser is not output)	1. Wire harness 2. Engine and ECT ECU	IN–34 IN–34
Security indicator is abnormally blinking.	1. Wire harness 2. Engine and ECT ECU	IN–34 IN–34

*1 : Check that the key which did not start the engine has been registered and that it is possible to start with other already registered key.

*2 : Finish the automatic registration mode because the mode might still remain.

*3 : See Pub No. RM684E.

DI628–02

CIRCUIT INSPECTION

DTC	B2796/99	No Communication in Immobiliser system

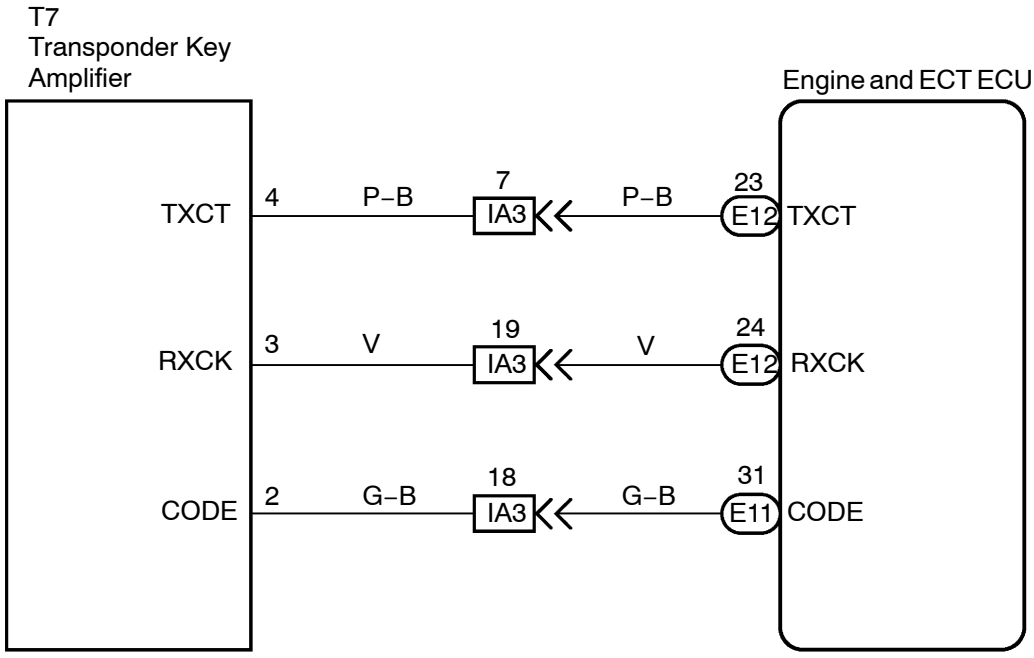
CIRCUIT DESCRIPTION

This code is stored in memory when inserting the key that does not have a transponder chip or if communication between the key and Engine and ECT ECU is impossible.

DTC No.	DTC Detecting Condition	Trouble Area
B2796/99	No communication	• Key • Transponder Key Coil • Transponder Key Amplifier • Wire harness • Engine and ECT ECU

WIRING DIAGRAM

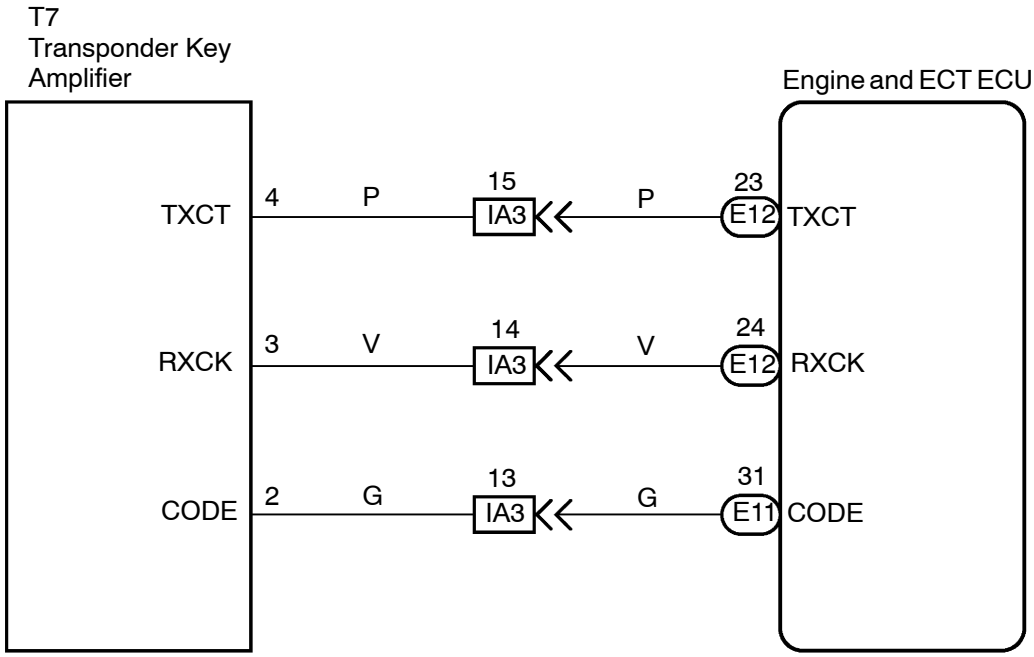
2JZ–GE:
LHD Models



N

I10750

2JZ–GE:
RHD Models



N

INSPECTION PROCEDURE

1	**Delete DTC and insert all the presently available keys to check whether the engine starts or not.**

RESULT:

A	All keys start the engine.
B	A specific key does not start the engine. In this case, DTC (B 2796) is stored in memory.
C	All keys do not start the engine. In this case, DTC (B 2796) is stored in memory.

A → **No problem at this time.**

HINT:
If the result is ”A”, please confirm whether or not customers have ever inserted the key (without transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

B → **The transponder chip of a specific key is defective. Replace the key.**

C

2	**Check transponder key coil (See Pub No. RM684E on page BE–201).**

NG → **Replace transponder key coil.**

OK

3	**Check harness and connector between transponder key amplifier and Engine and ECT ECU.**

NG → **Repair or replace harness and connector.**

OK

4	**Does it operate normally after replacement of transponder key amplifier?**

Yes → **Replace transponder key amplifier.**

No

Replace Engine and ECT ECU.

DI629–02

DTC	B2797/99	Communication Malfunction No.1

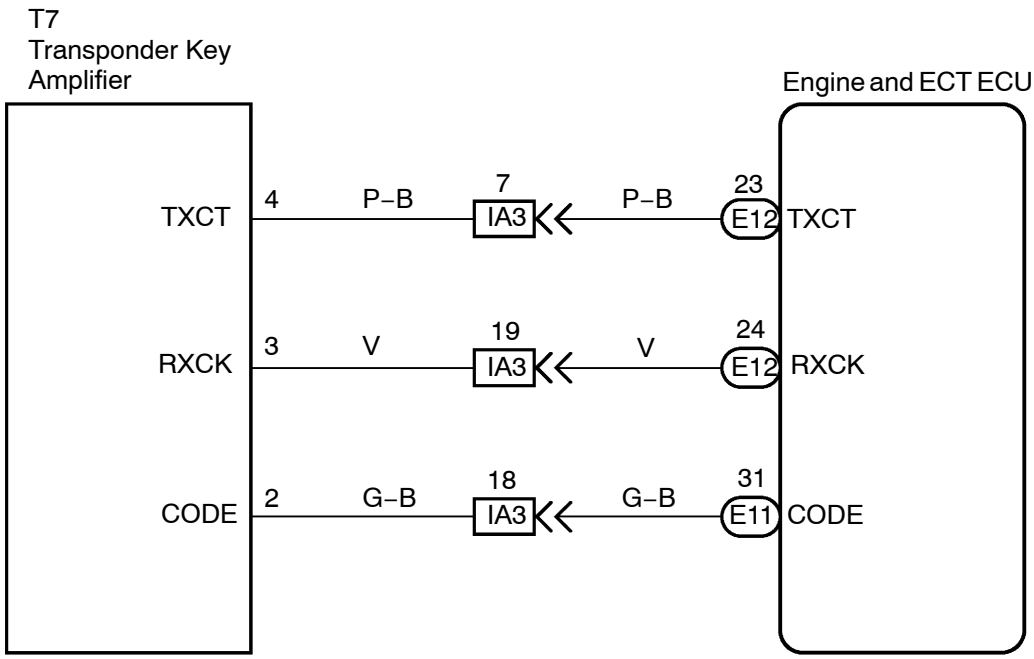
CIRCUIT DESCRIPTION

This code is detected when although the communication has been performed normally, an error occurs. (Example. Some noise is included in communication line.)

DTC No.	DTC Detecting Condition	Trouble Area
B2797/99	Communication error	• Wire Harness • Transponder Key Amplifier • Engine and ECT ECU

WIRING DIAGRAM

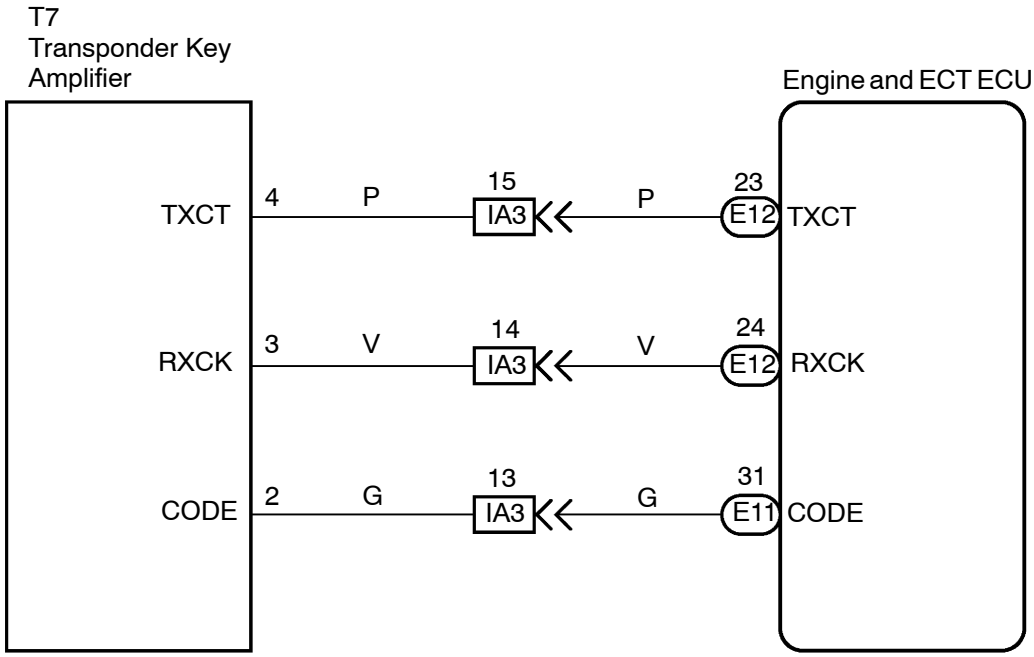
2JZ–GE:
LHD Models



N

I10750

2JZ–GE:
RHD Models

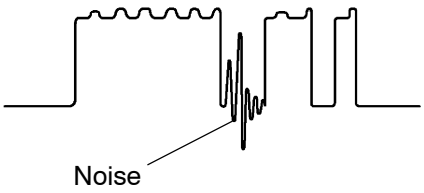


N

I10759

INSPECTION PROCEDURE

1	**Noise check**



PREPARATION:
Insert the already registered master key in the key cylinder.
CHECK:
Using an oscilloscope or hand–held tester, check that noise is included in the signals sent to the CODE terminal of Engine and ECT ECU.
OK:
No noise is detected.

NG → **Try to find the cause of the noise and remove it.**

OK

2	**Does the system operate normally after replacement of transponder key amplifier?**

Yes → **Replace transponder key amplifier.**

No

Replace Engine and ECT ECU.

DI62A–03

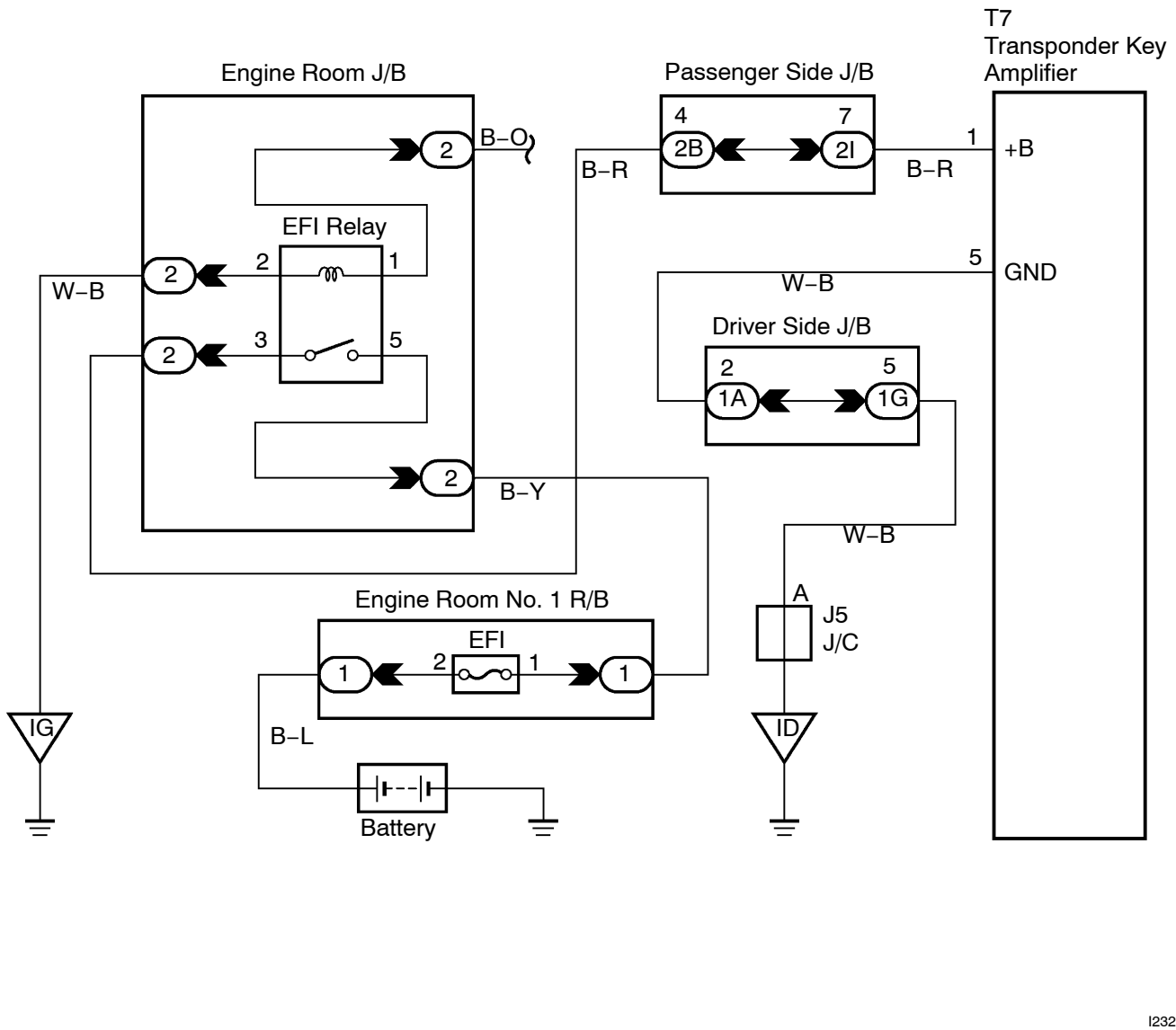
Power source circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the Transponder Key ECU

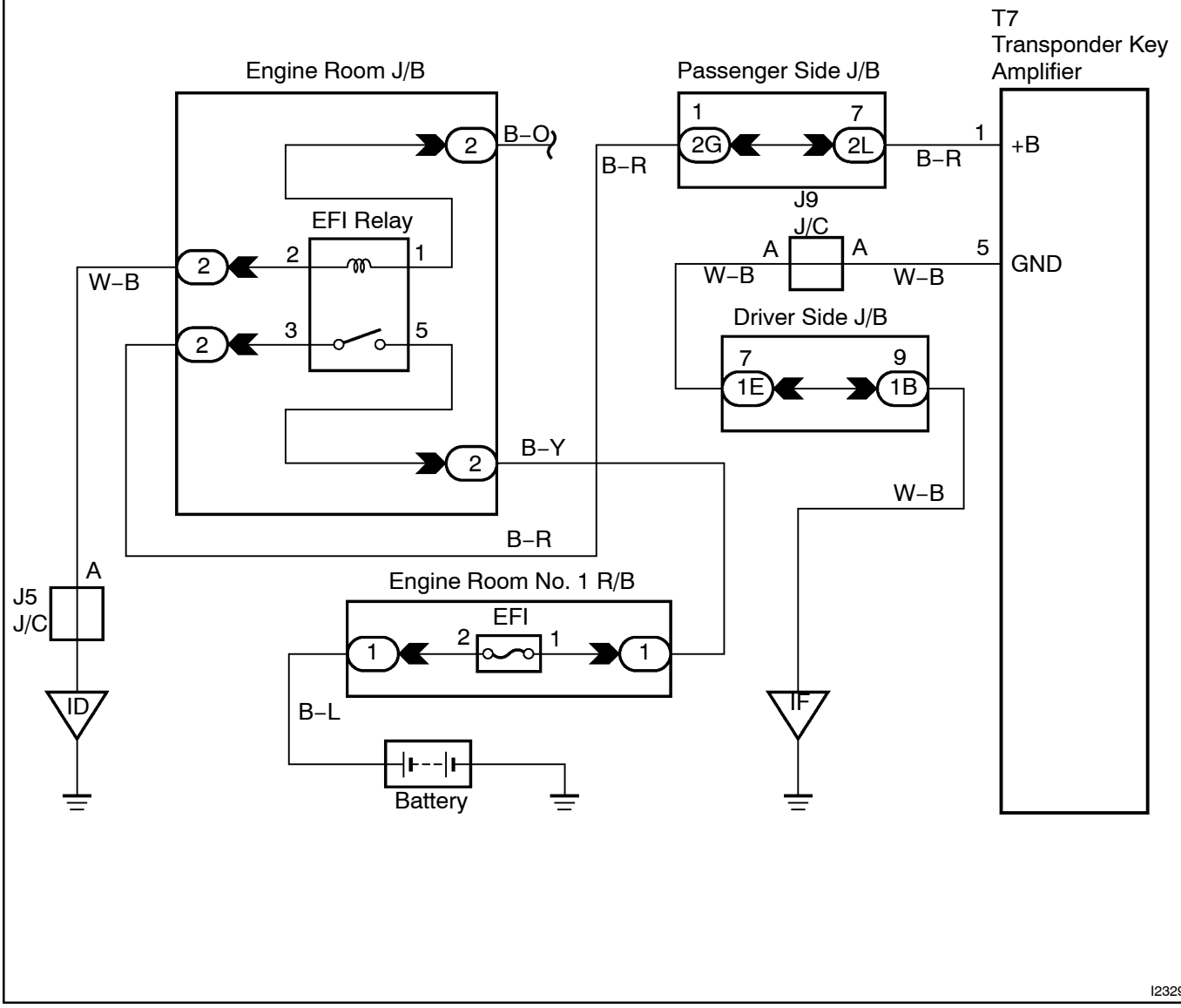
WIRING DIAGRAM

2JZ–GE:
LHD Models



I23295

2JZ–GE:
RHD Models



INSPECTION PROCEDURE

1	**Check EFI fuse.**

CHECK:
Check continuity of EFI fuse.
OK:
Continuity

NG → **Replace the failure fuse.**

OK ↓

2	**Check voltage between terminals EFI and GND of Transponder Key ECU connector.**

PREPARATION:
(a) Turn ignition switch OFF.
(b) Disconnect the Transponder Key ECU connector.
CHECK:
Measure voltage between terminals +B and GND.
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI–538).**

NG ↓

3	**Check wire harness and connector between Transponder Key ECU and body ground.**

NG → **Repair or replace wire harness or connector.**

OK ↓

Check and repair wire harness and connector between Transponder Key ECU and Battery.

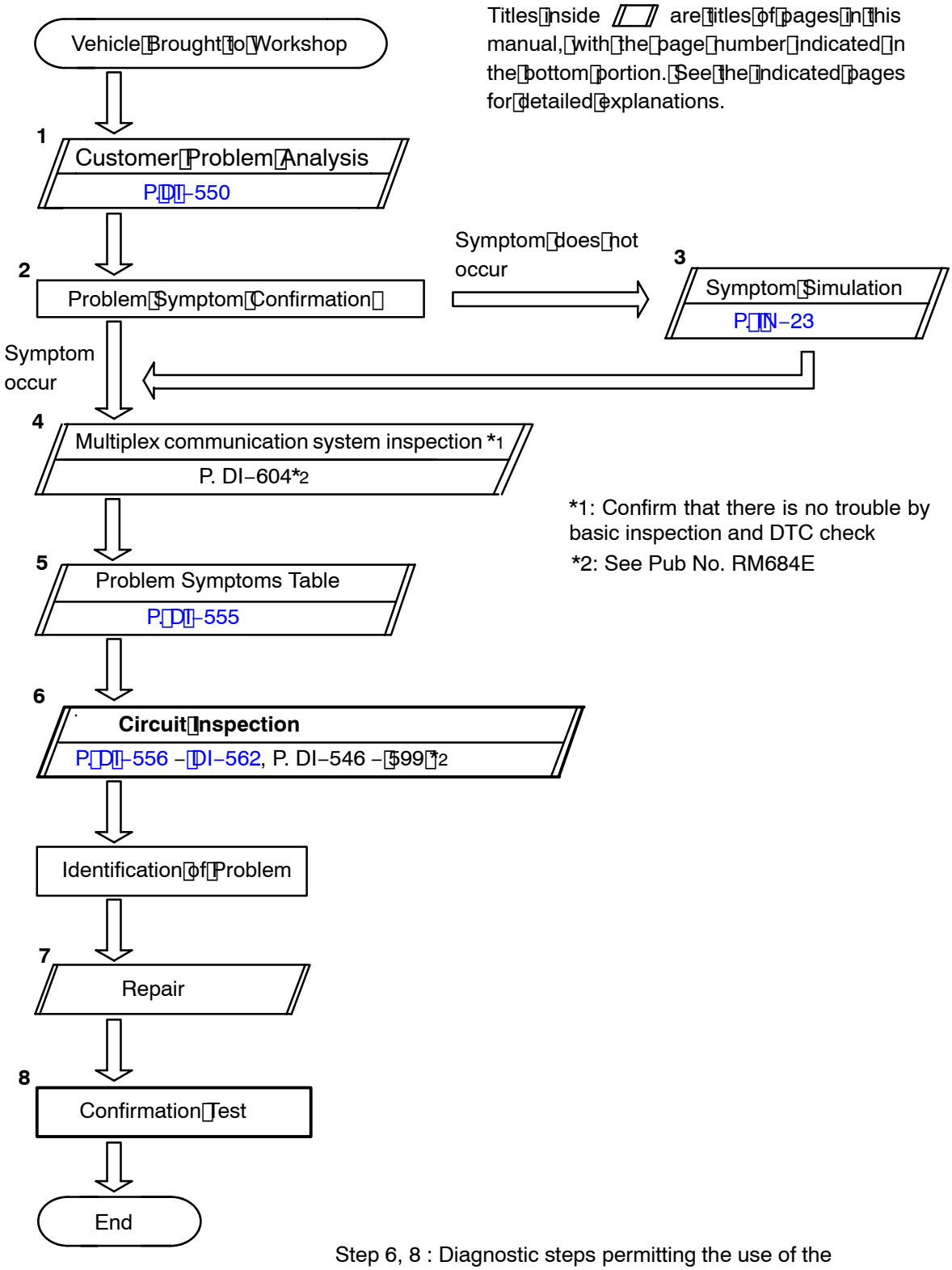
BODY CONTROL SYSTEM

DI62C–09

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the trouble shooting.



Step 6, 8 : Diagnostic steps permitting the use of the hand–held tester .

DI62D–01

CUSTOMER PROBLEM ANALYSIS CHECK

BODY CONTROL SYSTEM Check Sheet

Inspector's name: _____

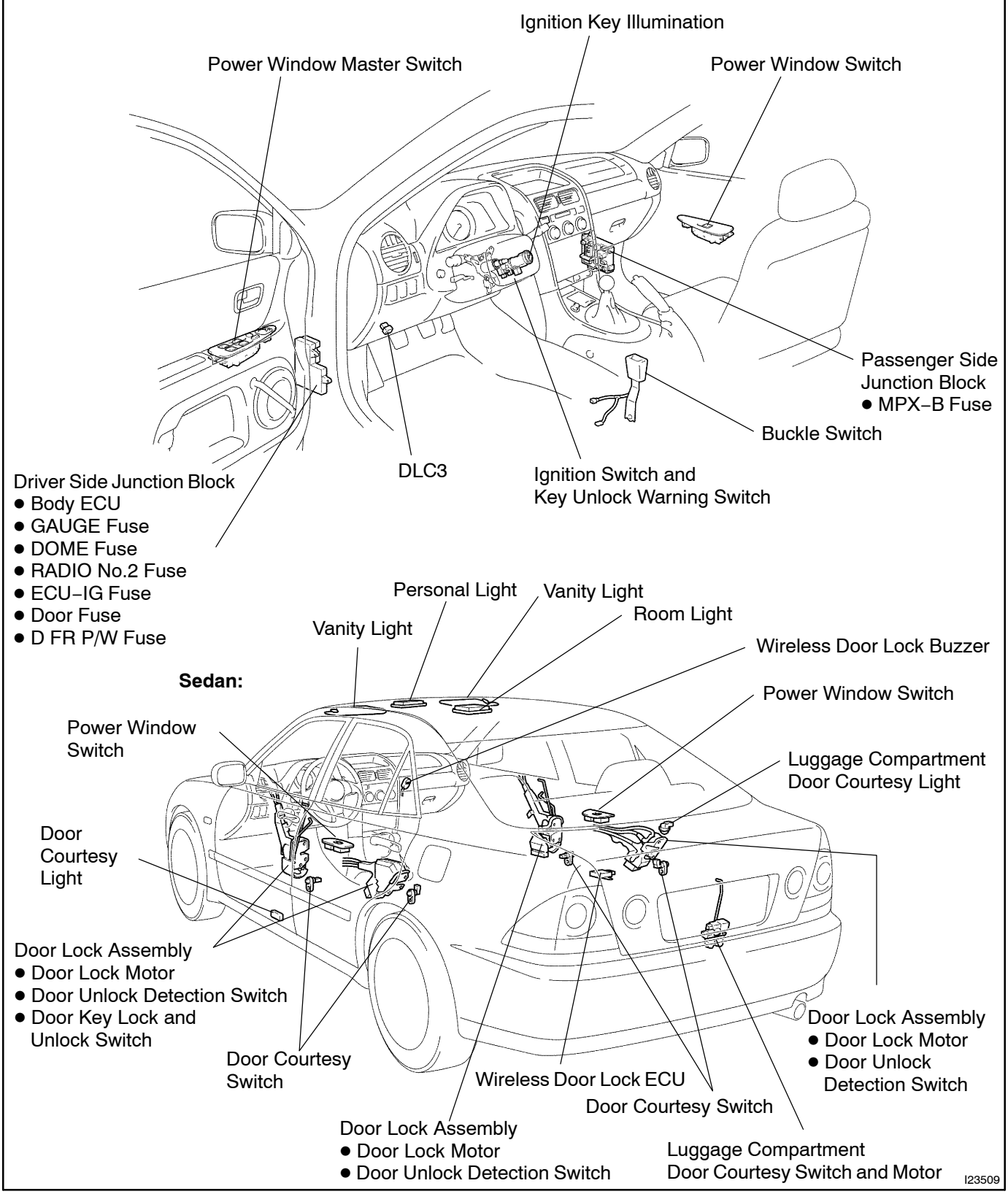
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/ Others
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

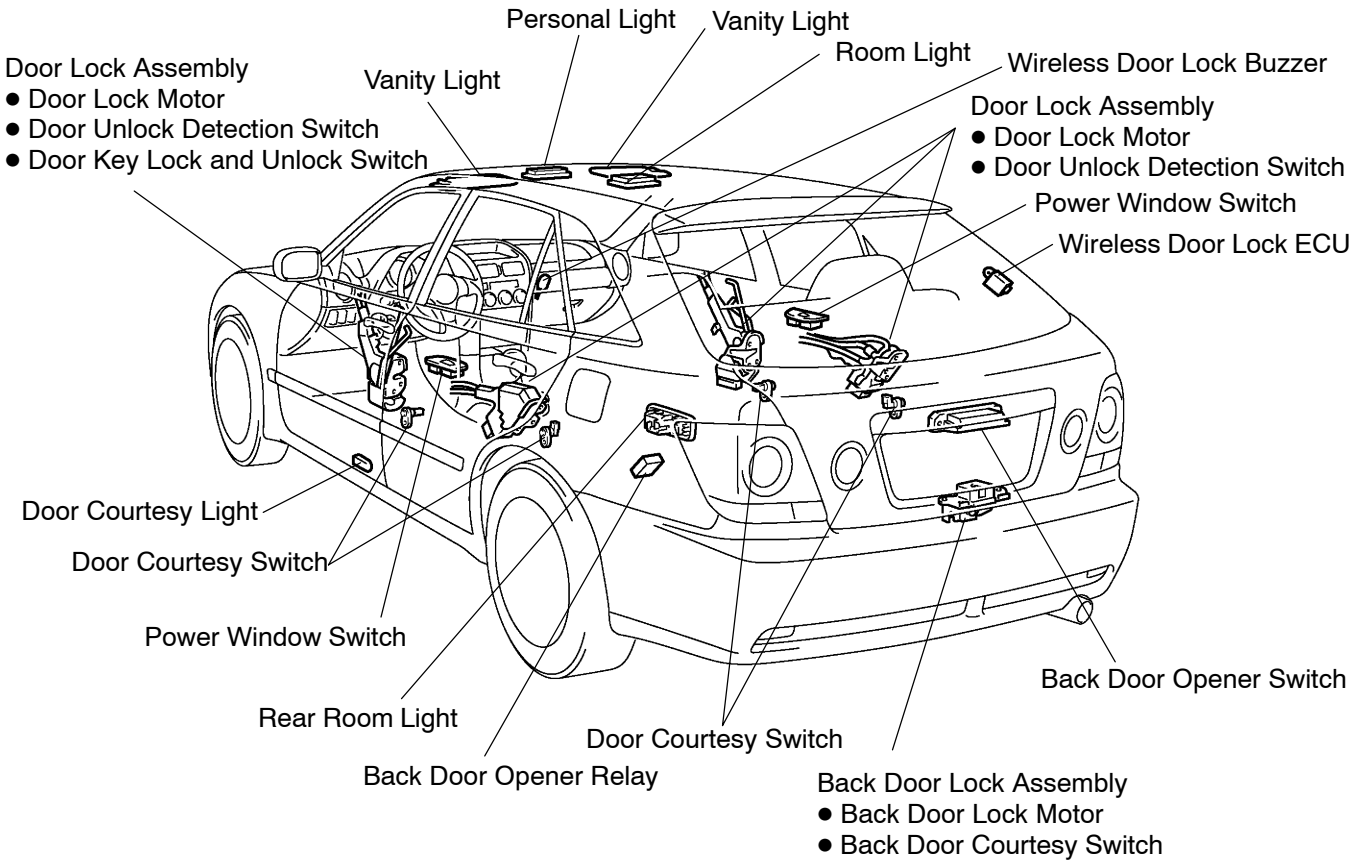
Malfunction System	☐ Key Reminder System
	☐ Light Control System
	☐ Illuminated Entry System
	☐ Seat Belt Warning
	☐ Power Window Control System
	☐ Power Door Lock Control System
	☐ Wireless Door Lock Control System
	☐ Others

DI9I2–01

PARTS LOCATION



Wagon:

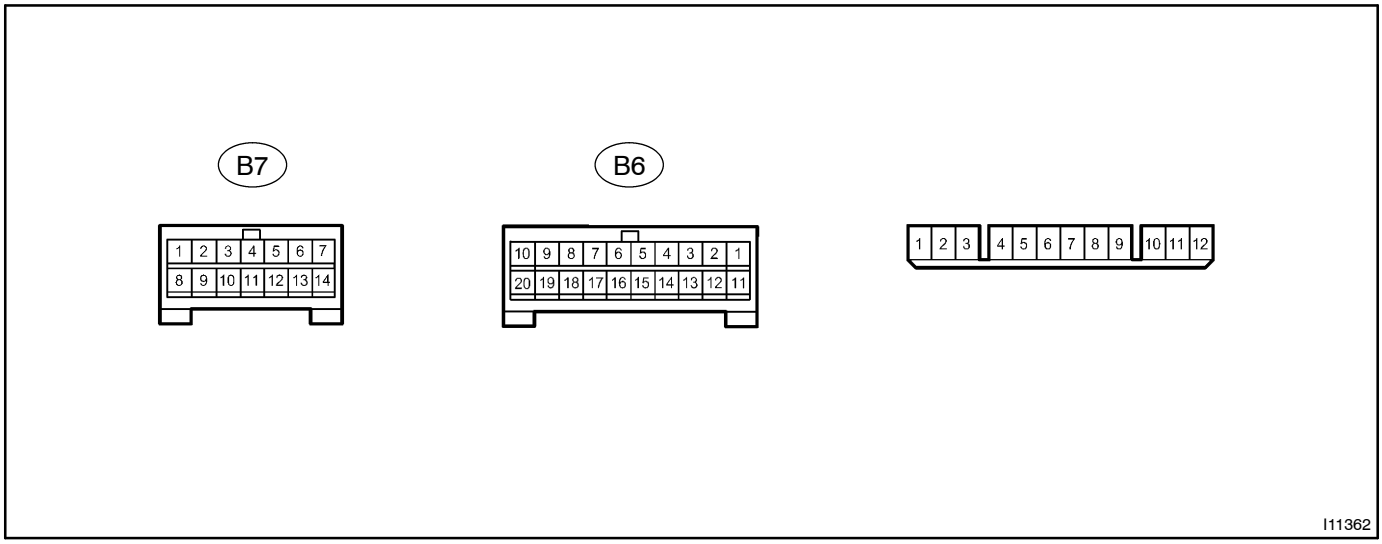


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DI62F–03

TERMINALS OF ECU



Symbols (Terminal No.)	Wring Color	Condition	STD Voltage (V)
BSUB – GND (1 – 12)	–	Constant	10 – 14 V
BECU – GND (2 – 12)	–	Constant	10 – 14 V
IG – GND (3 – 12)	–	Ignition switch position is LOCK or ACC.	Below 1 V
		Ignition switch position is ON.	10 – 14 V
ACC – GND (4 – 12)	–	Ignition switch position is LOCK.	Below 1 V
		Ignition switch position is ACC.	10 – 14 V
DEF – GND (5 – 12)	–	Defogger switch position is ON.	Below 1 V
MPX3 (6)	–	Multiplex communication circuit.	–
MPX1 – MPX2 (7 – B6–5)	L	Multiplex communication circuit.	–
ILE – GND (8 – 12)	–	Each interior light switch ON.	Below 1 V
ACT+ – ACT– (9 – 10)	–	Door lock operating.	10 – 14 V
BCTY – GND (11 – 12)	–	Driver door opened.	Below 1 V
		Driver door closed.	10 – 14 V
GND1 – Body ground (12 – Body ground)	–	Constant	Below 1 V
TAIL – GND2 (B6–2 – B6–19)	G – W–B	Light control switch position is TAIL or HEAD.	Below 1 V
		Light control switch position is OFF.	10 – 14 V
RRU – GND2 (B6–3 – B6–19)	R–Y – W–B	Rear Right side power window UP operation.	Below 1 V
RRD – GND2 (B6–4 – B6–19)	G–Y – W–B	Rear Right side power window DOWN operation.	Below 1 V
KSW – GND2 (B6–6 – B6–19)	B–Y – W–B	Key is inserted.	Below 1 V
		Key is not inserted.	10 – 14 V
DCLP – GND2 (B6–7 – B6–19)	R–W – W–B	Each interior light switch ON.	Below 1 V

PCTY – GND2 (B6–8 – B6–19)	R–B – W–B	Passenger door opened.	Below 1 V
		Passenger door closed.	10 – 14 V
PCLP – GND2 (B6–9 – B6–19)	R–G – W–B	Each interior light switch ON.	Below 1 V
RLD – GND2 (B6–10 – B6–19)	G–B – W–B	Rear Left side power window DOWN operation.	Below 1 V
RLU – GND2 (B6–11 – B6–19)	R – W–B	Rear Left side power window UP operation.	Below 1 V
OBD2 – GND2 (B6–14 – B6–19)	W – W–B	OBD2 communication circuit.	–
PU – GND2 (B6–17 – B6–19)	Y–B – W–B	Front Left side power window UP operation.	Below 1 V
PD – GND2 (B6–18 – B6–19)	L–W – W–B	Front Left side power window DOWN operation.	Below 1 V
GND2 – Body ground (B6–19 – Body ground)	W–B – Body ground	Constant	Below 1 V
Wagon: BDSU – GND2 (B6–20 – B6–19)	B–R – W–B	Back door opener switch ON.	Below 1 V
		Back door opener switch OFF.	10 – 14 V
PRG – RDA (B7–1 – B7–2)	R–B – GR–L	Wireless door lock receiver communication circuit.	–
DBKL – GND2 (B7–3 – B6–19)	P–G – W–B	With seat belt ON.	Below 1 V
		No seat belt ON.	10 – 14 V
LSWP – GND2 (B7–4 – B6–19)	L–R – W–B	Except driver's door is unlocked.	Below 1 V
		Except driver's door is locked.	10 – 14 V
RCTY – GND2 (B7–5 – B6–19)	R–L – W–B	Rear door opened.	Below 1 V
		Rear door closed.	10 – 14 V
DCTY – GND2 (B7–6 – B6–19)	R–G – W–B	Driver door opened.	Below 1 V
		Driver door closed.	10 – 14 V
Sedan: LGCY – GND2 (B7–7 – B6–19)	R–Y – W–B	Luggage compartment door opened.	Below 1 V
		Luggage compartment door closed.	10 – 14 V
Wagon: LGCY – GND2 (B7–7 – B6–19)	R–Y – W–B	Back door opened.	Below 1 V
		Back door closed.	10 – 14 V
Sedan: TR+ – GND2 (B7–8 – B6–19)	L–W – W–B	Luggage compartment door opener switch is operated.	Below 1 V
		Luggage compartment door opener switch is not operated.	10 – 14 V
Wagon: TR+ – GND2 (B7–8 – B6–19)	L–W – W–B	Back door opener switch is operated.	Below 1 V
		Back door opener switch is not operated.	10 – 14 V
HAZ – GND2 (B7–9 – B6–19)	G–W – W–B	Hazard warning switch position is ON.	Below 1 V
FE – GND2 (B7–13 – B6–19)	BR–W – W–B	Constant	Below 1 V
FR – GND2 (B7–14 – B6–19)	Y–R – W–B	Ignition switch position ON and fuel sender gauge position float UP.	Approx. 0.5 V
		Ignition switch position ON and fuel sender gauge position float DOWN.	Approx. 0.5 V

DI62G–09

PROBLEM SYMPTOMS TABLE

LIGHT CONTROL:

Symptom	Suspect Area	See page
Auto turn–off does not operate	12.Door courtesy switch circuit (Driver side) 13.Ignition switch 14.Body ECU 15.Theft deterrent ECU	DI–574* DI–549* – –

DOOR LOCK CONTROL:

Symptom	Suspect Area	See page
Lock or unlock cannot be operated with door lock control S/W.	1. Door lock control switch circuit 2. Body ECU 3. Power window master switch	DI–589* – –
Door key linked function does not operate.	1. Door key lock and unlock switch circuit 2. Body ECU 3. Power window master switch	DI–589* – –
Key confinement prevention function does not operate.	1. Key unlock switch circuit 2. Body ECU 3. Power window master switch	DI–566* – –

WIRELESS DOOR LOCK CONTROL:

Symptom	Suspect Area	See page
All function of wireless door lock control system do not operate.	1. Transmitter 2. Key unlock warning switch circuit 3. Wireless door lock ECU 4. Body ECU	BE–132* DI–566* BE–132* –
Lock (or unlock) function does not operate.	1. Door key lock and unlock switch circuit 2. Door unlock detection switch circuit 3. Body ECU	DI–589* DI–586* –
Automatic lock function operates even if any door is opened within 30 seconds after all doors are unlocked by wireless door lock control system .	1. Door courtesy switch circuit 2. Body ECU	DI–574* –

OTHERS:

Symptom	Suspect Area	See page
Does not operate the illuminated entry	1. Illumination circuit 2. Body ECU	DI–555* –
Key remainder system does not operate.	1. Key unlock warning switch circuit 2. Body ECU	DI–566* –
Seat belt warning does not operate.	1. Driver buckle switch circuit 2. Body ECU 3. Combination meter	DI–569* – BE–2*

* : See Pub No. RM684E

DI62J–02

CIRCUIT INSPECTION

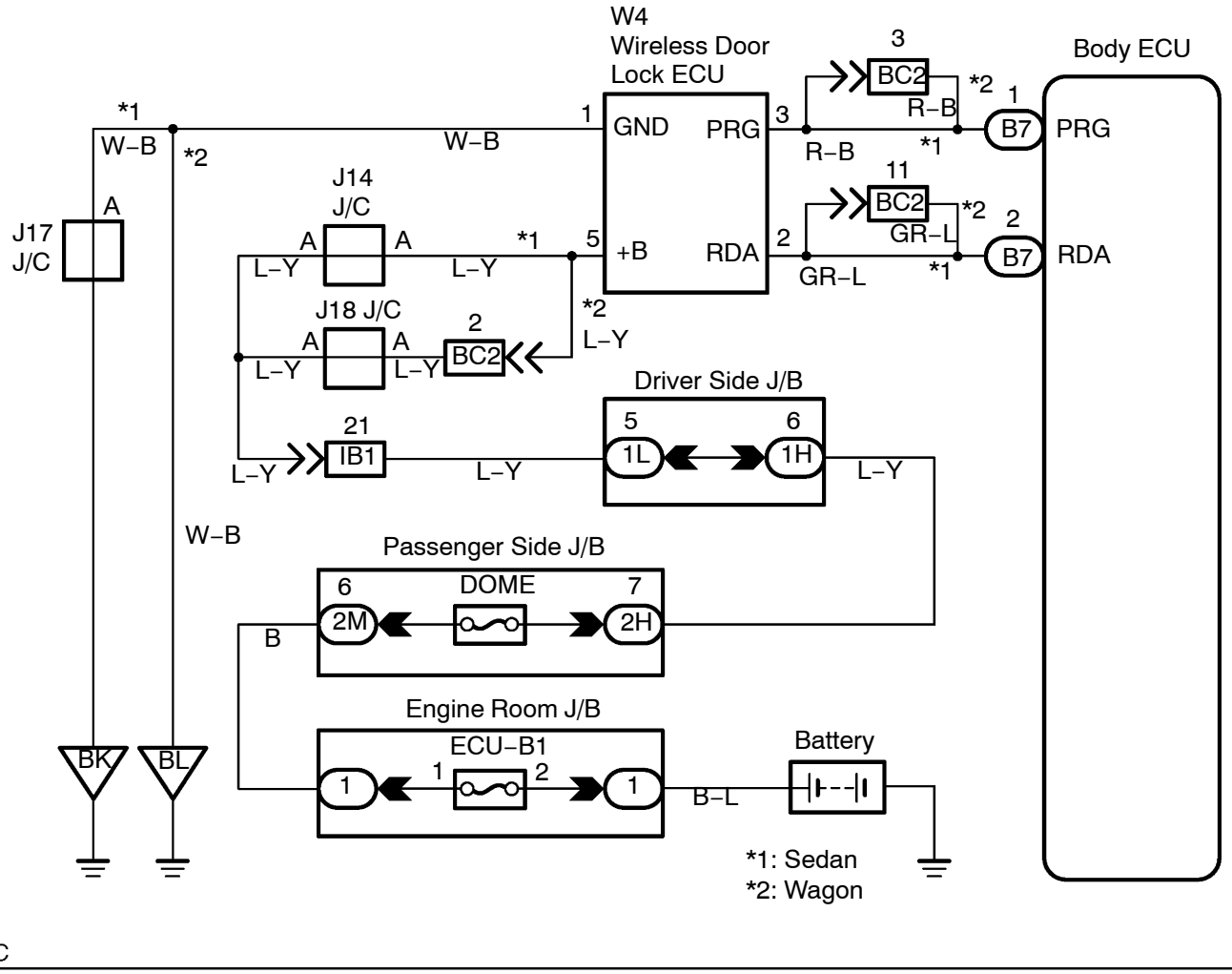
Wireless door lock tuner circuit

CIRCUIT DESCRIPTION

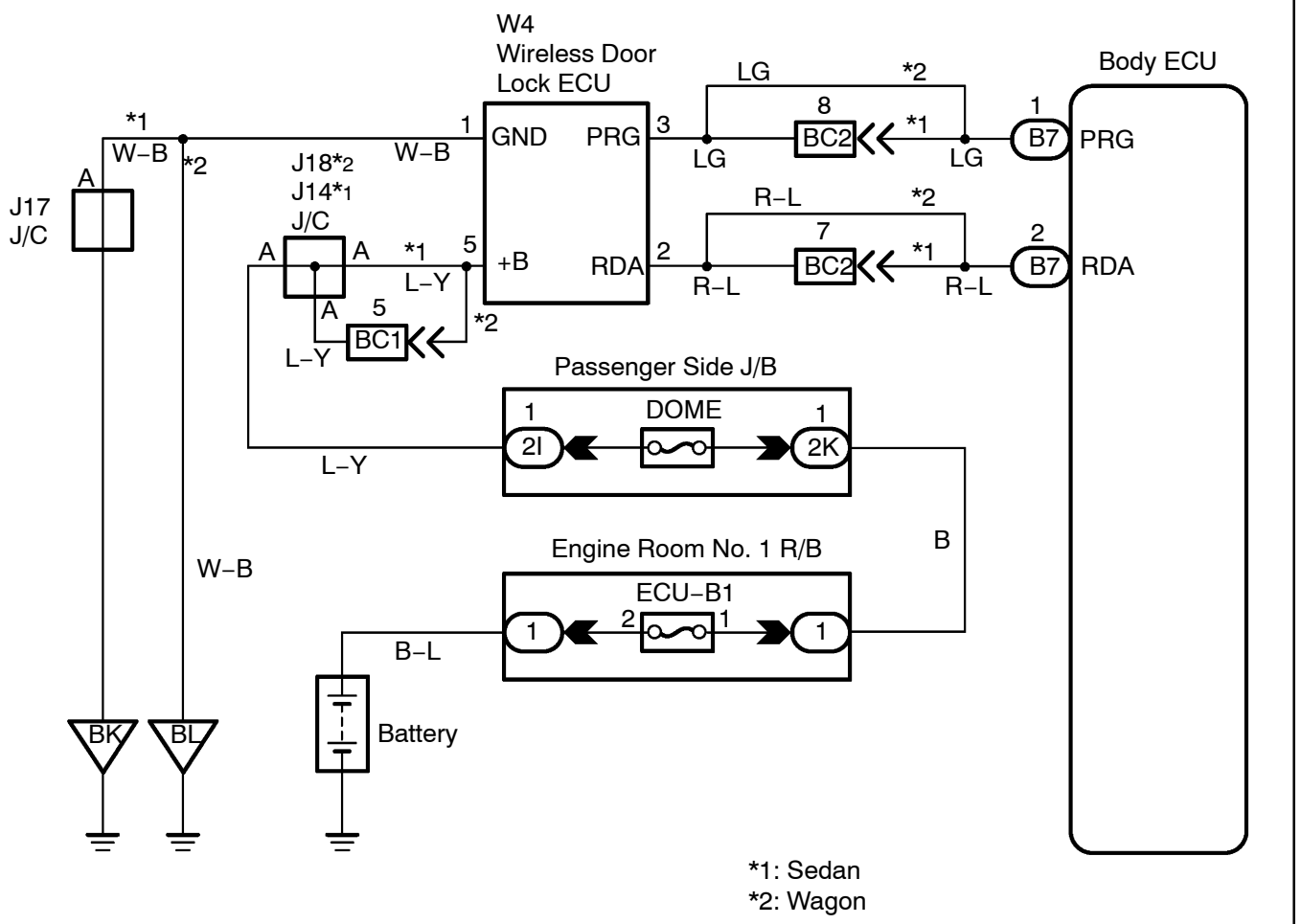
The signal from the transmitter will be input to the body ECU through RDA line. RDA line is diagnosed by the Body ECU, so check DTC also in case of the failure of the wireless function.

WIRING DIAGRAM

LHD Models



RHD Models


W4
Wireless Door
Lock ECU
Body ECU
GND
PRG
+B
RDA
LG
R–L
W–B
L–Y
B–L
B
*1
*2
J17
J/C
J18*2
J14*1
J/C
BC1
BC2
B7
PRG
RDA
Passenger Side J/B
DOME
2I
2K
Engine Room No. 1 R/B
ECU–B1
Battery
BK
BL
*1: Sedan
*2: Wagon
C
I23268

INSPECTION PROCEDURE

1	Check that DTC 42 is not output

NG → Check the RDA line.

OK

2	Check wire harness

PREPARATION:
Disconnect connectors of wireless door lock tuner and Body ECU.
CHECK:
Check continuity between terminals PRG of wireless door lock tuner and PRG of Body ECU.
OK:
Continuity

NG → Repair or replace wire harness

OK

3	Check the wireless door lock tuner

CHECK:
Replace the wireless door lock tuner and check if it recovers normally.
OK:
Must be recovered normally.

NG → Proceed to next circuit inspection shown on problem symptoms table. (See page DI–555)

OK

Failure of the original wireless door lock tuner.

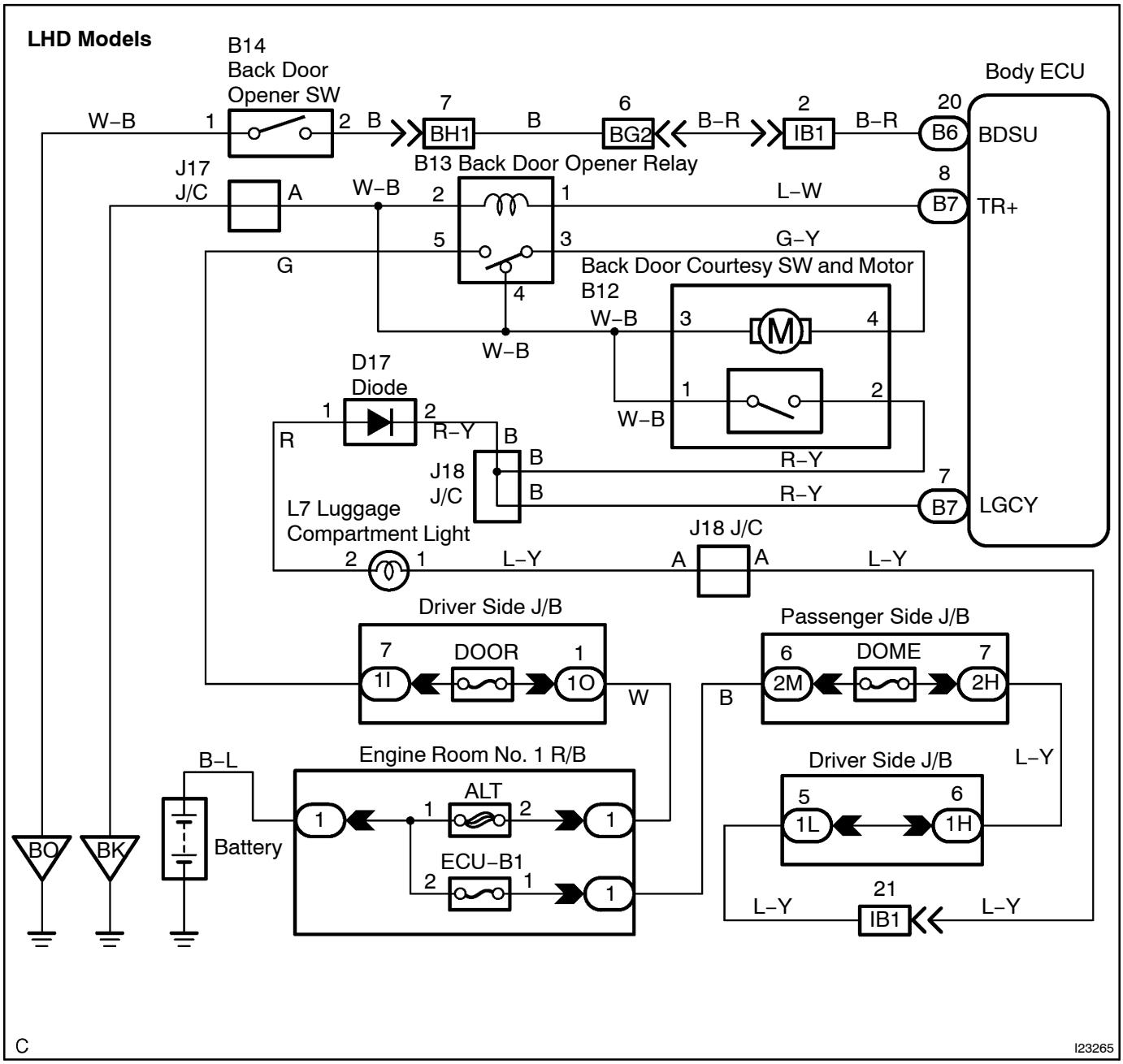
DI62R–02

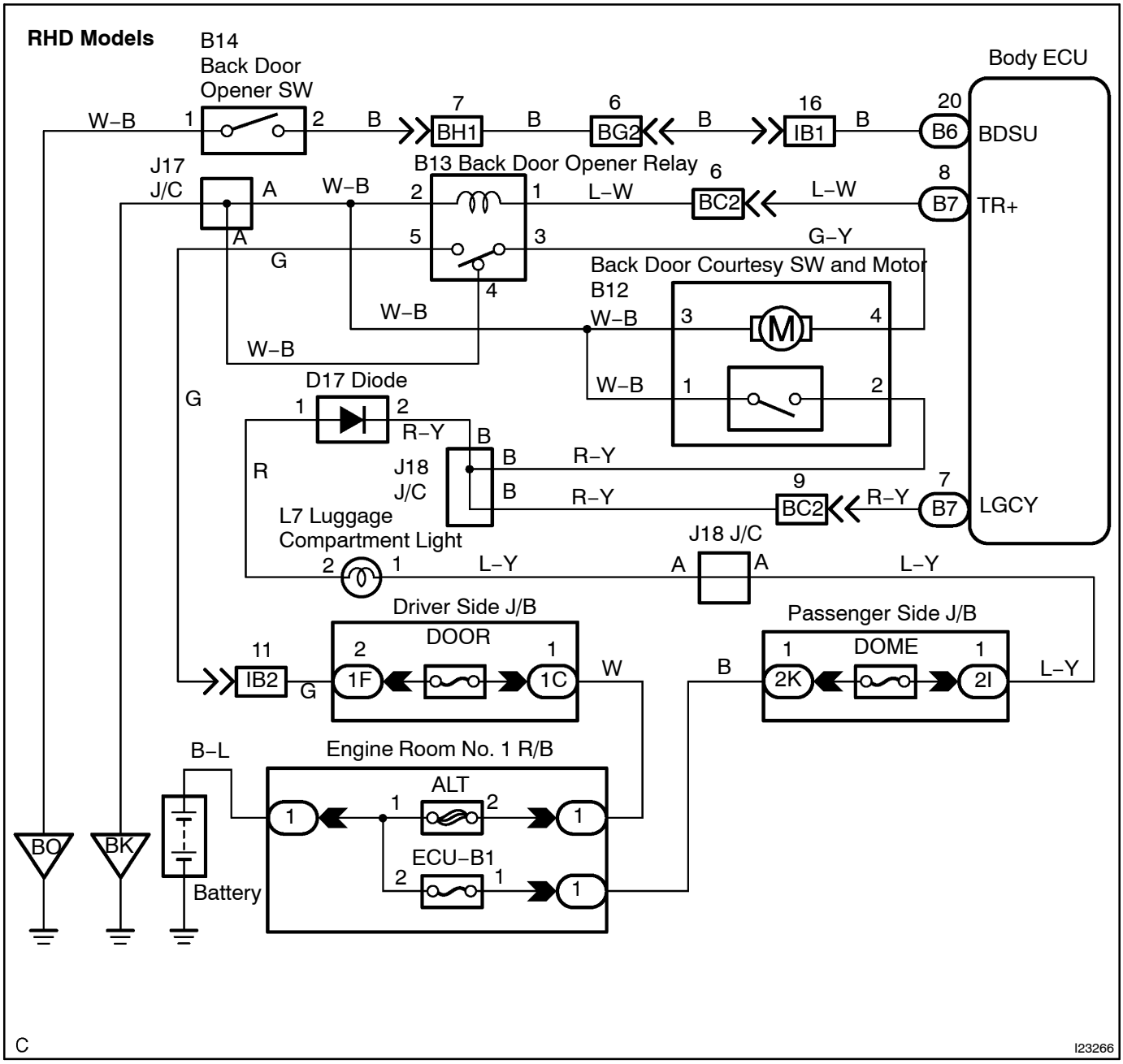
Back door courtesy switch circuit

CIRCUIT DESCRIPTION

The back door courtesy switch goes on when back door is opened and goes off when back door is closed.

WIRING DIAGRAM




RHD Models
B14
Back Door
Opener SW
Body ECU
W–B
1
2
B
7
BH1
6
BG2
16
IB1
20
B6
BDSU
J17
J/C
A
B13 Back Door Opener Relay
L–W
BC2
8
B7
TR+
G–Y
G
Back Door Courtesy SW and Motor
B12
M
3
4
D17 Diode
R–Y
R
J18
J/C
L7 Luggage
Compartment Light
9
LGCY
L–Y
Driver Side J/B
DOOR
11
IB2
1F
1C
W
Passenger Side J/B
DOME
2K
2I
B–L
Engine Room No. 1 R/B
ALT
ECU–B1
Battery
BO
BK
C
I23266

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check back door courtesy switch using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the back door courtesy switch using DATA LIST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–555)**

NG

2	**Check back door courtesy switch (See page BE–22).**

NG → **Replace the back door courtesy switch.**

OK

3	**Check wire harness and connector between back door courtesy switch and Body ECU.**

NG → **Repair or replace wire harness or connector.**

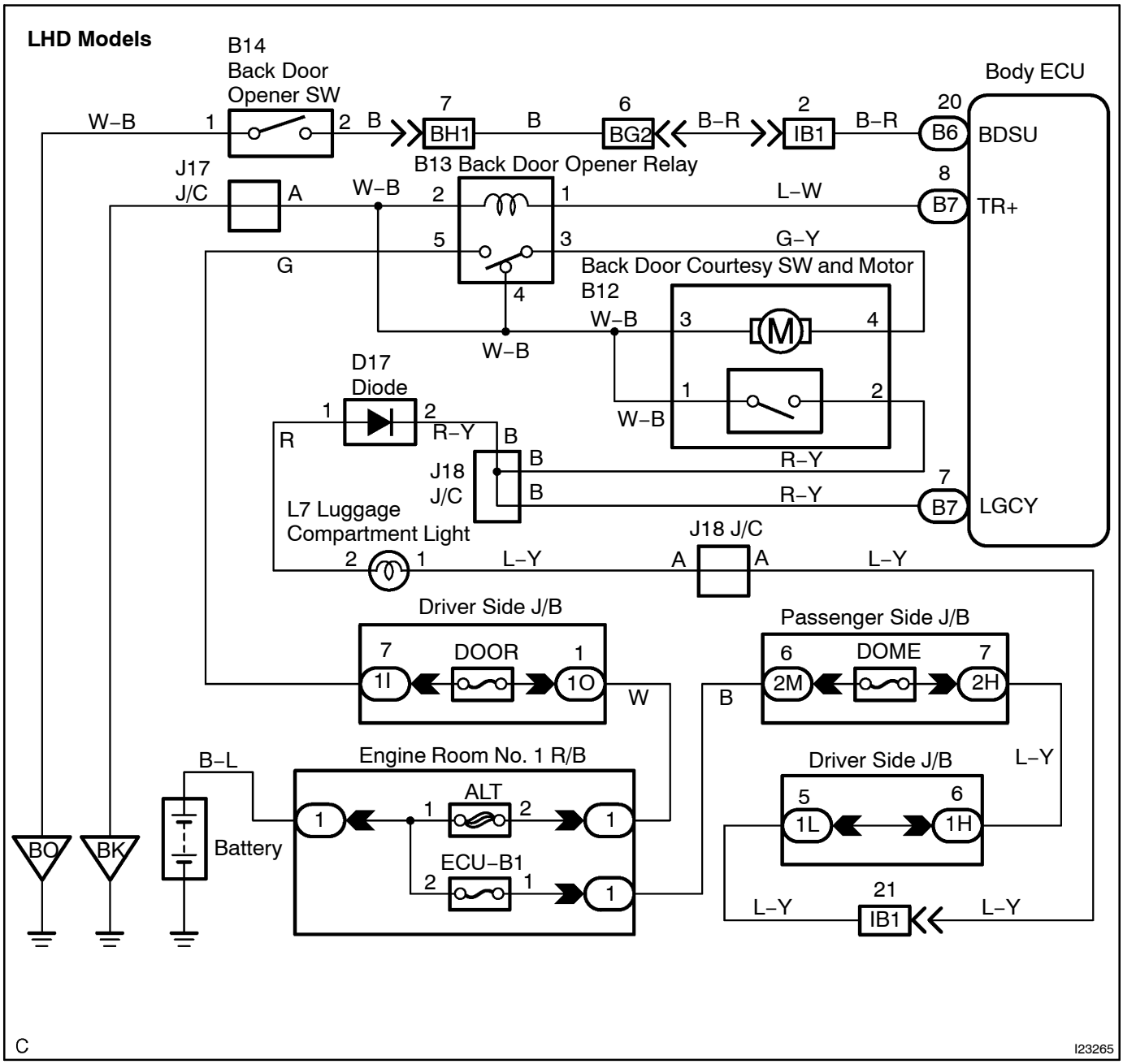
OK

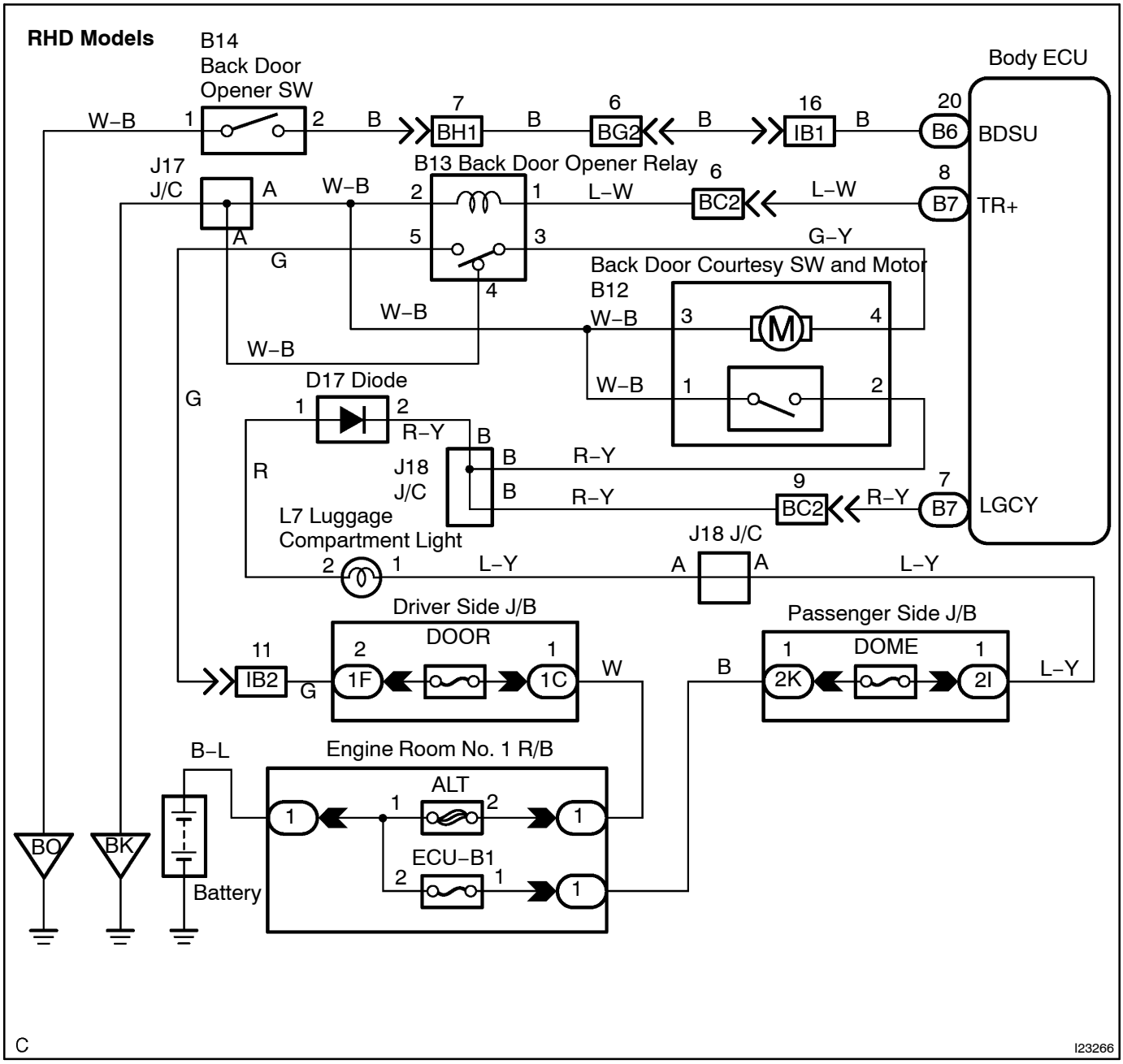
Proceed to next circuit inspection shown on problem symptoms table. (See page DI–555)

DI62S–02

Back door opener relay and motor

WIRING DIAGRAM




RHD Models
B14
Back Door
Opener SW
Body ECU
W–B
1
2
B
7
BH1
6
BG2
16
IB1
20
B6
BDSU
J17
J/C
A
B13 Back Door Opener Relay
L–W
BC2
8
B7
TR+
G–Y
G
5
3
4
Back Door Courtesy SW and Motor
B12
M
D17 Diode
R–Y
R
J18
J/C
L7 Luggage
Compartment Light
L–Y
9
7
LGCY
Driver Side J/B
DOOR
11
IB2
1F
1C
W
Passenger Side J/B
DOME
2K
2I
B–L
Engine Room No. 1 R/B
ALT
ECU–B1
Battery
BO
BK
C
I23266

INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check back door opener motor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check that the back door opener motor can operate in an ACTIVE TEST.

OK → **Proceed to next circuit inspection shown on problem symptoms table. (See page DI–555)**

NG

2	**Check back door opener motor. (See page BE–43)**

NG → **Replace the back door opener motor.**

OK

3	**Check wire harness and connector between back door opener motor and Body ECU, between back door opener switch and Body ECU, and back door opener relay and Body ECU.**

NG → **Repair or replace wire harness or connector.**

OK

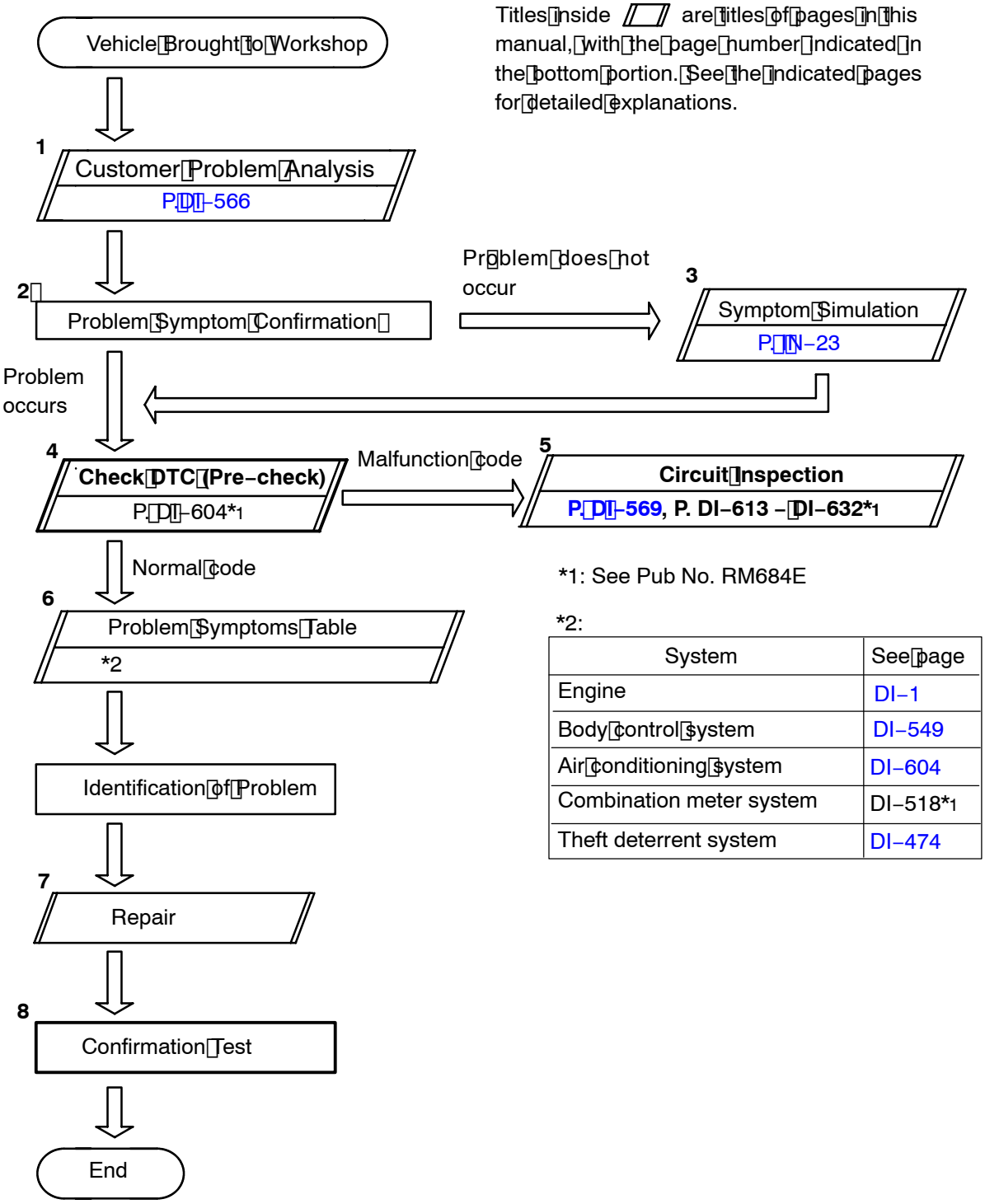
Proceed to next circuit inspection shown on problem symptoms table. (See page DI–555)

MULTIPLEX COMMUNICATION SYSTEM

DI622–03

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



Titles inside ▱ are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

*1: See Pub No. RM684E

*2:

System	See page
Engine	DI–1
Body control system	DI–549
Air conditioning system	DI–604
Combination meter system	DI–518*1
Theft deterrent system	DI–474

Step 4, 8 : Diagnostic steps permitting the use of the hand–held tester.

DI630–01

CUSTOMER PROBLEM ANALYSIS CHECK

MULTIPLEX COMMUNICATION SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

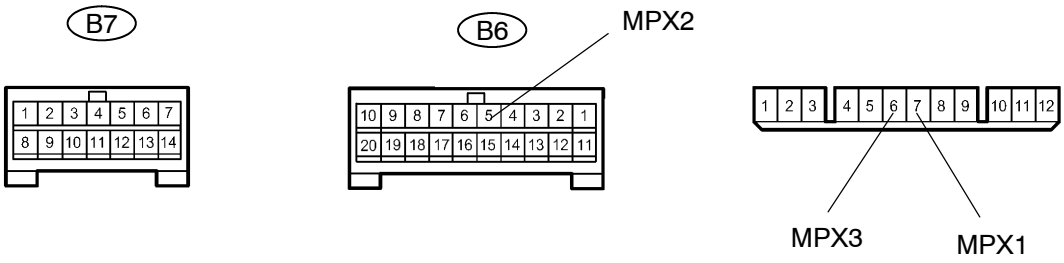
Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/ Others
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

Malfunction System	☐ Engine
	☐ Body Control System
	☐ Air Conditioning System
	☐ Combination Meter System
	☐ Theft Deterrent System

DI634–03

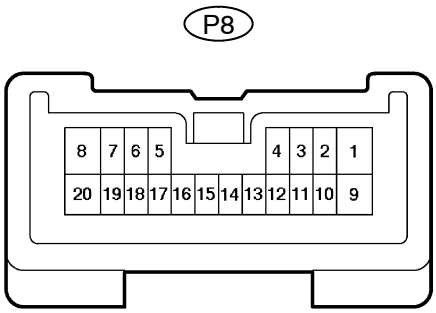
TERMINALS OF ECU

BODY CONTROL ECU



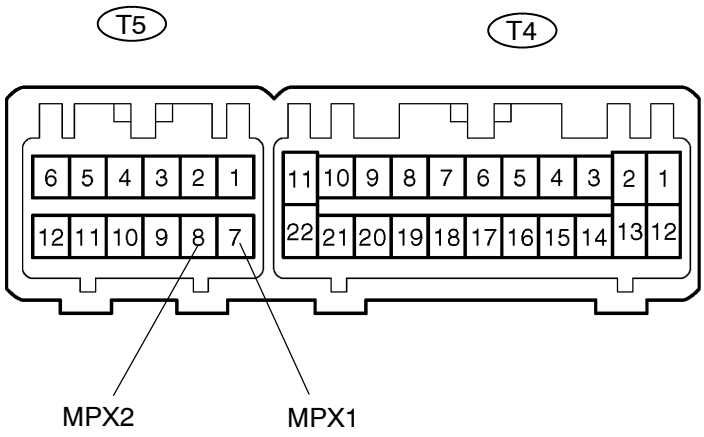
I11362

POWER WINDOW MASTER SWITCH



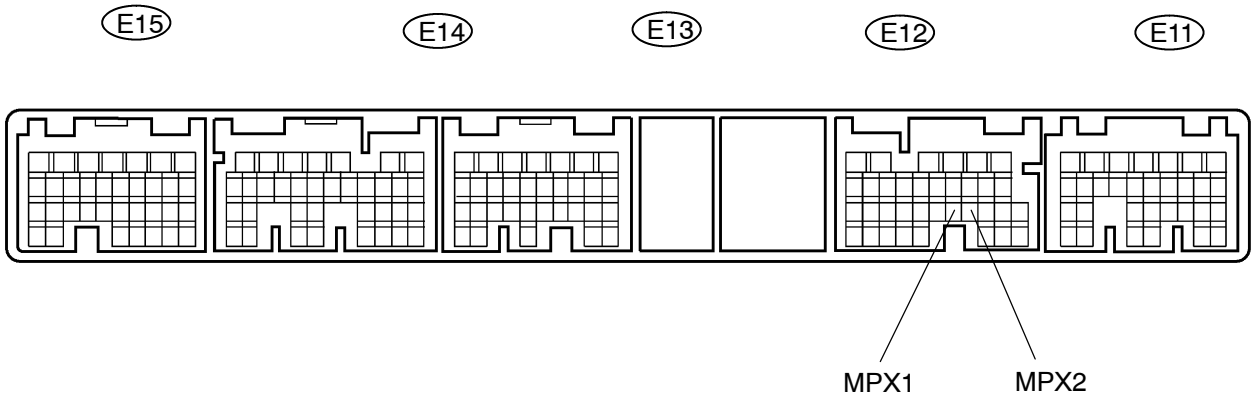
I11502

THEFT DETERRENT ECU



I01920

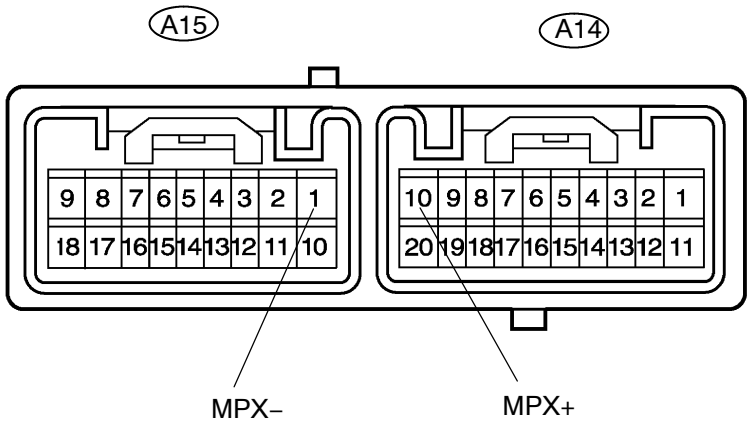
ENGINE AND ECT ECU
2JZ–GE:



C

I23299

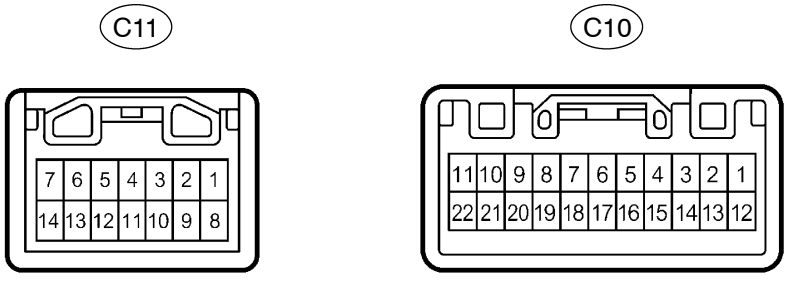
A/C ECU



C

I23300

COMBINATION METER ECU



12

I11363

DI636–02

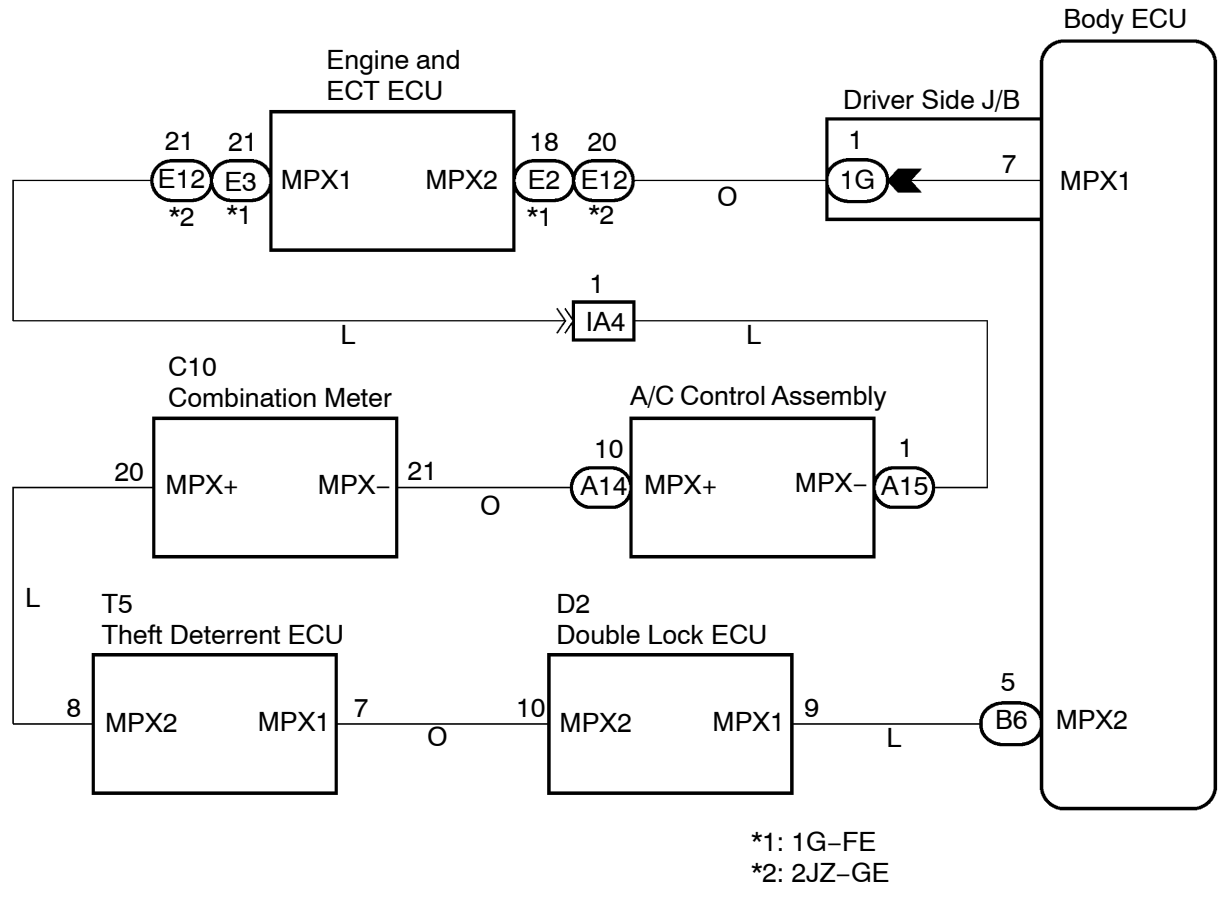
CIRCUIT INSPECTION

DTC	B1214 / 14	Communication bus malfunction (+B short)

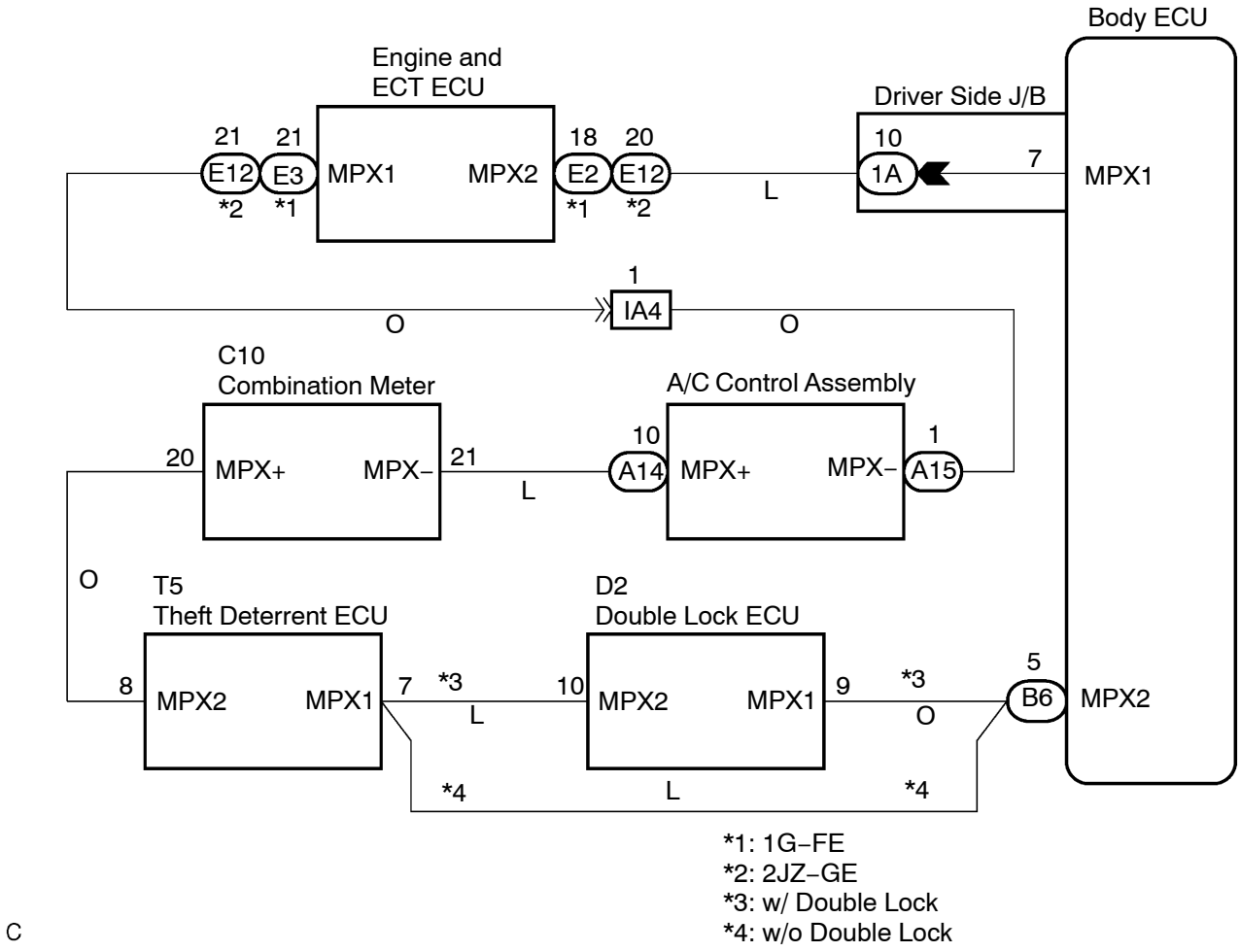
DTC	B1215 / 15	Communication bus malfunction (GND short)

WIRING DIAGRAM

LHD Models

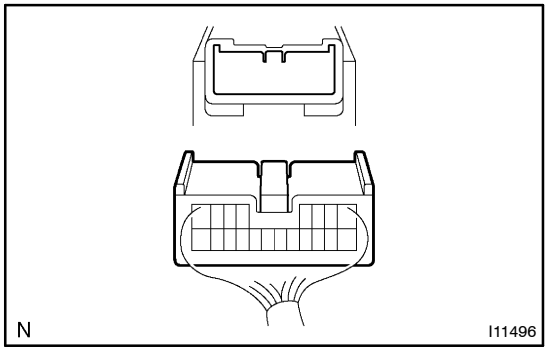


RHD Models


Body ECU
Engine and
ECT ECU
Driver Side J/B
21 21
E12 E3
*2 *1
MPX1
MPX2
18 20
E2 E12
*1 *2
L
10
1A
7
MPX1
1
IA4
O
O
C10
Combination Meter
A/C Control Assembly
20
MPX+
MPX–
21
L
10
A14
MPX+
MPX–
1
A15
O
T5
Theft Deterrent ECU
D2
Double Lock ECU
8
MPX2
MPX1
7
*3
L
10
MPX2
MPX1
9
*3
O
5
B6
MPX2
*4
L
*4
*1: 1G–FE
*2: 2JZ–GE
*3: w/ Double Lock
*4: w/o Double Lock
C
I23298

INSPECTION PROCEDURE

1	**Check the communication circuit inside power window master switch ECU.**

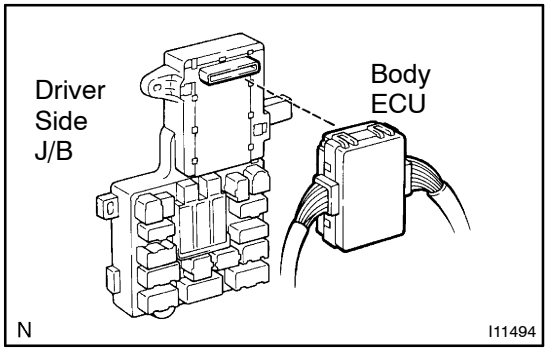


PREPARATION:
Disconnect the connector ”P8” of power window master switch.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	**Replace the power window master switch.**

NG

2	**Check for short circuit between power window master switch and body ECU.**



PREPARATION:
(a) Connect the connector ”P8” of power window master switch.
(b) Disconnect the connector of body ECU.
HINT:
Connector is disconnected by removing Body ECU from driver side junction block.
CHECK:
Check the DTC.
OK:
Code B1214/14 or B1215/15 is not output

OK	**Repair or replace the wireharness between power window master switch and body ECU.**

NG

Replace the body ECU.

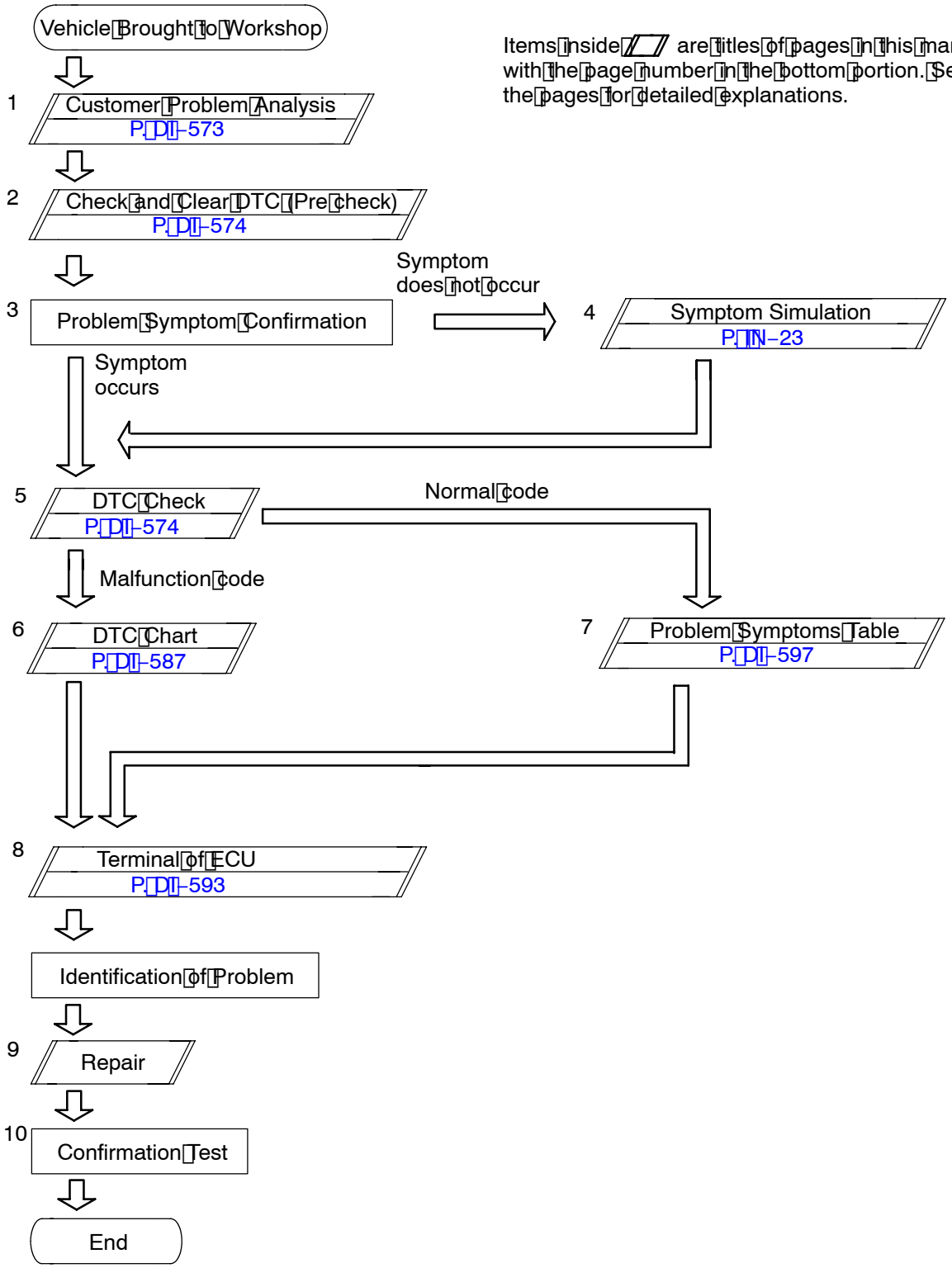
LEXUS NAVIGATION SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI27W–04

HINT:

The ECU of this system is connected to the multiplex communication system. Therefore, before starting troubleshooting, make sure to check that there is no trouble in the multiplex communication system.



DI27X–04

CUSTOMER PROBLEM ANALYSIS CHECK

LEXUS NAVIGATION SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Constant ☐ Intermittent (Times a day)

Problem Symptom	**Navigation malfunction**	☐ Cursor movement is defective.
		☐ Cursor does not move.
		☐ GPS mark does not appear.
		☐ Map is not displayed.
		☐ Others ( )
	Display malfunction	☐ Screen is dark.
		☐ Screen is white.
		☐ Color is not uniform.
		☐ Screen is in disorder.
		☐ Others ( )
	Control Switch malfunction	☐ Can not operate with panel switches.
		☐ Can not operate with touch switches.
		☐ Others ( )

	Parts name	**1st time malfunction code.**	**2nd time malfunction code.**
DTC Check	Navigation ECU		
	Multi Display		
	Radio receiver assembly		
	Power amplifier		

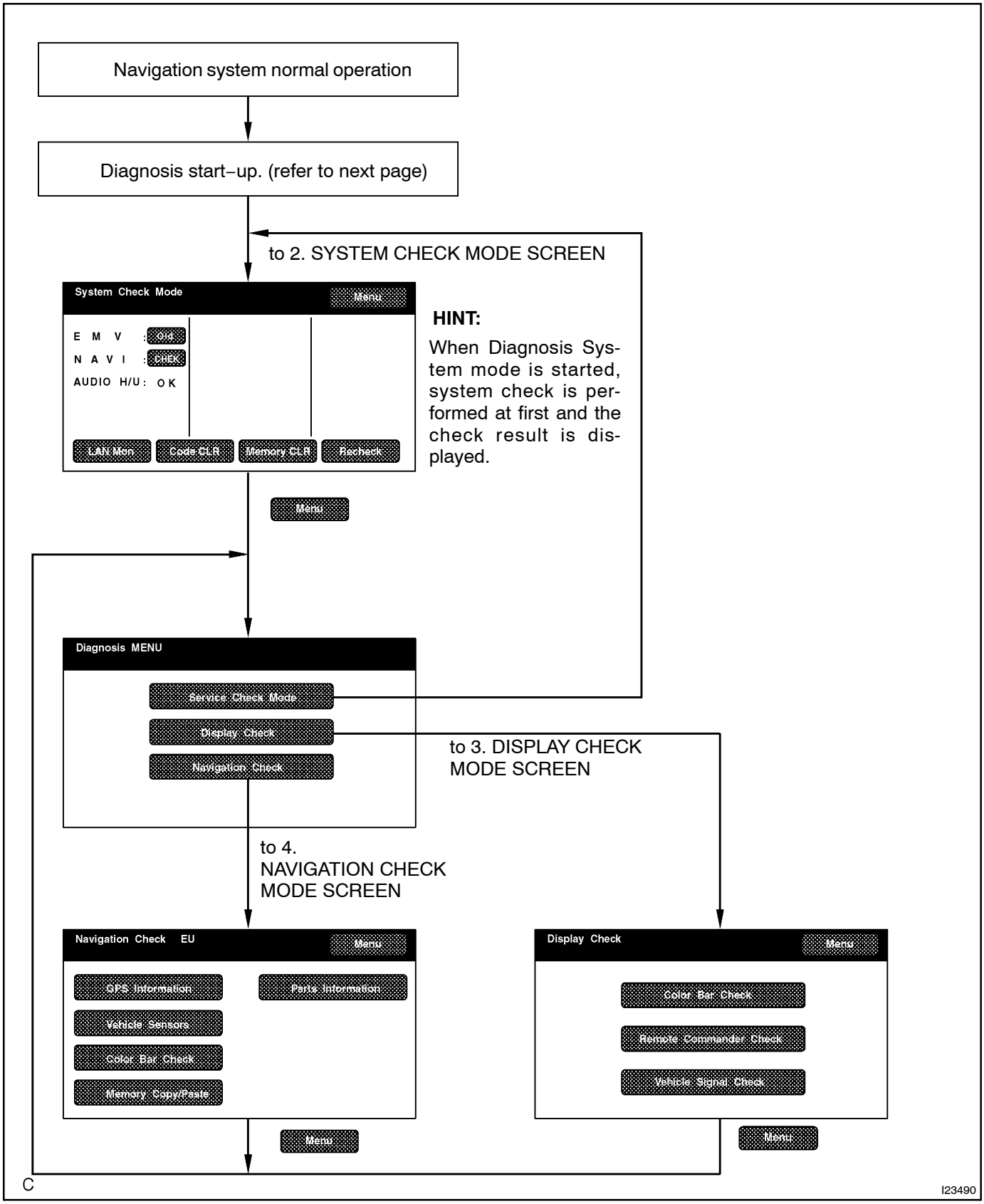
DI9I3–01

PRE–CHECK

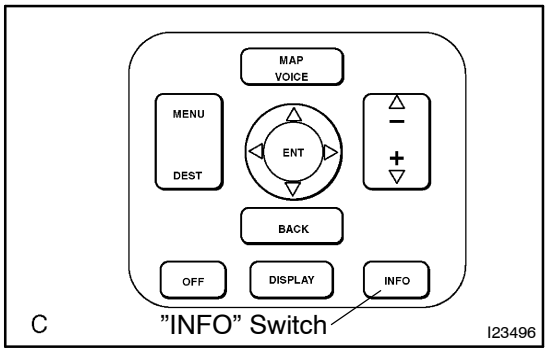
1. DIAGNOSIS SYSTEM MODE

HINT:

Diagnosis System Mode is operated as follows.



(a) DIAGNOSIS START–UP
To start the diagnosis menu, there are 2 ways: using a diagnosis check wire and using a switch.



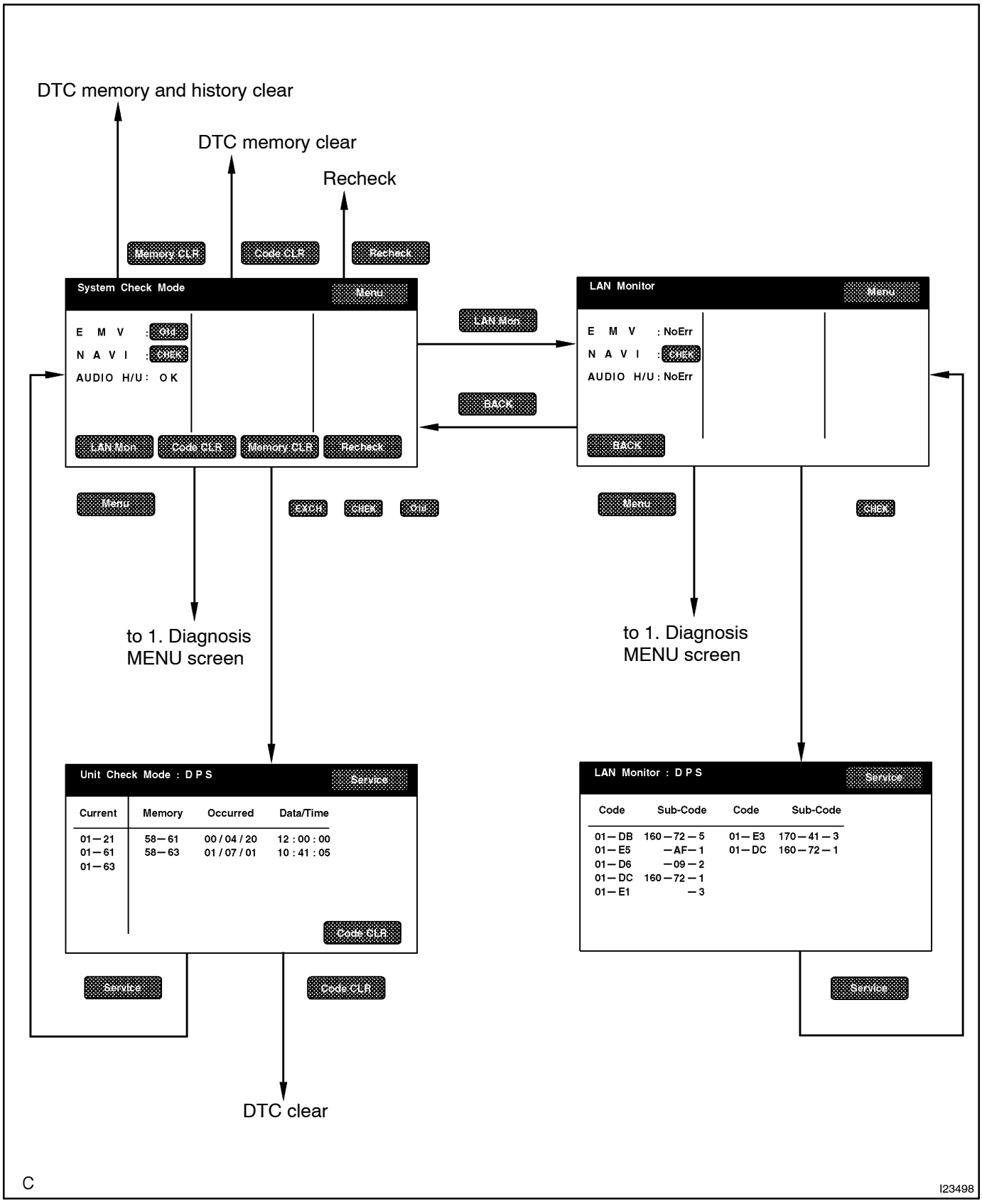
(b) START–UP BY SWITCH OPERATION (light control switch)
(1) Vehicle speed is 0 km/h (0 mph).
(2) Parking brake switch is pressed.
(3) While pressing ”INFO” switch, by turning the light control switch to OFF, TAIL, OFF, TAIL, OFF, TAIL and OFF the system is started up.

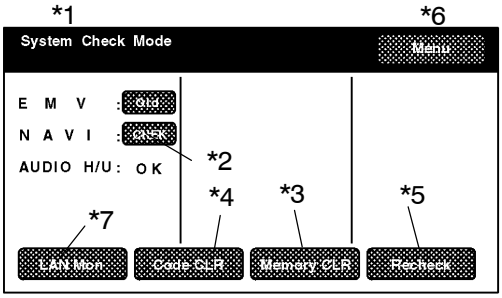
(c) FINISHING DIAGNOSIS SYSTEM MODE
Turn the ignition switch from ACC to OFF to finish the mode. If it is started by switch operation.

2. SERVICE CHECK MODE

HINT:

Service Check Mode is operated as follows.





C I23491

(a) System Check Mode

(1) Start the Diagnosis System.

Display Item	Function
Components Name/*1	List of component names including optional components (15 components max.) are displayed. When the names are not identified, their physical addresses are displayed.
Check Result/*2	Check results are displayed.
Memory Clear switch/*3	Pressing this switch for 3 sec. deletes all the information about master component registration.
DTC Clear switch/*4	Pressing this switch for 3 sec. deletes diagnosis memory of all the components. It deletes Service Check results and the screen displaying the check results.
Recheck/*5	Pressing this switch performs Service Check again.
MENU/*6	Pressing this switch activates the Diagnosis Menu screen.
LAN Monitor Switch/*7	Pressing this switch activates the LAN monitor screen.

HINT:

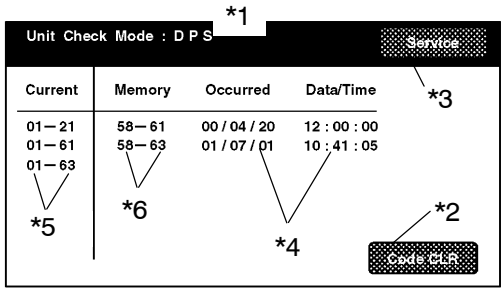
Service Check displays the check results based on the information obtained from each component's response to "System Check Execution" and "Diagnosis Memory Request", and the information of "Current DTC Notification" (the Unit Check that will be displayed on the next screens.).

(2) Read Check Result

Check Result	Meaning
OK	No DTC is identified.
EXCH	One or more DTC requesting for exchange are detected.
CHEK	One or more DTC requesting for check are detected.
NCON	No connection response to Diagnosis System start–up, whereas it has the connection response to the AVC LAN system when the power switch is turned on (when IG is turned to ACC).
Old	One or more DTC are detected because of old version.
NRES	No response to the information about the Diagnosis System, whereas it responds to the Diagnosis System start–up.
No Err	No DTC is identified.

HINT:

- After repair and check, press "Code CLR" for more than 3 sec. to delete diagnosis memory.
- After deleting diagnosis memory, press "Recheck" and make sure "OK" is displayed on the screen.



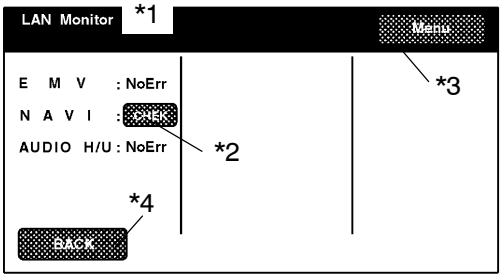
C I23493

(3) ”EXCH”, ”CHEK” and ”Old” can be used as switches to activate ”Unit Check Mode” for detail information. Check troubled parts of the components in these modes by referring to the DTC code list.

Display Item	Description
Components name/*1	Names of components to be checked are displayed.
DTC clear switch/*2	Pressing this switch for 3 sec. deletes DTC memory of the selected diagnosis component.
Service check mode screen switch/*3	Pressing this returns to the Service Check Mode screen.
Date/Time/*4	The date and time stamped at the time of DTC occurrence are displayed in the order of year–month–day–hour–minute–second. (If the date and time data is invalid, it is displayed as a blank.)
Current/ *5	Up to 6 DTC codes detected during the System Check are displayed.
Memory/ *6	DTC memories stored and current DTC Notification are displayed.

HINT:

- Detecting Unit DTC activates the Unit Check Mode on the screen.
- In the Unit Check Mode, DTC which is identified as ”EHCK” in the Service Check, is displayed as classified into Current DTC and Past DTC.



C I23492

(b) LAN Monitor

(1) Start the Diagnosis System.

Display Item	Function
Components Name/*1	List of component names including optional components (15 components max.) are displayed. When the names are not identified, their physical addresses are displayed.
Check Result/*2	Check results are displayed.
MENU/*3	Pressing this switch activates the Diagnosis Menu screen.
BACK/*4	Pressing this switch activates the System Check Mode screen.

HINT:

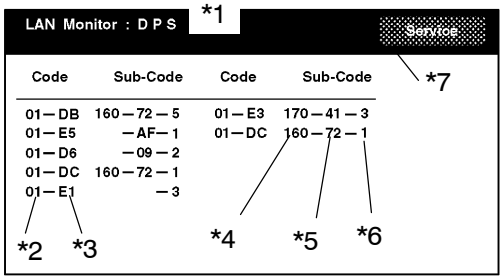
Service Check displays the check results based on the information obtained from each component’s response to ”System Check Execution” and ”Diagnosis Memory Request”, and the information of ”Current DTC Notification” (the LAN Monitor that will be displayed on the next screens.).

(2) Read Check Result

Check Result	Meaning
OK	No DTC is identified.
EXCH	One or more DTC requesting for exchange are detected.
CHEK	One or more DTC requesting for check are detected.
NCON	No connection response to Diagnosis System start–up, whereas it has the connection response to the AVC LAN system when the power switch is turned on (when IG is turned to ACC).
Old	One or more DTC are detected because of old version.
NRES	No response to the information about the Diagnosis System, whereas it responds to the Diagnosis System start–up.
No Err	No DTC is identified.

HINT:

- After repair and check, press ”Code CLR” for more than 3 sec. to delete diagnosis memory.
- After deleting diagnosis memory, press ”Recheck” and make sure ”OK” is displayed on the screen.



C I23494

(3) ”CHEK” can be used as switches to activate ”LAN Monitor” for detail information. Check troubled parts of the components in these modes by referring to the DTC code list.

Display Item	Description
Components name/*1	Names of components to be checked are displayed.
Segment/*2	Logical address codes corresponding to DTC are displayed.
DTC/*3	DTC is displayed.
Sub–Code (address numbers of related components)/*4	Physical address codes memorized together with DTC are displayed.
Sub–code (Connection confirmation number) /*5	Connection confirmation numbers memorized together with DTC are displayed.
Sub–code (Number of occurrence) /*6	The number of occurrence of the same DTC is displayed.
Service check mode screen switch/*7	Pressing this returns to the Service Check Mode screen.
Current/ *12	Up to 6 DTC codes detected during the System Check are displayed.
Memory/ *13	DTC memories stored and current DTC Notification are displayed.

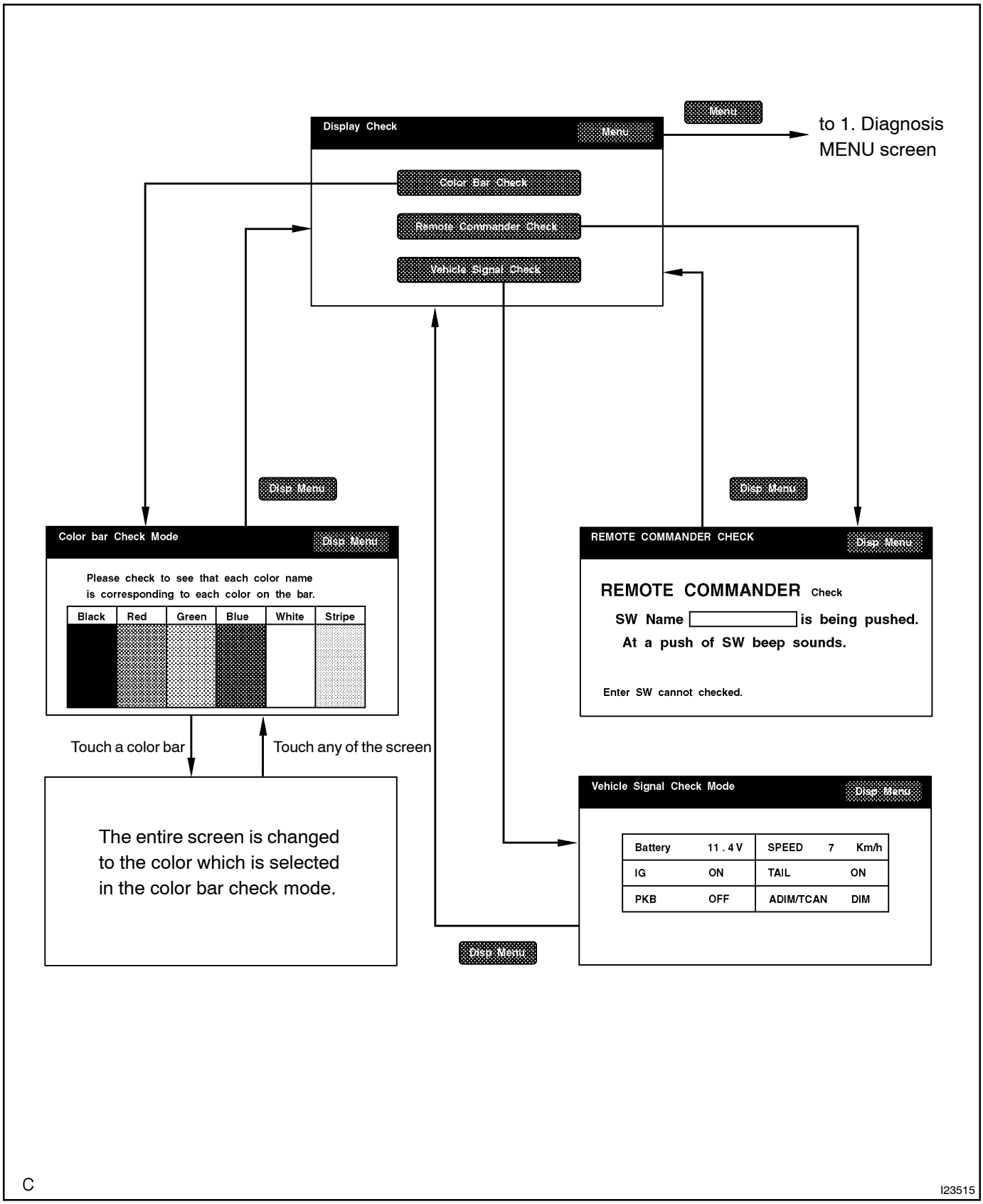
HINT:

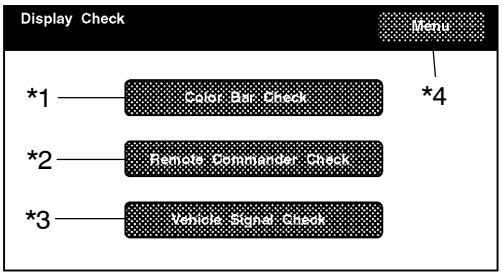
Detecting no LAN DTC activates the LAN Check Mode on the screen.

3. DISPLAY CHECK MODE

HINT:

Display Check Mode is operated as follows.



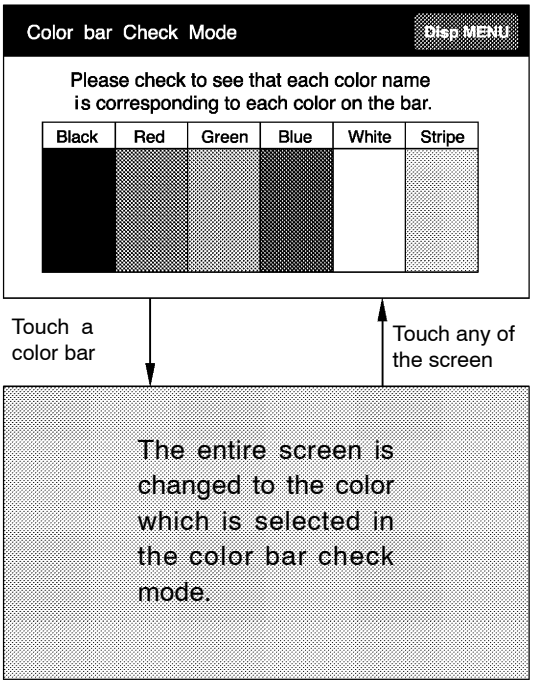


C I23495

(a) Display Check Mode

Display	Contents
Color Bar Check/*1	Color display is checked.
Remote Commander/*2	Operating condition of remote commander display is checked.
Vehicle Signal Check/*3	Status of the vehicle signal which has been loaded into the display is checked.
MENU/*4	Pressing this switch activates the Diagnosis Menu screen.

HINT:
In Display Check Mode, above checks can be performed.

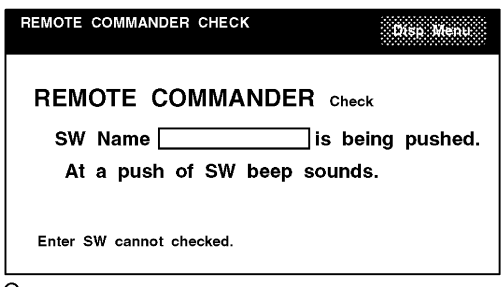


N I23620

(b) Display Color Bar Check
(1) Start the Diagnosis System.
(2) Select ”MENU”.
(3) Select ”Display Check”.
(4) Select ”Color Bar Check”.
(5) Make sure that each color name is corresponding to each color on the bar.

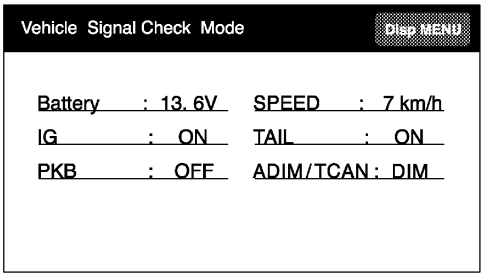
HINT:
Select Black, Red, Green, Blue, White and Stripe to display selected colors and stripe on the entire screen.

(6) Compare with the Color Bar Check in the Navigation Check and make sure that no difference is found.



C I23501

(c) Display Panel Switch Check
(1) Start the Diagnosis system.
(2) Select ”MENU”.
(3) Select ”Display Check”.
(4) Select ”Remote Commander”.
(5) Press each switch and make sure that it corresponds to the display on the screen.



C I23500

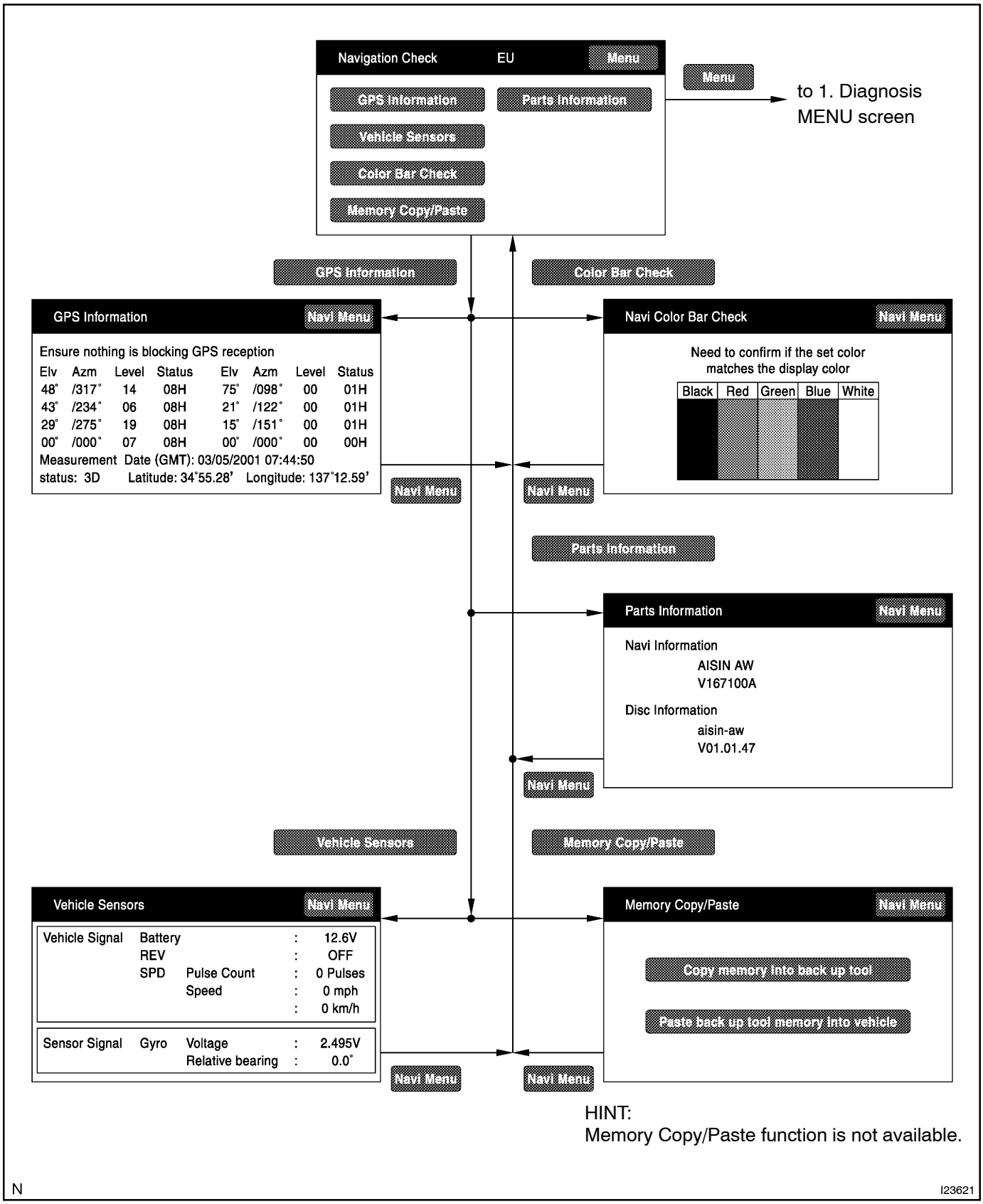
(d) Display Vehicle Signal Check
(1) Start the Diagnosis system.
(2) Select ”MENU”.
(3) Select ”Display Check”.
(4) Select ”Vehicle Signal Check”.
(5) Check the status of the vehicle signal (Battery, IG, PKB, SPEED, TAIL, ADIM/TCAN) loaded into the display.

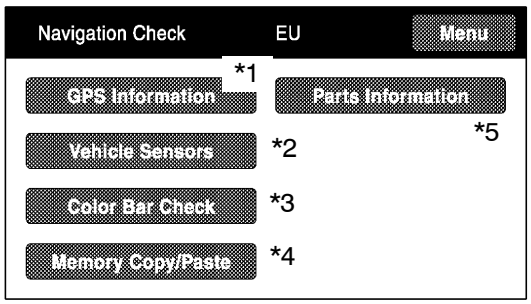
HINT:
Vehicle signal data is updated every 1 second.

4. NAVIGATION CHECK MODE

HINT:

Navigation Check Mode is operated as follows.



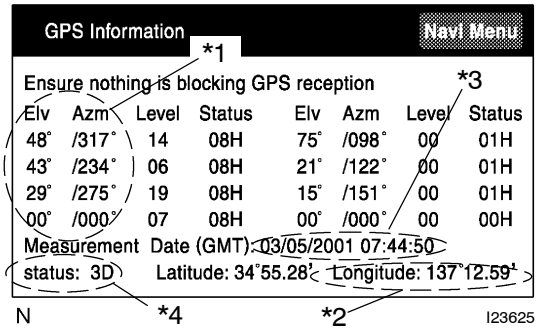


(a) Navigation Check Mode

Display	Description
GPS Information/*1	Information related to GPS is displayed (updated every 1 second.).
Vehicle Sensors/*2	Vehicle signal information to be loaded in the Navigation ECU is displayed (up-dated every 1 second.).
Color Bar Check/*3	Color display of the Navigation ECU is checked. (Compare with the Color Bar Check results in the Display Check.)
Memory Copy / Paste/*4	Using hand–held tester, read and write user data such as a placement of shop, restaurant etc. stored in memory.
Parts Information/*5	Navigation program version and disc version are displayed.

HINT:

- In the Navigation Check mode, the checks mentioned above can be conducted.
- The Navigation ECU operates each Navigation Check screen.



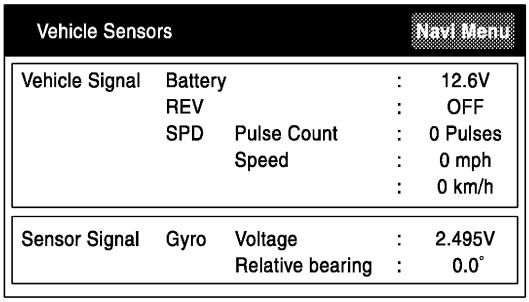
(b) GPS Information

(1) Start the Diagnosis system.
(2) Select ”MENU”.
(3) Select ”Navigation Check”.
(4) Select ”GPS Information”.
(5) Check the GPS–related information.

Display Data	Description
Satellite Information/*1	”Angle of elevation”, ”Azimuth”, ”Level of Signal” and ”Status of Wave Reception” of the Satellite captured by the antenna are displayed (for 8 satellites max.)
Position Data/*2	The latitude and longitude of the current position are displayed in degree, minute and second.
Time Data/*3	Date and time data obtained from the GPS receiver is displayed.

Measurement Status: /*4

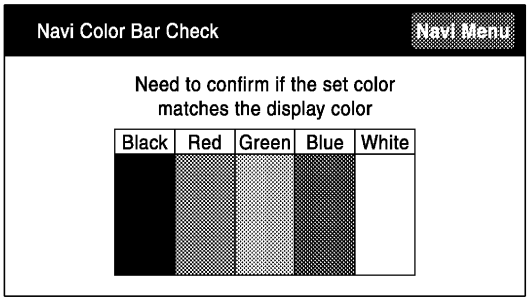
Display	Conditions
2D	Measurement on 2 dimensions
3D	Measurement on 3 dimensions
NG	GPS information cannot be used.
Error	Reception error occurs.
–	Other than the above



N I23624

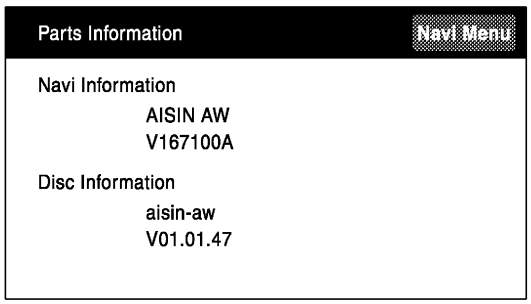
(c) Vehicle Sensors
(1) Start the Diagnosis system.
(2) Select ”MENU”.
(3) Select ”Navigation Check”.
(4) Select ”Vehicle sensors”.
(5) Check the vehicle signals (ACC, REV, SPD) and the output signal of the gyro sensor introduced into the navigation ECU.

Items	Display Method
ACC signal status	Displayed as ON/OFF.
REV signal status	Displayed as ON/OFF.
SPD signal status	The cumulative value of input pulse count and the vehicle speed [km/h] [mph] are displayed. [The cumulative value of input pulse count is set to be 0 when this screen is displayed. When the vehicle starts to drive, it is counted and displayed continually.]
Output signal of the gyro sensor	Voltage [V] and relative azimuthal angle [degree] are displayed. [The position of the vehicle when this screen is displayed is set to be 0 degree in azimuth. Based on this, relative azimuthal angle is measured and displayed continually.]



N I23623

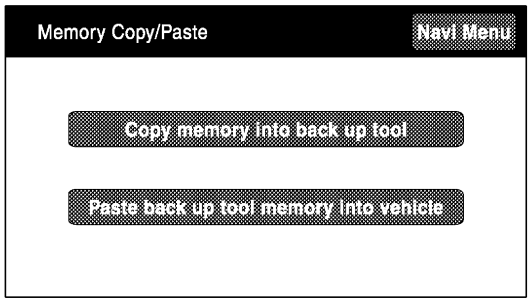
(d) Navigation Color Bar Check
(1) Start the Diagnosis system.
(2) Select ”MENU”.
(3) Select ”Navigation Check”.
(4) Select ”Color Bar Check”.
(5) Make sure that the set color matches the display color.
(6) Compare with the Color Bar Check in the Display Check and make sure that no difference is found.



N I23626

(e) Parts Information

(1) Start the Diagnosis system.
(2) Select ”MENU”.
(3) Select ”Navigation Check”.
(4) Select ”Parts Information”.
(5) Check the program and disc version.



N I23627

(f) Memory/ Copy/ Paste

HINT:

This function is not available.

DI27Z–12

DIAGNOSTIC TROUBLE CODE CHART

Terms	Meaning
Physical address	Three–digit code (shown in hexadecimal) which is given to each component comprising the AVC–LAN. Corresponding to the function, individual symbols are specified.
Logical address	Two–digit code (shown in hexadecimal) which is given to each function comprising the inner system of the AVC–LAN.

1. MULTI–DISPLAY (CRT DISPLAY) DISPLAY (Physical address: 110)

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting an engine.
- *2: This code is stored when 180 sec. has passed after the power supply connector is pulled out after engine start.
- *3: This code may be stored when the engine key is turned again after engine start.
- *4: This code may be stored when the engine key is turned again 1 min. after engine start.

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
21	ROM Error	Abnormal condition of ROM is detected.	Replace multi–display (CRT display) display (CRT display) display.
22	RAM Error	Abnormal condition of RAM is detected.	Replace multi–display (CRT display) display (CRT display) display.
D5 *1	Registered component disconnected	Component shown by sub–code is or was disconnected from system with ignition switch in ACC or ON. Communication with component shown by sub–code is not ensured when engine is started.	• Check harness for power supply of component shown by sub–code. • Check harness for communication system of component shown by sub–code.
D8 *2	No response to connection check	Component shown by sub–code is or was disconnected from system after engine is started.	• Check harness for power supply of component shown by sub–code. • Check harness for communication system of component shown by sub–code.
D9 *1	Last Mode Error	Component operated (sound and/or image was provided) before engine stop is or was disconnected with ignition switch in ACC or ON.	• Check harness for power supply of component shown by sub–code. • Check harness for communication system of component shown by sub–code.
DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Detected when sound and picture does not change by button operation	• Check harness for power supply system of component shown by sub–code. • Check harness for communication system of component shown by sub–code. • If error occurs again, replace component shown by auxilxary code
DB *1	Mode Status Error	Dual alarm is detected.	• Check harness for power supply system of component shown by sub–code. • Check harness for communication system of component shown by sub–code.
DC *4	Transmission Error	Transmission to component shown by sub–code has been failed. (This code does not necessarily mean actual failure.)	If same sub–code is recorded in other component(s), check harness for power supply and communication system of all components shown by code.

DE *3	Slave Reset (Momentary Interruption)	After engine start, slave component has been disconnected. DB	• Check harness for power supply system of component shown by sub–code. • Check harness for communication system of component shown by sub–code.
E4 *1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

(b) Logical address: 34 (Front monitor)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
10	Error in Picture Circuit	Error in power supply system for picture circuit (abnormal voltage) is detected.	Replace multi–display (CRT display) display.
11	Back–light Error (No current)	Decline in power output from inverter circuit for back–light.	Replace multi–display (CRT display) display.
12	Back–light Error (Excess current)	Excess power output from inverter circuit for back–light.	Replace multi–display (CRT display) display.

2. NAVIGATION ECU (Physical address: 178)

HINT:

- *1: Even if no failure is detected, this code may be stored depending on the battery condition or voltage for starting the engine.
- *2: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.
- *3: This code may be stored when the engine key is turned 1 min. again after engine start.
- *4: This code may be stored when the engine key is turned again after engine start.

(a) Logical address: 01 (Communication control)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, multi–display (CRT display) display was disconnected.	• Check harness for power supply system of multi–display (CRT display) display. • Check harness for communication system of multi–display (CRT display) display. • Check harness for power supply system of navigation ECU. • Check harness for communication system of navigation ECU.
D7 *2	Connection Check Error	Component in which this code is recorded has been disconnected from system after engine start. Or, when this code was recorded, multi–display (CRT display) display was disconnected. D6	• Check harness for power supply system of multi–display (CRT display) display. • Check harness for communication system of multi–display (CRT display) display. • Check harness for power supply system of navigation ECU. • Check harness for communication system of navigation ECU.
DC *3	Transmission Error	Transmission to component shown by sub–code has been failed. (This code does not necessarily mean actual failure.)	If same sub–code is recorded in other component(s), check harness for power supply and communication system of all components shown by code.

DD *4	Master Reset (Momentary Interruption)	Component that is to be master has been disconnected after engine start.	• Check harness for power supply system of multi–display (CRT display) display. • Check harness for communication system of multi–display (CRT display) display. • If error occurs frequently, replace multi–display (CRT display) display.
E0 *1	Registration Completion Instruction Error	”Registration Completion Instruction” command from master cannot be received.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
E2	ON/OFF Instruction Parameter Error	Error is detected in ON/OFF control command from multi–display (CRT display) display.	Replace multi–display (CRT display) display.
E3 *1	Registration Request Transmission	• Registration Request command is output from slave component. • Registration Request command is output from sub–master component.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub–master (audio) and master component.	• Check harness for power supply of multi–display (CRT display) display. • Check harness for communication system of multi–display (CRT display) display. • Check harness for communication system between multi–display (CRT display) display and radio and player.
E4 *1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

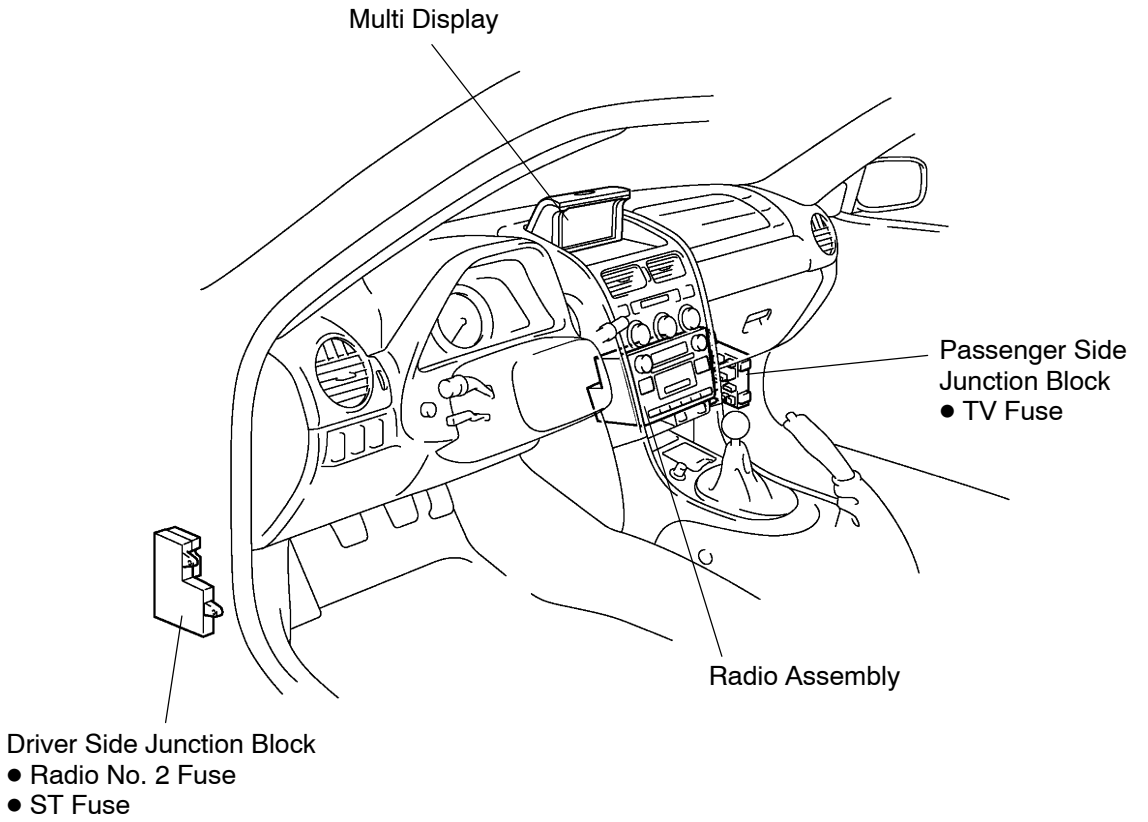
(b) Logical address: 58 (Navigation ECU)

DTC	Diagnosis item	Condition	Countermeasure and inspected parts
10	Gyro Error	Error in gyro sensor is detected. (Abnormal value in voltage output from sensor is detected for more than specified time.)	Replace navigation ECU.
11	GPS Receiver Error	Operation error of GPS receiver is detected.	At an outdoor site with a clear view, operate to display GPS data. If GPS mark is not properly displayed after 15 min. or more, replace navigation ECU.
40	GPS Antenna Error	Open condition of GPS antenna is detected. (Open circuit, connection failure of connectors, etc.)	Inspect antenna and replace if necessary.
41	Power Supply Error of GPS Antenna	Abnormal voltage of GPS antenna cable or short circuit is detected.	• Inspect GPS antenna and replace if necessary. (When no continuity is identified between connector’s core and sealed part, GPS antenna is normal.) • If GPS antenna is normal, replace navigation ECU.
42	Map Disc Error	Data cannot be read for a certain time due to scratches or dirt on disc surface or insertion of wrong disc.	Inspect disc and replace if necessary. (Visually check disc surface and wipe it with soft cloth.)
43	Vehicle Signal Error	Input error of vehicle signal is detected. (When no vehicle signal has been input for a certain time.)	• Inspect wire harness. • If wire harness is normal, replace navigation ECU.

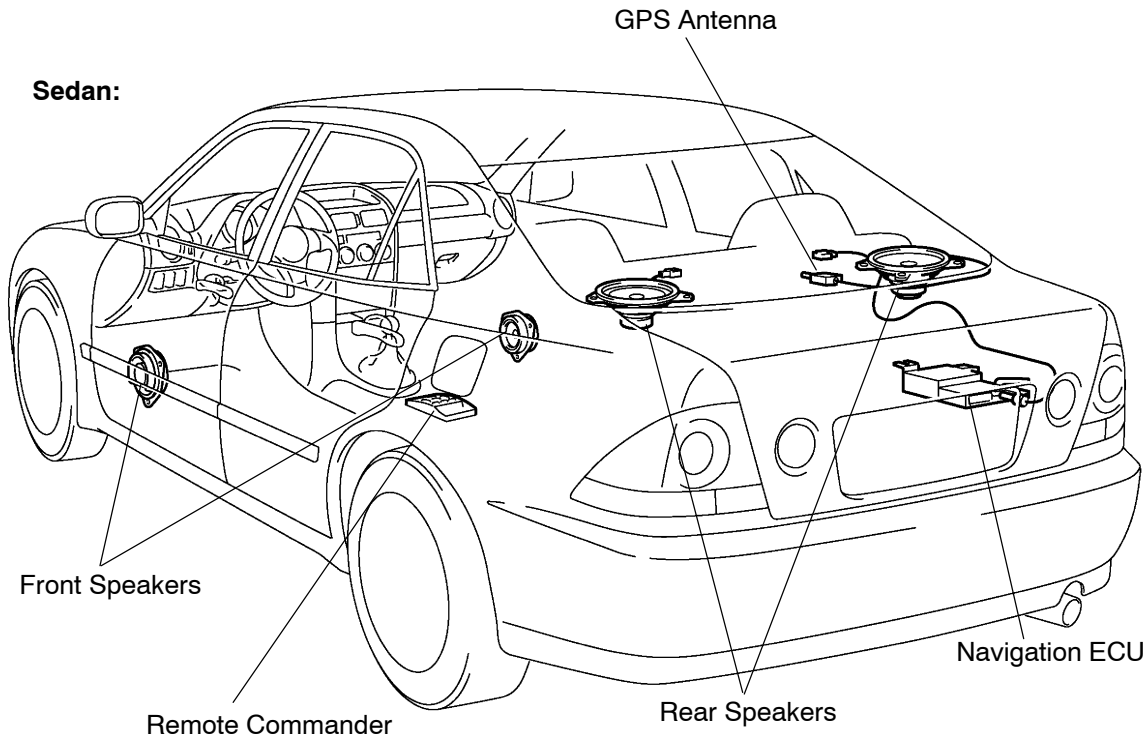
44	Player Error	Malfunction of player continues for a certain length of time.	• Check if disc can be inserted/taken out or not. If not, replace navigation ECU. • If it can be inserted/taken out and this code is output, replace navigation ECU.
45	Player Temp. Too High	Readout cannot be dome because temperature around player's pickup (reading part) is too high.	• With ignition switch OFF, leave in cool shaded place for a while and recheck. • If same code detected, replace navigation ECU.

DI9I4–01

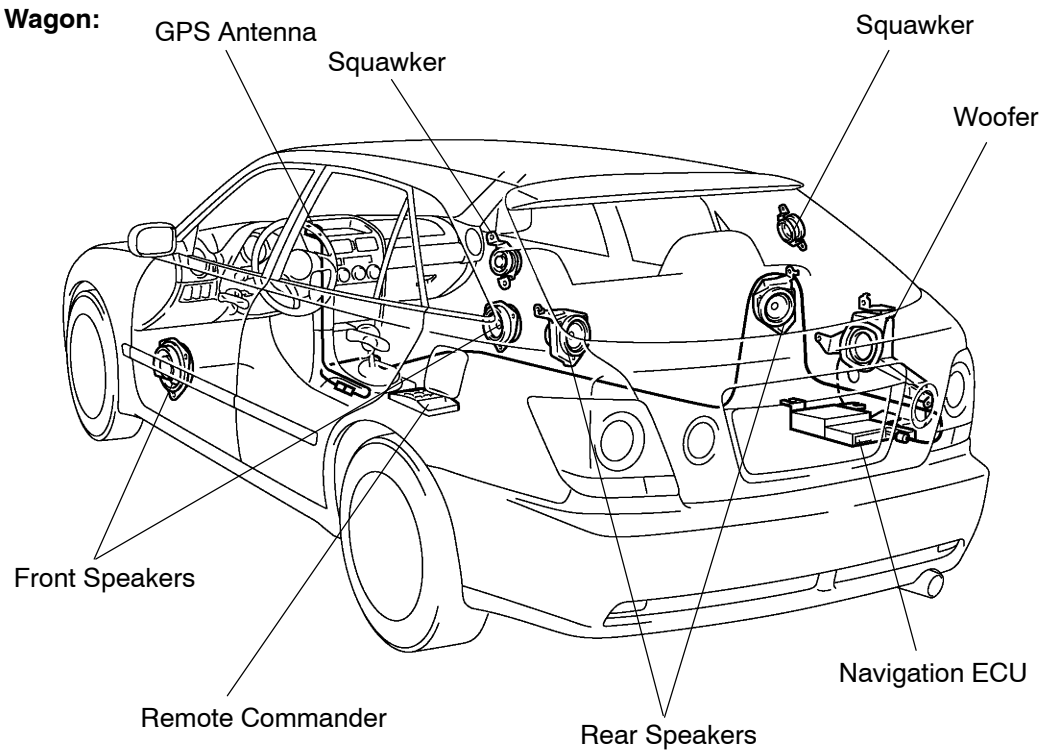
PARTS LOCATION



Sedan:



I23481


Wagon:
GPS Antenna
Squawker
Squawker
Woofer
Front Speakers
Navigation ECU
Remote Commander
Rear Speakers

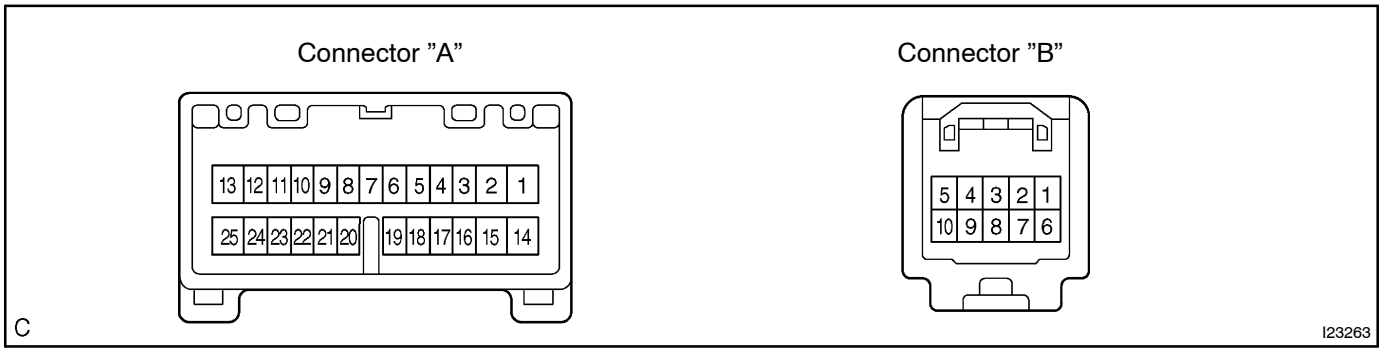
C

I23254

DI63F–02

TERMINALS OF ECU

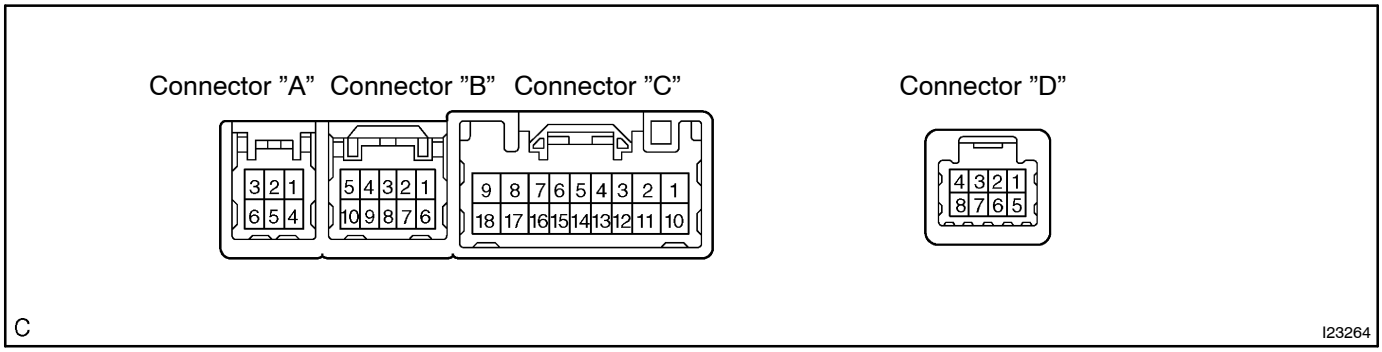
1. MULTI DISPLAY



Terminals (Symbols)	Condition	Specified value	Problem symptom when open circuit is detected. / Problem symptom when short circuit is detected.
A1 – A25 (+B – GND1)	Constant	Battery voltage	Screen is in disorder.
A3 – A25 (IG – GND1)	Ignition switch ON	Battery voltage	Navigation system does not operate.
A4 – A25 (SPD – GND1)	Input signal displayed	–	Navigation operation is available during driving, or a cursor on present site does not move.
A5 (GTX+)	System checking	–	Screen is in disorder. / Navigation system does not operate.
A7 – A25 (DR – GND1)	System checking	–	Screen is in disorder. / Navigation system does not operate.
A10 – A25 (RE1 – GND1)	Ignition switch position ACC	Approx. 3 V	Controller does not operate.
A14 – A25 (ACC – GND1)	Ignition switch position ACC	Battery voltage	Screen is in disorder / Fuse is blown.
A15 – A25 (ST1 – GND1)	Ignition switch ON	Battery voltage	Navigation system does not operate.
A16 – A25 (TC – GND1)	Ignition switch position OFF and connect terminals TC and CG of DLC3.	Continuity	Screen ins in disorder. / Constant screen is normal.
A17 – A25 (PKB – GND1)	Input signal displayed	–	The system can not enter diagnosis system mode. / Normal.
A18 (GTX–)	System checking	–	Screen is in disorder. / Navigation system does not operate.
A22 – Body ground (SGD1 – Body ground)	Constant	Continuity	Normal.
A25 – Body ground (GND1 – Body ground)	Diagnosis display check screen is white.	Continuity	Normal.

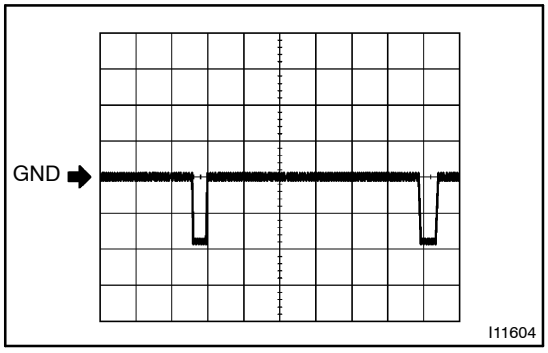
B1 – A25 (VR – GND1)	Constant	Approx. 2.5 V	Screen is in disorder.
			Navigation system does not operate.
B2 – A25 (R – GND1)	Diagnosis display check screen is white.	Using an oscilloscope *2	Screen color turns to light blue.
B3 – A25 (B – GND1)	Ignition switch position ACC	Using an oscilloscope *2	Screen color turns to yellow.
B5 (CTX+)	System checking	–	Screen is in disorder.
			Navigation system does not operate.
B6 – A25 (VG – GND1)	Constant	Continuity	Normal.
B7 – A25 (G – GN1)	Diagnosis display check screen is white.	Using an oscilloscope *2	Screen color turns to pink.
B8 – A25 (SYNC – GND1)	Navigation screen is display.	Using an oscilloscope *1	Screen noise or other types of noise occur.
B10 (CTX–)	System checking	–	Screen is in disorder.
			Navigation system does not operate.

2. NAVIGATION ECU



Terminals (Symbols)	Condition	Specified value	Problem symptom when open circuit / Problem symptom when short circuit
B1 – Body ground (VR – Body ground)	Constant	Continuity	Normal
B2 – C17 (R – GND)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to light blue.
B3 – C17 (B – GND)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to light yellow.
B5 – B10 (TX+ – TX–)	Ignition switch position ACC	Approx. 3 V	Controller does not operate.
B6 – Body ground (VG – Body ground)	Constant	Continuity	Normal
B7 – C17 (G – GND)	Diagnosis display check screen is while	Using an oscilloscope *2	Screen color turns to pink.
B8 – C17 (SYNC – GND)	Diagnosis display check screen is while	Using an oscilloscope *1	Screen is in disorder.
B10 – Body ground (TX– – Body ground)	Constant	Continuity	Normal.
C1 – C17 (AUI+ – GND)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.
C2 – C17 (AUO+ – GND)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.
C4 (MUTE)	Speaker sounding.	–	Screen noise or other types of noise occur. / Driver side speaker does not sound.
C5 (SPD)	Input signal displayed	–	Navigation operation is available during driving, or a cursor on present site does not move.
C9 – C17 (+B – GND)	Constant	Battery voltage	Screen is in disorder. / Fuse is blown.
C10 – C17 (AUI– – GND)	Speaker sounding.	5 – 7 V	Diver side speaker does not sound.
C11 – C17 (AUO– – GND)	Speaker sounding.	5 – 7 V	Driver side speaker does not sound.

C15 (MUTE)	Speaker sounding.	–	Screen noise or other types of noise occur.
			Driver side speaker does not sound.
C17 – Body ground (GND – Body ground)	Constant	Continuity	Normal.
C18 – C17 (ACC – GND)	Ignition switch position ACC.	Battery voltage	Screen is in disorder.
			Fuse is blown.
D1 – C17 (SW– – GND)	Ignition switch OFF	0 V	Switch illumination dose not light up and switch can be operation.
D3 – C17 (MIC+ – GND)	Ignition switch position ACC	Approx. 5 V	No voice can be heard from cellular phone and voice recognition cannot be done.
D4 – C17 (MACC – GND)	Ignition switch position ACC	Approx. 5 V	No voice can be heard from cellular phone and voice recognition cannot be done.
D5 – C17 (MIC– – GND)	Ignition switch position ACC	Approx. 5 V	No voice can be heard from cellular phone and voice recognition cannot be done.
D6 – Body ground (SGND – Body ground)	Constant	Continuity	Normal.
D7 (SNSE)	–	–	–
D8 – C17 (SW+ – GND)	Ignition switch position ACC	Approx. 5 V	Switch illumination dose not light up and switch can be operation.

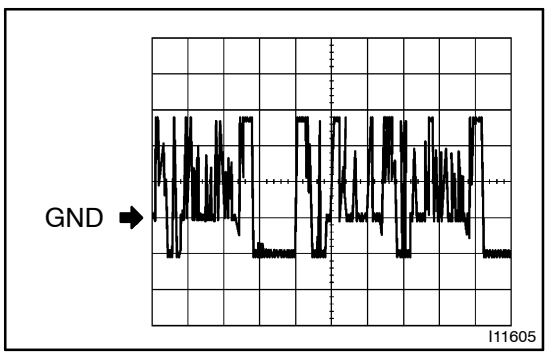


Oscilloscope

Wave *1

HINT:

- Terminal SYNC, EXSYNG ↔ GND1
- Gauge set 500 mV/DIV 10 μs/DIV
- Condition: Screen is display



Wave *2

HINT:

- Terminal R, G, B, E*–R, E*–G, EX–B ↔ GND1
- Gauge set 200 mV/DIV 10 μs/DIV
- Condition: Screen changing

DI282-10

PROBLEM SYMPTOMS TABLE

HINT:

Inspect the input/output voltage of the terminals which are described in the column of Terminal in the table.
Inspect other terminals which are not described referring to "Terminal of ECU".

Symptom	Suspect Area	See page
The screen is dark, nothing shines on the screen.	1. Multi display 2. Wire harness and connector	DI–593 IN–34
Nothing appears on the screen. (Back light lights up.)	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector C Terminal ACC, +B Connector B Terminal R, G, B) 3. Wire harness and connector	DI–593 DI–593 DI–593 IN–34
The screen is white.	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector B Terminal R, G, B) 3. Wire harness and connector	DI–593 DI–593 IN–34
The screen is in disorder. (Synchronizing disorderly.)	1. Multi display (Terminal SYNC) 2. Navigation ECU (Connector B Terminal SYNC) 3. Wire harness and connector	DI–593 DI–593 IN–34
The color on the screen is unusual.	1. Multi display (Terminal R, G, B) 2. Navigation ECU (Connector B Terminal R, G, B) 3. Wire harness and connector	DI–593 DI–593 IN–34
Remote commander switch does not work.	1. Remote commander 2. Cradle 3. Display ECU 4. Wire harness	– – DI–593 IN–34
GPS mark does not appear at any time and at any place.	1. Navigation ECU (Diagnosis check) 2. Wire harness and connector	DI–593 IN–34
A cursor on present site does not move.	1. Navigation ECU (SPD signal is checked on the "CAR SIGNAL INFORMATION" during diagnosis check.) 2. Wire harness and connector	DI–593 IN–34
Movement of cursor on present site is always unusual.	1. Navigation ECU	DI–593
Even though the battery has not been removed, the route and destination are not displayed.	1. Navigation ECU (Connector C Terminal "+B") 2. Wire harness and connector	DI–593 IN–34
Navigation voice can not be heard at all from the driver's side speaker.	1. Navigation ECU (Volume adjustment)	DI–593
No sound except the navigation voice can be heard at all from the driver's side speaker.	1. Navigation ECU (Connector "C" Terminal "AUI+", "AUI–", "AUO+", "AUO–") 2 Wire harness and connector	DI–593 IN–34
No sound can be heard at all from the driver's side speaker.	1. Driver's side speaker 2. Wire harness and connector	– IN–34
No map is Multi displayed on the screen.	1. Navigation ECU (Diagnosis check)	DI–593

DI63G–02

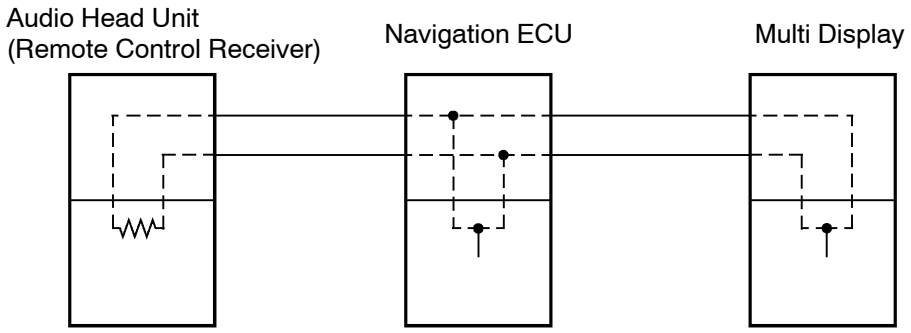
CIRCUIT INSPECTION

AVC–LAN (Communication bus) Circuit

CIRCUIT DESCRIPTION

Each unit of LEXUS navigation system connected with AVC–LAN (communication bus) transfers the signal of each switch by communication.
When +B short and GND short occur in this AVC–LAN, LEXUS navigation system will not function normally as the communication is discontinued.
In this AVC–LAN, Navigation ECU becomes the master of the communication, and the audio head unit has a resistance necessary for transmitting the communication.
Multi Display is connected between Navigation ECU and Audio head unit, LEXUS navigation system has the structure that makes communication impossible without Navigation ECU, Multi Display or Audio head unit.

AVC–LAN

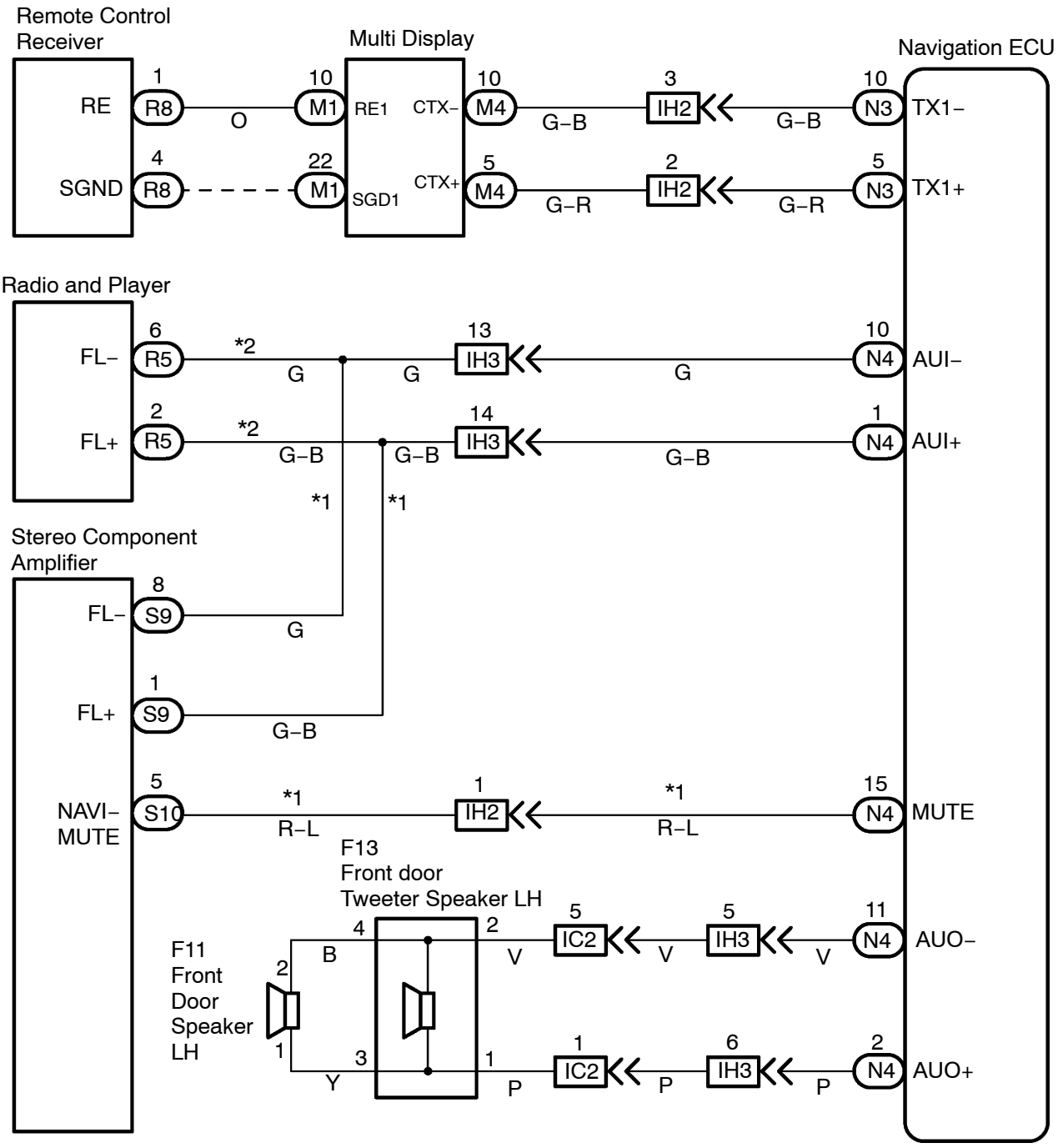


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I11572

WIRING DIAGRAM

LHD Models

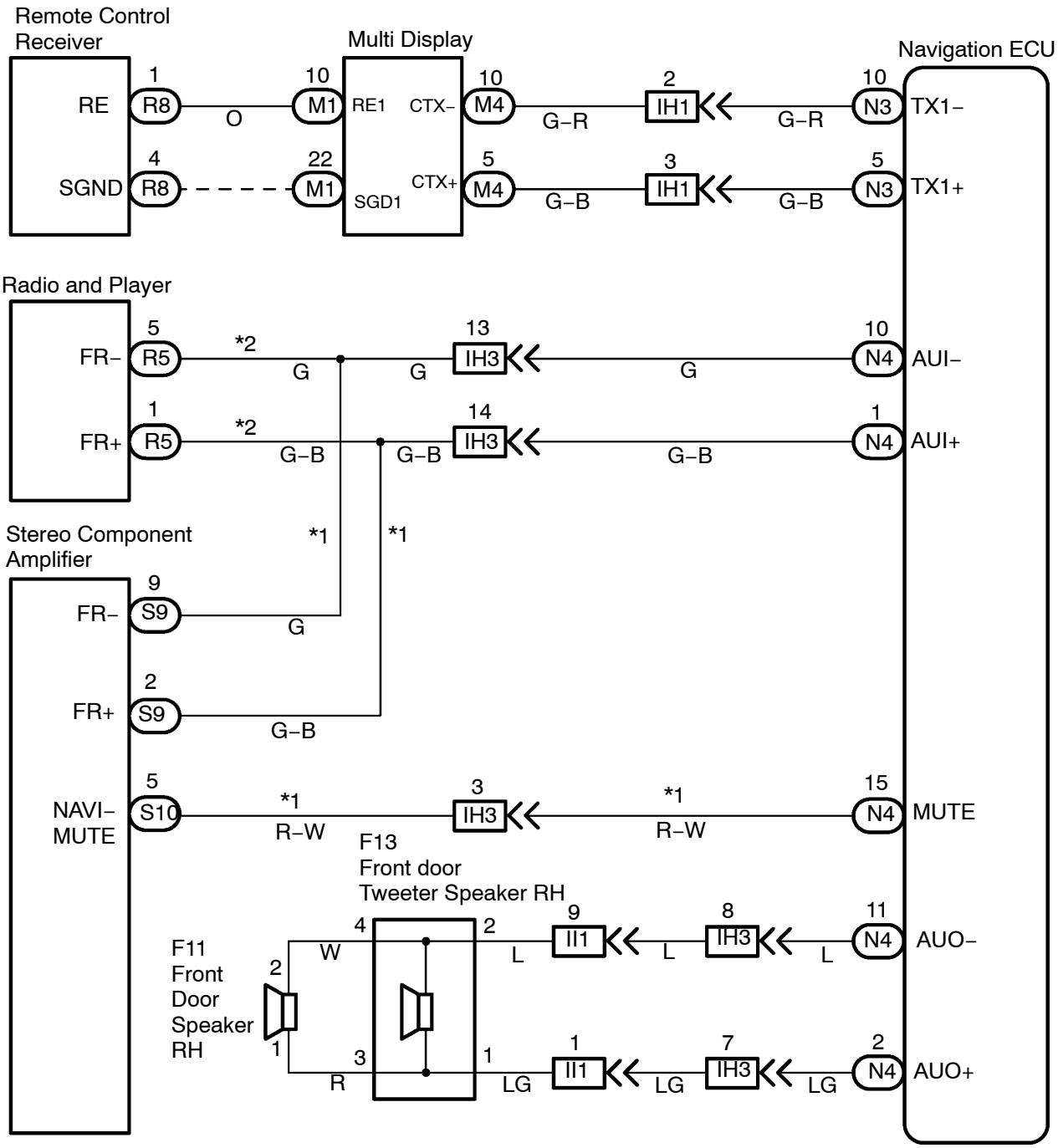


*1: 8 Speaker, 9 Speaker
*2: 6 Speaker

C

I23261

RHD Models



*1: 8 Speaker, 9 Speaker
*2: 6 Speaker

C

I23261

INSPECTION PROCEDURE

1	Disconnect the connector "S8" of power amplifier and check if AVC–LAN will be recovered normally.

CHECK:
Check that the display will change by pressing either of the Panel switch or Touch switch on the display.
HINT:
It can be judged that AVC–LAN is recovered if the display is changed.

OK	Replace the power amplifier

NG

2	Check wire harness and connector between radio and player and Navigation ECU. (See page IN–34)

NG	Repair or replace wire harness or connector between radio and player and Navigation ECU.

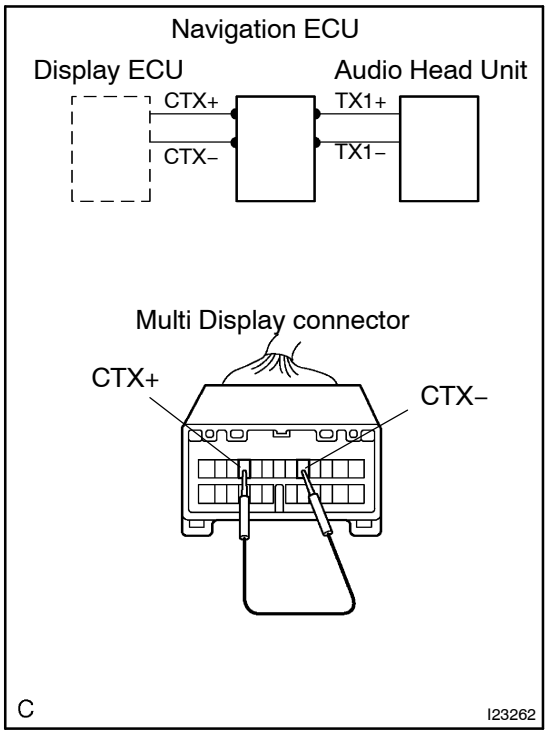
OK

3	Check wire harness and connector between Multi Display and Navigation ECU. (See page IN–34)

NG	Repair or replace wire harness or connector between Multi Display and Navigation ECU.

OK

4	Skip Display ECU and check AVC–LAN.



PREPARATION:

(a) Connect all the connectors except ”M1” of the Multi Display.

(b) Using 2 SSTs (Diagnosis check wire P/N 09893–12040), connect the terminal CTX+ of connector ”M1” and CTX+ of connector ”M1” of Multi Display.

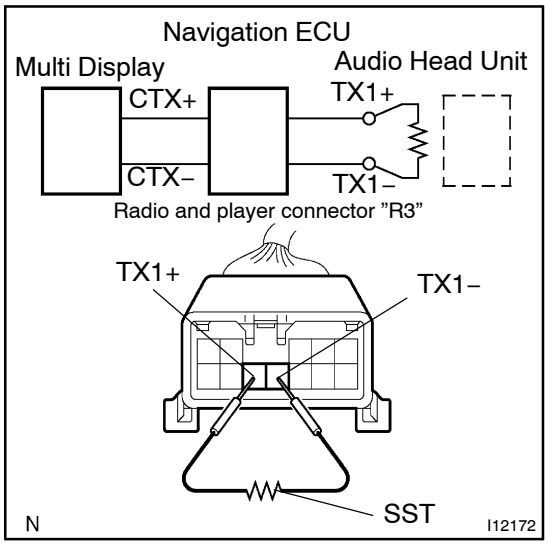
CHECK:

Operate radio and player (CD, Cassette tape, etc.) and check that the sound comes out from the speaker.
(Check that AVC–LAN is recovered.)

OK → **Replace the Multi Display.**

NG

5	Skip radio and player and check AVC–LAN.



PREPARATION:

(a) Connect Multi Display connector.
(b) Disconnect radio and player "F" connector.
(c) Using SST (Navigation Check Wire P/N 09843–18050), connect the terminal TX1+ to terminal TX1– of "F" connector of radio and player.

CHECK:

Operate the panel switch and the touch switch of the display and check that the navigation functions.
(Check that AVC–LAN is recovered.)

OK → **Replace the radio and player.**

NG

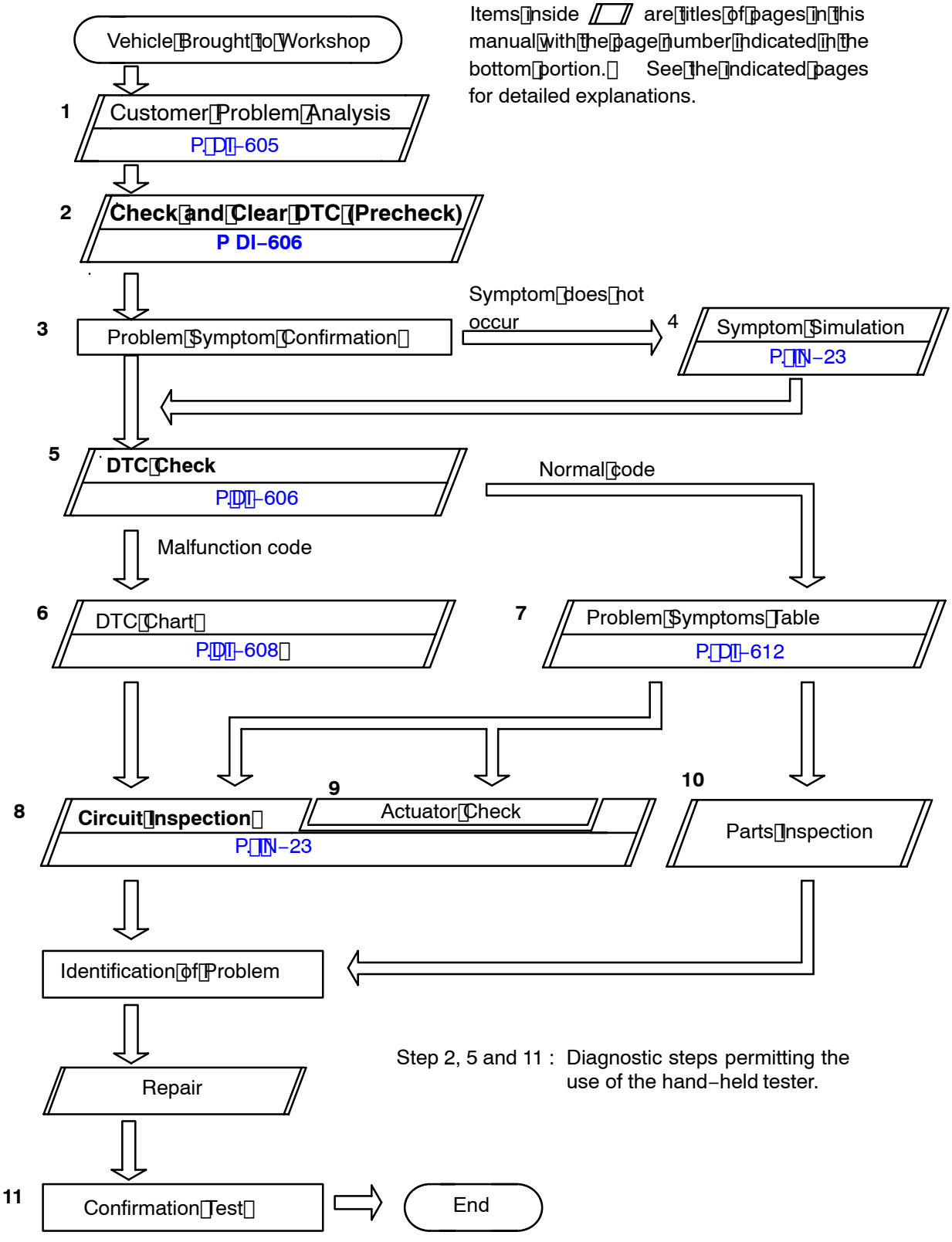
Replace the Navigation ECU.

AIR CONDITIONING SYSTEM

DI602–03

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



DI603–01

CUSTOMER PROBLEM ANALYSIS CHECK

AIR CONDITIONING SYSTEM Check Sheet

Inspector's name:

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date vehicle Brought In	/ /	**Odometer Reading**	**km Miles**

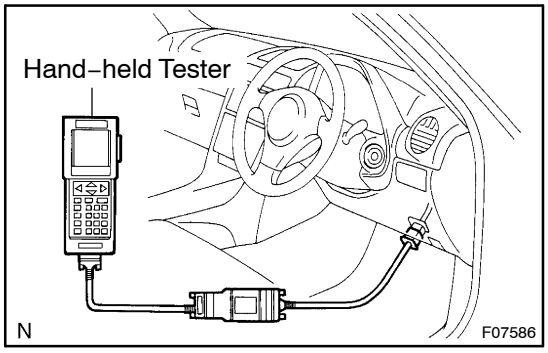
Date of Problem Occurrence	/ /
How Often does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)
Weather	☐ Fine ☐ Cloudy ☐ Snowy ☐ Various / Other
Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F °C)

Symptoms	**Air Flow Control is Faulty**	☐ Blower motor does not operation ☐ Blower motor speed does not change (Always Hi, Always Med, Always Lo)
	Temperature Control is Faulty	☐ Cabin temperature does not go down ☐ Cabin temperature does not rise ☐ Response is slow
	Air Inlet Control is Faulty	☐ Cannot change between FRS and REC (Always Fresh or always Recirculating)
	Vent Control is Faulty	☐ Mode will not chage ☐ Will not enter the desired mode

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI9GU–01

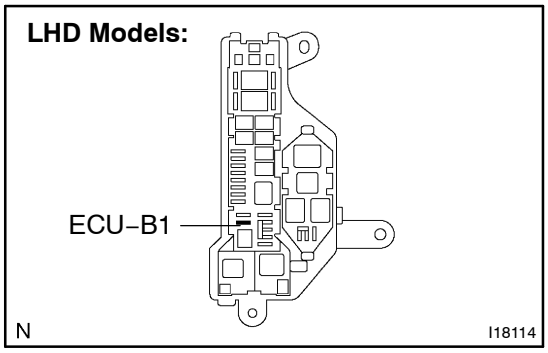
PRE–CHECK



1. DTC CHECK USING HAND–HELD TESTER

(a) Hook up the hand–held tester to the DLC3.

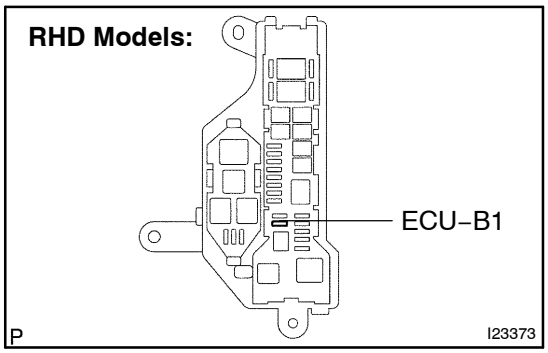
(b) Read the diagnostic trouble codes by following the prompts on the tester screen.
Please refer to the hand–held tester operator's manual for further details.



2. CLEARING DTC

(a) Pull out the ECU–B1 fuse in engin room J/B for 10 sec. or longer to clear diagnostic the DTC's memory.

(b) After reinserting the fuse, check that the normal code is output.



3. ACTUATOR CHECK

(a) Connect the hand–held tester to the DLC 3.
(b) Turn the ignition switch to ON and hand held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand–held tester.
(d) Check the temperature and air flow visual and by hand.

Step No.	Pattern No.	Conditions				
		Blower motor	Air flow vent	Air inlet damper	Magnetic clutch	Air mix damper
1	0	OFF	FACE	FRESH	OFF	Cool side (–10% open)
2	1	1	↑	↑	↑	↑
3	2	17	↑	RECIRC / FRESH (54.5 % OPEN)	ON	↑
4	3	↑	↑	↑	↑	↑
5	4	↑	↑	↑	↑	Cool / Hot (50% open)
6	5	↑	BI–LEVEL	↑	↑	↑
7	6	↑	FOOT*1	↑	↑	Hot side (110% open)
8	7	↑	FOOT*2	↑	↑	↑
9	8	↑	FOOT/DEF	↑	↑	↑
10	9	31	DEF	↑	↑	↑

(*1): There is leakage from defroster.
(*2): There is no leakage from defroster.

DI605–06

DIAGNOSTIC TROUBLE CODE CHART

If malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit.)

DTC No. (See page)	Detection Item	Trouble Area	Memory
B1400	Normal	–	–
B1411 (DI–614)	Room temperature sensor circuit	• Room temp. sensor • Harness or connector between room temp. sensor and A/C amplifier • A/C amplifier	○ (8.5 min. or more)
B1412 (DI–617)	Ambient temperature sensor circuit	• Ambient temp. sensor • Harness or connector between ambient temp. sensor and engine (and ECT) ECU • Harness or connector between engine (and ECT) ECU and A/C amplifier • A/C amplifier	○ (8.5 min. or more)
B1413 (DI–620)	Evaporator temperature sensor circuit	• Evaporator temp. sensor • Harness or connector between evaporator temp. sensor and A/C amplifier • A/C amplifier	○ (8.5 min. or more)
B1421 *3 (DI–623)	Solar sensor circuit	• Solar sensor • Harness or connector between solar sensor and A/C amplifier • A/C amplifier	– ○ (8.5 min. or more)
B1422 *4 (DI–626)	All conditions below are detected for 3 sec. or more (a) Engine speed: 450 rpm or more (b) Ratio between engine and compressor rpm deviates 20% or more in comparison to normal operation.	• Compressor drive belt • Compressor lock sensor • Compressor • Harness and connector between A/C amplifier and compressor, compressor lock sensor • A/C amplifier • Engine (and ECT) ECU	–
B1423 (DI–629)	Open in pressure sensor circuit Abnormal refrigerant pressure [below 196 kPa (2.0 kgf/cm^2, 28 psi) over 3,140 kPa (32.0 kgf/cm^2, 455 psi)]	• Pressure switch • Harness or connector between pressure switch and engine (and ECT) ECU. • Harness or connector between engine (and ECT) ECU and A/C amplifier • Refrigerant pipe line • A/C amplifier • Compressor	–
B1431 (DI–632)	Air mix damper position sensor circuit	• Air mix damper position sensor • A/C amplifier • Harness or connector between air mix damper position sensor and A/C amplifier	○ (1 min. or more)
B1432/32 (DI–635)	Air inlet damper position sensor circuit	• Air inlet damper position sensor • A/C amplifier • Harness or connector between air mix damper position sensor and A/C amplifier	○ (1 min. or more)
B1433 (DI–638)	Air outlet damper position sensor circuit	• Air outlet damper position sensor circuit • A/C amplifier • Harness or connector between air mix damper position sensor and A/C amplifier	○ (1 min. or more)

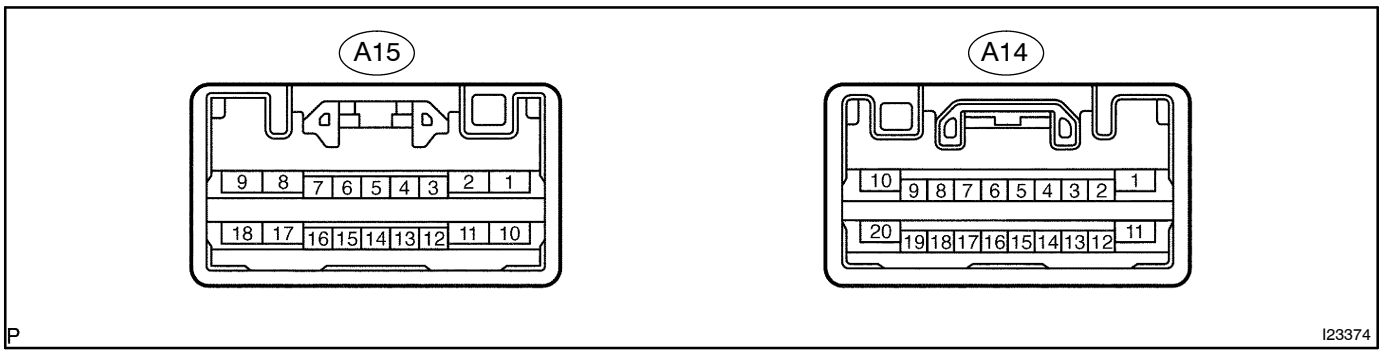
B1441/41 (DI–641)	Air mix damper control servomotor circuit	• Air mix damper control servomotor • Air mix damper position sensor • Harness or connector between A/C amplifier and air mix position sensor • Harness and connector between A/C amplifier and mix damper control servomotor • A/C amplifier	○ (15 secs. or more)
B1442/42 (DI–644)	Air inlet damper control servomotor	• Air inlet damper control servomotor • Air inlet damper position sensor • Harness or connector between A/C amplifier and air inlet position sensor • Harness and connector between A/C amplifier and inlet damper control servomotor • A/C amplifier	○ (15 secs. or more)
B1443/43 (DI–647)	Air outlet damper control servomotor circuit	• Air outlet damper control servomotor • Air outlet damper position sensor • Harness or connector between A/C amplifier and air outlet position sensor • Harness and connector between A/C amplifier and outlet damper control servomotor • A/C amplifier	○ (15 secs. or more)
99	Multiplex communication circuit	Open in multiplex communication circuit	–

HINT:

- *1: If the room temp. is approx. –20°C (–4°F) or lower, DTC B1411 may be output even though the system is normal.
- *2: If the ambient temperature is approx. –50°C (–58°F) or lower, a DTC may be output even though the system is normal.
- *3: If the check is being performed in a dark place, DTC B1421 (solar sensor circuit abnormal) could be displayed. In this case, perform DTC check again while shining a light, such as an inspection light, on the solar sensor. If DTC B1421/21 is still displayed, there could be trouble in the solar sensor circuit.
- *4: Compressor lock (DTC B1422) is indicated only for a current malfunction (See page DI–626). To confirm DTC B1422, preform the following steps.
  (1) With the engine ON, enter the DTC check mode.

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TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
HAZD ↔ GND (A14–1 ↔ A15–18)	G–W ↔ W–B	IG ON. Hazard switch: ON	Continuity
		IG ON. Hazard switch: OFF	No Continuity
AIF ↔ GND (A14–2 ↔ A15–18)	R–W ↔ W–B	IG ON. Air inlet selector: FRESH	Below 1.0 V
		IG ON. Air inlet selector: RECIRC	No voltage
AOD ↔ GND (A14–3 ↔ A15–18)	L–R ↔ W–B	IG ON. Mode selector: FACE	Below 1.0 V
		IG ON. Mode selector: DEF	10 – 14 V
TS ↔ SG (A14–5 ↔ A14–20)	GR–L ↔ BR–W	IG ON. Solar sensor subject to electric light	0.8 – 4.3 V
		IG ON. Solar sensor is covered by a cloth	Below 0.8 V
TPM ↔ SG (A14–6 ↔ A14–20)	R–Y ↔ BR–W	IG ON. Mode selector: FACE	3.5 – 4.5 V
		IG ON. Mode selector: DEF	0.5 – 1.5 V
TE ↔ SG (A14–7 ↔ A14–20)	B–R ↔ BR–W	IG ON. Evaporator temp.: 0 °C (32 °F)	2.0 – 2.4 V
		IG ON. Evaporator temp.: 15 °C (59 °F)	1.4 – 1.8 V
S5 ↔ SG (A14–8 ↔ A14–20)	GR–R ↔ BR–W	IG ON.	4.5 – 5.5 V
MPX+ ↔ GND (A14–10 ↔ A15–18)	O ↔ W–B (*1) L ↔ W–B (*2)	IG ON.	Pulse generation
AIR ↔ GND (A14–11 ↔ A15–18)	Y–G ↔ W–B	IG ON. Air inlet selector: FRESH	Below 1.0 V
		IG ON. Air inlet selector: RECIRC	10 – 14 V
AOF ↔ GND (A14–12 ↔ A15–18)	P–L ↔ W–B	IG ON. Mode selector: FACE	10 – 14 V
		IG ON. Mode selector: DEF	Below 1.0 V
AMC ↔ GND (A14–13 ↔ A15–18)	P–B ↔ W–B	IG ON. Temperature control: Max. Hot	Below 1.0 V
		IG ON. Temperature control: Max. Cool	10 – 14 V
AMH ↔ GND (A14–14 ↔ A15–18)	LG–R ↔ W–B	IG ON. Temperature control: Max. Hot	10 – 14 V
		IG ON. Temperature control: Max. Cool	Below 1.0 V
TP ↔ SG (A14–15 ↔ A14–20)	V–W ↔ BR–W	IG ON. Temperature control: Max. Hot	0.5 – 1.5 V
		IG ON. Temperature control: Max. Cool	3.5 – 4.5 V
TPI ↔ SG (A14–16 ↔ A14–20)	GR–R ↔ BR–W	IG ON. Air inlet selector: RECIRC	3.5 – 4.5 V
		IG ON. Air inlet selector: FRESH	0.5 – 1.5 V
TR ↔ SG (A14–17 ↔ A14–20)	L–W ↔ BR–W	IG ON. Cabin temp.: 25 °C (77 °F)	1.8 – 2.2 V
		IG ON. Cabin temp.: 40 °C (104 °F)	1.2 – 1.6 V
SG ↔ Body Ground (A14–20 ↔ Body Ground)	BR–W ↔ Body Ground	Always	Continuity
MPX– ↔ GND (A15–1 ↔ A15–18)	L ↔ W–B (*1) O ↔ W–B (*2)	IG ON.	Pulse generation
PKB ↔ GND (A15–3 ↔ A15–18)	Y–R ↔ W–B	IG ON. Brake warning light: ON	Below 1.0 V
		IG ON. Brake warning light: OFF	10 – 14 V

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
PWR ↔ GND (A15–4 ↔ A15–18)	L–W ↔ W–B	IG ON. Pattern select switch: PWR	Below 1.0 V
		IG ON. Pattern select switch: Except PWR	10 – 14 V
P–S/B ↔ GND (A15–5 ↔ A15–18)	P–G ↔ W–B (*1) P–B ↔ W–B (*2)	IG ON. Passenger seat belt warning: Flash	Below 1.0 V
		IG ON. Passenger seat belt warning: OFF	10 – 14 V
MHTR ↔ GND (A15–6 ↔ A15–18)	G–O ↔ W–B (*1) W–L ↔ W–B (*2)	IG ON. Defogger switch: ON	10 – 14 V
		IG ON. Defogger switch: OFF	Below 1.0 V
ACC ↔ GND (A15–7 ↔ A15–18)	GR ↔ W–B	IG ACC.	10 – 14 V
		IG OFF.	Below 1.0 V
+B ↔ Body ground (A15–8 ↔ Body ground)	R–Y ↔ Body Ground	Always	10 – 14 V
HR ↔ Body Ground (A15–10 ↔ Body Ground)	L ↔ Body Ground	IG ON.	Below 1.0 V
		IG OFF.	10 – 14 V
WIP ↔ GND (A15–11 ↔ A15–18)	L–R ↔ W–B	IG ON. Wiper switch: ON	Pulse generation
BLW ↔ GND (A15–12 ↔ A15–18)	V ↔ W–B	IG ON. Operate blower motor	Pulse generation
SNOW ↔ GND (A15–13 ↔ A15–18)	B–Y ↔ W–B	IG ON. Pattern select switch: SNOW	Below 1.0 V
		IG ON. Pattern select switch: Except SNOW	10 – 14 V
REOST ↔ GND (A15–14 ↔ A15–18)	W–G ↔ W–B	Light control switch: ON	Below 1.0 V
		Light control switch: OFF	No voltage
ILL+ ↔ GND (A15–15 ↔ A15–18)	G ↔ W–B	Light control switch: ON	10 – 14 V
		Light control switch: OFF	Below 1.0 V
IG ↔ GND (A15–16 ↔ A15–18)	B–R ↔ W–B	IG ON.	10 – 14 V
		IG OFF.	Below 1.0 V
GND ↔ Body ground (A15–18 ↔ Body ground)	W–B ↔ Body Ground	Always	Continuity

*1:LHD models
*2:RHD models

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PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate	1. A/C amplifier 2. ACC power source circuit	IN–34 DI–656
Air Flow Control: No blower operation	1. ACC power source circuit 2. Heater main relay circuit 3. Blower motor circuit 4. A/C amplifier	DI–656 DI–659 DI–663 IN–34
Air Flow Control: No blower control	1. Heater main relay circuit 2. Blower motor circuit 3. A/C amplifier 4.Solar sensor circuit	DI–659 DI–663 IN–34 DI–623
Air Flow Control: Insufficient air flow	Blower motor circuit	DI–663
Temperature Control: No cool air comes out	1. Refrigerant volume 2. Drive belt tension 3. Refrigeration system inspection with manifold gauge set 4. Compressor circuit 5. Pressure switch circuit 6. Air mix damper position sensor circuit 7. Air mix damper control servomotor circuit 8. Room temp. sensor circuit 9. Ambient temp. sensor circuit 10. A/C amplifier	AC–23 * AC–16 * AC–3 * DI–666 DI–629 DI–632 DI–641 DI–614 DI–617 IN–34
Temperature Control: No warm air comes out	1. Air mix damper position sensor circuit 2. Air mix damper control servomotor circuit 3. Room temp. sensor circuit 4. Ambient temp. sensor circuit 5. Evaporator temp. sensor circuit 6. A/C amplifier	DI–632 DI–641 DI–614 DI–617 DI–620 IN–34
Temperature Control: Output air is warmer or cooler that the set temperature or response is slow	1. Refrigerant volume 2. Drive belt tension 3. Refrigeration system inspection with manifold gauge set 4. Cooling fan system 5. Solar sensor circuit 6. Room temp. sensor circuit 7. Ambient temp. sensor circuit 8. Evaporator temp. sensor circuit 9. Air mix damper position sensor circuit 10. Air mix damper control servomotor circuit 11. Air inlet damper position sensor circuit 12. Air inlet damper control servomotor circuit 13. Condenser 14. Evaporator 15. Heater radiator 16. Expansion valve 17. A/C amplifier	AC–23 * AC–16 * AC–3 * CO–21 DI–623 DI–614 DI–617 DI–620 DI–632 DI–641 DI–635 DI–644 AC–48 * – – – IN–34

Symptom	Suspect Area	See page
Temperature Control: No temperature control (only Max. cool or Max. warm)	1. Room temp. sensor circuit 2. Ambient temp. sensor circuit 3. Air mix damper position sensor circuit 4. Air mix damper control servomotor circuit 5. A/C amplifier	DI–614 DI–617 DI–632 DI–641 IN–34
No air inlet control	1. Air inlet damper position sensor circuit 2. Air inlet damper control servomotor circuit 3. A/C amplifier	DI–635 DI–644 IN–34
No air flow mode	1. Air outlet damper position sensor circuit 2. Air outlet damper control servomotor circuit 3. A/C amplifier	DI–638 DI–647 IN–34
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. A/C amplifier	DI–666 IN–34
Set temp. value displayed does not change up with operation of temp. control switch.	A/C amplifier	IN–34
DTC not recorded. Set mode is cleared when IG switch is turned off.	1. Back–up power source circuit 2. A/C amplifier	DI–650 IN–34

*: LEXUS IS200 Repair Manual Pub. No. RM684E

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CIRCUIT INSPECTION

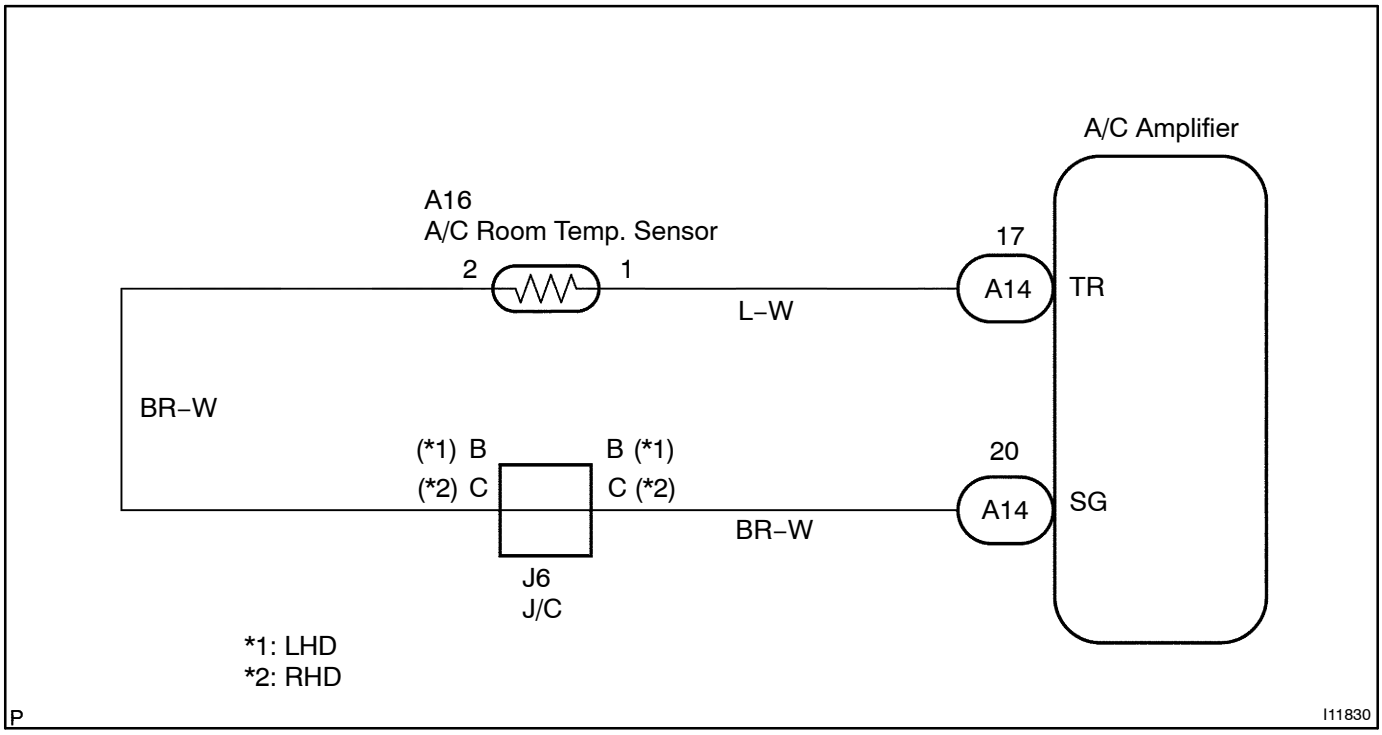
DTC	B1411	Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C amplifier.

DTC No.	Detection Item	Trouble Area
B1411	Open or short in room temperature sensor circuit.	• Room temperature sensor. • harness or connector between room temperature sensor and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

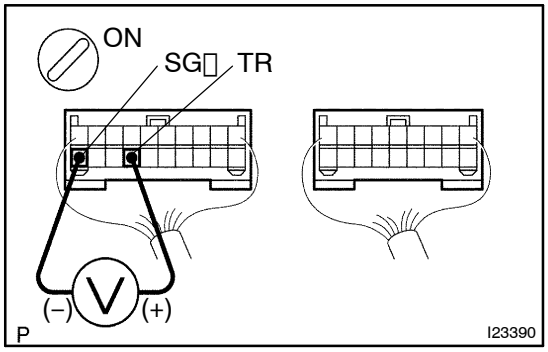
1	**Check room temp. sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the room temp. sensor using DATA LIST.

OK ⇒ **Check and replace A/C amplifier.**

NG

2	**Check voltage between terminals TR and SG of A/C amplifier connector.**



PREPARATION:
Remove A/C amplifier with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TR and SG of A/C amplifier connector at each temperature.

OK:

Voltage:
at 25°C (77°F): 1.8 – 2.2 V
at 40°C (104°F): 1.2 – 1.6 V

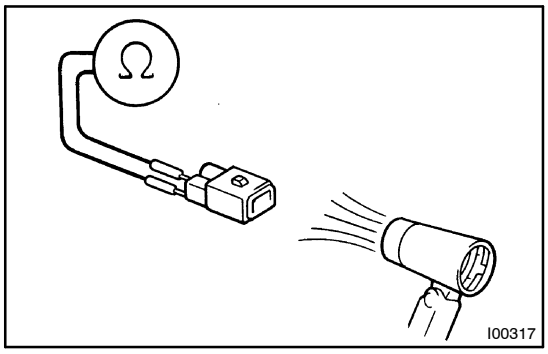
HINT:
As the temperature increases, the voltage decreases.

NG ⇒ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–612). However, if DTC B1411 is displayed, check and replace A/C amplifier.

3	**Check room temperature sensor.**



PREPARATION:
Remove room temperature sensor.
CHECK:
Measure resistance between terminals 1 and 2 of room temperature sensor connector at each temperature.
OK:

Resistance:
at 25°C (77°F): 1.65 – 1.75 KΩ
at 50°C (122°F): 0.55 – 0.65 KΩ

HINT:
As the temperature increases, the resistance decreases.

NG → **Replace room temperature sensor.**

OK

4	**Check harness and connector between A/C amplifier and room temperature sensor (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C amplifier.

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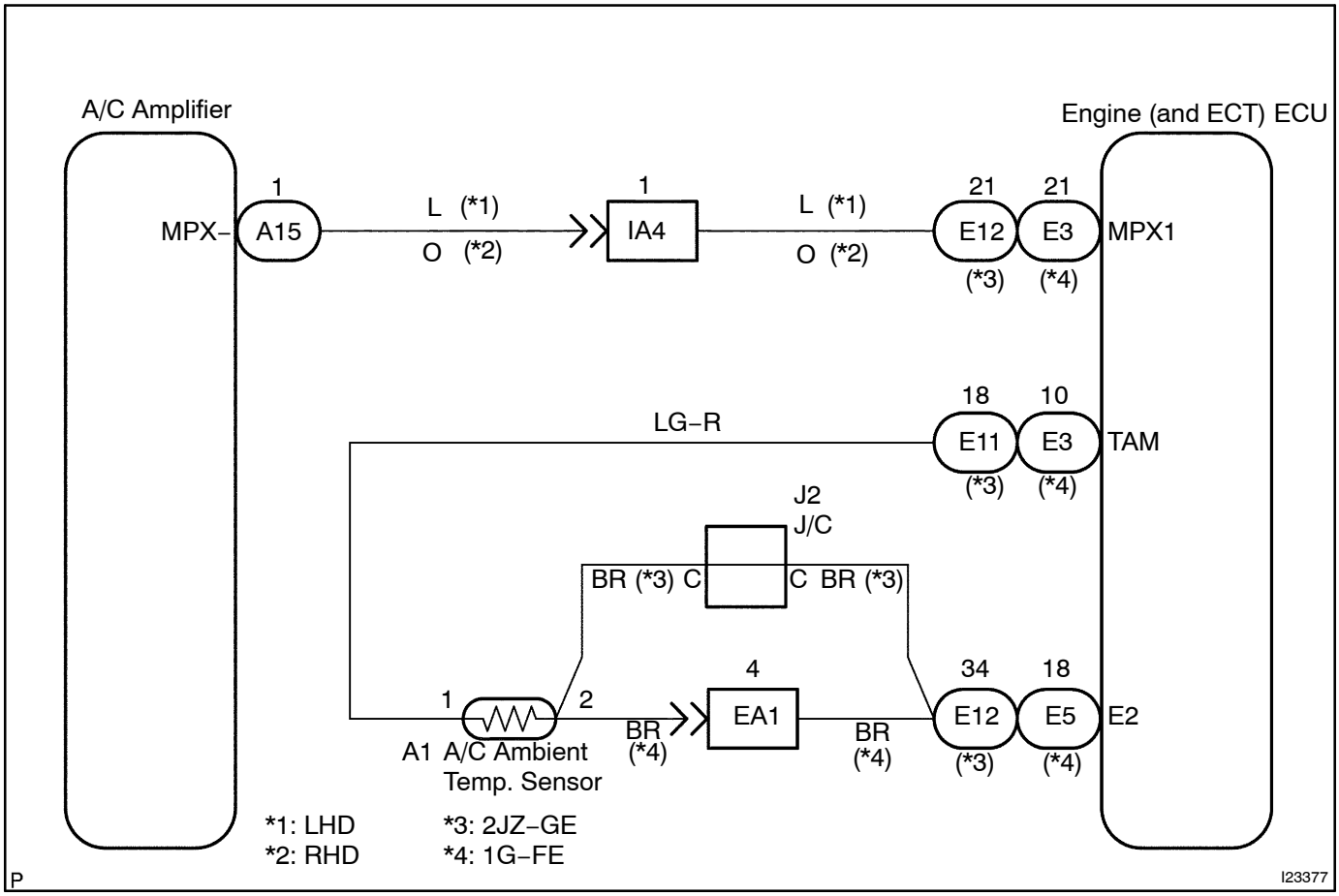
DTC	B1412	Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the ambient temperature and sends the appropriate signals to the A/C amplifier.

DTC No.	Detection Item	Trouble Area
B1412	Open or short in ambient temperature sensor circuit.	• Ambient temperature sensor. • Harness or connector between ambient temperature sensor and engine (and ECT) ECU • Harness or connector between engine (and ECT) ECU and A/C amplifier • Engine (and ECT) ECU • A/C amplifier

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

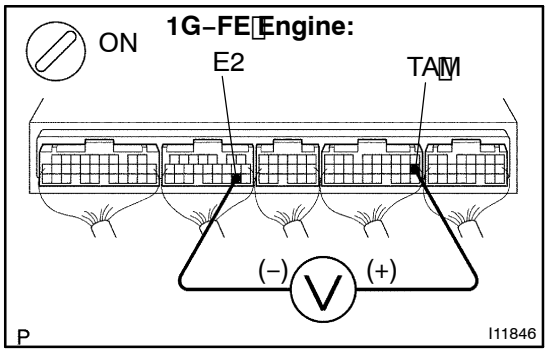
1	**Check ambient temp. sensor using hand–held tester.**

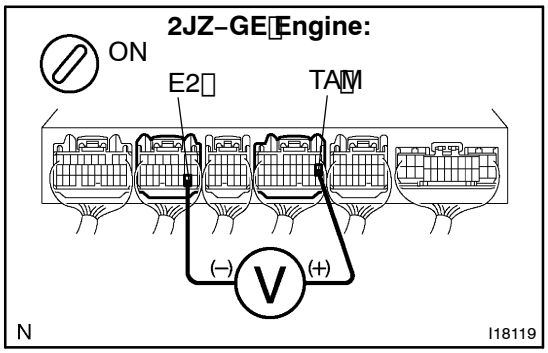
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the ambient temp. sensor using DATA LIST.

OK ⇒ **Check and replace engine (and ECT) ECU.**

NG

2	**Check voltage between terminals TAM and E2 of engine (and ECT) ECU.**





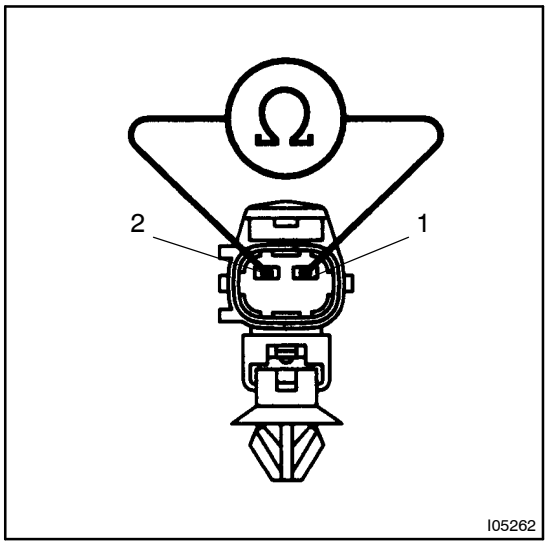
PREPARATION:
Remove engine (and ECT) ECU with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TAM and E2 of engine (and ECT) ECU connector at each temperature.
OK:
Voltage:
at 25°C (77°F): 1.35 – 1.75 V
at 40°C (104°F): 0.85 – 1.25 V
HINT:
As the temperature increases, the voltage decreases.

NG ⇒ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–612). However, if DTC B1412 is displayed, check and replace engine (and ECT) ECU and A/C amplifier.

3	**Check ambient temperature sensor.**



PREPARATION:
Disconnect ambient temperature sensor.
CHECK:
Measure resistance between terminals 1 and 2 of ambient temperature sensor connector at each temperature.
OK:

Resistance:
at 25°C (77°F): 1.6 – 1.8 kΩ
at 50°C (122°F): 0.5 – 0.7 kΩ

HINT:
As the temperature increases, the resistance decreases.
NOTICE:
When installing the ambient temperature sensor, be sure to connect the sensor connector before connecting the battery.

NG → **Replace ambient temperature sensor.**

OK

4	**Check harness and connector between engine (and ECT) ECU and ambient temperature sensor (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

5	**Check harness and connector between engine (and ECT) ECU and A/C amplifier (See page IN–34).**

NG → **Repair or replace harness or connector.**

OK

Check and replace engine (and ECT) ECU or A/C amplifier.

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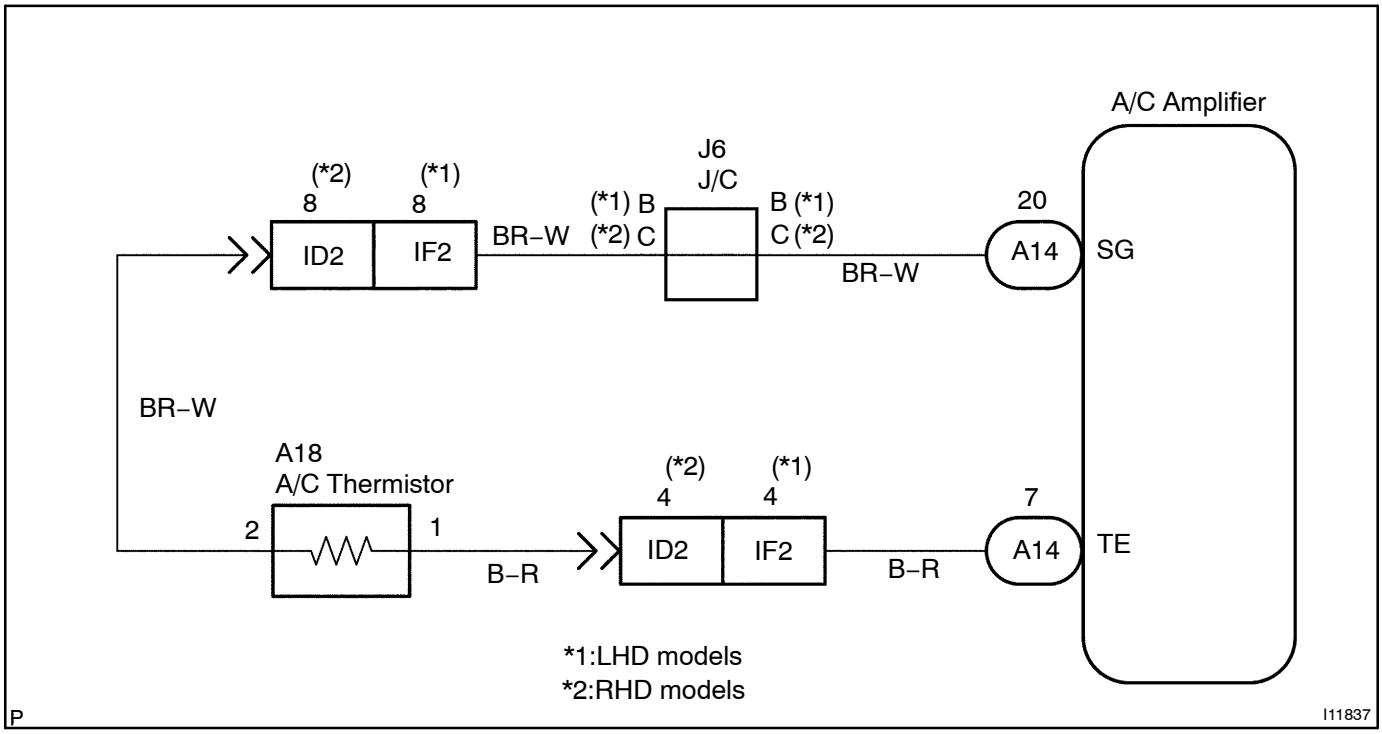
DTC	B1413	Evaporator Temperature Sensor circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the A/C unit and sends the appropriate signals to the A/C amplifier.

DTC No.	Detection Item	Trouble Area
B1413	Open or short in evaporator temperature sensor circuit.	• Evaporator temperature sensor. • Harness or connector between evaporator temperature sensor and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

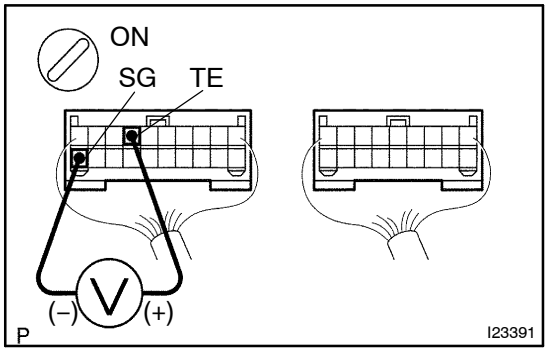
1	**Check evaporator temp. sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the evaporator temp. sensor using DATA LIST.

OK → **Check and replace A/C amplifier.**

NG

2	**Check voltage between terminals TE and SG5 of A/C amplifier connector.**



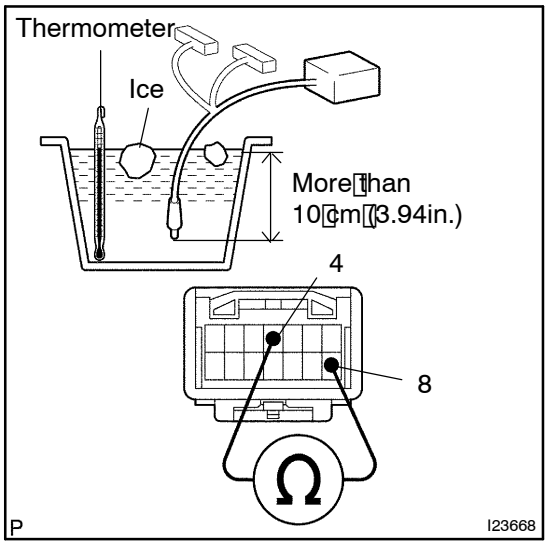
PREPARATION:
Remove the A/C amplifier with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals TE and SG of A/C amplifier connector at each temperature.
OK:
Voltage:
at 0°C (32°F): 2.0 – 2.4 V
at 15°C (59°F): 1.4 – 1.8 V
HINT:
As the temperature increases, the voltage decreases.

NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–612). However, if DTC B1413 is displayed, check and replace A/C amplifier.

3	**Check evaporator temperature sensor.**



PREPARATION:
Remove evaporator temperature sensor.
CHECK:
Measure resistance between terminals 4 and 8 of evaporator temperature sensor connector at each temperature.
OK:

Resistance:
at 0°C (32°F): 4.5 – 5.2 kΩ
at 15°C (59°F): 2.0 – 2.7 kΩ

HINT:
As the temperature increases, the resistance decreases.

NG	**Replace evaporator temperature sensor.**

OK

4	**Check harness and connector between A/C amplifier and evaporator temperature sensor (See page IN–34).**

NG	**Repair or replace harness or connector.**

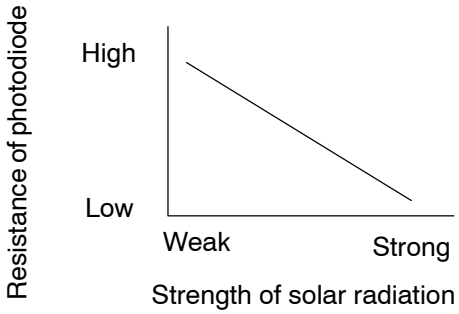
OK

Check and replace A/C amplifier.

DI60B–04

DTC	B1421	Solar Sensor Circuit

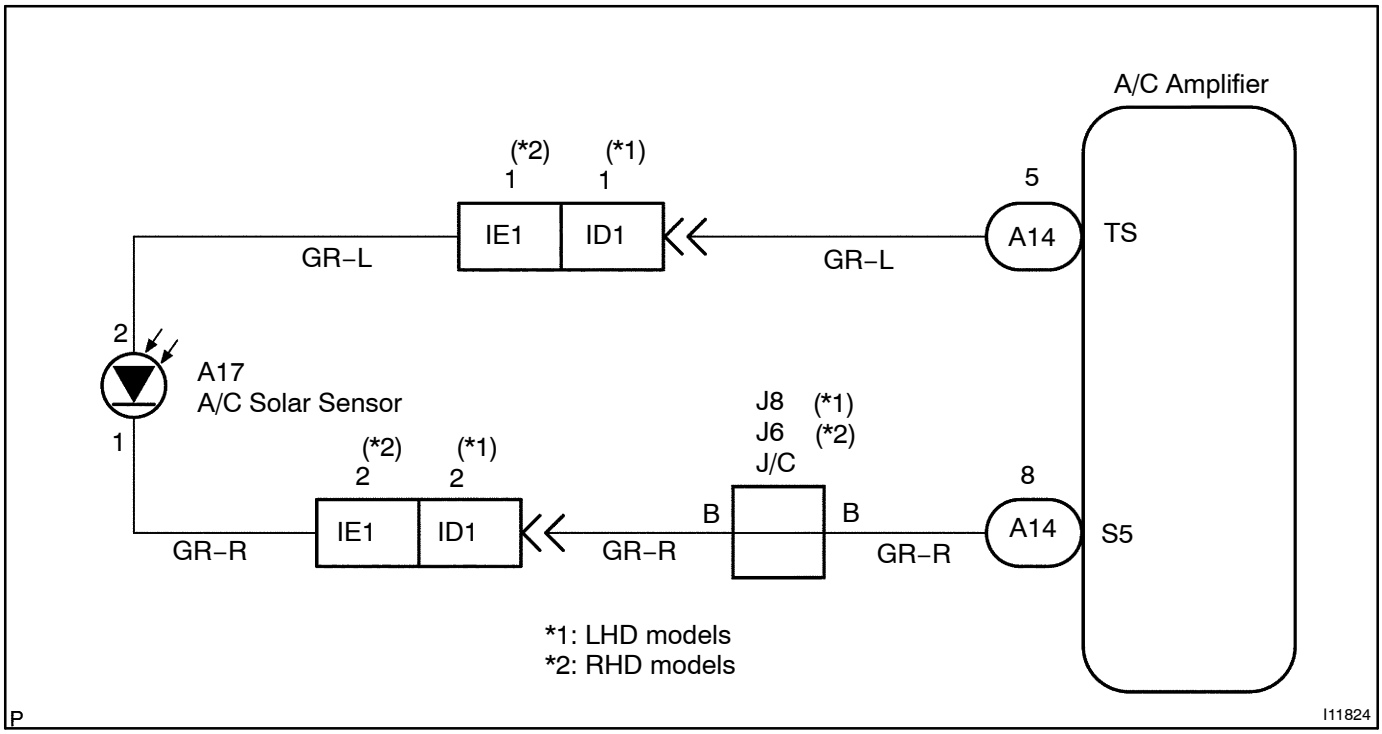
CIRCUIT DESCRIPTION



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C amplifier.

DTC No.	Detection Item	Trouble Area
B1421	Open or short in solar sensor circuit. Please note that display of diagnostic trouble code B1421 is not abnormal when the sensor is not receiving solar radiation.	• Solar sensor. • Harness or connector between solar sensor and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection step 1 and in case of not using the hand–held tester, start from step 2.

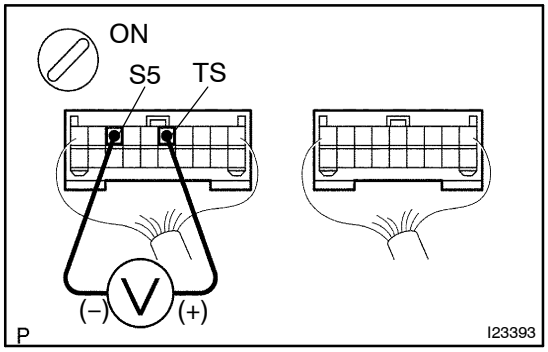
1	**Check solar sensor using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the solar sensor using DATA LIST.

OK ⇒ **Check and replace A/C amplifier.**

NG

2	**Check voltage between terminals S5 and TS of A/C amplifier connector.**



PREPARATION:
Remove A/C amplifier with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Measure voltage between terminals S5 and TS of A/C amplifier connector when the solar sensor is subjected to an electric light, and when the sensor is covered by a cloth.

OK:

Condition	Voltage
Sensor subjected to electric light	0.8 – 4.3 V
Sensor covered by a cloth	Below 0.8 V

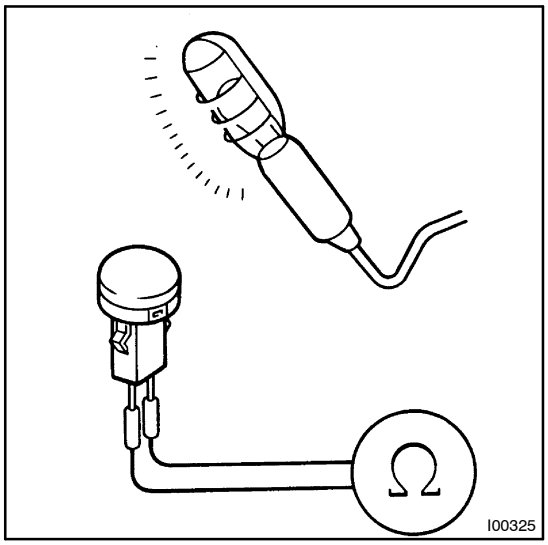
HINT:
As the inspection light is moved away from the sensor, the voltage increases.

NG ⇒ **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–612). However, if DTC B1421 is displayed, check and replace A/C amplifier.

3	Check solar sensor.



PREPARATION:
Remove solar sensor.
CHECK:
(a) Cover the sensor with a cloth.
(b) Measure resistance between terminals 1 and 2 of solar sensor connector.
HINT:
Connect positive (+) lead of ohmmeter to terminal 1 and negative (–) lead to terminal 2 of the solar sensor.
OK:
Resistance: ∞ Ω (no continuity)
PREPARATION:
(a) Remove the cloth from the solar sensor and subject the sensor to electric light.
(b) Measure resistance.
OK:
Resistance: Approx. 10 kΩ (continuity)
HINT:
As the electric light is moved away from the sensor, the resistance increases.

NG	Replace solar sensor.

OK

4	Check harness and connector between A/C amplifier and solar sensor (See page IN–34).

NG	Repair or replace harness or connector.

OK

Check and replace A/C amplifier.

DI9GW–01

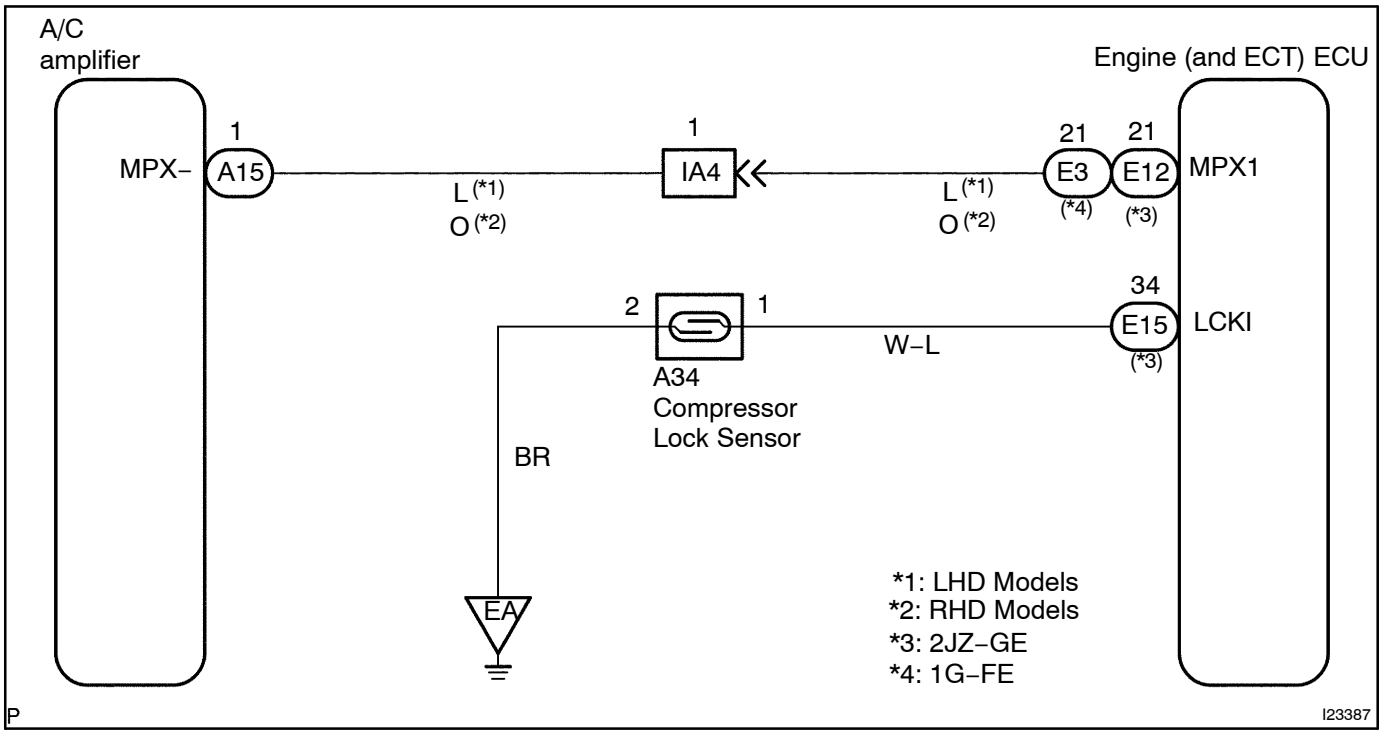
DTC	B1422	Compressor Lock Sensor Circuit

CIRCUIT DESCRIPTION

This sensor sends 1 pulse per engine revolution to the engine (and ECT) ECU.
If the number ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the engine (and ECT) ECU turns the compressor OFF. And, the indicator flashes at about 1 second intervals.

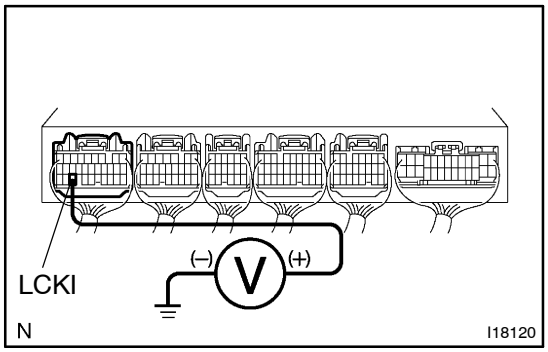
DTC No.	Detection Item	Trouble Area
B1422	All conditions below are detected for 3 secs. or more (a) Engine speed : 450rpm or more (b) Ratio between engine and compressor speed deviates 20% or more in comparison to normal operation.	• Compressor. • Compressor drive belt. • Compressor lock sensor. • Harness and connector between compressor and engine (and ECT) ECU. • Harness and connector between engine (and ECT) ECU and A/C amplifier. • Engine (and ECT) ECU. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal LCKI of engine (and ECT) ECU and body ground.



CHECK:

(a) Start engine.
(b) Blower dial to AUTO.
(c) Measure voltage between terminal LCKI of engine (and ECT) ECU connector and body ground when A/C switch is ON.

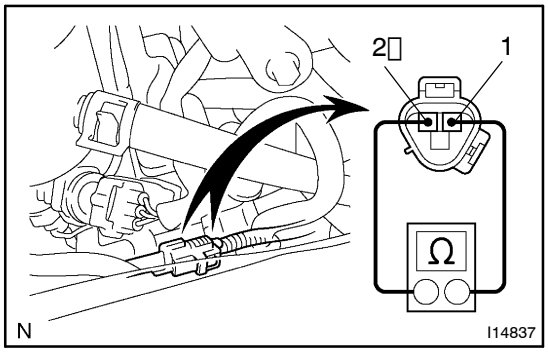
OK:

Voltage: 10 – 14 V

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).

NG

2	Check compressor lock sensor.



PREPARATION:

Disconnect compressor lock sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of compressor lock sensor connector.

OK:

Resistance:
at 20°C (68°F): 990 – 1210 Ω
at 100°C (212°F): 1280 – 1550 Ω

NG	Replace compressor lock sensor.

OK

3	Check harness and connectors between engine (and ECT) ECU and compressor lock sensor (See page IN–34).

NG	Repair or replace harness or connector.

OK

4	Check harness and connectors between engine (and ECT) ECU and A/C amplifier (See page IN–34).

NG → Repair or replace harness or connector.

OK →

Check and replace engine (and ECT) ECU.

DI9GX–01

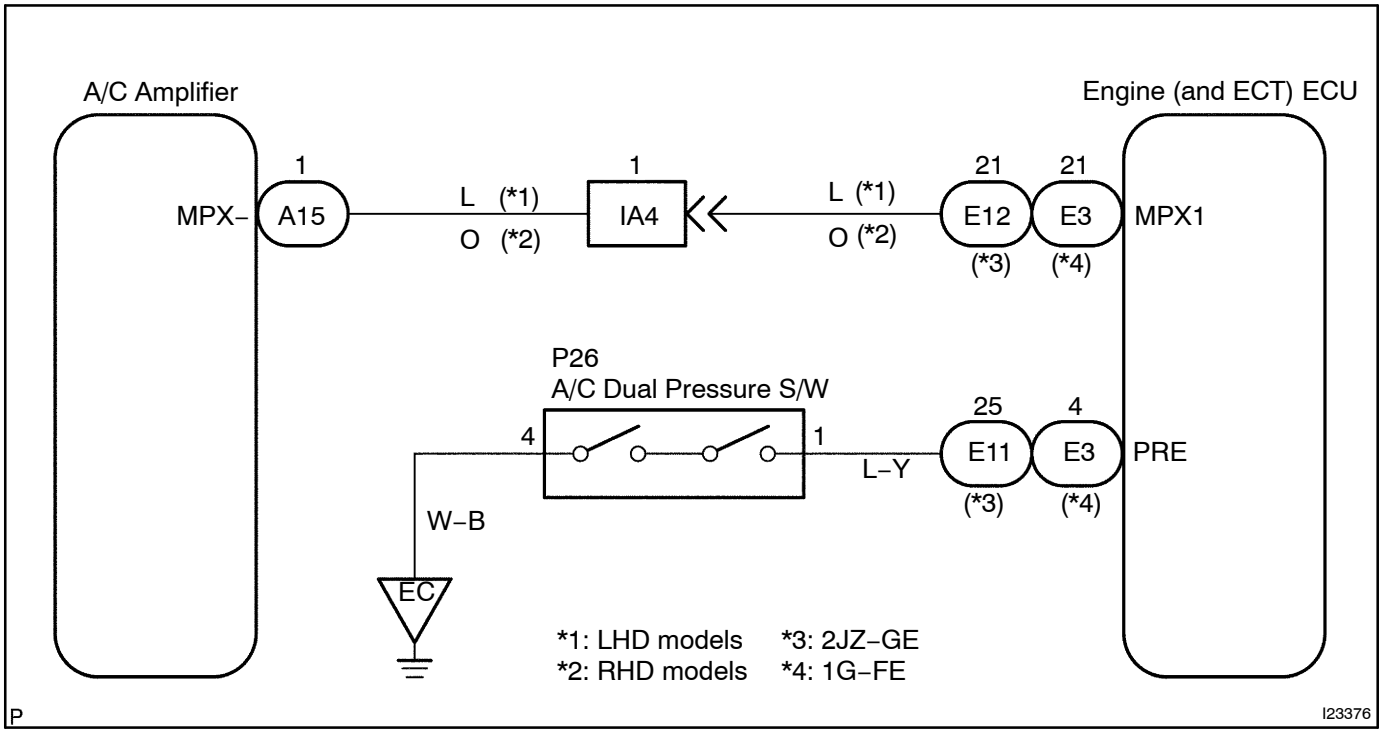
DTC	B1423	Pressure Switch Circuit

CIRCUIT DESCRIPTION

The pressure switch sends the appropriate signals to the engine (and ECT) ECU when the A/C refrigerant pressure drops too low or rises too high. When the engine (and ECT) ECU receives these signals, it outputs signals via the engine (and ECT) ECU to switch OFF the compressor relay and turns the magnetic clutch OFF.

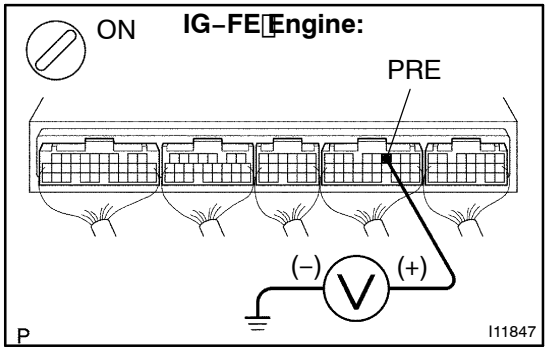
DTC No.	Detection Item	Trouble Area
B1423	• Open in pressure sensor circuit. • Abnormal refrigerant pressure. below 181 kPa (2.0 kg/cm^2, 28 psi) over 3,140 kPa (32.0 kgf/cm^2, 455 psi)	• Pressure switch. • Harness or connector between pressure switch and engine (and ECT) ECU • Harness or connector engine (and ECT) ECU and A/C amplifier • Refrigerant pipe line. • Engine (and ECT) ECU

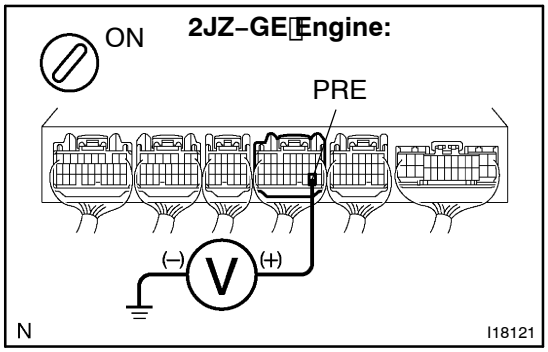
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal PRE of engine (and ECT) ECU and body ground.





PREPARATION:

Install the manifold gauge set.

CHECK:

(a) Turn ignition switch to ON.

(b) Check voltage between terminal PRE of engine (and ECT) ECU connector and body ground when refrigerant pressure is changed.

OK:

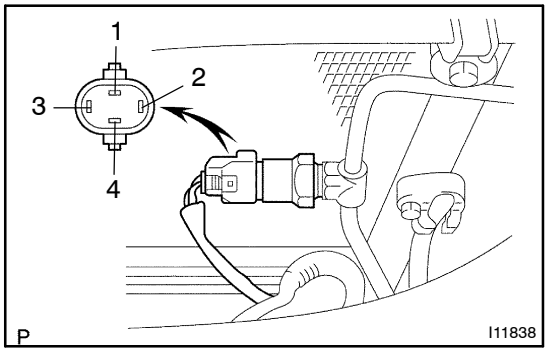
The voltage changes with refrigerant pressure, as shown in the diagram below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (0V) 225 kPa 196 kPa OFF (12V)	ON (0V) 2,550 kPa 3,140 kPa OFF (12V)

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).**

NG

2	Check pressure switch.



PREPARATION:

Disconnect pressure switch connector.

CHECK:

(a) Turn ignition switch to ON.

(b) Check continuity between terminals 1 and 4 of pressure switch when refrigerant pressure is changed.

OK:

The continuity changes with refrigerant pressure as shown below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (continuity) 211 kPa 181 kPa OFF (continuity)	ON (continuity) 2,550 kPa 3,140 kPa OFF (continuity)

NG → **Repair or replace harness or connector.**

OK

3	Check harness and connector between engine (and ECT) ECU and pressure switch, pressure switch and body ground (See page IN–34).

NG → Repair or replace harness or connector.

OK

4	Check harness and connector between engine (and ECT) ECU and A/C amplifier. (See page IN–34)

NG → Repair or replace harness or connector.

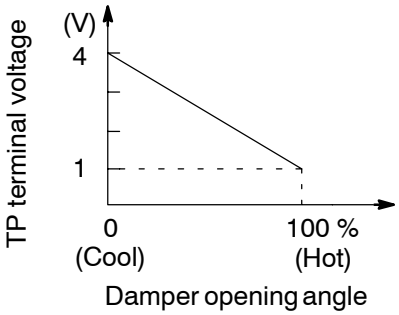
OK

Check and replace engine (and ECT) ECU.

DI9GY–01

DTC	B1431	Air Mix Damper Position Sensor Circuit

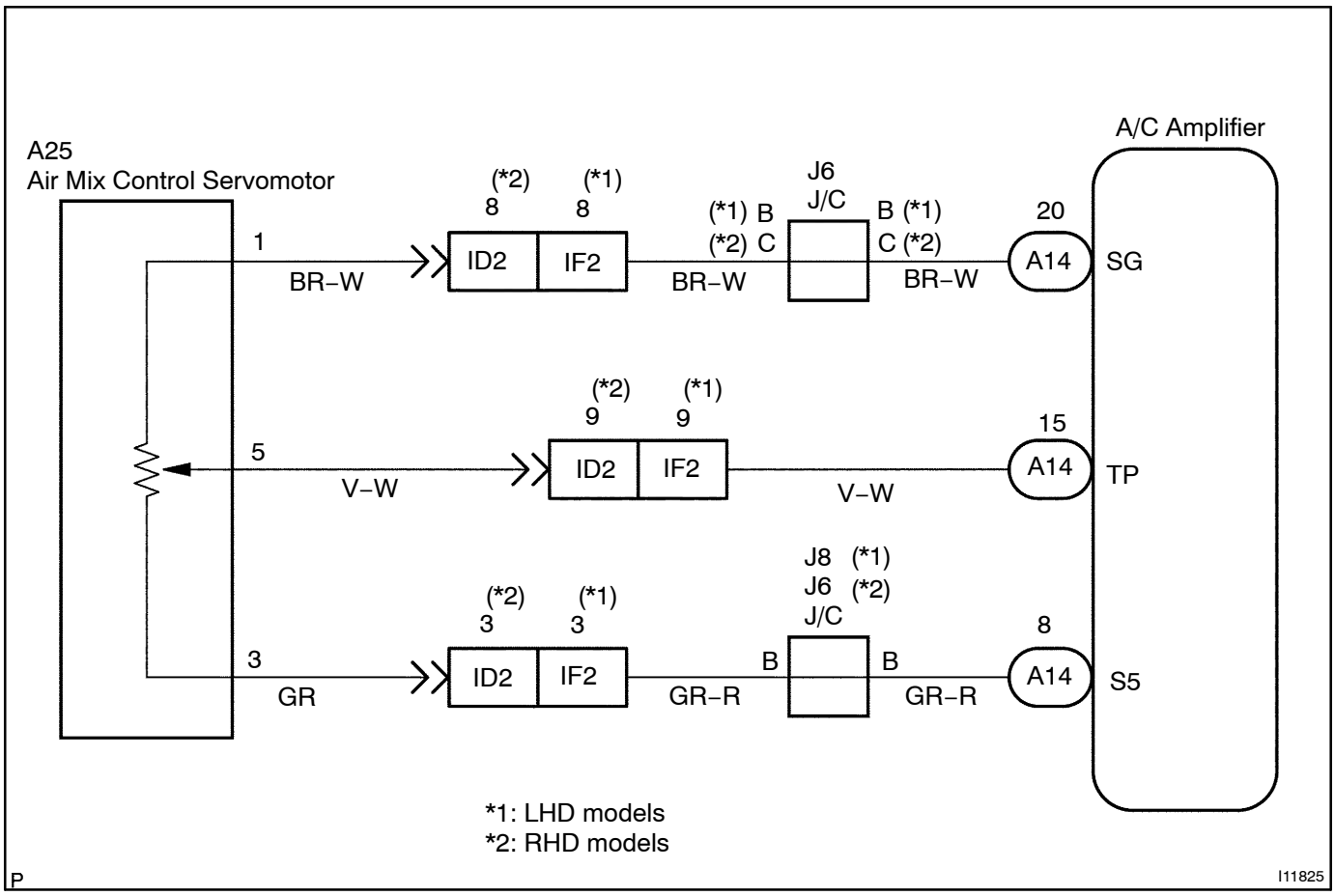
CIRCUIT DESCRIPTION



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C amplifier.
The position sensor is built into the air mix damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
B1431	Short to ground or power source circuit in air mix damper position sensor circuit.	• Air mix damper position sensor. • Harness or connector between air mix damper control servomotor assembly and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

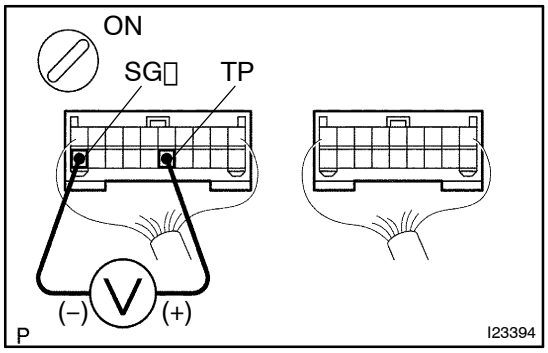
1	**Check air mix damper position using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the current position of air mix damper and the target position of air mix damper.
OK:
The current position and target position are almost similar.

OK ⇨ **Check and replace A/C amplifier.**

NG

2	**Check voltage between terminals TP and SG of A/C amplifier connector.**



PREPARATION:
Remove A/C amplifier with connectors still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Change the set temperature to activate the air mix damper control servomotor, and measure the voltage between terminals TP and SG of A/C amplifier connector each time when the set temperature is changed.
OK:

Set Temperature	Voltage
Max. cool	3.5 – 4.5 V
Max. warm	0.5 – 1.5 V

HINT:
As the set temperature increases, the voltage decreases.

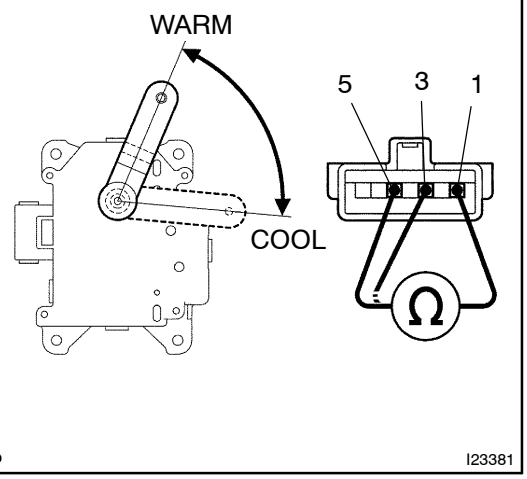
NG ⇨ **Go to step 3.**

Ok

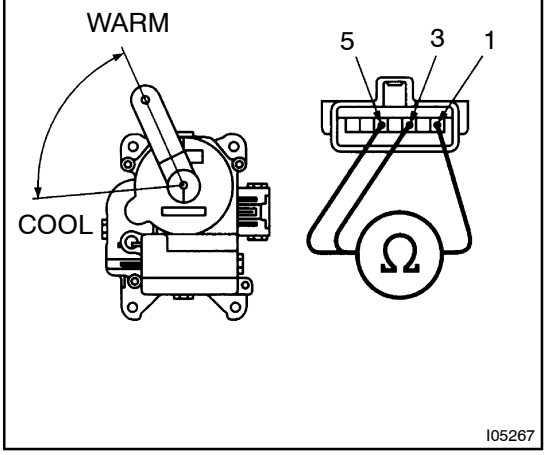
Proceed to next circuit inspection shown on problem symptoms table (See page DI–612). However, if DTC B1431 displayed, check and replace A/C amplifier.

3	Check air mix damper position sensor.

LHD Models:



RHD Models:



PREPARATION:

Remove the air mix damper control servomotor.

CHECK:

Measure resistance between terminals 1 and 3 of air mix damper control servomotor assembly connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:

While operating air mix damper control servomotor, following the procedure on page DI–641, measure resistance between terminals 1 and 5 of air mix damper control servomotor assembly connector.

OK:

Position	Resistance
Max. cool	3.6 – 6.8 kΩ
Max. warm	0.5 – 1.1 kΩ

HINT:

As the air mix damper control servomotor moves from cool side to hot side, the resistance decreases.

NG → **Replace air mix damper control servomotor assembly.**

OK

4	Check harness and connector between A/C amplifier and air mix damper control servomotor assembly (See page IN–34).

NG → **Repair or replace harness or connector.**

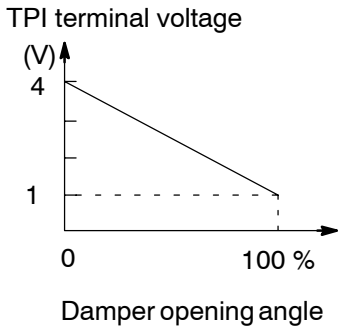
OK

Check and replace A/C amplifier.

DI9GZ–01

DTC	B1432	Air Inlet Damper Position Sensor Circuit

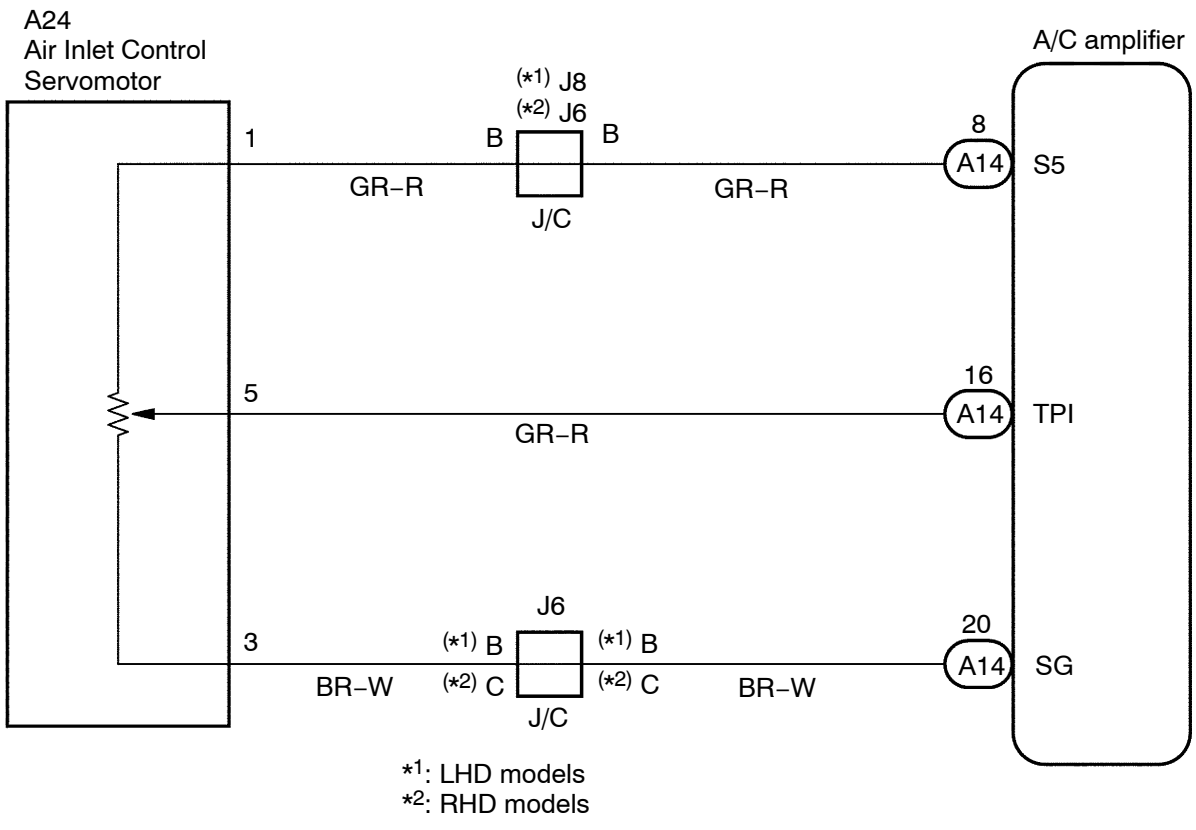
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C amplifier.
The position sensor is built into the air inlet damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
B1432	Short to ground or power source circuit in air inlet damper position sensor circuit.	• Air inlet damper position sensor. • Harness or connector between air inlet damper control servomotor assembly and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step 1 and in case of not using the hand–held tester, start from step 2.

1	**Check air inlet damper position using hand–held tester.**

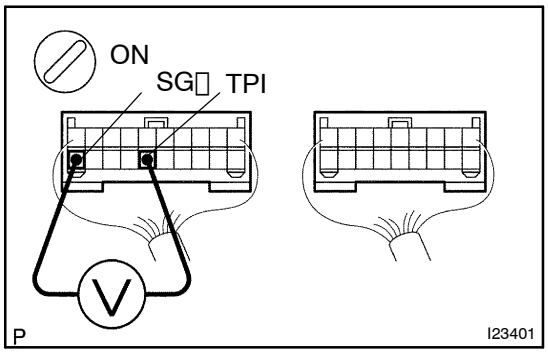
PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the current position of air inlet damper and the target position of air inlet damper.
OK:

The current position and target position are almost similar.

OK ⟩ **Check and replace A/C amplifier.**

NG

2	**Check voltage between terminals TPI and SG of A/C amplifier connector.**



PREPARATION:
Remove A/C amplifier with connectors still connected.
CHECK:
(a) Turn ignition switch ON.
(b) Press REC/FRS switch to change air inlet between fresh and recirculation air, and measure voltage between terminals TPI and SG of A/C amplifier when the air inlet damper control servomotor operates.
OK:

FRS–REC Switch	Voltage
REC	3.5 – 4.5 V
FRS	0.5 – 1.5 V

HINT:
As the air inlet damper control servomotor is moved form REC side to FRS side, the voltage decreases.

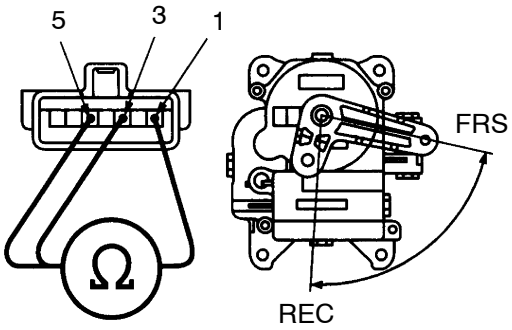
NG ⟩ **Go to step 3.**

OK

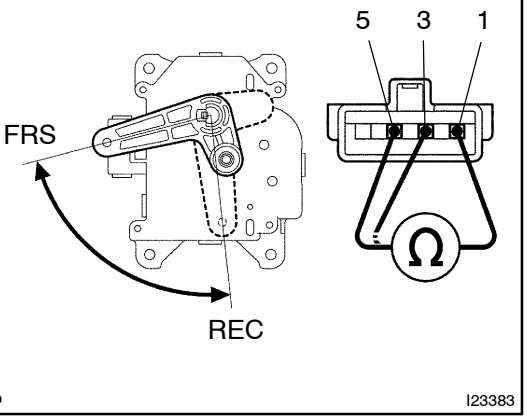
Proceed to next circuit inspection shown on problem symptoms table (See page DI–612). However, if DTC B1432/32 is displayed, check and replace A/C amplifier.

3	Check air inlet damper position sensor.

LHD Models:



RHD Models:



PREPARATION:

Remove the air inlet damper control servomotor.

CHECK:

Measure resistance between terminals 1 and 3 of air inlet damper control servomotor assembly connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:

While operating air inlet damper control servomotor, following the procedure on page DI–644, measure resistance between terminals 1 and 5 of air inlet damper control servomotor assembly connector.

OK:

Resistance

Damper Position	Resistance
REC side	3.1 – 5.8 kΩ
FRS side	0.8 – 1.6 kΩ

HINT:

As the air inlet damper control servomotor moves from REC side to FRS side, the resistance decreases.

NG	Replace air inlet damper control servomotor assembly.

OK

4	Check harness and connectors between A/C amplifier and air inlet damper control servomotor assembly (See page IN–34).

NG	Repair or replace harness or connector.

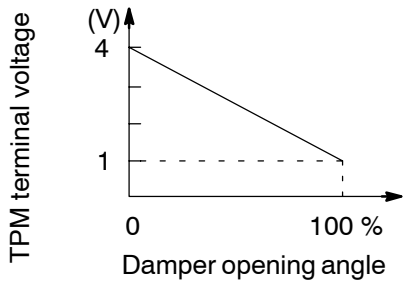
OK

Check and replace A/C amplifier.

DI9H0–01

DTC	B1433	Air Outlet Damper Position Sensor Circuit

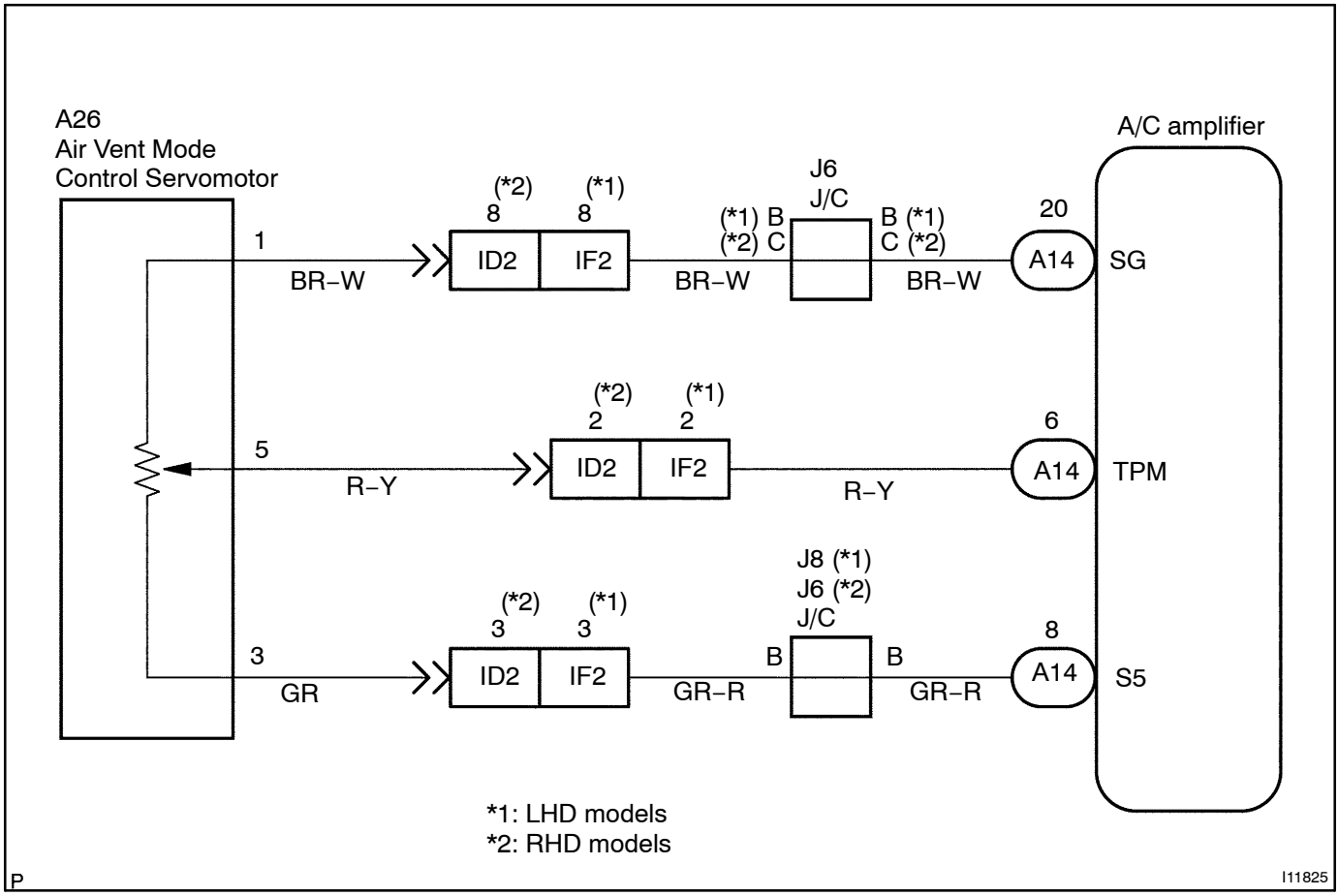
CIRCUIT DESCRIPTION



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C amplifier.
The position sensor is built into the air outlet damper control servomotor assembly.

DTC No.	Detection Item	Trouble Area
B1433	Short to ground or power source circuit in air outlet damper position sensor circuit.	• Air outlet damper position sensor. • Harness or connector between air outlet damper control servomotor assembly and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
In case of using the hand–held tester, start the inspection from step1 and in case of not using the hand–held tester, start from step2.

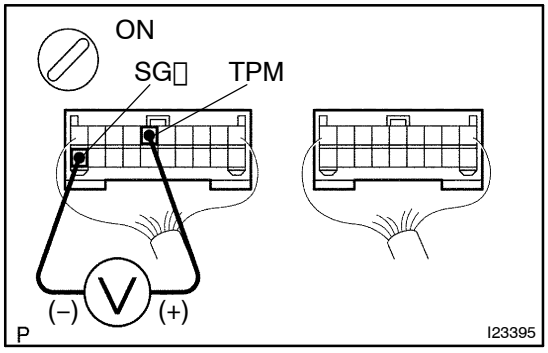
1	**Check air outlet damper position using hand–held tester.**

PREPARATION:
Connect the hand–held tester to the DLC3.
CHECK:
Check the current position of air outlet damper and the target position of air outlet damper.
OK:
The current position and target position are almost similar.

OK → **Check and replace A/C amplifier.**

NG

2	**Check voltage between terminals TPM and SG of A/C amplifier connector.**



PREPARATION:
(a) Remove A/C amplifier with connectors still connected.
(b) Turn ignition switch to ON.
CHECK:
Measure the voltage between terminals TPM and SG of A/C amplifier.
OK:

Mode selector	Voltage
FACE	3.5 – 4.5 V
DEF	0.5 – 1.5 V

HINT:
As the air outlet damper control servomotor is moved from FACE side to DEF side, the voltage decreases gradually without interruption.

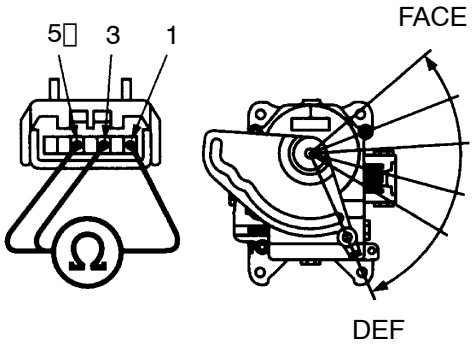
NG → **Go to step 3.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–612). However, if DTC B1434 is displayed, check and replace A/C amplifier.

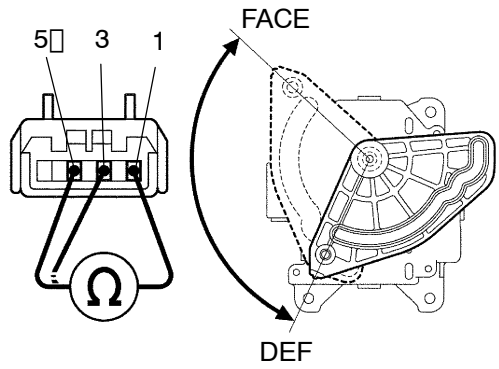
3	Check air outlet damper position sensor.

LHD Models:



I05271

RHD Models:



P I23385

PREPARATION:

Remove the air outlet servomotor.

CHECK:

Measure resistance between terminals 1 and 3 of air outlet servomotor assembly connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:

While operating air outlet damper control servomotor as in the procedure on page DI–647, measure resistance between terminals 3 and 5 of air outlet damper control servomotor.

OK:

Resistance:

Damper Position	Resistance
DEF	0.5 – 1.1 kΩ
FACE	3.6 – 6.8 kΩ

HINT:

As the air outlet servomotor moves from DEF side to FACE side, the resistance decreases gradually without interruption.

NG → **Replace air outlet damper control servomotor assembly.**

OK

4	Check harness and connector between A/C amplifier and air outlet damper control servomotor assembly (See page IN–34).

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C amplifier.

DI26G–04

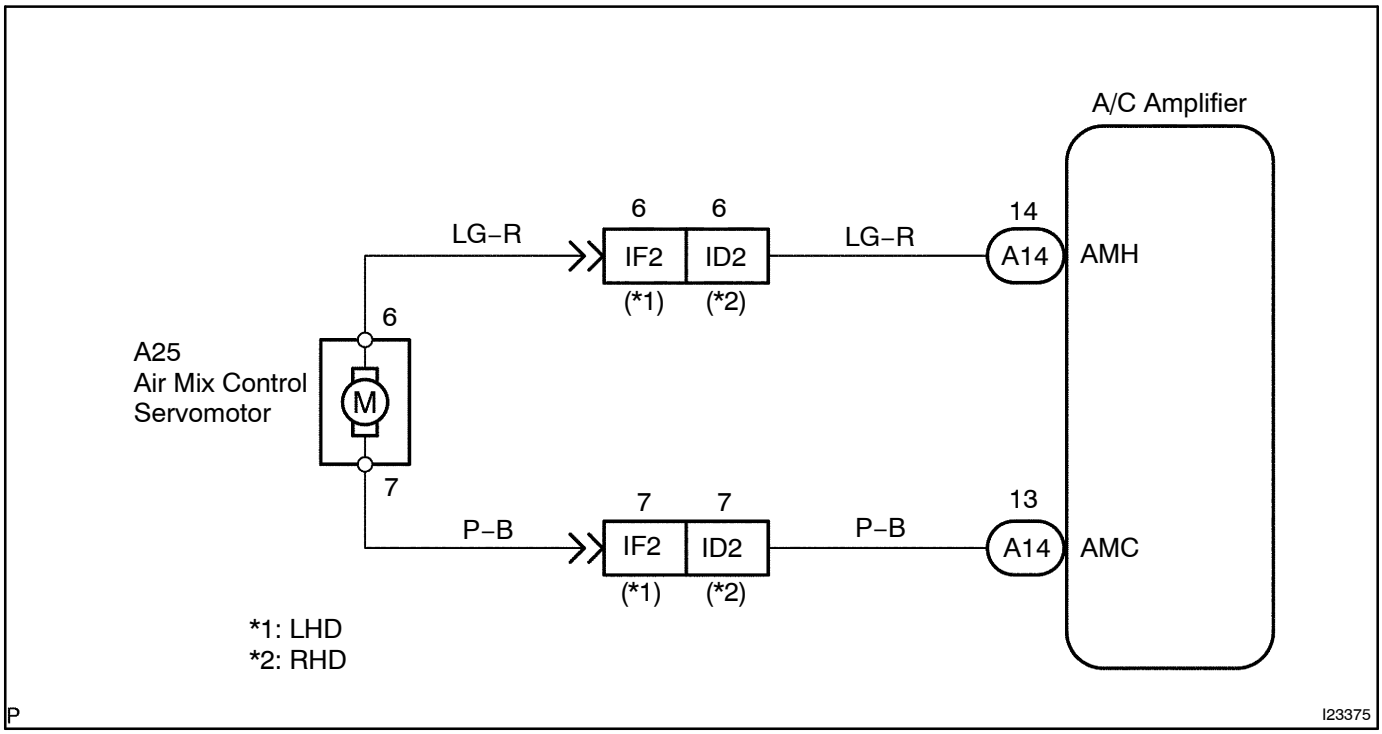
DTC	B1441	Air Mix Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air mix damper control servomotor is controlled by the A/C amplifier and moves the air mix damper to the desired position.

DTC No.	Detection Item	Trouble Area
B1441	Air mix damper position sensor value does not change even if A/C amplifier operates air mix damper control servomotor.	• Air mix damper control servomotor. • Air mix damper position sensor. • Harness or connector between A/C amplifier and A/M damper control servomotor, A/M damper position sensor. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

PREPARATION:

(a) Warm up the engine.

(b) Set to the actuator check mode (See page DI–606).

CHECK:

Check the operation of the air mix damper and the condition of the blower.

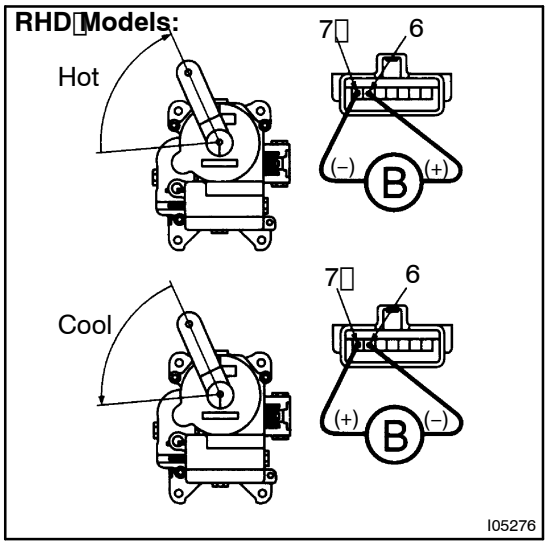
OK:

Display Code	Air Mix Damper	Condition
0 – 3	100% (Fully closed)	Cool air comes out
4 – 5	50%	
6 – 9	100% (Full opened)	Warm air comes out

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).**

NG

2	Check air mix damper control servomotor.



PREPARATION:

Remove the air mix damper control servomotor.

CHECK:

Connect positive (+) lead to terminal 6 and negative (–) lead to terminal 7.

OK:

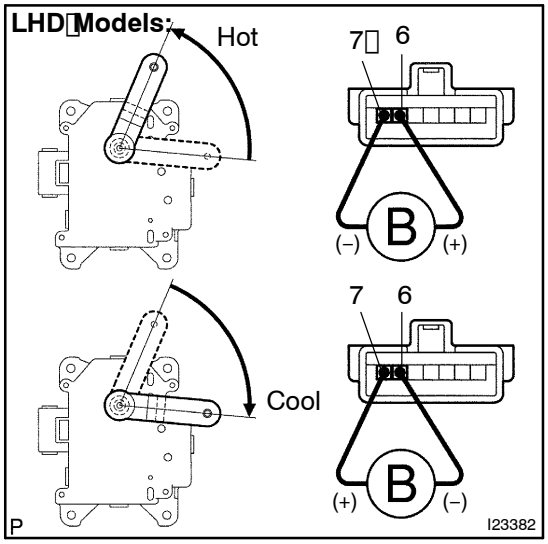
The lever turns smoothly to Hot side.

CHECK:

Connect positive (+) lead to terminal 7 and negative (–) lead to terminal 6.

OK:

The lever turns smoothly to Cool side.



NG	Replace air mix damper control servomotor assembly.

OK

3	Check harness and connector between A/C amplifier and air mix damper control servomotor assembly (See page IN–34).

NG	Repair or replace harness or connector.

OK

Check and replace A/C amplifier.

DI26H–05

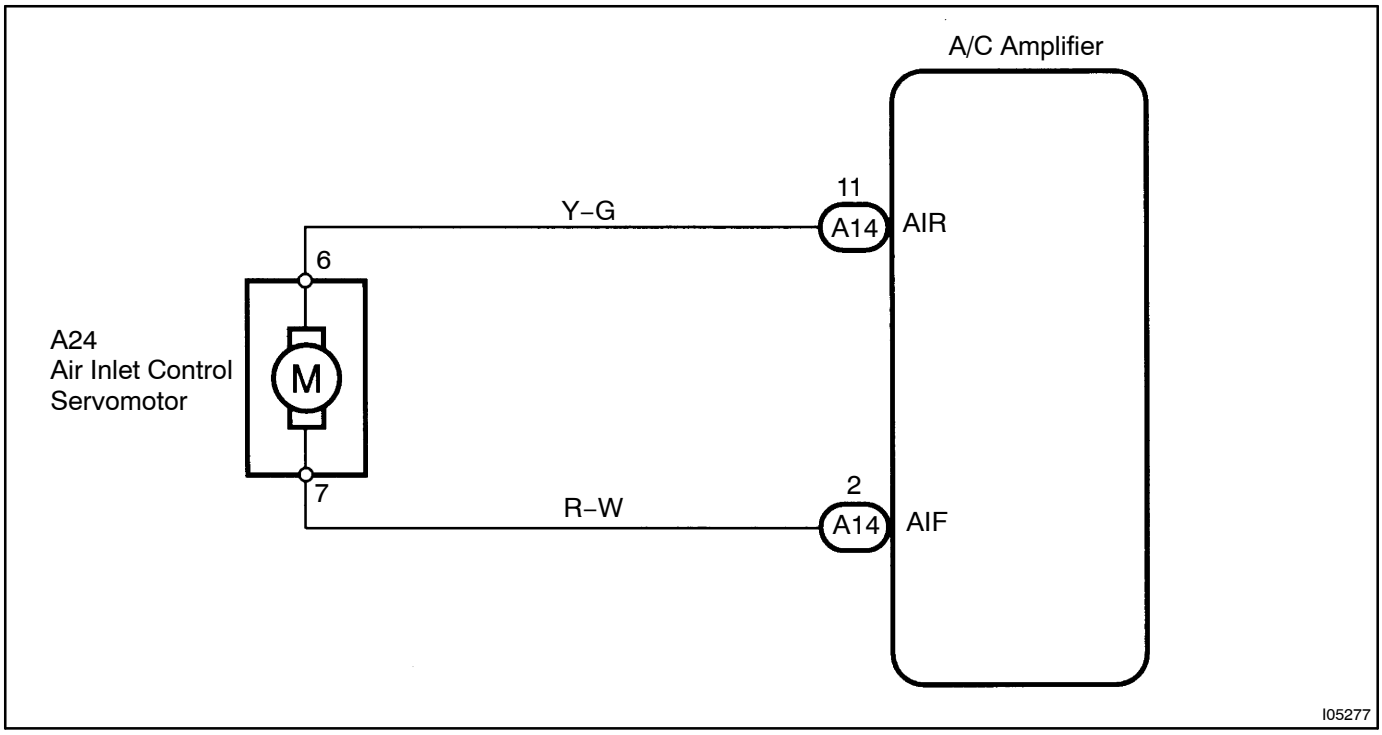
DTC	B1442	Air Inlet Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air inlet damper control servomotor is controlled by the A/C amplifier and moves the air inlet damper to the desired position.

DTC No.	Detection item	Trouble Area
B1442	Air inlet damper position sensor value does not change even if A/C amplifier operated air inlet damper control servomotor.	• Air inlet damper position sensor. • Harness or connector between air inlet damper control servomotor assembly and A/C amplifier. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

PREPARATION:

Set to the actuator check mode (See page DI–606).

CHECK:

Check the operation of air inlet damper.

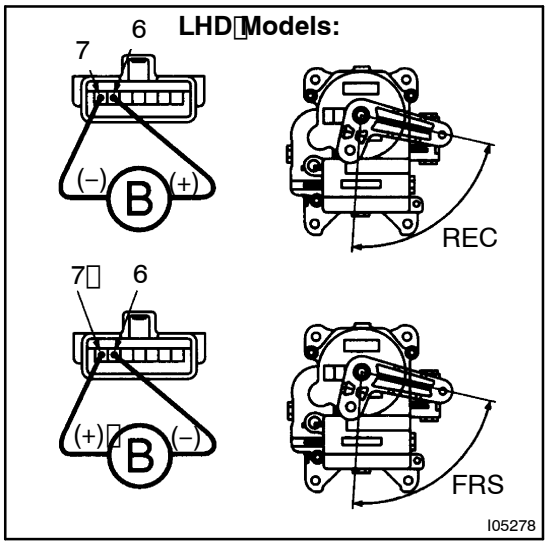
OK:

Display Code	Air Inlet Damper
0 – 1	FRESH
2 – 9	RECIRC

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).**

NG

2	Check air inlet damper control servomotor.



PREPARATION:

Remove air inlet damper control servomotor.

CHECK:

Connect positive (+) lead to terminal 6 and negative (–) lead to terminal 7.

OK:

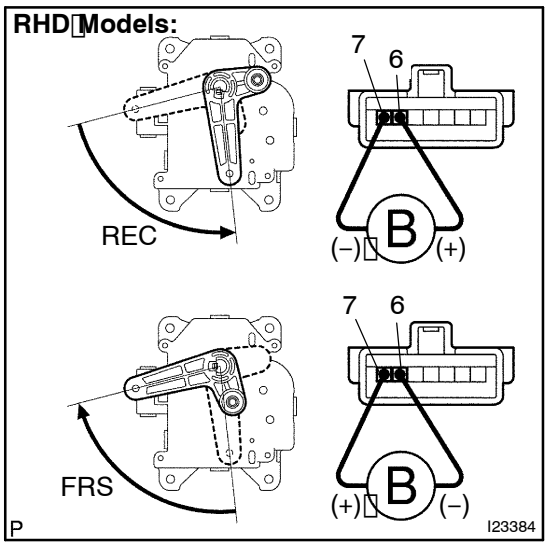
The lever moves smoothly to REC position.

CHECK:

Connect positive (+) lead to terminal 7 and negative (–) lead to terminal 6.

OK:

The lever moves smoothly to FRS position.



NG → Replace air inlet damper control servomotor assembly.

OK

3	Check harness and connector between A/C amplifier and air inlet damper control servomotor (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace A/C amplifier.

DI9H1–01

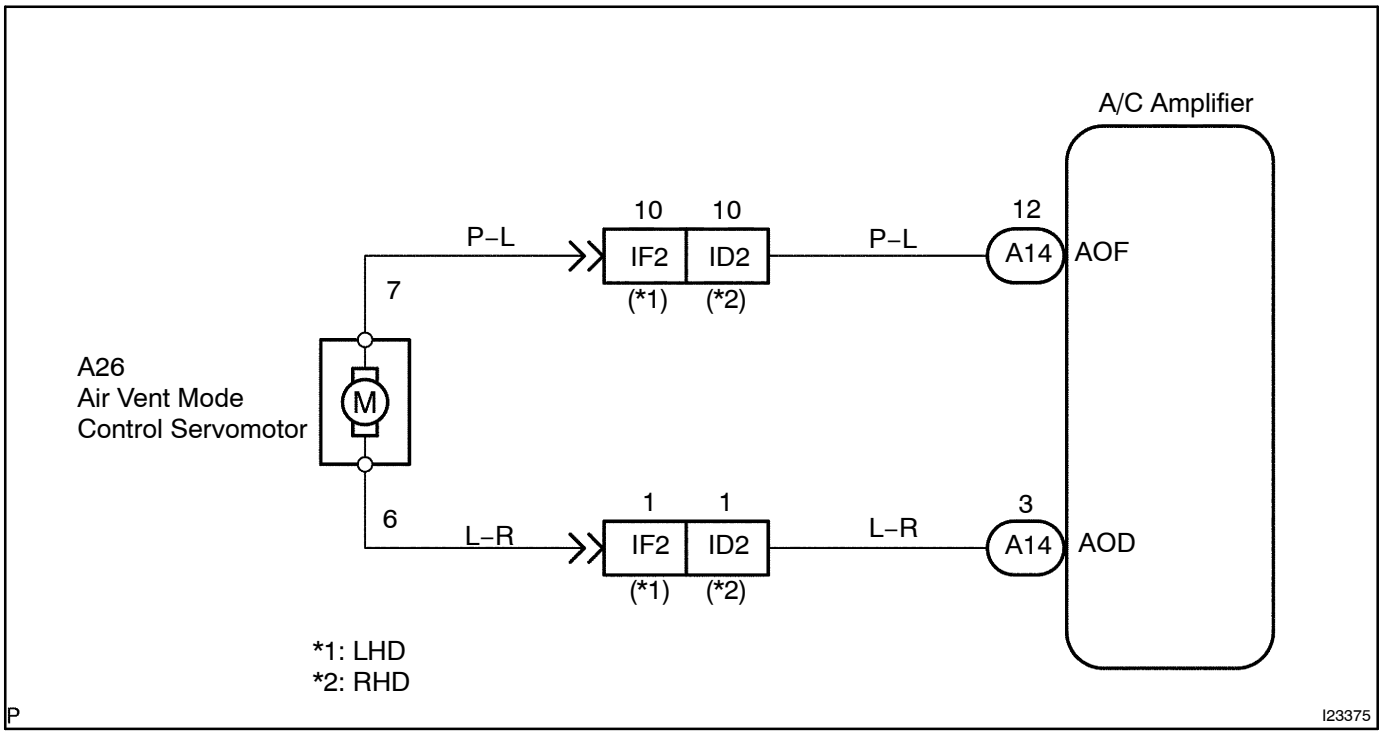
DTC	B1443	Air Outlet Damper Control Servomotor Circuit

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by the signals from the A/C amplifier. When the AUTO switch is on, the A/C amplifier changes the mode automatically between (FACE), (BI–LEVEL) and (FOOT) according to the temperature setting.

DTC No.	Detection Item	Trouble Area
B1443	Air outlet damper position sensor value does not change even if A/C amplifier operated air outlet damper control servomotor.	• Air outlet damper control servomotor. • Air outlet damper position sensor. • Harness or connector between A/C amplifier air outlet damper control servomotor, air outlet damper position sensor. • A/C amplifier.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

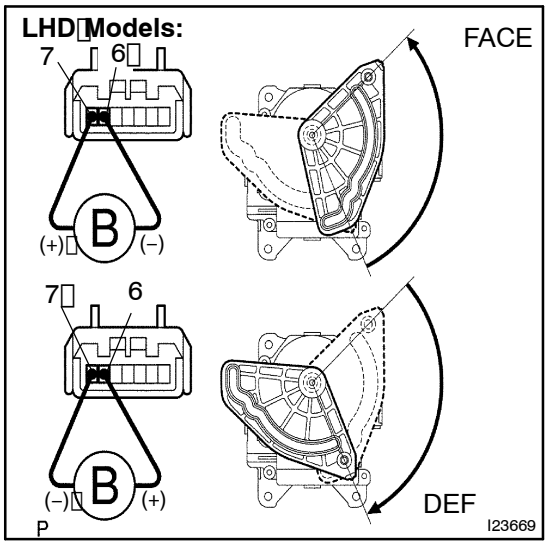
PREPARATION:
Set to the actuator check mode (See page DI–606).
CHECK:
Check the condition of air flow.
OK:

Display Code	Air Flow
0 – 4	FACE
5	BI–LEVEL
6, 7	FOOT
8	FOOT/DEF
9	DEF

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).**

NG

2	Check air outlet damper control servomotor.



PREPARATION:

Remove the air outlet damper control servomotor.

CHECK:

Connect positive (+) lead to terminal 7 and negative (–) lead to terminal 6.

OK:

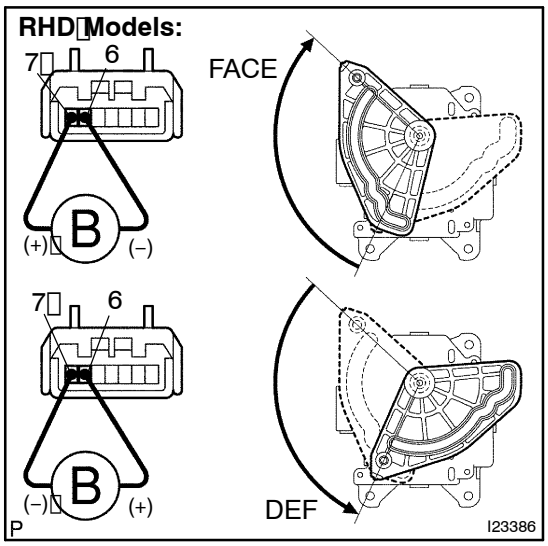
The lever moves smoothly to FACE position.

CHECK:

Connect positive (+) lead to terminal 6 and negative (–) lead to terminal 7.

OK:

The lever moves smoothly to DEF position.



NG → **Replace air outlet servomotor.**

OK

3	Check harness and connector between A/C amplifier and air outlet damper control servomotor (See page IN–34).

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C amplifier.

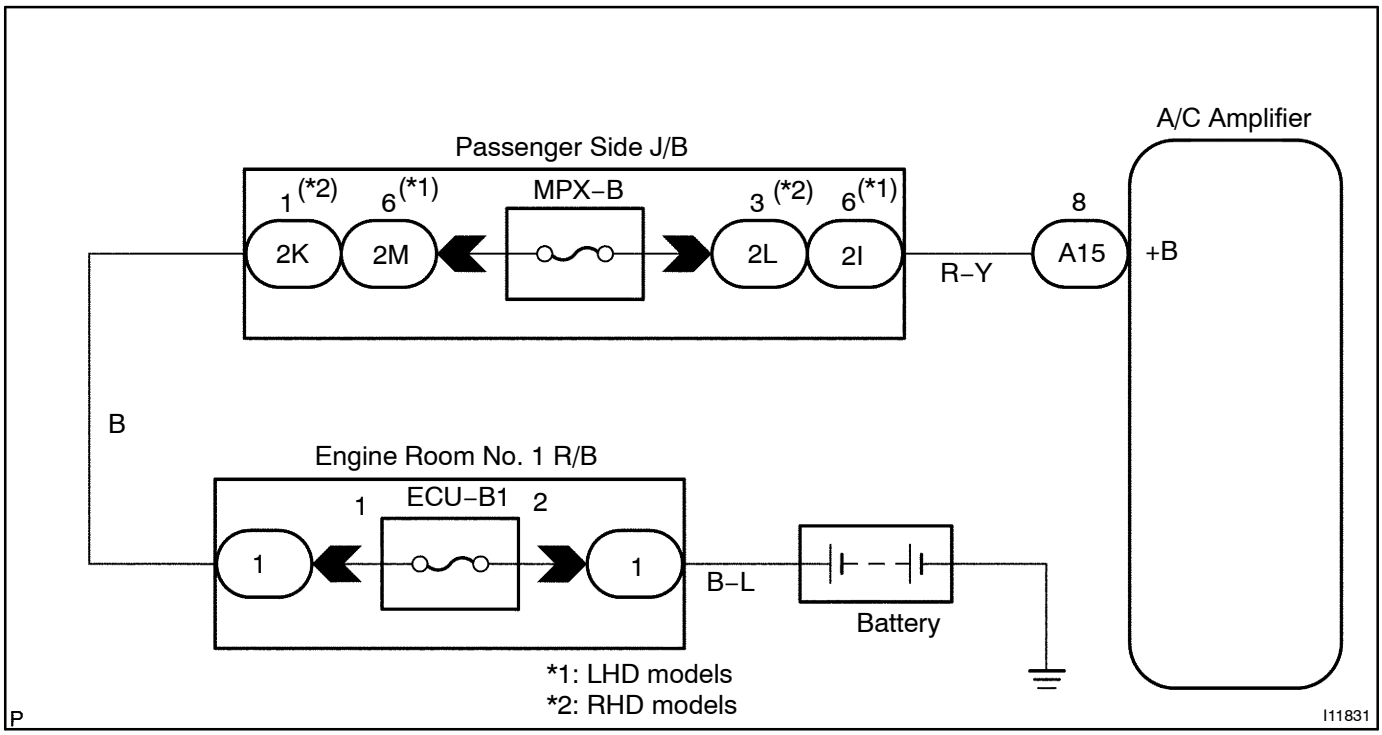
DI9H2–01

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

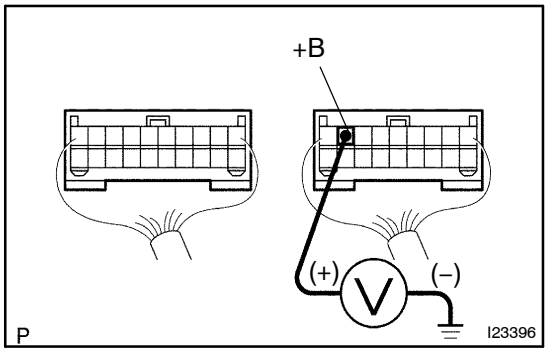
This is the back up poser source for the A/C amplifier. Power is supplied even when the ignition switch is off and is used for diagnostic trouble code memory, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal +B of A/C amplifier connector and body ground.

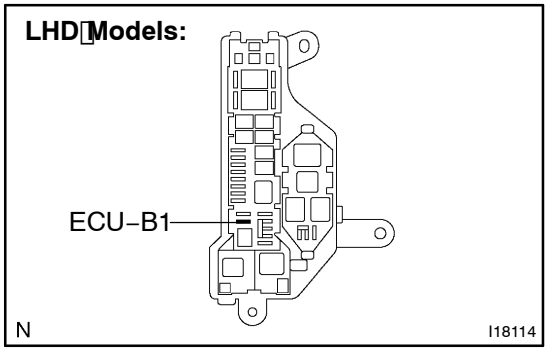


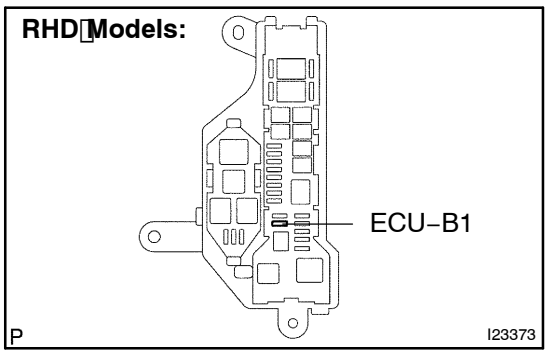
PREPARATION:
Remove the A/C amplifier with connector still connected.
CHECK:
Measure voltage between terminal +B of A/C amplifier connector and body ground.
OK:
Voltage: Battery voltage

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).

NG

2	Check ECU–B1 fuse.





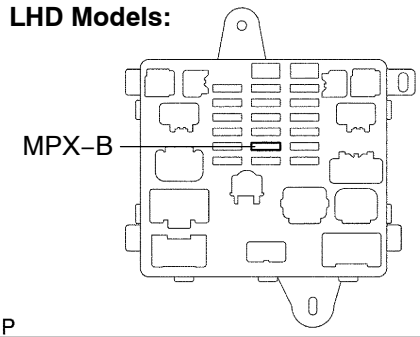
PREPARATION:
Remove ECU–B1 fuse from engine room J/B.
CHECK:
Check continuity of ECU–B1 fuse.
OK:
Continuity

NG	Check for short in all the harness and components connected to the ECU–B1 fuse (See attached wiring diagram).

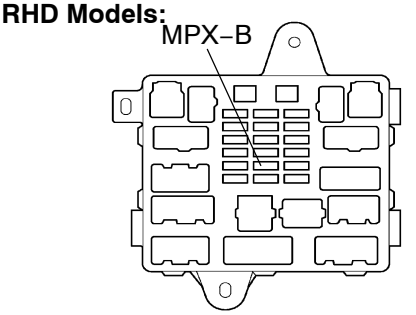
OK

3	Check MPX–B fuse.

LHD Models:



RHD Models:



PREPARATION:

Remove MPX–B fuse from passenger side J/B.

CHECK:

Check continuity of MPX–B fuse.

OK:

Continuity

NG → **Check for short in all the harness and components connected to the MPX–B fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C amplifier and battery.

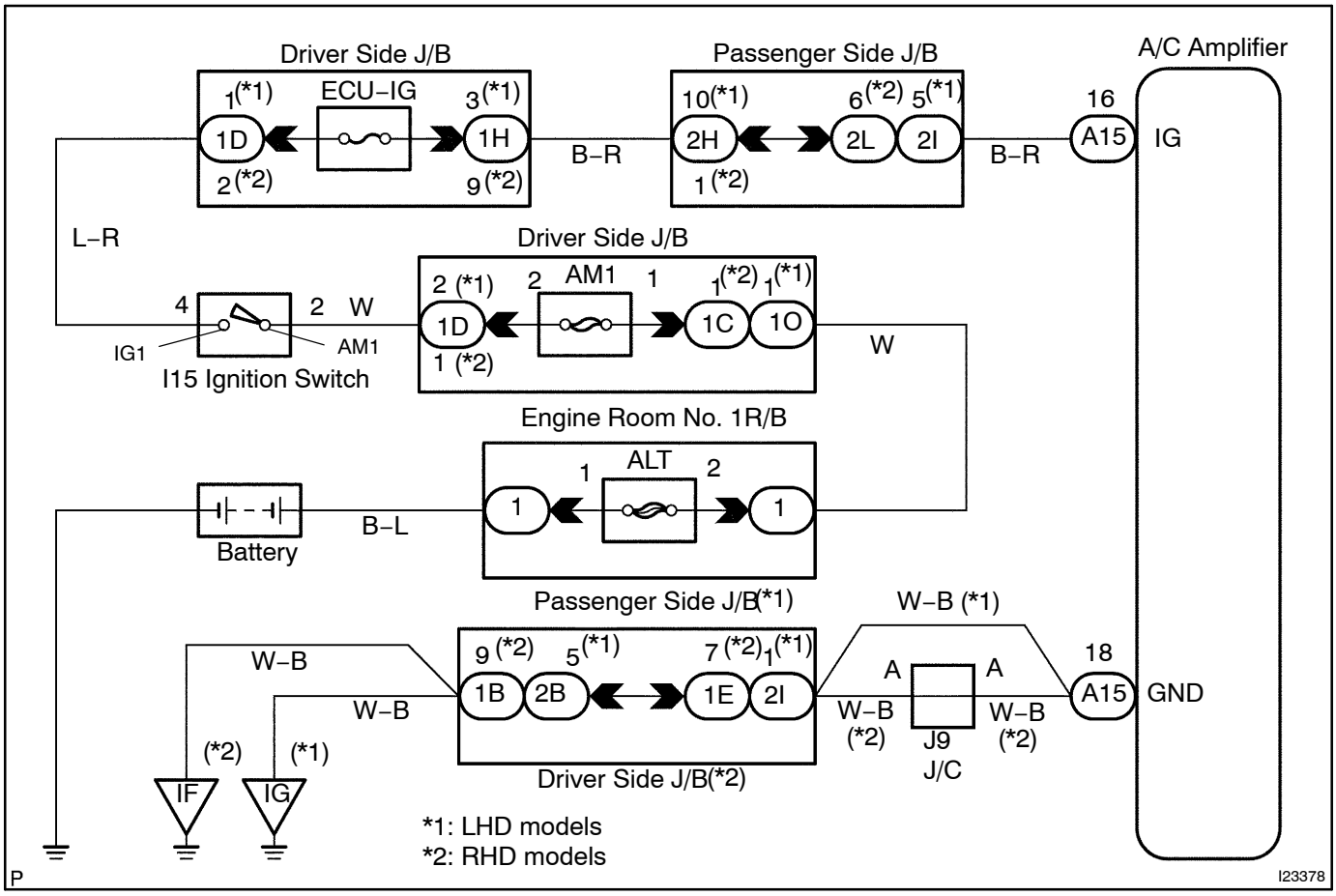
DI9H3–01

IG Power Source Circuit

CIRCUIT DESCRIPTION

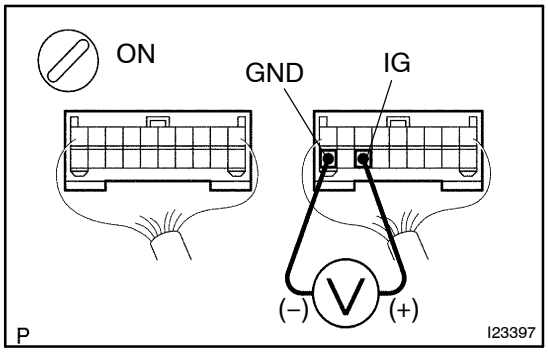
This is the power source for the A/C amplifier (contains the ECU) and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals IG and GND of A/C amplifier connector.



PREPARATION:

(a) Remove A/C amplifier with connectors still connected.

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals IG and GND of A/C amplifier.

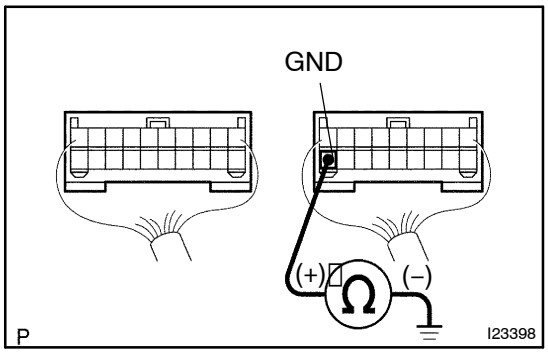
OK:

Voltage : 10 – 14 V

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).

NG

2	Check continuity between terminal GND of A/C amplifier and body ground.



CHECK:

Measure resistance between terminal GND of A/C amplifier and body ground.

OK:

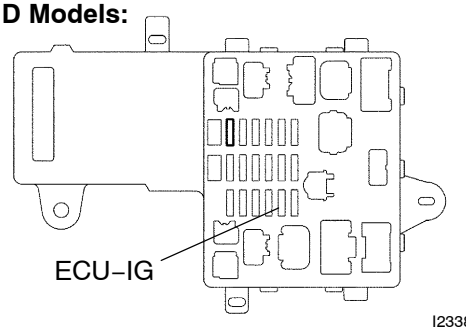
Resistance : 0 Ω (Continuity)

NG	Repair or replace harness or connector.

OK

3	Check ECU–IG fuse.

LHD Models:



PREPARATION:

Remove ECU–IG fuse from driver side J/B.

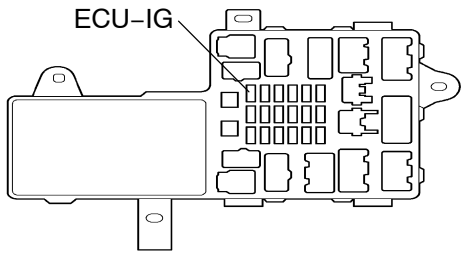
CHECK:

Check continuity of ECU–IG fuse.

OK:

Continuity exists.

RHD Models:



NG → **Check for shot in all the harness and components connected to the ECU–IG fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C amplifier and battery.

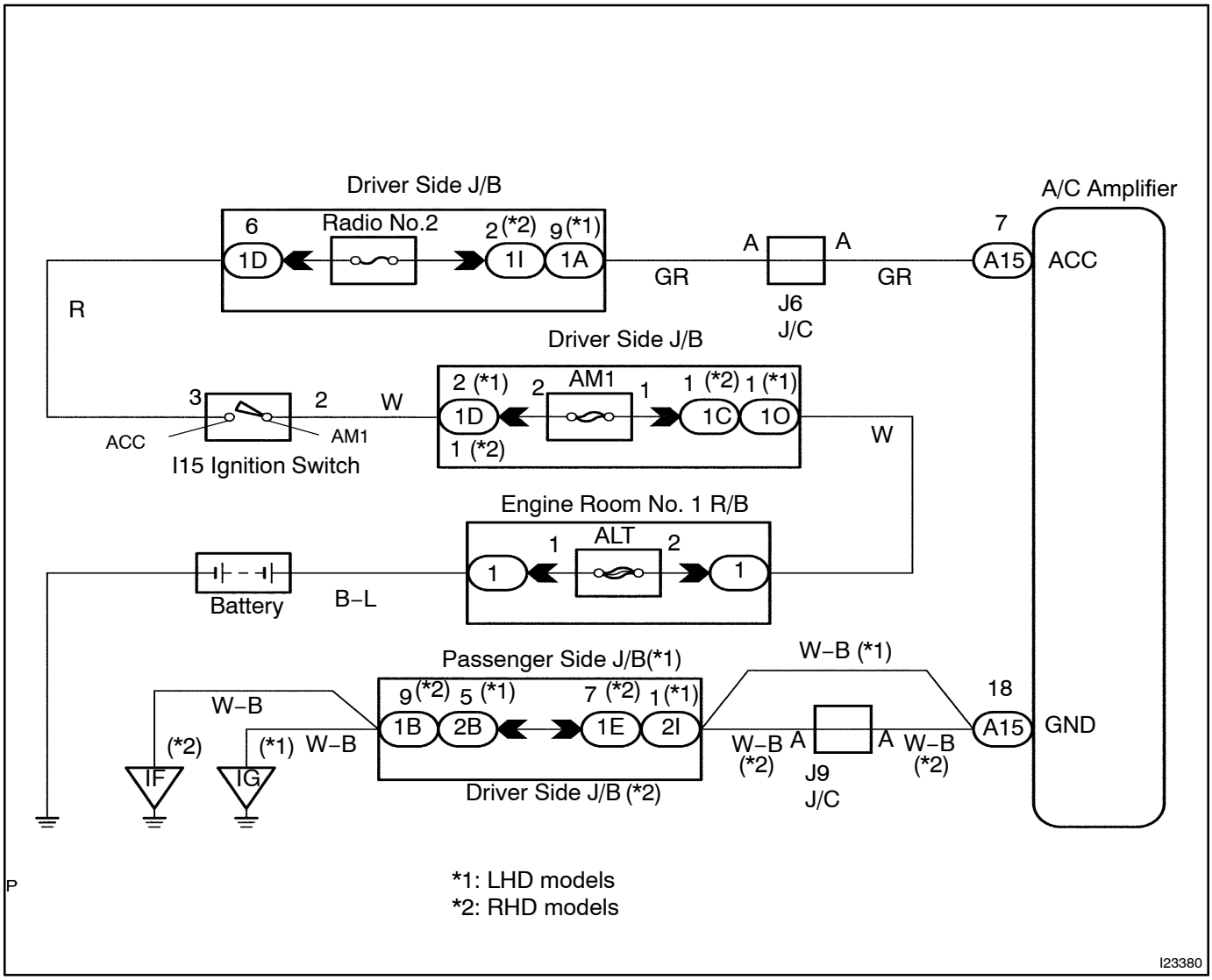
DI9H4–01

ACC Power Source Circuit

CIRCUIT DESCRIPTION

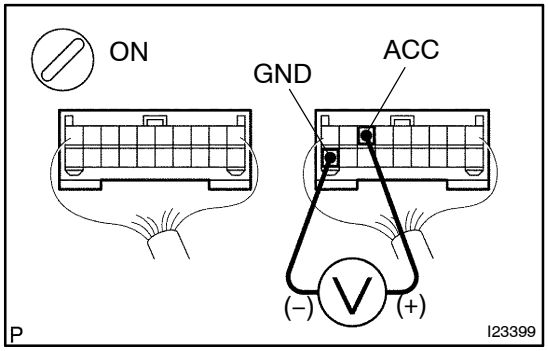
This is the power source for A/C amplifier and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals ACC and GND of A/C amplifier connector.



PREPARATION:

Remove A/C amplifier with connectors still connected.

CHECK:

(a) Turn ignition switch to ACC.

(b) Measure voltage between terminals ACC and GND of A/C amplifier.

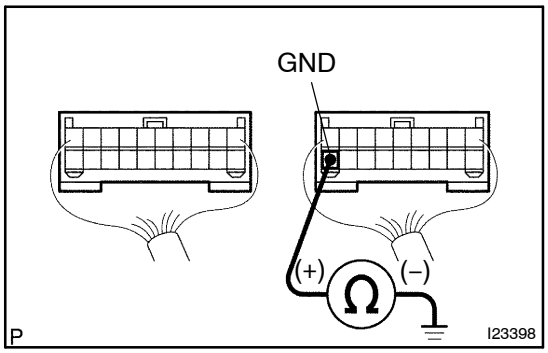
OK:

Voltage : Battery voltage

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).

NG

2	Check continuity between terminal GND of A/C amplifier and body ground.



CHECK:

Measure resistance between terminal GND of A/C amplifier and body ground.

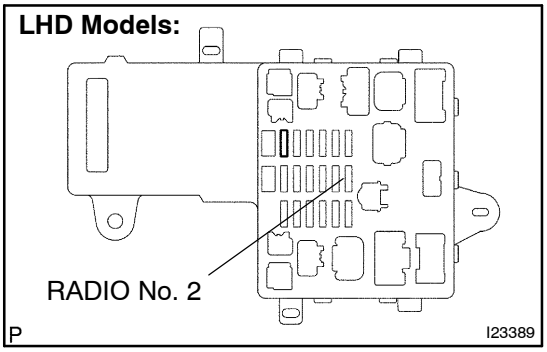
OK:

Resistance : 0 Ω (continuity)

NG	Repair or replace harness or connector.

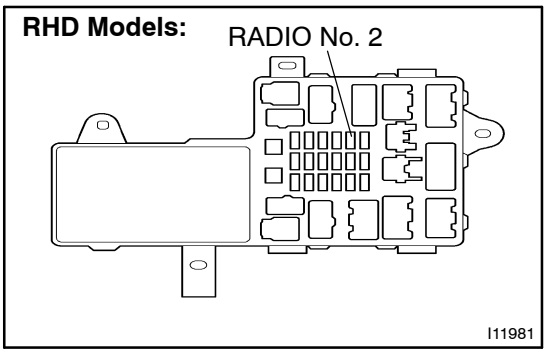
OK

3	Check RADIO No.2 fuse.



PREPARATION:
Remove RADIO No.2 fuse from driver side J/B.
CHECK:
Check continuity of RADIO No.2.
OK:

Continuity



NG → **Check for short in all the harness and components connected to the RADIO No.2 fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C amplifier and battery.

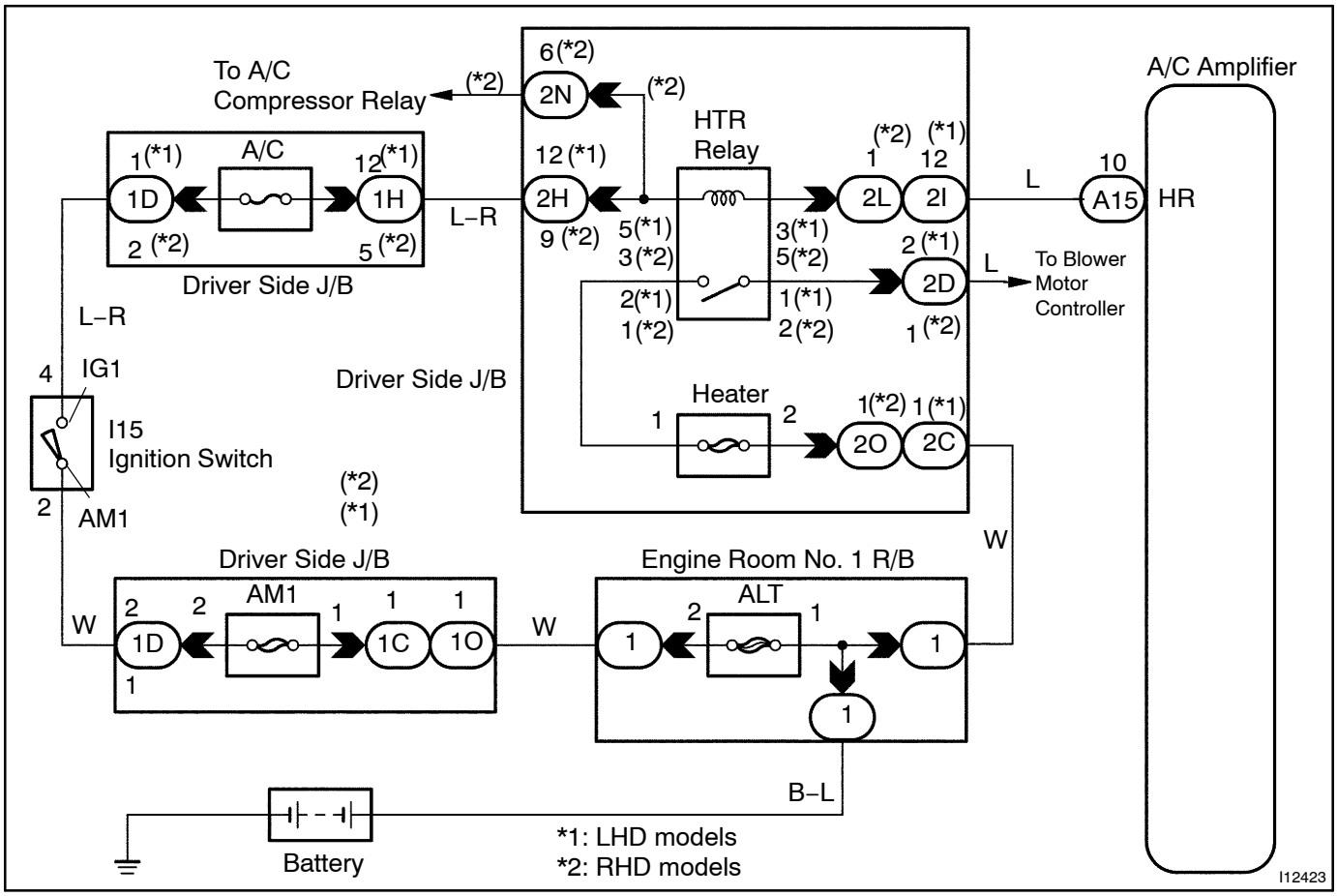
DI9H5–01

Heater Main Relay Circuit

CIRCUIT DESCRIPTION

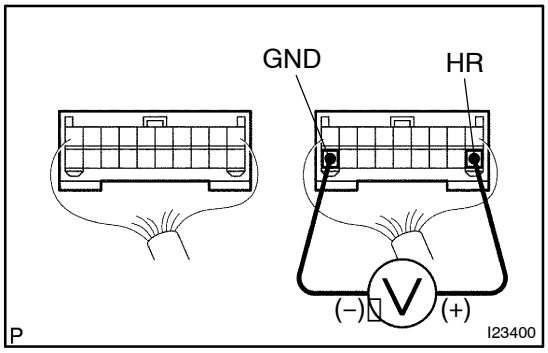
The heater main relay is switched on by signals from the A/C amplifier. It supplies power to the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal HR of A/C amplifier connector and body ground.



PREPARATION:

Remove A/C amplifier with connectors still connected.

CHECK:

Measure voltage between terminal HR of A/C amplifier and body ground when ignition switch is ON and OFF.

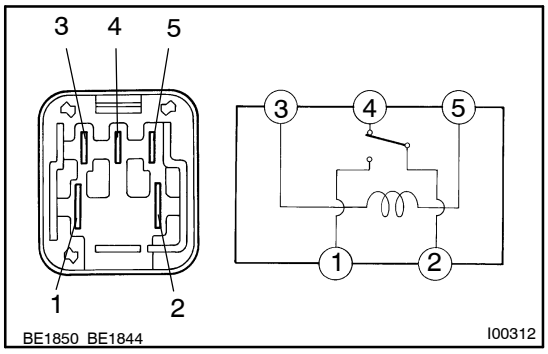
OK:

Ignition Switch	Voltage	
OFF	0 V	
ON	Blower ON	0 V
	Blower OFF	10 – 14 V

OK → Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).

NG

2	**Check heater main relay.**



PREPARATION:

Remove heater main relay from passenger side J/B.

CHECK:

Check continuity between each pair of terminals of heater main relay shown below.

OK:

Tester connection	Specified condition
1 – 4	No continuity
2 – 4	Continuity
3 – 5	62.5 – 90.9 Ω

PREPARATION:

Apply battery positive voltage between terminals 3 and 5.

CHECK:

Check continuity between each pair of terminal shown below.

OK:

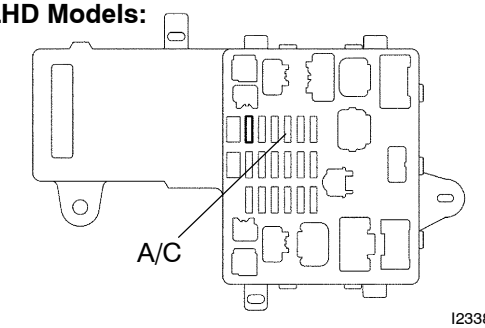
Tester connection	Specified condition
1 – 2	Continuity
2 – 4	No continuity

NG → **Replace hater main relay.**

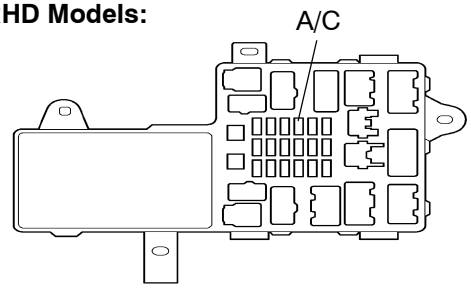
OK

3	Check A/C fuse

LHD Models:



RHD Models:



PREPARATION:

Remove A/C fuse from driver side J/B.

CHECK:

Check continuity of A/C fuse.

OK:

Continuity exists.

NG → **Check for short in all the harness and components connected to the A/C fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C amplifier and battery.

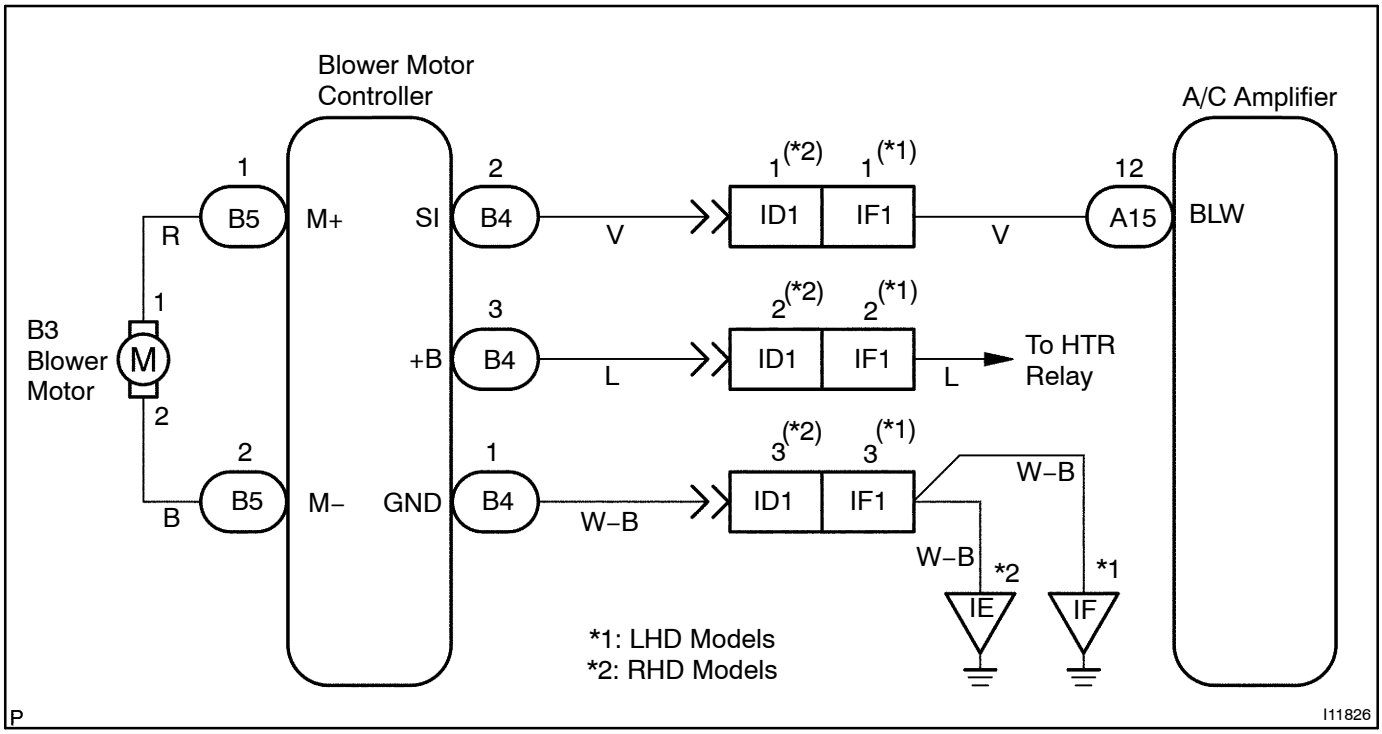
DI60M–03

Blower Motor Circuit

CIRCUIT DESCRIPTION

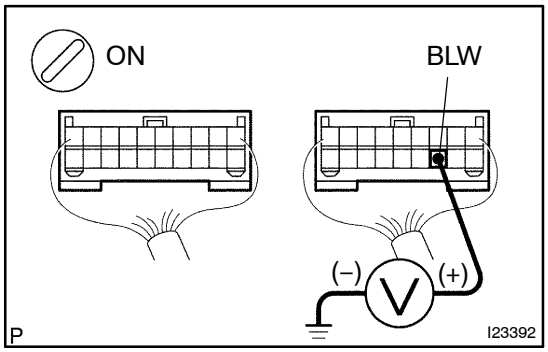
This is the power source for the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal BLW of A/C amplifier connector and body ground.**

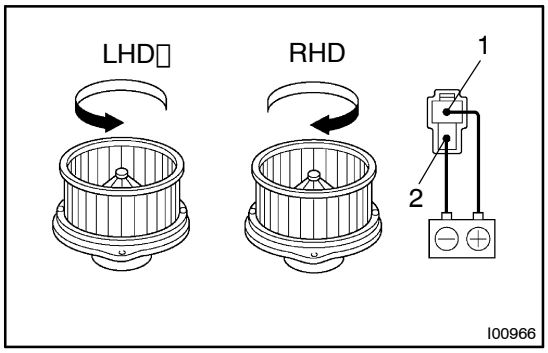


PREPARATION:
Remove the A/C amplifier with connector still connected.
CHECK:
(a) Turn ignition switch to ON.
(b) Operate blower motor.
(c) Measure voltage between terminal BLW of A/C amplifier and body ground.
OK:
Voltage: 1 – 3 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–612).**

NG

2	**Check blower motor.**

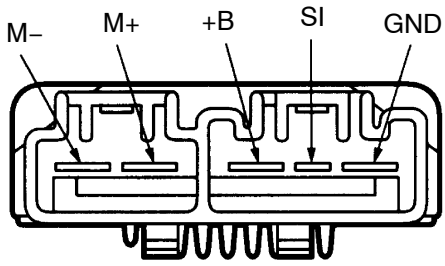


PREPARATION:
Remove blower motor.
CHECK:
Connect the positive (+) lead from the battery to terminal 1 of blower motor connector and the negative (–) lead to terminal 2.
OK:
Blower motor operates smoothly.

NG	**Replace blower motor.**

OK

3	Check blower motor control relay.



I05291

PREPARATION:

Remove blower motor control relay with connectors still connected.

CHECK:

(a) Turn ignition switch ON.

(b) Operate blower motor (High blower speed).

OK:

Terminals	Standard Value
GND ↔ Body Ground	Continuity
+B ↔ Body Ground	Battery voltage
+M ↔ Body Ground	Battery voltage
M+ ↔ M–	Battery voltage
SI ↔ Body Ground	1 – 3 V

NG → **Replace blower motor relay.**

OK →

Repair or replace harness or connector.

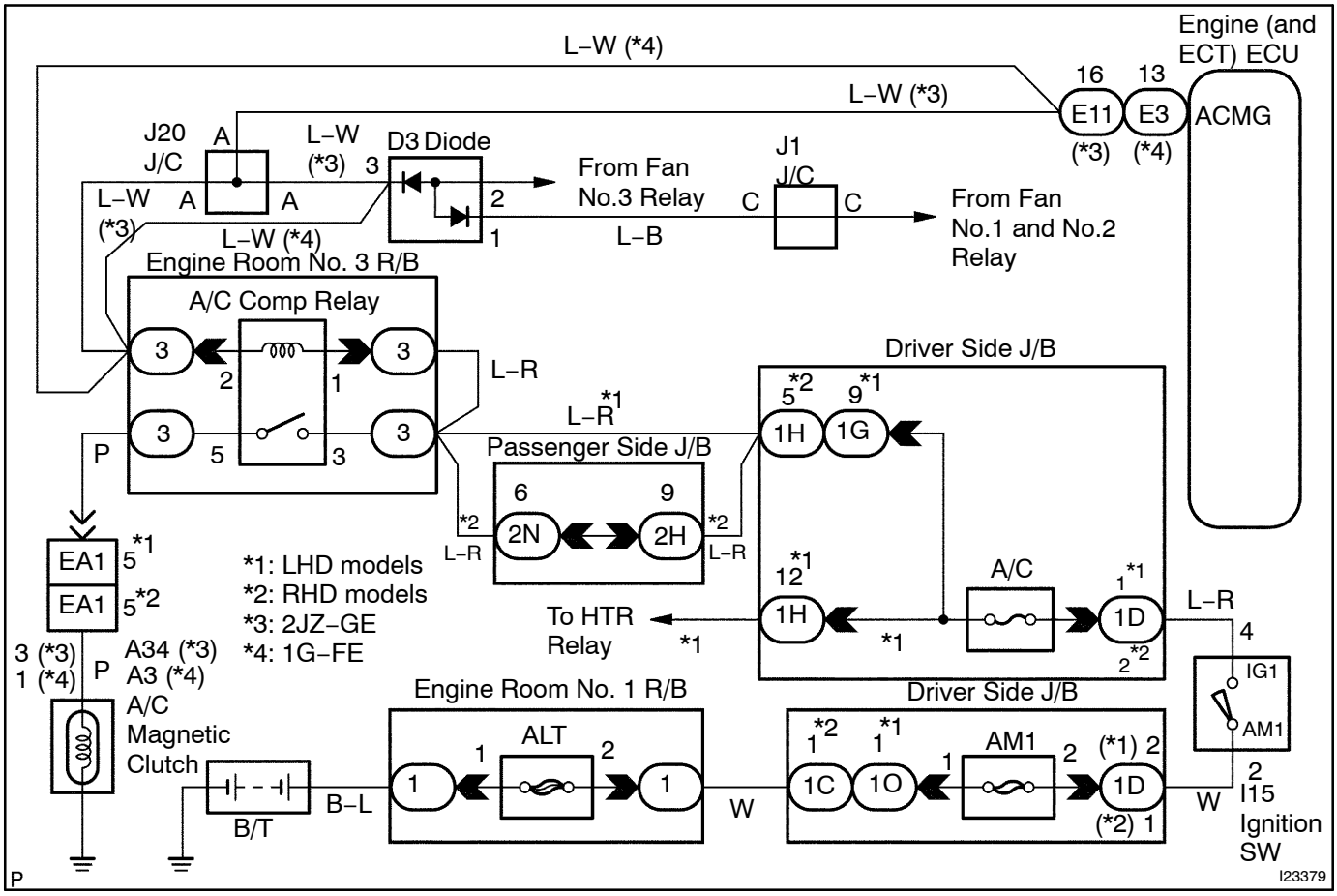
DI60N–03

Compressor Circuit

CIRCUIT DESCRIPTION

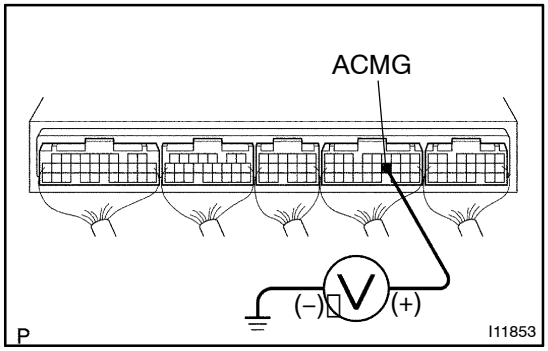
The A/C amplifier outputs the magnetic clutch ON signal from terminal MPX+ to the engine (and ECT) ECU. When the engine (and ECT) ECU receives this signal, it sends a signal from terminal ACMG and switches the A/C magnetic clutch relay ON, this turning the A/C compressor magnetic clutch ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal ACMG of engine (and ECT) ECU.



CHECK:

(a) Start engine.
(b) Push AUTO SW.
(c) Measure voltage between terminal ACMG of engine (and ECT) ECU connector and body ground when A/C switch is ON and OFF.

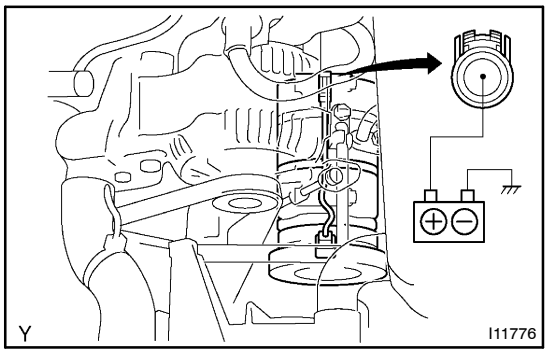
OK:

A/C switch	Voltage
ON	10 – 14 V
OFF	0 V

OK → Check and replace engine (and ECT) ECU and/or A/C amplifier.

NG

2	Check A/C compressor magnetic clutch.



PREPARATION:

Disconnect magnetic clutch connector.

CHECK:

Connect positive (+) lead connected to battery to magnetic clutch connector terminal.

OK:

Magnetic clutch is energized.

NG → Repair A/C compressor magnetic clutch.

OK

3	Check harness and connector between A/C compressor and compressor relay (See page IN–34).

NG → Repair or replace harness or connector.

OK

4	Check harness and connector between compressor relay and engine (and ECT) ECU (See page IN–34).

NG → Repair or replace harness or connector.

OK

5	Check harness and connector between engine (and ECT) ECU and A/C amplifier (See page IN–34).

NG → Repair or replace harness or connector.

OK

Check and replace engine (and ECT) ECU and/or A/C amplifier.

EMISSION CONTROL SYSTEM

EC00B–11

PURPOSE

The emission control systems are installed to reduce the amount of CO, HC and NOx exhausted from the engine (3) and (4)), to prevent the atmospheric release of blow–by gas–containing HC (1) and evaporated fuel containing HC being released from the fuel tank (2).
The function of each system is shown in these table.

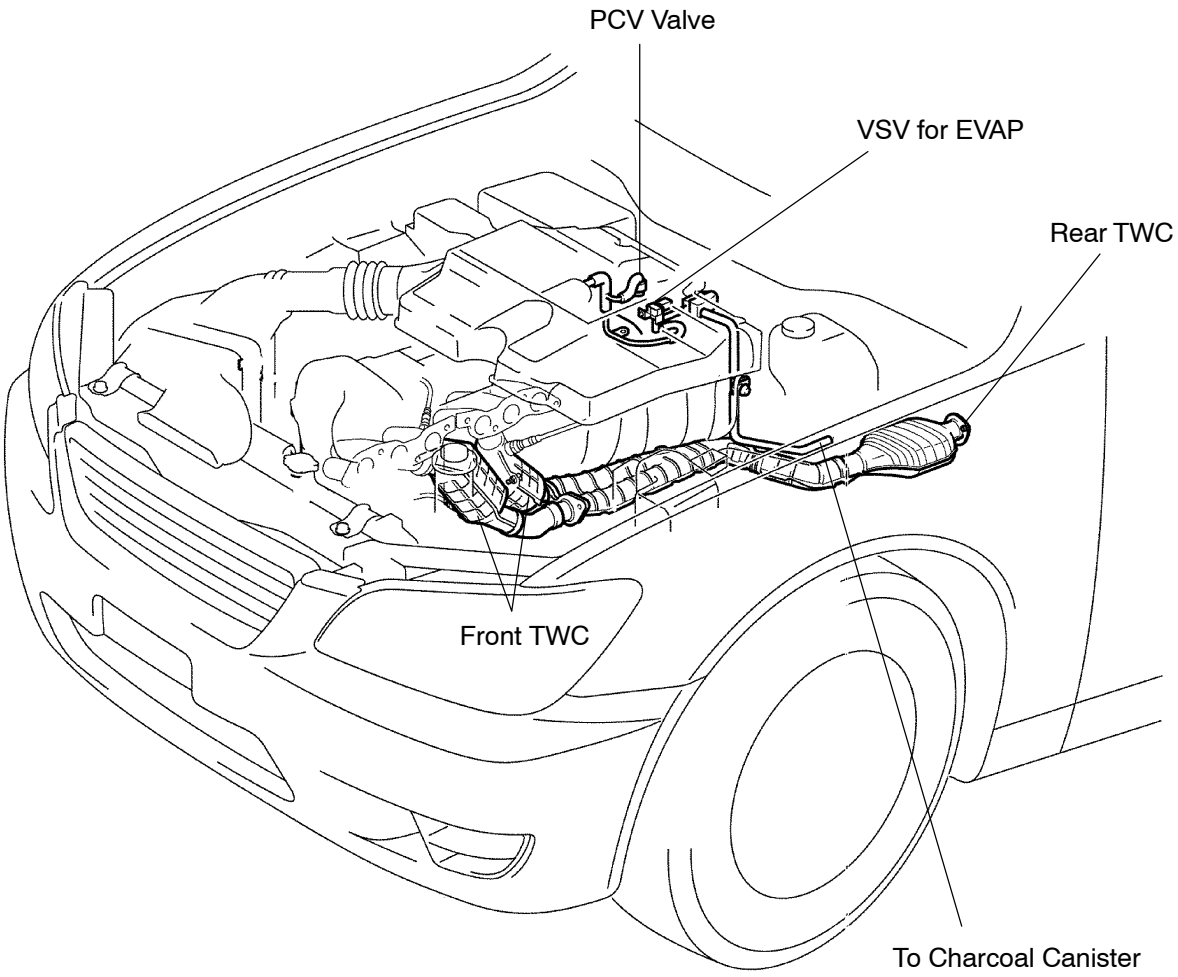
System	Abbreviation	Function
1. Positive Crankcase Ventilation	PCV	Reduces blow–by gas (HC)
2. Evaporative Emission Control	EVAP	Reduces evaporated HC
3. Three–Way Catalytic Converter	TWC	Reduces CO, HC and NOx
4. Electronic Fuel Injection *	EFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

Remark: * Fo inspection and repair of the EFI system, refer to the FI section this manual.

PARTS LAYOUT AND SCHEMATIC DRAWING

LOCATION

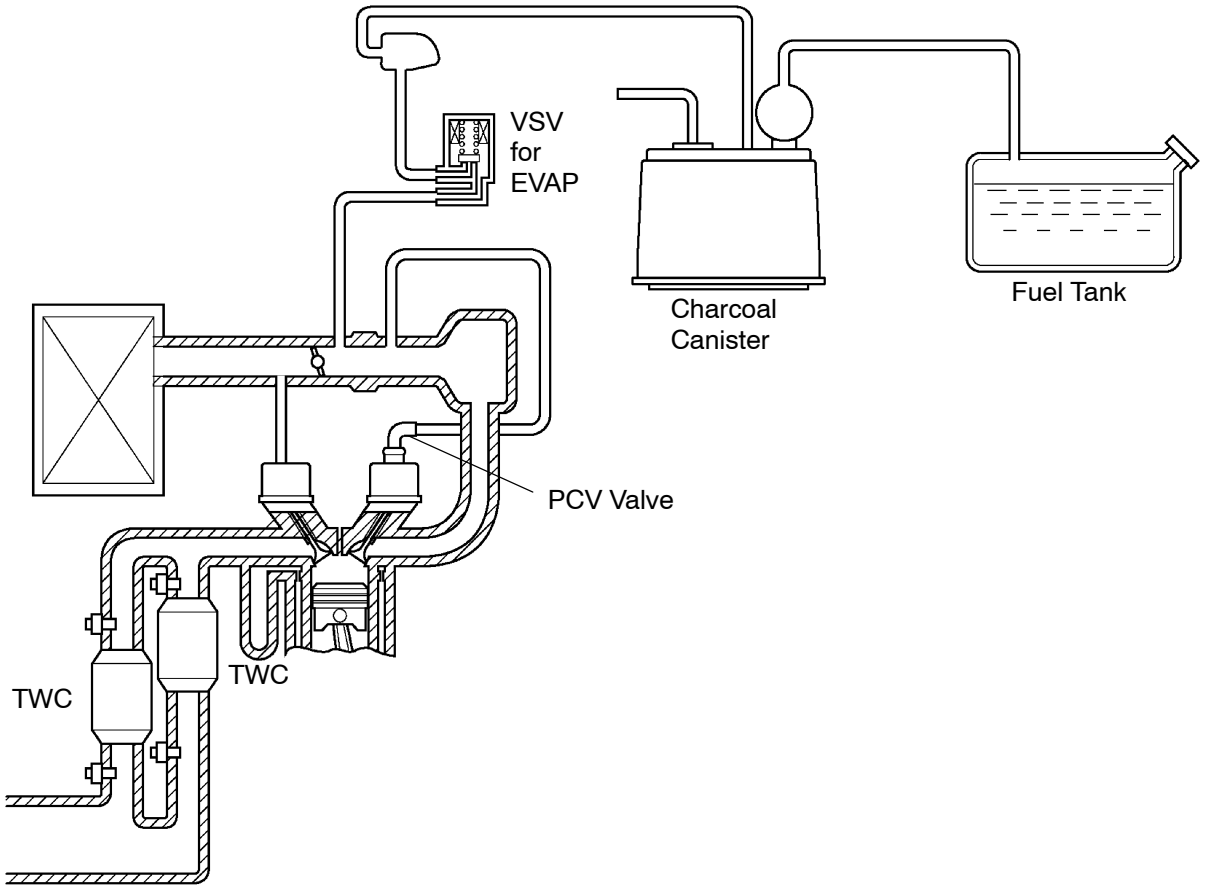
EC04V–13



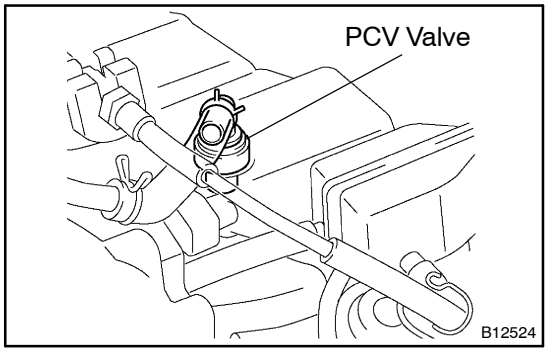
B14791

EC04W–13

DRAWING



B14792



POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

EC04X–08

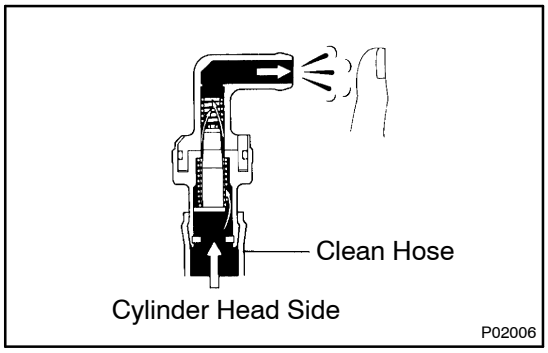
INSPECTION

1. REMOVE PCV VALVE

(a) Remove 4 nuts and engine cover.

(b) Disconnect the PCV hose from the PCV valve.

(c) Remove the PCV valve.



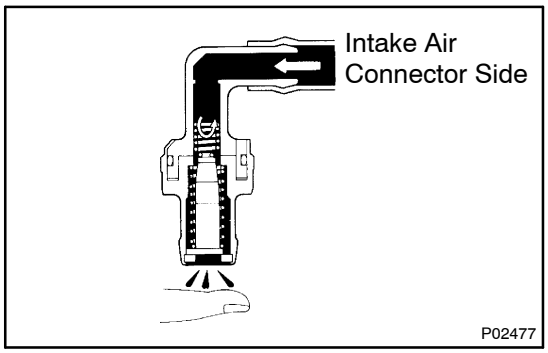
2. INSTALL CLEAN HOSE TO PCV VALVE

3. INSPECT PCV VALVE OPERATION

(a) Blow air into the cylinder head side, and check that air passes through easily.

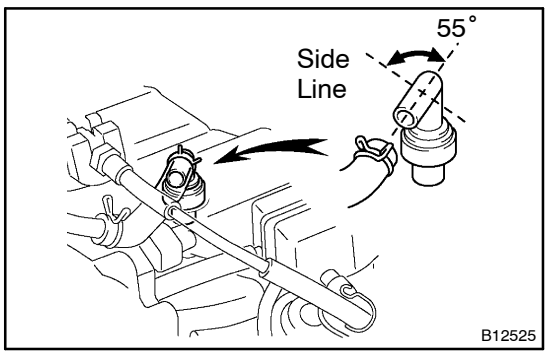
CAUTION:

Do not suck air through the valve. Petroleum substances inside the valve are harmful.



(b) Blow air into the intake air connector side, and check that air passes through with difficulty.

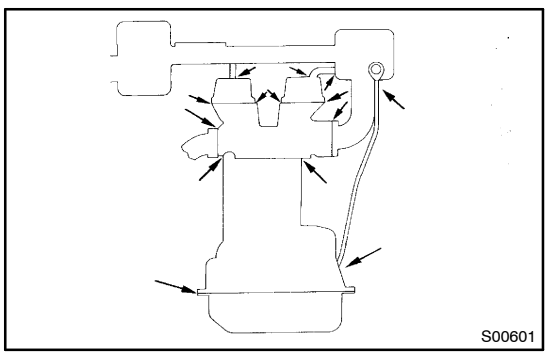
If operation is not as specified, replace the PCV valve.



4. REMOVE CLEAN HOSE FROM PCV VALVE

5. REINSTALL PCV VALVE

The port faces in the direction indicated in the illustration.



6. INSPECT HOSES, CONNECTIONS AND GASKETS

Check for cracks, leaks or damage.

7. REINSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

EC0KU–01

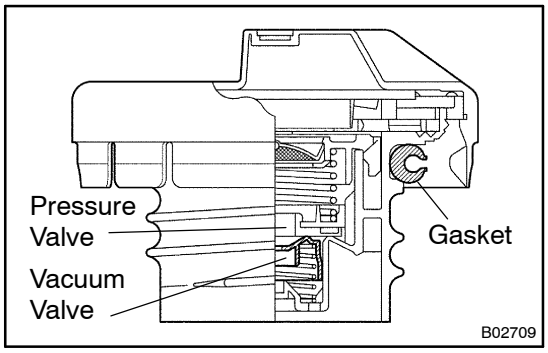
INSPECTION

1. INSPECT LINES AND CONNECTORS

Visually check for loose connections, sharp bends or damage.

2. INSPECT FUEL TANK

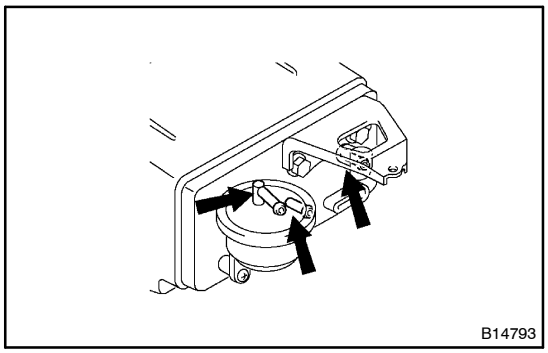
Visually check for deformation, cracks or fuel leakage.



3. INSPECT FUEL TANK CAP

Visually check if the cap and/or gasket are deformed or damaged.

If necessary, repair or replace the cap.

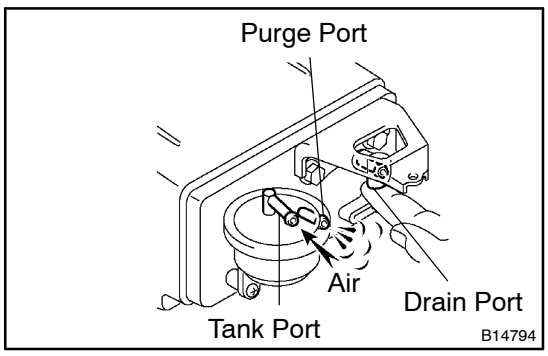


4. REMOVE CHARCOAL CANISTER

Disconnect the 2 hoses and pull up the canister.

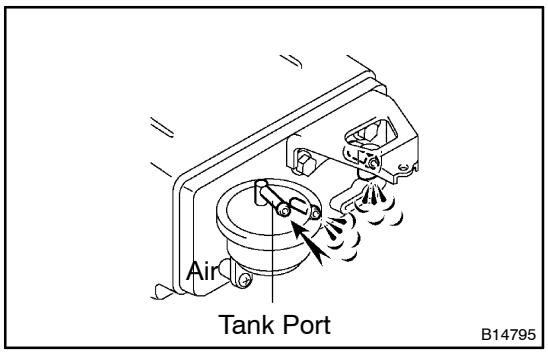
5. INSPECT CHARCOAL CANISTER

(a) Visually check the charcoal canister for cracks or damage.

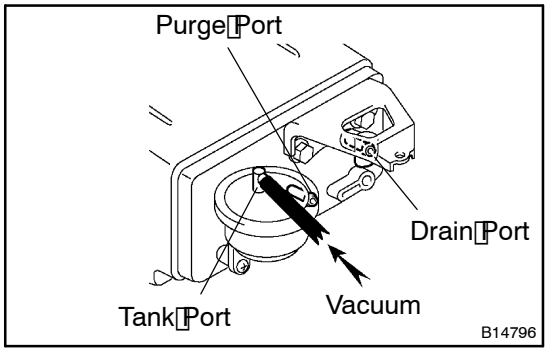


(b) Inspect the charcoal canister operation.

(1) While holding the drain port(s) closed, blow air (19.6 kPa, 0.2 kgf/cm^2, 2.8 psi) into the tank port and check that air flows from the purge port.

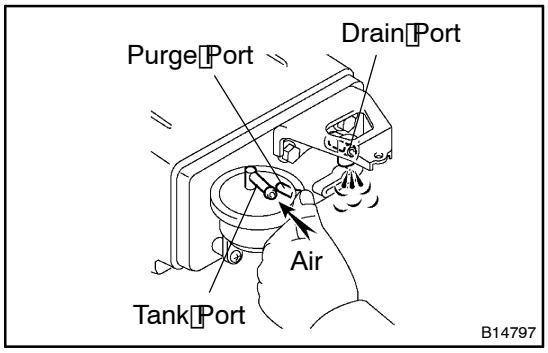


(2) Blow air (19.6 kPa, 0.2 kgf/cm^2, 2.8 psi) into tank port and check that air flows without resistance from the other port.



(3) Apply vacuum (9.8 kPa, 73.5 mmHg, 2.9 in.Hg) to tank port and check that the vacuum gauge indicator with settle at about 2.0 kPa (15.0 mmHg, 0.6 in.Hg).

If operation is not as specified, replace the charcoal canister.



(c) Clean the filter in the canister.
Clean the filter by blowing 294 kPa (3 kgf/cm², 43 psi) of compressed air into tank port while holding purge port closed.

NOTICE:

- **Do not attempt to wash the canister.**
- **No activated carbon should come out.**

6. REINSTALL CHARCOAL CANISTER

7. REMOVE VSV FOR EVAP

8. INSPECT VSV FOR EVAP (See page FI–56)

9. REINSTALL VSV FOR EVAP

THREE–WAY CATALYTIC CONVERTER (TWC) SYSTEM

EC0KV–01

ON–VEHICLE INSPECTION

1. INSPECT EXHAUST PIPE ASSEMBLY

(a) Check the connections for looseness or damage.

(b) Check the clamps for wear, cracks or damage.

2. INSPECT TWC

Check for dents or damage.

If any part of the protector is damaged or dented to the extent that it contacts the TWC, repair or replace it.

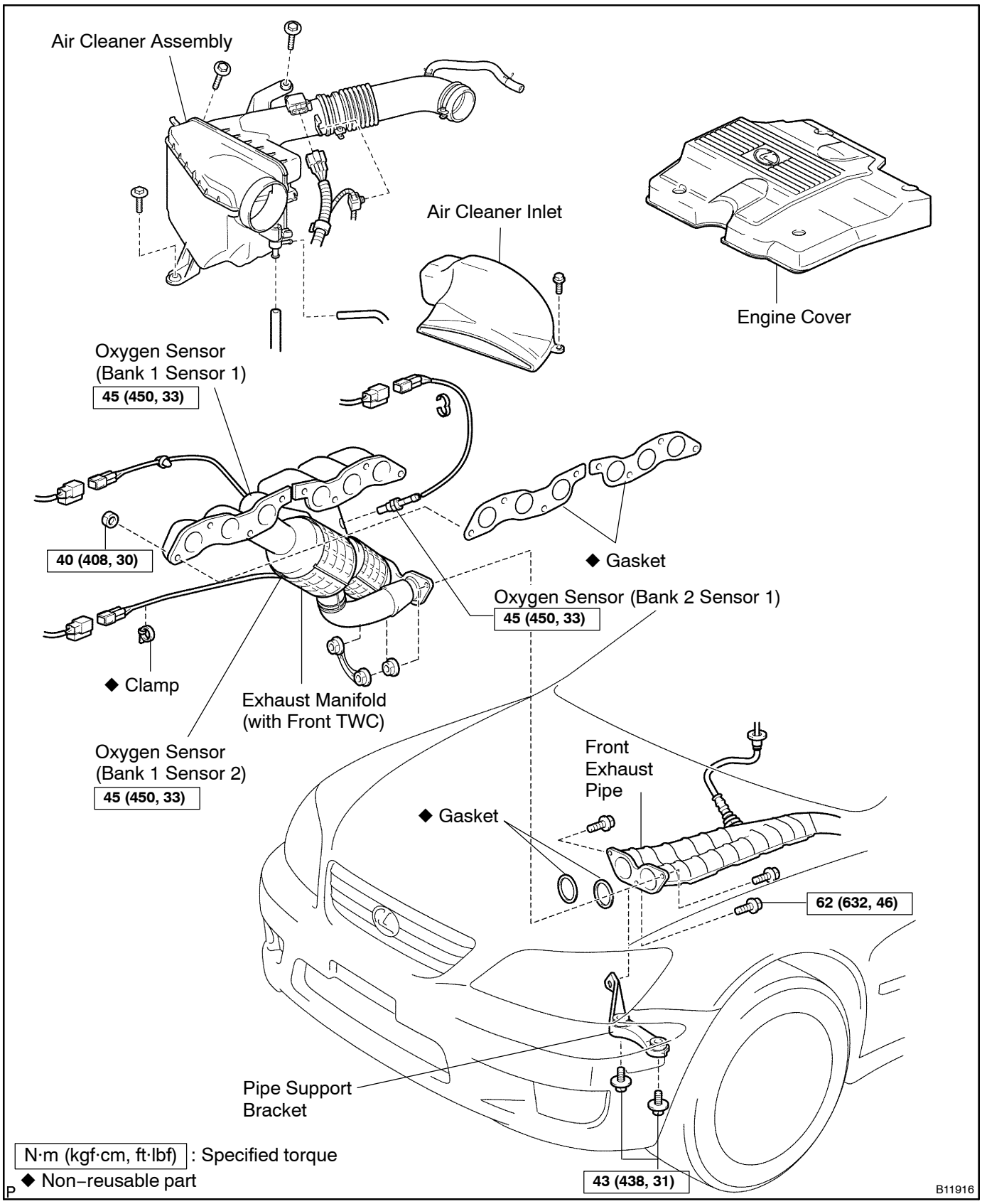
3. INSPECT TWC HEAT INSULATOR

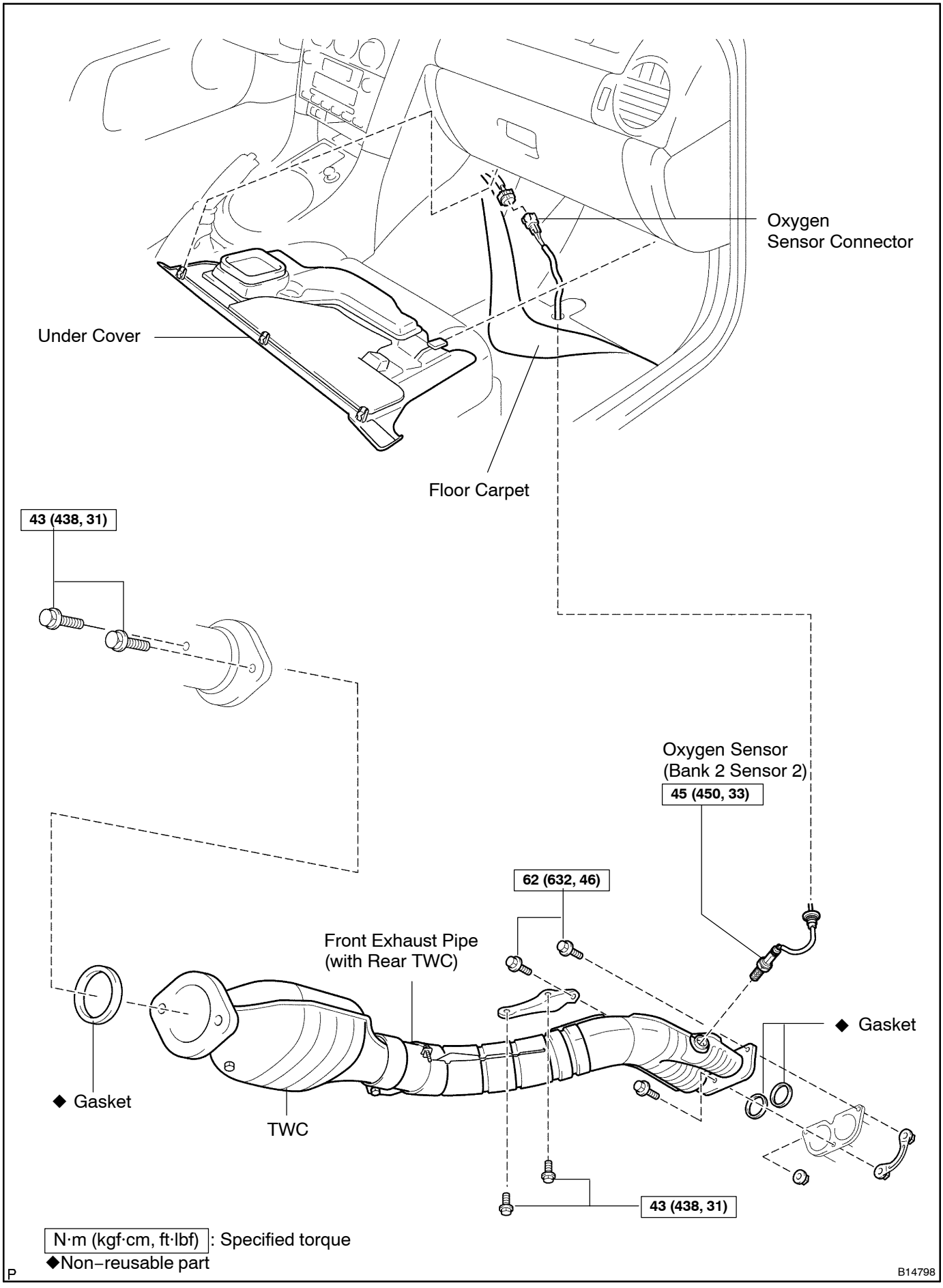
(a) Check the heat insulator for damage.

(b) Check for adequate clearance between the TWC and heat insulator.

EC0DF–05

COMPONENTS




Oxygen
Sensor Connector
Under Cover
Floor Carpet
43 (438, 31)
Oxygen Sensor
(Bank 2 Sensor 2)
45 (450, 33)
62 (632, 46)
Front Exhaust Pipe
(with Rear TWC)
◆ Gasket
◆ Gasket
TWC
43 (438, 31)
N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part
P
B14798

CO/HC

EM0D0-05

INSPECTION

HINT:

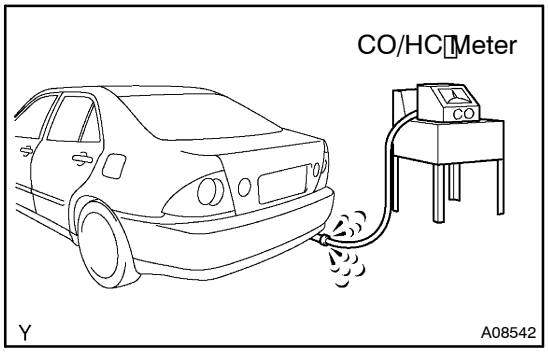
This check is used only to determine whether or not the idle CO/HC complies with regulations.

1. INITIAL CONDITIONS

(a) Engine at normal operating temperature
(b) Air cleaner installed
(c) All pipes and hoses of air induction system connected
(d) All accessories switched OFF
(e) All vacuum lines properly connected
(f) SFI system wiring connectors fully plugged
(g) Ignition timing checked correctly
(h) Transmission in neutral position
(i) Tachometer and CO/HC meter calibrated by hand

2. START ENGINE

3. RACE ENGINE AT 2,500 RPM FOR APPROX. 180 SECONDS



4. INSERT CO/HC METER TESTING PROBE AT LEAST 40 cm (1.3 ft) INTO TAILPIPE DURING IDLING

5. IMMEDIATELY CHECK CO/HC CONCENTRATION AT IDLE AND/OR 2,500 RPM

HINT:

When doing the 2 mode (2,500 rpm and idle) test, follow the measurement order prescribed by the applicable local regulations.

If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.

(a) Check oxygen sensors operation.
(See page DI-49)

(b) See the table below for possible causes, and then inspect and correct the applicable causes if necessary.

HC	CO	Phenomenon	Causes
High	Normal	Rough idle	1. Faulty ignitions: • Incorrect timing • Fouled, shorted or improperly gapped plugs • Open or crossed high–tension cords 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinder
High	Low	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: • PCV hose • Intake manifold • Throttle body • Cylinder head gasket 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty EFI systems: • Faulty pressure regulator • Defective water temperature sensor • Faulty engine ECU • Faulty injector • Faulty throttle position sensor • Faulty air flow meter

COMPRESSION

INSPECTION

EM0D1-08

HINT:

If there is lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

1. WARM UP AND STOP ENGINE

Allow the engine to warm up to normal operating temperature.

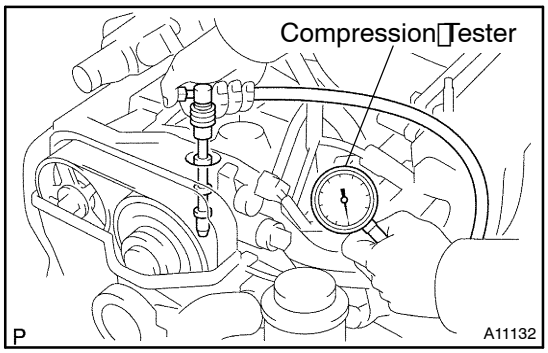
2. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

3. DISCONNECT IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page IG-6)

4. REMOVE SPARK PLUGS

5. DISCONNECT INJECTOR CONNECTORS



6. CHECK CYLINDER COMPRESSION

(a) Insert a compression tester into the spark plug hole.

(b) While cranking the engine, measure the compression pressure.

HINT:

Always use a fully charged battery to obtain engine revolutions of 250 rpm or more.

(c) Repeat steps (a) through (b) for each cylinder.

NOTICE:

This measurement must be done in as short a time as possible.

Compression:
1,324 kPa (13.5 kgf/cm^2, 192 psi) or more
Minimum pressure:
1,079 kPa (11.0 kgf/cm^2, 156 psi)
Difference between each cylinder:
98 kPa (1.0 kgf/cm^2, 14 psi) or less

(d) If the cylinder compression in 1 or more cylinders is low, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps (a) through (b) for the cylinder with low compression.

- If adding oil helps the compression, it is likely that the piston rings and/or cylinder bore are probably worn or damaged.
- If pressure stays low, a valve may be sticking or seating improper, or there may be leakage past the gasket.

7. RECONNECT INJECTOR CONNECTORS

HINT:

The Nos. 1, 3, 5 injector connectors are dark gray, and the Nos. 2, 4, 6 injector connectors are brown.

8. REINSTALL SPARK PLUGS

9. RECONNECT IGNITION COILS AND HIGH–TENSION CORD SET ASSEMBLY (See page IG–6)

10. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

VALVE CLEARANCE

ADJUSTMENT

EM0D2–06

HINT:

Inspect and adjust the valve clearance when the engine is cold.

1. REMOVE ENGINE COVER

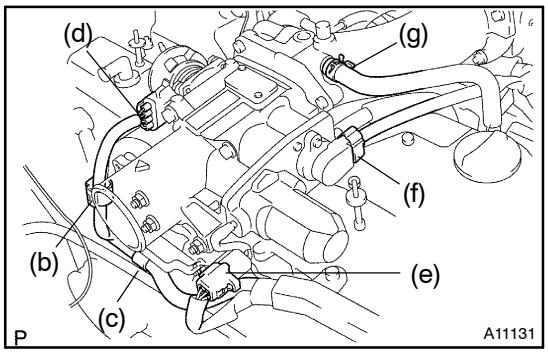
Remove the 4 nuts and engine cover.

2. DRAIN ENGINE COOLANT

3. REMOVE INTAKE AIR RESONATOR

4. REMOVE THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY

(a) Disconnect the accelerator cable from the throttle body.



(b) Disconnect the engine wire clamp from the clamp bracket of the throttle body.

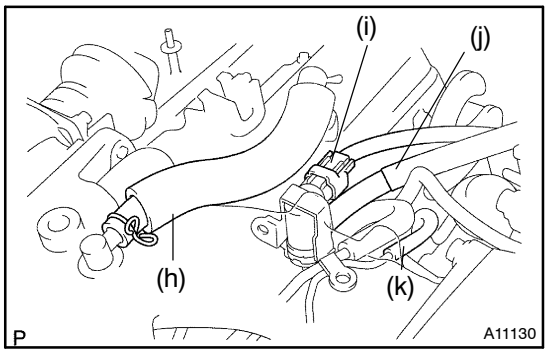
(c) Disconnect the engine wire from the clamp on the throttle body bracket.

(d) Disconnect the accelerator pedal position sensor connector.

(e) Disconnect the throttle control motor connector.

(f) Disconnect the throttle position sensor connector.

(g) Disconnect the air assist hose from the intake air connector.

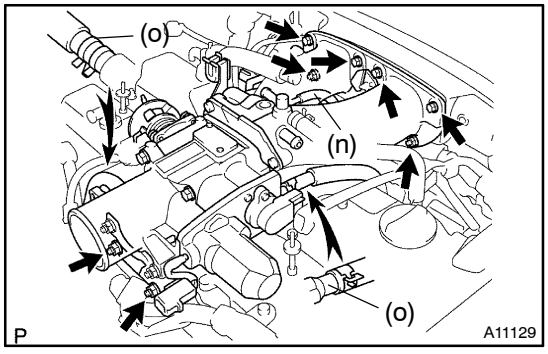


(h) Disconnect the PCV hose from the intake air connector.

(i) Disconnect the VSV connector for EVAP.

(j) Disconnect the EVAP hose (from charcoal canister) from the VSV for EVAP.

(k) Disconnect the vacuum hose (from No. 2 vacuum pipe) from the No. 1 vacuum pipe.



(l) Remove the 2 nuts holding the throttle body bracket to the cylinder head.

(m) Remove the 4 bolts and 2 nuts holding the intake air connector to the air intake chamber.

(n) Disconnect the vacuum hose (from actuator for ACIS) from the No. 1 vacuum pipe.

(o) Disconnect the 2 water bypass hoses from the throttle body, and remove the throttle body together with the intake air connector and gasket.

5. REMOVE NO. 3 TIMING BELT COVER

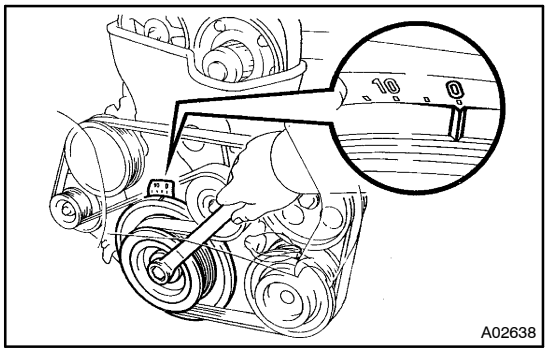
Using a 5 mm hexagon wrench, remove the 4 bolts, oil filler cap, timing belt cover and gasket.

6. REMOVE IGNITION COILS AND HIGH–TENSION CORD SET ASSEMBLY (See page IG–6)

7. REMOVE SPARK PLUGS

8. DISCONNECT ENGINE WIRE FROM CYLINDER HEAD COVERS

9. REMOVE CYLINDER HEAD COVERS (See page EM–34)

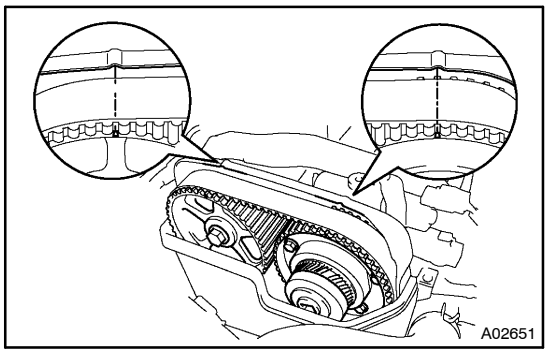


10. SET NO. 1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley and align its groove with the timing mark "0" of the No. 1 timing belt cover.

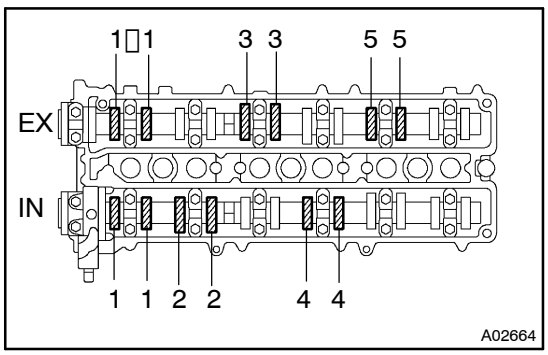
NOTICE:

Always turn the crankshaft clockwise.



(b) Check that the timing marks of the camshaft timing pulleys are aligned with the timing marks of the No. 4 timing belt cover.

If not, turn the crankshaft 1 revolution (360°).



11. INSPECT VALVE CLEARANCE

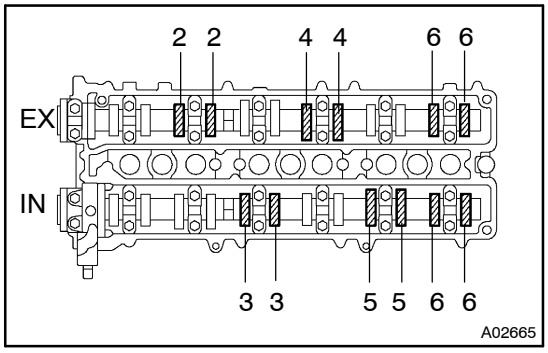
(a) Check only those valves indicated in the illustration.

- Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
- Record the valve clearance measurements of those that are out of specification. They will be used later to determine the required replacement adjusting shim.

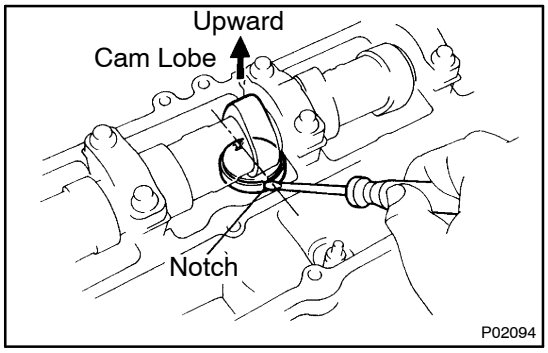
Valve clearance (Cold):

Intake	0.15 – 0.25 mm (0.006 – 0.010 in.)
Exhaust	0.25 – 0.35 mm (0.010 – 0.014 in.)

(b) Turn the crankshaft pulley 1 revolution (360°), and align the groove with the timing mark "0" of the No. 1 timing belt cover.



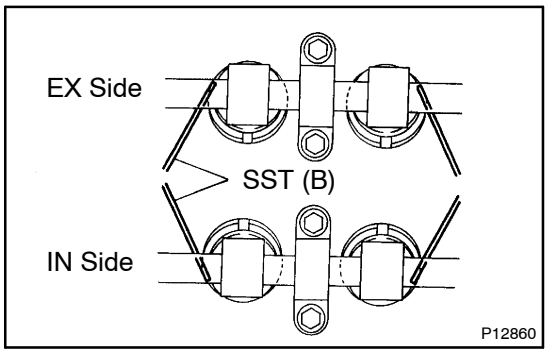
(c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))



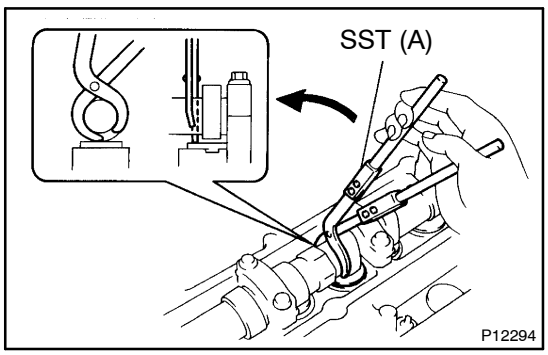
12. ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.

- Turn the camshaft so that the cam lobe for the valve to be adjusted faces up.
- Turn the valve lifter with a screwdriver so that the notches are perpendicular to the camshaft.

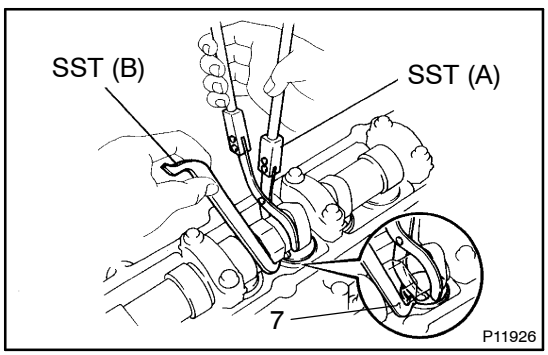


- Insert SST (B) gently from the inside as shown in the illustration.



- Using SST (A), hold the camshaft as shown in the illustration.

SST 09248–55040 (09248–05410)

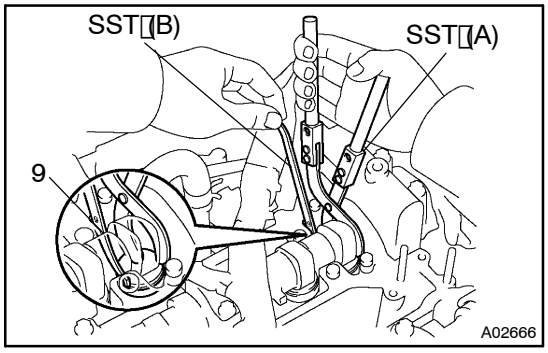


- Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

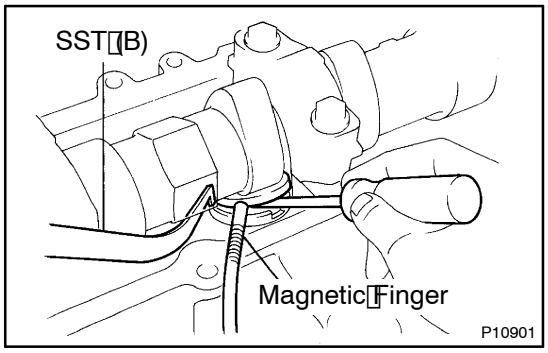
SST 09248–55040 (09248–05410, 09248–05420)

HINT:

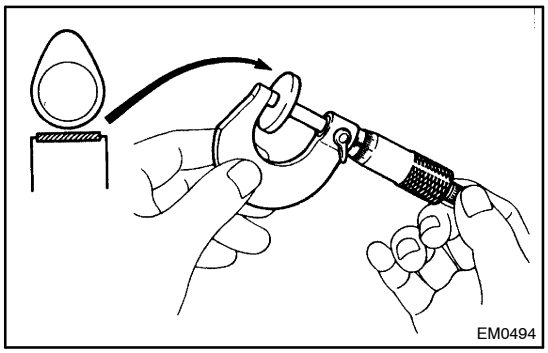
- Apply SST (B) at slight angle on the side marked with ”7” or ”9”, at the position shown in the illustration.



- When the adjusting shim of the No. 1 intake side replace, remove the No. 2 or No. 3 camshaft bearing cap, and insert SST as shown in the illustration.



- Using a small screwdriver and a magnetic finger, remove the adjusting shim.



(b) Determine the replacement adjusting shim size according to the following formula or Charts:

- Using a micrometer, measure the thickness of the removed shim.
- Calculate the thickness of a new shim so the valve clearance comes within specified value.

T ..... Thickness of used shim
A ..... Measured valve clearance
N ..... Thickness of new shim

Intake

N = T + (A – 0.20 mm (0.008 in.))

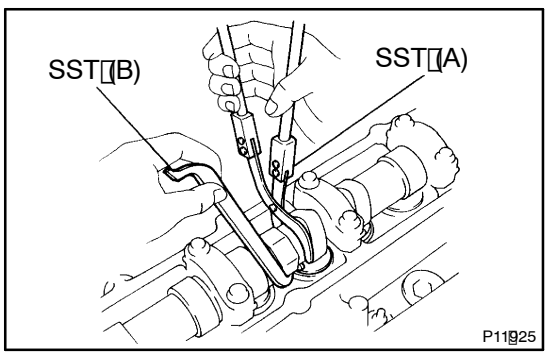
Exhaust

N = T + (A – 0.30 mm (0.012 in.))

- Select a new shim with a thickness as close as possible to the calculated values.

HINT:

Shims are available in 17 sizes in increments of 0.050 mm (0.0020 in.), from 2.500 mm (0.0984 in.) to 3.300 mm (0.1299 in.).



(c) Install a new adjusting shim.

- Place a new adjusting shim on the valve lifter, with imprinted numbers facing down.
- Press down the valve lifter with SST (A), and remove SST (B).

SST 09248–55040

13. REINSTALL CYLINDER HEAD COVERS
(See page EM–53)

14. RECONNECT ENGINE WIRE TO CYLINDER HEAD COVERS

15. REINSTALL SPARK PLUGS

16. REINSTALL IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page IG-6)

17. REINSTALL NO. 3 TIMING BELT COVER

(a) Install the gasket to the timing belt cover.

(b) Using a 5 mm hexagon wrench, install the timing belt cover with the 4 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

(c) Install the oil filler cap.

18. REINSTALL THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY

(a) Install a new gasket to the air intake chamber.

(b) Place the throttle body together with the intake air connector on the cylinder head.

(c) Connect the vacuum hose (from actuator for ACIS) to the No. 1 vacuum pipe.

(d) Connect the 2 water bypass hoses to the throttle body.

(e) Install the 4 bolts and 2 nuts holding the intake air connector to the air intake chamber.

Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)

(f) Install the 2 nuts holding the throttle body bracket to the cylinder head.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(g) Connect the air assist hose to the intake air connector.

(h) Install the PCV hose to the intake air connector.

(i) Install the EVAP hose (from charcoal canister) to the VSV for EVAP.

(j) Install the vacuum hose (from No. 2 vacuum pipe) to the No. 1 vacuum pipe.

(k) Install the throttle position sensor connector.

(l) Install the accelerator pedal position sensor connector.

(m) Install the throttle control motor connector.

(n) Install the VSV connector for EVAP.

(o) Secure the engine wire with the clamp on the throttle body bracket.

(p) Install the engine wire clamp with the clamp bracket of the throttle body.

(q) Connect the accelerator cable to the throttle body.

19. REINSTALL INTAKE AIR RESONATOR

20. REINSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

21. REFILL WITH ENGINE COOLANT

22. START ENGINE AND CHECK FOR LEAKS

Adjusting Shim Selection Chart (Intake)

| Measured Clearance mm (in.) \ Installed Shim Thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.560 (0.1008) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.650 (0.1043) | 2.660 (0.1047) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.080 (0.1213) | 3.100 (0.1220) | 3.120 (0.1228) | 3.140 (0.1236) | 3.150 (0.1240) | 3.160 (0.1244) | 3.180 (0.1252) | 3.200 (0.1260) | 3.220 (0.1268) | 3.240 (0.1276) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---

Adjusting Shim Selection Chart (Exhaust)

| Measured Clearance mm (in.) \ Installed Shim Thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.560 (0.1008) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.660 (0.1043) | 2.660 (0.1047) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.080 (0.1213) | 3.100 (0.1220) | 3.120 (0.1228) | 3.140 (0.1236) | 3.150 (0.1240) | 3.160 (0.1244) | 3.180 (0.1252) | 3.200 (0.1260) | 3.220 (0.1268) | 3.240 (0.1276) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---

IGNITION TIMING

EM1S2–01

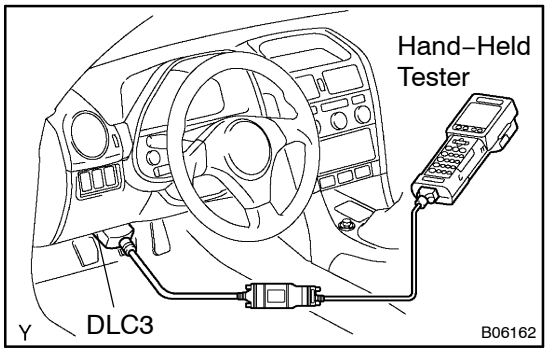
INSPECTION

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

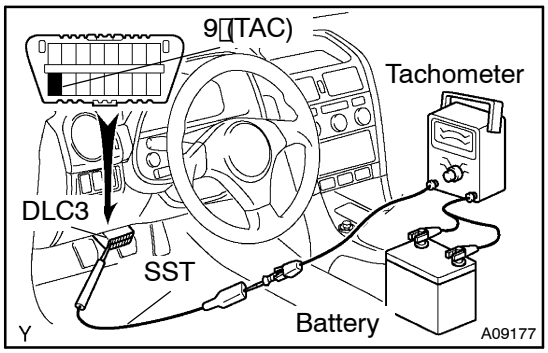
2. CONNECT TIMING LIGHT TO ENGINE

3. CHECK IDLE SPEED (See page EM–14)

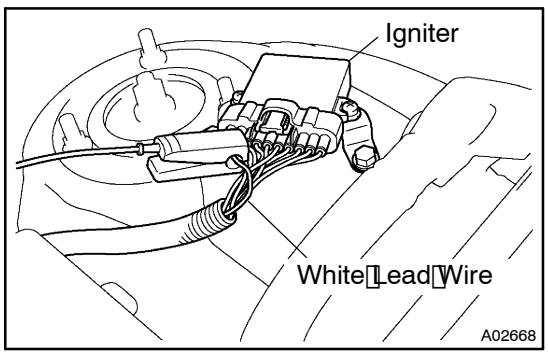


4. INSPECT IGNITION TIMING

(a) When using the hand–held tester;
Inspect the ignition timing.
(1) Connect a hand–held tester to the DLC3.
(2) Please refer to the hand–held tester operator's manual for further details.



(b) When not using the hand–held tester;
Inspect the ignition timing.
(1) Using SST, connect tachometer prove to terminal 9 (TAC) of the DLC3.
SST 09843–18030

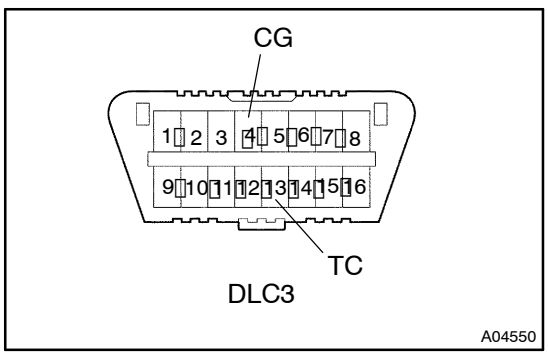


(2) Connect the timing light clip to the white lead wire.

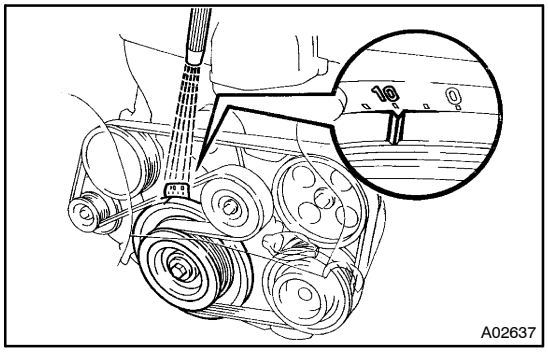
NOTICE:

Use a timing light that can detect the primary signal.

(c) Start the engine at idle.



(d) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.
SST 09843–18040



(e) Using a timing light, check the ignition timing.
Ignition timing: 10 ± 2° BTDC @ idle
(Transmission in neutral position)

(f) Remove the SST from the DLC3.

5. FURTHER CHECK IGNITION TIMING
Ignition timing: 6 – 16° BTDC @ idle
(Transmission in neutral position)

HINT:

The timing mark moves in a range between 6° and 16°.

6. DISCONNECT TIMING LIGHT FROM ENGINE

7. DISCONNECT HAND–HELD TESTER

IDLE SPEED

EM0D4–07

INSPECTION

1. INITIAL CONDITIONS

(a) Engine at normal operating temperature
(b) Air cleaner installed
(c) All pipes and hoses of air induction system connected
(d) All accessories switched OFF
(e) All vacuum lines properly connected
(f) SFI system wiring connectors fully plugged
(g) Ignition timing checked correctly
(h) Transmission in neutral position

2. CONNECT HAND–HELD TESTER (See page EM–12)

3. INSPECT IDLE SPEED

(a) Race the engine speed at 2,500 rpm for approx. 90 seconds.
(b) Check the idle speed.

Idle speed: 700 ± 50 rpm

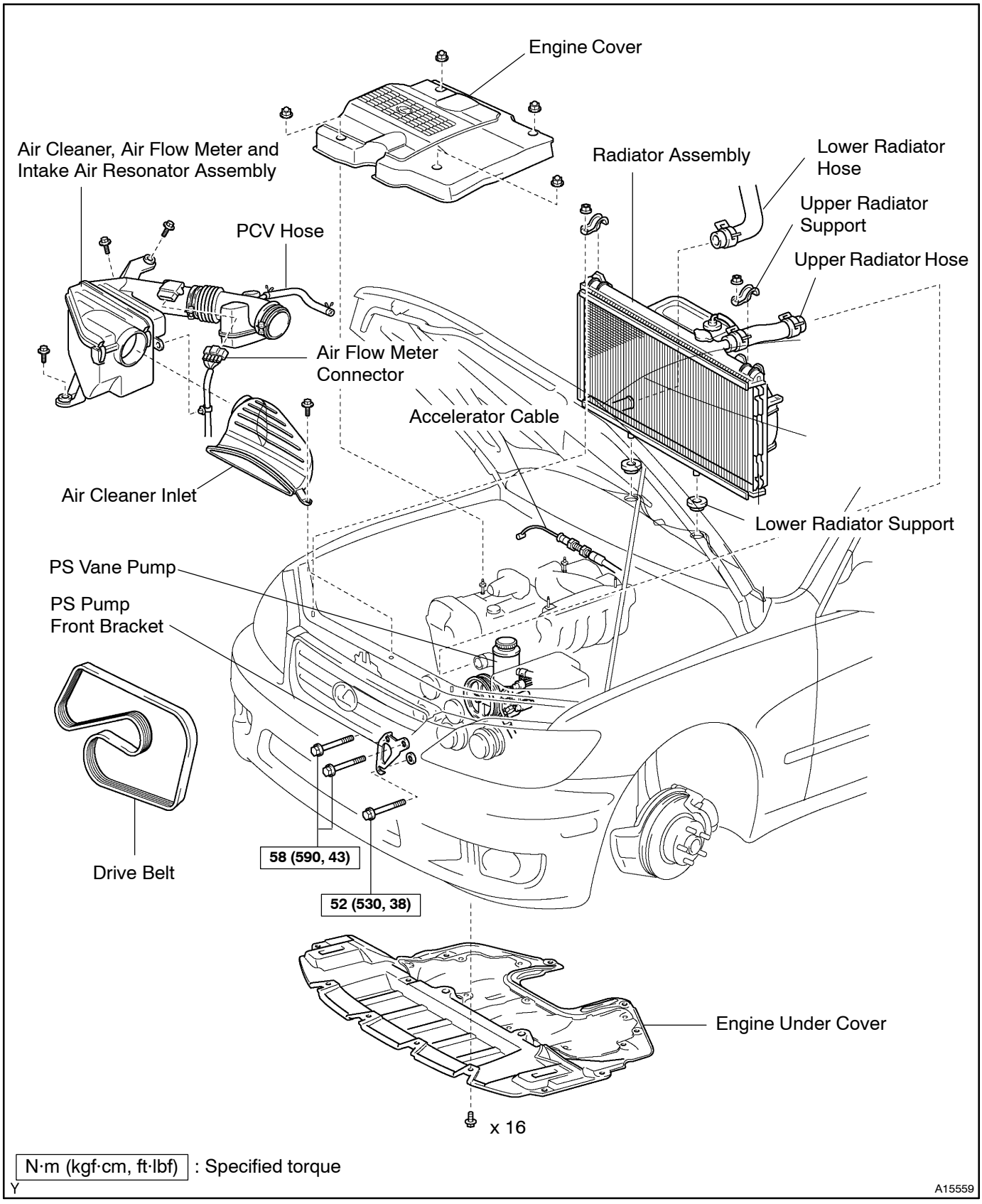
If the idle speed is not as specified, check the throttle body.

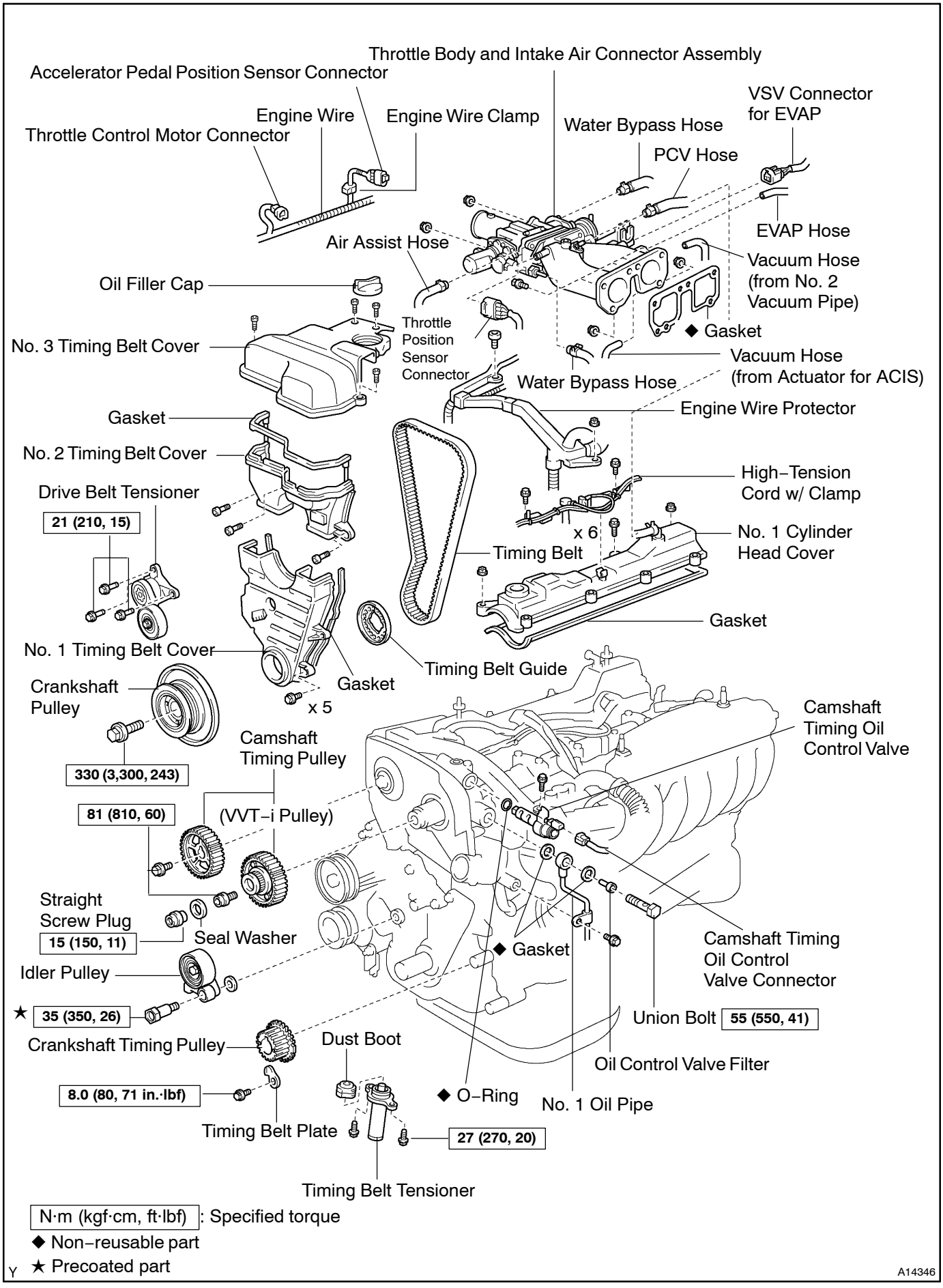
4. DISCONNECT HAND–HELD TESTER

TIMING BELT

COMPONENTS

EM0D5–07

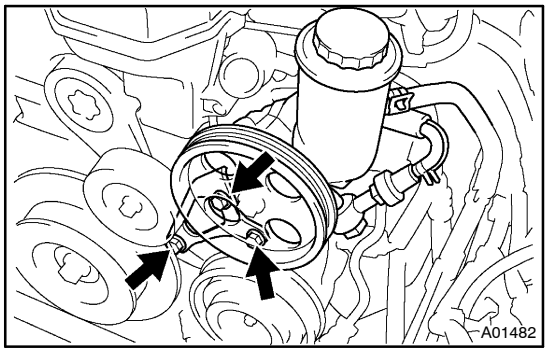



Throttle Body and Intake Air Connector Assembly
Accelerator Pedal Position Sensor Connector
Engine Wire
Engine Wire Clamp
Throttle Control Motor Connector
Water Bypass Hose
VSV Connector for EVAP
PCV Hose
EVAP Hose
Air Assist Hose
Vacuum Hose (from No. 2 Vacuum Pipe)
Oil Filler Cap
◆ Gasket
Throttle Position Sensor Connector
No. 3 Timing Belt Cover
Vacuum Hose (from Actuator for ACIS)
Water Bypass Hose
Engine Wire Protector
Gasket
No. 2 Timing Belt Cover
High–Tension Cord w/ Clamp
Drive Belt Tensioner
21 (210, 15)
x 6
No. 1 Cylinder Head Cover
Timing Belt
Gasket
No. 1 Timing Belt Cover
Timing Belt Guide
Gasket
x 5
Crankshaft Pulley
Camshaft Timing Oil Control Valve
330 (3,300, 243)
Camshaft Timing Pulley
81 (810, 60)
(VVT–i Pulley)
Straight Screw Plug
15 (150, 11)
Seal Washer
◆ Gasket
Camshaft Timing Oil Control Valve Connector
Idler Pulley
★ 35 (350, 26)
Union Bolt 55 (550, 41)
Crankshaft Timing Pulley
Dust Boot
Oil Control Valve Filter
8.0 (80, 71 in.·lbf)
◆ O–Ring
No. 1 Oil Pipe
Timing Belt Plate
27 (270, 20)
Timing Belt Tensioner
N·m (kgf·cm, ft·lbf): Specified torque
◆ Non–reusable part
★ Precoated part
A14346

EM1S3-01

REMOVAL

1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. REMOVE RADIATOR ASSEMBLY (See page CO-15)
4. REMOVE DRIVE BELT (See page CH-1)



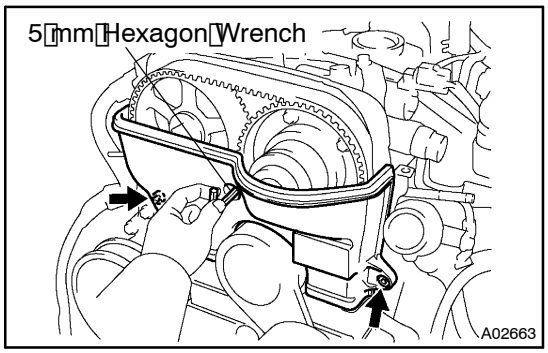
5. REMOVE PS PUMP AND FRONT BRACKET

(a) Remove the 3 bolts, plate washer and pump front bracket.

(b) Disconnect the vane pump from the bracket.

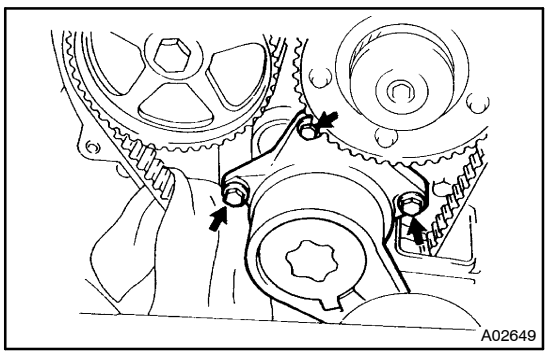
6. REMOVE NO. 3 TIMING BELT COVER

Using a 5 mm hexagon wrench, remove the 4 bolts, oil filler cap, timing belt cover and gasket.



7. REMOVE NO. 2 TIMING BELT COVER

Using a 5 mm hexagon wrench, remove the 3 bolts, timing belt cover and gasket.

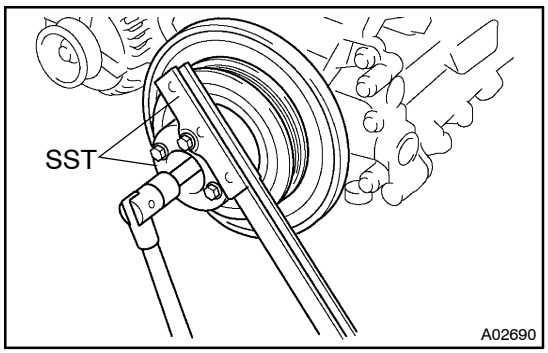


8. REMOVE DRIVE BELT TENSIONER

Remove the 3 bolts and tensioner.

NOTICE:

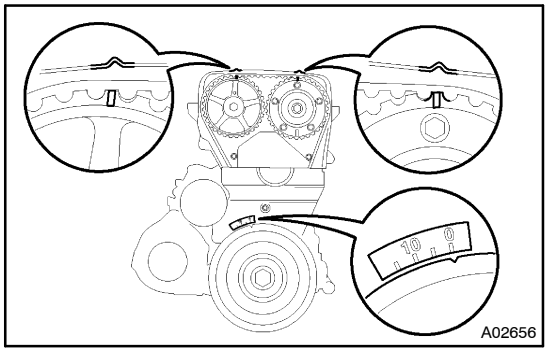
Be careful not to drop the bolts inside the timing belt cover.

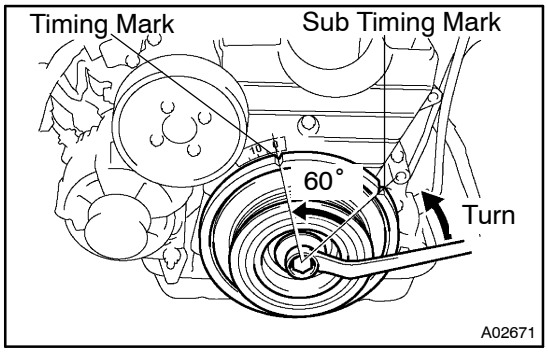


9. LOOSEN CRANKSHAFT PULLEY BOLT

Using SST, loosen the pulley bolt.

SST 09213 – 70011, 09330 – 00021





10. SET NO. 1 CYLINDER TO APPROX. 60° BTDC COMPRESSION

(a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the No. 1 timing belt cover.

NOTICE:

Always turn the crankshaft clockwise.

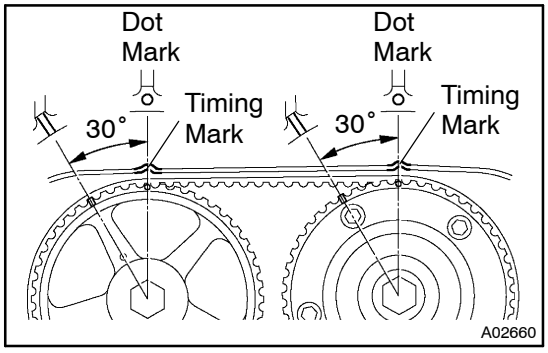
(b) Check that the timing marks (TDC mark) of the camshaft timing pulleys are aligned with the timing marks of the No. 4 timing belt cover.

If not, turn the crankshaft 1 revolution (360°).

(c) Turn the crankshaft pulley 60° counterclockwise to place the sub timing mark (60° mark BTDC) on the crankshaft pulley at the timing mark "0" position of the No. 1 timing belt cover.

NOTICE:

If the timing belt is disengaged, having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other when you remove the camshaft timing pulleys (steps 11 to 17), thus resulting damage. So, always set the crankshaft pulley at the correct angle.

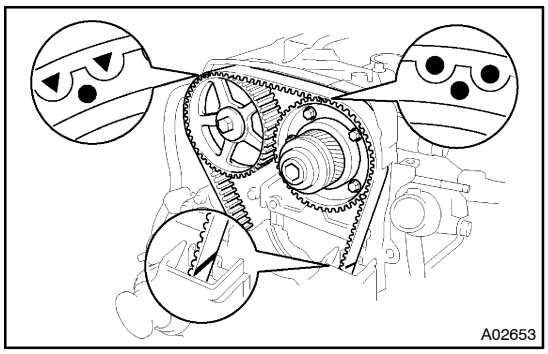


(d) Check that the dot marks (60° mark BTDC) of the camshaft timing pulleys are aligned with the timing marks of the No. 4 timing belt cover.

(e) Remove the crankshaft pulley bolt.

NOTICE:

Do not turn the crankshaft pulley.

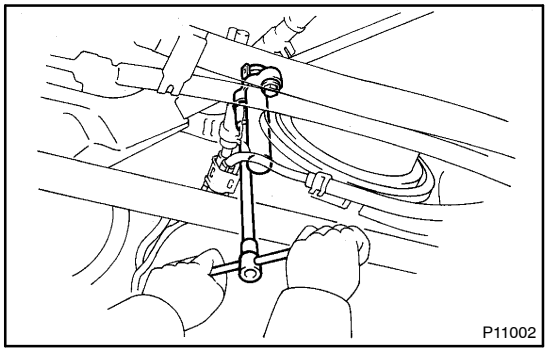


11. REMOVE TIMING BELT FROM CAMSHAFT TIMING PULLEYS

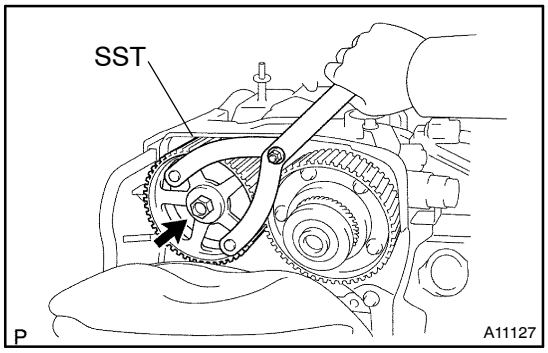
HINT:

(Re–using timing belt):

Place matchmarks on the timing belt and camshaft timing pulleys as shown in the illustration.



(a) Alternately loosen the 2 bolts, and remove them, the tensioner and dust boot.
(b) Disconnect the timing belt from the camshaft timing pulleys.



12. REMOVE EXHAUST CAMSHAFT TIMING PULLEY

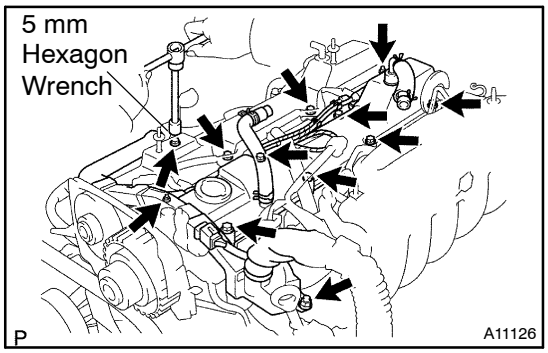
Using SST, remove the bolt and timing pulley.

SST 09960–10010 (09962–01000, 09963–01000)

13. REMOVE ENGINE COVER

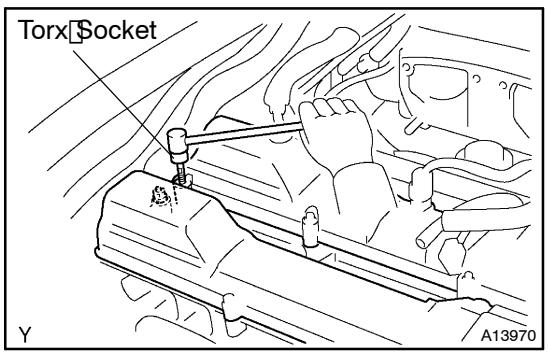
Remove the 4 nuts and engine cover.

14. REMOVE THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY (See page EM–5)



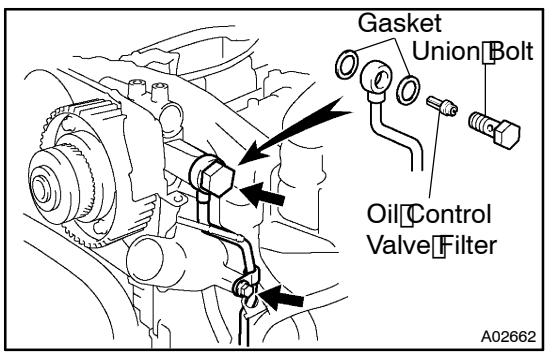
15. REMOVE NO. 1 CYLINDER HEAD COVER

(a) Using a 5 mm hexagon wrench, remove the bolts, and disconnect the engine wire protector from the No. 2 cylinder head cover.
(b) Remove the nut, and disconnect the engine wire protector from the intake manifold.
(c) Remove the 2 bolts, and disconnect the high–tension
(d) cords with the clamp from the No. 2 cylinder head.



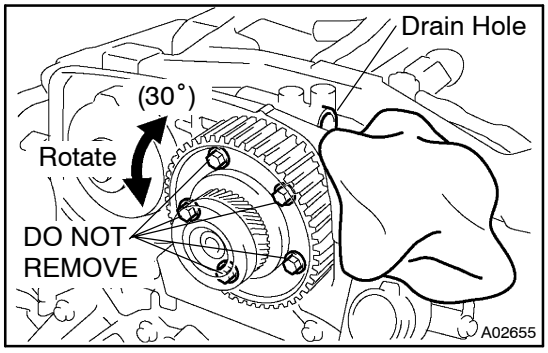
(e) Remove the 2 nuts from the No. 1 cylinder head cover.
(f) Using a torx socket (E5), remove the 2 stud bolts.
(g) Remove the 6 bolts, No. 1 cylinder head cover and gasket.

16. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE (See page FI–43)



17. DISCONNECT NO. 1 OIL PIPE

Remove the bolt, union bolt, oil control valve filter and 2 gaskets, and disconnect the No. 1 oil pipe from the No. 3 camshaft bearing cap.



18. REMOVE VVT–i (INTAKE CAMSHAFT TIMING) PULLEY

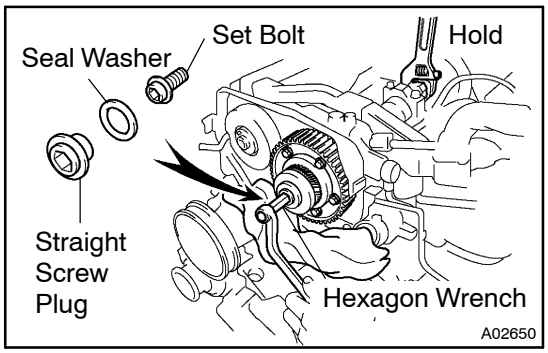
NOTICE:

- **The 5 bolts shown in the illustration determine the backlash of the gear in the timing pulley, so do not remove them.**
  If any of the 5 bolts are removed, install a new camshaft timing pulley assembly.
- **When removing the straight screw plug, follow the prescribed procedure in order to avoid spilling oil on the timing system parts.**

(a) Rotate the VVT–i pulley from left to right 2 to 3 times within its range of movement (30°) and use a waste cloth to collect the oil from the camshaft timing oil control valve installation hole.

NOTICE:

Approximately 20 cc (1.2 cu in.) of oil will be ejected, so take care not to spill it.



(b) Holding the hexagon portion of camshaft with a wrench.

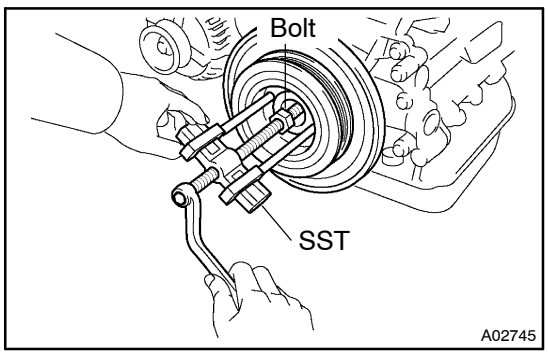
(c) Using a 14 mm hexagon wrench, remove the straight screw plug and seal washer.

NOTICE:

Some oil may spill, so put a waster cloth below the plug white doing the operation.

(d) Using a 10 mm hexagon wrench, and remove the set bolt and VVT–i pulley.

(e) Remove the wrench.



19. REMOVE CRANKSHAFT PULLEY

Using SST and bolt (diameter: 8 mm, pitch: 1.5 mm), remove the crankshaft pulley.

SST 09950–50013 (09951–05010, 09552–05010, 09553–05020, 09554–05031)

Bolt: Part No. 90119–18001

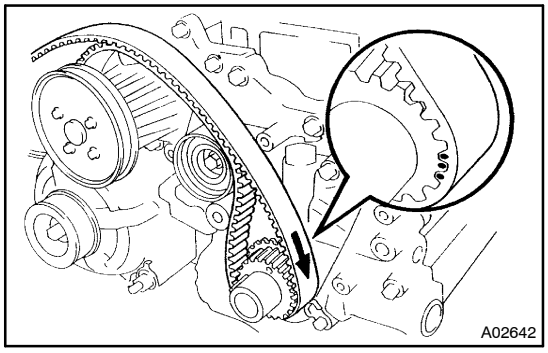
NOTICE:

Do not turn the crankshaft pulley.

20. REMOVE NO. 1 TIMING BELT COVER

Remove the 5 bolts, timing belt cover and gasket.

21. REMOVE TIMING BELT GUIDE

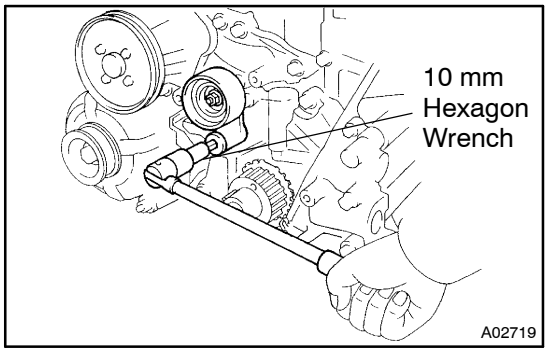


22. REMOVE TIMING BELT

HINT:

(When re–using timing belt):

Draw an arrow on the timing belt in the direction of engine revolution, and place matchmarks on the timing belt and crankshaft timing pulley.

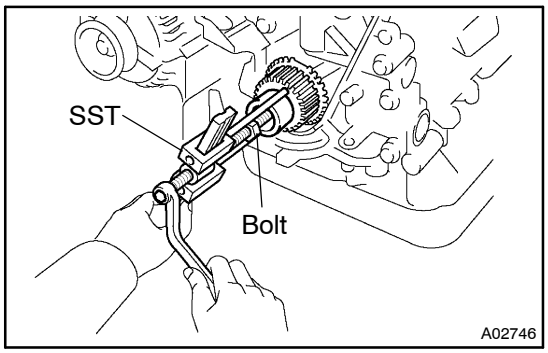


23. REMOVE IDLER PULLEY

Using a 10 mm hexagon wrench, remove the pivot bolt, plate washer and idler pulley.

24. REMOVE CRANKSHAFT TIMING PULLEY

(a) Remove the bolt and timing belt plate.



(b) Remove the crankshaft timing pulley.

If the pulley cannot be removed by hand, use SST and bolt (diameter: 8 mm, pitch: 1.5 mm) to remove the crankshaft timing pulley.

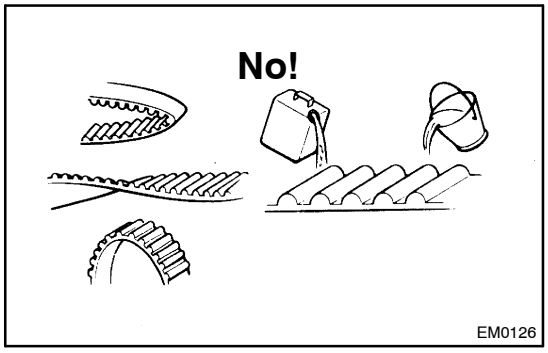
SST 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05011)

Bolt: Part No. 90119–18001

NOTICE:

- **Do not scratch the sensor part the crankshaft timing pulley.**
- **Do not turn the timing pulley.**

EM0D7–07



INSPECTION

1. INSPECT TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out. Do not allow the timing belt to come into contact with oil, water or steam.**
- **Do not utilize timing belt tension when installing or removing the mount bolt of the camshaft timing pulley.**

If there are any defects, as shown in the illustrations, check the following points.

(a) Premature parting
- Check for proper installation.
- Check the timing cover gasket for damage and proper installation.

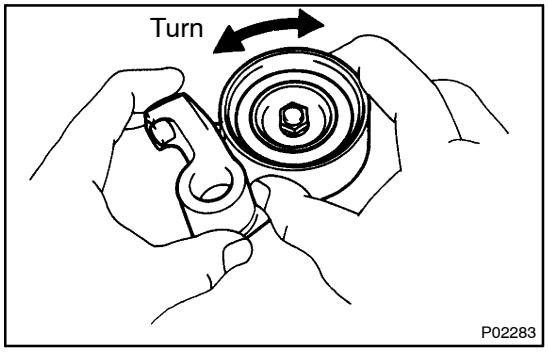
(b) If the belt teeth are cracked or damaged, check to see if either camshaft is locked.

(c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on the side of the idler pulley lock.

(d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.

(e) If there is noticeable wear on the belt teeth, check timing cover for damage and check gasket has been installed correctly and for foreign material on the pulley teeth.

If necessary, replace the timing belt.



2. INSPECT IDLER PULLEY

(a) Visually check the seal portion of the idler pulley for oil leakage.

If leakage is found, replace the idler pulley.

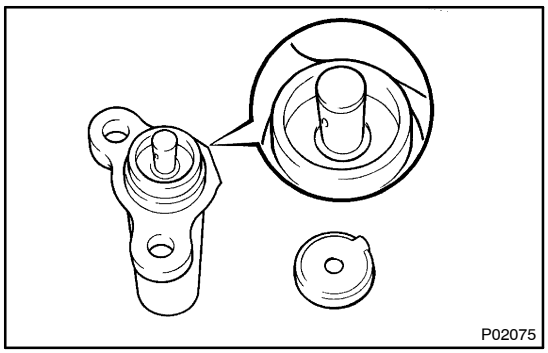
(b) Check the turning smoothness of the idler pulley.

If necessary, replace the idler pulley.

3. INSPECT DRIVE BELT TENSIONER

Check the turning smoothness of the tensioner.

If necessary, replace the tensioner.



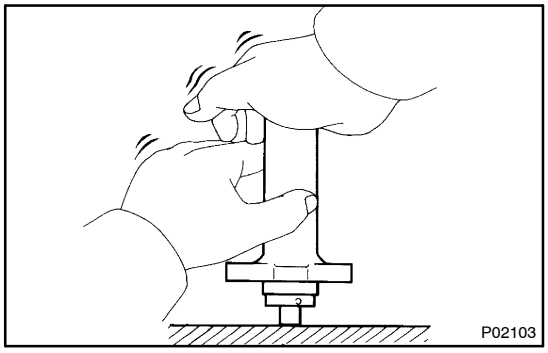
4. INSPECT TIMING BELT TENSIONER

(a) Visually check tensioner for oil leakage.

HINT:

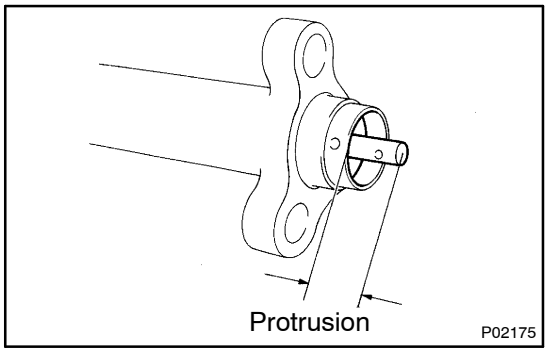
If there is only the faintest trace of oil on the seal on the push rod side, the tensioner is all right.

If leakage is found, replace tensioner.



(b) Hold the tensioner with both hands and push the push rod strongly against the floor or wall to check that it doesn't move.

If the push rod moves, replace the tensioner.



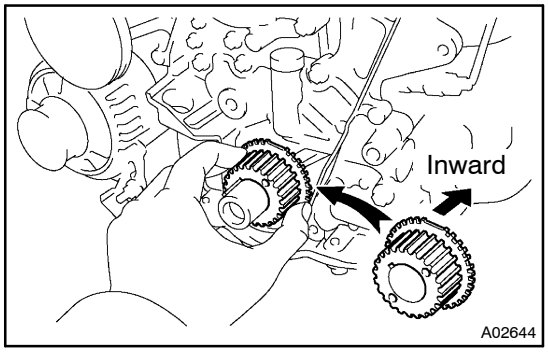
(c) Measure the protrusion of the push rod from the housing end.

Protrusion: 8.0 – 8.8 mm (0.315 – 0.346 in.)

If the protrusion is not as specified, replace the tensioner.

EM1S4–01

INSTALLATION



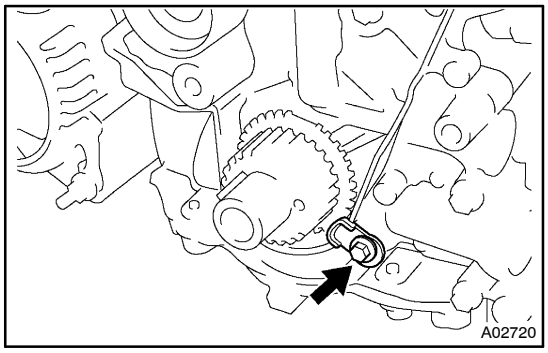
1. INSTALL CRANKSHAFT TIMING PULLEY

(a) Align the pulley set key with the key groove of the pulley.

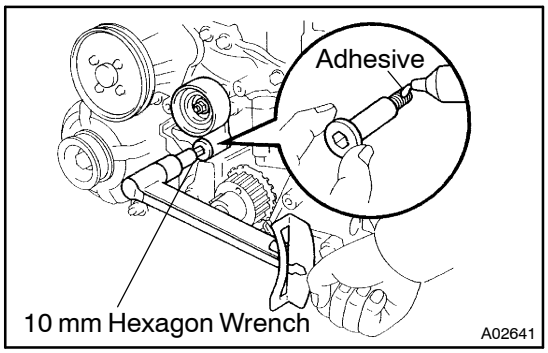
(b) Slide on the timing pulley facing the flange side inward.

NOTICE:

Do not scratch the sensor part of the crankshaft timing pulley.



(c) Install the timing belt plate with the bolt.
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

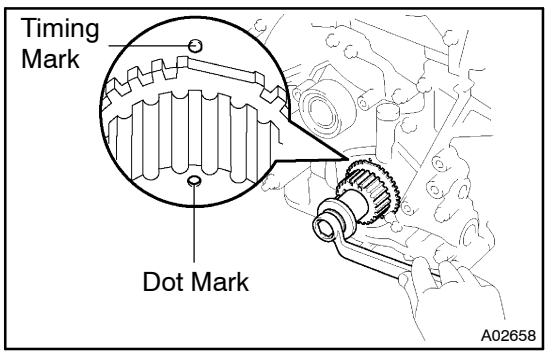


2. INSTALL IDLER PULLEY

(a) Apply adhesive to 2 or 3 threads of the pivot bolt.
Adhesive:
Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using a 10 mm hexagon wrench, install the plate washer and pulley with the pivot bolt.
Torque: 35 N·m (350 kgf·cm, 26 ft·lbf)

(c) Check that the pulley bracket moves smoothly.



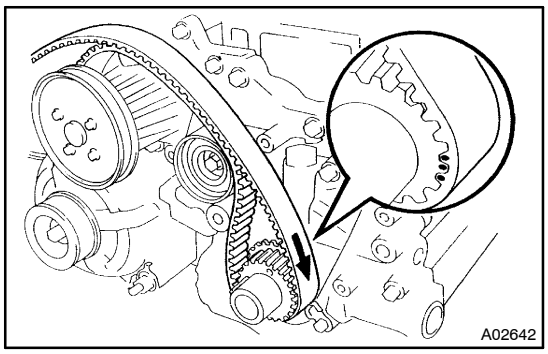
3. TEMPORARILY INSTALL TIMING BELT

NOTICE:

The engine should be cold.

(a) Use the crankshaft pulley bolt to turn the crankshaft, and align the dot mark on the crankshaft timing pulley and the timing mark on the oil pump body.

(b) Remove any oil or water on the crankshaft timing pulley and idler pulley, and keep them clean.

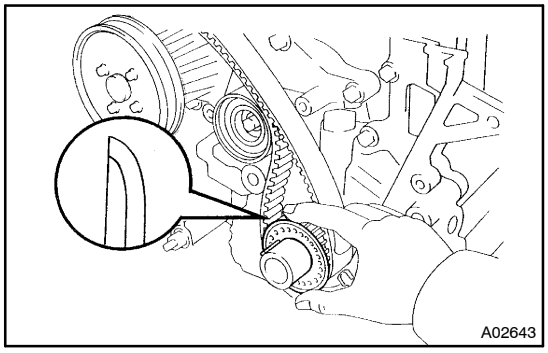


(c) Install the timing belt on the crankshaft timing pulley and idler pulley.

HINT:

When re–using timing belt:

Align the matchmarks of the crankshaft timing pulley and timing belt, and install the belt with the arrow pointing in the direction of engine revolution.



4. INSTALL TIMING BELT GUIDE

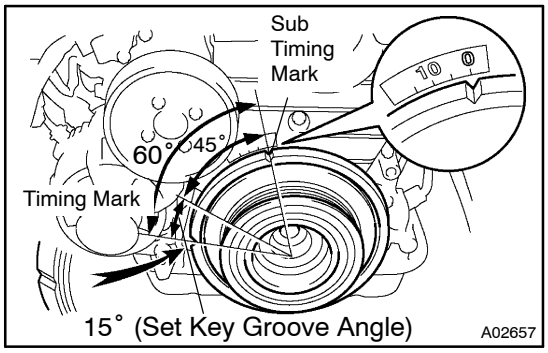
Install the guide, facing the cup side outward.

5. INSTALL NO. 1 TIMING BELT COVER

(a) Install the gasket to the timing belt cover.

(b) Install the timing belt cover with the 5 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)



6. INSTALL CRANKSHAFT PULLEY

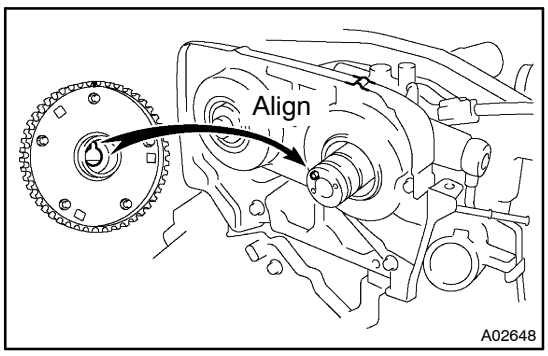
(a) Align the pulley set key with the key groove of the pulley, and slide on the pulley.

(b) Check that the sub timing mark (60° mark BTDC) of the crankshaft pulley is aligned with the timing mark "0" of the No. 1 timing belt cover.

HINT:

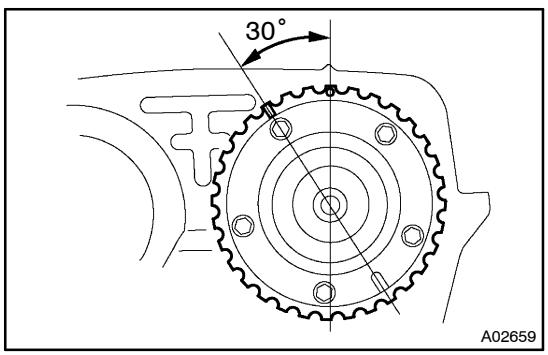
At this time, the crankshaft pulley set key groove and the timing mark (TDC mark) of the crankshaft pulley are as shown the illustration.

(c) Temporarily install the pulley bolt.

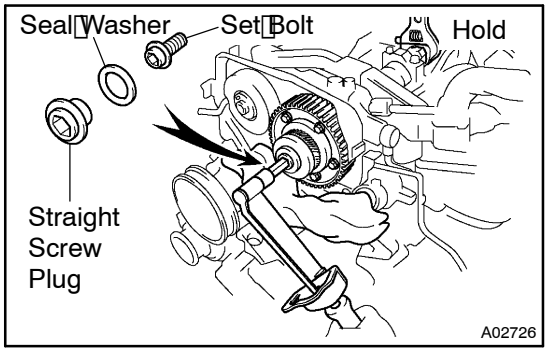


7. INSTALL VVT–i (INTAKE CAMSHAFT TIMING) PULLEY

(a) Align the camshaft knock pin with the VVT–i pulley, and push the VVT–i pulley by hand until you feel it touch the bottom.



(b) Check that the outer circumference of the VVT–i pulley easily rotates through 30°.



(c) Holding the hexagon portion of the camshaft with a wrench.

(d) Using a 10 mm hexagon wrench, and the set bolt.
Torque: 81 N·m (810 kgf·cm, 60 ft·lbf)

(e) Using a 14 mm hexagon wrench, install the straight screw plug with the seal washer to the set bolt.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(f) Align the dot mark on the camshaft timing pulley with the timing mark of the No.4 timing belt cover.

(g) Remove the wrench.

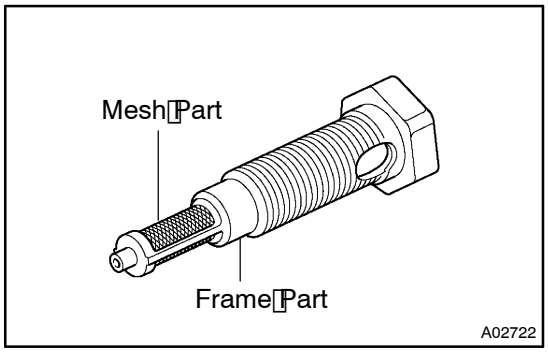
8. CONNECT NO. 1 OIL PIPE

(a) Install the union bolt to the oil control valve filter.

NOTICE:
In case of touching the filter, avoid holding the mesh part and holding the frame part.

(b) Install the oil pipe with 2 new gasket and the union bolt to the No.3 camshaft bearing cap.
Torque: 55 N·m (550 kgf·cm, 41 ft·lbf)

9. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE
(See page FI–43)



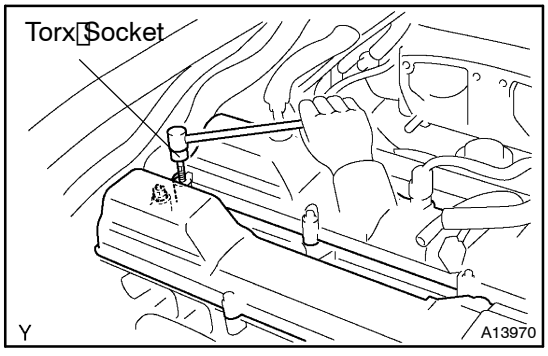
10. INSTALL NO. 1 CYLINDER HEAD COVER

(a) Install the cylinder head and gasket with the 6 bolts.
Torque: 8.5 N·m (85 kgf·cm, 75 in.·lbf)

(b) Using a torx socket (E5), install the 2 stud bolts.
Torque: 8.5 N·m (85 kgf·cm, 75 in.·lbf)

(c) Install the 2 nuts to the 2 stud bolts.
Torque: 8.5 N·m (85 kgf·cm, 75 in.·lbf)

(d) Install the high–tension cords and clamps with the 2 bolts.
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

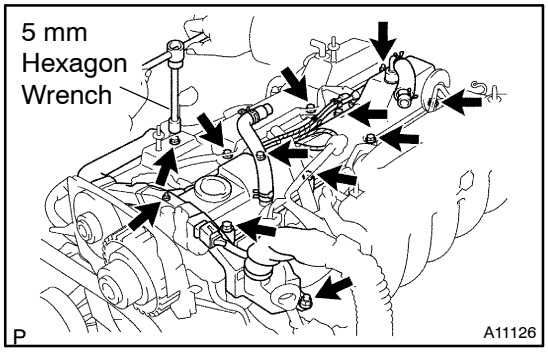


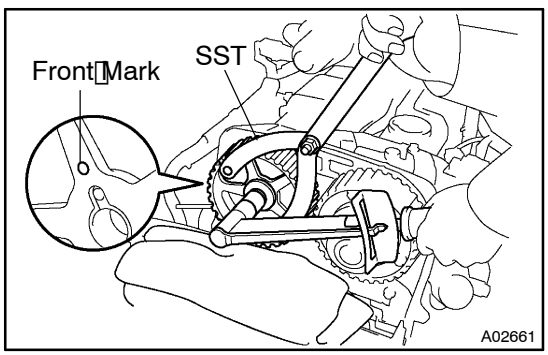
(e) Using a 5 mm hexagon wrench, install the engine wire protector with the bolt and nut.

11. INSTALL THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY (See page EM–5)

12. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.



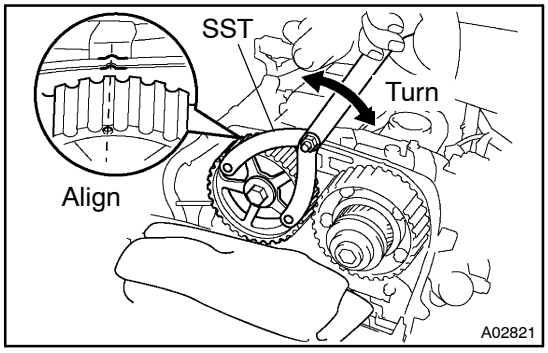


13. INSTALL EXHAUST CAMSHAFT TIMING PULLEY

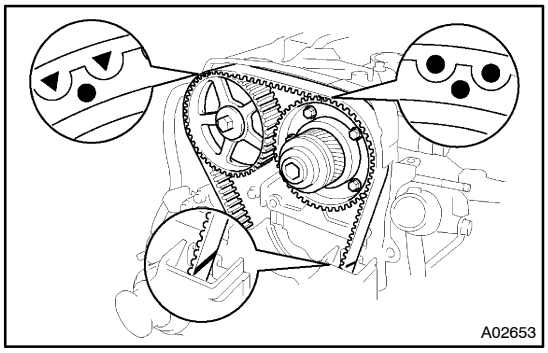
(a) Align the camshaft knock pin with the groove on the pulley, and slide on the timing pulley.

(b) Slide the timing pulley on the camshaft, facing the front mark forward.

(c) Using SST, install the pulley bolt.
SST 09960–10010 (09962–01000, 09963–01000)
Torque: 81 N·m (810 kgf·cm, 60 ft·lbf)



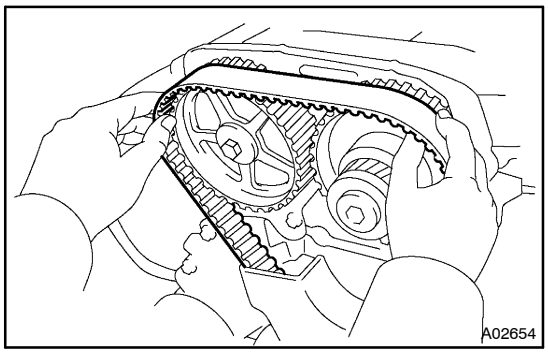
(d) Using SST, align the dot mark on the camshaft timing timing pulley with the timing mark of the No. 4 timing belt cover.
SST 09960–10010 (09962–01000, 09963–01000)



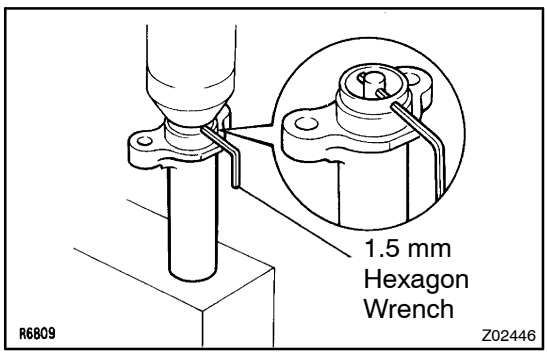
14. CONNECT TIMING BELT TO CAMSHAFT TIMING PULLEYS

HINT:
When re–using timing belt:

- Check that the matchmark on the timing belt matches the end of the No.1 timing belt cover.
  If the matchmark does not align, shift the meshing of the timing belt and crankshaft timing pulley until they align.
- Align the matchmarks of the timing belt and camshaft timing pulleys.

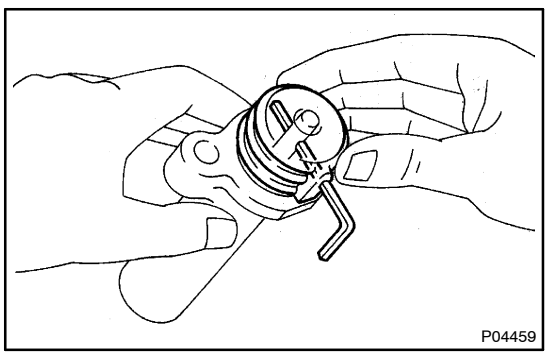


(a) Remove any oil or water on the camshaft timing pulley, and keep it clean.
(b) Install the timing belt, checking the tension between the crankshaft timing pulley and intake camshaft timing pulley.

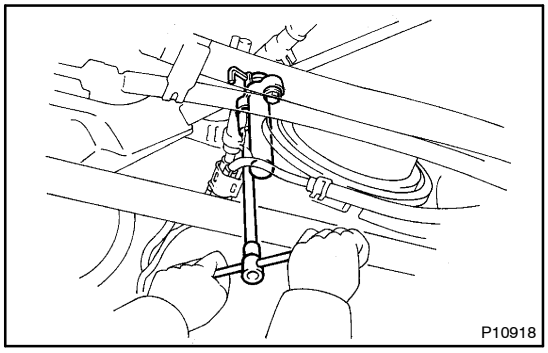


15. SET TIMING BELT TENSIONER

(a) Using a press, slowly press in the push rod using 981 – 9,807 N (100 – 1,000 kgf, 220 – 2,205 lbf) of force.
(b) Align the holes of the push rod and housing, pass a 1.5 mm hexagon wrench through the holes to keep the push rod retracted.
(c) Release the press.



(d) Install the dust boot onto the tensioner.

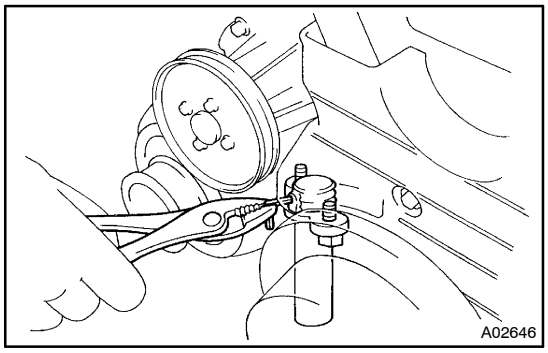


16. INSTALL TIMING BELT TENSIONER

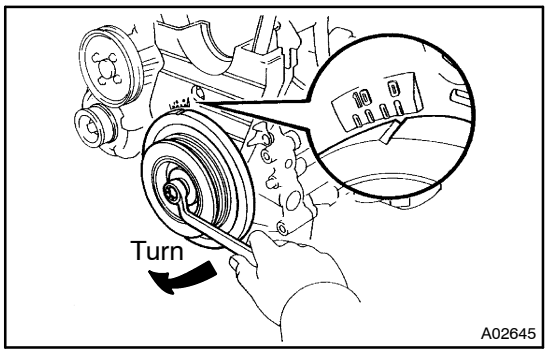
(a) Temporarily install the tensioner with the 2 bolts.

(b) Alternately tighten the 2 bolts.

Torque: 27 N·m (270 kgf·cm, 20 ft·lbf)



(c) Remove the 1.5 mm hexagon wrench from the tensioner with pliers.

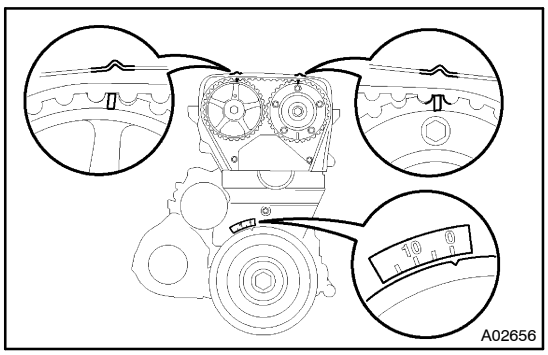


17. CHECK VALVE TIMING

(a) Slowly turn the crankshaft pulley 2 revolutions from TDC to TDC.

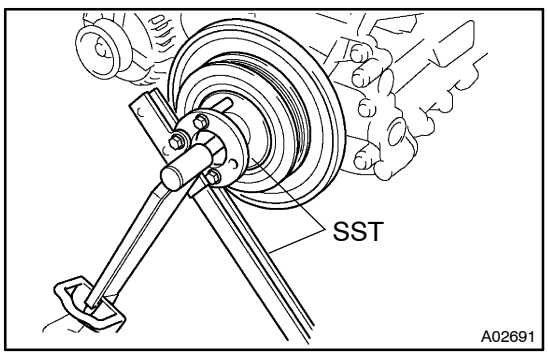
NOTICE:

Always turn the crankshaft clockwise.



(b) Check that each pulley aligns with the timing marks as shown in the illustration.

If the marks do not align, remove the timing belt and reinstall it.



18. TIGHTEN CRANKSHAFT PULLEY BOLT

Using SST, install the pulley bolt.

SST 09213–70011, 09330–00021

Torque: 330 N·m (3,300 kgf·cm, 243 ft·lbf)

19. INSTALL DRIVE BELT TENSIONER

Install the tensioner with the 3 bolts.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

NOTICE:

Be careful not to drop the bolts inside the timing belt cover.

20. INSTALL NO. 2 TIMING BELT COVER

(a) Install the gasket on the timing belt cover.

(b) Using a 5 mm hexagon wrench, install the timing belt cover with the 3 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

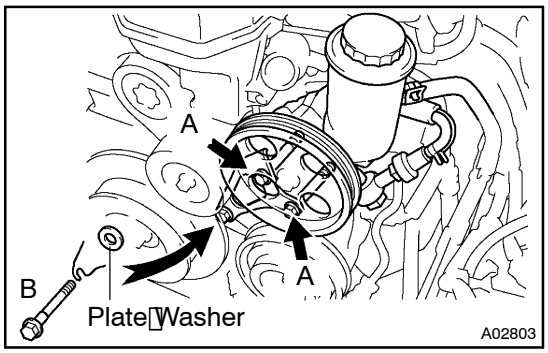
21. INSTALL NO. 3 TIMING BELT COVER

(a) Install the gasket on the timing belt cover.

(b) Using a 5 mm hexagon wrench, install the timing belt cover with the 4 bolts.

Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

(c) Install the oil filler cap.



22. INSTALL PS PUMP AND FRONT BRACKET

(a) Temporarily install the vane pump to the bracket.

(b) Install the plate washer and front bracket with the 3 bolts.

Torque: 58 N·m (590 kgf·cm, 43 ft·lbf) for A bolts
52 N·m (530 kgf·cm, 38 ft·lbf) for B bolt

23. INSTALL DRIVE BELT (See page CH–1)

24. INSTALL RADIATOR ASSEMBLY (See page CO–20)

25. FILL ENGINE WITH COOLANT

26. START ENGINE CHECK FOR LEAKS

27. INSTALL ENGINE UNDER COVER

28. ROAD TEST

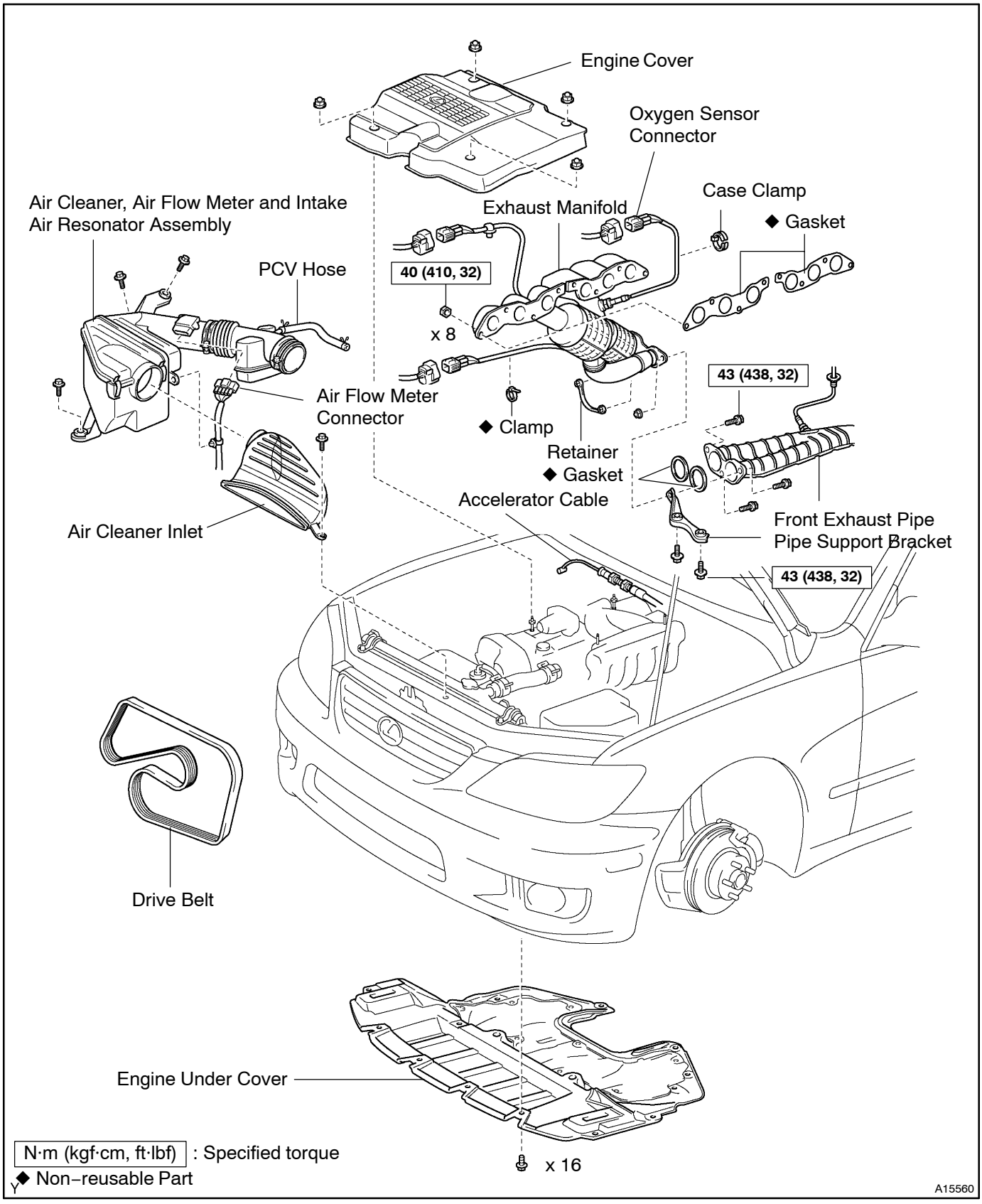
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

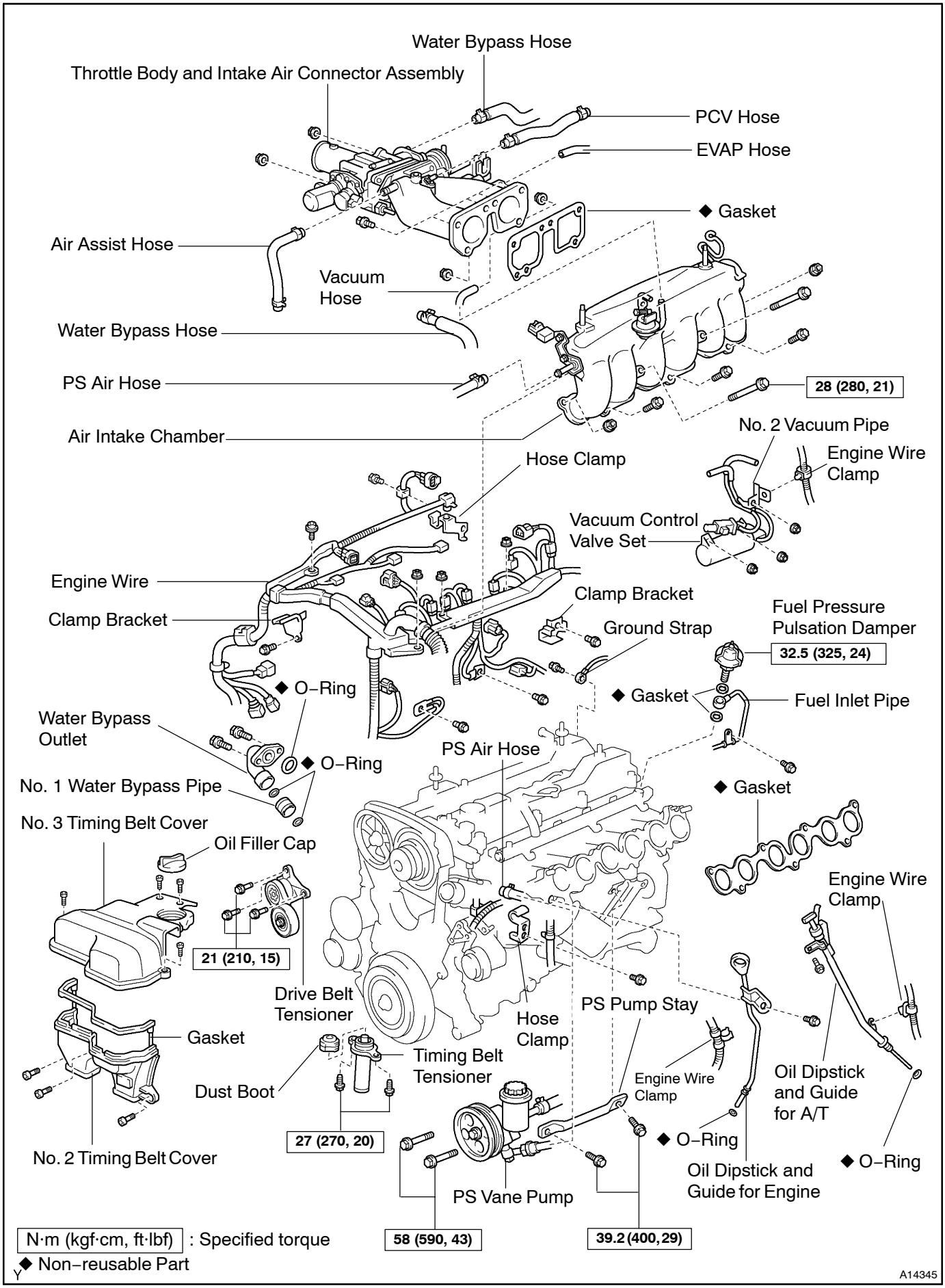
29. RECHECK ENGINE COOLANT LEVEL

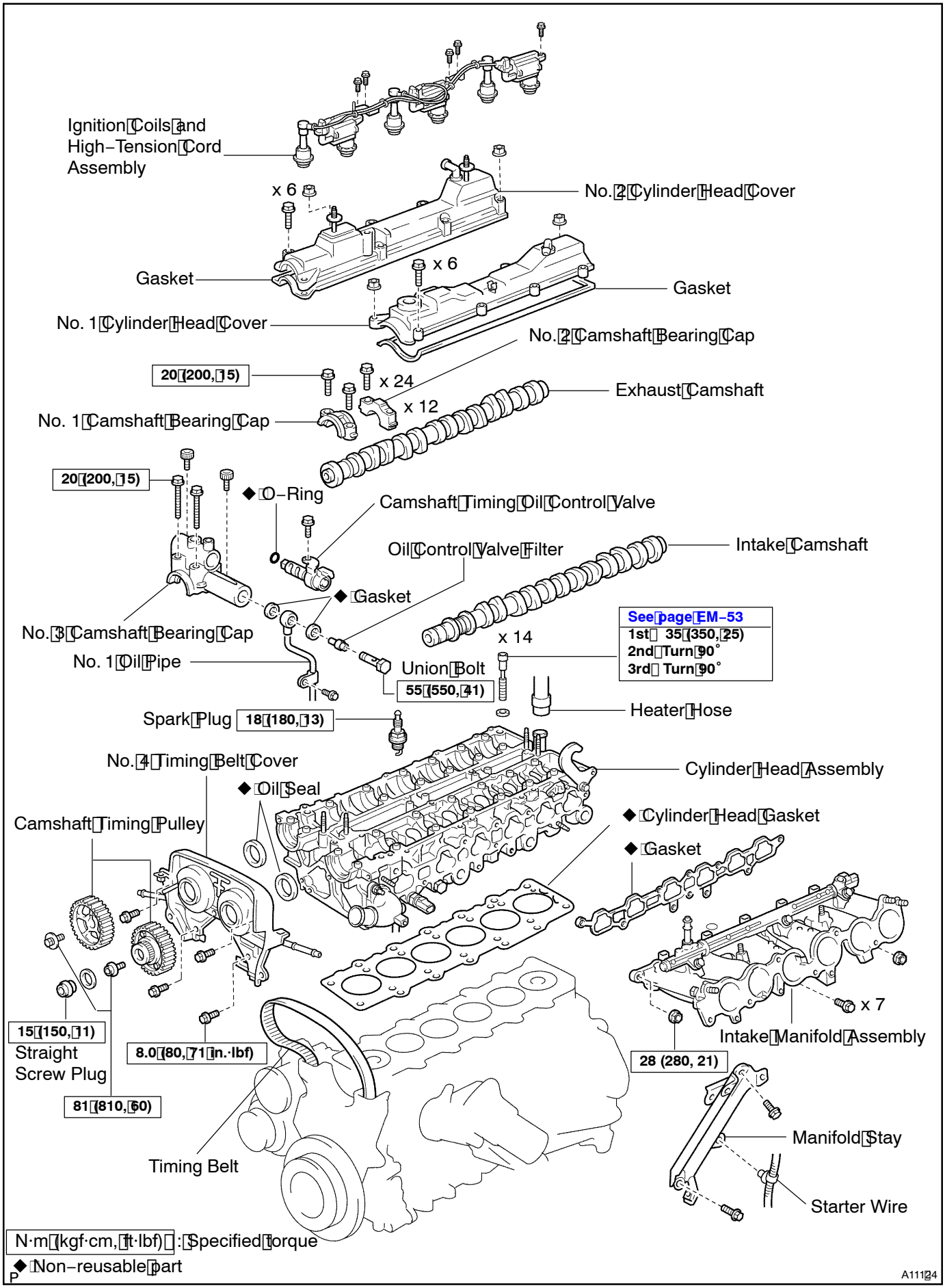
CYLINDER HEAD

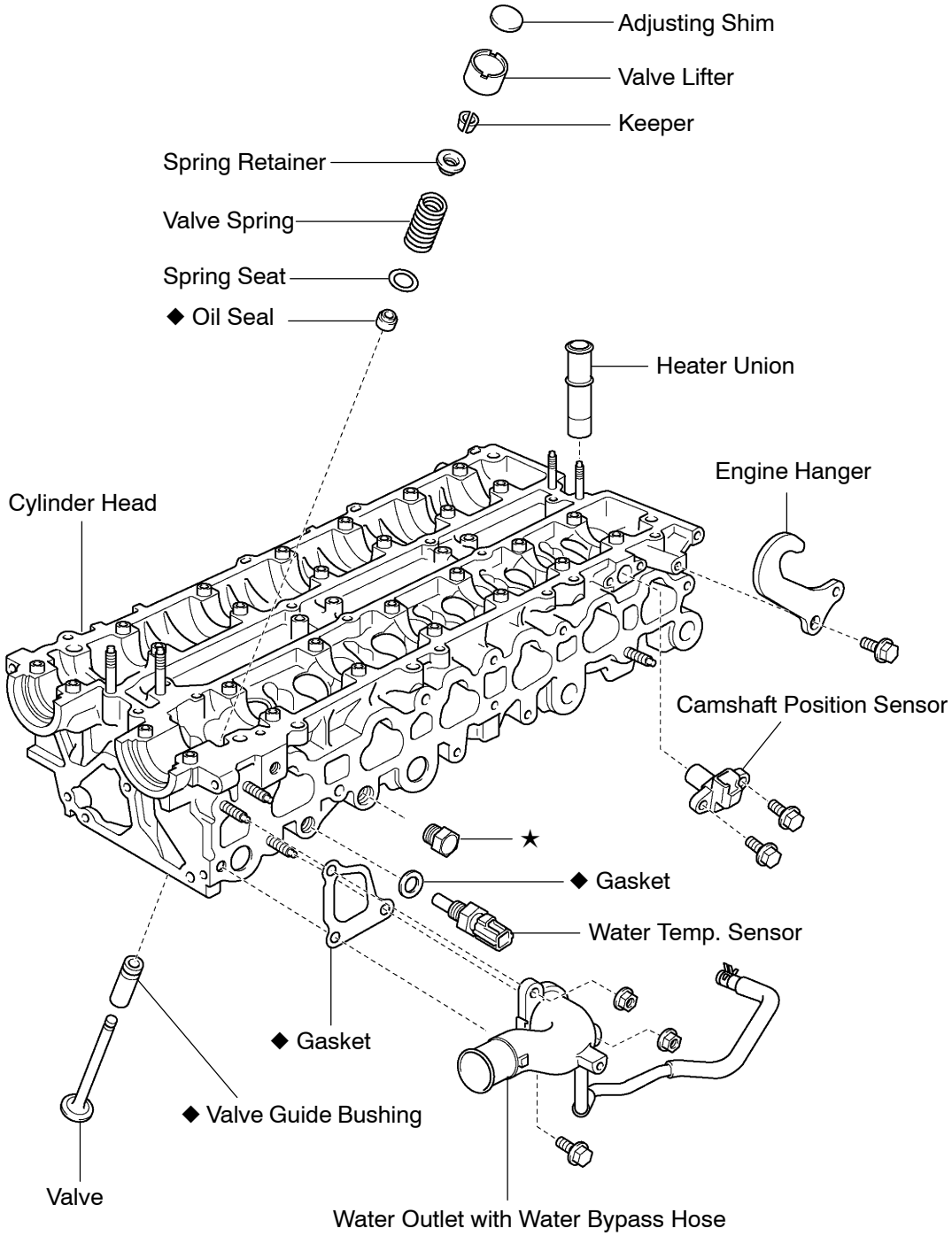
COMPONENTS

EM0D9–07




Water Bypass Hose
Throttle Body and Intake Air Connector Assembly
PCV Hose
EVAP Hose
◆ Gasket
Air Assist Hose
Vacuum Hose
Water Bypass Hose
PS Air Hose
28 (280, 21)
Air Intake Chamber
No. 2 Vacuum Pipe
Engine Wire Clamp
Hose Clamp
Vacuum Control Valve Set
Engine Wire
Clamp Bracket
Clamp Bracket
Ground Strap
Fuel Pressure Pulsation Damper
32.5 (325, 24)
◆ O–Ring
◆ Gasket
Fuel Inlet Pipe
Water Bypass Outlet
PS Air Hose
◆ O–Ring
No. 1 Water Bypass Pipe
◆ Gasket
No. 3 Timing Belt Cover
Oil Filler Cap
Engine Wire Clamp
21 (210, 15)
Drive Belt Tensioner
Hose Clamp
PS Pump Stay
Gasket
Timing Belt Tensioner
Dust Boot
Engine Wire Clamp
Oil Dipstick and Guide for A/T
◆ O–Ring
27 (270, 20)
◆ O–Ring
No. 2 Timing Belt Cover
Oil Dipstick and Guide for Engine
PS Vane Pump
58 (590, 43)
39.2 (400, 29)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable Part
A14345


Ignition Coils and High–Tension Cord Assembly
x 6
No. 2 Cylinder Head Cover
Gasket
x 6
Gasket
No. 1 Cylinder Head Cover
No. 2 Camshaft Bearing Cap
20 (200, 15)
x 24
Exhaust Camshaft
x 12
No. 1 Camshaft Bearing Cap
20 (200, 15)
◆ O–Ring
Camshaft Timing Oil Control Valve
Oil Control Valve Filter
Intake Camshaft
◆ Gasket
No. 3 Camshaft Bearing Cap
x 14
See page EM–53
1st 35 (350, 25)
2nd Turn 90°
3rd Turn 90°
No. 1 Oil Pipe
Union Bolt
55 (550, 41)
Heater Hose
Spark Plug
18 (180, 13)
No. 4 Timing Belt Cover
Cylinder Head Assembly
◆ Oil Seal
◆ Cylinder Head Gasket
Camshaft Timing Pulley
◆ Gasket
x 7
Intake Manifold Assembly
15 (150, 11)
Straight Screw Plug
8.0 (80, 71 in.·lbf)
28 (280, 21)
81 (810, 60)
Manifold Stay
Timing Belt
Starter Wire
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
A11124



◆ Non–reusable part
Y ★ Precoated part

A14344

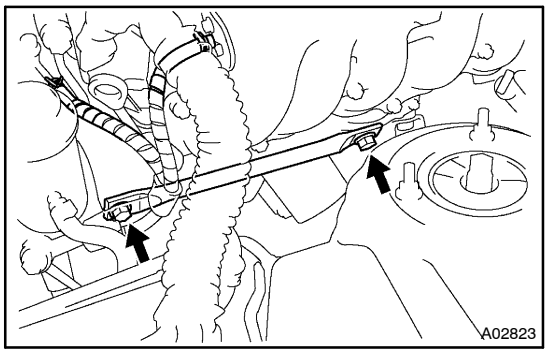
EM1S5–01

REMOVAL

1. **REMOVE ENGINE UNDER COVER**
2. **DRAIN ENGINE COOLANT**
3. **DISCONNECT UPPER RADIATOR HOSE FROM WATER OUTLET**
4. **REMOVE ENGINE COVER**

Remove the 4 nuts and engine cover.

5. **REMOVE AIR CLEANER INLET**
6. **REMOVE AIR CLEANER, AIR FLOW METER AND INTAKE AIR RESONATOR ASSEMBLY (See page EM–64)**
7. **REMOVE DRIVE BELT (See page CH–1)**

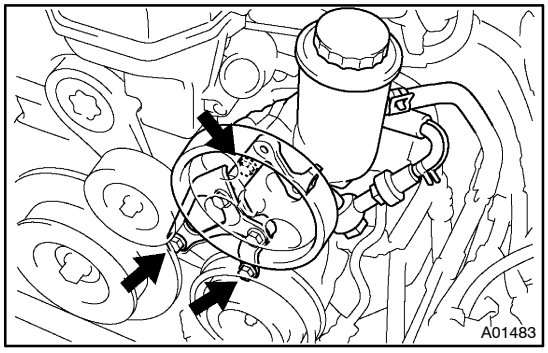


8. **DISCONNECT PS PUMP WITHOUT DISCONNECTING HOSES**

(a) Disconnect the PS air hose from the No. 4 timing belt cover.

(b) Disconnect the PS air hose from the air intake chamber.

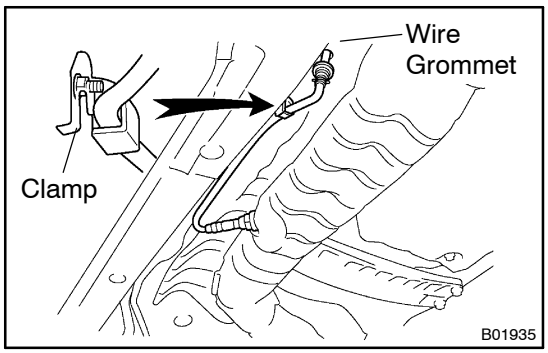
(c) Remove the 2 bolts and pump rear stay.



(d) Remove the 3 bolts and plate washer, and disconnect the vane pump assembly from the engine.

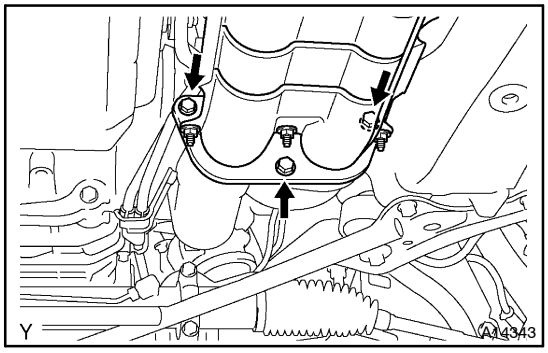
HINT:

Put aside the vane pump, and suspend it.

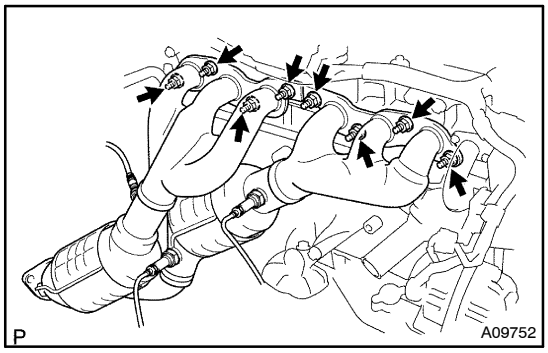


9. **DISCONNECT FRONT EXHAUST PIPE FROM EXHAUST MANIFOLD**

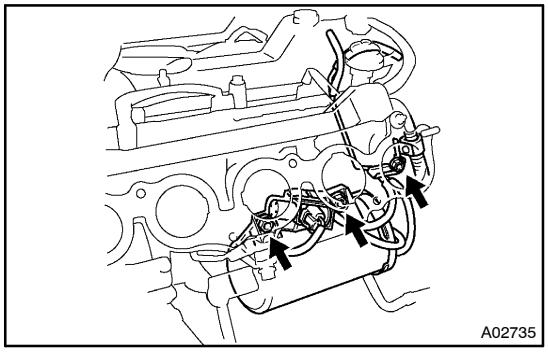
(a) Disconnect the wire grommet and sensor wire of the oxygen sensor (bank 2 sensor 2) from the hole and clamp on the floor.



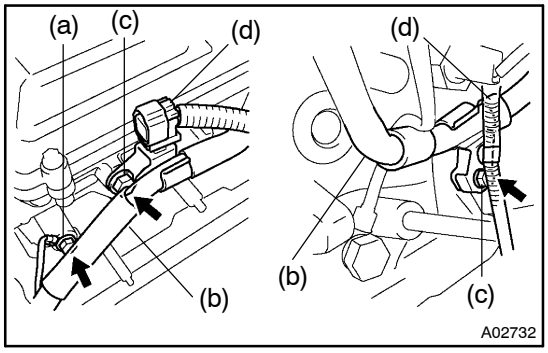
(b) Remove the 3 bolts, nuts and retainer holding the front exhaust pipe to the exhaust manifold.
(c) Disconnect the front exhaust pipe from the exhaust manifold, and remove the 2 gaskets.



10. REMOVE EXHAUST MANIFOLD
(a) Disconnect the 3 oxygen sensor connectors and clamp.
(b) Remove the clamp and case clamp.
(c) Using a 14 mm deep socket wrench, remove the 8 nuts, exhaust manifold and 2 gaskets.
11. REMOVE WATER BYPASS OUTLET AND NO. 1 WATER BYPASS PIPE (See page CO–9)
12. REMOVE THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY (See page EM–5)
13. REMOVE OIL DIPSTICK AND GUIDE FOR ENGINE (See page LU–6)
14. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page EM–64)
15. REMOVE AIR INTAKE CHAMBER (See page FI–46)



16. REMOVE VACUUM CONTROL VALVE SET AND NO. 2 VACUUM PIPE
(a) Disconnect the VSV connector for the ACIS.
(b) Remove the 3 nuts, vacuum control valve set and No. 2 vacuum pipe.
(c) Disconnect the engine wire clamp from the clamp bracket of the No. 2 vacuum pipe.
17. REMOVE NO. 3 TIMING BELT COVER
18. REMOVE IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page IG–6)
19. REMOVE SPARK PLUGS



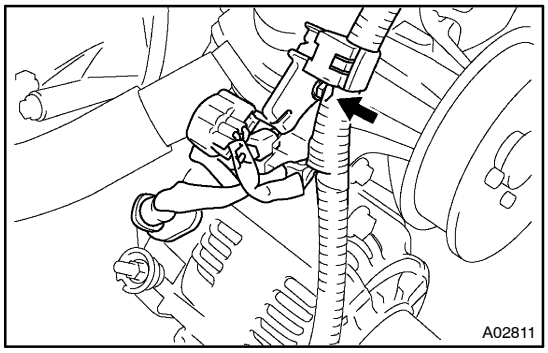
20. DISCONNECT ENGINE WIRE FROM CYLINDER HEAD

(a) Disconnect the ground strap from the cylinder head.

(b) Disconnect the 2 water bypass hoses from the hose clamps on the cylinder head and oil filter bracket.

(c) Remove the 2 bolts and hose clamps.

(d) Disconnect the oxygen sensor (bank 2 sensor 1) connector and engine wire clamp from the hose clamps.

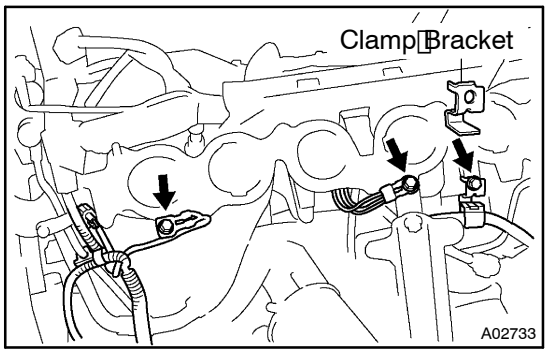


(e) Disconnect the oxygen sensor (bank 1 sensor 1) connector.

(f) Disconnect the crankshaft position sensor connector.

(g) Disconnect the alternator connector.

(h) Remove the bolt and clamp bracket, and disconnect the engine wire from the water pump.



(i) Disconnect the 2 ground terminals from the intake manifold.

(j) Disconnect the 2 engine wire clamps from the No. 1 oil pipe and clamp bracket on the intake manifold.

(k) Remove the bolt and clamp bracket.

(l) Disconnect the water temperature sensor connector.

(m) Remove the 2 knock sensor connectors.

(n) Remove the oil pressure switch connector.

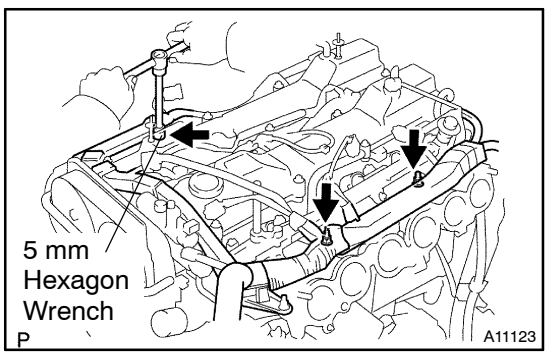
(o) Remove the oil level sensor connector.

(p) Remove the starter connector.

(q) Remove the 6 injector connectors.

(r) Remove the camshaft timing oil control valve connector.

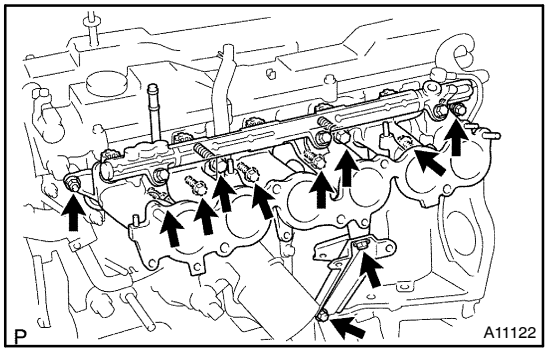
(s) Remove the camshaft position sensor connector.



(t) Using a 5 mm hexagon wrench, remove the bolt holding the engine wire protector to the No. 2 cylinder head cover.

(u) Remove the 3 nuts, and disconnect the engine wire protector from the intake manifold.

21. REMOVE FUEL PRESSURE PULSATION DAMPER (See page FI–26)

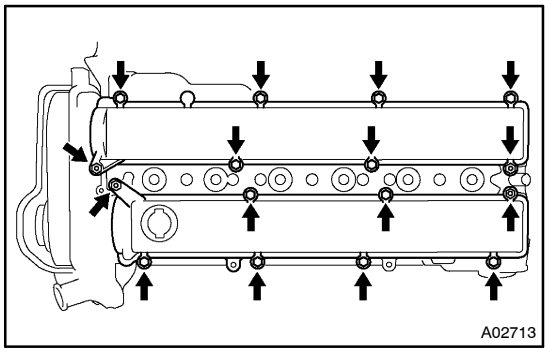


22. REMOVE INTAKE MANIFOLD ASSEMBLY

(a) Disconnect the starter wire from the manifold stay.

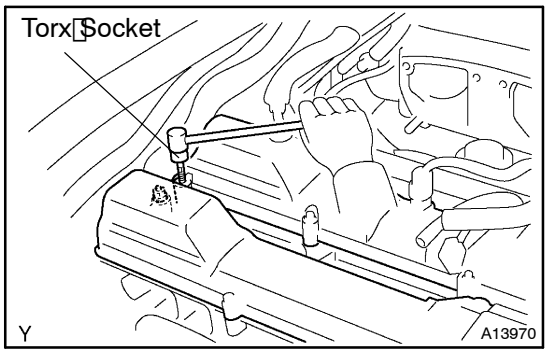
(b) Remove the 2 bolts and manifold stay.

(c) Remove the 7 bolts, 2 nuts, intake manifold and delivery pipe assembly and gasket.



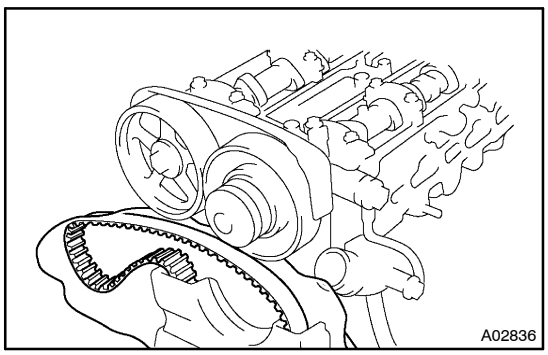
23. REMOVE NO. 1 AND NO. 2 CYLINDER HEAD COVERS

(a) Remove the 12 bolts and 4 nuts.



(b) Using a torx socket (E5), remove the 4 stud bolts.

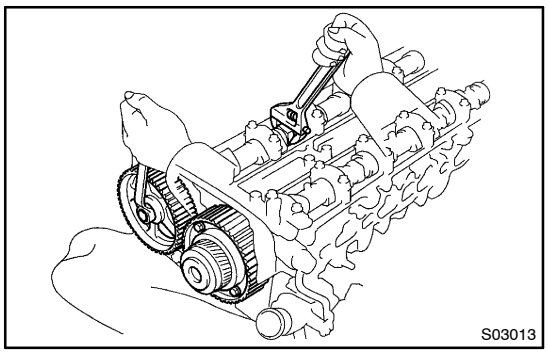
(c) Remove the cylinder head covers and gaskets.



24. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS (See page EM–17)

NOTICE:

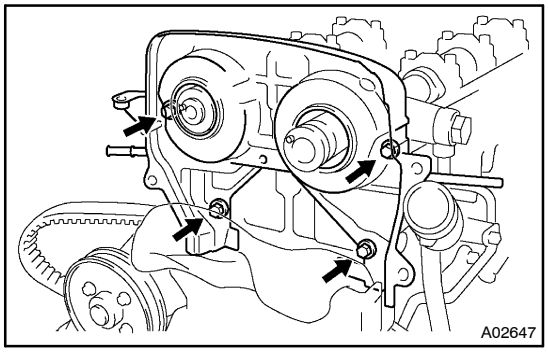
- **Support the timing belt, so that the measuring of the crankshaft timing pulley and timing belt does not shift.**
- **Be careful not to drop anything inside the timing belt cover.**
- **Do not allow the timing belt to come into contact with oil, water or dust.**



25. REMOVE CAMSHAFT TIMING PULLEYS

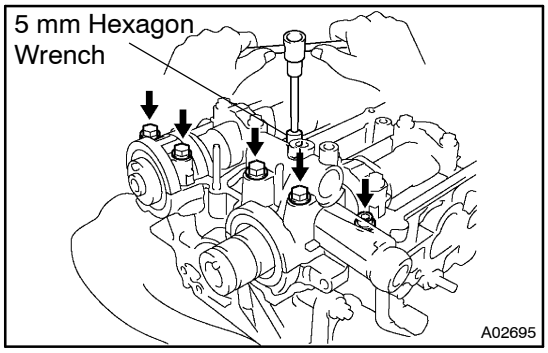
(a) Remove the exhaust camshaft timing pulley.
Hold the hexagon portion of the camshaft with a wrench, and remove the pulley bolt and camshaft pulley.

(b) Remove the VVT-i (intake camshaft timing) pulley (See page EM–17).



26. REMOVE NO. 4 TIMING BELT COVER

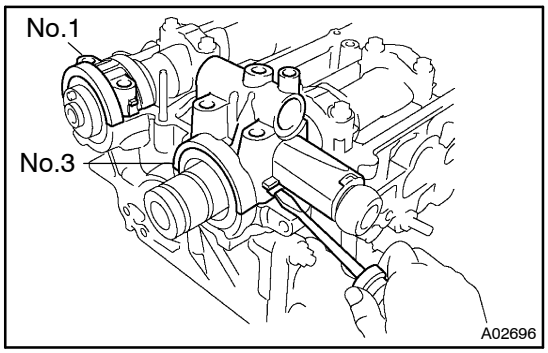
Remove the 4 bolts and timing belt cover.



27. REMOVE CAMSHAFTS

(a) Using a 5 mm hexagon wrench, the 2 No. 3 camshaft bearing cap bolts.

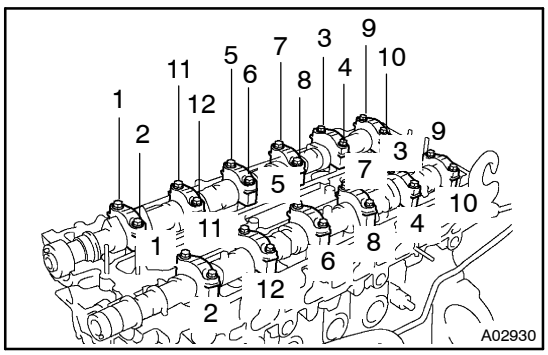
(b) Uniformly loosen and remove the 4 camshaft bearing cap bolts.



(c) Using a screwdriver, pry out the No. 1, 3 camshaft bearing caps and oil seals.

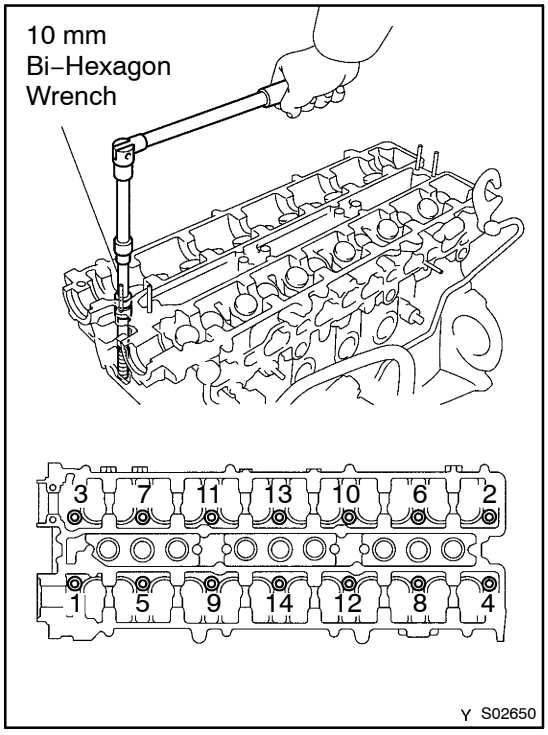
NOTICE:

Be careful not to damage the cap. Tape the screwdriver tip.



(d) Uniformly loosen and remove the 12 camshaft bearing cap bolts, in several passes, in the sequence shown.

(e) Remove the 6 No. 2 camshaft bearing caps and camshaft. Remove the intake and exhaust camshafts.



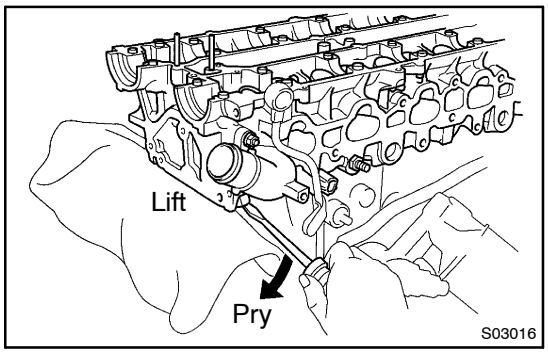
28. REMOVE CYLINDER HEAD ASSEMBLY

(a) Using a 10 mm bi–hexagon wrench, uniformly loosen and remove the 14 cylinder head bolts, in several passes, in the sequence shown.

NOTICE:

Cylinder head warpage or cranking could result from removing in incorrect order.

(b) Remove the 14 plate washers.



(c) Lift the cylinder head from the dowels on the cylinder block.

(d) Disconnect the heater hose from the heater union.

(e) Place the head on wooden blocks on a bench.

If the cylinder head is difficult to lift off, pry with a screwdriver between the cylinder head and block projection.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

EM0DB–04

DISASSEMBLY

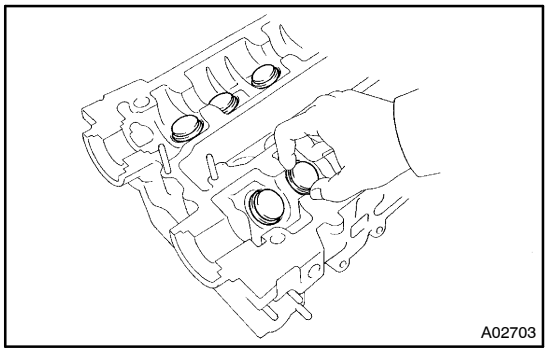
1. REMOVE WATER OUTLET WITH WATER BYPASS HOSE

Remove the 2 nuts, bolt, water outlet and gasket.

2. REMOVE ENGINE HANGER

3. REMOVE CAMSHAFT POSITION SENSOR

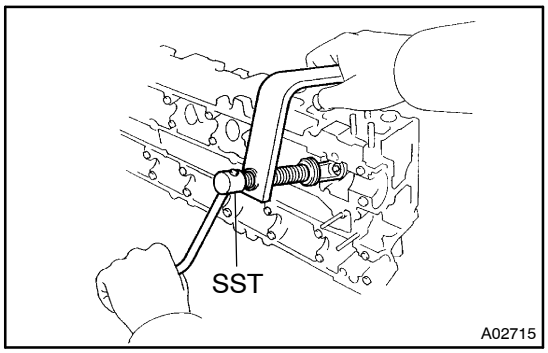
4. REMOVE ECT SENSOR



5. REMOVE VALVE LIFTERS AND SHIMS

HINT:

Store the valve lifters and shims in correct order.



6. REMOVE VALVES

(a) Using SST, compress the valve spring and remove the 2 keepers.

SST 09202–70020 (09202–00010)

(b) Remove the spring retainer, valve spring, valve and spring seat.

HINT:

Store the valves, valve springs, spring seats and spring retainers in correct order.

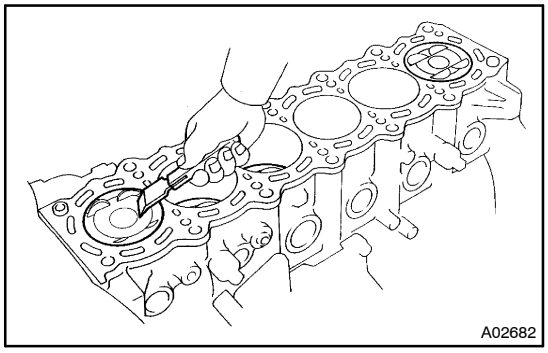
(c) Using needle–nose pliers, remove the oil seal.

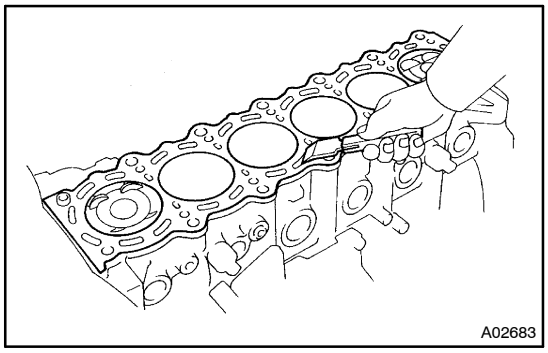
EM0DC–05

INSPECTION

1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

(a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.





(b) Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

(c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

Protect your eyes when using high – pressure compressed air.

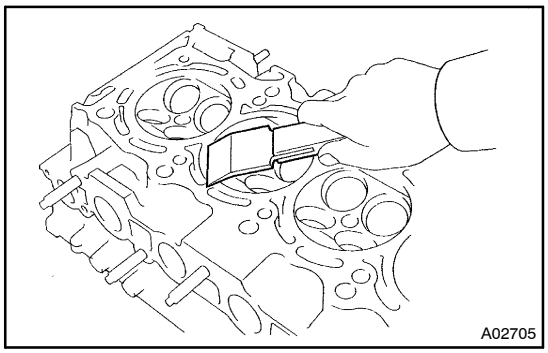
2. CLEAN CYLINDER HEAD

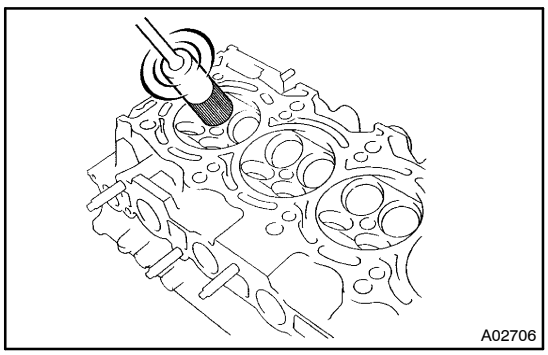
(a) Remove the gasket material.

Using a gasket scraper, remove all the gasket material from the cylinder block surface.

NOTICE:

Be careful not to scratch the cylinder block contact surface.



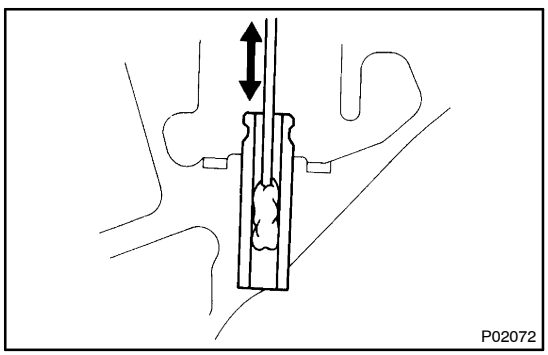


(b) Clean the combustion chambers.

Using a wire brush, remove all the carbon from the combustion chambers.

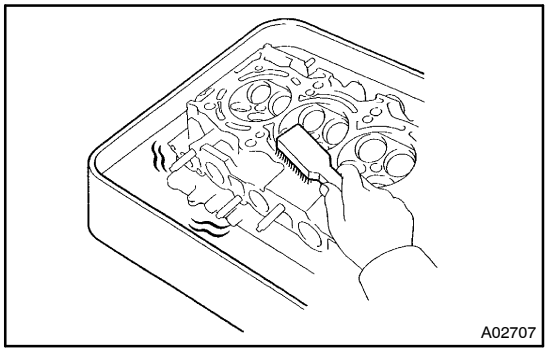
NOTICE:

Be careful not to scratch the cylinder block contact surface.

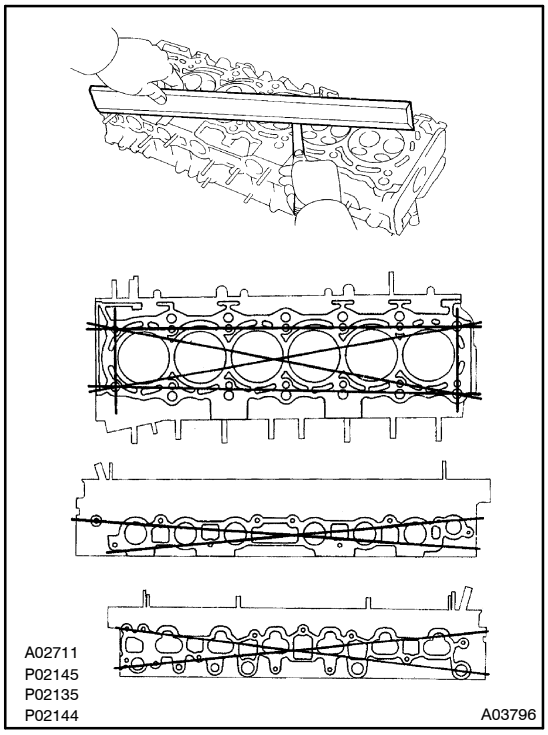


(c) Clean the valve guide bushings.

Using a valve guide bushing brush and solvent, clean all the guide bushings.


A02707

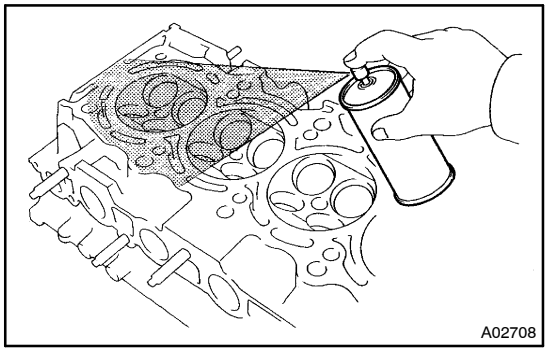
(d) Clean the cylinder head.
Using a soft brush and solvent, thoroughly clean the cylinder head.


A02711
P02145
P02135
P02144
A03796

3. INSPECT CYLINDER HEAD

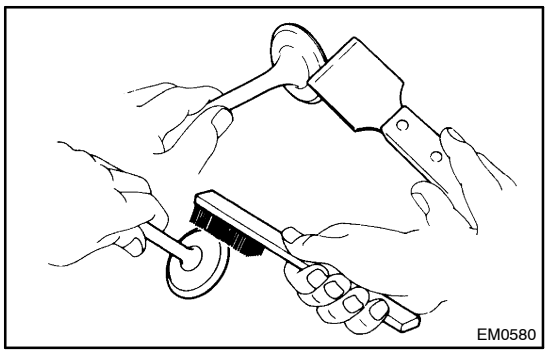
(a) Inspect for the flatness.
Using precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block, intake and exhaust manifolds for warpage.
Maximum warpage: 0.10 mm (0.0039 in.)

If warpage is greater than maximum, replace the cylinder head.


A02708

(b) Inspect for the cranks.
Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

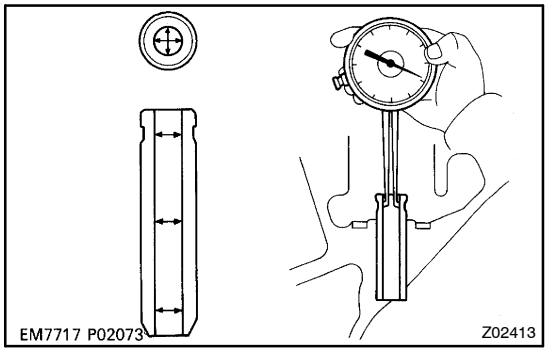
If cracked, replace the cylinder head.


EM0580

4. CLEAN VALVES

(a) Using a gasket scraper, chip off any carbon from the valve head.

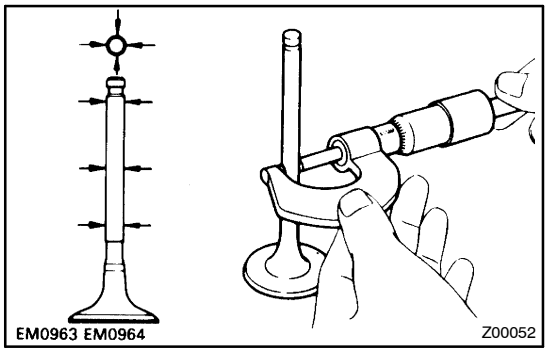
(b) Using a wire brush, thoroughly clean the valve.



5. INSPECT VALVE STEMS AND GUIDE BUSHINGS

(a) Using a caliper gauge, measure the inside diameter of the guide bushing.

Bushing inside diameter:
6.010 – 6.030 mm (0.2366 – 0.2374 in.)



(b) Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:

Intake	5.970 – 5.985 mm (0.2350 – 0.2356 in.)
Exhaust	5.965 – 5.980 mm (0.2348 – 0.2354 in.)

(c) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.

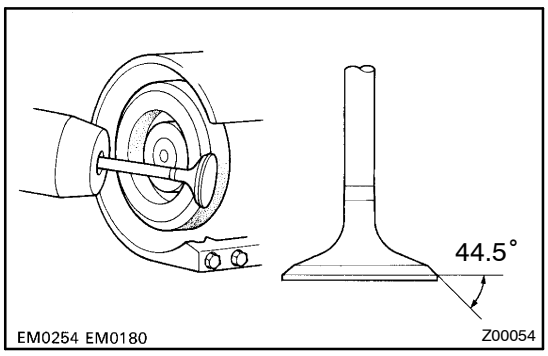
Standard oil clearance:

Intake	0.025 – 0.060 mm (0.0010 – 0.0024 in.)
Exhaust	0.030 – 0.065 mm (0.0012 – 0.0026 in.)

Maximum oil clearance:

Intake	0.08 mm (0.0031 in.)
Exhaust	0.10 mm (0.0039 in.)

If the clearance is greater than maximum, replace the valve and guide bushing. (See page EM–49)

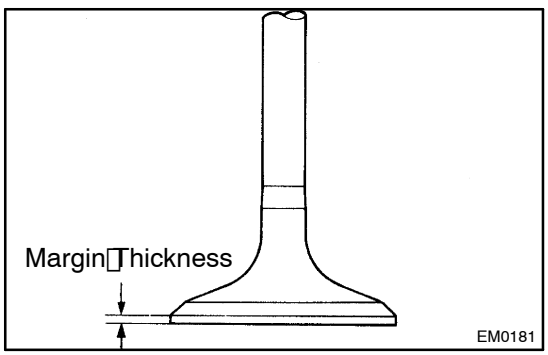


6. INSPECT AND GRIND VALVES

(a) Grind the valve enough to remove pits and carbon.

(b) Check that the valve is ground to the correct valve face angle.

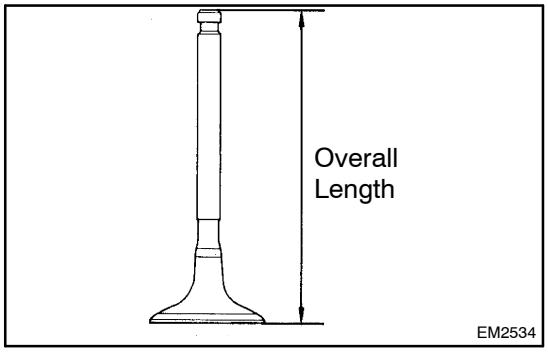
Valve face angle: 44.5°



(c) Check the valve head margin thickness.

Standard margin thickness:
0.8 – 1.2 mm (0.031 – 0.047 in.)
Minimum margin thickness:
0.5 mm (0.020 in.)

If the margin thickness is less than minimum, replace the valve.



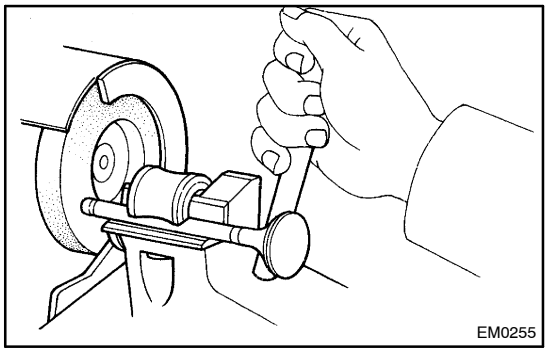
(d) Check the valve overall length.

Standard overall length:

Intake	98.29 – 98.79 mm (3.8697 – 3.8894 in.)
Exhaust	98.84 – 99.34 mm (3.8913 – 3.9110 in.)

Minimum overall length:

Intake	98.19 mm (3.8657 in.)
Exhaust	98.74 mm (3.8874 in.)



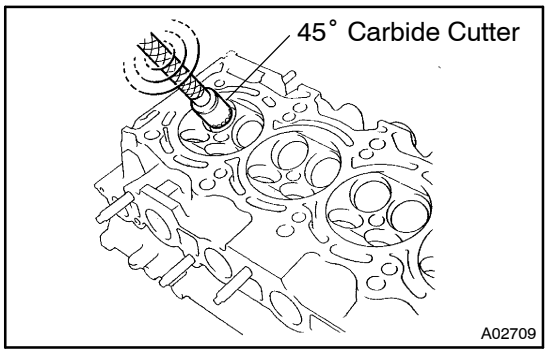
If the overall length is less than minimum, replace the valve.

(e) Check the surface of the valve stem tip for wear.

If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

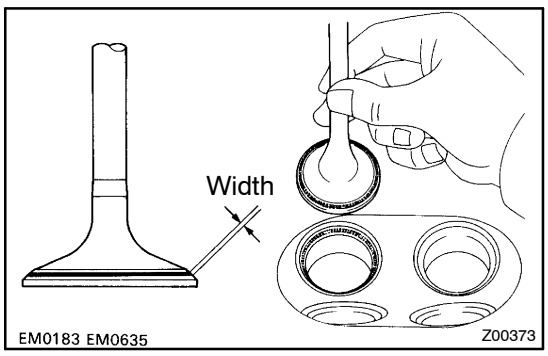
NOTICE:

Do not grind off more than the minimum overall length.



7. INSPECT AND CLEAN VALVE SEATS

(a) Using a 45° carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.

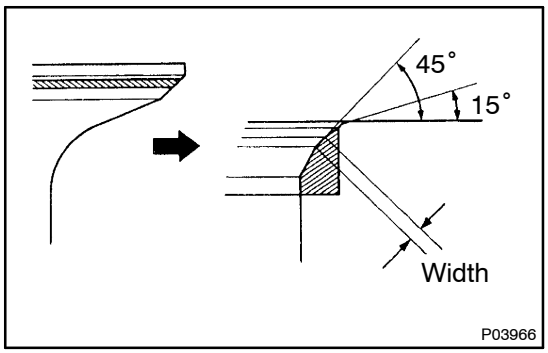


(b) Check the valve seating position.

Apply a thin coat of Prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate the valve.

(c) Check the valve face and seat for the following:

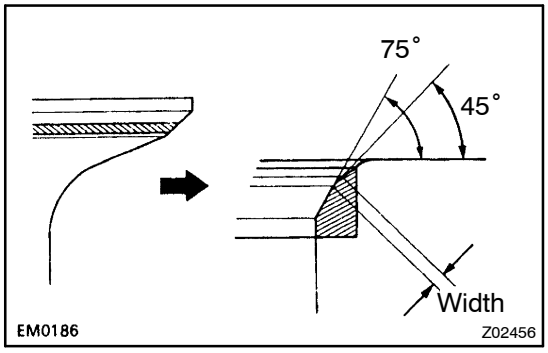
- If blue appears 360° around the face, the valve is concentric. If not, replace the valve.
- If blue appears 360° around the valve seat, the guide and face are concentric. If not, resurface the seat.
- Check that the seat contact is in the middle of the valve face with the following width:



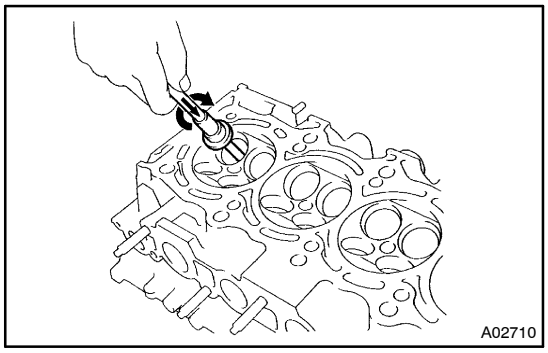
If not, correct the valve seats as follows:

Intake	1.0 – 1.4 mm (0.039 – 0.055 in.)
Exhaust	1.2 – 1.6 mm (0.047 – 0.063 in.)

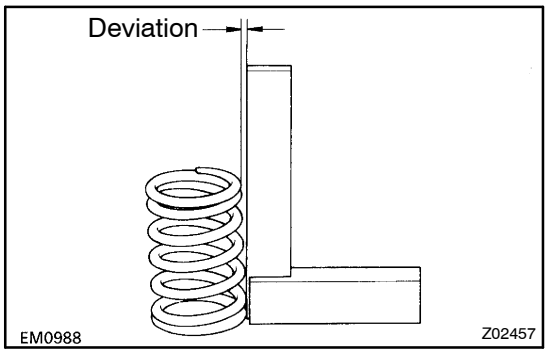
(1) If the seating is too high on the valve face, use 15° and 45° cutters to correct the seat.



(2) If the seating is too low on the valve face, use 75° and 45° cutters to correct the seat.



(d) Hand–lap the valve and valve seat with an abrasive compound.
(e) After hand–lapping, clean the valve and valve seat.

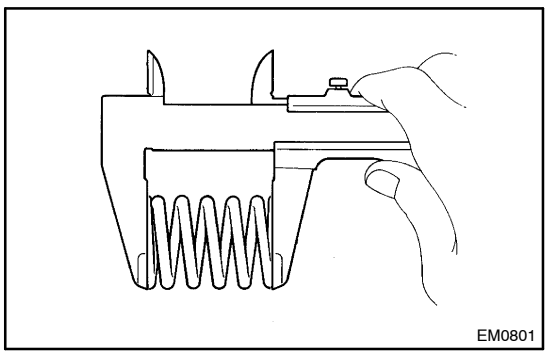


8. INSPECT VALVE SPRINGS

(a) Using a steel square, measure the deviation of the valve spring.

Maximum deviation: 2.0 mm (0.079 in.)

If deviation is greater than maximum, replace the valve spring.

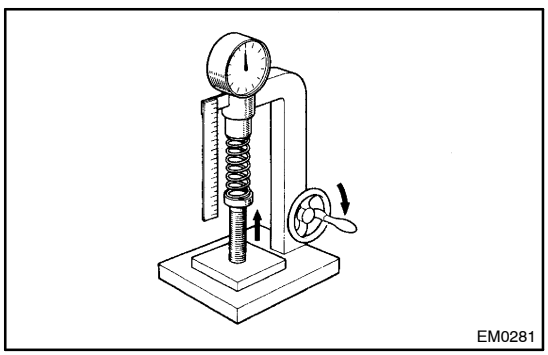


(b) Using vernier calipers, measure the free length of the valve spring.

Free length:

Pink painted mark	43.71 mm (1.7209 in.)
Yellow painted mark	44.10 mm (1.7362 in.)

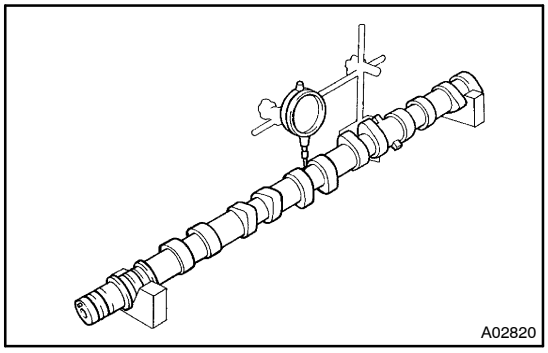
If the free length is not as specified, replace the valve spring.



(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:
186.2 – 205.8 N (19.0 – 21.0 kgf, 41.9 – 46.3 lbf)
at 34.5 mm (1.358 in.)

If the installed tension is not as specified, replace the valve spring.



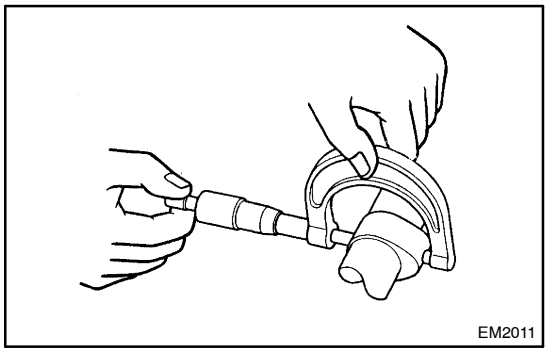
9. INSPECT CAMSHAFTS FOR RUNOUT

(a) Place the camshaft on V-blocks.

(b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.08 mm (0.0031 in.)

If the circle runout is greater than maximum, replace the camshaft.



10. INSPECT CAM LOBES

Using a micrometer, measure the cam lobe height.

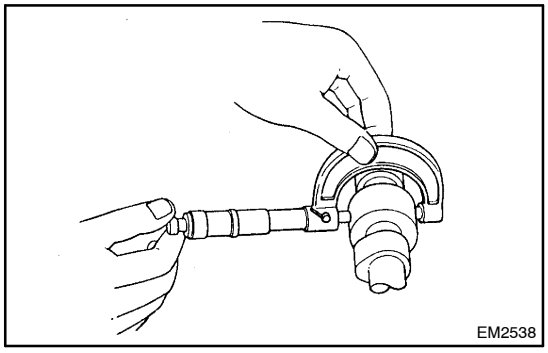
Standard cam lobe height:

Intake	44.310 – 44.360 mm (1.7445 – 1.7465 in.)
Exhaust	44.250 – 44.350 mm (1.7421 – 1.7461 in.)

Minimum cam lobe height:

Intake	44.16 mm (1.7386 in.)
Exhaust	44.10 mm (1.7362 in.)

If the cam lobe height is less than minimum, replace the camshaft.



11. INSPECT CAMSHAFT JOURNALS

Using a micrometer, measure the journal diameter.

Journal diameter:

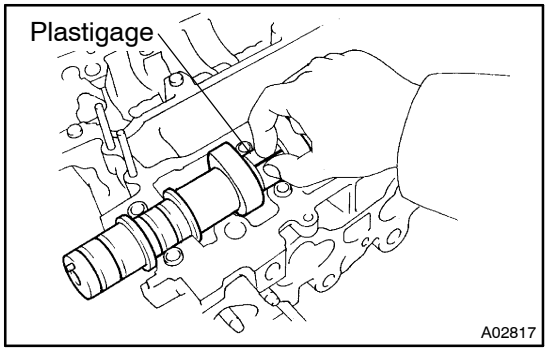
28.949 – 28.965 mm (1.1397 – 1.1404 in.)

If the journal diameter is not as specified, check the oil clearance.

12. INSPECT CAMSHAFT BEARING

Check the bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.



13. INSPECT CAMSHAFT JOURNAL OIL CLEARANCE

(a) Clean the bearing caps and camshaft journals.

(b) Place the camshafts on the cylinder head.

(c) Lay a strip of Plastigage across each of the camshaft journals.

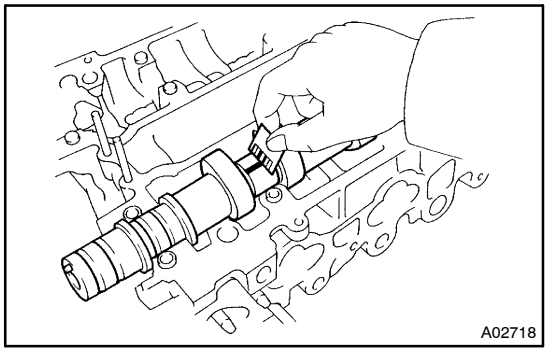
(d) Install the bearing caps. (See page EM–53)

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

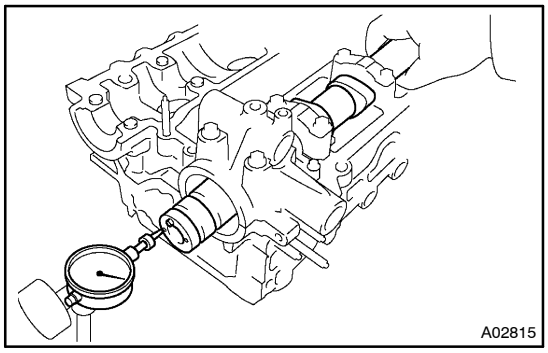
NOTICE:

Do not turn the camshaft.

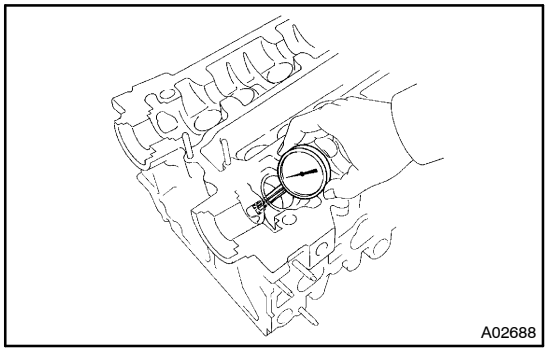
(e) Remove the bearing caps.



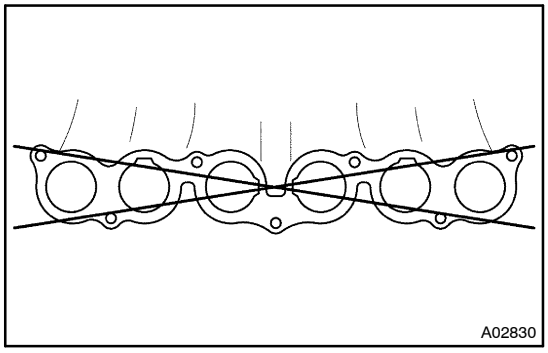
(f) Measure the Plastigage at its widest point.
Standard oil clearance:
0.035 – 0.072 mm (0.0014 – 0.0028 in.)
Maximum oil clearance:
0.10 mm (0.0039 in.)
If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.
(g) Completely remove the Plastigage.



14. INSPECT CAMSHAFT THRUST CLEARANCE
(a) Install the camshafts. (See page EM–53)
(b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.
Standard thrust clearance:
0.080 – 0.190 mm (0.0031 – 0.0075 in.)
Maximum thrust clearance:
0.30 mm (0.0118 in.)
If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.



15. INSPECT VALVE LIFTERS AND LIFTER BORES
(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.
Lifter bore diameter:
31.000 – 31.016 mm (1.2205 – 1.2211 in.)
(b) Using a micrometer, measure the lifter diameter.
Lifter diameter:
30.966 – 30.976 mm (1.2191 – 1.2195 in.)
(c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.
Standard oil clearance:
0.024 – 0.050 mm (0.0009 – 0.0020 in.)
Maximum oil clearance:
0.07 mm (0.0028 in.)
If the oil clearance is greater than maximum, replace the lifter. If necessary, replace the cylinder head.

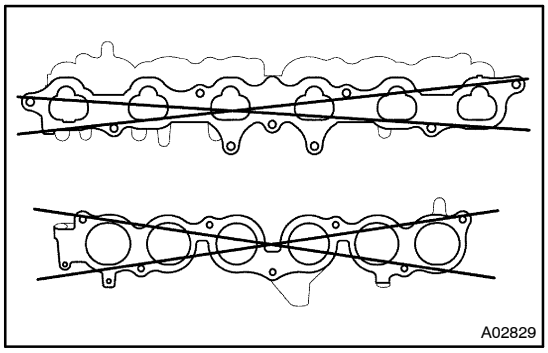


16. INSPECT AIR INTAKE CHAMBER

Using a precision straight edge and feeler gauge, measure the surfaces contacting the intake manifold for warpage.

Maximum warpage: 0.15 mm (0.0059 in.)

If warpage is greater than maximum, replace the chamber.

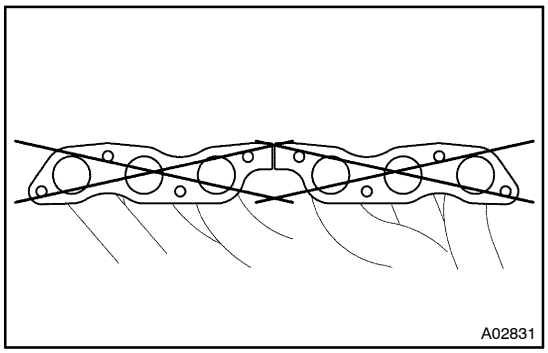


17. INSPECT INTAKE MANIFOLD

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder head and air intake chamber for warpage.

Maximum warpage: 0.15 mm (0.0059 in.)

If warpage is greater than maximum, replace the manifold.

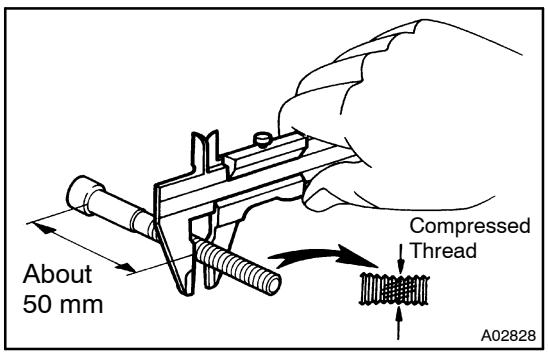


18. INSPECT EXHAUST MANIFOLD

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder head for warpage.

Maximum warpage: 0.50 mm (0.0196 in.)

If warpage is greater than maximum, replace the manifold.



19. INSPECT CYLINDER HEAD BOLTS

Using a vernier caliper, measure the thread outside diameter of the bolt.

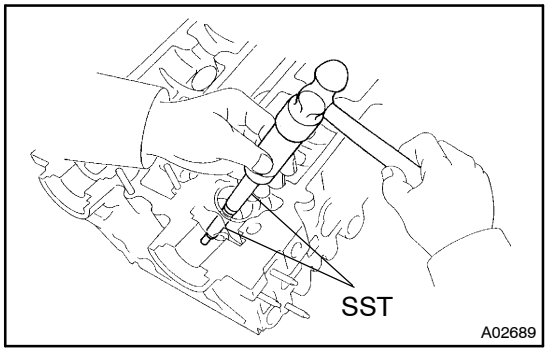
Standard outside diameter:
10.8 – 11.0 mm (0.425 – 0.433 in.)
Minimum outside diameter:
10.7 mm (0.421 in.)

If the diameter is less than minimum, replace the bolt.

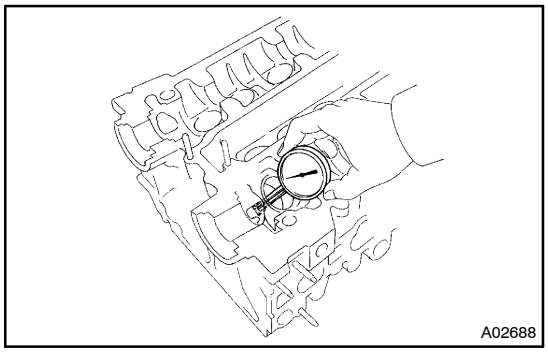
EM0DD–05

REPLACEMENT

REPLACE VALVE GUIDE BUSHINGS



(a) Using SST and a hammer, tap out the guide bushing.
SST 09201–10000 (09201–01060),
09950–70010 (09951–07100)



(b) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

(c) Select a new guide bushing (STD or O/S 0.05).

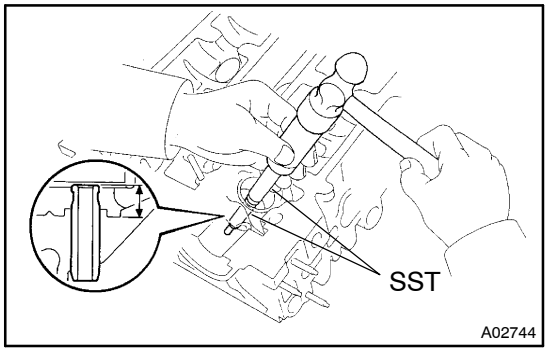
If the bushing bore diameter of the cylinder head is greater than 11.006 mm (0.4333 in.), machine the bushing bore to the following dimension:

11.035 – 11.056 mm (0.4344 – 0.4353 in.)

If the bushing bore diameter of the cylinder head is greater than 11.056 mm (0.4353 in.), replace the cylinder head.

Both intake and exhaust

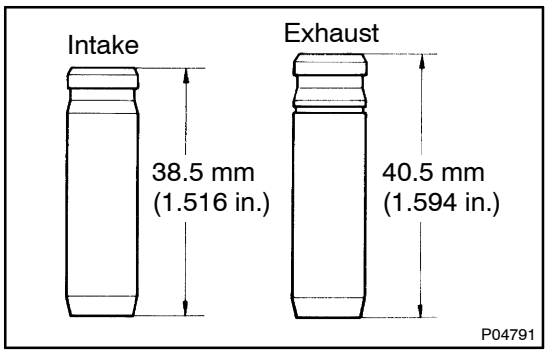
Bushing bore diameter mm (in.)	Bushing size
10.985 – 11.006 mm (0.4325 – 0.4333 in.)	Use STD
11.035 – 11.056 mm (0.4344 – 0.4353 in.)	Use O/S 0.05



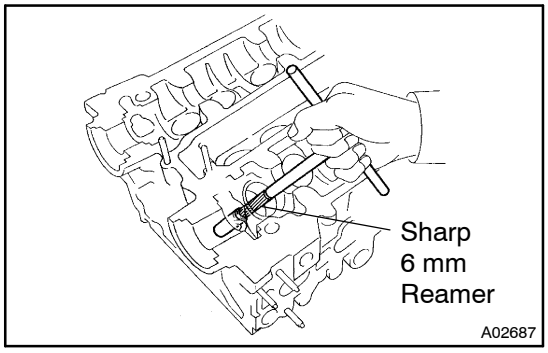
(d) Using SST and a hammer, tap in a new guide bushing to the specified protrusion height.
SST 09201–10000 (09201–01060),
09950–70010 (09951–07100)

Protrusion height:

Intake	12.3 – 12.7 mm (0.484 – 0.500 in.)
Exhaust	11.4 – 11.8 mm (0.449 – 0.465 in.)



HINT:
Different bushings are used for the intake and exhaust.



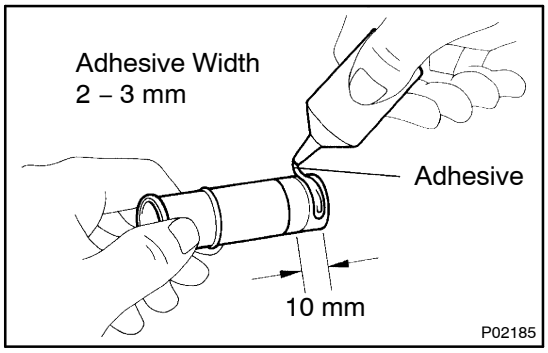
(e) Using a sharp 6 mm reamer, ream the guide bushing to obtain the standard specified clearance (See page EM–41) between the guide bushing and valve stem.

EM0DE–05

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.



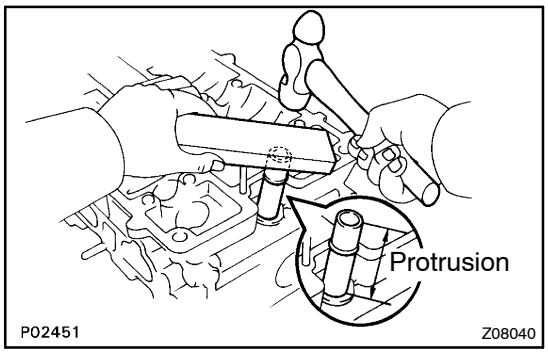
1. INSTALL HEATER UNION

HINT:

When using a new cylinder head, a new heater union must be installed.

(a) Apply adhesive to the end of the heater union as shown in the illustration.

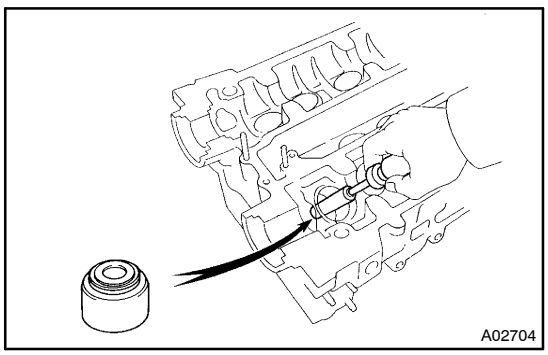
Adhesive: Part No.08833–00070, THREE BOND 1324 or equivalent



(b) Using a wooden block and hammer, tap in a new heater union, leaving 48 mm (1.89 in.) protruding from the cylinder head.

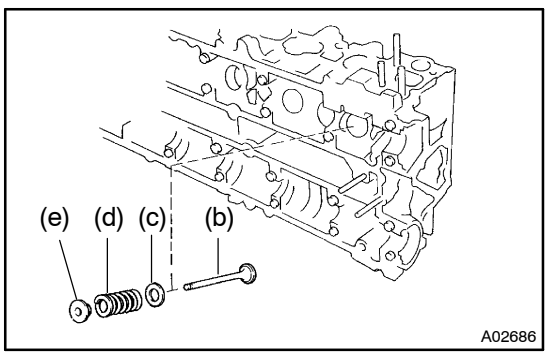
NOTICE:

Do not tap it in too far.

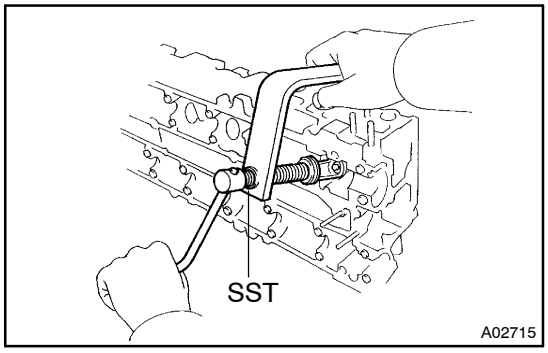


2. INSTALL VALVES

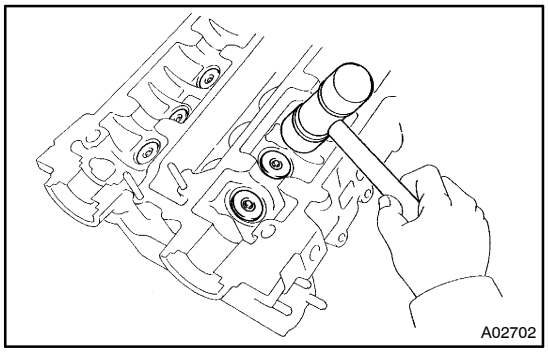
(a) Install a new oil seal on the valve guide bushing.



(b) Install the valve.
(c) Install the spring seat.
(d) Install the valve spring.
(e) Install the spring retainer.



(f) Using SST, compress the valve spring and place the 2 keepers around the valve stem.
SST 09202–70020 (09202–00010)



(g) Using a plastic–faced hammer, lightly tap the valve stem tip to assure proper fit.

3. INSTALL VALVE LIFTERS AND SHIMS

(a) Install the valve lifter and shim.

(b) Check that the valve lifter rotates smoothly by hand.

4. INSTALL ECT SENSOR
Torque: 19.6 N·m (200 kgf·cm, 14 ft·lbf)

5. INSTALL CAMSHAFT POSITION SENSOR

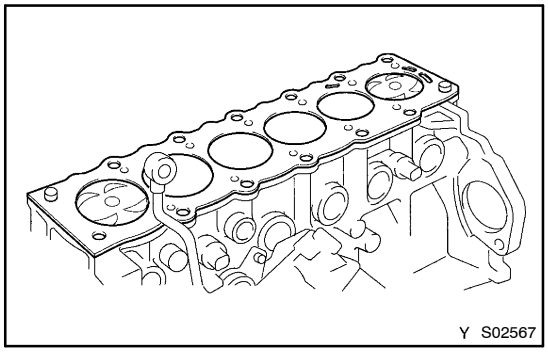
6. INSTALL ENGINE HANGER
Torque: 40 N·m (400 kgf·cm, 30 ft·lbf)

7. INSTALL WATER OUTLET WITH WATER BYPASS HOSE

Install a new gasket and the water outlet with the bolt and 2 nuts.
Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)

EM1S6–01

INSTALLATION



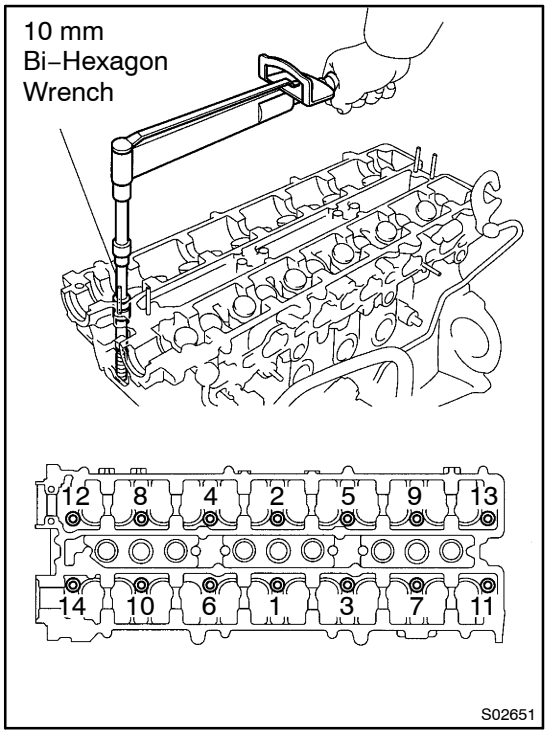
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

(a) Place a new cylinder head gasket in position on the cylinder block.

NOTICE:

Be sure to install it correctly.

(b) Place the cylinder head in position on the cylinder head gasket.



2. INSTALL CYLINDER HEAD BOLTS

HINT:

- The cylinder head bolts are tightened in 2 progressive steps (steps (c) and (f)).
- If any of bolts break or deform, replace them.

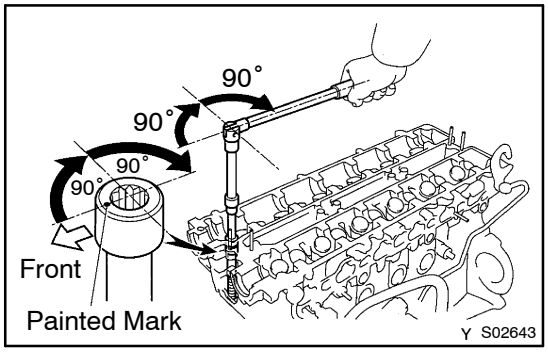
(a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

(b) Install the 14 plate washers to each cylinder head bolt.

(c) Using a 10 mm bi–hexagon wrench, uniformly tighten the cylinder head bolts, in several passes, in the sequence shown.

Torque: 35 N·m (350 kgf·cm, 26 ft·lbf)

If any of the bolts do not meet the torque specification, replace the bolt.

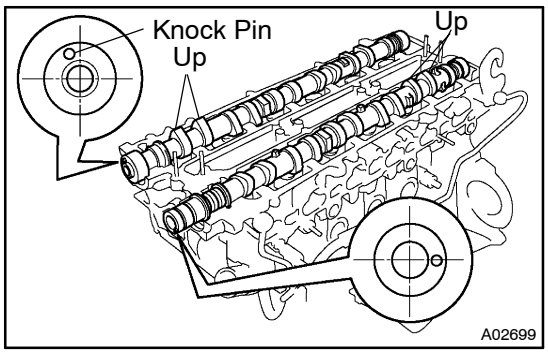


(d) Mark the front of the cylinder head bolt head with paint.

(e) Retighten the cylinder head bolts 90° in the numerical order shown.

(f) Retighten cylinder head bolts by an additional 90° shown.

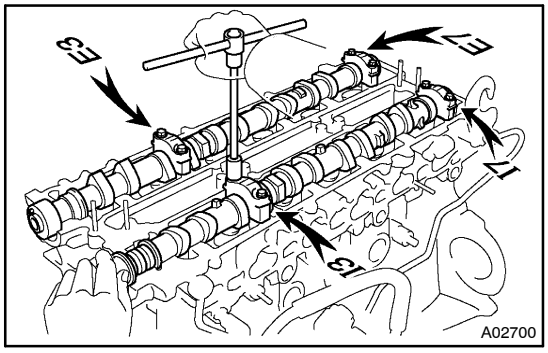
(g) Check that the painted mark is now turned to the rear.



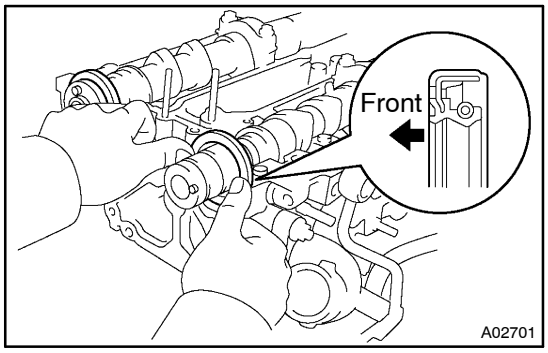
3. INSTALL CAMSHAFTS

(a) Apply engine oil to the thrust portion of the camshaft.

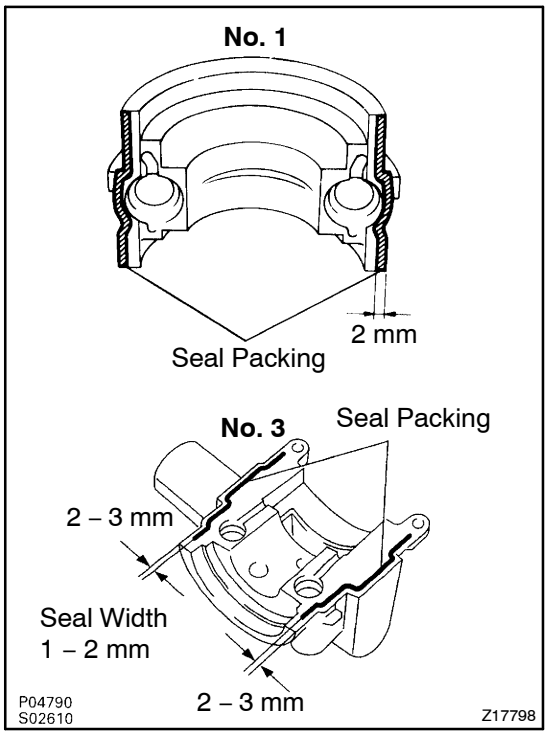
(b) Place the camshaft on the cylinder head with the cam lobe facing up as shown.



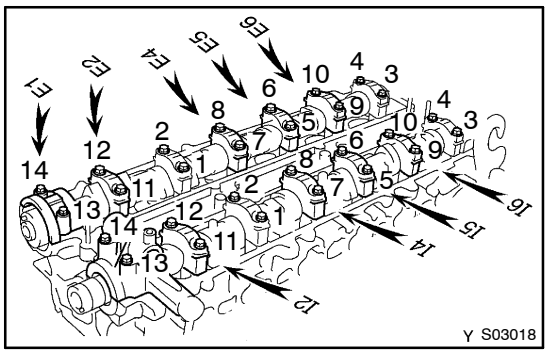
(c) Place the (No. 3, 7 journal) camshaft bearing caps in their proper location.
(d) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(e) Temporarily tighten these bearing cap bolts uniformly and alternately, in several passes, until the bearing caps are snug with the cylinder head.



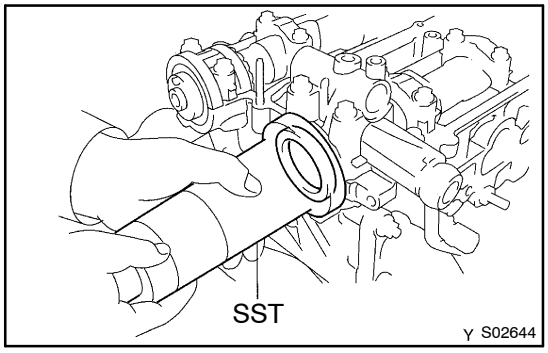
(f) Apply MP grease to a new camshaft oil seal lip.
(g) Install the 2 oil seals to the camshafts.



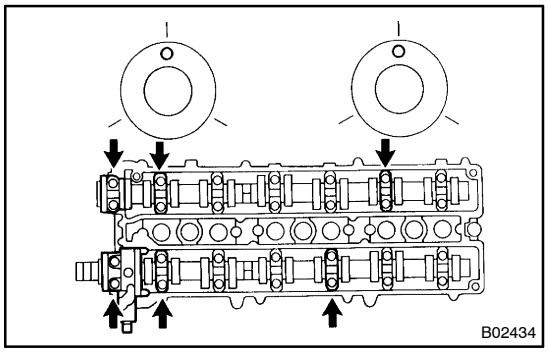
(h) Clean the installed surfaces of the No. 1, 3 camshaft bearing cap and cylinder head with cleaner.
(i) Apply seal packing to the bearing caps as shown.
Seal packing: Part No. 08826–00080 or equivalent



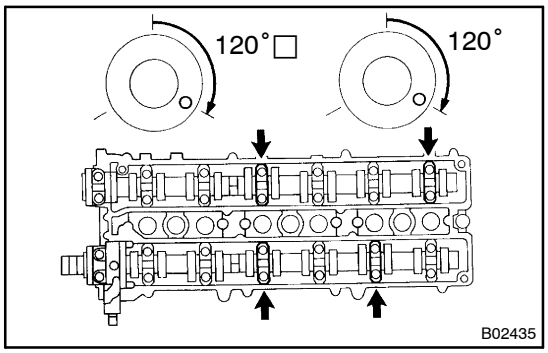
(j) Install the other bearing caps in their proper locations.
(k) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(l) Install and uniformly tighten the 14 bearing cap bolts on one side, in several passes, in the sequence shown.
Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)
(m) Using a 5 mm hexagon wrench, the 2 No. 3 camshaft bearing cap bolts.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)



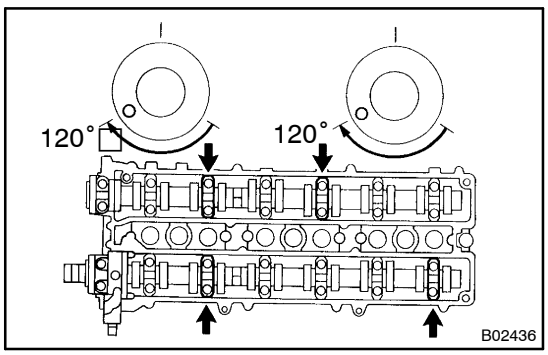
(n) Using SST, push the 2 oil seals in as far as they can go.
SST 09316-60011 (09316-00011, 09316-00051)



(o) Rotate the camshaft with a wrench at the hexagon position, bring the forward straight pin up.
(p) Loosen the 12 bearing cap bolts as shown, until they can be turned by hand; retighten in several passes.
Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)



(q) Turn the camshaft 1/3 of a revolution.
(r) Loosen the 8 bearing cap bolts as shown, until they can be turned by hand; retighten in several passes.
Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)

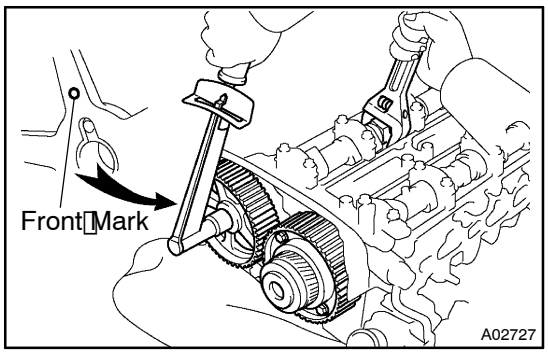


(s) Turn the camshaft a further 1/3 of a revolution.
(t) Loosen the 8 bearing cap bolts as shown, until they can be turned by hand; retighten in several passes.
Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)

4. CHECK AND ADJUST VALVE CLEARANCE (See page EM–5)

5. INSTALL NO. 4 TIMING BELT COVER

Install the timing belt cover with 4 bolts.
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

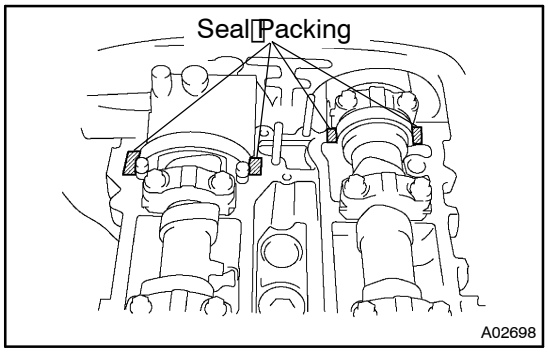


6. INSTALL CAMSHAFT TIMING PULLEYS

(a) Install the exhaust camshaft timing pulley.
(1) Align the camshaft knock pin with the groove in the pulley, and slide on the pulley.
(2) Slide the timing pulley on the camshaft, facing the front mark forward.
(3) Hold the hexagon portion of the camshaft with a wrench, and tighten the timing pulley bolt.
Torque: 81 N·m (810 kgf·cm, 60 ft·lbf)

(b) Install the VV–i (intake camshaft timing) pulley (See page EM–24).

7. **CONNECT TIMING BELT TO CAMSHAFT TIMING PULLEYS (See page EM–24)**



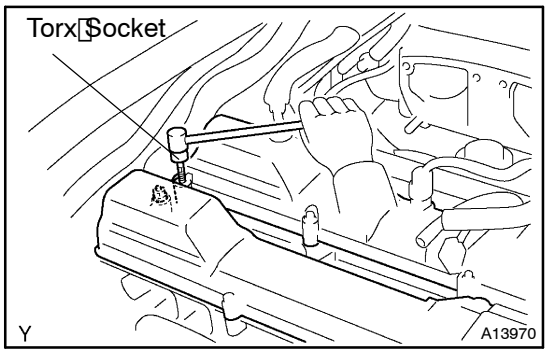
8. **INSTALL NO. 1 AND NO. 2 CYLINDER HEAD COVERS**

(a) Remove the any old packing (FIPG) material.

(b) Apply seal packing to the cylinder head as shown in the illustration.
Seal packing: Part No. 08826–00080 or equivalent

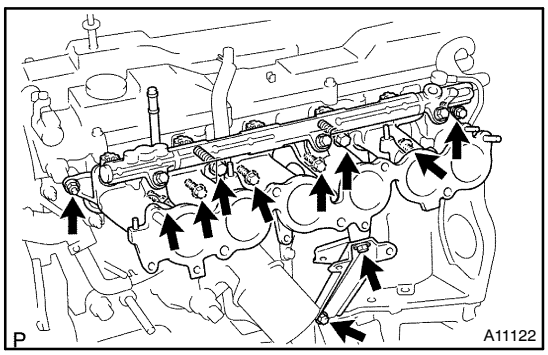
(c) Install the gaskets to the cylinder head covers.

(d) Install the cylinder head covers with the 12 bolts.
Torque: 8.5 N·m (85 kgf·cm, 75 in.·lbf)



(e) Using a torx socket (E5), install the 4 stud bolts.
Torque: 8.5 N·m (85 kgf·cm, 75 in.·lbf)

(f) Install the 4 nuts to the stud bolts.
Torque: 8.5 N·m (85 kgf·cm, 75 in.·lbf)



9. **INSTALL INTAKE MANIFOLD ASSEMBLY**

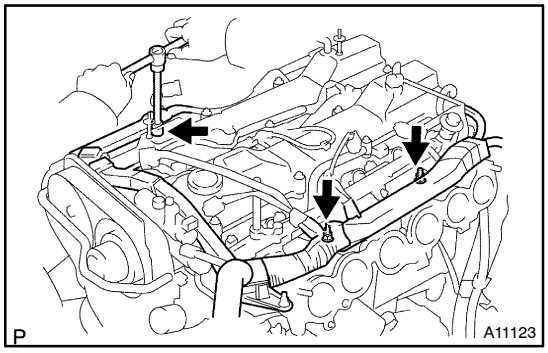
(a) Install a new gasket and the intake manifold and delivery pipe assembly with the 7 bolts and 2 nuts.
Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)

(b) Pass the water bypass hose between the No.2, No.3 intake ports of the manifold and delivery pipe.

(c) Install the manifold stay with the 2 bolts.
Torque: 40 N·m (400 kgf·cm, 30 ft·lbf)

(d) Install the starter wire to the manifold stay.

10. **INSTALL FUEL PRESSURE PULSATION DAMPER (See page FI–27)**



11. CONNECT ENGINE WIRE TO CYLINDER HEAD

(a) Install the engine wire protector with the 3 nuts.

(b) Using a 5 mm hexagon wrench, install the bolt holding the engine wire protector to the No. 2 cylinder head cover.

(c) Connect the 6 injector connectors.

HINT:

The No. 1, 3, 5 injector connectors are dark gray, and the No. 2, 4, 6 injector connectors are brown.

(d) Connect the camshaft timing oil control valve connector.

(e) Connect the camshaft position sensor connector.

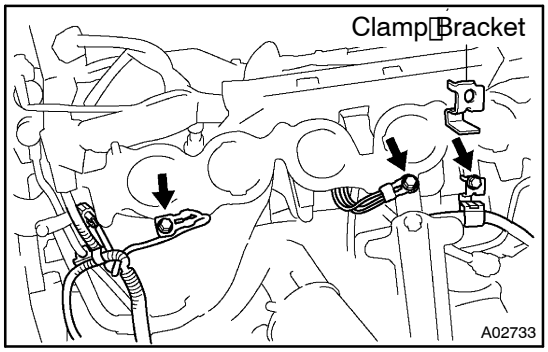
(f) Connect the water temperature sensor connector.

(g) Connect the 2 knock sensor connector.

(h) Connect the starter connector.

(i) Connect the oil pressure switch connector.

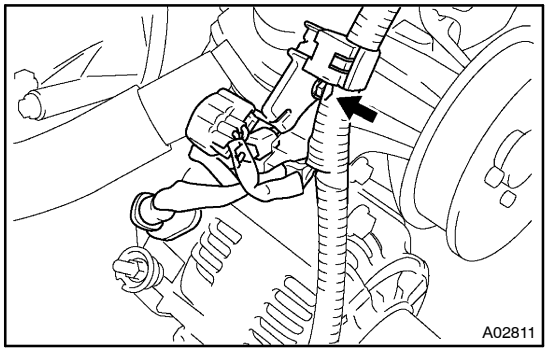
(j) Connect the oil level sensor connector.



(k) Install the clamp bracket to the intake manifold.

(l) Connect the 2 wire clamps to the No. 1 oil pipe and clamp bracket on the intake manifold.

(m) Install the 2 ground terminals to the intake manifold. Tighten so that each calking part should face inside.



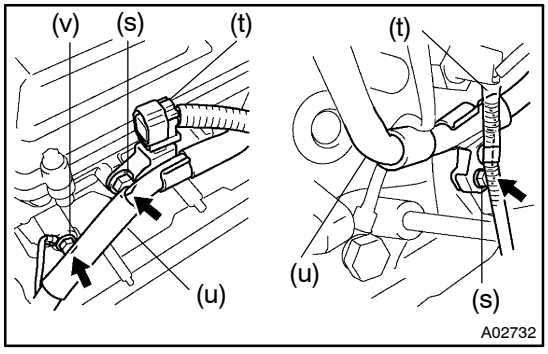
(n) Install the clamp bracket to the water pump.

(o) Connect the alternator connector.

(p) Connect the crankshaft position sensor connector.

(q) Connect the oxygen sensor (bank 1 sensor 1) connector.

(r) Secure the engine wire with the clamp.



(s) Install the 2 hose clamps to the cylinder head and oil filter bracket.

(t) Install the oxygen sensor (bank 2 sensor 1) connector and engine wire clamp to the hose clamps.

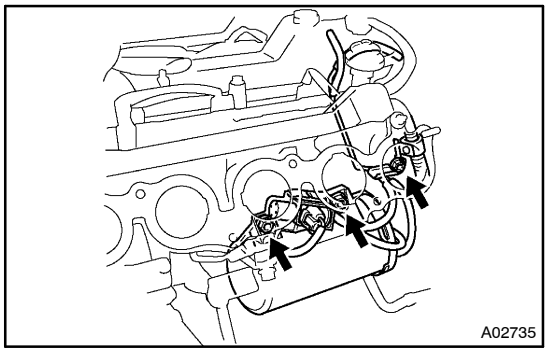
(u) Install the 2 water bypass hoses to the hose clamps on the cylinder head and oil filter bracket.

(v) Install the ground strap to the cylinder head.

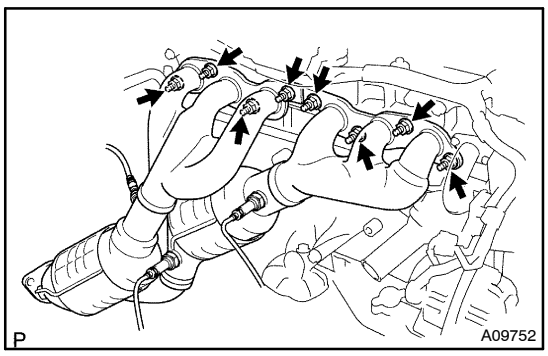
12. INSTALL SPARK PLUGS

13. INSTALL IGNITION COILS AND HIGH-TENSION CORD SET ASSEMBLY (See page IG-6)

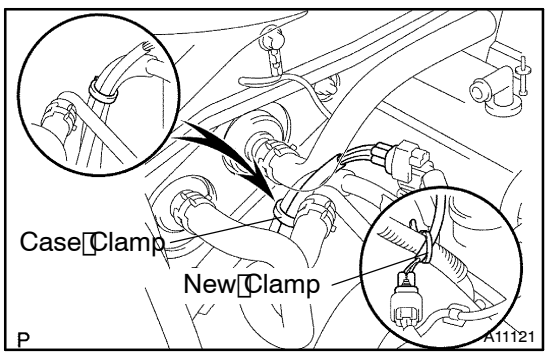
14. INSTALL NO. 3 TIMING BELT COVER
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)



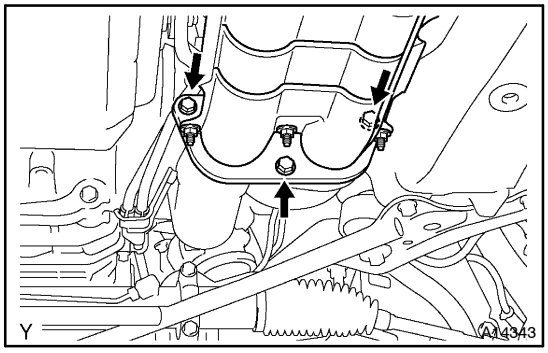
15. INSTALL VACUUM CONTROL VALVE SET AND NO. 2 VACUUM PIPE
(a) Install the vacuum control valve set and No. 2 vacuum pipe with the 3 nuts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)
(b) Install the engine wire clamp to the clamp bracket of the No. 2 vacuum pipe.
(c) Connect the VSV connector for the ACIS.
16. INSTALL AIR INTAKE CHAMBER (See page FI–49)
17. INSTALL OIL DIPSTICK AND GUIDE FOR A/T (See page EM–70)
18. INSTALL OIL DIPSTICK AND GUIDE FOR ENGINE (See page LU–12)
19. INSTALL THROTTLE BODY AND INTAKE AIR CONNECTOR ASSEMBLY (See page EM–5)
20. INSTALL WATER BYPASS OUTLET AND NO. 1 WATER BYPASS PIPE (See page CO–11)



21. INSTALL EXHAUST MANIFOLD
(a) Install 2 new gaskets to the cylinder head.
(b) Using a 14 mm deep socket wrench, install the exhaust manifold with the 8 nuts. Uniformly tighten the nuts in several passes.
Torque: 40 N·m (408 kgf·cm, 30 ft·lbf)
(c) Connect the 3 oxygen sensor connectors and clamp.



(d) Install a new clamp and the case clamp as shown in the illustration.

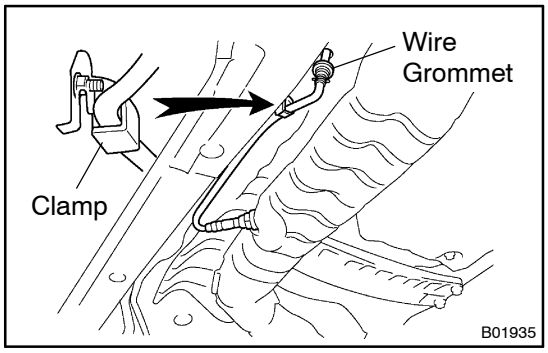


22. CONNECT FRONT EXHAUST PIPE TO EXHAUST MANIFOLD

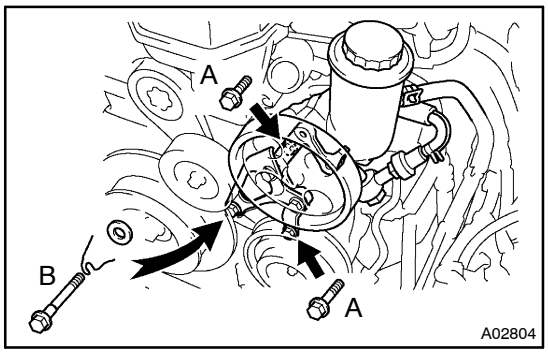
(a) Temporarily install the pipe support bracket to the transmission with the 2 bolts.

(b) Install 2 new gaskets to front end of the front exhaust pipe, and connect the front exhaust pipe to the exhaust manifold with the 3 bolts, nuts and retainer.

Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)



(c) Connect the wire grommet and sensor wire of the the oxygen sensor (bank 2 sensor 2) to the hole and clamp on the floor.



23. INSTALL PS PUMP

(a) Install the vane pump assembly with the 3 bolts and plate washer.

Torque:
57.9 N·m (590 kgf·cm, 43 ft·lbf) for A bolts
52 N·m (530 kgf·cm, 38 ft·lbf) for B bolt

(b) Install the pump rear stay with the 2 bolts.

Torque: 39.2 N·m (400 kgf·cm, 29 ft·lbf)

(c) Connect the PS air hose to the No. 4 timing belt cover.

(d) Connect the PS air hose to the air intake chamber.

24. INSTALL DRIVE BELT (See page CH–1)

25. INSTALL AIR CLEANER, MAF METER AND INTAKE AIR RESONATOR ASSEMBLY (See page EM–70)

26. INSTALL AIR CLEANER INLET

27. CONNECT UPPER RADIATOR HOSE TO WATER OUTLET

28. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

29. FILL WITH ENGINE COOLANT

30. START ENGINE AND CHECK FOR LEAKS

31. INSTALL ENGINE UNDER COVER

32. ROAD TEST

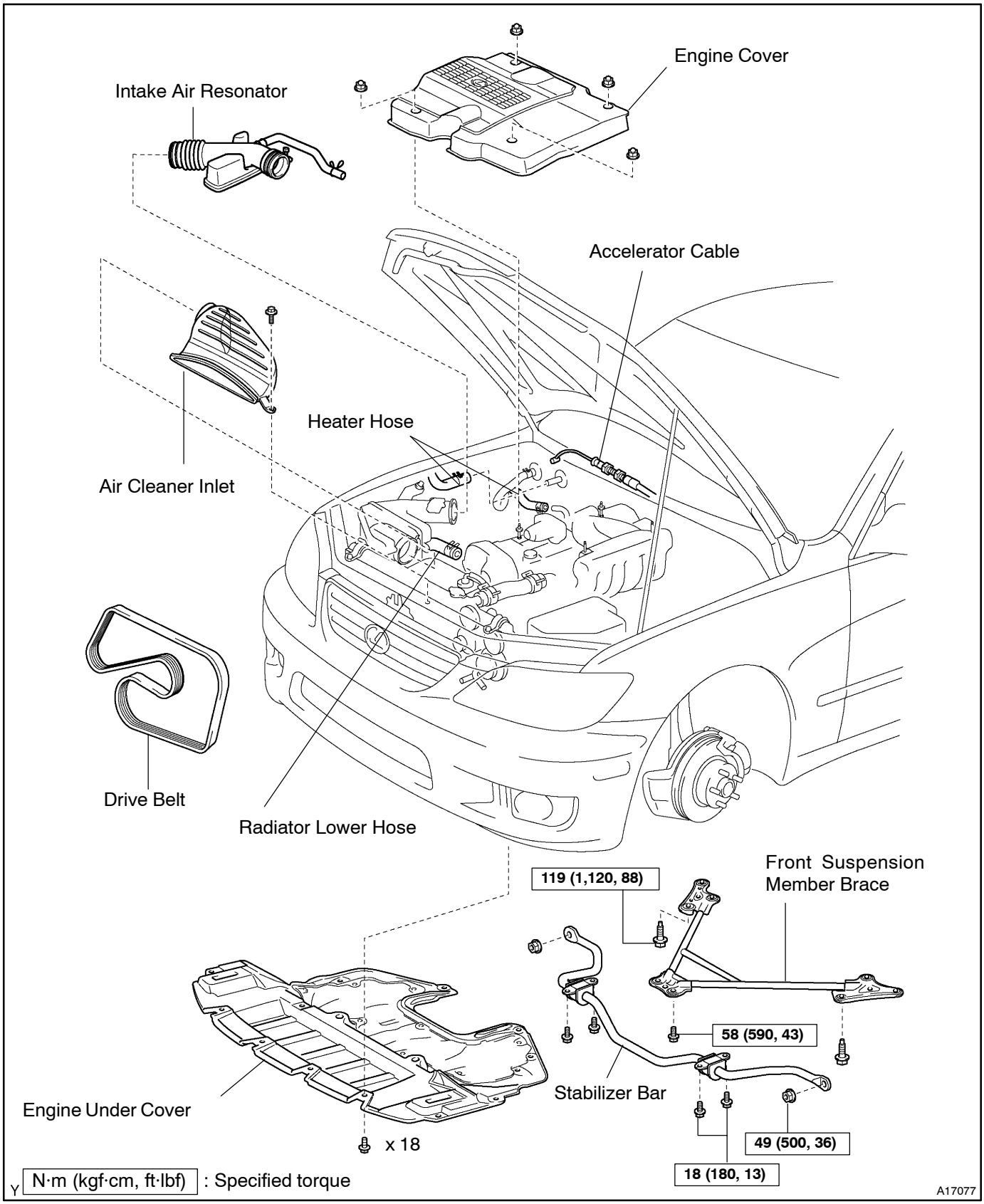
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

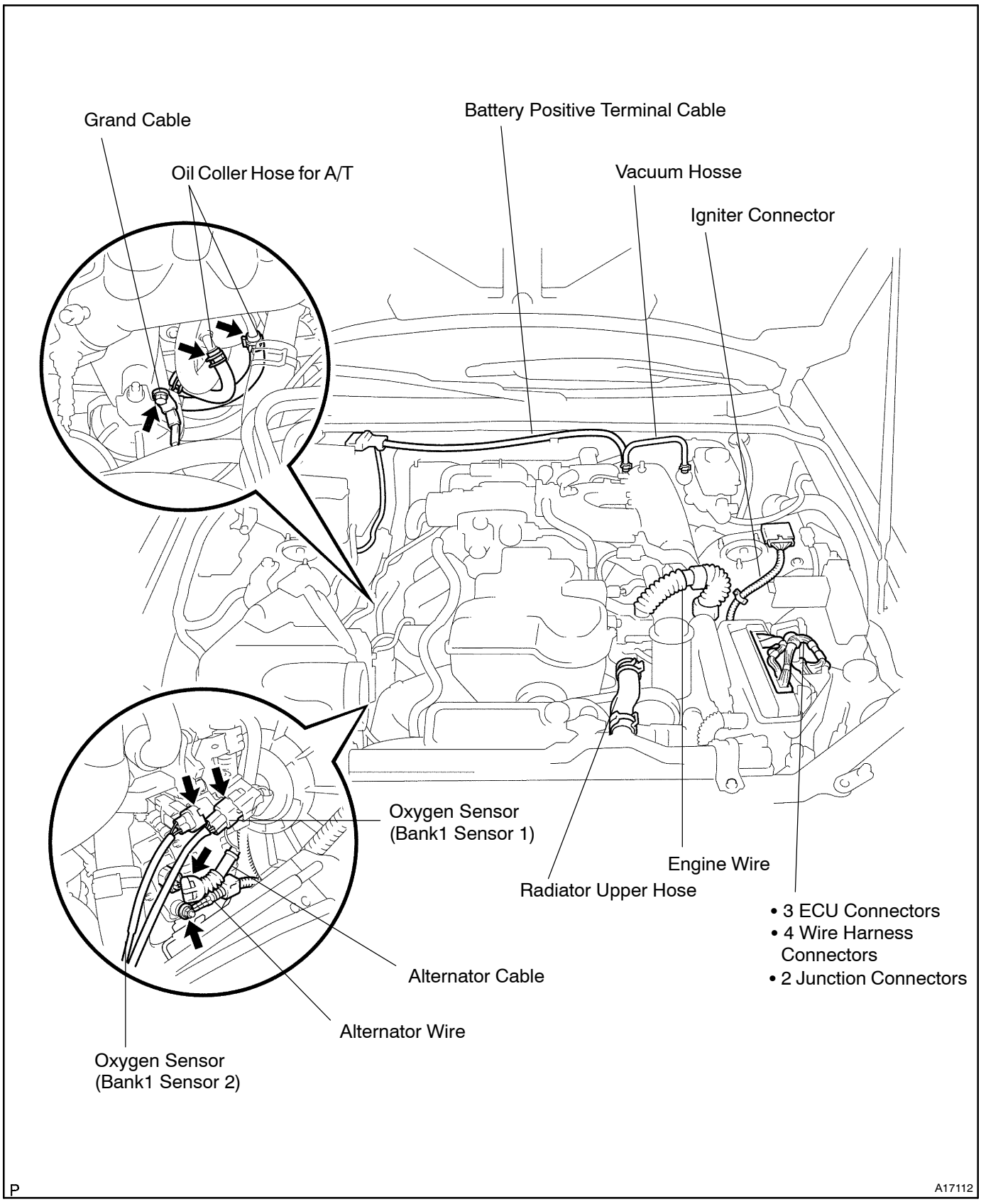
33. RECHECK ENGINE COOLANT LEVEL

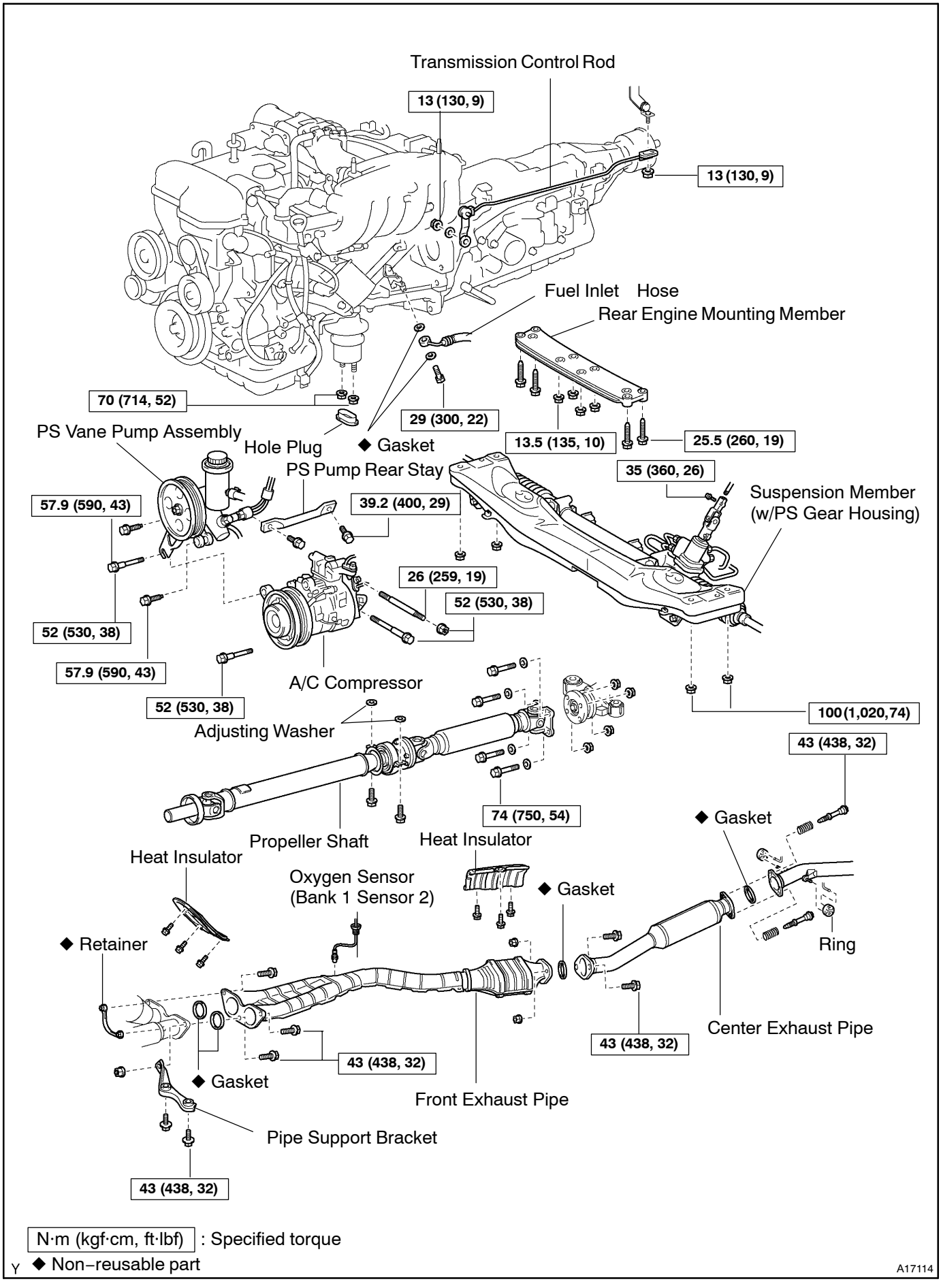
ENGINE UNIT

COMPONENTS

EM1S7–01



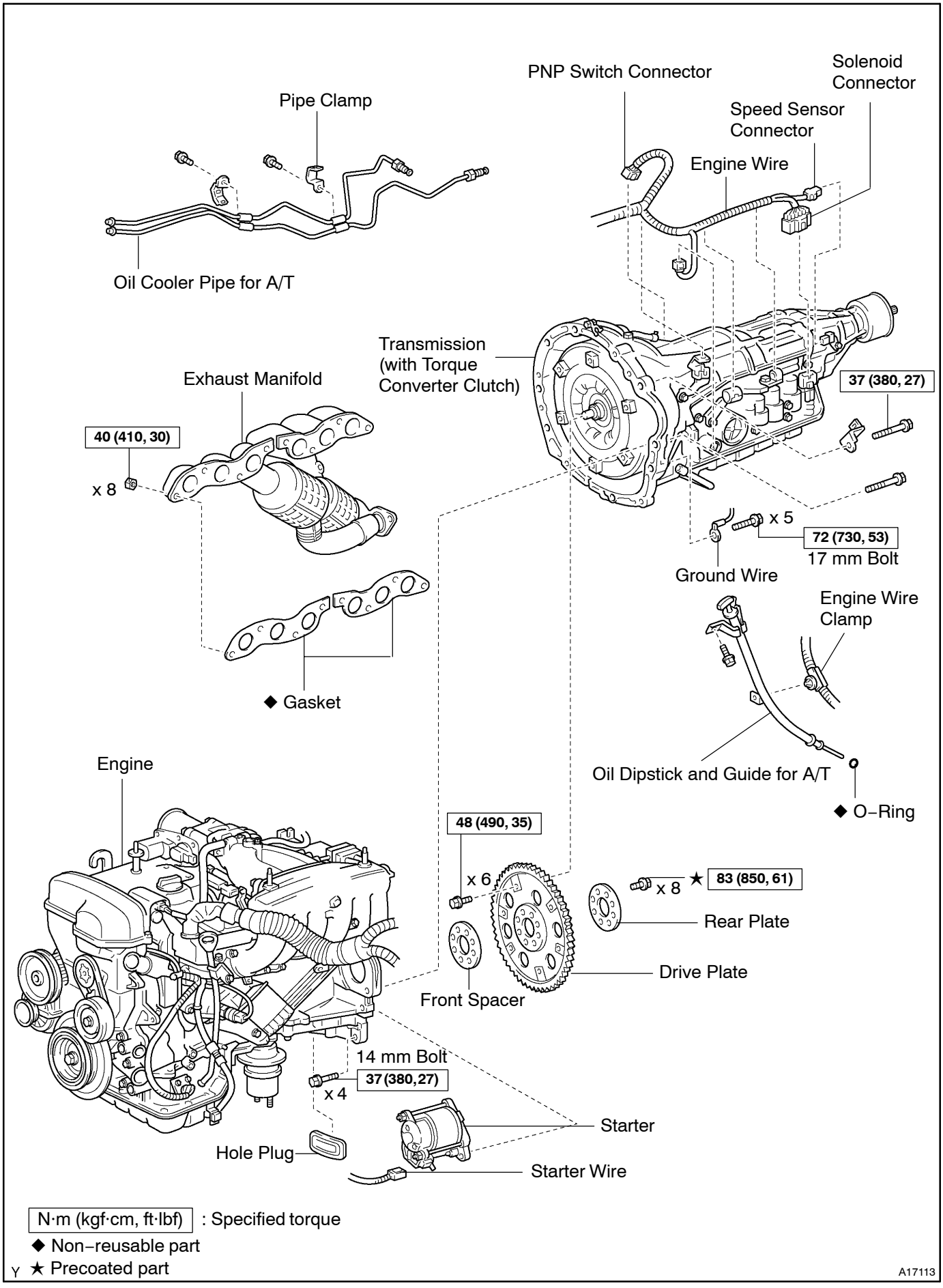

Grand Cable
Battery Positive Terminal Cable
Oil Coller Hose for A/T
Vacuum Hosse
Igniter Connector
Oxygen Sensor
(Bank1 Sensor 1)
Engine Wire
Radiator Upper Hose
• 3 ECU Connectors
• 4 Wire Harness
Connectors
• 2 Junction Connectors
Alternator Cable
Alternator Wire
Oxygen Sensor
(Bank1 Sensor 2)
P
A17112



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

◆ Non–reusable part

A17114



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part

A17113

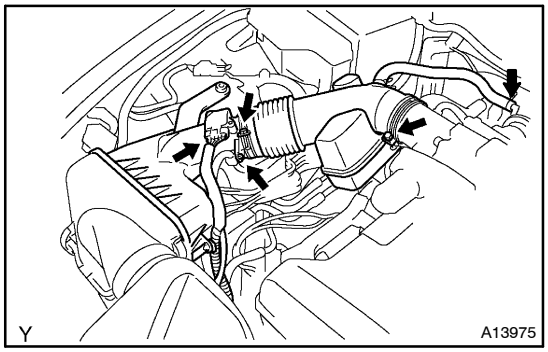
EM1S8-01

REMOVAL

1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. DRAIN ENGINE OIL
4. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

5. REMOVE AIR CLEANER INLET
6. DISCONNECT RADIATOR UPPER AND LOWER HOSES FROM ENGINE
7. DISCONNECT ACCELERATOR CABLE FROM ENGINE



8. REMOVE INTAKE AIR RESONATOR

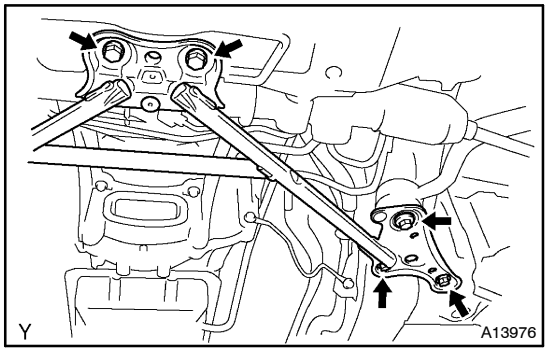
(a) Disconnect the air flow meter connector.

(b) Disconnect the engine wire clamp from the air cleaner case.

(c) Disconnect the PCV hose from the No. 2 cylinder head cover.

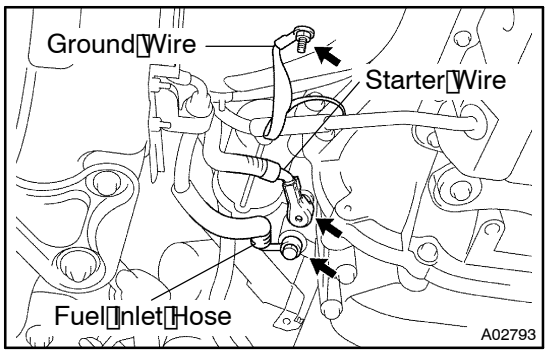
(d) Loosen the 2 hose clamp bolts, remove the intake air resonator from the throttle body.

9. REMOVE DRIVE BELT (See page CH–1)



10. REMOVE FRONT SUSPENSION MEMBER BRACE

Remove the 8 bolts and brace.

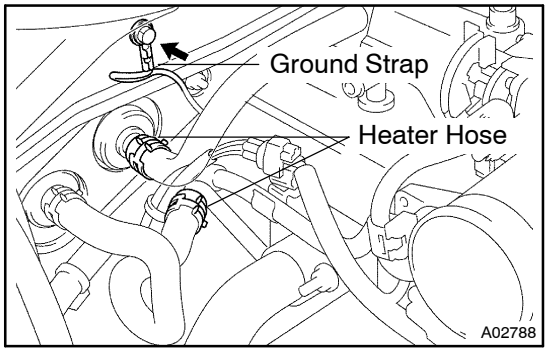


11. DISCONNECT WIRES, CABLE, STRAP, CONNECTORS, HOSES AND CLAMPS

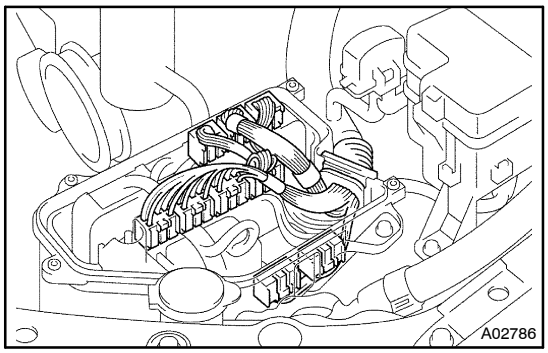
(a) Disconnect the ground wire from the floor.

(b) Disconnect the starter wire from the terminal and manifold stay.

(c) Disconnect the fuel inlet hose from the fuel pipe support.

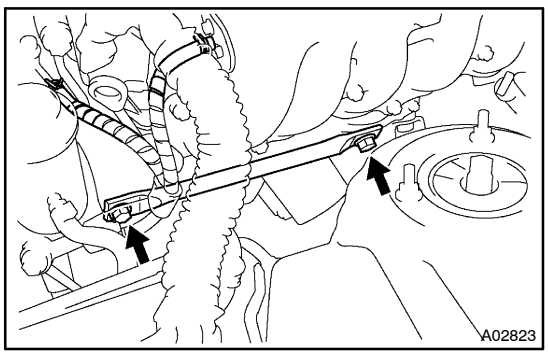


(d) Disconnect the ground strap from the dash panel.
(e) Disconnect the heater hose from the heater pipe.
(f) Disconnect the heater hose from the water bypass pipe.
(g) Disconnect the vacuum hose from the brake booster.
(h) Disconnect the 2 oxygen sensors connector.
  (1) Disconnect the wire clamp from the body.
  (2) Disconnect the bank 1 sensor 1 connector.
  (3) Disconnect the bank 1 sensor 2 connector.
(i) Remove the nut, and disconnect the alternator wire.
(j) Disconnect the alternator connector.
(k) Disconnect the ground cable from the bracket on the cylinder block.
(l) Disconnect the engine wire clamp from the wire clip of alternator.
(m) Disconnect the igniter connector.
(n) Disconnect the 2 engine wire clamps from the clamp brackets.



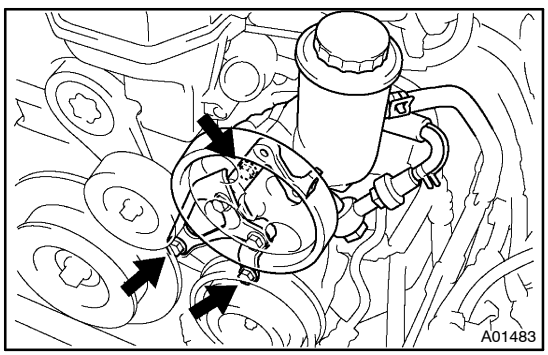
12. DISCONNECT ENGINE WIRE FROM ENGINE ECU BOX

(a) Remove the ECU hood and ECU cover.
(b) Disconnect the 3 ECU connectors.
(c) Disconnect the 4 wire harness connectors.
(d) Disconnect the 2 junction connectors.
(e) Disconnect the grommet and engine wire from the ECU box.

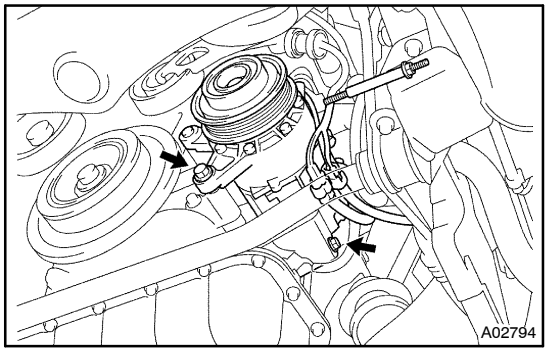


13. DISCONNECT PS PUMP AND A/C COMPRESSOR WITHOUT DISCONNECTING HOSES

(a) Remove the 2 bolts and pump rear stay.

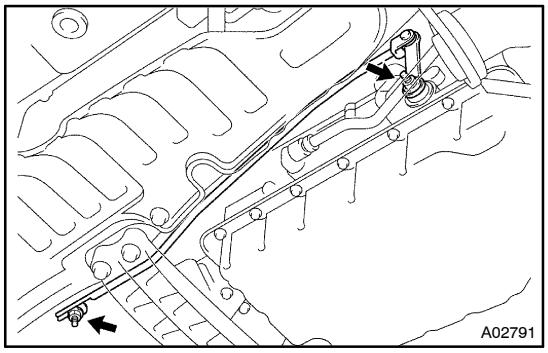


(b) Remove the 3 bolts and plate washer, and disconnect the vane pump assembly from the engine.



(c) Loosen the nut.
(d) Using a Torx socket (E10), remove the stud bolt and nut.
(e) Disconnect the PPS solenoid valve connector.
(f) Disconnect the A/C compressor connector.
(g) Remove the 2 bolts, and disconnect the compressor from the engine.

HINT:
Put aside the vane pump and compressor, and suspend it securely.

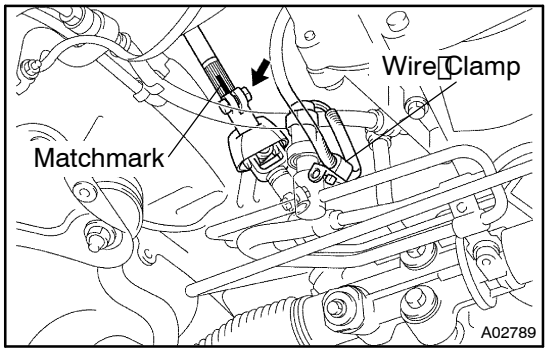


14. REMOVE PROPELLER SHAFT (See page PR–3)

15. REMOVE TRANSMISSION CONTROL ROD

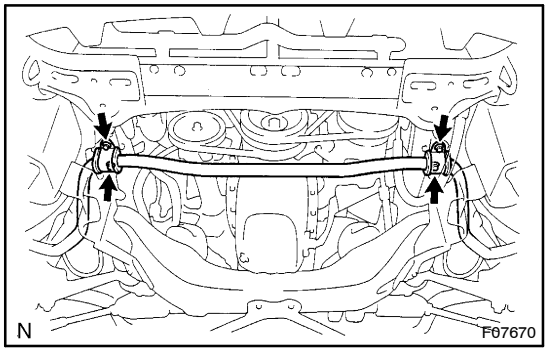
Remove the 2 nuts and control rod.

16. REMOVE FRONT AND CENTER EXHAUST PIPES (See page EM–99)



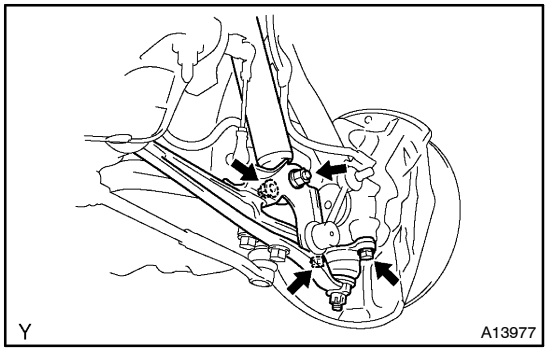
17. DISCONNECT SLIDING YOKE

(a) Check the steering wheel at the straight–ahead position, and place matchmarks on the sliding yoke and intermediate shaft.
(b) Remove the bolt, disconnect the sliding yoke from the steering intermediate shaft.
(c) Disconnect the PS pressure switch connector and wire clamp.



18. REMOVE STABILIZER BAR

(a) Remove the 2 nuts from the stabilizer bar links.
(b) Remove the 4 bolts and 2 stabilizer bar brackets, 2 bushings.

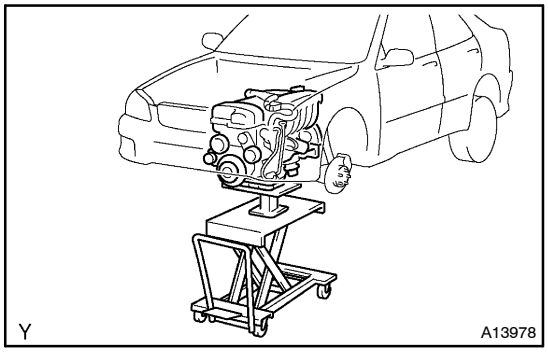


19. DISCONNECT SHOCK ABSORBER

Remove the bolt and nut, disconnect the shock absorber from the shock absorber bracket.

20. DISCONNECT LOWER ARM

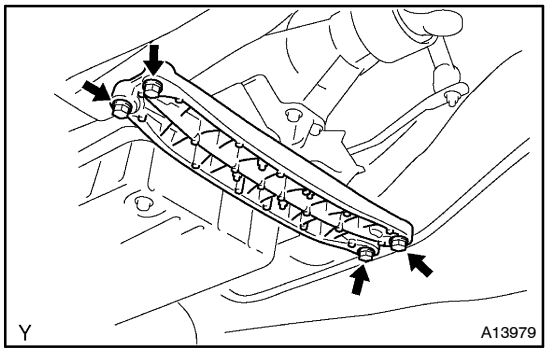
(a) Remove the nut, disconnect the height level sensor from the lower arm.
(b) Remove the 2 bolts, disconnect the lower arm from the steering knuckle.



21. SET ENGINE JACK

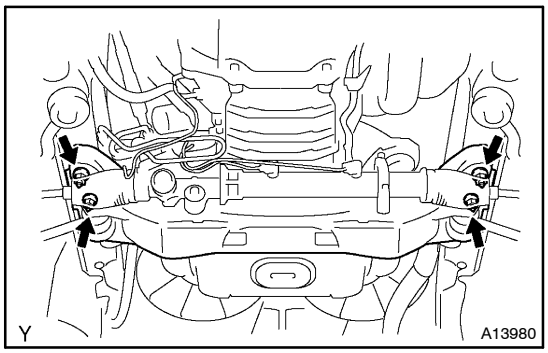
NOTICE:

Using chain, hold the engine tightly.



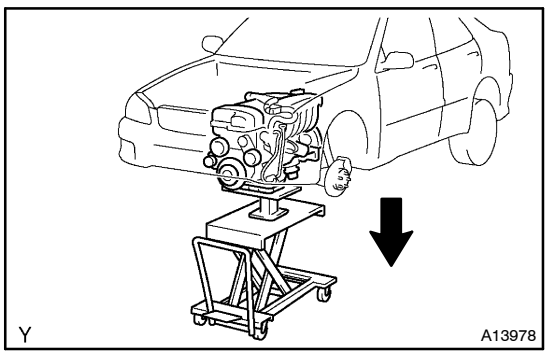
22. DISCONNECT REAR ENGINE MOUNTING

Remove the 4 bolts and rear engine mounting.



23. DISCONNECT SUSPENSION MEMBER

Remove the 4 bolts and disconnect the suspension member from the body.



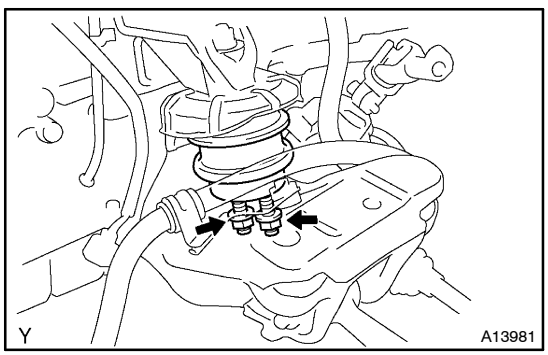
24. REMOVE ENGINE AND TRANSMISSION ASSEMBLY

(a) Remove the engine out of vehicle slowly and carefully.

NOTICE:

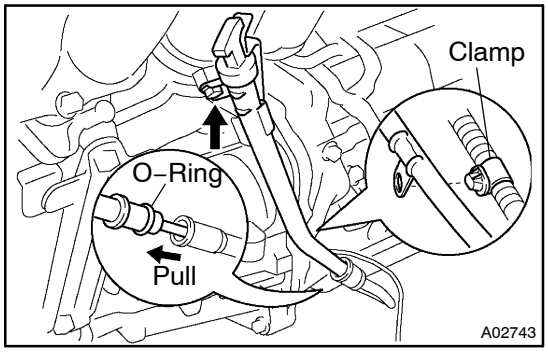
Make sure the engine is clear of all wiring, hoses and cables.

(b) Using a engine sliding device, and place the engine and transaxle assembly onto the stand.



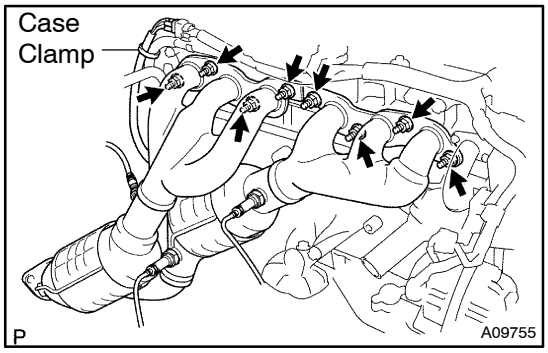
25. REMOVE SUSPENSION MEMBER FROM ENGINE

Remove the 4 nuts and suspension member with the steering gear housing from the engine.



26. REMOVE OIL DIPSTICK AND GUIDE FOR A/T

(a) Disconnect the engine wire clamp from the dipstick guide.
(b) Remove the bolt.
(c) Pull out the dipstick guide and dipstick from the dipstick tube.
(d) Remove the O–ring from the dipstick guide.

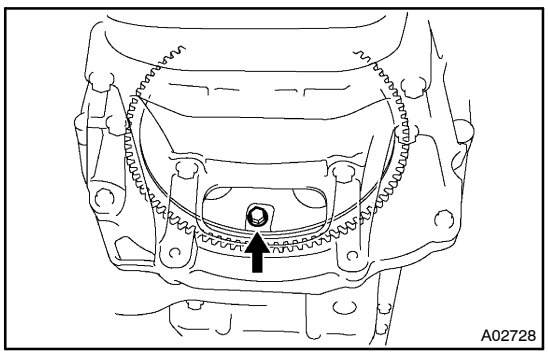


27. REMOVE EXHAUST MANIFOLD

(a) Remove the case clamp.
(b) Disconnect the oxygen sensor (bank 2 sensor 1) connector.
(c) Remove the 8 nuts, exhaust manifold and 2 gaskets.

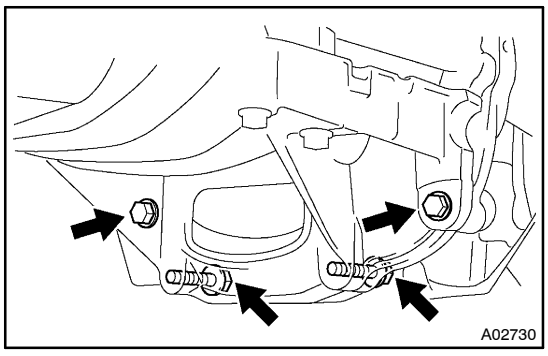
28. REMOVE OIL COOLER HOSES AND OIL COOLER PIPES FOR A/T

(a) Disconnect the 2 oil cooler hoses for A/T.
(b) Remove the 2 bolts and pipe clamps.
(c) Loosen the 2 union nuts.
(d) Remove the 2 oil cooler hoses and 2 oil cooler pipes.



29. REMOVE TORQUE CONVERTER CLUTCH BOLTS

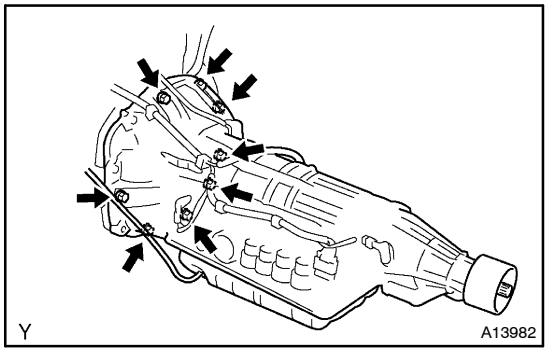
(a) Remove the hole plug.
(b) Turn the crankshaft pulley bolt to gain access to each bolt.
(c) Hold the crankshaft pulley bolt with a wrench, and remove the 6 bolts.



30. REMOVE 4 BOLTS HOLDING NO. 1 OIL PAN TO TRANSMISSION

31. REMOVE STARTER

(a) Disconnect the starter connector.
(b) Remove the 2 bolts, clamp bracket and starter.



32. DISCONNECT ENGINE WIRE FROM TRANSMISSION

(a) Disconnect the speed sensor connector.
(b) Disconnect the PNP switch connector.
(c) Disconnect the solenoid connector.
(d) Disconnect the direct clutch speed sensor connector.
(e) Disconnect the engine wire from the 3 wire clamps.

33. REMOVE TRANSMISSION FROM ENGINE

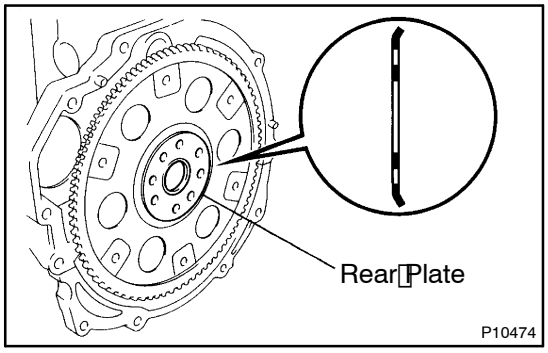
(a) Remove the 5 bolts and ground wire.
(b) Remove the transmission together with the torque converter clutch from the engine.

34. REMOVE DRIVE PLATE

Remove the 8 bolts, rear plate, drive plate and front spacer.

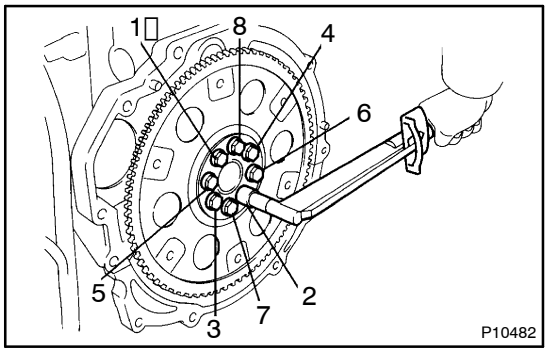
EM0DI-07

INSTALLATION



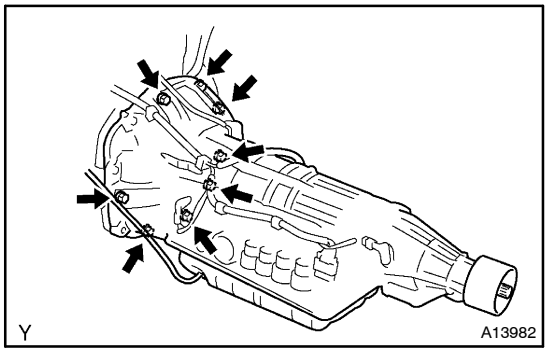
1. INSTALL DRIVE PLATE

(a) Install the front spacer, drive plate and rear plate on the crankshaft.



(b) Apply adhesive to 2 or 3 threads of the mounting bolt end.
Adhesive:
Part No. 08833–00070, THREE BOND 1324 or equivalent

(c) Install the uniformly tighten the 8 mounting bolts, in several passes, in the sequence shown.
Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



2. INSTALL TRANSMISSION TO ENGINE

(a) Check the torque converter clutch installation (See page AT–39).

(b) Attach the transmission to the engine.

(c) Install the ground wire and 5 bolts.
Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)

3. CONNECT ENGINE WIRE TO TRANSMISSION

(a) Connect the speed sensor connector.

(b) Connect the PNP switch connector.

(c) Connect the solenoid connector.

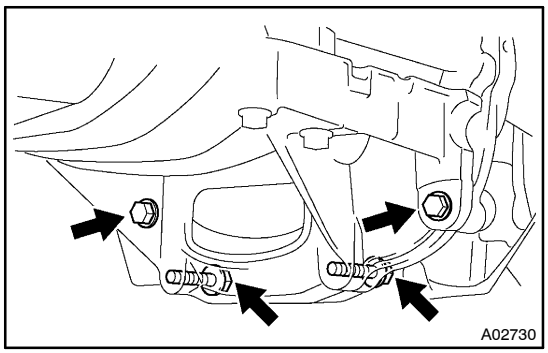
(d) Connect the direct clutch speed sensor connector.

(e) Connect the engine wire to the 3 wire clamps.

4. INSTALL STARTER

(a) Install the starter and clamp bracket with the 2 bolts.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

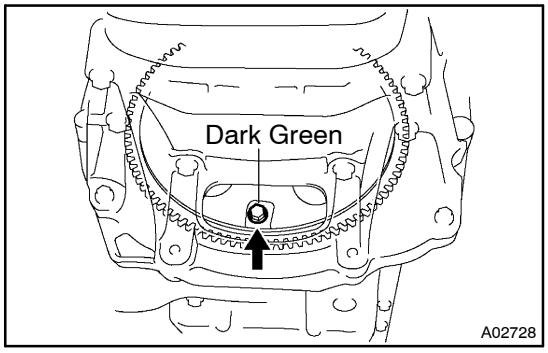
(b) Connect the starter connector.



5. INSTALL 4 BOLTS HOLDING NO. 1 OIL PAN TO TRANSMISSION
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

6. INSTALL TORQUE CONVERTER CLUTCH BOLTS

(a) Apply adhesive to 2 or 3 threads of the bolt end.
Adhesive:
Part No. 08833–00070, THREE BOND 1324 or equivalent



(b) Hold the crankshaft pulley bolt with a wrench, and install the 6 bolts evenly.

Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)

HINT:

First install the dark green colored bolt, install the other bolts.

(c) Install the hole plug.

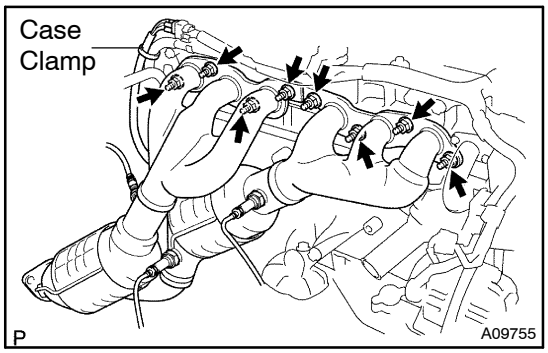
7. INSTALL OIL COOLER HOSES AND OIL COOLER PIPES FOR A/T

(a) Install the 2 oil cooler hoses and 2 oil cooler pipes.

(b) Tighten the 2 union nuts.

(c) Install the 2 bolts and pipe clamps.

(d) Connect the 2 oil cooler hoses for A/T.



8. INSTALL EXHAUST MANIFOLD

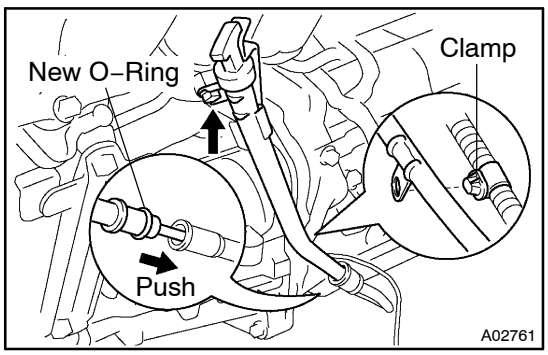
(a) Install 2 new gaskets to the cylinder head.

(b) Using a 14 mm deep socket wrench, install the exhaust manifold with the 8 nuts. Uniformly tighten the nuts in several passes.

Torque: 40 N·m (408 kgf·cm, 30 ft·lbf)

(c) Connect the oxygen sensor (bank 2 sensor 1) connector.

(d) Install the case clamp.



9. INSTALL OIL DIPSTICK GUIDE AND DIPSTICK FOR A/T

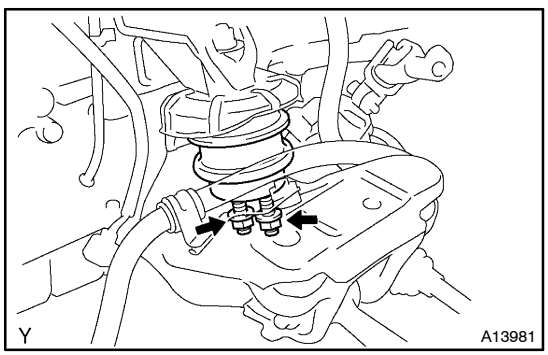
(a) Install a new O–ring to the dipstick guide.

(b) Push in the dipstick guide end to the dipstick tube of the oil pan.

(c) Install the dipstick guide with the bolt.

(d) Connect the engine wire clamp to the dipstick guide.

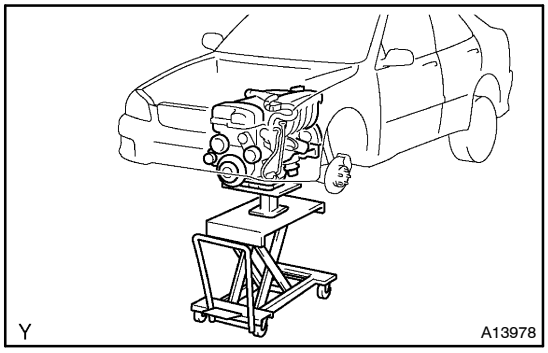
(e) Install the dipstick.



10. INSTALL SUSPENSION MEMBER TO ENGINE

Install the suspension member with the 4 nuts and to the engine.

Torque: 70 N·m (714 kgf·cm, 52 ft·lbf)



11. SET ENGINE JACK

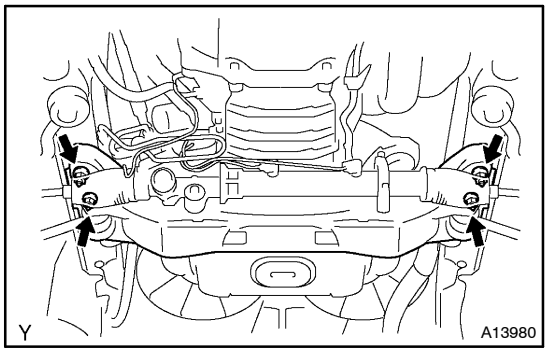
NOTICE:

Using a chain, hold the engine tightly.

12. INSTALL ENGINE AND TRANSMISSION ASSEMBLY IN VEHICLE

(a) Raise the engine into the engine compartment.

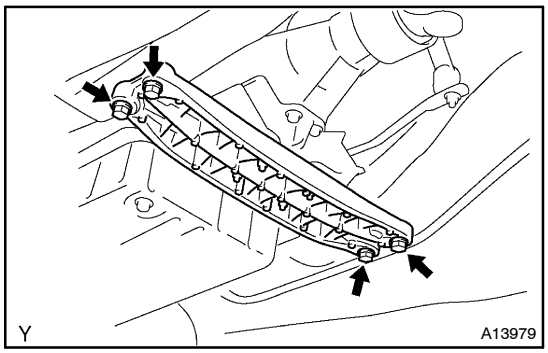
(b) Keep the engine level, and align RH and LH mountings with the insulator.



13. CONNECT SUSPENSION MEMBER

Connect the suspension member with the 4 bolts to the body.

Torque: 70 N·m (714 kgf·cm, 52 ft·lbf)

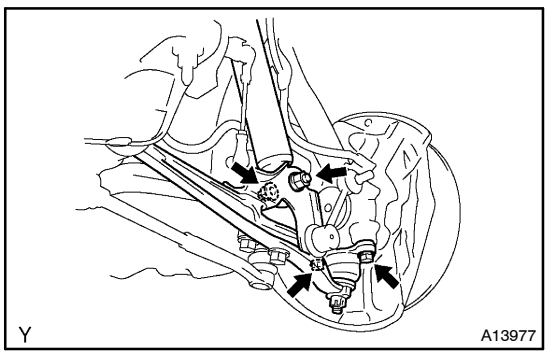


14. CONNECT REAR ENGINE MOUNTING

Install the rear engine mounting with the 4 bolts.

Torque: 25.5 N·m (260 kgf·cm, 19 ft·lbf)

15. REMOVE ENGINE JACK



16. CONNECT LOWER ARM

(a) Connect the lower arm with the 2 bolts to the steering knuckle.

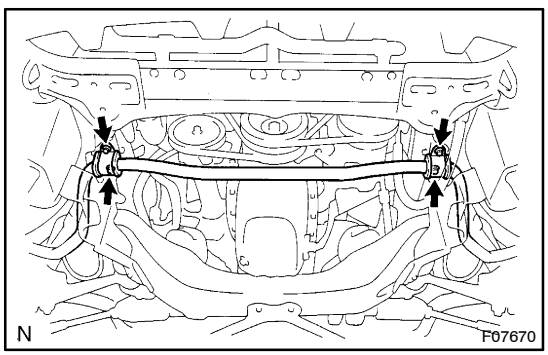
Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)

(b) Connect the height level sensor to the lower arm.

17. CONNECT SHOCK ABSORBER

Connect the shock absorber with the bolt and nut.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



18. INSTALL STABILIZER BAR

(a) Install the 2 bushings and 2 stabilizer bar brackets to the stabilizer bar.

(b) Install the stabilizer bar with the 4 bolts and 2 nuts.

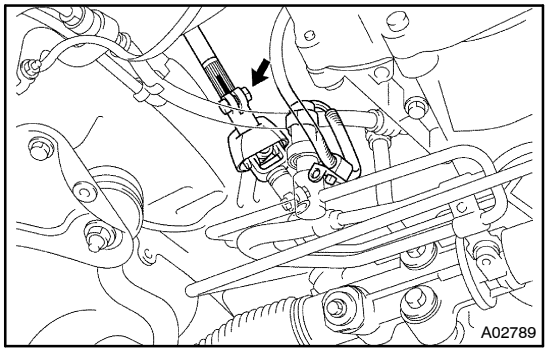
Torque:

Bolt: 18 N·m (180 kgf·cm, 13 ft·lbf)

Nut: 49 N·m (500 kgf·cm, 36 ft·lbf)

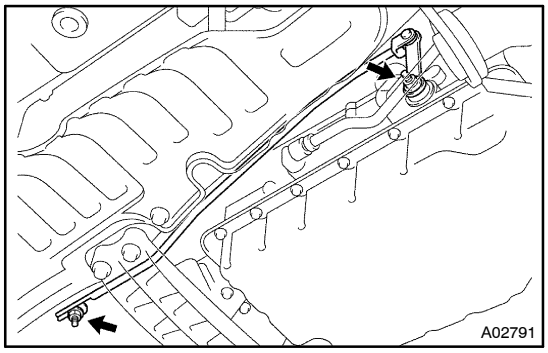
19. CONNECT SLIDING YOKE

(a) Align the matchmarks and connect the sliding yoke to the steering intermediate shaft.

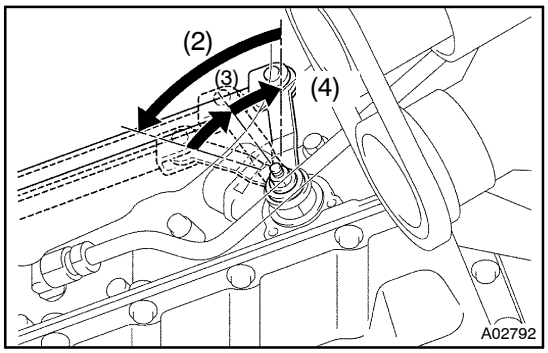


(b) Install the bolt holding the sliding yoke to the steering intermediate shaft.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)
(c) Connect the PS pressure switch and wire clamp.

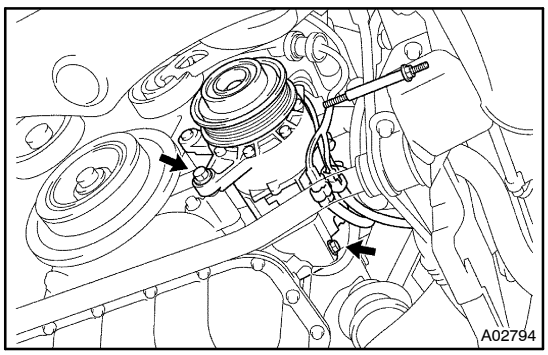
20. INSTALL FRONT AND CENTER EXHAUST PIPE
(See page EM–99)
Torque: 43 N·m (438 kgf·cm, 32 ft·lbf)



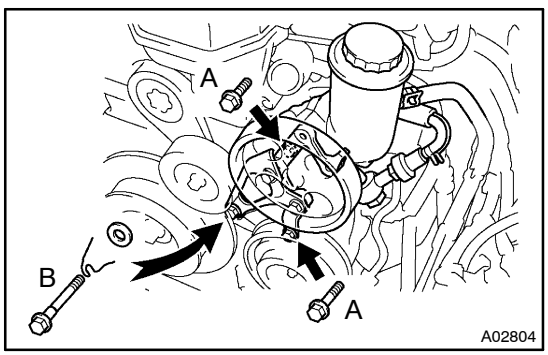
21. INSTALL TRANSMISSION CONTROL ROD
Install the control rod with the 2 nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



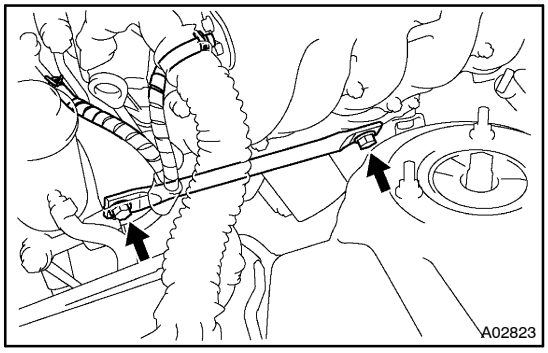
If the indicator is not aligned with the correct position, carry out the following adjustment procedures.
(1) Loosen the nut on the shift lever.
(2) Push the control shaft lever fully rearward.
(3) Return the control shaft lever 2 notches to the N position.
(4) Set the shift lever to the N position.
(5) While holding the shift lever lightly toward the R position side, tighten the nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



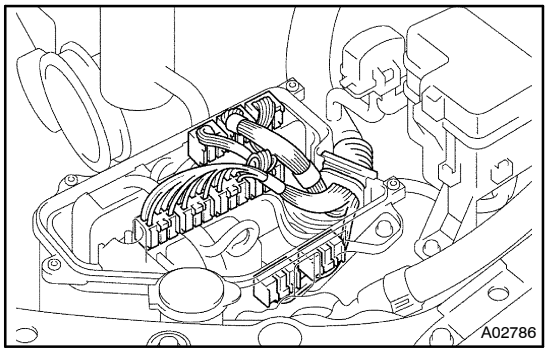
22. INSTALL A/C COMPRESSOR AND PS PUMP
(a) Temporarily install the compressor with the 2 bolts.
(b) Using a torx socket (E10), install the stud bolt.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)
(c) Tighten the nut and 2 bolts.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)
(d) Connect the compressor connector.
(e) Connect the PPS solenoid valve connector.



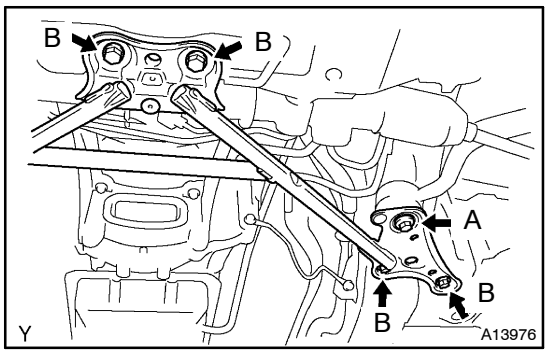
(f) Install the vane pump assembly with the 3 bolts and plate washer.
Torque:
57.9 N·m (590 kgf·cm, 43 ft·lbf) for A bolts
52 N·m (530 kgf·cm, 38 ft·lbf) for B bolt



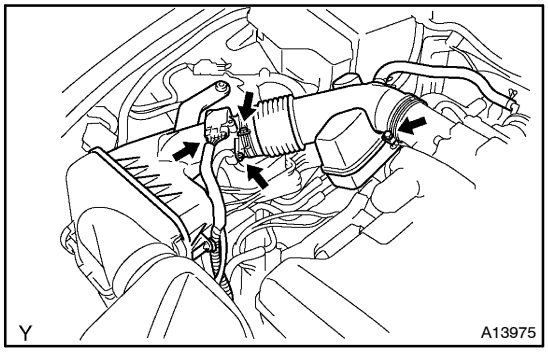
(g) Install the pump rear stay with the 2 bolts.
Torque: 39.2 N·m (400 kgf·cm, 29 ft·lbf)



23. CONNECT ENGINE WIRE TO ENGINE ECU BOX
(a) Install the engine wire grommet to the ECU box.
(b) Connect the 3 ECU connectors.
(c) Connect the 4 wire harness connectors.
(d) Connect the 2 junction connectors.
(e) Install the ECU cover and ECU hood.
24. CONNECT CLAMPS, WIRES, CONNECTORS, HOSES, CABLE AND STRAP
(a) Connect the 2 engine wire clamps to the clamp brackets.
(b) Connect the igniter connector.
(c) Connect the engine wire clamp to the wire clip of the alternator.
(d) Connect the ground cable to the bracket on the cylinder block.
(e) Connect the alternator wire.
(f) Connect the alternator cable, and install the nut.
(g) Connect the 2 oxygen sensors.
(1) Connect the bank 1 sensor 1 connector.
(2) Connect the bank 1 sensor 2 connector.
(3) Connect the wire clamp to the body.
(h) Connect the vacuum hose to the brake booster.
(i) Connect the heater hose to the heater pipe.
(j) Connect the heater hose to the water bypass pipe.
(k) Connect the ground strap to the dash panel.
(l) Connect the fuel inlet hose to the fuel pipe support.
Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)
(m) Connect the starter wire to the terminal and manifold stay.
(n) Connect the ground wire to the floor.



25. INSTALL FRONT SUSPENSION MEMBER BRACE
Install the brace with the 8 bolts.
Torque:
Bolt A: 119 N·m (1,210 kgf·cm, 88 ft·lbf)
Bolt B: 58 N·m (590 kgf·cm, 43 ft·lbf)
26. INSTALL DRIVE BELT (See page CH–1)
27. CONNECT ACCELERATOR CABLE TO ENGINE



28. INSTALL INTAKE AIR CONNECTOR PIPE

(a) Connect the intake air resonator to the throttle body.
(b) Tighten the hose clamp bolt holding the intake air resonator to the throttle body.
(c) Connect the air flow meter connector.
(d) Connect the engine wire clamp to the air cleaner case.
(e) Connect the PCV hose to the No. 2 cylinder head cover.

29. CONNECT RADIATOR UPPER AND LOWER HOSES

30. INSTALL AIR CLEANER INLET

31. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

32. FILL WITH ENGINE COOLANT

33. FILL WITH ENGINE OIL

34. START ENGINE AND CHECK FOR LEAKS

35. INSTALL ENGINE UNDER COVER

NOTICE:

Be careful not to damage the body or glass with the hood end.

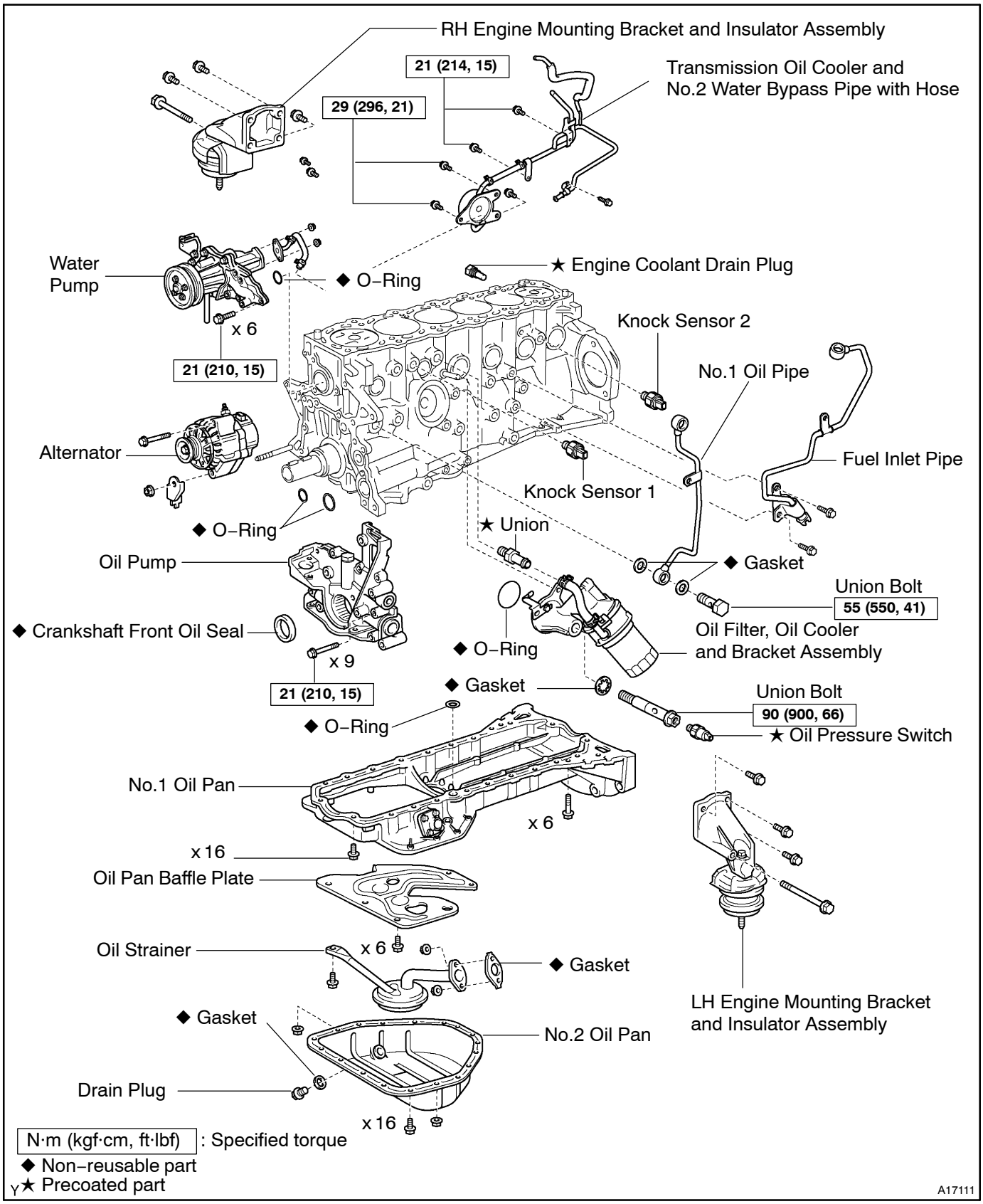
36. PERFORM ROAD TEST

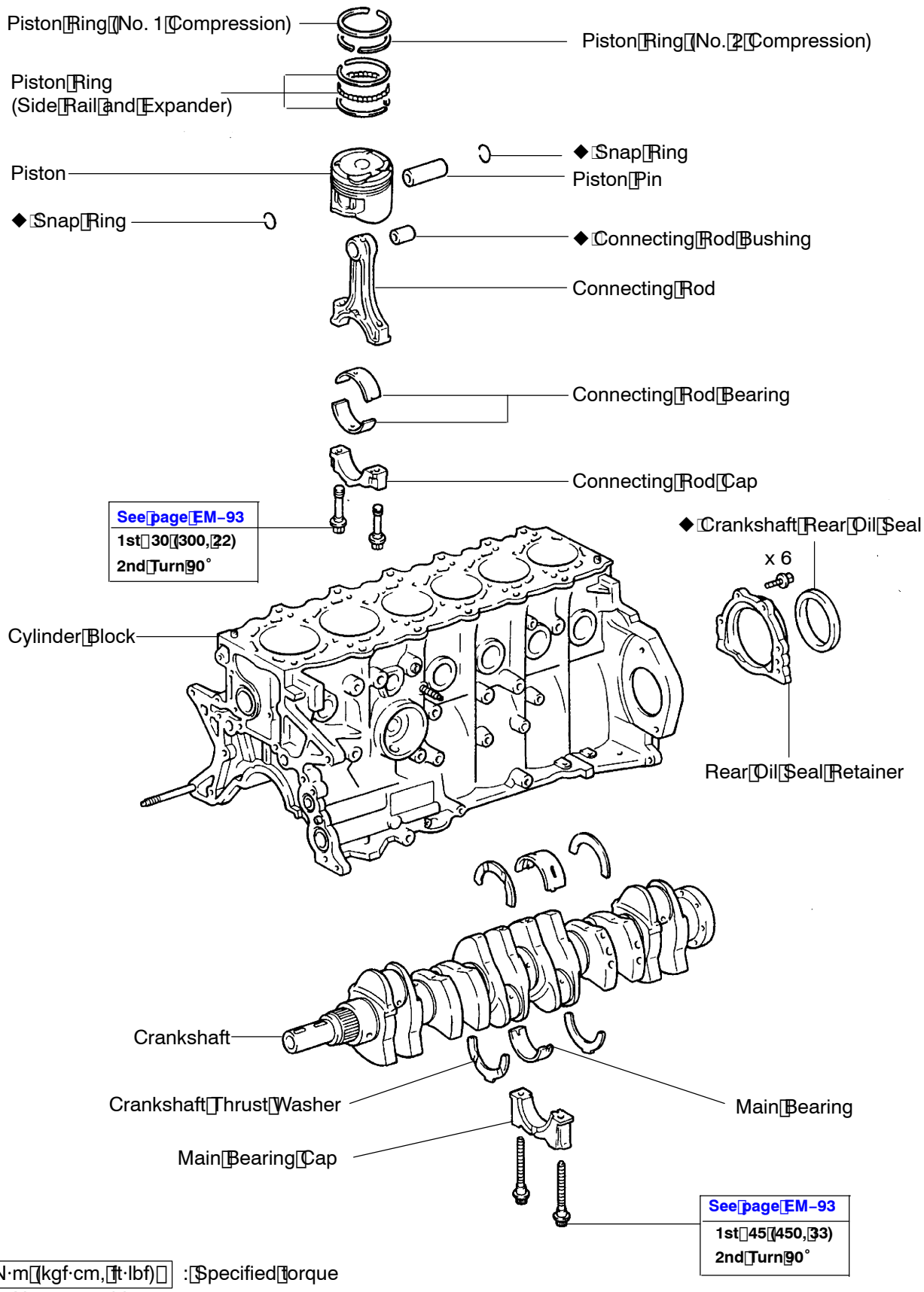
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

37. RECHECK ENGINE COOLANT AND OIL LEVELS

CYLINDER BLOCK COMPONENTS

EM0DJ–05





N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

A02806

EM0DK–05

DISASSEMBLY

1. INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY

2. REMOVE ALTERNATOR

Remove the bolt, nut, pipe bracket and alternator.

3. REMOVE TIMING BELT AND PULLEYS (See page EM–17)

4. REMOVE TRANSMISSION OIL COOLER AND NO. 2 WATER BYPASS PIPE WITH HOSE

(a) Disconnect the water bypass hose.

(b) Remove the 6 bolts and transmission oil cooler and No. 2 water bypass pipe with hose.

5. REMOVE WATER PUMP

Remove the 6 bolts, water pump and O–ring.

6. REMOVE CYLINDER HEAD (See page EM–34)

7. REMOVE OIL PRESSURE SWITCH AND KNOCK SENSORS

Using SST, remove the switch and sensors.

SST 09816–30010

8. REMOVE OIL FILTER, OIL COOLER AND BRACKET ASSEMBLY

(a) Disconnect the water bypass hose from the union.

(b) Remove the union bolt and oil filter bracket.

(c) Remove the gasket from the union bolt.

(d) Remove the O–ring from the oil filter bracket.

9. REMOVE NO. 1 OIL PIPE

Remove the union bolt, No.1 oil pipe and 2 gaskets.

10. REMOVE FUEL INLET PIPE

Remove the 2 bolts and fuel inlet pipe.

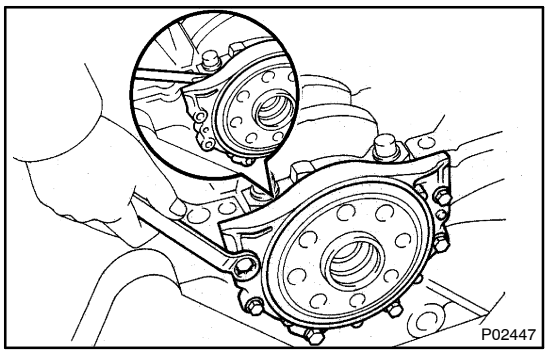
11. REMOVE LH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

Remove the 4 bolts and mounting bracket.

12. REMOVE RH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

Remove the 4 bolts and mounting bracket.

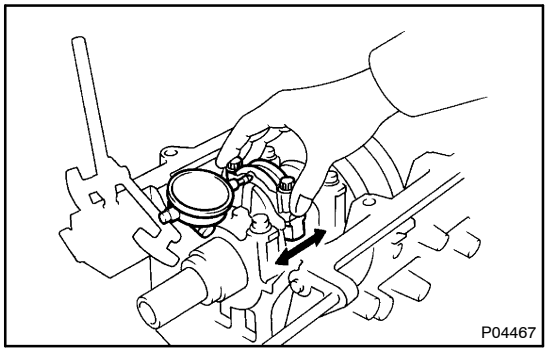
13. REMOVE OIL PUMP (See page LU–6)



14. REMOVE REAR OIL SEAL RETAINER

(a) Remove the 6 bolts of the retainer.

(b) Remove the oil seal retainer by prying the area between the oil seal retainer and main bearing cap with a screwdriver.



15. CHECK CONNECTING ROD THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rods back and forth.

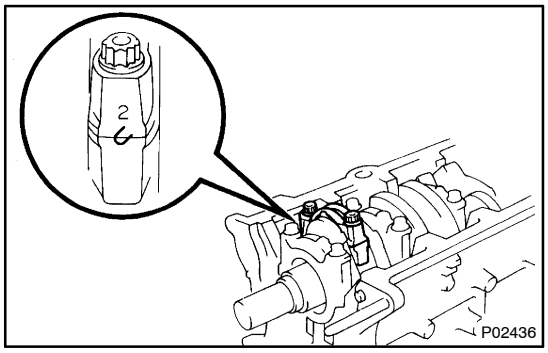
Standard thrust clearance:
0.250 – 0.402 mm (0.0098 – 0.0158 in.)
Maximum thrust clearance:
0.50 mm (0.0197 in.)

If the thrust clearance is greater than maximum, replace the connecting rod assembly(s). If necessary, replace the crankshaft.

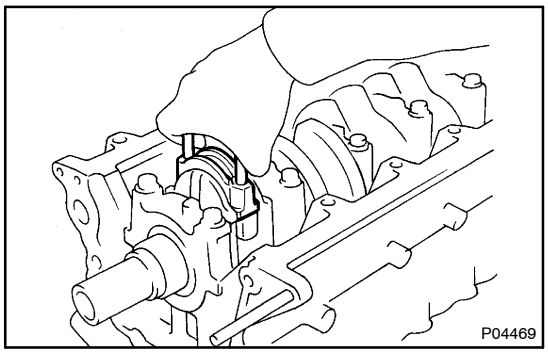
Connecting rod thickness:
25.898 – 25.950 mm (1.0196 – 1.0217 in.)

16. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

(a) Check the matchmarks on the connecting rod and cap to ensure correct reassembly.



(b) Remove the connecting rod cap bolts.

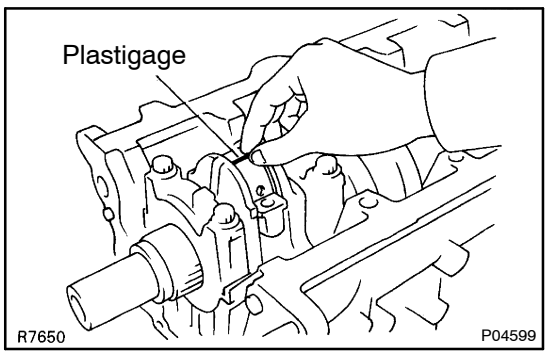


(c) Using the 2 removed connecting rod bolts, remove the connecting rod cap and lower bearing by wiggling the connecting rod cap right and left.

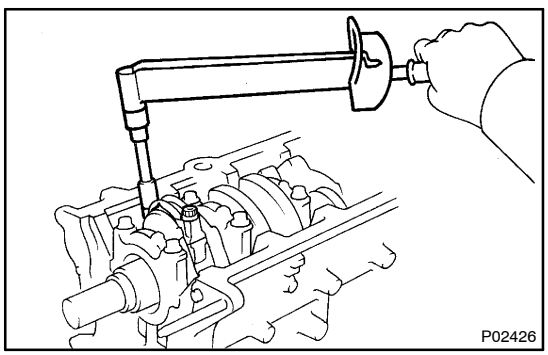
HINT:
Keep the lower bearing inserted with the connecting rod cap.

(d) Clean the crank pin and bearings.

(e) Check the crank pin and bearing for pitting and scratches. If the crank pin or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



(f) Lay a strip of Plastigage across the crank pin.

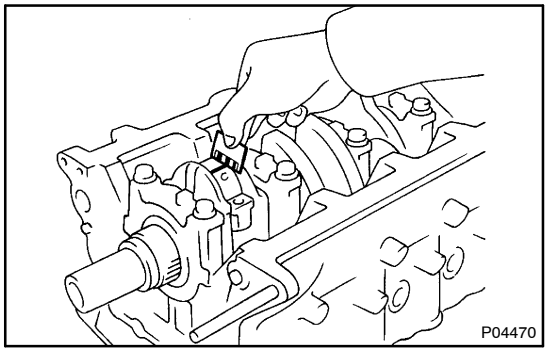


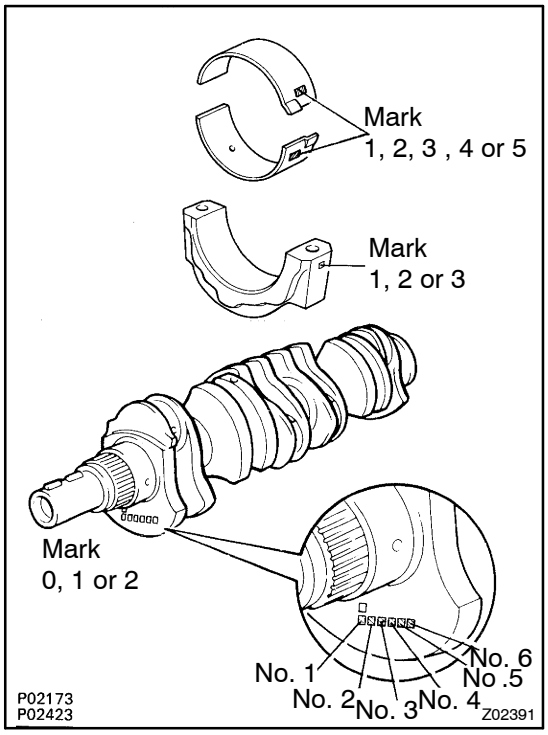
(g) Install the connecting rod cap with the 2 bolts.
(See page EM–93)

Torque:
1st 30 N·m (300 kgf·cm, 22 ft·lbf)
2nd Turn extra 90°

NOTICE:
Do not turn the crankshaft.

(h) Remove the 2 bolts, connecting rod cap and lower bearing. (See procedure (b) and (c) above)





(i) Measure the Plastigage at its widest point.

Standard oil clearance:

STD	0.023 – 0.041 mm (0.0009 – 0.0016 in.)
U/S 0.25	0.028 – 0.066 mm (0.0011 – 0.0026 in.)

Maximum oil clearance:

STD	0.07 mm (0.0027 in.)
U/S 0.25	0.08 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.

HINT:

If using a standard bearing, replace with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the connecting rod cap and crankshaft, then selecting the bearing with the same number as the total. There are 5 sizes of standard bearings, marked ”1”, ”2”, ”3”, ”4” and ”5” accordingly.

	Number mark								
Connecting rod cap	1			2			3		
Crankshaft	0	1	2	0	1	2	0	1	2
Use bearing	1	2	3	2	3	4	3	4	5

EXAMPLE: Connecting rod cap ”3” + Crankshaft ”1”
= Total number 4 (Use bearing ”4”)

Reference

Connecting rod big end inside diameter:

Mark ”1”	55.025 – 55.031 mm (2.1663 – 2.1666 in.)
Mark ”2”	55.031 – 55.037 mm (2.1666 – 2.1668 in.)
Mark ”3”	55.037 – 55.043 mm (2.1668 – 2.1670 in.)

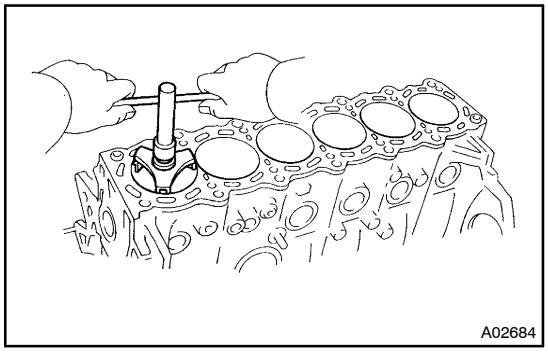
Crankshaft crank pin diameter:

Mark ”0”	51.994 – 52.000 mm (2.0470 – 2.0472 in.)
Mark ”1”	51.988 – 51.994 mm (2.0468 – 2.0470 in.)
Mark ”2”	51.982 – 51.988 mm (2.0465 – 2.0468 in.)

Standard sized bearing center wall thickness:

Mark ”1”	1.498 – 1.501 mm (0.0590 – 0.0591 in.)
Mark ”2”	1.501 – 1.504 mm (0.0591 – 0.0592 in.)
Mark ”3”	1.504 – 1.507 mm (0.0592 – 0.0593 in.)
Mark ”4”	1.507 – 1.510 mm (0.0593 – 0.0594 in.)
Mark ”5”	1.510 – 1.513 mm (0.0594 – 0.0596 in.)

(j) Completely remove the Plastigage.

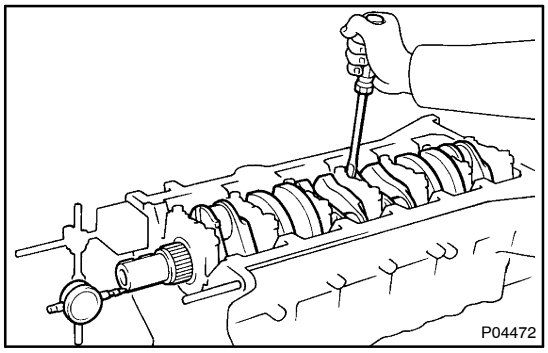


17. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

(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.

- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in correct order.



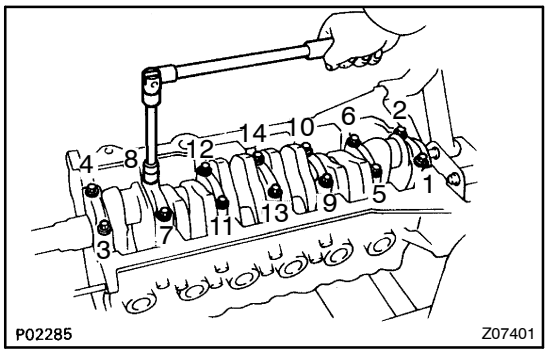
18. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.020 – 0.220 mm (0.0008 – 0.0087 in.)
Maximum thrust clearance:
0.30 mm (0.0118 in.)

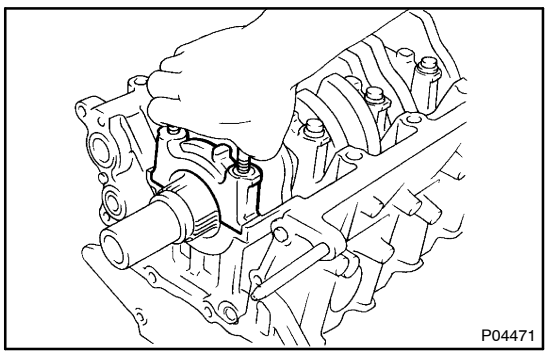
If the thrust clearance is greater than maximum, replace the thrust washers as a set.

Thrust washer thickness:
1.940 – 1.990 mm (0.0764 – 0.0783 in.)



19. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

(a) Uniformly loosen and remove the 14 main bearing cap bolts, in several passes, in the sequence shown.



(b) Using the removed main bearing cap bolts, pry the main bearing cap back and forth, and remove the main bearing caps, lower bearings and lower thrust washers (No.4 main bearing cap only).

HINT:

- Keep the lower bearing and main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in correct order.

(c) Lift out the crankshaft.

HINT:

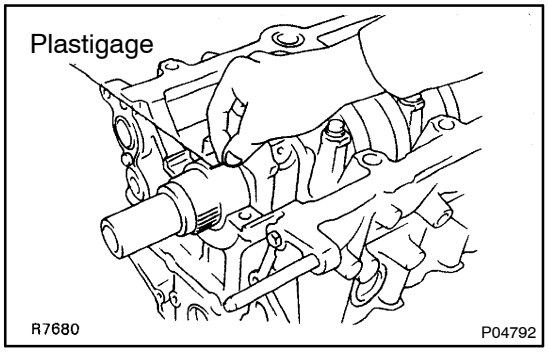
Keep the upper bearing and upper thrust washers together with the cylinder block.

(d) Clean each main journal and bearing.

(e) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.

(f) Place the crankshaft on the cylinder block.



(g) Lay a strip of Plastigage across each journal.

(h) Install the main bearing caps. (See page EM–93)

Torque:

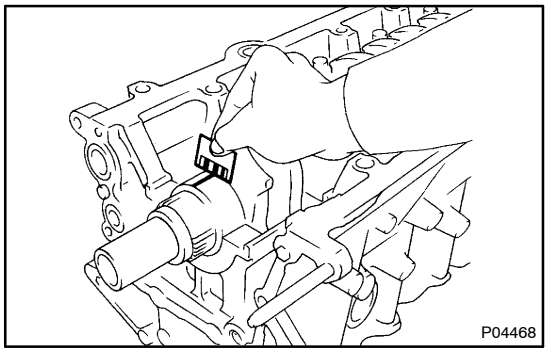
1st 45 N·m (450 kgf·cm, 33 ft·lbf)

2nd Turn extra 90°

NOTICE:

Do not turn the crankshaft.

(i) Remove the main bearing caps.
(See procedures (a) and (b) above)



(j) Measure the Plastigage at its widest point.

Standard clearance:

STD	0.026 – 0.040 mm (0.0010 – 0.0016 in.)
U/S 0.25	0.025 – 0.061 mm (0.0010 – 0.0024 in.)

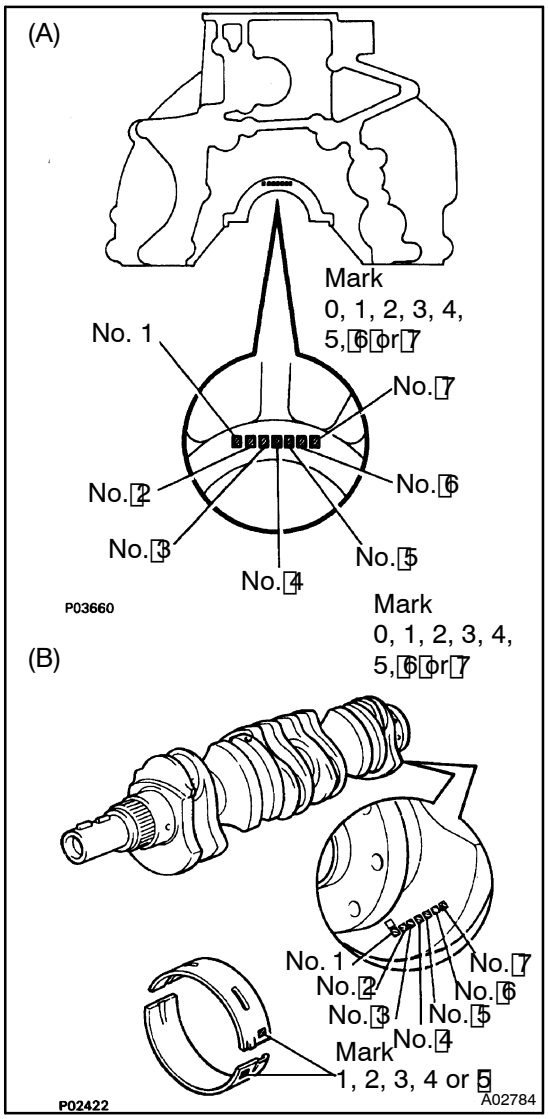
Maximum clearance:

STD	0.06 mm (0.0024 in.)
U/S 0.25	0.08 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.

HINT:

If using a standard bearing, replace with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then refer to the table below for the appropriate bearing number. There are 5 sizes of standard bearings, marked "1", "2", "3", "4" and "5" accordingly.



	Total number "1" : Number mark				
Cylinder block (A) + Crankshaft (B) =	0–2	3–5	6–8	9–11	12–14
Use bearing	"1"	"2"	"3"	"4"	"5"

EXAMPLE: Cylinder block "3" (A)
+ Crankshaft "4" (B)
= Total number 7 (Use bearing "3")

Standard sized bearing selection chart:

Crankshaft number mark	Cylinder block number mark							
	0	1	2	3	4	5	6	7
0	1	1	1	2	2	2	3	3
1	1	1	2	2	2	3	3	3
2	1	2	2	2	3	3	3	4
3	2	2	2	3	3	3	4	4
4	2	2	3	3	3	4	4	4
5	2	3	3	3	4	4	4	4
6	3	3	3	4	4	5	5	5
7	3	3	4	4	5	5	5	5

EXAMPLE: Cylinder block ”3” Crankshaft ”4”
= Use bearing ”3”

Reference

Cylinder block main journal bore diameter (A):

Mark ”0”	66.020 – 66.022 mm (2.59922 – 2.59929 in.)
Mark ”1”	66.022 – 66.024 mm (2.59929 – 2.59936 in.)
Mark ”2”	66.024 – 66.026 mm (2.59936 – 2.59944 in.)
Mark ”3”	66.026 – 66.028 mm (2.59944 – 2.59952 in.)
Mark ”4”	66.028 – 66.030 mm (2.59952 – 2.59960 in.)
Mark ”5”	66.030 – 66.032 mm (2.59960 – 2.59968 in.)
Mark ”6”	66.032 – 66.034 mm (2.59968 – 2.59976 in.)
Mark ”7”	66.034 – 66.036 mm (2.59976 – 2.59984 in.)

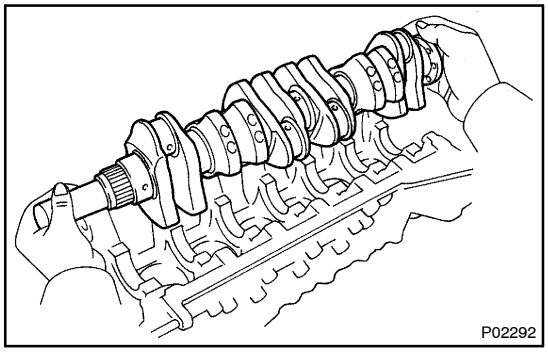
Crankshaft main journal diameter (B):

Mark ”0”	61.998 – 62.000 mm (2.44086 – 2.44094 in.)
Mark ”1”	61.996 – 61.998 mm (2.44078 – 2.44086 in.)
Mark ”2”	61.994 – 61.996 mm (2.44070 – 2.44078 in.)
Mark ”3”	61.992 – 61.994 mm (2.44063 – 2.44070 in.)
Mark ”4”	61.990 – 61.992 mm (2.44055 – 2.44063 in.)
Mark ”5”	61.988 – 61.990 mm (2.44047 – 2.44055 in.)
Mark ”6”	61.986 – 61.988 mm (2.44039 – 2.44047 in.)
Mark ”7”	61.984 – 61.986 mm (2.44031 – 2.44039 in.)

Standard bearing center wall thickness:

Mark ”1”	1.994 – 1.997 mm (0.0785 – 0.0786 in.)
Mark ”2”	1.997 – 2.000 mm (0.0786 – 0.0787 in.)
Mark ”3”	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
Mark ”4”	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
Mark ”5”	2.006 – 2.009 mm (0.0790 – 0.0791 in.)

(k) Completely remove the Plastigage.



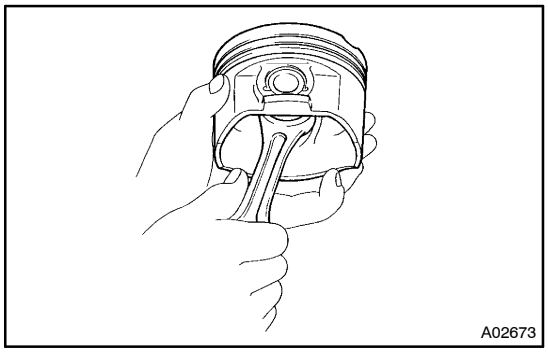
20. REMOVE CRANKSHAFT

(a) Lift out the crankshaft

(b) Remove the upper bearings and upper thrust washers from the cylinder block.

HINT:

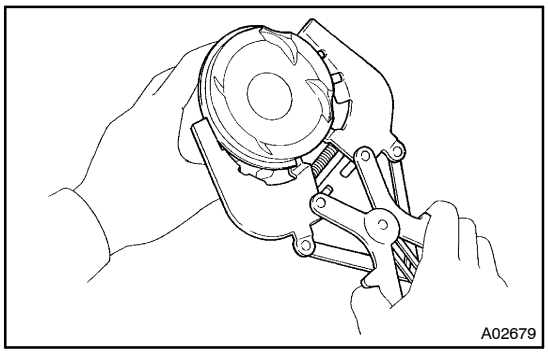
Arrange the main bearing caps, bearings and thrust washers in the correct order.



21. CHECK FIT BETWEEN PISTON AND PISTON PIN

Try to move the piston back and forth on the piston pin.

If any movement is felt, replace the piston and pin as a set.



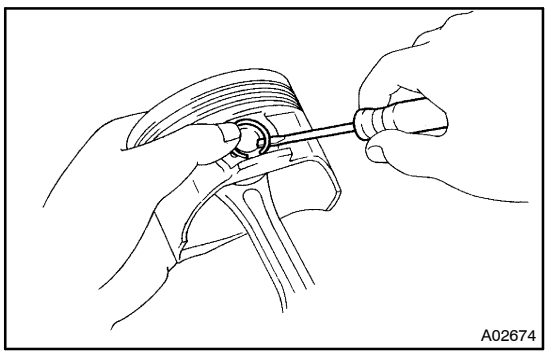
22. REMOVE PISTON RINGS

(a) Using a piston ring expander, remove the 2 compression rings.

(b) Remove the 2 side rails and oil ring expander by hand.

HINT:

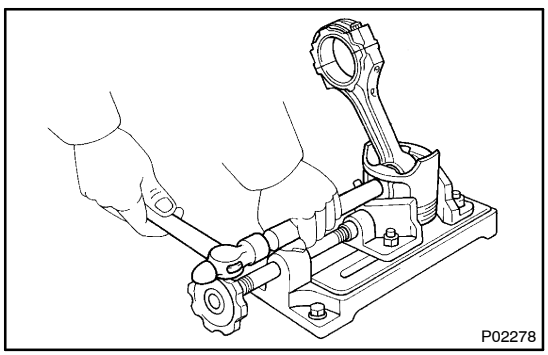
Arrange the piston rings in correct order only.



23. DISCONNECT CONNECTING ROD FROM PISTON

(a) Using a small screwdriver, remove the 2 snap rings.

(b) Gradually heat the piston to about 80˚C (176˚F).



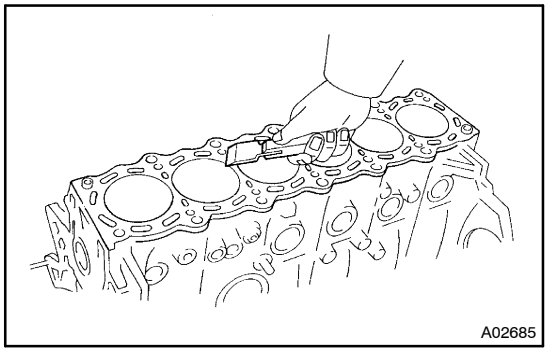
(c) Using a plastic–faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.

HINT:

- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.

EM0DL–07

INSPECTION



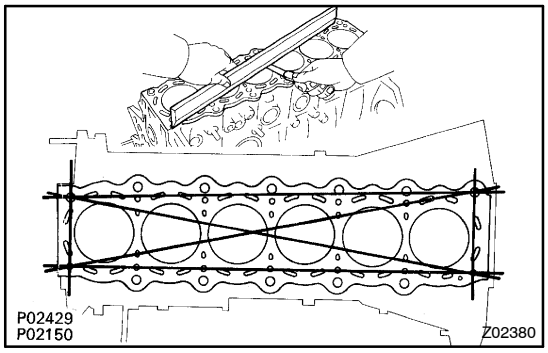
1. CLEAN CYLINDER BLOCK

(a) Remove gasket material

Using a gasket scraper, remove all the gasket material from the cylinder block surface.

(b) Clean cylinder block

Using a soft brush and solvent, thoroughly clean the cylinder block.

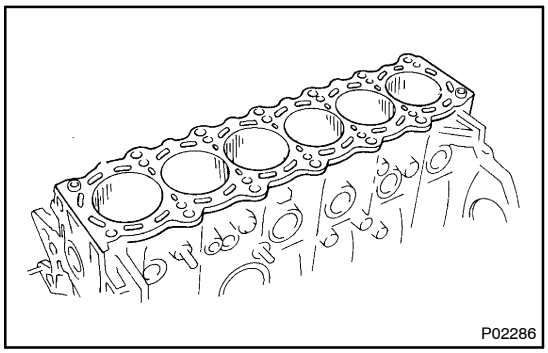


2. INSPECT CYLINDER BLOCK SURFACE FOR FLATNESS

Using precision straight edge and feeler gauge,
measure the top surfaces of the cylinder block for warpage.

Maximum warpage: 0.07 mm (0.0028 in.)

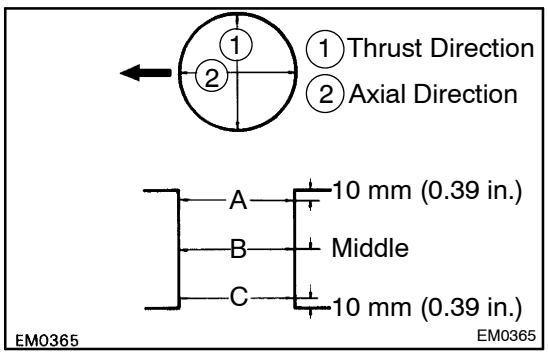
If warpage is greater than maximum, replace the cylinder block.



3. INSPECT CYLINDER FOR VERTICAL SCRATCHES

Visually check the cylinder for vertical scratches.

If deep scratches are present, replace the cylinder block.

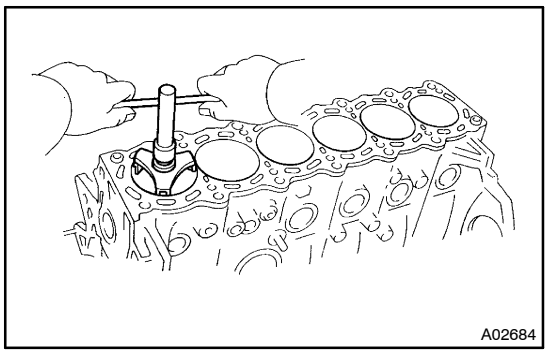


4. INSPECT CYLINDER BORE DIAMETER

Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

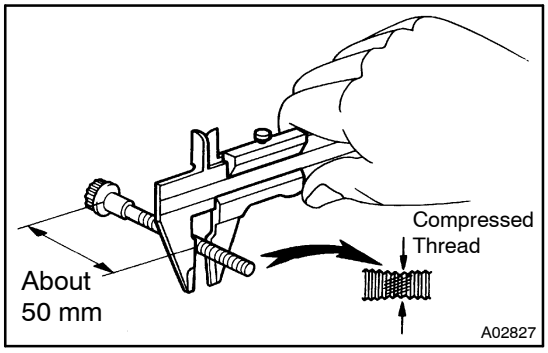
Standard diameter:
86.000 – 86.013 mm (3.3858 – 3.3863 in.)
Maximum diameter:
86.02 mm (3.3866 in.)

If the diameter is greater than maximum, replace the cylinder block.



5. REMOVE CYLINDER RIDGE

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

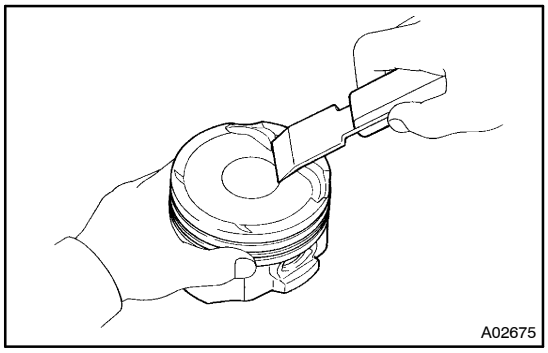


6. INSPECT MAIN BEARING CAP BOLTS

Using vernier calipers, measure the minimum diameter of the compressed thread at the measuring point.

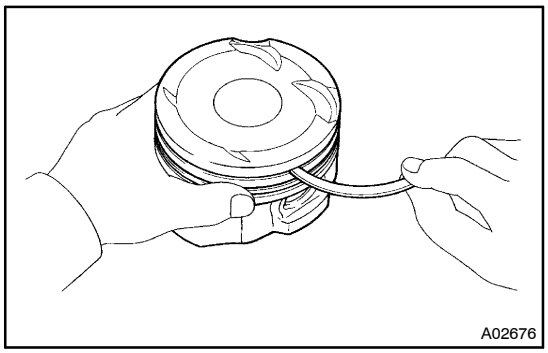
Standard diameter:
9.96 – 9.97 mm (0.3921 – 0.3925 in.)
Minimum diameter:
9.7 mm (0.382 in.)

If the diameter is less than minimum, replace the bolt.



7. CLEAN PISTON

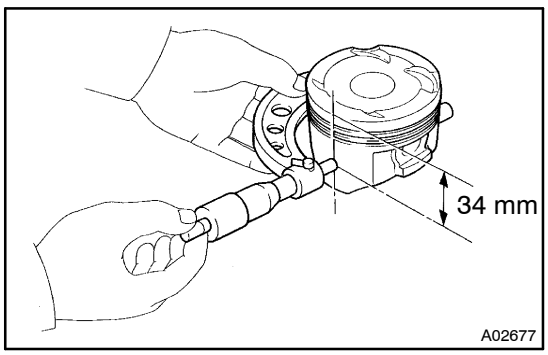
(a) Using a gasket scraper, remove the carbon from the piston top.



(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.

(c) Using solvent and a brush, thoroughly clean the piston.

NOTICE:
Do not use a wire brush.



8. INSPECT PISTON OIL CLEARANCE

(a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 34 mm (1.34 in.) from the piston head.

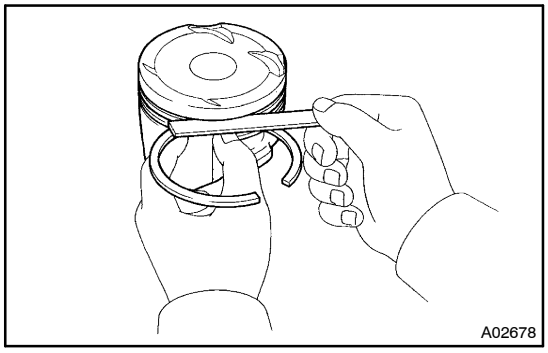
Piston diameter:
85.945 – 85.965 mm (3.3837 – 3.3844 in.)

(b) Measure the cylinder bore diameter in the thrust directions. (See step 4)

(c) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:
0.035 – 0.068 mm (0.0014 – 0.0027 in.)
Maximum oil clearance:
0.10 mm (0.0039 in.)

If the oil clearance is greater than maximum, replace all the 6 pistons. If necessary, replace the cylinder block.



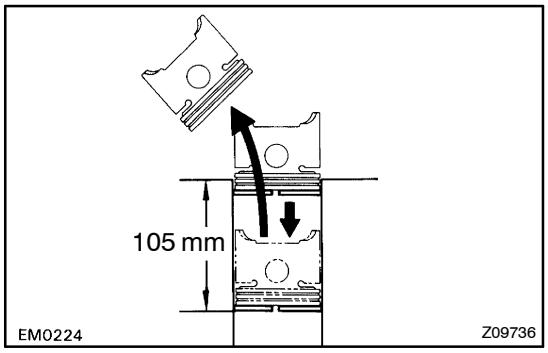
9. INSPECT PISTON RING GROOVE CLEARANCE

Using a feeler gauge, measure the clearance between new piston ring and the wall of the piston ring groove.

Ring groove clearance:

No. 1	0.011 – 0.070 mm (0.0004 – 0.0028 in.)
No. 2	0.030 – 0.070 mm (0.0012 – 0.0028 in.)

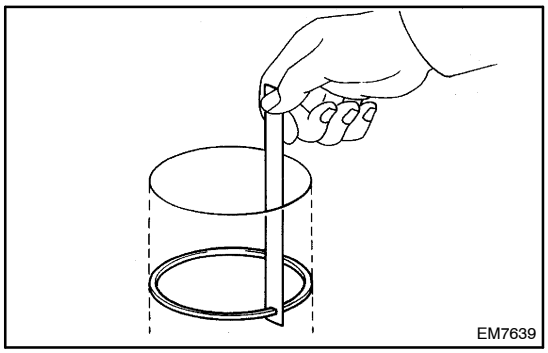
If the clearance is not as specified, replace the piston.



10. INSPECT PISTON RING END GAP

(a) Insert the piston ring into the cylinder bore.

(b) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 105 mm (4.13 in.) from the top of the cylinder block.



(c) Using a feeler gauge, measure the ring end gap.

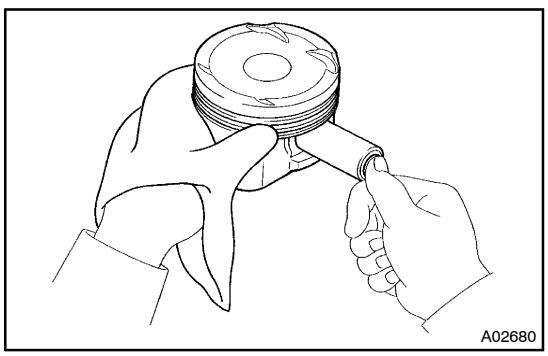
Standard ring end gap:

No. 1	0.300 – 0.470 mm (0.0118 – 0.0185 in.)
No. 2	0.350 – 0.520 mm (0.0138 – 0.0205 in.)
Oil (Side rail)	0.130 – 0.450 mm (0.0051 – 0.0177 in.)

Maximum ring end gap:

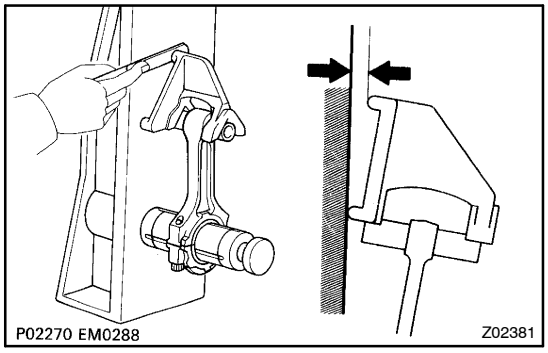
No. 1	1.07 mm (0.0421 in.)
No. 2	1.12 mm (0.0441 in.)
Oil (Side rail)	1.05 mm (0.0413 in.)

If the end gap is greater than maximum, replace the piston ring.
If the end gap is greater than maximum, even with a new piston ring, replace the cylinder block.



11. INSPECT PISTON PIN FIT

At 80°C (176°F), you should be able to push the piston pin into the piston pin hole with your thumb.



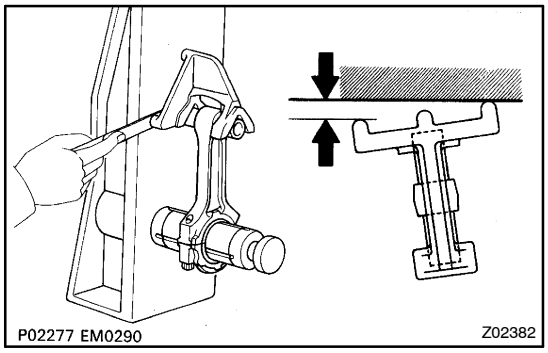
12. INSPECT CONNECTING ROD ALIGNMENT

Using a feeler gauge and rod aligner, check the connecting rod alignment.

- Check for out–of–alignment

Maximum out–of–alignment:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

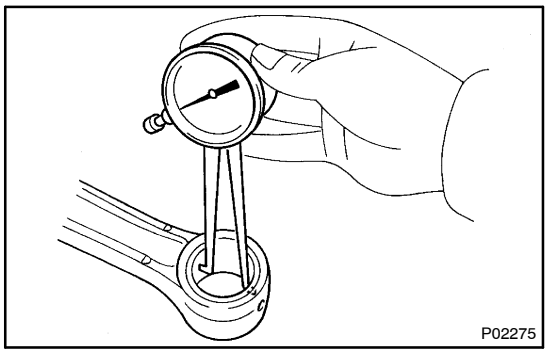
If out–of–alignment is greater than maximum, replace the connecting rod assembly.



- Check for twist

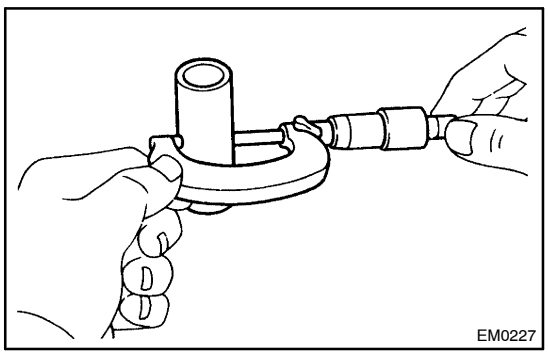
Maximum twist:
0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If twist is greater than maximum, replace the connecting rod assembly.



13. INSPECT PISTON PIN OIL CLEARANCE

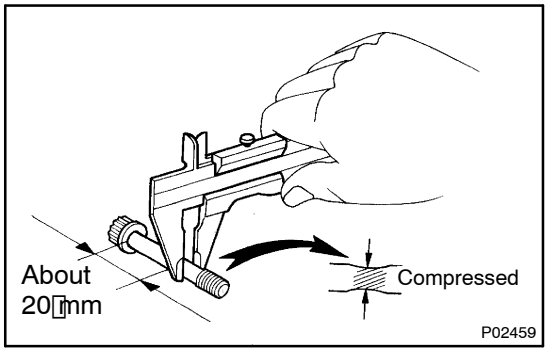
(a) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.
Bushing inside diameter:
22.005 – 22.014 mm (0.8663 – 0.8667 in.)



(b) Using a micrometer, measure the piston pin diameter.
Piston pin diameter:
21.997 – 22.006 mm (0.8660 – 0.8664 in.)

(c) Subtract the piston pin diameter measurement from the bushing in side diameter measurement.
Standard oil clearance:
0.005 – 0.011 mm (0.0002 – 0.0004 in.)
Maximum oil clearance:
0.05 mm (0.0020 in.)

If the oil clearance is greater than maximum, replace the bushing. If necessary, replace the piston and piston pin as a set.



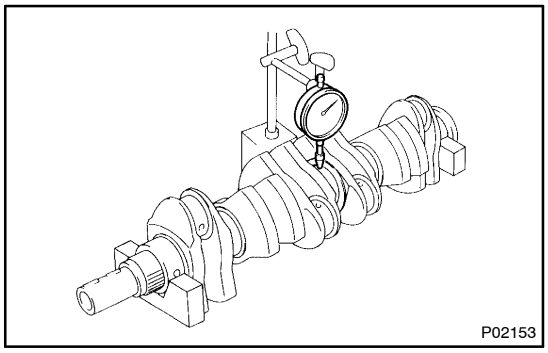
14. INSPECT CONNECTING ROD BOLTS

Using vernier calipers, measure the minimum diameter of the compressed bolt at the measuring point.

Standard diameter: 8.1 – 8.3 mm (0.319 – 0.327 in.)

Minimum diameter: 8.0 mm (0.315 in.)

If the diameter is less than minimum, replace the connecting rod bolt.



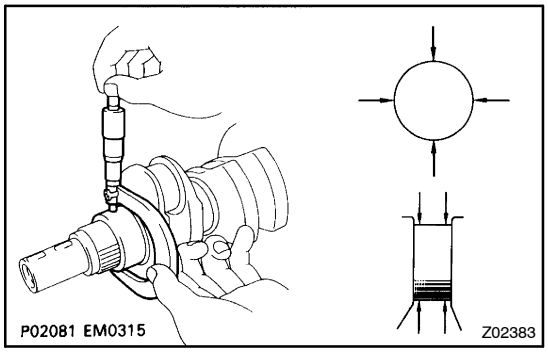
15. INSPECT CRANKSHAFT FOR RUNOUT

(a) Place the crankshaft on V–blocks.

(b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the crankshaft.



16. INSPECT MAIN JOURNALS AND CRANK PINS

(a) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:

STD	61.984 – 62.000 mm (2.4403 – 2.4409 in.)
U/S 0.25	61.745 – 61.755 mm (2.4309 – 2.4313 in.)

Crank pin diameter:

STD	51.982 – 52.000 mm (2.0465 – 2.0472 in.)
U/S 0.25	51.745 – 51.755 mm (2.0372 – 2.0376 in.)

If the diameter is not as specified, check the oil clearance. (See page EM–78)

(b) Check each main journal and crank pin for taper and out–of–round as shown.

Maximum taper and out–of–round:

0.02 mm (0.0008 in.)

If the taper or out–of–round is greater than maximum, grind or replace the crankshaft.

17. IF NECESSARY, GRIND AND HONE MAIN JOURNALS AND/OR CRANK PINS

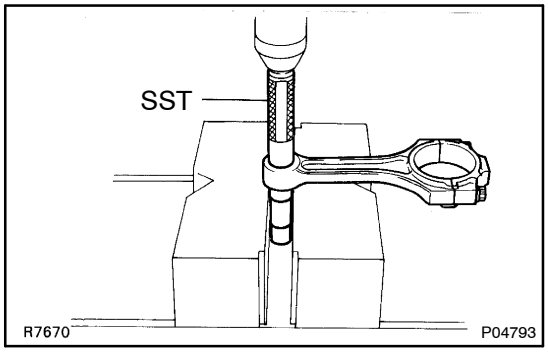
- Grind and hone the main journals and/or crank pins to the finished undersized diameter (See procedure step 16).
- Install new main journal and/or crank pin undersized bearings.

EM0DM–06

REPLACEMENT

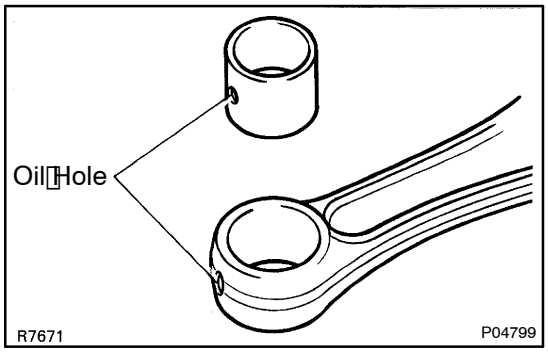
1. REPLACE CONNECTING ROD BUSHING

(a) Using SST and a press, press out the bushing.
SST 09222–30010

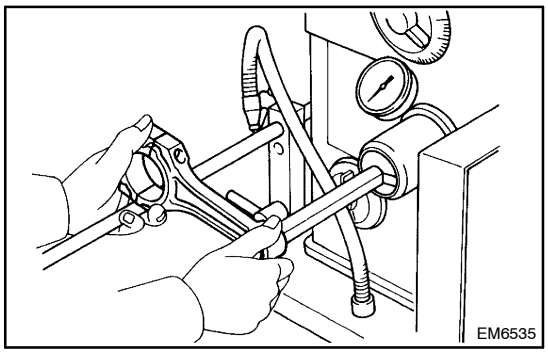


(b) Align the oil holes of a new bushing and the connecting rod.

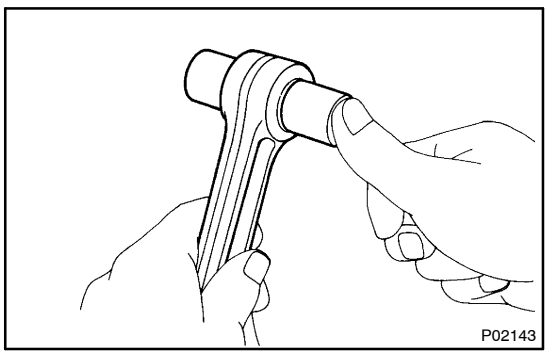
(c) Using SST and a press, press in the bushing.
SST 09222–30010



(d) Using a pin hole grinder, bore the bushing to obtain the standard specified clearance (See page EM–85) between the bushing and piston pin.



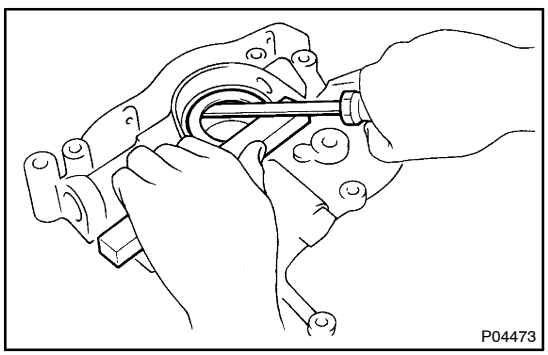
(e) Check the piston pin fit at room temperature.
Coat the piston pin with engine oil and push it into the connecting rod with your thumb.

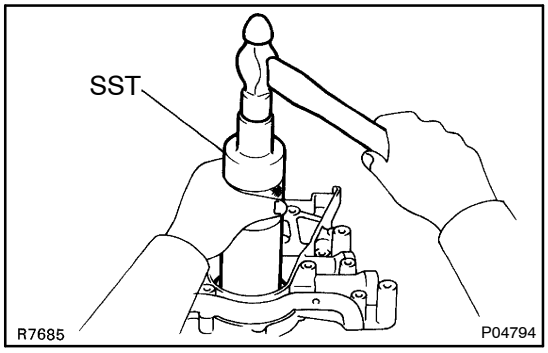


2. REPLACE CRANKSHAFT FRONT OIL SEAL

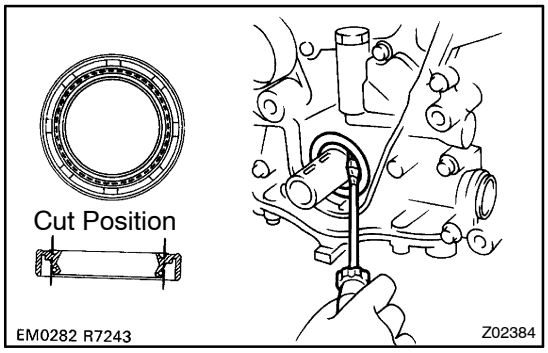
HINT:
There are 2 methods (a) and (b) to replace the oil seal as follows:

(a) If the oil pump is removed form the cylinder block.
(1) Using a screwdriver, pry out the oil seal.



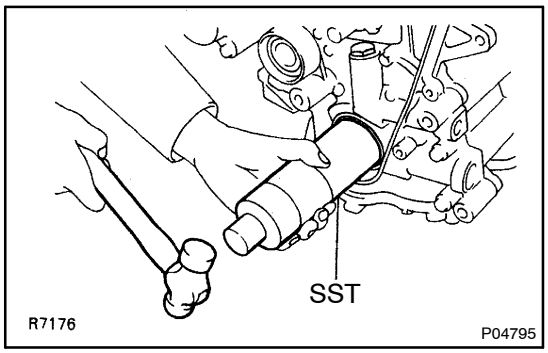


(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump body edge.
SST 09316–60011 (09316–00011)
(3) Apply MP grease to the oil seal lip.

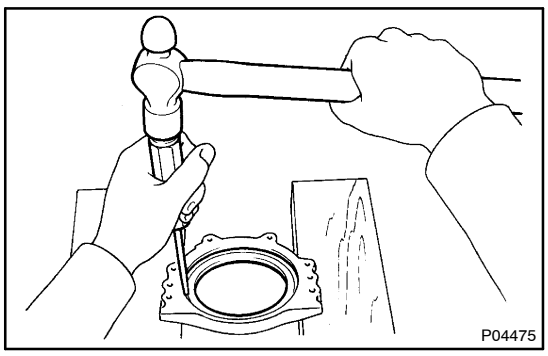


(b) If the pump is installed on the cylinder block.
(1) Using a knife, cut off the oil seal lip.
(2) Using a screwdriver, pry out the oil seal.

NOTICE:
Be careful not to damage the crankshaft. Tape the screwdriver tip.



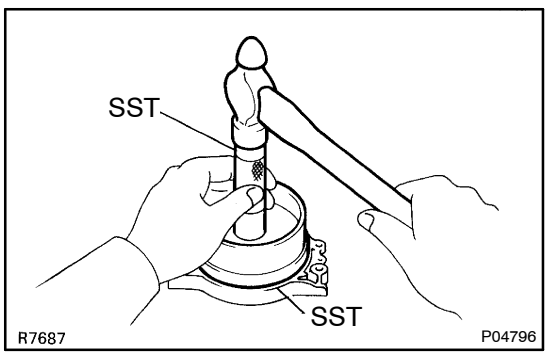
(3) Apply MP grease to a new oil seal lip.
(4) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump body edge.
SST 09316–60011 (09316–00011)



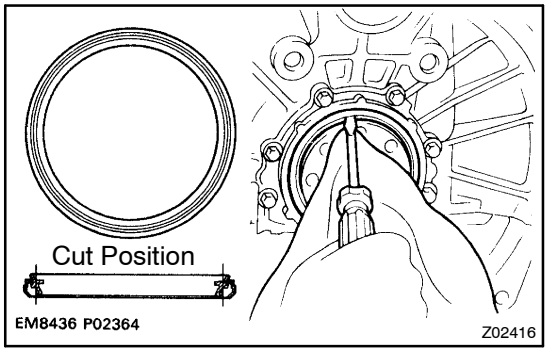
3. REPLACE CRANKSHAFT REAR OIL SEAL

HINT:
There are 2 methods (a) and (b) to replace the oil seal as follows:

(a) If the rear oil seal retainer is removed from the cylinder block.
(1) Using a screwdriver and hammer, tap out the oil seal.

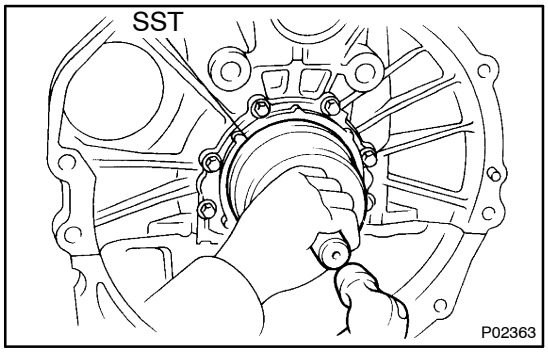


(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223–15030, 09950–70010 (09951–07100)
(3) Apply MP grease to the oil seal lip.



(b) If the rear seal retainer is installed on the cylinder block.
(1) Using a knife, cut off the oil seal lip.
(2) Using a screwdriver, pry out the oil seal.

NOTICE:
Be careful not to damage the crankshaft. Tape the screwdriver tip.



(3) Apply MP grease to a new oil seal lip.
(4) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.

SST 09223–15030, 09950–70010 (09951–07100)

EM0DN–05

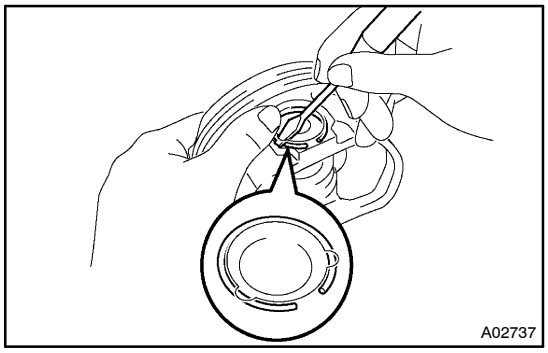
REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O–rings and oil seals with new parts.

NOTICE:

Apply a generous amount of oil on the sliding surface of the bearing, and not on the back of it or on the surface to which it is installed.



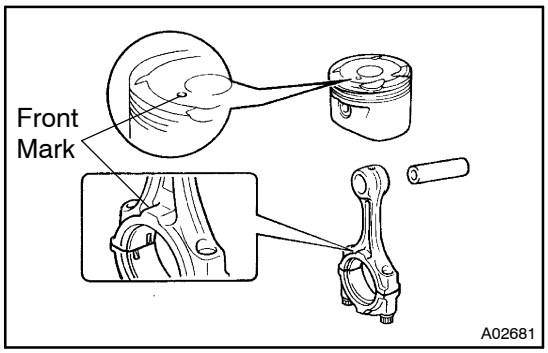
1. ASSEMBLE PISTON AND CONNECTING ROD

(a) Using a small screwdriver, install a new snap ring on one side of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

(b) Gradually heat the piston to about 80˚C (176˚F).



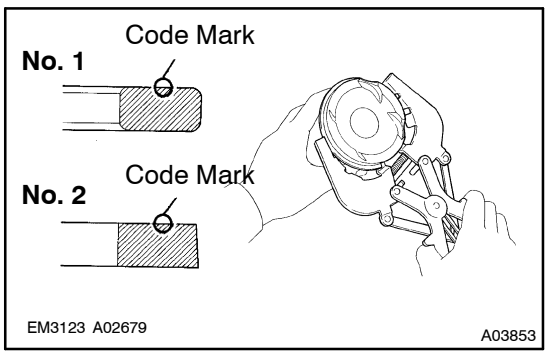
(c) Coat the piston pin with engine oil.

(d) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.

(e) Install a new snap ring at the other end of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.



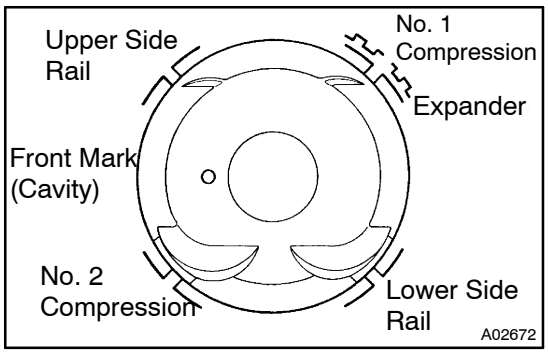
2. INSTALL PISTON RINGS

(a) Install the oil ring expander and 2 side rails by hand.

(b) Using a piston ring expander, install the 2 compression rings with the code mark facing up.

Code mark:

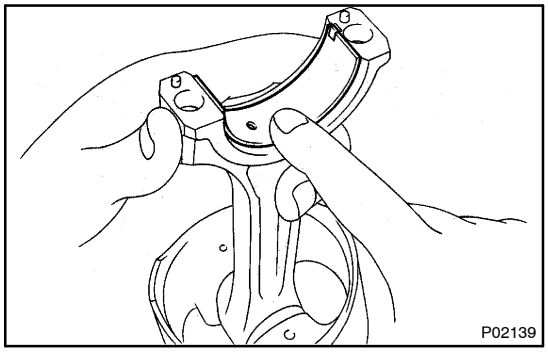
No. 1	1T
No. 2	2T



(c) Position the piston rings so that the ring ends are as shown.

NOTICE:

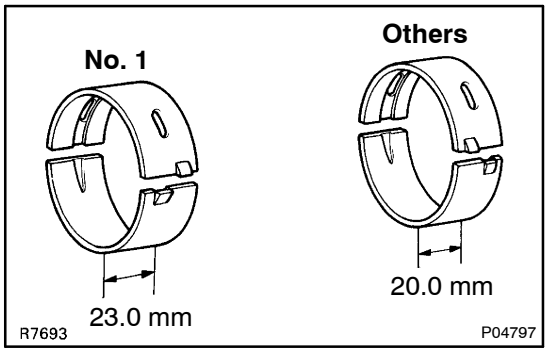
Do not align the piston ring ends.



3. INSTALL BEARINGS

(a) Align the bearing claw with the groove of the connecting rod and connecting cap.

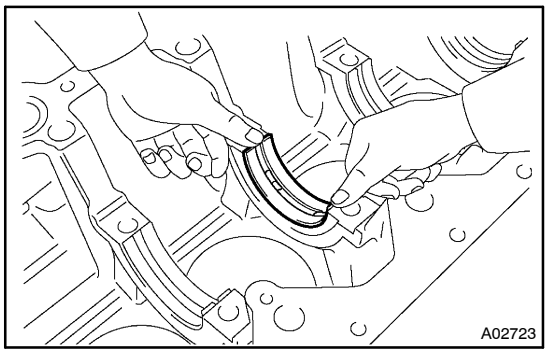
(b) Install the bearings in the connecting rod and connecting rod cap.



4. INSTALL MAIN BEARINGS

HINT:

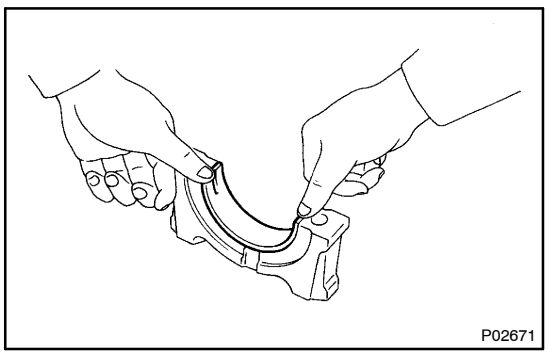
- Main bearings come in widths of 20.0 mm (0.787 in.) and 23.0 mm (0.906 in.). Install the 23.0 mm bearings in the No.1 cylinder block journal position with the main bearing cap. Install the 20.0 mm bearings in the other positions.
- Upper bearings have an oil groove and oil holes; lower bearings do not.



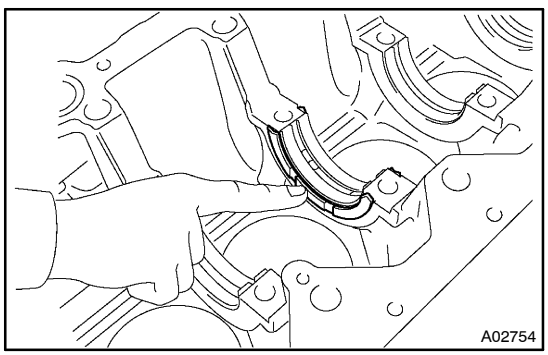
(a) Align the bearing claw with the claw groove of the main bearing cap or cylinder block.

NOTICE:

Install the bearing with the oil hole in the cylinder block.



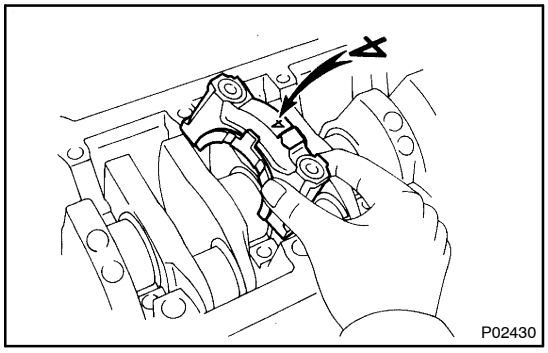
(b) Install the bearings in the cylinder block and main bearing caps.



5. INSTALL UPPER THRUST WASHERS

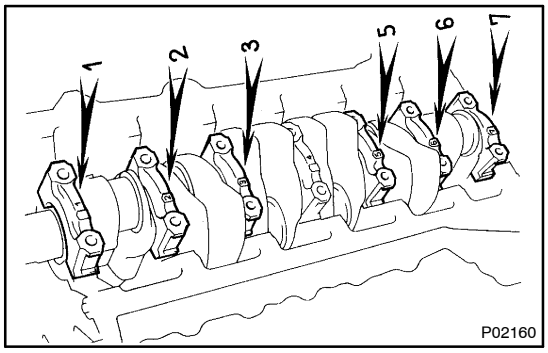
Install the 2 thrust washers under the No.4 main journal position of the cylinder block with the oil grooves facing outward.

6. PLACE CRANKSHAFT ON CYLINDER BLOCK



7. PLACE MAIN BEARING CAP AND LOWER THRUST WASHERS ON CYLINDER BLOCK

(a) Install the lower thrust washers on the No. 4 main bearing with the grooves facing outward.

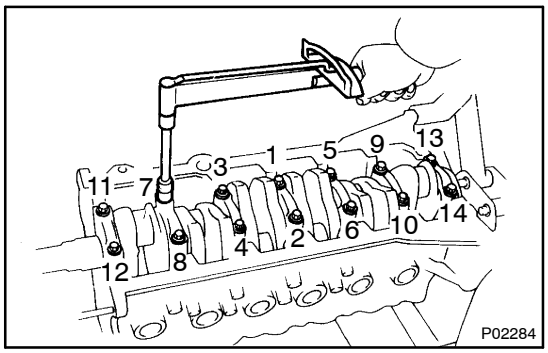


(b) Install the main bearing caps in numerical order with the arrows facing forward.

8. INSTALL MAIN BEARING CAP BOLTS

HINT:

- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any of the main bearing bolts break or deform, replace them.

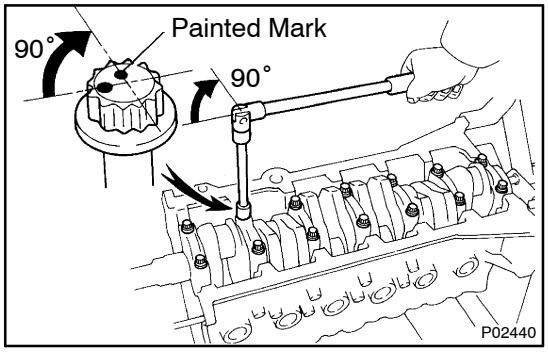


(a) Apply a light coat of engine oil on the threads and under the heads of the main bearing cap bolts.

(b) Install and uniformly tighten the 14 main bearing cap bolts, in several passes, in the sequence shown.

Torque: 45 N·m (450 kgf·cm, 33 ft·lbf)

If any one of the main bearing cap bolts does not meet the torque specification, replace the main bearing cap bolt.

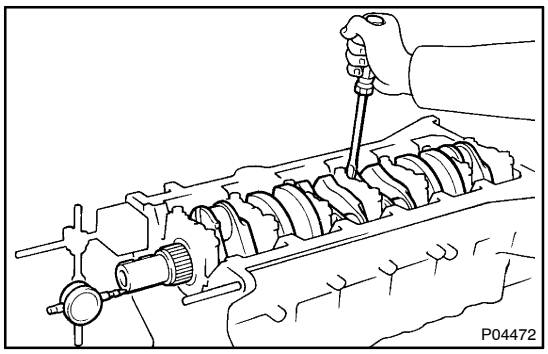


(c) Mark the front of the main bearing cap bolt head with paint.

(d) Retighten the main bearing cap bolts 90° in the numerical order shown above.

(e) Check that the painted mark is now at a 90° angle to the front.

(f) Check that the crankshaft turns smoothly.



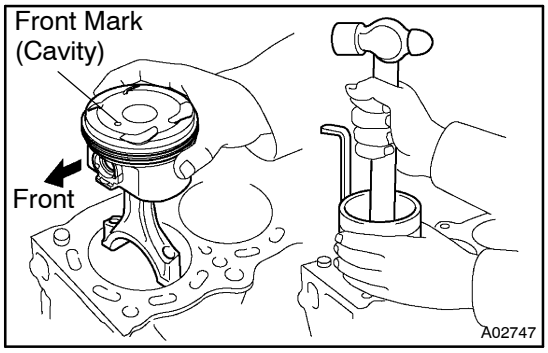
9. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.020 – 0.220 mm (0.0008 – 0.0087 in.)
Maximum thrust clearance:
0.30 mm (0.0118 in.)

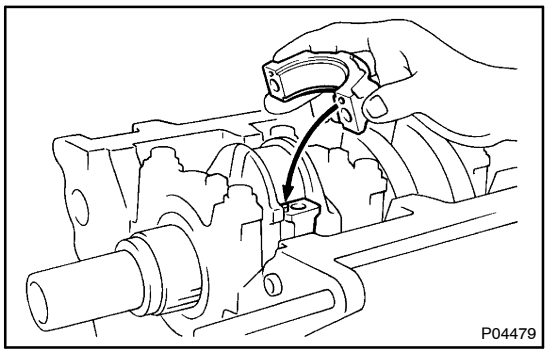
If the thrust clearance is greater than maximum, replace the thrust washers as a set.

Thrust washer thickness:
1.940 – 1.990 mm (0.0764 – 0.0783 in.)



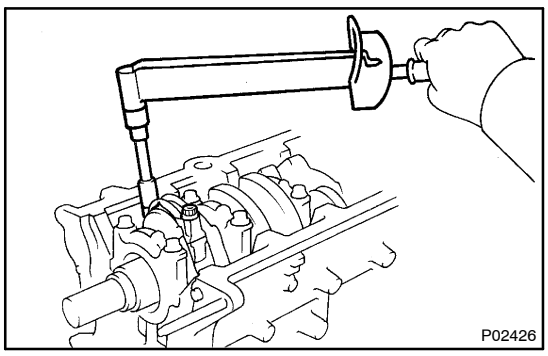
10. INSTALL PISTON AND CONNECTING ROD ASSEMBLIES

Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.



11. PLACE CONNECTING ROD CAP ON CONNECTING ROD

(a) Match the numbered connecting rod cap with the connecting rod.
(b) Install the connecting rod cap with by aligning the dowel pin to the corresponding hole.

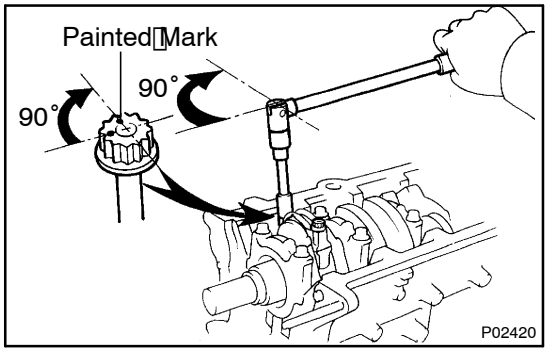


12. INSTALL CONNECTING ROD CAP BOLTS

HINT:
- The connecting rod cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any of the connecting rod bolts break or deform, replace them.

(a) Apply a light coat of engine oil on the threads and under the heads of the connecting rod cap bolts.
(b) Install and alternately tighten the bolts of the connecting rod cap in several passes.
Torque: 30 N·m (300 kgf·cm, 22 ft·lbf)

If any one of the connecting rod cap bolts does not meet the torque specification, replace the cap bolt.

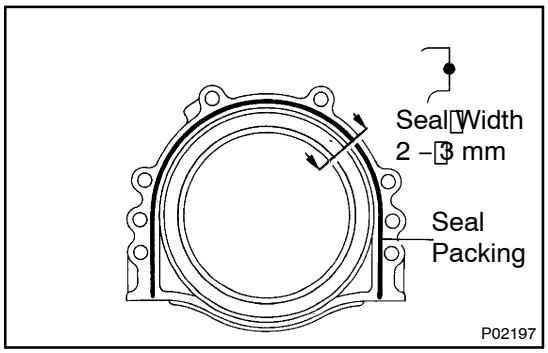


(c) Mark the front of the connecting rod cap bolt with paint.
(d) Retighten the connecting rod cap bolts 90° in the numerical order shown.
(e) Check that the painted mark is now at a 90° angle to the front.
(f) Check that the crankshaft turns smoothly.

13. CHECK CONNECTING ROD THRUST CLEARANCE (See page EM–78)

14. INSTALL REAR OIL SEAL RETAINER

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the retainer and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all debris.
- Using a non–residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the retainer as shown in the illustration.
Seal packing: Part No.08826–00080 or equivalent
- Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Install the retainer with the 6 bolts.
Torque: 6.0 N·m (60 kgf·cm, 53 in.·lbf)

15. INSTALL OIL PUMP (See page LU–12)

16. INSTALL RH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

Install the mounting bracket with the 4 bolts.
Torque: 59 N·m (590 kgf·cm, 44 ft·lbf)

17. INSTALL LH ENGINE MOUNTING BRACKET AND INSULATOR ASSEMBLY

Install the mounting bracket with the 4 bolts.
Torque: 59 N·m (590 kgf·cm, 44 ft·lbf)

18. INSTALL FUEL INLET PIPE

Install the fuel inlet pipe with the 2 bolts.
Torque: 29 N·m (290 kgf·cm, 21 ft·lbf)

19. INSTALL NO. 1 OIL PIPE

Install the No. 1 oil pipe with 2 new gaskets and the union bolt.
Torque: 55 N·m (550 kgf·cm, 41 ft·lbf)

20. INSTALL OIL FILTER, OIL COOLER AND BRACKET ASSEMBLY

(a) Install a new O–ring to the oil filter bracket.

(b) Install a new gasket to the union bolt.
(c) Install the oil filter bracket with the union bolt.
Torque: 90 N·m (900 kgf·cm, 65 ft·lbf)
(d) Connect the water bypass hose to the union.

21. INSTALL OIL PRESSURE SWITCH AND KNOCK SENSORS (See page LU–1, FI–63)

22. INSTALL CYLINDER HEAD (See page EM–53)

23. INSTALL WATER PUMP (See page CO–7)

24. INSTALL TRANSMISSION OIL COOLER AND NO. 2 WATER BYPASS PIPE WITH HOSE

(a) Install the transmission oil cooler and No. 2 water bypass pipe with hose and 6 bolts.
Torque:

Oil cooler	29 N·m (296 kgf·cm, 21 ft·lbf)
Water btpass pipe	21 N·m (214 kgf·cm, 15 ft·lbf)

(b) Connect the water bypass hose.

25. INSTALL TIMING PULLEYS AND BELT (See page EM–24)

26. INSTALL ALTERNATOR

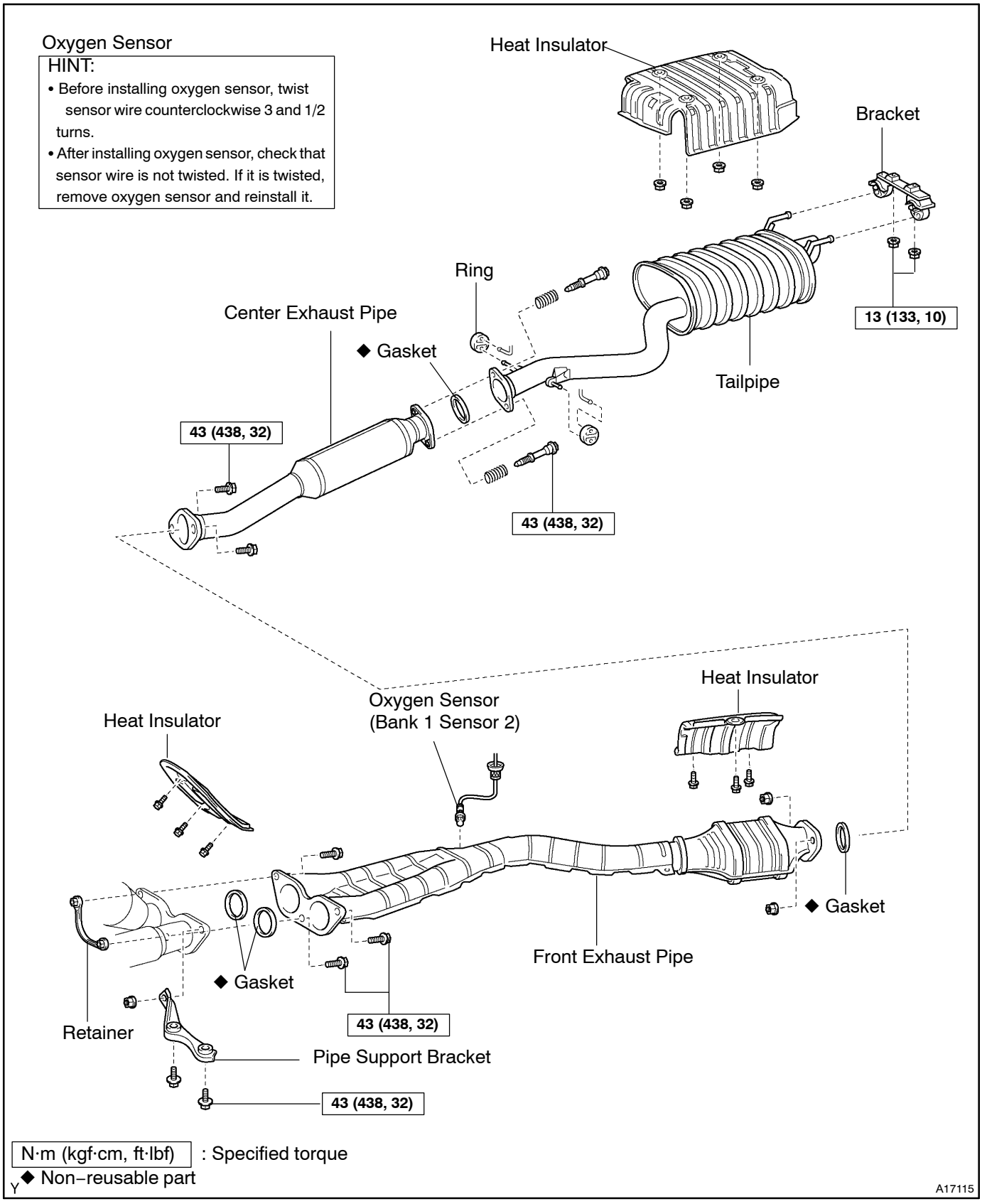
Install the alternator and pipe bracket with the bolt and nut.
Torque: 40 N·m (400 kgf·cm, 30 ft·lbf)

27. REMOVE ENGINE STAND FROM ENGINE

EXHAUST SYSTEM

COMPONENTS

EM0DO–07



EFI SYSTEM

SF0N1–07

PRECAUTION

1. BEFORE WORKING ON FUEL SYSTEM, DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY

HINT:

Any diagnostic trouble code retained by the engine ECU will be erased when the battery negative (–) terminal cable is removed from the battery.

Therefore, if necessary, read the diagnostic trouble code(s) before removing the negative (–) terminal cable from the battery.

2. DO NOT SMOKE OR WORK NEAR AN OPEN FLAME WHEN WORKING ON FUEL SYSTEM

3. KEEP GASOLINE AWAY FROM RUBBER OR LEATHER PARTS

4. MAINTENANCE PRECAUTIONS

(a) Precaution when the connecting gauge.
Use battery as the power source for the timing light, etc.

(b) In the event of engine misfire, these precautions should be taken.
  (1) Check proper connection of battery terminals, etc.
  (2) Handle high–tension cords carefully.
  (3) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
  (4) When cleaning the engine compartment, be especially careful to protect the electrical system from water.

(c) Precautions when the handling oxygen sensors.
  (1) Do not allow oxygen sensor to drop or hit against an object.
  (2) Do not allow the sensor to come into contact with water.

5. IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

6. AIR INDUCTION SYSTEM

(a) Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of tune.

(b) Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will cause air suction and cause the engine to run out of tune.

7. ELECTRONIC CONTROL SYSTEM

(a) Before removing EFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch OFF or disconnecting the negative (–) terminal cable from the battery.

HINT:

Always check the diagnostic trouble code before disconnecting the negative (–) terminal cable from the battery.

(b) When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cable terminals.

(c) Do not permit parts to receive a severe impact during removal or installation. Handle all EFI parts carefully, especially the engine ECU.

(d) Do not be careless during troubleshooting as there are numerous transistor circuits and even slight terminal contact can further troubles.

(e) Do not open the ECU cover.

(f) When inspecting during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the EFI parts and wiring connectors.

(g) Parts should be replaced as an assembly.

(h) Care is required when pulling out and inserting wiring connectors.

(1) Release the lock and pull out the connector, pulling on the connectors.

(2) Fully insert the connector and check that it is locked.

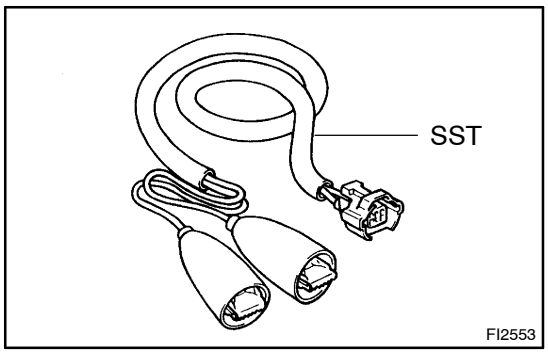
(i) When inspecting a connector with a volt/ohmmeter.

(1) Carefully take out the water–proofing rubber if it is a water–proof type connector.

(2) Insert the test probe into the connector from wiring side when checking the continuity, amperage or voltage.

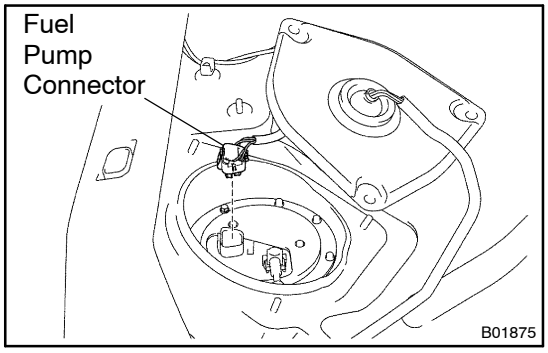
(3) Do not apply unnecessary force to the terminal.

(4) After checking, install the water–proofing rubber on the connector securely.



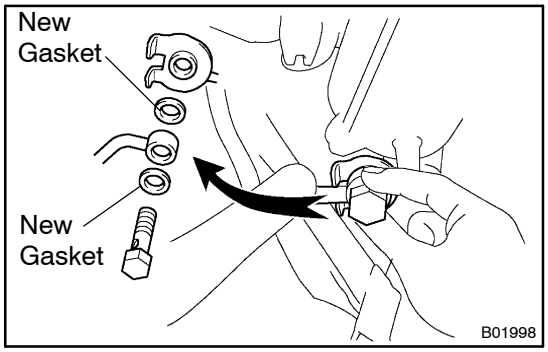
(5) Use SST for inspection or test of the injector or its wiring connector.

SST 09842–30070

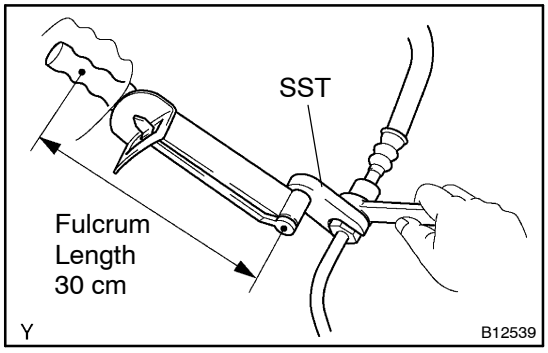


8. FUEL SYSTEM

(a) When disconnecting the high pressure fuel line, a large amount of gasoline will spill out, so observe these procedures:
   (1) Disconnect the fuel pump connector.
   (2) Start the engine. After the engine has stopped on its own, turn the ignition switch OFF.
   (3) Put a container under the connection.
   (4) Slowly loosen the connection.
   (5) Disconnect the connection.
   (6) Plug the connection with a rubber plug.
   (7) Reconnect the fuel pump connector.



(b) When connecting the flare nut or union bolt on the high pressure pipe union, observe these procedures:
   (1) Union Bolt Type:
   Always use a new gasket.
   (2) Union Bolt Type:
   Tighten the union bolt by hand.
   (3) Union Bolt Type:
   Tighten the union bolt to the specified torque.
   Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)



   (4) Flare Nut Type:
   Apply a light coat of engine oil to the flare and tighten the flare nut by hand.
   (5) Flare Nut Type:
   Using SST, tighten the flare nut to the specified torque.
   SST 09023–38400

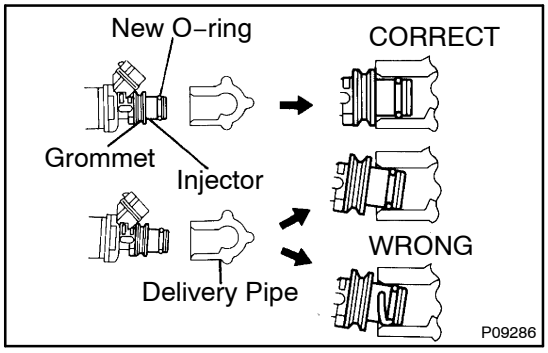
NOTICE:

Do not rotate the fuel pipe, when tightening the flare nut.

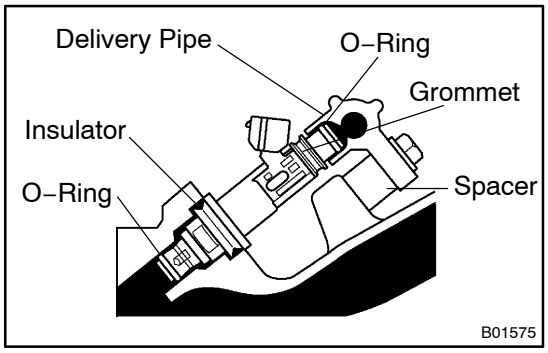
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf) for using SST
38 N·m (387 kgf·cm, 28 ft·lbf)

HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

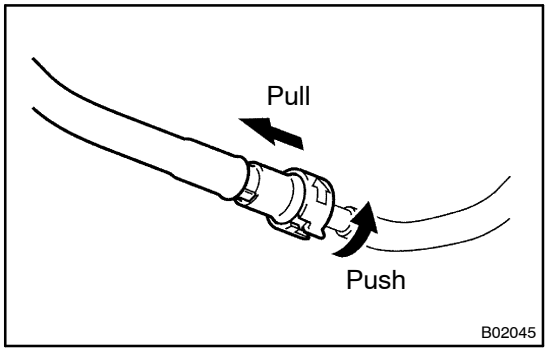


(c) Observe these precautions when removing and installing the injectors.
(1) Never reuse the O–ring.
(2) When placing a new O–ring on the injector, take care not to damage it in any way.
(3) Coat a new O–ring with spindle oil or gasoline before installing–never use engine, gear or brake oil.

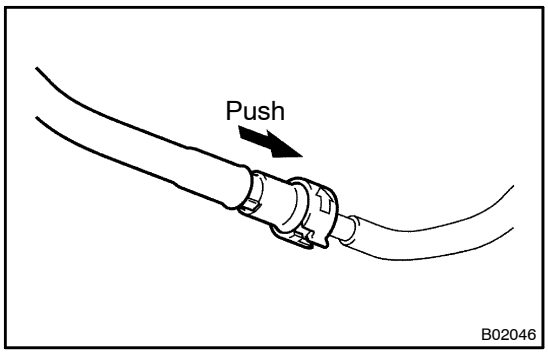


(d) Install the injector to the delivery pipe and intake manifold as shown in the illustration.
Before installing the injector, must apply spindle oil or gasoline on the place where a delivery pipe or an intake manifold touches an O–ring of the injector.

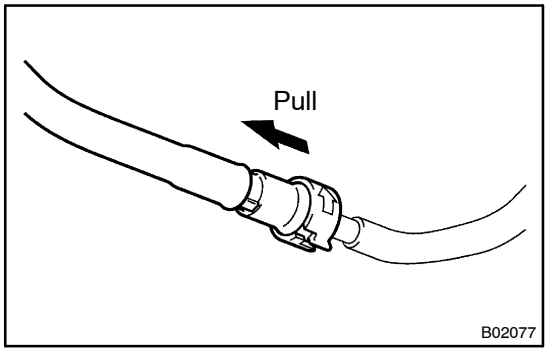
(e) Observe these precautions when disconnecting the fuel tube connector (quick type):
(1) Check if there is any dirt like mud on the pipe and around the connector before disconnecting them and clean the dirt away.
(2) Be sure to disconnect with hands.



(3) When the connector and the pipe are stuck, push and pull the connector to free to disconnect and pull it out. Do not use any tool at this time.
(4) Inspect if there is any dirt or the likes on the seal surface of the disconnected pipe and clean it away.
(5) Prevent the disconnected pipe and connector from damaging and mixing foreign objects by covering them with a vinyl bag.

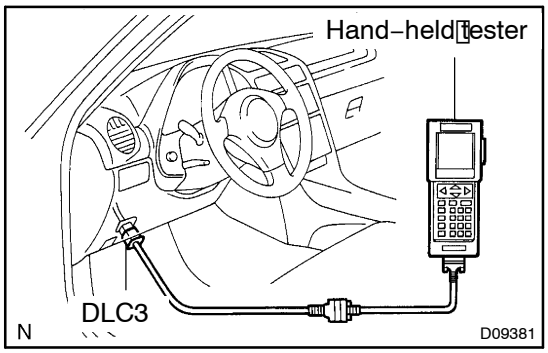


(f) Observe these precautions when connecting the fuel tube connector (quick type):
(1) Check if there is any damage or foreign objects on the connected part of the pipe.
(2) Match the axis of the connector with axis of the pipe, and push in the connector until the connector makes a ”click” sound. In case the connections is tight, apply little amount of new engine oil on the tip of the pipe.



(3) After having finished the connection, check if the pipe and the connector are securely connected by pulling them.
(4) Check if there is any fuel leakage.

(g) Observe these precautions when handling nylon tube.
(1) Pay attention not to turn the connected part of the nylon tube and quick connector with force when connecting them.
(2) Pay attention not to kink the nylon tube.
(3) Do not remove the EPDM protector on the outside of the nylon tube.
(4) Must not close the piping with the nylon tube by bending it.



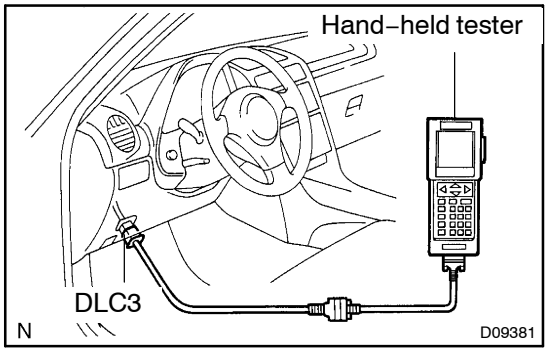
(h) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.
(1) Connect a hand–held tester to the DLC3.
(2) Turn the ignition switch ON and push the hand–held tester main switch ON.

NOTICE:
Do not start the engine.

(3) Select the ACTIVE TEST mode on the hand–held tester.
(4) Please refer to the hand–held tester operator's manual for further details.
(5) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page FI–6).
(6) Check that there are no leaks from any part of the fuel system.
(7) Turn the ignition switch OFF.
(8) Disconnect the hand–held tester from the DLC3.
(9) Start the engine.

NOTICE:
Keep cranking the engine until the air is removed from the fuel line.

(10) After the engine starts, check again that there are no fuel leaks.



FUEL PUMP

SF0N2–09

ON–VEHICLE INSPECTION

1. CHECK FUEL PUMP OPERATION

(a) Connect a hand–held tester to the DLC3.

(b) Turn the ignition switch ON and hand–held tester main switch ON.

NOTICE:

Do not start the engine.

(c) Select the ACTIVE TEST mode on the hand–held tester.

(d) Please refer to the hand–held tester operator's manual for further details.

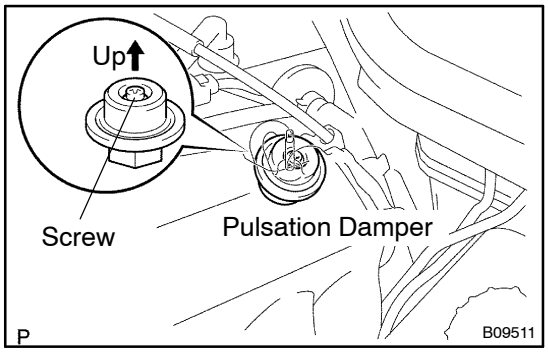
(e) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See step 3)

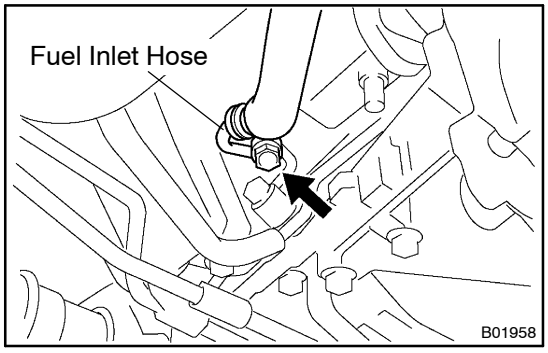
(f) Check that the pulsation damper screw rises up when the fuel pump operates.

If there is no pressure, check the fusible link, fuses, EFI main relay, fuel pump ECU, fuel pump, ECM and wiring connections.

(g) Turn the ignition switch OFF.

(h) Disconnect the hand–held tester from the DLC3.





2. CHECK FUEL PRESSURE

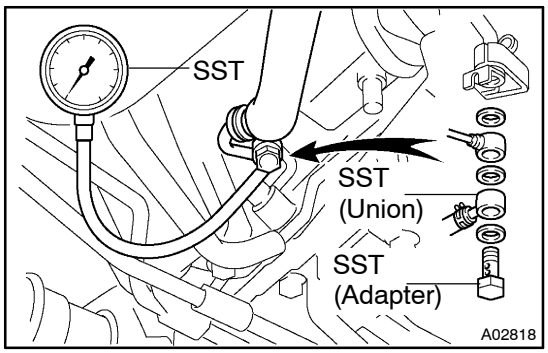
(a) Check the battery positive voltage is above 12 V.

(b) Disconnect the negative (–) terminal cable from the battery.

(c) Remove the union bolt and 2 gaskets, and disconnect the fuel inlet hose from the fuel pipe support.

NOTICE:

- **Put a shop towel under the fuel pipe support.**
- **Slowly loosen the union bolt.**

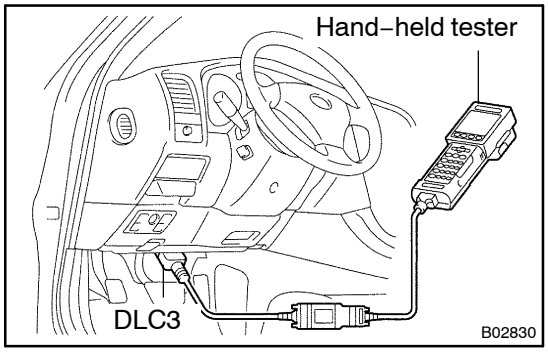


(d) Install the fuel inlet hose and SST (pressure gauge) to the fuel pipe support with the 3 gaskets and SST (union and adapter).

SST 09268–45014 (09268–41190, 90405–06167)

Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

(e) Wipe off any splattered gasoline.



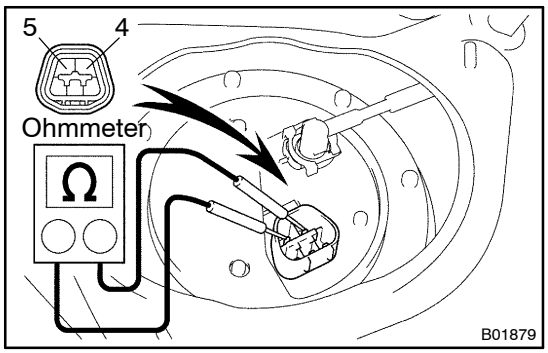
(f) Connect a hand–held tester to the DLC3.
(See step 1 in check fuel pump operation (a) to (e))
(g) Measure the fuel pressure.
Fuel pressure:
304 – 343 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)

If pressure is high, replace the fuel pressure regulator.
If pressure is low, check these parts:

- Fuel hoses and connections
- Fuel pump
- Fuel filter
- Fuel pressure regulator

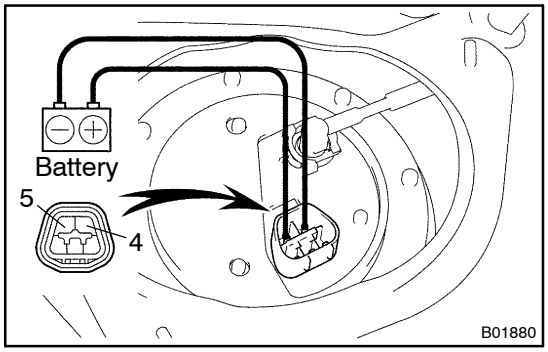
(h) Disconnect the hand–held tester from the DLC3.
(i) Start the engine.
(j) Measure the fuel pressure at idle.
Fuel pressure:
304 – 343 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)
(k) Stop the engine.
(l) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.
Fuel pressure: 147 kPa (1.5 kgf/cm^2, 21 psi) or more

If pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.
(m) After checking fuel pressure, disconnect the negative (–) terminal cable from the battery and carefully remove SST to prevent gasoline from splashing.
SST 09268–45014
(n) Reconnect the fuel inlet hose to the fuel pipe support with 2 new gaskets and the union bolt.
Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)
(o) Reconnect the negative (–) terminal cable to the battery.
(p) Check for fuel leaks.



3. INSPECT FUEL PUMP
(a) Remove the rear seat cushion.
(b) Remove the 3 cap nuts and floor service hole cover.
(c) Disconnect the fuel pump & sender gauge connector.
(d) Using an ohmmeter, measure the resistance between terminals 4 and 5.
Resistance: 0.2 – 3.0 Ω at 20°C (68°F)

If the resistance is not as specified, replace the fuel pump.



(e) Inspect the fuel pump operation.
Connect the positive (+) lead from the battery to terminal 4 of the connector, and the negative (–) lead to terminal 5. Check that the fuel pump operates.

NOTICE:

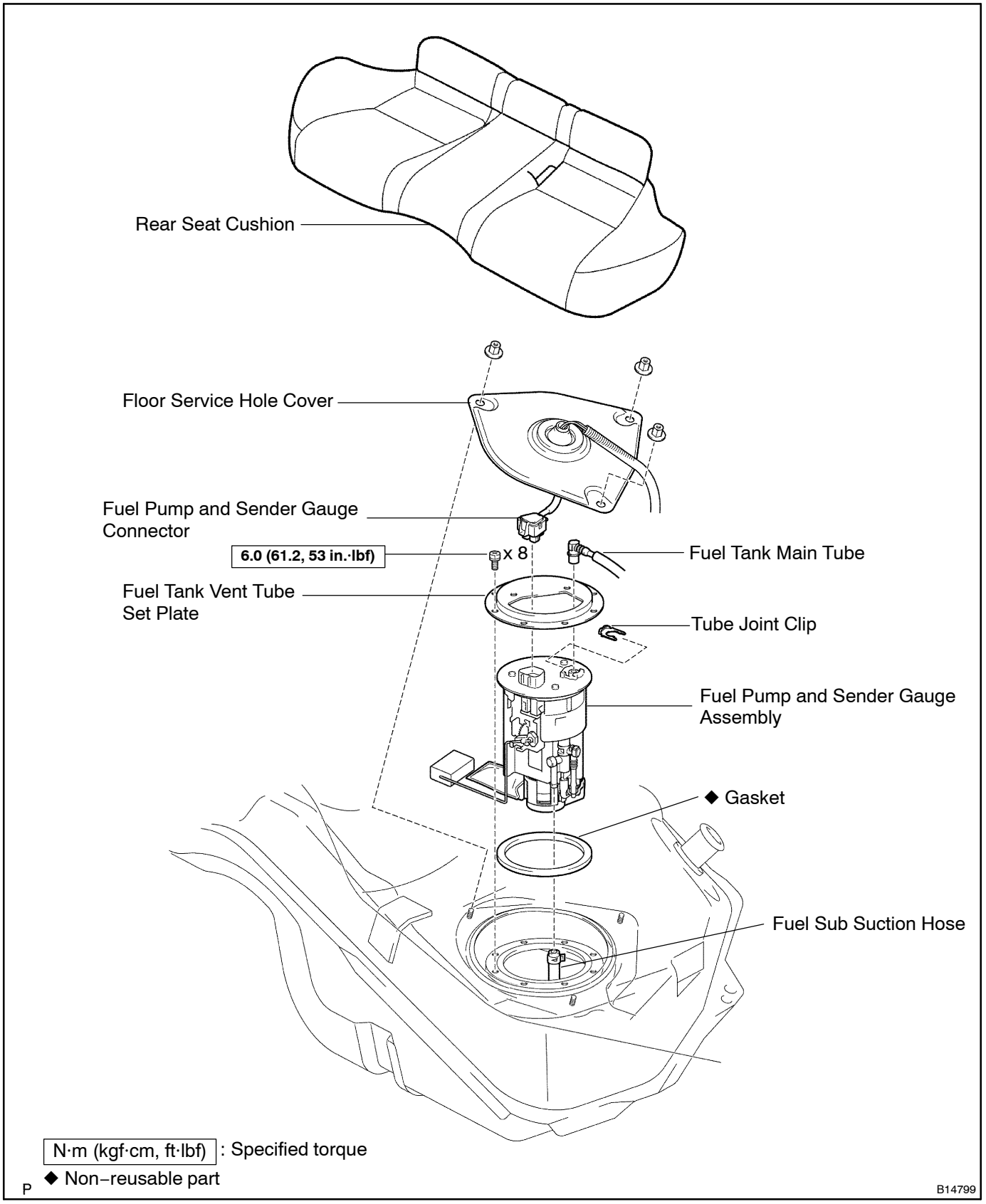
- **These tests must be done quickly (within 10 seconds) to prevent the coil burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always do the switching at the battery side.**

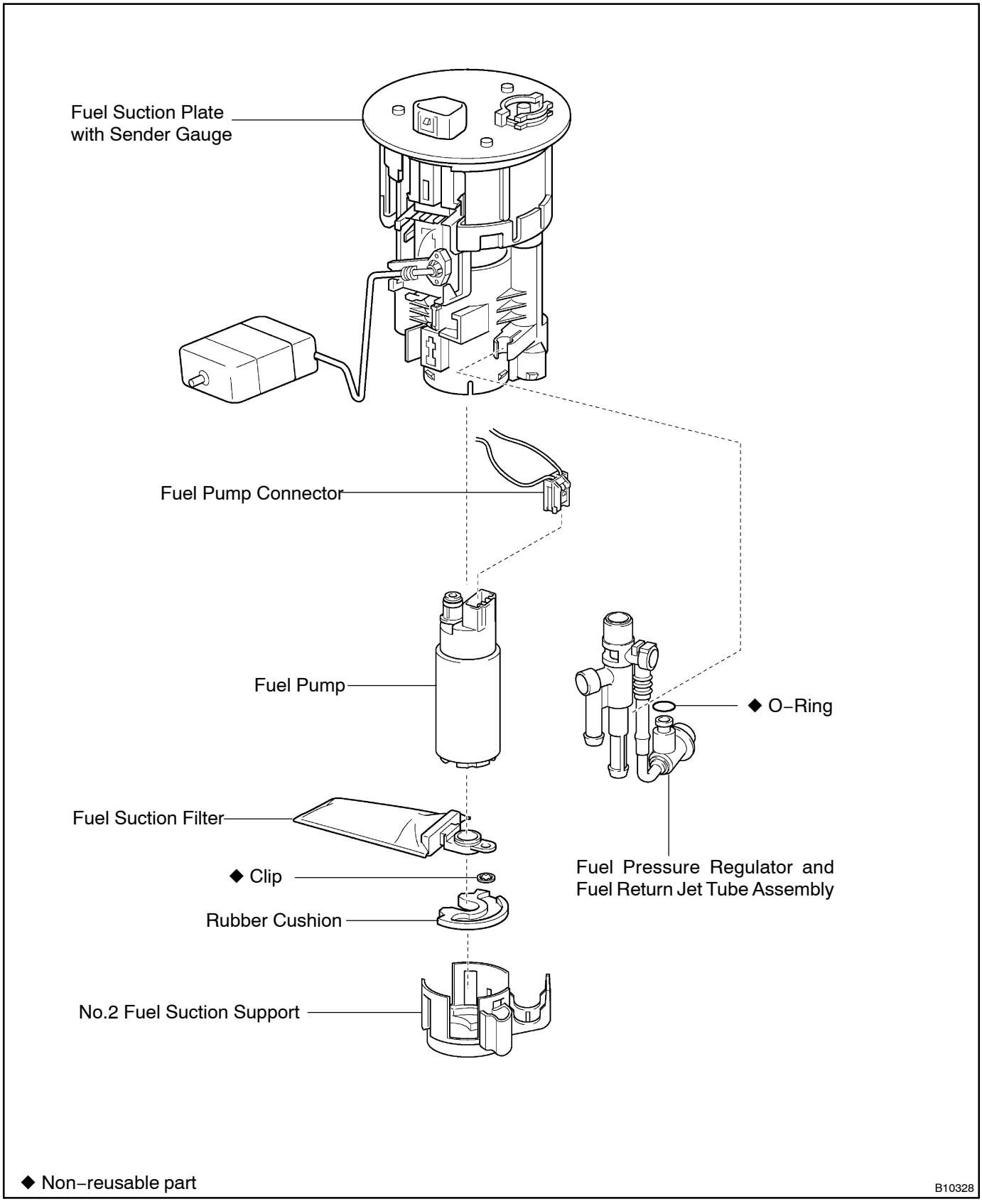
If operation is not as specified, replace the fuel pump.

(f) Reconnect the fuel pump & sender gauge connector.
(g) Reinstall the floor service hole cover with the cap nuts.
(h) Reinstall the rear seat cushion.

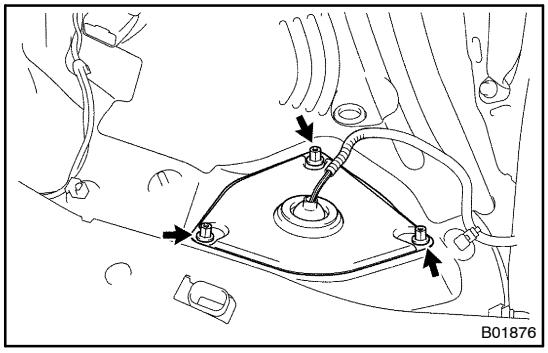
SF0N3–09

COMPONENTS




Fuel Suction Plate with Sender Gauge
Fuel Pump Connector
Fuel Pump
◆ O–Ring
Fuel Suction Filter
◆ Clip
Rubber Cushion
Fuel Pressure Regulator and Fuel Return Jet Tube Assembly
No.2 Fuel Suction Support
◆ Non–reusable part
B10328

SF1SJ–01



REMOVAL

CAUTION:
Do not smoke or work near an open flame when working the fuel pump.

1. REMOVE REAR SEAT CUSHION

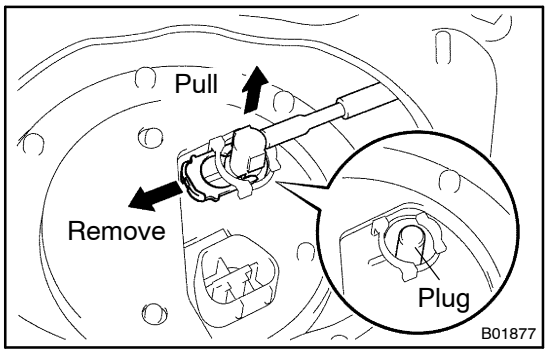
2. REMOVE FLOOR SERVICE HOLE COVER

Remove the 3 cap nuts and service hole cover.

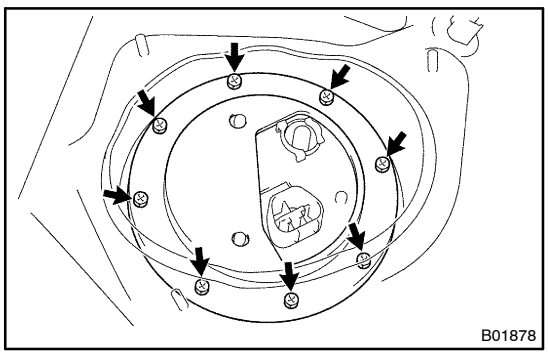
3. DISCONNECT FUEL PUMP AND SENDER GAUGE CONNECTOR

4. DISCONNECT FUEL TANK MAIN TUBE (FUEL TUBE CONNECTOR) FROM FUEL SECTION PLATE

CAUTION:
- **Perform disconnecting operation of the fuel tube connector (quick type) after observing precaution (See page FI–1).**
- **As there is retained pressure in the fuel line, prevent it from splashing inside the vehicle compartment.**

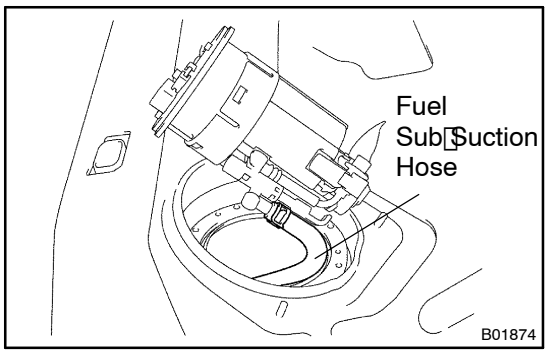


(a) Remove the tube joint clip.
(b) Pull out the fuel main tube.
(c) Plug the port of the fuel suction plate with a clean rubber cap.



5. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK

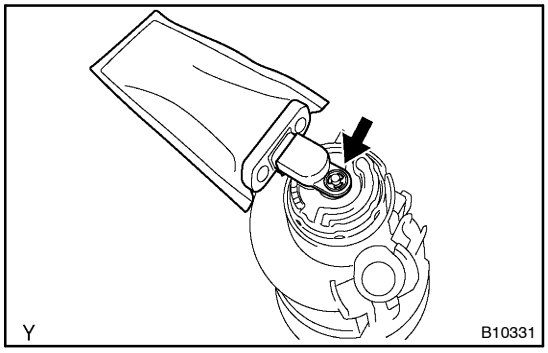
(a) Remove the 8 bolts and fuel tank vent tube set plate.



(b) Lift up the fuel pump and sender gauge assembly, and disconnect the fuel sub suction hose from the fuel return jet tube and remove the fuel pump, sender gauge assembly and gasket.

6. REMOVE NO.2 FUEL SUCTION SUPPORT (See page FI–17)

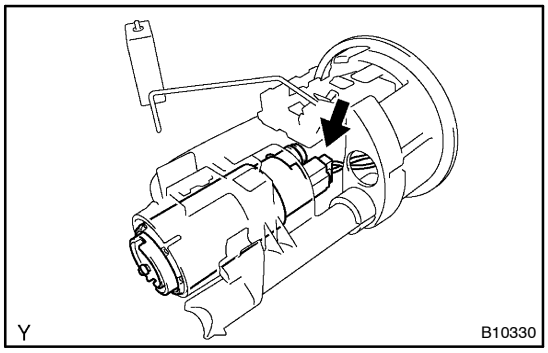
7. REMOVE FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY (See page FI–17)



8. REMOVE FUEL SUCTION FILTER

(a) Remove the clip.

(b) Pull out the suction filter.

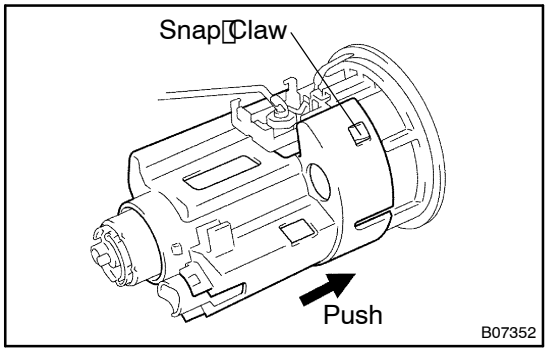


9. REMOVE FUEL PUMP

(a) Disconnect the fuel pump connector from the fuel pump.

(b) Pull out the fuel pump.

SF1LC–02



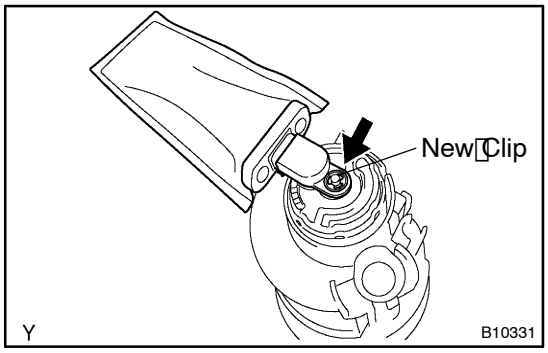
INSTALLATION

1. INSTALL FUEL PUMP

(a) Apply a light coat of gasoline to the O–ring.

(b) Push in the fuel pump.

(c) Connect the fuel pump connector.

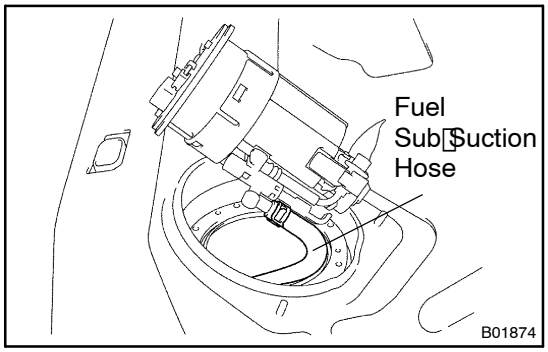


2. INSTALL FUEL SUCTION FILTER

Install the suction filter with a new clip.

3. INSTALL FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY (See page FI–18)

4. INSTALL NO.2 FUEL SUCTION SUPPORT (See page FI–18)

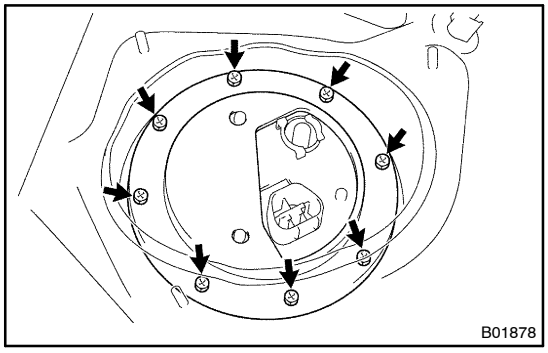


5. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK

(a) Install a new gasket to the fuel suction plate.

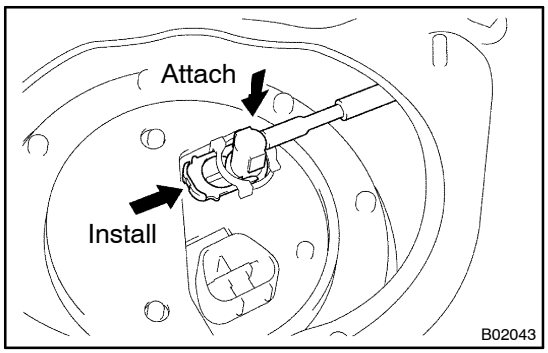
(b) Connect the fuel sub suction hose to the fuel return jet tube.

(c) Attach the fuel pump and sender gauge assembly to the fuel tank.



(d) Install the fuel tank vent tube set plate with the 8 bolts.

Torque: 6.0 N·m (61.2 kgf·cm, 53 in.·lbf)



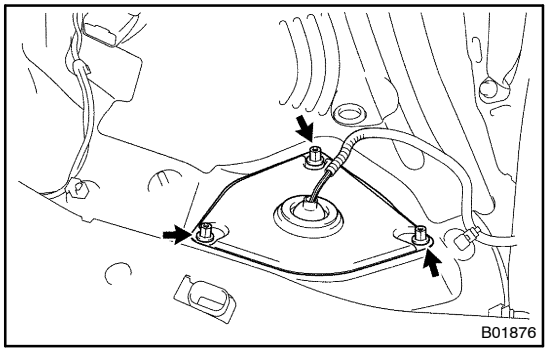
6. CONNECT FUEL TANK MAIN TUBE (FUEL TUBE CONNECTOR) TO FUEL SUCTION PLATE

(a) Attach the fuel tube connector to the port of the fuel suction plate.

(b) Install the tube joint clip.

7. CONNECT FUEL PUMP AND SENDER GAUGE CONNECTOR

8. CHECK FOR FUEL LEAKS (See page FI–1)



9. INSTALL FLOOR SERVICE HOLE COVER

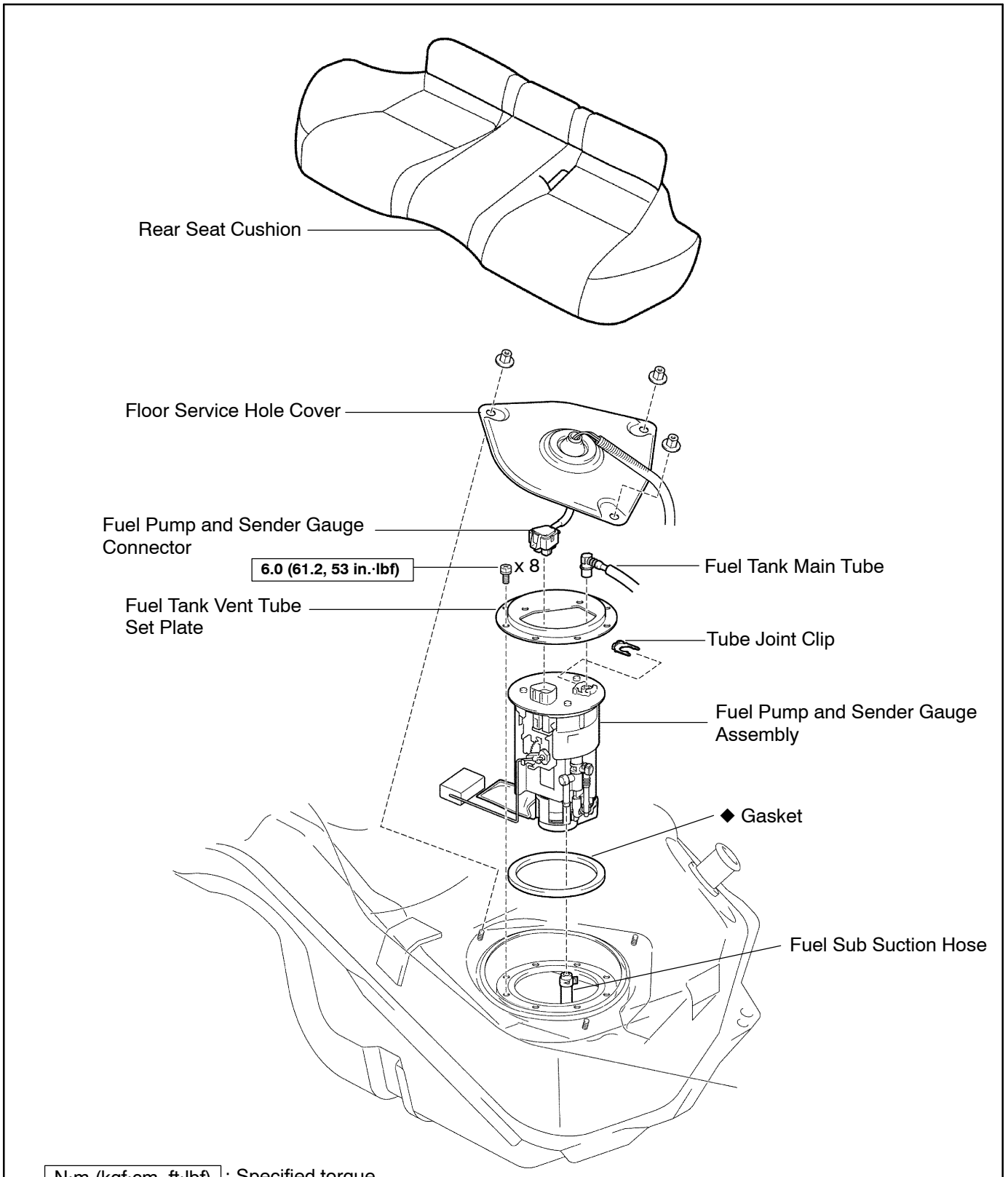
Install the service hole cover with the 3 cap nuts.

10. INSTALL REAR SEAT CUSHION

FUEL PRESSURE REGULATOR

COMPONENTS

SF0N6–06

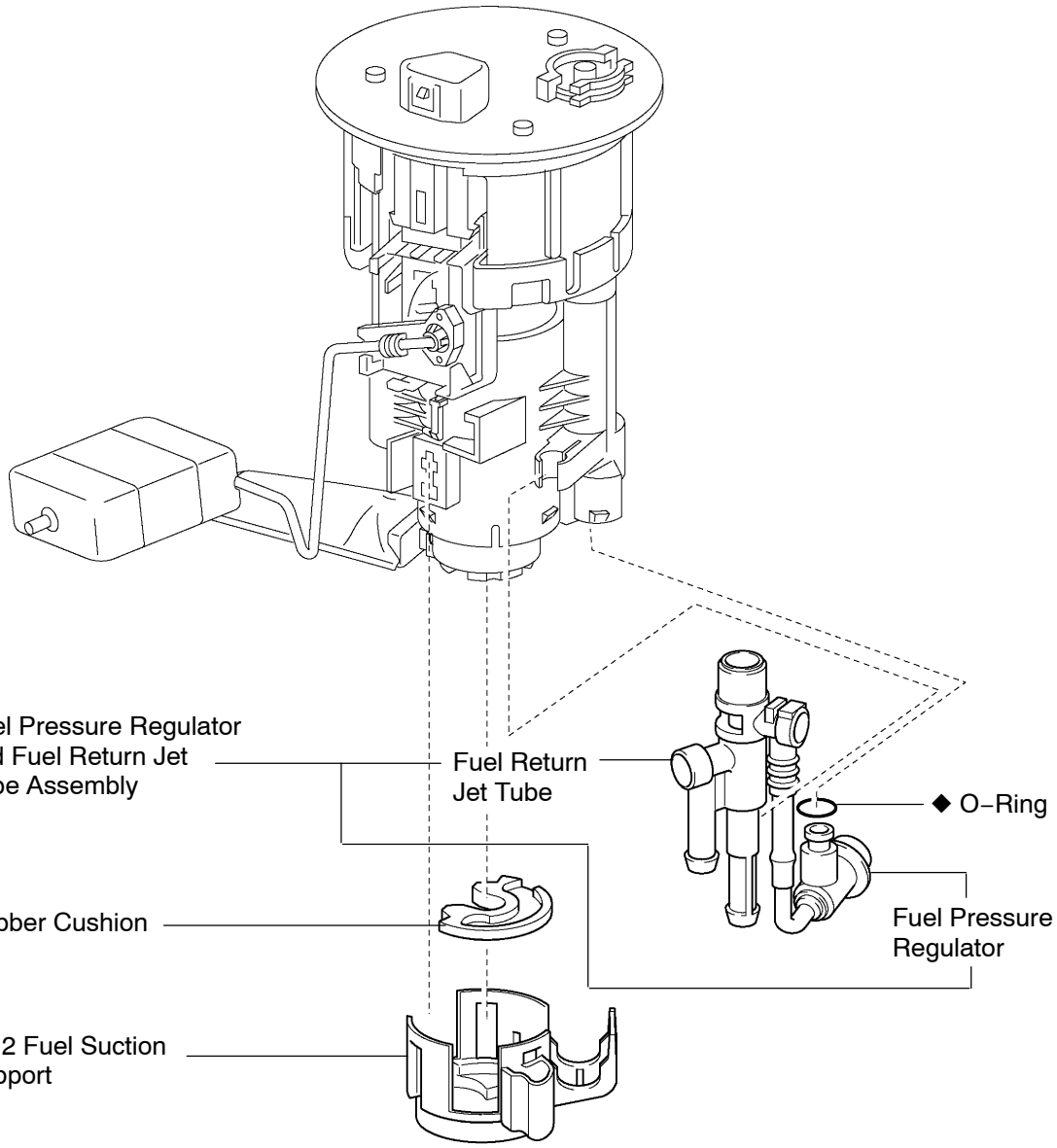


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

P

B14799



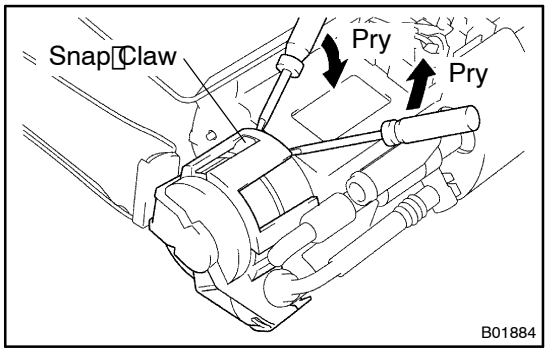
Y ◆ Non–reusable part

B10327

SF0N7–08

REMOVAL

1. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK (See page FI–11)



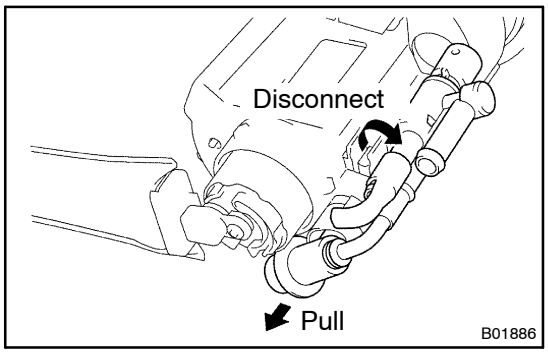
2. REMOVE NO.2 FUEL SUCTION SUPPORT

(a) Using 2 screwdrivers, disconnect the 4 snap claws from the claw holes and remove the fuel suction support.

NOTICE:

Be careful not to damage the suction supports.

(b) Remove the rubber cushion.



3. REMOVE FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY

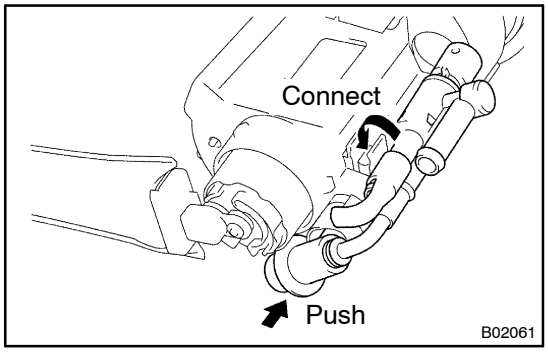
(a) Disconnect the fuel return jet tube from the clamp of the No.2 fuel suction support.

(b) Pull out the fuel pressure regulator from the fuel filter, and remove the fuel pressure regulator and fuel return jet tube assembly.

(c) Remove the O–ring from the fuel pressure regulator.

SF0N8–08

INSTALLATION



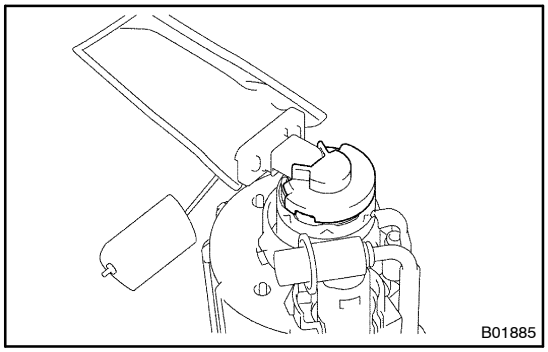
1. INSTALL FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY

(a) Apply a light coat of gasoline to a new O–ring, and install it to the fuel pressure regulator.

(b) Push in the fuel pressure regulator to the fuel filter.

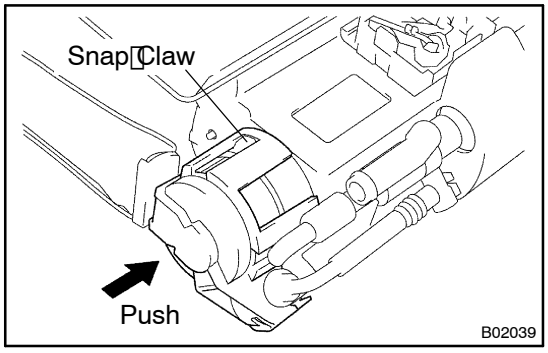
(c) Check that the fuel pressure regulator rotates smoothly. If it does not rotates smoothly, the O–ring may be pinched, so remove the fuel pressure regulator and perform again steps (b) and (c) above.

(d) Connect the fuel return jet tube to the clamp of the No.2 fuel suction support.



2. INSTALL NO.2 FUEL SUCTION SUPPORT

(a) Install the rubber cushion to the fuel pump.



(b) Push the fuel suction support, and attach the 4 snap claws to the claw holes.

3. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK (See page FI–13)

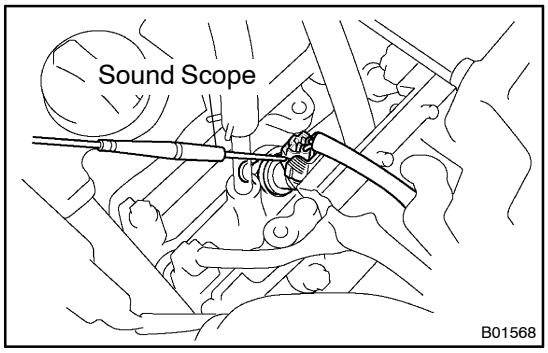
INJECTOR

SF0N9–09

ON–VEHICLE INSPECTION

1. REMOVE ENGINE COVER

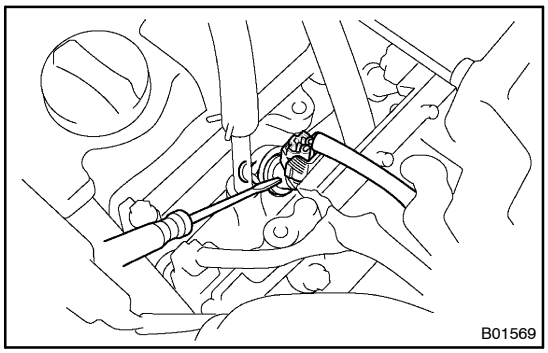
Remove 4 nuts and engine cover.



2. INSPECT INJECTOR OPERATION

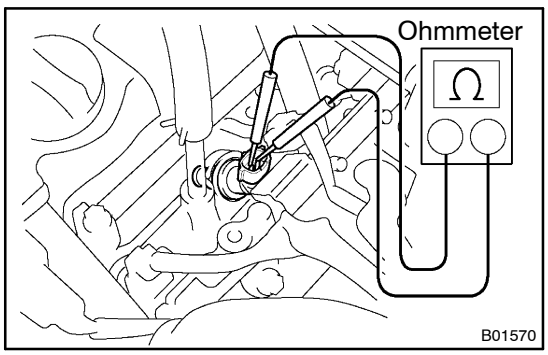
Check operation sound from each injector.

(1) With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine speed.



(2) If you have no sound scope, you can check the injector transmission operation with a screwdriver.

If no sound or an unusual sound is heard, check the wiring connector, injector or injection signal from the ECU.



3. INSPECT INJECTOR RESISTANCE

(a) Disconnect the injector connectors.

(b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 13.4 – 14.2 Ω at 20°C (68°F)

If the resistance is not as specified, replace the injector.

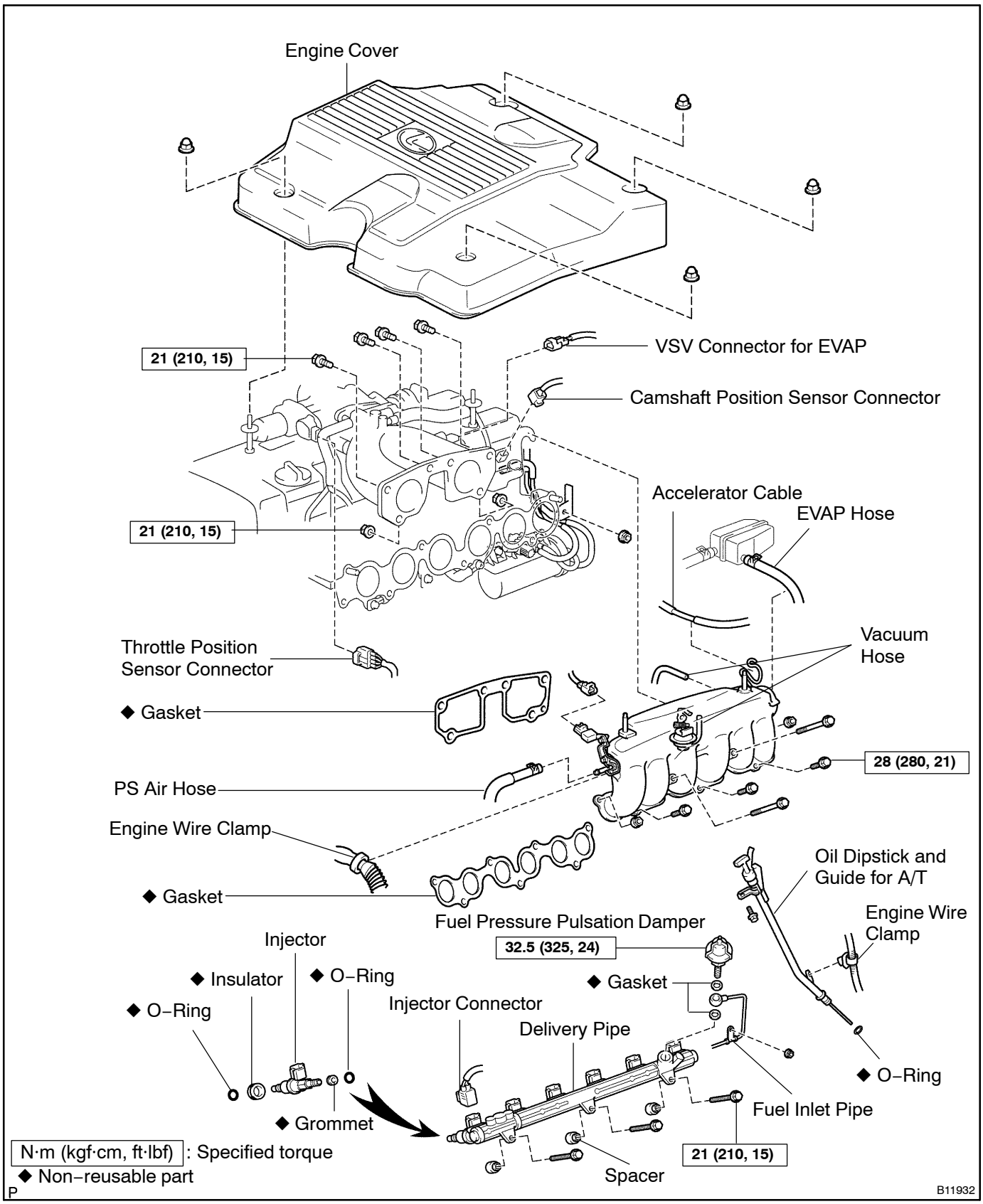
(c) Reconnect the injector connectors.

4. REINSTALL ENGINE COVER

Reinstall the 4 engine cover with the 4 nuts.

SF151–04

COMPONENTS



SF0NB–07

REMOVAL

1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

2. REMOVE AIR INTAKE CHAMBER (See page FI–46)

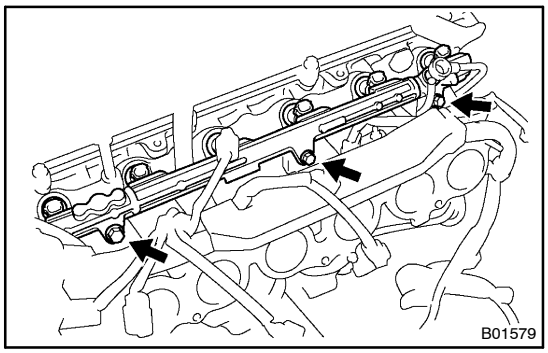
3. REMOVE FUEL PRESSURE PULSATION DAMPER (See page FI–26)

4. REMOVE DELIVERY PIPE AND INJECTORS

NOTICE:

- **Be careful not to drop the injectors when removing the delivery pipe.**
- **Pay attention to put any hung load on the injector to and from the side direction.**

(a) Disconnect the 6 injector connectors.
(b) Disconnect the camshaft position sensor connector.
(c) Disconnect the throttle position sensor connector.
(d) Disconnect the VSV connector for EVAP.



(e) Remove the 3 bolts and delivery pipe together with the 6 injectors.
(f) Pull out the 6 injectors from the delivery pipe.
(g) Remove the O–rings, grommet and insulator from each injector.
(h) Remove the 3 spacers from the intake manifold.

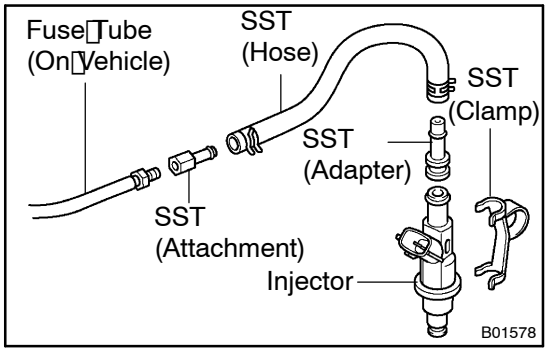
SF0NC–08

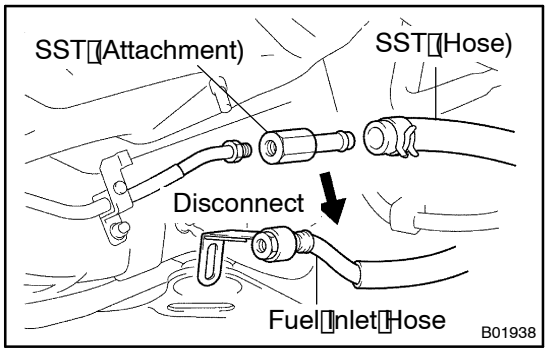
INSPECTION

1. INSPECT INJECTOR INJECTION

CAUTION:

Keep injector clear of sparks during the test.



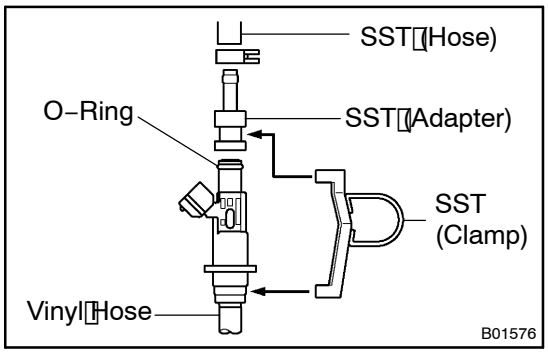


(a) Remove the nut, and disconnect the fuel inlet hose from the fuel main tube.

(b) Temporarily install SST (attachment) to the fuel main tube.
SST 09268–41047 (09268–52011)

(c) Tighten the flare nut on the fuel main tube (See page FI–1).

(d) Connect SST (hose) to the SST (attachment).
SST 09268–41047



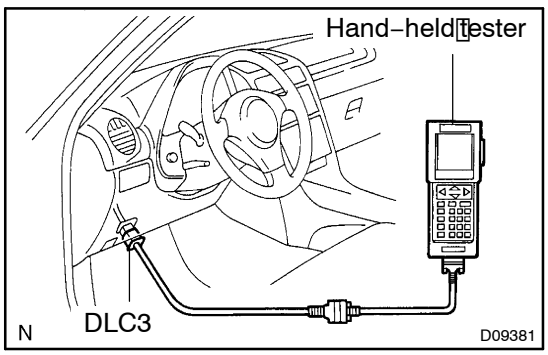
(e) Install the O–ring to the injector.

(f) Connect SST (hose) to the injector with SST (adapter), and hold the injector and adapter with SST (clamp).
SST 09268–41047 (09268–41110, 09268–41300)

(g) Put the injector into the graduated cylinder.

CAUTION:

Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.



(h) Connect the hand–held tester to the DLC3.

(i) Connect the battery negative (–) terminal cable to the battery.

(j) Turn the ignition switch ON and hand–held tester main switch ON.

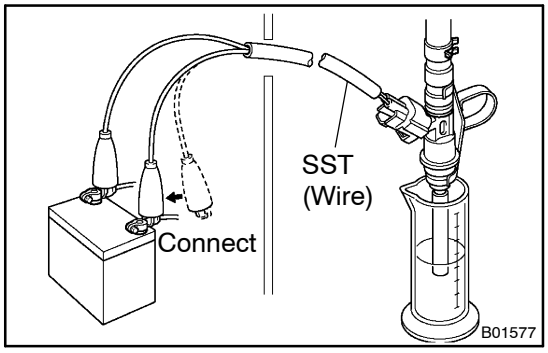
NOTICE:

Do not start the engine.

(k) Select the ACTIVE TEST mode on the hand–held tester.

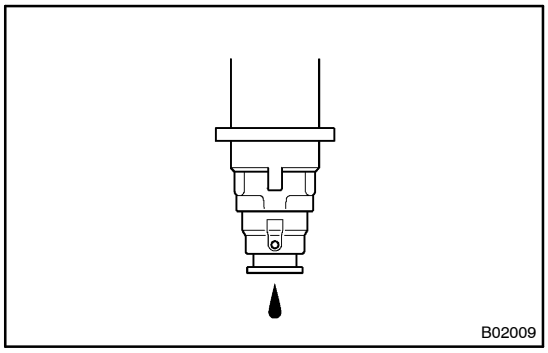
(l) Please refer to the hand–held tester operator's manual for further details.

(m) If you have no hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page FI–6).



(n) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector 2 or 3 times.
SST 09842–30070
Injection volume:
60 – 73 cm^3 (3.7 – 4.5 cu in.) per 15 seconds
Difference between each injector:
13 cm^3 (0.8 cu in.) or less

If the injection volume is not as specified, replace the injector.



2. INSPECT LEAKAGE

(a) In the condition above, disconnect the test probes of SST (wire) from the battery and check the fuel leakage from the injector.
SST 09842–30070
Fuel drop: 1 drop or less per 12 minutes

(b) Turn the ignition switch OFF.

(c) Disconnect the negative (–) terminal cable from the battery.

(d) Remove the SST.
SST 09268–41047, 09842–30070

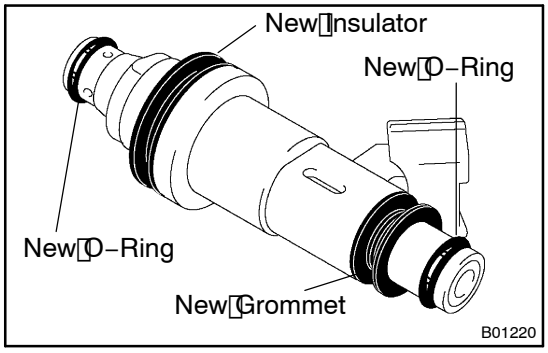
(e) Reconnect the fuel inlet hose to the fuel main tube (See page FI–1).

(f) Install the fuel inlet hose with the nut.
Torque: 9 N·m (90 kgf·cm, 80 in.·lbf)

(g) Disconnect the hand–held tester from the DLC3.

SF0ND–07

INSTALLATION

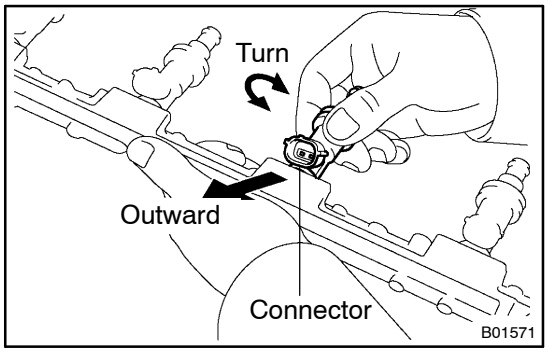


1. INSTALL INJECTORS AND DELIVERY PIPE

(a) Install new insulator and grommet to each injector.

(b) Apply a light coat of spindle oil or gasoline to 2 new O–rings and install them to each injector.

(c) Apply a light coat of spindle oil or gasoline on the place where a delivery pipe touches an O–ring of the injector.



(d) While turning the injector clockwise and counterclockwise, push it to the delivery pipe. Install the 6 injectors.

(e) Position the injector connector outward.

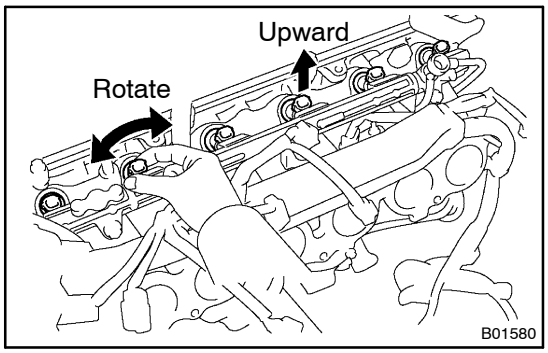
(f) Place the 3 spacers in position on the intake manifold.

(g) Apply a light coat of spindle oil or gasoline on the place where a intake manifold touches an O–ring of the injector.

(h) Place the 6 injectors together with the delivery pipe and 3 bolts in position on the intake manifold.

(i) Temporarily install the 3 bolts holding the delivery pipe to the intake manifold.

(j) Check that the injectors rotate smoothly.



HINT:

If injectors do not rotate smoothly, the probable cause is incorrect installation of O–rings. Replace the O–rings.

(k) Position the injector connector upward.

(l) Connect the 6 injector connectors.

HINT:

The Nos.1, 3, 5 injector connectors are dark gray, and the Nos.2, 4, 6 injector connectors are brown.

(m) Tighten the 3 bolts holding the delivery pipe to the intake manifold.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(n) Connect these connectors:

- Camshaft position sensor connector
- Throttle position sensor connector
- VSV connector for EVAP

2. INSTALL FUEL PRESSURE PULSATION DAMPER

(See page FI–27)

3. INSTALL AIR INTAKE CHAMBER

(See page FI–49)

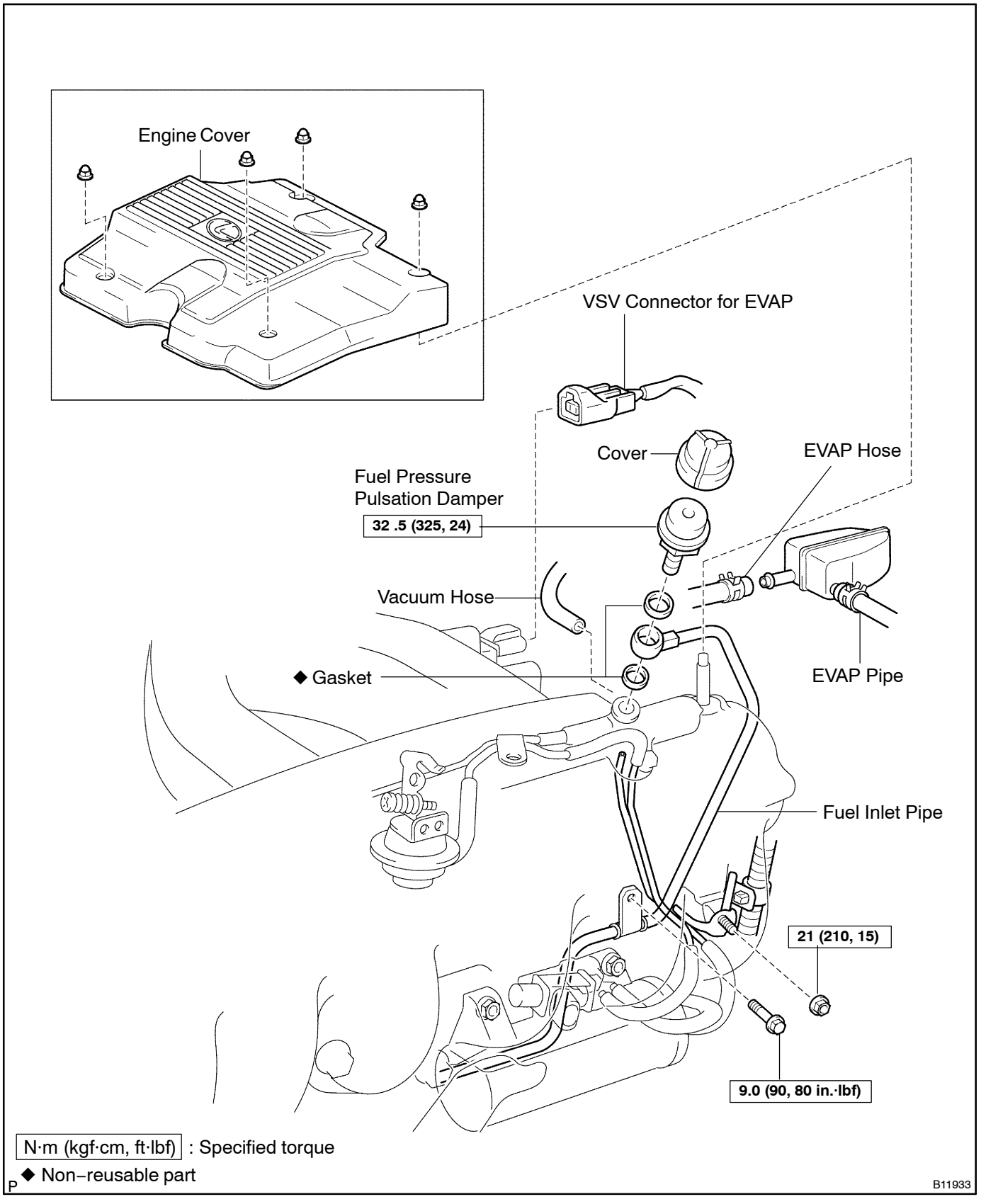
4. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

FUEL PRESSURE PULSATION DAMPER

COMPONENTS

SF0NE–09



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

◆ Non–reusable part

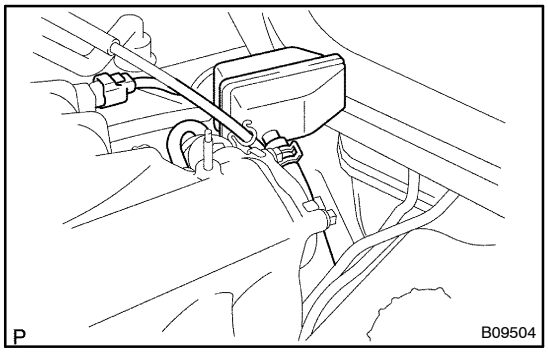
B11933

SF0NF–06

REMOVAL

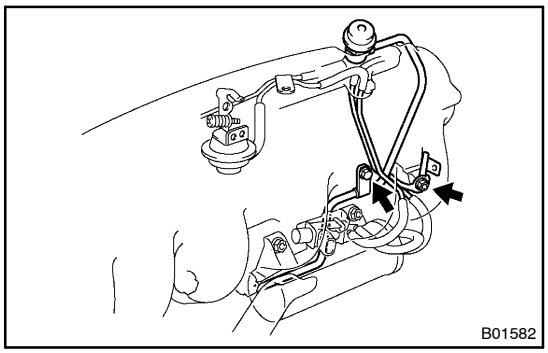
1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.



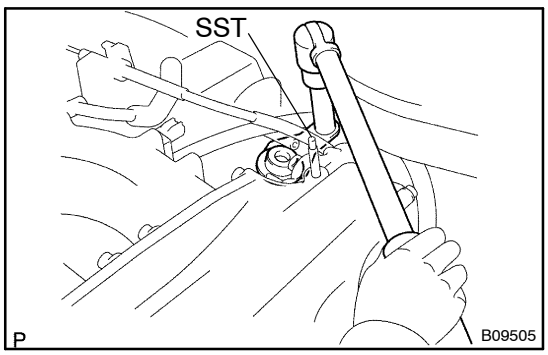
2. DISCONNECT CONNECTOR AND HOSES

(a) Disconnect the VSV connector for the EVAP.
(b) Disconnect the EVAP hose from the EVAP pipe.
(c) Disconnect the vacuum hose (from No.2 vacuum pipe) from the air intake chamber.



3. REMOVE FUEL PRESSURE PULSATION DAMPER

(a) Remove the nut holding the No.2 vacuum pipe to the intake manifold.
(b) Remove the bolt holding the fuel inlet pipe to the intake manifold.



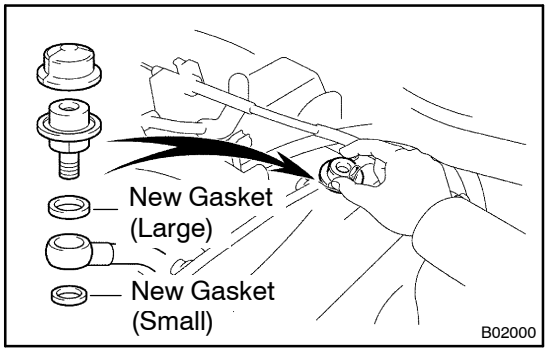
(c) Using SST, remove the pulsation damper and 2 gaskets.
SST 09612–24014 (09617–24011)

CAUTION:

- **Put a shop towel under the delivery pipe.**
- **Slowly loosen the pulsation damper.**

SF0NG–07

INSTALLATION

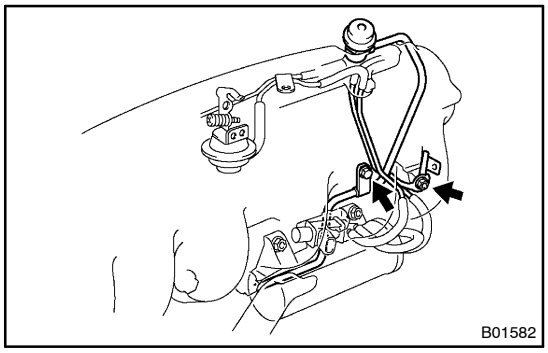


1. INSTALL FUEL PRESSURE PULSATION DAMPER

(a) Install the fuel inlet pipe and pulsation damper with 2 new gaskets.

HINT:

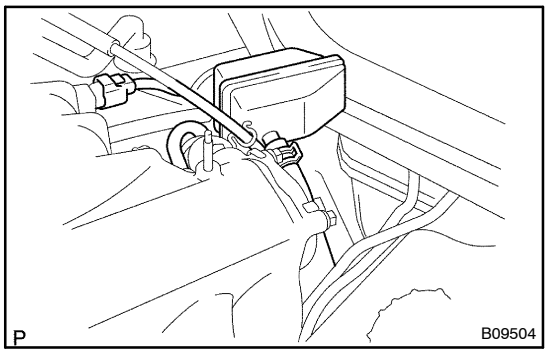
Different the gaskets are used for the upper (large side) and lower (small side).



(b) Using SST, tighten the pulsation damper.
SST 09612 – 24014 (09617 – 24011)
Torque: 32.5 N·m (325 kgf·cm, 24 ft·lbf)

(c) Install the bolt holding the fuel inlet pipe to the intake manifold.
Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

(d) Install the nut holding the No. 2 vacuum pipe to the intake manifold.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



2. CONNECT CONNECTOR AND HOSES

(a) Connect the vacuum hose (from No.2 vacuum pipe) to the air intake chamber.

(b) Connect the EVAP hose to the EVAP pipe.

(c) Connect the VSV connector for the EVAP.

3. INSTALL ENGINE COVER

Install the engine cover with the 4 nuts.

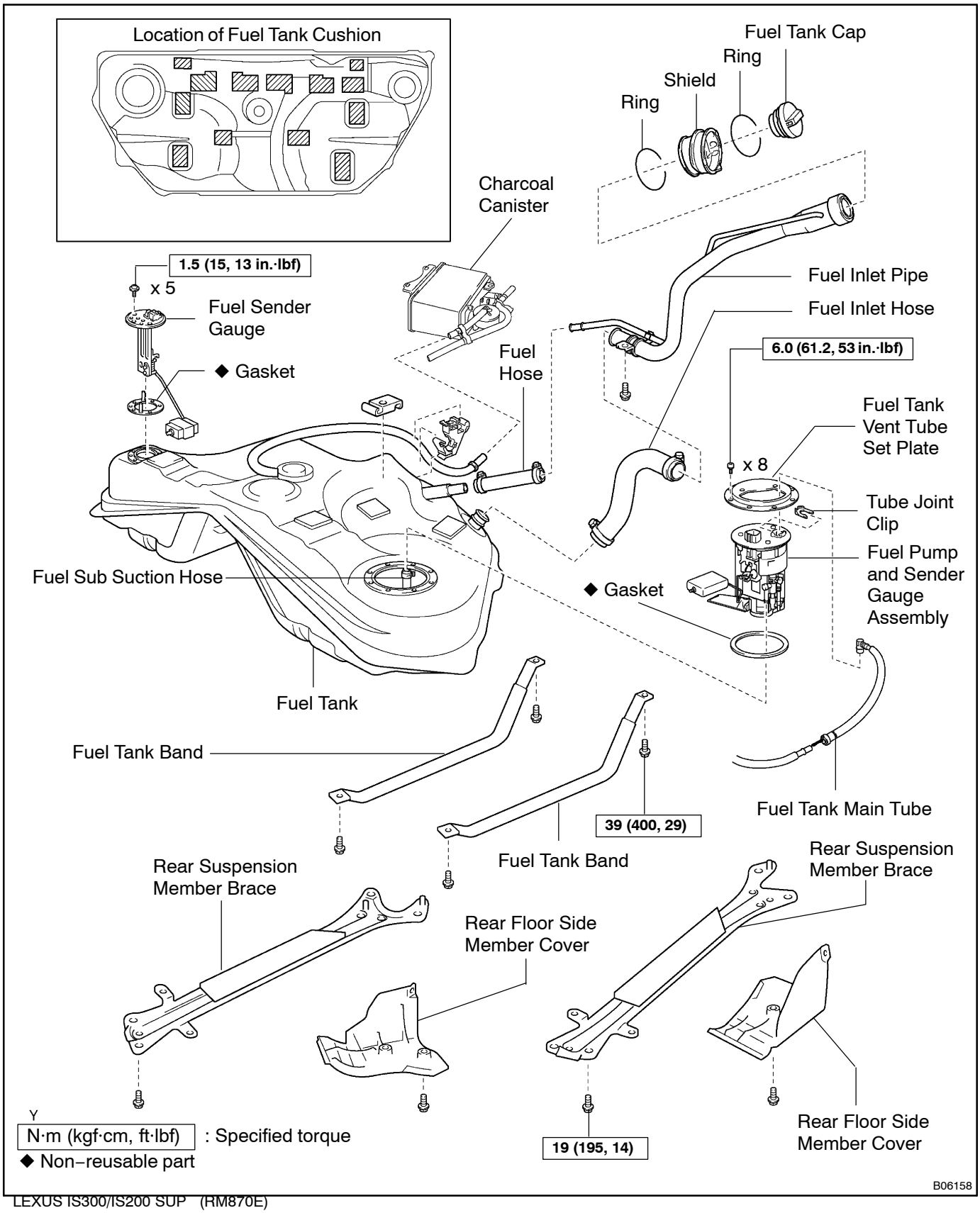
FUEL TANK AND LINE

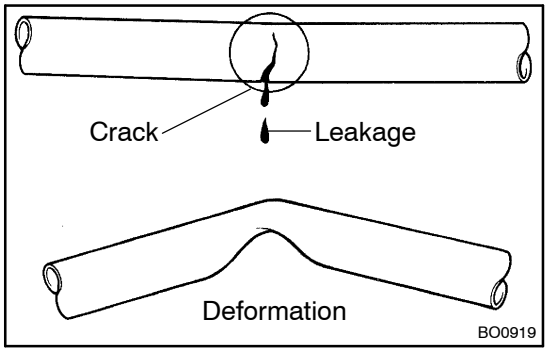
FI026–03

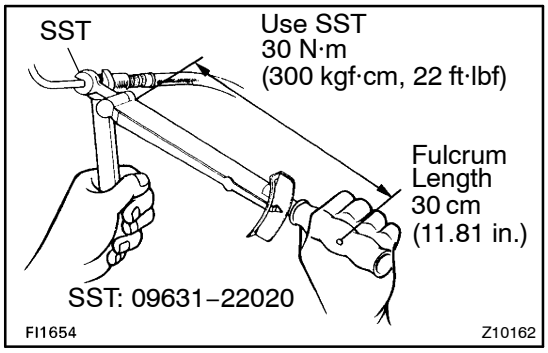
COMPONENTS

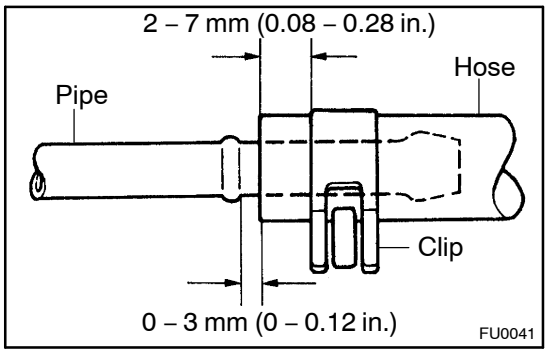
CAUTION:

- **Always use new gasket when replacing the fuel tank or component parts.**
- **Apply proper torque to all parts tightened.**









SF0NI–09

INSPECTION

INSPECT FUEL TANK AND LINE

(a) Check the fuel lines for cracks or leakage, and all connections for deformation.

(b) Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.

(c) Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.

(d) Check the filler neck for damage or fuel leakage.

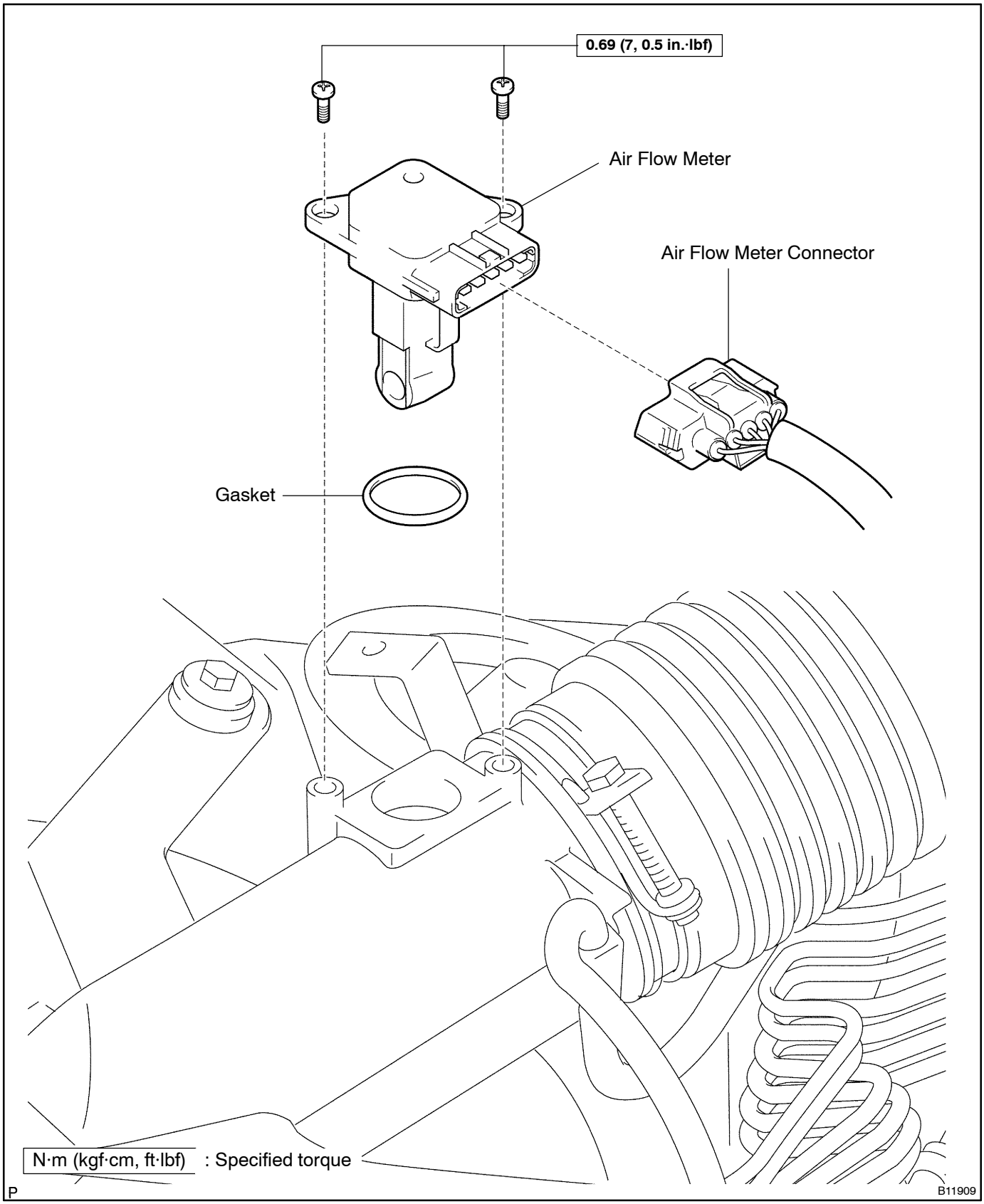
(e) Hose and pipe connections are as shown in the illustration.

If a problem is found, repair or replace the parts as necessary.

AIR FLOW METER

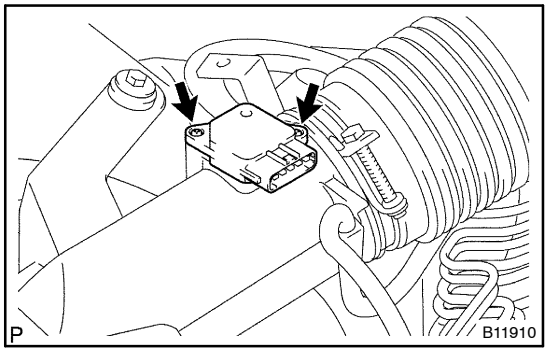
COMPONENTS

SF0NJ–10



SF0NK–06

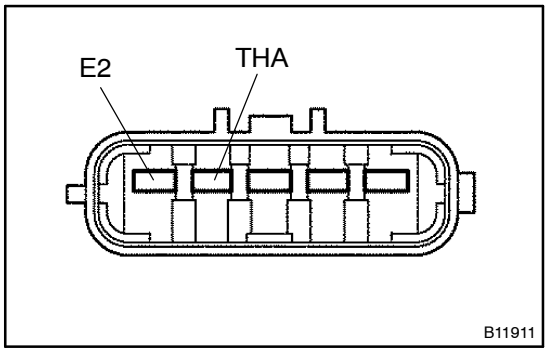
INSPECTION



1. REMOVE AIR FLOW METER METER

(a) Disconnect the air flow meter connector.

(b) Remove the 2 screws, air flow meter and gasket.

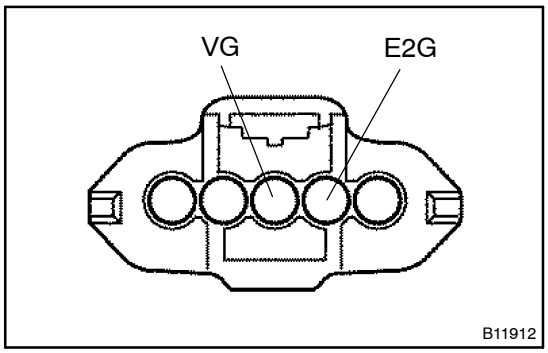


2. INSPECT AIR FLOW METER RESISTANCE

Using an ohmmeter, measure the resistance between terminals THA and E2.

Terminals	Resistance	Temperature
THA–E2	13.6 – 18.4 kΩ	–20°C (–4°F)
THA–E2	2.21 – 2.69 kΩ	20°C (68°F)
THA–E2	0.493 – 0.667 kΩ	60°C (140°F)

If the resistance is not as specified, replace the air flow meter.



3. INSPECT AIR FLOW METER OPERATION

(a) Connect the air flow meter connector.

(b) Connect the negative (–) terminal cable to the battery.

(c) Turn the ignition switch ON.

(d) Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (–) tester probe to terminal E2G.

(e) Blow air into the air flow meter, and check that the voltage fluctuates.

If operation is not as specified, replace the air flow meter.

(f) Turn the ignition switch OFF.

(g) Disconnect the negative (–) terminal cable from the battery.

(h) Disconnect the air flow meter connector.

4. REINSTALL AIR FLOW METER

(a) Install the gasket to the air flow meter.

(b) Install the air flow meter with the 2 screws.

Torque: 0.69 N·m (7 kgf·cm 0.5 in.·lbf)

(c) Connect the air flow meter connector.

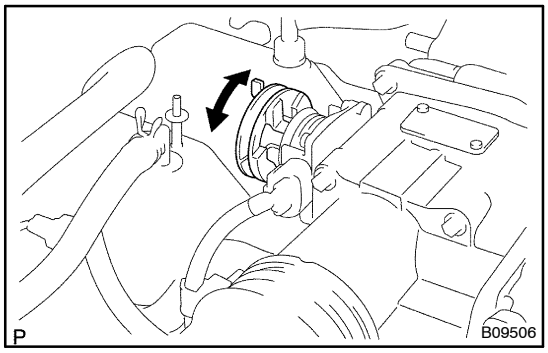
THROTTLE BODY

SF0NL–08

ON–VEHICLE INSPECTION

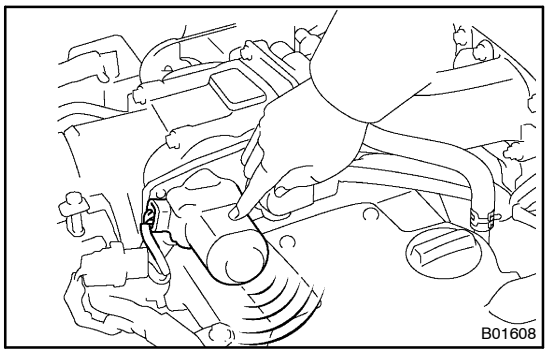
1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.



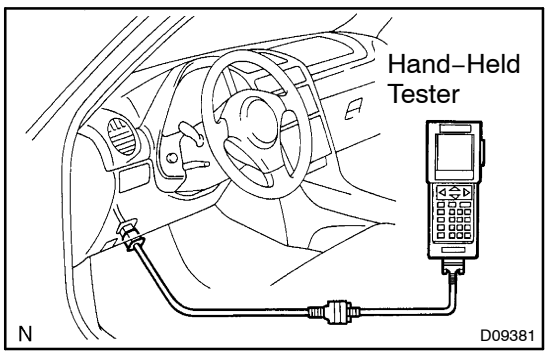
2. INSPECT SYSTEM OPERATION

(a) Check that the throttle linkage moves smoothly.



(b) Inspect the throttle control motor for operating sound.
  (1) Turn the ignition switch ON.
  (2) When turning the accelerator pedal position sensor lever, check the running sound of the motor. Also, check that there is no friction sound.

If operation is not as specified, check the throttle control motor, wiring and engine ECU.



(c) Inspect the throttle position sensor and accelerator pedal position sensor function.
  (1) Connect the hand–held tester to the DLC3.
  (2) When turning the accelerator pedal position sensor lever to the full–open position, check that the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA showns the standard value.

Throttle valve opening percentage: 60 % or more

If operation is not as specified, check that the throttle position sensor, accelerator pedal position sensor, wiring and engine ECU.

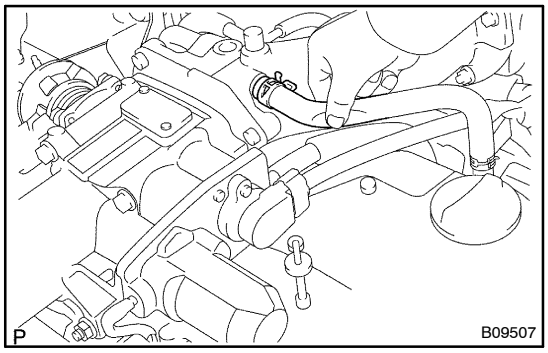
(d) Start the engine, and check that the malfunction indicator Lamp (MIL) does not light up.

(e) Inspect the air assist system.
  (1) Allow the engine to warm up to normal operating temperature.

(2) Turn the A/C switch ON and OFF, and check the idle speed.

Idle speed (Transmission in neutral):
700 ± 50 rpm (A/C OFF)
750 ± 50 rpm (A/C ON)

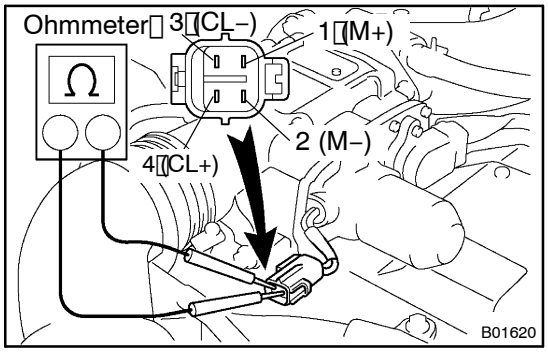
NOTICE:
Perform inspection under condition without electrical load.



(3) With engine idling, pinch the air assist hose and check that engine speed drops, and then returns back up to idle speed.

If operation is not as specified, check the throttle body, wiring and engine ECU.

(f) After checking the above (b) to (e), perform the driving test and check that there is no sense of incongruity.



3. INSPECT THROTTLE CONTROL MOTOR

(a) Disconnect the throttle control motor connector.

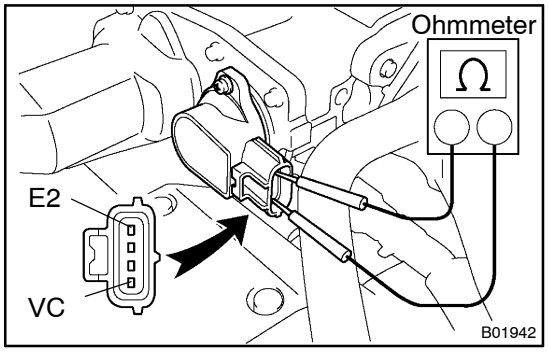
(b) Using an ohmmeter, measure the resistance between terminal 3 (CL–) and 4 (CL+).

Resistance: 4.2 – 5.2 Ω at 20°C (68°F)

(c) Using an ohmmeter, measure the resistance between terminal 1 (M+) and 2 (M–).

Resistance: 0.3 – 100 Ω at 20°C (68°F)

If the resistance is not as specified, replace the throttle control motor (See page FI–37).



(d) Reconnect the throttle control motor connector.

4. INSPECT THROTTLE POSITION SENSOR

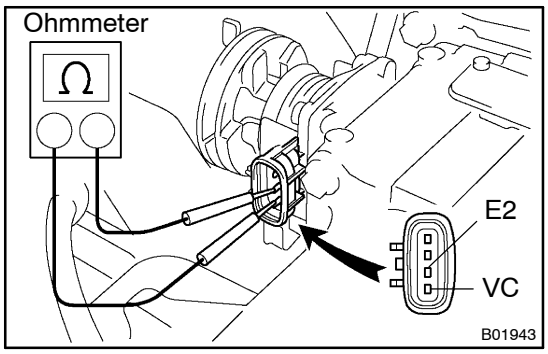
(a) Disconnect the throttle position sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals VC and E2.

Resistance: 1.2 – 3.2 kΩ at 20°C (68°F)

If the resistance is not as specified, replace the throttle position sensor (See page FI–37).

(c) Reconnect the throttle position sensor connector.



5. INSPECT ACCELERATOR PEDAL POSITION SENSOR

(a) Disconnect the accelerator pedal position sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals VC and E2.

Resistance: 1.2 – 3.2 kΩ at 20°C (68°F)

If the resistance is not as specified, replace the accelerator pedal position sensor (See page FI–37).

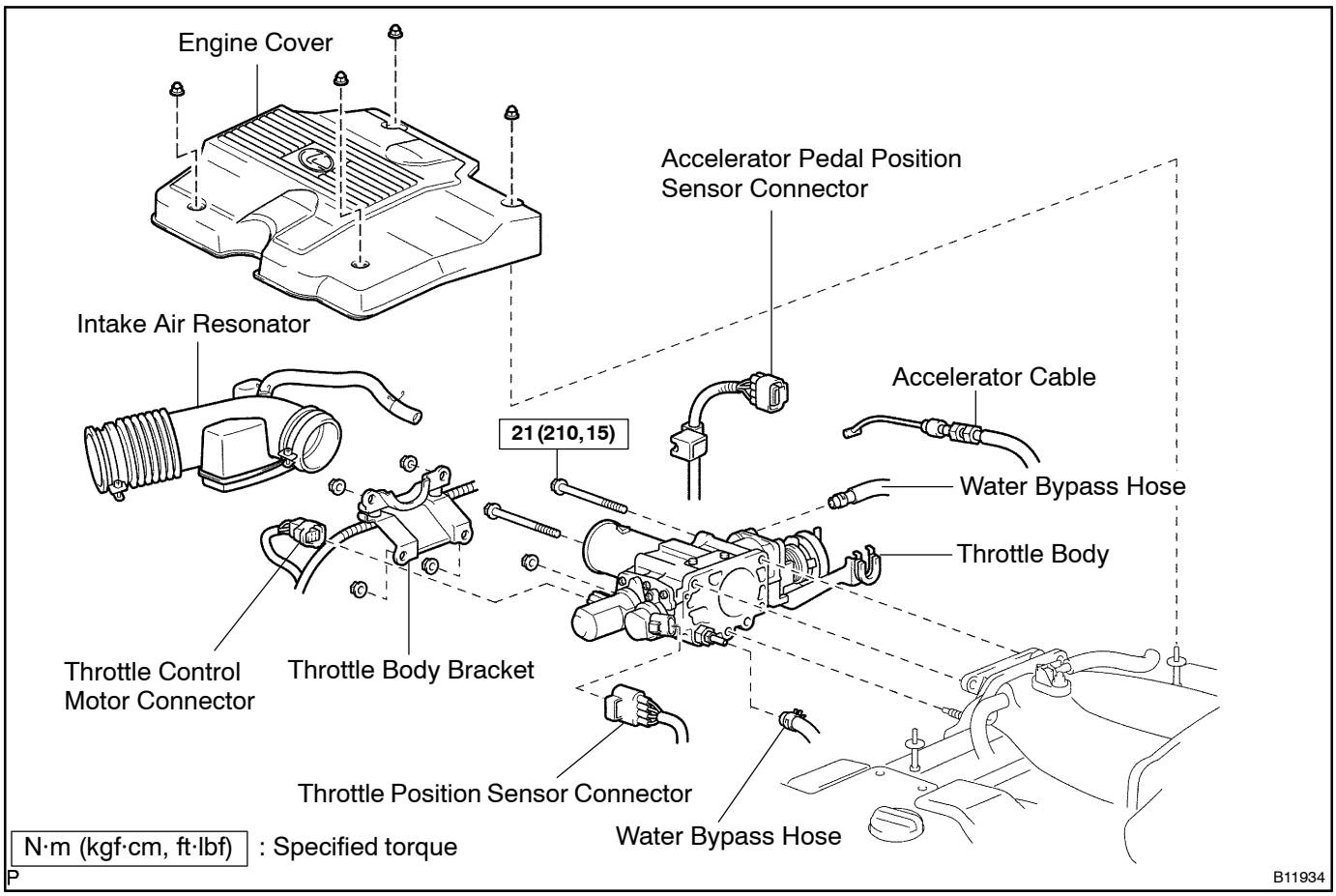
(c) Reconnect the accelerator pedal position sensor connector.

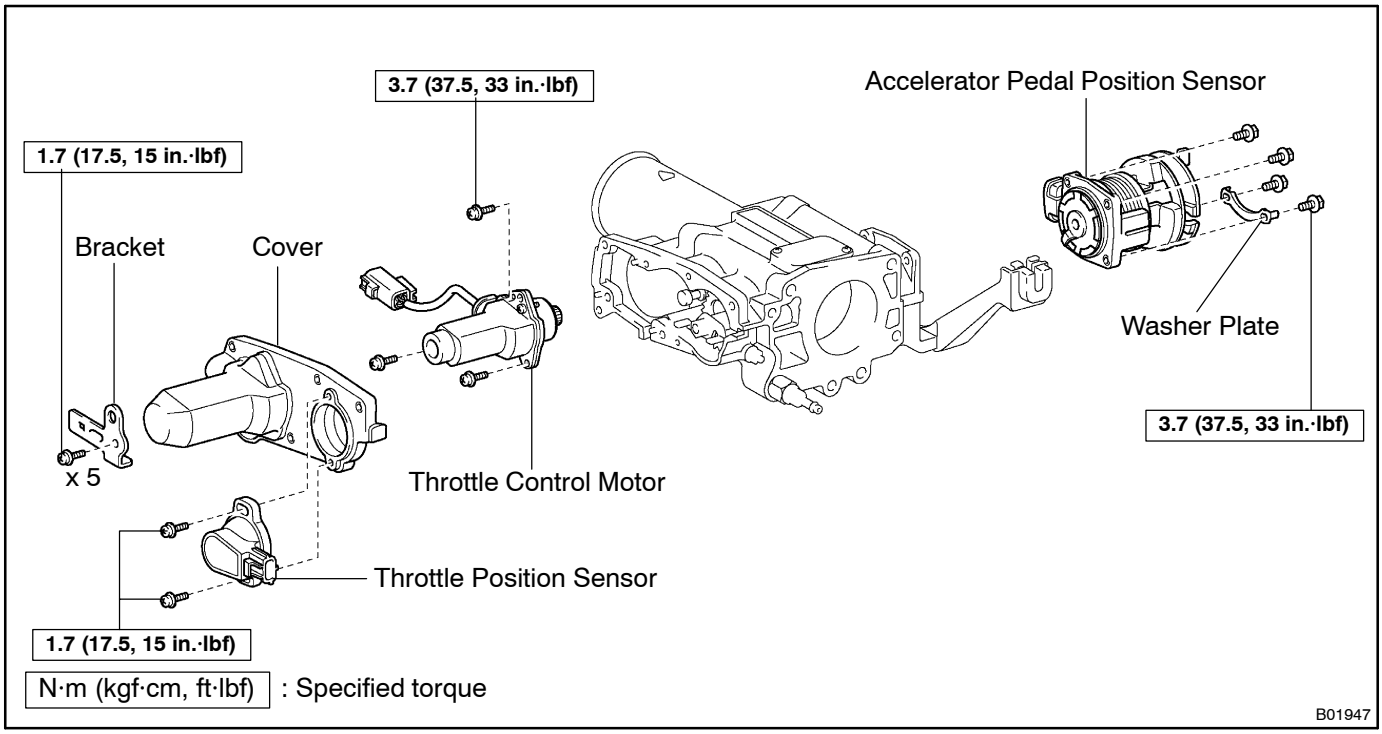
6. REINSTALL ENGINE COVER

Reinstall the engine cover with the 4 nuts.

SF0NM–12

COMPONENTS





SF0NN–07

REMOVAL

1. DRAIN ENGINE COOLANT

2. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.

3. REMOVE INTAKE AIR RESONATOR

4. REMOVE THROTTLE BODY BRACKET AND THROTTLE BODY

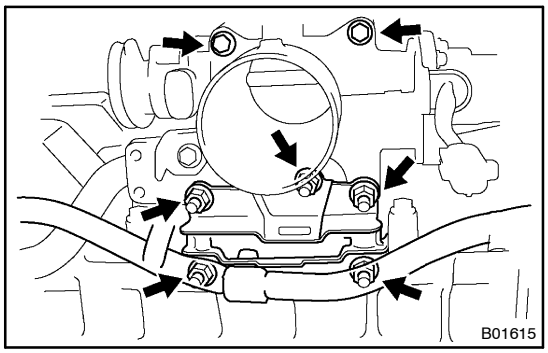
(a) Disconnect the accelerator cable.

(b) Disconnect the throttle position sensor connector.

(c) Disconnect the throttle control motor connector.

(d) Disconnect the accelerator pedal position sensor connector.

(e) Disconnect the engine wire clamp from the clamp bracket of throttle body.



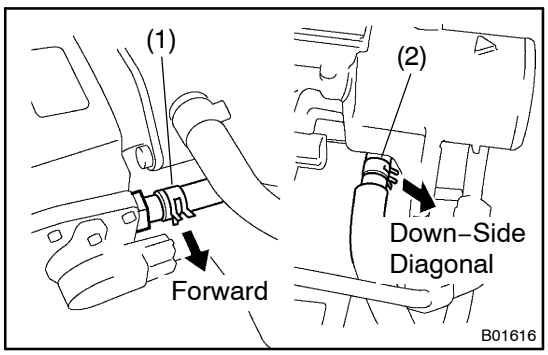
(f) Remove the 2 bolts and nut holding the throttle body to the intake air connector.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(g) Remove the 4 nuts and throttle body bracket.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(h) Slightly slide the throttle body away from the intake air connector.

NOTICE:

When putting up the throttle body, do not hold the motor part.



(i) Disconnect the 2 water bypass hoses from the throttle body, and remove the throttle body.

HINT:

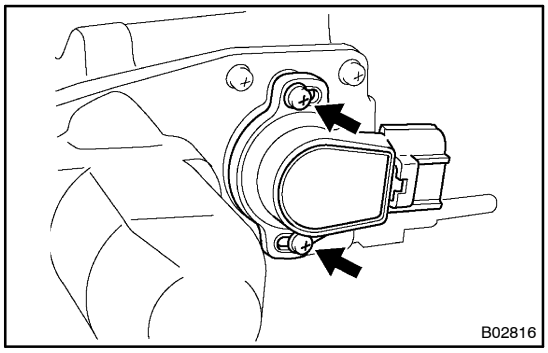
- At the time of installation, please refer to the following items.
- Connect the water bypass hose with its discrimination mark downward.
- Install the with its craw direction for (1) forward and down–side diagonal (engine side about 45˚) for (2).

SF0NO–08

REPLACEMENT

NOTICE:

- **To prevent deterioration, do not shock the throttle position sensor and accelerator pedal position sensor.**
- **Mixing of the foreign objects may cause the gear locking, so thoroughly check that there is no stuck of any foreign objects and clean up if any.**

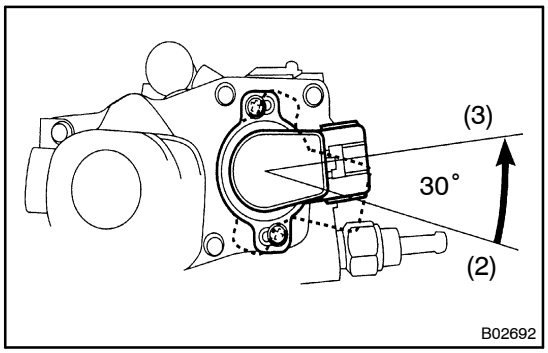


1. REPLACE THROTTLE POSITION SENSOR

(a) Remove the 2 set screws and throttle position sensor.

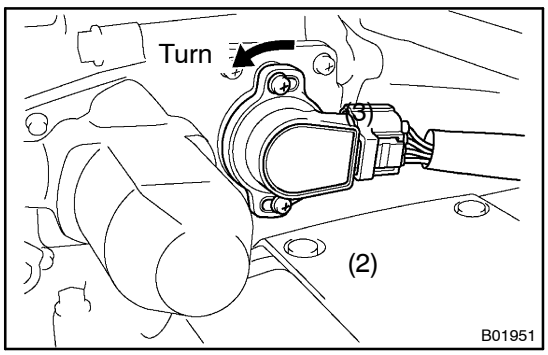
(b) Reinstall the throttle position sensor.

(1) Check that the throttle valve is under the condition of the opener opening angle (about 3.5˚).



(2) Install the sensor to the place where is at 30˚ rotated to the right from the specified installation position.

(3) Gradually turn sensor counterclockwise until it touches the throttle valve shaft and temporarily torque the 2 set screws.



(c) Adjust the throttle position sensor.

(1) Connect the throttle position sensor connector.

NOTICE:

At this time, do not connect the throttle control motor connector.

(2) Connect the hand–held tester to the DLC3.

(3) Turn the ignition switch ON.

NOTICE:

After turning the ignition switch ON, do not depress the accelerator pedal.

(4) While reading the value of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA, turn the throttle position sensor slowly to left and set the sensor at the center value of the standard value, and then torque the screws.

Torque: 1.7 N·m (17.5 kgf·cm, 15 in.·lbf)

Standard throttle valve opening percentage:

14.8 ± 0.8 %

NOTICE:

At the time of tightening the screw, as the sensor itself tends to turn causing to slanting, check that it is within the standard value after having finished the torque.

(5) Fully close the throttle valve with a screwdriver and check that the value of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA stays with the standard value.

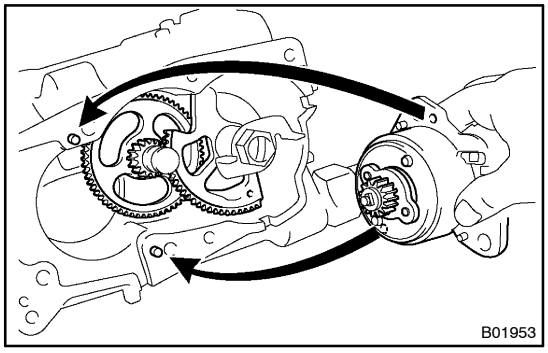
Standard throttle valve opening percentage:
10 – 14 %

If the throttle valve opening percentage is not as specified, repeat steps (4) through (5).

(6) Paint the sensor set screws.
(7) Turn the ignition switch OFF.
(8) Disconnect the hand–held tester from the DLC3.
(9) Disconnect the throttle position sensor connector.

2. REPLACE THROTTLE CONTROL MOTOR

(a) Remove the throttle position sensor.
(b) Remove the throttle control motor.
(1) Disconnect the connector from the bracket.
(2) Remove the 5 screws, bracket and cover.
(3) Remove the 3 screws and throttle control motor.

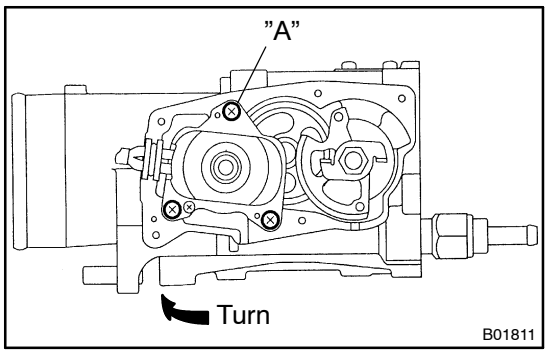


(c) Reinstall the throttle control motor.
(1) Apply the grease thinly on the whole surface of the gear teeth.

NOTICE:

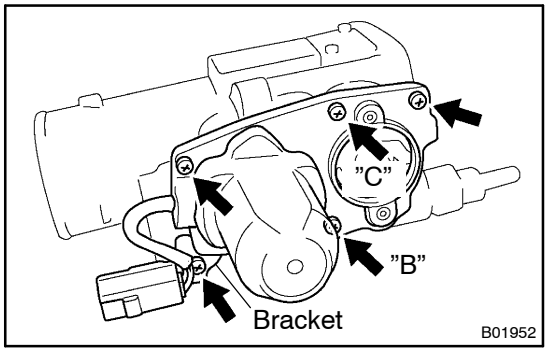
Do not apply the grease other than specified because grease has been already applied to the component to be replaced.

(2) Align the protrusions of the motor with the positioning pin holes of the throttle body.



(3) Rotate the motor to the direction marked with an arrow and temporarily install the set screw ”A” under the condition that there is no wobbles in the motor and the positioning pin.
(4) Tighten the 3 set screws.

Torque: 3.7 N·m (37.5 kgf·cm, 33 in.·lbf)



(5) Temporarily install the cover with the 2 screws "B" and "C".

NOTICE:

The grommet of motor not be caught.

(6) Tighten the 5 screws.

Torque: 1.7 N·m (17.5 kgf·cm, 15 in.·lbf)

(7) Connect the connector to the bracket.

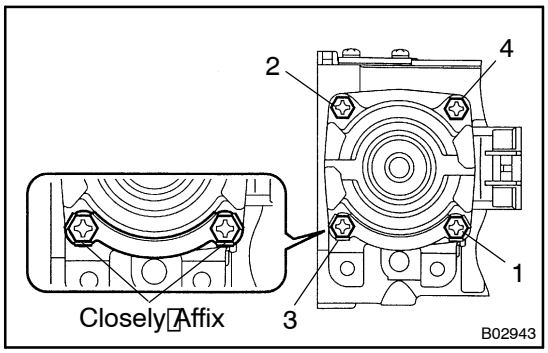
(d) Reinstall and adjust the throttle position sensor. (See step 1)

3. REPLACE ACCELERATOR PEDAL POSITION SENSOR

(a) Remove the accelerator pedal position sensor.

(1) Using a small screwdriver, pry the 4 stoppers of the washer plate.

(2) Remove the 4 set bolts, washer plate and accelerator pedal position sensor.



(b) Reinstall the accelerator pedal position sensor.

(1) Install the accelerator pedal position sensor to the throttle body.

(2) Torque the 4 bolts in the order shown in the illustration through the washer plate.

Torque: 3.7 N·m (37.5 kgf·cm, 33 in.·lbf)

(3) Bend the stopper of the washer plate and closely affix to the bolts.

(c) Inspect the accelerator pedal position sensor.

(1) Connect the accelerator pedal position sensor connector.

(2) Connect the hand–held tester to the DLC3.

(3) Turn the ignition switch ON.

NOTICE:

After turning the ignition switch ON, do not depress the accelerator pedal.

(4) Check that the ACCEL POS #1 (VPA) voltage of the CURRENT DATA shows the standard value.

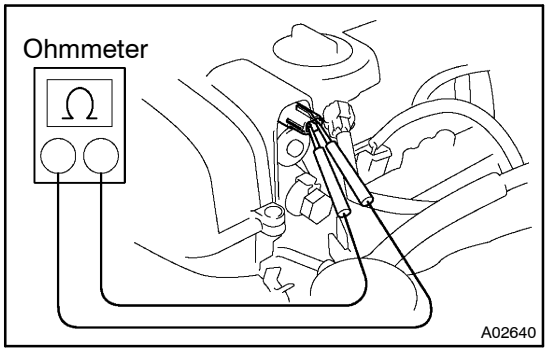
Standard accelerator pedal position voltage:
0.3 – 0.9 V

4. AFTER INSTALL THROTTLE BODY, INSPECT SYSTEM OPERATION (See page FI–32)

SF0NP–10

INSTALLATION

Installation is in the reverse order of removal (See page FI–36).



CAMSHAFT TIMING OIL CONTROL VALVE

SF0NR–07

ON–VEHICLE INSPECTION

1. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE RESISTANCE

(a) Disconnect the oil control valve connector.

(b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 5.5 – 12.5 Ω at 20°C (68°F)

If the resistance is not as specified, replace the valve.

(c) Reconnect the oil control valve connector.

2. INSPECT VVT–i OPERATION

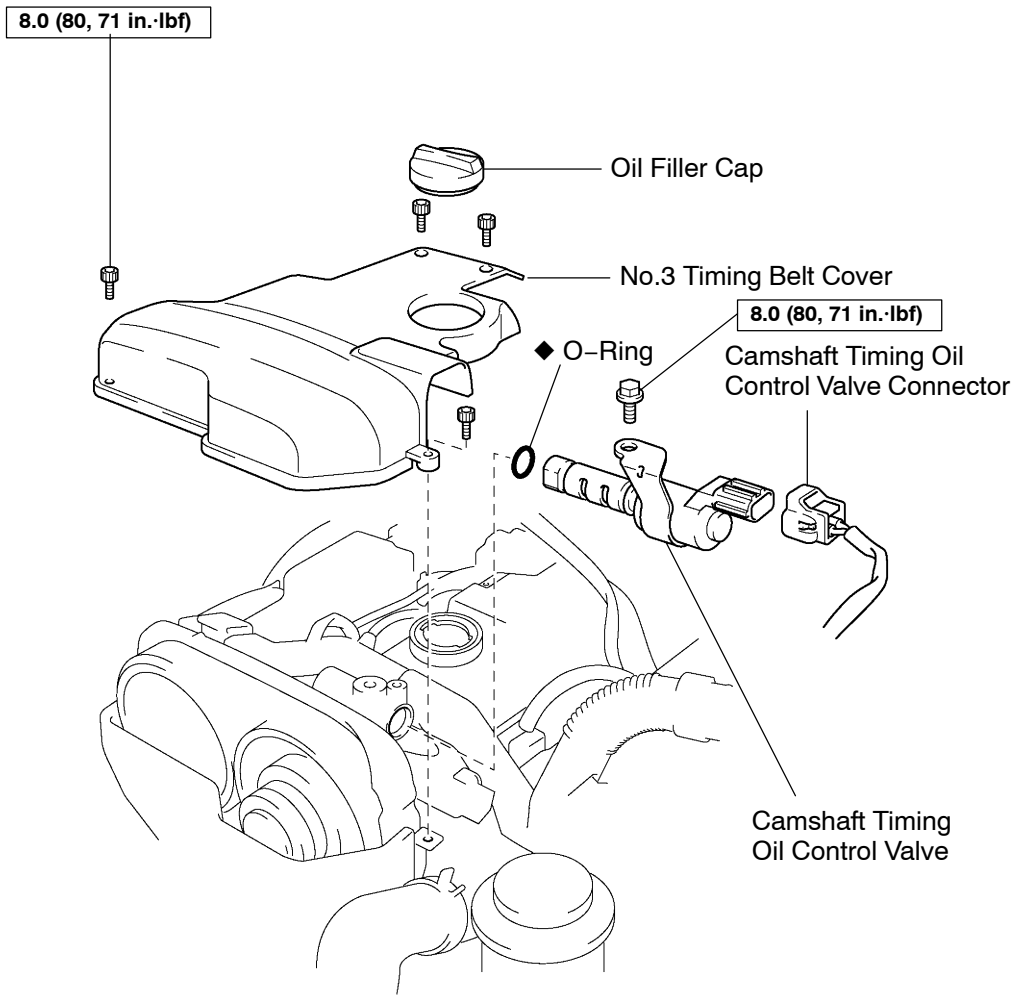
(a) Allow the engine to warm up to normal operating temperature.

(b) Check that the engine stalls or becomes in rough–idling state when the battery positive voltage is applied to the oil control valve with the engine idling.

If operation is not as specified, check the oil control valve (see page FI–43), VVT–i pulley, intake camshaft, wiring and engine ECU.

SF0NQ–07

COMPONENTS

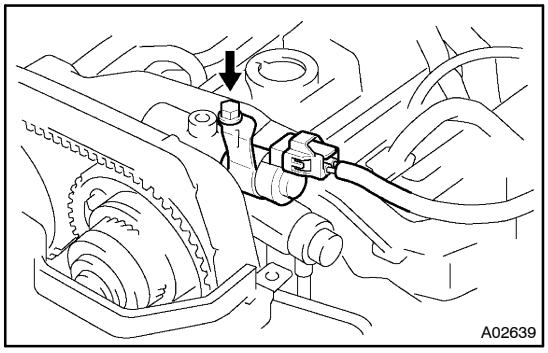


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

B11945

SF0NS–04



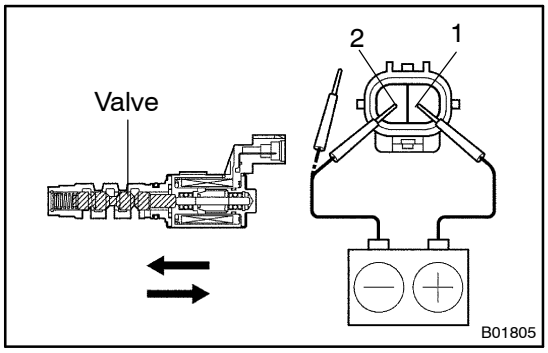
INSPECTION

1. REMOVE NO.3 TIMING BELT COVER

2. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE

(a) Disconnect the oil control valve connector.

(b) Remove the bolt, oil control valve and O–ring.



3. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE OPERATION

Connect positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2, and check the movement of the valve.

Battery positive voltage is applied	Valve moves in ← direction
Battery positive voltage is cut off	Valve moves in → direction

If operation is not as specified, replace the valve.

4. REINSTALL CAMSHAFT TIMING OIL CONTROL VALVE

(a) Install a new O–ring to the oil control valve.

(b) Install the oil control valve with the bolt.
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

(c) Connect the oil control valve connector.

5. REINSTALL NO.3 TIMING BELT COVER
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)

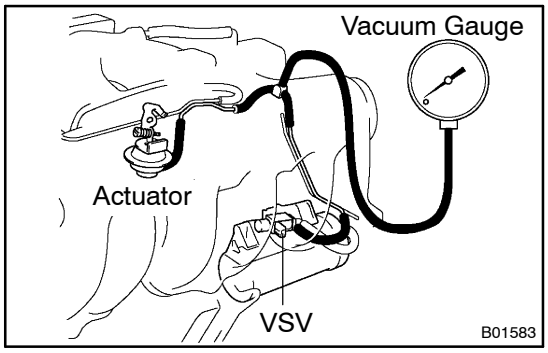
ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS)

SF0NT–06

ON–VEHICLE INSPECTION

1. REMOVE ENGINE COVER

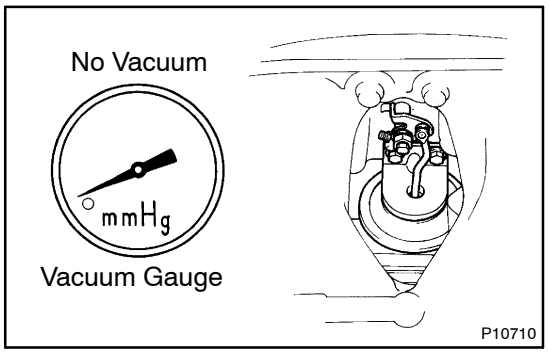
Remove the 4 nuts and engine cover.



2. CONNECT VACUUM GAUGE

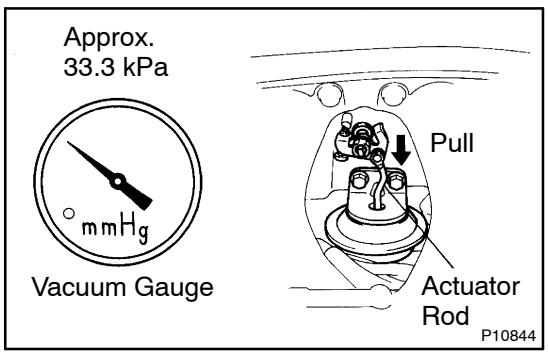
Using a 3–way connector, connect vacuum gauge to the hose between the actuator and VSV.

3. START ENGINE



4. INSPECT INTAKE AIR CONTROL VALVE

(a) While the engine is idling, check that the vacuum gauge needle does not move.



(b) Rapidly depress the accelerator pedal to fully open position and check that the vacuum gauge needle momentarily fluctuates approx. 33.3 kPa (250 mmHg, 9.84 in.Hg) or more. (The actuator rod is pulled down.)

5. REMOVE VACUUM GAUGE

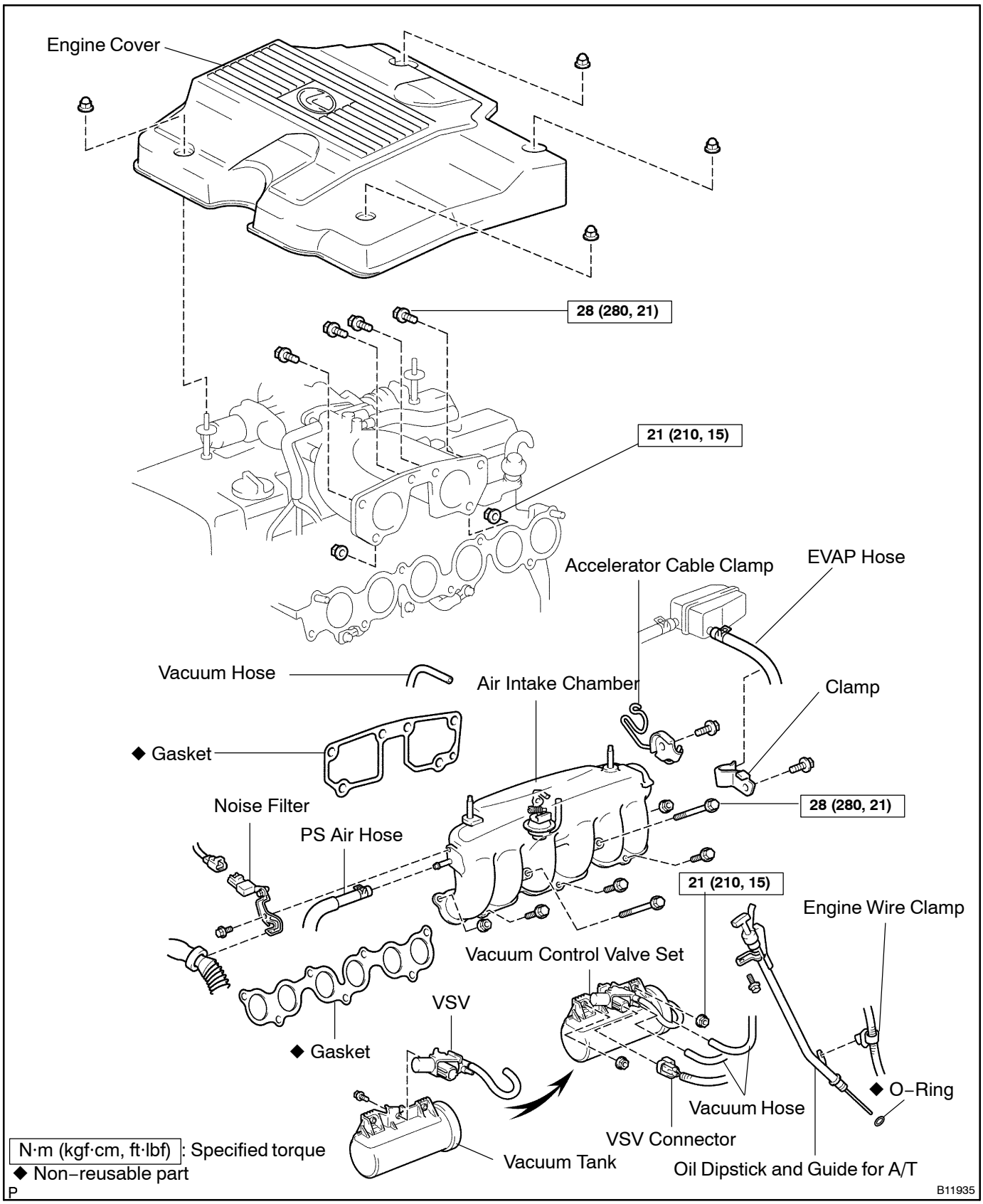
Remove the vacuum gauge, and reconnect the vacuum hoses to their proper locations.

6. REINSTALL ENGINE COVER

Reinstall the engine cover with the 4 nuts.

SF0NU–06

COMPONENTS

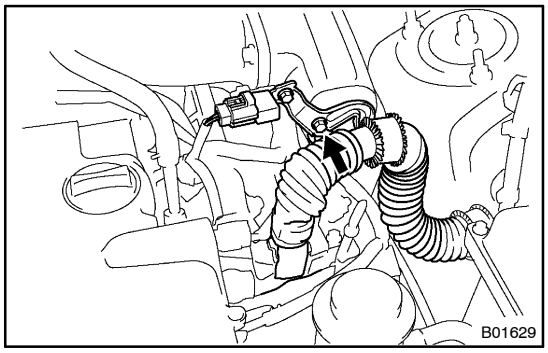


SF0NV–06

REMOVAL

1. REMOVE ENGINE COVER

Remove the engine cover and 4 nuts.



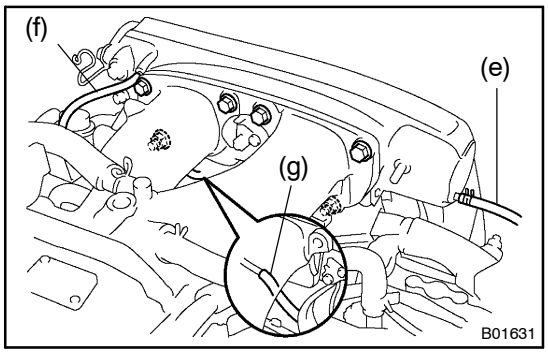
2. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page EM–64)

3. REMOVE AIR INTAKE CHAMBER (WITH INTAKE AIR CONTROL VALVE)

(a) Disconnect the noise filter connector.

(b) Disconnect the engine wire clamp from the bracket.

(c) Remove the bolt, bracket and noise filter.

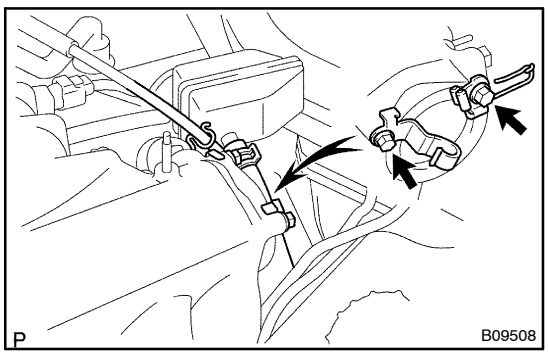


(d) Remove the 4 bolts and 2 nuts holding the intake air connector to the air intake chamber,
Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)

(e) Disconnect the PS air hose from the air intake chamber.

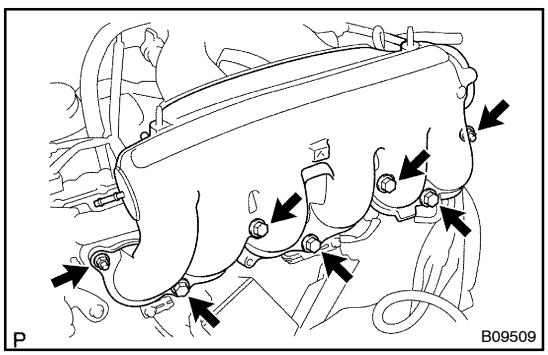
(f) Disconnect the vacuum hose (from No.2 vacuum pipe) from the air intake chamber.

(g) Disconnect the vacuum hose (from actuator for ACIS) from the No.1 vacuum pipe.



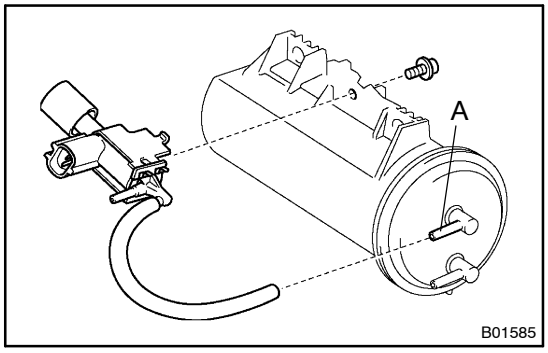
(h) Disconnect the accelerator cable, and remove the bolt and accelerator cable clamp.

(i) Disconnect the EVAP hose, and remove the bolt and clamp.



(j) Remove the 5 bolts, 2 nuts, air intake chamber and 2 gaskets.
Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)

4. REMOVE VACUUM CONTROL VALVE SET (See page FI–48)



5. REMOVE VSV FROM VACUUM TANK

(a) Disconnect the vacuum hose from port A of the vacuum tank.

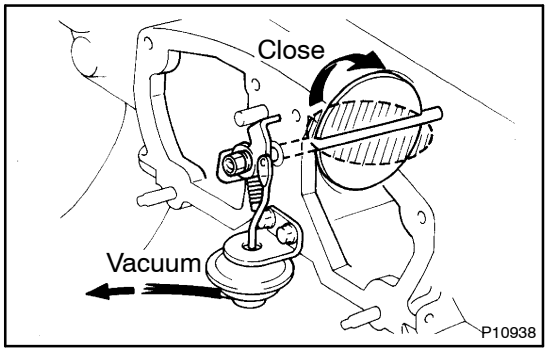
(b) Remove the screw and VSV.

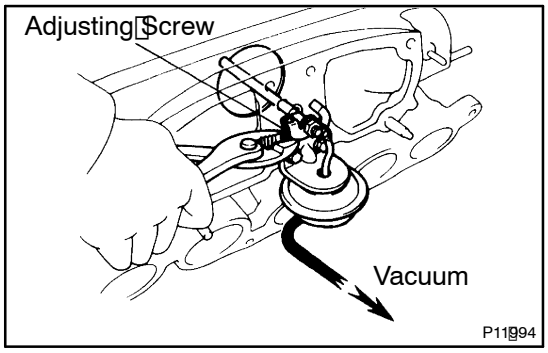
SF0NW–05

INSPECTION

1. INSPECT INTAKE AIR CONTROL VALVE

(a) With 53.3 kPa (400 mmHg, 15.75 in.Hg) of vacuum applied to the actuator, check that the actuator rod moves.





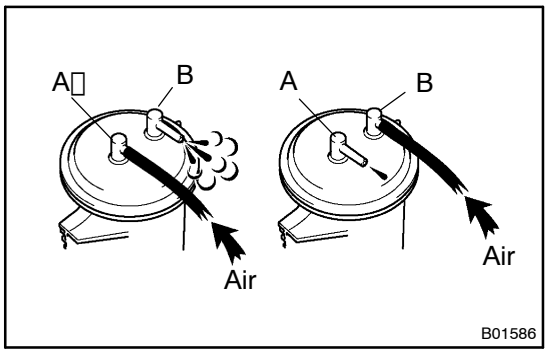
If operation is not as specified, turn the adjusting screw.

(b) 1 minute after applying the vacuum in (a), check that the actuator rod does not return.

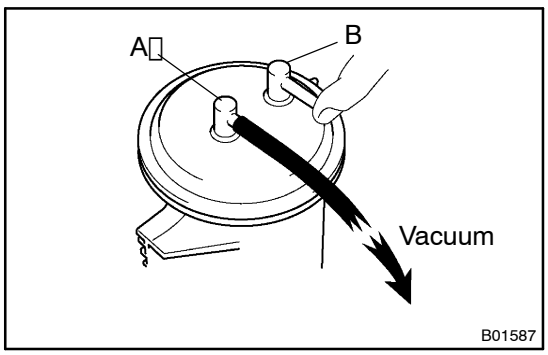
2. INSPECT VACUUM TANK

(a) Check that air flows from ports A to B.

(b) Check that air does not flow ports B to A.



(c) Plug port B with your finger, and apply 53.3 kPa (400 mmHg, 15.75 in.Hg) of vacuum to port A, and check that there is no change in vacuum after 1 minute.



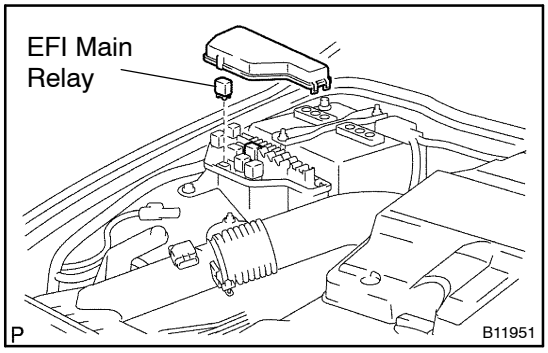
If operation is not as specified, replace the vacuum tank.

3. INSPECT VSV (See page FI–48)

SF0NX–05

INSTALLATION

Installation is in the reverse order of removal (See page FI–49).



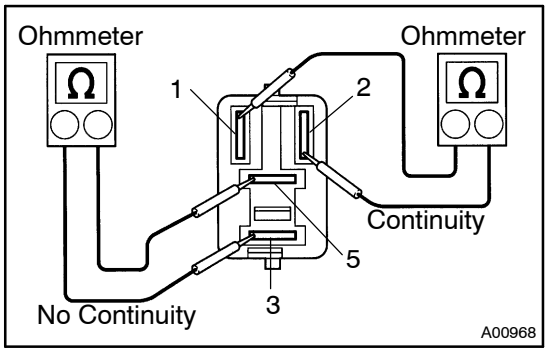
EFI MAIN RELAY

SF0NY–08

INSPECTION

1. REMOVE RELAY BOX COVER

2. REMOVE EFI MAIN RELAY (Marking:EFI)



3. INSPECT EFI MAIN RELAY

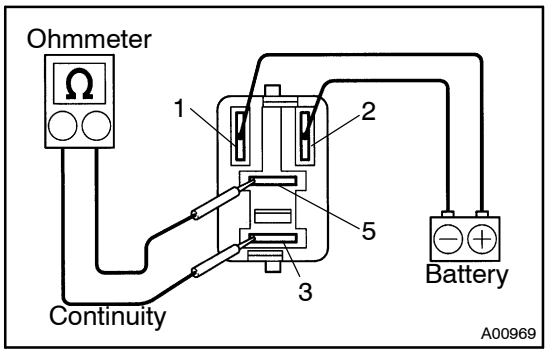
(a) Inspect the relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



(b) Inspect the relay operation.

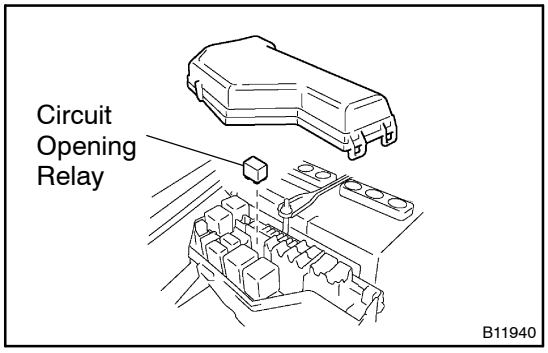
(1) Apply battery positive voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

4. REINSTALL EFI MAIN RELAY

5. REINSTALL RELAY BOX COVER



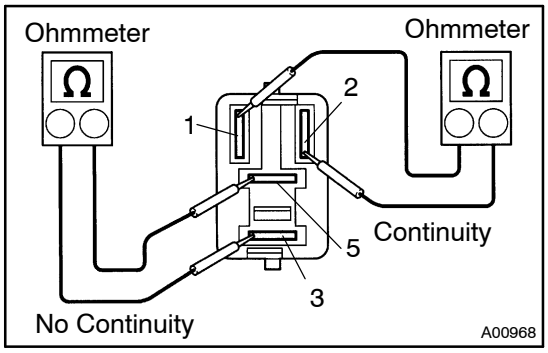
CIRCUIT OPENING RELAY

SF0A0–15

INSPECTION

1. REMOVE RELAY BOX COVER

2. REMOVE EFI MAIN RELAY (Marking CIR OPN)



3. INSPECT CIRCUIT OPENING RELAY

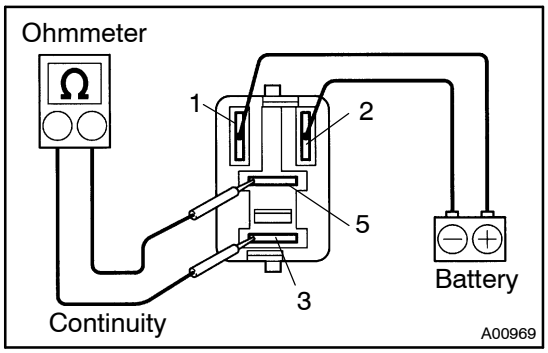
(a) Inspect the relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



(b) Inspect the relay operation.

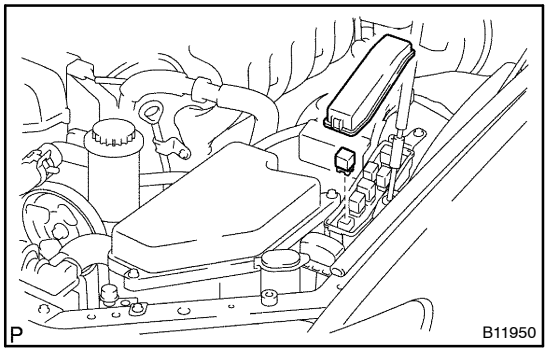
(1) Apply battery positive voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

4. REINSTALL CIRCUIT OPENING MAIN RELAY

5. REINSTALL RELAY BOX COVER



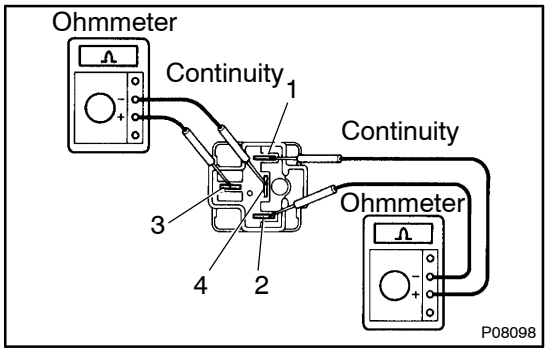
FUEL PUMP RELAY

SF1LG–02

INSPECTION

1. REMOVE RELAY BOX COVER

2. REMOVE FUEL PUMP RELAY (Marking: FUEL PUMP)



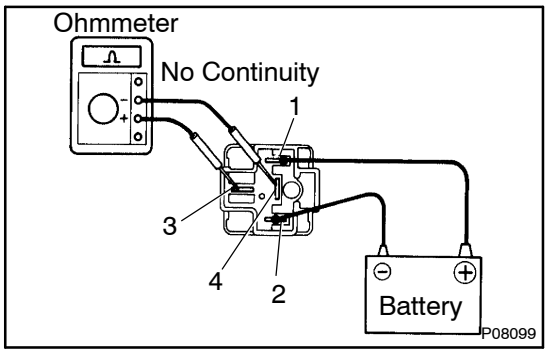
3. INSPECT FUEL PUMP RELAY CONTINUITY

(a) Using an ohmmeter, check that continuity exists between terminals 1 and 2.

If no continuity exists, replace the relay.

(b) Check that there is continuity between terminals 3 and 4.

If no continuity exists, replace the relay.



4. INSPECT FUEL PUMP RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that no continuity exists between terminals 3 and 4.

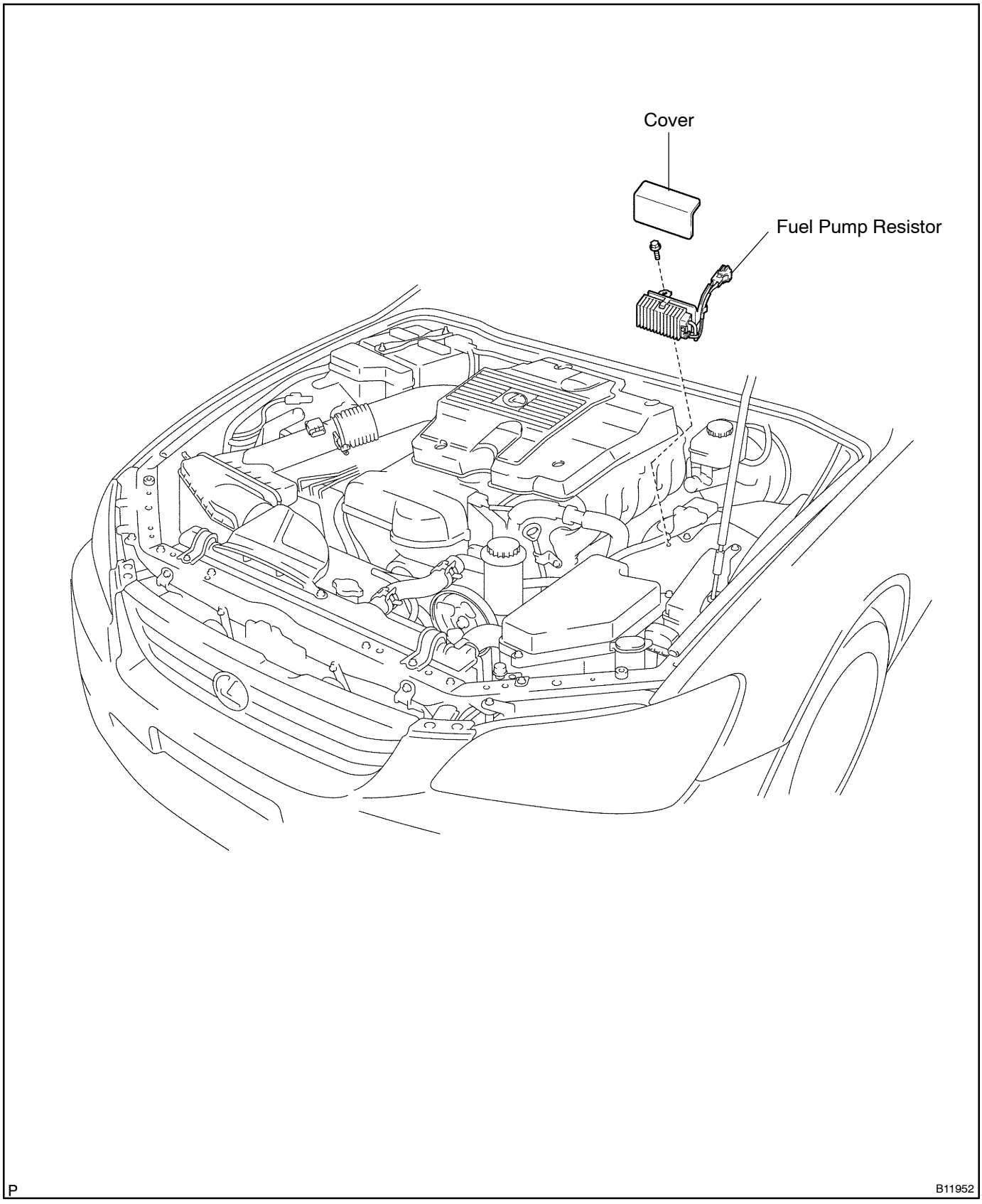
If continuity exists, replace the relay.

5. REINSTALL FUEL PUMP RELAY

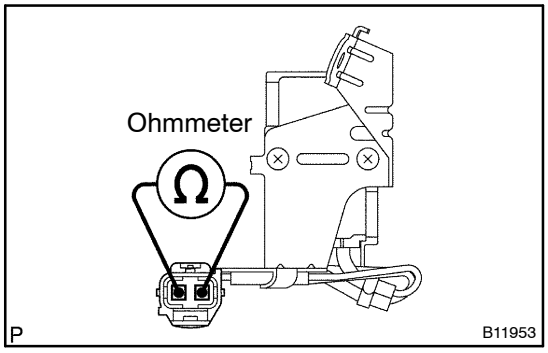
FUEL PUMP RESISTOR

COMPONENTS

SF1LF–02



SF0FX–08



INSPECTION

INSPECT FUEL PUMP RESISTOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance:

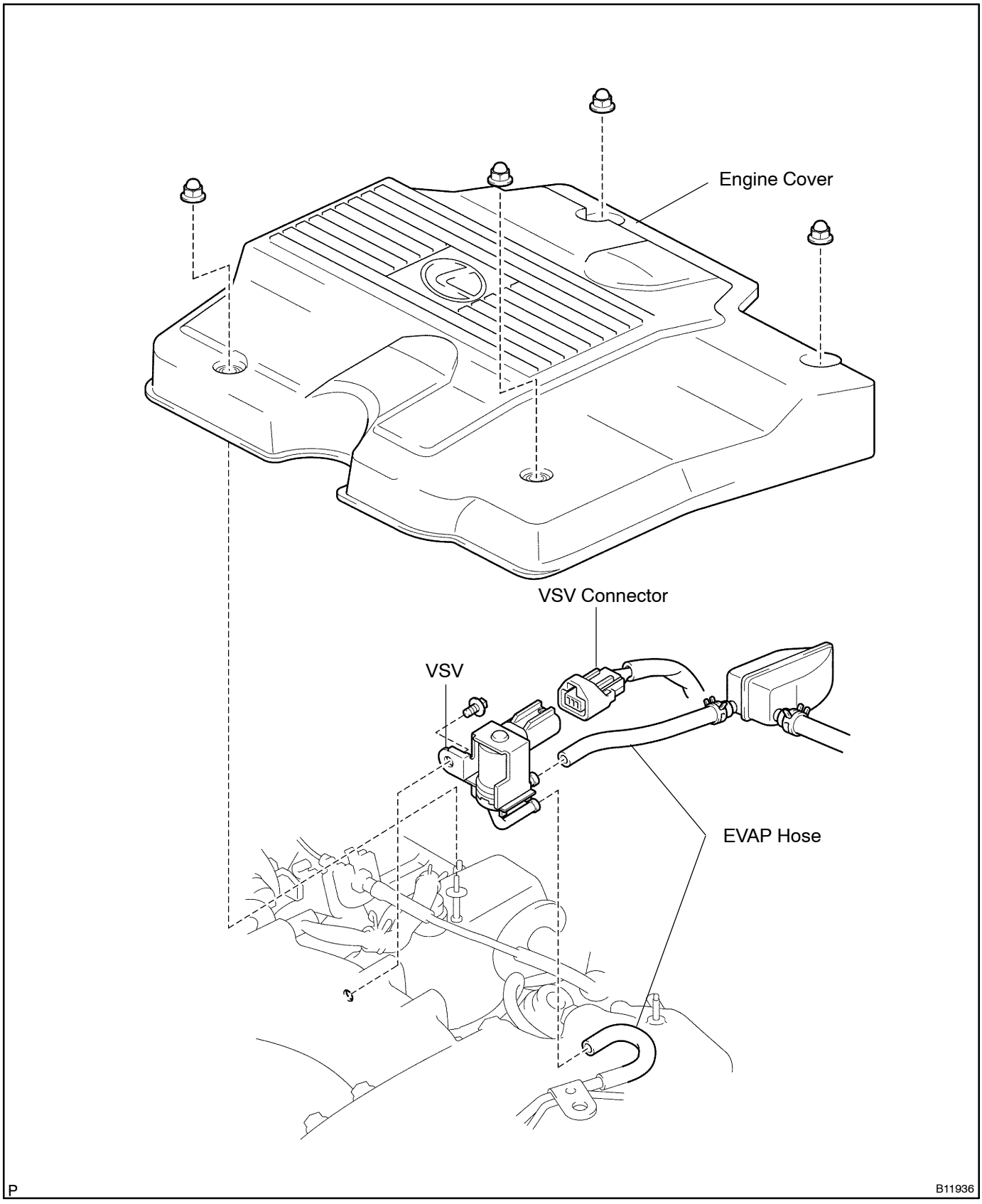
0.30 – 0.35 Ω at 20°C (68°F)

If the resistance is not as specified, replace the resistor.

VSV FOR EVAPORATIVE EMISSION (EVAP)

COMPONENTS

SF0NZ–06

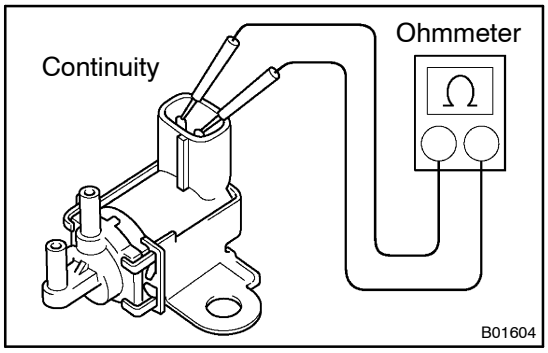


SF0O0–07

INSPECTION

1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.



2. REMOVE VSV

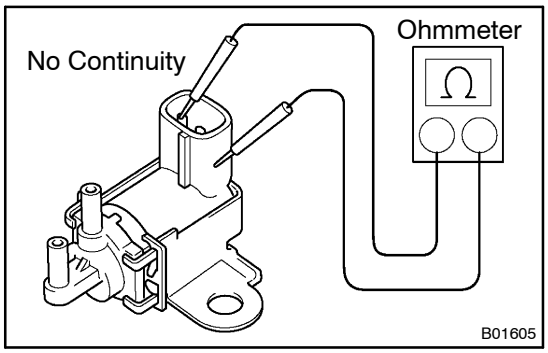
3. INSPECT VSV

(a) Inspect the VSV for open circuit.

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 27 – 33 Ω at 20°C (68°F)

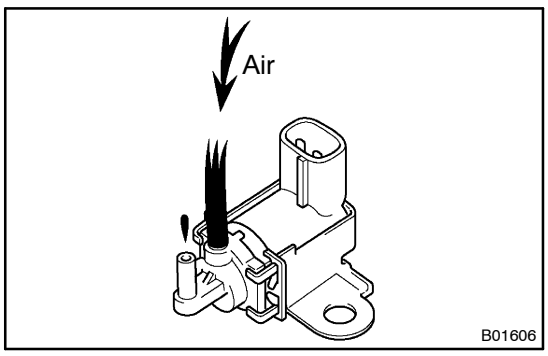
If there is no continuity, replace the VSV.



(b) Inspect the VSV for ground.

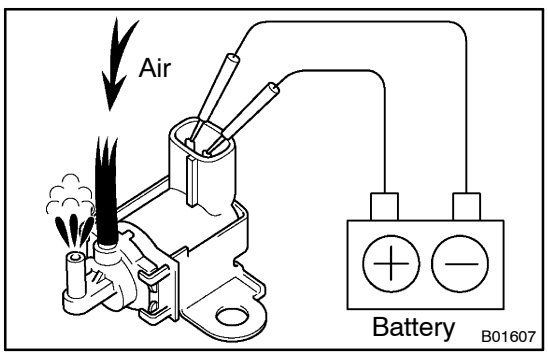
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



(c) Inspect the VSV operation.

(1) Check that air does not flows from the ports.



(2) Apply battery positive voltage across the terminals.

(3) Check that air flows from the ports.

If operation is not specified, replace the VSV.

4. REINSTALL VSV

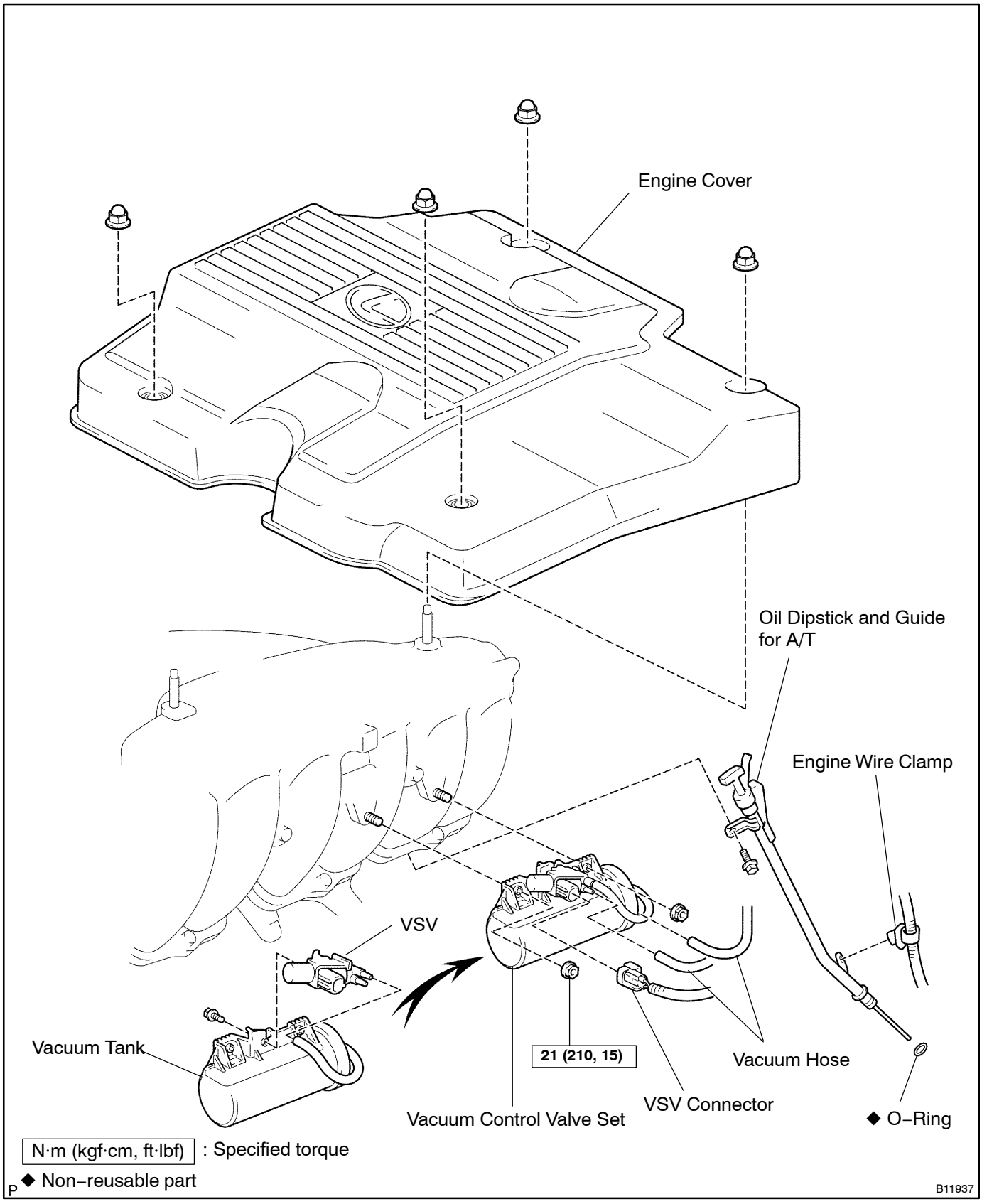
5. REINSTALL ENGINE COVER

Reinstall the engine cover with the 4 nuts.

VSV FOR ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS)

SF0O1–05

COMPONENTS



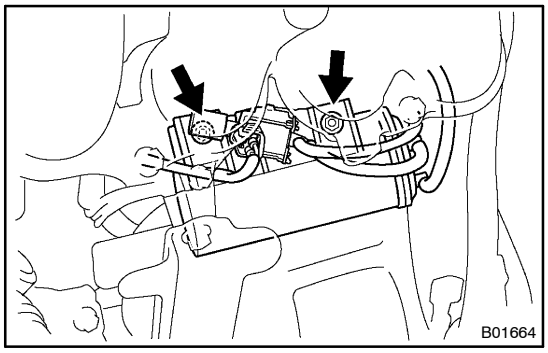
SF0O2–06

INSPECTION

1. REMOVE ENGINE COVER

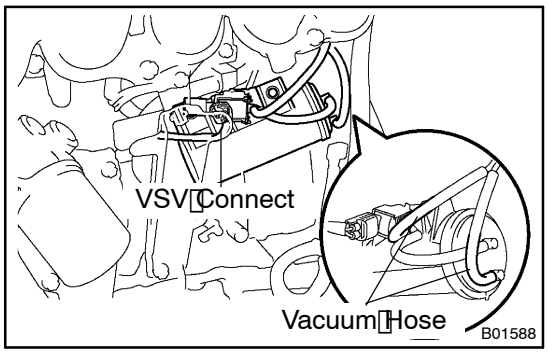
Remove the 4 nuts and engine cover.

2. REMOVE OIL DIPSTICK AND GUIDE FOR A/T
(See page EM–64)



3. REMOVE VACUUM CONTROL VALVE SET

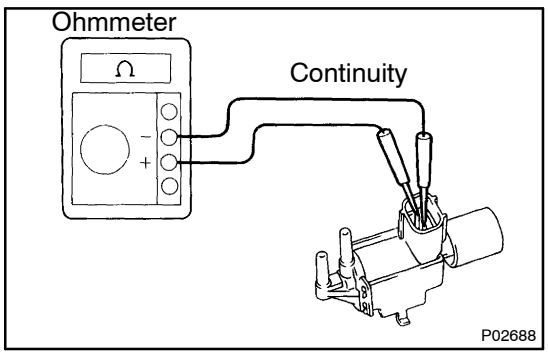
(a) Remove the 2 nuts, and disconnect the vacuum tank from the intake manifold.



(b) Disconnect VSV connector and vacuum hoses, and remove the vacuum control valve set.

4. REMOVE VSV

Remove the screw, vacuum hose and VSV.



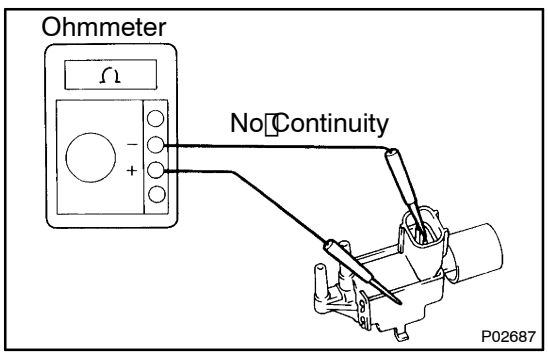
5. INSPECT VSV

(a) Inspect the VSV for open circuit.

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 38.5 – 44.5 Ω at 20°C (68°F)

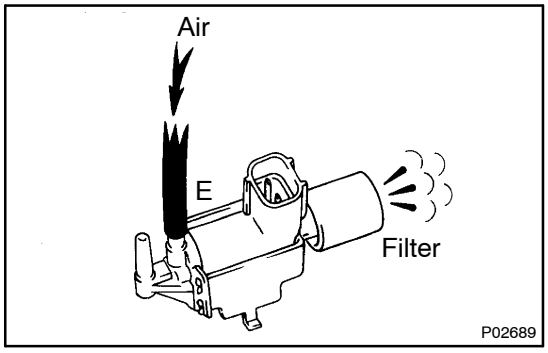
If there is no continuity, replace the VSV.



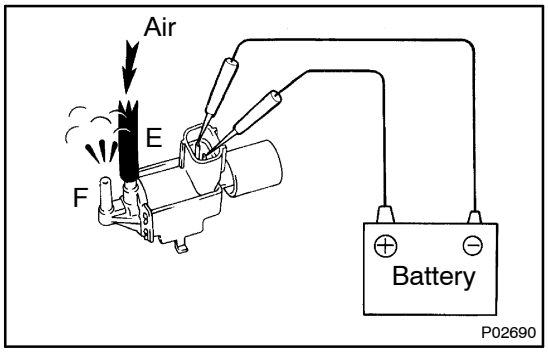
(b) Inspect the VSV for ground.

Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



(c) Inspect the VSV operation.
(1) Check that air flows from port E to the filter.



(2) Apply battery positive voltage across the terminals.
(3) Check that air flows from ports E to F.

6. REINSTALL VSV

(a) Install the VSV with the screw to the vacuum tank.
(b) Install the vacuum hose.

7. REINSTALL VACUUM CONTROL VALVE SET

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

8. REINSTALL OIL DIPSTICK AND GUIDE FOR A/T

HINT:

Using a new O–ring.

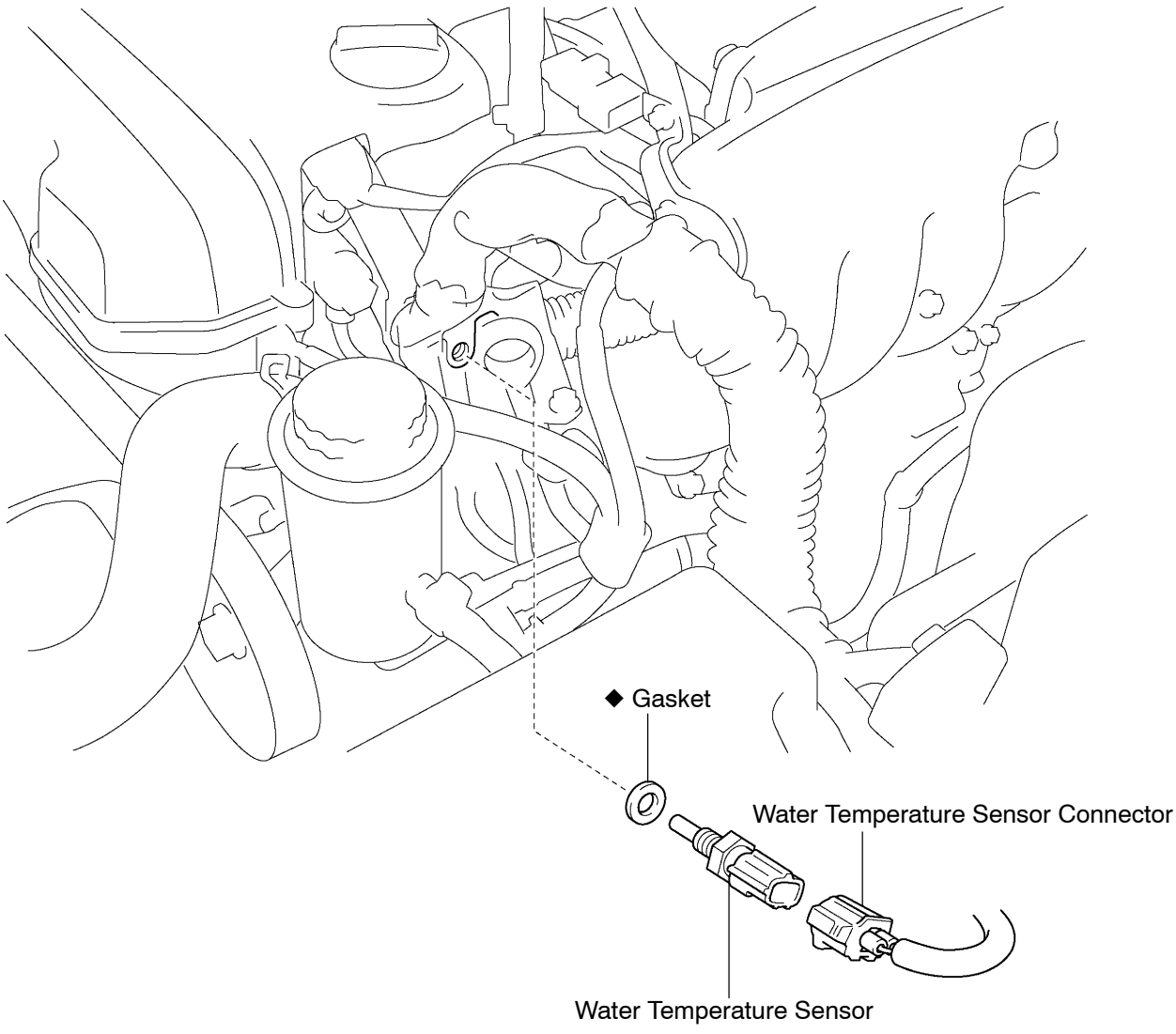
9. REINSTALL SEGINE COVER

Reinstall the engine cover with the 4 nuts.

WATER TEMPERATURE SENSOR

COMPONENTS

SF0O5–07



◆ Non–reusable part

B02006

SF0O6–05

INSPECTION

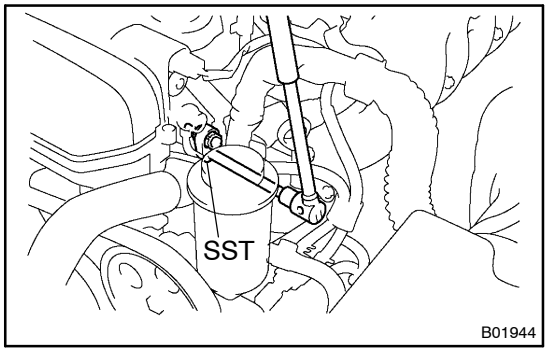
1. DRAIN ENGINE COOLANT

2. REMOVE WATER TEMPERATURE SENSOR

(a) Disconnect the water temperature sensor connector.

(b) Using SST, remove the water temperature sensor and gasket.

SST 09205–76030



3. INSPECT WATER TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to the graph

If the resistance is not as specified, replace the water temperature sensor.

4. REINSTALL WATER TEMPERATURE SENSOR

(a) Install a new gasket to the water temperature sensor.

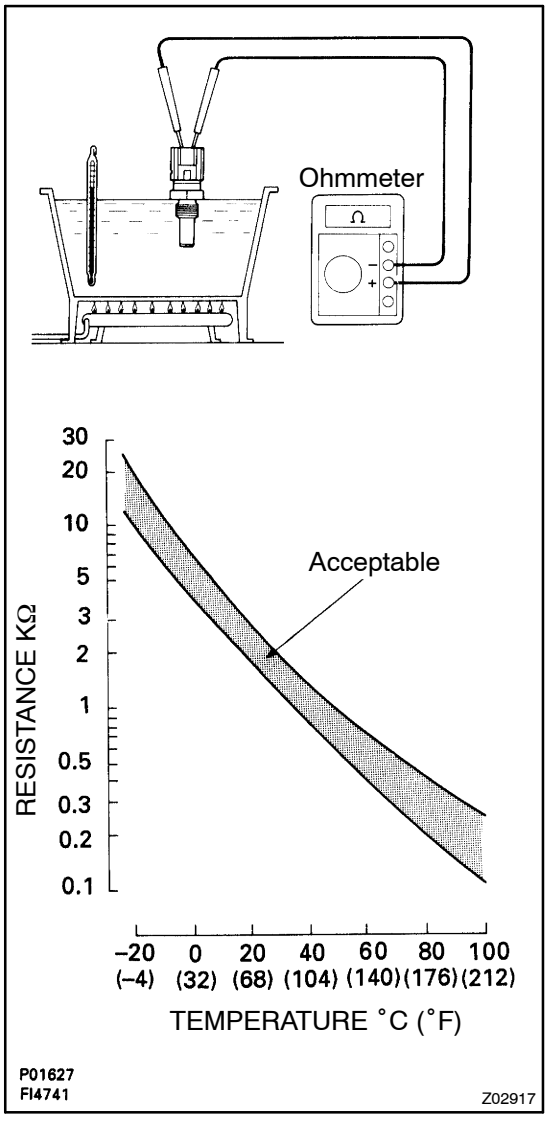
(b) Using SST, install the water temperature sensor.

SST 09205–76030

Torque: 19.6 N·m (200 kgf·cm, 14 ft·lbf)

(c) Connect the water temperature sensor sensor connector.

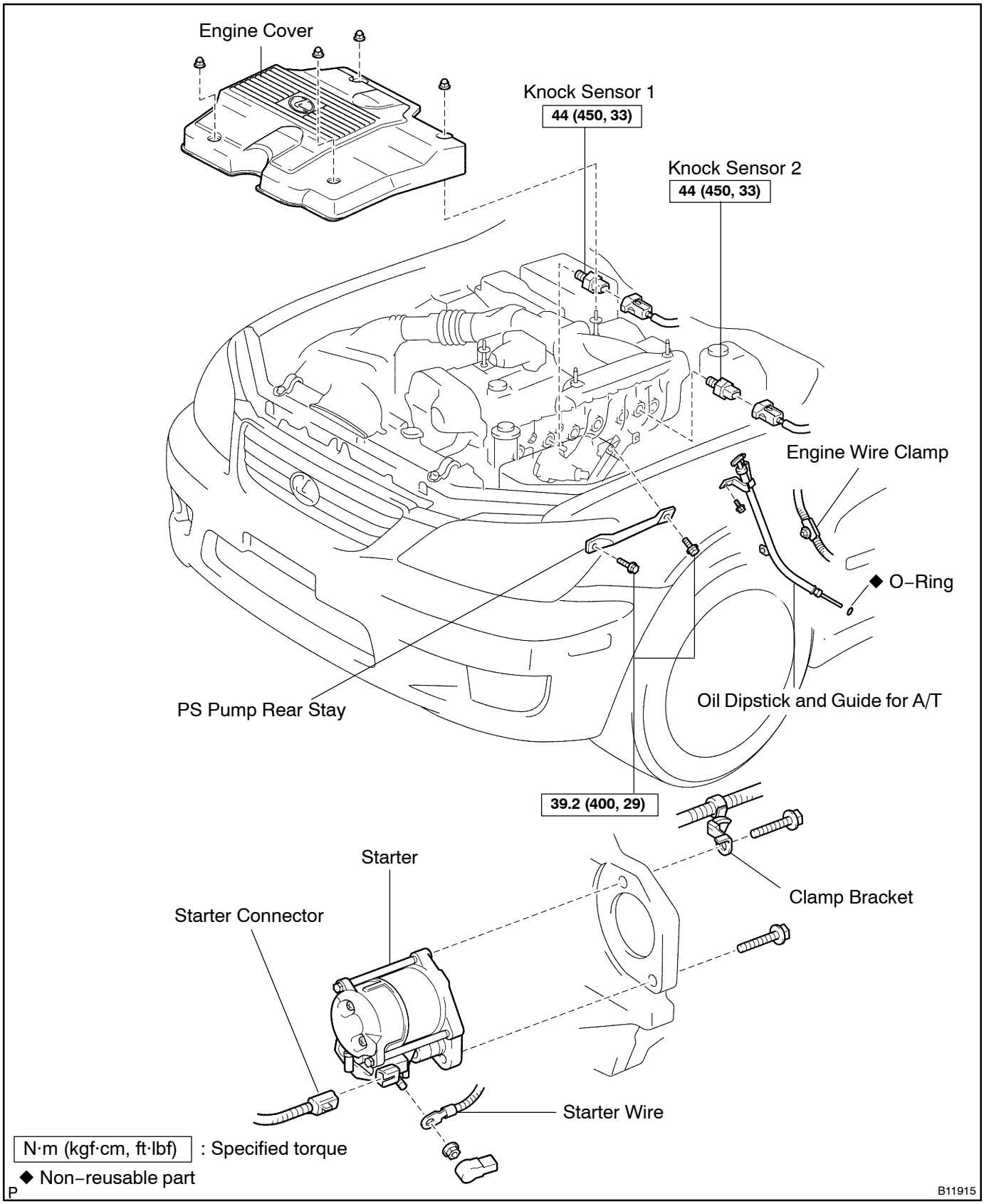
5. REFILL WITH ENGINE COOLANT



KNOCK SENSOR

COMPONENTS

SF0O9–07

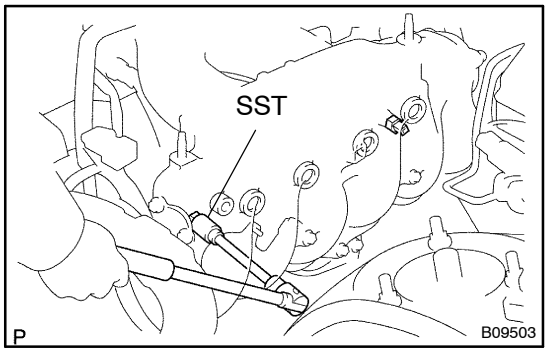


SF0OA–06

INSPECTION

1. REMOVE ENGINE COVER

Remove the 4 nuts and engine cover.



2. REMOVE PS PUMP REAR STAY

3. REMOVE KNOCK SENSOR 1

(a) Disconnect the knock sensor connector.

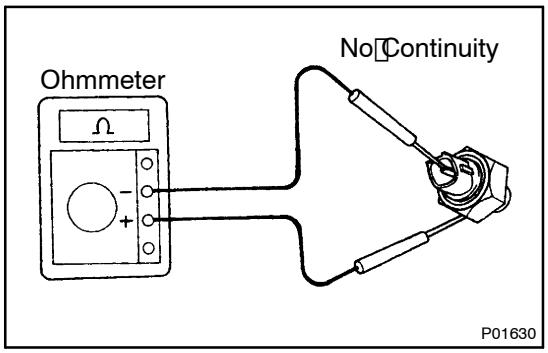
(b) Using SST, remove the knock sensor.

SST 09816–30010

4. REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page EM–64)

5. REMOVE STARTER (See page ST–3)

6. REMOVE KNOCK SENSOR 2



7. INSPECT KNOCK SENSORS

Using an ohmmeter, check that there is no continuity between the terminal and body.

If there is continuity, replace the sensor.

8. REINSTALL KNOCK SENSORS

(a) Using SST, install the knock sensor.

SST 09816–30010

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

(b) Connect the knock sensor connector.

9. REINSTALL STARTER (See page ST–15)

10. REINSTALL OIL DIPSTICK AND GUIDE FOR A/T

HINT:

Use a new O–ring.

11. REINSTALL PS PUMP REAR STAY

Torque: 39.2 N·m (400 kgf·cm, 29 ft·lbf)

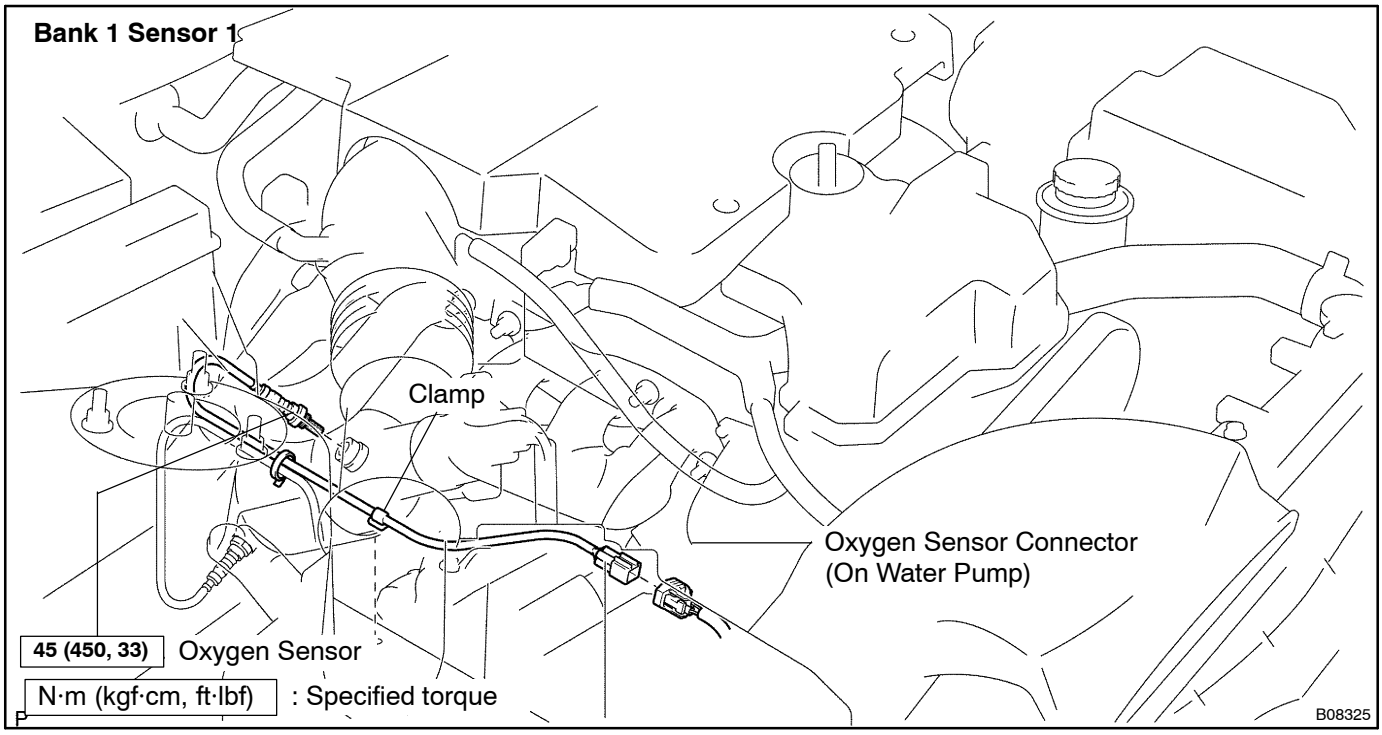
12. REINSTALL ENGINE COVER

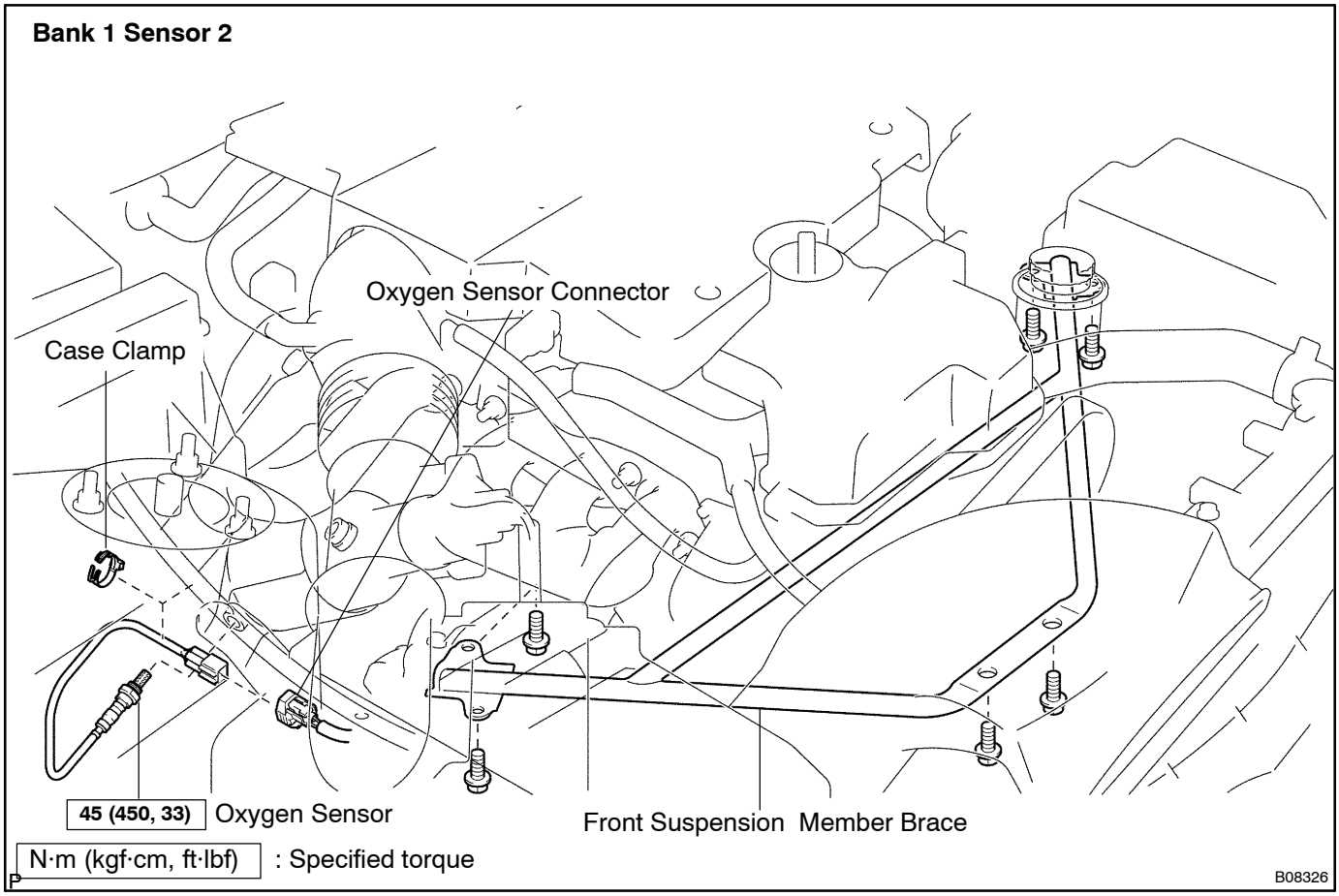
Reinstall the engine cover with the 4 nuts.

OXYGEN SENSOR

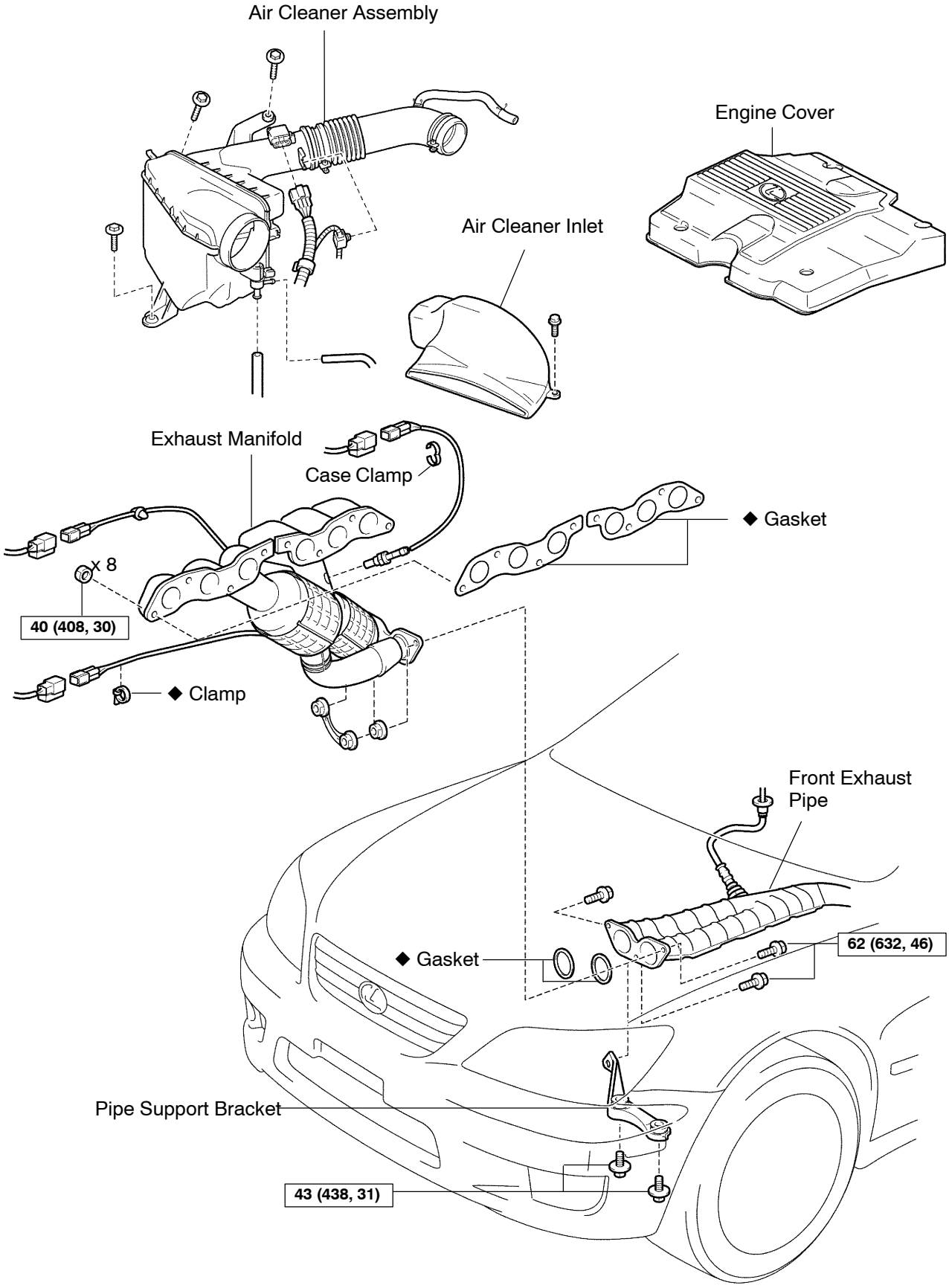
COMPONENTS

SF0OB–06





Bank 2 Sensor 1

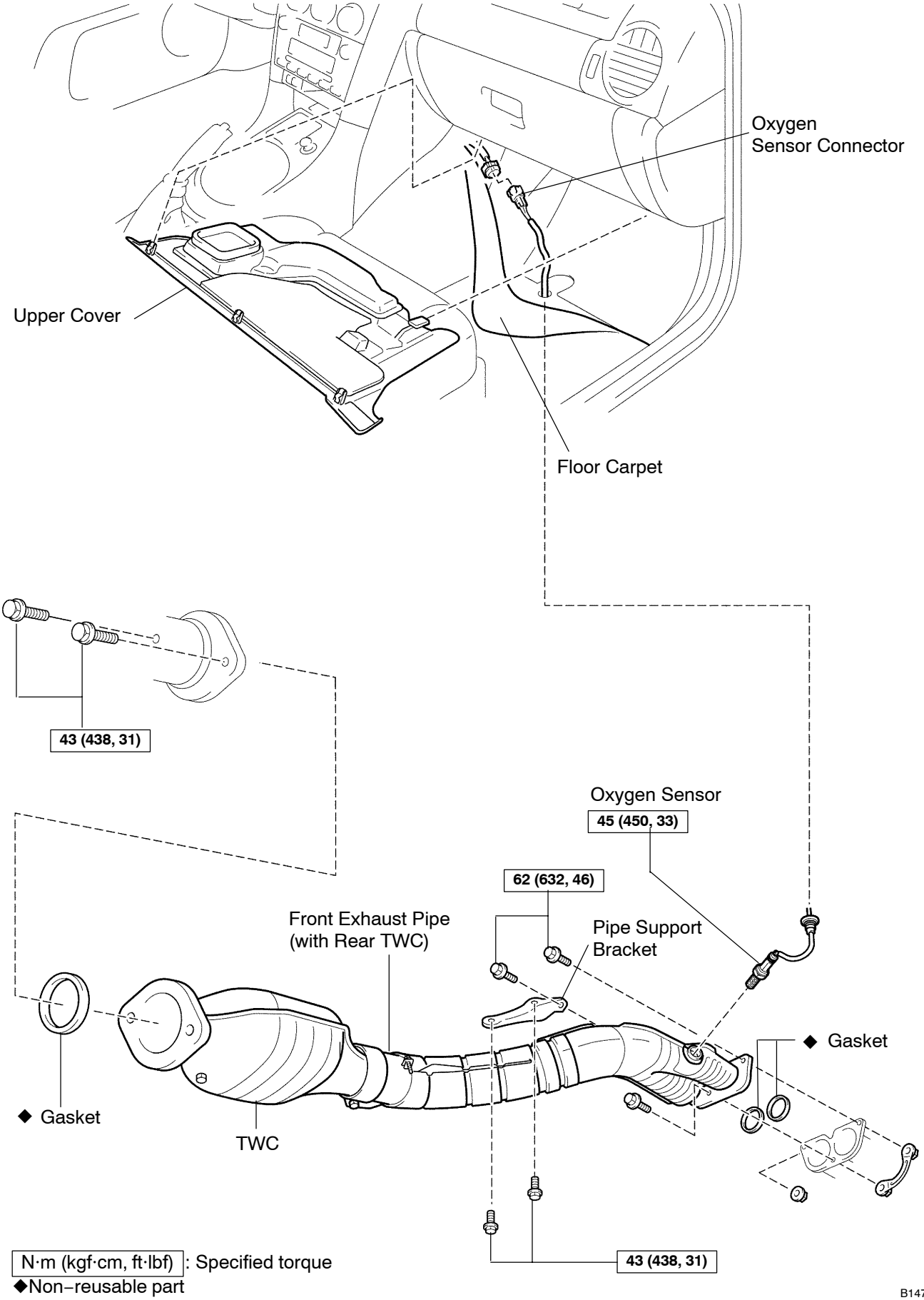


P

N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

B11916

Bank 2 Sensor 2

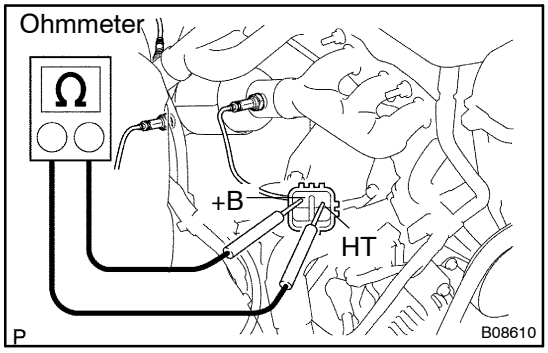


N·m (kgf·cm, ft·lbf) : Specified torque
◆Non–reusable part

P

B14798

SF0OC-08



INSPECTION

1. INSPECT HEATER RESISTANCE OF OXYGEN SENSORS (BANK 1, 2 SENSOR 1 AND BANK 1 SENSOR 2)

(a) Disconnect the oxygen sensor connectors.

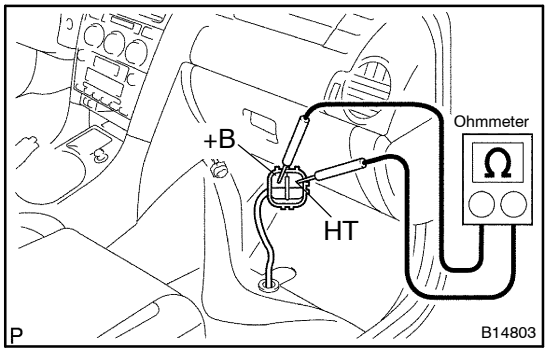
(b) Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 11 – 16 Ω at 20°C (68°F)

If the resistance is not as specified, replace the sensor.

Torque: 45 N·m (450 kgf·cm, 33 ft·lbf)

(c) Reconnect the oxygen sensor connectors.



2. INSPECT HEATER RESISTANCE OF OXYGEN SENSOR (BANK 2 SENSOR 2)

(a) Take out the front side of the floor carpet.

(b) Disconnect the oxygen sensor connector.
Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 11 – 16 Ω at 20°C (68°F)

If the resistance is not as specified, replace the sensor.

Torque: 45 N·m (450 kgf·cm, 33 ft·lbf)

(c) Reconnect the oxygen sensor connector.

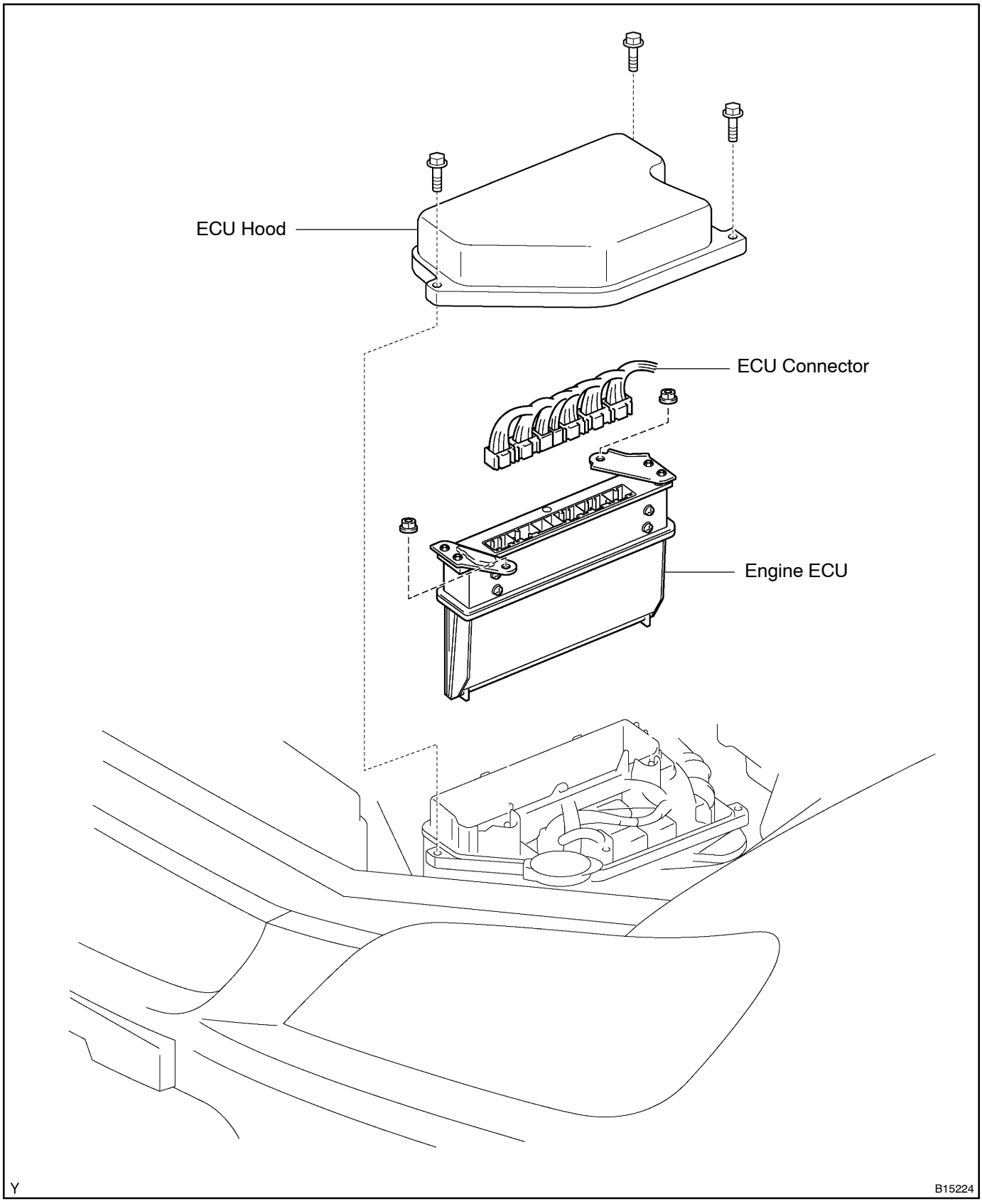
(d) Reinstall the floor carpet.

3. INSPECT OPERATION OF OXYGEN SENSOR (See page DI–49)

ENGINE ECU

COMPONENTS

SF0OF–10



SF0OG–05

INSPECTION

1. REMOVE ENGINE ECU
2. INSPECT ENGINE ECU (See page DI–22)
3. REINSTALL ENGINE ECU

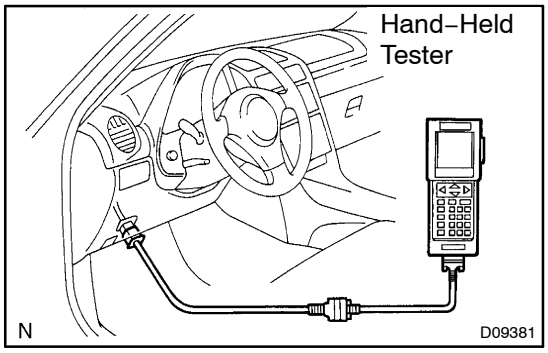
FUEL CUT RPM

SF0OH–08

INSPECTION

1. WARM UP ENGINE

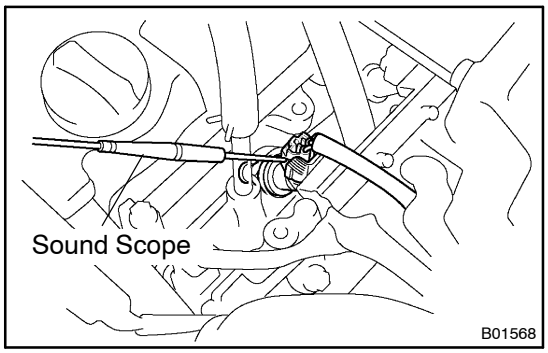
Allow the engine to warm up to normal operating temperature.



2. CONNECT LEXUS HAND–HELD TESTER TO DLC3

(a) Connect the hand–held tester to the DLC3.

(b) Please refer to the hand–held tester operator's manual for further details.



3. INSPECT FUEL CUT–OFF OPERATION

(a) Increase the engine speed to at least 3,000 rpm.

(b) Check for injector operating noise.

(c) Check that when the throttle lever is released, injector operation noise stops momentarily and then resumes.

HINT:

Measure with the A/C OFF.

Fuel return rpm: 1,000 rpm

4. DISCONNECT HAND–HELD TESTER OR OBDII SCAN TOOL

IGNITION SYSTEM

IG0KF–02

ON–VEHICLE INSPECTION

NOTICE:

"Cold" and "Hot" in these sentences express the temperature of the coils and sensors themselves. "Cold" is from –10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F).

1. INSPECT IGNITER AND SPARK TEST

Check that the spark occurs.

Disconnect the 6 injector connectors.

Remove the ignition coil (See page IG–7).

Remove the spark plug.

Install the spark plug to the ignition coil, and connect the ignition coil connector.

Ground the spark plug.

Check if spark occurs while engine is being cranked.

NOTICE:

To prevent excess fuel being injected from the injectors during this test, do not crank the engine for more 5 – 10 seconds at a time.

If the spark does not occur, do the test as follows:

SPARK TEST

↓ NO

CHECK CONNECTION OF IGNITION COIL AND IGNITER → BAD → Connect securely.

↓ OK

CHECK RESISTANCE OF HIGH–TENSION CORD (See step 2)
Maximum resistance: 25 kΩ per cord → BAD → Replace the cord(s).

↓ OK

CHECK POWER SUPPLY TO IGNITION COIL AND IGNITER
1. Turn ignition switch to ON.
2. Check that there is battery positive voltage at ignition coil positive (+) terminal.

→ BAD → Check wiring between ignition switch to ignition coil and igniter.

↓ OK

CHECK RESISTANCE OF IGNITION COIL (See step 4)

Resistance:	Cold	Hot
Primary	0.33 – 0.52 Ω	0.42 – 0.61 Ω
Secondary	8.5 – 14.7 kΩ	10.8 – 17.2 kΩ

→ BAD → Replace the ignition coil.

↓ OK

CHECK RESISTANCE OF CAMSHAFT POSITION SENSOR (See step 5)

Resistance:	Cold	Hot
	835 – 1,400 Ω	1,060 – 1,645 Ω

→ BAD → Replace the camshaft position sensor.

↓ OK

CHECK RESISTANCE OF CRANKSHAFT POSITION SENSOR (See step 6)

Resistance:	Cold	Hot
	1,630 – 2,740 Ω	2,065 – 3,225 Ω

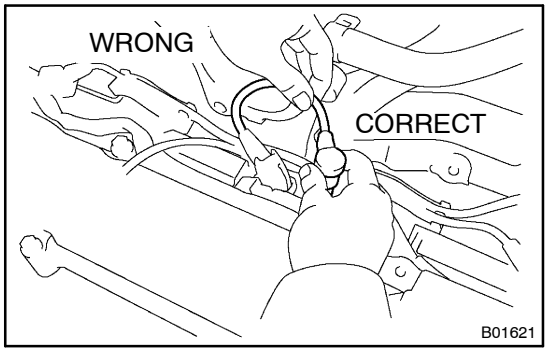
→ BAD → Replace the crankshaft position sensor.

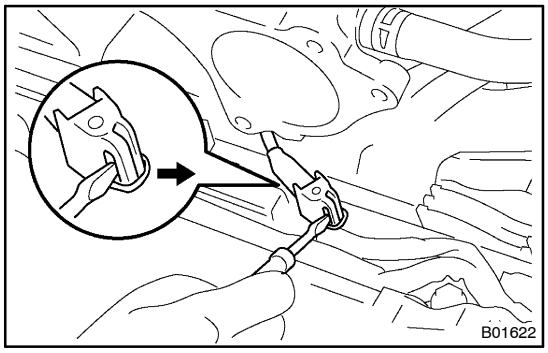
↓ OK

CHECK IGT SIGNAL FROM ENGINE ECU (See page DI–125) → BAD → Check wiring between ENGINE ECU and igniter, and then try another ENGINE ECU

↓ OK

TRY ANOTHER IGNITER





2. INSPECT HIGH–TENSION CORDS

(a) Remove the No.3 timing belt cover.

(b) Remove the throttle body gasket (See page IG–7).

(c) Disconnect the high–tension cord set from the spark plugs.
Disconnect the high–tension cords at the rubber boot.
DO NOT pull on the cords.

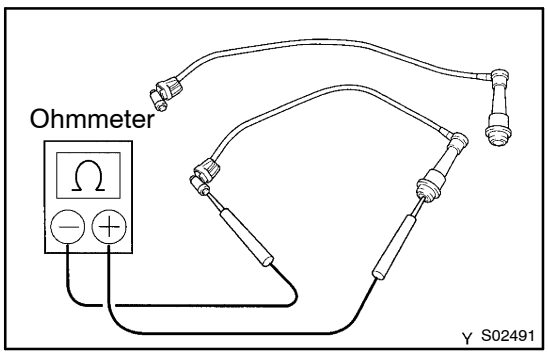
NOTICE:

Pulling on or bending the cords may damage the conductor inside.

(d) Disconnect the high–tension cord set from the ignition coils.
(1) Using a screwdriver, lift up the lock claw and disconnect the holder from the ignition coils.
(2) Disconnect the high–tension cord at the grommet.
DO NOT pull on the cord.

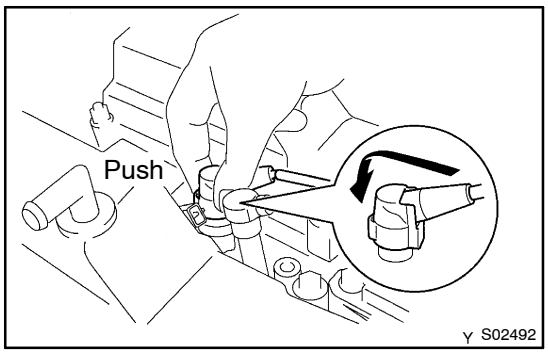
NOTICE:

- **Pulling on or bending the cords may damage the conductor inside.**
- **Do not wipe any of the oil from the grommet after the high–tension cord is disconnected.**

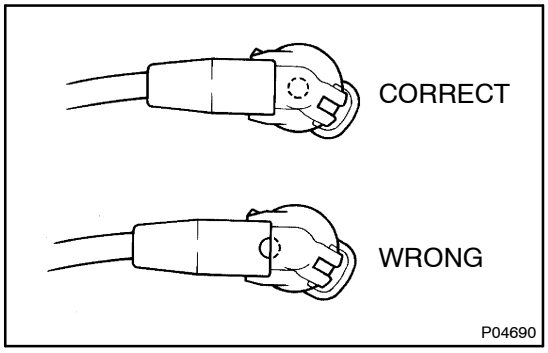


(e) Using an ohmmeter, measure the resistance.
Maximum resistance: 25 kΩ per cord

If the resistance is greater than the maximum, check the terminals. If necessary, replace the high–tension cord.



(f) Reconnect the high–tension cord set to the ignition coils.
(1) Assemble the holder and grommet.
(2) Align the spline of the ignition coil with the spline of the holder, and push in the cord.



NOTICE:

Check that the holder is correctly installed to the grommet as shown in the illustration.

(3) Check that the lock claw of the holder is engaged by lightly pulling the holder.

(g) Reconnect the high–tension cord set to the spark plugs.

(h) Reinstall the throttle body gasket (See page IG–9).

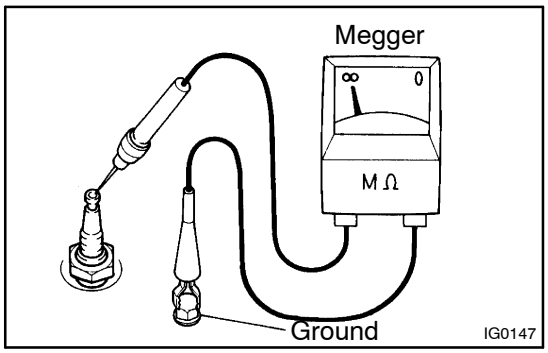
(i) Reinstall the No. 3 timing belt cover.

3. INSPECT SPARK PLUGS

NOTICE:

- **Never use a wire brush for cleaning.**
- **Never attempt to adjust the electrode gap on used a spark plug.**

(a) Remove the ignition coils and high–tension cord set assembly (See page IG–7).



(b) Inspect the electrode.

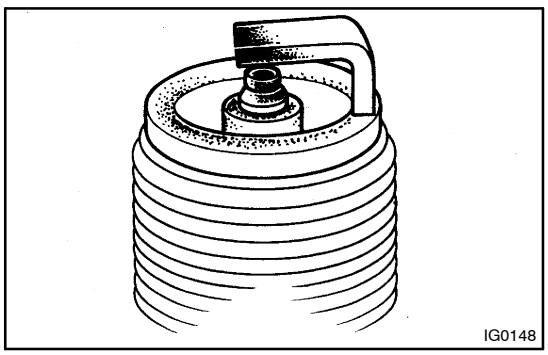
- Using a megger (insulation resistance meter), measure the insulation resistance.

Standard correct insulation resistance:
10 MΩ or more

If the resistance is less than specified, proceed to step (d).

HINT:

If a megger is not available, the following simple method of inspection provides fairly accurate results.



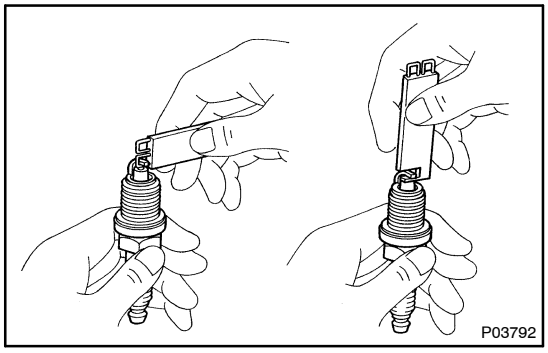
- Simple Method:
  - Quickly race the engine 5 times to 4,000 rpm.
  - Remove the spark plug. (See step c)
  - Visually check the spark plug.
    If the electrode is dry...OK
    If the electrode is wet...Proceed to step (d)
  - Reinstall the spark plug. (See step g)

(c) Using a 16 mm plug wrench, remove the 6 spark plugs.

(d) Visually check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

Recommended spark plug:
DENSO made: SK16R–P11



(e) Inspect the electrode gap.

Maximum electrode gap for used spark plug:
1.2 mm (0.047 in.)

If the gap is greater than maximum, replace the spark plug.

Correct electrode gap for new spark plug:
1.0 – 1.1 mm (0.039 – 0.043 in.)

NOTICE:

If adjusting the gap of a new spark plug, bend only the base of the ground electrode. Do not touch the tip. Never attempt to adjust the gap on the used plug.

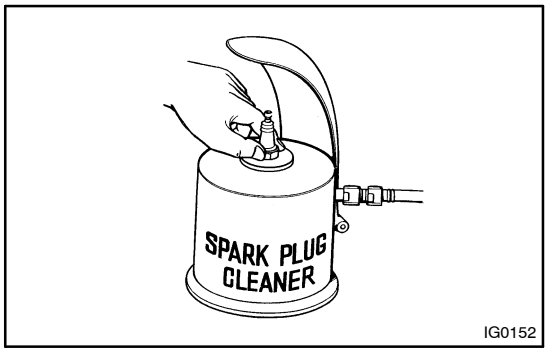
(f) Clean the spark plugs.

If the electrode has traces of wet carbon, allow it to dry and then clean with a spark plug cleaner.

Air pressure: Below 588 kPa (6 kgf/cm², 85 psi)
Duration: 20 seconds or less

HINT:

If there are traces of oil, remove it with gasoline before using the spark plug cleaner.



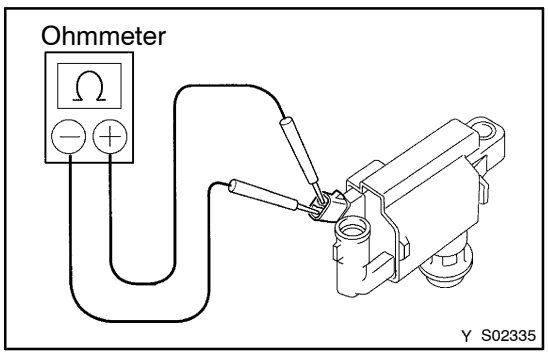
(g) Using a 16 mm plug wrench, reinstall the 6 spark plugs.

Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

(h) Reinstall the ignition coils and high–tension cord set assembly (See page IG–9).

4. INSPECT IGNITION COILS

(a) Remove the ignition coil assembly (See page IG–7).

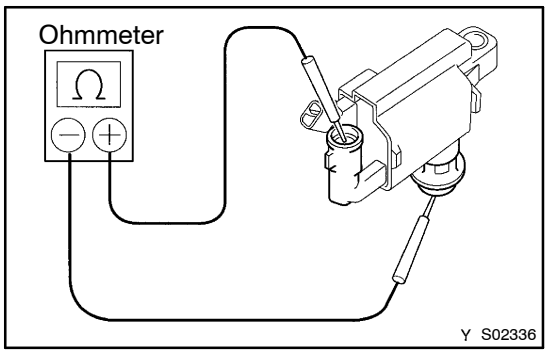


(b) Using an ohmmeter, measure the resistance between the positive (+) and negative (–) terminals.

Primary coil resistance:

Cold	0.33 – 0.52 Ω
Hot	0.42 – 0.61 Ω

If the resistance is not as specified, replace the ignition coil.



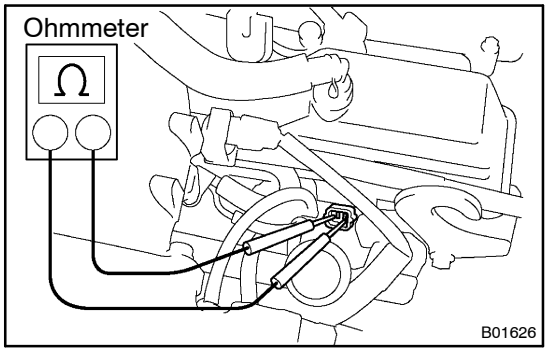
(c) Using an ohmmeter, measure the resistance between the positive (+) and high–tension terminal.

Secondary coil resistance:

Cold	8.5 – 14.7 kΩ
Hot	10.8 – 17.2 kΩ

If the resistance is not as specified, replace the ignition coil.

(d) Reinstall the ignition coil assembly (See page IG–9).



5. INSPECT CAMSHAFT POSITION SENSOR

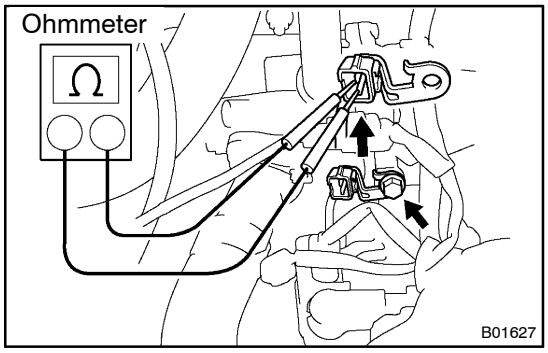
(a) Disconnect the camshaft position sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	835 – 1,400 Ω
Hot	1,060 – 1,645 Ω

If the resistance is not as specified, replace the camshaft position sensor.



(c) Reconnect the camshaft position sensor connector.

6. INSPECT CRANKSHAFT POSITION SENSOR

(a) Disconnect the crankshaft position sensor connector.

(b) Remove the bolt holding the connector bracket to the water pump.

(c) Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	1,630 – 2,740 Ω
Hot	2,065 – 3,225 Ω

If the resistance is not as specified, replace the sensor.

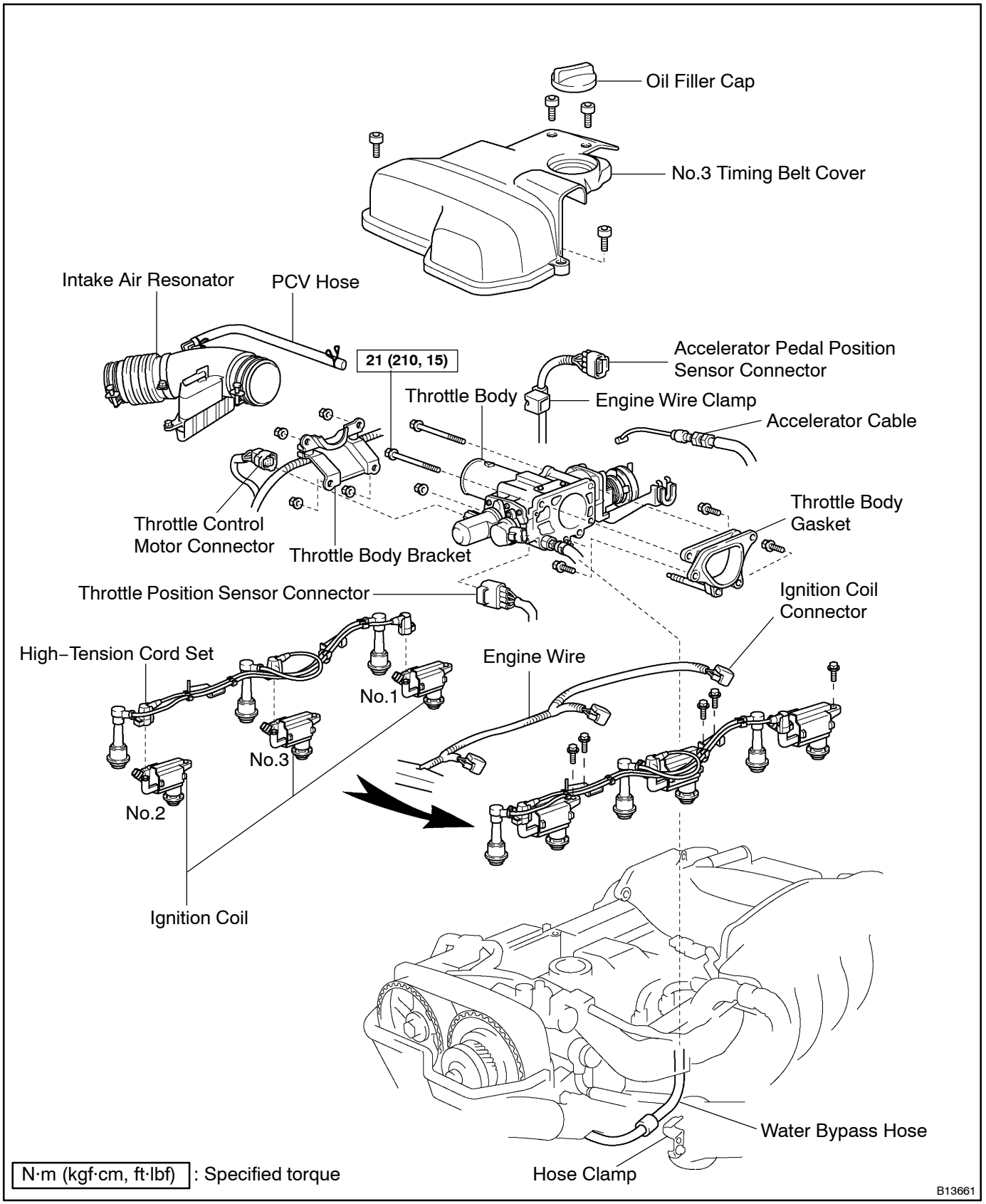
(d) Reinstall the bolt holding the connector bracket to the water pump.

(e) Reconnect the crankshaft position sensor connector.

IGNITION COIL

COMPONENTS

IG05T–06



IG05U–05

REMOVAL

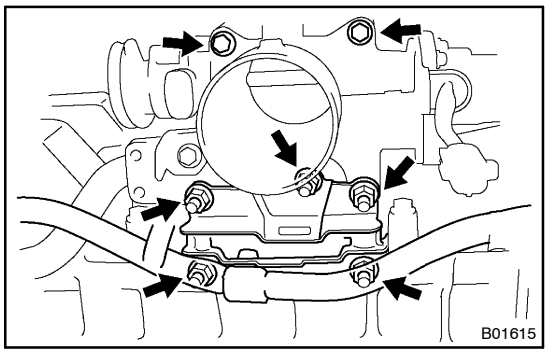
1. REMOVE INTAKE AIR RESONATOR

2. REMOVE NO.3 TIMING BELT COVER

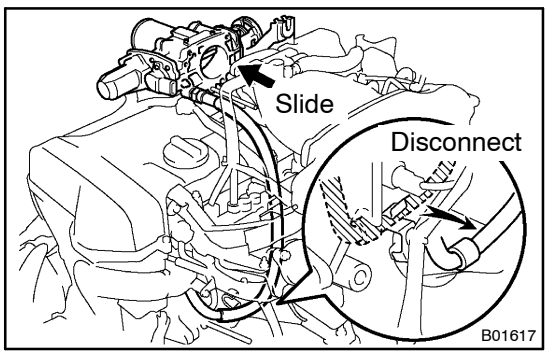
Using a 5 mm hexagon wrench, remove the 4 bolts, oil filler cap, No.3 timing belt cover and gasket.

3. DISCONNECT THROTTLE BODY FROM INTAKE AIR CONNECTOR WITHOUT DISCONNECTING WATER BYPASS HOSES

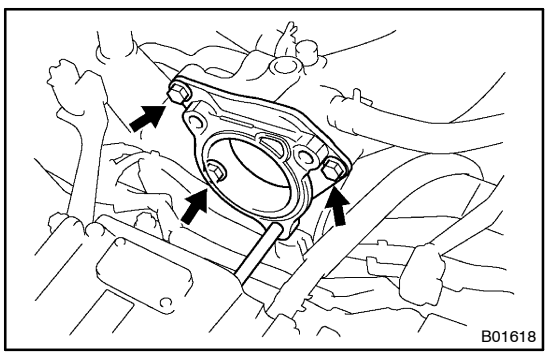
(a) Disconnect the accelerator cable.
(b) Disconnect the throttle position sensor connector.
(c) Disconnect the throttle control motor connector.
(d) Disconnect the accelerator pedal position sensor connector.
(e) Disconnect the engine wire clamp from the clamp bracket of the throttle body.



(f) Remove the 2 bolts and nut holding the throttle body to the intake air connector.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)
(g) Remove the 4 nuts and the throttle body bracket.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

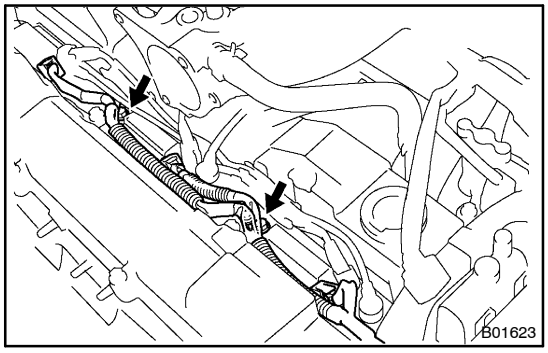


(h) Disconnect the water bypass hose from the hose clamp on the oil filter bracket.
(i) Slightly slide the throttle body away from the intake air connector.



4. REMOVE THROTTLE BODY GASKET

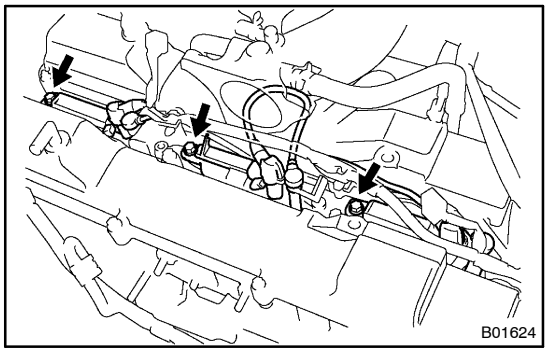
Remove the 3 bolts and throttle body gasket.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



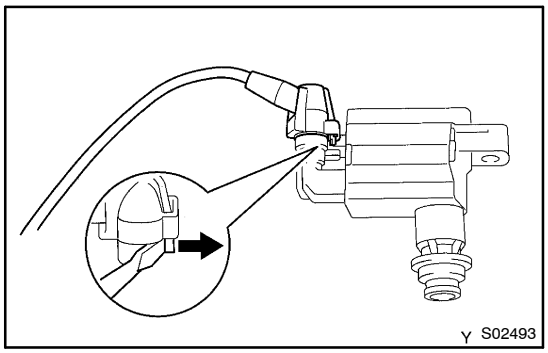
5. REMOVE IGNITION COILS AND HIGH – TENSION CORDS SET ASSEMBLY

(a) Disconnect the 3 connectors from the ignition coils.

(b) Remove the 2 bolts, and disconnect the clamps from the engine wire.



(c) Remove the 3 bolts, the ignition coils and high – tension cord set assembly.
Torque: 8.0 N·m (80 kgf·cm, 71 in.·lbf)



6. REMOVE IGNITION COILS FROM HIGH – TENSION CORD SET

IG0LN–01

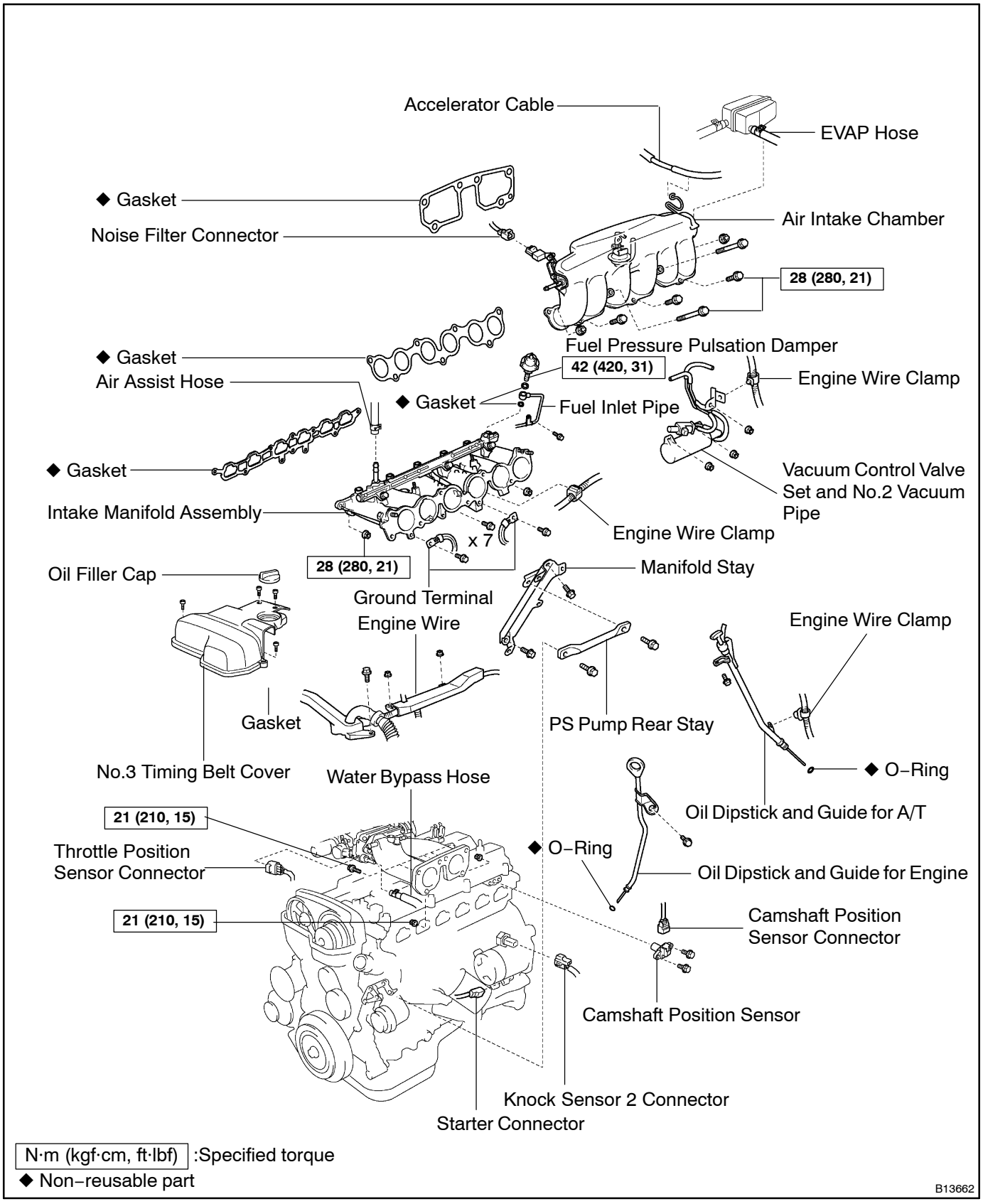
INSTALLATION

Installation is in the reverse order of removal (See page IG–7).

CAMSHAFT POSITION SENSOR

IG05V–06

COMPONENTS



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

◆ Non–reusable part

B13662

IG05W-05

REMOVAL

1. **DRAIN ENGINE COOLANT**
2. **REMOVE OIL DIPSTICK AND GUIDE FOR ENGINE (See page EM-64)**
3. **REMOVE OIL DIPSTICK AND GUIDE FOR A/T (See page EM-64)**
4. **REMOVE AIR INTAKE CHAMBER (See page FI-46)**
5. **REMOVE VACUUM CONTROL VALVE SET AND NO.2 VACUUM PIPE (See page EM-34)**
6. **REMOVE NO.3 TIMING BELT COVER**
7. **DISCONNECT HOSES AND ENGINE WIRE**

(a) Disconnect the air assist hose from the intake manifold.

(b) Disconnect the water bypass hose (from the water outlet) from the throttle body.

(c) Disconnect the 2 ground terminals from the intake manifold.

HINT:

At time of the installation, place refer to the following item. Tighten so that each calking part should inside.

(d) Disconnect the throttle position sensor connector.

(e) Disconnect the 6 injector connectors.

(f) Disconnect the camshaft position sensor connector.

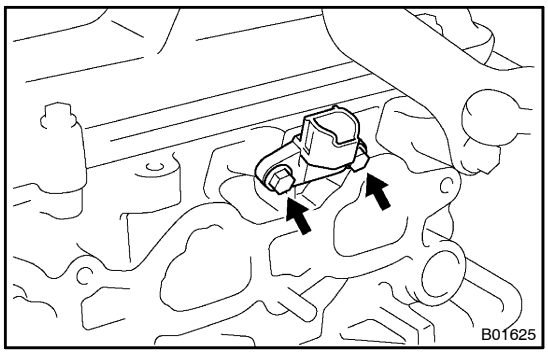
(g) Disconnect the knock sensor 2 connector.

(h) Disconnect the starter connector.

(i) Disconnect the engine wire clamp from the clamp bracket on the intake manifold.

(j) Remove the 3 nuts, and disconnect the engine wire protector from the intake manifold.

8. **REMOVE FUEL PRESSURE PULSATION DAMPER (See page FI-26)**
9. **REMOVE PS PUMP REAR STAY**
   Torque: 39.2 N·m (400 kgf·cm, 29 ft·lbf)
10. **REMOVE INTAKE MANIFOLD ASSEMBLY (See page EM-53)**



11. **REMOVE CAMSHAFT POSITION SENSOR**

Remove the 2 bolts and camshaft position sensor.

Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

IG05X–01

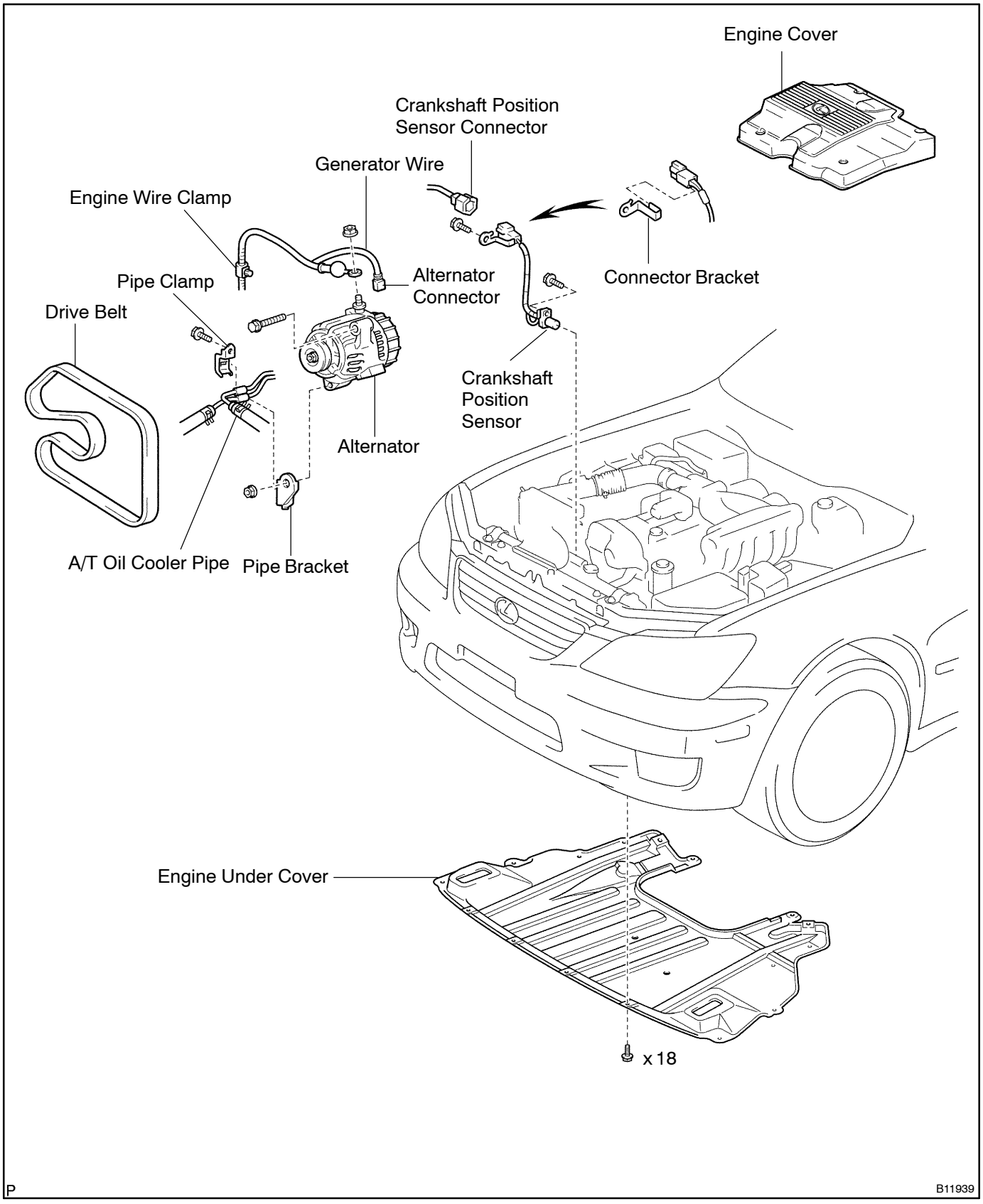
INSTALLATION

Installation is in the reverse order of removal (See page IG–11).

CRANKSHAFT POSITION SENSOR

IG060–07

COMPONENTS

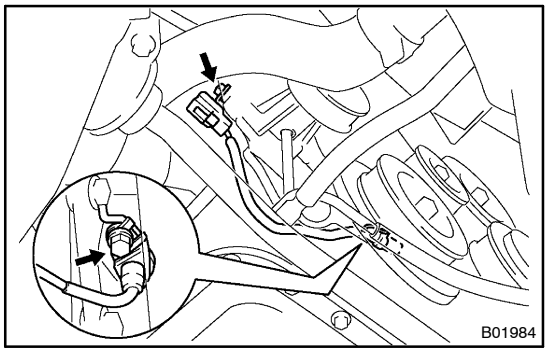


IG05Y–07

REMOVAL

1. **REMOVE ALTERNATOR (See page CH–6)**
2. **DISCONNECT CRANKSHAFT POSITION SENSOR CONNECTOR**

(a) Disconnect the sensor connector.



(b) Remove the bolt holding the connector bracket to the water pump.

3. **REMOVE CRANKSHAFT POSITION SENSOR**

(a) Remove the bolt and crankshaft position sensor.
Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

(b) Remove the connector bracket from the connector.

IG05Z–05

INSTALLATION

Installation is in the reverse order of removal (See page IG–14).

HOW TO USE THIS MANUAL

IN0FB–01

GENERAL INFORMATION

1. INDEX

An INDEX is provided on the first page of each section to guide you to the item to be repaired. To assist you in finding your way through the manual, the section title and major heading are given at the top of every page.

2. PRECAUTION

At the beginning of each section, a PRECAUTION is given that pertains to all repair operations contained in that section.

Read these precautions before starting any repair task.

3. TROUBLESHOOTING

TROUBLESHOOTING tables are included for each system to help you diagnose the problem and find the cause. The fundamentals of how to proceed with troubleshooting are described on page IN–23.

Be sure to read this before performing troubleshooting.

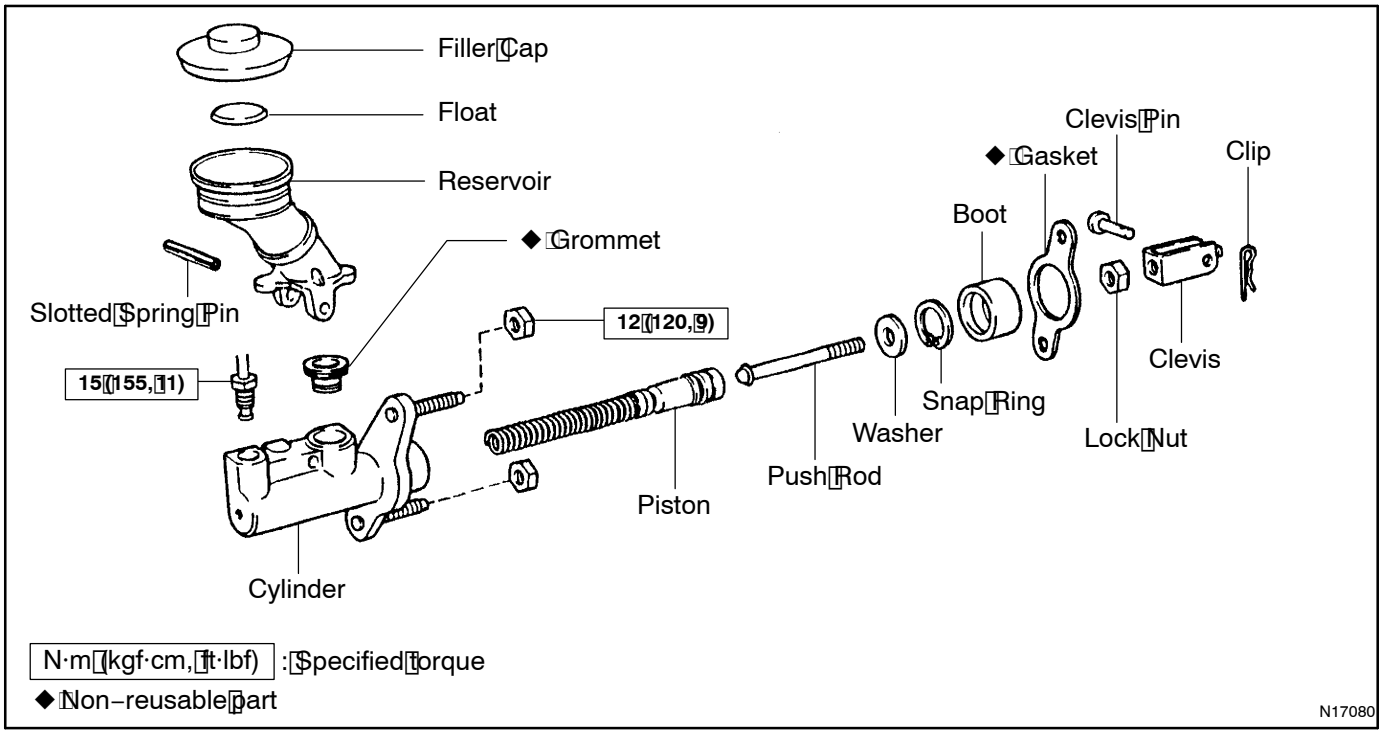
4. PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

5. REPAIR PROCEDURES

Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.

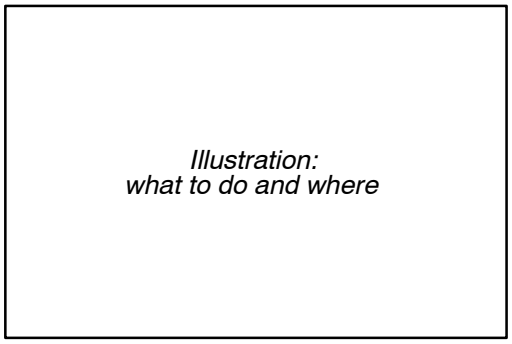
Example:



The procedures are presented in a step–by–step format:

- The illustration shows what to do and where to do it.
- The task heading tells what to do.
- The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:



Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

SST 09350–30020 (09350–06120)

Set part No. *Component part No.*

Detailed text : how to do task

(b) Measure the stroke applying and releasing the compressed air (392 — 785 kPa, 4 — 8 kgf/cm^2 or 57 — 114 psi) as shown in the illustration.

Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)

Specification

This format provides the experienced technician with a FAST TRACK to the information needed. The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

6. REFERENCES

References have been kept to a minimum. However, when they are required you are given the page to refer to.

7. SPECIFICATIONS

Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found in Service Specifications section for quick reference.

8. CAUTIONS, NOTICES, HINTS:

- CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- HINTS are separated from the text but do not appear in bold. They provide additional information to help you perform the repair efficiently.

9. SI UNIT

The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

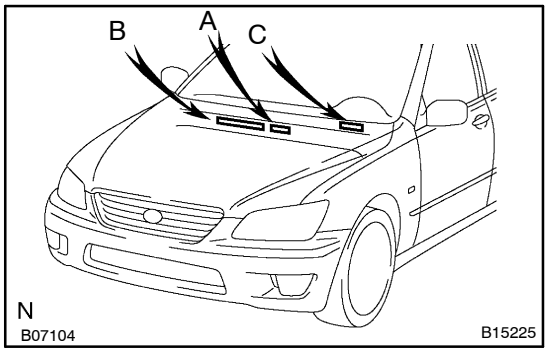
Example:

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

IDENTIFICATION INFORMATION

IN04P–20

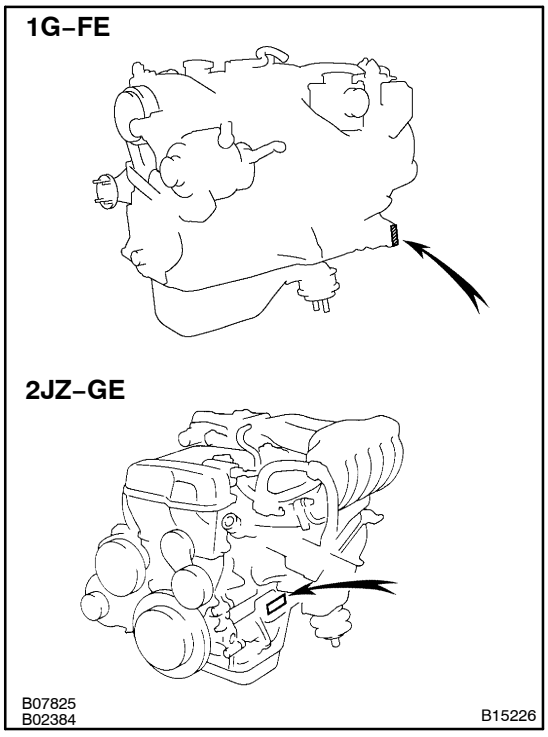
VEHICLE IDENTIFICATION AND ENGINE SERIAL NUMBER



1. VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is stamped on the cowl panel. This number has also been stamped on the manufacture's plate and the identification number plate (Europe RHD), as shown in the illustration.

A: Manufacture's Plate
B: Vehicle Identification Number
C: Identification Number Plate (Europe RHD)



2. ENGINE SERIAL NUMBER

The engine serial number is stamped on the engine block, as shown in the illustration.

REPAIR INSTRUCTIONS

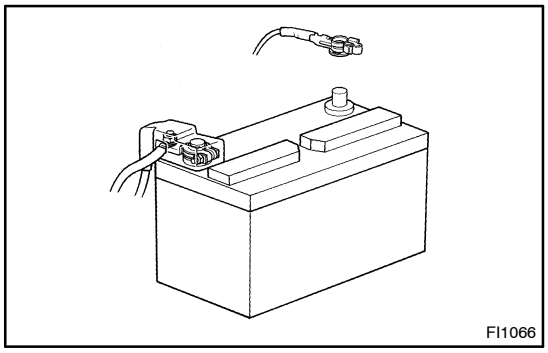
IN0FD–03

GENERAL INFORMATION

BASIC REPAIR HINT

(a) Use fender, seat and floor covers to keep the vehicle clean and prevent damage.

(b) During disassembly, keep parts in the appropriate order to facilitate reassembly.


FI1066

(c) Installation and removal of battery terminal:

(1) Before performing electrical work, disconnect the negative (–) terminal cable from the battery.

(2) If it is necessary to disconnect the battery for inspection or repair, first disconnect the negative (–) terminal cable.

(3) When disconnecting the terminal cable, to prevent damage to battery terminal, loosen the cable nut and raise the cable straight up without twisting or prying it.

(4) Clean the battery terminals and cable ends with a clean shop rag. Do not scrape them with a file or other abrasive objects.

(5) Install the cable ends to the battery terminals after loosening the nut, and tighten the nut after installation. Do not use a hammer to tap the cable ends onto the terminals.

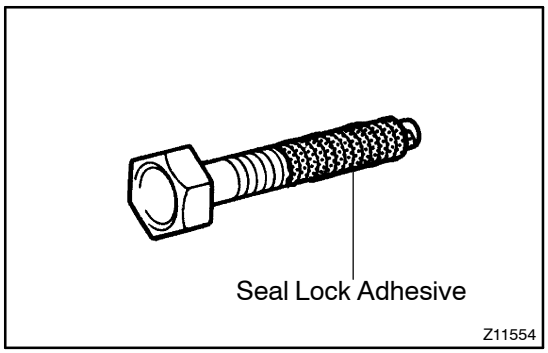
(6) Be sure the cover for the positive (+) terminal is properly in place.

(d) Check hose and wiring connectors to make sure that they are connected securely and correctly.

(e) Non–reusable parts

(1) Always replace cotter pins, gaskets, O–rings, oil seals, etc. with new ones.

(2) Non–reusable parts are indicated in the component illustrations by the "◆" symbol.



Z11554

(f) Precoated parts

Precoated parts are bolts, nuts, etc. that are coated with a seal lock adhesive at the factory.

(1) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.

(2) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

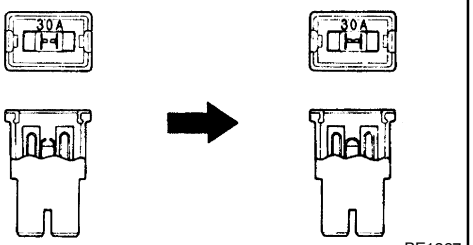
(3) Precoated parts are indicated in the component illustrations by the "★" symbol.

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

(h) Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

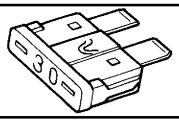
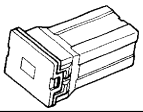
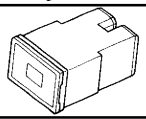
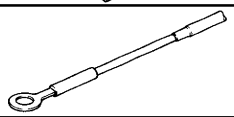
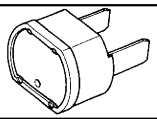
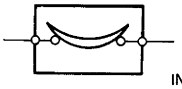
(i) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in Preparation section in this manual.

Medium Current Fuse and High Current Fuse Equal Amperage Rating



BE1367

(j) When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

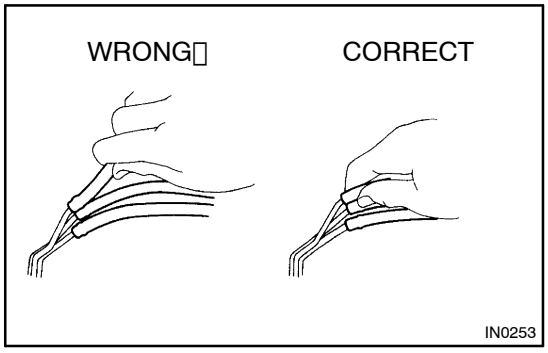
Illustration	Symbol	Part Name	Abbreviation
 BE5594	 IN0365	FUSE	FUSE
 BE5595	 IN0366	MEDIUM CURRENT FUSE	M–FUSE
 BE5596	 IN0367	HIGH CURRENT FUSE	H–FUSE
 BE5597	 IN0367	FUSIBLE LINK	FL
 BE5598	 IN0368	CIRCUIT BREAKER	CB

V00076

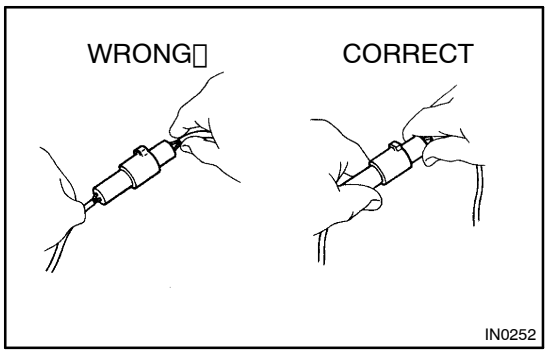
(k) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page IN–8).
- Cancel the parking brake on the level place and shift the transmission in Neutral (or N range).
- When jacking up the front wheels of the vehicle at first place stoppers behind the rear wheels.
- When jacking up the rear wheels of the vehicle at first place stoppers before the front wheels.
- When either the front or rear wheels only should be jacked up, set rigid racks and place stoppers in front and behind the other wheels on the ground.
- After the vehicle is jacked up, be sure to support it on rigid racks. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

(l) Observe the following precautions to avoid damage to the following 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 destroyed by static electricity.)



(2) To disconnect vacuum hoses, pull off the end, not the middle of the hose.



(3) To pull apart electrical connectors, pull on the connector itself, not the wires.

(4) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.

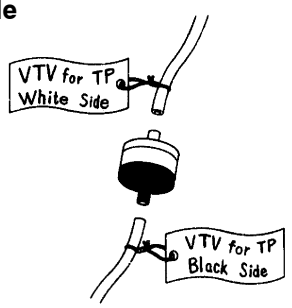
(5) When steam cleaning an engine, protect the electronic components, air filter and emission–related components from water.

(6) Never use an impact wrench to remove or install temperature switches or temperature sensors.

(7) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.

(8) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step–down adapter for adjustment. Once the hose has been stretched, it may leak air.

Example



IN0002

(m) Installation and removal of vacuum hose:

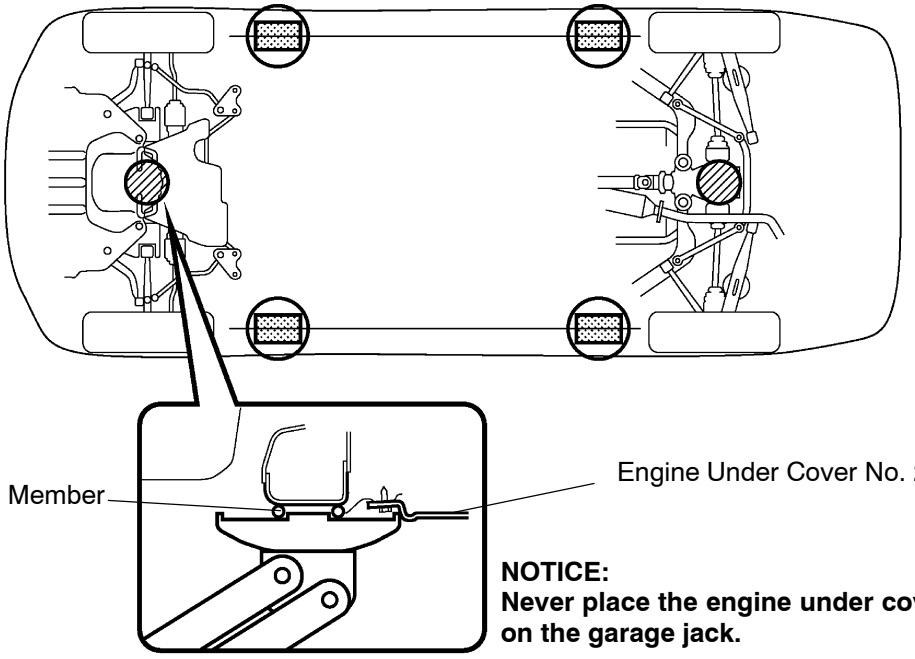
(1) When disconnecting vacuum hoses, use tags to identify how they should be reconnected to.

(2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.

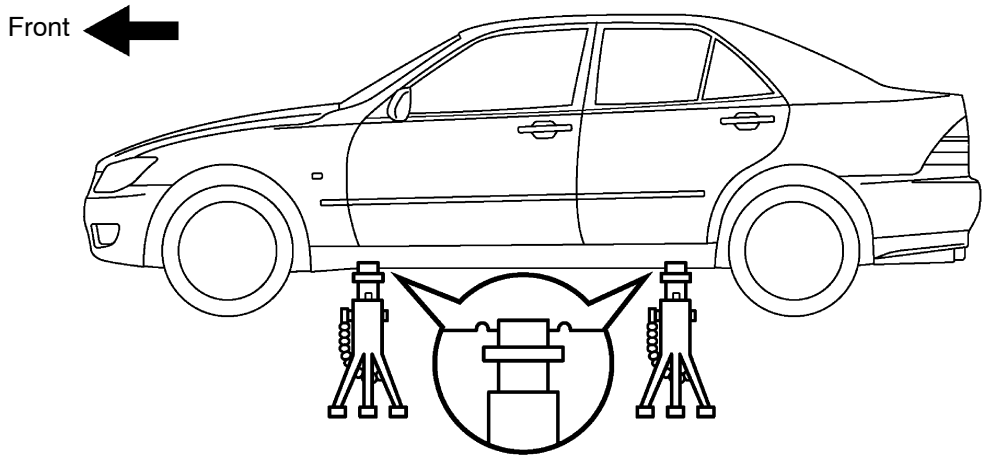
(n) Unless otherwise stated, all resistance is measured at an ambient temperature of 20˚C (68˚F). Because the resistance may be outside specifications if measured at high temperatures immediately after the vehicle has been running, measurement should be made when the engine has cooled down.

IN04O–14

VEHICLE LIFT AND SUPPORT LOCATIONS



NOTICE:
Never place the engine under cover No. 2 on the garage jack.



JACK POSITION

Front - - - - - - - - - Front suspension member
Rear - - - - - - - - - Differential carrier

CAUTION: When jacking–up the front and rear, make sure the vehicle is not carrying any extra weight.

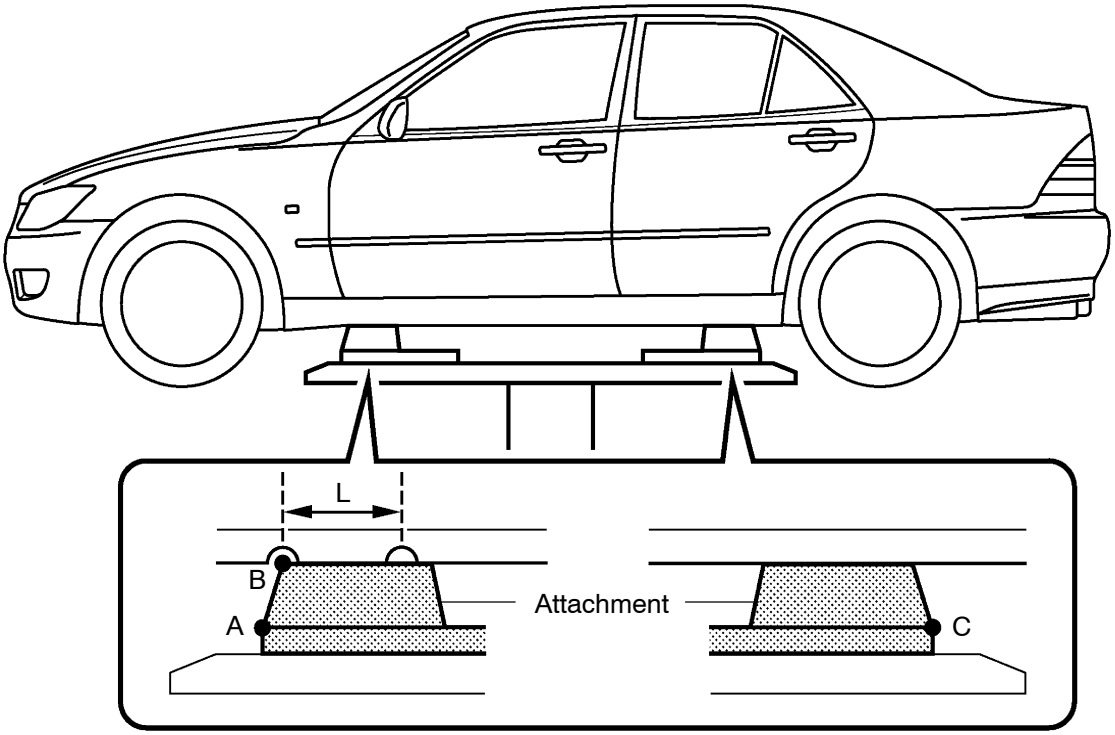
PANTOGRAPH JACK POSITION

SUPPORT POSITION

Safety stand and swing arm type lift -

I11883

Plate Type Lift

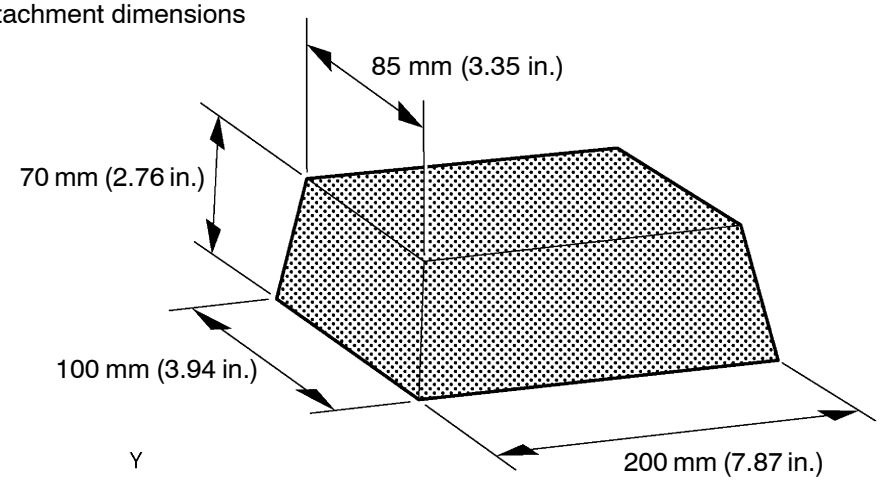


HINT:

Right and left set position	Place the vehicle over the center of the lift.
Front and rear set position	● When using attachments, place the one for front side vertically and the one for rear side horizontally to the vehicle. ● Align the cushion gum ends of the plate with the attachment lower ends (A, C). ● Align the attachment upper end (B) with the rocker flange front side notch.

NOTICE:
Check the interference of the attachment with the front floor cover when placing the attachment on the plate.

Attachment dimensions



I11884
B11105

B15227

FOR ALL OF VEHICLES

IN0IW–01

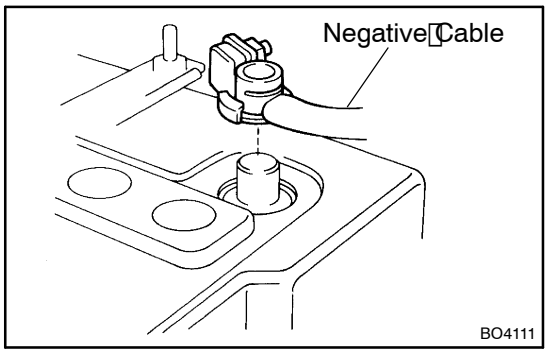
PRECAUTION

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

(a) The LEXUS IS300/IS200 is equipped with an SRS (Supplemental Restraint System), such as the driver airbag, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly and seat belt pretensioners.

Failure to carry out service operations in the correct sequence could cause the supplemental restraint system to unexpectedly deploy during servicing, possibly leading to a serious accident.

Further, if a mistake is made in servicing the supplemental restraint system, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in this manual.



(b) GENERAL NOTICE

(1) Malfunction symptoms of the supplemental restraint system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting. When troubleshooting the supplemental restraint system, always inspect the diagnostic trouble codes before disconnecting the battery (See page DI–413).

(2) Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.

(The supplemental restraint system is equipped with a back–up power source so that if work is started within 90 seconds of disconnecting the negative (–) terminal cable from the battery, the SRS may deploy.)

When the negative (–) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the each memory system. Then when work is finished, reset the clock and audio systems as before.

To avoid erasing the memory of each memory system, never use a back–up power supply from another battery.

(3) Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad (See Pub. No. RM684E, page RS–15), front passenger airbag assembly (See Pub. No. RM684E, page RS–28),

side airbag assembly (See Pub. No. RM684E, page RS–42), curtain shield airbag assembly (See page RS–17), front airbag sensor (See page RS–28), side and curtain shield airbag sensor assembly (See page RS–33) and seat belt pretensioner (See Pub. No. RM684E, page BO–152) should be inspected.

(4) Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.

(5) Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.

(6) Never disassemble and repair the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, front airbag sensor, side and curtain shied airbag sensor assembly or seat belt pretensioner.

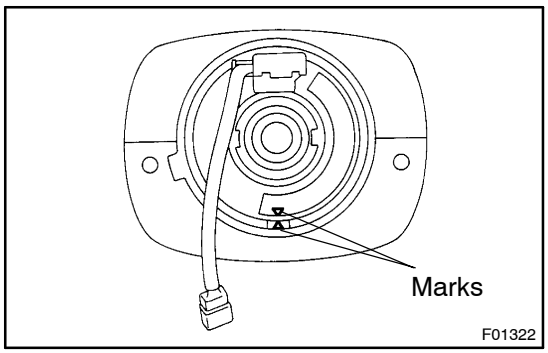
(7) If the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, front airbag sensor, side and curtain shied airbag sensor assembly or seat belt pretensioner has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.

(8) Do not directly expose the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, front airbag sensor, side and curtain shied airbag sensor assembly or seat belt pretensioner to hot air or flames.

(9) Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit.

(10) Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.

(11) After work on the supplemental restraint system is completed, check the SRS warning light (See page DI–413).



(c) SPIRAL CABLE (in Combination Switch)

The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, otherwise cable disconnection and other troubles may result. Refer to SR–10 of this manual concerning correct steering wheel installation.

(d) STEERING WHEEL PAD (with Airbag)

(1) When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.
Storing the pad with its metallic surface facing upward may lead to a serious accident if the airbag deploys for some reason. In addition do not store a steering wheel pad on top of another one.

(2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)

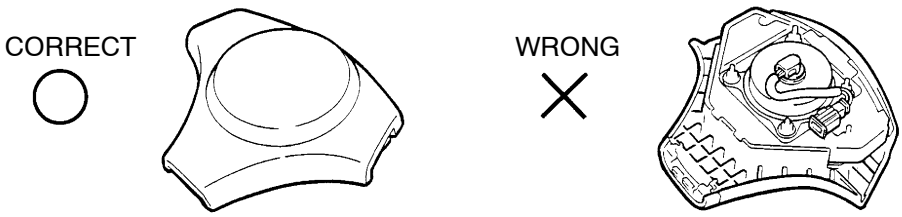
(3) Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.

(4) Store the steering wheel pad where the ambient temperature remains below 93˚C (200˚F), without high humidity and away from electrical noise.

(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the steering column near the combination switch connector before starting work.

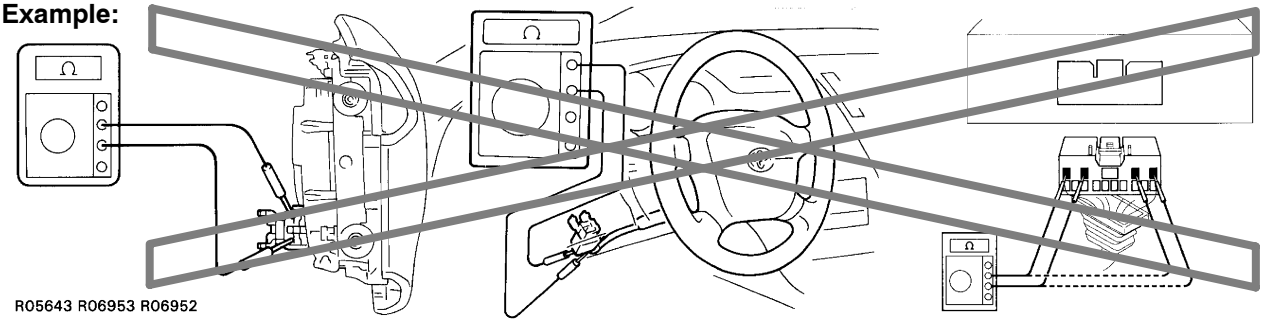
(6) When disposing of a vehicle or the steering wheel pad alone, the airbag should be deployed using an SST before disposal (See Pub. No. RM684E on page RS–17).
Carry out the operation in a safe place away from electrical noise.

Example:



N I11754

Example:



R05643 R06953 R06952 Z13950

(e) FRONT PASSENGER AIRBAG ASSEMBLY

(1) Always store a removed or new front passenger airbag assembly with the airbag deployment direction facing up.
Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag deploys.

(2) Never measure the resistance of the airbag squib (This may cause the airbag to deploy, which is very dangerous.).

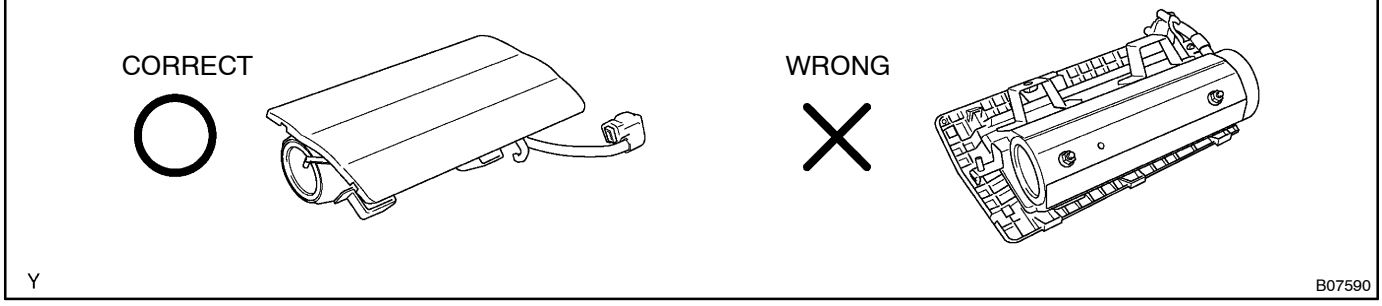
(3) Grease should not be applied to the front passenger airbag assembly and the airbag door should not be cleaned with detergents of any kind.

(4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.

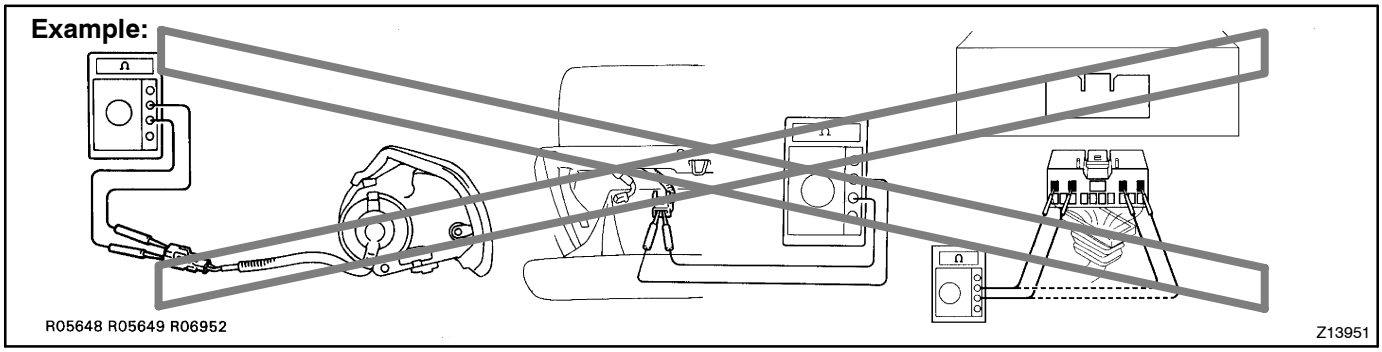
(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) installed on the assembly before starting work.

(6) When disposing of a vehicle or the front passenger airbag assembly alone, the airbag should be deployed using an SST before disposal (See Pub. No. RM684E on page RS–30).
Perform the operation in a safe place away from electrical noise.

Example:



Example:



(f) SIDE AIRBAG ASSEMBLY

(1) Always store a removed or new side airbag assembly with the airbag deployment direction facing up. Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag deploys.

(2) Never measure the resistance of the airbag squib (This may cause the airbag to deploy, which is very dangerous.).

(3) Grease should not be applied to the side airbag assembly and the surface should not be cleaned with detergents of any kind.

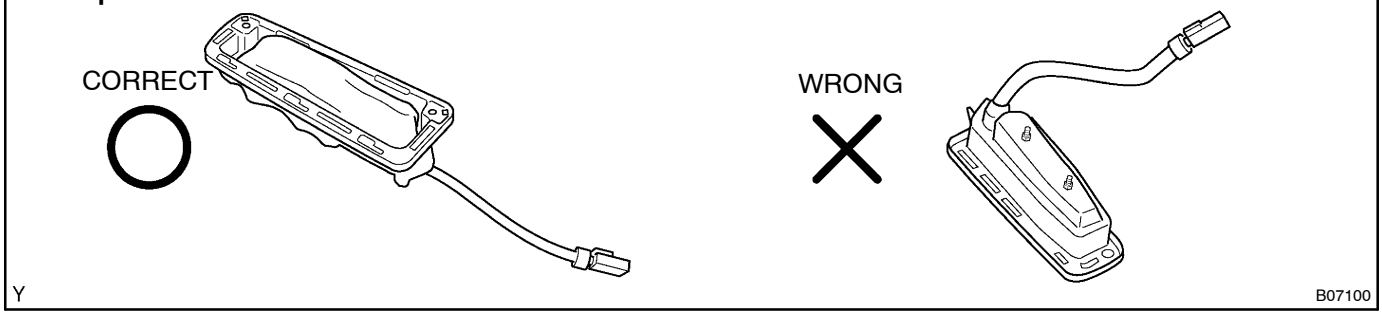
(4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.

(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the seat before starting work.

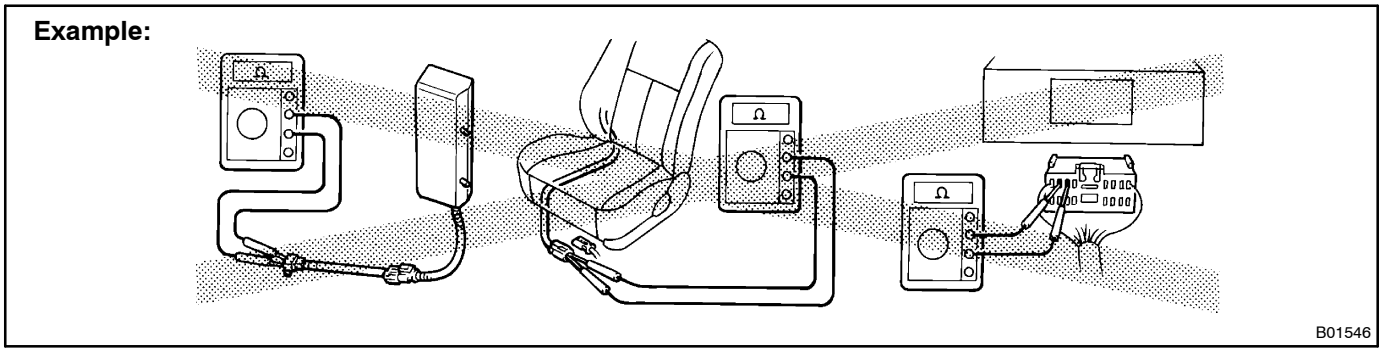
(6) When disposing of a vehicle or the side airbag assembly alone, the airbag should be deployed using an SST before disposal (See Pub. No. RM684E on page RS–43).

Perform the operation in a safe place away from electrical noise.

Example:



Example:



(g) CURTAIN SHIELD AIRBAG ASSEMBLY

(1) Always store a removed or new curtain shield airbag assembly in a clear plastic bag, and keep it in a safe place.

NOTICE:
Protection bag is not reuse.

CAUTION:
Never disassemble the curtain shield airbag assembly

(2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)

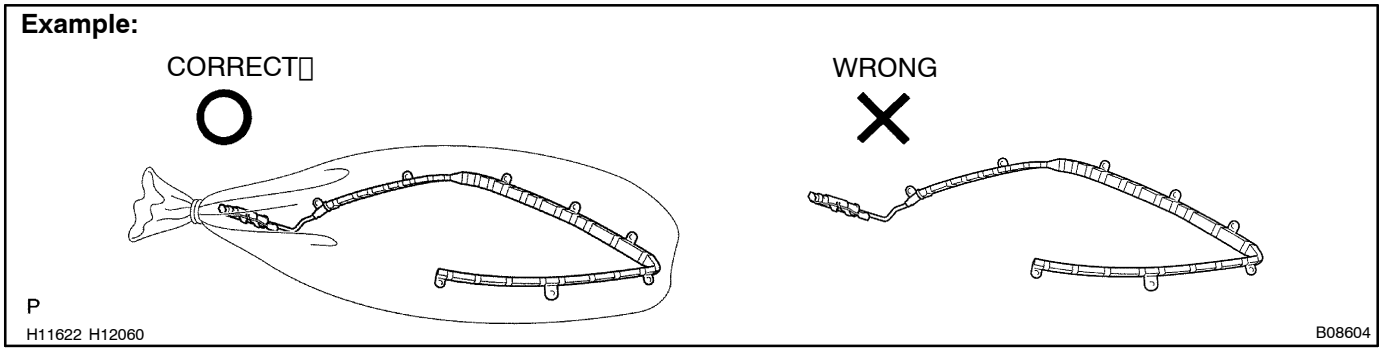
(3) Grease should not be attached to the curtain shield airbag assembly and the surface should not be cleaned with detergents of any kind.

(4) Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.

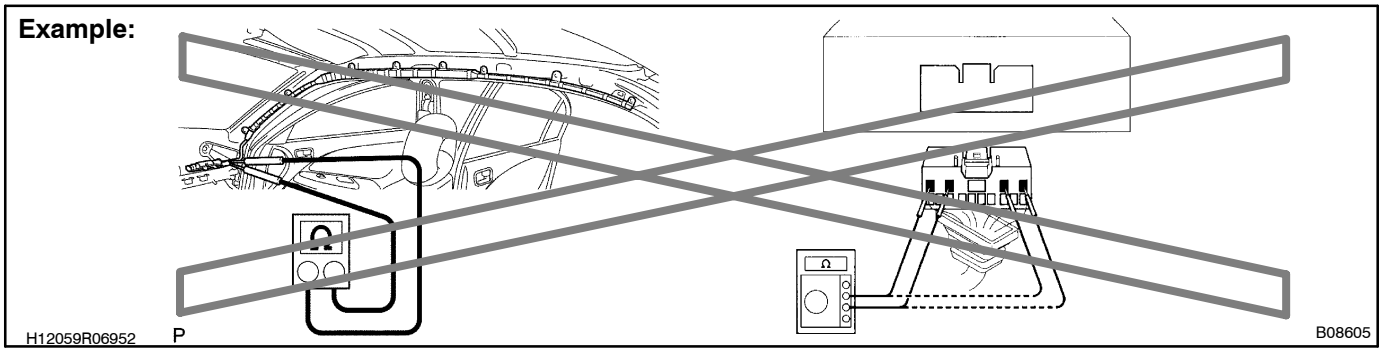
(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) into the instrument panel before starting work.

(6) When disposing of a vehicle or the curtain shield airbag assembly alone, the airbag should be deployed using an SST before disposal (See page RS–18). Perform the operation in a safe place away from electrical noise.

Example:



Example:



(h) SEAT BELT PRETENSIONER

(1) Never measure the resistance of the seat belt pretensioner. (This may cause the seat belt pretensioner to activate, which is very dangerous.)

(2) Never disassemble the seat belt pretensioner.

(3) Never install the seat belt pretensioner in another vehicle.

(4) Store the seat belt pretensioner where the ambient temperature remains below 80°C (176°F) and away from electrical noise without high humidity.

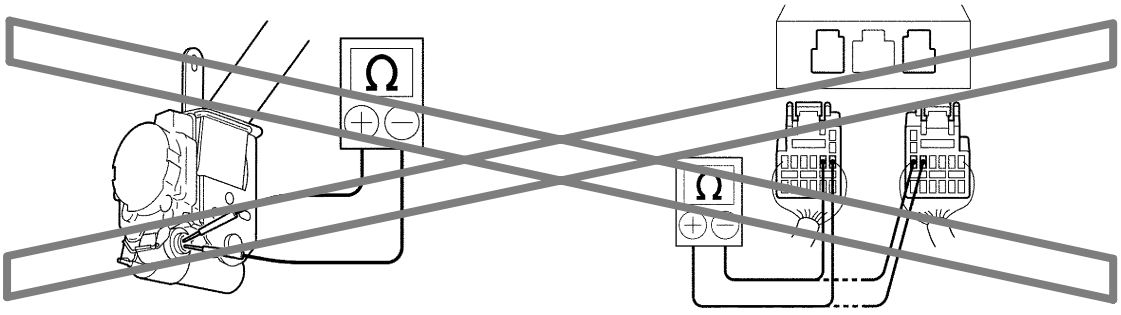
(5) When using electric welding, first disconnect the connector (yellow color and 2 pins) before starting work.

(6) When disposing of a vehicle or the seat belt pretensioner alone, the seat belt pretensioner should be activated before disposal (See Pub. No. RM684E, page BO–153).
Perform the operation in a safe place away from electrical noise.

(7) The seat belt pretensioner is hot after activation, so let it cool down sufficiently before the disposal. However never apply water to the seat belt pretensioner.

(8) Oil or water should not be put on the front seat outer belt and the front seat outer belt should not be cleaned with detergents of any kind.

Example:



B02121

(i) AIRBAG SENSOR ASSEMBLY

(1) Never reuse the airbag sensor assembly involved in a collision when the SRS has deployed.

(2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the supplemental restraint system.

(3) Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery, even if only loosing the set bolts of the airbag sensor assembly.

(j) WIRE HARNESS AND CONNECTOR

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 due to an accident, etc., repair or replace it as shown on page RS–39.

2. FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

CAUTION:

If large amount of unburned gasoline flows into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

(a) Use only unleaded gasoline.

(b) Avoid prolonged idling.
Avoid running the engine at idle speed for more than 20 minutes.

(c) Avoid spark jump test.
(1) Perform spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
(2) While testing, never race the engine.

(d) Avoid prolonged engine compression measurement.
Engine compression tests must be done as rapidly as possible.

(e) Do not run engine when fuel tank is nearly empty.
This may cause the engine to misfire and create an extra load on the converter.

(f) Avoid coasting with ignition turned off.

(g) Do not dispose of used catalyst along with parts contaminated with gasoline or oil.

3. IF VEHICLE IS EQUIPPED WITH MOBILE COMMUNICATION SYSTEM

For vehicles with mobile communication systems such as two–way radios and cellular telephones, observe the following precautions.

(1) Install the antenna as far as possible away from the ECU and sensors of the vehicle's electronic system.

(2) Install the antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle's electronic systems. For details about ECU and sensors locations, refer to the section on the applicable component.

(3) Avoid winding the antenna feeder together with other wiring as much as possible, and also avoid running the antenna feeder parallel with other wire harnesses.

(4) Check that the antenna and feeder are correctly adjusted.

(5) Do not install powerful mobile communications system.

4. FOR USING HAND–HELD TESTER

CAUTION:

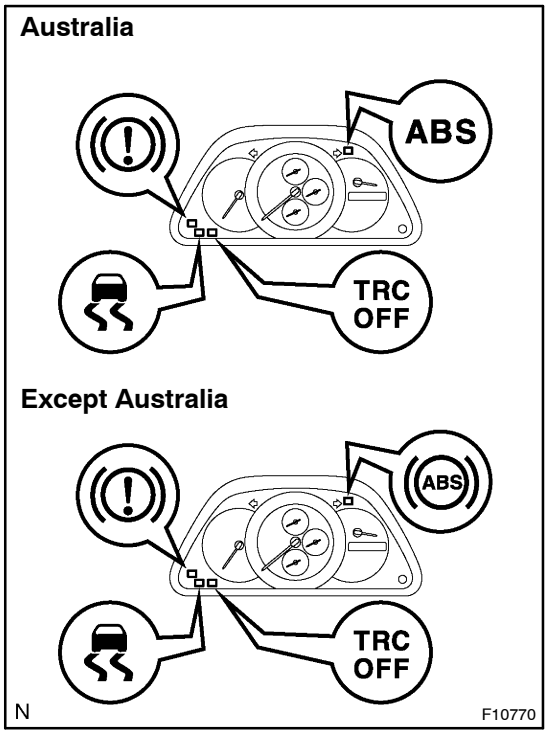
Observe the following items for safety reasons:

- **Before using the hand–held tester, the hand–held tester's operator manual should be read thoroughly.**
- **Be sure to route all cables securely when driving with the hand–held tester connected to the vehicle. (i.e. Keep cables away from feet, pedals, steering wheel and shift lever.)**
- **Two persons are required when test driving with the hand–held tester, one person to drive the vehicle and the other person to operate the hand–held tester.**

5. FOR VEHICLES EQUIPPED WITH TRACTION CONTROL (TRC) SYSTEM

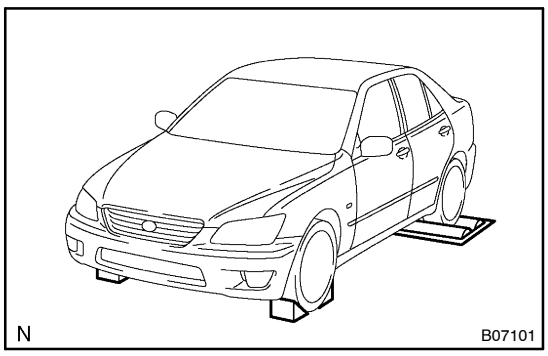
NOTICE:

When using a 2–wheel drum tester such as a speedometer tester or chassis dynamometer, etc., or jacking up the rear wheels and driving the wheels, always push in the TRC cut switch and turn the TRC system OFF.



(a) Press the TRC cut switch.
(b) Check that the TRC system is turned OFF by the TRC cut switch.

HINT:
The SLIP indicator light should be always on immediately after the engine is restarted.



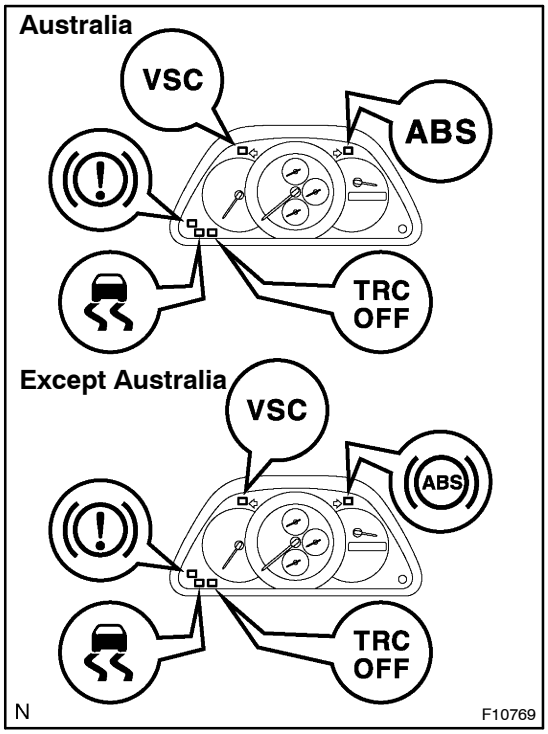
(c) Begin measurements.
(d) Press the TRC cut switch to turn the TRC to the operative mode and check that the TRC OFF indicator light goes off.

HINT:
The SLIP indicator light blinks when the TRC system is operational.

6. FOR VEHICLES EQUIPPED WITH VEHICLE SKID CONTROL (VSC) SYSTEM

NOTICE:

When using 2–wheel drum tester such as a speedometer tester or chassis dynamometer, etc., or jacking up the front wheels and driving the wheels, always push in the VSC OFF switch to turn the VSC system OFF.

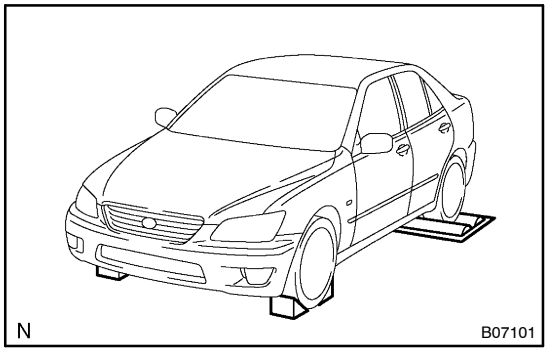


(a) Press the VSC OFF switch.

(b) Check that the VSC OFF indicator light comes ON.

HINT:

The VSC OFF indicator light should be always OFF when the engine is restarted.

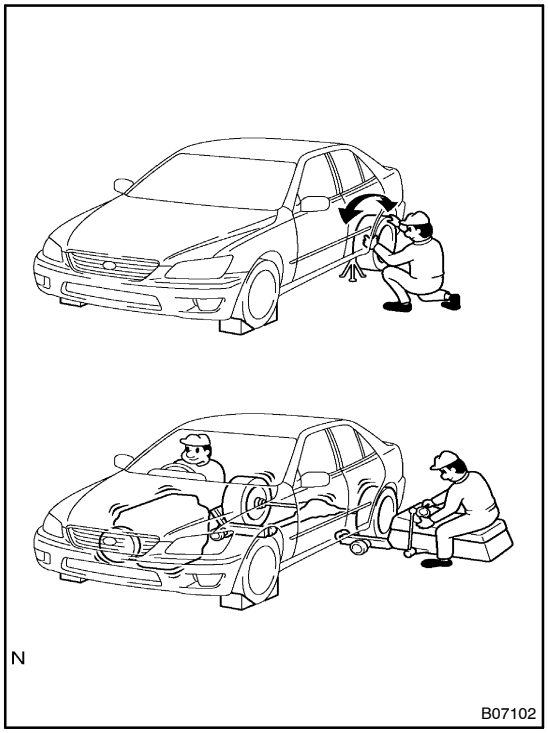


(c) Begin measurements.

(d) Press the VSC OFF switch again to change the VSC system to operational condition and check that the VSC OFF indicator light goes off.

HINT:

The SLIP indicator light blinks and the VSC buzzer sounds when the VSC system is operational.



7. FOR VEHICLES EQUIPPED WITH LIMITED SLIP DIFFERENTIAL

(a) Never apply driving force when RH or LH rear wheel only is touching the ground.

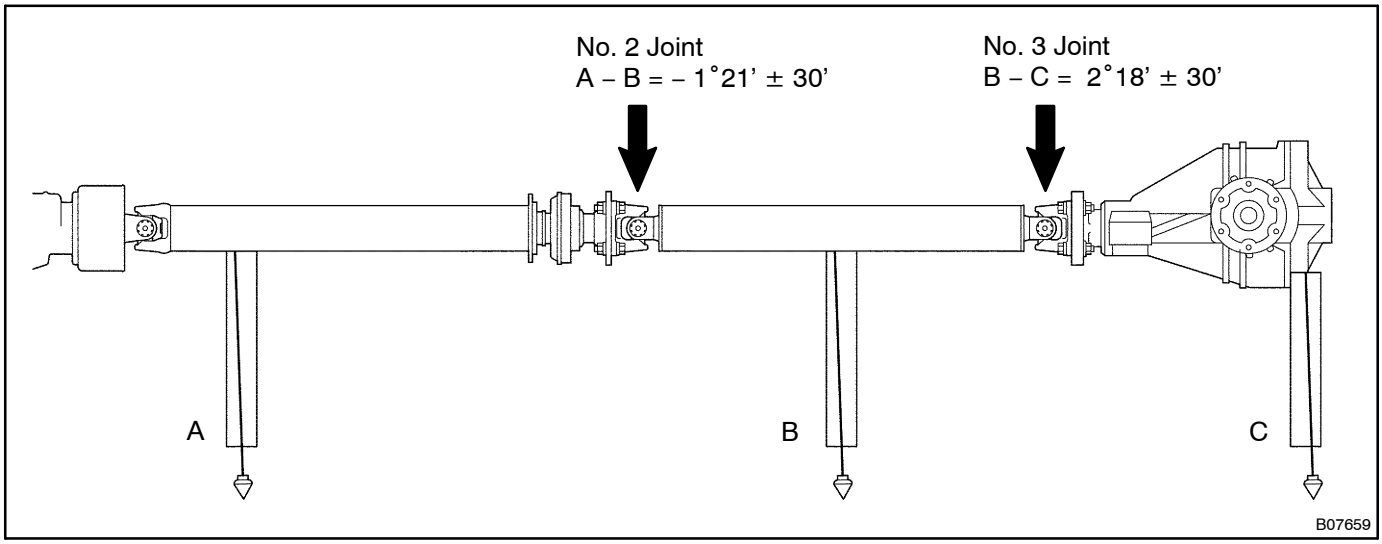
(b) During service/rectification work never spin (race) the RH or LH rear wheel only such as with ON–The Car type wheel balancer, both rear wheels must be off the ground.

HINT:

- In case of the above, due to the construction of the LSD the driving force is transmitted to the opposite wheel and therefore it is possible for the vehicle to start suddenly if only one rear wheel is off the ground. Furthermore it could result in component damage to the LSD due to the loads acting on it.
- Always raise both rear wheels off the ground and support the vehicle on suitable safety stand.

8. INSPECTION AND ADJUSTMENT OF JOINT ANGLE DURING REMOVAL AND INSTALLATION OF PROPELLER SHAFT

When performing operations which involve the removal and installation of the propeller shaft, always check the joint angle. Make adjustments if necessary (See Pub. No. RM684E on page PR–11).



HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

IN04S–32

GENERAL INFORMATION

A large number of ECU controlled systems are used in the LEXUS IS300/IS200. In general, the ECU controlled system is considered to be a very intricate system requiring a high level of technical knowledge and expert skill to troubleshoot. However, the fact is that if you proceed to inspect the circuits one by one, troubleshooting of these systems is not complex. If you have adequate understanding of the system and a basic knowledge of electricity, accurate diagnosis and necessary repair can be performed to locate and fix the problem. This manual is designed through emphasis of the above standpoint to help service technicians perform accurate and effective troubleshooting, and is compiled for the following major ECU controlled systems:

The troubleshooting procedure and how to make use of it are described on the following pages.

System	Page
1. Engine (2JZ–GE)	DI–1
2. Automatic Transmission (A650E)	DI–167
3. ABS with EBD & BA & TRC System	DI–249
4. ABS with EBD & BA & TRC & VSC System	DI–316
5. Supplemental Restraint System	DI–411
6. Theft Deterrent System	DI–474
7. Cruise Control System	DI–519
8. Engine Immobiliser System	DI–535
9. Body Control System	DI–549
10.Multiplex Communication System	DI–565
11.LEXUS Navigation System	DI–572
12.Air Conditioning System	DI–604

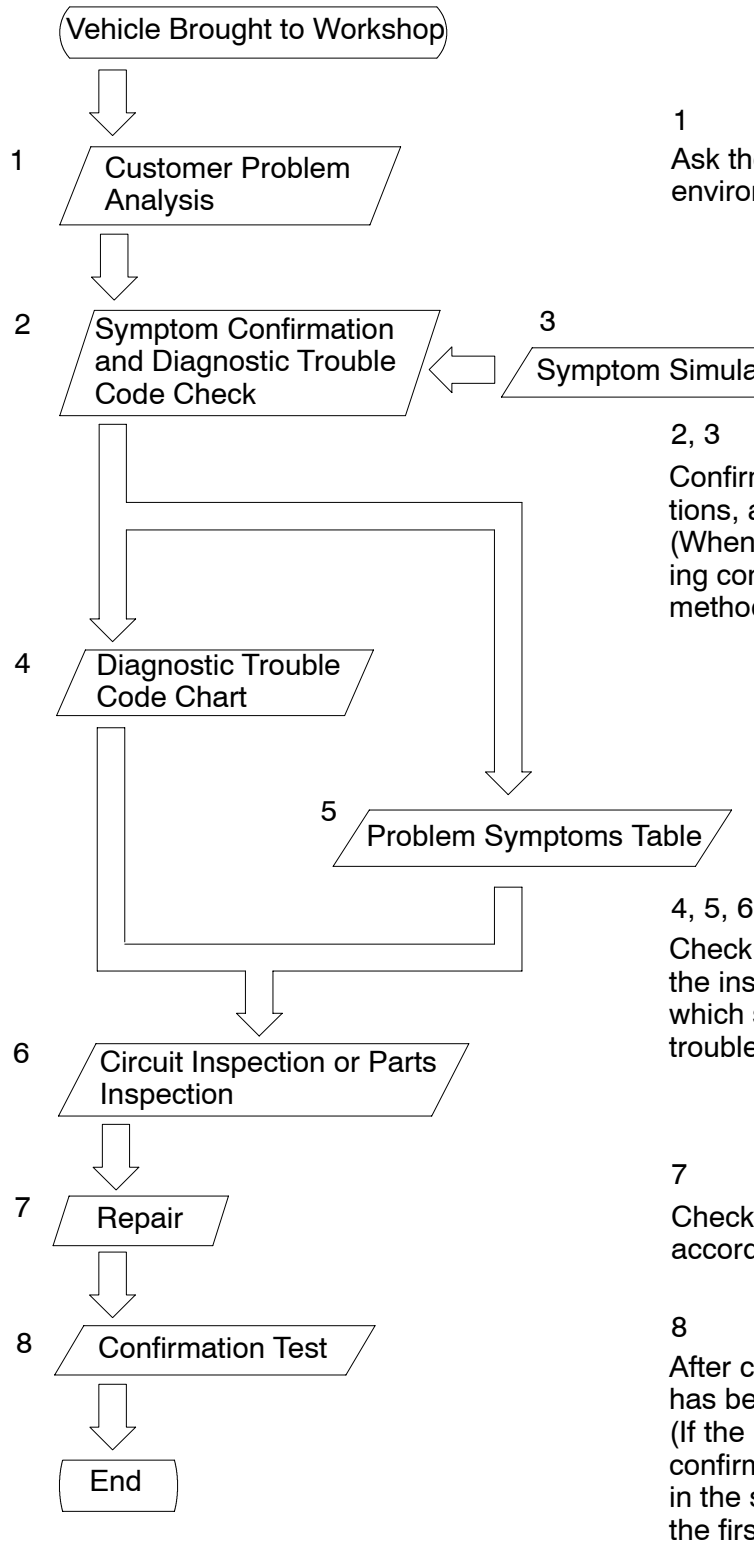
FOR USING HAND–HELD TESTER

- Before using the tester, the tester's operator manual should be read thoroughly.
- If the tester cannot communicate with ECU controlled systems when you have connected the cable of the tester to DLC3, turned the ignition switch ON and operated the tester, there is a problem on the vehicle side or tester side.
  (1) If communication is normal when the tester is connected to another vehicle, inspect the diagnosis data link line (Bus⊕line) or ECU power circuit of the vehicle.
  (2) If communication is still not possible when the tester is connected to another vehicle, the problem is probably in the tester itself, so perform the Self Test procedures outline in the Tester Operator's Manual.

IN08W–23

HOW TO PROCEED WITH TROUBLESHOOTING

Carry out troubleshooting in accordance with the procedure on the following page. Here, only the basic procedure is shown. Details are provided in Diagnostics section, showing the most effective methods for each circuit. Confirm the troubleshooting procedures first for the relevant circuit before beginning troubleshooting of that circuit.



1

Ask the customer about the conditions and the environment when the problem occurred.

2, 3

Confirm the symptoms and the problem conditions, and check the diagnostic trouble codes. (When the problem symptoms do not appear during confirmation, use the symptom simulation method described later on.)

4, 5, 6

Check the results obtained in Step 2, then confirm the inspection procedure for the system or the part which should be checked using the diagnostic trouble code chart or the problem symptoms table.

7

Check and repair the affected system or part in accordance with the instructions in Step 6.

8

After completing repairs, confirm that the problem has been eliminated.
(If the problem is not reproduced, perform the confirmation test under the same conditions and in the same environment as when it occurred for the first time.)

1. CUSTOMER PROBLEM ANALYSIS

In troubleshooting, the problem symptoms must be confirmed accurately and all preconceptions must be cleared away in order to give an accurate judgement. To ascertain just what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time it occurred.
Important Point in the Problem Analysis:
The following 5 items are important points in the problem analysis. Past problems which are thought to be unrelated and the repair history, etc. may also help in some cases, so as much information as possible should be gathered and its relationship with the problem symptoms should be correctly ascertained for reference in troubleshooting. A customer problem analysis table is provided in Diagnostics section for each system for your use.

Important Points in the Customer 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

(Sample) Supplemental restraint system check sheet.

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet **Inspector's Name**

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	Approx.
Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]

2. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE CHECK

The diagnostic system in the LEXUS IS300/IS200 fulfills various functions. The first function is the Diagnostic Trouble Code Check in which a malfunction in the signal circuits to the ECU is stored in code in the ECU memory at the time of occurrence, to be output by the 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 check functions, the problem areas can be narrowed down quickly and troubleshooting can be performed effectively. Diagnostic functions are incorporated in the following systems in the LEXUS IS300/IS200.

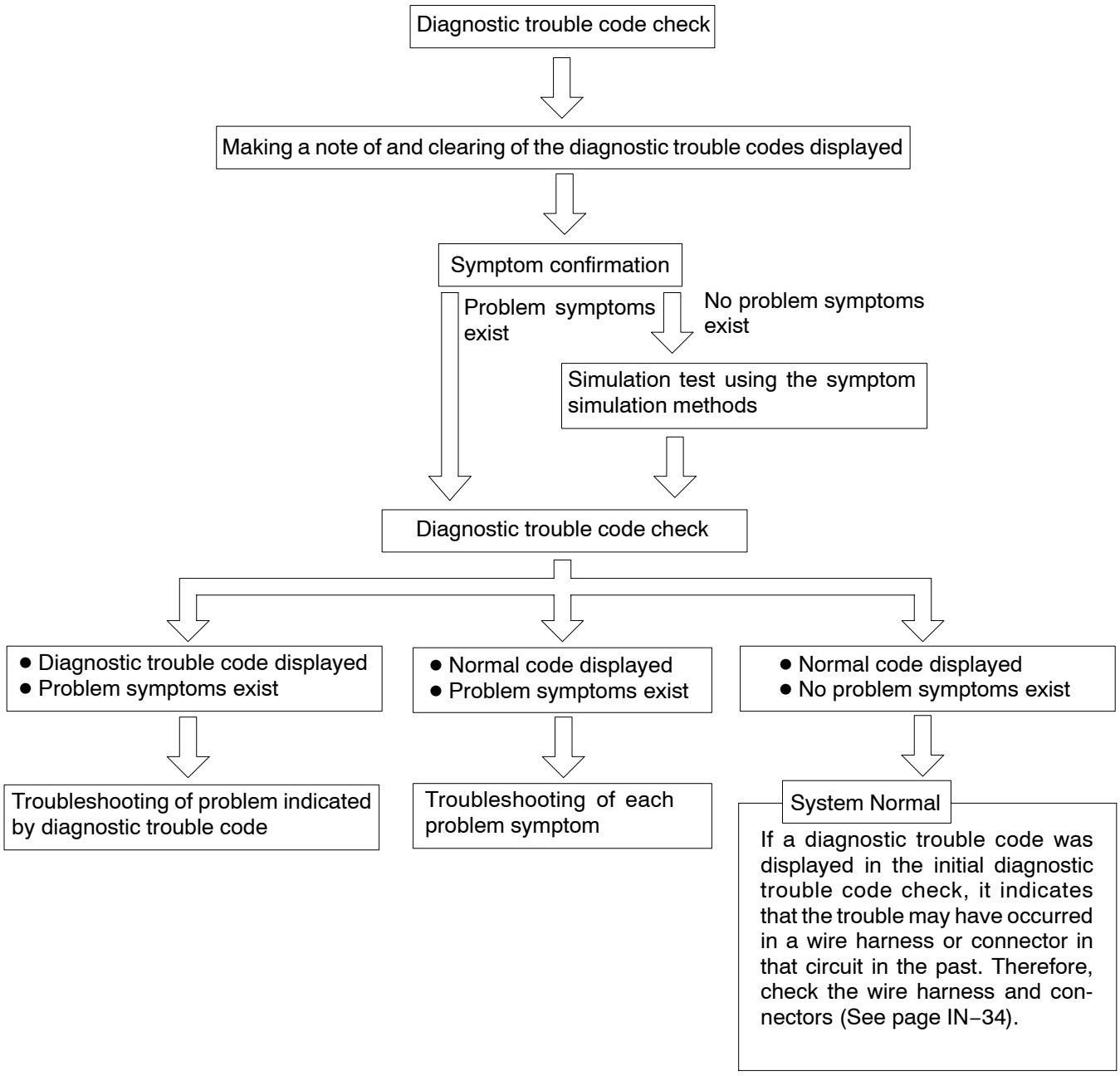
System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Diagnostic Test Mode (Active Test)
1. Engine (2JZ–GE)	○ (with Check Mode)	○	○
2. Automatic Transmission (A650E)	○ (with Check Mode)	○	○
3. ABS with EBD & BA & TRC System	○	○	○
4. ABS with EBD & BA & TRC & VSC System	○	○	○
5. Supplemental Restraint System	○		
6. Theft Deterrent System			○
7. Cruise Control System	○	○	
8. Engine Immobiliser System	○		
9. Body Control System			○
10.Multiplex Communication System	○		○
11.LEXUS Navigation System			○
12.Air Conditioning System	○		○

In diagnostic trouble code check, it is very important to determine whether the problem indicated by the diagnostic trouble code is still occurring or occurred in the past but returned to normal at present. In addition, it must be checked in the problem symptom check whether the malfunction indicated by the diagnostic trouble code is directly related to the problem symptom or not. For this reason, the diagnostic trouble codes should be checked before and after the symptom confirmation to determine the current conditions, as shown in the table below. If this is not done, it may, depending on the case, result in unnecessary troubleshooting for normally operating systems, thus making it more difficult to locate the problem, or in repairs not pertinent to the problem. Therefore, always follow the procedure in correct order and perform the diagnostic trouble code check.

DIAGNOSTIC TROUBLE CODE CHECK PROCEDURE

Diagnostic Trouble Code Check (Make a note of and then clear)	Confirmation of Symptoms	Diagnostic Trouble Code Check	Problem Condition
Diagnostic Trouble Code Display	Problem symptoms exist	Same diagnostic trouble code is displayed	Problem is still occurring in the diagnostic circuit
		Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit (The diagnostic trouble code displayed first is either for a past problem or it is a secondary problem)
	No problem symptoms exist		The problem occurred in the diagnostic circuit in the past
Normal Code Display	Problem symptoms exist	Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit
	No problem symptoms exist	Normal code is displayed	The problem occurred in a place other than in the diagnostic circuit in the past

Taking into account the points on the previous page, a flow chart showing how to proceed with troubleshooting using the diagnostic trouble code check is shown below. This flow chart shows how to utilize the diagnostic trouble code check effectively, then by carefully checking the results, indicates how to proceed either to diagnostic trouble code troubleshooting or to troubleshooting of problem symptoms table.

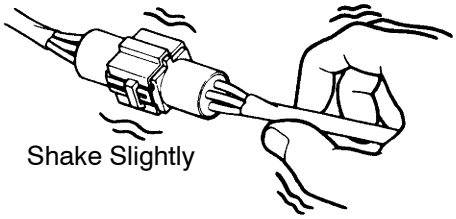
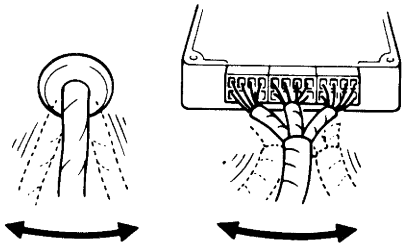
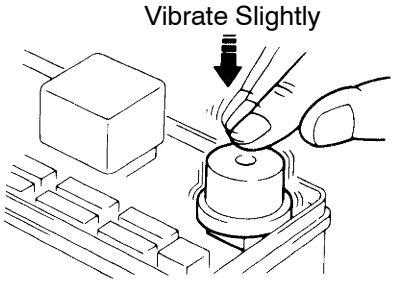


3. SYMPTOM SIMULATION

The most difficult case in troubleshooting is when there are no problem symptoms occurring. In such cases, a thorough customer problem analysis must be carried out, then simulate the same or similar conditions and environment in which the problem occurred in the customer's vehicle. No matter how much experience a technician has, or how skilled he or she may be, if he or she proceeds to troubleshoot without confirming the problem symptoms he or she will tend to overlook something important in the repair operation and make a wrong guess somewhere, which will only lead to a standstill. For example, for a problem which only occurs when the engine is cold, or for a problem which occurs due to vibration caused by the road during driving, etc., the problem can never be determined so long as the symptoms are confirmed with the engine hot condition or the vehicle at a standstill. Since vibration, heat or water penetration (moisture) is likely to cause problem which is difficult to reproduce, the symptom simulation tests introduced here are effective measures in that the external causes are applied to the vehicle in a stopped condition.

Important Points in the Symptom Simulation Test:

In the symptom simulation test, the problem symptoms should of course be confirmed, but the problem area or parts must also be found out. To do this, narrow down the possible problem circuits according to the symptoms before starting this test and connect a tester beforehand. After that, carry out the symptom simulation test, judging whether the circuit being tested is defective or normal and also confirming the problem symptoms at the same time. Refer to the problem symptoms table for each system to narrow down the possible causes of the symptom.

1	**VIBRATION METHOD: When vibration seems to be the major cause.**
CONNECTORS Slightly shake the connector vertically and horizontally. **WIRE HARNESS** Slightly shake the wire harness vertically and horizontally. The connector joint, fulcrum of the vibration, and body through portion are the major areas to be checked thoroughly.	  FI2331 FI2332
PARTS AND SENSOR Apply slight vibration with a finger to the part of the sensor considered to be the problem cause and check that the malfunction occurs. HINT: Applying strong vibration to relays may result in open relays.	 FI2330

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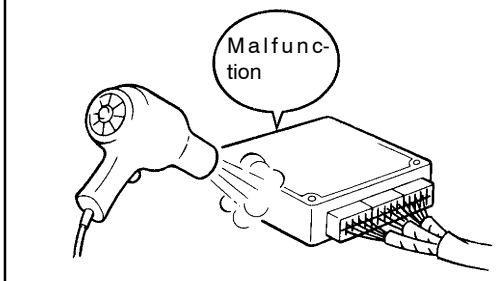
2	**HEAT METHOD: When the problem seems to occur when the suspect area is heated.**

Heat the component that is the likely cause of the malfunction with a hair dryer or similar object. Check to see if the malfunction occurs.

NOTICE:

(1) Do not heat to more than 60°C (140°F). (Temperature is limited not to damage the components.)

(2) Do not apply heat directly to parts in the ECU.



FI2334

3	**WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high–humidity condition.**

Sprinkle water onto the vehicle and check to see if the malfunction occurs.

NOTICE:

(1) Never sprinkle water directly into the engine compartment, but indirectly change the temperature and humidity by applying water spray onto the radiator front surface.

(2) Never apply water directly onto the electronic components.

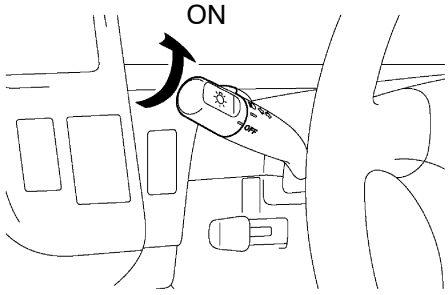
HINT:
If a vehicle is subject to water leakage, the leaked water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be taken.



FI6649

4	**OTHER: When a malfunction seems to occur when electrical load is excessive.**

Turn on all electrical loads including the heater blower, head lights, rear window defogger, etc. and check to see if the malfunction occurs.



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4. DIAGNOSTIC TROUBLE CODE CHART

The inspection procedure is shown in the table below. This table permits efficient and accurate troubleshooting using the diagnostic trouble codes displayed in the diagnostic trouble code check. Proceed with troubleshooting in accordance with the inspection procedure given in the diagnostic chart corresponding to the diagnostic trouble codes displayed. The Supplemental Restraint System diagnostic trouble code chart is shown below as an example.

- DTC No.
  Indicates the diagnostic trouble code.
- Page or Instructions
  Indicates the page where the inspection procedure for each circuit is to be found, or gives instructions for checking and repairs.

- Trouble Area
  Indicates the suspect area of the problem.

- Detection Item
  Indicates the system of the problem or contents of the problem.

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit for that code listed in the table below (Proceed to the page given for that circuit).

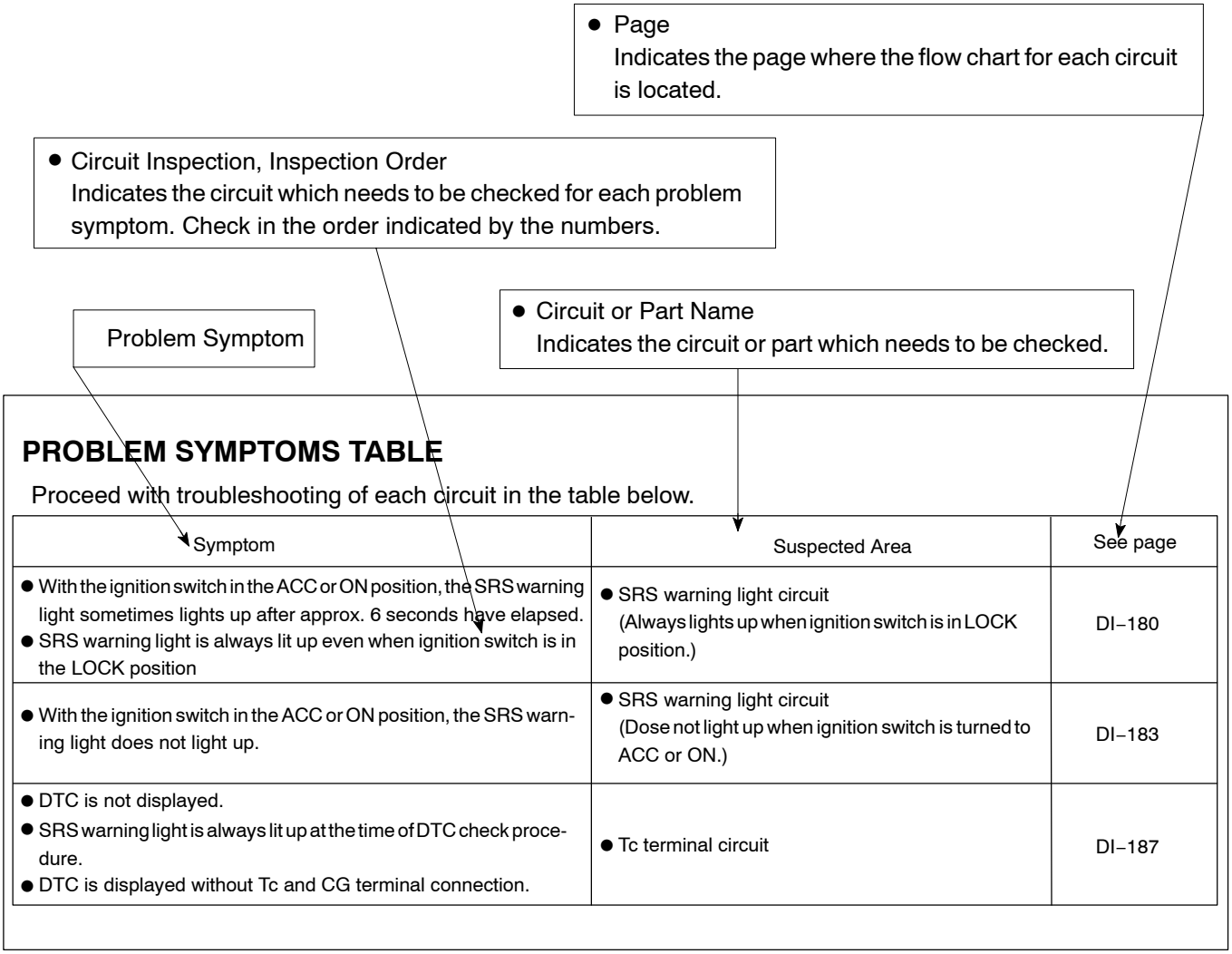
DTC No. (See page)	Detection Item	Trouble Area	SRS Warming Light
B0100/13 (DI–119)	● Short in D squib circuit	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0101/14 (DI–124)	● Open in D squib circuit	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0102/11 (DI–128)	● Short in D squib circuit (to ground)	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0103/12 (DI–132)	● Short in D squib circuit (to B+)	● Steering wheel pad (squib) ● Spiral cable ● Airbag sensor assembly ● Wire harness	ON
B0105/53 (DI–136)	● Short in P squib circuit	● Front Passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	ON
B0106/54	● Open in P squib circuit	● Front Passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	
	b circuit (to Ground)	● Front Passenger airbag assembly (squib) ● Airbag sensor assembly ● Wire harness	

5. PROBLEM SYMPTOMS TABLE

The suspected circuits or parts for each problem symptom are shown in the table below. Use this table to troubleshoot the problem when a ”Normal” code is displayed in the diagnostic trouble code check but the problem is still occurring. Numbers in the table indicate the inspection order in which the circuits or parts should be checked.

HINT:

When the problem is not detected by the diagnostic system even though the problem symptom is present, it is considered that the problem is occurring outside the detection range of the diagnostic system, or that the problem is occurring in a system other than the diagnostic system.



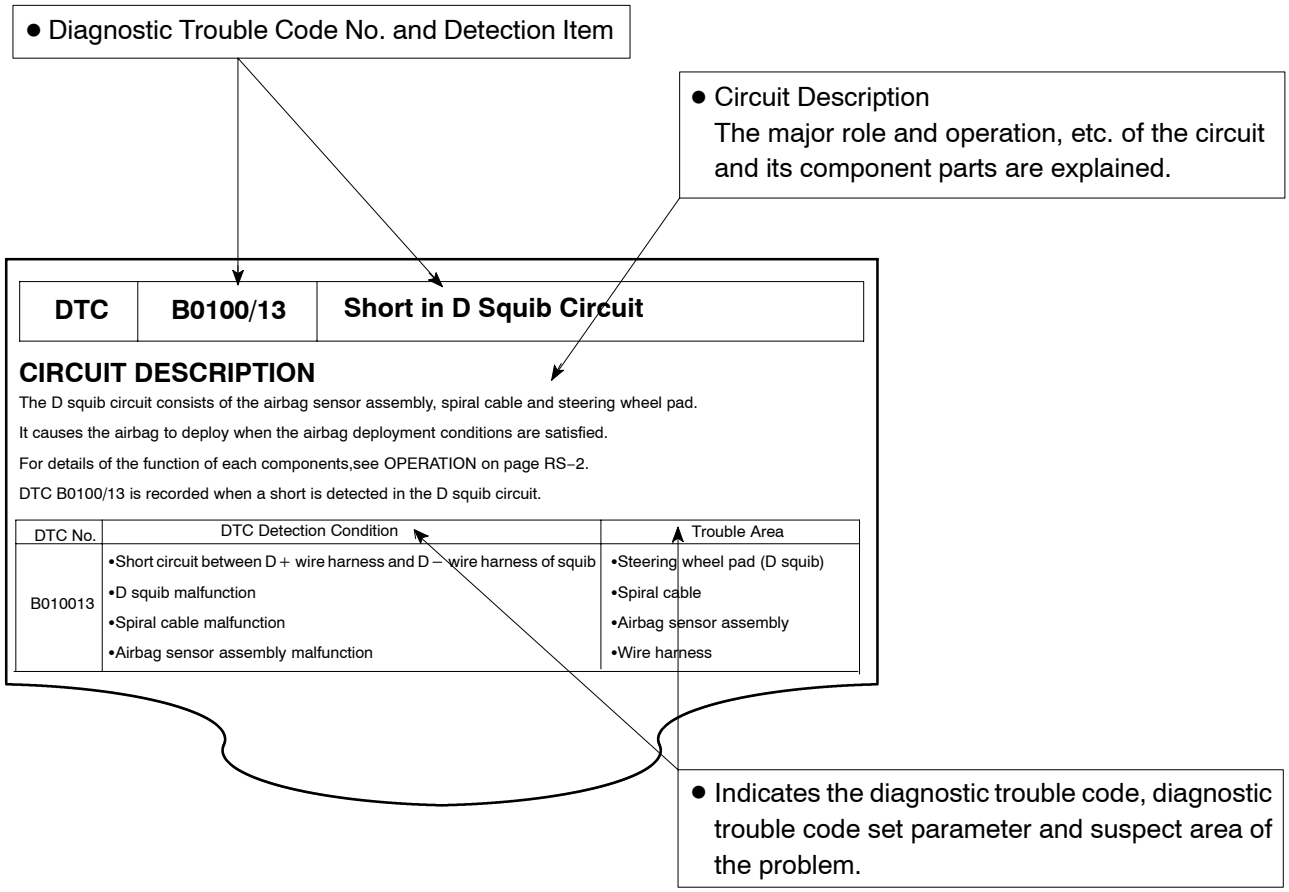
PROBLEM SYMPTOMS TABLE

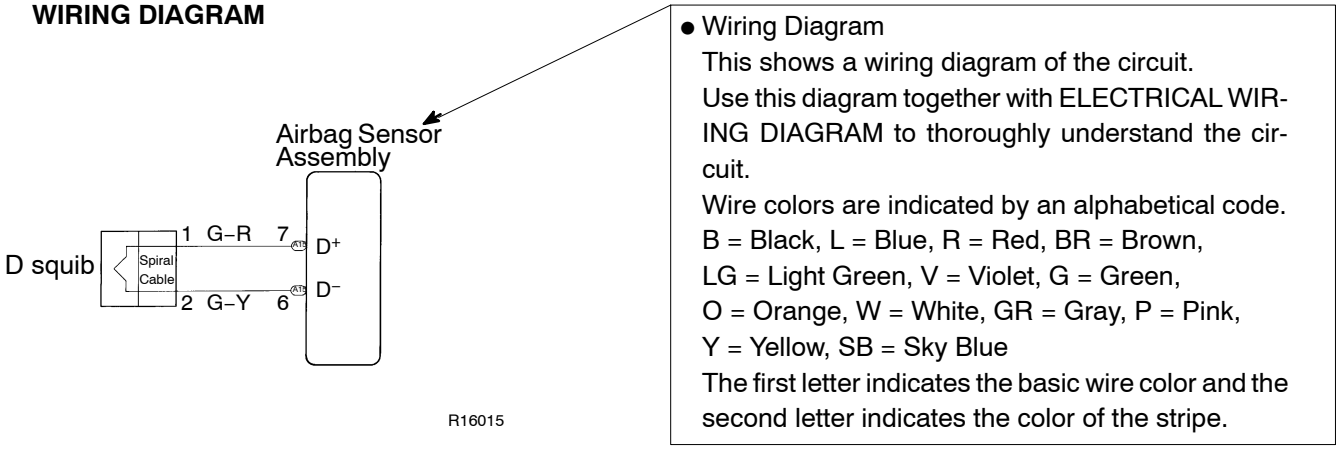
Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspected Area	See page
● With the ignition switch in the ACC or ON position, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed. ● SRS warning light is always lit up even when ignition switch is in the LOCK position	● SRS warning light circuit (Always lights up when ignition switch is in LOCK position.)	DI–180
● With the ignition switch in the ACC or ON position, the SRS warning light does not light up.	● SRS warning light circuit (Dose not light up when ignition switch is turned to ACC or ON.)	DI–183
● DTC is not displayed. ● SRS warning light is always lit up at the time of DTC check procedure. ● DTC is displayed without Tc and CG terminal connection.	● Tc terminal circuit	DI–187

6. CIRCUIT INSPECTION

How to read and use each page is shown below.





B00803

● Indicates the position of the ignition switch during the check.

LOCK
Ignition Switch LOCK (OFF)

ON
Ignition Switch ON

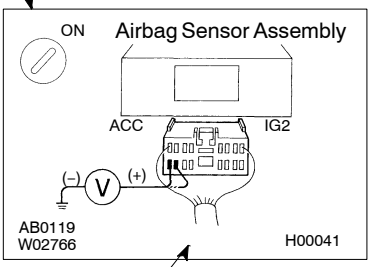
START
Ignition Switch START

ACC
Ignition Switch ACC

● Inspection Procedure
Use the inspection procedure to determine if the circuit is normal or abnormal, and if it is abnormal, use it to determine whether the problem is located in the sensors, actuators, wire harness or ECU.

INSPECTION PROCEDURE

2	**Check voltage at IG2 and ACC of airbag sensor assembly.**



PREPARATION:
Turn ignition switch ON.

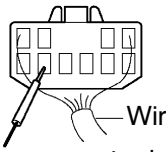
CHECK:
Measure voltage between terminals IG2 and ACC of airbag sensor assembly and body ground.

OK:
Voltage: Below 16 V

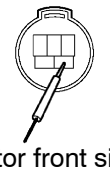
NG → **Check battery and charging system (See charging system section).**

OK

● Indicates the place to check the voltage or resistance.
● Indicates the connector position to be checked, from the front or back side.

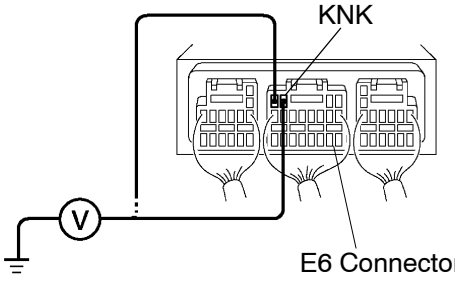


Check from the connector back side (with harness).

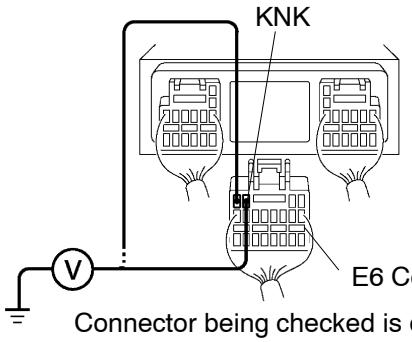


Check from the connector front side (without harness).
In this case, care must be taken not to bend the terminals.

● Indicates the condition of the connector of ECU during the check.



Connector being checked is connected.

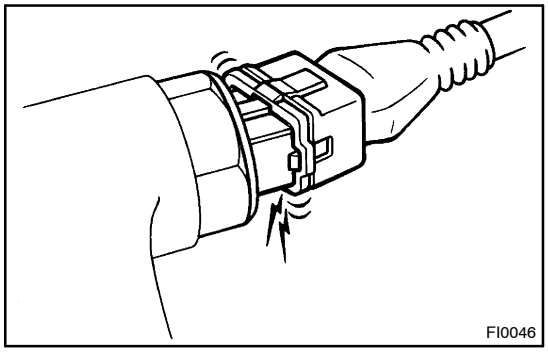


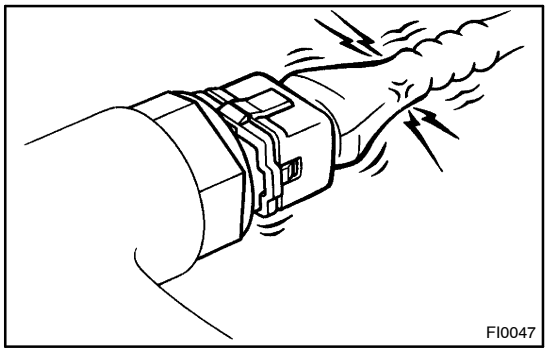
Connector being checked is disconnected.

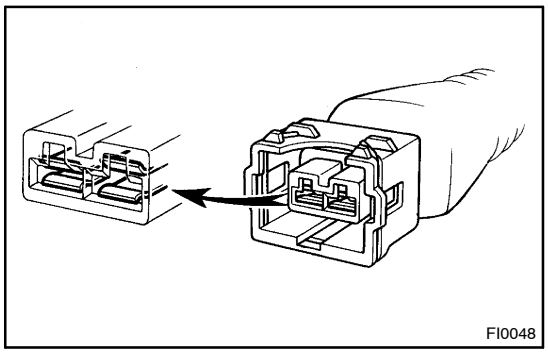
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FI0046


FI0047


FI0048

HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE

1. CONNECTOR CONNECTION AND TERMINAL INSPECTION

- For troubleshooting, diagnostic trouble code charts or problem symptom table are provided for each circuit with detailed inspection procedures on the following pages.
- When all the component parts, wire harnesses and connectors of each circuit except the ECU are found to be normal in troubleshooting, then it is determined that the problem is in the ECU. Accordingly, if diagnosis is performed without the problem symptoms occurring, refer to Step 8 to replace the ECU. So always confirm that the problem symptoms are occurring, or proceed with inspection while using the symptom simulation method.
- The instructions ”Check wire harness and connector” and ”Check and replace ECU” which appear in the inspection procedure, are common and applicable to all diagnostic trouble codes. Follow the procedure outlined below whenever these instructions appear.

OPEN CIRCUIT:

This could be due to a disconnected wire harness, faulty contact in the connector, a connector terminal pulled out, etc.

HINT:

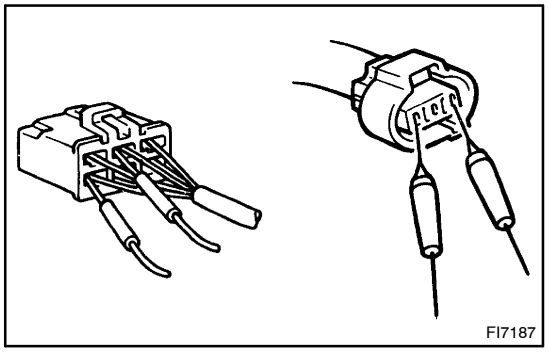
- It is rarely the case that a wire is broken in the middle of it. Most cases occur at the connector. In particular, carefully check the connectors of sensors and actuators.
- Faulty contact could be due to rusting of the connector terminals, to foreign materials entering terminals or a deformation of connector terminals. Simply disconnecting and reconnecting the connectors once changes the condition of the connection and may result in a return to normal operation. Therefore, in troubleshooting, if no abnormality is found in the wire harness and connector check, but the problem disappears after the check, then the cause is considered to be in the wire harness or connectors.

SHORT CIRCUIT:

This could be due to a short circuit between wire harness and the body ground or to a short circuit occurred inside the switch, etc.

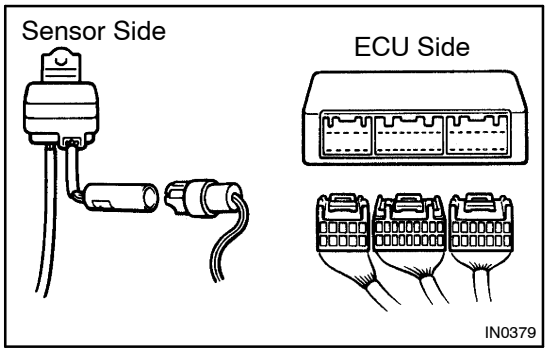
HINT:

When there is a short circuit between the wire harness and body ground, check thoroughly whether the wire harness is caught in the body or is clamped properly.



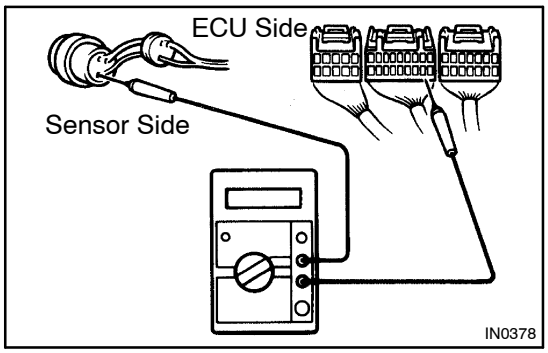
2. CONNECTOR HANDLING

When inserting tester probes into a connector, insert them from the rear of the connector. When necessary, use mini test leads. For water resistant connectors which cannot be accessed from behind, take good care not to deform the connector terminals.



3. CONTINUITY CHECK (OPEN CIRCUIT CHECK)

(a) Disconnect the connectors at both ECU and sensor sides.

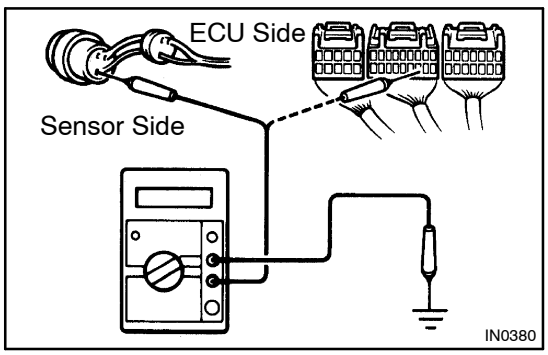


(b) Measure the resistance between the applicable terminals of the connectors.

Resistance: 1 Ω or less

HINT:

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



4. RESISTANCE CHECK (SHORT CIRCUIT CHECK)

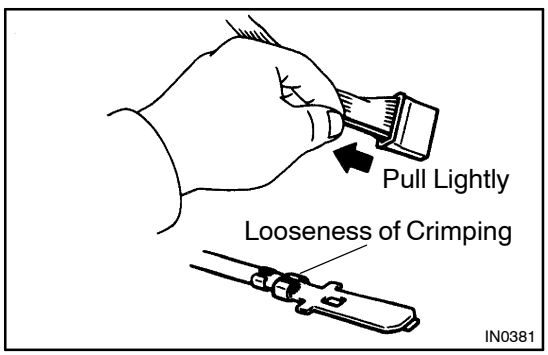
(a) Disconnect the connectors on both ends.

(b) Measure the resistance between the applicable terminals of the connectors and body ground. Be sure to carry out this check on the connectors on both ends.

Resistance: 1 MΩ or higher

HINT:

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



5. VISUAL CHECK AND CONTACT PRESSURE CHECK

(a) Disconnect the connectors at both ends.

(b) Check for rust or foreign material, etc. in the terminals of the connectors.

(c) Check crimped portions for looseness or damage and check that the terminals are secured in lock portion.

HINT:

The terminals should not come out when pulled lightly from the back.

(d) Prepare a test male terminal and insert it in the female terminal, then pull it out.

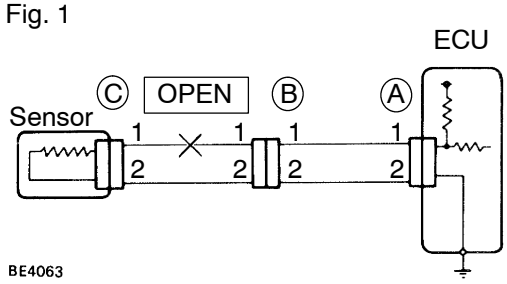
NOTICE:

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

HINT:

When the test terminal is pulled out more easily than others, there may be poor contact in that section.

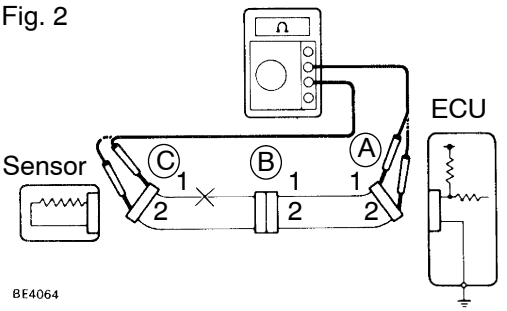
Fig. 1



6. CHECK OPEN CIRCUIT

For the open circuit in the wire harness in Fig. 1, perform "(a) Continuity Check" or "(b) Voltage Check" to locate the section.

Fig. 2



(a) Check the continuity.

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

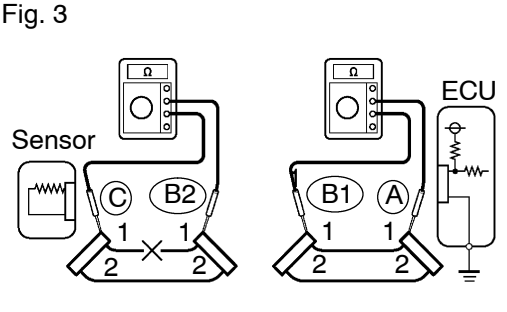
In the case of Fig. 2:

Between terminal 1 of connector "A" and terminal 1 of connector "C" → No continuity (open)

Between terminal 2 of connector "A" and terminal 2 of connector "C" → Continuity

Therefore, it is found out that there is an open circuit 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.

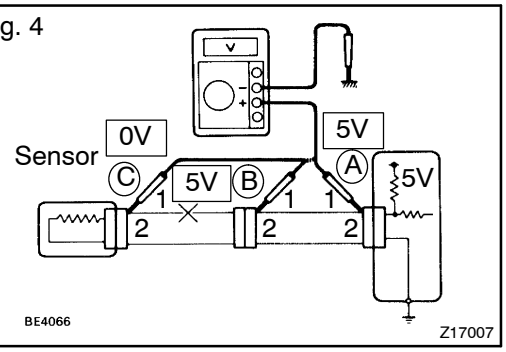
In the case of Fig. 3:

Between terminal 1 of connector "A" and terminal 1 of connector "B1" → Continuity

Between terminal 1 of connector "B2" and terminal 1 of connector "C" → No continuity (open)

Therefore, it is found out that there is an open circuit between terminal 1 of connector "B2" and terminal 1 of connector "C".

Fig. 4



(b) Check the voltage.

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

As shown in Fig. 4, with each connector still connected, measure the voltage between body ground and terminal 1 of connector ”A” at the ECU 5V output terminal, terminal 1 of connector ”B”, and terminal 1 of connector ”C”, in that order.

If the results are:

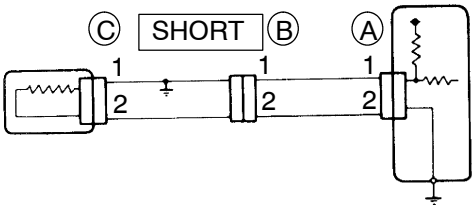
5V: Between Terminal 1 of connector ”A” and Body Ground

5V: Between Terminal 1 of connector ”B” and Body Ground

0V: Between Terminal 1 of connector ”C” and Body Ground

Then it is found out that there is an open circuit in the wire harness between terminal 1 of ”B” and terminal 1 of ”C”.

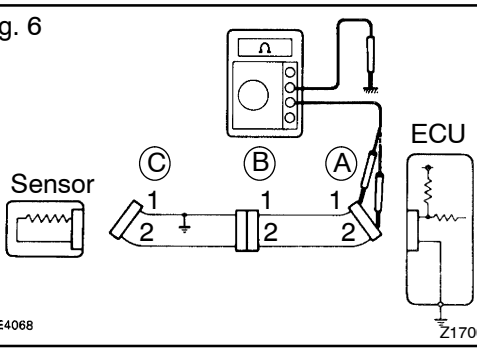
Fig. 5



7. CHECK SHORT CIRCUIT

If the wire harness is ground shorted as in Fig. 5, locate the section by conducting a ”continuity check with ground”.

Fig. 6



Check the continuity with ground.

(1) Disconnect connectors ”A” and ”C” and measure the resistance between terminal 1 and 2 of connector ”A” and body ground.

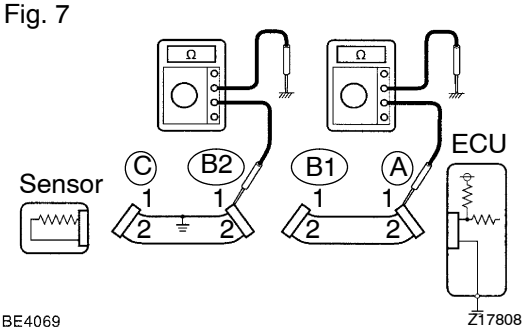
In the case of Fig. 6:

Between terminal 1 of connector ”A” and body ground → Continuity (short)

Between terminal 2 of connector ”A” and body ground → No continuity

Therefore, it is found out that there is a short circuit between terminal 1 of connector ”A” and terminal 1 of connector ”C”.

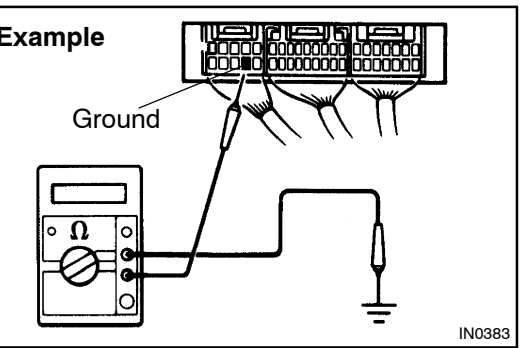
Fig. 7



(2) Disconnect connector ”B” and measure the resistance between terminal 1 of connector ”A” and body ground, and terminal 1 of connector ”B2” and body ground.
In the case of Fig. 7:
Between terminal 1 of connector ”A” and body ground → No continuity
Between terminal 1 of connector ”B2” and body ground → Continuity (short)
Therefore, it is found out that there is a short circuit between terminal 1 of connector ”B2” and terminal 1 of connector ”C”.

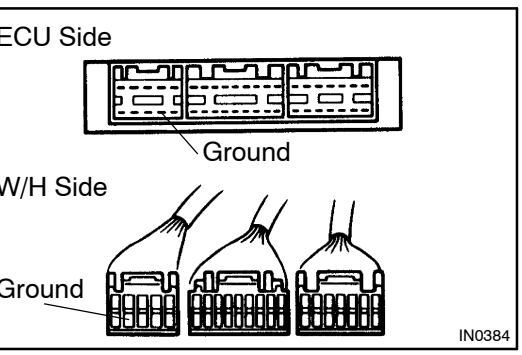
8. CHECK AND REPLACE ECU

First check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty, so replace the ECU with a normal one and check that the symptoms appear.



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

Resistance: 1 Ω or less



(2) Disconnect the ECU connector, check the ground terminals on the ECU side and the wire harness side for bend and check the contact pressure.

TERMS

ABBREVIATIONS USED IN THIS MANUAL

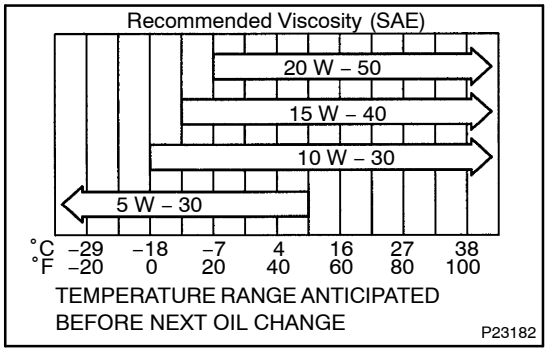
IN0FG–01

Abbreviations	Meaning
ABS	Anti–Lock Brake System
A/C	Air Conditioner
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACSD	Automatic Cold Start Device
A.D.D.	Automatic Disconnecting Differential
AHC	Active Height Control Suspension
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
APPROX.	Approximately
A/T	Automatic Transmission (Transaxle)
ATF	Automatic Transmission Fluid
AUTO	Automatic
BA	Brake Assist
BACS	Boost Altitude Compensation System
BAT	Battery
B/L	Bi–Level
BVSV	Bimetallic Vacuum Switching Valve
CB	Circuit Breaker
CD	Compact Disc
CH	Channel
CKD	Complete Knock Down
COMB.	Combination
CPE	Coupe
CRS	Child Restraint System
CTR	Center
DC	Direct Current
DIFF.	Differential
DIFF. LOCK	Differential Lock
DLC	Data Link Connector
DSP	Digital Signal Processor
DTC	Diagnostic Trouble Code
EBD	Electronic Brake Force Distribution
ECT	Electronic Control Transmission
ECU	Electronic Control Unit
EDU	Electronic Driving Unit
EFI	Electronic Fuel Injection
E/G	Engine
ELR	Emergency Locking Retractor

FF	Front–Engine Front–Wheel–Drive
FIPG	Formed In Place Gasket
FL	Fusible Link
Fr	Front
FR	Front–Engine Rear–Wheel–Drive
FWD	Front–Wheel–Drive
GND	Ground
GSA	Gear Shift Actuator
H/B	Hatchback
HI	High
HID	High Intensity Discharge (Head Lamp)
HPU	Hydraulic Power Unit
HT	Hard Top
HWS	Heated Windshield System
IAC	Idle Air Control
IFS	Independent Front Suspension
IG	Ignition
INT	Intermittent
I/P	Instrument Panel
IRS	Independent Rear Suspension
J/B	Junction Block
J/C	Junction Connector
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	Left–Hand
LHD	Left–Hand Drive
LO	Low
LSD	Limited Slip Differential
LSP & PV	Load Sensing Proportioning And Bypass Valve
LSPV	Load Sensing Proportioning Valve
MAP	Manifold Absolute Pressure
MAX.	Maximum
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MP	Multipurpose
MPI	Multipoint Electronic Fuel Injection
MPX	Multiplex Communication System
M/T	Manual Transmission (Transaxle)
N	Neutral
No.	Number
O2S	Oxygen Sensor
O/D	Overdrive
OPT	Option

P & BV	Proportioning And Bypass Valve
PCS	Power Control System
PKB	Parking Brake
PPS	Progressive Power Steering
PS	Power Steering
PTO	Power Take–Off
RAM	Random Access Memory
R/B	Relay Block
RBS	Recirculating Ball Type Steering
R/F	Reinforcement
RFS	Rigid Front Suspension
RH	Right–Hand
RHD	Right–Hand Drive
RLY	Relay
ROM	Read Only Memory
Rr	Rear
RR	Rear–Engine Rear–Wheel Drive
RRS	Rigid Rear Suspension
RWD	Rear–Wheel Drive
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SMT	Sequential Manual Transmission
SPEC	Specification
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
SW	Switch
SYS	System
T/A	Transaxle
TACH	Tachometer
TDC	Top Dead Center
TEMP.	Temperature
TEMS	TOYOTA Electronic Modulated Suspension
TFT	Toyota Free–Tronic
T/M	Transmission
TMC	TOYOTA Motor Corporation
TRC	Traction Control System
U/D	Underdrive
VENT	Ventilator
VIN	Vehicle Identification Number
VSC	Vehicle Stability Control
w/	With
WGN	Wagon
W/H	Wire Harness

w/o	Without
1st	First
2nd	Second
2WD	Two Wheel Drive Vehicle (4x2)
4WD	Four Wheel Drive Vehicle (4x4)



OIL AND FILTER

LU05G–07

INSPECTION

1. CHECK OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If oil quality is visibly poor, replace the oil.

Oil grade:

API grade SH, Energy–Conserving II or SJ, Energy–Conserving ILSAC multigrade engine oil. Recomended viscosity is as shown in the illustration.

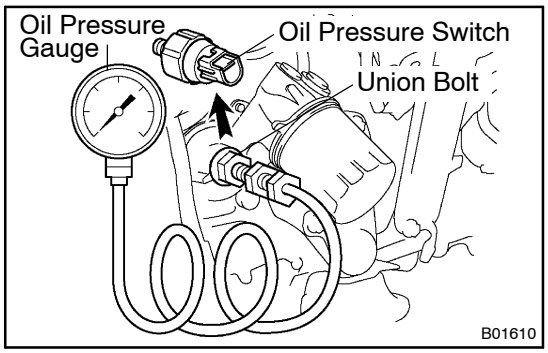
2. CHECK ENGINE OIL LEVEL

After warming up the engine and then 5 minutes after the engine stop, oil level should be between the low level and full level marks of the dipstick.

If low, check for leakage and add oil up to the full level mark.

NOTICE:

Do not fill with engine oil above the F mark.



3. CHECK OIL PRESSURE

(a) Disconnect the oil pressure switch connector.

(b) Using SST, remove the oil pressure switch.
SST 09816–30010

(c) Install an oil pressure gauge.

(d) Warm up the engine.

(e) Measure the oil pressure.

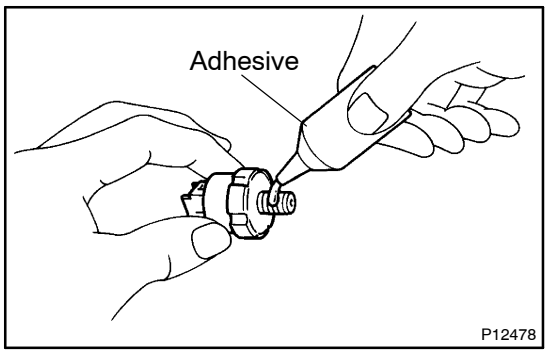
Standard:

Engine speed	Oil pressure
Idle	49 kPa (0.5 kgf/cm^2, 7 psi) or more
3,000 rpm	324 kPa (3.3 kgf/cm^2, 47 psi) or more

(f) Remove the oil pressure gauge.

(g) Tighten the union bolt.

Torque: 90 N·m (900 kgf·cm, 66 ft·lbf)



(h) Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(i) Using SST, reinstall the oil pressure switch.
SST 09816–30010

Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(j) Reconnect the oil pressure switch connector.

4. CHECK ENGINE OIL LEAK

LU05H–07

REPLACEMENT

CAUTION:

- **Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.**
- **Exercise caution in order to minimize the length and frequency of contact of your skin to used oil. Wear protective clothing and gloves. Wash your skin thoroughly with soap and water, or use water–less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.**
- **In order to preserve the environment, used oil and used oil filters must be disposed of only at designated disposal sites.**

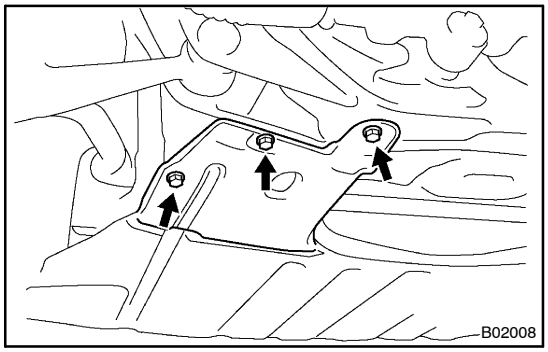
1. DRAIN ENGINE OIL

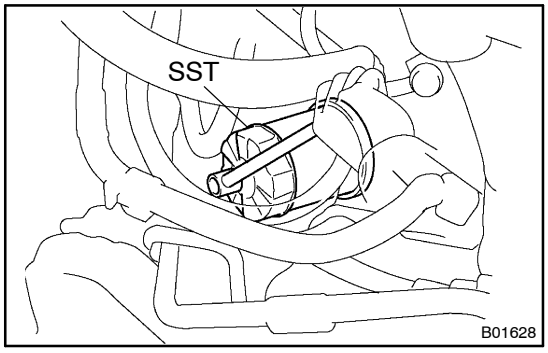
(a) Remove the oil filler cap.

(b) Remove the oil drain plug, and drain the oil into a container.

2. REPLACE OIL FILTER

(a) Remove the 3 screws, and bend the engine under cover.

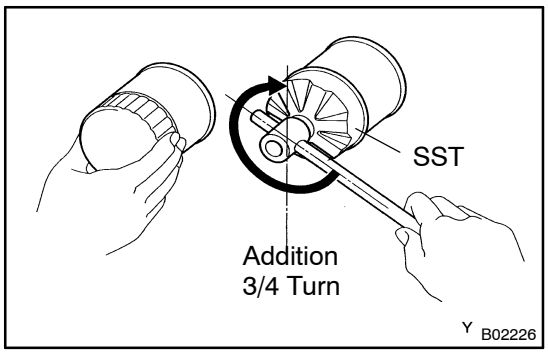




(b) Using SST, remove the oil filter.
SST 09228–07501

(c) Clean the oil filter contact surface on the oil filter mounting.

(d) Lubricate the filter rubber gasket with clean engine oil.



(e) Tighten the oil filter by hand until the rubber gasket contacts the seat of the filter mounting.

(f) Using SST, tighten it an additional 3/4 turn to seat the filter.
SST 09228–07501

(g) Reinstall the engine under cover with the 3 screws.

3. FILL WITH ENGINE OIL

(a) Clean and install the oil drain plug with a new gasket.
Torque: 38 N·m (390 kgf·cm, 28 ft·lbf)

(b) Fill with fresh engine oil.
Capacity:

Drain and refill	w/ Oil filter change	5.5 liters (5.8 US qts, 4.8 Imp. qts)
	w/o Oil filter change	5.2 liters (5.5 US qts, 4.5 Imp. qts)
Dry fill		6.6 liters (7.0 US qts, 5.8 Imp. qts)

(c) Reinstall the oil filler cap.

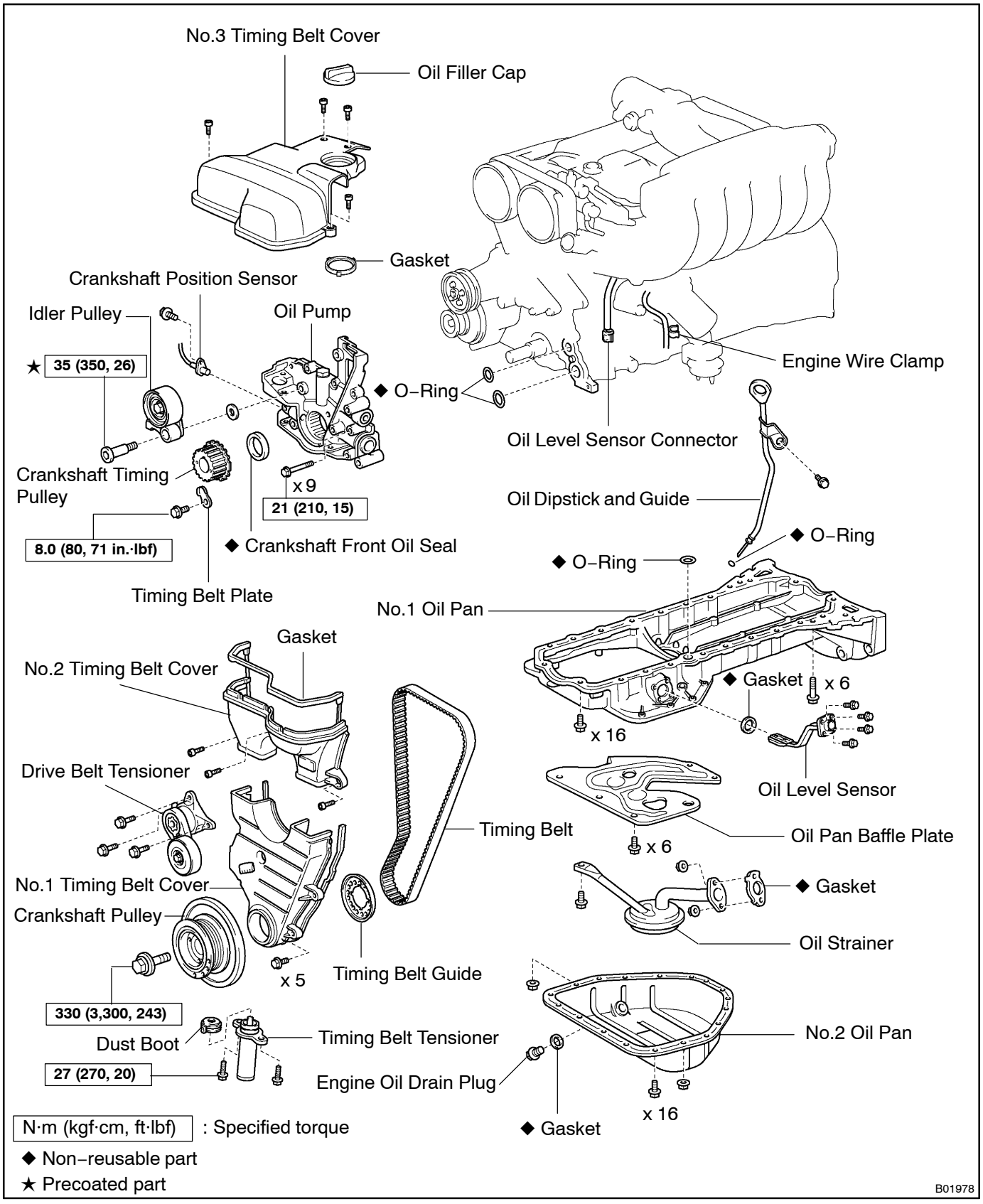
4. CHECK OIL LEAK

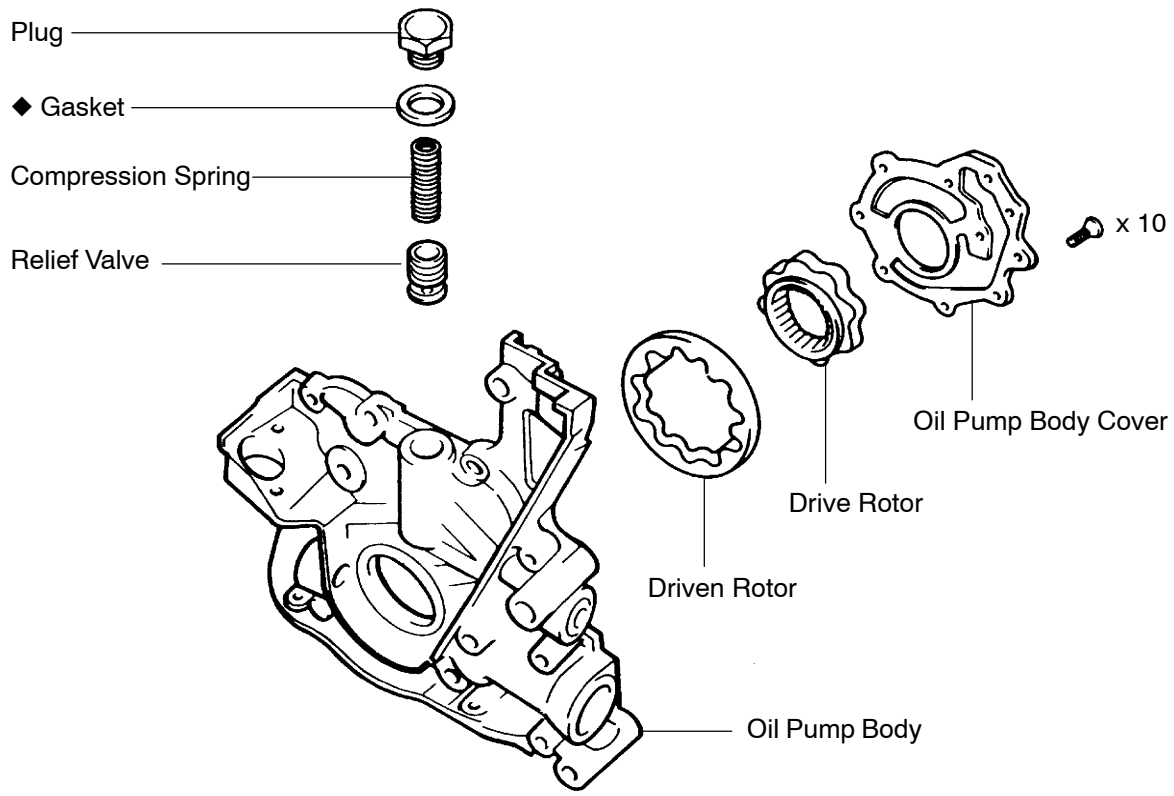
5. RECHECK ENGINE OIL LEVEL

OIL PUMP

COMPONENTS

LU05I–05



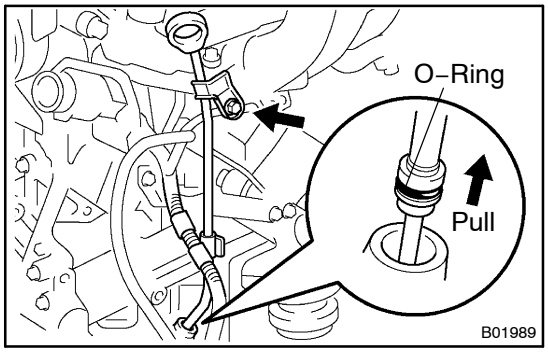

Plug
◆ Gasket
Compression Spring
Relief Valve
x 10
Oil Pump Body Cover
Drive Rotor
Driven Rotor
Oil Pump Body
◆ Non–reusable part
B01643

LU05J–04

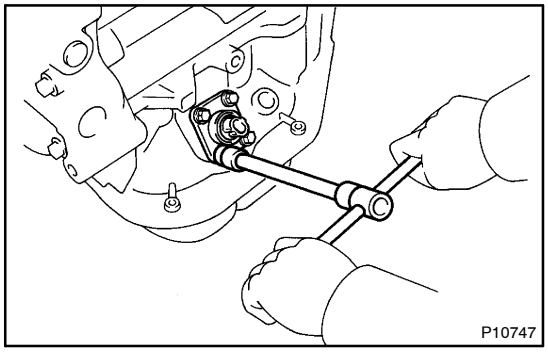
REMOVAL

HINT:
When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

1. **REMOVE ENGINE WITH TRANSMISSION**
   (See page EM–64)
2. **SEPARATE ENGINE AND TRANSMISSION**
   (See page EM–64)
3. **INSTALL ENGINE TO ENGINE STAND FOR REMOVAL**
4. **REMOVE CRANKSHAFT POSITION SENSOR**
5. **REMOVE TIMING BELT, IDLER PULLEY AND CRANKSHAFT TIMING PULLEY (See page EM–17)**



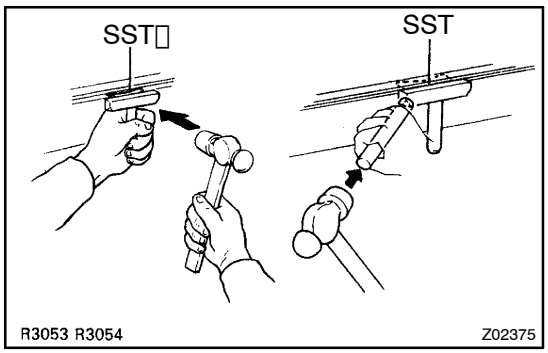
6. **REMOVE OIL DIPSTICK AND GUIDE**
(a) Disconnect the engine wire clamp from the dipstick guide.
(b) Remove the bolt.
(c) Pull out the dipstick guide together with the dipstick.
(d) Remove the O–ring from the dipstick guide.



7. **REMOVE OIL LEVEL SENSOR**
(a) Disconnect the level sensor connector.
(b) Remove the 4 bolts and level sensor.
(c) Remove the gasket from the level sensor.

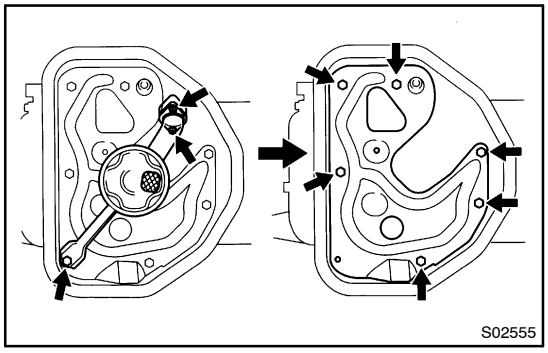
NOTICE:
Be careful not to drop the oil level sensor when removing it.

8. **REMOVE NO.2 OIL PAN**
(a) Remove the 16 bolts and 2 nuts.



(b) Insert the blade of SST between the No.1 and No.2 oil pan, break the seal of the applied sealer and remove the No.2 oil pan.
SST 09032–00100

NOTICE:
Be careful not to damage the No.2 oil pan contact surface of the No.1 oil pan. Be careful not to damage the oil pan flange.

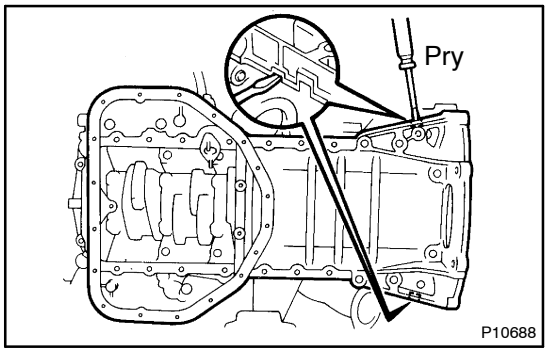


9. REMOVE OIL STRAINER

Remove the bolt, 2 nuts, oil strainer and gasket.

10. REMOVE OIL PAN BAFFLE PLATE

Remove the 6 bolts and baffle plate.



11. REMOVE NO.1 OIL PAN

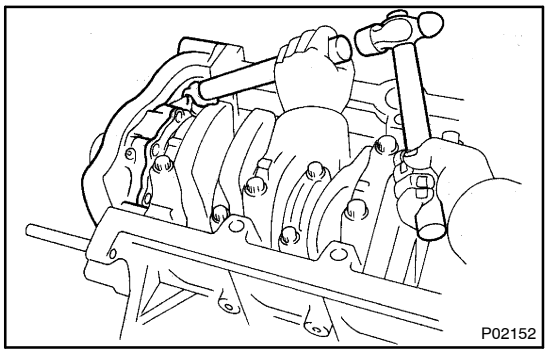
(a) Remove the 22 bolts.

(b) Remove the No.1 oil pan by prying the portions between the cylinder block and No.1 oil pan with a screwdriver.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder block and No.1 oil pan.

(c) Remove the O–ring from the cylinder block.



12. REMOVE OIL PUMP

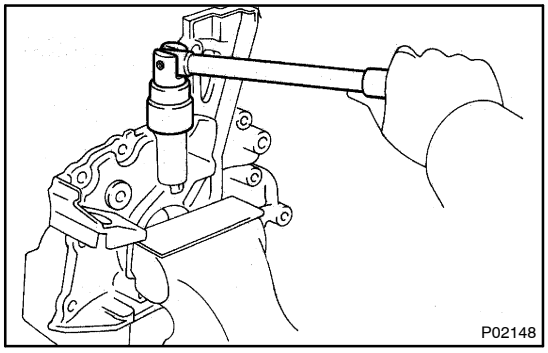
(a) Remove the 9 bolts.

(b) Using a hammer and a brass bar, remove the oil pump by carefully tapping the oil pump body.

(c) Remove the 2 O–rings from the cylinder block.

LU05K–05

DISASSEMBLY



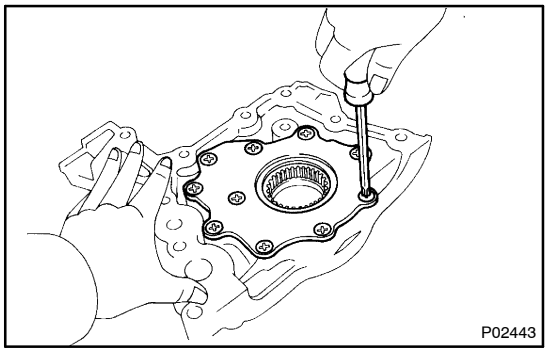
1. REMOVE RELIEF VALVE

(a) Carefully mount the pump body in a soft jaw vise.

(b) Remove the plug, gasket, compression spring and relief valve.

NOTICE:

Be careful not to damage the pump body.

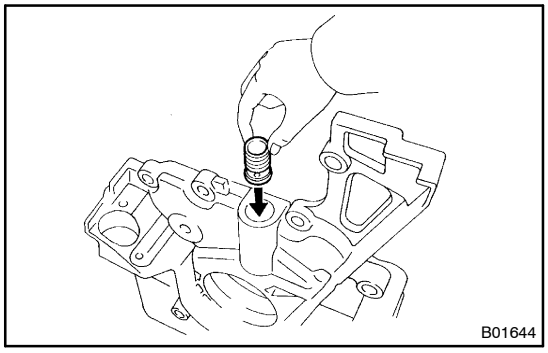


2. REMOVE DRIVE AND DRIVEN ROTORS

Remove the 10 screws, pump body cover, the drive and driven rotors.

LU05L–06

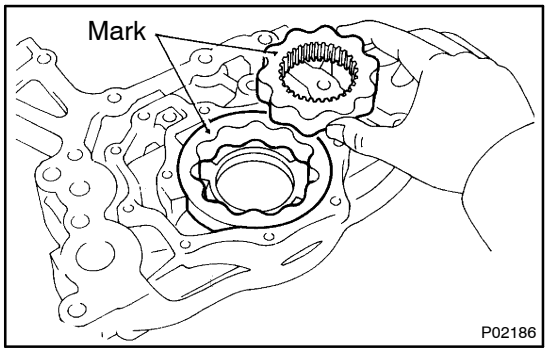
INSPECTION



1. INSPECT RELIEF VALVE

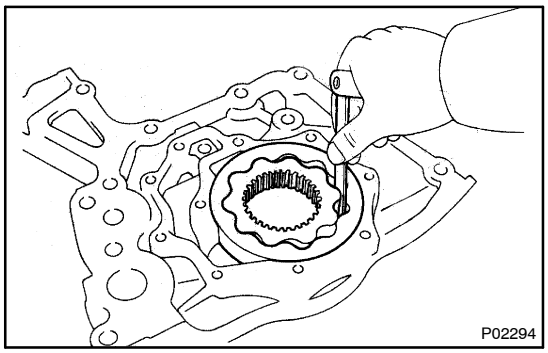
Coat the valve with engine oil and check that it falls smoothly into the valve hole under its own weight.

If it doesn't, replace the relief valve. If necessary, replace the oil pump assembly.



2. PLACE DRIVE AND DRIVEN ROTORS INTO OIL PUMP BODY

The marks on the rotors must face up.

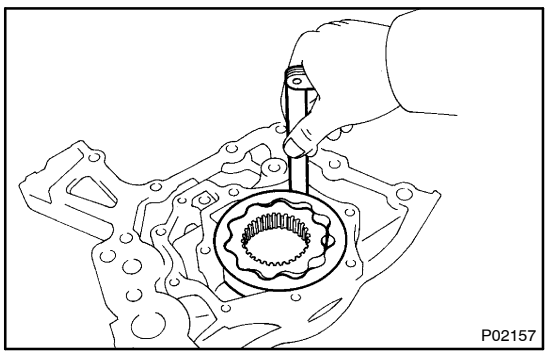


3. INSPECT ROTOR TIP CLEARANCE

Using a feeler gauge, measure the clearance between the drive and driven rotors.

Standard tip clearance:
0.060 – 0.240 mm (0.0024 – 0.0094 in.)
Maximum tip clearance:
0.30 mm (0.0118 in.)

If the tip clearance is greater than maximum, replace the rotors as a set.

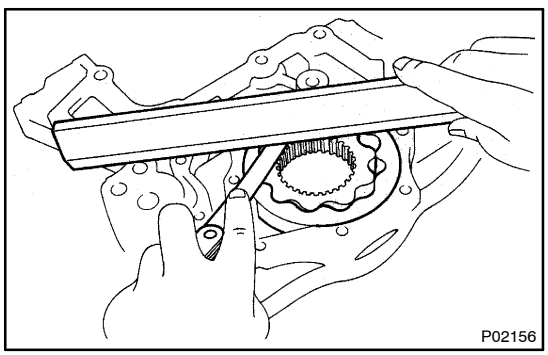


4. INSPECT ROTOR BODY CLEARANCE

Using a feeler gauge, measure the clearance between the driven rotor and pump body.

Standard body clearance:
0.100 – 0.175 mm (0.0039 – 0.0069 in.)
Maximum body clearance:
0.20 mm (0.0079 in.)

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



5. INSPECT ROTOR SIDE CLEARANCE

Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance:
0.030 – 0.090 mm (0.0012 – 0.0035 in.)
Maximum side clearance:
0.12 mm (0.0047 in.)

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

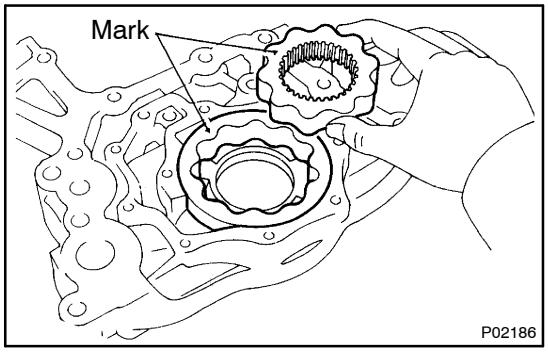
6. REMOVE DRIVE AND DRIVEN ROTORS

LU05M–01

REPLACEMENT

REPLACE FRONT CRANKSHAFT OIL SEAL (See page EM–90).

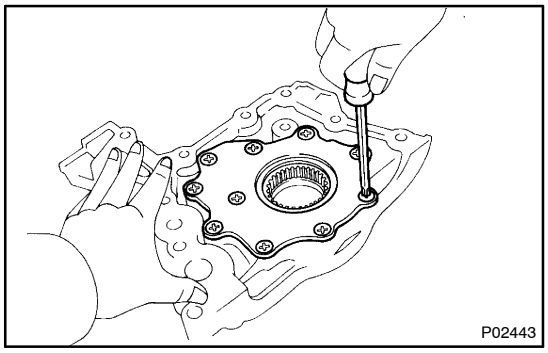
LU05N–05



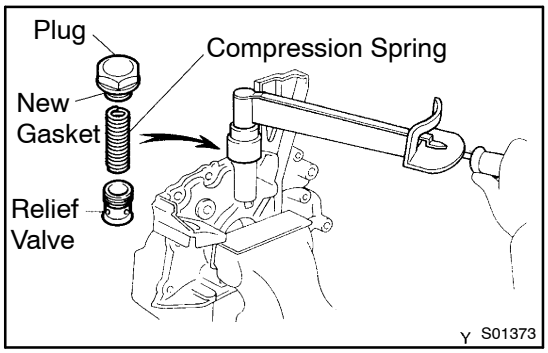
REASSEMBLY

1. INSTALL DRIVE AND DRIVEN ROTORS

(a) Place the drive and driven rotors into oil pump body with the mark facing upward.



(b) Install the pump body cover with the 10 screws.
Torque: 10 N·m (105 kgf·cm, 8 ft·lbf)



2. INSTALL RELIEF VALVE

(a) Carefully mount the pump body in a soft jaw vise.

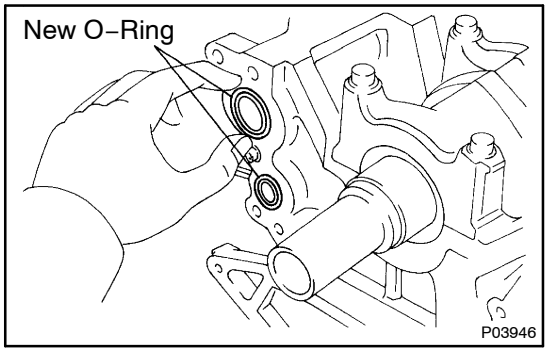
NOTICE:

Be careful not to damage the pump body.

(b) Insert the relief valve and compression spring into the oil pump body hole.

(c) Install the plug with a new gasket.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

LU05O–05



INSTALLATION

1. INSTALL OIL PUMP

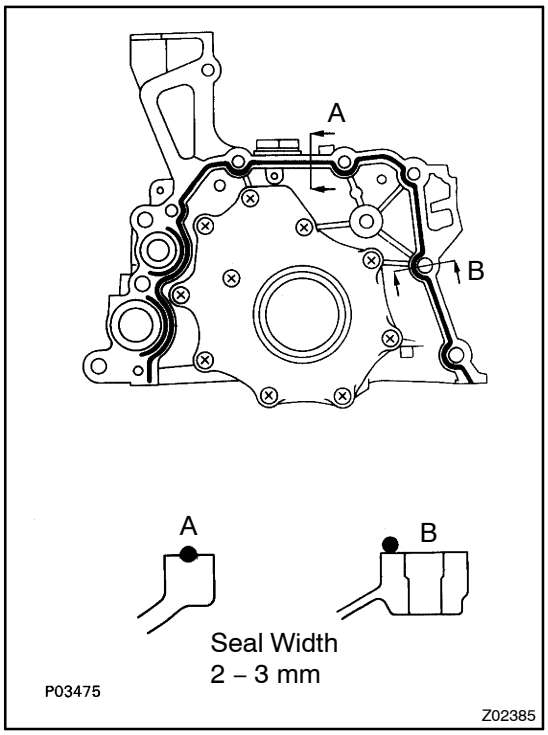
(a) Place 2 new O–rings in position on the cylinder block.

(b) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump and cylinder block.

- Using a razor blade gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the debris.
- Using a non–residue solvent, clean both sealing surfaces.

NOTICE:

Do not use a solvent which will affect the painted surfaces.



(c) Apply seal packing to the oil pump as shown in the illustration.

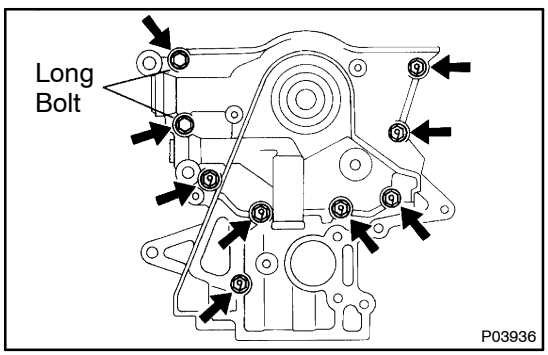
Seal packing: Part No.08826–00080 or equivalent

- Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.

HINT:

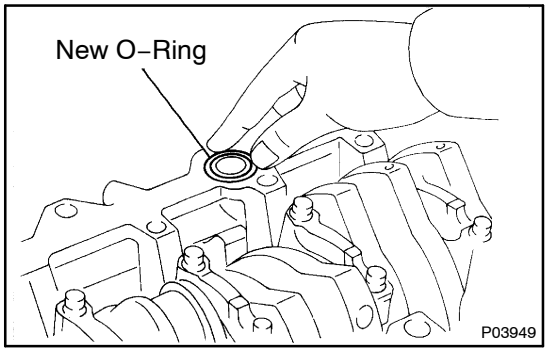
Avoid applying an excessive amount to the surface. Be particularly careful near oil passages.

- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(d) Install the oil pump with the 9 bolts.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)



2. INSTALL NO.1 OIL PAN

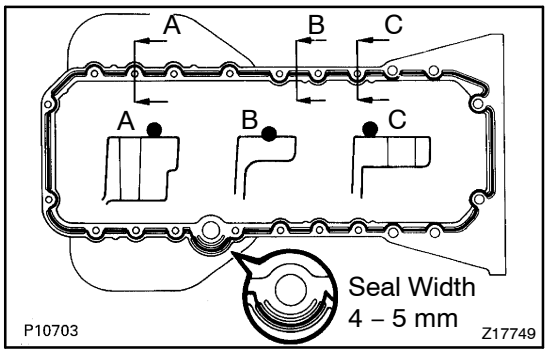
(a) Place a new O–ring in the position on the cylinder block.

(b) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 oil pan and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the debris.
- Using a non–residue solvent, clean both sealing surfaces.

NOTICE:

Do not use a solvent which will affect the painted surfaces.



(c) Apply seal packing to the No.1 oil pan as shown in the illustration.

Seal packing: Part No.08826–00080 or equivalent

- Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(d) Install the No.1 oil pan with the 22 bolts.

Torque:

12 mm head 21 N·m (210 kgf·cm, 15 ft·lbf)

14 mm head 40 N·m (400 kgf·cm, 30 ft·lbf)

3. INSTALL OIL PAN BAFFLE PLATE

Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

4. INSTALL OIL STRAINER

Install a new gasket and the oil strainer with the bolt and 2 nuts.

Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)

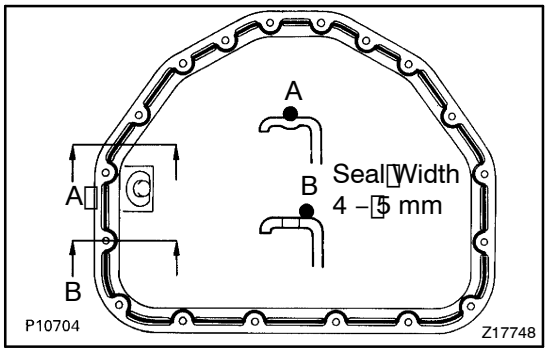
5. INSTALL NO.2 OIL PAN

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 and No.2 oil pans.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the debris.

• Using a non–residue solvent, clean both sealing surfaces.

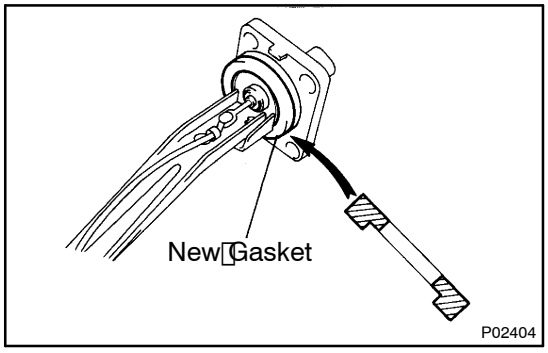
NOTICE:
Do not use a solvent which will affect the painted surfaces.



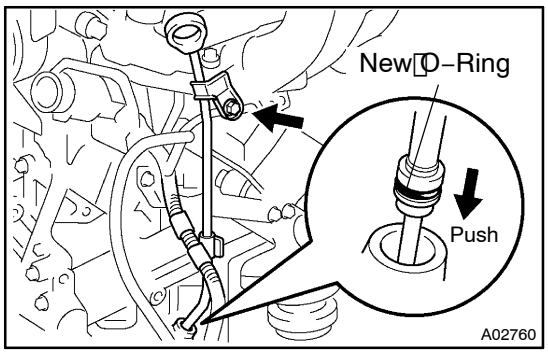
(b) Apply seal packing to the No.2 oil pan as shown in the illustration.
Seal packing: Part No.08826–00080 or equivalent
• Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

HINT:
Avoid applying an excessive amount to the surface.
• Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
• Immediately remove nozzle from the tube and reinstall cap.

(c) Install the No.2 oil pan with the 16 bolts and 2 nuts.
Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)



6. INSTALL OIL LEVEL SENSOR
(a) Install a new gasket to the level sensor.
(b) Install the level sensor with the 4 bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)
(c) Connect the level sensor connector.



7. INSTALL OIL DIPSTICK GUIDE AND DIPSTICK
(a) Install a new O–ring on the dipstick guide.
(b) Apply soapy water on the O–ring.
(c) Push in the dipstick guide into the guide hole of the No.1 oil pan.
(d) Install the dipstick guide with the bolt.
(e) Install the dipstick.
(f) Connect the engine wire clamp to the dipstick guide.

8. INSTALL CRANKSHAFT TIMING PULLEY, IDLER PULLEY AND TIMING BELT (See page EM–24)

9. INSTALL CRANKSHAFT POSITION SENSOR
Torque: 9.0 N·m (90 kgf·cm, 80 in.·lbf)
10. REMOVE ENGINE STAND FROM ENGINE
11. ASSEMBLY ENGINE AND TRANSMISSION (See page EM–70)
12. INSTALL ENGINE WITH TRANSMISSION (See page EM–70)

ENGINE

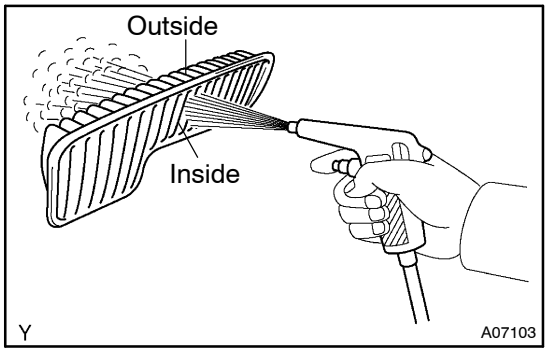
INSPECTION

MA052–01

HINT:

Inspect these items when the engine is cold.

1. **REPLACE TIMING BELT**
   (IS200: See Pub. No. RM684E on page EM–18)
   (IS300: See page EM–17)
2. **INSPECT DRIVE BELT**
   (IS200: See Pub. No. RM684E on page CH–1)
   (IS300: See page CH–1)
3. **REPLACE SPARK PLUGS**
   (IS200: See Pub. No. RM684E on page IG–1)
   (IS300: See page IG–1)



4. **INSPECT AIR 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.

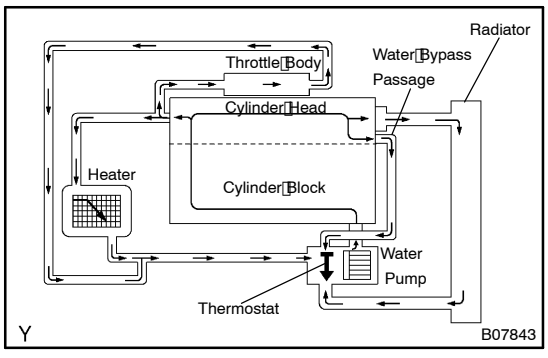
(c) Clean the filter with compressed air.
First blow from the inside thoroughly, then blow the outside of the filter.

(d) Reinstall the air filter.

5. **REPLACE AIR FILTER**

Replace the air filter with a new one.

6. **REPLACE ENGINE OIL AND OIL FILTER**
   (IS200: See Pub. No. RM684E on page LU–3)
   (IS300: See page LU–2)



7. **INSPECT COOLING, HEATER SYSTEM HOSES AND CONNECTIONS**

(a) Check the relating parts for coolant leakage and damage.

• Radiator	• Water pump
• Radiator reservoir	• Cylinder block & Cylinder head
• Drain plugs	• Heater
• Water inlet	• Throttle body
• Water outlet	• Oil cooler

(b) Check the hoses cracks or deterioration.

(c) Check the clamps for looseness.
(d) The coolant level at radiator reservoir should be between "LOW" and "FULL" lines.

8. REPLACE ENGINE COOLANT
(IS200: See Pub. No. RM684E on page CO–2)
(IS300: See page CO–1)

9. INSPECT PCV VALVE, HOSES AND CONNECTIONS
(IS200: See Pub. No. RM684E on page EC–4)
(IS300: See page EC–4)

10. INSPECT CHARCOAL CANISTER
(IS200: See Pub. No. RM684E on page EC–6)
(IS300: See page EC–5)

11. Except Europe:
REPLACE FUEL FILTER
(IS200: See Pub. No. RM684E on page FI–9)
(IS300: See page FI–9)

12. INSPECT FUEL TANK CAP
(IS200: See Pub. No. RM684E on page EC–9)
(IS300: See page EC–5)

13. INSPECT FUEL LINES, CONNECTIONS AND FUEL VAPOR CONTROL VALVE

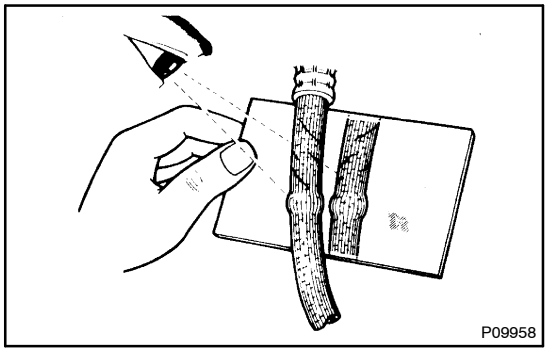
Visually check the fuel lines for cracks, leakage, loose connections, deformation or tank band looseness.

14. INSPECT EXHAUST PIPES AND MOUNTINGS

Visually check the pipes, hangers and connections for severe corrosion, leaks or damage.

15. INSPECT BATTERY
(IS200: See Pub. No. RM684E on page CH–1)
(IS300: See page CH–1)

16. INSPECT VALVE CLEARANCE
(IS200: See Pub. No. RM684E on page EM–6)
(IS300: See page EM–5)



BRAKE

MA01R-09

INSPECTION

1. INSPECT BRAKE LINE PIPES AND HOSES

HINT:

Check in a well lighted area. Check the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before checking the front brake.

(a) Check all brake lines and hoses for.
- Damage
- Wear
- Deformation
- Cracks
- Corrosion
- Leaks
- Bends
- Twists

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

(c) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.

(d) Check that the lines install in grommets pass through the center of the grommets.

2. INSPECT FRONT AND REAR BRAKE PADS AND DISCS
(See Pub. No. RM684E on pages BR–23, 28, 32 and 37)

3. INSPECT PARKING BRAKE LININGS AND DRUMS
(See Pub. No. RM684E on page BR–42)

4. INSPECT OR CHANGE BRAKE FLUID
(See Pub. No. RM684E on page BR–4)
Fluid: SAE J1703 or FMVSS No.116 DOT3

CHASSIS

MA01S–03

INSPECTION

1. INSPECT CLUTCH PEDAL (See Pub. No. RM684E on page CL–2)

(a) Check the pedal for smooth operation.

(b) Check that the pedal has the proper freeplay.

2. INSPECT CLUTCH FLUID

3. INSPECT POWER STEERING FLUID (See Pub. No. RM684E on page SR–6)

4. INSPECT DRIVE SHAFT BOOTS

Inspect the drive shaft boots for clamp looseness, grease leakage or damage.

5. INSPECT STEERING LINKAGE

(a) Check the steering wheel freeplay (See page SR–6).

(b) Check the steering linkage for looseness or damage.

Check that:

- Tie rod ends do not have excessive play.
- Dust seals and boots are not damaged.
- Boot clamps are not loose.

6. INSPECT STEERING GEAR HOUSING OIL

Check the steering gear housing for oil leakage.

7. CHECK WHEEL ALIGNMENT (SIDE SLIP)

Side slip: 3.0 mm/m (0.118 in./3.3 ft) or less

8. INSPECT LOWER BALL JOINTS AND DUST COVERS

(a) Jack up the front of the vehicle and support it with stands.

(b) Make sure the front wheels are in a straight–ahead position, and depress the brake pedal.

(c) Jack up the lower suspension arm until there is about half a load on the front coil spring.

(d) Inspect the dust cover for damage.

9. CHECK AUTOMATIC TRANSMISSION AND DIFFERENTIAL

Visually check the automatic transmission and differential for oil leakage.

If leakage is found, check for the cause and repair it.

10. CHECK MANUAL TRANSMISSION AND DIFFERENTIAL

Visually check the manual transmission and differential for oil leakage.

If leakage is found, check for the cause and repair it.

11. REPLACE AUTOMATIC TRANSMISSION FLUID

(IS200: See Pub. No. RM684E on page DI–156) (IS300: See page AT–1)

12. REPLACE MANUAL TRANSMISSION OIL (See Pub. No. RM684E on page MT–5)

13. REPLACE DIFFERENTIAL OIL

(IS200: See Pub. No. RM684E on page SA–69) (IS300: See page SA–40)

14. INSPECT FRONT AND REAR SUSPENSIONS

(a) Check the suspension parts for looseness or damage.

(b) Check the shock absorber performance.

(c) Check the vehicle for tilting.

(d) Check the springs for wear or breakage.

(e) Check the suspension bushings for wear.

(f) Check the wheel bearings for wear or noise.

- Jack up the front and rear axle and support them on stands.
- Move the wheel in axial and radial directions and check the wheel bearing for wear.
- Rotate the wheel and check the bearing for noise.

BODY

MA053–01

INSPECTION

1. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

(a) Where necessary, tighten all parts of the chassis.
- Front axle and suspension
- Driven train
- Rear axle and suspension
- Steering system
- Brake system
- Engine mounting etc.

(b) Where necessary, tighten all parts of the body.
- Seat belt system
- Seats
- Doors and hood
- Body mountings
- Fuel tank
- Exhaust pipe system etc.

2. CHECK TIRES AND INFLATION PRESSURE

(a) Check tires for abnormal abrasion or cracks.

(b) Check and adjust the tires inflation pressure.

Cold tire inflation pressure: (See page SA–1)

3. CHECK LIGHTS, HORNS, WIPERS AND WASHERS

Check the function of lights, horns, wipers and washers.

4. REPLACE AIR REFINER FILTER (See Pub. No. RM684E on page AC–96)

5. Except Europe:
CHECK AIR CONDITIONER REFRIGERANT AMOUNT
(See Pub. No. RM684E on page AC–3)

6. Europe:
CORROSION INSPECTION

7. Australia:
ROAD TEST

(a) Check the engine and chassis for abnormal noises.

(b) Check that the vehicle does not wander or pull to one side.

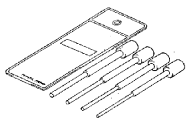
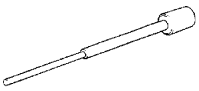
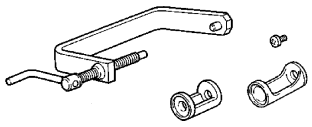
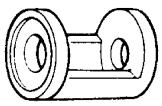
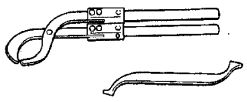
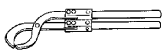
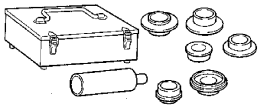
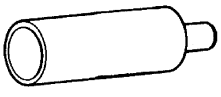
(c) Check that the brakes work properly and do not drag.

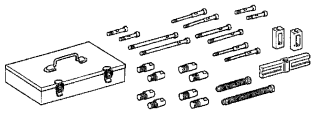
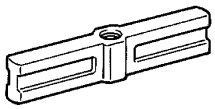
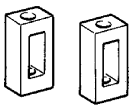
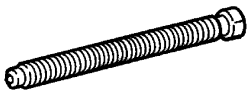
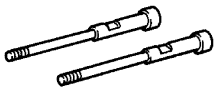
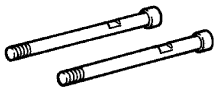
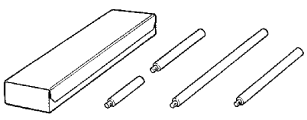
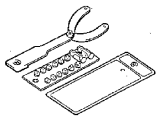
(d) Do setting of the parking brake shoes and drum.

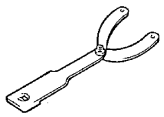
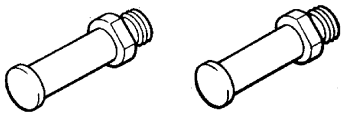
ENGINE MECHANICAL (2JZ–GE)

PP0TD–04

SST (Special Service Tools)

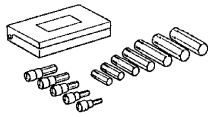
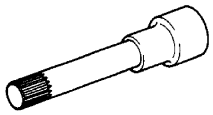
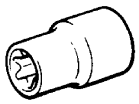
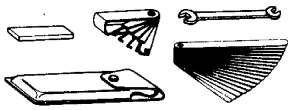
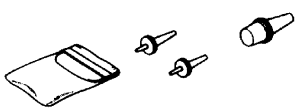
	09201–10000	Valve Guide Bushing Remover & Replacer Set	
	(09201–01060)	Valve Guide Bushing Remover & Replacer 6	
	09202–70020	Valve Spring Compressor	
	(09202–00010)	Attachment	
	09213–70011	Crankshaft Pully Holding Tool	
	09222–30010	Connecting Rod Bushing Remover & Replacer	
	09223–15030	Oil Seal & Bearing Replacer	Crankshaft rear oil seal
	09248–55040	Valve Clearance Adjust Tool Set	
	(09248–05410)	Valve Lifter Press	
	(09248–05420)	Valve Lifter Stopper	
	09316–60011	Transmission & Transfer Bearing Replacer	
	(09316–00011)	Replacer Pipe	Crankshaft front oil seal Camshaft oil seal

	(09316–00051)	Replacer "D"	Camshaft oil seal
	09330–00021	Companion Flange Holding Tool	Crankshaft pulley
	09816–30010	Oil Pressure Switch Socket	Knock sensor Oil pressure switch
	09843–18020	Diagnosis Check Wire	
	09950–50013	Puller C Set	
	(09951–05010)	Hanger 150	Crankshaft pulley Crankshaft timing pulley
	(09952–05010)	Slide Arm	Crankshaft pulley Crankshaft timing pulley
	(09953–05020)	Center Bolt 150	Crankshaft pulley Crankshaft timing pulley
	(09954–05011)	Claw No.1	Crankshaft timing pulley
	(09954–05031)	Claw No.3	Crankshaft pulley
	09950–70010	Handle Set	
	(09951–07100)	Handle 100	Valve guide bushing Crankshaft rear oil seal
	09960–10010	Variable Pin Wrench Set	

	(09962–01000) Variable Pin Wrench Arm Assy	Camshaft timing pulley
	(09963–01000) Pin 10	Camshaft timing pulley

PP0TE–06

RECOMMENDED TOOLS

	09040–00011	Hexagon Wrench Set .	
	09043–50100	Bi–hexagon Wrench 10 mm .	Cylinder head bolt
	09044–00020	Torx Socket E10 .	A/C compressor stud bolt
	09090–04020	Engine Sling Device	For suspending engine
	09200–00010	Engine Adjust Kit .	
	09258–00030	Hose Plug Set .	

PP0TF–07

EQUIPMENT

Abrasive compound	Valve
Bolt (Part No. 90105 – 10345)	For suspending engine
Bolt (Part No. 90119 – 18001)	Crankshaft pulley, Crankshaft timing pulley
Caliper gauge	
CO/HC meter	
Compression gauge	
Connecting rod aligner	
Cylinder gauge	
Dial indicator	
Dye penetrant	
Engine tune–up tester	
Heater	
Micrometer	
Mirror	
Magnetic finger	
No.1 engine hanger (Part No. 12281 – 46050)	For suspending engine
Piston ring compressor	
Piston ring expander	
Plastigage	
Precision straight edge	
Press	
Ridge reamer	Cylinder
Soft brash	
Solvent	
Spring tester	Valve spring
Steel square	Valve spring
Thermometer	
Torque wrench	
Valve seat cutter	
Vernier calipers	
V–block	
Wire brush	

PP1XM–02

SSM (Special Service Materials)

08826–00080	Seal Packing Black or equivalent (FIPG)	No.1, No.3 camshaft bearing cap Cylinder head cover Rear oil seal retainer
08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Drive plate bolt Heater union Torque converter clutch bolt
08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Idler pulley povot bolt

EMISSION CONTROL (2JZ–GE)

PP0TH–09

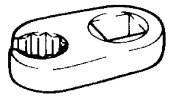
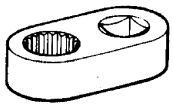
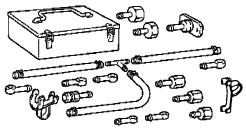
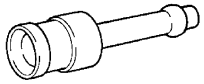
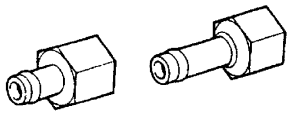
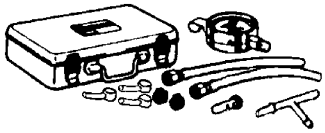
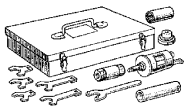
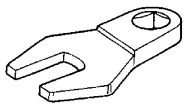
EQUIPMENT

Pressure gauge	
Torque wrench	
Vacuum gauge	

ELECTRONIC FUEL INJECTION (2JZ–GE)

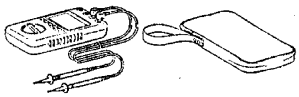
PP3QT–01

SST (Special Service Tools)

	09023–38400	Union Nut Wrench 14mm	
	09205–76030	Cylinder Head Setting Bolt Tightening Adaptor	ECT sensor
	09268–41047	Injection Measuring Tool Set	
	(09268–41110)	Adaptor	
	(09268–41300)	Clamp	
	(09268–52011)	Injection Measuring Attachment	
	09268–45014	EFI Fuel Pressure Gauge	
	09612–24014	Steering Gear Housing Overhaul Tool Set	
	(09617–24011)	Steering Rack Wrench	Fuel pressure pulsation damper
	09816–30010	Oil Pressure Switch Socket	Knock sensor
	09842–30070	Wiring ”F” EFI Inspection	Injector

PP3QU–01

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	

PP0TJ–08

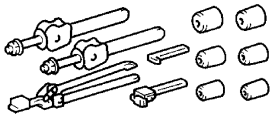
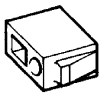
EQUIPMENT

Graduated cylinder	Injector
Heater	
Hand–held tester	
Sound scope	Injector
Thermometer	
Torque wrench	
Vacuum gauge	

COOLING (2JZ–GE)

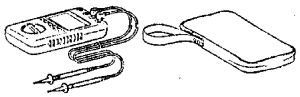
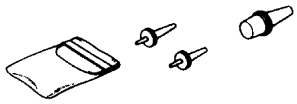
PP0TK–05

SST (Special Service Tools)

	09230–01010	Radiator Service Tool Set	
	09231–14010	Punch	

PP0TL–05

RECOMMENDED TOOLS

	09082–00040	TOYOTA Electrical Tester.	
	09258–00030	Hose Plug Set .	

PP0TM–10

EQUIPMENT

Heater	Thermostat, Water temperature switch
Radiator cap tester	
Rubber hose (Inside diameter 6 – 8 mm)	
Soft–faced hammer	
Thermometer	Thermostat, Water temperature switch
Torque wrench	
Vernier calipers	

PP0TN–07

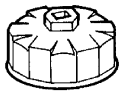
COOLANT

Item	Capacity	Classification
Engine coolant	7.7 liters (8.1 US qts, 6.8 Imp. qts)	TOYOTA Long Life Coolant

LUBRICATION (2JZ–GE)

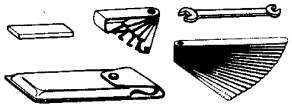
PP0TO–05

SST (Special Service Tools)

	09032–00100	Oil Pan Seal Cutter	
	09228–07501	Oil Filter Wrench	
	09816–30010	Oil Pressure Switch Socket	

PP0TP–01

RECOMMENDED TOOLS

	09200–00010 Engine Adjust Kit .	

PP0TQ–05

EQUIPMENT

Feeler Gauge	Oil pump
Oil pressure gauge	
Precision straight edge	Oil pump
Torque wrench	

PP0TR–08

LUBRICANT

Item	Capacity	Classification
Engine oil		
Dry fill	6.6 liters (7.0 US qts, 5.8 Imp. qts)	API grade SH, Energy–Conserving ll or SJ, IL-SAC Energy–Conserving multigrade engine oil.
Drain and refill		
w/ Oil filter change	5.5 liters (5.8 US qts, 4.8 Imp. qts)	
w/o Oil filter change	5.2 liters (5.5 US qts, 4.5 Imp. qts)	

PP1XN–01

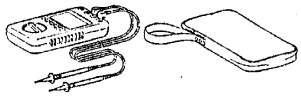
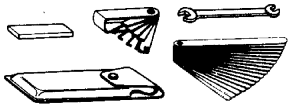
SSM (Special Service Materials)

08826–00080	Seal Packing Black or equivalent (FIPG)	Oil pump No.1 oil pan No.2 oil pan
08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Oil pressure switch

IGNITION (2JZ–GE)

RECOMMENDED TOOLS

PP0TT–01

	09082–00040	TOYOTA Electrical Tester.	
	09200–00010	Engine Adjust Kit .	

PP0TU–08

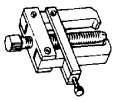
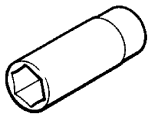
EQUIPMENT

Spark plug cleaner	
Torque wrench	

STARTING (2JZ–GE)

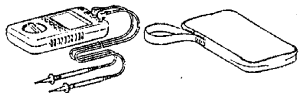
PP0TV–04

SST (Special Service Tools)

	09286–46011	Injection Pump Spline Shaft Puller	Armature bearing
	09810–38140	Starter Magnet Switch Nut Wrench 14	Terminal nut
	09820–00031	Alternator Rear Bearing Replacer	Armature rear bearing

PP0TW–01

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	

PP0TX–01

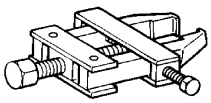
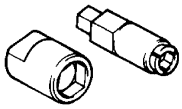
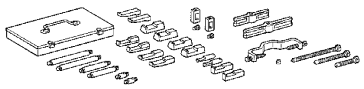
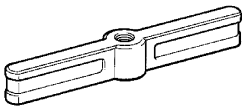
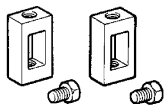
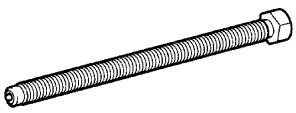
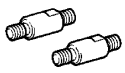
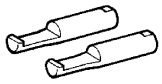
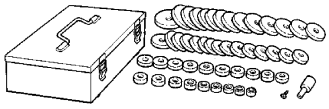
EQUIPMENT

Dial indicator	Commutator runout
High–temperature grease	
Magnetic finger	Steel ball
Press	Magnetic switch terminal kit
Pull scale	Brush spring
Sandpaper	Commutator
Torque wrench	
V–block	Commutator
Vernier calipers	Commutator, Brush

CHARGING (2JZ–GE)

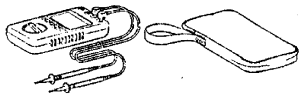
PP0TY–05

SST (Special Service Tools)

	09285–76010	Injection Pump Camshaft Bearing Cone Replacer	Rotor rear bearing cover
	09820–00021	Alternator Rear Bearing Puller	
	09820–00031	Alternator Rear Bearing Replacer	Rotor rear bearing
	09820–63011	Alternator Pulley Set Nut Wrench Set	
	09950–40011	Puller B Set	
	(09951–04020)	Hanger 200	Rectifier end frame
	(09952–04010)	Slide Arm	Rectifier end frame
	(09953–04030)	Center Bolt 200	Rectifier end frame
	(09954–04010)	Arm 25	Rectifier end frame
	(09955–04041)	Claw No.4	Rectifier end frame
	09950–60010	Replacer Set	
	(09951–00500)	Replacer 50	Rotor front bearing

PP0TZ–01

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	

PP0U0–01

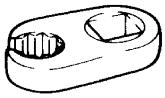
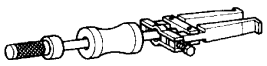
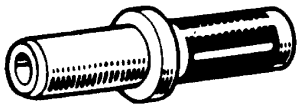
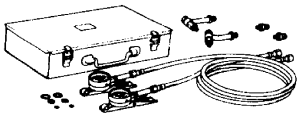
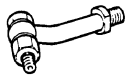
EQUIPMENT

Ammeter (A)	
Battery specific gravity gauge	Except maintenance–free battery
Torque wrench	
Vernier calipers	Rotor (Slip ring)

AUTOMATIC TRANSMISSION

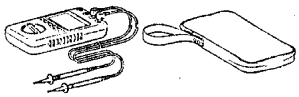
PP3QV–01

SST (Special Service Tools)

	09032–00100	Oil Pan Seal Cutter	Oil pan
	09023–12700	Union Nut Wrench 17mm	
	09308–00010	Oil Seal Puller	Extension housing rear oil seal
	09325–20010	Transmission Oil Plug	Extension housing rear oil seal
	09350–30020	TOYOTA Automatic Transmission Tool Set	
	(09351–32020)	Stator Stopper	
	09843–18040	Diagnosis Check Wire No.2	
	09992–00095	Automatic Transmission Oil Pressure Gauge Set	
	(09992–00231)	Adaptor C	
	(09992–00271)	Gauge Assy	

PP3BQ–02

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	

PP0N6–10

EQUIPMENT

OBD II scan tool	
Dial indicator or dial indicator with magnetic base	
Straight edge	
Torque wrench	

PP0N7–14

LUBRICANT

Item	Capacity	Classification
Automatic transmission fluid		
Dry fill	8.2 liters (8.7 US qts, 7.2 Imp. qts)	ATF TYPE T–IV
Drain and refill	2.0 liters (2.1 US qts, 1.8 Imp. qts)	

PP3BR–02

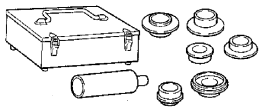
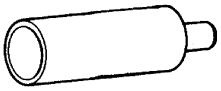
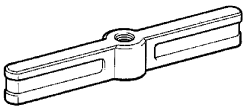
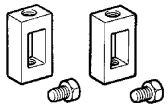
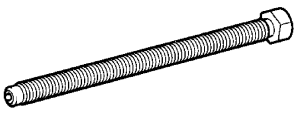
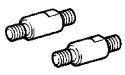
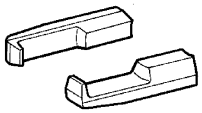
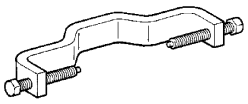
SSM (Special Service Materials)

08826–00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	Transmission case x Oil pan
08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Extension housing set bolt
08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Transmission case x Extension housing

PROPELLER SHAFT

PP3R1–01

SST (Special Service Tools)

	09316–60011	Transmission & Transfer Bearing Replacer	
	(09316–00011)	Replacer Pipe	
	09325–40010	Transmission Oil Plug	
	09330–00021	Companion Flange Holding Tool	
	09950–40011	Puller B Set	
	(09951–04020)	Hanger 200	
	(09952–04010)	Slide Arm	
	(09953–04030)	Center Bolt 200	
	(09954–04010)	Arm 25	
	(09955–04061)	Claw No.6	
	(09957–04010)	Attachment	
	(09958–04011)	Holder	

PP0ST–02

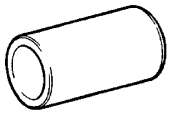
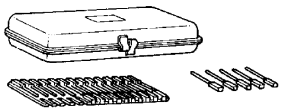
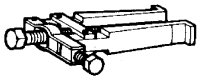
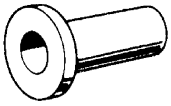
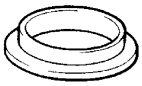
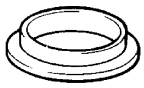
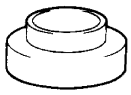
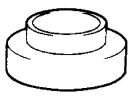
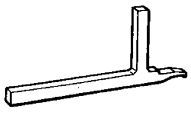
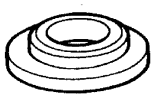
EQUIPMENT

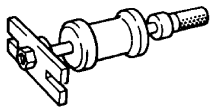
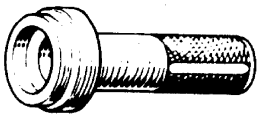
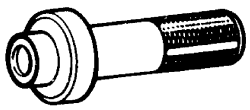
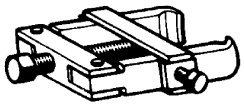
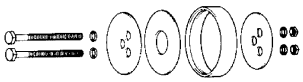
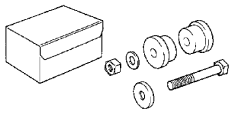
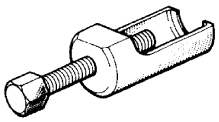
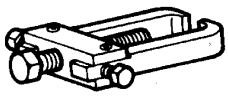
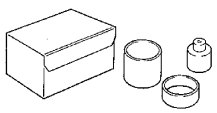
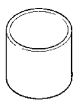
Dial indicator	
Torque wrench	

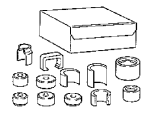
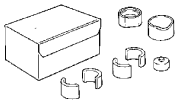
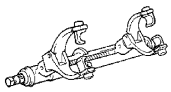
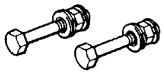
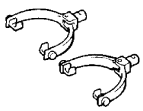
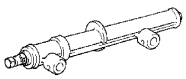
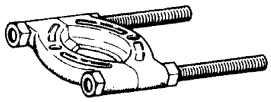
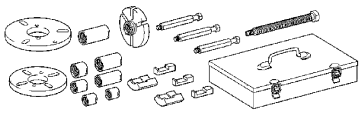
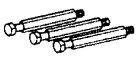
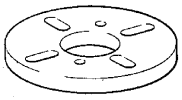
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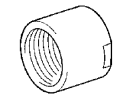
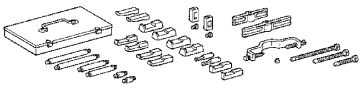
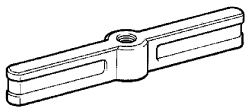
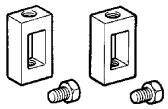
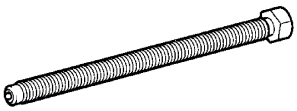
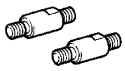
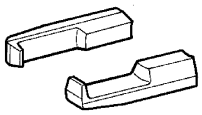
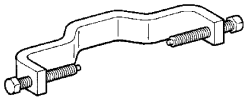
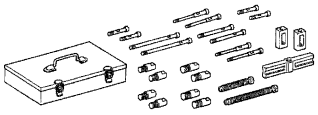
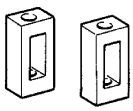
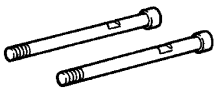
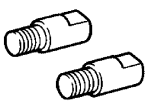
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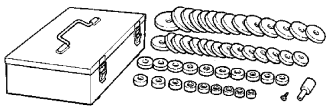
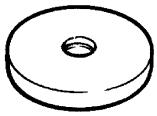
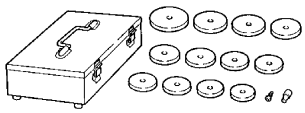
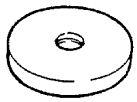
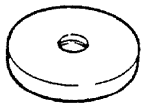
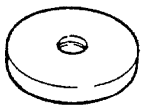
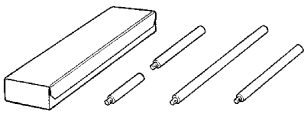
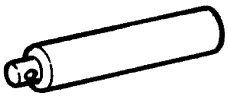
SST (Special Service Tools)

	09223–00010	Cover & Seal Replacer	Rear differential
	09240–00020	Wire Gauge Set	
	09308–00010	Oil Seal Puller	Rear differential
	09308–10010	Oil Seal Puller	Rear differential
	09309–36010	Transmission Rear Bearing Replacer	Rear drive shaft
	09316–12010	Transfer Bearing Replacer	Rear differential
	09330–00021	Companion Flange Holding Tool	Rear differential
	09502–12010	Differential Bearing Replacer	Rear drive shaft
	09502–24010	Bearing Replacer	Front axle
	09502–24010	Bearing Replacer	
	09504–22012	Differential Side Bearing Replacer	
	09506–30012	Differential Drive Pinion Rear Bearing Cone Replacer	Rear differential

	09520–24010	Differential Side Gear Shaft Puller	Rear differential
	09554–22010	Differential Oil Seal Replacer	Rear differential
	09554–30011	Differential Oil Seal Replacer	Rear differential
	09556–22010	Drive Pinion Front Bearing Remover	Rear differential
	09570–24010	Differential Mounting Cushion Remover & Replacer	Rear differential
	09608–16042	Front Hub Bearing Adjusting Tool	Rear drive shaft
	(09608–02021)	Bolt & Nut	
	(09608–02041)	Retainer	
	09610–20012	Pitman Arm Puller	Front suspension Rear suspension
	09628–62011	Ball Joint Puller	Front suspension Rear suspension
	09710–04081	Base	Rear differential
	09710–28021	Front Suspension Bushing Tool Set	
	(09710–08031)	Base	

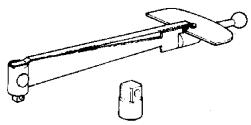
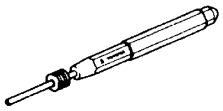
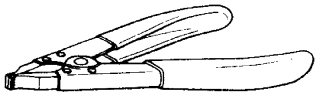
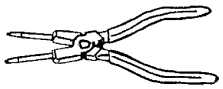
	09710–30021	Suspension Bushing Tool Set	
	(09710–03131)	Bushing Remover	
	09726–12023	Lower Suspension Arm Bushing Remover & Replacer	
	09727–30021	Coil Spring Compressor	Front suspension Rear suspension
	(09727–00010)	Bolt Set	
	(09727–00021)	Arm Set	
	(09727–00031)	Compressor	
	09950–00020	Bearing Remover	Rear differential
	09950–30012	Puller A Set	
	(09951–03010)	Upper Plate	
	(09953–03010)	Center Bolt	
	(09954–03010)	Arm	
	(09955–03030)	Lower Plate 130	

	(09956–03020) Adapter 18	
	09950–40011 Puller B Set	
	(09951–04020) Hanger 200	Rear differential
	(09952–04010) Slide Arm	Rear differential
	(09953–04030) Center Bolt 200	Rear differential
	(09954–04010) Arm 25	Rear differential
	(09955–04061) Claw No.6	Rear differential
	(09957–04010) Attachment	Rear differential
	(09958–04011) Holder	Rear differential
	09950–50013 Puller C Set	
	(09952–05010) Slide Arm	Rear differential
	(09954–05031) Claw No.3	Rear differential
	(09955–05040) Adapter No.4	Rear differential

	09950–60010 Replacer Set	
	(09951–00400) Replacer 40	Rear differential
	(09951–00480) Replacer 48	Rear differential
	(09951–00600) Replacer 60	Rear differential
	09950–60020 Replacer Set No.2	
	(09951–00710) Replacer 71	Rear differential
	(09951–00780) Replacer 78	
	(09951–00790) Replacer 79	Rear differential
	09950–70010 Handle Set	
	(09951–07100) Handle 100	Rear differential
	(09951–07150) Handle 150	Rear differential
	(09951–07200) Handle 200	Rear differential

PP3R2–01

RECOMMENDED TOOLS

	09025–00010	Torque Wrench (30 kgf–cm)	
	09031–00030	Pin Punch .	
	09905–00012	Snap Ring No.1 Expander .	
	09905–00013	Snap Ring Pliers .	

PP0T3-04

EQUIPMENT

Dial indicator with magnetic base	
Micrometer	
Torque wrench	
Vernier caliper	

PP0T4–06

LUBRICANT

REAR DRIVE SHAFT		
Item	Capacity	Classification
● 2JZ–GE Engine		
Outboard joint grease	170 – 180 g (0.37 – 0.40 lb, 6.0 – 6.3 oz.)	
Inboard joint grease	144 – 154 g (0.32 – 0.34 lb, 5.1 – 5.4 oz.)	
REAR DIFFERENTIAL		
Item	Capacity	Classification
Differential oil	–	Hypoid gear oil API GL–5 Above –18˚C (0˚F) SAE 90 Below –18˚C (0˚F) SAE 80W–90 or 80W

PP3R3–01

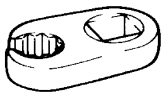
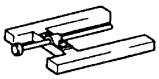
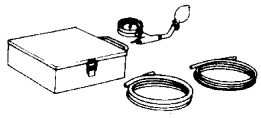
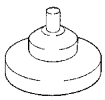
SSM (Special Service Materials)

08826–00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	

BRAKE

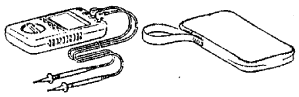
PP3R4–01

SST (Special Service Tools)

	09023–00100	Union Nut Wrench 10 mm	
	09737–00011	Brake Booster Push Rod Gauge	
	09992–00242	Turbocharger Pressure Gauge	
	09992–00350	Brake Reservoir Pressure Adapter	

PP3R5–01

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	

PP0CJ–12

EQUIPMENT

Torque wrench	

PP0CK–05

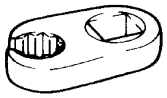
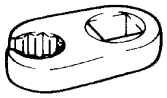
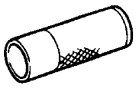
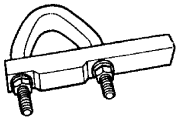
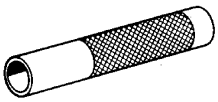
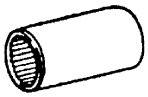
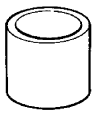
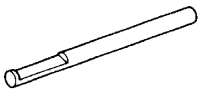
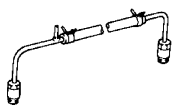
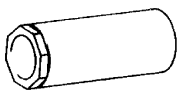
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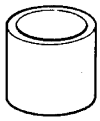
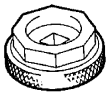
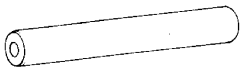
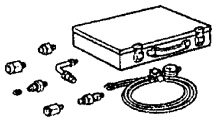
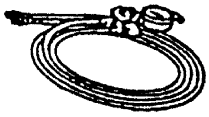
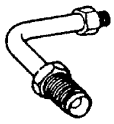
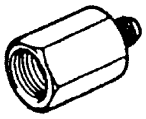
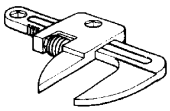
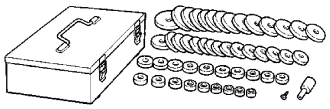
Item	Capacity	Classification
Brake fluid	–	SAE J1703 or FMVSS No. 116 DOT3

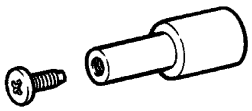
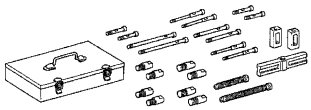
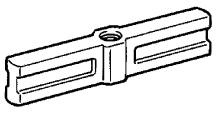
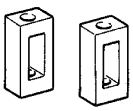
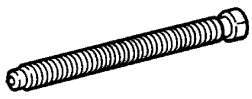
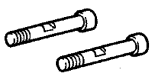
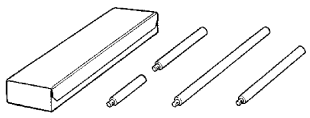
STEERING

PP3QY–01

SST (Special Service Tools)

	09023–38200	Union Nut Wrench 12mm	PS gear
	09023–38400	Union Nut Wrench 14mm	PS gear
	09216–00041	V–Ribbed Belt Tensioner Wrench	
	09608–04031	Front Hub Inner Bearing Cone Replacer	
	09612–00012	Rack & Pinion Steering Rack Housing Stand	PS gear
	09612–22011	Tilt Handle Bearing Replacer	Tilt steering column
	09616–00011	Steering Worm Bearing Adjusting Socket	PS gear
	09630–24014	Steering Rack Oil Seal Tool Set	PS gear
	(09620–24051)	Seal Ring Tool	
	09631–10030	Oil Seal Remover	PS vane pump
	09631–12071	Steering Rack Oil Seal Test Tool	PS gear
	09631–20060	Bearing Guide Nut Wrench	PS gear

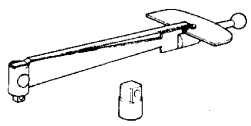
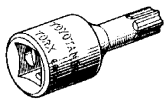
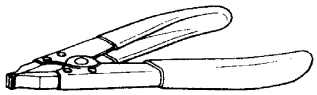
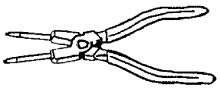
	09631–20081	Seal Ring Tool	PS gear
	09631–20090	Cylinder End Stopper Nut Wrench	PS gear
	09631–33010	Steering Rack Cover "I"	PS gear
	09640–10010	Power Steering Pressure Gauge Set	Power steering fluid
	(09641–01010)	Gauge Assy	
	(09641–01030)	Attachment B	
	(09641–01060)	Attachment E	
	09922–10010	Variable Open Wrench	PS gear
	09950–60010	Replacer Set	
	(09951–00180)	Replacer 18	PS gear
	(09951–00240)	Replacer 24	PS gear
	(09951–00250)	Replacer 25	PS gear
	(09951–00280)	Replacer 28	PS gear

	(09951–00310) Replacer 31	PS gear
	(09951–00320) Replacer 32	PS vane pump PS gear
	(09951–00330) Replacer 33	PS vane punp
	(09951–00340) Replacer 34	PS gear
	(09951–00360) Replacer 36	PS gear
	(09951–00430) Replacer 43	PS gear
	(09952–06010) Adapter	PS gear
	09950–50013 Puller C Set	Tilt steering column
	(09951–05010) Hanger 150	
	(09952–05010) Slide Arm	
	(09953–05020) Center Bolt 150	
	(09954–05021) Claw No.2	
	09950–70010 Handle Set	

	(09951–07100) Handle 100	PS vane pump PS gear
	(09951–07150) Handle 150	PS gear
	(09951–07200) Handle 200	PS gear
	(09951–07360) Handle 360	PS gear

PP23U–02

RECOMMENDED TOOLS

	09025–00010	Torque Wrench (30 kgf–cm)	PS vane pump PS gear
	09042–00010	Torx Socket T30 .	Tilt steering column
	09905–00012	Snap Ring No.1 Expander .	
	09905–00013	Snap Ring Pliers .	

PP18L–10

EQUIPMENT

Caliper gauge	PS vane pump
Vernier calipers	PS vane pump
Dial indicator	PS gear
Feeler gauge	PS vane pump
Micrometer	PS vane pump
Torque wrench	

PP18M–08

LUBRICANT

Item	Capacity	Classification
Power steering fluid (Total)	0.9 liters (1.0 US qts, 0.8 Imp.qts)	ATF DEXRON® II or III

PP18N–07

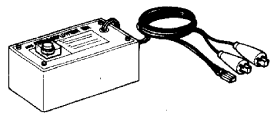
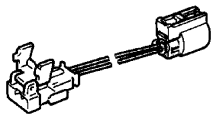
SSM (Special Service Materials)

08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	PS gear

SUPPLEMENTAL RESTRAINT SYSTEM

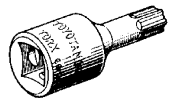
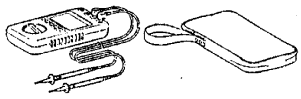
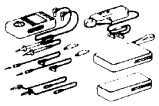
PP3QZ–01

SST (Special Service Tools)

	09082–00700	SRS Airbag Deployment Tool	
	09082–00760	Airbag Deployment Wire Sub–harness No.4	for Curtain Shield Airbag Assembly
	09843–18040	Diagnosis Check Wire No.2	

PP3R0–01

RECOMMENDED TOOLS

	09042–00010	Torx Socket T30 .	
	09082–00040	TOYOTA Electrical Tester.	
	09082–00050	TOYOTA Electrical Tester Set.	

PP0T0-02

EQUIPMENT

Torque wrench	
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Airbag disposal
Vinyl bag	Airbag disposal

BODY ELECTRICAL

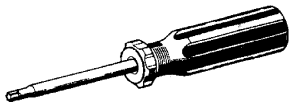
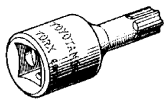
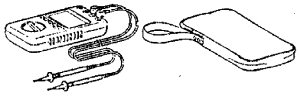
PP0O0–02

SST (Special Service Tools)

	09843–18020 Diagnosis Check Wire	

PP0O1–02

RECOMMENDED TOOLS

	09041–00030	Torx Driver T30 .	For removing and installing steering wheel pad
	09042–00010	Torx Socket T30 .	For removing and installing steering wheel pad
	09082–00040	TOYOTA Electrical Tester.	

PP0O2–18

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Engine oil level warning switch, Seat heater
Dry cell battery	Fuel sender gauge, Power mirror
Heat light	Seat heater
Torque wrench	
Clip remover	For removing cowl louver
Masking tape	Rear window defogger wire
Tin foil	Rear window defogger wire

PP0T6–01

SSM (Special Service Materials)

	08888–88888	DuPont Paste No. 4817 or equivalent	Rear window defogger

BODY

PP3QW–01

SST (Special Service Tools)

 09806–30010 Windshield Moulding Remover	

PP3QX–01

RECOMMENDED TOOLS

	09070–20010 Moulding Remover .	

PP0TA–09

EQUIPMENT

Clip remover	
Torque wrench	
Torx driver	
Hog ring pliers	
Hand riveter	
Tape	To avoid surface damage
Adhesive tape	To avoid surface damage
Adhesive	
Cleaner	
Shop rag	
Knife	
Sealer gun	
Brush	
Wooden block or similar object	For tying both piano wire ends
Plastic sheet	To avoid surface damage

PP0TB–01

LUBRICANT

Item	Capacity	Classification
MP grease	–	–

PP0TC–07

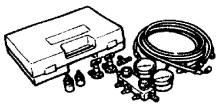
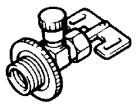
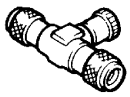
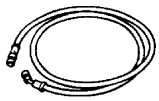
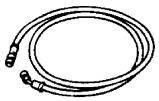
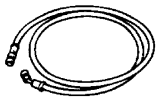
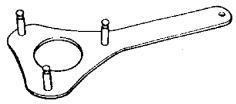
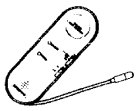
SSM (Special Service Materials)

08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	
08833–00030	Three cement black or equivalent	
08850–00801	Windshield Glass Adhesive Set or equivalent	

AIR CONDITIONING

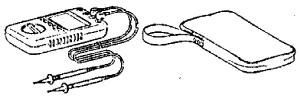
PP3QS–01

SST (Special Service Tools)

	07110–58060	Air Conditioner Service Tool Set	
	(07117–58060)	Refrigerant Drain Service Valve	
	(07117–58070)	T–Joint	
	(07117–58080)	Quick Disconnect Adapter	High pressure side
	(07117–58090)	Quick Disconnect Adapter	Low pressure side
	(07117–88060)	Refrigerant Charging Hose	High pressure side (Color: Red)
	(07117–88070)	Refrigerant Charging Hose	Low pressure side (Color: Blue)
	(07117–88080)	Refrigerant Charging Hose	Utility (Color: Green)
	07112–66040	Magnetic Clutch Remover	
	07112–76060	Magnetic Clutch Stopper	
	07116–38360	Gas Leak Detector Assembly	
	09216–00041	V–Ribbed Belt Tensioner Wrench	

PP0SO–02

RECOMMENDED TOOLS

	09044–00020	Torx Socket E10 .	Compressor (GS300)
	09082–00040	TOYOTA Electrical Tester.	

PP0SP–01

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Sernsor
Torque wrench	
Dial indicator	Magnetic clutch
Plastic hammer	Magnetic clutch

PP0SQ–02

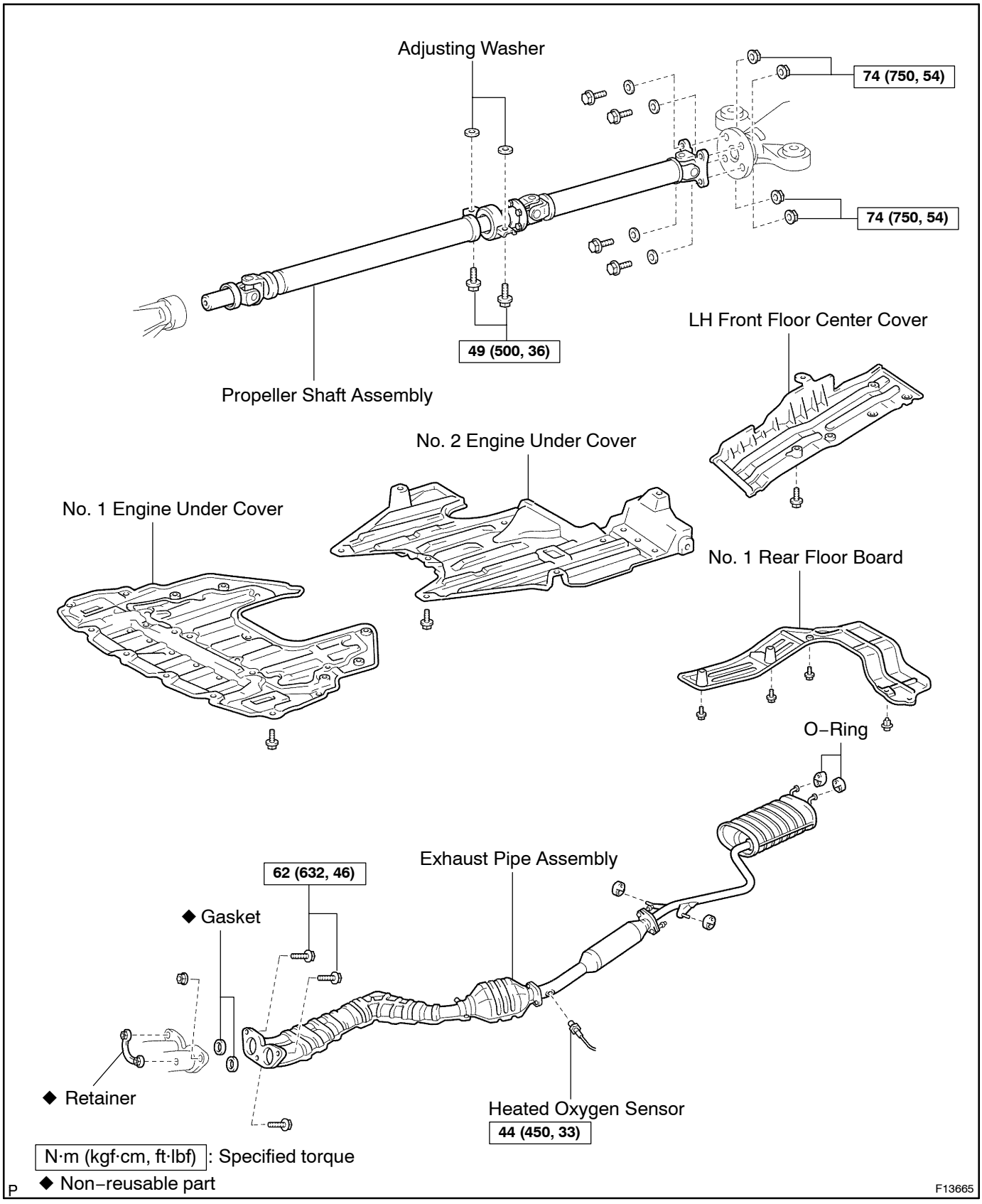
LUBRICANT

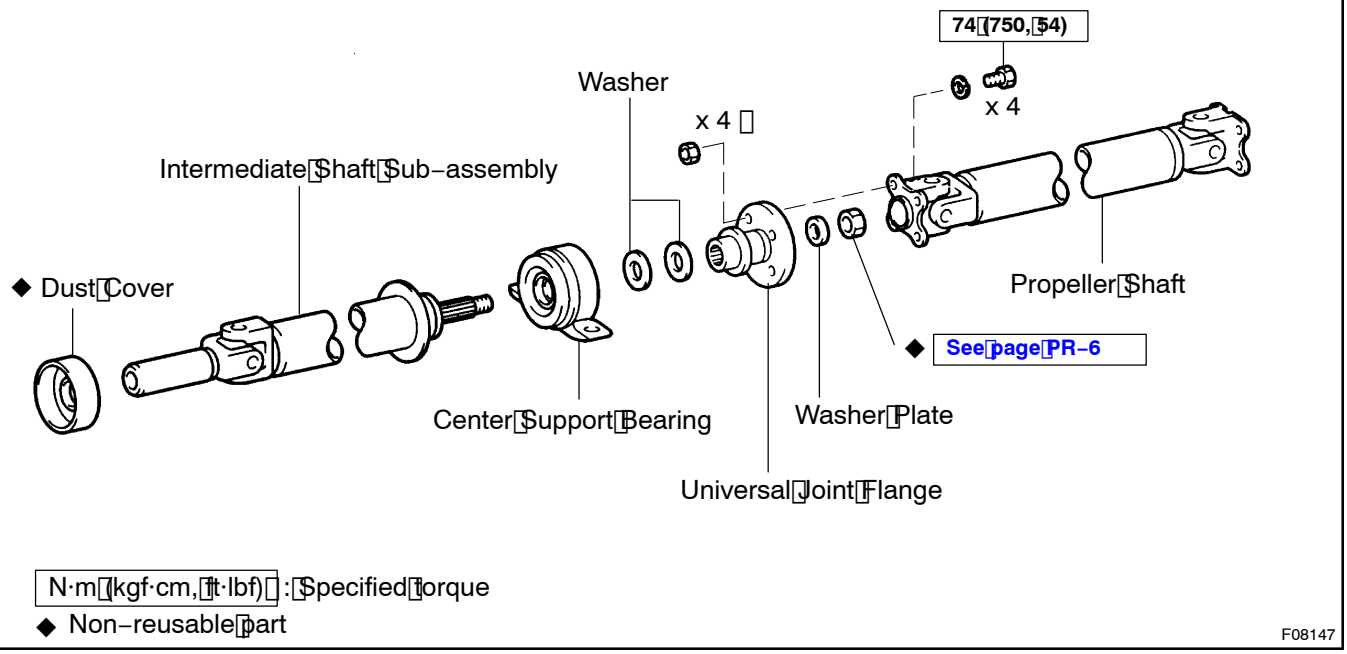
Item	Capacity	Classification
Compressor oil	–	ND–OIL 8 or equivalent
When replacing condenser	40 cc (1.4 fl. oz.)	

PROPELLER SHAFT ASSEMBLY (2JZ–GE)

PR05B–03

COMPONENTS




74 (750, 54)
x 4
Washer
x 4
Intermediate Shaft Sub–assembly
◆ Dust Cover
Propeller Shaft
◆ See page PR–6
Center Support Bearing
Washer Plate
Universal Joint Flange
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
F08147

PR05C–03

REMOVAL

1. REMOVE NO.1 ENGINE UNDER COVER

2. REMOVE LH FRONT FLOOR CENTER COVER

3. REMOVE NO.2 ENGINE UNDER COVER

4. REMOVE NO. 1 REAR FLOOR BOARD

5. REMOVE EXHAUST PIPE ASSEMBLY

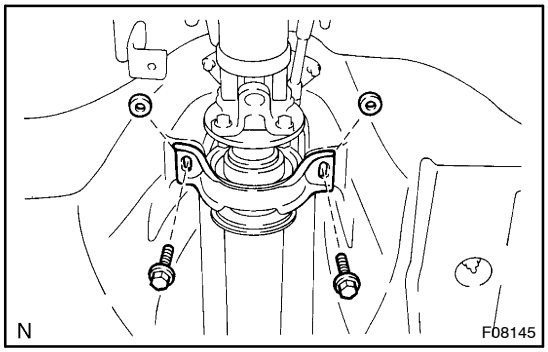
(a) Disconnect the heated oxygen sensor.

(b) Remove the 3 bolts, retainer and nut from the exhaust manifold.

(c) Disconnect the exhaust pipe assembly from the 4 O–rings.

(d) Remove the exhaust pipe assembly.

(e) Remove the 2 gaskets from exhaust pipe assembly.



6. REMOVE PROPELLER SHAFT

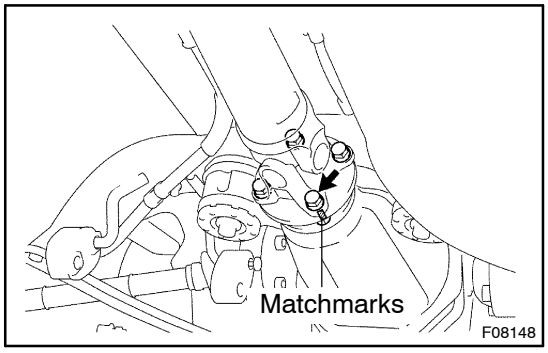
(a) Remove the 2 center support bearing set bolts and adjusting washers.

HINT:

Production vehicles are not equipped with adjusting washers.

NOTICE:

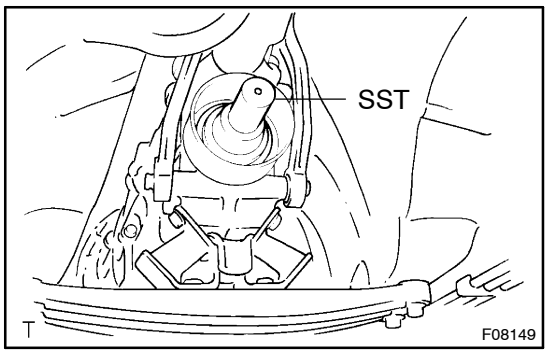
When removing the set bolts, support the center support bearing by hand so that the transmission and intermediate shaft, and propeller shaft and differential, remain in a straight line.



(b) Place matchmarks on the differential companion flange and propeller shaft.

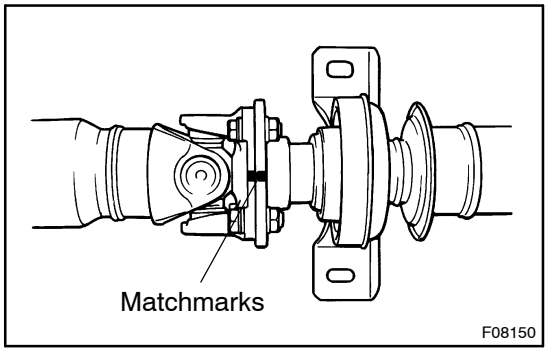
(c) Remove the 4 bolts, washers and nuts.

(d) Pull the yoke from the transmission.



(e) Install SST in the transmission to prevent oil leakage.
SST 09325–40010

PR05D–03



DISASSEMBLY

DISASSEMBLE PROPELLER SHAFT

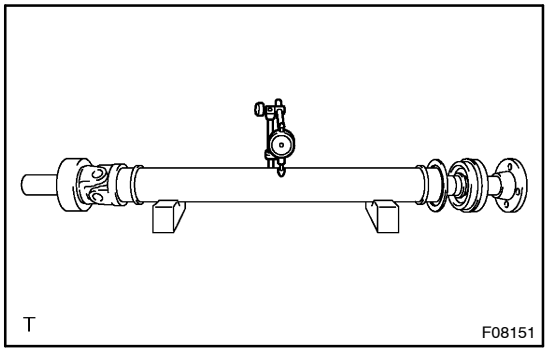
(a) Place matchmarks on the universal joint flange and propeller shaft flange.

(b) Remove the 4 bolts, washers and nuts.

(c) Separate the intermediate shaft and propeller shaft.

PR05E–02

INSPECTION

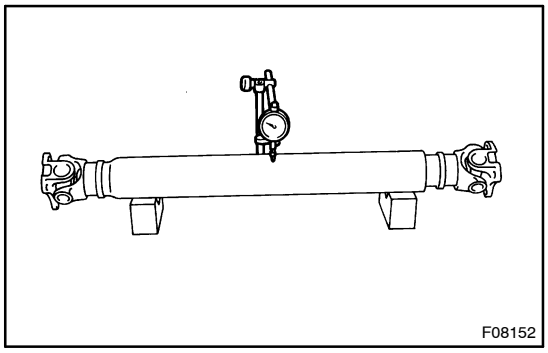


1. INSPECT RUNOUT OF INTERMEDIATE SHAFT

Using a dial indicator, inspect the intermediate shaft runout.

Maximum runout: 0.8 mm (0.031 in.)

If the runout is greater than the maximum, replace the intermediate shaft sub–assembly.

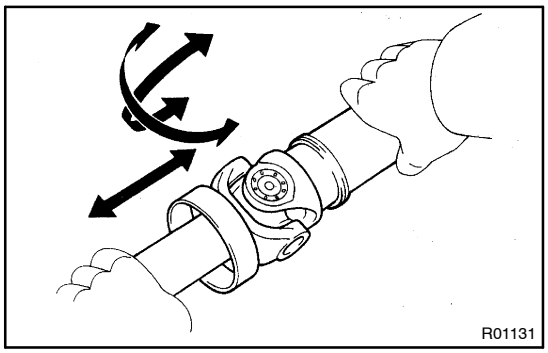


2. INSPECT RUNOUT OF PROPELLER SHAFT

Using a dial indicator, inspect the propeller shaft runout.

Maximum runout: 0.8 mm (0.031 in.)

If the runout is greater than the maximum, replace the propeller shaft assembly.

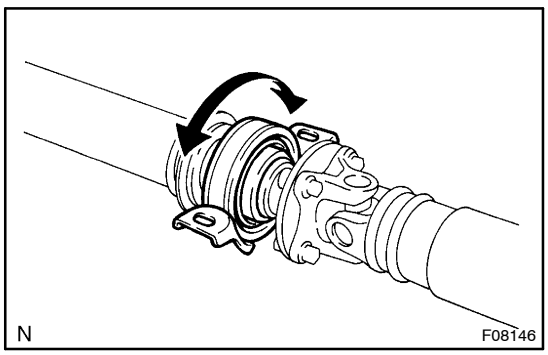


3. INSPECT SPIDER BEARING

(a) Check if the spider bearing rotates smoothly.

(b) Check if there any play in the spider bearing.

If necessary, replace the propeller shaft assembly or intermediate shaft sub–assembly.



4. INSPECT CENTER SUPPORT BEARING

(a) Check if the bearing turns smoothly.

(b) Check for crack in or damage to the cushion.

If the center support bearing is damaged, worn or does not turn smoothly, replace it.

PR05F–03

REPLACEMENT

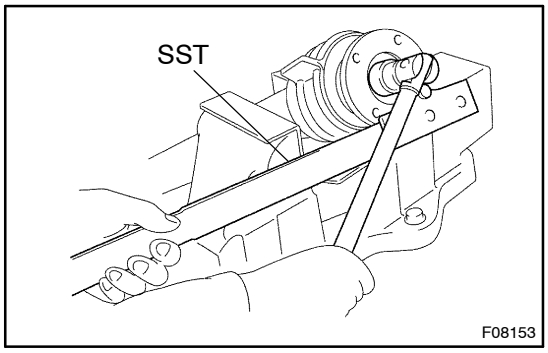
NOTICE:

Be careful not to grip the propller shaft tube too tightly in the vise as will cause deformation.

1. REPLACE CENTER SUPPORT BEARING

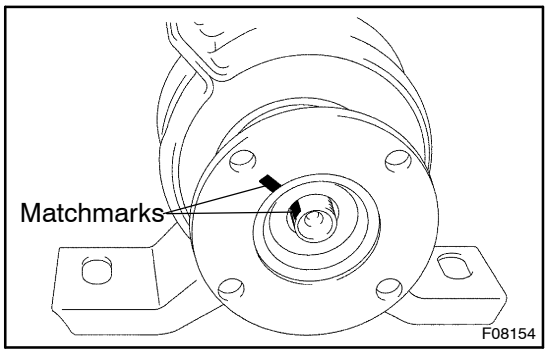
(a) Using a chisel and hammer, unstake the staked part of the nut.

(b) Mount the intermediate shaft sub–assembly in a vise.

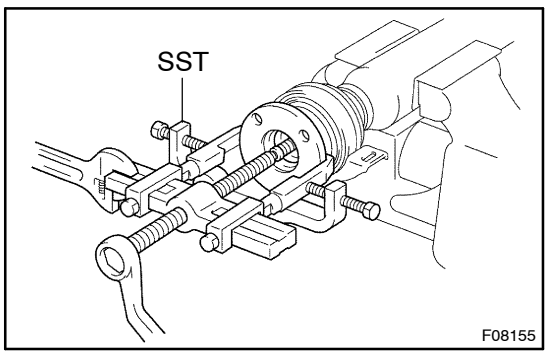


(c) Using SST to hold the universal joint flange, remove the nut.
SST 09930–00021

(d) Remove the washer plate.



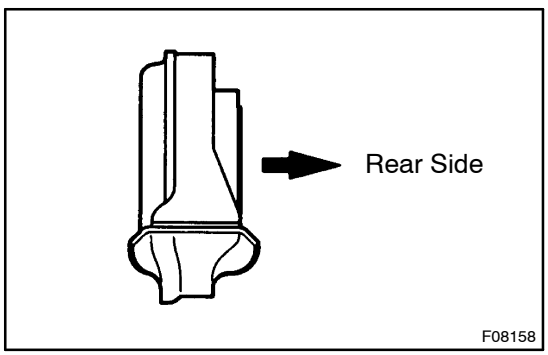
(e) Place matchmarks on the universal joint flange and intermediate shaft.



(f) Using SST, remove the universal joint flange.
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04011)

(g) Remove the 2 washers.

(h) Remove the center support bearing.

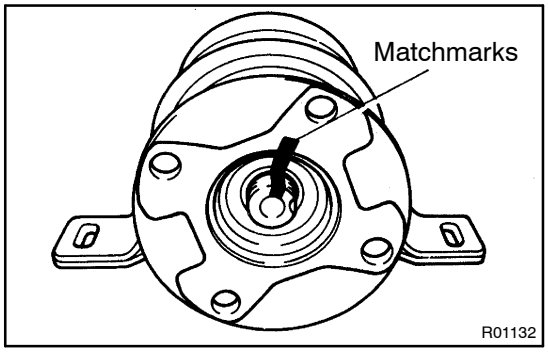


(i) Install a new center support bearing to intermediate shaft.

HINT:

Install the center support bearing in the direction, as shown.

(j) Install the 2 washers.

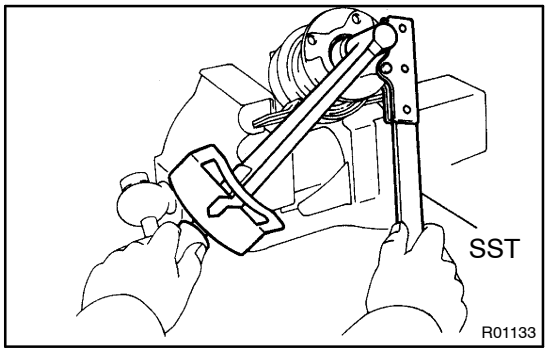


(k) Align the matchmarks on the universal joint flange and intermediate shaft, and install the universal joint flange.

HINT:

If replacing eighter the center flange or intermediate shaft, reassemble them so that the front yoke of the intermediate shaft and the rear yoke of the propeller shaft are facing in the same direction.

(l) Install the washer plate.

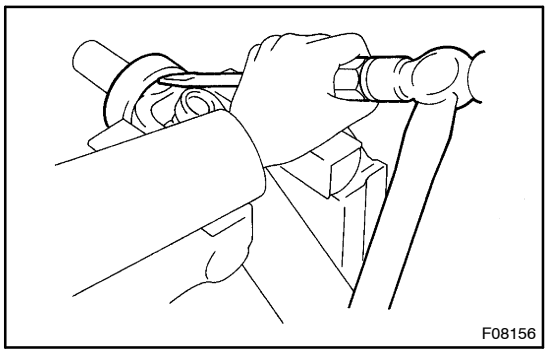


(m) Using SST to hold the flange, install a new nut.
SST 09330–00021
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)

(n) Loosen the nut.

(o) Torque the nut again.
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

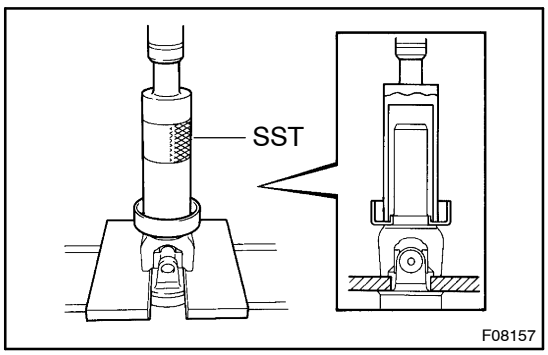
(p) Using a chisel and hammer, stake the nut.



2. REPLACE DUST COVER

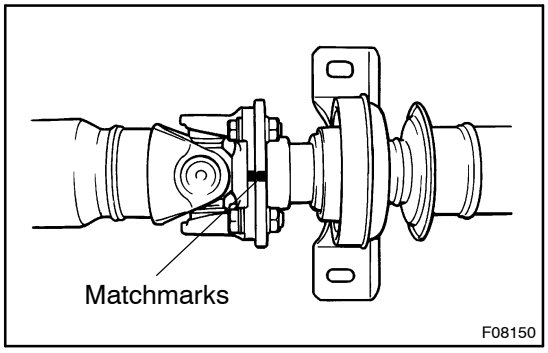
(a) Mount the intermediate shaft sub–assembly in a vise.

(b) Using a screwdriver and hammer, remove the dust cover.



(c) Using SST and press, install a new dust cover.
SST 09316–60011 (09316–00011)

PR05G–04



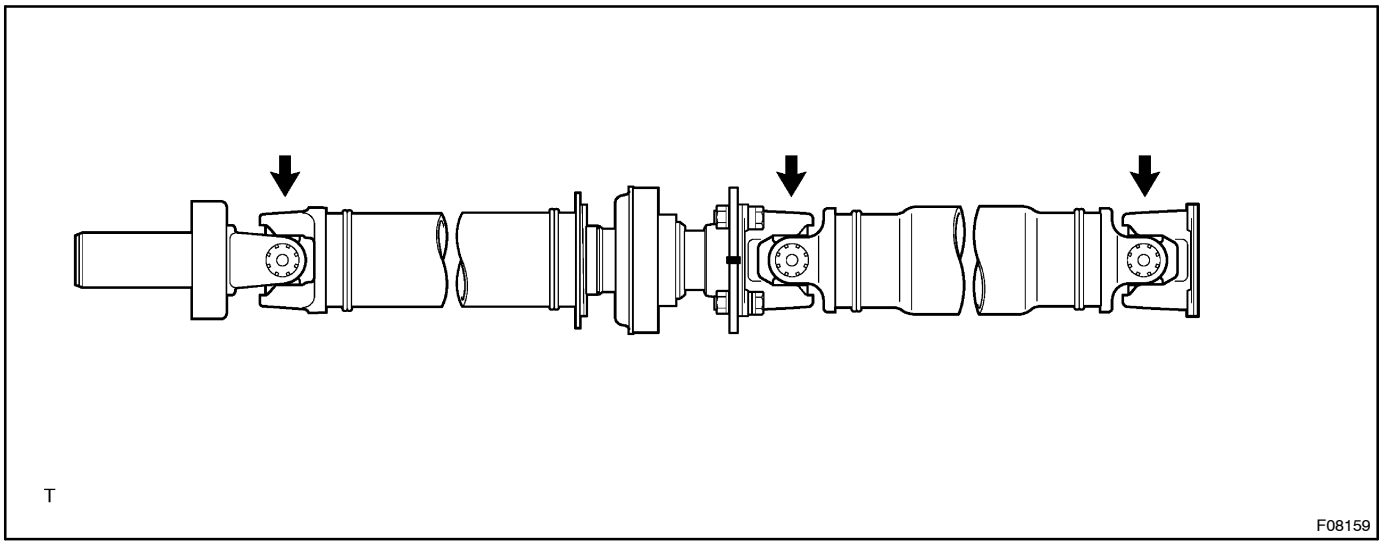
REASSEMBLY

REASSEMBLE PROPELLER SHAFT

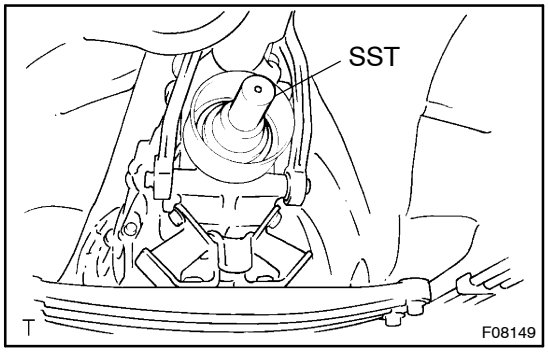
(a) Assemble the propeller shaft, align the matchmarks on the universal joint flange and propeller shaft flange, and connect the flanges with the 4 bolts, washers and nuts.

(b) Torque the 4 nuts.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

HINT:
Assemble the propeller shaft so that each joint faces in the direction as shown in the illustration.



PR05H–03



INSTALLATION

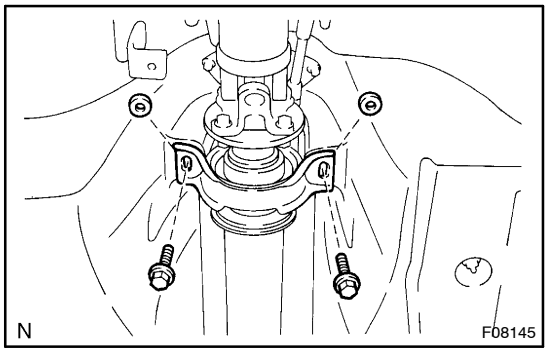
1. INSTALL PROPELLER SHAFT

(a) Remove the SST.
SST 09325–40010

(b) Insert the propeller shaft assembly to the transmission.

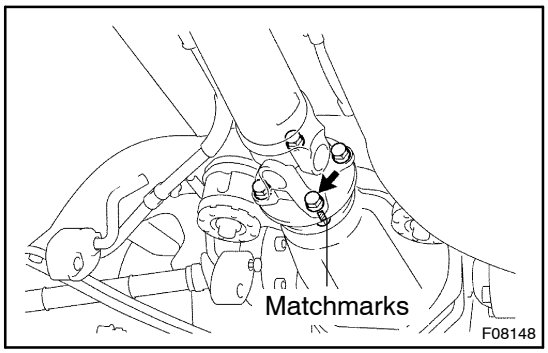
NOTICE:

Support the center support bearing by hand so that the transmission and intermediate shaft, and propeller shaft and differential, remain in a straight line.

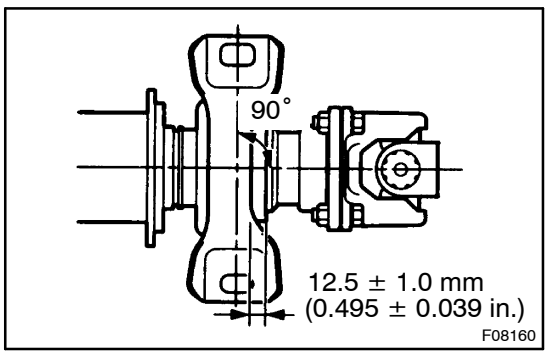


(c) Temporarily install the 2 center support bearing set bolts with the adjusting washers.

HINT:
Use the adjusting washers wich were removed.



(d) Align the matchmarks and install the propeller shaft on the differential with the 4 bolts, washers and nuts.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



(e) Torque the 2 center support bearing set bolts.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

HINT:
Adjust the center support bearing to keep the dimension, as shown with the vehicle in the unladen condition.
Under the same condition, check if the center line of the center support bearing is at right angles to the shaft axial direction.

2. INSTALL EXHAUST PIPE ASSEMBLY

(a) Connect the exhaust pipe assembly to the 4 O–rings.

(b) Install the exhaust pipe assembly with the 2 gaskets, 3 bolts, retainer and nut.
Torque: 62 N·m (632 kgf·cm, 46 ft·lbf)

(c) Connect the heated oxygen sensor.
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

3. INSTALL NO. 1 REAR FLOOR BOARD

4. INSTALL NO.2 ENGINE UNDER COVER

5. INSTALL LH FROTN FLOOR CENTER COVER

6. INSTALL NO.1 ENGINE UNDER COVER

SRS AIRBAG

PRECAUTION

RS01Y–53

CAUTION:

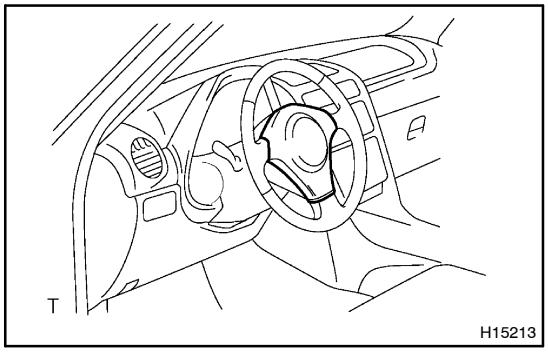
- The LEXUS IS300/IS200 is equipped with SRS, which comprises a driver airbag, front passenger airbag, side airbag and curtain shield airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible that the SRS may fail to operate when required. Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedures described in the repair manual.
- Work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
  (The SRS is equipped with a back–up power source so that if work is started within 90 seconds from disconnecting the negative (–) terminal cable of the battery, the SRS may be deployed.)
- Do not expose the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, airbag sensor assembly, front airbag sensor or side and curtain shield airbag sensor assembly directly to hot air or flames.

NOTICE:

- Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.
- Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, side airbag assembly, airbag sensor assembly, front airbag sensor, curtain shield airbag assembly and side and curtain shield airbag sensor assembly should be inspected (See Pub. No. RM684E on page RS–15, RS–28, RS–42, RS–55, RS–60, RS–17 and RS–33 on this manual).
- Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Never disassemble and repair the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, airbag sensor assembly, front airbag sensor or side and curtain shield airbag sensor assembly in order to reuse it.
- If the steering wheel pad, front passenger airbag assembly, side airbag assembly, curtain shield airbag assembly, airbag sensor assembly, front airbag sensor or side and curtain shield airbag sensor assembly has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace it with new one.
- Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting the system's electrical circuits.
- Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- After work on the SRS is completed, perform the SRS warning light check (See page DI–413).
- When the negative (–) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as they were before and adjust the clock. To avoid erasing the memory in each memory system, never use a back– up power supply from outside the vehicle.
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

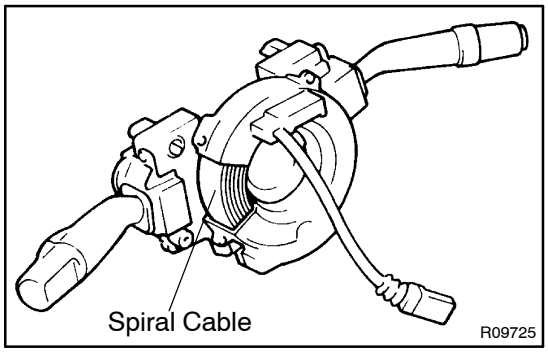
RS0UB–01

OPERATION



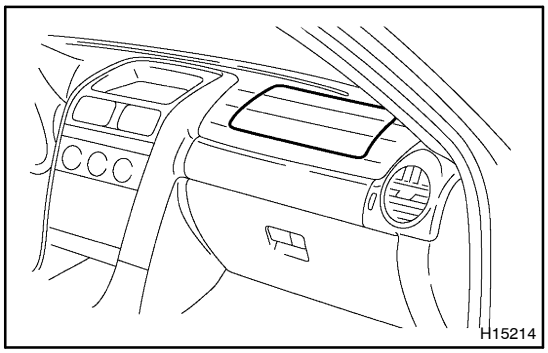
1. STEERING WHEEL PAD (with AIRBAG)

The inflater and bag of the SRS are stored in the steering wheel pad and cannot be disassembled. The inflater contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the airbag sensor assembly.



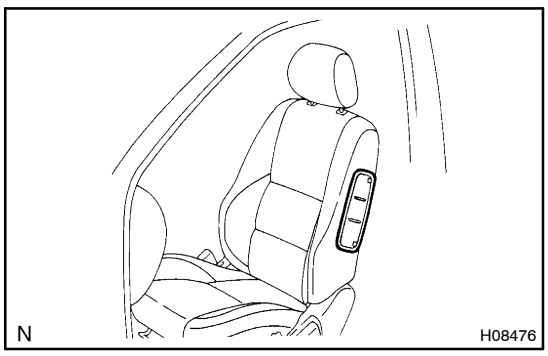
2. SPIRAL CABLE (in COMBINATION SWITCH)

A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



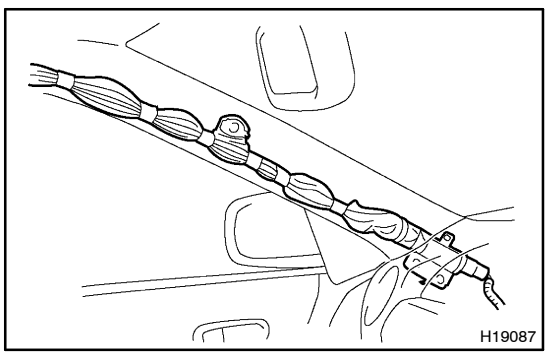
3. FRONT PASSENGER AIRBAG ASSEMBLY

The inflater and bag of the SRS are stored in the front passenger airbag assembly and cannot be disassembled. The inflater contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the airbag sensor assembly.



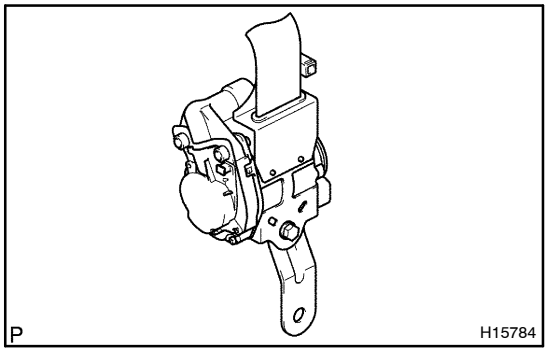
4. SIDE AIRBAG ASSEMBLY

The inflater and bag of the SRS side airbag are stored in the side airbag assembly and cannot be disassembled. The inflater contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the side and curtain shield airbag sensor assembly.



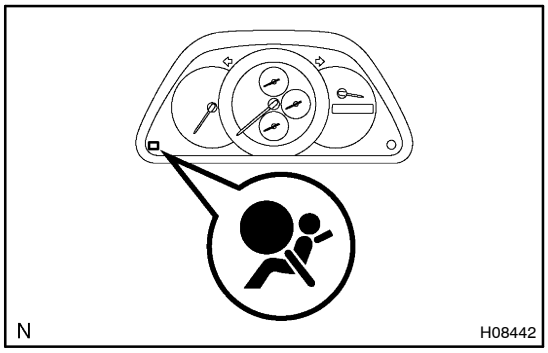
5. CURTAIN SHIELD AIRBAG ASSEMBLY

The inflater and bag of the SRS are stored in the curtain shield airbag assembly and cannot be disassembled. The inflater contains a squib, igniter charge, gas generator, etc., and inflates the bag when instructed by the airbag sensor assembly.



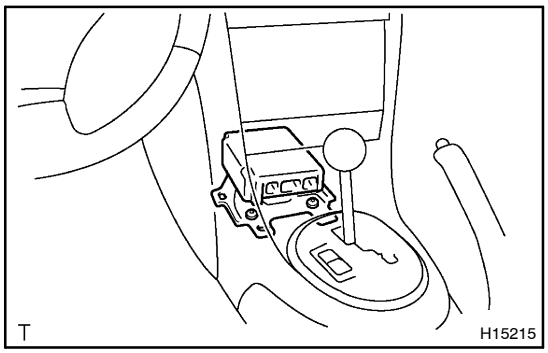
6. SEAT BELT PRETENSIONER

The seat belt pretensioner system is a component of the front seat outer belt. The pretensioner contains a squib, gas generator, wire, piston, etc., and operates in the event of a frontal collision. The seat belt pretensioner cannot be disassembled.



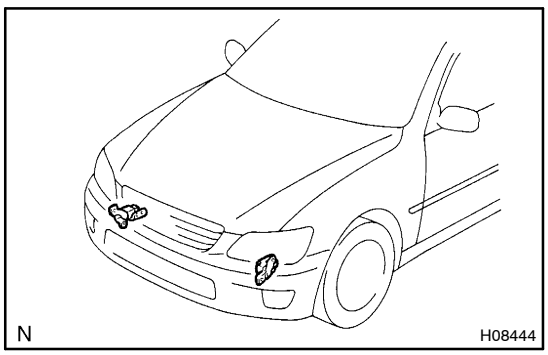
7. SRS WARNING LIGHT

The SRS warning light is located on the combination meter. It goes on to alert the driver of trouble in the system when a malfunction is detected in the airbag sensor assembly self–diagnosis. In normal operation conditions when the ignition switch is turned to the ON position, the light goes on for about 6 seconds and then goes off.



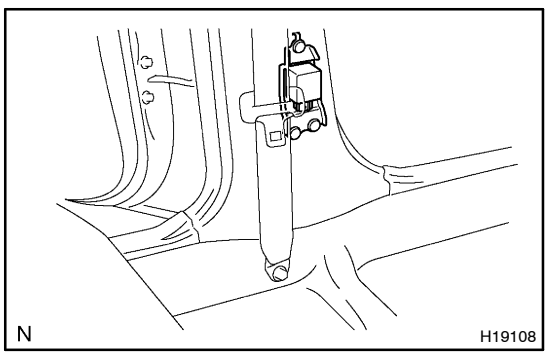
8. AIRBAG SENSOR ASSEMBLY

The airbag sensor assembly is mounted on the floor inside the console box. The airbag sensor assembly consists of an airbag sensor, safing sensor, diagnosis circuit, ignition control, drive circuit, etc. It receives signals from the airbag sensor, front airbag sensor, side and curtain shield airbag sensor assembly and door side airbag assembly and judges whether the SRS must be activated or not. The airbag sensor assembly cannot be disassembled.



9. FRONT AIRBAG SENSOR

The front airbag sensor is mounted inside each of the side members. The sensor unit is a mechanical type. When the sensor detects deceleration force above a predetermined limit, contact is made in the sensor, sending a signal to the airbag sensor assembly. The front airbag sensor cannot be disassembled.



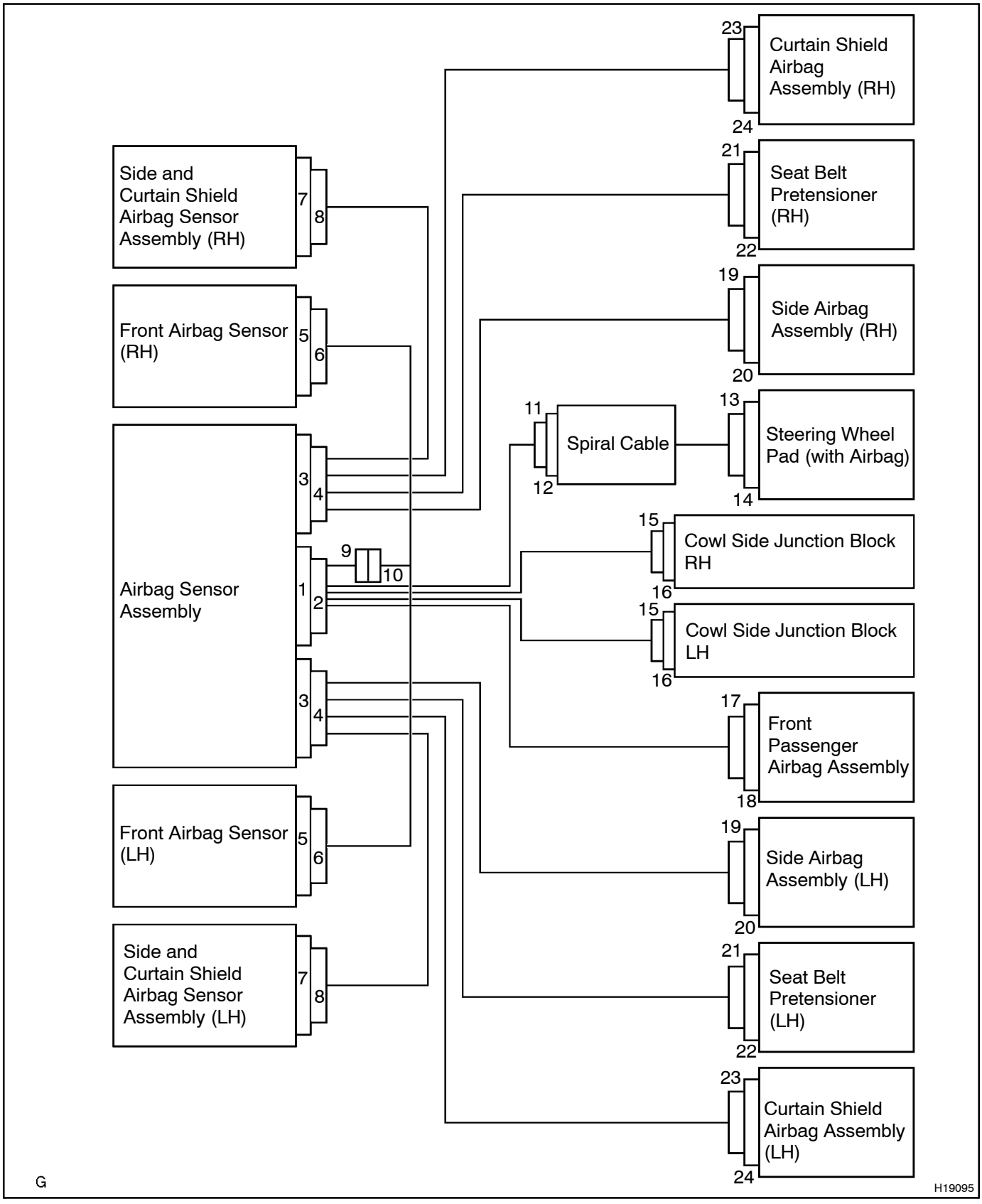
10. SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

The side and curtain shield airbag sensor assembly is mounted in the LH and RH center pillars. The side and curtain shield airbag sensor assembly consists of a lateral deceleration sensor, safing sensor, diagnosis circuit, etc. It sends signals to the airbag sensor assembly to judge whether the SRS side and curtain shield airbag must be activated or not. The side and curtain shield airbag sensor assembly cannot be disassembled.

11. SRS CONNECTORS

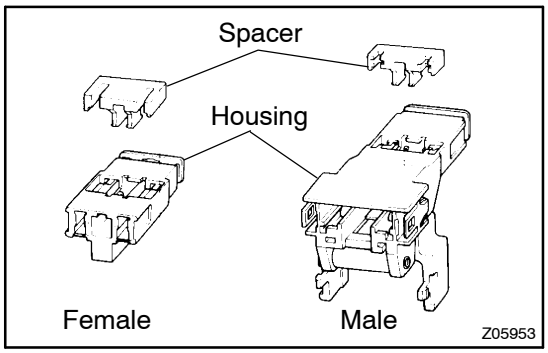
HINT:

SRS connectors are located as shown in the following illustration.



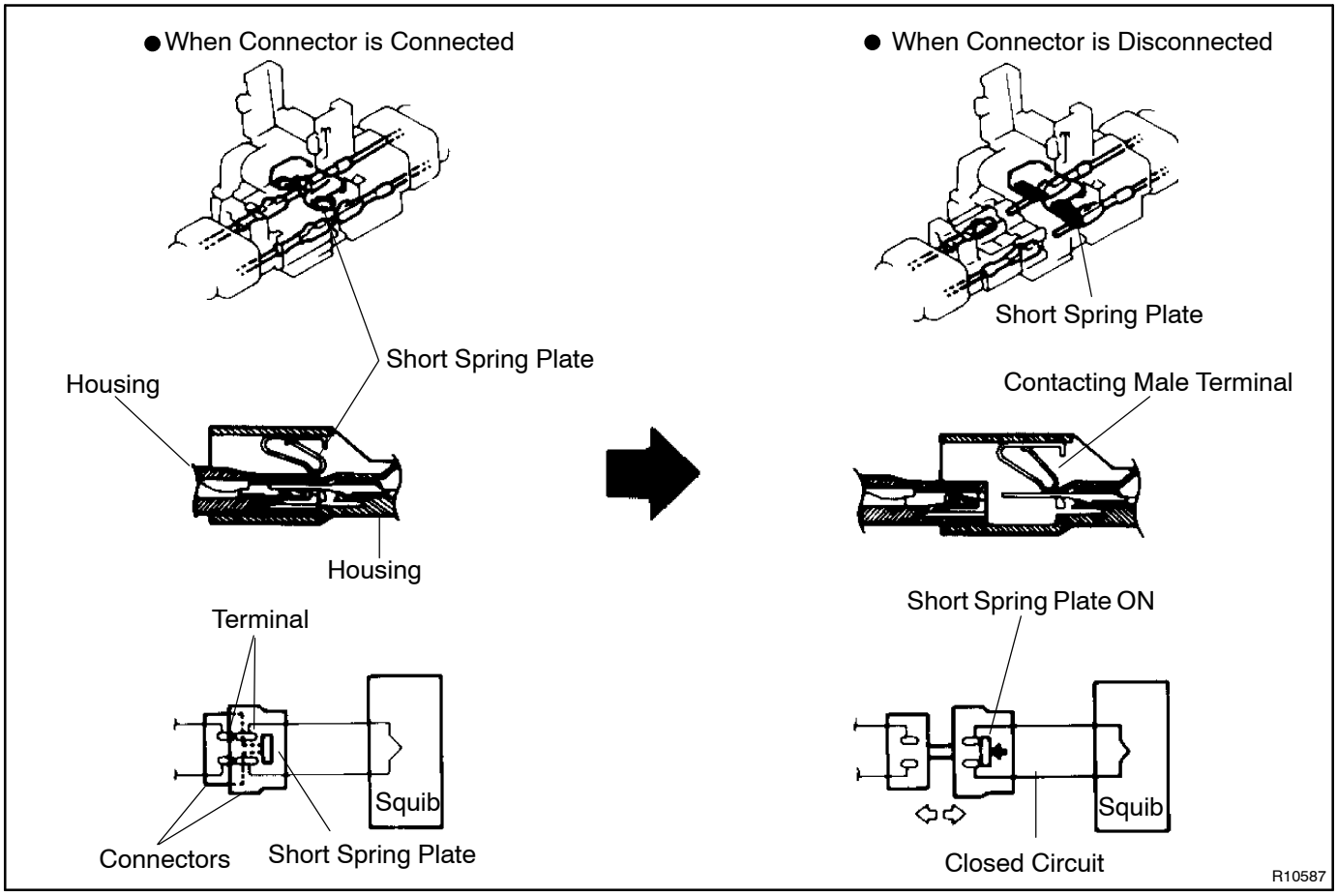
No.	Item	Application
(1)	Terminal Twin–Lock Mechanism	Connectors 2, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16, 17, 19, 21, 23
(2)	Airbag Activation Prevention Mechanism	Connectors 2, 4, 12, 14, 18, 20, 22, 24
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3, 4
(4)	Harf Connection Prevention Mechanism	Connectors 6, 8, 9, 11, 13, 17, 19, 21, 23
(5)	Connector Twin–Lock Mechanism	Connectors 16

(a) All connectors in the SRS are colored in yellow to distinguish them from other connectors. Connectors having special functions and specifically designed for the SRS are used in the locations shown on the previous page to ensure high reliability. These connectors use durable gold–plated terminals.

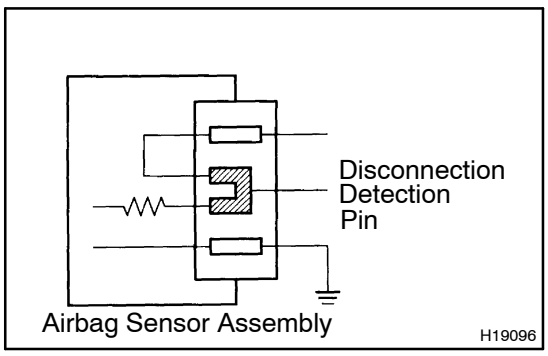


(1) Terminal twin–lock mechanism:
Each connector has a two–piece component consisting of a housing and a spacer. This design enables the terminal to be locked securely by two locking devices (the retainer and the lance) to prevent terminals from coming out.

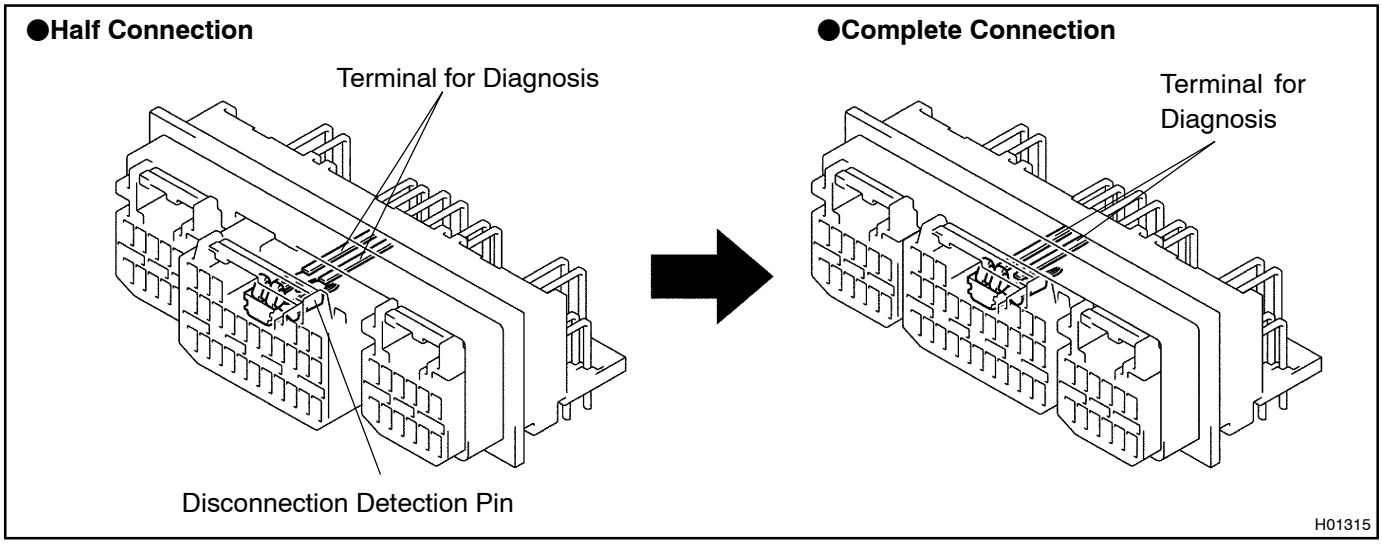
(2) Airbag activation prevention mechanism:
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects positive (+) terminal and negative (–) terminal of the squib.



HINT:
The type of connector is shown in the diagram on the previous page.

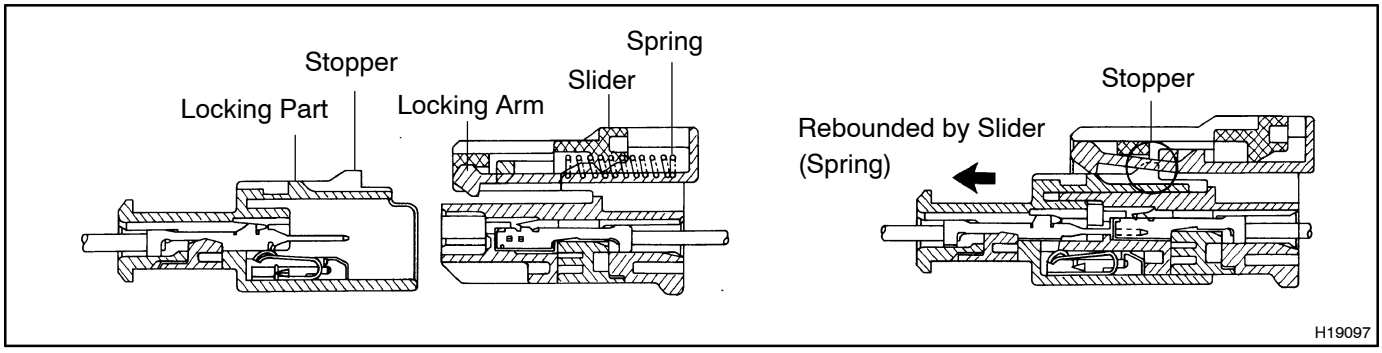


(3) Electrical connection check mechanism:
This mechanism electrically checks that connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the disconnection detection pin connects with the diagnosis terminals when the connector housing lock is locked.

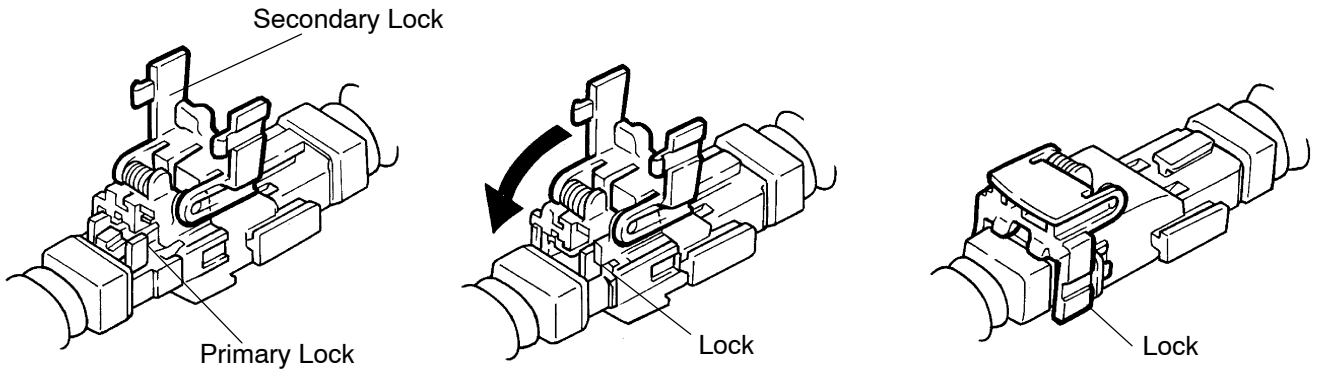


HINT:
The connectors shown in this illustration are connectors, ”1”, ”2” and ”3” in step 8.

(4) Harf connection prevention mechanism:
If the connector is not completely connected, the connector is disconnected due to the spring operation to the extent that no continuity exists.



(5) Connector twin–lock mechanism:
With this mechanism connectors (male and female connectors) are locked by 2 locking devices to increase the connection reliability. If the primary lock is incomplate, ribs interfere and prevent the secondary lock.



Primary Lock Incomplete (Secondary Lock Prevented)

Primary Lock Complete (Secondary Lock Permitted)

Twin–Lock Completed

H03989

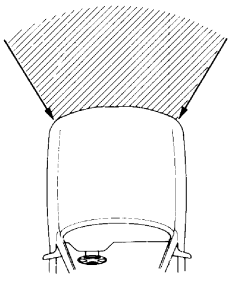


Fig.1

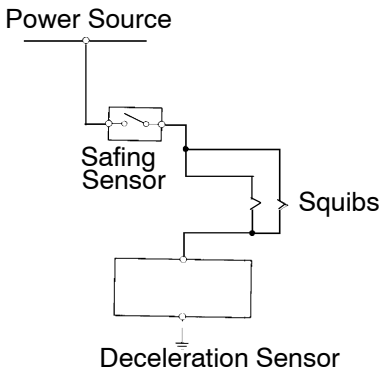
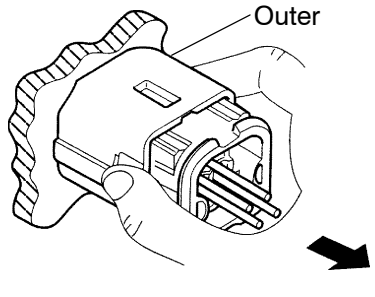


Fig.2

Z14034

(b) When the vehicle is involved in a frontal collision in the hatched area (Fig. 1) and the shock is larger than the predetermined level, the SRS is activated automatically. A safing sensor is designed to go on at a smaller deceleration rate than the airbag sensor. As illustrated in Fig. 2, ignition is caused when current flows to the squib, which happens when a safing sensor and the deceleration sensor go on simultaneously. When a deceleration force acts on the sensors, 2 squibs in the driver airbag and front passenger airbag ignite and generate gas. The gas discharging into the driver airbag and front passenger airbag rapidly increases the pressure inside the bags, breaking open the steering wheel pad and instrument panel.
Bag inflation then ends, and the bags deflate as the gas is discharged through discharge holes at the bag's rear or side.



H01581

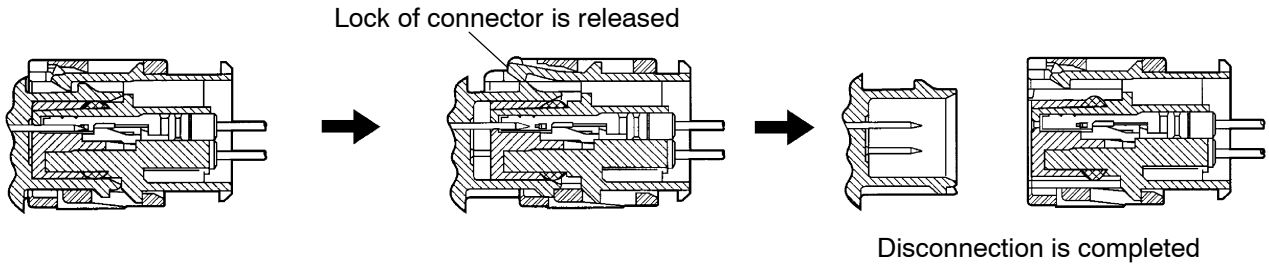
12. DISCONNECTION OF CONNECTORS FOR FRONT AIRBAG SENSOR AND SIDE AND CURTAIN SHIELD AIRBAG SENSOR

(a) While holding both flank sides of the outer, slide the outer to the direction shown by an arrow.

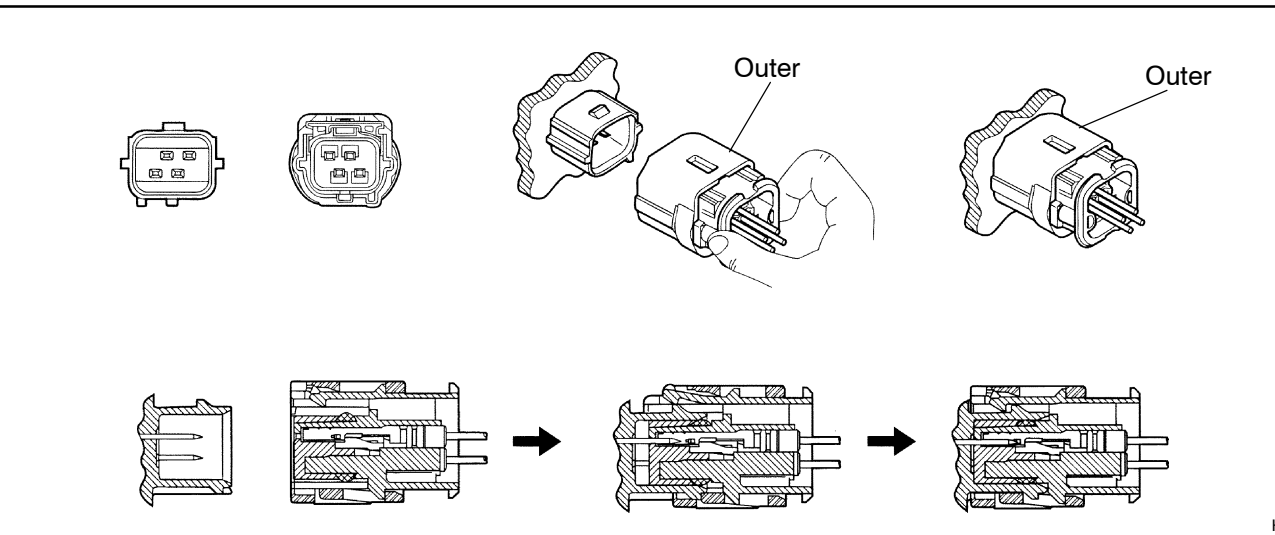
(b) Lock of the connectors is released, then disconnect the connectors.

HINT:

Be sure to hold both flank sides of the outer. If holding the top and bottom sides, it will obstruct disconnection.



13. CONNECTION OF CONNECTORS FOR FRONT AIRBAG SENSOR AND SIDE AND CURTAIN SHIELD AIRBAG SENSOR



(a) Align the male connector (of the side of sensor) and female connector in the same direction as shown in the illustration and fit in them without rubbing.

(b) As they are fitted in, the outer slides rearward. Press it until the outer returns to its original position again.

If fitting stops half way, connectors will separate.

(c) Be sure to insert until they are locked. After fitting in, pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

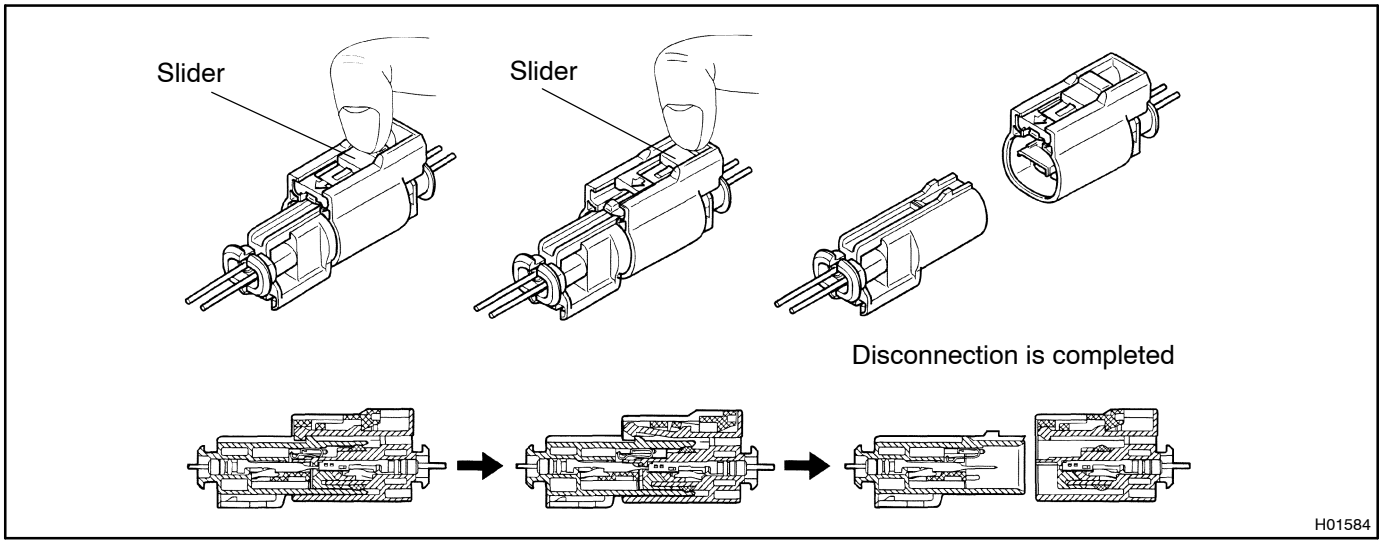
- Do not fit in while holding the outer.
- When fitting in, the outer slides. Do not touch it.

14. DISCONNECTION OF SIDE AIRBAG CONNECTOR

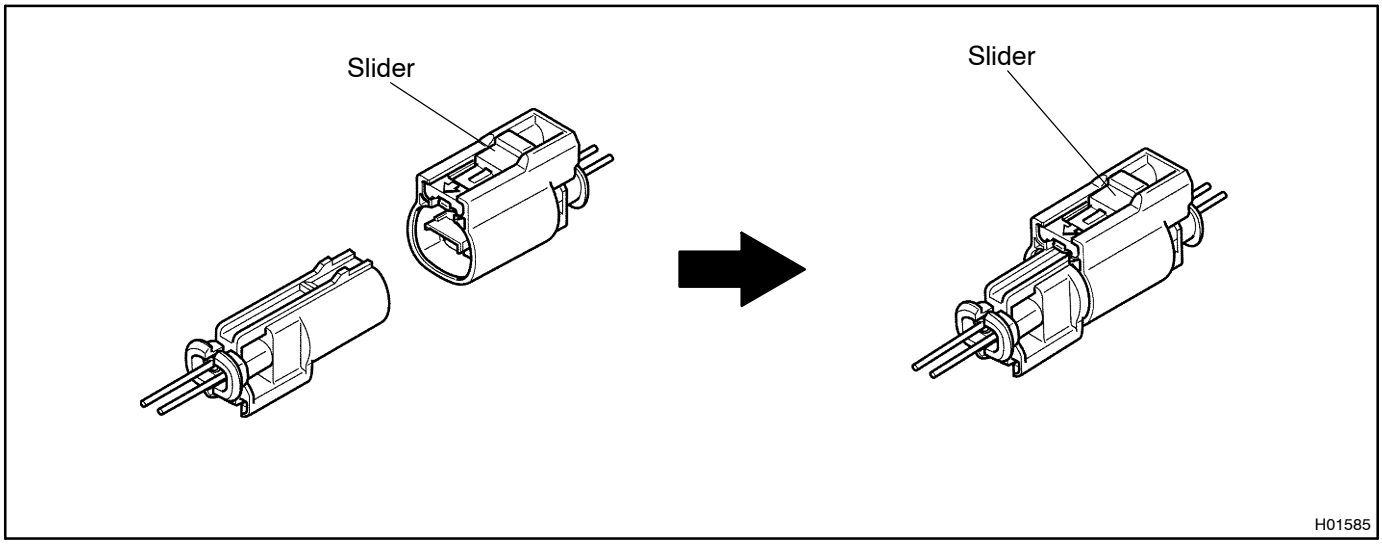
(a) Place a finger on the slider.

(b) Slide the slider to release lock.

(c) Disconnect the connector.



15. CONNECTION OF SIDE AIRBAG CONNECTOR



(a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit in them without rubbing.

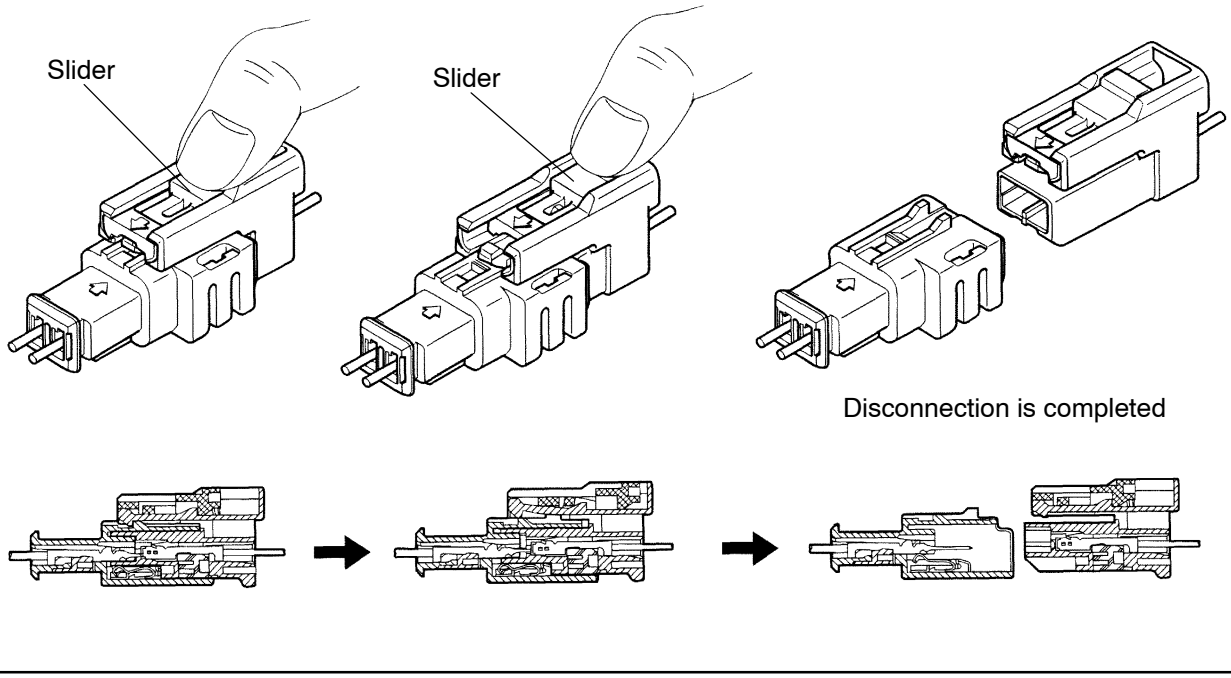
(b) Be sure to insert until they are locked. After fitting in pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.

16. DISCONNECTION OF CONNECTORS FOR STEERING WHEEL PAD (with AIRBAG), CURTAIN SHIELD AIRBAG ASSEMBLY AND FRONT PASSENGER AIRBAG ASSEMBLY

(a) Place a finger on the slider.
(b) Slide the slider to release lock.
(c) Disconnect the connector.



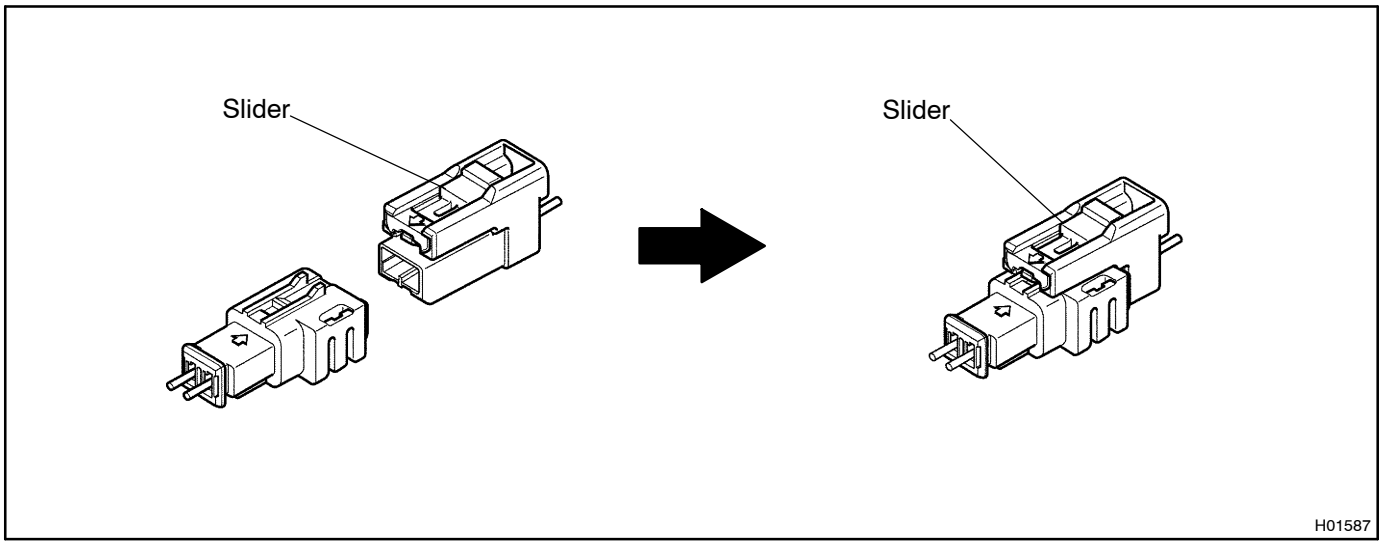
17. CONNECTION OF CONNECTORS FOR STEERING WHEEL PAD (with AIRBAG), CURTAIN SHIELD AIRBAG ASSEMBLY AND FRONT PASSENGER AIRBAG ASSEMBLY

(a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit in them without rubbing.

(b) Be sure to insert until they are locked. After fitting in pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

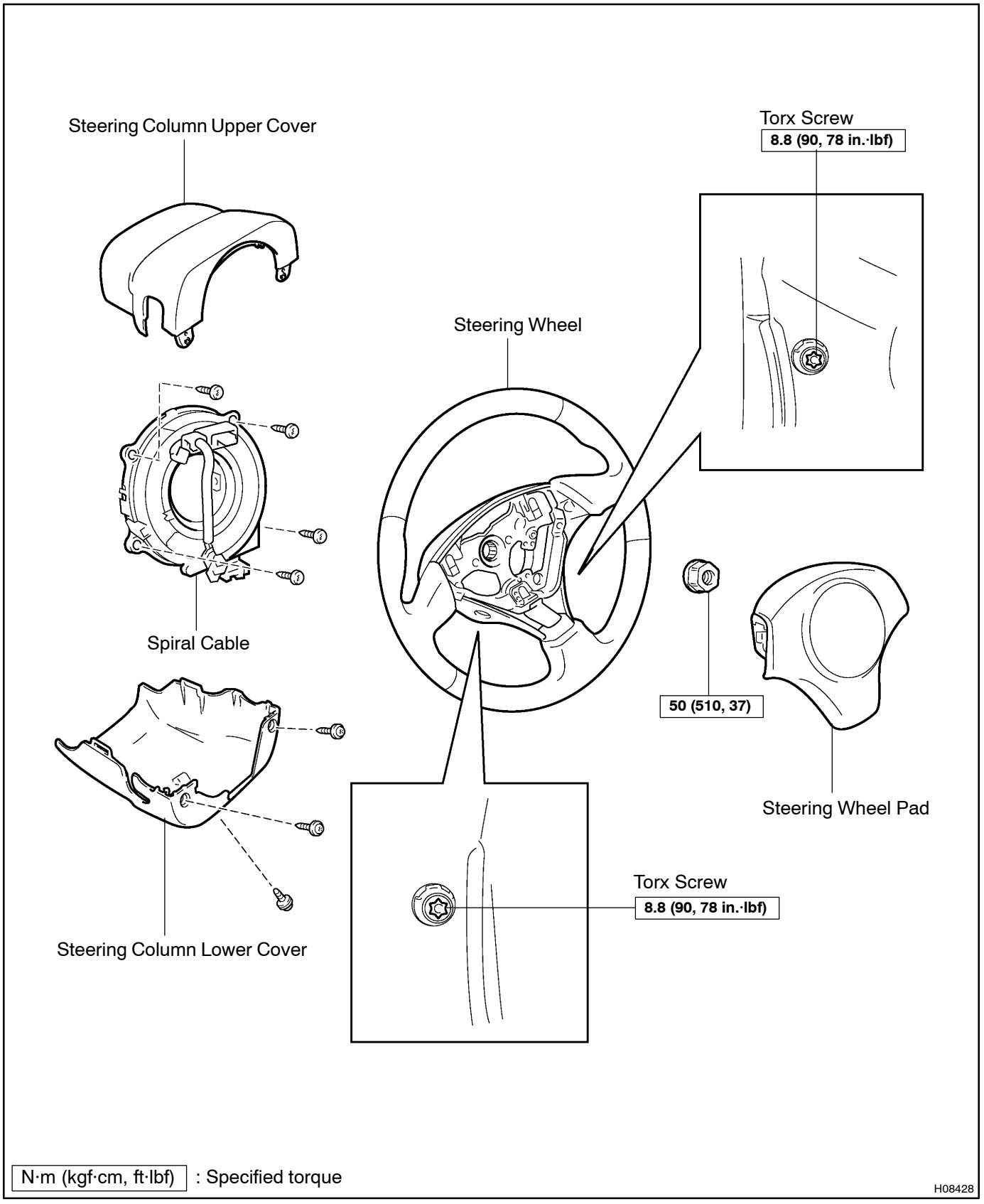
- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.



STEERING WHEEL PAD AND SPIRAL CABLE

RS00Y–50

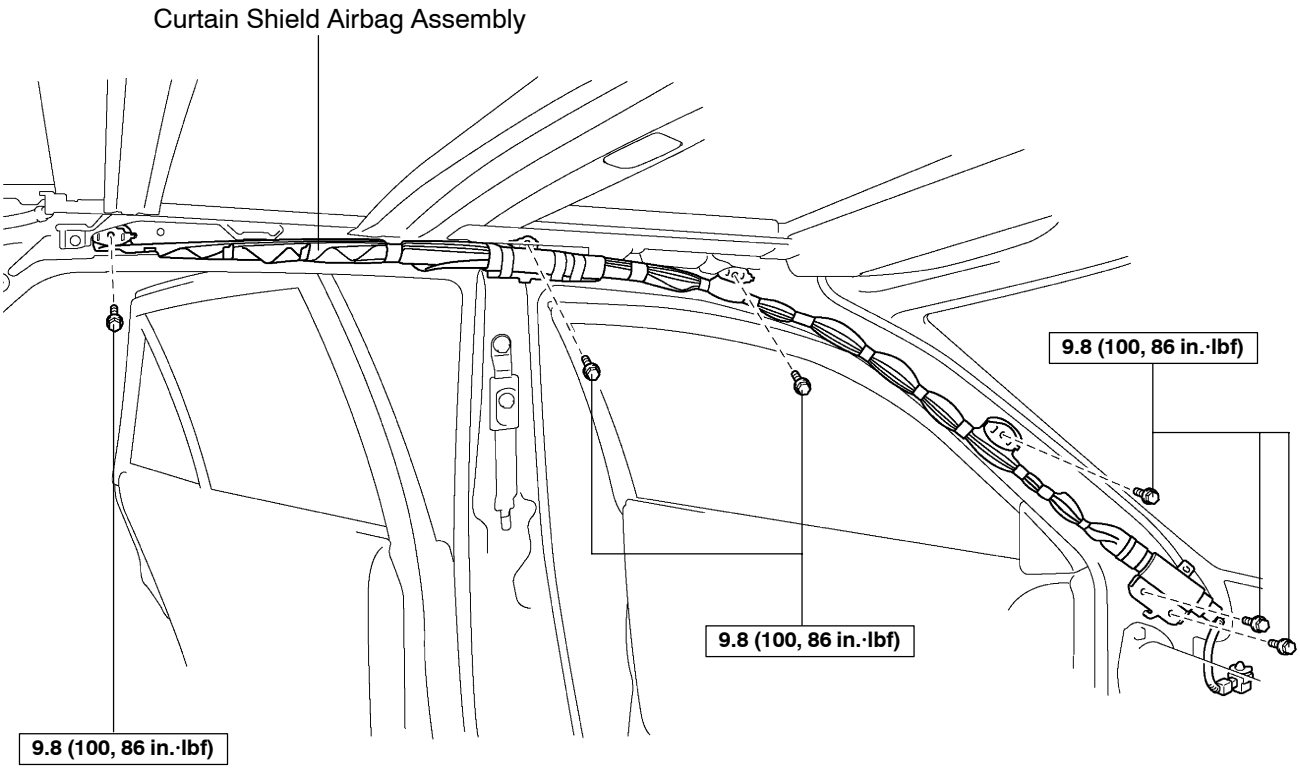
COMPONENTS



CURTAIN SHIELD AIRBAG ASSEMBLY

COMPONENTS

RS0N2–06



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

H19085

RS0UC–01

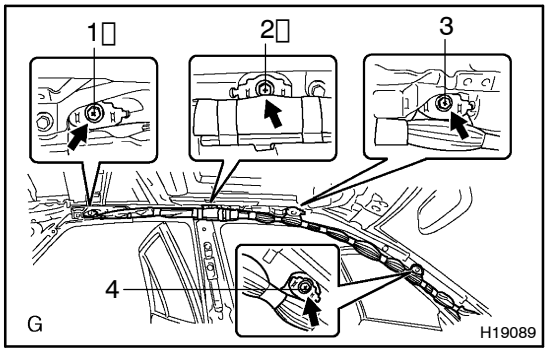
REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected and the ignition switch is at ON position, DTCs will be recorded.**
- **Never use any airbag parts removed from another vehicle. When replacing parts, replace them with new ones.**

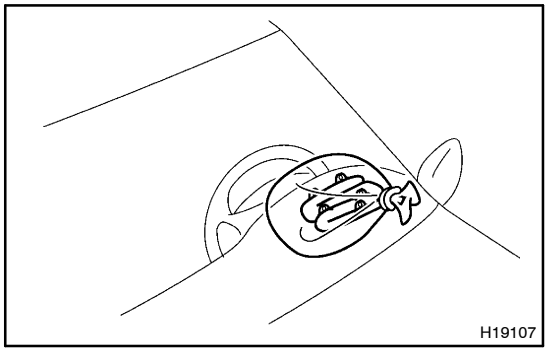
1. REMOVE ROOF HEADLINING

Pages for reference	See page
Sedan	BO–72
Wagon	BO–80



2. In case without removing inflater:
REMOVE CURTAIN SHIELD AIRBAG ASSEMBLY

(a) In the order shown in the illustration, remove the bolts and deployment section of the curtain shield airbag assembly.



(b) Put the removed curtain shield airbag assembly into a clear plastic bag and put it on the instrument panel.

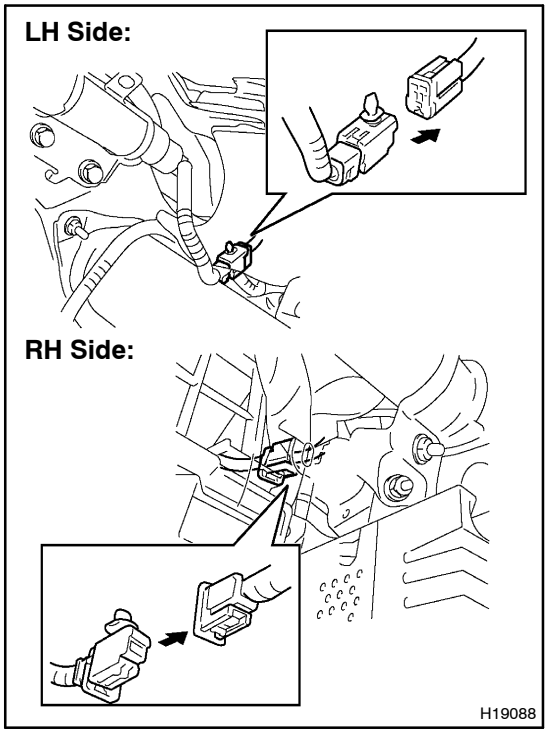
CAUTION:

Never disassemble the curtain shield airbag assembly.

NOTICE:

The clear plastic bag is not reusable.

3. REMOVE INSTRUMENT PANEL (See page BO–59)

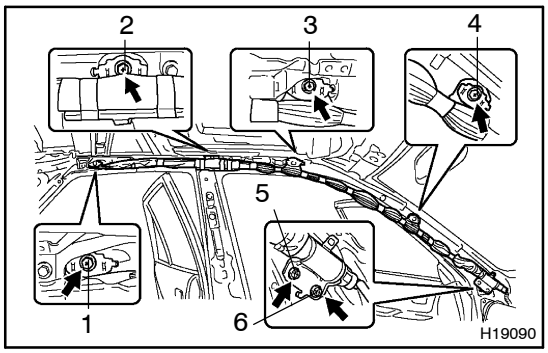


4. REMOVE CURTAIN SHIELD AIRBAG ASSEMBLY

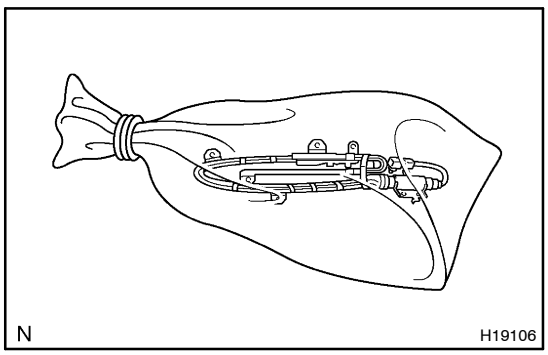
(a) Disengage the clamp and remove the curtain shield airbag assembly connector.

(b) Disconnect the connector for curtain sealed airbag assembly.

(c) Disengage the claw and disconnect the vehicle wire harness from the bracket of the curtain shield airbag assembly.



(d) In the order shown in the illustration, remove the bolts and curtain shield airbag assembly.



(e) Put the removed curtain shield airbag assembly into a clear plastic bag and keep it in a safe place.

CAUTION:

Never disassemble the curtain shield airbag assembly.

NOTICE:

The protection bag is not reusable.

RS0UD–01

INSPECTION

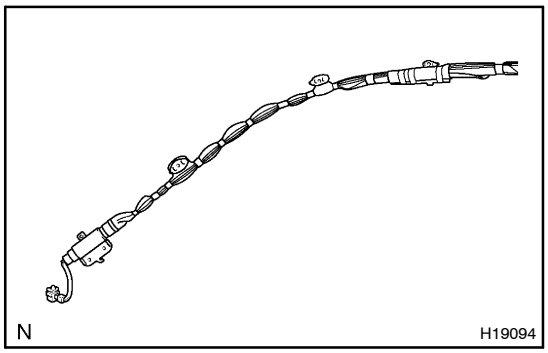
1. Vehicles not involved in collision:
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Perform a diagnostic system check (See page DI–413).

(b) Perform a visual check which includes the following item with the curtain shield airbag assembly installed in the vehicle.
Check for cuts, minute cracks or marked discoloration on the front pillar garnish and roof headlining.

2. Vehicle involved in a collision and airbag is not deployed:
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Perform a diagnostic system check (See page DI–413).



(b) Perform a visual check which includes the following items with the curtain shield airbag assembly removed from the vehicle.
- Check for cuts, tears and cracks, or marked discoloration of the curtain shield airbag assembly.
- Check for cuts and cracks in wire harness, and chipping in connectors.

CAUTION:
For removal and installation of the curtain shield airbag assembly, see page RS–15 and RS–25. Be sure to follow the correct procedure.

3. Vehicle involved in a collision and airbag is deployed:
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Perform a diagnostic system check (See page DI–413).

(b) Perform a visual check which includes the following items with the curtain shield airbag assembly removed from the vehicle.
- Check for deformation or cracks on the body part to where the curtain shield airbag installed.
- Check for damage of the connector and wire harness.

HINT:
If the body part is deformed or cracked, replace it.

RS0N5–07

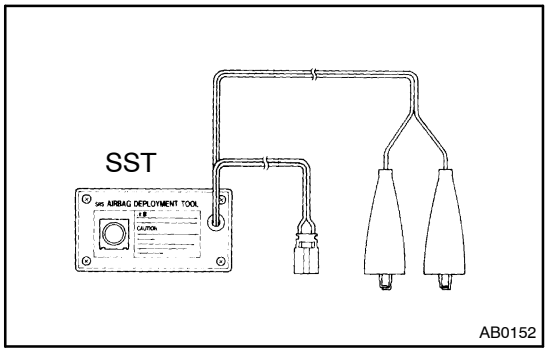
DISPOSAL

HINT:

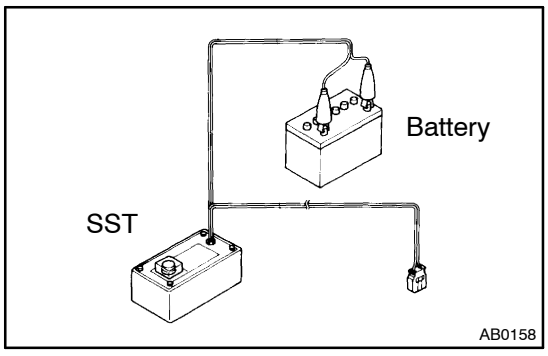
When scrapping vehicles equipped with an SRS or disposing of the curtain shield airbag assembly always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of the DISTRIBUTOR.

CAUTION:

- **Never dispose of a curtain shield airbag assembly which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out–of–doors 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.**
  SST 09082–00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the airbag assembly.**
- **The side airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling side airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a side airbag assembly with the deployed airbag.**



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

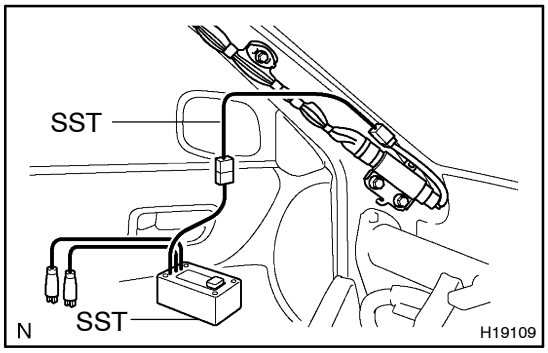
Have a battery ready as the power source to deploy the airbag.

(a) Check functioning of the SST (See Pub. No. RM684E step 1–(a) on page RS–18).
SST 09082–00700

(b) Disconnect the curtain shield airbag connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



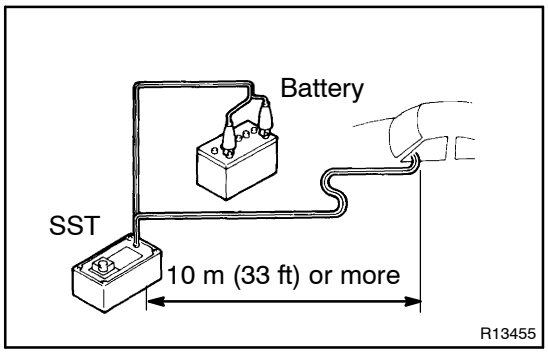
(c) Install the SST.

(1) Connect the connectors of the 2 SST to the airbag connector.

SST 09082–00700, 09082–00760

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



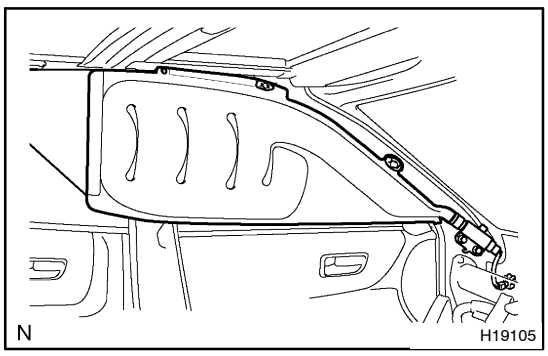
(2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.



(d) Deploy the airbag.

(1) Check that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

CAUTION:

- **The curtain shield airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling the curtain shield airbag assembly with the deployed airbag.**
- **Do not apply water, etc. to the curtain shield airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **When scrapping a vehicle, deploy the airbag and scrap the vehicle with the curtain shield airbag assembly still installed.**

2. DEPLOYMENT WHEN DISPOSING OF CURTAIN SHIELD AIRBAG ASSEMBLY

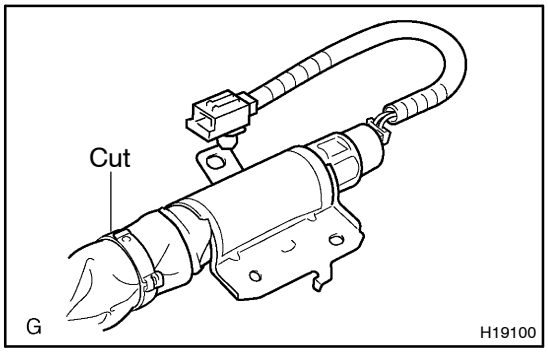
NOTICE:

- **When disposing of the curtain shield airbag assembly only, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

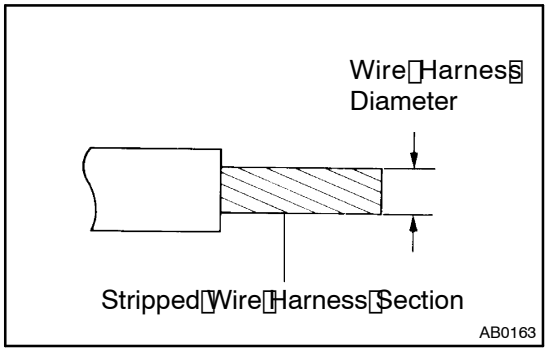
HINT:

Have a battery ready as the power source to deploy the airbag.

(a) Remove the curtain shield airbag assembly (See page RS–15).



(b) Cut off the deployment section in airbag from inflator.



(c) Using a service–purpose wire harness, 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)

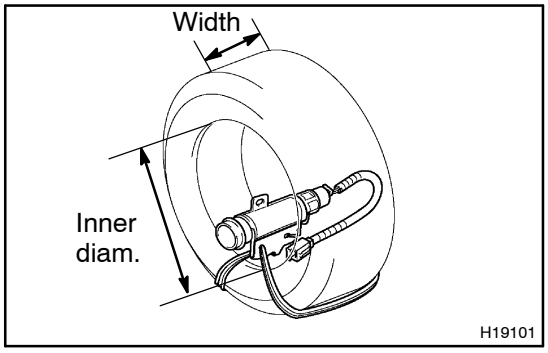
CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the side airbag assembly, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm^2 (0.0019 in^2.).

HINT:

To calculate the square of the stripped wire harness section–

Square = 3.14 x (Diameter)^2 divided by 4



Position the curtain shield airbag assembly inside the tire with the airbag deployment direction facing inside.

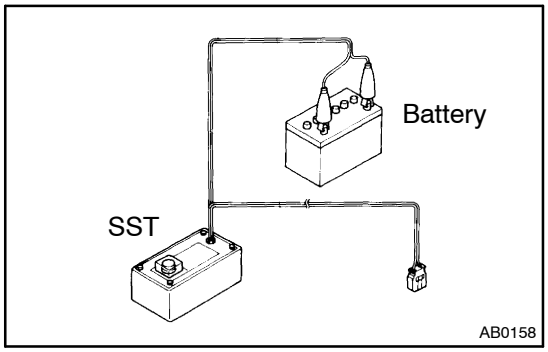
Tire size: Must exceed the following dimensions–
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:

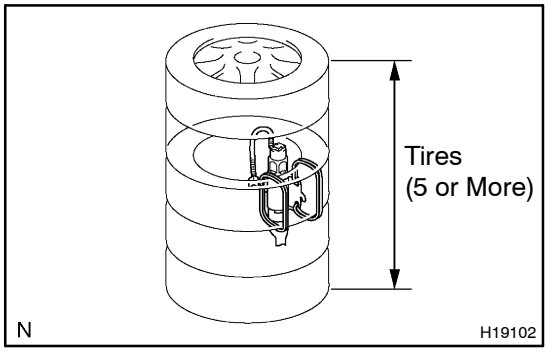
Make sure the wire harness is tight. It is very dangerous when a loose wire harness results in the curtain shield airbag assembly coming free due to the shock from the airbag deploying.

NOTICE:

The tire will be marked by the airbag deployment, so when disposing of the airbag use a redundant tire.



(d) Check functioning of the SST (See Pub. No. RM684E step 1–(a) on page RS–18).
SST 09082–00700

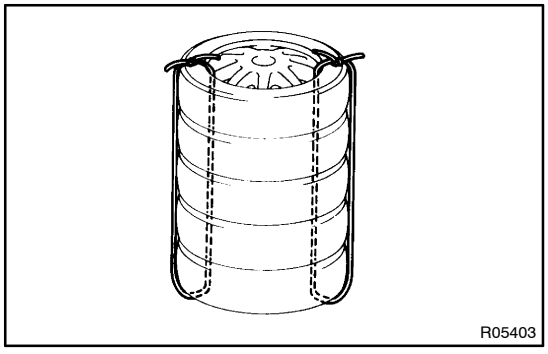


(e) Place the tires.

CAUTION:

Place the tire so that the deployment direction of the curtain shield airbag will be downward.

(1) Place at least 2 tires under the tire to which the side airbag assembly is tied.
(2) Place at least 2 tires over the tire to which the side airbag assembly is tied. The top tire should have the wheel installed.



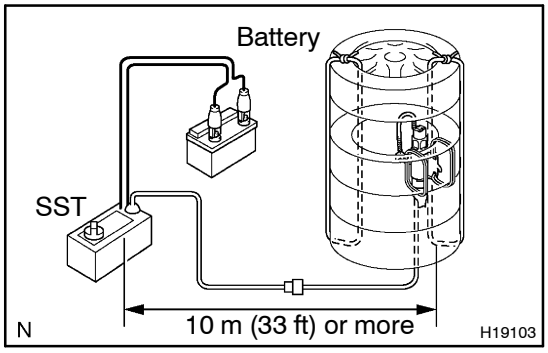
(3) Tie the tires together with 2 wire harness.

CAUTION:

Make sure that the wire harness are tight. It is very dangerous when loose wire harness results in the tires coming free due to the shock from the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Secure at least 1 m (3 ft) of slack for the wire harness.



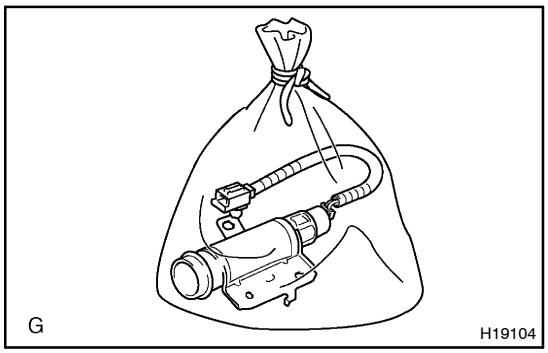
(f) Install the SST.
Connect the connectors of the 2 SST to the curtain shield airbag assembly connector.
SST 09082–00700, 09082–00760

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 battery positive (+) terminal and the black clip to the battery negative (–) terminal.
(2) Check that no one is within 10 m (33 ft) area around the tire which the side airbag assembly is tied to.
(3) Press the SST activation switch and deploy the airbag.

HINT:
The airbag deploys simultaneously as the LED of the SST activation switch lights up.

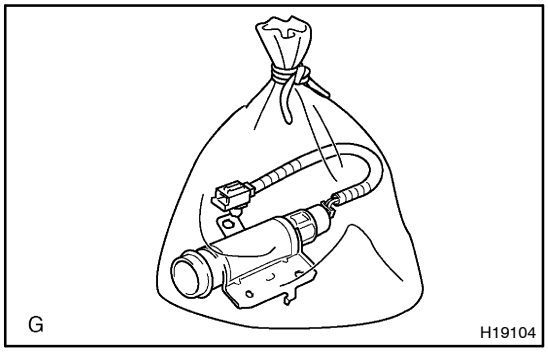


(h) Dispose of the curtain shield airbag assembly.

CAUTION:

- **The curtain shield airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a curtain shield airbag assembly with the deployed airbag.**
- **Do not apply water etc. to a curtain shield airbag assembly with the 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 vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.



3. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY WITH AIRBAG DEPLOYED IN COLLISION

Dispose of the curtain shield airbag assembly.

CAUTION:

- **The curtain shield airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a curtain shield airbag assembly with the deployed airbag.**
- **Do not apply water etc. to a curtain shield airbag assembly with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**

(1) Remove the curtain shield airbag assembly (See page RS–155).

(2) Place the curtain shield airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

RS0N6–04

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the curtain shield airbag assembly, front pillar garnish and/or roof headlining.

Case	Part to be replaced
If the curtain shield airbag has been deployed.	Curtain shield airbag assembly
If the curtain shield airbag assembly has been found to be faulty in trouble-shooting.	Curtain shield airbag assembly
If the curtain shield airbag assembly has been found to be faulty during checking items (See page RS–17).	Curtain shield airbag assembly
If the front pillar garnish has been found to be faulty during the check (See page RS–17).	Front pillar garnish
If the roof headlining has been found to be faulty during the check (See page RS–17).	Roof headlining
If the curtain shield airbag assembly has been dropped.	Curtain shield airbag assembly

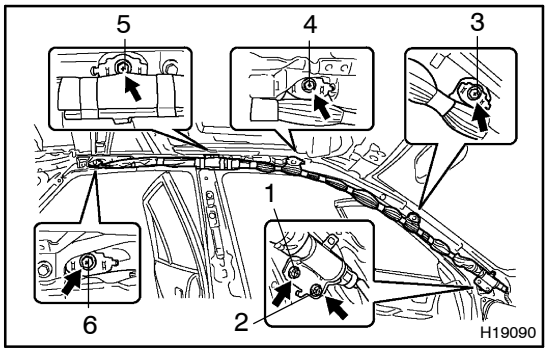
CAUTION:

For removal and installation of the curtain shield airbag assembly, see page RS–15 and RS–25. Be sure to follow the correct procedure.

RS0N7–04

INSTALLATION

NOTICE:
Never use airbag parts removed from another vehicle.
When replacing parts, replace them with new parts.



1. INSTALL CURTAIN SHIELD AIRBAG ASSEMBLY

(a) In order shown in the illustration, install the curtain shield airbag assembly with the 6 bolts.

Torque: 9.8 N·m (100 kgf·cm, 86 in.·lbf)

CAUTION:
Pay attention not to twist the deployment section of the curtain shield airbag assembly.
NOTICE:

- **Make sure that the curtain shield airbag assembly is installed with the specified torque.**
- **If the curtain shield airbag assembly has been dropped, or any cracks, dents or other defects in the case or connector, replace the curtain shield airbag assembly with a new one.**
- **When installing the curtain shield airbag assembly, be carefull to prevent it from being pinched between other parts.**

(b) Connect the connector of the curtain shield airbag assembly.

2. INSTALL INSTRUMENT PANEL (See page BO–65)

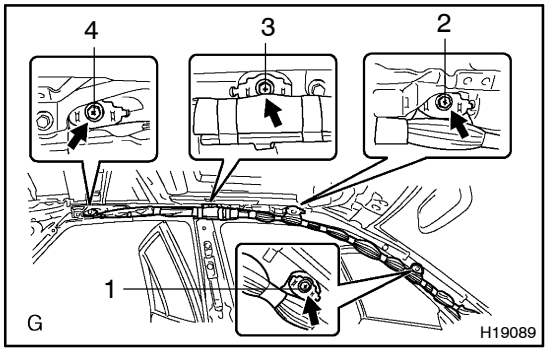
3. When inflator is installed:
INSTALL CURTAIN SHIELD AIRBAG ASSEMBLY

In order shown in the illustration, install the deployment section of the curtain shield airbag assembly with the 4 bolts.

Torque: 9.8 N·m (100 kgf·cm, 86 in.·lbf)

CAUTION:
Pay attention not to twist it.
NOTICE:

- **Make sure that the curtain shield airbag assembly is installed with the specified torque.**
- **When installing the curtain shield airbag assembly, be carefull to prevent it from being pinched between other parts.**



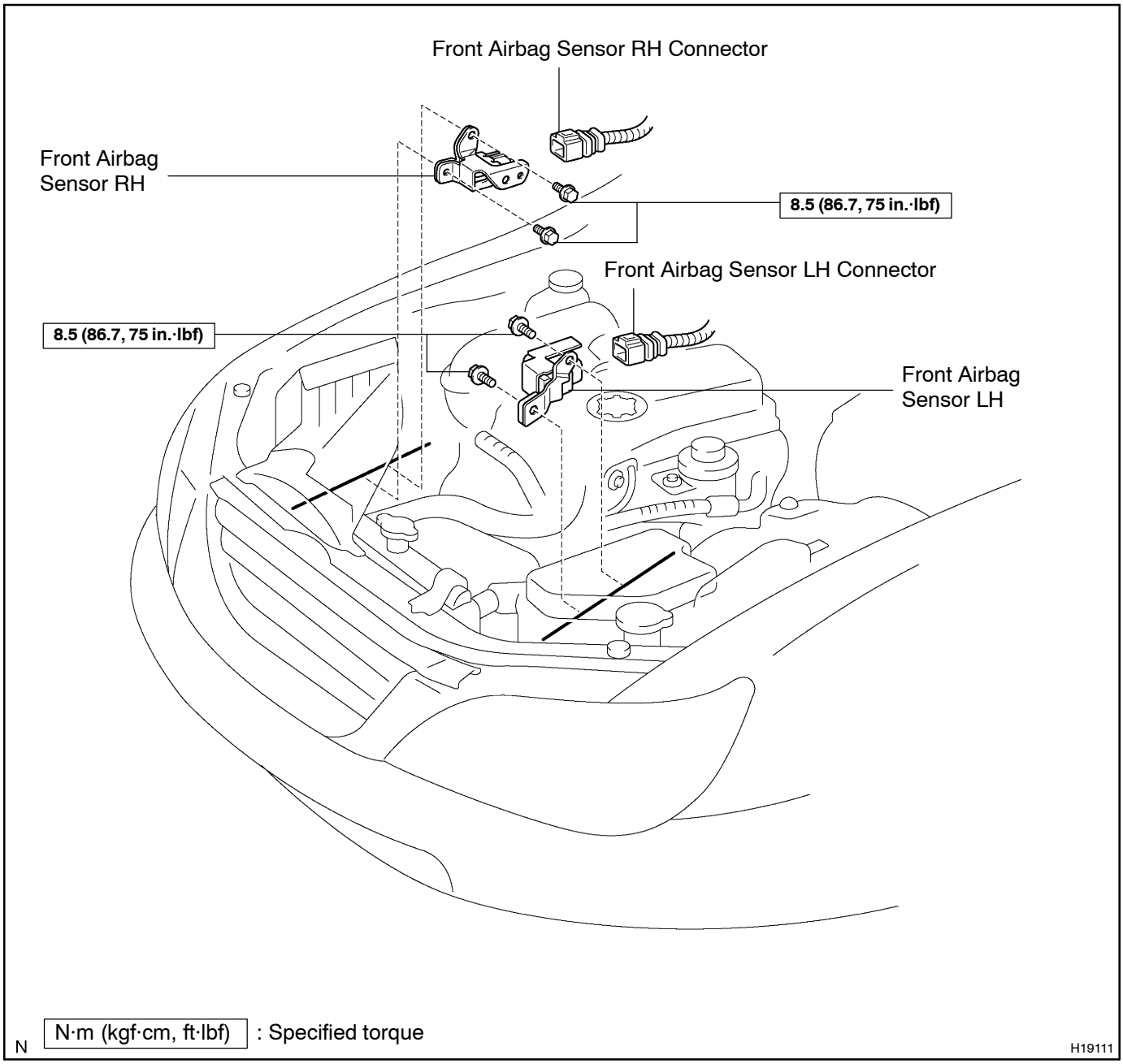
4. INSTALL ROOF HEADLINING

Pages for reference	See page
Sedan	BO–76
Wagon	BO–85

FRONT AIRBAG SENSOR

RS07U–05

COMPONENTS

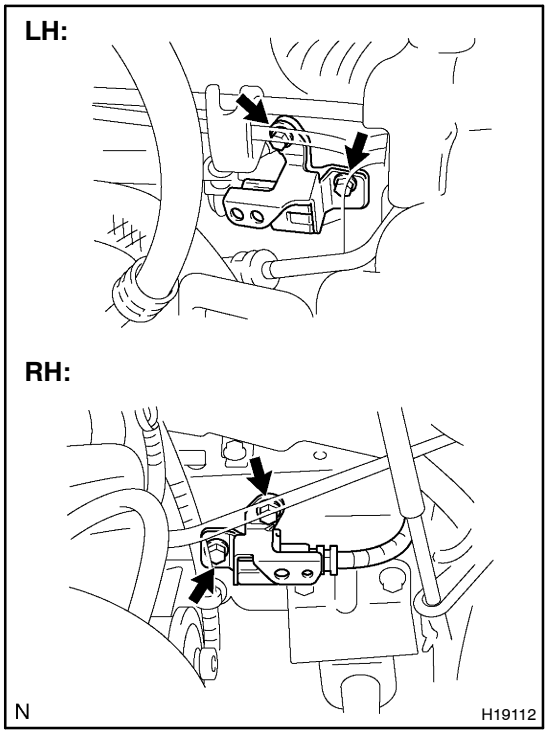


RS0UJ–01

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected with the ignition switch in ON or ACC position, DTCs will be recorded.**
- **Never use any SRS parts removed from another vehicle. When replacing parts, replace them with new one.**
- **Never reuse the sensor involved in a collision when the SRS has deployed.**
- **Never repair a sensor in order to reuse it.**



REMOVE FRONT AIRBAG SENSOR

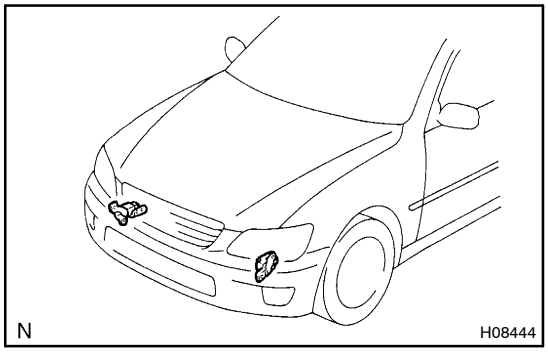
(a) Disconnect the front airbag sensor connector.

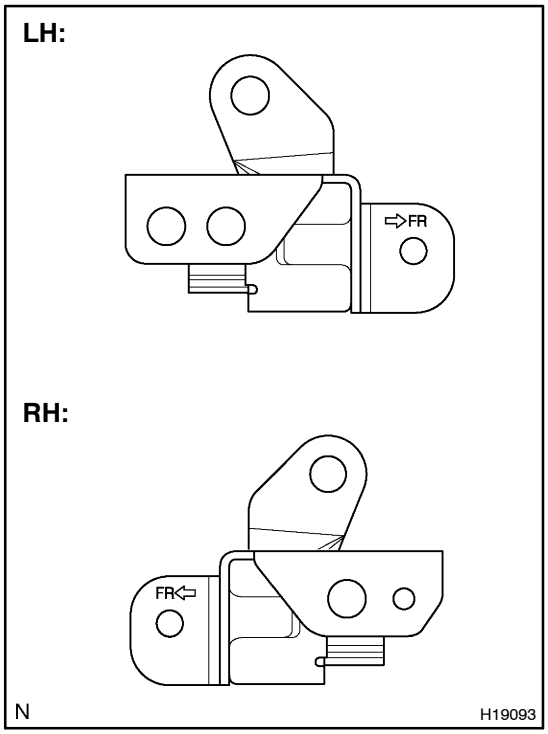
NOTICE:

Disconnect the connector with the sensor assembly installed.

(b) Remove the 2 bolts and front airbag sensor.

(c) Employ the same manner described above to the other side.





RS07W–04

INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

Perform a diagnostic system check (See page DI–413).

2. VEHICLES INVOLVED IN COLLISION

(a) Perform a diagnostic system check (See page DI–413).

(b) If the front fender of the car or its periphery is damaged, do a visual check for damage to the front airbag sensor, which includes the following items even if the airbag was not deployed:

- Bracket deformation
- Paint peeling off the bracket
- Cracks, dents or chips in the case
- Cracks, dents, chipping and scratches in the connector
- Peeling of the label or damage to the serial number

RS07X–04

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the front airbag sensor.

- If the SRS has been deployed in a collision. (Replace both the left and right airbag sensors.).
- If the front airbag sensor has been found to be faulty in troubleshooting.
- If the front airbag sensor has been found to be faulty during the check in item. (See page RS–28).
- If the front airbag sensor has been dropped.

CAUTION:

For removal and installation of the front airbag sensor, see page RS–27 and RS–30. Be sure to follow the correct procedure.

RS0UK–01

INSTALLATION

INSTALL FRONT AIRBAG SENSOR

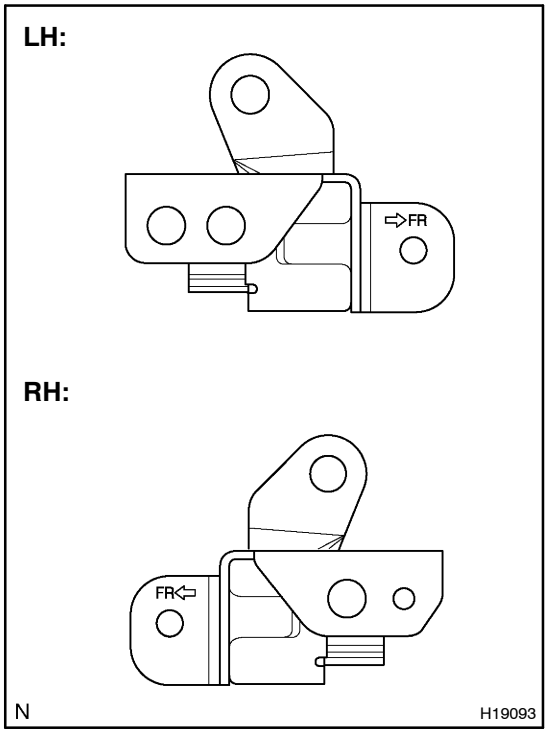
(a) Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.

Torque: 8.5 N·m (86.7 kgf·cm, 75 in.·lbf)

NOTICE:

- **Connection of the connector is done after the sensor has been installed.**
- **Make sure the sensor is installed with the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or other defects in the case, brackets or connector, replace the removed sensor with a new one.**
- **The front sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If the connector is not securely locked, a malfunction code will be detected by the diagnostic system.**

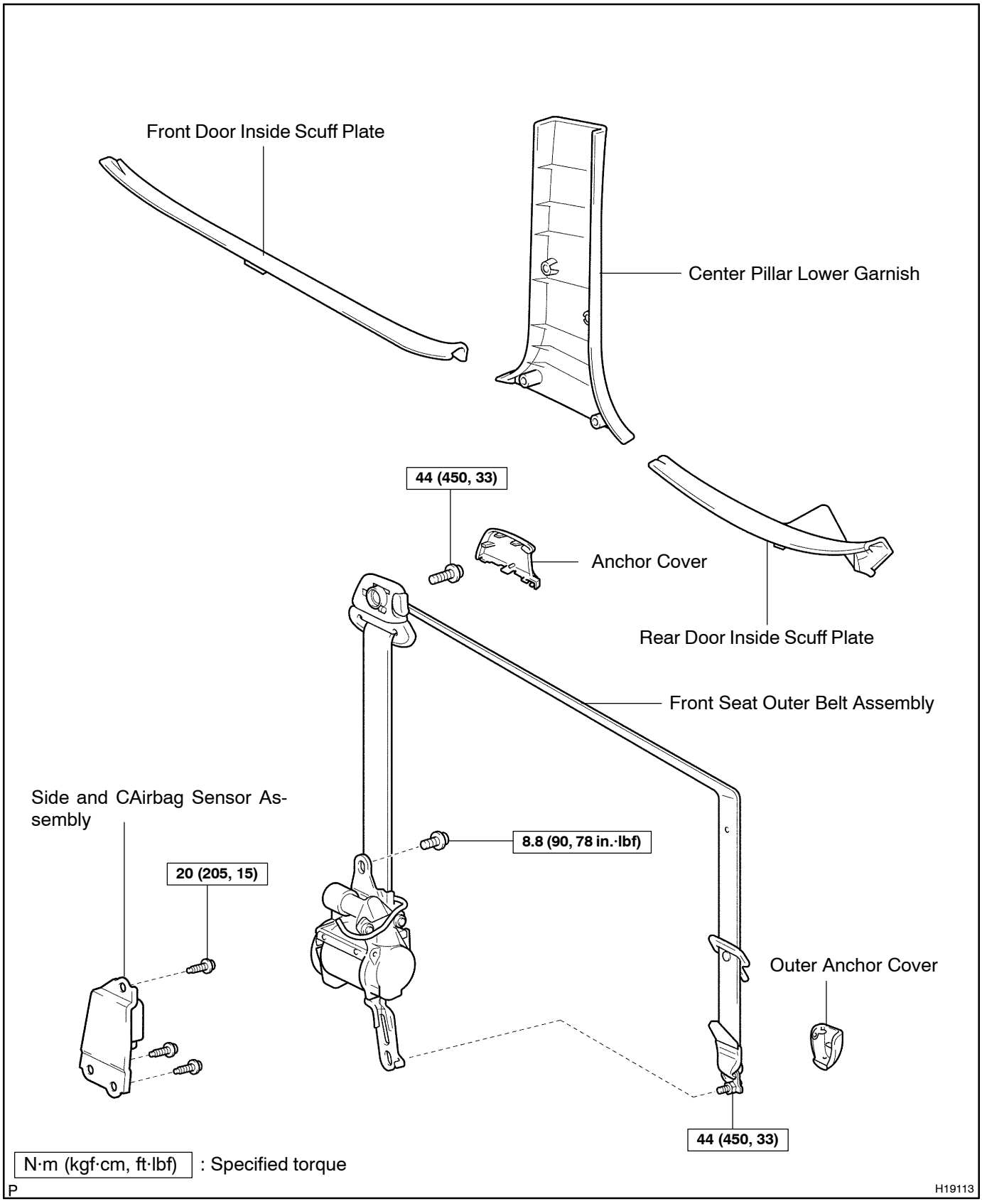
(b) Connect the front airbag sensor connector.



SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

RS0UE–01

COMPONENTS



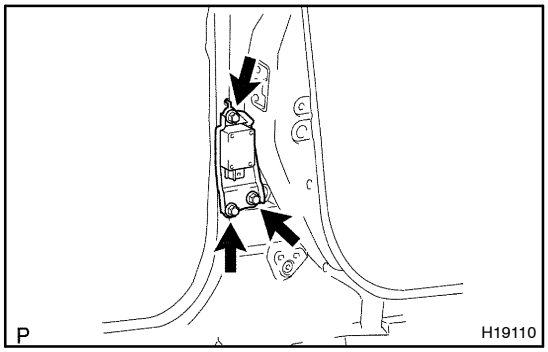
RS0UF–01

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected with the ignition switch at ON position, DTC will be recorded.**
- **Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)**

1. **REMOVE FRONT AND REAR DOOR INSIDE SCUFF PLATES**
2. **REMOVE CENTER PILLAR LOWER GARNISH**
3. **REMOVE FRONT SEAT OUTER BELT ASSEMBLY (See Pub. No. RM684E on page BO–147)**



4. **REMOVE SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY**

(a) Disconnect the side and curtain shield airbag sensor assembly connector.

NOTICE:

Disconnect the connector with the sensor assembly installed.

(b) Remove the 3 bolts and side and curtain shield airbag sensor assembly.

RS0UG–01

INSPECTION

1. Vehicle not involved in collision:
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

Do a diagnostic system check (See page DI–413).

2. Vehicle involved in collision and airbag is not deployed:
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

Do a diagnostic system check (See page DI–413).

3. Vehicle involved in collision and airbag is deployed:
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

Replace the side airbag sensor assembly (See page RS–32).

RS0UH–01

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the side and curtain shield airbag sensor assembly.

- If the side and curtain shield airbag sensor assembly has been deployed in a collision.
- If the side and curtain shield airbag sensor assembly has been found to be faulty in troubleshooting.
- If the side and curtain shield airbag sensor assembly has been dropped.

CAUTION:

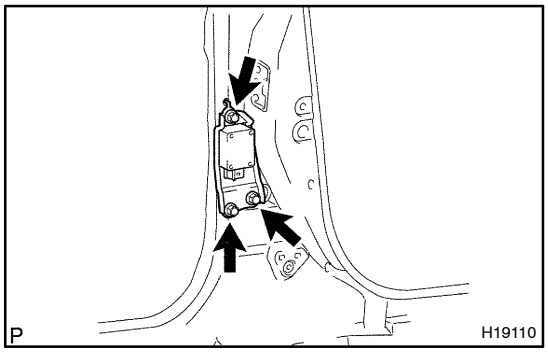
For removal and installation of the side and curtain shield airbag sensor assembly, see page RS–32 and RS–35. Be sure to follow the correct procedure.

RS0UI–01

INSTALLATION

NOTICE:

- **Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.**
- **Never reuse the side and curtain shield airbag sensor assembly involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**



1. INSTALL SIDE AND CURTAIN SHIELD AIRBAG SENSOR ASSEMBLY

(a) Install the side and curtain shield airbag sensor assembly with the 3 bolts.

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

(b) Connect the side and curtain shield airbag sensor assembly connector.

NOTICE:

- **Connection of the connector is done after the sensor assembly has been installed. Make sure the sensor assembly is installed with the specified torque.**
- **If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.**
- **When installing the sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.**
- **After installation, shake the sensor assembly to check that there is no looseness.**

2. INSTALL FRONT SEAT OUTER BELT ASSEMBLY (See Pub. No. RM684E on page BO–147)

3. INSTALL CENTER PILLAR LOWER GARNISH

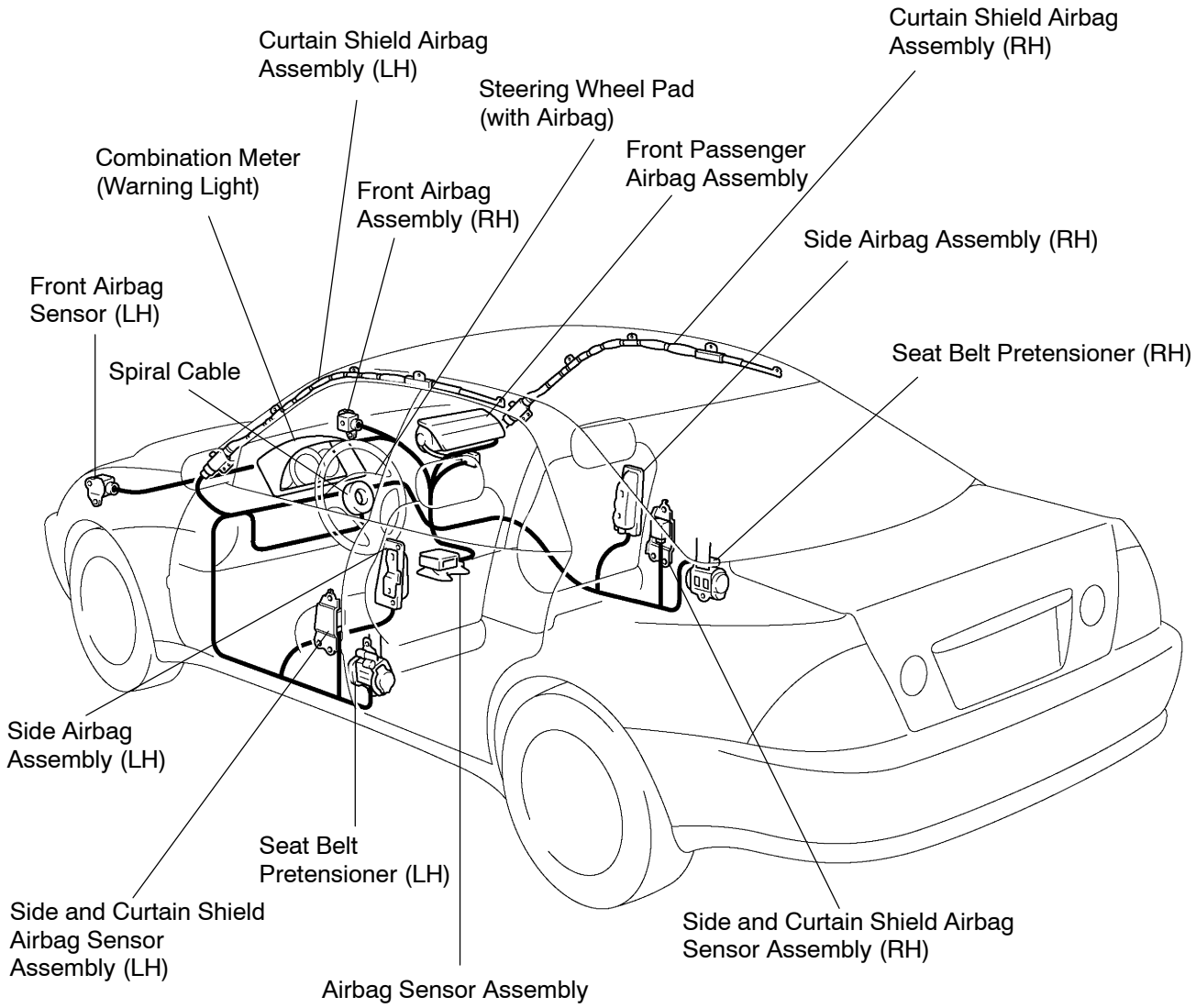
4. INSTALL FRONT AND REAR DOOR INSIDE SCUFF PLATES

WIRE HARNESS AND CONNECTOR

LOCATION

RS0UL–01

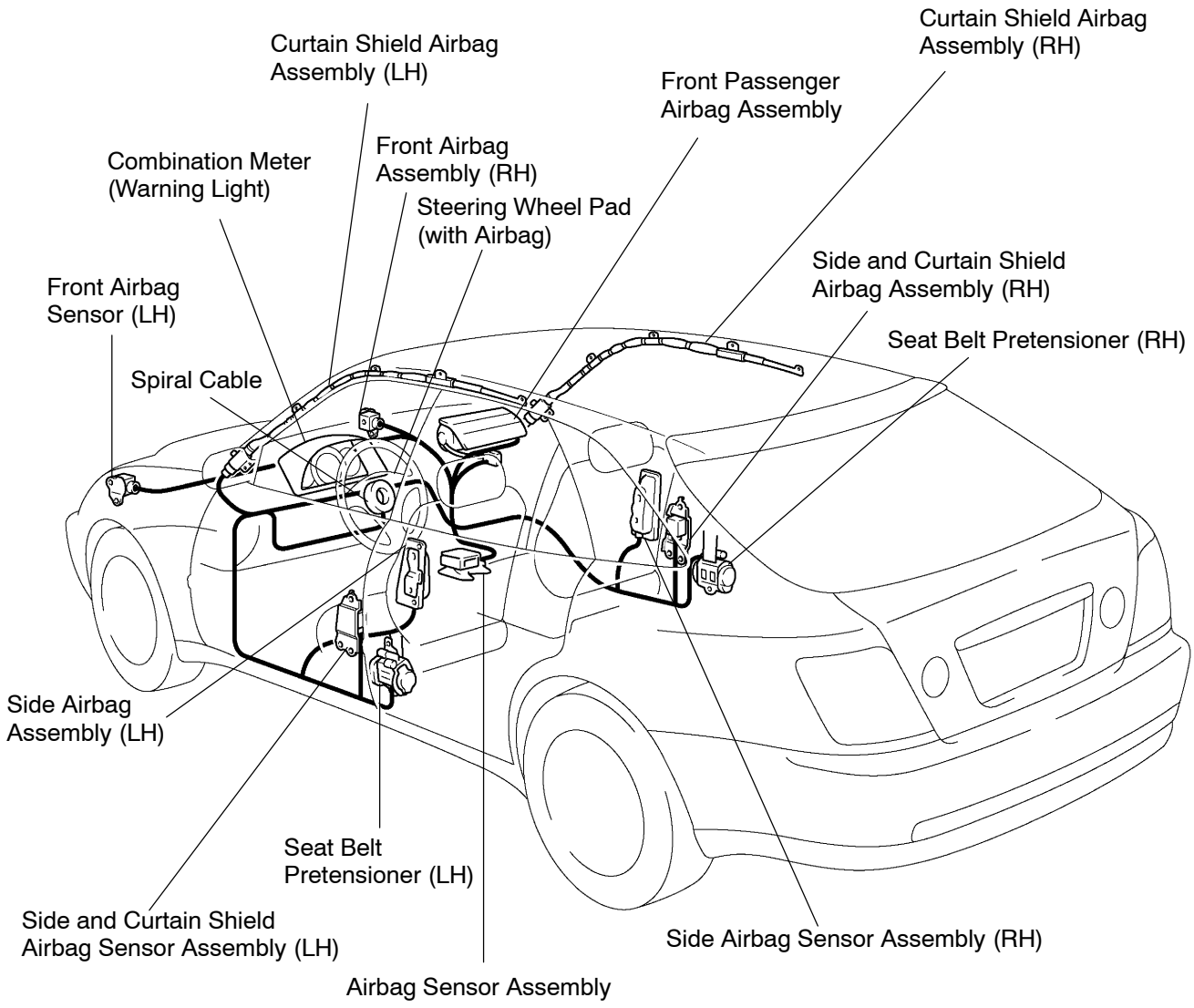
Sedan:



N

H19272

Wagon:



N

H19086

RS085–04

INSPECTION

HINT:

The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color.

1. Vehicles not involved in collision:
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

Perform a diagnostic system check (See page DI–413).

2. Vehicles involved in collision:
INSPECT SUPPLEMENTAL RESTRAINT SYSTEM

(a) Perform a diagnostic system check (See page DI–413).

(b) Check breaks in all wires of the SRS wire harness, and exposed conductors.

(c) Check to see if the SRS wire harness connectors are cracked or chipped.

RS086-04

REPLACEMENT

In the following cases, replace the wire harness or connector.

- If any part of the SRS wire harness or any connector has been found to be faulty in troubleshooting.
- If any part of the SRS wire harness or any connector has been found to be faulty during checking items (See page RS–38).

CAUTION:

If the wire harness used in the SRS is damaged, replace the whole wire harness assembly.

TIRE AND WHEEL

SA289–01

INSPECTION

1. INSPECT TIRE

(a) Check the tires for wear and proper inflation pressure.

Cold tire inflation pressure (SEDAN):

Europe:

Up to 4 passengers:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	280 (2.8, 41)*1 260 (2.6, 38)*2 230 (2.3, 33)*3	310 (3.1, 45)*1 270 (2.7, 39)*2 230 (2.3, 33)*3
205/55R16 89V	260 (2.6, 38)*1 250 (2.5, 36)*2 230 (2.3, 33)*3	290 (2.9, 42)*1 250 (2.5, 36)*2 230 (2.3, 33)*3

5 passengers:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	330 (3.3, 48)*1 300 (3.0, 44)*2 250 (2.5, 36)*3	350 (3.5, 51)*1 300 (3.0, 44)*2 250 (2.5, 36)*3
205/55R16 89V	310 (3.1, 45)*1 280 (2.8, 41)*2 230 (2.3, 33)*3	330 (3.3, 48)*1 280 (2.8, 41)*2 230 (2.3, 33)*3

*1: For driving at 210 km/h (131 mph) or over

*2: For driving at 160 km/h (100 mph) to 210 km/h (131 mph)

*3: For driving under 160 km/h (100 mph)

Others:

Up to 4 passengers:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	280 (2.8, 41)*4 230 (2.3, 33)*5	310 (3.1, 45)*4 230 (2.3, 33)*5
205/55R16 89V	270 (2.7, 39)*4 220 (2.2, 32)*5	290 (2.9, 42)*4 220 (2.2, 32)*5

5 passengers:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	330 (3.3, 48)*4 250 (2.5, 36)*5	350 (3.5, 51)*4 250 (2.5, 36)*5
205/55R16 89V	310 (3.1, 45)*4 230 (2.3, 33)*5	330 (3.3, 48)*4 230 (2.3, 33)*5

*4: For driving at 140 km/h (88 mph) or over

*5: For driving under 140 km/h (88 mph)

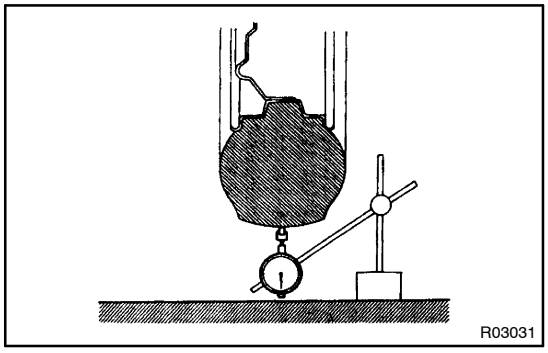
Cold tire inflation pressure (WAGON):
Up to 4 passengers:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	280 (2.8, 41) *1 260 (2.6, 38) *2 230 (2.3, 33) *3	–
225/45ZR17	–	290 (2.9, 42) *1 270 (2.7, 39) *2 240 (2.4, 35) *3
205/55R16 89V	260 (2.6, 38) *1 250 (2.5, 36) *2 230 (2.3, 33) *3	310 (3.1, 45) *1 260 (2.6, 38) *2 230 (2.3, 33) *3

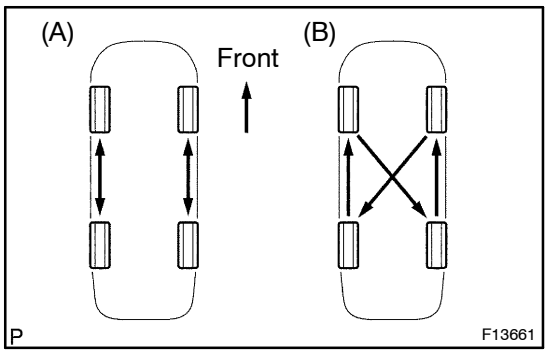
5 passengers:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
215/45ZR17	330 (3.3, 48) *1 300 (3.0, 44) *2 250 (2.5, 36) *3	–
225/45ZR17	–	340 (3.4, 49) *1 310 (3.1, 45) *2 260 (2.6, 38) *3
205/55R16 89V	310 (3.1, 45) *1 280 (2.8, 41) *2 230 (2.3, 33) *3	330 (3.3, 48) *1 290 (2.9, 42) *2 240 (2.4, 35) *3

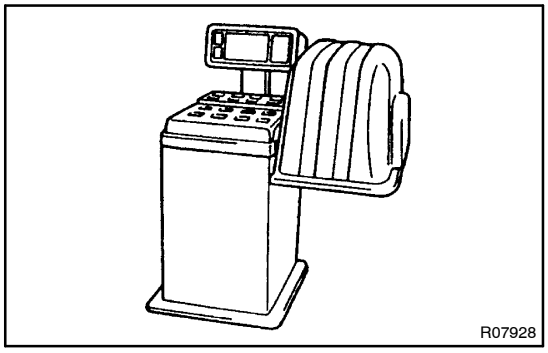
*1: For driving at 210 km/h (131 mph) or over
*2: For driving at 160 km/h (100 mph) to 210 km/h (131 mph)
*3: For driving under 160 km/h (100 mph)



(b) Check the tire runout.
Tire runout: 1.4 mm (0.055 in.) or less



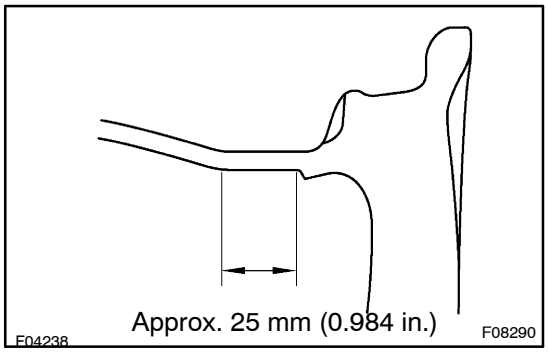
2. ROTATING TIRES
NOTICE:
Tires must not be rotated for wagon due to the difference in size between the front and rear tires.
HINT:
Rotate tires as shown in the illustration as rotation way differs according to whether the tire turning direction is specified (A) or (B).



3. INSPECT WHEEL BALANCE

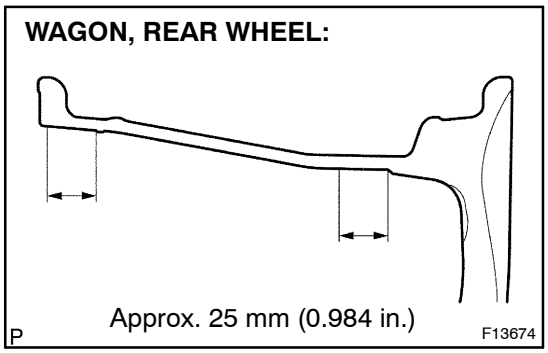
(a) Check and adjust the off–the–car balance.

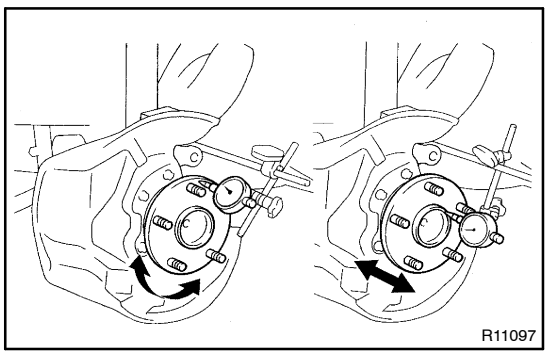
(b) If necessary, check and adjust the on–the–car balance.
Imbalance after adjustment: 8.0 g (0.018 lb) or less



NOTICE:

- **Adhere the sticking type balance weight to the flat position shown in the illustration.**
- **Push the balance weight securely with a finger to adhere it to the position.**
  (Pushing force: 10 kgf/more than 2 secs.)
- **After cleaning the surface which the balance weight will be adhered to of dirt, oil and water with a cleaning detergent, adhere the balance weight to the surface.**
- **Do not touch the sticking surface of the tape.**
- **Do not use the once used balance weight.**
- **Please use the TOYOTA genuine sticking type balance weight.**





4. CHECK WHEEL BEARING LOOSENESS

(a) Check the backlash in the bearing shaft direction.
Maximum: 0.05 mm (0.0020 in.)

(b) Check the axle hub deviation.
Maximum: 0.05 mm (0.0020 in.)

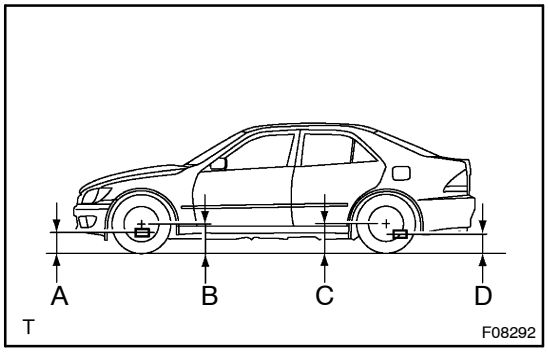
5. CHECK FRONT SUSPENSION FOR LOOSENESS

6. CHECK STEERING LINKAGE FOR LOOSENESS

7. CHECK BALL JOINT FOR LOOSENESS AND EXCESSIVE PLAY (See Pub No. RM684E on page SA–36)

8. CHECK SHOCK ABSORBER WORKS PROPERLY

- Check for oil leak
- Check mounting bushings for wear
- Bounce front and rear of the vehicle



FRONT WHEEL ALIGNMENT

SA1IU–05

INSPECTION

1. MEASURE VEHICLE HEIGHT

Vehicle height (SEDAN):

(Great Britain sports package):

Front vehicle height	Rear vehicle height
72 mm (2.83 in.)	85 mm (3.35 in.)

(China):

Front vehicle height	Rear vehicle height
56 mm (2.20 in.)	66 mm (2.60 in.)

(Except Great Britain sports package and China):

Front vehicle height	Rear vehicle height
66 mm (2.60 in.)	66 mm (2.60 in.)

Vehicle height (WAGON):

(Great Britain sports package):

Front vehicle height	Rear vehicle height
72 mm (2.83 in.)	85 mm (3.35 in.)

(Except Great Britain sports package):

Front vehicle height	Rear vehicle height
66 mm (2.60 in.)	66 mm (2.60 in.)

Measuring points:

A: Ground clearance of the front No .1 lower suspension arm mounting bolt center.

B: Ground clearance of the front wheel center.

C: Ground clearance of the rear wheel center.

D: Ground clearance of the No. 2 lower suspension arm mounting bolt (Suspension member side) tail center.

Vehicle height:

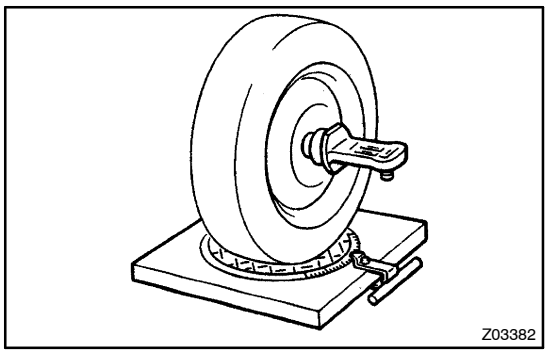
Front: B – A

Rear: C – D

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specified value.

If the vehicle height is not the specified value, try to adjust it by pushing down on or lifting the body.



2. INSTALL CAMBER–CASTER–KINGPIN GAUGE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

Camber, caster and steering axis inclination (SEDAN):
(Great Britain sports package):

Camber	–0°30' ± 30' (–0.5° ± 0.5°)
Right–left error	30' (0.5°) or less
Caster	6°07' ± 30' (6.12° ± 0.5°)
Right–left error	30' (0.5°) or less
Steering axis inclination	9°25' ± 30' (9.42° ± 0.5°)
Right–left error	30' (0.5°) or less

(China):

Camber	–0°06' ± 30' (–0.10° ± 0.5°)
Right–left error	30' (0.5°) or less
Caster	5°43' ± 30' (5.72° ± 0.5°)
Right–left error	30' (0.5°) or less
Steering axis inclination	9°01' ± 30' (9.02° ± 0.5°)
Right–left error	30' (0.5°) or less

(Except Great Britain sports package and China):

Camber	–0°21' ± 30' (–0.35° ± 0.5°)
Right–left error	30' (0.5°) or less
Caster	5°46' ± 30' (5.77° ± 0.5°)
Right–left error	30' (0.5°) or less
Steering axis inclination	9°16' ± 30' (9.27° ± 0.5°)
Right–left error	30' (0.5°) or less

Camber, caster and steering axis inclination (WAGON):
(Great Britain sports package):

Camber	–0°30' ± 30' (–0.5° ± 0.5°)
Right–left error	30' (0.5°) or less
Caster	6°07' ± 30' (6.12° ± 0.5°)
Right–left error	30' (0.5°) or less
Steering axis inclination	9°25' ± 30' (9.42° ± 0.5°)
Right–left error	30' (0.5°) or less

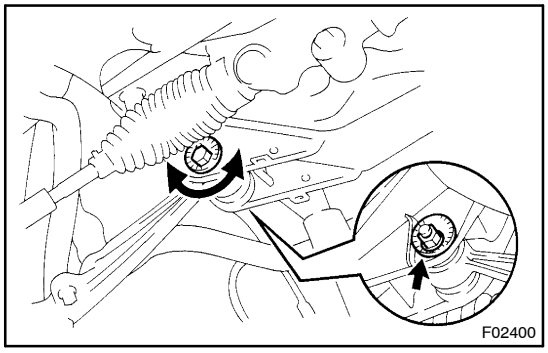
(Except Great Britain sports package):

Camber	–0°21' ± 30' (–0.35° ± 0.5°)
Right–left error	30' (0.5°) or less
Caster	5°46' ± 30' (5.77° ± 0.5°)
Right–left error	30' (0.5°) or less
Steering axis inclination	9°16' ± 30' (9.27° ± 0.5°)
Right–left error	30' (0.5°) or less

If the caster and steering axis inclination are not within the specified values, after the camber has been correctly adjusted, recheck the suspension parts for damaged and/or worn out parts.

4. ADJUST CAMBER

HINT:
After adjusting the camber, inspect the caster and toe–in.

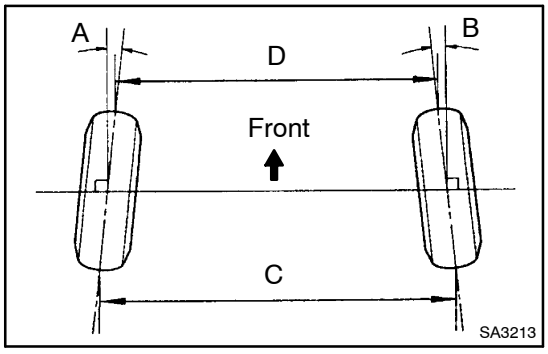


(a) Loosen the camber adjusting cam nut of the No. 1 lower suspension arm.
(b) Turn the camber adjusting cam of the No. 1 lower suspension arm and adjust the camber.

HINT:

- Try to adjust the camber to the center of the specified value.
- Camber will change about 7.5' (0.13°) with each graduation of the adjusting cam.

(c) Torque the camber adjusting cam nut of the No. 1 lower suspension arm.
Torque: 184 N·m (1,880 kgf·cm, 136 ft·lbf)



5. INSPECT TOE–IN

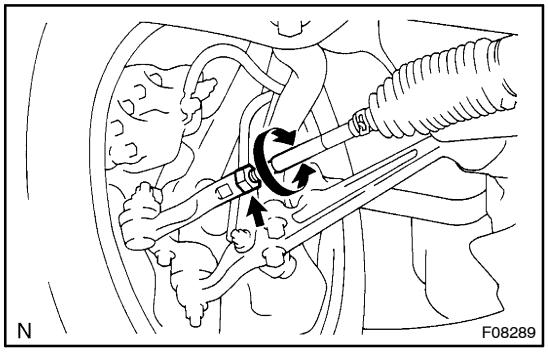
Toe–in:

Toe–in (total)	A + B: 0°06' ± 12' (0.1° ± 0.2°) C – D: 1 ± 2 mm (0.04 ± 0.08 in.)

If the toe–in is not within the specified value, adjust it at the rack ends.

6. ADJUST TOE–IN

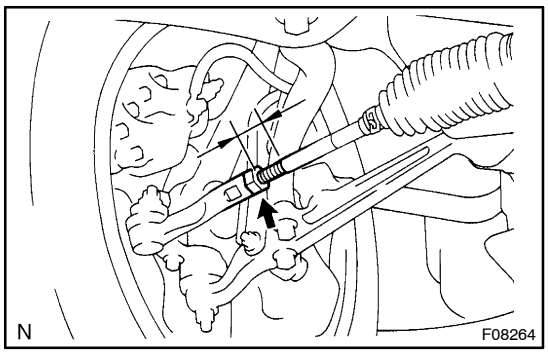
(a) Using pliers, remove the boot clips.



(b) Loosen the tie rod end lock nuts.
(c) Turn the right and left rack ends by an equal amount to adjust the toe–in.

HINT:

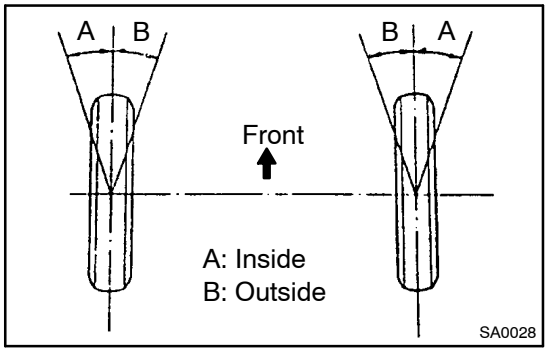
Try to adjust the toe–in to the center of the specified value.



(d) Make sure that the lengths of the right and left rack ends are same.
Rack end length difference: 1.5 mm (0.059 in.) or less
(e) Torque the tie rod end lock nuts.
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)
(f) Place the boots on the seats and using pliers, install the clips.

HINT:

Make sure that the boots are not twisted.



7. INSPECT WHEEL ANGLE

Turn the steering wheel fully, and measure the turning angle.

Wheel turning angle (SEDAN)

(Great Britain sports package):

Inside wheel	41°01' (39°01' – 42°01') 41.02° (39.02° – 42.02°)
Outside wheel (Reference)	33°23' 33.38°

(China):

Inside wheel	41°03' (39°03' – 42°03') 41.05° (39.05° – 42.05°)
Outside wheel (Reference)	33°40' 33.6°

(Except Great Britain sports package and China):

Inside wheel	41°02' (39°02' – 42°02') 41.03° (39.03° – 42.03°)
Outside wheel (Reference)	33°30' 33.5°

Wheel turning angle (WAGON)

(Great Britain sports package):

Inside wheel	41°01' (39°01' – 42°01') 41.02° (39.02° – 42.02°)
Outside wheel (Reference)	33°23' 33.38°

(Except Great Britain sports package):

Inside wheel	41°02' (39°02' – 42°02') 41.03° (39.03° – 42.03°)
Outside wheel (Reference)	33°30' 33.5°

If the right and left inside wheel angles differ from the specified value, inspect the toe–in.

REAR WHEEL ALIGNMENT

SA0R4–07

INSPECTION

1. MEASURE VEHICLE HEIGHT (See page SA–4)

2. INSTALL CAMBER–CASTER–KINGPIN GAUGE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

3. INSPECT CAMBER

Camber (SEDAN):

(Great Britain sports package):

Camber Right–left error	–0°55'± 30' (–0.92° ± 0.5°) 30' (0.5°) or less

(Except Great Britain sports package):

Camber Right–left error	–0°23'± 30' (–0.38° ± 0.5°) 30' (0.5°) or less

Camber (WAGON):

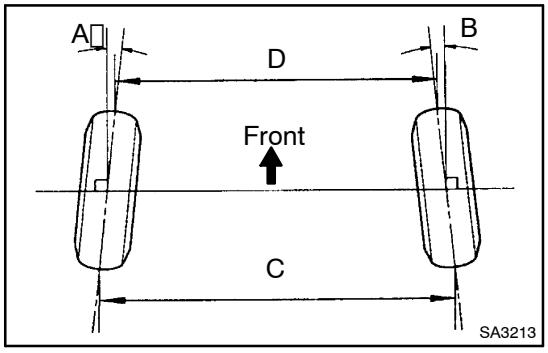
(Great Britain sports package):

Camber Right–left error	–0°55'± 30' (–0.92° ± 0.5°) 30' (0.5°) or less

(Except Great Britain sports package):

Camber Right–left error	–0°23'± 30' (–0.38° ± 0.5°) 30' (0.5°) or less

If the camber is not within the specified valve, after the toe–in is inspected, see step 5. to adjust.

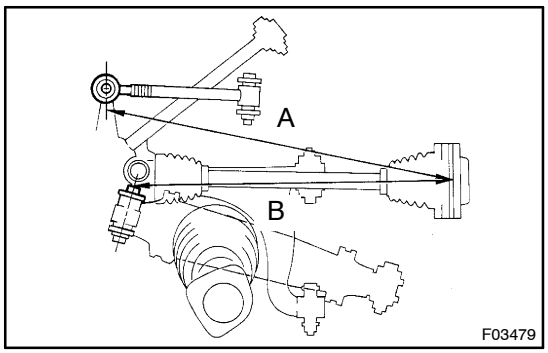


4. INSPECT TOE–IN

Toe–in:

Toe–in (total)	A + B: 0°12'± 12' (0.2° ± 0.2°) C – D: 2 ± 2 mm (0.08 ± 0.08 in.)

If the toe–in is not within the specified valve, after the camber is inspected, see step 5. to adjust.



5. ADJUST CAMBER AND TOE–IN

(a) Measure the lengths of the toe control link (A) and No. 2 lower suspension arm (B), as shown in the illustration.

(b) Obtain the difference between A and B.

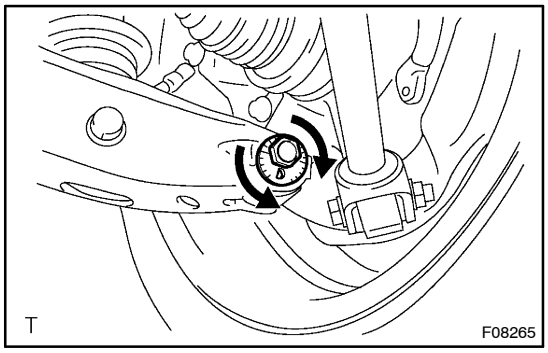
(c) Employ the same manner described above to the other side.

(d) Obtain the difference between right and left from the values obtained above.

Right and left difference: 4.0 mm (0.157 in.) or less

If they are not within the specified value, adjust the lengths of them by turning the adjusting cam.

(e) Inspect the camber and toe–in.



(f) Adjust the camber.

(1) Loosen the camber adjusting cam nut of the No. 2 lower suspension arm.

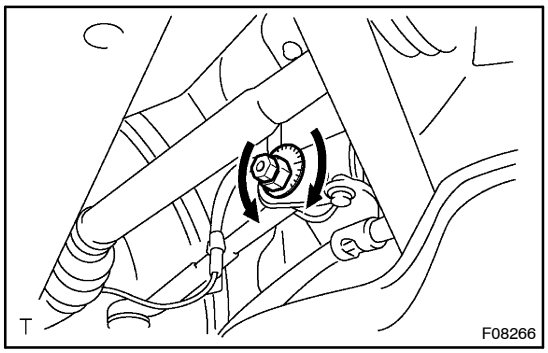
(2) Turn the camber adjusting cam of the No. 2 lower suspension arm and adjust the camber.

HINT:

Camber will change about 5.0' (0.08°) with each graduation of the adjusting cam.

(3) Torque the camber adjusting cam nut.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)



(g) Adjust the toe–in.

(1) Loosen the camber adjusting cam nut of the toe control link.

(2) Turn the camber adjusting cam of the toe control link and adjust the toe–in.

HINT:

Toe–in will change about 4.0 mm (0.157 in.) with each graduation of the adjusting cam.

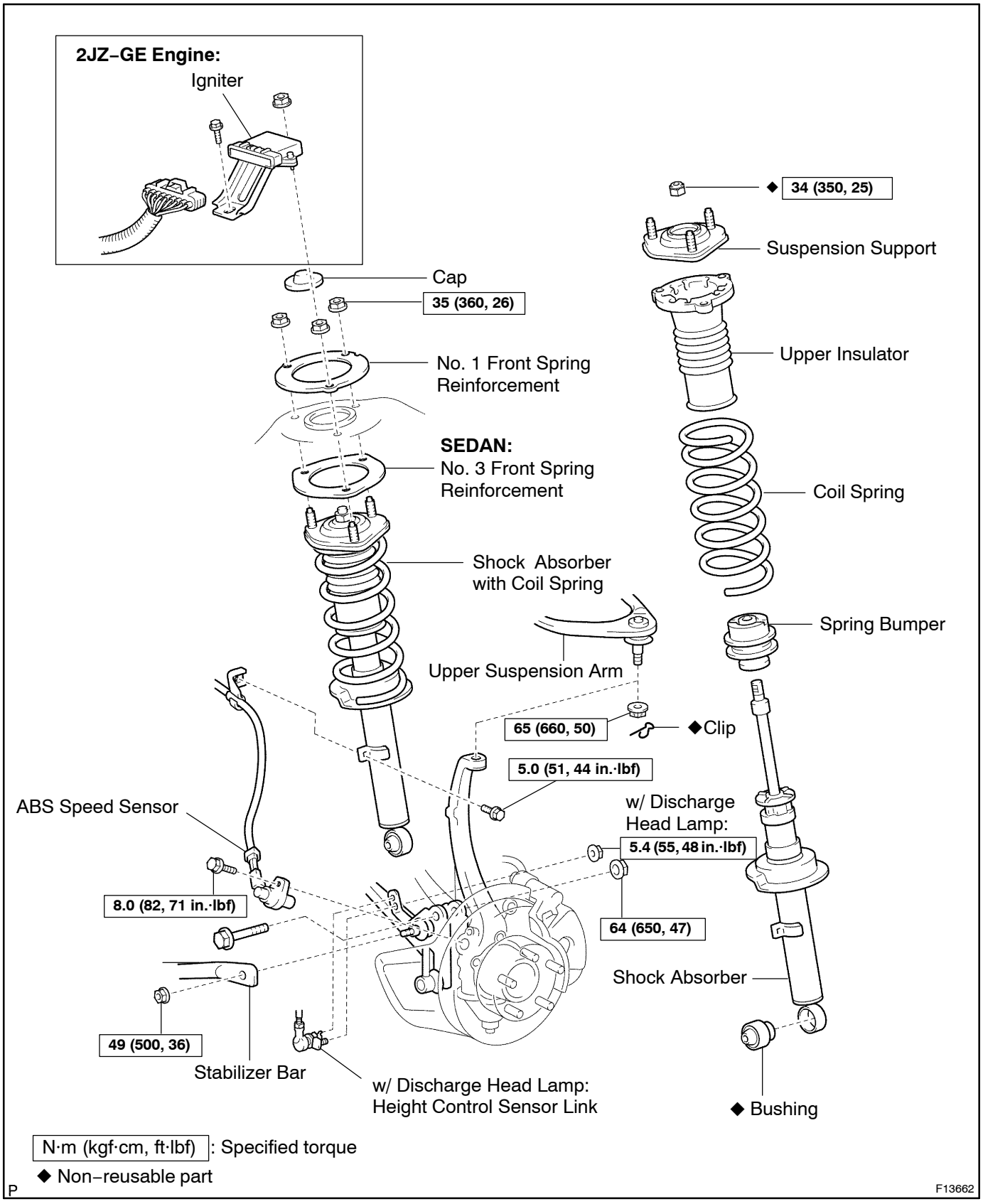
(3) Torque the camber adjusting cam nut.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

FRONT SHOCK ABSORBER

COMPONENTS

SA0RB–10



SA28A–01

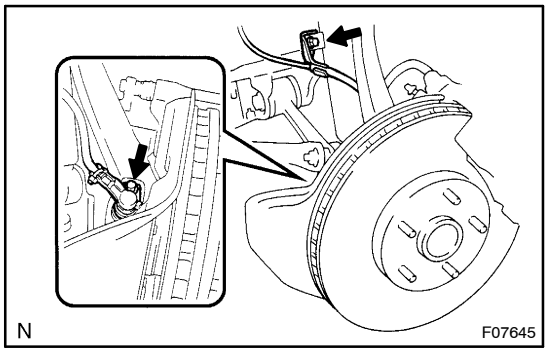
REMOVAL

1. REMOVE FRONT WHEEL

2. 2JZ–GE Engine:
REMOVE IGNITER

(a) Disconnect the connector.

(b) Remove the bolt, nut and igniter.



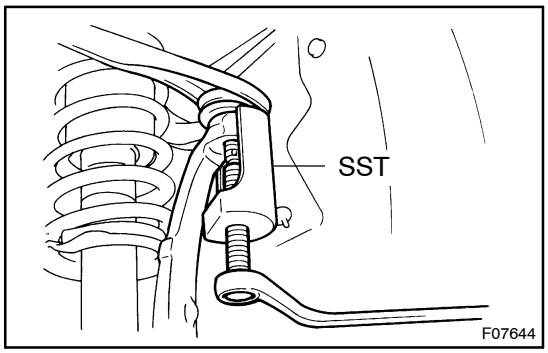
3. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS CLAMP

(a) Remove the bolt and disconnect the ABS speed sensor from the steering knuckle.

(b) Remove the bolt and disconnect the ABS speed sensor wire harness clamp from the shock absorber.

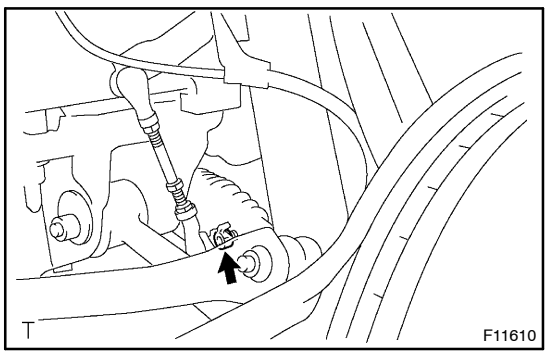
4. DISCONNECT UPPER SUSPENSION ARM FROM STEERING KNUCKLE

(a) Remove the clip and nut.



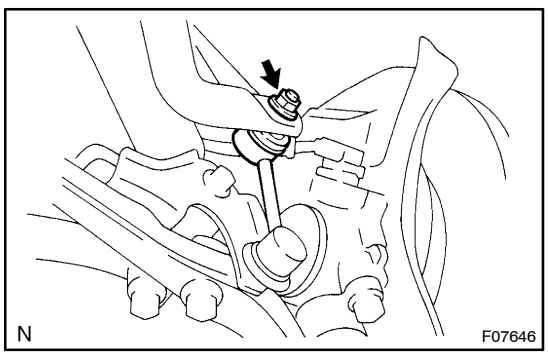
(b) Using SST, disconnect the upper suspension arm.
SST 09610–20012

(c) Support the steering knuckle securely.



5. w/ DISCHAGE HEAD LAMP:
DISCONNECT HEIGHT CONTROL SENSOR LINK

Remove the nut and disconnect the height control sensor link from lower arm.

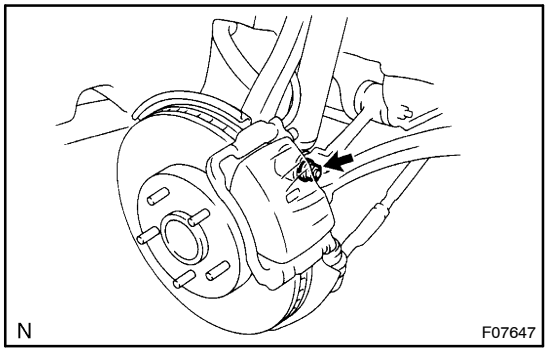


6. DISCONNECT STABILIZER BAR LINK FROM STABILIZER BAR

Remove the nut and disconnect the stabilizer bar link.

HINT:

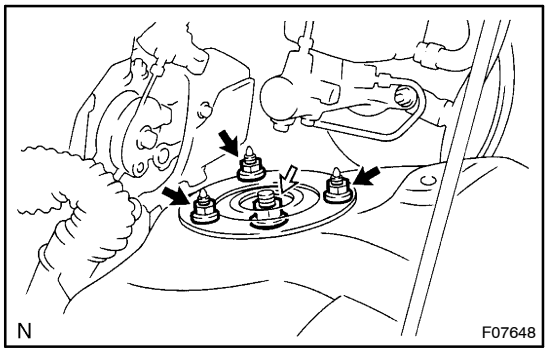
If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.



7. REMOVE FRONT SHOCK ABSORBER WITH COIL SPRING

(a) Remove the nut and bolt, and disconnect the shock absorber from the shock absorber bracket.

(b) Remove the cap from the suspension support.



(c) Loosen the nut in the center of the suspension support.

NOTICE:

Do not remove it.

HINT:

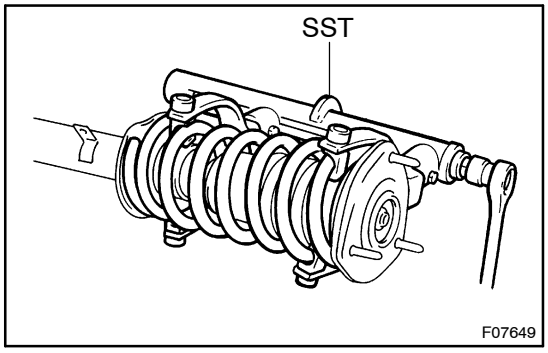
If not disassembling the shock absorber, it is not necessary to loosen the nut.

(d) Remove the 3 nuts, No. 1 front spring reinforcement and shock absorber with coil spring from the body.

(e) SEDAN:

Remove the No. 3 front spring reinforcement from the shock absorber.

SA0RD–07



DISASSEMBLY

REMOVE SUSPENSION SUPPORT AND COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

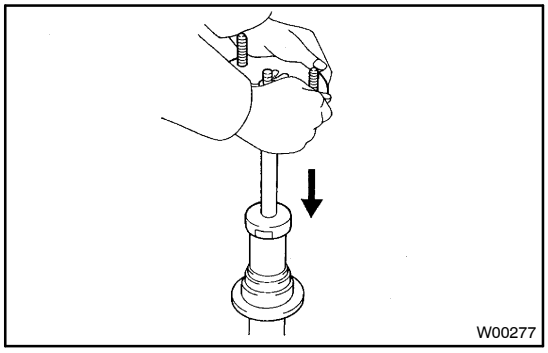
NOTICE:

Do not use an impact wrench. It will damage the SST.

(b) Remove the suspension support nut.

(c) Remove the suspension support, upper insulator, coil spring and spring bumper from the shock absorber.

SA0RE–06



INSPECTION

INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual operation sounds. If there is any abnormality, replace the shock absorber with a new one.

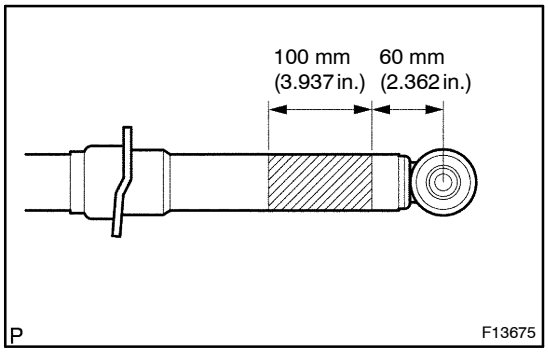
NOTICE:

When discarding the shock absorber, see DISPOSAL on page SA–15.

SA0RF–06

DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER PISTON ROD



2. DRILL HOLE TO DISCHARGE GAS FROM CYLINDER

(a) Place the shock absorber horizontally to prevent the oil from coming out.

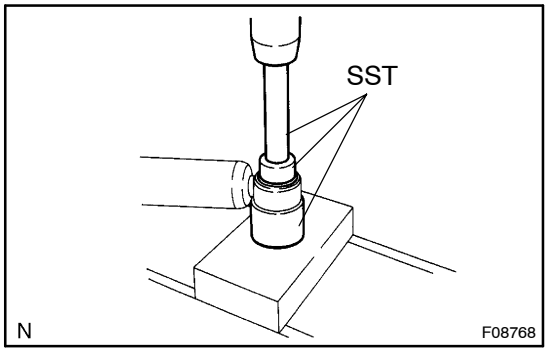
(b) Using a drill, make a hole on the top of the shell as shown to discharge the gas inside.

CAUTION:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless and non–poisonous.**

SA1QS–02

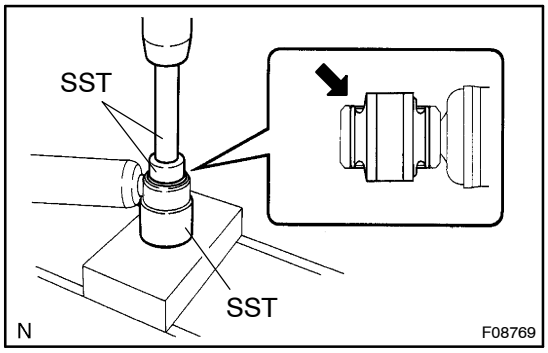
REPLACEMENT



1. REMOVE BUSHING

Using SST and a press, remove the bushing.

SST 09710–28021 (09710–08031),
09710–30021 (09710–03131),
09950–70010 (09951–07100)



2. INSTALL BUSHING

Using SST and a press, install a new bushing.

SST 09710–28021 (09710–08031),
09710–30021 (09710–03131),
09950–70010 (09951–07100)

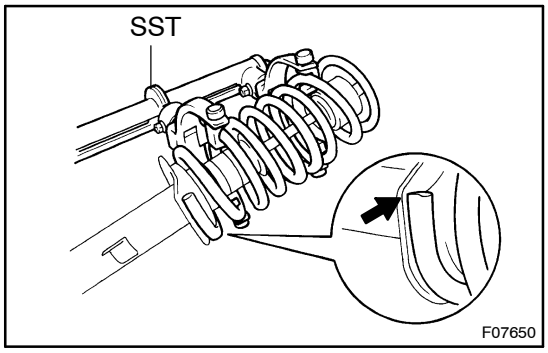
HINT:

Install the bushing until it is flush with the bushing bracket of the shock absorber.

SA0RG–07

REASSEMBLY

1. INSTALL SPRING BUMPER TO PISTON ROD



2. INSTALL COIL SPRING

(a) Using SST, compress the coil spring.

SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

NOTICE:

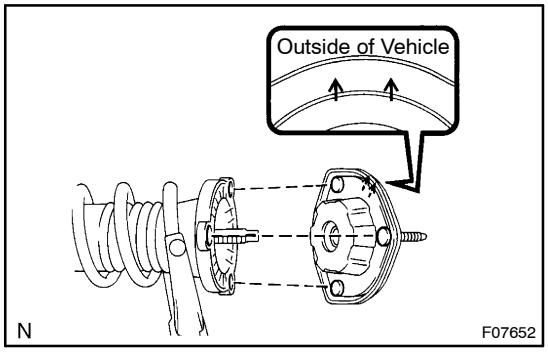
Do not use an impact wrench. It will damage the SST.

(b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the gap of the spring seat of the shock absorber.

3. INSTALL UPPER INSULATOR TO SHOCK ABSORBER



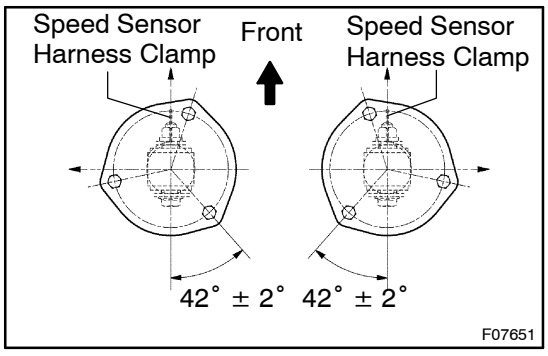
4. INSTALL SUSPENSION SUPPORT

(a) Install the suspension support to the shock absorber, as shown in the illustration.

HINT:

Align the bolt of the suspension support with the cut–out of the upper insulator.

(b) Temporarily tighten a new lock nut.



(c) Align the suspension support with the shock absorber lower bolt as shown in the illustration.

5. REMOVE SST

SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

HINT:

After removing the SST, recheck the direction of the suspension support.

SA28B–01

INSTALLATION

1. INSTALL FRONT SHOCK ABSORBER WITH COIL SPRING

(a) SEDAN:
Install the No. 3 front spring reinforcement to the shock absorber.

(b) Install the shock absorber, No. 1 front spring reinforcement to the body with the 3 nuts.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(c) Connect the shock absorber to the shock absorber bracket with the bolt and nut.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

HINT:
After stabilizing the suspension, torque the nut.

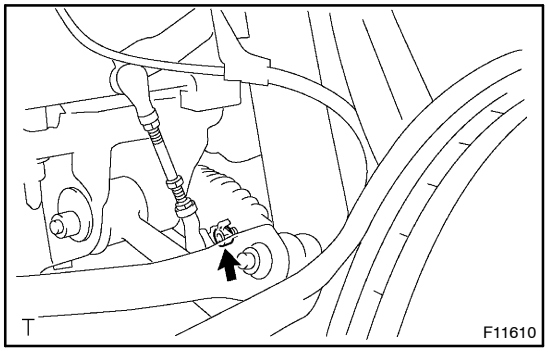
(d) Torque the nut in the center of the suspension support.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

HINT:
If the shock absorber has not been disassembled, it is not necessary to torque the nut.

(e) Install the cap to the suspension support.

2. CONNECT STABILIZER BAR LINK TO STABILIZER BAR
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.



3. w/ DISCHAGE HEAD LAMP:
CONNECT HEIGHT CONTROL SENSOR LINK

(a) Set the lower arm to the vehicle height.

(b) Install the sensor link to the lower arm bracket with a nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:

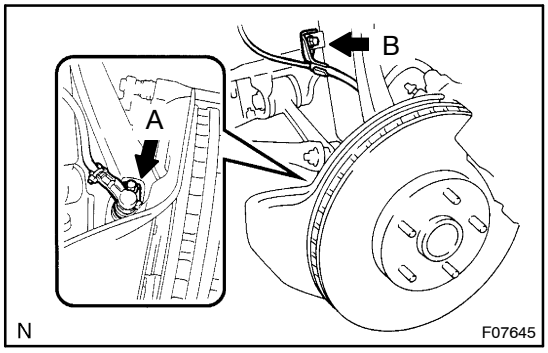
- **Be careful not to brake the link fixing pin until the above operation is completed.**
- **The pin can the broken after completion of the above, however, the sensor arm rotation angle shall not exceed the range of ±70° from the standard vehicle height.**

4. CONNECT UPPER SUSPENSION ARM TO STEERING KNUCKLE

(a) Connect the upper suspension arm with the nut.
Torque: 65 N·m (660 kgf·cm, 50 ft·lbf)

(b) Install a new clip.

If the holes for the clip are not aligned, tighten the nut further up to 60°.



5. CONNECT ABS SPEED SENSOR AND WIRE HARNESS CLAMP
Torque:
Bolt A: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
Bolt B: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

6. 2JZ–GE Engine:
INSTALL IGNITER

(a) Install the igniter with the bolt and nut.

(b) Connect the connector.

7. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

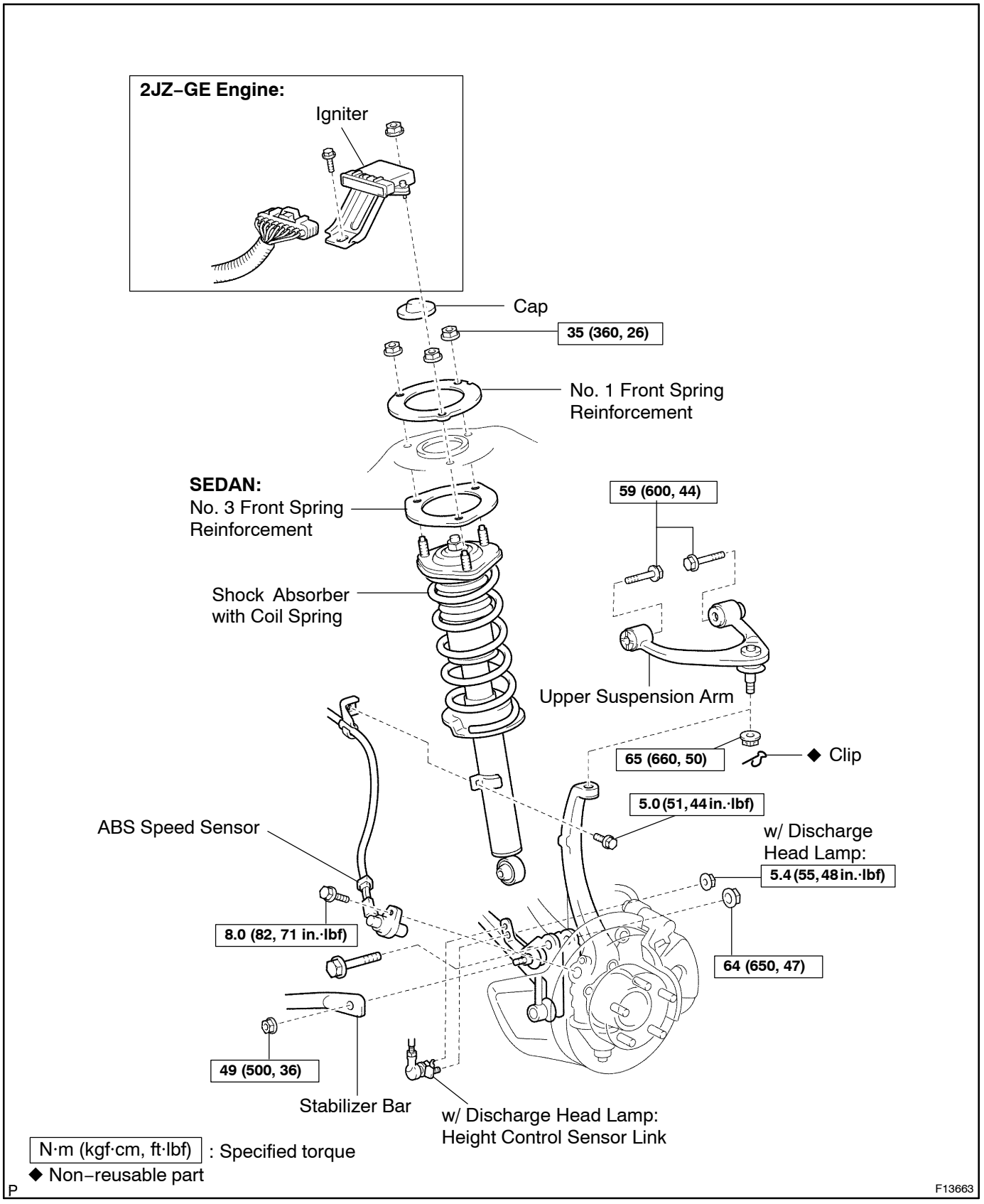
8. CHECK FRONT WHEEL ALIGNMENT
(See page SA–4)

9. CHECK ABS SPEED SENSOR SIGNAL
w/ VSC (See page DI–318)
w/o VSC (See page DI–251)

FRONT UPPER SUSPENSION ARM

COMPONENTS

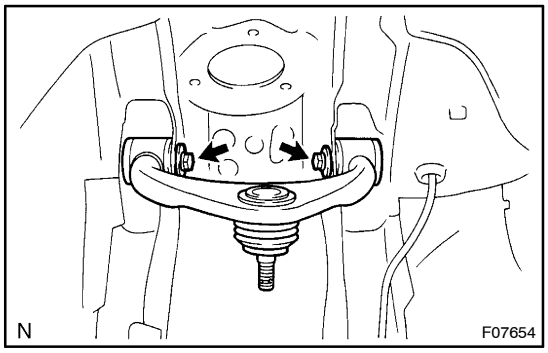
SA0RI–08



SA0RJ–05

REMOVAL

1. REMOVE FRONT WHEEL
2. REMOVE FRONT SHOCK ABSORBER
(See page SA–11)



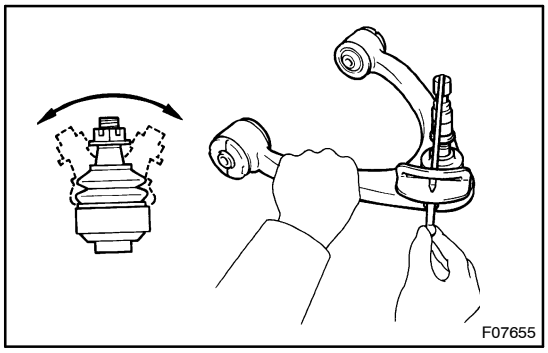
3. REMOVE UPPER SUSPENSION ARM

Remove the 2 bolts and upper suspension arm from the body.

SA0RK–06

INSPECTION

1. INSPECT UPPER SUSPENSION ARM BALL JOINT BOOT FOR DAMAGE



2. INSPECT UPPER SUSPENSION ARM BALL JOINT FOR ROTATION CONDITION

(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 1 turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.·lbf)

SA0RL–07

INSTALLATION

1. INSTALL UPPER SUSPENSION ARM TO BODY
Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)

HINT:

After stabilizing the suspension, torque the bolt.

2. INSTALL FRONT SHOCK ABSORBER (See page SA–18)

3. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

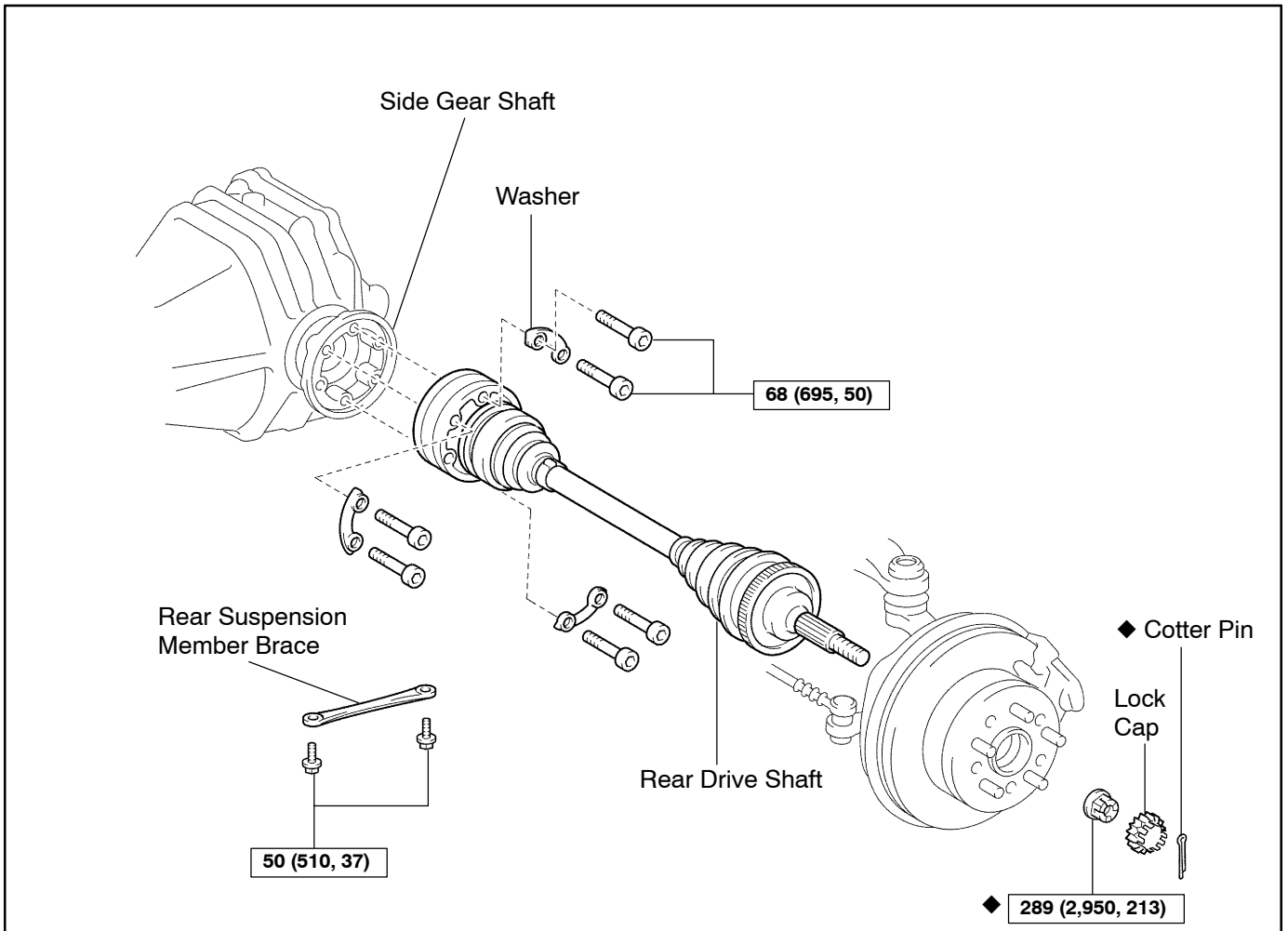
4. CHECK FRONT WHEEL ALIGNMENT (See page SA–4)

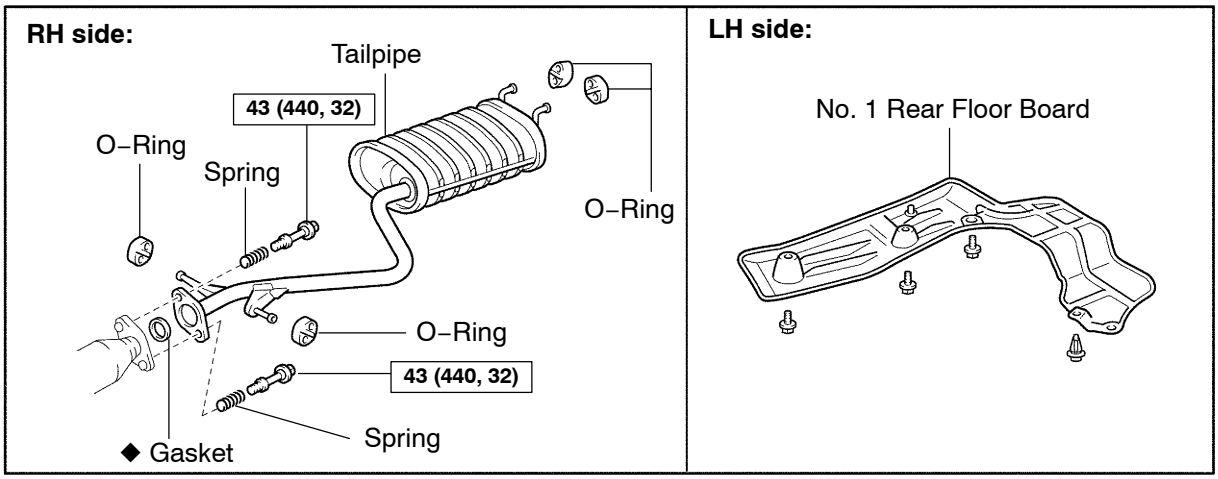
5. CHECK ABS SPEED SENSOR SIGNAL
w/ VSC (See page DI–318)
w/o VSC (See page DI–251)

REAR DRIVE SHAFT (2JZ–GE)

COMPONENTS

SA282–01

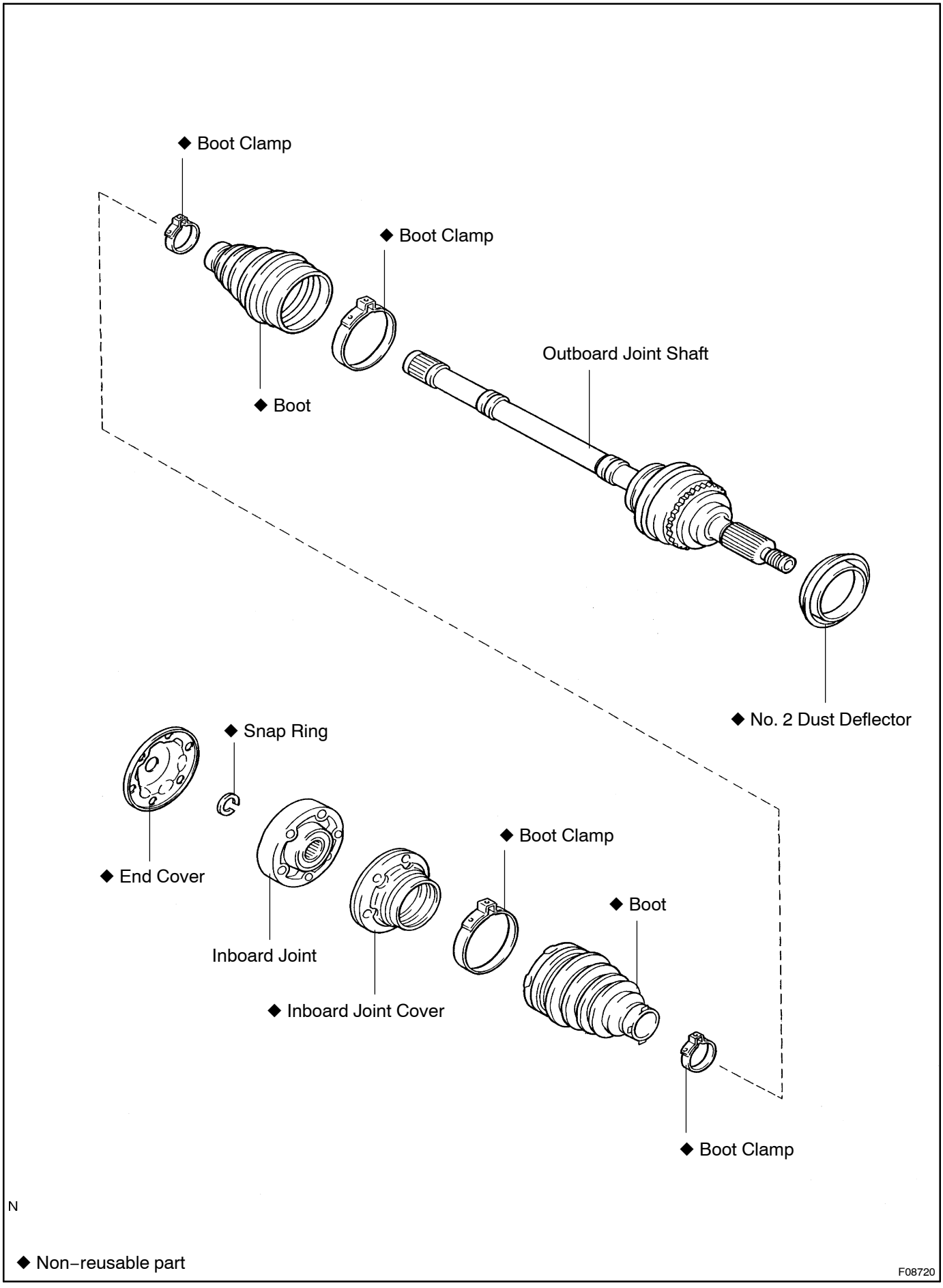




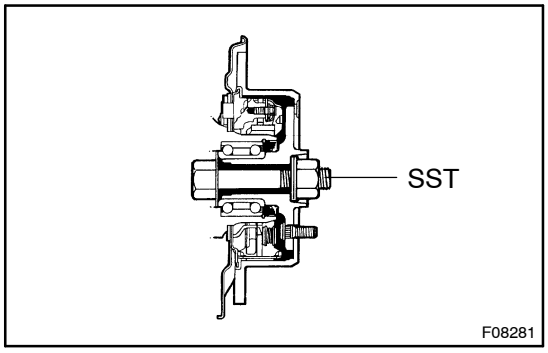
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

P

F13666


◆ Boot Clamp
◆ Boot Clamp
Outboard Joint Shaft
◆ Boot
◆ No. 2 Dust Deflector
◆ Snap Ring
◆ End Cover
◆ Boot Clamp
◆ Boot
Inboard Joint
◆ Inboard Joint Cover
◆ Boot Clamp
N
◆ Non–reusable part
F08720

SA283–01

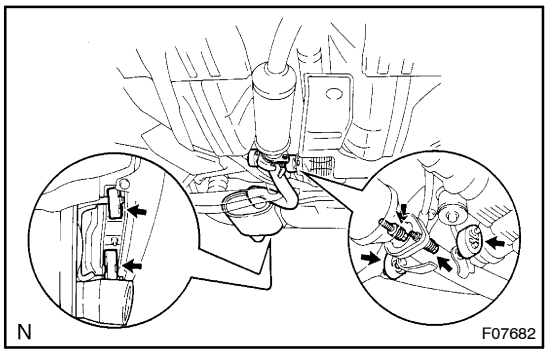


REMOVAL

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)
- **After disconnecting the drive shaft from the axle hub, work carefully so as not to damage the ABS speed sensor rotor serration on the drive shaft.**

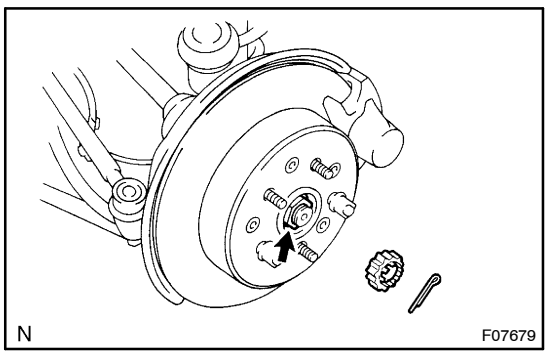
1. REMOVE REAR WHEEL



2. RH side:
REMOVE EXHAUST TAIL PIPE

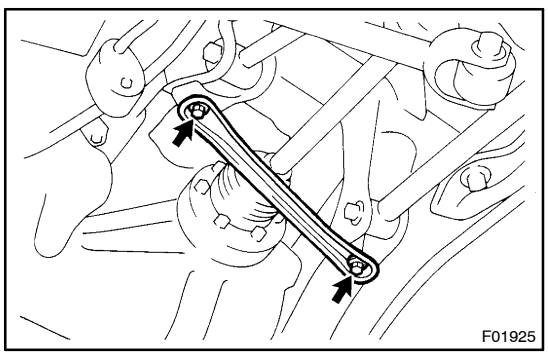
(a) Remove the 2 bolts and disconnect the exhaust tail pipe from the center pipe.
(b) Disconnect the 4 O–rings and remove the exhaust center pipe.
(c) Support the front pipe and center pipe securely.
(d) Remove the gasket.

3. LH side:
REMOVE NO. 1 REAR FLOOR BOARD



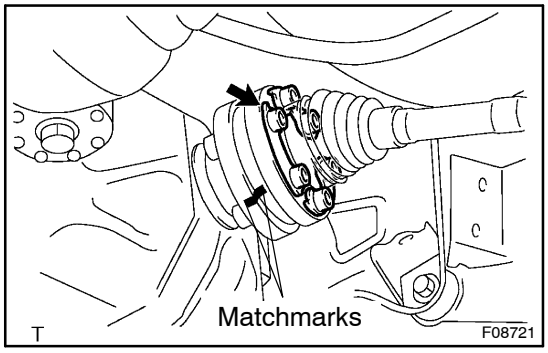
4. REMOVE COTTER PIN, LOCK CAP AND LOCK NUT

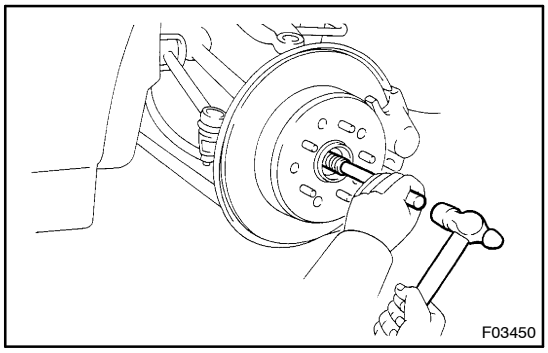
(a) Remove the cotter pin and lock cap.
(b) While depressing the brake pedal, using a socket wrench (32 mm), remove the nut.



5. REMOVE REAR SUSPENSION MEMBER BRACE

Remove the 2 bolts and suspension member brace.





6. REMOVE REAR DRIVE SHAFT

(a) Place matchmarks on the drive shaft and side gear shaft.

NOTICE:

Do not punch to marks.

(b) Using 8 mm hexagon wrench, remove the 6 hexagon bolts and 3 washers, while applying the brakes.

(c) Disconnect the inboard joint from the differential side gear shaft.

NOTICE:

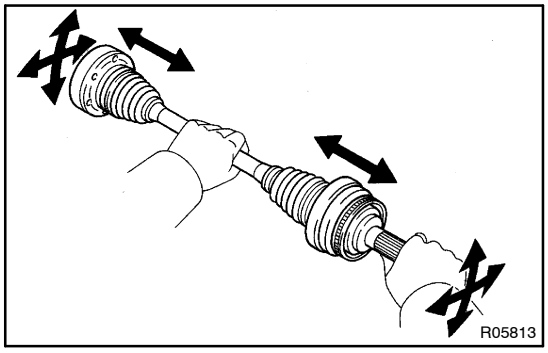
Be careful not to damage the boots and end cover.

(d) Using a brass bar and hammer, lightly tap the end of the drive shaft to disengage the axle hub and remove the drive shaft.

NOTICE:

Be careful not to damage the boots, ABS speed sensor rotor of the drive shaft and oil seal of the axle hub bearing.

SA284–01



DISASSEMBLY

1. CHECK DRIVE SHAFT

(a) Check to see that the joints slide smoothly in the axial direction.

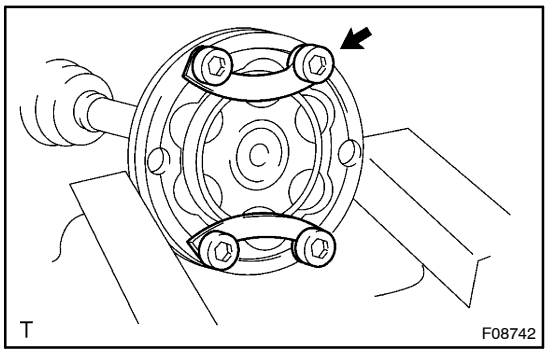
If a large angle is applied for the cross–groove type joint, the joint will be felt like it is catching, but this does not indicate an abnormality.

(b) Check the boots for damage or crack.

(c) Check the ABS speed sensor rotor for damage.

2. REMOVE END COVER

(a) Using a screwdriver, remove the end cover.



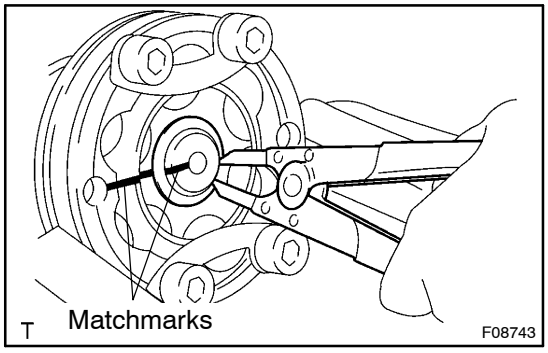
(b) Using bolts, nuts and washers, keep the inboard joint assembly not to take apart.

NOTICE:

Tighten the bolts by hand to avoid scratching the flange surface.

3. REMOVE INBOARD AND OUTBOARD JOINT BOOT CLAMPS

Using a side cutter, cut the boot clamps and remove them.



4. REMOVE INBOARD JOINT

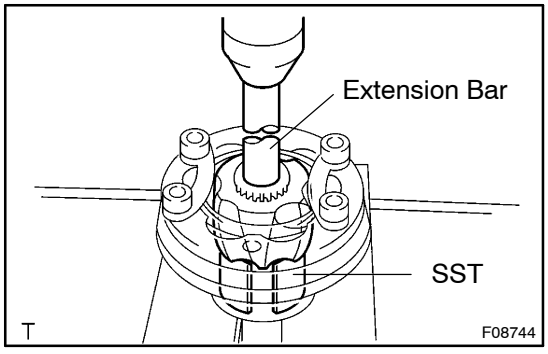
(a) Place matchmarks on the inboard joint and outboard joint shaft.

NOTICE:

Do not punch the marks.

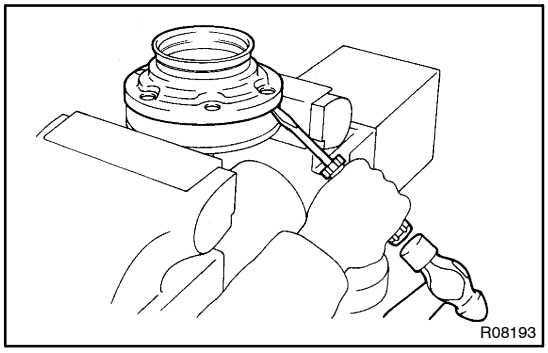
(b) Using a snap ring expander, remove the snap ring.

(c) Slide the inboard joint boot toward the outboard joint.



(d) Using SST, an extension bar and press, remove the inboard joint from the outboard joint shaft.
SST 09726–12023 (09726–01031)

(e) Remove the bolts, nuts and washers.



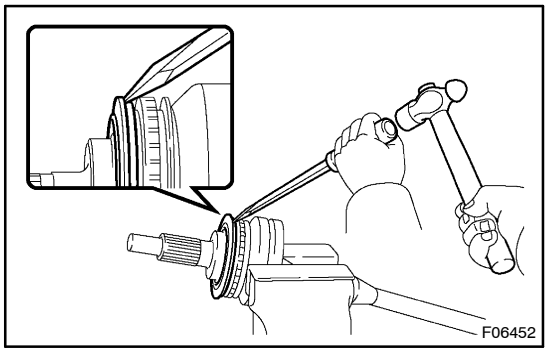
(f) Clamp the inboard joint in a soft jaw vise.
(g) Using a screwdriver and hammer, pry around the whole perimeter of the inboard joint cover and remove the inboard joint.

NOTICE:

To prevent the balls from falling, remove the inboard joint by holding the inner and outer races.

5. REMOVE BOOTS

Remove the inboard and outboard joint boots.



6. REMOVE NO. 2 DUST DEFLECTOR

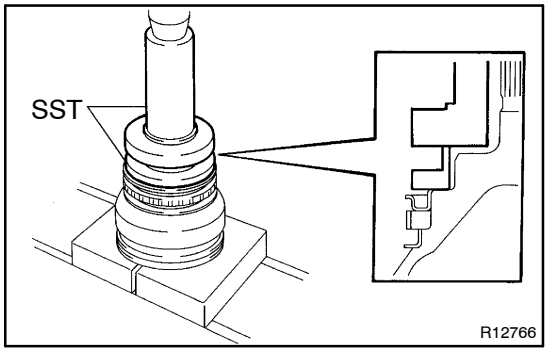
(a) Clamp the outboard joint in a soft jaw vise.
(b) Using a screwdriver and hammer, remove the No. 2 dust deflector.

NOTICE:

Be careful not to damage the ABS speed sensor rotor.

SA285–01

REASSEMBLY



1. INSTALL NO. 2 DUST DEFLECTOR

Using SST and a press, install a new No. 2 dust deflector.

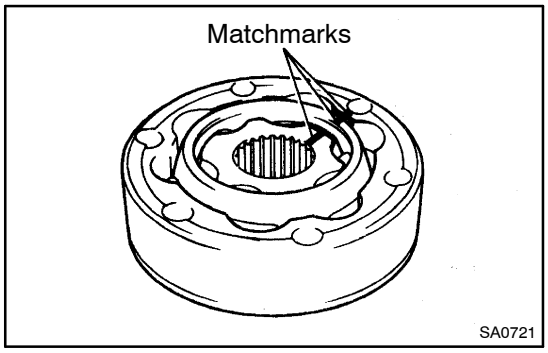
SST 09309–36010, 09502–12010

NOTICE:

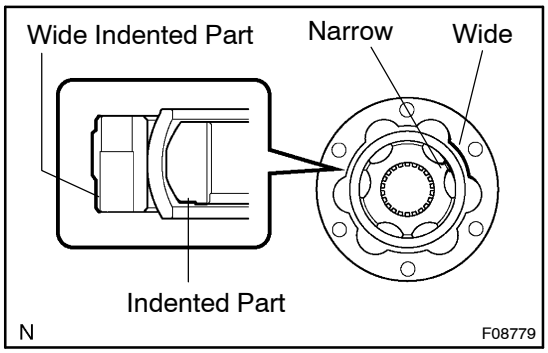
Be careful not to damage the ABS speed sensor rotor.

2. ASSEMBLE INBOARD JOINT

If the joint has come apart, reassemble it in the following order.



(a) Align the matchmarks placed before removal.



If the matchmarks have disappeared, do the following procedure.

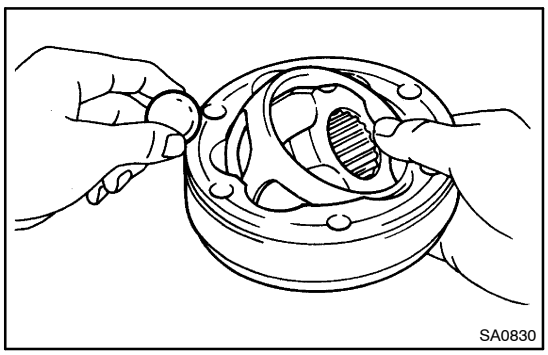
(1) Install the inner race to the cage.

(2) Install the outer race so that the wide indented part is at the same side as the indented part of the inner race.

HINT:

The cage does not have the specified attachment direction.

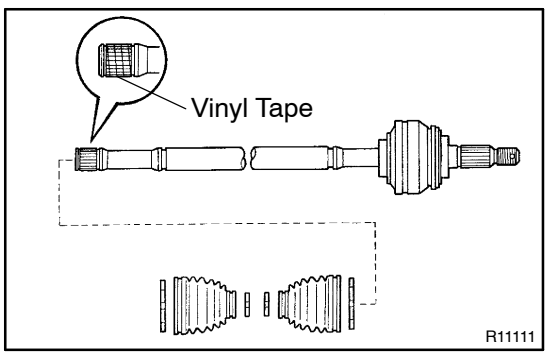
(3) Match the narrow projections of the inner race with the wide projections of the outer race.



(b) Tilt the cage and inner race to the side and insert the balls one by one.

NOTICE:

When the cage and inner race are tilted over, support the joint with your hand to prevent the balls from falling out.



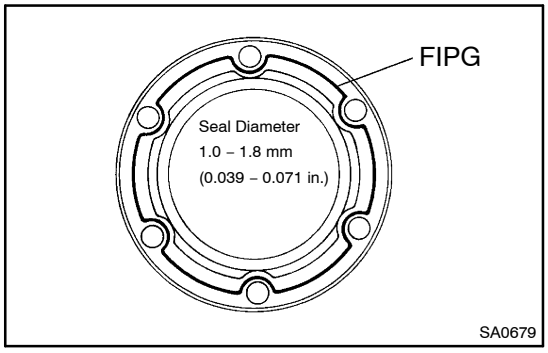
3. TEMPORARILY INSTALL BOOTS AND BOOT CLAMPS

(a) Place 4 new boot clamps to each new boot.

HINT:

Before installing the boots, wrap vinyl tape around the spline of the shaft to prevent boots from being damaged.

(b) Install the 2 boots with clamps to the drive shaft.



4. INSTALL INBOARD JOINT COVER

(a) Remove any packing material on the inboard joint.

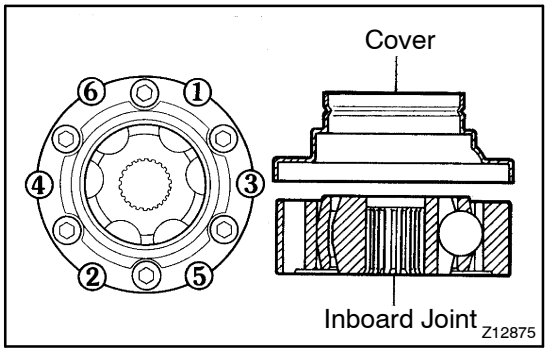
(b) Apply FIPG to a new inboard joint cover as shown in the illustration.

HINT:

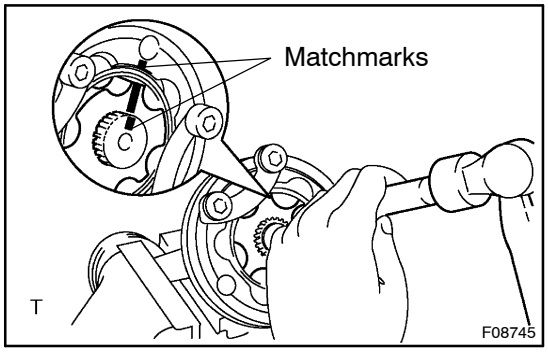
- Use FIPG supplied with a new end cover.
- Do not apply too much.

(c) Remove grease from the surface of the inboard joint facing to the cover.

(d) Align the bolt holes in the cover with those of the inboard joint, then insert the hexagon bolts.



(e) Using a plastic hammer, tap the rim of the inboard joint cover into place. Do this in the order shown, and repeat several times.



5. INSTALL INBOARD JOINT

(a) Align the matchmarks placed before removal.

(b) Using a brass bar and hammer, install the inboard joint to outboard joint shaft.

NOTICE:

Check that the brass bar is not touching the cage, but inner race.

(c) Using a snap ring expander, install a new snap ring.

6. ASSEMBLE BOOTS TO JOINTS

Before assembling the boots, pack with only the same amount of grease that was wiped off.

Grease capacity:

Outboard joint grease	170 – 180 g (0.37 – 0.40 lb, 6.0 – 6.3 oz.)
Inboard joint grease	144 – 154 g (0.32 – 0.34 lb, 5.1 – 5.4 oz.)

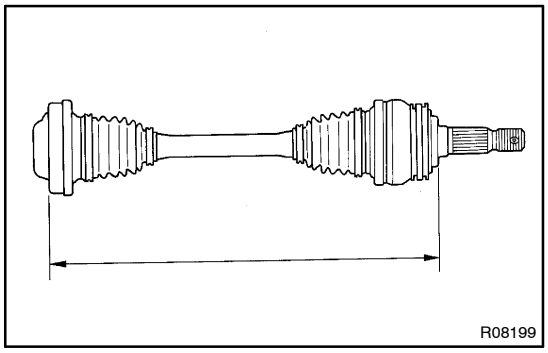
HINT:

Use the grease supplied in the boot kit.

NOTICE:

- **Keep grease off the joint connection groove of the boot.**

- **Pack with grease all over the ball contact surface inside the joint.**

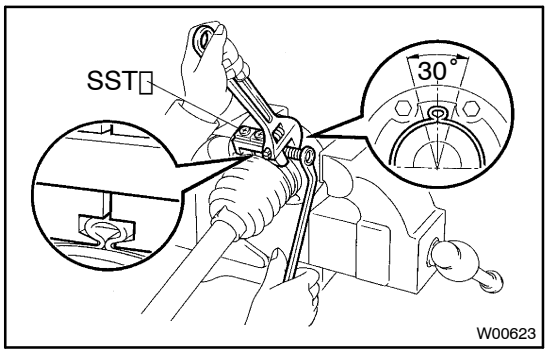


7. CHECK DRIVE SHAFT STANDARD LENGTH

Drive shaft standard length:

RH	585.35 mm (23.045 in.)
LH	539.75 mm (21.250 in.)

HINT:
The drive shaft is designed to move ±20 mm (0.79 in.) from the normal position.

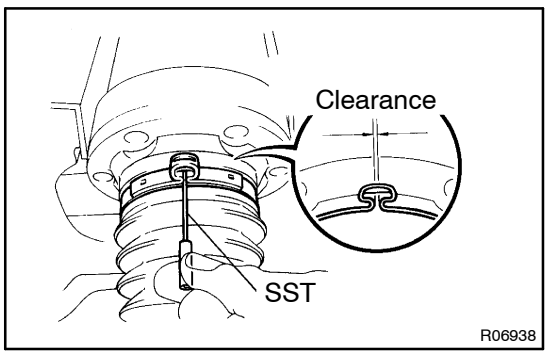


8. INSTALL NEW BOOT CLAMPS TO BOTH BOOTS

(a) Place SST onto the inboard joint large boot clamp.
SST 09521–24010

(b) Tighten SST so that the clamp is pinched.

NOTICE:
Do not overtighten the SST.



(c) Using SST, adjust the clearance of the clamp.
SST 09240–00020
Clearance: 0.8 mm (0.031 in.) or less

(d) Employ the same manner to the other clamps.

9. INSTALL END COVER

(a) Remove grease from the surface of the inboard joint facing to the cover.

(b) Apply FIPG supplied with a new end cover.

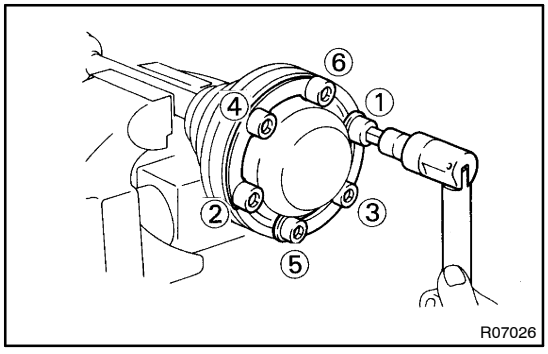
(c) Align the bolt holes in the cover with those of the inboard joint.

(d) Install the 6 hexagon bolts and 3 washers from the end cover side.

(e) Install 6 nuts to the boot side.

(f) Using a 8 mm hexagon wrench, tighten the bolts. Do this in the order shown, and repeat several times.

(g) Check that the claw of the end cover touches the inboard joint.



10. CHECK DRIVE SHAFT (See page SA–28)

SA286–01

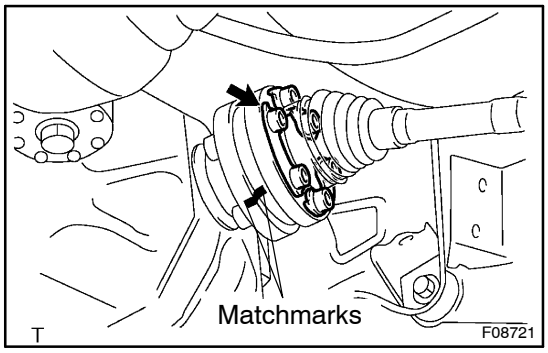
INSTALLATION

1. INSTALL REAR DRIVE SHAFT

(a) Install the drive shaft to the axle hub.

NOTICE:

Be careful not to damage the boots and ABS speed sensor rotor of the drive shaft and oil seal of the axle hub bearing.



(b) Align the matchmarks and connect the drive shaft to the side gear shaft.

NOTICE:

Be careful not to damage the boots and end cover.

(c) Using 8 mm hexagon wrench, install the 3 washers and 6 hexagon bolts, while applying the brakes.

Torque: 68 N·m (695 kgf·cm, 50 ft·lbf)

2. INSTALL REAR SUSPENSION MEMBER BRACE

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

3. INSTALL LOCK NUT, LOCK CAP AND COTTER PIN

(a) While applying brakes, using a socket wrench (32 mm), install a new nut.

Torque: 289 N·m (2,950 kgf·cm, 213 ft·lbf)

(b) Install the lock cap and a new cotter pin.

If the holes for the cotter pin are not aligned, tighten the nut further up to 60°.

4. RH side:

INSTALL EXHAUST TAIL PIPE

(a) Install a new gasket.

(b) Install the exhaust tail pipe to the 4 O–rings.

(c) Connect the exhaust tail pipe to the center pipe with the 2 bolts and 2 springs.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

5. LH side:

INSTALL NO.1 REAR FLOOR BOARD

6. CHECK REAR WHEEL ALIGNMENT

(See page SA–8)

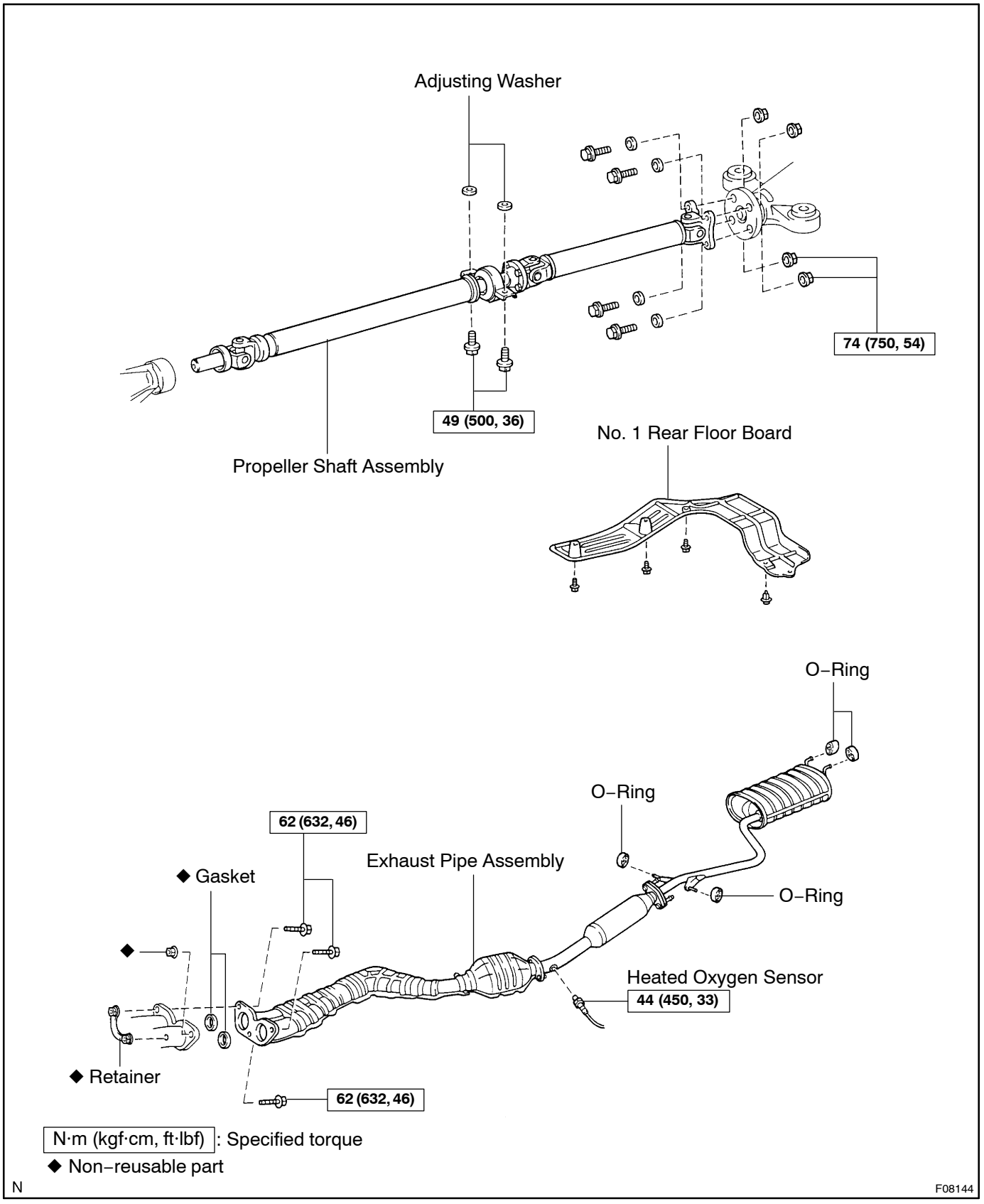
7. CHECK ABS SPEED SENSOR SIGNAL

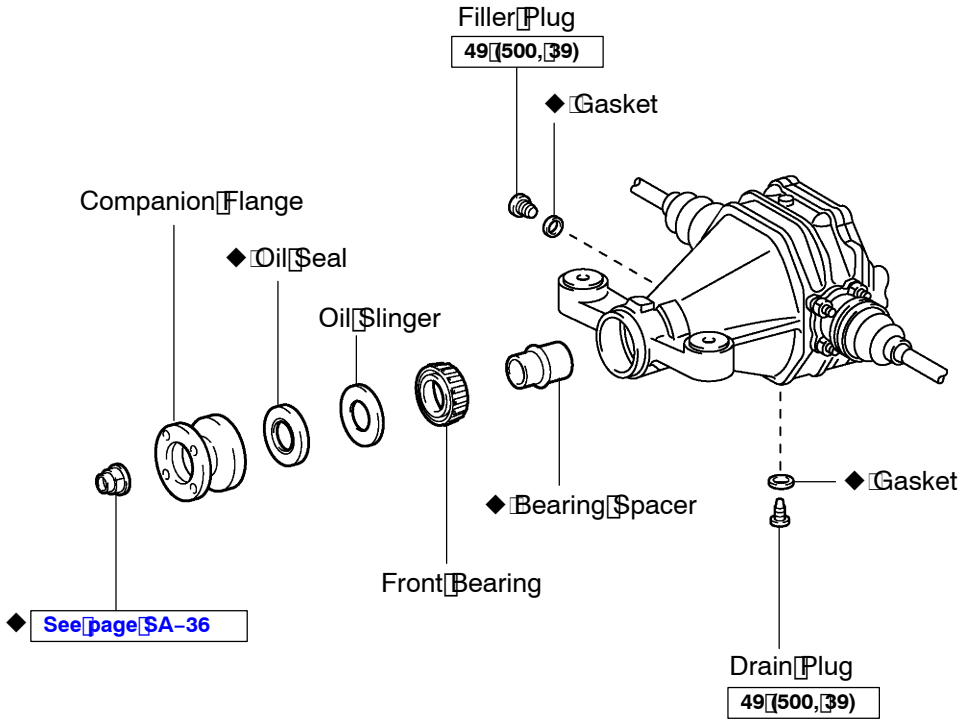
(See page DI–251, DI–318)

REAR DIFFERENTIAL FRONT OIL SEAL

COMPONENTS

SA1J9–04





T

N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

F07687

SA1JA–04

REPLACEMENT

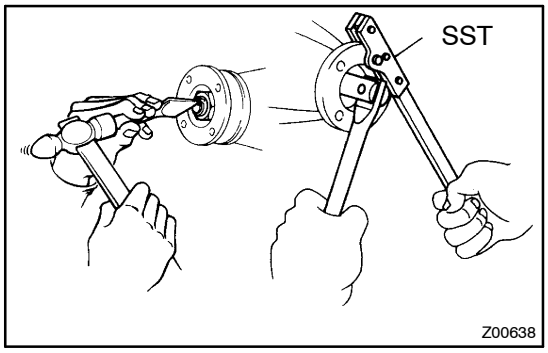
1. REMOVE NO. 1 REAR FLOOR BOARD

2. DRAIN DIFFERENTIAL OIL

3. REMOVE EXHAUST PIPE ASSEMBLY

4. 1G–FE Engine:
REMOVE PROPELLER SHAFT (See Pub. No. RM684E on page PR–10)

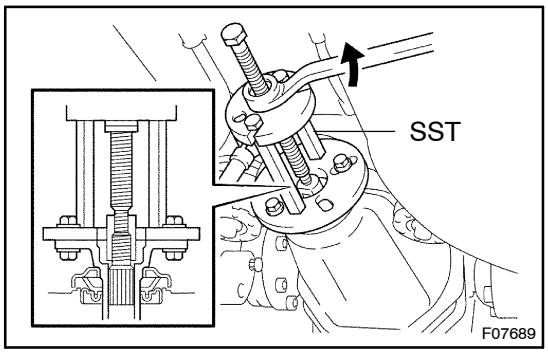
5. 2JZ–GE Engine:
REMOVE PROPELLER SHAFT (See page PR–3)



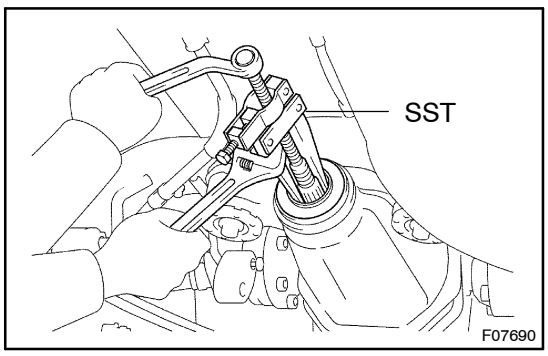
6. REMOVE COMPANION FLANGE

(a) Using a chisel and hammer, unstake the nut.

(b) Using SST to hold the flange, remove the nut.
SST 09330–00021



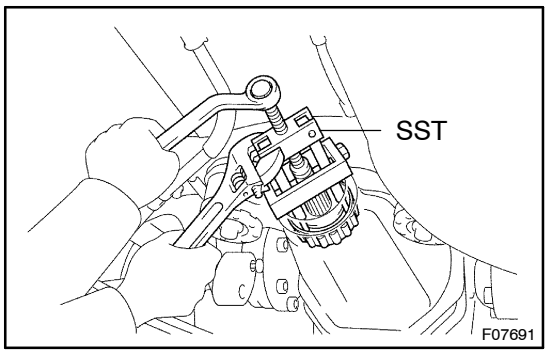
(c) Using SST, remove the companion flange.
SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)



7. REMOVE REAR DIFFERENTIAL FRONT OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal.
SST 09308–10010

(b) Remove the oil slinger.



8. REMOVE FRONT BEARING AND BEARING SPACER

(a) Using SST, remove the front bearing from the drive pinion.
SST 09556–22010

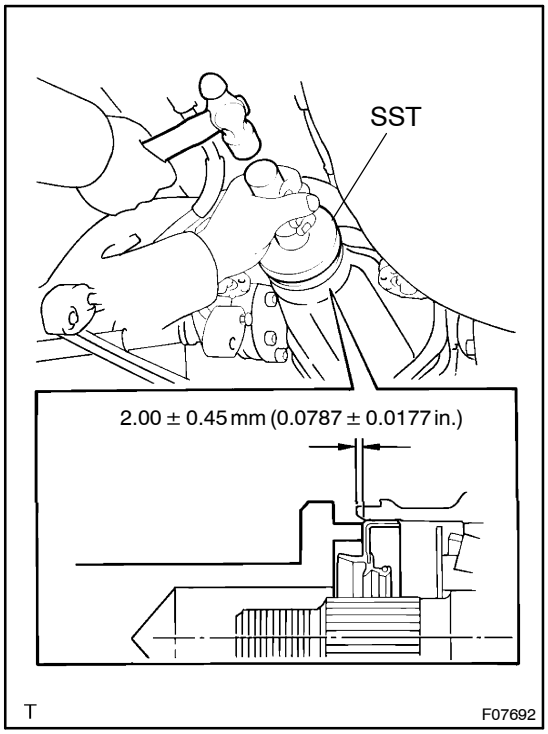
(b) Remove the bearing spacer.

9. INSTALL BEARING SPACER, FRONT BEARING AND OIL SLINGER

Install a new bearing spacer, front bearing and oil slinger.

HINT:

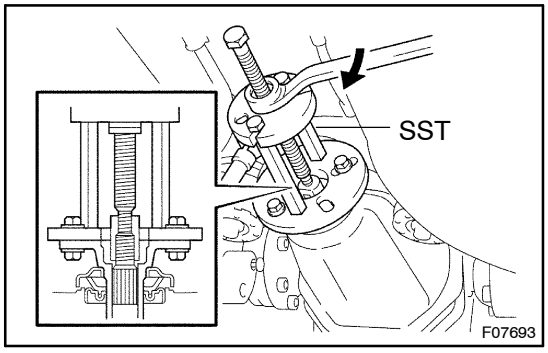
- Install the bearing spacer with its larger diameter side facing the rearward.
- Install the oil slinger with the concave surface facing the bearing side.



10. INSTALL REAR DIFFERENTIAL FRONT OIL SEAL

(a) Using SST and hammer, install a new oil seal.
SST 09554–30011
Oil seal drive in depth:
2.00 ± 0.45 mm (0.0787 ± 0.0177 in.)

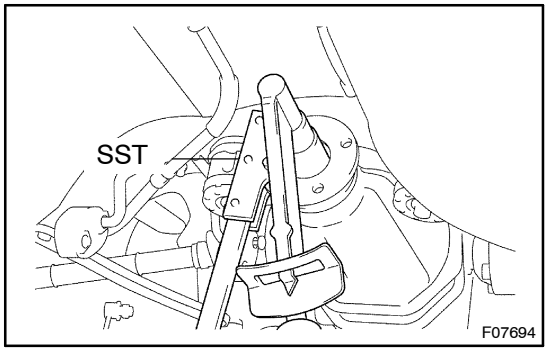
(b) Coat MP grease to the oil seal lip.



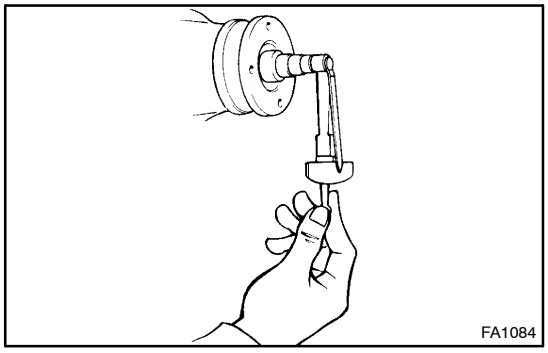
11. INSTALL COMPANION FLANGE

(a) Using SST, install the companion flange.
SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)

(b) Coat the threads of a new nut with hypoid gear oil LSD.



(c) Using SST to hold the flange, torque the nut while checking the preload.
SST 09330–00021


FA1084

12. ADJUST DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload of the using the backlash between the drive pinion and ring gear.

Preload (at starting):
New bearing:
(1G–FE Engine)
1.3 – 1.9 N·m (13 – 19 kgf·cm, 12 – 17 in.·lbf)
(2JZ–GE Engine)
0.98 – 1.57 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in.·lbf)
Reused bearing:
(1G–FE Engine)
0.4 – 0.7 N·m (4 – 7 kgf·cm, 3.5 – 6.2 in.·lbf)
(2JZ–GE Engine)
0.49 – 0.78 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

If the preload is greater than the specified value, replace the bearing spacer.

If the preload is less than the specified value, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

Torque: 223 N·m (2,274 kgf·cm, 164 ft·lbf) or less

If the maximum torque is exceeded while retighten the nut, replace the bearing spacer and repeat the preload procedure. Do not loosen the pinion nut to reduce the preload.

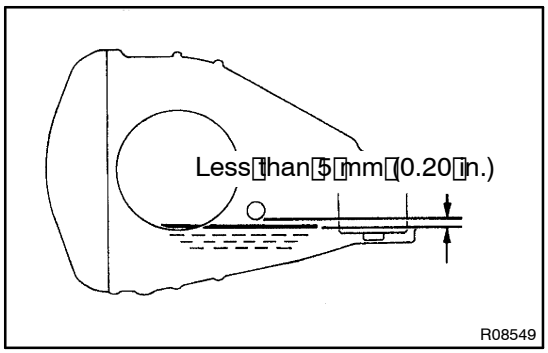
13. STAKE DRIVE PINION NUT

Using a chisel and hammer, stake the nut.

14. 1G–FE Engine:
INSTALL PROPELLER SHAFT (See Pub. No. RM684E on page PR–10)

15. 2JZ–GE Engine:
INSTALL PROPELLER SHAFT (See page PR–9)

16. INSTALL EXHAUST PIPE ASSEMBLY



R08549

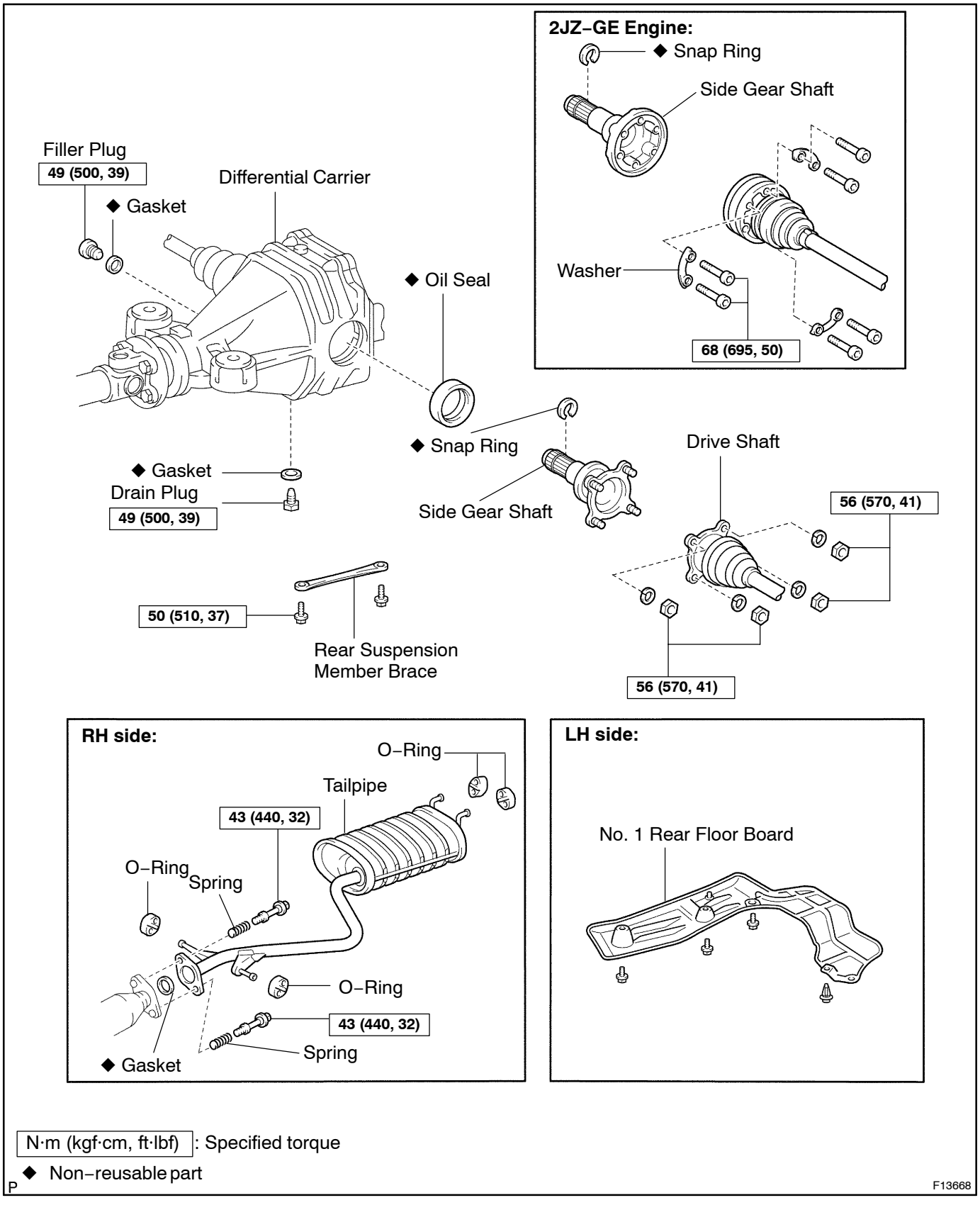
17. FILL AND CHECK DIFFERENTIAL OIL LEVEL
Torque: 49 N·m (500 kgf·cm, 39 ft·lbf)
Oil grade: Hypoid gear oil API GL–5
Viscosity:
Above –18 °C (0 °F) SAE 90
Below –18 °C (0 °F) SAE 80W–90 or 80W

18. INSTALL NO. 1 REAR FLOOR BOARD

REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL

COMPONENTS

SA0S9–07



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

◆ Non–reusable part

P

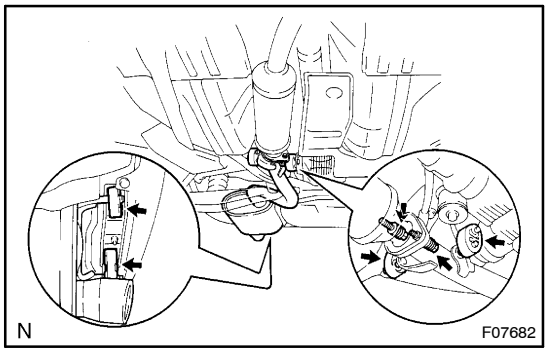
F13668

SA1JB–02

REPLACEMENT

1. REMOVE NO. 1 REAR FLOOR BOARD

2. DRAIN DIFFERENTIAL OIL



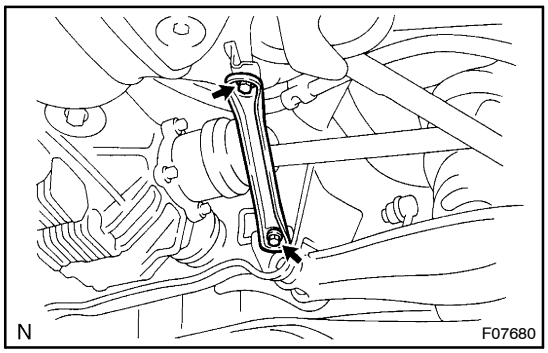
3. RH side:
REMOVE TAILPIPE

(a) Remove the 2 bolts, springs and disconnect the tailpipe from the center exhaust pipe.

(b) Disconnect the 4 O–rings from the tailpipe and remove the tailpipe.

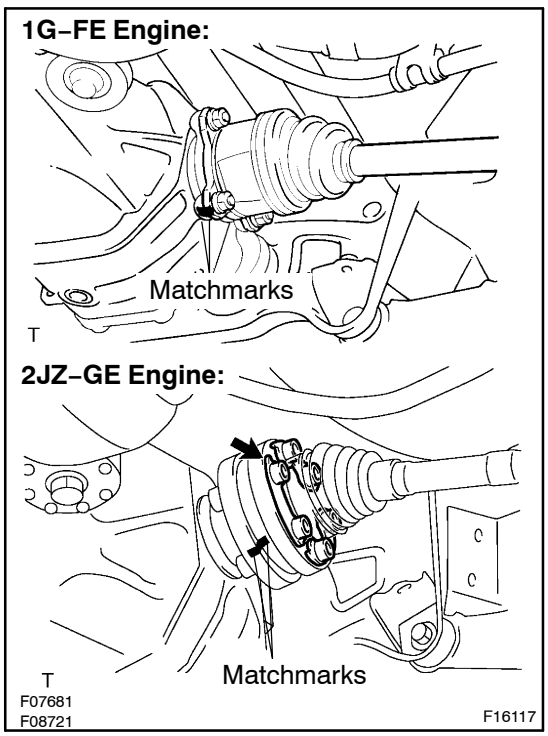
(c) Support the center exhaust pipe securely.

(d) Remove the gasket.



4. REMOVE REAR SUSPENSION MEMBER BRACE

Remove the 2 bolts and suspension member brace.



5. DISCONNECT DRIVE SHAFT FROM SIDE GEAR SHAFT

(a) Place matchmarks on the drive shaft and side gear shaft.

NOTICE:

Do not punch to mark the matchmarks. Use paint, etc.

(b) 1G–FE Engine:

(1) Remove the 4 nuts and washers while depressing the brake pedal.

(2) Push and compress the inboard joint and disconnect the drive shaft from the side gear shaft.

(c) 2JZ–GE Engine:

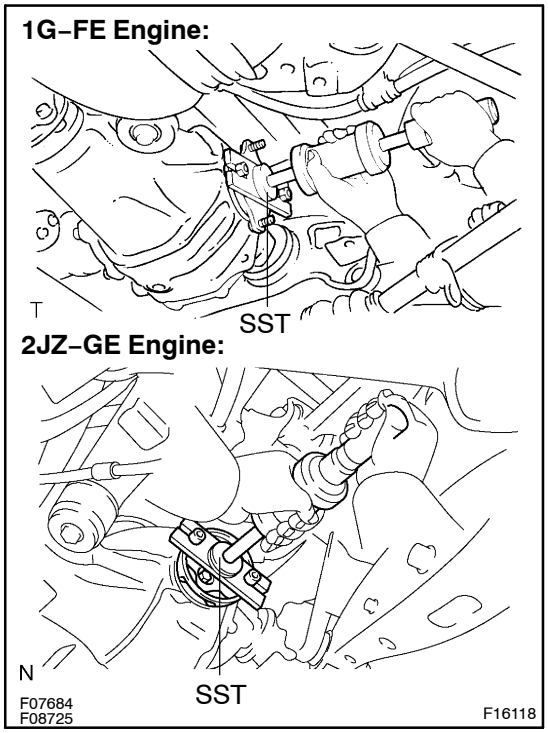
(1) Using a 8 mm hexagon wrench, remove the 6 hexagon bolts and 3 washers, while applying the brakes.

(2) Disconnect the drive shaft from the differential side gear shaft.

NOTICE:

Be careful not to damage the boots and inboard joint tulip.

(d) Support the drive shaft securely.

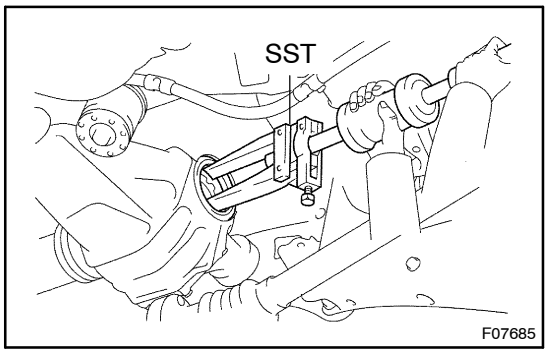


6. REMOVE SIDE GEAR SHAFT

(a) 1G–FE Engine:
Using SST and the 2 nuts, remove the side gear shaft.
SST 09520–24010

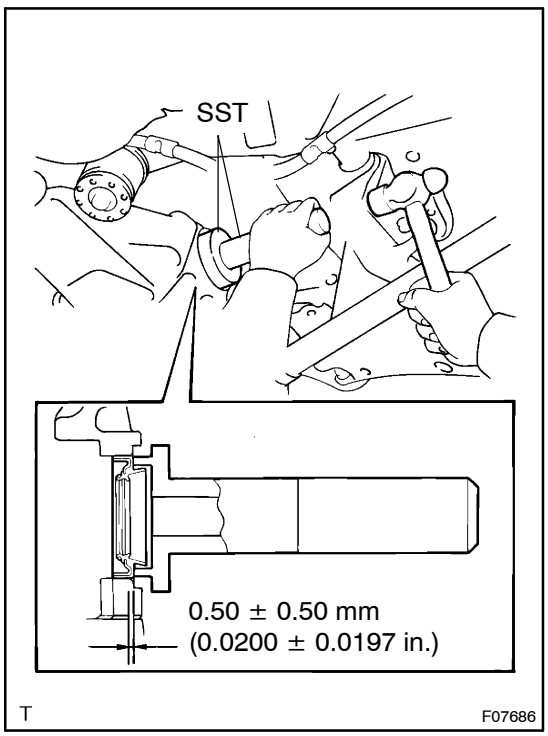
(b) 2JZ–GE Engine:
Using SST and the 2 bolts, remove the side gear shaft.
SST 09520–24010

(c) Using needle–nose pliers, remove the snap ring from the side gear shaft.



7. REMOVE SIDE GEAR SHAFT OIL SEAL

Using SST, remove the oil seal.
SST 09308–00010



8. INSTALL SIDE GEAR SHAFT OIL SEAL

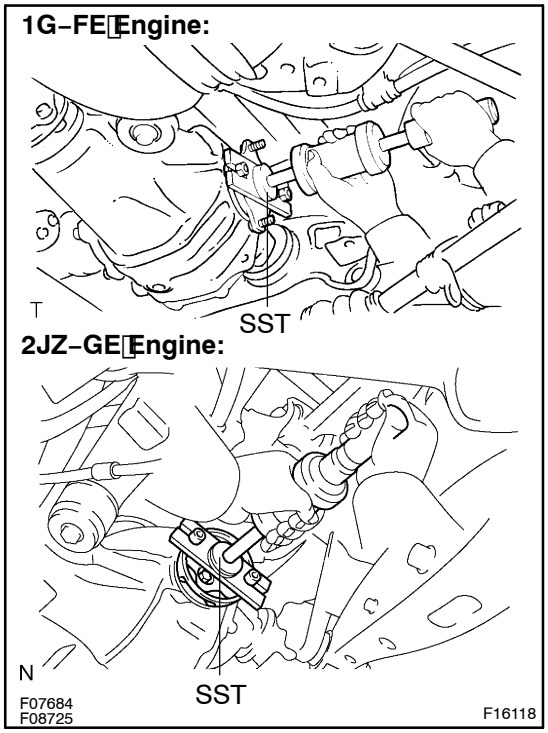
(a) Using SST and a hammer, install a new oil seal.
SST 09554–22010
Oil seal drive in depth:
0.50 ± 0.50 mm (0.0200 ± 0.0197 in.)

(b) Coat MP grease to the oil seal lip.

9. INSTALL SIDE GEAR SHAFT

(a) Using needle–nose pliers, install a new snap ring to the side gear shaft.

(b) Coat the snap ring with MP grease.



(c) 1G–FE Engine:
Using SST and the 2 nuts, install the side gear shaft.
SST 09520–24010

(d) 2JZ–GE Engine:
Using SST and the 2 bolts, install the side gear shaft.
SST 09520–24010

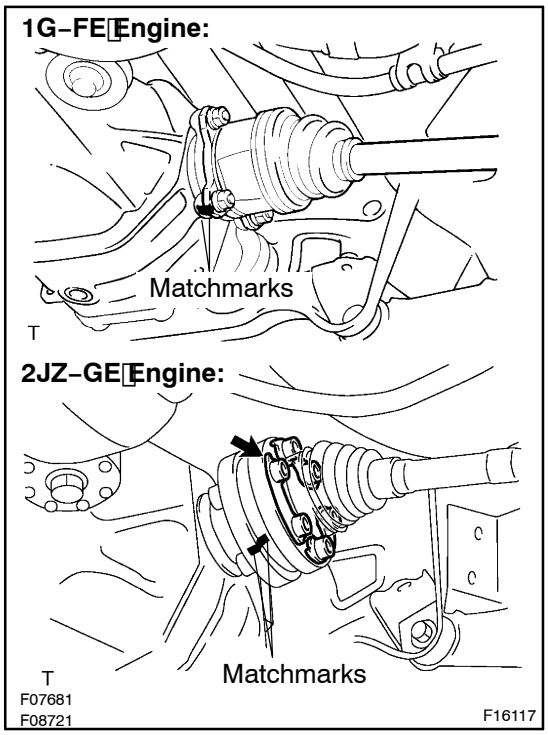
NOTICE:

Be careful not to damage the side gear shaft oil seal.

HINT:

- Before installing the drive shaft, set the snap ring with it's opening side facing downward.
- Whether the side gear shaft is in contact with the side gear or not can be known from the sound or feeling when driving it.

(e) Check that the side gear shaft will not come out by trying to pull it out by hand.



10. CONNECT DRIVE SHAFT TO SIDE GEAR SHAFT

(a) 1G–FE Engine:
Align the matchmarks and push and compress the inboard joint and connect the drive shaft to the side gear shaft.

(b) 2JZ–GE Engine:
Align the matchmarks and connect the drive shaft to the side gear shaft.

NOTICE:

Be careful not to damage the boots and inboard joint tulip.

(c) Install the 4 washers and nuts while depressing the brakes pedal.
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

(d) Using a 8 mm hexagon wrench, install the 3 washers and 6 hexagon bolts, while applying the brakes.
Torque: 68 N·m (695 kgf·cm, 50 ft·lbf)

11. INSTALL REAR SUSPENSION MEMBER BRACE
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

12. RH side:
INSTALL TAILPIPE

(a) Install a new gasket.

(b) Install the tailpipe to the 4 O–rings.

(c) Connect the tailpipe to the center exhaust pipe with the 2 springs and bolts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

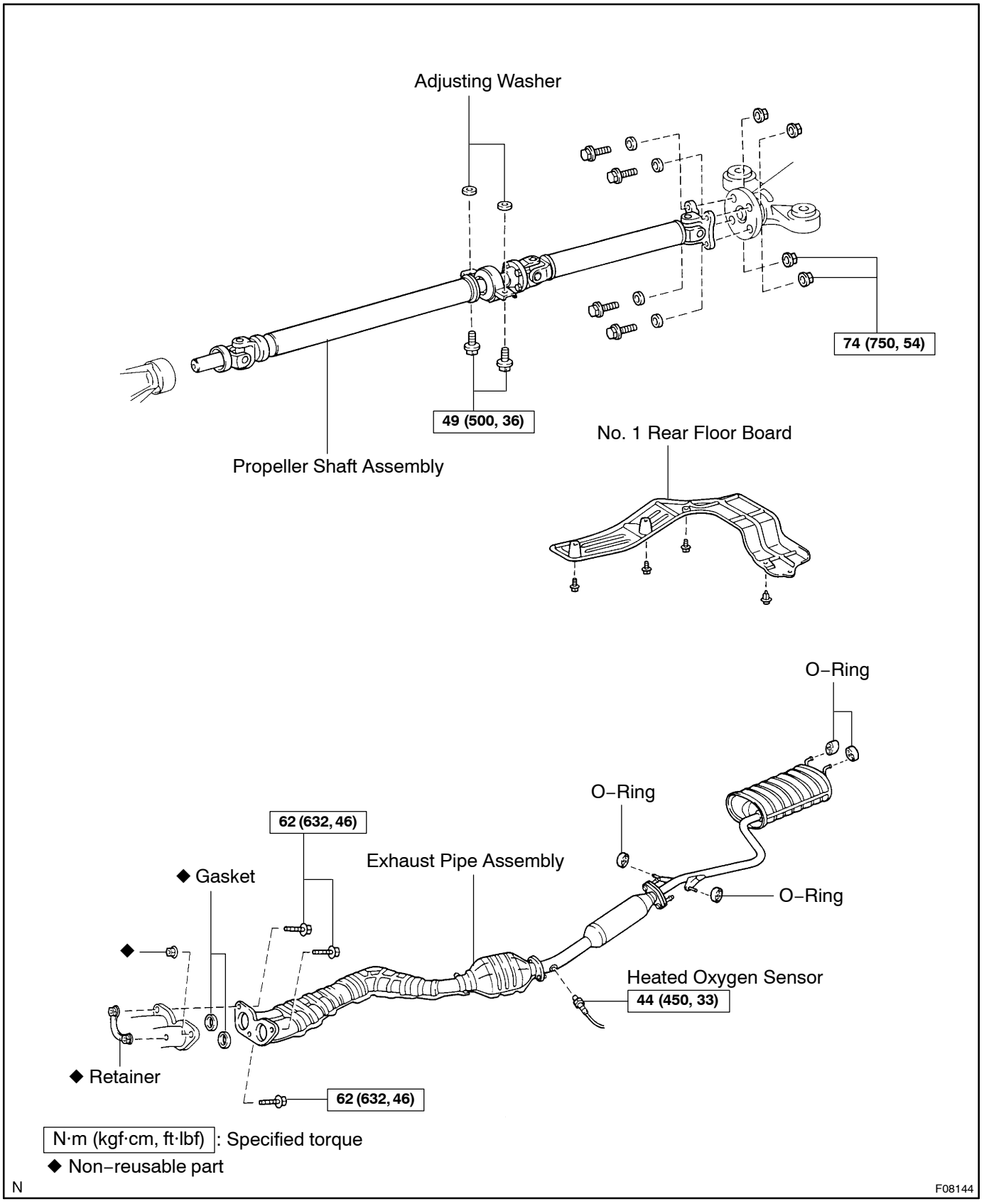
13. FILL AND CHECK DIFFERENTIAL OIL LEVEL
(See page SA–36)

14. INSTALL NO. 1 REAR FLOOR BOARD

REAR DIFFERENTIAL CARRIER

COMPONENTS

SA1JC–04

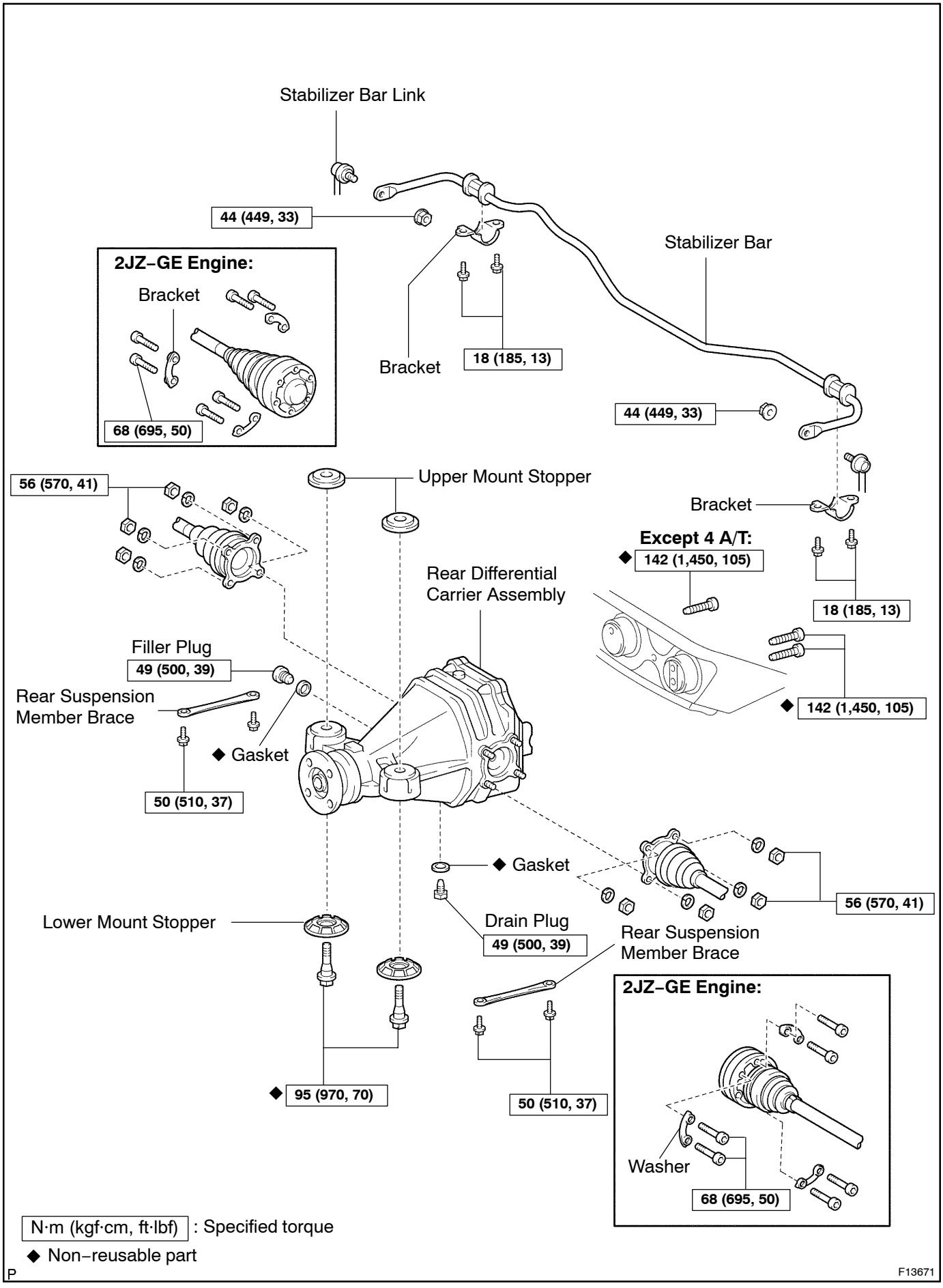


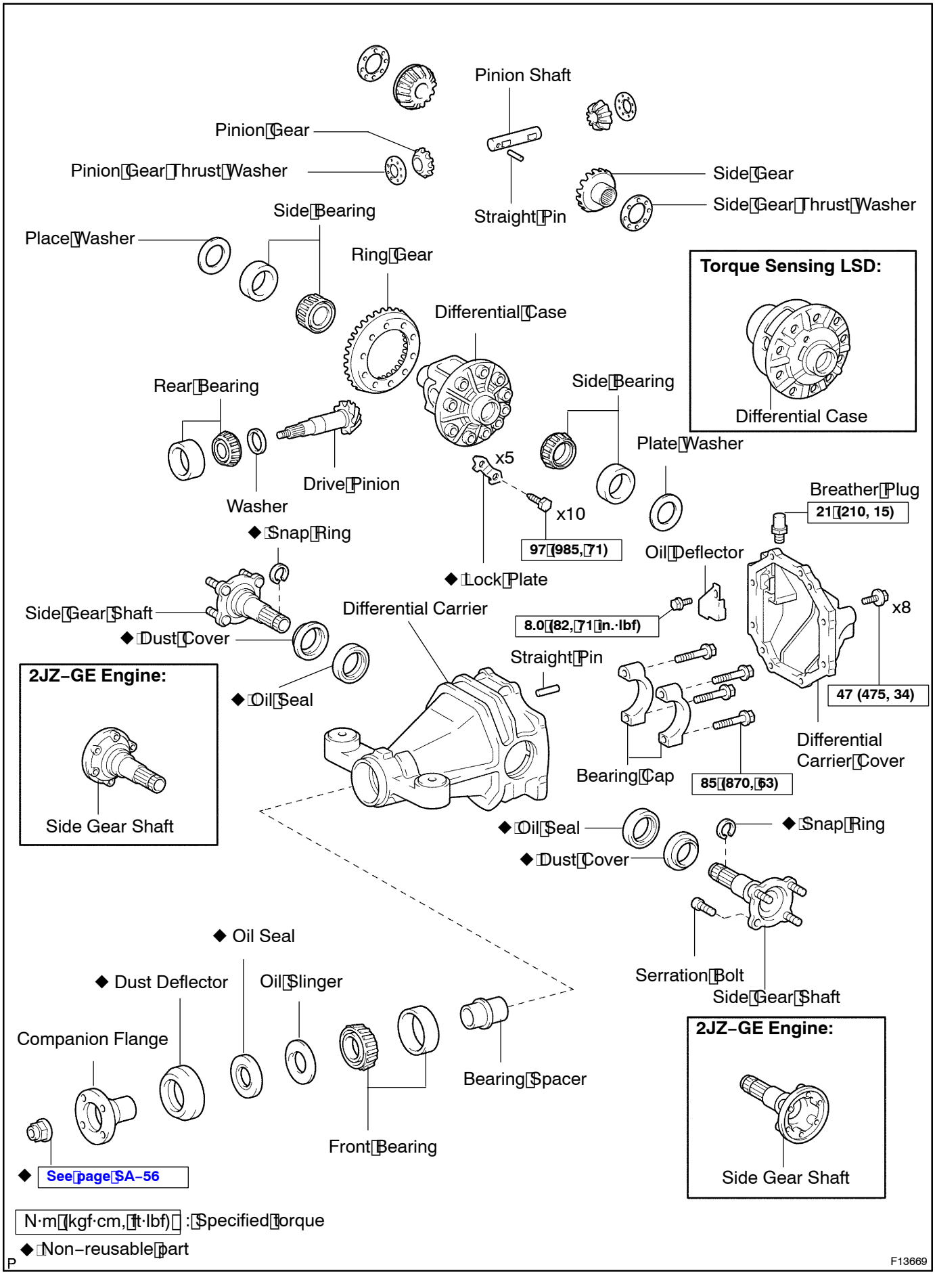
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non–reusable part

N

F08144


Stabilizer Bar Link
44 (449, 33)
2JZ–GE Engine:
Bracket
68 (695, 50)
Bracket
18 (185, 13)
Stabilizer Bar
44 (449, 33)
56 (570, 41)
Upper Mount Stopper
Bracket
Except 4 A/T:
◆ 142 (1,450, 105)
18 (185, 13)
Rear Differential Carrier Assembly
Filler Plug
49 (500, 39)
Rear Suspension Member Brace
◆ Gasket
50 (510, 37)
◆ 142 (1,450, 105)
◆ Gasket
56 (570, 41)
Lower Mount Stopper
Drain Plug
49 (500, 39)
Rear Suspension Member Brace
2JZ–GE Engine:
◆ 95 (970, 70)
50 (510, 37)
Washer
68 (695, 50)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
P
F13671

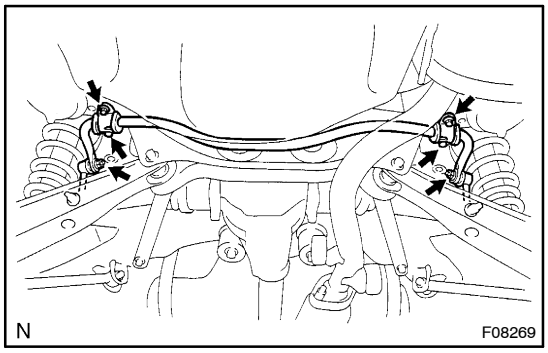

Pinion Shaft
Pinion Gear
Pinion Gear Thrust Washer
Side Gear
Side Gear Thrust Washer
Straight Pin
Side Bearing
Place Washer
Ring Gear
Differential Case
Torque Sensing LSD:
Differential Case
Rear Bearing
Drive Pinion
Washer
Side Bearing
Plate Washer
x5
x10
97 (985, 71)
◆ Snap Ring
◆ Lock Plate
Breather Plug
21 (210, 15)
Oil Deflector
Side Gear Shaft
◆ Dust Cover
◆ Oil Seal
Differential Carrier
8.0 (82, 71 in.·lbf)
x8
Straight Pin
47 (475, 34)
2JZ–GE Engine:
Side Gear Shaft
Bearing Cap
85 (870, 63)
Differential Carrier Cover
◆ Oil Seal
◆ Dust Cover
◆ Snap Ring
Serration Bolt
Side Gear Shaft
◆ Oil Seal
◆ Dust Deflector
Oil Slinger
Companion Flange
Bearing Spacer
Front Bearing
2JZ–GE Engine:
Side Gear Shaft
◆ See page SA–56
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
P
F13669

SA1JD–04

REMOVAL

1. REMOVE NO. 1 REAR FLOOR BOARD

2. DRAIN DIFFERENTIAL OIL



3. DISCONNECT 2 STABILIZER BAR BRACKETS

Remove the 4 bolts and 2 brackets from the rear suspension member.

4. DISCONNECT STABILIZER BAR LINK FROM STABILIZER BAR

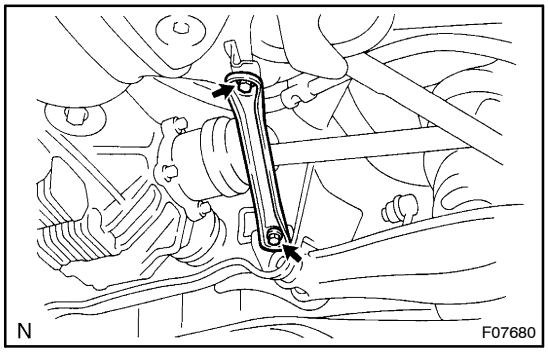
Remove the 2 nuts and disconnect the stabilizer bar link.

HINT:

If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

5. 1G–FE Engine:
REMOVE PROPELLER SHAFT (See Pub. No. RM684E on page PR–10)

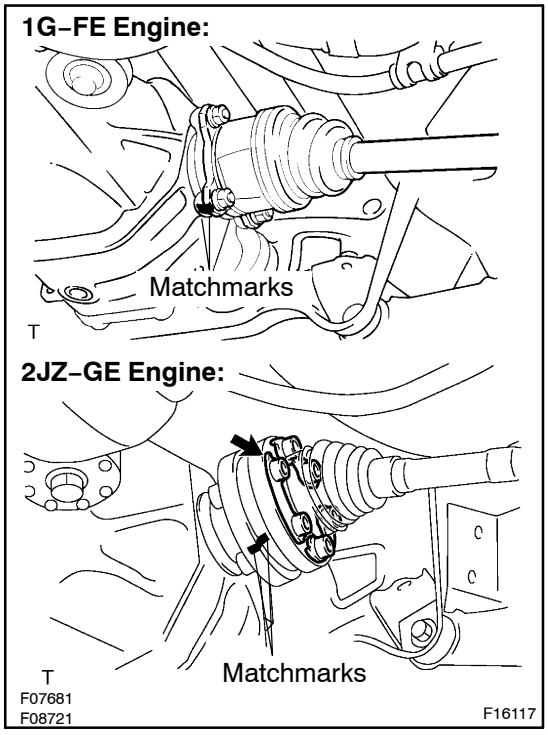
6. 2JZ–GE Engine:
REMOVE PROPELLER SHAFT (See page PR–3)



7. REMOVE RH AND LH REAR SUSPENSION MEMBER BRACES

(a) Remove the 2 bolts and suspension member brace.

(b) Employ the same manner described above to the other side.



8. DISCONNECT RH AND LH DRIVE SHAFTS FROM SIDE GEAR SHAFTS

(a) Place matchmarks on the drive shaft and side gear shaft.

NOTICE:

Do not punch to mark the matchmarks. Use paint, ect.

(b) 1G–FE Engine:

(1) Remove the 4 nuts and washers while depressing the brake pedal.

(2) Push and compress the inboard joint and disconnect the drive shaft from the side gear shaft.

(c) 2JZ–GE Engine:

(1) Using a 8 mm hexagon wrench, remove the 6 hexagon bolts and 3 washers, while applying the brakes.

(2) Disconnect the drive shaft fron the differential side gear shaft.

NOTICE:

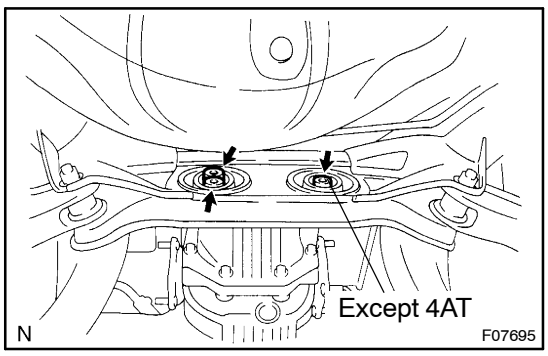
Be careful not to damage the boots and end cover.

(d) Support the drive shaft securely.

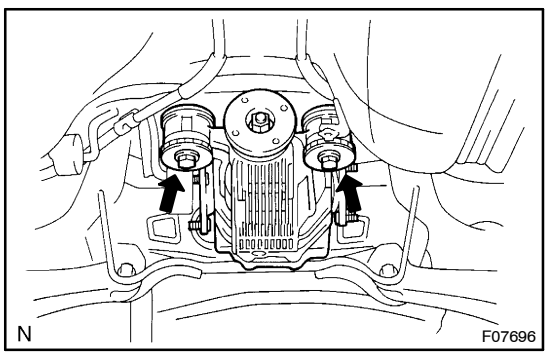
(e) Employ the same manner described above to the other side.

9. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY

(a) Support the rear differential carrier assembly with a jack.



(b) Using a hexagon wrench (12 mm), remove the 2 or 3 hexagon bolts.



(c) Remove the 2 bolts, lower mount stoppers and rear differential carrier assembly from the rear suspension member.

NOTICE:

Do not let the rear differential carrier assembly interfere with the drive shaft.

(d) Remove the 2 upper mount stoppers from the rear differential carrier.

SA1JE–03

DISASSEMBLY

1. REMOVE DIFFERENTIAL CARRIER COVER

(a) Remove the 8 bolts from the carrier cover.

(b) Using a brass bar and hammer, separate the cover from the carrier.

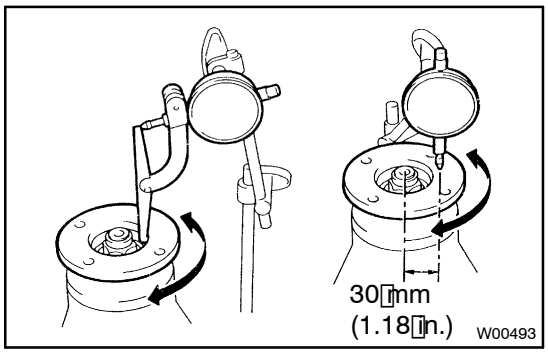
(c) Remove the breather plug from the differential carrier cover.

(d) Remove the bolt and oil deflector from the differential carrier cover.

2. REMOVE DIFFERENTIAL CARRIER STRAIGHT PIN

Using pliers, remove the straight pin from the differential carrier.

3. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND, ETC.

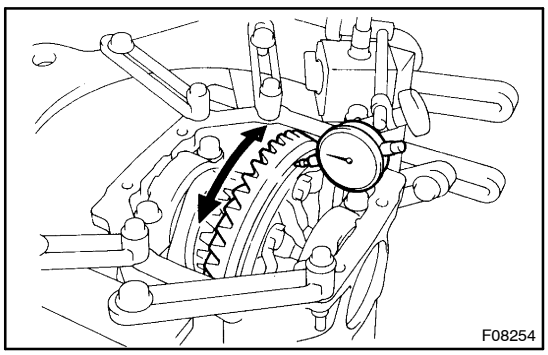


4. CHECK COMPANION FLANGE RUNOUT

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

Maximum runout: 0.09 mm (0.0035 in.)

If the runout is greater than the maximum, replace the companion flange.

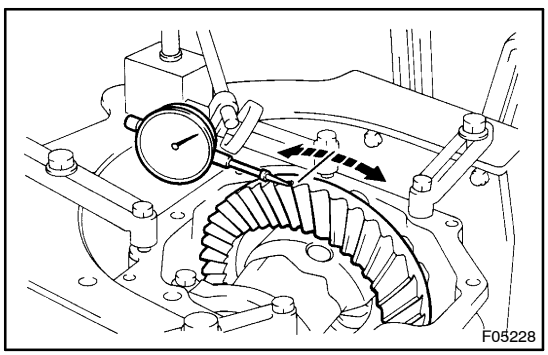


5. CHECK RING GEAR RUNOUT

Using a dial indicator, while turning the companion flange measure the ring gear runout.

Maximum runout: 0.07 mm (0.0028 in.)

If the runout is greater than the maximum, replace the ring gear and drive pinion as a set.



6. CHECK RING GEAR BACKLASH

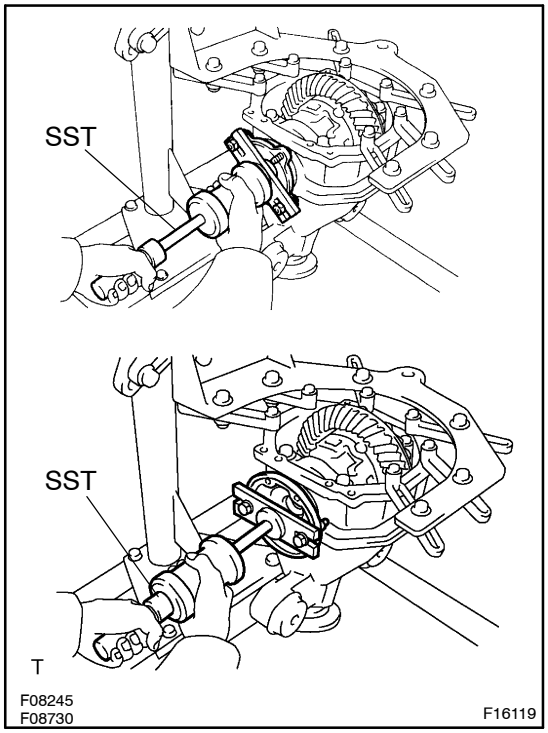
Using a dial indicator, while holding the companion flange measure the ring gear backlash.

Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

HINT:

Measure at 3 or more places on the circumference of the ring gear.

If the backlash is not within the specified value, adjust the backlash (See page SA–56).

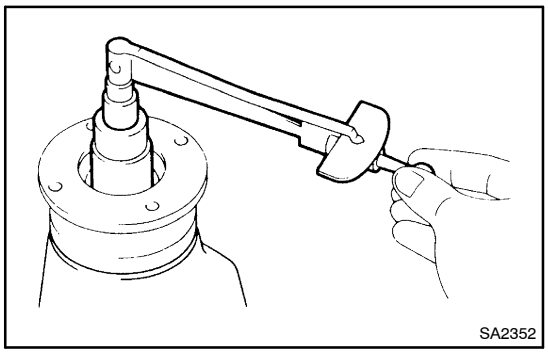


7. REMOVE SIDE GEAR SHAFTS

(a) 1G–FE Engine:
Using SST and the 2 nuts, remove the 2 side gear shafts from the differential carrier.
SST 09520–24010

(b) 2JZ–GE Engine:
Using SST and the 2 bolts, remove the 2 side gear shafts from the differential carrier.
SST 09520–24010

(c) Using a screwdriver, remove the 2 snap rings from the side gear shafts.



8. MEASURE DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload using the backlash of the drive pinion and ring gear.

Preload (at starting):
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

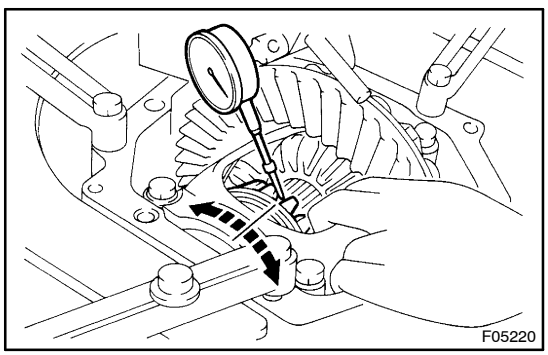
9. CHECK TOTAL PRELOAD

Using a torque wrench, measure the total preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):
Drive pinion preload plus
0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.·lbf)

If necessary, disassemble and inspect the differential.

10. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA–56)

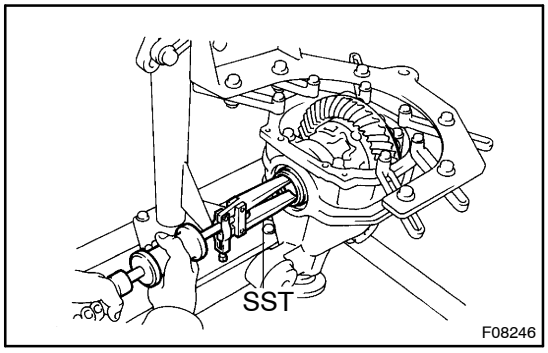


11. 2 pinion differential:
CHECK SIDE GEAR BACKLASH

Using a dial indicator, measure the side gear backlash while holding one pinion gear toward the differential case.

Backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is not within the specified value, install the correct thrust washers (See page SA–56).



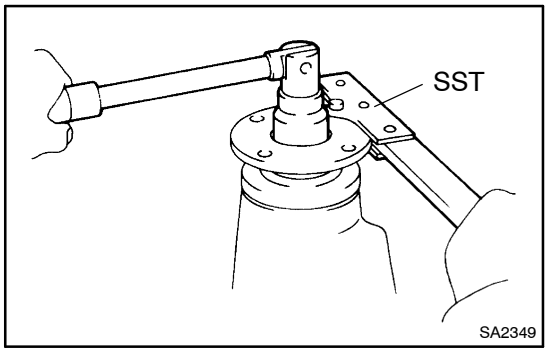
12. REMOVE SIDE GEAR SHAFT OIL SEALS

Using SST, remove the 2 side gear shaft oil seals.

SST 09308–00010

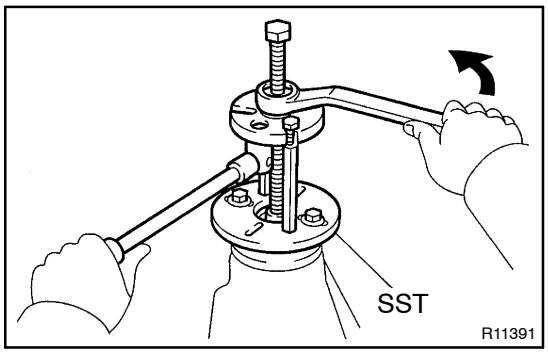
13. REMOVE COMPANION FLANGE

(a) Using a chisel and hammer, unstake the nut.



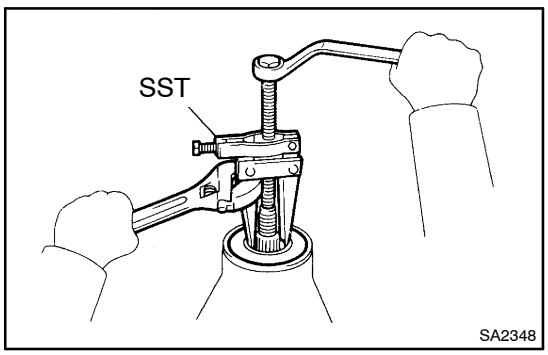
(b) Using SST to hold the flange, remove the nut.

SST 09330–00021



(c) Using SST, remove the companion flange.

SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)

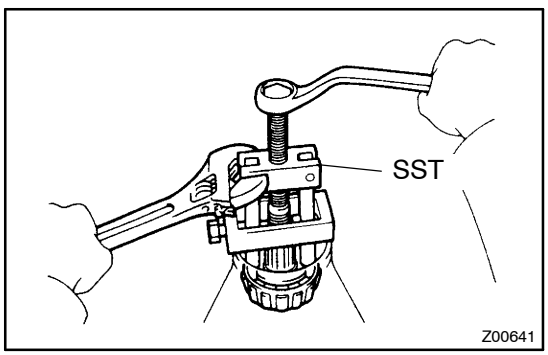


14. REMOVE FRONT OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal from the differential carrier.

SST 09308–10010

(b) Remove the oil slinger.

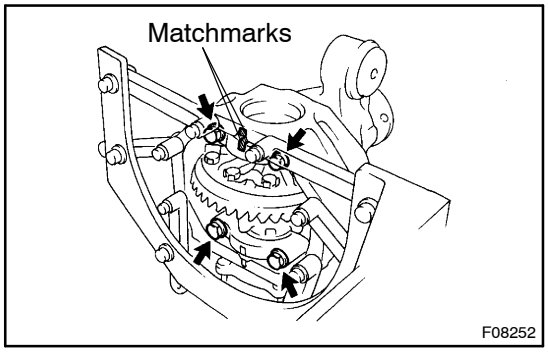


15. REMOVE FRONT BEARING

Using SST, remove the front bearing from the drive pinion.

SST 09556–22010

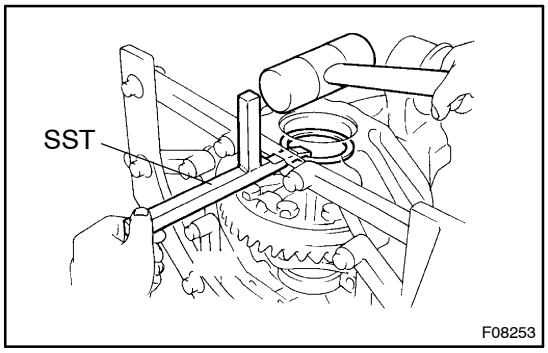
If the front bearing is damaged or worn, replace the front bearing.



16. REMOVE DIFFERENTIAL CASE ASSEMBLY

(a) Place matchmarks on the bearing cap and differential carrier.

(b) Remove the 4 bolts and 2 bearing caps.



(c) Using SST and a plastic hammer, remove the 2 plate washers.

SST 09504–22012

HINT:

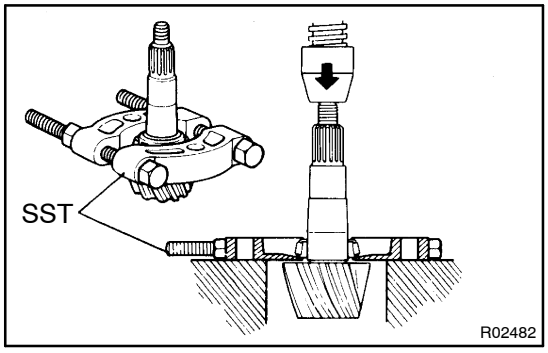
Measure the plate washer and note down the thickness.

(d) Remove the differential case with the bearing outer races from the differential carrier.

HINT:

Tag the bearing outer races to show the location for reassembling.

17. REMOVE DRIVE PINION AND BEARING SPACER FROM DIFFERENTIAL CARRIER



18. REMOVE REAR BEARING

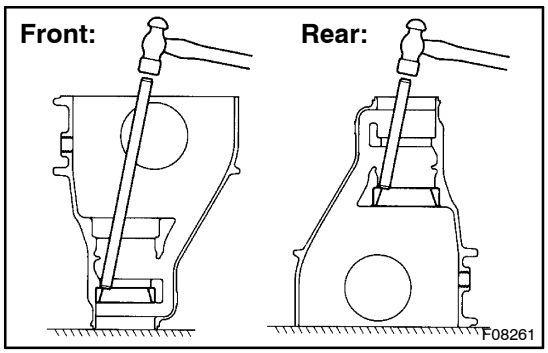
(a) Using SST and a press, remove the rear bearing from the drive pinion.

SST 09950–00020

HINT:

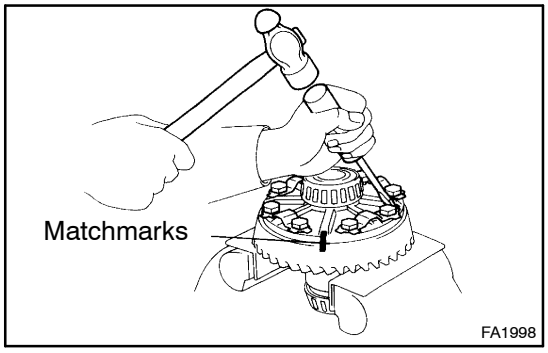
If the drive pinion or ring gear is damaged, replace them as a set.

(b) Remove the washer.



19. REMOVE FRONT AND REAR BEARING OUTER RACES

Using a brass bar and hammer, remove the front and rear bearing outer races.



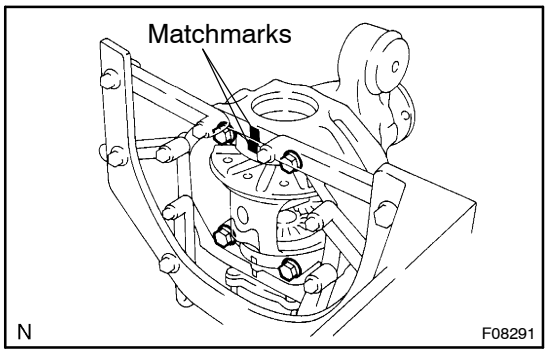
20. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.
(b) Using a screwdriver and hammer, unstake the 5 lock plates.
(c) Remove the 10 bolts and 5 lock plates.
(d) Using a plastic hammer, tap on the ring gear to separate it from the differential case.

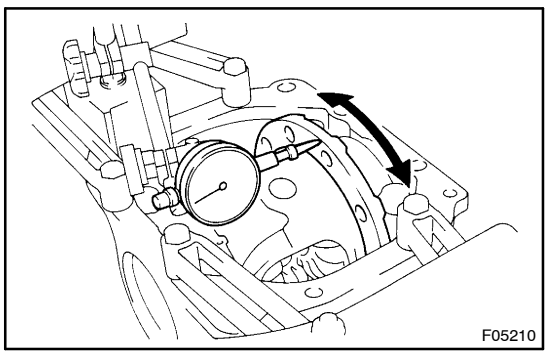
21. CHECK DIFFERENTIAL CASE RUNOUT

(a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
(b) Install the assembled plate washers onto the side bearings.
(c) Install the differential case in the differential carrier.

HINT:
If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.
However, select a plate washer that allows no clearance between it and the carrier.



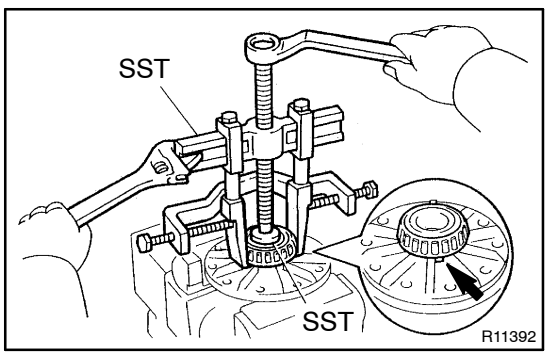
(d) Align matchmarks on the bearing cap and differential carrier.
(e) Install and uniformly tighten the 4 bolts a little at a time.



(f) Using a dial indicator, while turning the companion flange measure the differential case runout.
Maximum runout: 0.07 mm (0.0028 in.)

If the runout is greater than the maximum, replace the differential case and side bearings as a set.

(g) Remove the differential case.



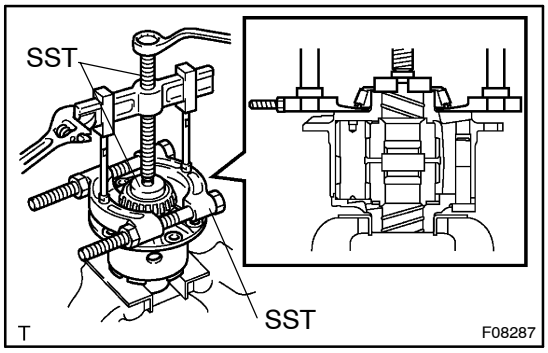
22. REMOVE SIDE BEARINGS

(a) 2 pinion differential:
Using SST, remove the 2 side bearings from the differential case.
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04011), 09950–60010 (09951–00480)

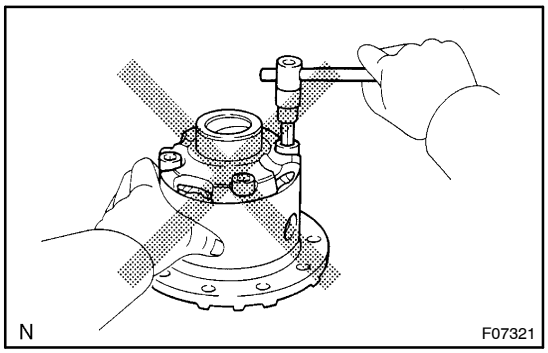
HINT:
Fix the claws of SST to the notches in the differential case.

(b) Torque sensing LSD ring gear side:
Using SST, remove the side bearing from the differential case.
SST 09950–40011 (09951–04020, 09952–04010, 09953–04030, 09954–04010, 09955–04061, 09957–04010, 09958–04011), 09950–60010 (09951–00480)

HINT:
Fix the claws of SST to the notches in the differential case.

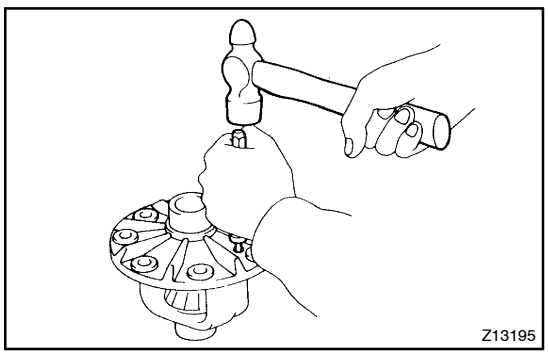


(c) Torque sensing LSD ring gear back side:
Using SST, remove the side bearing from the differential case.
SST 09950–00020, 09950–40011 (09951–04020, 09953–04030, 09957–04010), 09950–50012 (09952–05010, 09954–05030, 09955–05040)



23. 2 pinion differential:
DISASSEMBLE DIFFERENTIAL CASE ASSEMBLY

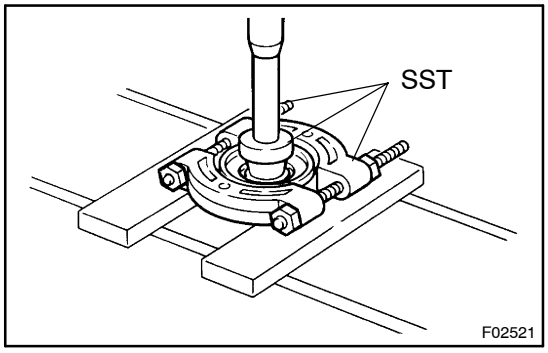
NOTICE:
If equipped with torque sensing LSD, do not disassemble the differential case.



(a) Using a pin punch (5 mm) and hammer, remove the straight pin.
(b) Remove the pinion shaft, 2 pinion gears, pinion gear thrust washers, side gears and side gear thrust washers from the differential case.

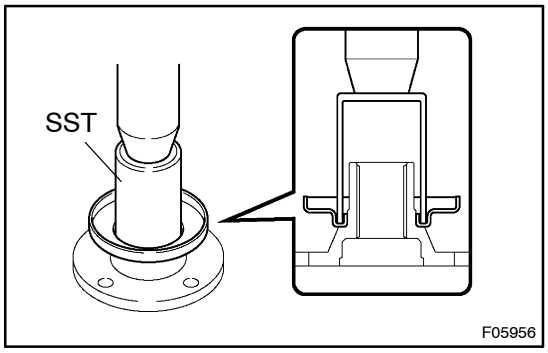
SA287–01

REPLACEMENT



1. REPLACE COMPANION FLANGE DUST DEFLECTOR, IF NECESSARY

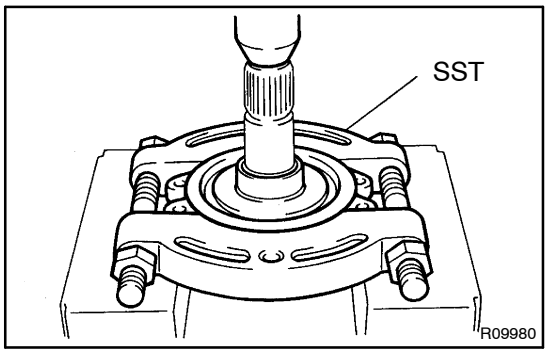
(a) Using SST and a press, remove the dust deflector.
SST 09950–00020, 09950–60010 (09951–00400), 09950–70010 (09951–07100)



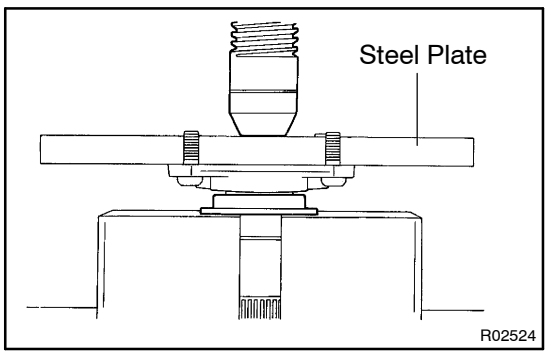
(b) Using SST and a press, install a new dust deflector.
SST 09223–00010

2. REPLACE SIDE GEAR SHAFT DUST COVER, IF NECESSARY

(a) 1G–FE Engine:
Using screwdriver and hammer, remove the dust cover.



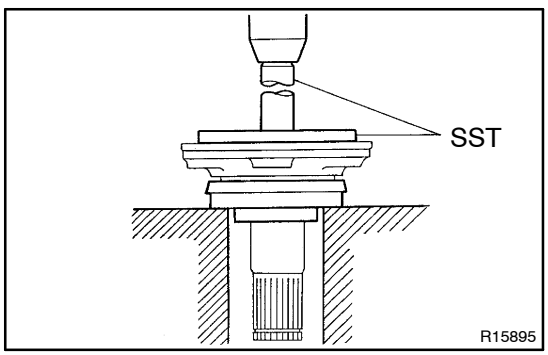
(b) 2JZ–GE Engine:
Using SST and a press, remove the dust cover.
SST 09950–00020



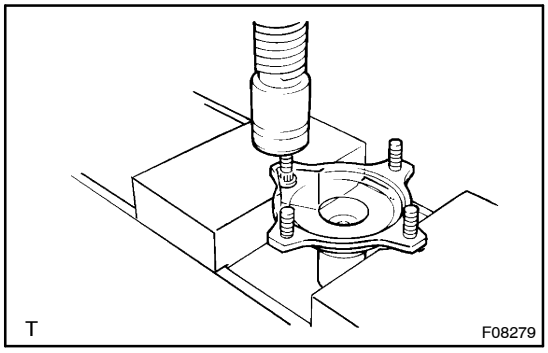
(c) 1G–FE Engine:
Using a steel plate and press, install a new dust cover.

NOTICE:

Be careful not to deform the dust cover.

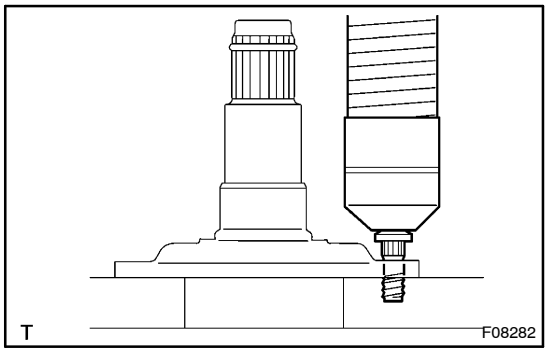


(d) 2JZ–GE Engine:
Using SST and a press, install a new dust cover.
SST 09502–24010, 09950–60020 (09951–00780), 09950–70010 (09951–07150)



3. REPLACE SIDE GEAR SHAFT SERRATION BOLT, IF NECESSARY

(a) Using a press, remove the serration bolt.



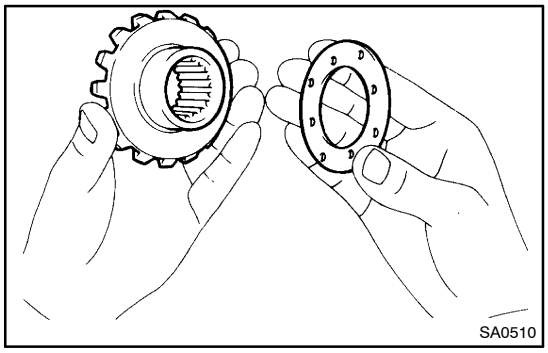
(b) Using a press, install a new serration bolt.

SA1JF–04

REASSEMBLY

HINT:

- Using a shop rag, clean off any foreign object from the parts.
- Apply all of the sliding and rotating surfaces with hypoid gear oil.


SA0510

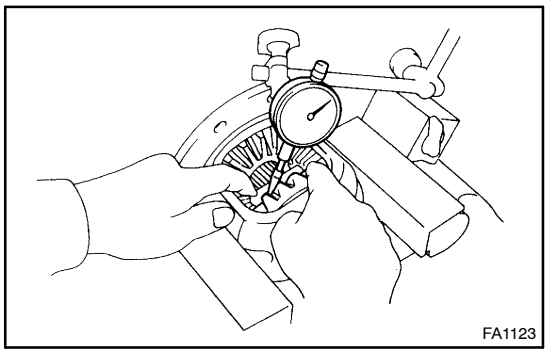
1. 2 pinion differential:
MEASURE SIDE GEAR BACKLASH AND REASSEMBLE DIFFERENTIAL CASE

(a) Install the 2 thrust washers to the 2 side gears.

(b) Install the 2 side gears, pinion gears, pinion gear thrust washers and pinion shaft in the differential case.

HINT:

Align the holes of the differential case and pinion shaft.

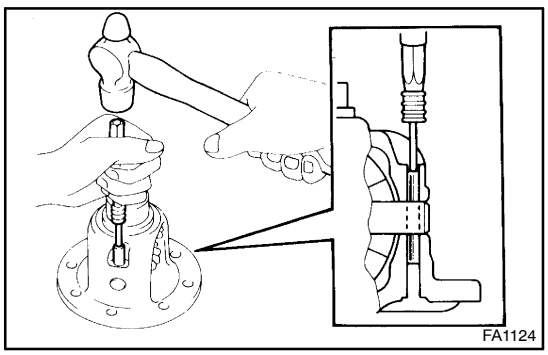

FA1123

(c) Using a dial indicator, measure the side gear backlash while holding one pinion gear toward the differential case.
Backlash: 0.05 – 0.20 mm (0.0020 – 0.0079 in.)

If the backlash is not within the specified value, install the side gear thrust washers with different thicknesses.

Thrust washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.0 (0.039)	1.2 (0.047)
1.1 (0.043)	1.3 (0.051)


FA1124

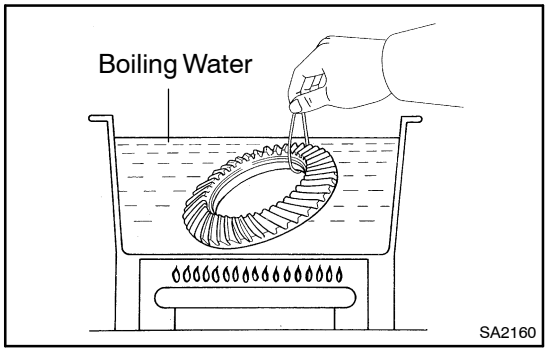
2. 2 pinion differential:
INSTALL STRAIGHT PIN AND STAKE DIFFERENTIAL CASE

(a) Using a 5 mm pin punch and hammer, install the straight pin through the differential case and hole of the pinion shaft.

(b) Using a chisel and hammer, stake the outside of the differential case pin hole.

3. INSTALL RING GEAR ON DIFFERENTIAL CASE

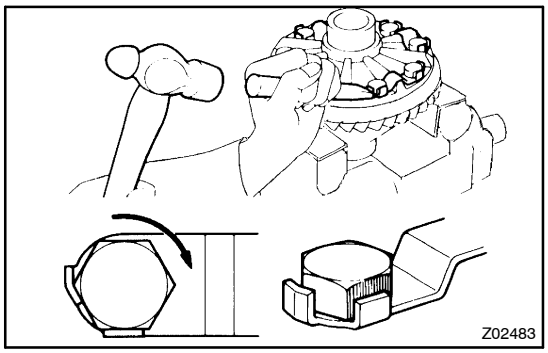
(a) Clean the contact surfaces of the differential case and ring gear.



(b) Heat the ring gear to approx. 100°C (212°F) in boiling water.
(c) Carefully take the ring gear out of the boiling water.
(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

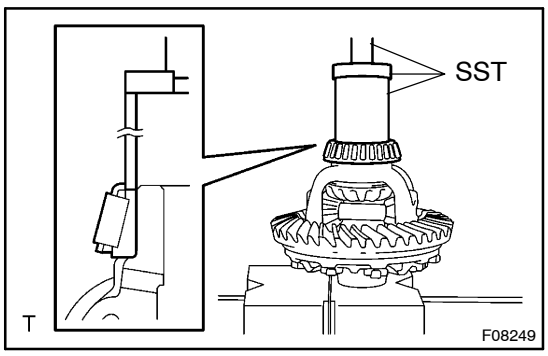
HINT:
Align the matchmarks on the ring gear and differential case.

(e) Temporarily install 5 new lock plates and 10 bolts so that the bolt holes in the ring gear and differential case are not misaligned.
(f) After the ring gear has cooled sufficiently, torque the 10 ring gear set bolts.
Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)



(g) Using a chisel and hammer, stake the 5 lock plates.

HINT:
Stake the claws of the lock plates to fix the bolts. For the claw contacting the protruding portion of the bolt, stake only the half of it along the tightening direction.



4. INSTALL SIDE BEARINGS

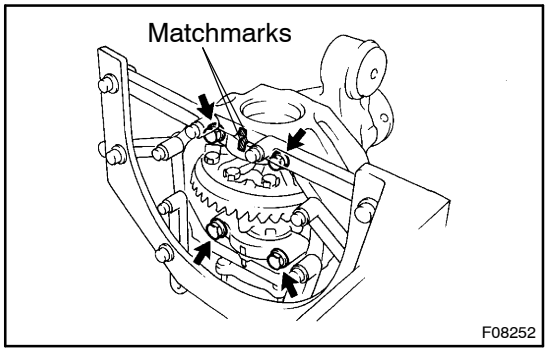
Using SST and a press, install the 2 bearings to the differential case.

SST 09710–04081, 09950–60010 (09951–00600), 09950–70010 (09951–07100)

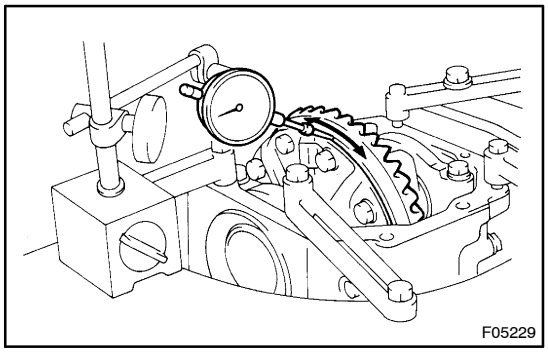
5. CHECK RING GEAR RUNOUT

(a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.
(b) Install the assembled plate washers onto the side bearings.
(c) Install the differential case in the differential carrier.

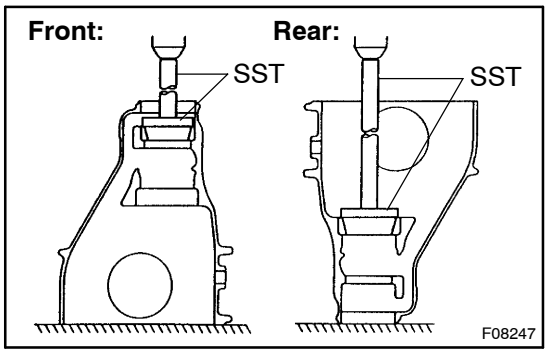
HINT:
If it is difficult to install the differential case into the carrier, replace the plate washer with a thinner one.
However, select a plate washer that allows no clearance between it and the carrier.



(d) Align matchmarks on the bearing cap and differential carrier.
(e) Install and uniformly tighten the 4 bolts a little at a time.



(f) Using a dial indicator, measure the ring gear runout.
Maximum runout: 0.07 mm (0.0028 in.)
(g) Remove the differential case.



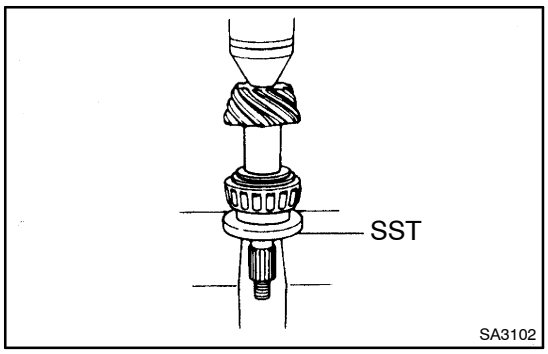
6. INSTALL FRONT AND REAR BEARING OUTER RACES

(a) Using SST and a press, install the front bearing outer race.
SST 09950–60020 (09951–00710), 09950–70010 (09951–07150)
(b) Using SST and a press, install the rear bearing outer race.
SST 09950–60020 (09951–00790), 09950–70010 (09951–07200)

7. INSTALL REAR BEARING

(a) Install the washer on the drive pinion.

HINT:
First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.



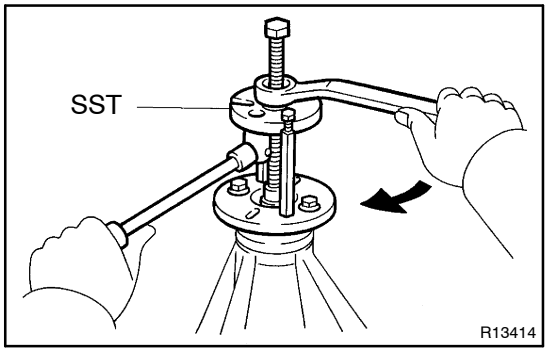
(b) Using SST and a press, install the rear bearing onto the drive pinion.
SST 09506–30012

8. TEMPORARILY ADJUST DRIVE PINION PRELOAD

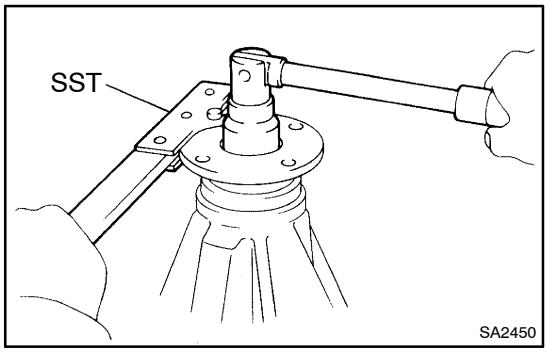
(a) Install the drive pinion and front bearing.

HINT:
Assemble the spacer and oil seal after adjusting the gear contact pattern.

(b) Install the oil slinger.



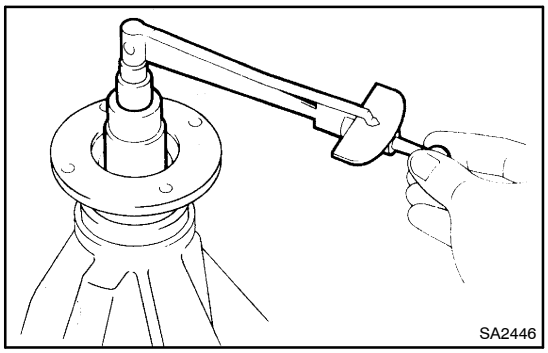
(c) Using SST, install the companion flange.
SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)



(d) Using SST to hold the flange and adjust the drive pinion preload by tightening the nut.

NOTICE:

- **Coat the nut and threads of the drive pinion with hypoid gear oil LSD.**
- **As there is no spacer, tighten the nut a little at a time, being careful not to overtighten.**



(e) Using a torque wrench, measure the drive pinion preload using the backlash between the drive pinion and ring gear.

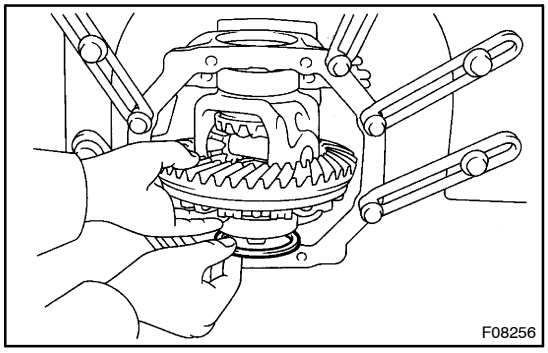
Preload (at starting):
New bearing:
(1G–FE Engine)
1.3 – 1.9 N·m (13 – 19 kgf·cm, 11.5 – 16.8 in.·lbf)
(2JZ–GE Engine)
0.98 – 1.57 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in.·lbf)
Reused bearing:
(1G–FE Engine)
0.4 – 0.7 N·m (4 – 7 kgf·cm, 3.5 – 6.2 in.·lbf)
(2JZ–GE Engine)
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

HINT:
Measure the drive pinion preload after turning the bearing clockwise and counterclockwise several times to make the bearing smooth.

9. INSTALL DIFFERENTIAL CASE IN DIFFERENTIAL CARRIER

(a) Place the bearing outer races on their respective bearings. Check that the right and left outer races are not interchanged.

(b) Install the differential case in the differential carrier.



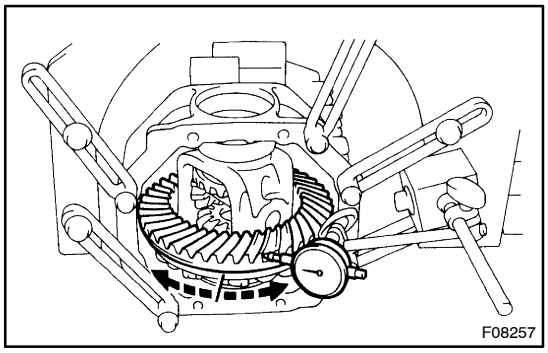
10. ADJUST RING GEAR BACKLASH

(a) Install the plate washer on the ring gear back side.

HINT:

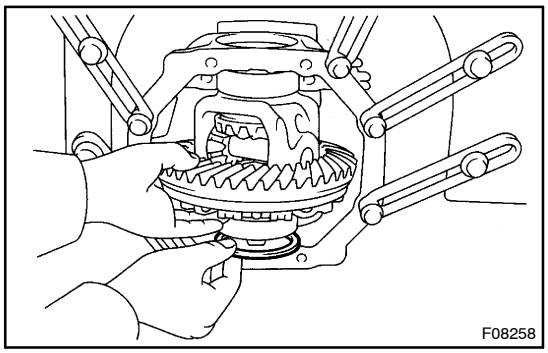
Make sure that the ring gear has backlash.

(b) Tap on the ring gear with a plastic hammer so that the washer fits to the bearing.



(c) Using a dial indicator, while holding the companion flange, measure the ring gear backlash.

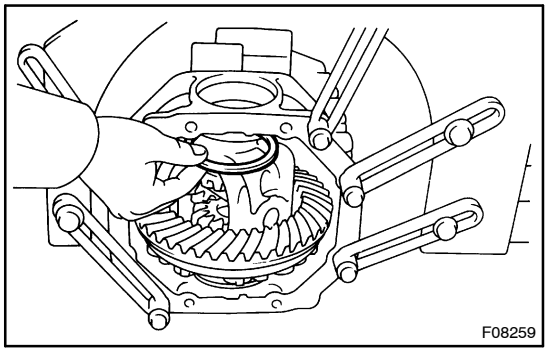
Backlash (Reference):
0.13 – 0.18 mm (0.0051 – 0.0071 in.)



(d) Select a plate washer for back side ring gear, using the backlash as reference.

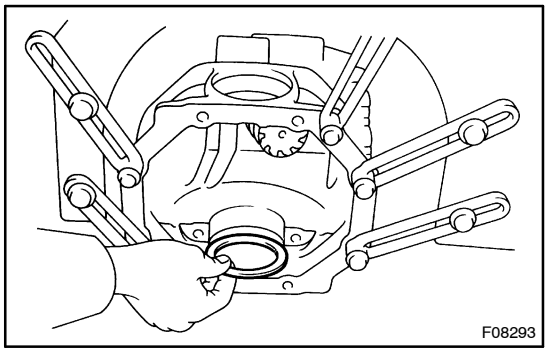
Side plate washer thickness:

Thickness mm (in.)	Thickness mm (in.)
2.58 (0.1016)	2.92 (0.1150)
2.60 (0.1024)	2.94 (0.1157)
2.62 (0.1031)	2.96 (0.1165)
2.64 (0.1039)	2.98 (0.1173)
2.66 (0.1047)	3.00 (0.1181)
2.68 (0.1055)	3.02 (0.1189)
2.70 (0.1063)	3.04 (0.1197)
2.72 (0.1071)	3.06 (0.1205)
2.74 (0.1079)	3.08 (0.1213)
2.76 (0.1087)	3.10 (0.1220)
2.78 (0.1094)	3.12 (0.1228)
2.80 (0.1102)	3.14 (0.1236)
2.82 (0.1110)	3.16 (0.1244)
2.84 (0.1118)	3.18 (0.1252)
2.86 (0.1126)	3.20 (0.1260)
2.88 (0.1134)	3.22 (0.1268)
2.90 (0.1142)	3.24 (0.1276)

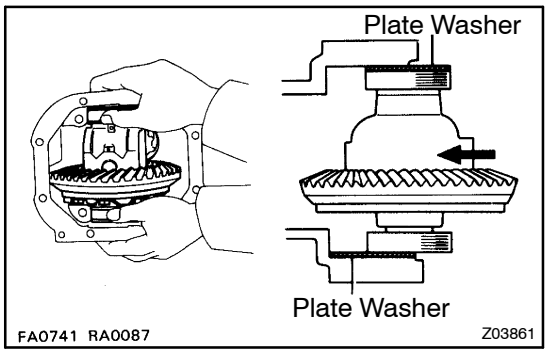


(e) Select a ring gear teeth side plate washer so that there is no clearance between the outer race and case.

(f) Remove the plate washers and differential case.

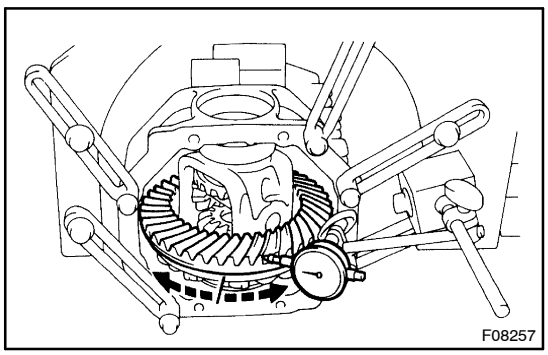


(g) Install the plate washer into the ring gear back side of the carrier.



(h) Place the other plate washer onto the differential case together with the outer race, and install the differential case with the outer race into the carrier.

(i) Tap on the ring gear with a plastic hammer so that the washers fit to the bearing.



(j) Using a dial indicator, while holding the companion flange measure the ring gear backlash.

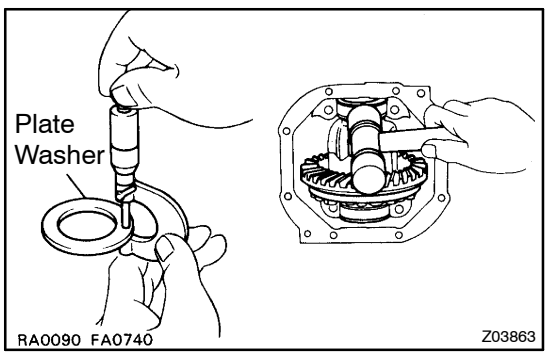
Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

If the backlash is not within the specified value, adjust it by either increasing or decreasing the thickness of washers on both sides by an equal amount.

HINT:

There should be no clearance between the plate washer and case.

Make sure that there is ring gear backlash.



11. ADJUST SIDE BEARING PRELOAD

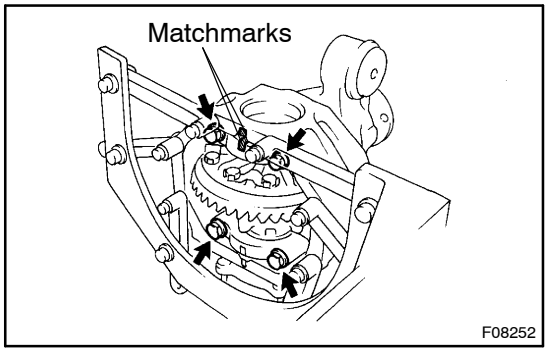
(a) Remove the ring gear teeth side plate washer and using a micrometer, measure the thickness.

(b) Using the backlash as a reference, install a new washer 0.06 – 0.09 mm (0.0024 – 0.0035 in.) thicker than the washer removed.

HINT:

Select a washer which can be pressed in 2/3 of the way with your finger.

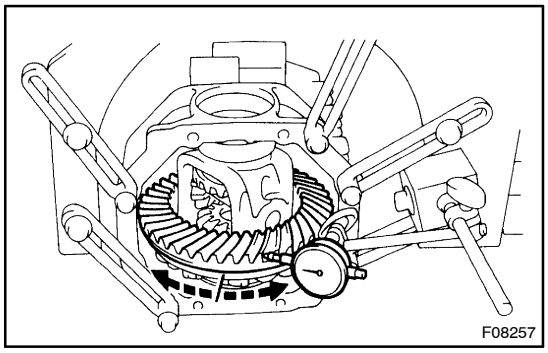
(c) Using a plastic hammer, install the plate washer.



(d) Align matchmarks on the bearing cap and differential carrier.

(e) Tighten the 4 bolts.

Torque: 85 N·m (870 kgf·cm, 63 ft·lbf)



(f) Using a dial indicator, while holding the companion flange adjust the ring gear backlash until it is within the specified value.

Backlash: 0.13 – 0.18 mm (0.0051 – 0.0071 in.)

If the backlash is not within the specified value, adjust by either increasing or decreasing the thickness of washers on both sides by an equal amount.

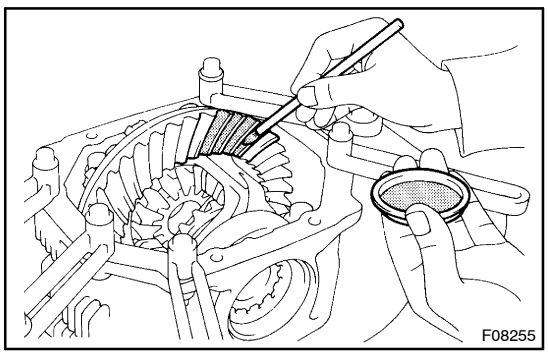
HINT:

The backlash will change by about 0.02 mm (0.0008 in.) corresponding to 0.03 mm (0.0012 in.) change in the plate washer.

12. MEASURE TOTAL PRELOAD

Using a torque wrench, measure the total preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):
Drive pinion preload plus
0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.·lbf)

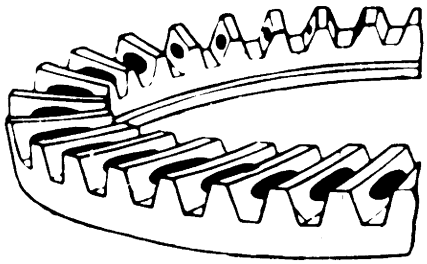


13. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(a) Coat 3 or 4 teeth at 3 different positions on the ring gear with red lead primer.

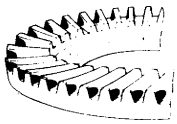
(b) Hold the companion flange firmly and rotate the ring gear in both directions.

(c) Inspect the tooth contact pattern.

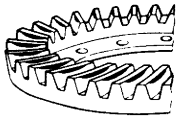


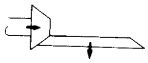
Proper Contact

Heel Contact



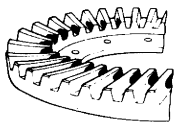
Face Contact



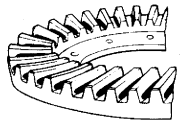


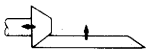
Select an adjusting shim that will bring the drive pinion closer to the gear.

Toe Contact



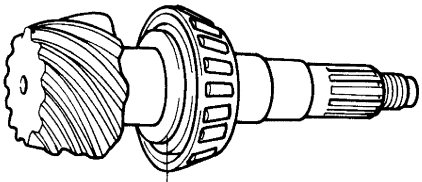
Flank Contact





Select an adjusting shim that will shift the drive pinion gear away from the ring gear.

R02495



Washer

FA2008

If the teeth are not contacting properly, use the following table to select a proper washer for correction.

Washer thickness:

Thickness mm (in.)	Thickness mm (in.)
1.70 (0.0669)	2.03 (0.0799)
1.73 (0.0681)	2.06 (0.0811)
1.76 (0.0693)	2.09 (0.0822)
1.79 (0.0704)	2.12 (0.0835)
1.82 (0.0717)	2.15 (0.0847)
1.85 (0.0729)	2.18 (0.0858)
1.88 (0.0740)	2.21 (0.0870)
1.91 (0.0752)	2.24 (0.0882)
1.94 (0.0764)	2.27 (0.0894)
1.97 (0.0776)	2.30 (0.0906)
2.00 (0.0787)	2.33 (0.0918)

14. REMOVE COMPANION FLANGE (See page SA–48)

15. REMOVE OIL SLINGER

16. REMOVE FRONT BEARING (See page SA–48)

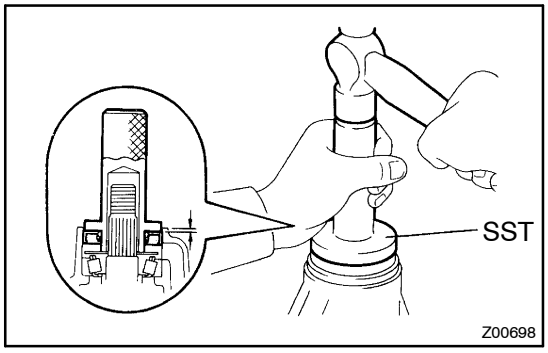
17. INSTALL BEARING SPACER

Install a new bearing spacer.

HINT:

Face the spacer with the large inner diameter to the rear side.

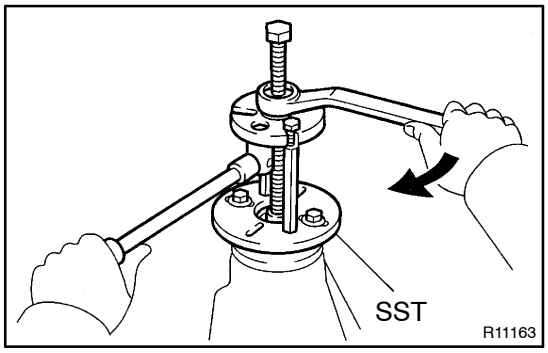
18. INSTALL FRONT BEARING AND OIL SLINGER



19. INSTALL FRONT OIL SEAL

(a) Using SST and a hammer, install a new oil seal.
SST 09554–30011
Oil seal drive in depth:
2.00 ± 0.45 mm (0.0787 ± 0.0177 in.)

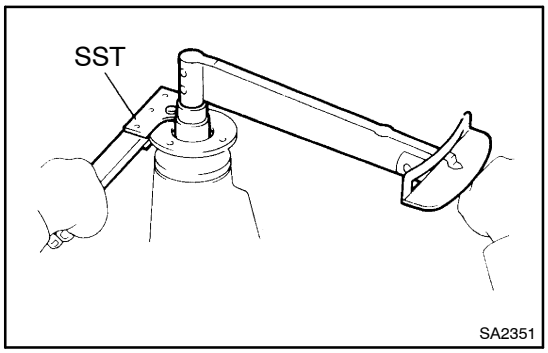
(b) Coat MP grease to the oil seal lip.



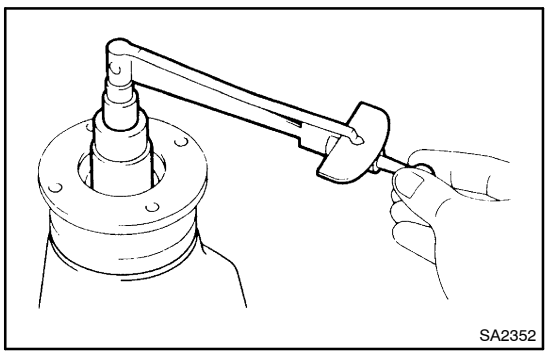
20. INSTALL COMPANION FLANGE

(a) Using SST, install the companion flange.
SST 09950–30012 (09951–03010, 09953–03010, 09954–03010, 09955–03030, 09956–03020)

(b) Coat the thread of a new nut with hypoid gear oil LSD.



(c) Using SST to hold the flange, tighten the nut.
SST 09330–00021

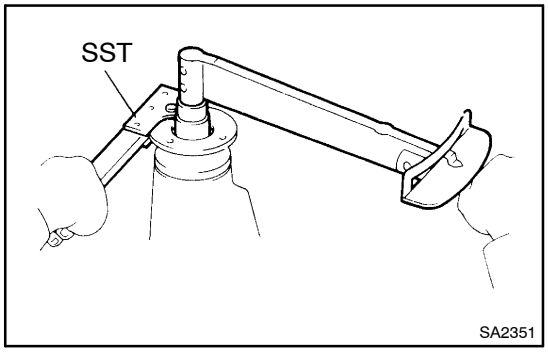


21. ADJUST DRIVE PINION PRELOAD

Using a torque wrench, measure the drive pinion preload using the backlash between the drive pinion and ring gear.

Preload (at starting):
New bearing:
(1G–FE Engine)
1.3 – 1.9 N·m (13 – 19 kgf·cm, 12 – 17 in.·lbf)
(2JZ–GE Engine)
0.98 – 1.57 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in.·lbf)
Reused bearing:
(1G–FE Engine)
0.4 – 0.7 N·m (4 – 7 kgf·cm, 3.5 – 6.2 in.·lbf)
(2JZ–GE Engine)
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)

If the preload is greater than the specified value, replace the bearing spacer.



If the preload is less than the specified value, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

SST 09330–00021

Torque: 223 N·m (2,274 kgf·cm, 164 ft·lbf) or less

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.

Do not loosen the pinion nut to reduce the preload.

22. RECHECK TOTAL PRELOAD (See page SA–48)

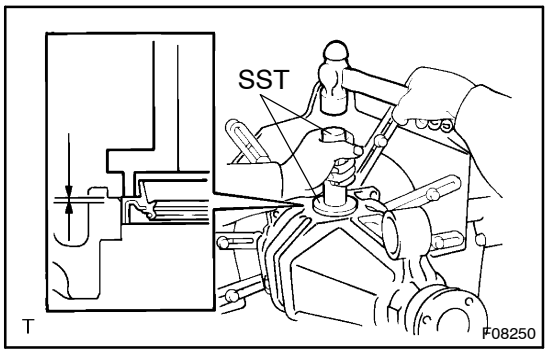
23. RECHECK RING GEAR BACKLASH (See page SA–48)

24. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step. 13)

25. CHECK COMPANION FLANGE RUNOUT (See page SA–48)

26. STAKE DRIVE PINION NUT

Using a chisel and hammer, stake the nut.



27. INSTALL SIDE GEAR SHAFT OIL SEALS

(a) Using SST and a press, install 2 new oil seals.

SST 09554–22010

Oil seal drive in depth:

0.50 ± 0.50 mm (0.0200 ± 0.0197 in.)

(b) Coat MP grease to the oil seal lip.

28. INSTALL SIDE GEAR SHAFTS

(a) Using needle–nose pliers, install 2 new snap rings to the side gear shafts.

(b) Coat the MP grease to the snap rings

(c) 1G–FE Engine:

Using SST and the 2 nuts, install the 2 side gear shafts to the differential carrier.

SST 09520–24010

(d) 2JZ–GE Engine:

Using SST and the 2 bolts, install the ide gear shaft to the differential carrier.

SST 09520–24010

NOTICE:

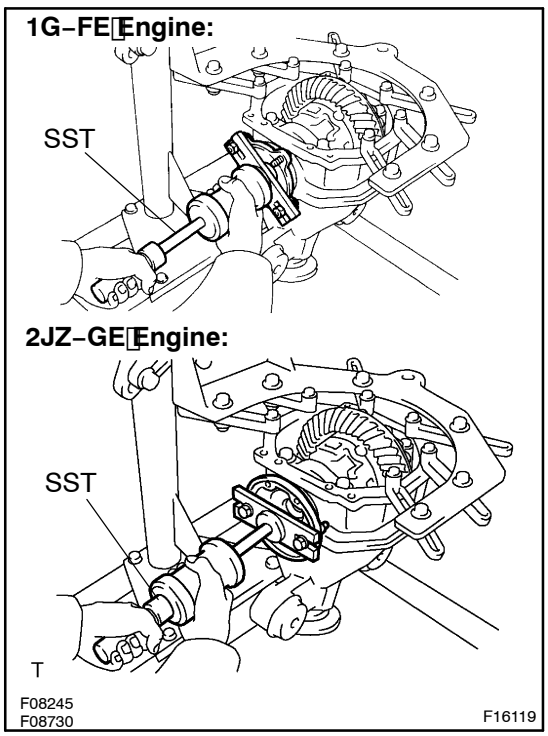
Be careful not to damage the side gear shaft oil seal.

HINT:

- Before installing the side gear shaft, set the snap ring with it's opening side facing downward.
- Whether the side gear shaft is in contact with the side gear or not can be known from the sound or feeling when driving it.

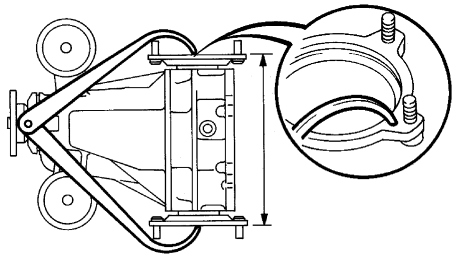
(e) Check that the side gear shaft will not come out by trying to pull it out by hand.

(f) Employ the same manner described above to the other side.

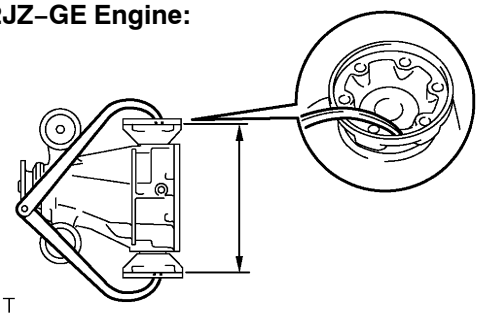


29. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND, ETC.

1G–FE Engine:



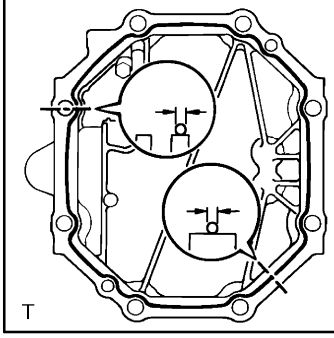
2JZ–GE Engine:



T

F08268
F08731

F16120



Seal Width
Approx.
2 – 3 mm
(0.08 – 0.12 in.)

T

F08251

30. INSPECT DIFFERENTIAL CARRIER

Using vernier calipers, measure the distance between the right and left side gear shafts, as shown in the illustration.

Standard distance:

1G–FE Engine:

239.2 ± 0.3 mm (9.4173 ± 0.0118 in.)

2JZ–GE Engine:

279.7 mm (11.012 in.) or less

31. INSTALL DIFFERENTIAL CARRIER STRAIGHT PIN

Using a plastic hammer, install the straight pin.

32. INSTALL DIFFERENTIAL CARRIER COVER

(a) Install the oil deflector with the bolt to the carrier cover.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

(b) Install the breather plug to the carrier cover.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(c) Remove any old FIPG material and be careful not to drop oil on the contact surfaces of the differential carrier and carrier cover.

(d) Clean both installation surfaces of loose FIPG and oil material with gasoline or alcohol.

(e) Apply FIPG to the carrier cover, as shown in the illustration.
FIPG:
Part No. 08826–00090, THREE BOND 1281 or equivalent.

HINT:

- Allow on overlap of 10 mm (0.37 in.) or more between the start and end of FIPG application.
- Install the carrier cover within 10 minutes after applying FIPG.

(f) Install the differential carrier cover with the 8 bolts.
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

HINT:

Do not add oil or drive the vehicle immediately after installing the cover, and leave it as it is for an hour or more.

Also, for 12 hours or more, avoid rapid acceleration/ deceleration.

SA1JG–04

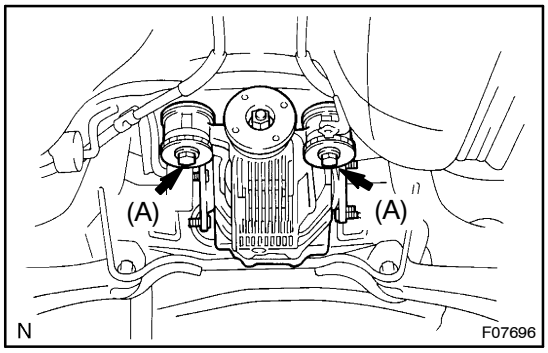
INSTALLATION

1. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY

(a) Install the 2 upper mount stoppers on the rear differential carrier assembly.

HINT:

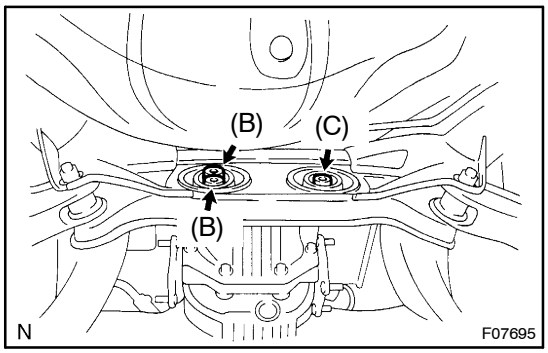
Use the upper mount stopper which was removed.



(b) Support the rear differential carrier assembly with a jack and temporally install the lower mount stoppers and 2 new bolt (A).

NOTICE:

Do not let the rear differential carrier assembly interfere with the drive shaft.



(c) Temporally install 2 new hexagon bolts (B).

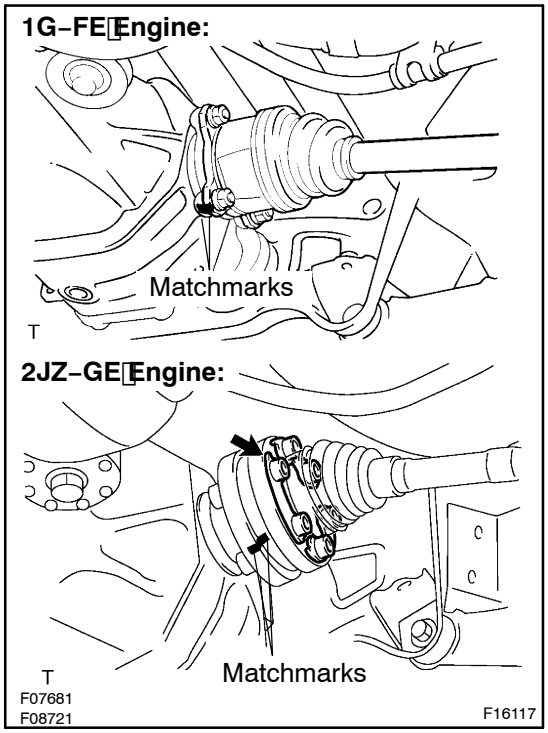
(d) Except 4AT:
Temporally install a new hexagon bolt (C).

(e) Using a 12 mm hexagon wrench, torque the 2 hexagon bolts (B).
Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)

(f) Except 4AT:
Using a 12 mm hexagon wrench, torque the hexagon bolt (C).
Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)

(g) Torque the 2 bolts (A).
Torque: 95 N·m (970 kgf·cm, 70 ft·lbf)

(h) Lower the jack.



2. CONNECT RH AND LH DRIVE SHAFTS TO SIDE GEAR SHAFTS

(a) Align the matchmarks, and push and compress the inboard joint and connect the drive shaft to the side gear shaft.

NOTICE:

Be careful not to damage the boots and inboard joint tulip.

(b) 1G–FE Engine:
Install the 4 washers and nuts while depressing the brakes pedal.
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

(c) Employ the same manner described above to the other side.

(d) 2JZ–GE Engine:
Using a 8 mm hexagon wrench, install the 3 washers and 6 hexagon bolts, while applying the brakes.
Torque: 68 N·m (695 kgf·cm, 50 ft·lbf)

(e) Employ the same manner described above to the other side.

3. INSTALL RH AND LH REAR SUSPENSION MEMBER BRACES
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

4. 1G–FE Engine:
INSTALL PROPELLER SHAFT (See Pub. No. RM684E on page PR–10)

5. 2JZ–GE Engine:
INSTALL PROPELLER SHAFT (See page PR–9)

6. CONNECT STABILIZER BAR LINK TO STABILIZER BAR
Torque: 44 N·m (449 kgf·cm, 33 ft·lbf)

HINT:
If the ball joint turns together with the nut, use a hexagon wrench (5 mm) to hold the stud.

7. CONNECT 2 STABILIZER BAR BRACKETS TO REAR SUSPENSION MEMBER
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

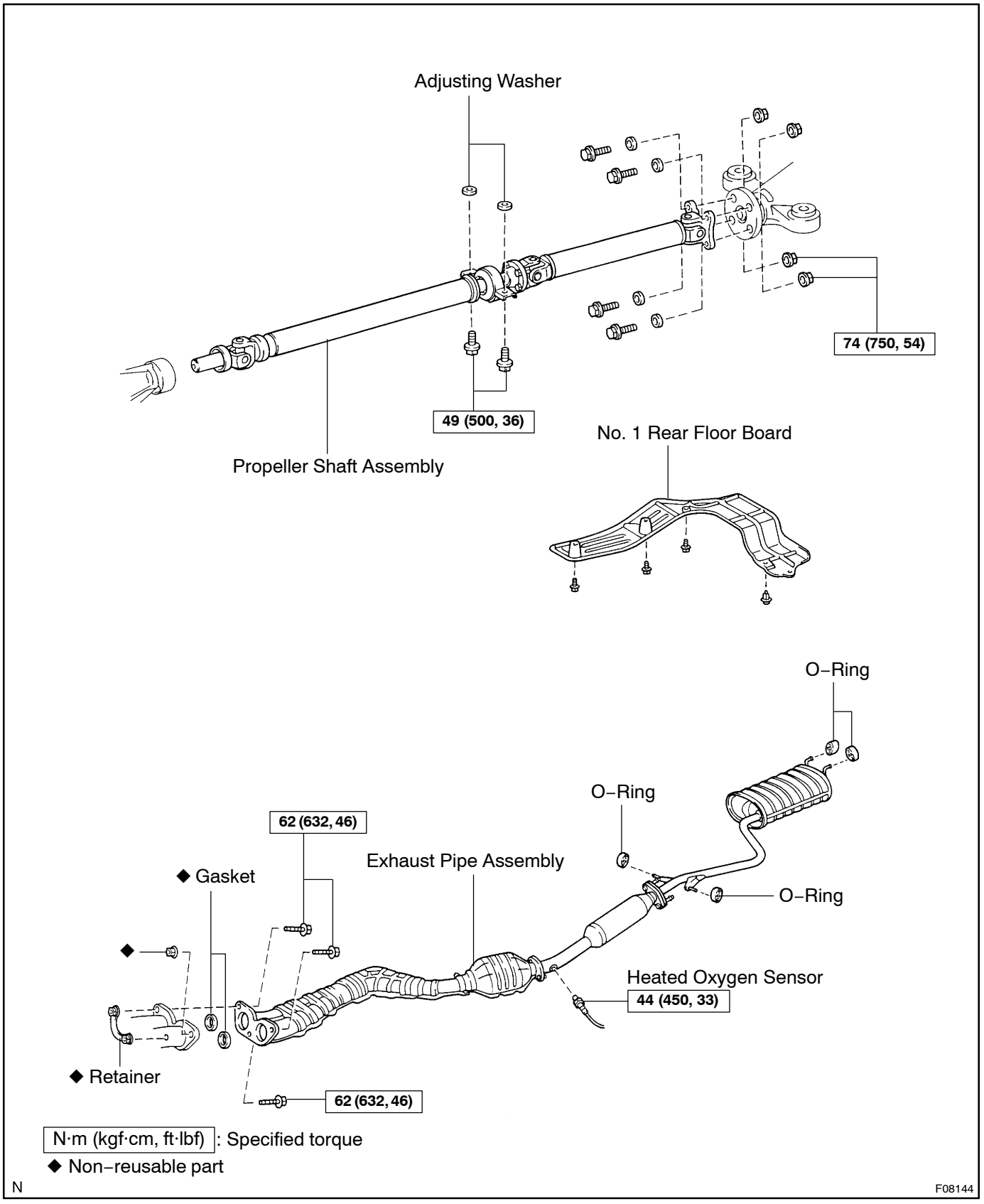
8. FILL AND CHECK DIFFERENTIAL OIL LEVEL (See page SA–36)

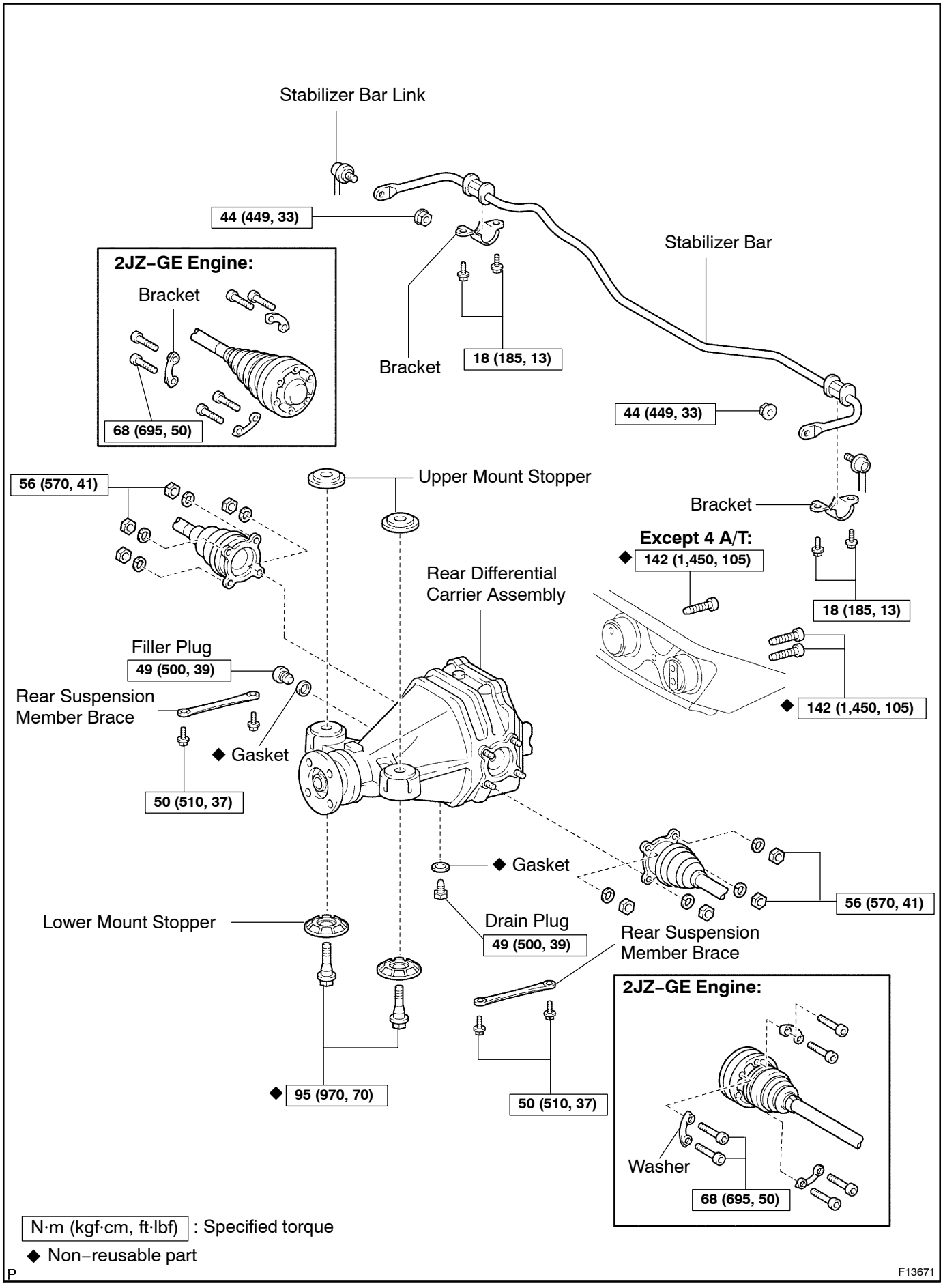
9. INSTALL NO. 1 REAR FLOOR BOARD

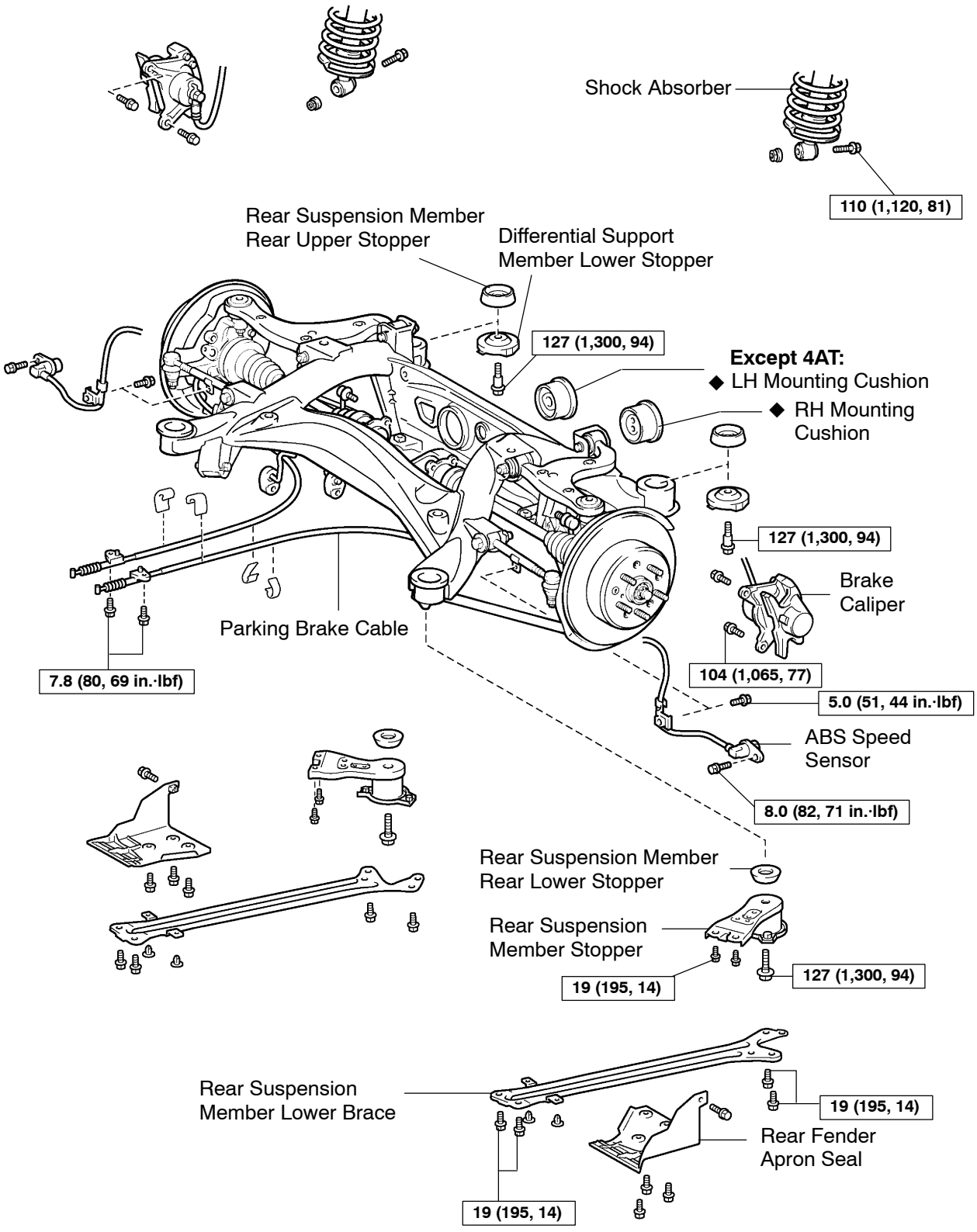
DIFFERENTIAL MOUNTING CUSHION

SA1JH–04

COMPONENTS



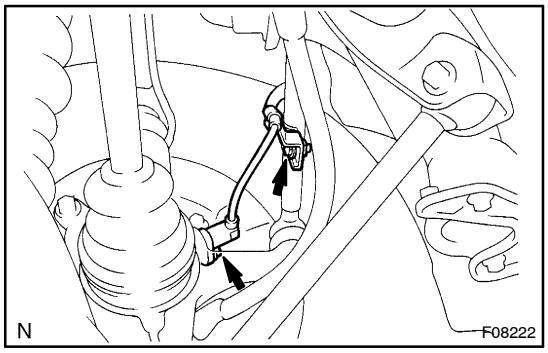

Stabilizer Bar Link
44 (449, 33)
Stabilizer Bar
2JZ–GE Engine:
Bracket
68 (695, 50)
Bracket
18 (185, 13)
44 (449, 33)
56 (570, 41)
Upper Mount Stopper
Bracket
Except 4 A/T:
◆ 142 (1,450, 105)
18 (185, 13)
Rear Differential Carrier Assembly
Filler Plug
49 (500, 39)
Rear Suspension Member Brace
◆ Gasket
50 (510, 37)
◆ 142 (1,450, 105)
◆ Gasket
56 (570, 41)
Lower Mount Stopper
Drain Plug
49 (500, 39)
Rear Suspension Member Brace
2JZ–GE Engine:
◆ 95 (970, 70)
50 (510, 37)
Washer
68 (695, 50)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
P
F13671


Shock Absorber
110 (1,120, 81)
Rear Suspension Member
Rear Upper Stopper
Differential Support
Member Lower Stopper
127 (1,300, 94)
Except 4AT:
◆ LH Mounting Cushion
◆ RH Mounting
Cushion
127 (1,300, 94)
Brake
Caliper
Parking Brake Cable
7.8 (80, 69 in.·lbf)
104 (1,065, 77)
5.0 (51, 44 in.·lbf)
ABS Speed
Sensor
8.0 (82, 71 in.·lbf)
Rear Suspension Member
Rear Lower Stopper
Rear Suspension
Member Stopper
19 (195, 14)
127 (1,300, 94)
Rear Suspension
Member Lower Brace
19 (195, 14)
Rear Fender
Apron Seal
19 (195, 14)
T
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
F07707

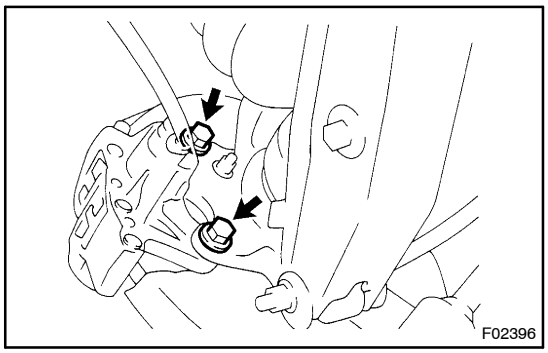
SA288-01

REPLACEMENT

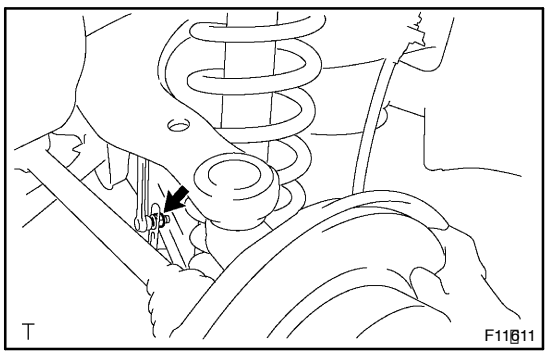
1. REMOVE REAR WHEELS
2. REMOVE REAR DIFFERENTIAL CARRIER ASSEMBLY (See page SA–46)



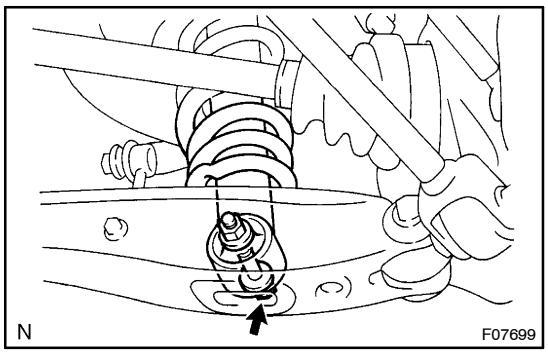
3. DISCONNECT RH AND LH ABS SPEED SENSORS AND WIRE HARNESS
(a) Remove the bolt and disconnect the ABS speed sensor from the rear axle carrier.
(b) Remove the bolt and disconnect the ABS speed sensor wire harness clamp from the toe control link.
(c) Employ the same manner described above to the other side.
4. REMOVE RH AND LH REAR FENDER APRON SEALS



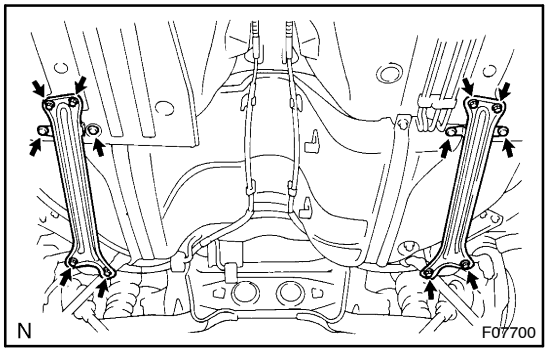
5. REMOVE RH AND LH BRAKE CALIPERS
(a) Remove the 2 bolts and brake caliper from the axle carrier.
(b) Support the brake caliper securely.
(c) Employ the same manner described above to the other side.



6. DISCONNECT HEIGHT CONTROL SENSOR LINK
Remove the nut and disconnect the height control sensor link from lower arm bracket.

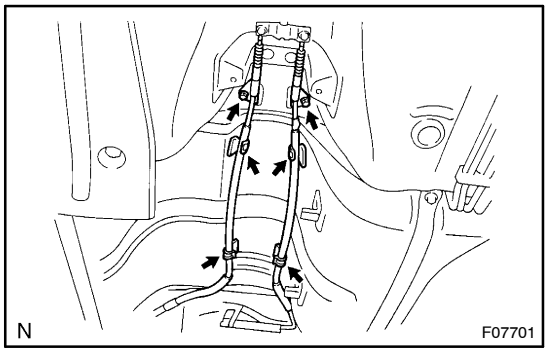


7. DISCONNECT RH AND LH SHOCK ABSORBERS FROM NO. 2 LOWER SUSPENSION ARMS
(a) Remove the nut and bolt, and disconnect the shock absorber.
(b) Employ the same manner described above to the other side.



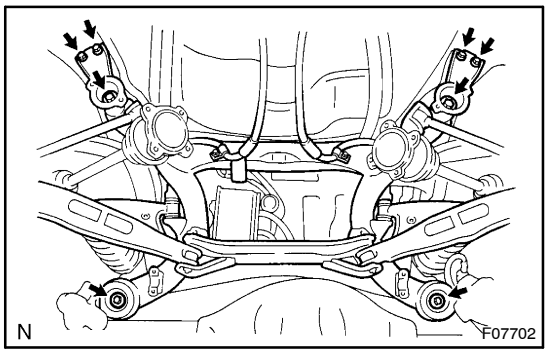
8. REMOVE RH AND LH REAR SUSPENSION MEMBER LOWER BRACES

Remove the 8 bolts, 4 clips and 2 lower braces.



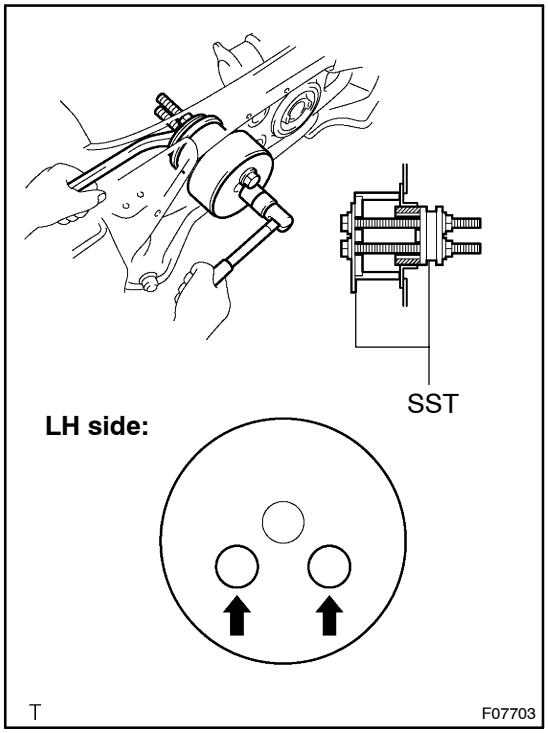
9. DISCONNECT PARKING BRAKE CABLE

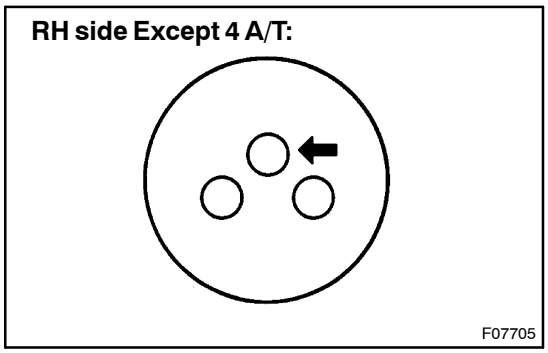
(a) Disconnect the parking brake cable from the 4 clamps.
(b) Remove the 2 bolts and disconnect the parking brake cable.



10. REMOVE REAR SUSPENSION MEMBER

(a) Support the rear suspension member with a jack.
(b) Remove the 8 bolts, 2 rear suspension member stoppers and 2 differential support member lower stoppers.
(c) Lower the rear suspension member.
(d) Remove the rear suspension member rear upper and lower stoppers from the rear suspension member.





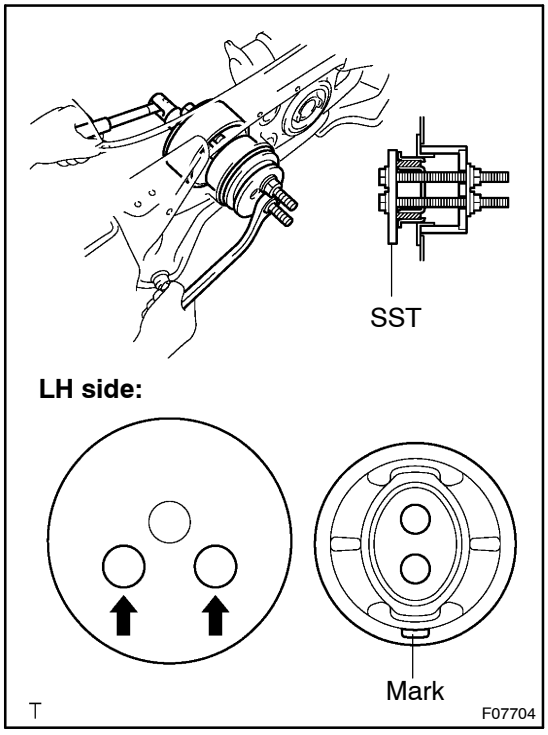
11. REMOVE DIFFERENTIAL MOUNTING CUSHION

Using SST, remove the differential mounting cushion.

SST 09316–12010, 09570–24010

NOTICE:

- **When driving out the mounting cushion, be careful not to touch the suspension member with the SST.**
- **Align the SST straight so that the bolt of the SST is parallel with the center line of the mounting cushion.**
- **When installing the bolts to the RH and LH differential mounting cushions, make sure that the bolts are passed through the correct holes in the SST, as shown in the illustration.**



12. INSTALL DIFFERENTIAL MOUNTING CUSHION

Using SST, install the cushion so that the marks are positioned, as shown in the illustration.

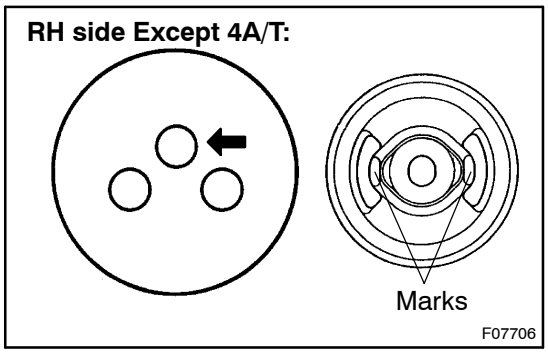
SST 09570–24010

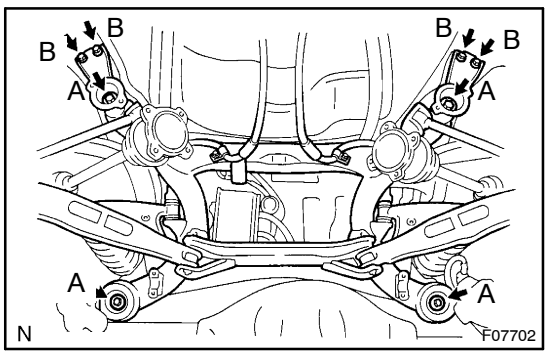
NOTICE:

- **Be careful not to confuse RH and LH sides, and its top and bottom.**
- **Set the SST after temporarily installing the differential mounting cushion into the member so as not to install at an angle.**
- **To confirm that the differential mounting cushion is aligned straight in relation to the member, check that the SST is fully in contact with all of the cushion.**

13. INSTALL REAR SUSPENSION MEMBER

(a) Install the rear suspension member rear upper and lower stoppers to the rear suspension member.





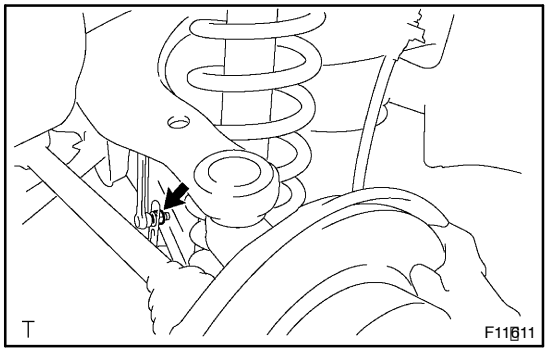
(b) Install the 2 differential support member lower stopper, rear suspension member stopper with the 8 bolts.
Torque:
A bolt: 127 N·m (1,300 kgf·cm, 94 ft·lbf)
B bolt: 19 N·m (195 kgf·cm, 14 ft·lbf)

(c) Lower the jack.

14. CONNECT PARKING BRAKE CABLE
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

15. INSTALL RH AND LH REAR SUSPENSION MEMBER LOWER BRACES
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

16. CONNECT RH AND LH SHOCK ABSORBERS TO NO. 2 LOWER SUSPENSION ARMS
Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)



17. CONNECT HEIGHT CONTROL SENSOR LINK

(a) Set the lower arm to the vehicle height.

(b) Install the sensor link to the lower arm bracket with a nut.

Torque: 5.4 N·m (55 kgf·cm, 48 ft·lbf)

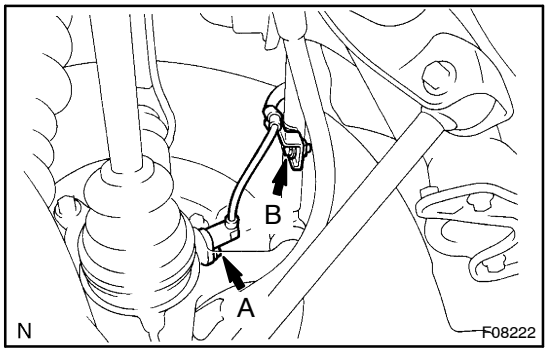
NOTICE:

- **Be careful not to brake the link fixing pin until the above operation is completed.**
- **The pin can be broken after completion of the above, however, the sensor arm rotation angle shall not exceed the range of ± 70° from the standard vehicle height.**

18. INSTALL RH AND LH BRAKE CALIPERS TO STEERING KNUCKLES

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

19. INSTALL RH AND LH REAR FENDER APRON SEALS



20. CONNECT RH AND LH ABS SPEED SENSORS AND WIRE HARNESS

Torque:

Bolt A: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

Bolt B: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

21. INSTALL REAR DIFFERENTIAL CARRIER ASSEMBLY (See page SA–67)

22. INSTALL REAR WHEELS

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

23. DEPRESS BRAKE PEDAL SEVERAL TIMES

24. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

25. CHECK ABS SPEED SENSOR SIGNAL

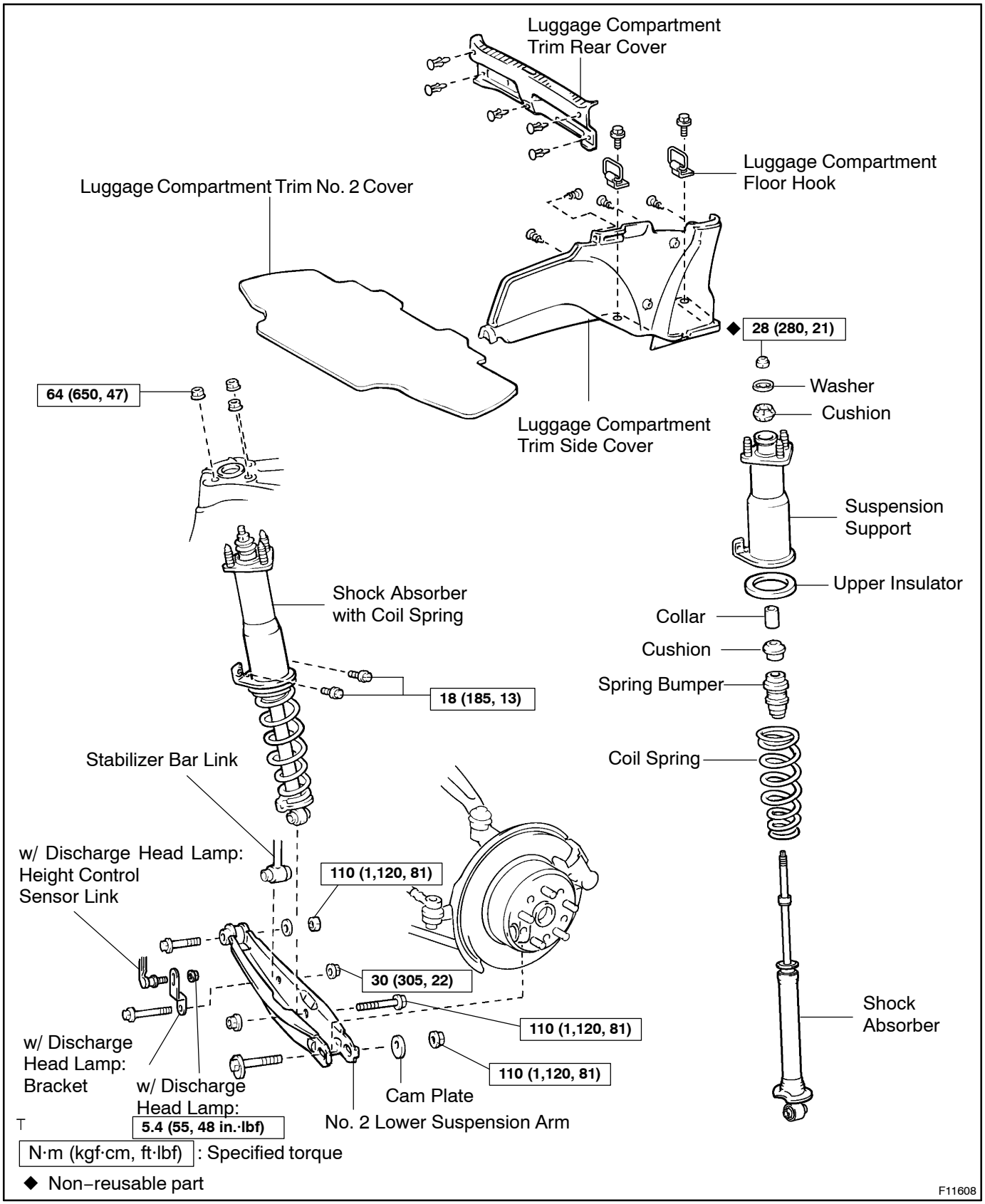
w/VSC (See page DI–318)

w/o VSC (See page DI–251)

REAR SHOCK ABSORBER (Sedan)

COMPONENTS

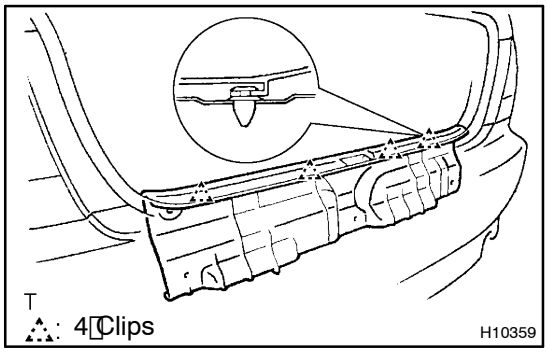
SA0SI–08



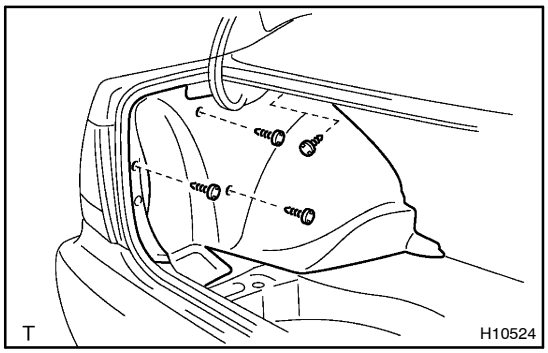
SA1JJ–04

REMOVAL

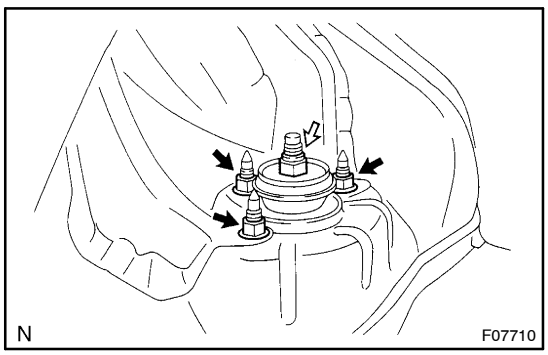
1. REMOVE REAR WHEEL
2. REMOVE LUGGAGE COMPARTMENT TRIM NO. 2 COVER



3. REMOVE LUGGAGE COMPARTMENT TRIM REAR COVER
4. REMOVE LUGGAGE COMPARTMENT FLOOR HOOKS



5. REMOVE LUGGAGE COMPARTMENT TRIM SIDE COVER
6. REMOVE NO. 2 LOWER SUSPENSION ARM (See page SA–97)



7. **REMOVE REAR SHOCK ABSORBER WITH COIL SPRING**

(a) Loosen the nut in the center of the suspension support.

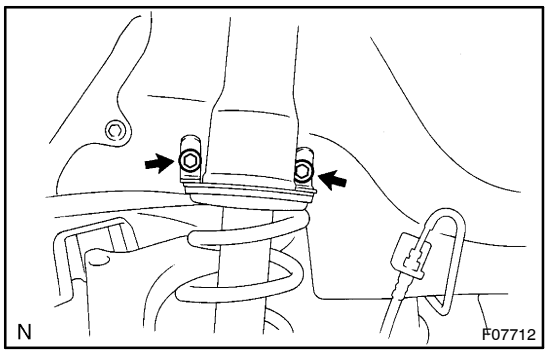
NOTICE:

Do not remove it.

HINT:

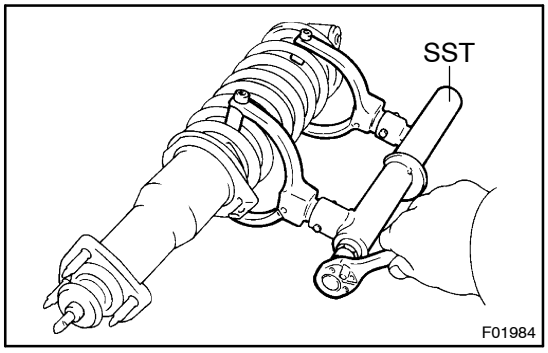
If not disassembling the shock absorber, it is not necessary to loosen the nut.

(b) Remove the 3 nuts from the body.



(c) Remove the 2 bolts and shock absorber with the coil spring from the body.

SA0SK–05



DISASSEMBLY

REMOVE SUSPENSION SUPPORT AND COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

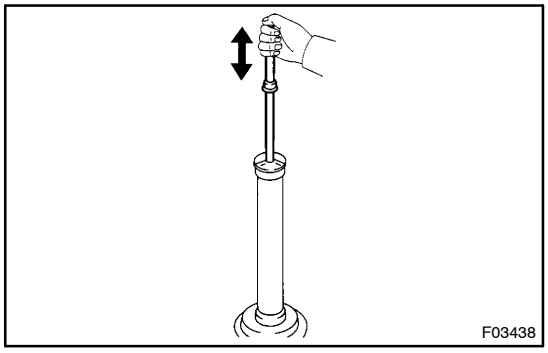
NOTICE:

Do not use an impact wrench. It will damage the SST.

(b) Remove the suspension support nut.

(c) Remove the washer, cushion, suspension support, upper insulator, coil spring, collar, cushion and spring bumper.

SA0SL–05



INSPECTION

INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual sound during operation.

If there is any abnormality, replace the shock absorber with a new one.

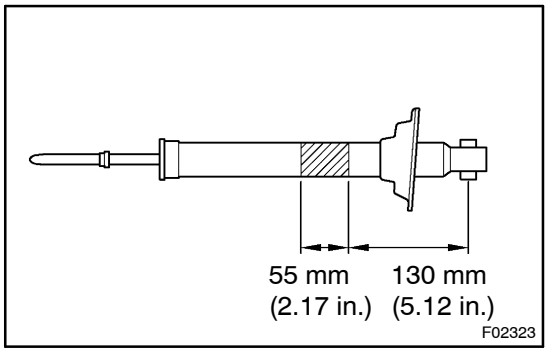
NOTICE:

When discarding the shock absorber, see DISPOSAL on page SA–81.

SA0SM–05

DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD



2. DRILL HOLE TO DISCHARGE GAS FROM CYLINDER

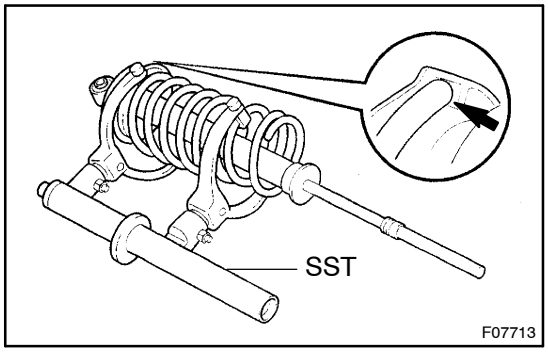
Using a drill, make a hole in the cylinder as shown to discharge the gas inside.

CAUTION:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless and non–poisonous.**

SA0SN–06

REASSEMBLY



INSTALL SUSPENSION SUPPORT AND COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

NOTICE:

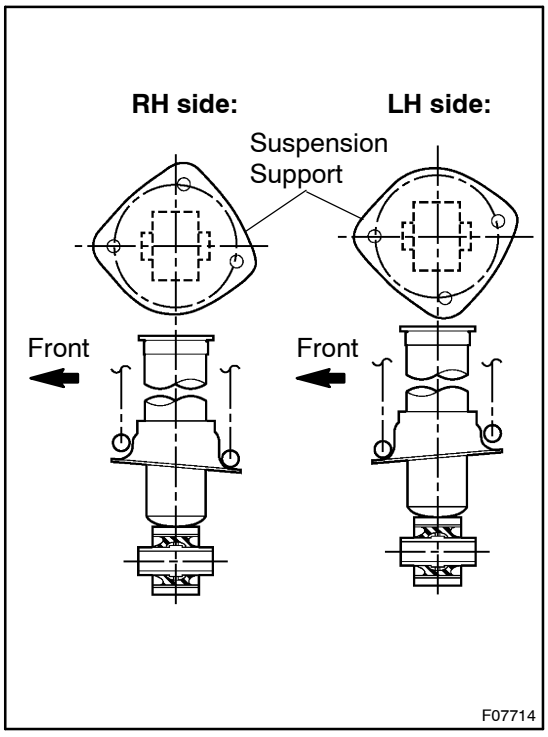
Do not use an impact wrench. It will damage the SST.

(b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the gap of the spring seat of the shock absorber.

(c) Install the spring bumper, cushion, collar, upper insulator, suspension support, cushion and washer to the shock absorber and temporarily tighten a new nut.



(d) Rotate the suspension support, as shown in the illustration.

(e) Remove the SST.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

HINT:

After removing the SST, recheck the direction of the suspension support.

SA0SO–06

INSTALLATION

1. INSTALL REAR SHOCK ABSORBER WITH COIL SPRING

(a) Install the suspension support to the body with the 3 nuts.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

(b) Connect the shock absorber with coil spring to the body with the 2 bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(c) Torque the nut in the center of the suspension support.

Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)

HINT:

If the shock absorber has not been disassembled, it is not necessary to torque the nut.

2. INSTALL NO. 2 LOWER SUSPENSION ARM (See page SA–99)

3. INSTALL LUGGAGE COMPARTMENT TRIM SIDE COVER

4. INSTALL LUGGAGE COMPARTMENT FLOOR HOOKS

5. INSTALL LUGGAGE COMPARTMENT TRIM REAR COVER

6. INSTALL LUGGAGE COMPARTMENT TRIM NO. 2 COVER

7. INSTALL REAR WHEEL

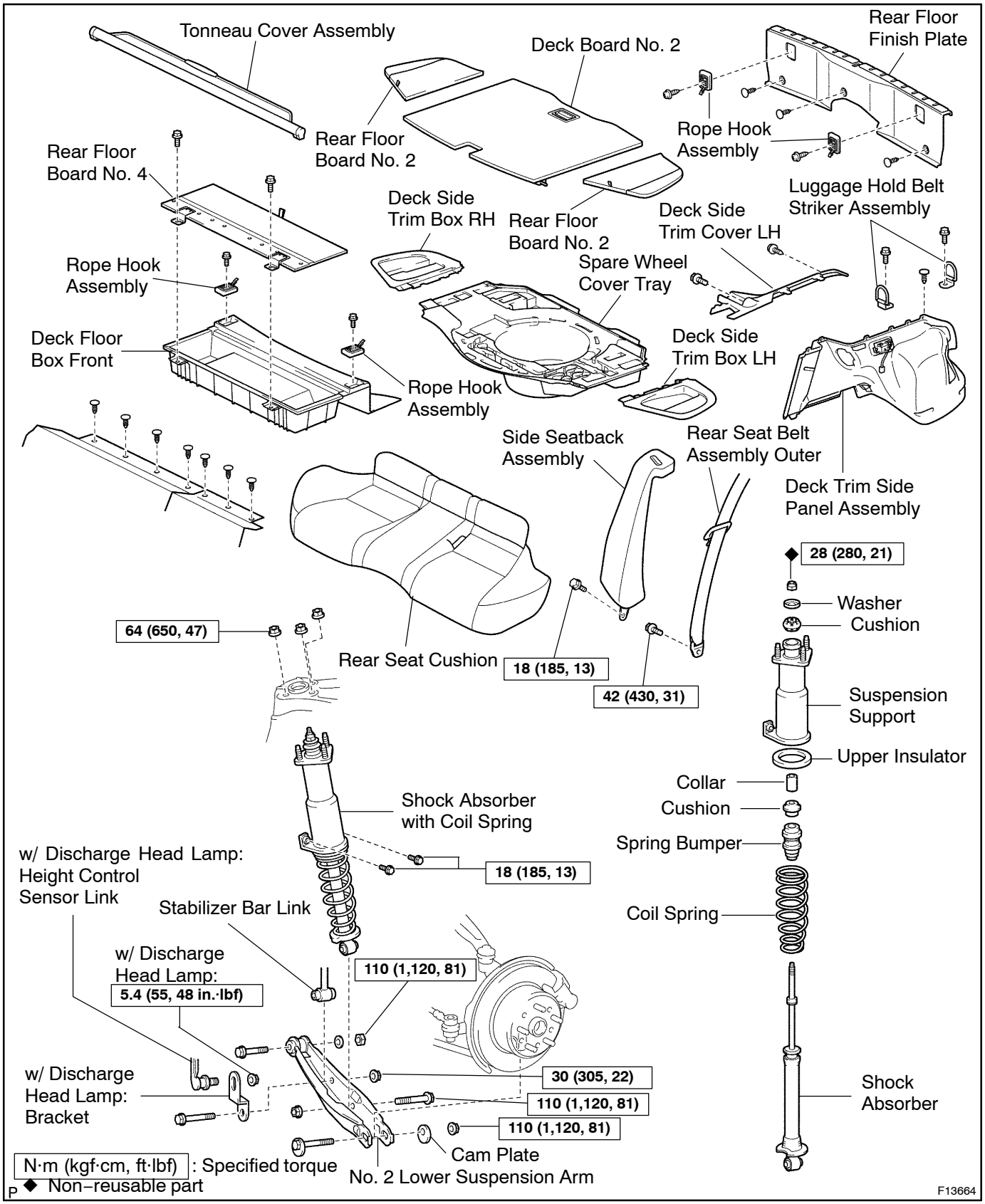
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

8. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

REAR SHOCK ABSORBER (Wagon)

COMPONENTS

SA0SI–09



SA28C–01

REMOVAL

1. REMOVE REAR WHEEL

2. REMOVE REAR SEAT CUSHION (See page BO–112)

3. REMOVE TONNEAU COVER ASSEMBLY

4. REMOVE REAR SEAT BELT ASSEMBLY OUTER

5. REMOVE SIDE SEATBACK ASSEMBLY (See page BO–112)

6. REMOVE REAR FLOOR BOARD NO.4

(a) Remove the seat back board carpets.

(b) Remove the 2 bolts and rear floor board.

7. REMOVE DECK FLOOR BOX FRONT

(a) Remove the 2 bolts and 2 rope hook assemblies.

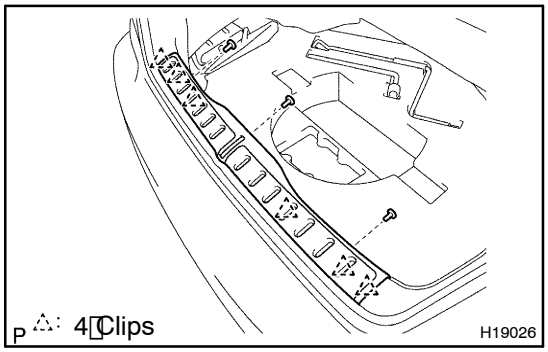
(b) Remove the deck floor box front.

8. REMOVE DECK BOARD NO.2

Remove the rear floor board No.2, No.3 and deck board No.2.

9. REMOVE SPARE WHEEL COVER TRAY

Remove the deck side trim box LH, RH and the spare wheel cover tray.



10. REMOVE REAR FLOOR FINISH PLATE

(a) Remove the 2 bolts and 2 rope hook assemblies.

(b) Remove the 3 clips.

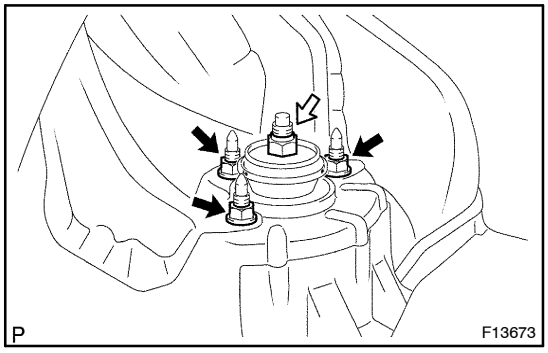
(c) Using a screwdriver, remove the rear floor finish plate.

HINT:

Tape the screwdriver tip before use.

11. REMOVE DECK TRIM SIDE PANEL ASSEMBLY (See page BO–80)

12. REMOVE NO.2 LOWER SUSPENSION ARM (See page SA–97)



13. REMOVE REAR SHOCK ABSORBER WITH COIL SPRING

(a) Loosen the nut in the center of the suspension support.

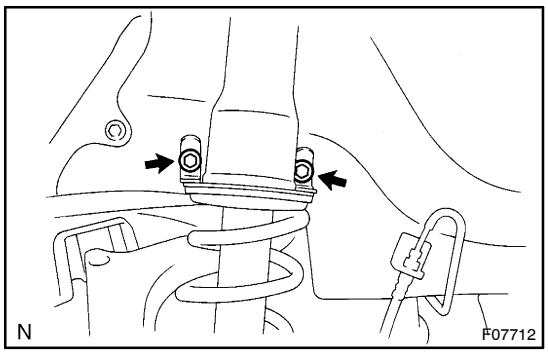
NOTICE:

Do not remove it.

HINT:

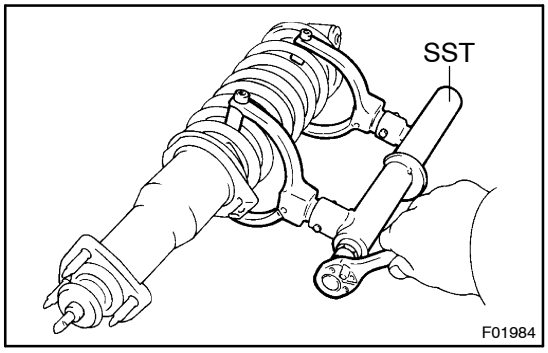
If not disassembling the shock absorber, it is not necessary to loosen the nut.

(b) Remove the 3 nuts from the body.



(c) Remove the 2 bolts and shock absorber with the coil spring from the body.

SA0SK–06



DISASSEMBLY

REMOVE SUSPENSION SUPPORT AND COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

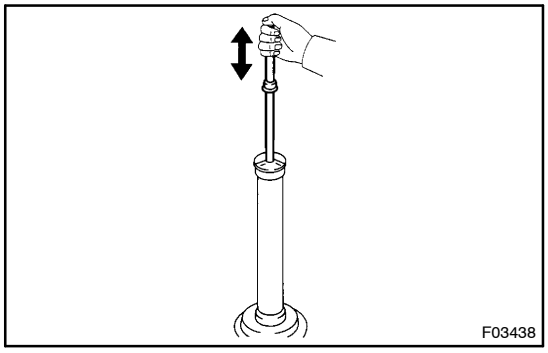
NOTICE:

Do not use an impact wrench. It will damage the SST.

(b) Remove the suspension support nut.

(c) Remove the washer, cushion, suspension support, upper insulator, coil spring, collar, cushion and spring bumper.

SA0SL–06



INSPECTION

INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual sound during operation.

If there is any abnormality, replace the shock absorber with a new one.

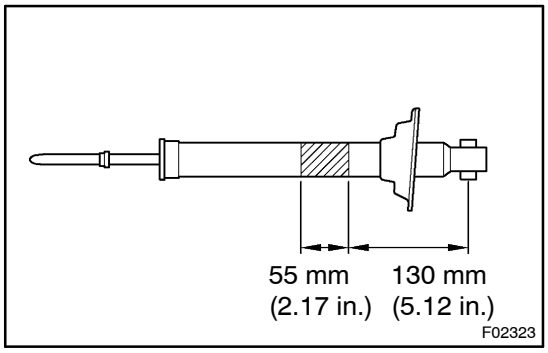
NOTICE:

When discarding the shock absorber, see DISPOSAL on page SA–88.

SA0SM–06

DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD



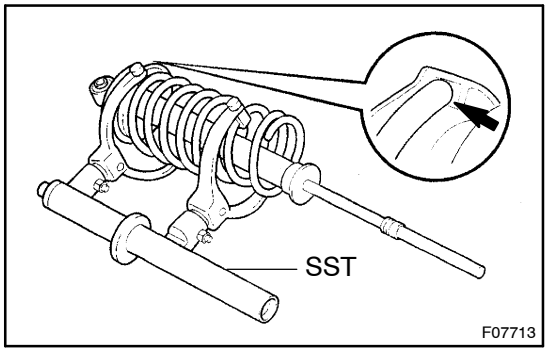
2. DRILL HOLE TO DISCHARGE GAS FROM CYLINDER

Using a drill, make a hole in the cylinder as shown to discharge the gas inside.

CAUTION:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless and non–poisonous.**

SA0SN–07



REASSEMBLY

INSTALL SUSPENSION SUPPORT AND COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

NOTICE:

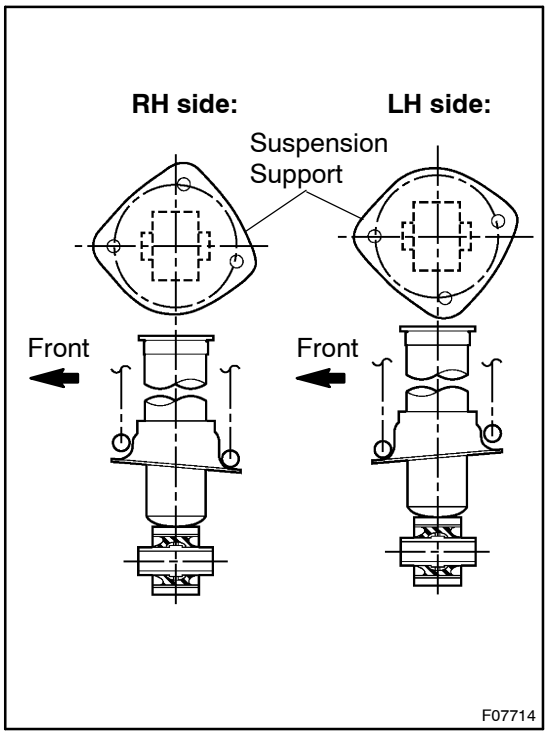
Do not use an impact wrench. It will damage the SST.

(b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the gap of the spring seat of the shock absorber.

(c) Install the spring bumper, cushion, collar, upper insulator, suspension support, cushion and washer to the shock absorber and temporarily tighten a new nut.



(d) Rotate the suspension support, as shown in the illustration.

(e) Remove the SST.
SST 09727–30021 (09727–00010, 09727–00021, 09727–00031)

HINT:

After removing the SST, recheck the direction of the suspension support.

SA28D–01

INSTALLATION

1. INSTALL REAR SHOCK ABSORBER WITH COIL SPRING

(a) Install the suspension support to the body with the 3 nuts.
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

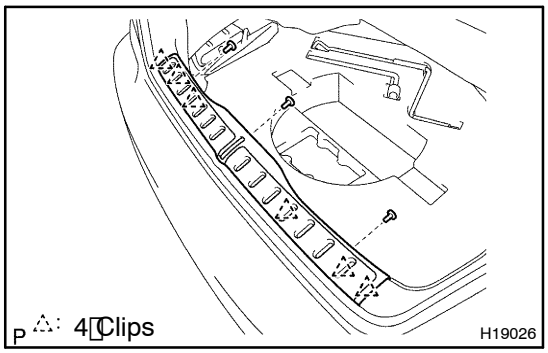
(b) Connect the shock absorber with coil spring to the body with the 2 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(c) Torque the nut in the center of the suspension support.
Torque: 28 N·m (280 kgf·cm, 21 ft·lbf)

HINT:
If the shock absorber has not been disassembled, it is not necessary to torque the nut.

2. INSTALL NO. 2 LOWER SUSPENSION ARM
(See page SA–99)

3. INSTALL DECK TRIM SIDE PANEL ASSEMBLY
(See page BO–85)



4. INSTALL REAR FLOOR FINISH PLATE

(a) Install 3 clips and rear floor finish plate.

(b) Install the 2 bolts and 2 rope hook assemblies.

5. INSTALL SPARE WHEEL COVER TRAY

Install the deck side trim board LH, RH and the spare wheel cover tray.

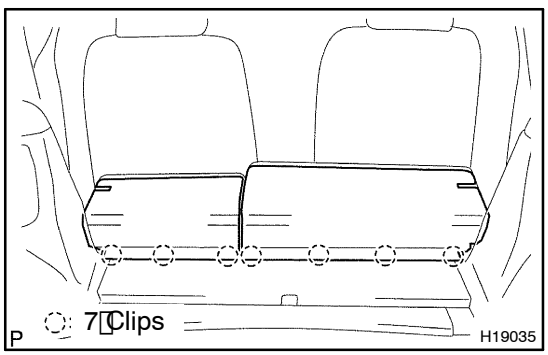
6. INSTALL DECK BOARD NO. 2

Install the rear floor board No. 2, No. 3 and deck board No. 2.

7. INSTALL DECK FLOOR BOX FRONT

(a) Install the deck floor box front.

(b) Install the 2 bolts and 2 rope hook assemblies.



8. INSTALL REAR FLOOR BOARD NO. 4

Install the rear floor board No. 4 with the 2 bolts.

9. INSTALL SIDE SEATBACK ASSEMBLY
(See page BO–117)

10. INSTALL REAR SEAT BELT ASSEMBLY OUTER

11. INSTALL TONNEAU COVER ASSEMBLY

12. INSTALL REAR SEAT CUSHION (See page BO–117)

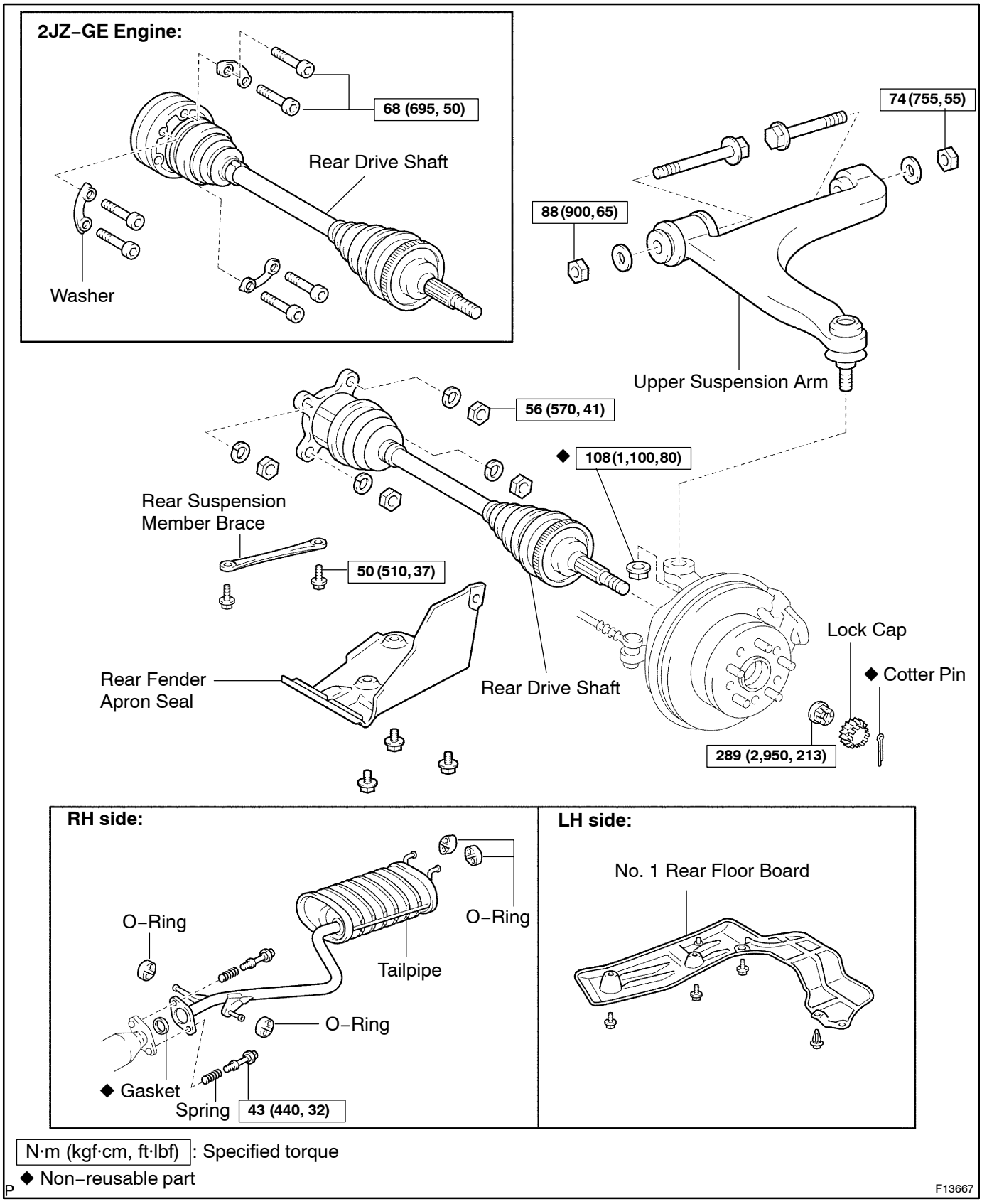
13. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

14. CHECK REAR WHEEL ALIGNMENT
(See page SA–8)

REAR UPPER SUSPENSION ARM

COMPONENTS

SA0SP–07



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

◆ Non–reusable part

P

F13667

SA0SQ–07

REMOVAL

1. REMOVE REAR WHEEL

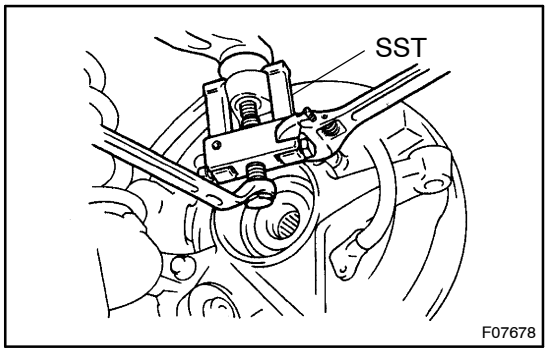
2. REMOVE DRIVE SHAFT

2JZ–GE Engine: (See page SA–26)

1G–FE Engine:
(See Pub. No. RM684E on page SA–56)

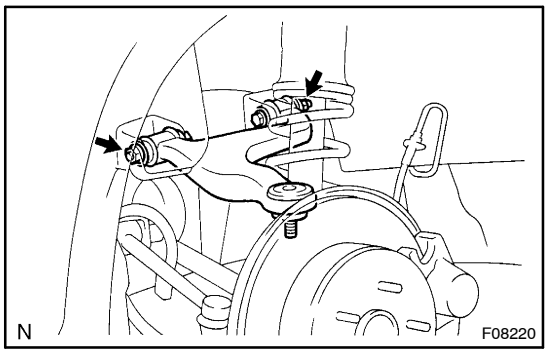
3. REMOVE UPPER SUSPENSION ARM

(a) Remove the nut.



(b) Using SST, disconnect the upper suspension arm from the axle carrier.
SST 09628–62011

(c) Support the axle carrier securely.

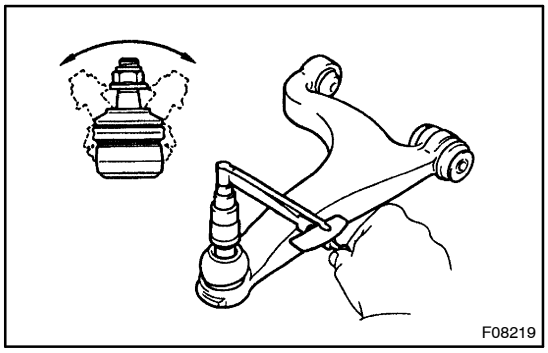


(d) Remove the 2 nuts, washers, bolts and upper suspension arm from the body.

SA0SR–07

INSPECTION

1. INSPECT UPPER SUSPENSION ARM BALL JOINT BOOT FOR DAMAGE



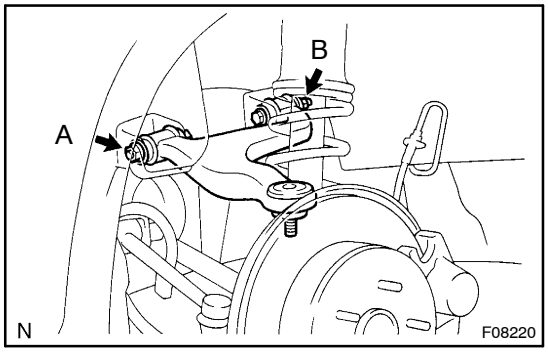
2. INSPECT UPPER SUSPENSION ARM BALL JOINT FOR ROTATION CONDITION

(a) As shown in the illustration, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using torque wrench, turn the nut continuously 1 turn per 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
1.0 – 2.9 N·m (10 – 30 kgf·cm, 9 – 26 in.·lbf)

SA1JK–04



INSTALLATION

1. INSTALL UPPER SUSPENSION ARM

(a) Install the upper suspension arm to the body with the 2 bolts, washers and 2 nuts.

Torque:
Nut A: 88 N·m (900 kgf·cm, 65 ft·lbf)
Nut B: 74 N·m (755 kgf·cm, 55 ft·lbf)

HINT:

After stabilizing the suspension arm, torque the nut.

(b) Connect the upper suspension arm to the axle carrier with a new nut.

Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)

2. REMOVE DRIVE SHAFT

2JZ–GE Engine: (See page SA–33)
1G–FE Engine:
(See Pub. No. RM684E on page SA–62)

3. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

4. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

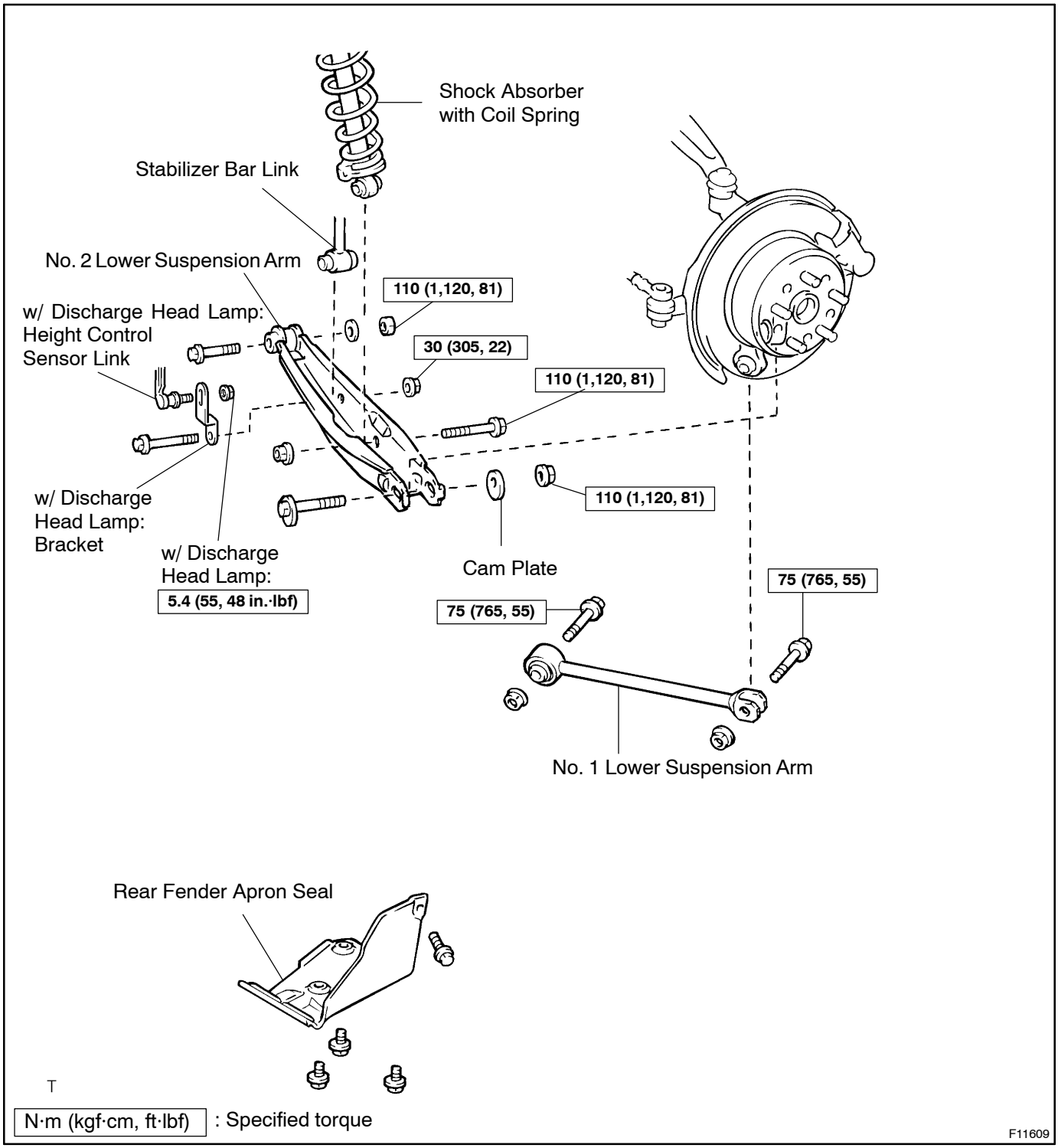
5. CHECK ABS SPEED SENSOR SIGNAL

w/ VSC (See page DI–318)
w/o VSC (See page DI–251)

REAR LOWER SUSPENSION ARM

COMPONENTS

SA0ST–07

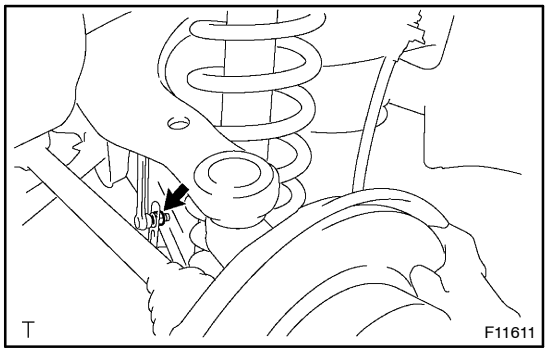


SA20N–02

REMOVAL

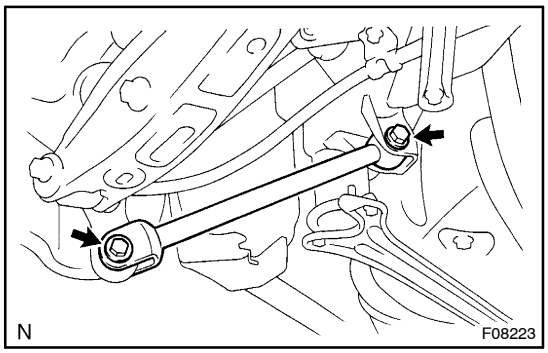
1. REMOVE REAR WHEEL

2. REMOVE REAR FENDER APRON SEAL



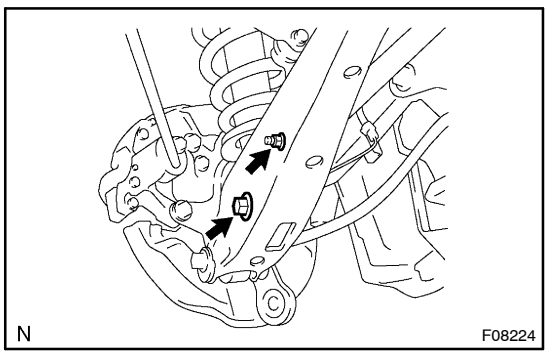
3. w/ DISCHARG HEAD LAMP
DISCONNECT HEIGHT CONTROL SENSOR LINK

Remove the nut and disconnect the height control sensor link from lower arm bracket.



4. REMOVE NO. 1 LOWER SUSPENSION ARM

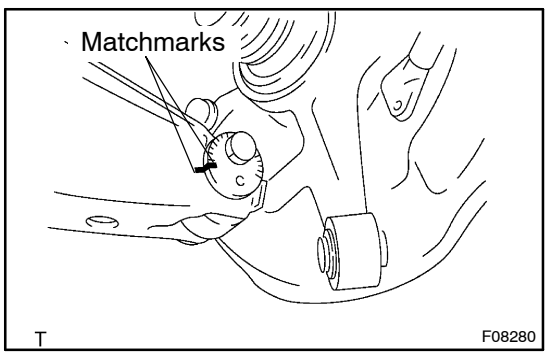
Remove the 2 bolts, nuts, and No. 1 lower suspension arm.



5. REMOVE NO. 2 LOWER SUSPENSION ARM

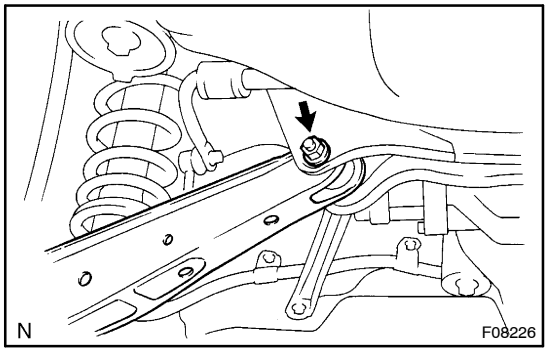
(a) Remove the nut, bolt and bracket, and disconnect the stabilizer bar link from the No. 2 lower suspension arm.

(b) Remove the bolt and nut, and disconnect the shock absorber from the No. 2 lower suspension arm.



(c) Place matchmarks on the cam bolt and No. 2 lower suspension arm.

(d) Remove the nut, cam plate and cam bolt, and disconnect the axle carrier.



(e) Remove the nut, washer, bolt and No. 2 lower suspension arm from the rear suspension member.

SA20O–02

INSTALLATION

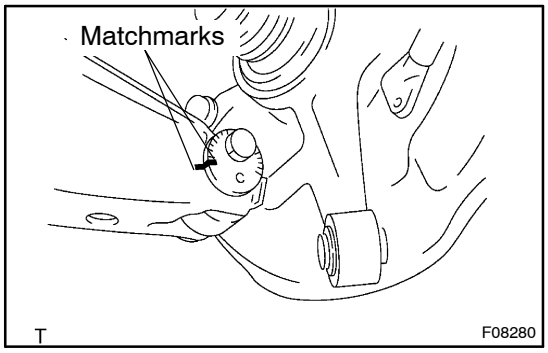
1. INSTALL NO. 2 LOWER SUSPENSION ARM

(a) Install the No. 2 lower suspension arm to the rear suspension member with bolt, washer and nut.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

After stabilizing the suspension, torque the nut.



(b) Connect the No. 2 lower suspension arm to the axle carrier with the cam bolt, cam plate and nut.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

After stabilizing the suspension, align the matchmarks on the cam bolt and No. 2 lower suspension arm, and torque the nut.

(c) Connect the shock absorber to the No. 2 lower suspension arm with the bolt and nut.

Torque: 110 N·m (1,120 kgf·cm, 81 ft·lbf)

HINT:

After stabilizing the suspension, torque the nut.

(d) Connect the stabilizer bar link to the No. 2 lower suspension arm with the bracket, bolt and nut.

Torque: 30 N·m (305 kgf·cm, 22 ft·lbf)

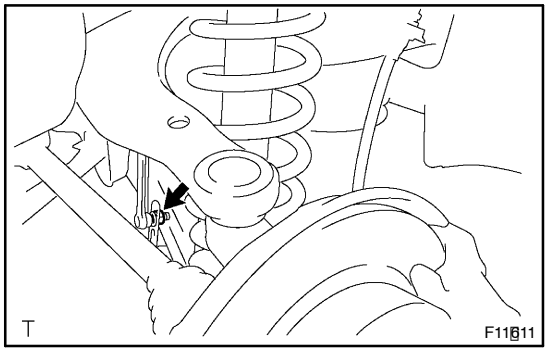
2. INSTALL NO. 1 LOWER SUSPENSION ARM

Install the No. 1 lower suspension arm with the 2 bolts and nuts.

Torque: 75 N·m (765 kgf·cm, 55 ft·lbf)

HINT:

After stabilizing the suspension, torque the bolt.



3. w/ DISCHARG HEAD LAMP
CONNECT HEIGHT CONTROL SENSOR LINK

(a) Set the lower arm to the vehicle height.

(b) Install the sensor link to the lower arm bracket with a nut.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:

- **Be careful not to brake the link fixing pin until the above operation is completed.**
- **The pin can be broken after completion of the above, however, the sensor arm rotation angle shall not exceed the range of ± 70° from the standard vehicle height.**

4. INSTALL REAR FENDER APRON SEAL

5. INSTALL REAR WHEEL

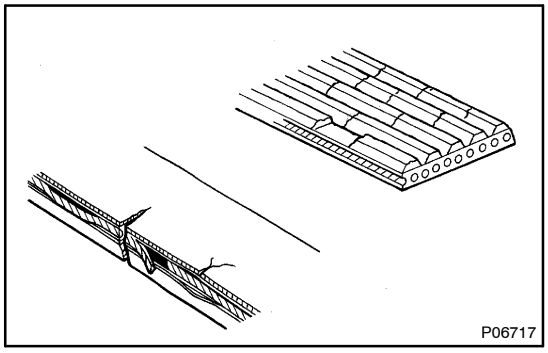
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

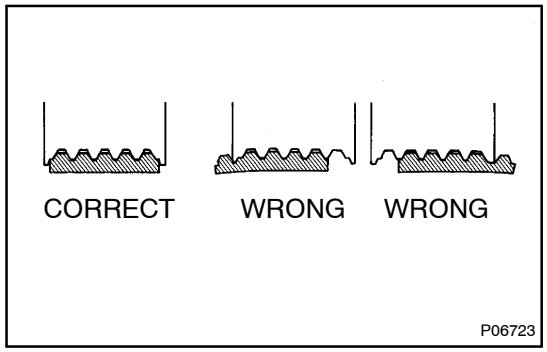
6. CHECK REAR WHEEL ALIGNMENT (See page SA–8)

7. CHECK ABS SPEED SENSOR SIGNAL

w/ VSC (See page DI–318)

w/o VSC (See page DI–251)


P06717



P06723

DRIVE BELT (2JZ–GE)

SR1HJ–01

INSPECTION

INSPECT DRIVE BELT

Visually check the belt for excessive wear, frayed cords etc.
If any defect has been found, replace the drive belt.
HINT:

- Cracks on the rib side of a belt are considered acceptable. If the missing chunks from the ribs are found on the belt, it should be replaced.
- After installing a belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.

POWER STEERING FLUID (2JZ–GE)

SR1HK–01

BLEEDING

1. CHECK FLUID LEVEL (See page SR–3)

2. JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS

3. TURN STEERING WHEEL

With the engine stopped, turn the wheel slowly from lock to lock several times.

4. LOWER VEHICLE

5. START ENGINE

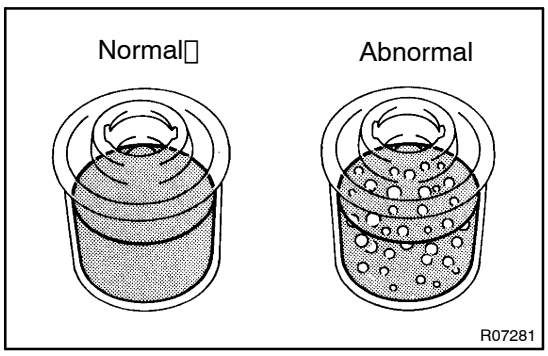
Run the engine at idle for a few minutes.

6. TURN STEERING WHEEL

(a) With the engine idling, turn the wheel to left or right full lock position and keep it there for 2 – 3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2 – 3 seconds.

(b) Repeat (a) several times.

7. STOP ENGINE

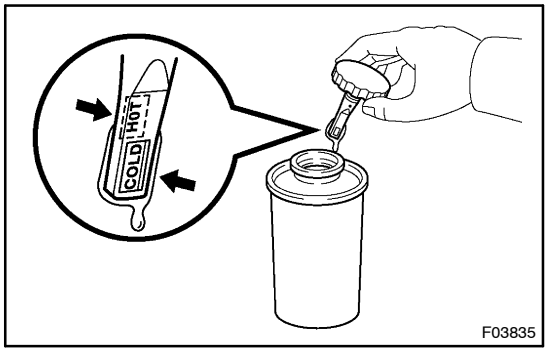


8. CHECK FOR FOAMING OR EMULSIFICATION

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

9. CHECK FLUID LEVEL (See page SR–3)

SR1HL–01



INSPECTION

1. CHECK 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

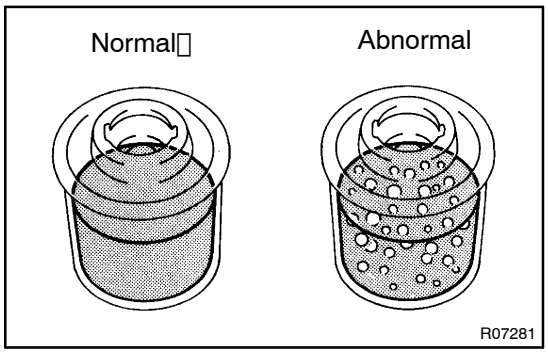
HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir. If the fluid is cold, check that it is within the COLD LEVEL range.

(c) Start the engine and run it at idle.

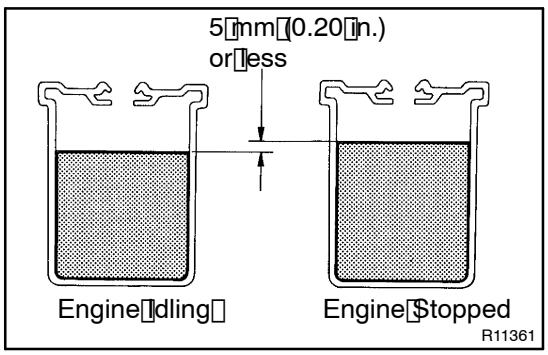
(d) Turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 80°C (176°F)



(e) Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system (See page SR–2).



(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 power steering system (See page SR–2).

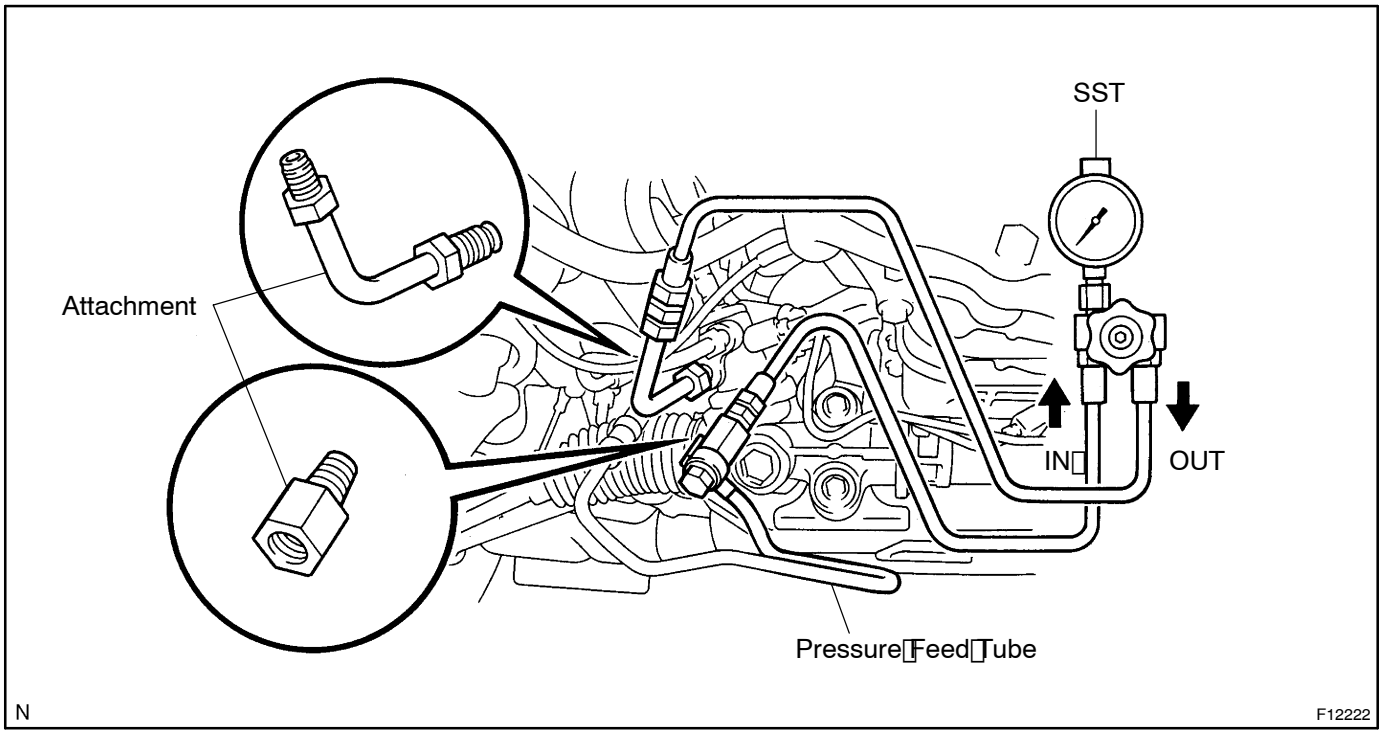
(i) Check the fluid level.

2. CHECK STEERING FLUID PRESSURE

(a) Disconnect the pressure feed tube from the PS gear (See page SR–14).

(b) Connect SST, as shown in the illustration below.
SST 09640–10010 (09641–01010, 09641–01030, 09641–01060)

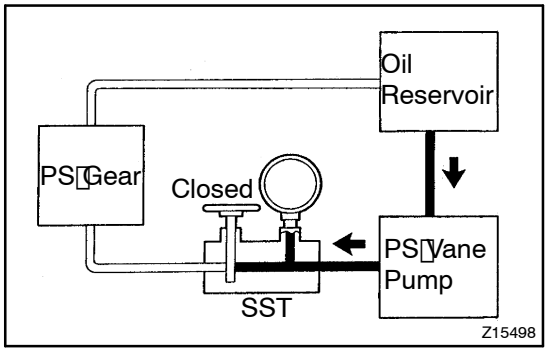
NOTICE:
Check that the valve of the SST is in the open position.



(c) Bleed the power steering system (See page SR–2).

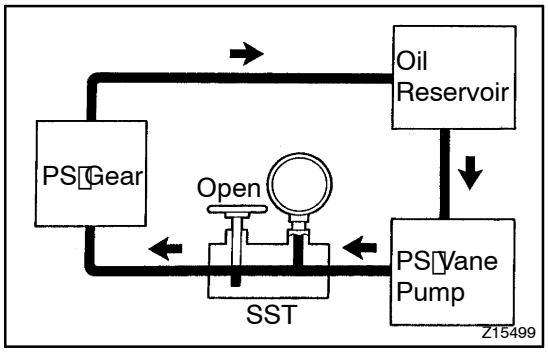
(d) Start the engine and run it at idle.

(e) Turn the steering wheel from lock to lock several times to boost fluid temperature.
Fluid temperature: 80 °C (176 °F)



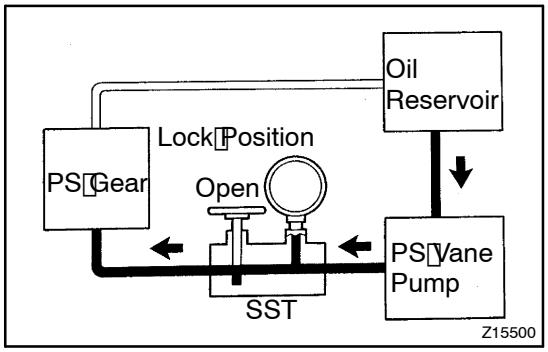
(f) With the engine idling, close the valve of the SST and observe the reading on the SST.
Minimum fluid pressure:
6,900 kPa (70 kgf/cm², 996 psi)

NOTICE:
- **Do not keep the valve closed for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**



(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.
Difference fluid pressure:
490 kPa (5 kgf/cm², 71 psi) or less

NOTICE:
Do not turn the steering wheel.



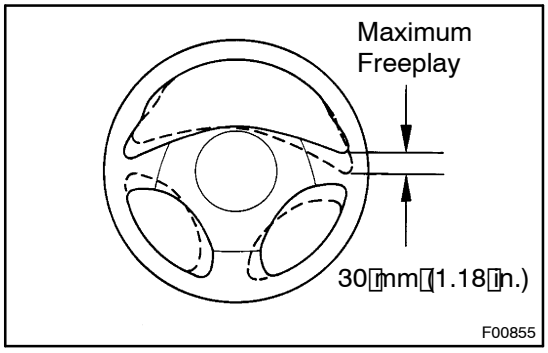
(i) With the engine idling and valve fully opened, turn the steering wheel to full lock position.
Minimum fluid pressure:
6,900 kPa (70 kgf/cm², 996 psi)

NOTICE:
- **Do not maintain lock position for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**

(j) Disconnect the SST.
SST 09640–10010 (09641–01010, 09641–01030, 09641–01060)

(k) Connect the pressure feed tube to the PS gear (See page SR–22).

(l) Bleed the power steering system (See page SR–2).



STEERING WHEEL

SR05R–19

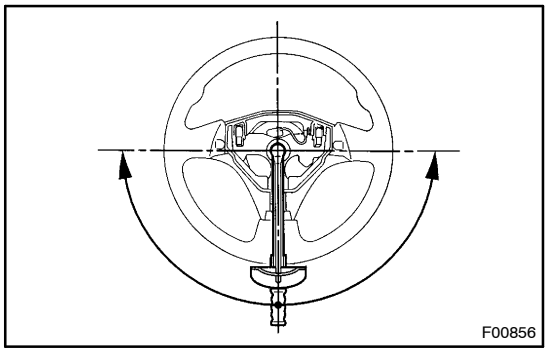
INSPECTION

1. CHECK STEERING WHEEL FREEPLAY

(a) Stop the vehicle and face the tires straight ahead.

(b) Rock the steering wheel gently up and down with a finger lightly, check the steering wheel freeplay.

Maximum freeplay: 30 mm (1.18 in.)



2. CHECK STEERING EFFORT

(a) Center the steering wheel.

(b) Remove the steering wheel pad. (See page SR–8)

(c) Start the engine and run it at idle.

(d) Measure the steering effort in both directions.

Steering effort (Reference):

4.2 – 5.4 N·m (43 – 55 kgf·cm, 37 – 48 in.·lbf)

HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

(e) Torque the steering wheel set nut.

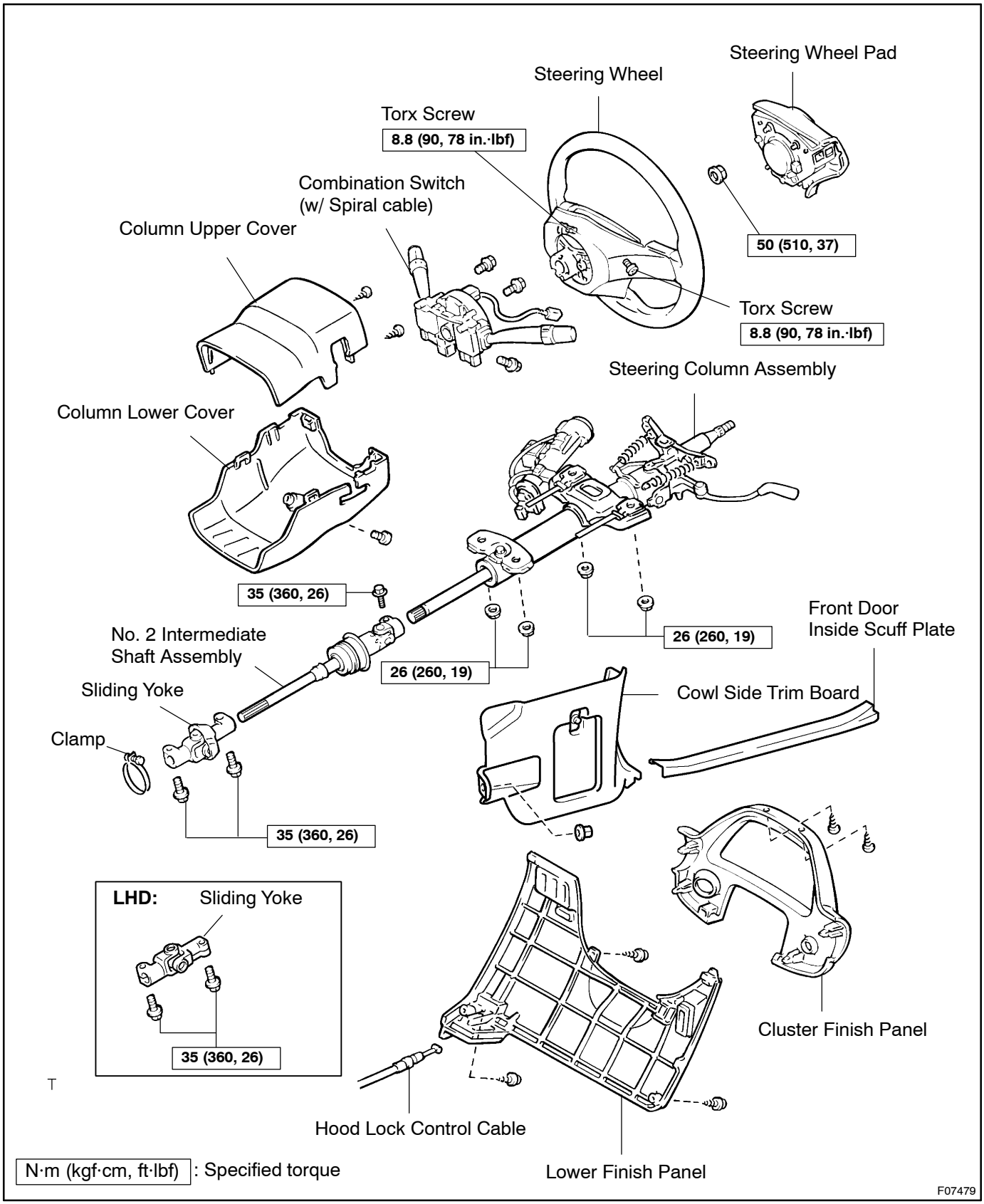
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

(f) Install the steering wheel pad. (See page SR–10)

TILT STEERING COLUMN

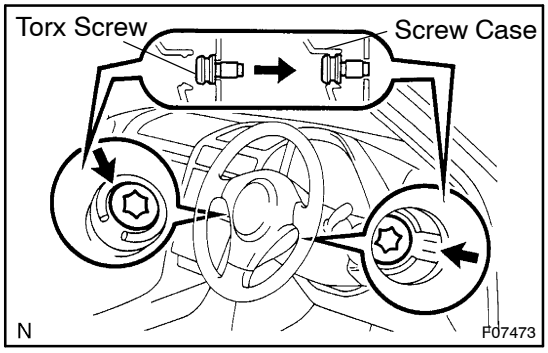
COMPONENTS

SR1HG–01



SR1HH–01

REMOVAL



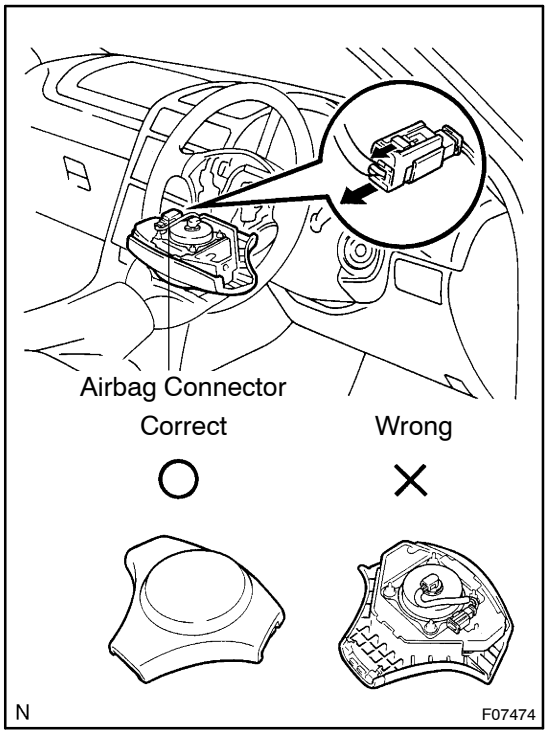
1. REMOVE STEERING WHEEL PAD

NOTICE:

If the airbag connector is disconnected with the ignition switch at ON or ACC, DTCs will be recorded.

(a) Place the front wheels facing straight ahead.

(b) Using a torx socket wrench, loosen the 2 torx screws until the groove along the screw circumference catches on the screw case.



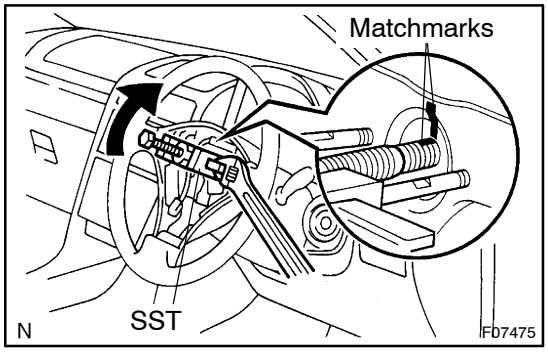
(c) Pull out the wheel pad from the steering wheel and disconnect the airbag connector.

CAUTION:

- **When storing the wheel pad, keep the upper surface of the pad facing upward.**
- **Never disassemble the wheel pad.**

NOTICE:

When removing the wheel pad, take care not to pull the airbag wire harness.



2. REMOVE STEERING WHEEL

(a) Disconnect the connector.

(b) Remove the steering wheel set nut.

(c) Place matchmarks on the steering wheel and main shaft assembly.

(d) Using SST, remove the wheel.

SST 09950–50013 (09951–05010, 09952–05010, 09953–05020, 09954–05021)

3. REMOVE FRONT DOOR INSIDE SCUFF PLATE AND COWL SIDE TRIM BOARD

(a) Remove the front door inside scuff plate.

(b) Remove the clip and cowl side trim board.

4. REMOVE LOWER FINISH PANEL

(a) Remove the 3 screws.

(b) Disconnect the connectors and remove the lower finish panel.

(c) Disconnect the hood lock control cable.

5. REMOVE CLUSTER FINISH PANEL

(a) Remove the 2 screws.

(b) Disconnect the connector and remove the cluster finish panel.

6. REMOVE COLUMN UPPER AND LOWER COVERS

(a) Remove the 3 screws and column lower cover.

(b) Remove the column upper cover.

7. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE

(a) Disconnect the connectors.

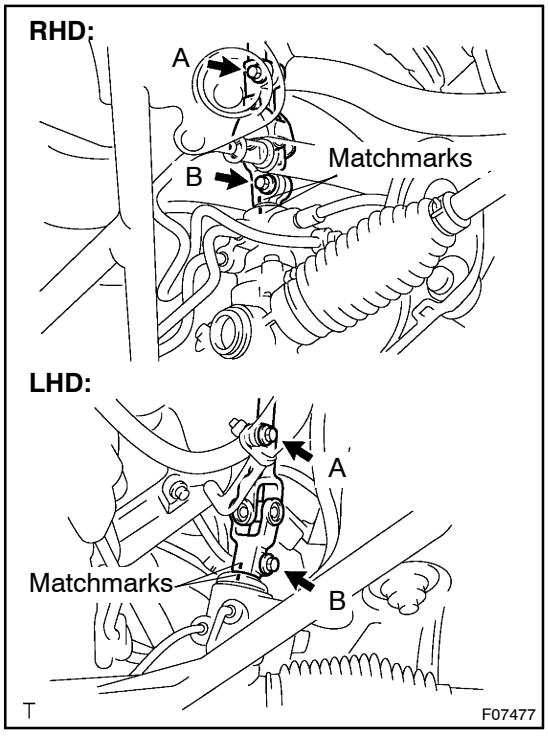
(b) Disconnect the airbag connector.

(c) Remove the 3 screws and combination switch.

8. REMOVE SPIRAL CABLE

NOTICE:

Do not disassemble the cable or apply oil to it.



9. DISCONNECT SLIDING YOKE

(a) Place matchmarks on the sliding yoke and control valve shaft.

(b) Loosen the bolt A and remove the bolt B.

10. REMOVE STEERING COLUMN ASSEMBLY

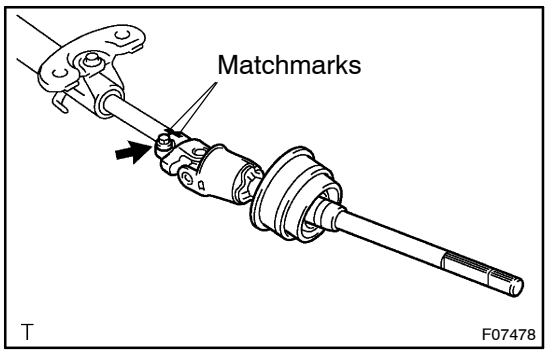
(a) Loosen the clamp.

(b) Disconnect the connectors.

(c) Remove the 4 nuts and steering column assembly.

11. REMOVE SLIDING YOKE

Remove the bolt A and sliding yoke.



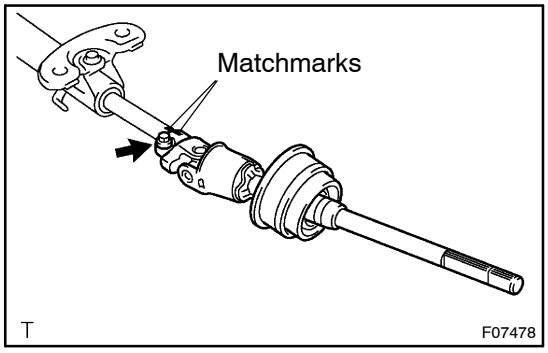
12. REMOVE NO. 2 INTERMEDIATE SHAFT ASSEMBLY

(a) Place matchmarks on the No. 2 intermediate shaft assembly and main shaft.

(b) Remove the bolt and No. 2 intermediate shaft assembly.

SR1HI–01

INSTALLATION



1. INSTALL NO. 2 INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the No. 2 intermediate shaft assembly and main shaft.

(b) Install the No. 2 intermediate shaft assembly with the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

2. INSTALL SLIDING YOKE

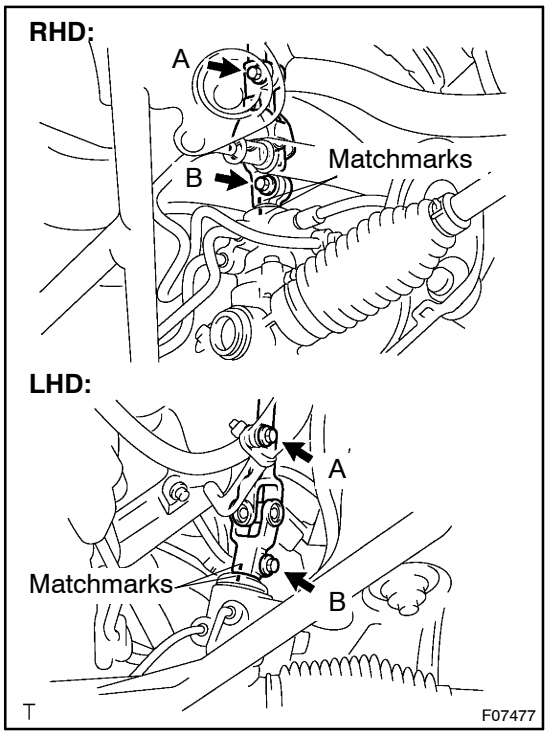
Temporarily install the sliding yoke with the bolt A.

3. INSTALL STEERING COLUMN ASSEMBLY

(a) Install the steering column assembly with the 4 nuts.
Torque: 26 N·m (260 kgf·cm, 19 ft·lbf)

(b) Connect the connectors.

(c) Tighten the clamp.



4. CONNECT SLIDING YOKE

(a) Align the matchmarks on the sliding yoke and control valve shaft.

(b) Install the bolt B.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(c) Torque the bolt A.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

5. INSTALL SPIRAL CABLE

6. INSTALL COMBINATION SWITCH WITH SPIRAL CABLE

(a) Install the combination switch with the 3 screws.

(b) Connect the airbag connector.

(c) Connect the connectors.

7. INSTALL COLUMN UPPER AND LOWER COVERS

(a) Install the column upper cover.

(b) Install the column lower cover with the 3 screws.

8. INSTALL CLUSTER FINISH PANEL

(a) Connect the connector and install the cluster finish panel.

(b) Install the 2 screws.

9. INSTALL LOWER FINISH PANEL

(a) Connect the hood lock control cable to the lower finish panel.

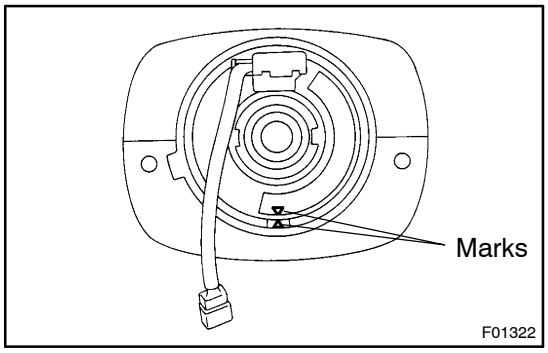
(b) Connect the connectors and install the lower finish panel.

(c) Install the 3 screws.

10. INSTALL FRONT DOOR INSIDE SCUFF PLATE AND COWL SIDE TRIM BOARD

(a) Install the cowl side trim board with the clip.

(b) Install the front door inside scuff plate.



11. CENTER SPIRAL CABLE

(a) Check that the front wheels are facing straight ahead.

(b) Turn the cable counterclockwise by hand until it becomes harder to turn.

(c) Then rotate the cable clockwise about 2.5 turns to align the marks.

HINT:

The cable will rotate about 2.5 turns to either left or right of the center.

12. INSTALL STEERING WHEEL

(a) Align the matchmarks on the steering wheel and main shaft assembly.

(b) Install the steering wheel set nut.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

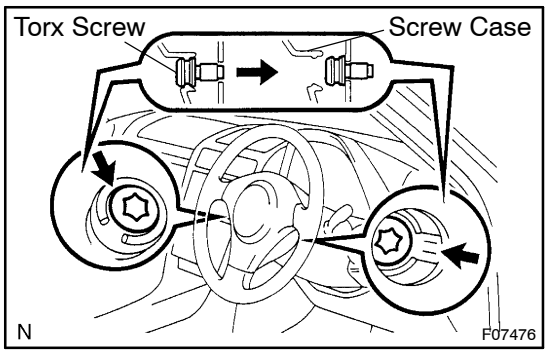
(c) Connect the connector.

13. INSTALL STEERING WHEEL PAD

NOTICE:

- **Never use airbag parts from another vehicle. When replacing parts, replace with new ones.**
- **Make sure the wheel pad is installed with the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects on the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and that they are not pinched between other parts.**

(a) Connect the airbag connector.



(b) Install the steering wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.

(c) Using a torx socket wrench, torque the 2 screws.

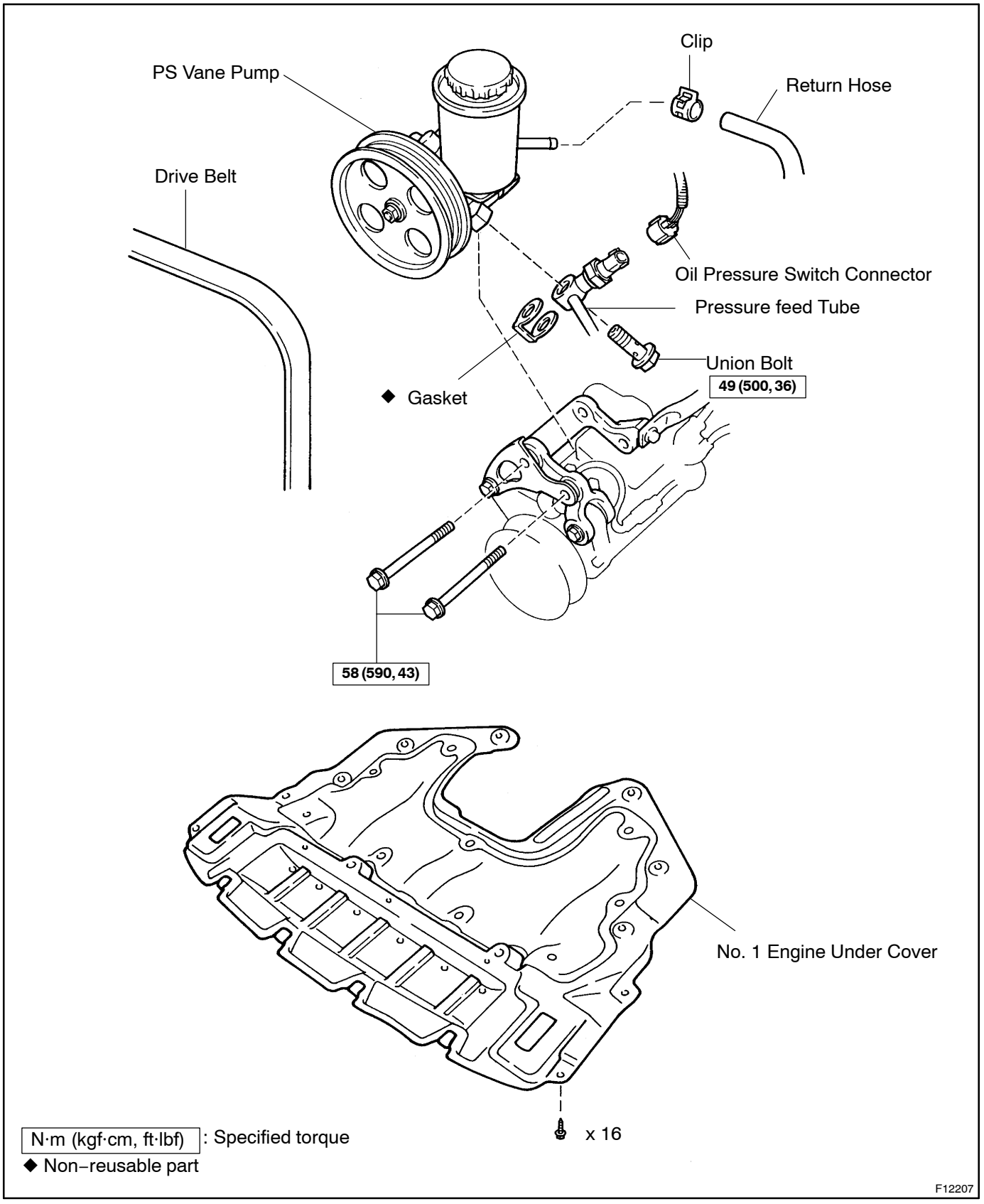
Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

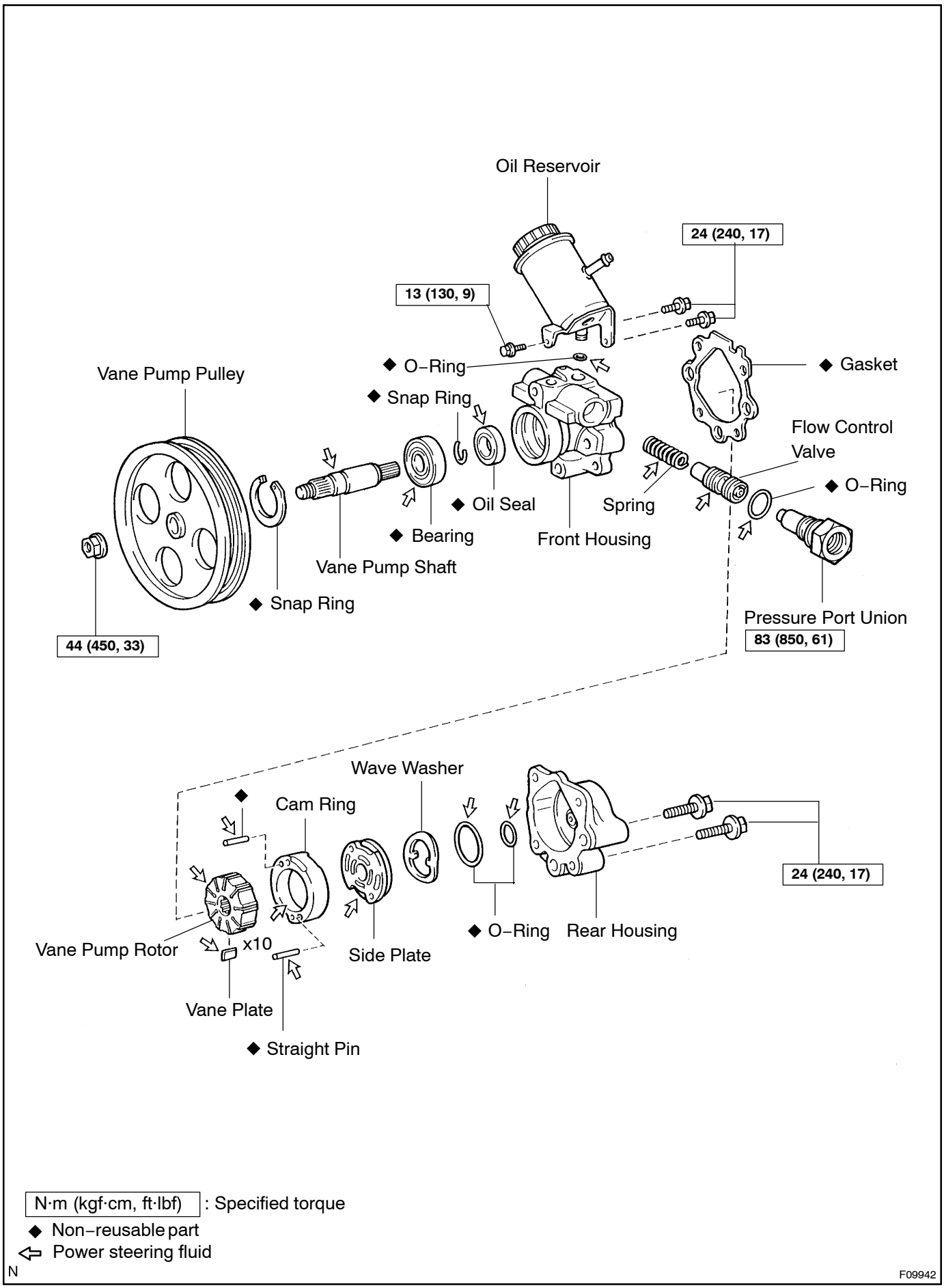
14. CHECK STEERING WHEEL CENTER POINT

POWER STEERING VANE PUMP (2JZ–GE)

SR1H9–01

COMPONENTS



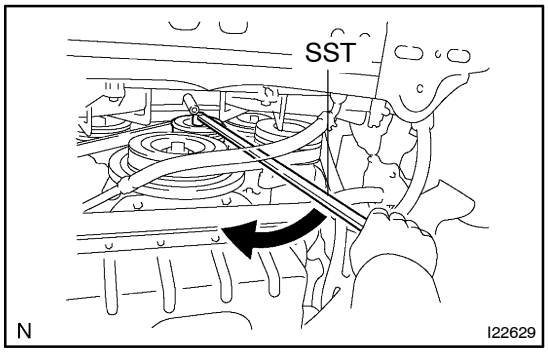

Oil Reservoir
24 (240, 17)
13 (130, 9)
◆ O–Ring
◆ Gasket
Vane Pump Pulley
◆ Snap Ring
Flow Control Valve
◆ O–Ring
◆ Oil Seal
Spring
◆ Bearing
Front Housing
Vane Pump Shaft
◆ Snap Ring
Pressure Port Union
83 (850, 61)
44 (450, 33)
Wave Washer
◆
Cam Ring
24 (240, 17)
◆ O–Ring
Rear Housing
Vane Pump Rotor
x10
Side Plate
Vane Plate
◆ Straight Pin
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
⇦ Power steering fluid
N
F09942

SR1HA–01

REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER

Remove the 16 screws, clip and No. 1 engine under cover.



2. REMOVE DRIVE BELT

Using SST, loosen the drive belt tension by turning the drive belt tensioner clockwise from the bottom side, and remove the drive belt.

SST 09216–00041

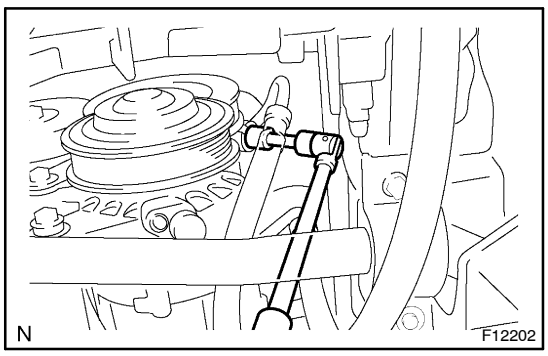
3. DISCONNECT OIL PRESSURE SWITCH CONNECTOR

4. DISCONNECT RETURN HOSE

Remove the clip and disconnect the return hose.

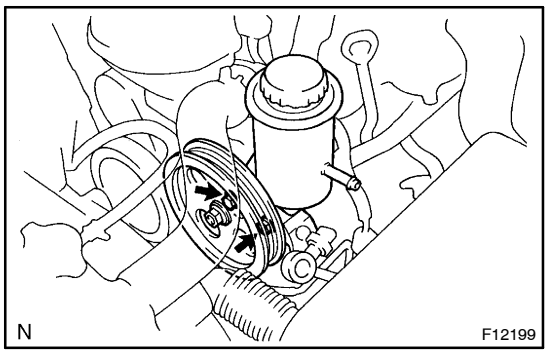
NOTICE:

Take care not to spill fluid on the drive belt and oil pressure switch connector.



5. DISCONNECT PRESSURE FEED TUBE

Remove the union bolt and gasket and disconnect the pressure feed tube.

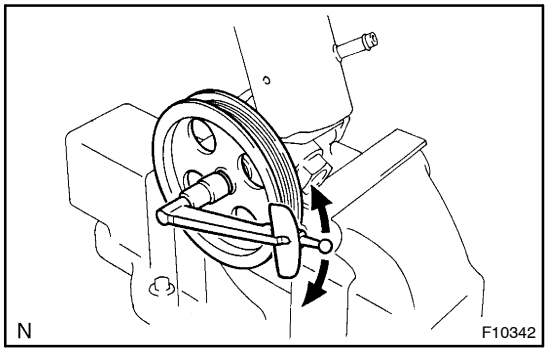


6. REMOVE PS VANE PUMP ASSEMBLY

Remove the 2 bolts and PS vane pump assembly.

SR1HB–01

DISASSEMBLY



NOTICE:

When using a vise, do not overtighten it.

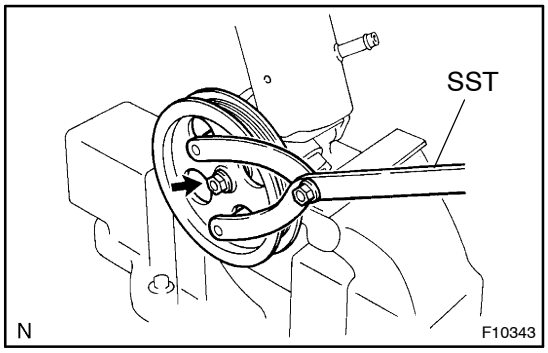
1. MEASURE PS VANE PUMP ROTATING TORQUE

(a) Check that the pump rotates smoothly without abnormal noise.

(b) Using a torque wrench, check the pump rotating torque.

Rotating torque:

0.25 N·m (2.5 kgf·cm, 2.2 in.·lbf) or less



2. REMOVE VANE PUMP PULLEY

Using SST, stop the pulley rotating and remove the pulley set nut.

SST 09960–10010 (09962–01000, 09963–01000)

3. REMOVE OIL RESERVOIR

(a) Remove the 3 bolts and oil reservoir.

(b) Remove the O–ring from the oil reservoir.

4. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

(a) Remove the pressure port union, flow control valve and spring.

(b) Remove the O–ring from the pressure port union.

5. REMOVE REAR HOUSING

(a) Remove the 2 bolts and rear housing.

(b) Remove the 2 O–rings from the rear housing.

6. REMOVE WAVE WASHER

7. REMOVE SIDE PLATE

8. REMOVE CAM RING, 10 VANE PLATES AND VANE PUMP ROTOR

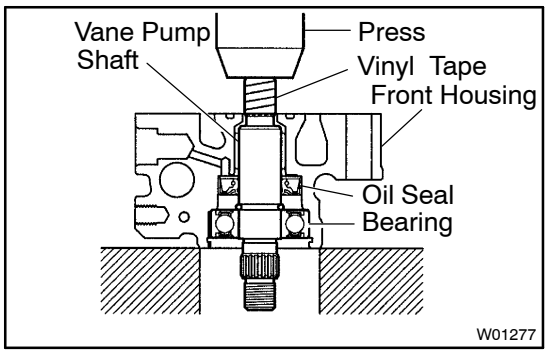
NOTICE:

Be careful not to drop the vane plate.

9. REMOVE 2 STRAIGHT PINS

Remove the 2 straight pins from the front housing.

10. REMOVE GASKET



11. REMOVE VANE PUMP SHAFT WITH BEARING

(a) Using snap ring pliers, remove the snap ring from the front housing.

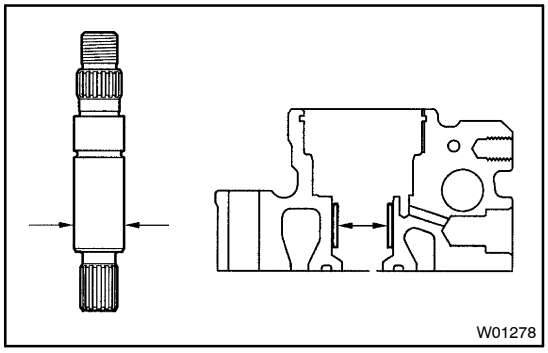
(b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the vane pump shaft.

(c) Using a press,press out the vane pump shaft with the bearing.

NOTICE:

Be careful not to damage the oil seal lip.

SR1HC–01



INSPECTION

NOTICE:

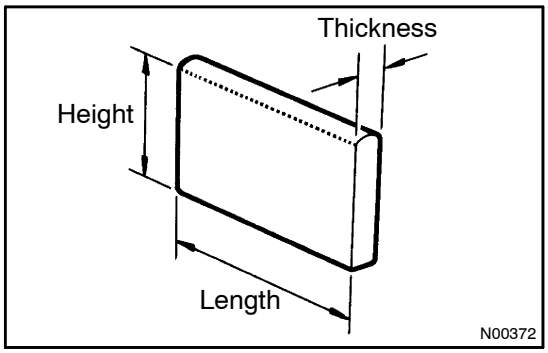
When using a vise, do not overtighten it.

1. CHECK OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

Using a micrometer and caliper gauge, measure the oil clearance.

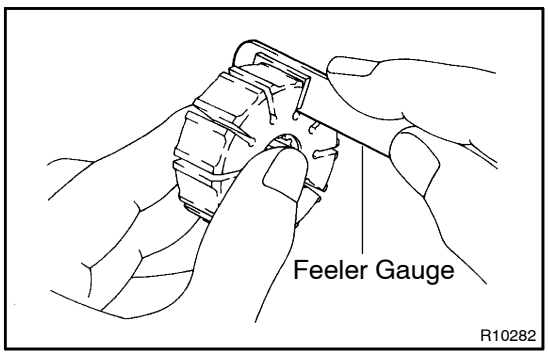
Standard clearance:
0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the vane pump shaft and front housing.

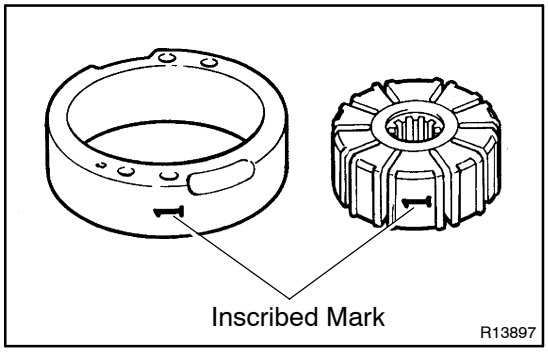


2. INSPECT VANE PUMP ROTOR AND VANE PLATES

(a) Using a micrometer, measure the height, thickness and length of the 10 vane plates.
Minimum height: 8.6 mm (0.339 in.)
Minimum thickness: 1.40 mm (0.0551 in.)
Minimum length: 14.99 mm (0.5902 in.)



(b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane plate.
Maximum clearance: 0.033 mm (0.0013 in.)



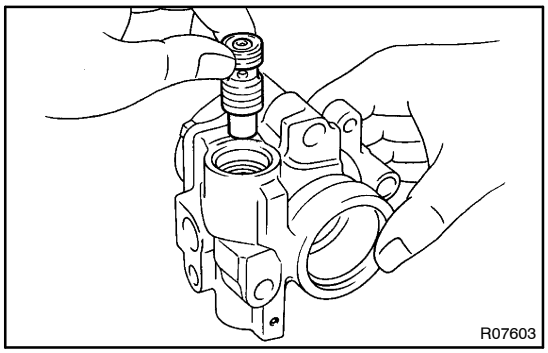
If it is more than the maximum, replace the vane plate and/or vane pump rotor with one having the same mark stamped on the cam ring.

Inscribed mark: 1, 2, 3, 4 or None

HINT:

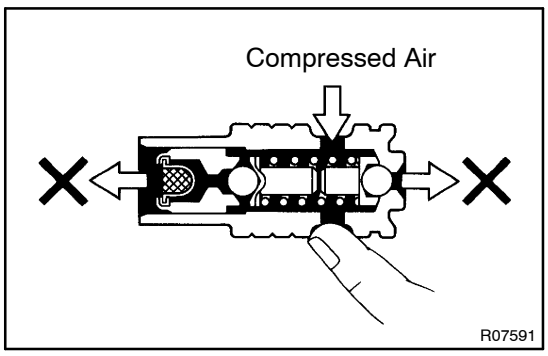
There are 5 vane plate lengths with the following rotor and cam ring marks:

Rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
None	44345–26010	14.999–15.001 (0.59051–0.59059)
1	44345–26020	14.997–14.999 (0.59043–0.59051)
2	44345–26030	14.995–14.997 (0.59035–0.59043)
3	44345–26040	14.993–14.995 (0.59027–0.59035)
4	44345–26050	14.991–14.993 (0.59020–0.59027)

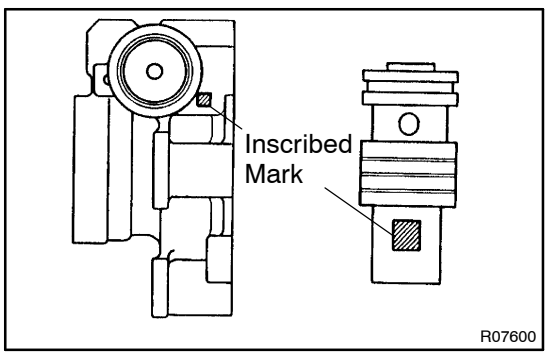


3. INSPECT FLOW CONTROL VALVE

(a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the valve hole by its own weight.

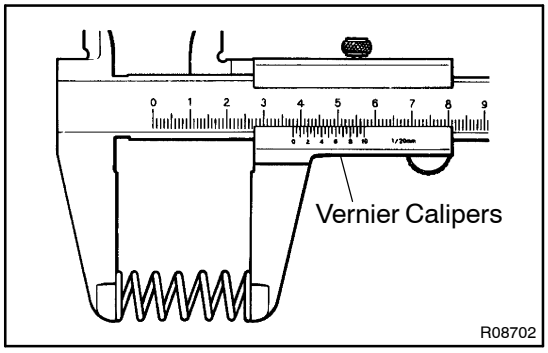


(b) Check the flow control valve for leakage.
Close one of the holes and apply compressed air 392 – 490 kPa (4 – 5 kgf/cm^2, 57 – 71 psi) into the opposite side, and confirm that air does not come out from the end holes.



If necessary, replace the flow control valve with one having the same letter as inscribed on the front housing.

Inscribed mark: A, B, C, D, E or F



4. INSPECT SPRING

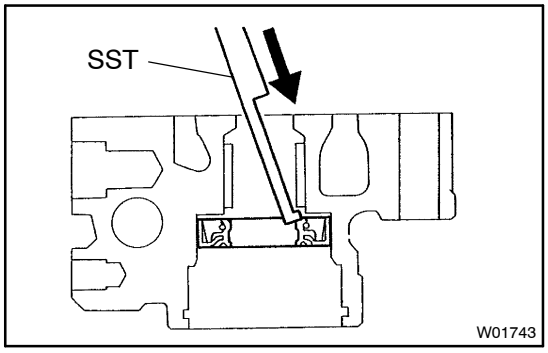
Using vernier calipers, measure the free length of the spring.

Minimum free length: 33.2 mm (1.307 in.)

If it is not within the specification, replace the spring.

SR1HD–01

REPLACEMENT



NOTICE:

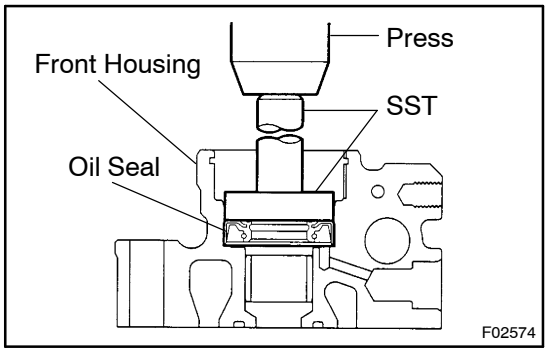
When using a vise, do not overtighten it.

1. IF NECESSARY, REPLACE OIL SEAL

(a) Using SST and a hammer,tap out the oil seal from the front housing.
SST 09631–10030

NOTICE:

Be careful not to damage the bushing of the front housing.

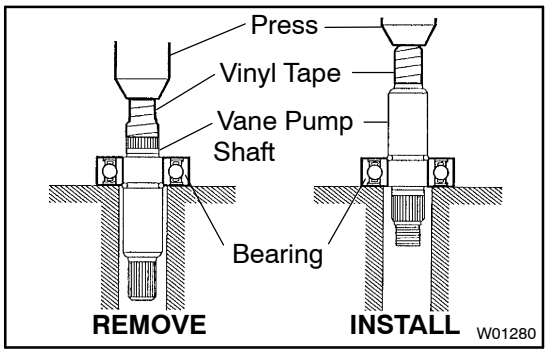


(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST and a press,press in the oil seal.
SST 09950–60010 (09951–00330),
09950–70010 (09951–07100)

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.



2. IF NECESSARY, REPLACE BEARING

(a) Using a press,press out the bearing from the vane pump shaft.

(b) Using snap ring expander, replace the snap ring with new one.

NOTICE:

Be careful not to damage the shaft.

(c) Coat a new bearing with power steering fluid.

(d) Using a press,press in the bearing to the shaft.

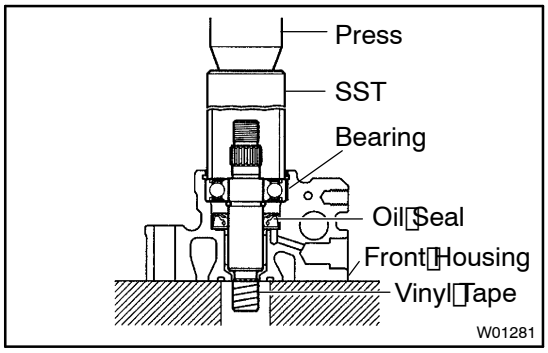
SR1HE–01

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID (See page SR–12)



2. INSTALL VANE PUMP SHAFT WITH BEARING

(a) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the vane pump shaft.

(b) Using SST and a press, press in the vane pump shaft with the bearing.

SST 09608–04031

NOTICE:

Be careful not to damage the oil seal.

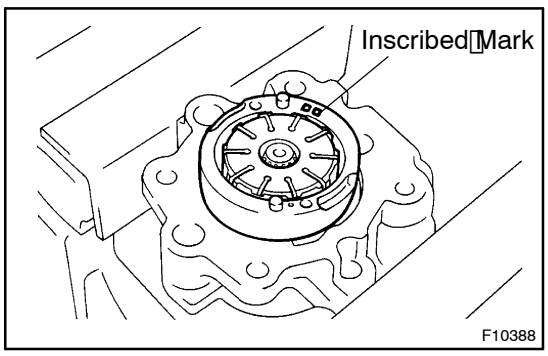
(c) Using snap ring pliers, install a new snap ring to the front housing.

3. INSTALL 2 STRAIGHT PINS

Using a plastic hammer, tap in 2 new straight pins to the front housing.

NOTICE:

Be careful not to damage the straight pins.



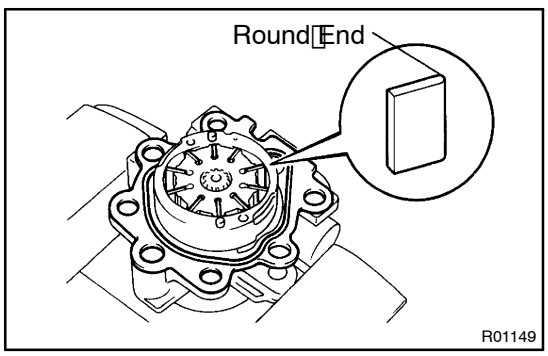
4. INSTALL CAM RING

Install the cam ring with the inscribed mark facing outward.

HINT:

Align the holes of the cam ring with the 2 straight pins.

5. INSTALL VANE PUMP ROTOR



6. INSTALL 10 VANE PLATES AND GASKET

(a) Install the 10 vane plates with the round end facing outward.

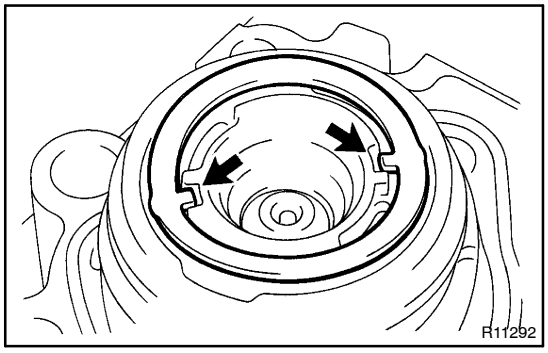
(b) Install a new gasket on the front housing.

NOTICE:

Be careful the direction of the gasket.

7. INSTALL SIDE PLATE

Align the holes of the side plate and 2 straight pins.



8. INSTALL WAVE WASHER

Install the wave washer so that its protrusions fit into the slots in the side plate.

9. INSTALL REAR HOUSING

(a) Coat 2 new O–rings with power steering fluid and install them to the rear housing.

(b) Install the rear housing with the 2 bolts.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

10. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

(a) Install the spring.

(b) Install the flow control valve facing in the correct direction (See page SR–12).

(c) Coat a new O–ring with power steering fluid, and install it to the pressure port union.

(d) Install the pressure port union.

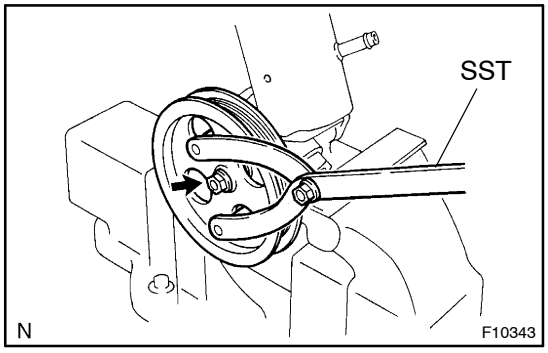
Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)

11. INSTALL OIL RESERVOIR

(a) Coat a new O–ring with power steering fluid and install it to the oil reservoir.

(b) Install the oil reservoir with the 3 bolts.

Torque:
Front side bolt: 13 N·m (130 kgf·cm, 9 ft·lbf)
Rear side bolts: 24 N·m (240 kgf·cm, 17 ft·lbf)



12. INSTALL VANE PUMP PULLEY

(a) Install the vane pump pulley and nut to the vane pump shaft.

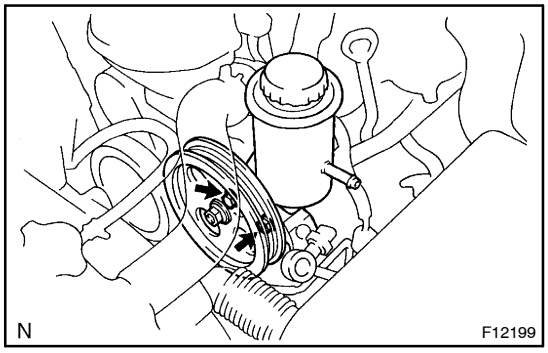
(b) Using SST, stop the pulley rotating and torque the pulley set nut.

SST 09960–10010 (09962–01000, 09963–01000)

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

13. MEASURE PS VANE PUMP ROTATING TORQUE (See page SR–15)

SR1HF–01



INSTALLATION

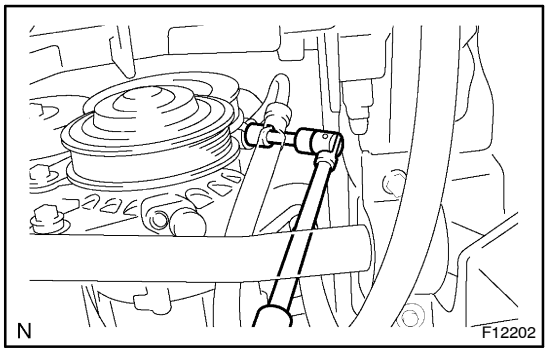
1. INSTALL PS VANE PUMP ASSEMBLY

Install the PS vane pump assembly with the 2 bolts.

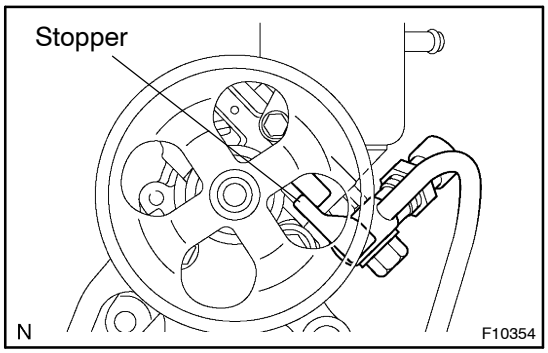
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

2. CONNECT PRESSURE FEED TUBE

(a) Install a new gasket to the pressure feed tube.



(b) Connect the pressure feed tube with the union bolt.



HINT:

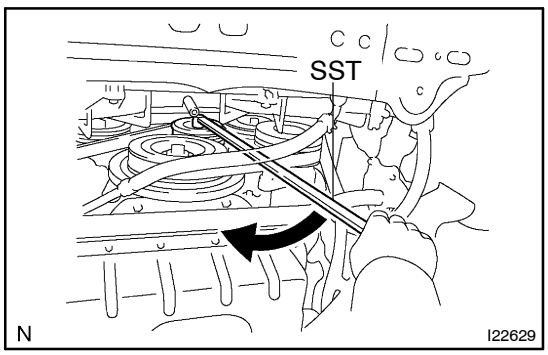
Make sure the stopper of the pressure feed tube touches the PS vane pump body as shown in the illustration, then install the union bolt.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

3. CONNECT RETURN HOSE

Connect the return hose with the clip.

4. CONNECT OIL PRESSURE SWITCH CONNECTOR



5. INSTALL DRIVE BELT

Using SST, loosen the drive belt tension by tuning the drive belt tensioner clockwise from the bottom side, and install the drive belt.

SST 09216–00041

6. INSTALL NO. 1 ENGINE UNDER COVER

Install the No. 1 engine under cover with the 16 screws and clip.

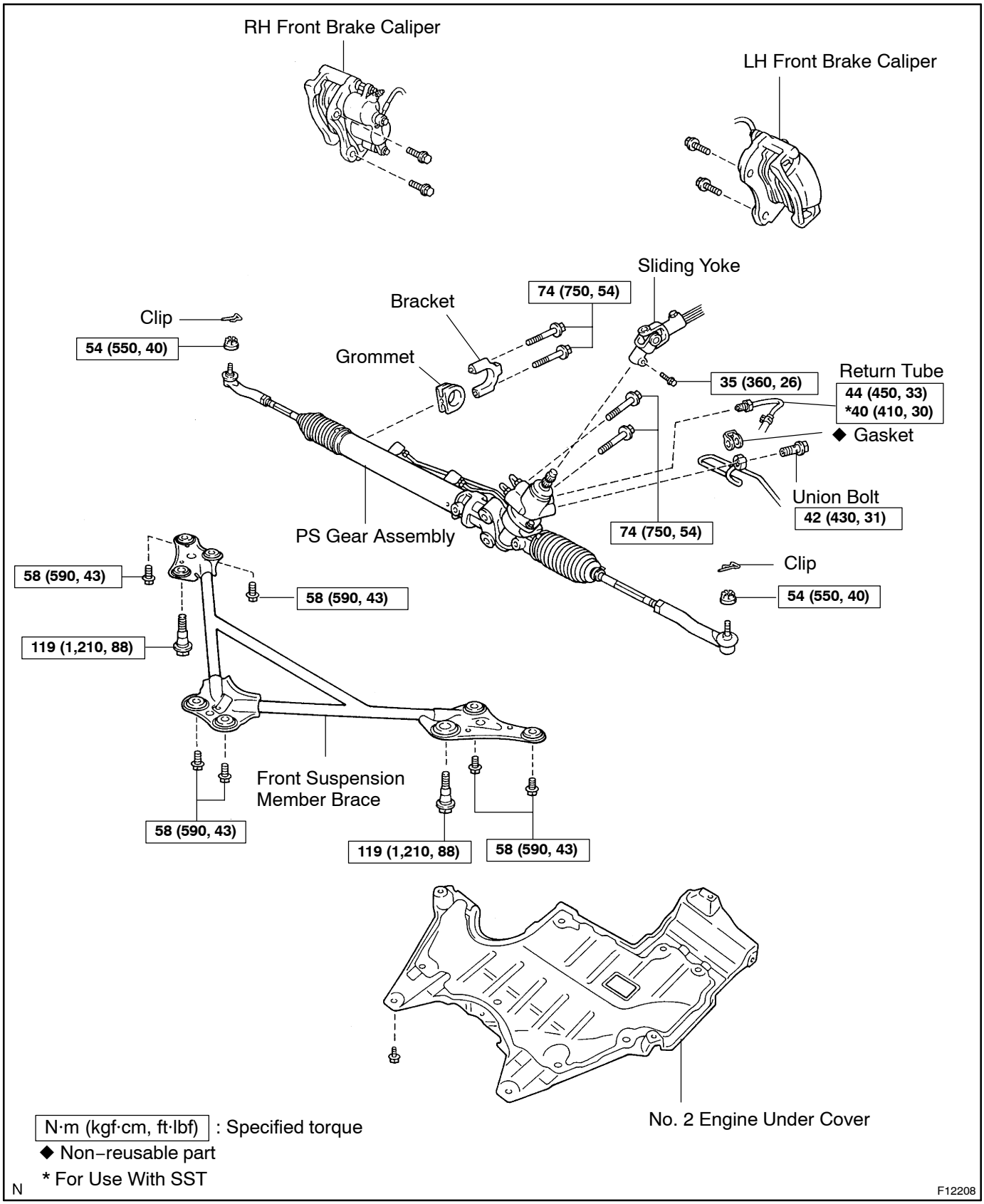
7. BLEED POWER STEERING SYSTEM

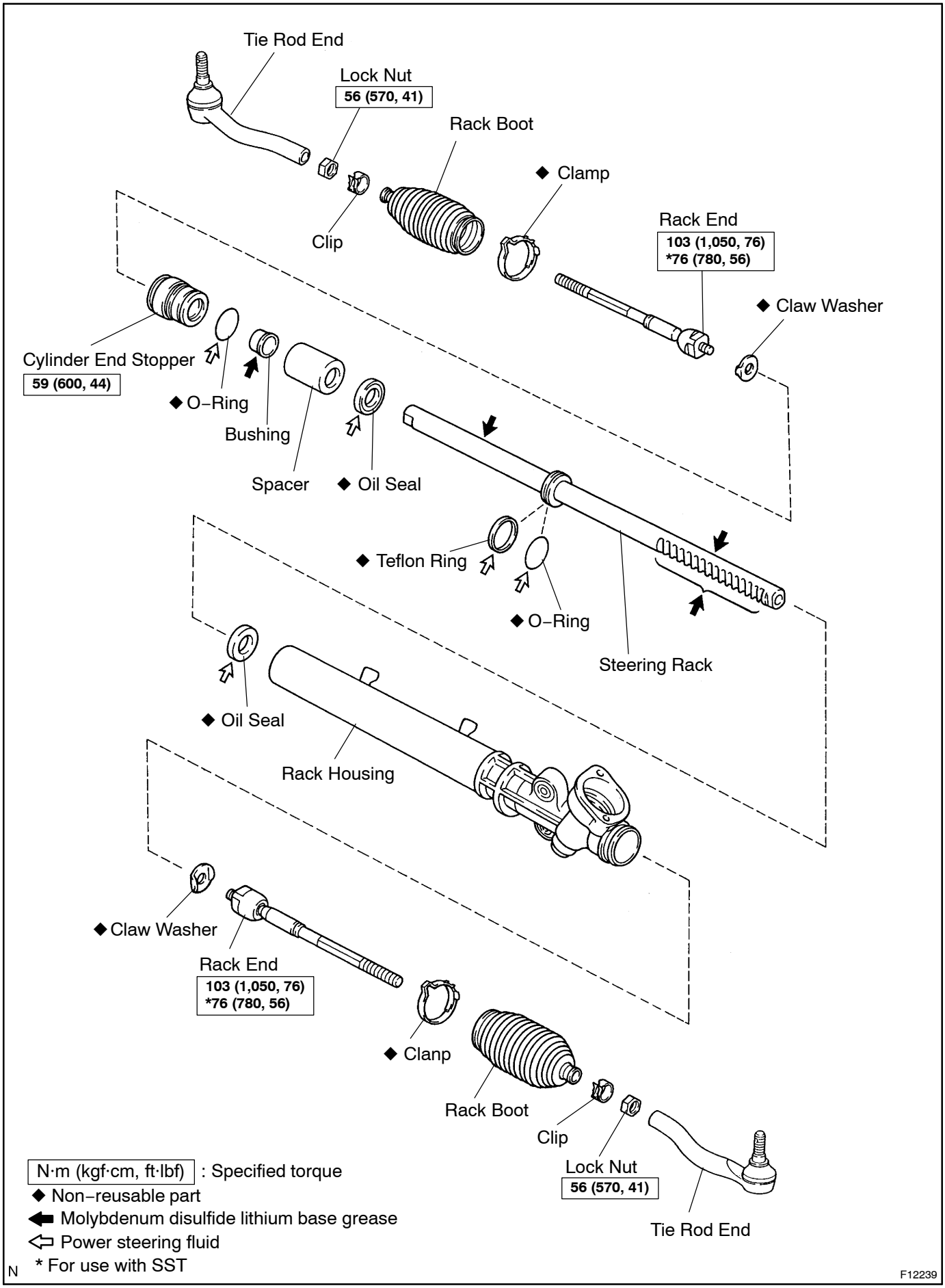
(See page SR–2)

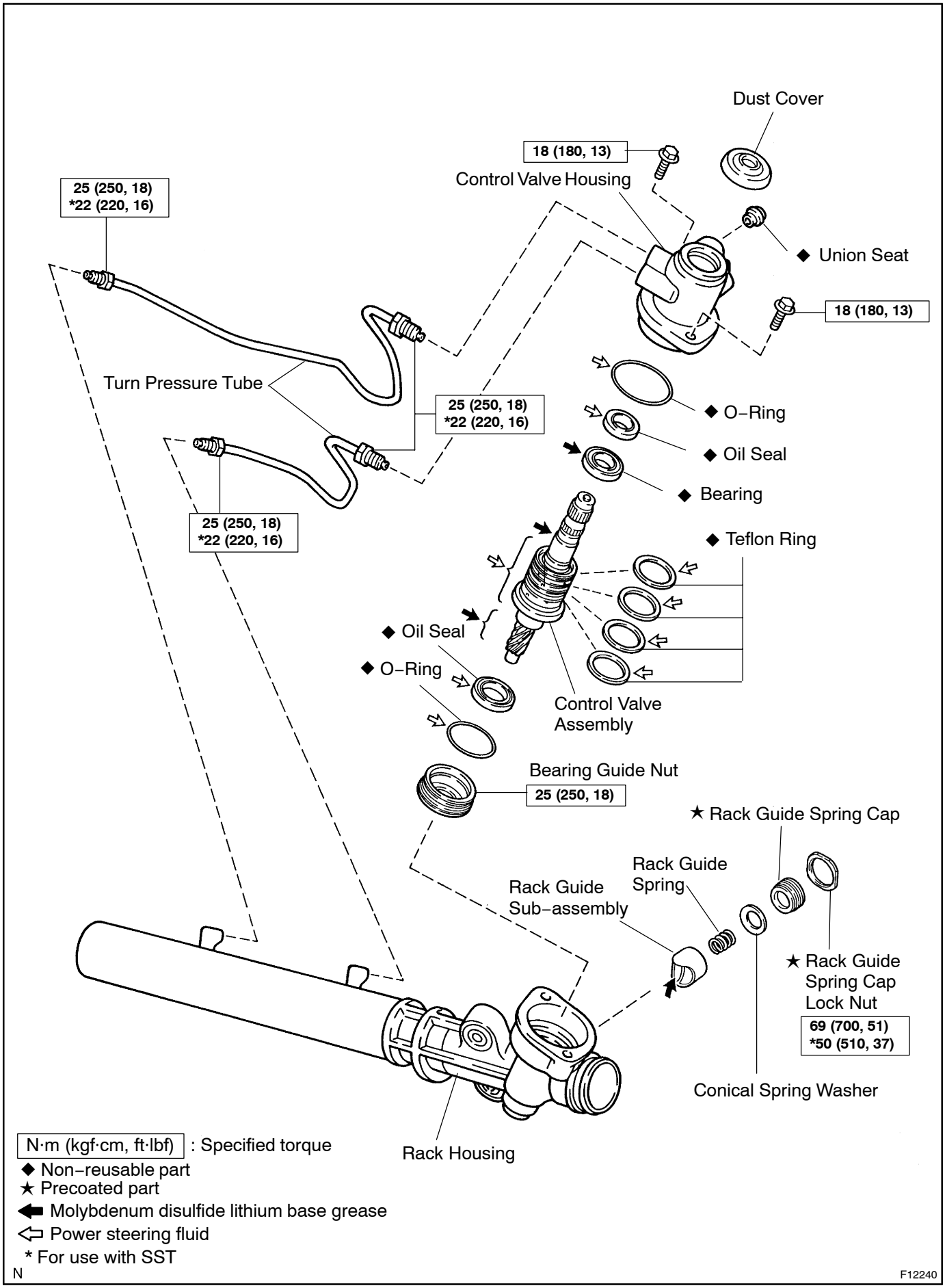
POWER STEERING GEAR (2JZ–GE)

COMPONENTS

SR1H2–01



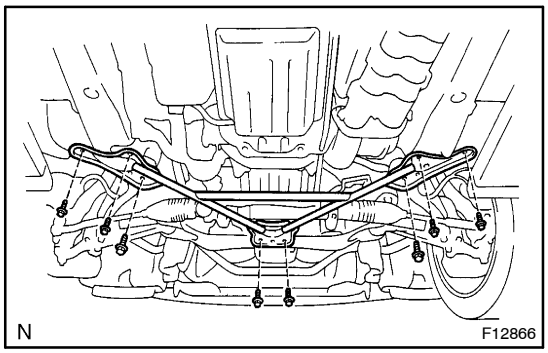

Tie Rod End
Lock Nut
56 (570, 41)
Rack Boot
◆ Clamp
Clip
Rack End
103 (1,050, 76)
*76 (780, 56)
◆ Claw Washer
Cylinder End Stopper
59 (600, 44)
◆ O–Ring
Bushing
Spacer
◆ Oil Seal
◆ Teflon Ring
◆ O–Ring
Steering Rack
◆ Oil Seal
Rack Housing
◆ Claw Washer
Rack End
103 (1,050, 76)
*76 (780, 56)
◆ Clanp
Rack Boot
Clip
Lock Nut
56 (570, 41)
Tie Rod End
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Molybdenum disulfide lithium base grease
Power steering fluid
* For use with SST
N
F12239


Dust Cover
18 (180, 13)
Control Valve Housing
25 (250, 18)
*22 (220, 16)
◆ Union Seat
18 (180, 13)
Turn Pressure Tube
25 (250, 18)
*22 (220, 16)
◆ O–Ring
◆ Oil Seal
◆ Bearing
25 (250, 18)
*22 (220, 16)
◆ Teflon Ring
◆ Oil Seal
◆ O–Ring
Control Valve
Assembly
Bearing Guide Nut
25 (250, 18)
★ Rack Guide Spring Cap
Rack Guide
Spring
Rack Guide
Sub–assembly
★ Rack Guide
Spring Cap
Lock Nut
69 (700, 51)
*50 (510, 37)
Conical Spring Washer
Rack Housing
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
Molybdenum disulfide lithium base grease
Power steering fluid
* For use with SST
N
F12240

SR1H3–01

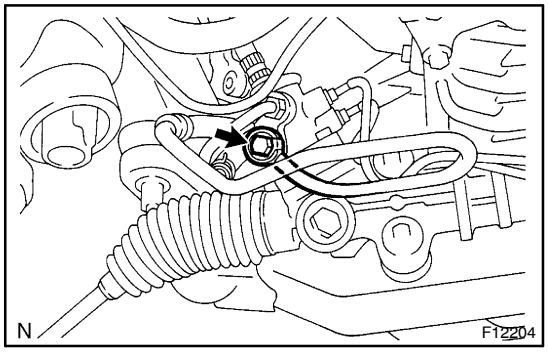
REMOVAL

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD
2. REMOVE STEERING WHEEL PAD (See page SR–8)
3. REMOVE STEERING WHEEL (See page SR–8)
4. REMOVE RH AND LH FRONT BRAKE CALIPERS (See Pub.No.RM684E on page BR–26)
5. DISCONNECT RH AND LH TIE ROD ENDS (See Pub.No.RM684E on page SA–32)
6. REMOVE NO. 2 ENGINE UNDER COVER
7. DISCONNECT SLIDING YOKE (See page SR–8)



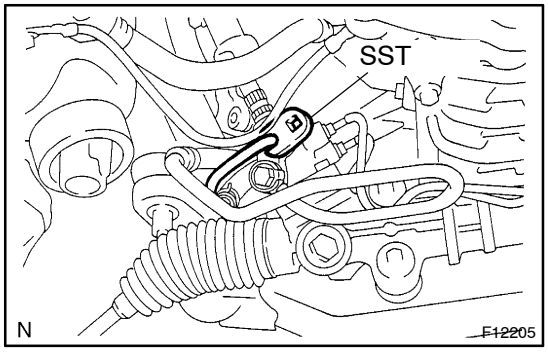
8. REMOVE FRONT SUSPENSION MEMBER BRACE

Remove the 8 bolts and front suspension member brace.



9. DISCONNECT PRESSURE FEED TUBE

Remove the union bolt and gasket, and disconnect the pressure feed tube.



10. DISCONNECT RETURN TUBE

Using SST, disconnect the return tube.

SST 09023–38400

11. REMOVE PS GEAR ASSEMBLY, BRACKET AND GROMMET

Remove the 4 bolts, PS gear assembly, bracket and grommet.

SR1H4–01

DISASSEMBLY

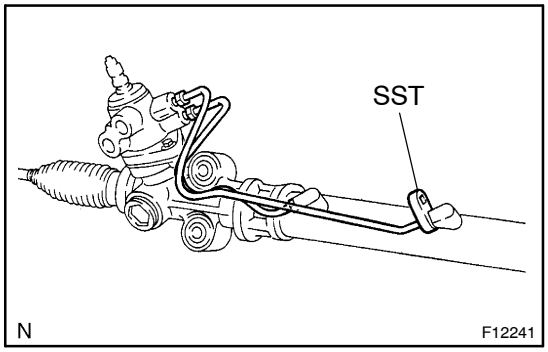
NOTICE:

When using a vise, do not overtighten it.

1. REMOVE 2 TURN PRESSURE TUBES

Using SST, remove the 2 turn pressure tubes.

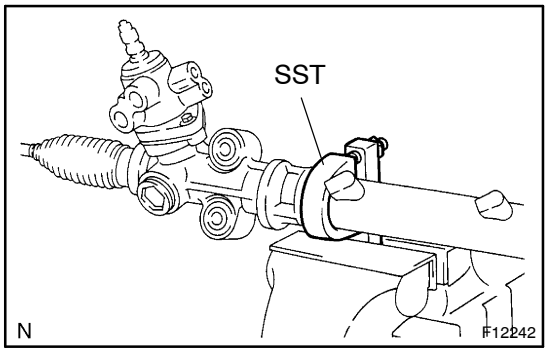
SST 09023–38200



2. SECURE PS GEAR ASSEMBLY IN VISE

Using SST, secure the PS gear assembly in a vise.

SST 09612–00012

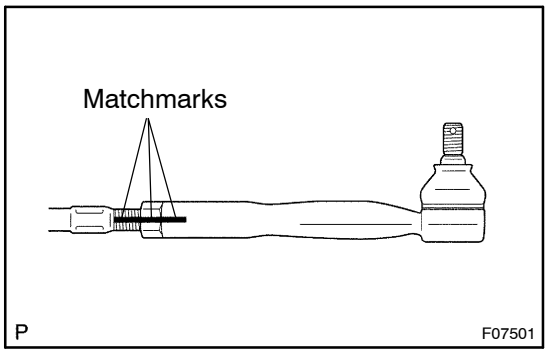


3. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Place matchmarks on the tie rod end, lock nut and rack end.

(b) Loosen the lock nut, and remove the tie rod end and lock nut.

(c) Employ the same manner described above to the other side.



4. REMOVE RH AND LH CLIPS, RACK BOOTS AND CLAMPS

(a) Using pliers, loosen the clamp as shown in the illustration.

(b) Remove the clamp, clip and rack boot.

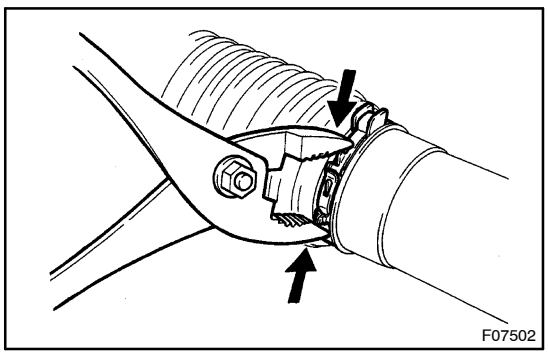
NOTICE:

Be careful not to damage the boot.

HINT:

Mark the RH and LH rack boots.

(c) Employ the same manner described above to the other side.

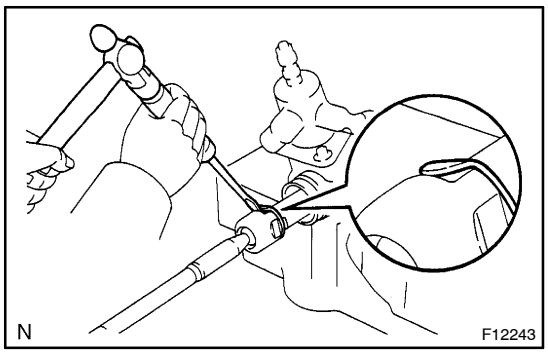


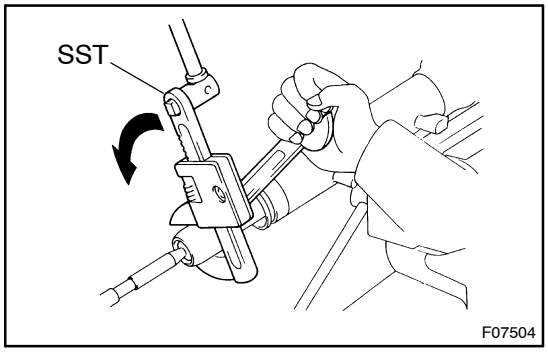
5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

(a) Using a screwdriver and a hammer, unstake the washer.

NOTICE:

Avoid any impact on the steering rack.



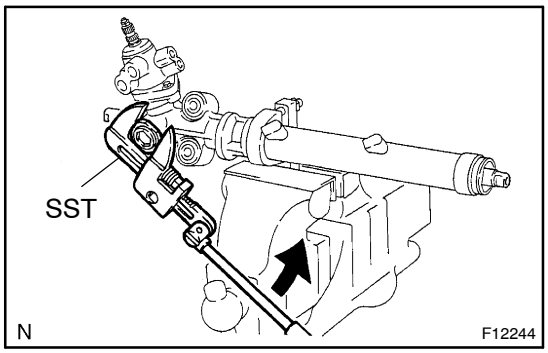


(b) Using a spanner, hold the steering rack steadily and using SST, remove the rack end.
SST 09922–10010

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

HINT:
Mark the RH and LH rack ends.

(c) Remove the claw washer.
(d) Employ the same manner described above to the other side.



6. REMOVE RACK GUIDE SPRING CAP LOCK NUT

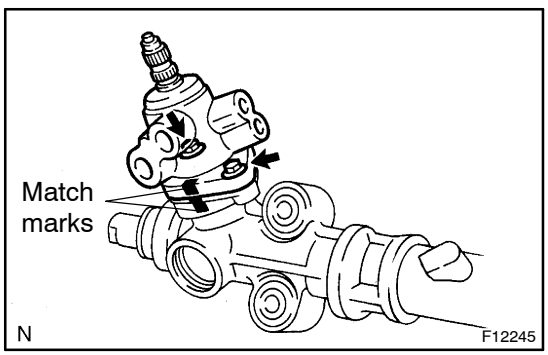
Using SST, remove the rack guide spring cap lock nut.
SST 09922–10010

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

7. REMOVE RACK GUIDE SPRING CAP, CONICAL SPRING, RACK GUIDE SPRING AND RACK GUIDE SUB–ASSEMBLY

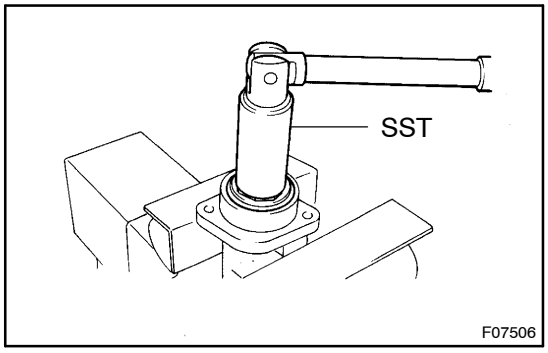
(a) Using a hexagon wrench (24 mm), remove the rack guide spring cap.
(b) Remove the conical spring, rack guide spring and rack guide sub–assembly.

8. REMOVE DUST COVER



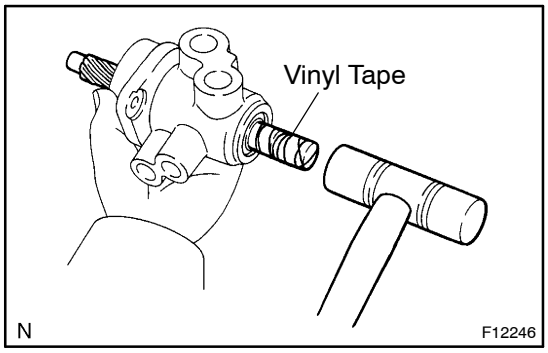
9. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

(a) Place matchmarks on the control valve housing and rack housing.
(b) Remove the 2 bolts and pull out the control valve housing with control valve assembly.
(c) Remove the O–ring from the control valve housing.



10. REMOVE BEARING GUIDE NUT AND CONTROL VALVE ASSEMBLY

(a) Using SST, loosen the bearing guide nut.
SST 09631–20060



(b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.

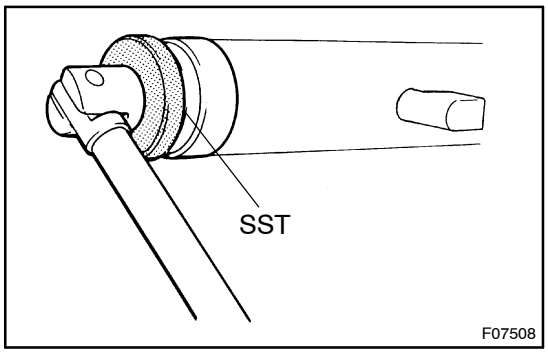
(c) Using a plastic hammer, tap out the control valve assembly with the bearing guide nut from the control valve housing.

NOTICE:

Be careful not to damage the oil seal lip

(d) Remove the bearing guide nut from the control valve assembly.

(e) Remove the O–ring from the bearing guide nut.

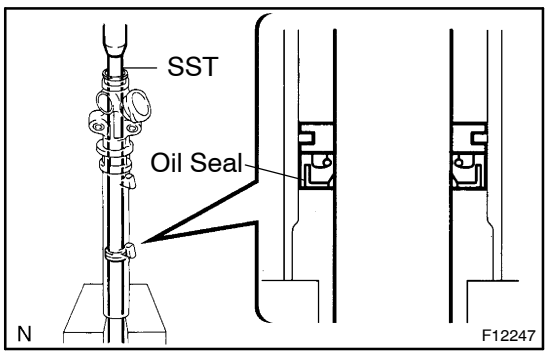


11. REMOVE CYLINDER END STOPPER AND SPACER

(a) Using SST, remove the cylinder end stopper.
SST 09631–20090

(b) Remove the O–ring from the cylinder end stopper.

(c) Remove the spacer.



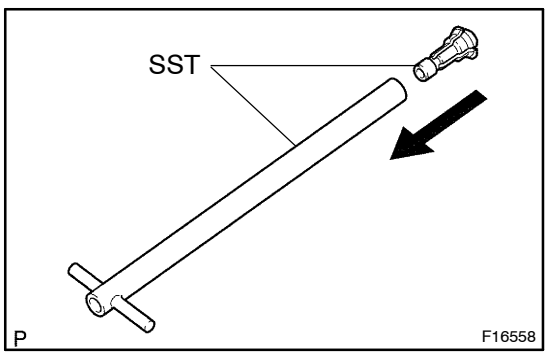
12. REMOVE STEERING RACK WITH OIL SEAL

(a) Using SST, press out the steering rack with the oil seal.
SST 09950–70010 (09951–07200)

NOTICE:

Take care not to drop the steering rack.

(b) Remove the oil seal from the steering rack.

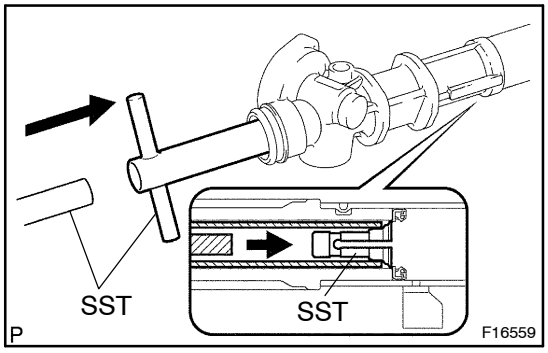


13. REMOVE OIL SEAL

(a) Install SST (09612–07130) on SST (09612–07210).
SST 09612–70100 (09612–07130, 09612–07210)

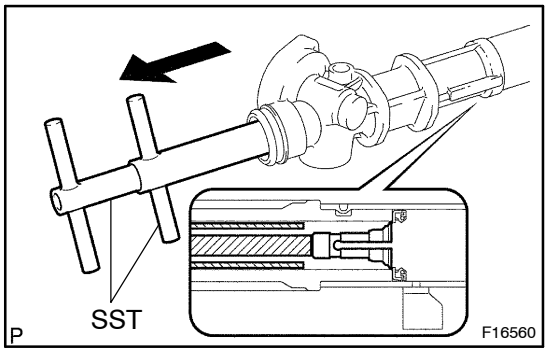
NOTICE:

- **Before using them, apply a small dab of grease to the inside wall of SST (09612–07210, 09612–07130).**
- **To prevent the inside of the housing from being damaged securely install SST 09612–07130) on SST (09612–07210).**



(b) Diagonally insert SST (09612–07210) into the housing until it contacts with the oil seal, and then further insert the SST (09612–07210) until the tip of SST (09612–07220) contacts with SST (09612–07130).
SST 09612–70100 (09612–07130, 09612–07210, 09612–07220)

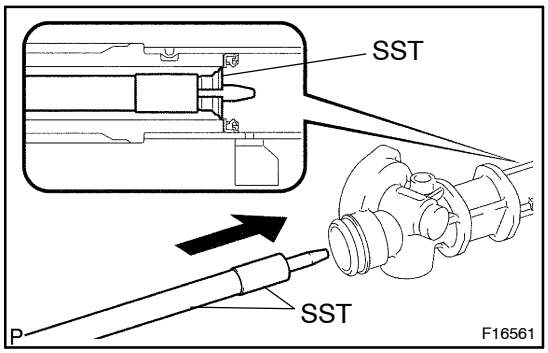
NOTICE:
Do not damage the inside of the housing.



(c) Secure SST (09612–07220), and pull SST (09612–07210) to place SST (09612–07130) in the housing.
SST 09612–70100 (09612–07130, 09612–07210, 09612–07220)

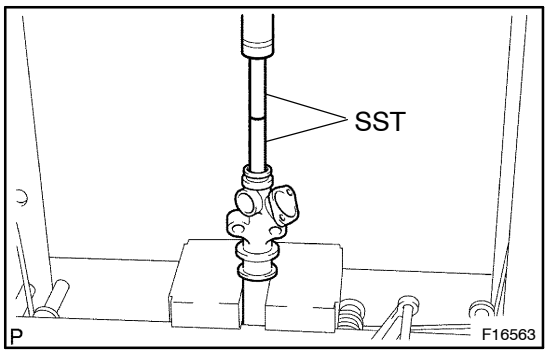
HINT:
Place SST on the chamfering position between the oil seal and rack housing.

(d) Remove the SST (09612–07210, 09612–07220).
SST 09612–70100 (09612–07210, 09612–07220)



(e) After installing SST (09612–07240) on SST (09612–07210), insert the tip of SST (09612–07230) in the service hole of SST (09612–07130).
SST 09612–70100 (09612–07130, 09612–07230, 09612–07240)

NOTICE:
- **Before using them, apply a small dab of grease to the tip of SST (09612–07230).**
- **To prevent SST (09612–07130) from being damaged, be sure to install SST (09612–07240).**
- **Do not damage the inside of the rack housing.**



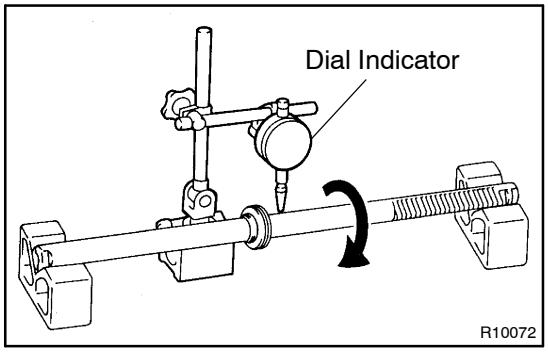
(f) Install SST (09951–07100) on SST (09612–07230) and remove the oil seal using a press.
SST 09612–70100 (09612–07130, 09612–07230, 09612–07240), 09950–70010 (09951–07100)

NOTICE:
Do not damage the rack housing.

HINT:
Replace SST (09951–07100) with SST that is different in length in the set, if necessary.

SR1H5–01

INSPECTION

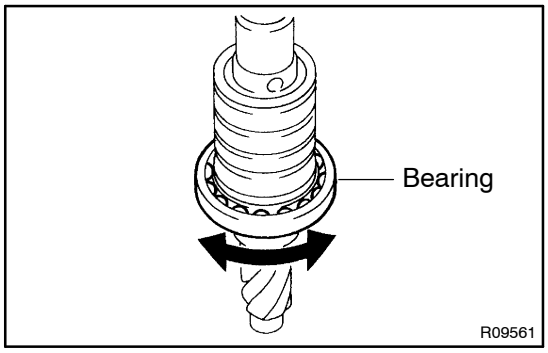


1. INSPECT STEERING RACK

(a) Using a dial indicator, check the steering rack for runout and for teeth wear and damage.

Maximum runout: 0.15 mm (0.0059 in.)

(b) Check the back surface for wear and damage.



2. INSPECT BEARING

(a) Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the control valve assembly.

(b) Coat the bearing with molybdenum disulfide lithium base grease.

SR1H6–01

REPLACEMENT

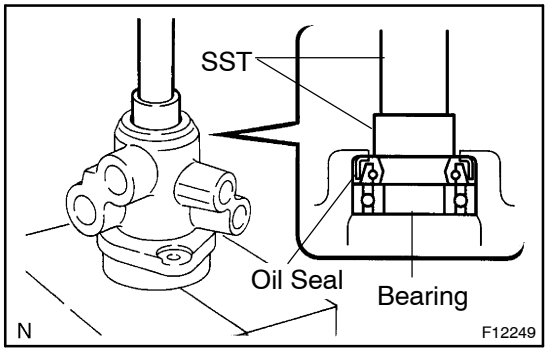
NOTICE:

When using a vise, do not overtighten it.

1. IF NECESSARY, REPLACE OIL SEAL AND BEARING

(a) Using SST, press out the bearing and oil seal from the control valve housing.

SST 09950–60010 (09951–00240), 09950–70010 (09951–07100)



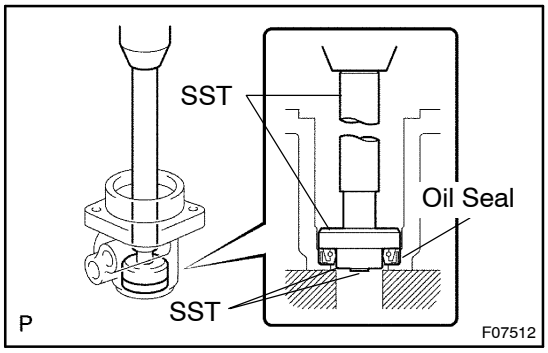
(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.

SST 09950–60010 (09951–00180, 09951–00320, 09952–06010), 09950–70010 (09951–07150)

NOTICE:

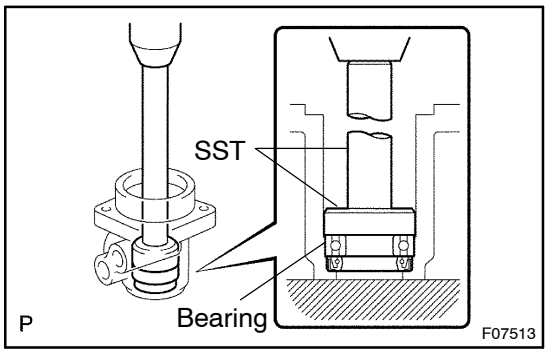
Make sure that the oil seal is installed facing in the correct direction.



(d) Coat a new bearing with molybdenum disulfide lithium base grease.

(e) Using SST, press in the bearing.

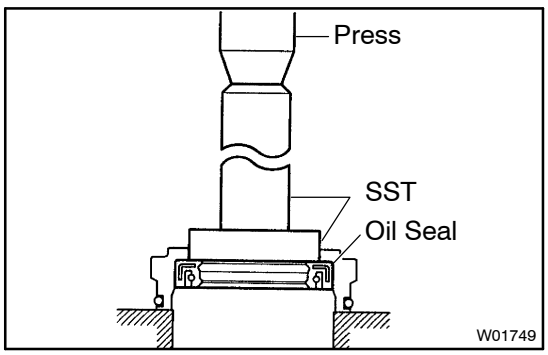
SST 09950–60010 (09951–00340), 09950–70010 (09951–07150)



2. IF NECESSARY, REPLACE OIL SEAL

(a) Using SST, press out the oil seal from the bearing guide nut.

SST 09950–60010 (09951–00310), 09950–70010 (09951–07100)



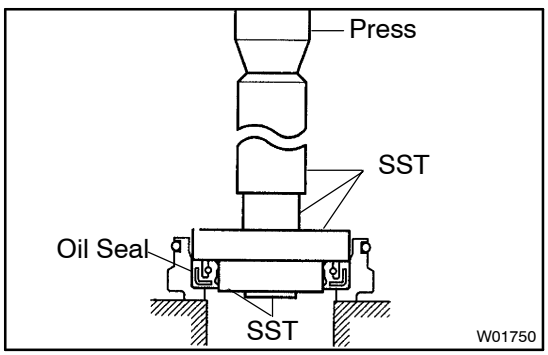
(b) Coat a new oil seal lip with power steering fluid.

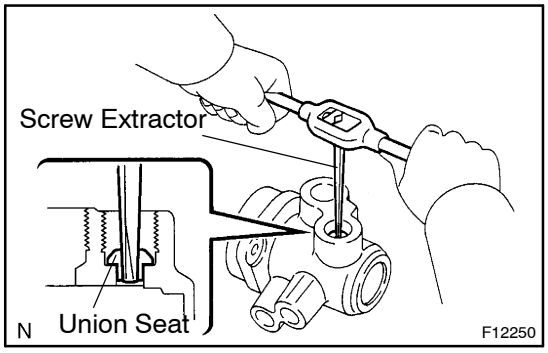
(c) Using SST, press in the oil seal.

SST 09950–60010 (09951–00250, 09951–00360, 09952–06010), 09950–70010 (09951–07100)

NOTICE:

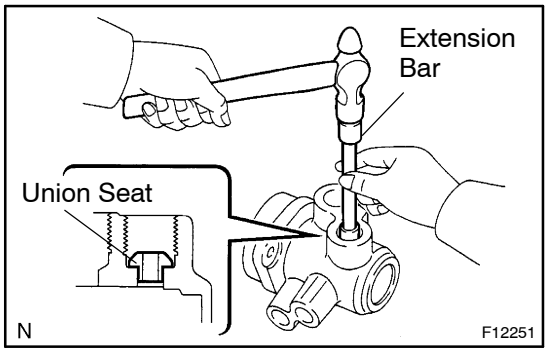
Make sure that the oil seal is installed facing in the correct direction.



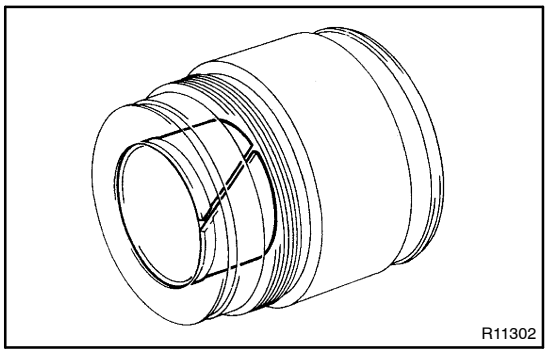


3. IF NECESSARY, REPLACE UNION SEAT

(a) Using a screw extractor, remove the union seat from the control valve housing.



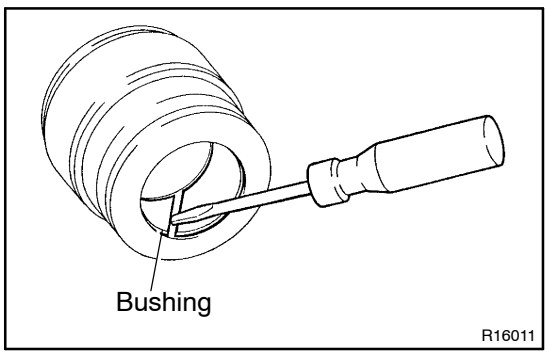
(b) Using a plastic hammer and extension bar, lightly tap in a new union seat.



4. INSPECT BUSHING

(a) Check the inside of the bushing of the cylinder end stopper for cracks. If faulty, replace the bushing.

(b) Apply molybdenum disulfide lithium base grease to the inside of the bushing.



5. IF NECESSARY, REPLACE BUSHING

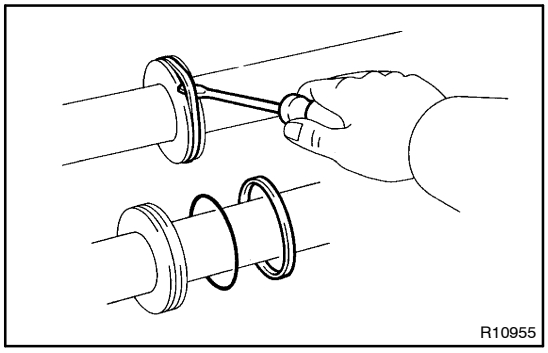
(a) Using a screwdriver, remove the bushing from the cylinder end stopper.

NOTICE:

Be careful not to damage the cylinder end stopper.

(b) Coat the inside of a new bushing with molybdenum disulfide lithium base grease.

(c) Install the bushing.



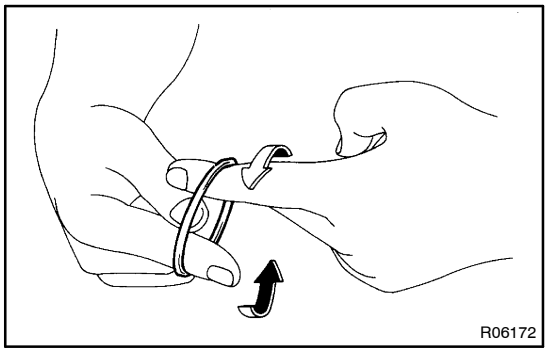
6. IF NECESSARY, REPLACE TEFLON RING AND O–RING

(a) Using a screwdriver, remove the teflon ring and O–ring from the steering rack.

NOTICE:

Be careful not to damage the groove for the teflon ring.

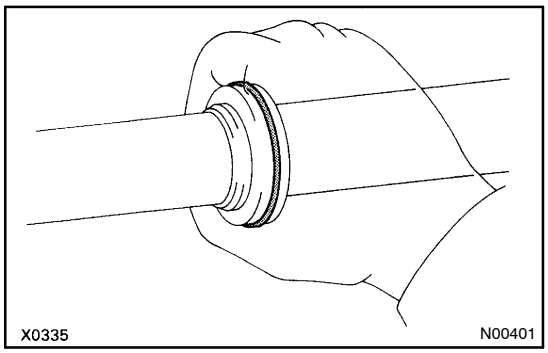
(b) Coat a new O–ring with power steering fluid and install it to the steering rack.



(c) Expand a new teflon ring with your fingers.

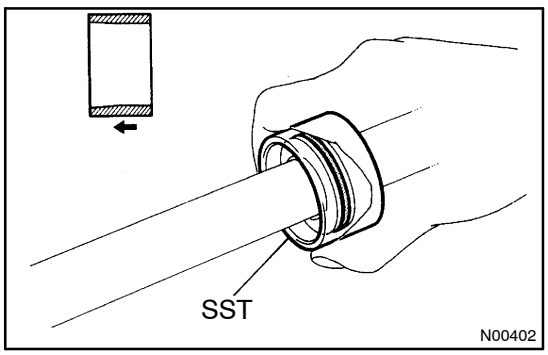
NOTICE:

Be careful not to overexpand the teflon ring.



(d) Coat the teflon ring with power steering fluid.

(e) Install the teflon ring to the steering rack and settle it down with your fingers.

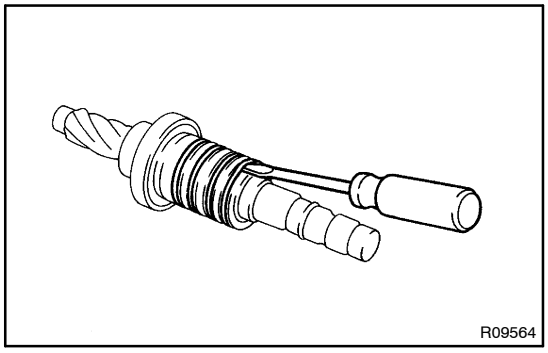


(f) Carefully slide the tapered end of SST over the teflon ring until it fits to the steering rack.

SST 09630–24014 (09620–24051)

NOTICE:

Be careful not to damage the teflon ring.



7. IF NECESSARY, REPLACE 4 TEFLON RINGS

(a) Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

NOTICE:

Be careful not to damage the grooves for the teflon ring.

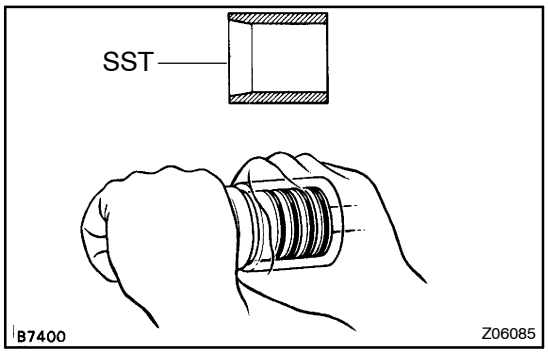
(b) Expand 4 new teflon rings with your fingers.

NOTICE:

Be careful not to overexpand the teflon ring.

(c) Coat the teflon rings with power steering fluid.

(d) Install the teflon rings to the control valve assembly, and settle them down with your fingers.



(e) Carefully slide the tapered end of SST over the teflon rings until they fit to the control valve assembly.

SST 09631–20081

NOTICE:

Be careful not to damage the teflon rings.

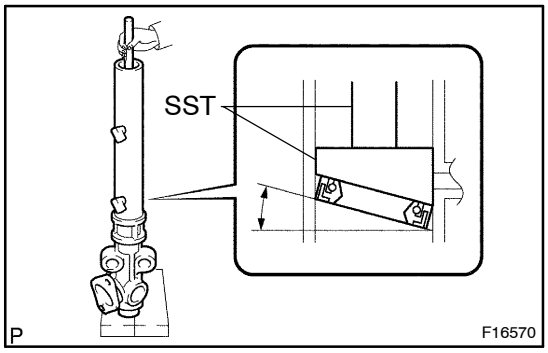
SR1H7–01

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR–23)



2. INSTALL OIL SEAL

(a) Apply power steering fluid to a new oil seal, and install the oil seal on the rack housing at an angle.

NOTICE:

Install the oil seal in the correct direction.

HINT:

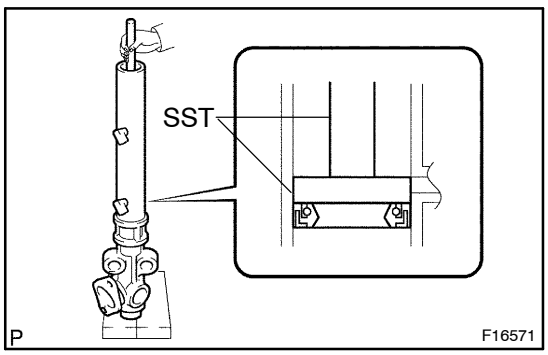
Install the oil seal so that the port faces downward with approx. 15 degrees.

(b) Using SST, push in the oil seal by hand until it passes through the 2 ports.

SST 09631–00180, 09950–70010 (09951–07360)

NOTICE:

Do not turn SST when inserting the oil seal.

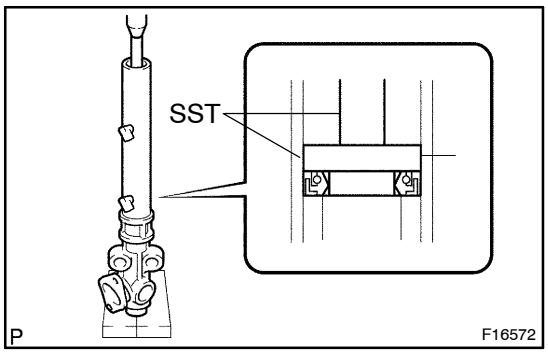


(c) After the oil seal has passed through the ports, push in the oil seal by hand until it becomes level, using SST.

SST 09950–60010 (09951–00430), 09950–70010 (09951–07360)

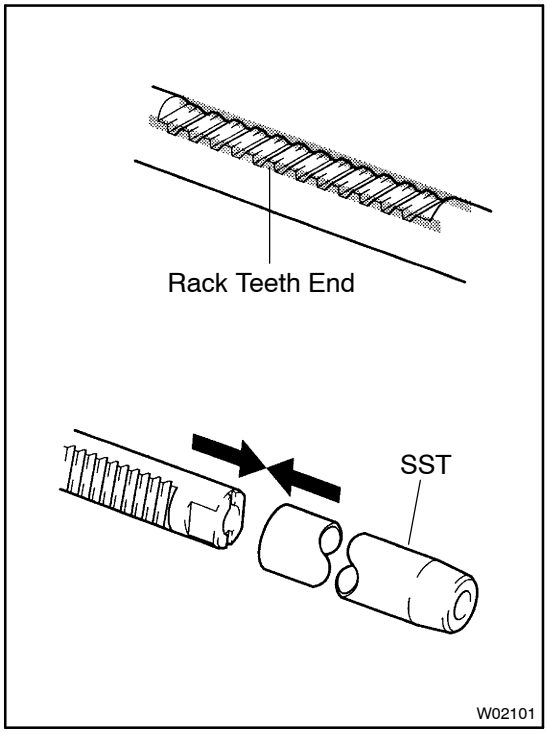
NOTICE:

When SST is set, do not damage the inside surface of the rack housing.



(d) After the oil seal has become level, using SST and press, install the oil seal.

SST 09950–60010 (09951–00430), 09950–70010 (09951–07360)

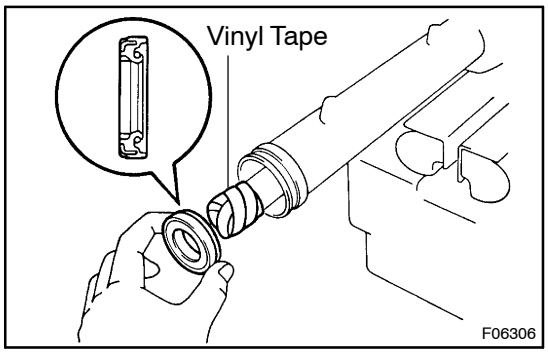


3. INSTALL STEERING RACK

(a) Install SST to the rack.
SST 09631–33010

HINT:
If necessary, scrape the burrs off the rack teeth end and burnish.

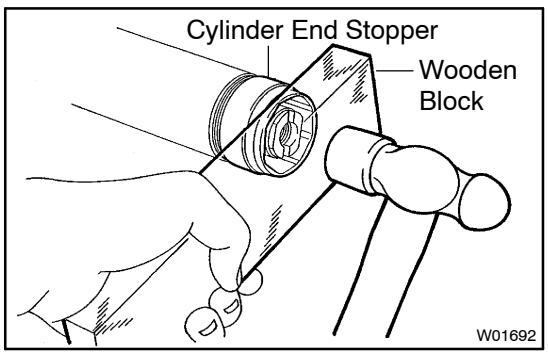
(b) Coat SST with power steering fluid.
(c) Install the steering rack into the rack housing.
(d) Remove the SST.
SST 09631–33010



4. INSTALL OIL SEAL

(a) Coat a new oil seal lip with power steering fluid.
(b) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
(c) Install the oil seal by pushing it into the rack housing without tilting.

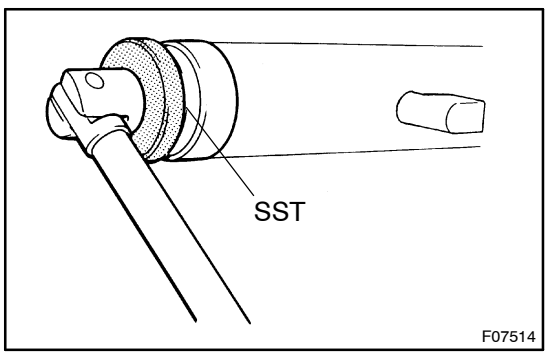
NOTICE:
Make sure that the oil seal is installed facing in the correct direction.



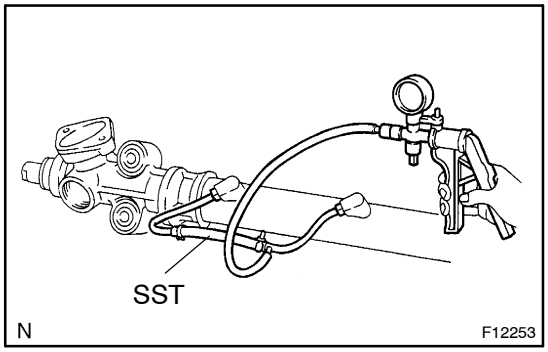
5. INSTALL CYLINDER END STOPPER AND SPACER

(a) Install the spacer.
(b) Coat a new O–ring with power steering fluid and install it to the cylinder end stopper.
(c) Using a wooden block and hammer, drive in the cylinder end stopper until it is tightly installed.

NOTICE:
Be careful not to damage the O–ring.



(d) Using SST, torque the cylinder end stopper.
SST 09631–20090
Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)



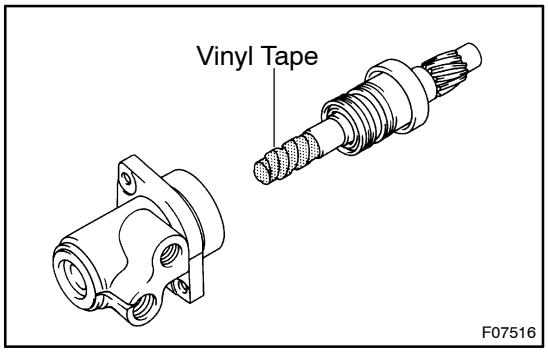
6. AIR TIGHTNESS TEST

(a) Install SST to the rack housing.
SST 09631–12071

(b) Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.

(c) Check that there is no change in the vacuum.

If there is a change in the vacuum, check the installation of the oil seals.



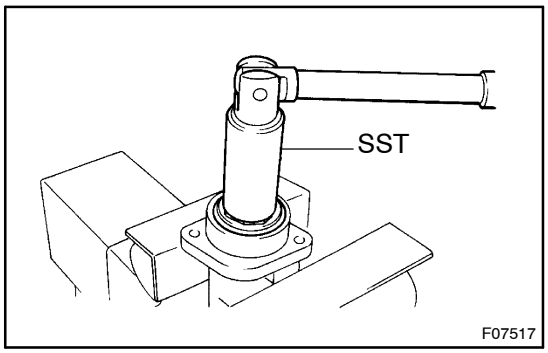
7. INSTALL CONTROL VALVE ASSEMBLY

(a) Coat the teflon rings with power steering fluid.

(b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.

(c) Push the control valve assembly into the control valve housing.

NOTICE:
Be careful not to damage the teflon rings and oil seal lip.

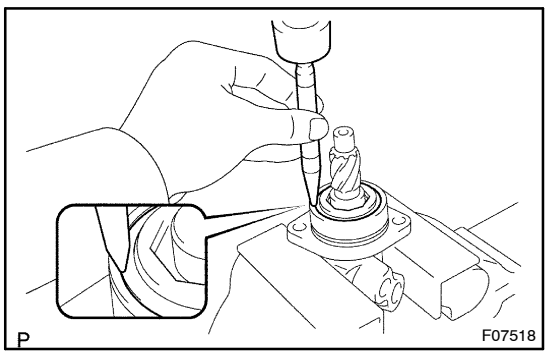


8. INSTALL BEARING GUIDE NUT

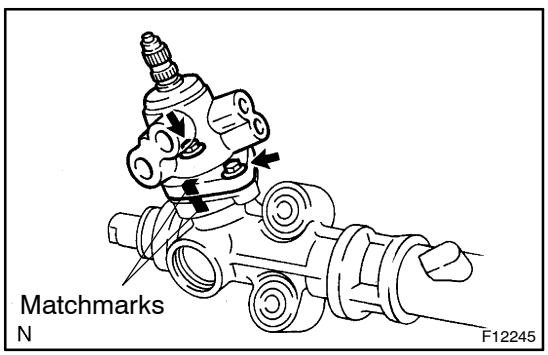
(a) Coat a new O–ring with power steering fluid, and install it to the bearing guide nut.

(b) Using SST, install the bearing guide nut.
SST 09631–20060
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

NOTICE:
Be careful not to damage the oil seal lip.



(c) Using a punch, stake the bearing guide nut.



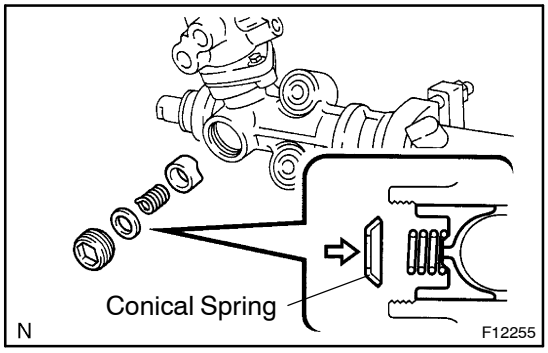
9. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

(a) Coat a new O–ring with power steering fluid, and install it to the control valve housing.

(b) Align the matchmarks on the valve housing and rack housing.

(c) Install the 2 bolts.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

10. INSTALL DUST COVER



11. INSTALL RACK GUIDE SUB–ASSEMBLY, RACK GUIDE SPRING, CONICAL SPRING AND RACK GUIDE SPRING CAP

(a) Install the rack guide sub–assembly, rack guide spring and conical spring.

NOTICE:

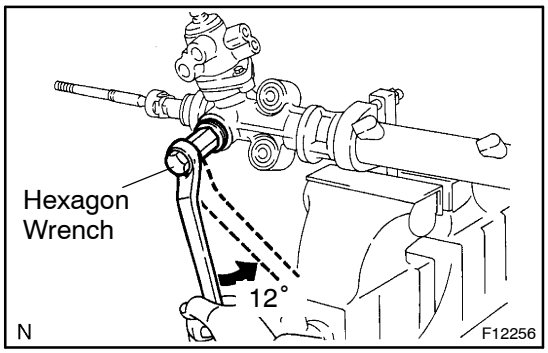
Make sure that the conical spring is installed facing in the correct direction.

(b) 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

(c) Temporarily install the rack guide spring cap.



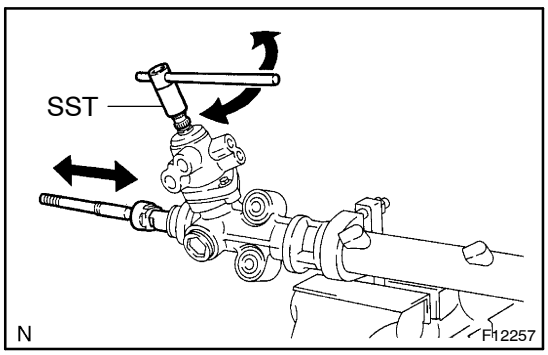
12. ADJUST TOTAL PRELOAD

(a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.

(b) Using a hexagon wrench (24 mm), torque the rack guide spring cap.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

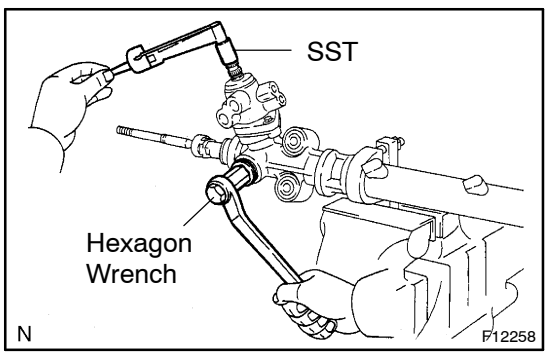
(c) Using a hexagon wrench (24 mm), return the rack guide spring cap 12°.



(d) Using SST, turn the control valve shaft right and left 1 or 2 times.

SST 09616–00011

(e) Using a hexagon wrench (24 mm), loosen the rack guide spring cap until the rack guide spring is not functioning.

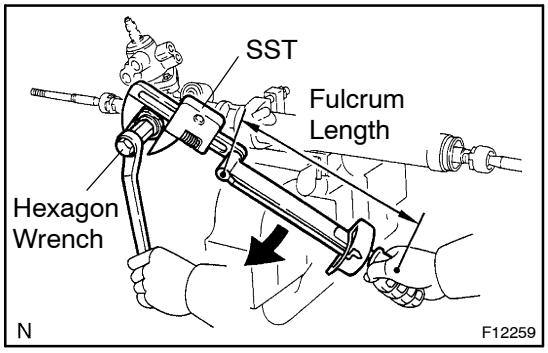


(f) Using SST, a torque wrench and hexagon wrench (24 mm), tighten the rack guide spring cap until the preload is within the specification.

SST 09616–00011

Preload (turning):

1.2 – 1.7 N·m (12.2 – 17.3 kgf·cm, 10.6 – 15.0 in.·lbf)



13. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply sealant to 2 or 3 threads of the rack guide spring cap lock nut.
Sealant:
Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Temporarily install the rack guide spring cap lock nut.

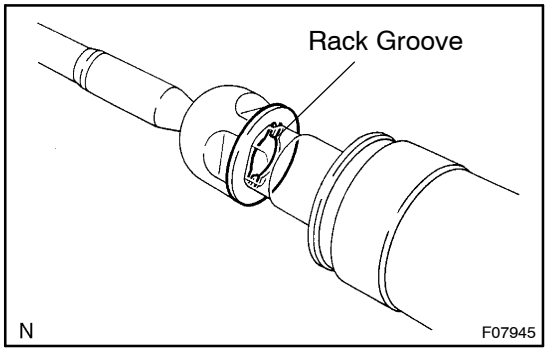
(c) Using a hexagon wrench (24 mm), hold the rack guide spring cap and using SST, torque the rack guide spring cap lock nut.
SST 09922–10010
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

HINT:
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

(d) Recheck the total preload.
Preload (turning):
1.2 – 1.7 N·m (12.2 – 17.3 kgf·cm, 10.6 – 15.0 in.·lbf)

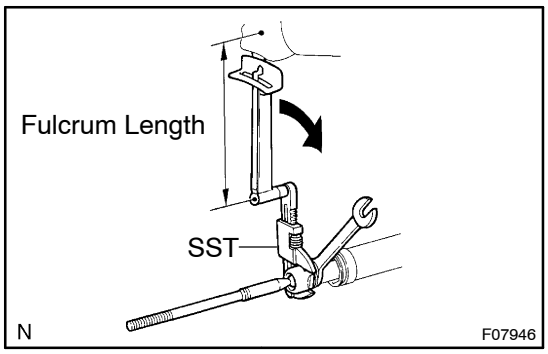
(e) Remove the RH and LH rack ends.



14. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS

(a) Install a new claw washer, and temporarily install the rack end.

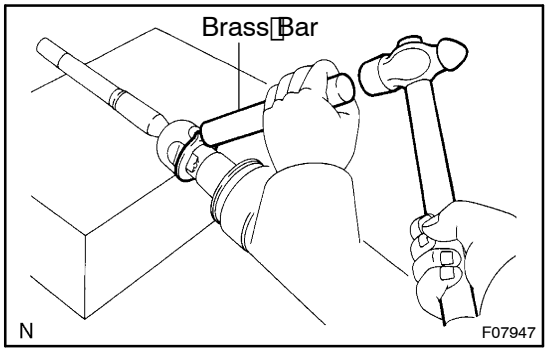
HINT:
Align the claws of the claw washer with the steering rack grooves.



(b) Using a spanner, hold the steering rack steadily and using SST, torque the rack end.
SST 09922–10010
Torque: 76 N·m (780 kgf·cm, 56 ft·lbf)

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

HINT:
Use a torque wrench with a fulcrum length of 380 mm (14.96 in.).

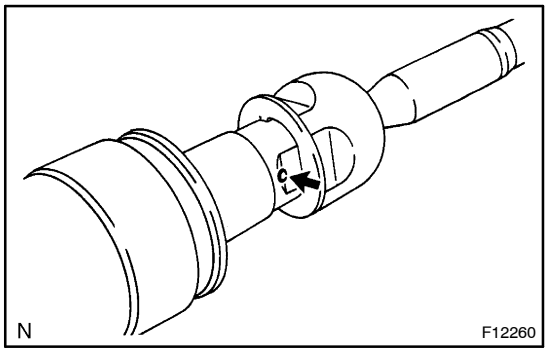


(c) Using a brass bar and a hammer, stake the washer.

NOTICE:

Avoid any impact on the steering rack.

(d) Employ the same manner described above to the other side.



15. INSTALL RH AND LH RACK BOOTS, CLAMPS AND CLIPS

(a) 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.

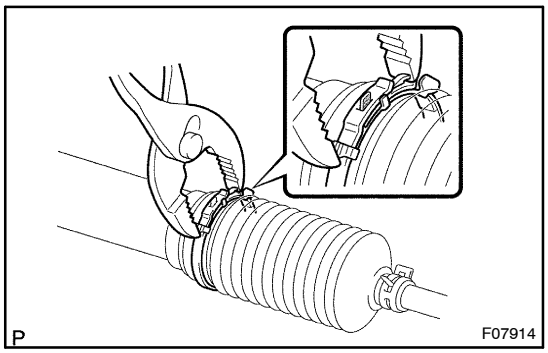
(b) Install the boot, clip and a new clamp.

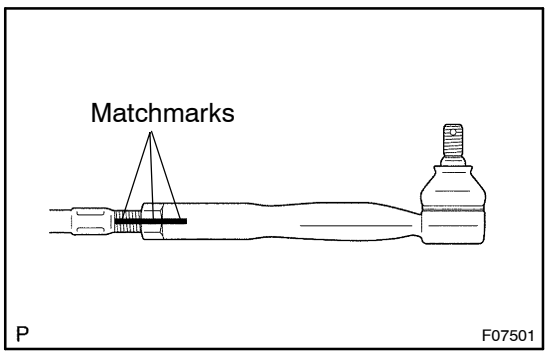
NOTICE:

Be careful not to damage or twist the boot.

(c) Tighten the clamp as shown in the illustration.

(d) Employ the same manner described above to the other side.





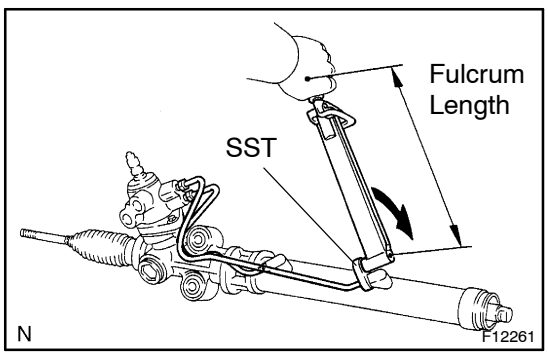
16. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.

(b) After adjusting toe–in, torque the nut (See page SA–4).

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

(c) Employ the same manner described above to the other side.



17. INSTALL 2 TURN PRESSURE TUBES

Using SST, install the 2 turn pressure tubes.

SST 09023–38200

Torque: 22 N·m (220 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 in case that SST is parallel to a torque wrench.

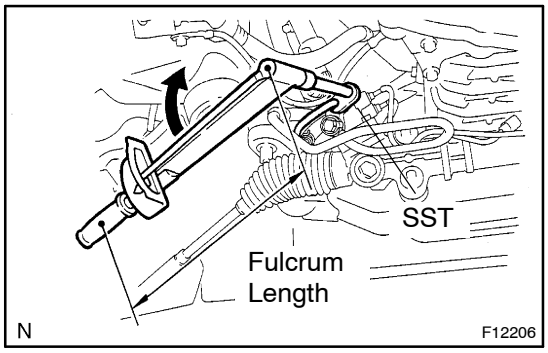
SR1H8–01

INSTALLATION

1. INSTALL GROMMET, BRACKET AND PS GEAR ASSEMBLY

Install the grommet, bracket and PS gear assembly with the 4 bolts.

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



2. CONNECT RETURN TUBE

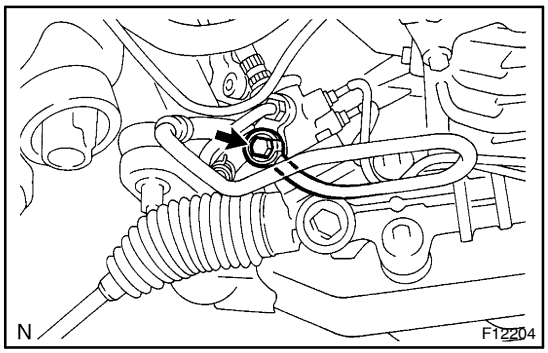
Using SST, connect the return tube.

SST 09023–38400

Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)

HINT:

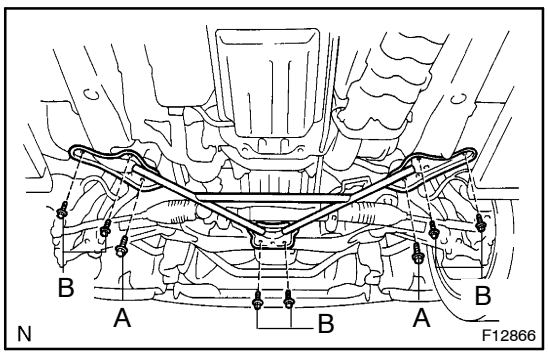
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in).
- This torque value is effective in case that SST is parallel to a torque wrench.



3. CONNECT PRESSURE FEED TUBE

Install a new gasket, then connect the pressure feed tube with the union bolt.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)



4. INSTALL FRONT SUSPENSION MEMBER BRACE

Install the front suspension member brace with the 8 bolts.

Torque:

Bolt A: 119 N·m (1,210 kgf·cm, 88 ft·lbf)

Bolt B: 58 N·m (590 kgf·cm, 43 ft·lbf)

5. CONNECT SLIDING YOKE

(See page SR–10)

6. INSTALL NO. 2 ENGINE UNDER COVER

7. CONNECT RH AND LH TIE ROD ENDS

(See Pub.No.RM684E on page SA–34)

8. INSTALL RH AND LH FRONT BRAKE CALIPERS

(See Pub.No.RM684E on page BR–30)

9. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

10. CENTER SPIRAL CABLE

(See page SR–10)

11. INSTALL STEERING WHEEL

(a) Align the matchmarks on the steering wheel and steering column main shaft.

(b) Temporarily tighten the steering wheel set nut.

(c) Connect the connector.

12. BLEED POWER STEERING SYSTEM
(See page SR–2)

13. CHECK STEERING WHEEL CENTER POINT

14. TORQUE STEERING WHEEL SET NUT
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

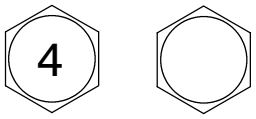
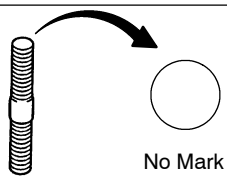
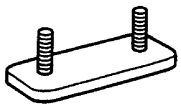
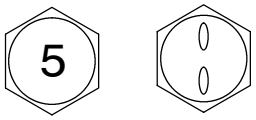
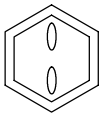
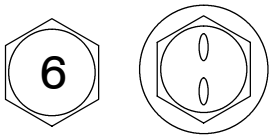
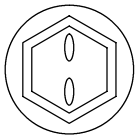
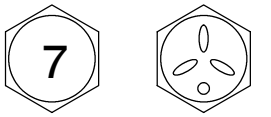
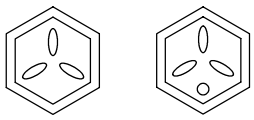
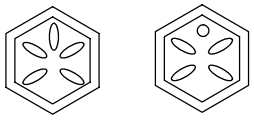
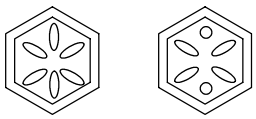
15. INSTALL STEERING WHEEL PAD
(See page SR–10)

16. CHECK FRONT WHEEL ALIGNMENT
(See page SA–4)

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

SS0ZS–01

Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
 No Mark	 No Mark	 No Mark		4T
				5T
 w/ Washer	 w/ Washer			6T
				7T
				8T
				9T
				10T
				11T

B06431

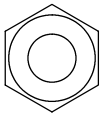
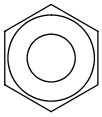
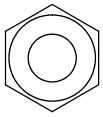
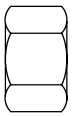
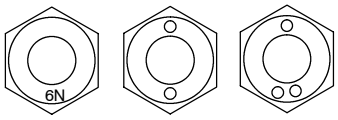
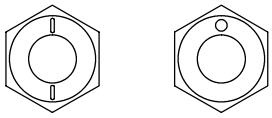
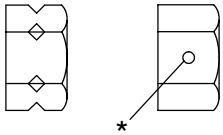
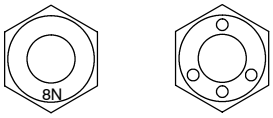
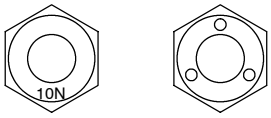
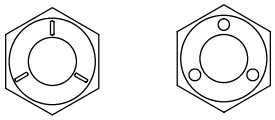
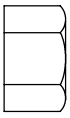
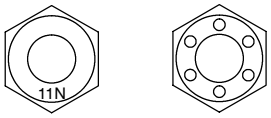
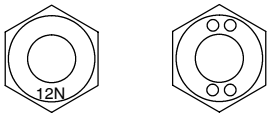
SS0ZT–01

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

SS0ZU–01

HOW TO DETERMINE NUT STRENGTH

Nut Type			Class
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
 6N			6N
		 *	7N (5T)
 8N			8N
 10N		 No Mark	10N (7T)
 11N			11N
 12N			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

ENGINE MECHANICAL (2JZ–GE)

SS0FH–12

SERVICE DATA

Compression pressure		at 250 rpm STD	1,324 kPa (13.5 kgf/cm^2, 192 psi) or more
		Minimum	1,079 kPa (11.0 kgf/cm^2, 156 psi)
		Difference of pressure between each cylinder	98 kPa (1.0 kgf/cm^2, 14 psi) or less
Valve clearance		at cold Intake	0.15 – 0.25 mm (0.006 – 0.010 in.)
		Exhaust	0.25 – 0.35 mm (0.010 – 0.014 in.)
	Adjusting shim (for repair part)	Mark 2.500	2.500 mm (0.0984 in.)
		Mark 2.550	2.550 mm (0.1004 in.)
		Mark 2.600	2.600 mm (0.1024 in.)
		Mark 2.650	2.650 mm (0.1043 in.)
		Mark 2.700	2.700 mm (0.1063 in.)
		Mark 2.750	2.750 mm (0.1083 in.)
		Mark 2.800	2.800 mm (0.1102 in.)
		Mark 2.850	2.850 mm (0.1122 in.)
		Mark 2.900	2.900 mm (0.1142 in.)
		Mark 2.950	2.950 mm (0.1161 in.)
		Mark 3.000	3.000 mm (0.1181 in.)
		Mark 3.050	3.050 mm (0.1201 in.)
		Mark 3.100	3.100 mm (0.1220 in.)
		Mark 3.150	3.150 mm (0.1240 in.)
		Mark 3.200	3.200 mm (0.1260 in.)
		Mark 3.250	3.250 mm (0.1280 in.)
		Mark 3.300	3.300 mm (0.1299 in.)
Ignition timing	w/ Terminals TC and CG connected of DLC3		10° ± 2° BTDC @ idle
Idle speed			700 ± 50 rpm
Timing belt tensioner	Protrusion (from housing side)		8.0 – 8.8 mm (0.315 – 0.346 in.)
Cylinder head	Warpage		
	Cylinder block side	Maximum	0.10 mm (0.0039 in.)
	Intake manifold side	Maximum	0.10 mm (0.0039 in.)
	Exhaust manifold side	Maximum	0.10 mm (0.0039 in.)
	Valve guide bore diameter	STD	10.985 – 11.006 mm (0.4325 – 0.4333 in.)
		O/S 0.05	11.035 – 11.056 mm (0.4344 – 0.4353 in.)
	Valve seat		
	Refacing angle		15°, 45°, 75°
	Contacting angle		45°
	Contacting width	Intake	1.0 – 1.4 mm (0.039 – 0.055 in.)
		Exhaust	1.2 – 1.6 mm (0.047 – 0.063 in.)
	Cylinder head bolt diameter	STD	10.8 – 11.0 mm (0.425 – 0.433 in.)
		Minimum	10.7 mm (0.421 in.)
Valve guide bushing	Inside diameter		6.010 – 6.030 mm (0.2366 – 0.2374 in.)
	Outside diameter (for repair part)	STD	11.033 – 11.044 mm (0.4344 – 0.4348 in.)
		O/S 0.05	11.083 – 11.094 mm (0.4363 – 0.4368 in.)
Valve	Valve overall length	STD Intake	98.29 – 98.79 mm (3.8697 – 3.8894 in.)
		Exhaust	98.84 – 99.34 mm (3.8913 – 3.9110 in.)
		Minimum Intake	98.19 mm (3.8657 in.)
		Exhaust	98.74 mm (3.8874 in.)
	Valve face angle		44.5°
	Stem diameter	Intake	5.970 – 5.985 mm (0.2350 – 0.2356 in.)
		Exhaust	5.965 – 5.980 mm (0.2348 – 0.2354 in.)

Valve (cont'd)	Stem oil clearance	STD Intake	0.025 – 0.060 mm (0.0010 – 0.0024 in.)
		Exhaust	0.030 – 0.065 mm (0.0012 – 0.0026 in.)
		Maximum Intake	0.08 mm (0.0031 in.)
		Exhaust	0.10 mm (0.0039 in.)
	Margin thickness	STD	0.8 – 1.2 mm (0.031 – 0.047 in.)
		Minimum	0.5 mm (0.020 in.)
Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length	Pink painted mark	43.71 mm (1.7209 in.)
		Yellow painted mark	44.10 mm (1.7362 in.)
	Installed tension at 34.5 mm (1.358 in.)		186.2 – 205.8 N (19.0 – 21.0 kgf, 41.9 – 46.3 lbf)
Valve lifter	Lifter diameter		30.966 – 30.976 mm (1.2191 – 1.2195 in.)
	Lifter bore diameter		31.000 – 31.016 mm (1.2205 – 1.2211 in.)
	Oil clearance	STD	0.024 – 0.050 mm (0.0009 – 0.0020 in.)
		Maximum	0.07 mm (0.0028 in.)
Camshaft	Thrust clearance	STD	0.080 – 0.190 mm (0.0031 – 0.0075 in.)
		Maximum	0.30 mm (0.0118 in.)
	Cam lobe height	STD Intake	44.310 – 44.360 mm (1.7445 – 1.7465 in.)
		Exhaust	44.250 – 44.350 mm (1.7421 – 1.7461 in.)
		Maximum Intake	44.16 mm (1.7386 in.)
		Exhaust	44.10 mm (1.7362 in.)
	Journal diameter		28.949 – 28.965 mm (1.1397 – 1.1404 in.)
	Journal oil clearance	STD	0.035 – 0.072 mm (0.0014 – 0.0028 in.)
		Maximum	0.10 mm (0.0039 in.)
	Circle runout	Maximum	0.08 mm (0.0031 in.)
Air intake chamber	Warpage	Maximum	0.15 mm (0.0059 in.)
Manifold	Warpage	Maximum Intake	0.15 mm (0.0059 in.)
		Exhaust	0.50 mm (0.0196 in.)
Cylinder block	Cylinder head surface warpage	Maximum	0.07 mm (0.0028 in.)
	Cylinder bore diameter	STD	86.000 – 86.013 mm (3.3858 – 3.3863 in.)
		Maximum	86.02 mm (3.3866 in.)
	Main bearing bolt diameter	STD	9.96 – 9.97 mm (0.3921 – 0.3925 in.)
		Minimum	9.7 mm (0.382 in.)
Connecting rod	Thrust clearance	STD	0.250 – 0.402 mm (0.0098 – 0.0158 in.)
		Maximum	0.50 mm (0.0197 in.)
	Connecting bolt diameter	STD	8.1 – 8.3 mm (0.319 – 0.327 in.)
		Minimum	8.0 mm (0.315 in.)
	Connecting rod oil clearance	STD STD	0.023 – 0.041 mm (0.0009 – 0.0016 in.)
		U/S 0.25	0.028 – 0.066 mm (0.0011 – 0.0026 in.)
		Maximum STD	0.07 mm (0.0027 in.)
		U/S 0.25	0.08 mm (0.0031 in.)
	Connecting rod bearing center wall thickness		
	(Reference)	STD Mark 1	1.498 – 1.501 mm (0.0590 – 0.0591 in.)
		Mark 2	1.501 – 1.504 mm (0.0591 – 0.0592 in.)
		Mark 3	1.504 – 1.507 mm (0.0592 – 0.0593 in.)
		Mark 4	1.507 – 1.510 mm (0.0593 – 0.0594 in.)
		Mark 5	1.510 – 1.513 mm (0.0594 – 0.0596 in.)
	Bushing inside diameter		22.005 – 22.014 mm (0.8663 – 0.8667 in.)
	Piston pin diameter		21.997 – 22.006 mm (0.8660 – 0.8664 in.)
	Piston pin oil clearance	STD	0.005 – 0.011 mm (0.0002 – 0.0004 in.)
		Maximum	0.05 mm (0.0020 in.)
	Rod out – of alignment	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
	Rod twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)

Piston and Piston ring	Piston diameter		85.935 – 85.945 mm (3.3833 – 3.3837 in.)
	Piston oil clearance	STD	0.055 – 0.078 mm (0.0022 – 0.0031 in.)
		Maximum	0.10 mm (0.0039 in.)
	Piston ring groove clearance	No.1	0.011 – 0.070 mm (0.0004 – 0.0028 in.)
		No.2	0.030 – 0.070 mm (0.0012 – 0.0028 in.)
	Piston ring end gap	STD No.1	0.300 – 0.470 mm (0.0118 – 0.0185 in.)
		No.2	0.350 – 0.520 mm (0.0138 – 0.0205 in.)
		Oil	0.130 – 0.450 mm (0.0051 – 0.0177 in.)
		Maximum No.1	1.07 mm (0.0421 in.)
		No.2	1.12 mm (0.0441 in.)
		Oil	1.05 mm (0.0413 in.)
Crankshaft	Thrust clearance	STD	0.020 – 0.220 mm (0.0008 – 0.0087 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness	STD	1.940 – 1.990 mm (0.0764 – 0.0783 in.)
	Main journal oil clearance	STD STD	0.026 – 0.040 mm (0.0010 – 0.0016 in.)
		U/S 0.25	0.025 – 0.061 mm (0.0010 – 0.0024 in.)
		Maximum STD	0.06 mm (0.0024 in.)
		U/S 0.25	0.08 mm (0.0031 in.)
	Main journal diameter	STD	61.984 – 62.000 mm (2.4403 – 2.4409 in.)
		U/S 0.25	61.745 – 61.755 mm (2.4309 – 2.4313 in.)
	Main bearing center wall thickness (Reference)		
		Mark 1	1.994 – 1.997 mm (0.0785 – 0.0786 in.)
		Mark 2	1.997 – 2.000 mm (0.0786 – 0.0787 in.)
		Mark 3	2.000 – 2.003 mm (0.0787 – 0.0789 in.)
		Mark 4	2.003 – 2.006 mm (0.0789 – 0.0790 in.)
		Mark 5	2.006 – 2.009 mm (0.0790 – 0.0791 in.)
	Crank pin diameter	STD	51.982 – 52.000 mm (2.0465 – 2.0472 in.)
		U/S 0.25	51.745 – 51.755 mm (2.0372 – 2.0376 in.)
	Circle runout	Maximum	0.06 mm (0.0024 in.)
	Main journal taper and out–of–round	Maximum	0.02 mm (0.0008 in.)
	Crank pin taper and out–of–round	Maximum	0.02 mm (0.0008 in.)

SS0FI–10

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
No.3 timing belt cover x Cylinder head		8.0	80	71 in.·lbf
Intake air connector x Air intake chamber		28	280	21
Throttle body bracket x Cylinder head		21	210	15
Timing belt plate x Oil pump		8.0	80	71 in.·lbf
Idler pulley x Oil pump		35	350	26
No.1 timing belt cover x Oil pump		8.0	80	71 in.·lbf
Camshaft timing pulley x Camshaft		81	810	60
Straight screw plug x Camshaft timing pulley		15	150	11
No.1 oil pipe x No.3 camshaft bearing cap		55	550	41
Cylinder head cover x Cylinder head		8.5	85	75 in.·lbf
High–tension cord x Cylinder head cover		8.0	80	71 in.·lbf
Timing belt tensioner x Oil pump		27	270	20
Crankshaft pulley x Crankshaft		330	3,300	243
Drive belt tensioner x Cylinder head		21	210	15
No.2 timing belt cover x Cylinder head		8.0	80	71 in.·lbf
PS pump front bracket x PS vane pump		58	590	43
PS pump front bracket x Cylinder block		52	530	38
Camshaft bearing cap x Cylinder head		20	200	14
Water temperture sensor x Cylinder head		19.6	200	14
Engine hanger x Cylinder head		40	400	30
Water outlet x Cylinder head		28	280	21
Cylinder head x Cylinder head	1st 2nd 3rd	35 Turn 90° Turn 90°	350 Turn 90° Turn 90°	26 Turn 90° Turn 90°
No.3 camshaft bearing cap x Cylinder head	Hexagon bolt	5.0	50	44 in.·lbf
No.4 timing belt cover x Cylinder head		8.0	80	71 in.·lbf
Cylinder head cover x Cylinder head		8.5	85	75 in.·lbf
Intake manifold x Cylinder head		28	280	21
Manifold stay x Intake manifold		40	400	30
Manifold stay x Cylinder block		40	400	30
Vacuum control valve set x Intake manifold		21	210	15
Exhaust manifold x Cylinder head		40	408	30
Front exhaust pipe x Exhaust manifold		44	440	32
Pipe support bracket x Transmission		43	438	32
PS vane pump x Cylinder block		57.9	590	43
PS vane pump installation bolt	Bolt A Bolt B	57.9 52	590 530	43 38
PS pump rear stay x Manifold stay		39.2	400	30
Engine hanger x Cylinder head		40	400	30
Rear support member x Body		25.5	260	19
Drive plate x Crankshaft		83	850	61
Transmission x Cylinder block		72	730	53
Starter x Transmission		37	380	27
No.1 oil pan x Transmission		37	380	27

Part tightened		N·m	kgf·cm	ft·lbf
Drive plate x Torque converter clutch		48	490	35
Front suspension crossmember x Engine mounting insulator		70	714	52
Front suspension member x Body		70	714	52
Rear engine mounting x Body		25.5	260	19
Lower arm x Steering knuckle		245	2,500	181
Shock absorber installation bolt and nut		64	650	47
Front stabilizer bar x Body	Bolt	18	180	13
	Nut	49	500	30
Sliding yoke x Steering intermediate shaft		35	360	26
Transmission control rod x Shift lever		13	130	9
Transmission control rod x Transmission		13	130	9
A/C compressor x Cylinder block	Stud bolt	26	265	19
	Bolt and nut	52	530	38
Fuel inlet hose x Fuel pipe support		29	300	22
Front suspension member brace	Bolt A	119	1,210	88
	Bolt B	58	590	43
Connecting rod cap x Connecting rod	1st	30	300	22
	2nd	Turn 90°	Turn 90°	Turn 90°
Main bearing cap x Cylinder block	1st	45	450	33
	2nd	Turn 90°	Turn 90°	Turn 90°
Rear oil seal retainer x Cylinder block		6.0	60	53
Engine mounting bracket x Cylinder block		59	590	44
Fuel inlet pipe x Cylinder block		29	290	21
No.1 oil pipe x Cylinder block		55	550	41
Oil filter bracket x Cylinder block		90	900	66
Transmission oil cooler x Cylinder block		29	296	21
No. 2 water bypass pipe with hose x Cylinder block		21	214	15
Alternator x Water pump		40	400	30
Alternator x Cylinder block		40	400	30
Front exhaust pipe x Center exhaust pipe		43	438	32
Center exhaust pipe x Tailpipe		43	438	32
Heated oxygen sensor x Front exhaust pipe		45	450	33

EMISSION CONTROL (2JZ–GE)

TORQUE SPECIFICATION

SS0FJ–11

Part tightened	N·m	kgf·cm	ft·lbf
Front exhaust pipe (with rear TWC) x Exhaust manifold	62	632	46
Front exhaust pipe (with rear TWC) x Center Exhaust Pipe	43	438	32
Pipe support bracket x Transmission	43	438	31
oxygen sensor x Exhaust manifold	45	450	33
Exhaust manifold x Cylinder head	40	408	30

ELECTRONIC FUEL INJECTION (2JZ–GE)

SS0FK–13

SERVICE DATA

Fuel pressure regulator	Fuel pressure		304 – 343 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)
Fuel pump	Resistance	at 20°C (68°F)	0.2 – 3.0 Ω
Injector	Resistance Injection volume Difference between each cylinder Fuel leakage	at 20°C (68°F)	13.4 – 14.2 Ω 60 – 73 cm^3 (3.7 – 4.5 cu in.) per 15 sec. 13 cm^3 (0.8 cu in.) or less 1 drop or less per 12 minutes
MAF meter	Resistance (THA – E2)	at –20°C (–4°F) at 20°C (68°F) at 60°C (140°F)	13.6 – 18.4kΩ 2.21 – 2.69 kΩ 0.49 – 0.67 kΩ
Throttle body	Throttle body fully closed angle		3.5°
Throttle control motor	Motor (M+ – M–) Clutch (CL+ – CL–)	at 20°C (68°F) at 20°C (68°F)	0.3 – 100 Ω 4.2 – 5.2 Ω
Throttle position sensor	Resistance (VC – E2) Throttle valve opening percentage	at 20°C (68°F) STD	1.2 – 3.2 kΩ 14.8 ± 0.8 %
Accelerator pedal position sensor	Resistance (VC – E2) Accelerator pedal position voltage	at 20°C (68°F) STD	1.2 – 3.2 kΩ 0.3 – 0.9 V
Camshaft timing oil control valve	Resistance	at 20°C (68°F)	5.5 – 12 Ω
Fuel pump resister	Resistance	at 20°C (68°F)	0.30 – 0.35 Ω
VSV for EVAP	Resistance	at 20°C (68°F)	27 – 33 Ω
VSV for acoustic control induction system (ACIS)	Resistance	at 20°C (68°F)	38.5 – 44.5 Ω
Water tempurature sensor	Resistance	at –20°C (–4°F) 0°C (32°F) 20°C (68°F) 40°C (104°F) 60°C (140°F) 80°C (176°F)	10 – 20 kΩ 4 – 7 kΩ 2 – 3 kΩ 0.9 – 1.3 kΩ 0.4 – 0.7 kΩ 0.2 – 0.4 kΩ
Heated oxygen sensor	Heater coil resistance	at 20°C (68°F)	11 – 16 Ω
Fuel cut rpm		Fuel return rpm	1,000 rpm

SS0FL–14

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Fuel line for union bolt	29	300	22
Fuel line for flare nut (for using SST)	38 (30)	387 (310)	28 (22)
Fuel tank vent tube set plate x Fuel tank	6.0	61.2	53 in.·lbf
Fuel inlet hose x Body	9.0	90	80 in.·lbf
Delivery pipe x Intake manifold	21	210	15
Fuel pressure pulsation damper x Fuel pipe support	32.5	325	24
Fuel inlet pipe x Intake manifold	9.0	90	80 in.·lbf
Fuel sender gauge x Fuel tank	1.5	15	13 in.·lbf
Fuel tank band x Body	39	400	31
MAF meter x Air cleaner	0.69	7	0.5 in.·lbf
Throttle body bracket x Throttle body	21	210	15
Throttle body bracket x Cylinder head	21	210	15
Throttle position sensor x Throttle body	1.7	17.5	15 in.·lbf
Throttle control motor x Throttle body	3.7	37.5	33 in.·lbf
Throttle control motor cover x Throttle body	1.7	17.5	15 in.·lbf
Accelerator pedal position sensor x Throttle body	3.7	37.5	33 in.·lbf
Camshaft timing oil control valve x No.3 camshaft bearing cap	8.0	80	71 in.·lbf
No.3 timing belt cover x Cylinder head cover	8.0	80	71 in.·lbf
Intake air connector x Air intake chamber	28	280	21
Air intake chamber x Intake manifold	28	280	21
Vacuum control valve set x Intake manifold	21	210	15
Water temperature sensor x Cylinder head	19.6	200	14
Knock sensor x Cylinder block	44	450	33
PS pump rear stay x Manifold stay	39.2	400	29
PS pump rear stay x PS pump bracket	39.2	400	29
Heated oxygen sensor x Exhaust manifold	45	450	33
Heated oxygen sensor x Front exhaust pipe	45	450	33

COOLING (2JZ–GE)

SS0FM–06

SERVICE DATA

Thermostat	Valve opening temperature Valve lift	 at 95°C (203°F)	80 – 84°C (176 – 183°F) 8.5 mm (0.335 in.) or more
Radiator cap	Relief valve opening pressure	STD Minimum	93 – 123 kPa (0.95 – 1.25 kgf/cm^2, 13.5 – 17.8 psi) 78 kPa (0.8 kgf/cm^2, 11.4 psi)
Electric cooling fan	Rotating amperage	at 20°C (68°F)	8.5 – 11.5 A

SS0FN–09

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Water pump x Cylinder block	21	210	15
Water pump x No.2 water bypass pipe	21	210	15
Generator x Water pump	40	400	30
Generator x Cylinder block	40	400	30
Water bypass outlet x Cylinder head	9.0	90	80 in.·lbf
Water pump pulley x Water pump	14	140	10
Water inlet x Water pump	9.0	90	80 in.·lbf
Electric cooling fan x Radiator	5.0	50	44 in.·lbf
Upper radiator support x Body	13.5	135	10

LUBRICATION (2JZ–GE)

SS0DY–02

SERVICE DATA

Oil pressure		at idle speed	49 kPa (0.5 kgf/cm^2, 7 psi) or more
		at 3,000 rpm	324 kPa (3.3 kgf/cm^2, 47 psi) or more
Oil pump	Tip clearance	STD	0.060 – 0.240 mm (0.0024 – 0.0094 in.)
		Maximum	0.30 mm (0.0118 in.)
	Body clearance	STD	0.100 – 0.175 mm (0.0039 – 0.0069 in.)
		Maximum	0.20 mm (0.0079 in.)
	Side clearance	STD	0.030 – 0.090 mm (0.0012 – 0.0035 in.)
		Maximum	0.12 mm (0.0047 in.)

SS0DZ–02

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Union bolt x Cylinder block		90	900	66
Oil pressure switch x Union bolt		15	150	11
Oil drain plug x No.2 oil pan		38	390	28
Oil pump body cover x Oil pump body		10	105	8
Plug x Oil pump body		49	500	36
Oil pump x Cylinder block		21	210	15
No.1 oil pan x Cylinder block	12 mm head	21	210	15
	14 mm head	40	400	30
Oil pan baffle plate x No.1 oil pan		9.0	90	80 in.·lbf
Oil strainer x No.1 oil pan		9.0	90	80 in.·lbf
No.2 oil pan x No.1 oil pan		9.0	90	80 in.·lbf
Oil level sensor x No.1 oil pan		5.4	55	48 in.·lbf
Crankshaft position sensor x Oil pump		9.0	90	80 in.·lbf

IGNITION (2JZ–GE)

SS0FO–08

SERVICE DATA

High–tension cord	Resistance	Maximum	25 kΩ per cord
Spark plug	Recommended spark plug	DENSO made	SK16R–P11
	Correct electrode gap for new plug		1.2 mm (0.047 in.)
	Maximum electrode gap for used plug		1.0 – 1.1 mm (0.039 – 0.043 in.)
Ignition coil	Primary coil resistance	at cold	0.33 – 0.52 Ω
		at hot	0.42 – 0.61 Ω
	Secondary coil resistance	at cold	8.5 – 14.7 kΩ
		at hot	10.8 – 17.2 kΩ
Camshaft position sensor	Resistance	at cold	835 – 1,400 Ω
		at hot	1,060 – 1,645 Ω
Crankshaft position sensor	Resistance	at cold	1,630 – 2,740 Ω
		at hot	2,065 – 3,225 Ω

SS0FP–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	18	180	13
Throttle body x Intake air connector	21	210	15
Throttle body bracket x Cylinder head	21	210	15
Throttle body bracket x Throttle body	21	210	15
Throttle body gasket x Intake air connector	21	210	15
Ignition coils and high–tension cord set assembly x Cylinder head	8.0	80	71 in.·lbf
PS pump rear stay x Manifold stay	39.2	400	29
PS pump rear stay x PS pump bracket	39.2	400	29
Camshaft position sensor x Cylinder head	9.0	90	80 in.·lbf
Crankshaft position sensor x Oil pump	9.0	90	80 in.·lbf

STARTING (2JZ–GE)

SS0FQ–01

SERVICE DATA

Starter	Rated voltage and output power		12 V 1.4 kW
	No–load characteristics	Current	90 A or less at 11.5 V
		rpm	3,000 rpm or more
	Brush length	STD	15.5 mm (0.610 in.)
		Minimum	10.0 mm (0.394 in.)
	Spring installed load	STD	17.6 – 23.5 N (1.8 – 2.4 kgf, 3.9 – 5.3 lbf)
		Minimum	11.8 N (1.2 kgf, 2.6 lbf)
	Commutator		
	Diameter	STD	30.0 mm (1.181 in.)
		Minimum	29.0 mm (1.412 in.)
	Undercut depth	STD	0.6 mm (0.024 in.)
		Minimum	0.2 mm (0.008 in.)
	Circle runout	Maximum	0.05 mm (0.0020 in.)
	Magnetic switch		
	Contact plate for wear	Maximum	0.9 mm (0.035 in.)

SS0FR–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Starter x Transmission	37	380	27
Lead wire x Terminal C of starter	5.9	60	52 in.·lbf
Field frame x Armature assembly	5.9	60	52 in.·lbf
Starter housing x Magnetic switch	5.9	60	52 in.·lbf
End cover x Field frame	1.5	15	13 in.·lbf
Terminal nut x Terminal 30 of starter	17	173	13
Terminal nut x Terminal C of starter	17	173	13
Magnetic switch end cover x Magnetic switch	2.5	26	22 in.·lbf

CHARGING (2JZ–GE)

SS0E6–12

SERVICE DATA

Battery	Voltage (Maintenance–free battery)	at 20˚C (68˚F)	12.5 – 12.9 V
	Specific gravity (Except maintenance–free battery)	at 20˚C (68˚F)	1.25 – 1.29
Generator	Rated output		12 V 80 A
	Rotor coil resistance	at 20˚C (68˚C)	2.1 – 2.5 Ω
	Slip ring diameter	STD	14.2 – 14.4 mm (0.559 – 0.567 in.)
		Minimum	12.8 mm (0.504 in.)
	Brush exposed length	STD	9.5 –11.5 mm (0.374 –0.453 in.)
		Minimum	1.5 mm (0.059 in.)
Voltage regulator	Regulating voltage		13.2 – 14.8 V

SS0E7–13

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Alternator x Engine		40	410	30
Alternator wire x Alternator		9.8	100	7
Bearing retainer x Drive end frame		3.0	31	27 in.·lbf
Rectifier end frame x Drive end frame		4.5	46	40 in.·lbf
Wire clip x Rectifier end frame		5.4	55	48 in.·lbf
Pulley x Rotor		110.5	1,125	81
Rectifier holder x Coil lead on rectifier end frame		2.9	30	26 in.·lbf
Voltage regulator x Rectifier end frame		2.0	20	18 in.·lbf
Voltage regulator x Rectifier holder		2.0	20	18 in.·lbf
Brush holder x Rectifier holder		2.0	20	18 in.·lbf
Brush holder x Voltage regulator		2.0	20	18 in.·lbf
Rear end cover x Rectifier holder		4.4	45	39 in.·lbf
Plate terminal x Rectifier holder	Nut	4.4	45	39 in.·lbf
	Bolt	3.9	40	35 in.·lbf
Terminal insulator x Rectifier holder		6.5	67	58 in.·lbf

AUTOMATIC TRANSMISSION

SERVICE DATA

SS0C5–12

Line pressure (Wheel locked)		
	Idling	
	D position	390 – 460 kPa (4.0 – 4.7 kgf·cm^2, 57 – 67 psi)
	R position	0
	Stall	
	D position	1,200 – 1,360 kPa (12.2 – 13.8 kgf·cm^2, 174 – 196 psi)
	R position	1,640 – 1,960 kPa (16.7 – 19.8 kgf·cm^2, 238 – 282 psi)
Engine stall revolution (D position)		2,700 ± 150 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (N position and A/C OFF)		700 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter sleeve runout	Max.	0.30 mm (0.0118 in.)
Torque converter installation (Correct distance)		More than 0.1 mm (0.004 in.)
Shift schedule (NORM and PWR mode)		
Differential gear ratio 3.583		
D, 4 position		
(Throttle valve fully opened)	1 → 2	52 – 65 km/h (32 – 40 mph)
	2 → 3	85 – 96 km/h (53 – 60 mph)
	3 → 4	129 – 146 km/h (80 – 91 mph)
	4 → 5	184 – 203 km/h (114 – 126 mph)
	5 → 4	177 – 193 km/h (110 – 120 mph)
	4 → 3	117 – 130 km/h (73 – 81 mph)
	3 → 2	65 – 72 km/h (40 – 45 mph)
	2 → 1	35 – 41 km/h (22 – 25 mph)
(Throttle valve fully closed)	4 → 5	23 – 28 km/h (14 – 17 mph)
	5 → 4	41 – 47 km/h (25 – 29 mph)
3 position		
(Throttle valve fully opened)	1 → 2	52 – 65 km/h (32 – 40 mph)
	2 → 3	85 –96 km/h (53 – 60 mph)
	4 → 3	134 – 148 km/h (83 – 92 mph)
	3 → 2	65 – 72 km/h (40 – 45 mph)
	2 → 1	35 – 41 km/h (22 – 25 mph)
2 position		
(Throttle valve fully opened)	1 → 2	52 – 65 km/h (32 – 40 mph)
	3 → 2	90 – 99 km/h (56 – 62 mph)
	2 → 1	35 – 41 km/h (22 – 25 mph)
L position		
(Throttle valve fully opened)	2 → 1	19 – 24 km/h (12 – 15 mph)

Shift schedule (SNOW mode)		
Differential gear ratio 3.583		
D, 4 position		
(Throttle valve fully opened)	1 → 2	44 – 67 km/h (24 – 34 mph)
	2 → 3	70 – 98 km/h (37 – 50 mph)
	3 → 4	107 – 147 km/h (57 – 74 mph)
	4 → 5	154 – 203 km/h (82 – 103 mph)
	5 → 4	92 – 138 km/h (43 – 60 mph)
	4 → 3	55 – 82 km/h (25 – 37 mph)
	3 → 2	30 – 50 km/h (13– 21 mph)
(Throttle valve fully closed)	4 → 5	41 – 47 km/h (25 – 29 mph)
	5 → 4	23 – 28 km/h (14 – 17 mph)
3 position		
(Throttle valve fully opened)	1 → 2	44 – 67 km/h (24 – 36 mph)
	2 → 3	70 – 98 km/h (37 – 50 mph)
	4 → 3	134 – 148 km/h (83 – 92 mph)
	3 → 2	30 – 50 km/h (12 – 21 mph)
2 position		
(Throttle valve fully opened)	1 → 2	44 – 67 km/h (24 – 34 mph)
	3 → 2	90 – 99 km/h (56 – 62 mph)
L position		
(Throttle valve fully opened)	2 → 1	30 – 50 km/h (12 – 15 mph)
Lock–up point	(Throttle valve opening 5 %)	
5th gear (D position)	Lock–up ON	58 – 65 km/h (36 – 40 mph)
	Lock–up OFF	56 – 63 km/h (35 – 39 mph)
4th gear (4 position)	Lock–up ON	58 – 65 km/h (36 – 40 mph)
	Lock–up OFF	56 – 63 km/h (35 – 39 mph)
Flex lock–up point		
(Throttle valve opening 3 %)		
D position (When accelerating)		
5th gear	Lock–up ON	41 – 47 km/h (25 – 29 mph)
	Lock–up OFF	39 – 45 km/h (24 – 28 mph)
4th gear	Lock–up ON	31 – 36 km/h (19 – 22 mph)
	Lock–up OFF	29 – 35 km/h (18 – 22 mph)

SS139–03

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Extension housing x Transmission case	34	345	25
Transmission mounting bracket x Extension housing	12	120	9
Engine rear support member x Frame	25	260	19
Engine rear support member x Transmission mounting bracket	13.5	135	10
Transmission mounting bracket x Transmission Case	12	120	9
Vehicle speed sensor set bolt	5.4	55	48 in.·lbf
O/D direct clutch speed sensor set bolt	5.4	55	48 in.·lbf
ATF temperature sensor connector set bolt	5.4	55	48 in.·lbf
Drain plug	20	205	15
Shift solenoid valve SLU and SLT set bolt	6.4	65	56 in.·lbf
Shift solenoid valve SLN and No. 4 set bolt	10	100	7
Shift solenoid valve clamp set bolt	6.4	65	56 in.·lbf
Shift solenoid valve No. 1 and No. 3	6.4	65	56
Shift solenoid valve No. 2	10	100	7
Shift control rod set nut	13	130	9
Valve body x Transmission case	10	100	7
Oil pan x Transmission case	7.4	75	65 in.·lbf
Oil strainer x Valve body	10	100	7
Parking lock pawl bracket x Transmission case	7.4	75	65 in.·lbf
Control shaft lever set nut	16	163	12
Shift lever guide housing assembly x Shift lever plate	4.9	50	43 in.·lbf
Floor shift lever assembly set bolt	8.3	85	73 in.·lbf
Transmission oil cooler x cylinder block	29	296	21.4
Oil cooler pipe clamp bolt	5.4	55	48 in.·lbf
Oil cooler pipe union nut	44	450	33
Transmission x Engine 14 mm head	37	380	27
Transmission x Engine 17 mm head	72	730	53
Starter x Transmission	37	380	27
Exhaust pipe assembly x Exhaust manifold	62	632	46
Exhaust manifold with TWC x Engine	39	400	29
Pipe support bracket x Transmission	43	438	32
Torque converter x Drive plate	48	490	35
Propeller shaft x Differential	74	750	54
Propeller shaft x Body	49	500	36
Drive plate x Crankshaft	83	850	61

PROPELLER SHAFT

SERVICE DATA

SS0F7–03

Shaft runout Max.	0.8 mm (0.031 in.)
Center support bearing adjusting washer thickness	1.0 mm (0.039 in.) 2.0 mm (0.079 in.) 2.5 mm (0.098 in.) 3.0 mm (0.118 in.) 3.6 mm (0.142 in.) 4.0 mm (0.157 in.) 4.5 mm (0.177 in.)

SS0F8–02

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Propeller shaft x Differential		74	750	54
Propeller shaft x Intermediate shaft		74	750	54
Intermediate shaft x Center support bearing x Universal joint flange	1st	181	1,850	134
	2nd	Loosen nut		
	3rd	69	700	51
Center support bearing x Body		49	500	36
Exhaust pipe assembly x Exhaust manifold		62	632	46
Heated oxygen sensor x Exhaust pipe assembly		44	450	33

SUSPENSION AND AXLE

SERVICE DATA

SS0FD–10

Cold tire inflation pressure (SEDAN,Europe)	Up to 4 passengers		
	Tire size		
	215/45ZR17	Front*1	280 kPa (2.8 kgf/cm^2, 41 psi)
		Rear*1	310 kPa (3.1 kgf/cm^2, 45 psi)
		Front*2	260 kPa (2.6 kgf/cm^2, 38 psi)
		Rear*2	270 kPa (2.7 kgf/cm^2, 39 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	230 kPa (2.3 kgf/cm^2, 33 psi)
	205/55R16 89V	Front*1	260 kPa (2.6 kgf/cm^2, 38 psi)
		Rear*1	290 kPa (2.9 kgf/cm^2, 42 psi)
		Front*2	250 kPa (2.5 kgf/cm^2, 36 psi)
		Rear*2	250 kPa (2.5 kgf/cm^2, 36 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	230 kPa (2.3 kgf/cm^2, 33 psi)
	5 passengers		
	Tire size		
	215/45ZR17	Front*1	330 kPa (3.3 kgf/cm^2, 48 psi)
		Rear*1	350 kPa (3.5 kgf/cm^2, 51 psi)
		Front*2	300 kPa (3.0 kgf/cm^2, 44 psi)
		Rear*2	300 kPa (3.0 kgf/cm^2, 44 psi)
		Front*3	250 kPa (2.5 kgf/cm^2, 36 psi)
		Rear*3	250 kPa (2.5 kgf/cm^2, 36 psi)
	205/55R16 89V	Front*1	310 kPa (3.1 kgf/cm^2, 45 psi)
		Rear*1	330 kPa (3.3 kgf/cm^2, 48 psi)
		Front*2	280 kPa (2.8 kgf/cm^2, 41 psi)
		Rear*2	280 kPa (2.8 kgf/cm^2, 41 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	230 kPa (2.3 kgf/cm^2, 33 psi)
Cold tire inflation pressure (SEDAN,Others)	Up to 4 passengers		
	Tire size		
	215/45ZR17	Front*4	280 kPa (2.8 kgf/cm^2, 41 psi)
		Rear*4	310 kPa (3.1 kgf/cm^2, 45 psi)
		Front*5	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*5	230 kPa (2.3 kgf/cm^2, 33 psi)
	205/55R16 89V	Front*4	270 kPa (2.7 kgf/cm^2, 39 psi)
		Rear*4	290 kPa (2.9 kgf/cm^2, 42 psi)
		Front*5	220 kPa (2.2 kgf/cm^2, 32 psi)
		Rear*5	220 kPa (2.2 kgf/cm^2, 32 psi)
	5 passengers		
	Tire size		
	215/45ZR17	Front*4	330 kPa (3.3 kgf/cm^2, 48 psi)
		Rear*4	350 kPa (3.5 kgf/cm^2, 51 psi)
		Front*5	250 kPa (2.5 kgf/cm^2, 36 psi)
		Rear*5	250 kPa (2.5 kgf/cm^2, 36 psi)
	205/55R16 89V	Front*4	310 kPa (3.1 kgf/cm^2, 45 psi)
		Rear*4	330 kPa (3.3 kgf/cm^2, 48 psi)
		Front*5	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*5	230 kPa (2.3 kgf/cm^2, 33 psi)

Cold tire inflation pressure (WAGON)	Up to 4 passengers		
	Tire size		
	215/45ZR17	Front*1	280 kPa (2.8 kgf/cm^2, 41 psi)
		Front*2	260 kPa (2.6 kgf/cm^2, 38 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
	225/45ZR17	Rear*1	290 kPa (2.9 kgf/cm^2, 42 psi)
		Rear*2	270 kPa (2.7 kgf/cm^2, 39 psi)
		Rear*3	240 kPa (2.4 kgf/cm^2, 35 psi)
	205/55R16 89V	Front*1	260 kPa (2.6 kgf/cm^2, 38 psi)
		Rear*1	310 kPa (3.1 kgf/cm^2, 45 psi)
		Front*2	250 kPa (2.5 kgf/cm^2, 36 psi)
		Rear*2	260 kPa (2.6 kgf/cm^2, 38 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	230 kPa (2.3 kgf/cm^2, 33 psi)
	5 passengers		
	Tire size		
	215/45ZR17	Front*1	330 kPa (3.3 kgf/cm^2, 48 psi)
		Front*2	300 kPa (3.0 kgf/cm^2, 44 psi)
		Front*3	250 kPa (2.5 kgf/cm^2, 36 psi)
	225/45ZR17	Rear*1	340 kPa (3.4 kgf/cm^2, 49 psi)
		Rear*2	310 kPa (3.1 kgf/cm^2, 45 psi)
		Rear*3	260 kPa (2.6 kgf/cm^2, 38 psi)
	205/55R16 89V	Front*1	310 kPa (3.1 kgf/cm^2, 45 psi)
		Rear*1	330 kPa (3.3 kgf/cm^2, 48 psi)
		Front*2	280 kPa (2.8 kgf/cm^2, 41 psi)
		Rear*2	290 kPa (2.9 kgf/cm^2, 42 psi)
		Front*3	230 kPa (2.3 kgf/cm^2, 33 psi)
		Rear*3	240 kPa (2.4 kgf/cm^2, 35 psi)
Front wheel alignment	Vehicle height (SEDAN)		
	(Great Britain sports package)	Front: B*7 – A*6	72 mm (2.83 in.)
		Rear: C*8 – D*9	85 mm (3.35 in.)
	(China)	Front: B*7 – A*6	56 mm (2.20 in.)
		Rear: C*8 – D*9	66 mm (2.60 in.)
	(Except Great Britain sports package and China)	Front: B*7 – A*6	66 mm (2.60 in.)
		Rear: C*8 – D*9	66 mm (2.60 in.)
	Vehicle height (WAGON)		
	(Great Britain sports package)	Front: B*7 – A*6	72 mm (2.83 in.)
		Rear: C*8 – D*9	85 mm (3.35 in.)
	(Except Great Britain sports package)	Front: B*7 – A*6	66 mm (2.60 in.)
		Rear: C*8 – D*9	66 mm (2.60 in.)
	Camber (SEDAN)		
	(Great Britain sports package)		–0°30' ± 30' (–0.5° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(China)		–0°06' ± 30' (–0.10° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(Except Great Britain sports package and China)		–0°21' ± 30' (–0.35° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Camber (WAGON)		
	(Great Britain sports package)		–0°30' ± 30' (–0.5° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(Except Great Britain sports package)		–0°21' ± 30' (–0.35° ± 0.5°)
		Right–left error	30' (0.5°) or less

Front wheel alignment	Caster (SEDAN)		
	(Great Britain sports package)		6°07' ± 30' (6.12° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(China)		5°43' ± 30' (5.72° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(Except Great Britain sports package and China)		5°46' ± 30' (5.77° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Caster (WAGON)		
	(Great Britain sports package)		6°07' ± 30' (6.12° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(Except Great Britain sports package)		5°46' ± 30' (5.77° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Steering axis inclination (SEDAN)		
	(Great Britain sports package)		9°25' ± 30' (9.42° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(China)		9°01' ± 30' (9.02° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(Except Great Britain sports package and China)		9°16' ± 30' (9.27° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Caster (WAGON)		
	(Great Britain sports package)		9°25' ± 30' (9.42° ± 0.5°)
		Right–left error	30' (0.5°) or less
	(Except Great Britain sports package)		9°16' ± 30' (9.27° ± 0.5°)
		Right–left error	30' (0.5°) or less
	Toe–in (total)		0°06' ± 12' (0.1° ± 0.2°) 1 ± 2 mm (0.04 ± 0.08 in.)
	Wheel angle (SEDAN)		
	(Great Britain sports package)	Inside wheel	41°01' (39°01' – 42°01') 41.02° (39.02° – 42.02°)
		Outside wheel: Reference	33°23' 33.38°
	(China)	Inside wheel	41°03' (39°03' – 42°03') 41.05° (39.05° – 42.05°)
		Outside wheel: Reference	33°40' 33.6°
	(Except Great Britain sports package and China)	Inside wheel	41°02' (39°02' – 42°02') 41.03° (39.03° – 42.03°)
		Outside wheel: Reference	33°30' 33.5°
	Caster (WAGON)		
	(Great Britain sports package)	Inside wheel	41°01' (39°01' – 42°01') 41.02° (39.02° – 42.02°)
		Outside wheel: Reference	33°23' 33.38°
	(Except Great Britain sports package)	Inside wheel	41°02' (39°02' – 42°02') 41.03° (39.03° – 42.03°)
		Outside wheel: Reference	33°30' 33.5°

Rear wheel alignment	Camber (SEDAN) (Great Britain sports package) Right–left error (Except Great Britain sports package) Right–left error Camber (WAGON) (Great Britain sports package) Right–left error (Except Great Britain sports package) Right–left error	 –0°55' ± 30' (–0.92° ± 0.5°) 30' (0.5°) or less –0°23' ± 30' (–0.38° ± 0.5°) 30' (0.5°) or less –0°55' ± 30' (–0.92° ± 0.5°) 30' (0.5°) or less –0°23' ± 30' (–0.38° ± 0.5°) 30' (0.5°) or less
	Toe–in (total)	0°12' ± 12' (0.2° ± 0.2°) 2 ± 2 mm (0.08 ± 0.08 in.)
Front suspension	Upper ball joint turning torque	1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.·lbf)

*1: For driving at 210 km/h (131 mph) or over
*2: For driving at 160 km/h (100 mph) to 210 km/h (131 mph)
*3: For driving under 160 km/h (100 mph)
*4: For driving at 140 km/h (88 mph) or over
*5: For driving under 140 km/h (88 mph)
*6: Ground clearance of the front No .1 lower suspension arm mounting bolt center.
*7: Ground clearance of the front wheel center.
*8: Ground clearance of the rear wheel center.
*9: Ground clearance of the No. 2 lower suspension arm mounting bolt (Suspension member side) tail center.

Rear drive shaft (2JZ–GE)	Drive shaft standard length	RH: 585.4 ± 5.0 mm (23.047 ± 0.197 in.) LH: 539.8 ± 5.0 mm (21.252 ± 0.197 in.)
Rear suspension	Upper ball joint turning torque	1.0 – 2.9 N·m (10 – 30 kgf·cm, 9 – 26 in.·lbf)
Rear differential	Companion flange vertical runout Maximum	0.09 mm (0.0035 in.)
	Companion flange lateral runout Maximum	0.09 mm (0.0035 in.)
	Ring gear runout Maximum	0.07 mm (0.0028 in.)
	Ring gear backlash Maximum	0.13 – 0.18 mm (0.0051 – 0.0071 in.)
	Drive pinion bearing (at starting) New bearing (1G–FE) (2JZ–GE) Reused bearing (1G–FE) (2JZ–GE)	 1.3 – 1.9 N·m (13 – 19 kgf·cm, 11.5 – 16.8 in.·lbf) 0.98 – 1.57 N·m (10 – 16 kgf·cm, 8.7 – 13.9 in.·lbf) 0.4 – 0.7 N·m (4 – 7 kgf·cm, 3.5 – 6.2 in.·lbf) 0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.·lbf)
	Total preload (at starting)	Drive pinion preload plus 0.4 – 0.6 N·m (4 – 6 kgf·cm, 3.5 – 5.2 in.·lbf)
	Side gear backlash (2 pinion differential)	0.05 – 0.20 mm (0.0020 – 0.0079 in.)
	Differential case runout Maximum	0.07 mm (0.0028 in.)
	Pinion gear backlash	0.05 – 0.20 mm (0.0020 ± 0.0079 in.)
	Side gear shaft oil seal drive in depth	0.50 ± 0.50 mm (0.0200 ± 0.0200 in.)
	Front oil seal drive in depth	2.00 ± 0.45 mm (0.0787 ± 0.0177 in.)
	Right and left side gear shafts standard distance (1G–FE) (2JZ–GE)	239.2 ± 0.3 mm (9.4173 ± 0.0118 in.) 279.7 mm (11.012 in.) or less
	Pinion gear backlash adjusting thrust washer	1.0 mm (0.039 in.) 1.1 mm (0.043 in.) 1.2 mm (0.047 in.) 1.3 mm (0.051 in.)

Rear differential	Side bearing adjusting washer thickness	2.58 mm (0.1016 in.) 2.60 mm (0.1024 in.) 2.62 mm (0.1031 in.) 2.64 mm (0.1039 in.) 2.66 mm (0.1047 in.) 2.68 mm (0.1055 in.) 2.70 mm (0.1063 in.) 2.72 mm (0.1071 in.) 2.74 mm (0.1079 in.) 2.76 mm (0.1087 in.) 2.78 mm (0.1094 in.) 2.80 mm (0.1102 in.) 2.82 mm (0.1110 in.) 2.84 mm (0.1118 in.) 2.86 mm (0.1126 in.) 2.88 mm (0.1134 in.) 2.90 mm (0.1142 in.) 2.92 mm (0.1150 in.) 2.94 mm (0.1157 in.) 2.96 mm (0.1165 in.) 2.98 mm (0.1173 in.) 3.00 mm (0.1181 in.) 3.02 mm (0.1189 in.) 3.04 mm (0.1197 in.) 3.06 mm (0.1205 in.) 3.08 mm (0.1213 in.) 3.10 mm (0.1220 in.) 3.12 mm (0.1228 in.) 3.14 mm (0.1236 in.) 3.16 mm (0.1244 in.) 3.18 mm (0.1252 in.) 3.20 mm (0.1260 in.) 3.22 mm (0.1268 in.) 3.24 mm (0.1276 in.)
	Drive pinion bearing adjusting washer thickness	1.70 mm (0.0669 in.) 1.73 mm (0.0681 in.) 1.76 mm (0.0693 in.) 1.79 mm (0.0704 in.) 1.82 mm (0.0717 in.) 1.85 mm (0.0729 in.) 1.88 mm (0.0740 in.) 1.91 mm (0.0752 in.) 1.94 mm (0.0764 in.) 1.97 mm (0.0776 in.) 2.00 mm (0.0787 in.) 2.03 mm (0.0799 in.) 2.06 mm (0.0811 in.) 2.09 mm (0.0822 in.) 2.12 mm (0.0835 in.) 2.15 mm (0.0847 in.) 2.18 mm (0.0858 in.) 2.21 mm (0.0870 in.) 2.24 mm (0.0882 in.) 2.27 mm (0.0894 in.) 2.30 mm (0.0906 in.) 2.33 mm (0.0918 in.)

SS0FE–09

TORQUE SPECIFICATION

Part tighten		N·m	kgf·cm	ft·lbf
FRONT SUSPENSION				
ABS speed sensor wire harness x Shock absorber		5.0	51	44 in.·lbf
Height control sensor link x Bracket		5.4	55	48 in.·lbf
Stabilizer bar x Stabilizer bar link		49	500	36
Shock absorber x Shock absorber bracket		64	650	47
Piston rod x Suspension support		34	350	25
Suspension support x Body		35	360	26
Upper suspension arm x Body		59	600	44
REAR DRIVE SHAFT				
Exhaust tail pipe x Exhaust center pipe		43	440	32
Rear suspention member brace x Body		50	510	37
Drive shaft x Axle hub		289	2,950	213
Drive shaft x Differential side gear shaft		68	695	50
REAR DIFFERENTIAL				
Differential drain plug		49	500	36
Differential filler plug		49	500	36
Differential mounting bolt	Front	95	970	70
	Rear	142	1,450	105
Ring gear set bolt		97	985	71
Companion flange lock nut		See page SA–56		
Differential carrier cover set bolt		47	475	34
Breather plug		21	210	15
Rear suspension member brace set bolt		50	510	37
Front exhaust pipe x Exhaust pipe assembly		62	632	46
Heated oxygen sensor		44	450	33
Propeller shaft center support bearing set bolt		49	500	36
Propeller shaft assembly x Rear differential		74	750	54
Differential carrier x Bearing cap		85	870	63
Oil deflector x Differential carrier cover		8.0	82	71 in.·lbf
Rear suspension member x Body		127	1,300	94
Rear suspension member stopper x Body		19	195	14
Rear suspension member lower brace x Body		19	195	14
Parking brake cable x Body		7.8	80	69 in.·lbf
REAR SUSPENSION				
Suspension support x Body	Upper side	64	650	47
	Lower side	18	185	13
Piston rod x Suspension support		28	280	21
Upper suspension arm x Body	Front side	88	900	65
	Rear side	74	755	55
No. 2 lower suspension arm x Stabilizer bar link		30	305	22
No. 2 lower suspension arm x Shock absorber		110	1,120	81
No. 2 lower suspension arm x Rear suspension member		110	1,120	81
Height control sensor link x Bracket		5.4	55	48 in.·lbf
Toe control link x Rear suspension member		49	500	36

BRAKE

SS062–21

SERVICE DATA

Brake pedal height (from asphalt sheet)	154.0 – 164.0 mm (6.063 – 6.457 in.)
Brake pedal freeplay	1.0 – 6.0 mm (0.04 – 0.24 in.)
Stop light switch crearance	1.5 – 2.5 mm (0.059 – 0.098 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.2 lbf)	More than 99 mm (3.9 in.)

SS063–23

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Brake line union nut		15	155	11
Brake booster clevis lock nut		25	260	19
Brake booster x Pedal bracket		13	130	9
Bleeder plug	(Brake caliper)	11	110	8
	(Brake actuator)	8.3	85	74 in.·lbf
Master cylinder x Brake booster		13	130	9
Master cylinder x Cable bracket	(1G–FE)	10	102	7
Reservoir set screw		1.8	18	16 in.·lbf
Brake actuator x Actuator bracket		5.4	55	48 in.·lbf
Brake actuator assembly x Body		19	195	14

STEERING

SERVICE DATA

SS0MY–17

POWER STEERING FLUID (2JZ–GE)		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed	Minimum	6,900 kPa (70 kgf/cm^2, 996 psi)
STEERING WHEEL		
Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Steering effort at idle speed		4.2 – 5.4 N·m (43 – 55 kgf·cm, 37 – 48 in.lbf)
POWER STEERING VANE PUMP (2JZ–GE)		
Vane pump rotating torque		0.2 N·m (2.5 kgf·cm, 2.2 in.·lbf) or less
Vane pump shaft and front housing bushing oil clearance	STD Maximum	0.03 – 0.05 mm (0.0012 – 0.0020 in.) 0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.6 mm (0.339 in.)
Vane plate thickness	Minimum	1.40 mm (0.0551 in.)
Vane plate length	Minimum	14.99 mm (0.5902 in.)
Vane plate and vane pump rotor groove clearance	Maximum	0.033 mm (0.0013 in.)
Vane plate length	Pump rotor and cam ring mark	
	None	14.999 – 15.001 mm (0.59051 – 0.59059 in.)
	1	14.997 – 14.999 mm (0.59043 – 0.59051 in.)
	2	14.995 – 14.997 mm (0.59035 – 0.59043 in.)
	3	14.993 – 14.995 mm (0.59027 – 0.59035 in.)
	4	14.991 – 14.993 mm (0.59020 – 0.59027 in.)
Spring free length	Minimum	33.2 mm (1.307 in.)
POWER STEERING GEAR (2JZ–GE)		
Steering rack runout	Maximum	0.15 mm (0.0059 in.)
Total preload	Turning	1.2 – 1.7 N·m (12.2 – 17.3 kgf·cm, 10.6 – 15.0 in.·lbf)

SS136–03

TORQUE SPECIFICATION

Part tighten		N·m	kgf·cm	ft·lbf
TILT STEERING COLUMN				
Tilt steering shaft		20	210	15
Turn signal bracket set bolt		2.9	30	26 in.·lbf
Column protector set bolt		6.1	60	52 in.·lbf
Column tube support x Column tube		15	150	11
No. 2 intermediate shaft assembly x Main shaft assembly		35	360	26
Steering column assembly set nut		26	270	19
Sliding yoke x No. 2 intermediate shaft assembly		35	360	26
Sliding yoke x Control valve 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 VANE PUMP (2JZ–GE)				
Rear housing		24	240	17
Pressure port union		83	850	61
Oil reservoir	Front side	13	130	9
	Rear side	24	240	17
Vane pump pulley set nut		44	450	33
Vane pump assembly set bolt		58	590	43
Pressure feed tube x PS vane pump assembly		49	500	36
POWER STEERING GEAR (2JZ–GE)				
Cylinder end stopper		59	600	44
Bearing guide nut		25	250	18
Control valve housing x Rack housing		18	180	13
Rack guide spring cap lock nut		50 (69)	510 (700)	37 (51)
Rack x Rack end		76 (103)	780 (1,050)	56 (76)
Tie rod end lock nut		56	570	41
Turn pressure tube union nut		22 (25)	220 (250)	16 (18)
PS gear assembly set bolt		74	750	54
Return tube x PS gear assembly		40 (44)	410 (450)	30 (33)
Pressure feed tube x PS gear assembly		42	430	31
Front suspension member brace	Bolt A	119	1,210	88
	Bolt B	58	590	43
Sliding yoke x Control valve shaft		35	360	26
Tie rod end x Steering knuckle		54	550	40
Front brake caliper x Steering knuckle		118	1,200	87
Steering wheel set nut		50	510	37

( ): For use without SST

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

SS0FC–10

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	50	510	37
Steering wheel pad	8.8	90	78 in.·lbf
Curtain shield airbag assembly x Body	9.8	100	86 in.·lbf
Front seat outer belt x Body	44	450	33
Front airbag sensor	8.5	86.7	75 in.·lbf
Side and curtain shield airbag sensor assembly	20	205	15

BODY ELECTRICAL

SERVICE DATA

SS0CN–26

SPEEDOMETER (ON–VEHICLE)	
Standard indication (mph) Europe Models	Allowable range (mph)
20	21 – 23.5
40	41.5 – 44
60	62.5 – 66
80	83 – 87
100	104 – 108.5
120	125 – 130
140	146 – 151.5
Standard indication (km/h) Europe Models	Allowable range (km/h)
20	21 – 25
40	41.5 – 46
60	62.5 – 67
80	83 – 88
100	104 – 109
120	125 – 130.5
140	145.5 – 151.5
160	166 – 173
180	186.5 – 194.5
200	207 – 216
220	227.5 – 237.5
240	248 – 259
Standard indication (km/h) Australia	Allowable range (km/h)
20	17.5 – 21.5
40	38 – 42
60	58 – 63
80	78 – 84
100	99 – 104.5
120	119.5 – 125.5
140	139.5 – 146.5
160	159.5 – 167.5
180	179.5 – 188.5
200	199.5 – 209.5
220	227.5 – 237.5
240	248 – 259
TACHOMETER (ON–VEHICLE)/ DC 13.5 V 25 °C at (77 °F)	
Standard indication	Allowable range
700	630 – 770
1,000	900 – 1,100
2,000	1,850 – 2,150
3,000	2,850 – 3,150
4,000	3,800 – 4,200
5,000	4,800 – 5,200

6,000	5,750 – 6,250
7,000	6,700 – 7,300
8,000	7,700 – 8,300

BODY

TORQUE SPECIFICATION

SS0FF–06

Part tightened		N·m	kgf·cm	ft·lbf
FRONT BUMPER (Wagon)		–	–	–
Front bumper cover x Body		5.4	55	48 in.·lbf
BACK DOOR		–	–	–
Back door lock x Body		12.5	128	9
Door hinge x Door panel		8.0	82	71 in.·lbf
Door hinge x Body		11.5	117	8
Door lock striler x Body		23	235	17
Back door outside handle x Back door outside garnish		4.0	40	35 in.·lbf
REAR WIPER AND WASHER (Wagon)		–	–	–
Wiper arm x Rear wiper motor		5.5	56	49 in.·lbf
Nut x Rear wiper motor		12	122	9
Rear wiper motor x Rear wiper motor		5.5	56	49 in.·lbf
BACK DOOR STAY		–	–	–
Back door stay x Door panel		22	224	16
Back door stay x Body		19.5	199	14
SLIDING ROOF		–	–	–
Drive rail x Bracket		5.5	56	49 in.·lbf
Sliding roof housing x Body		8.0	82	71 in.·lbf
Sliding roof glass x Sliding roof housing		5.5	56	49 in.·lbf
INSTRUMENT PANEL		–	–	–
Steering wheel nut		35	357	26
Front passenger airbag assembly x reinforcement	For bolt: For nut:	20 5.5	205 56	15 49
FRONT SEAT		–	–	–
Seat x Body		38	387	28
Seatback x Seat adjuster		43	440	32
Seat cushion x Seat adjuster		21	214	15
Side airbag cover x Seat back frame		4.7	48	42 in.·lbf
REAR SEAT (Wagon)		–	–	–
Seatback x Body		21	214	15
SEAT BELT		–	–	–
Front Seat Belt:		–	–	–
Adjustable anchor x Body		42	428	31
Shoulder anchor x Adjustable anchor		42	428	31
Retractor x Body	Upper Bolt:	7.5	76	66 in.·lbf
Retractor x Body	Lower Bolt:	42	428	31
Inner belt x Seat		42	428	31
Rear Seat Belt (Sedan):		–	–	–
Floor anchor x Body		42	428	31
Inner belt x Body		42	428	31
Retractor x Body		42	428	31
CRS anchor set bolt		21	214	15

Rear Seat Belt (Wagon):	–	–	–
Floor anchor x Body	42	428	31
Inner belt x Body	42	428	31
Retractor x Body Floor side: Roof Side:	42	428	31
CRS anchor set bolt	13.2	135	10

AIR CONDITIONING

SERVICE DATA

SS0F5–08

Refrigerant volume		600 ± 50 g (21.16 ± 1.76 oz.)
Idle Speed	Magnetic clutch not engaged	600 ± 50 rpm
	Magnetic clutch engaged	650 ± 50 rpm
Magnetic clutch clearance		0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

SS0F6–07

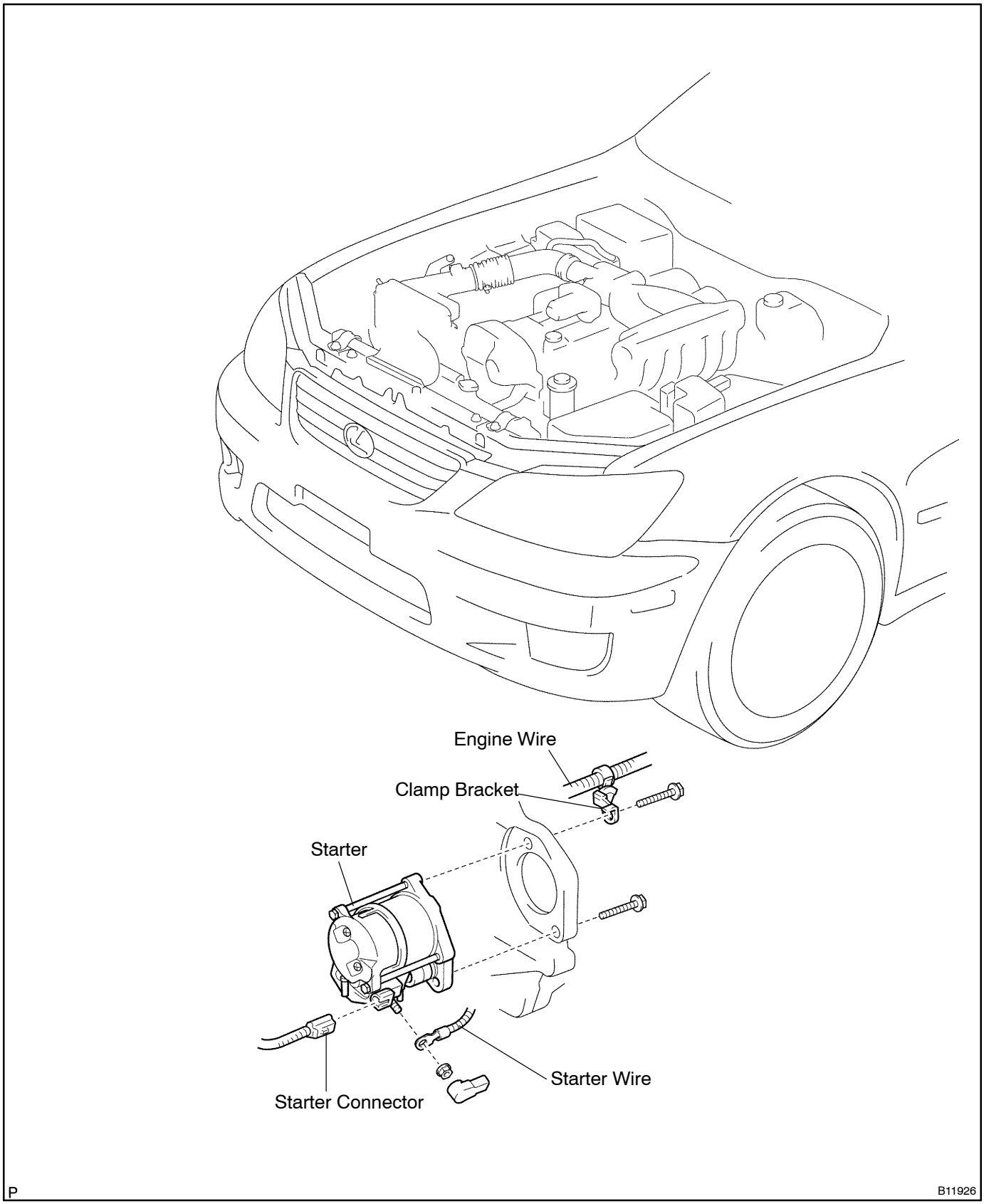
TORQUE SPECIFICATION

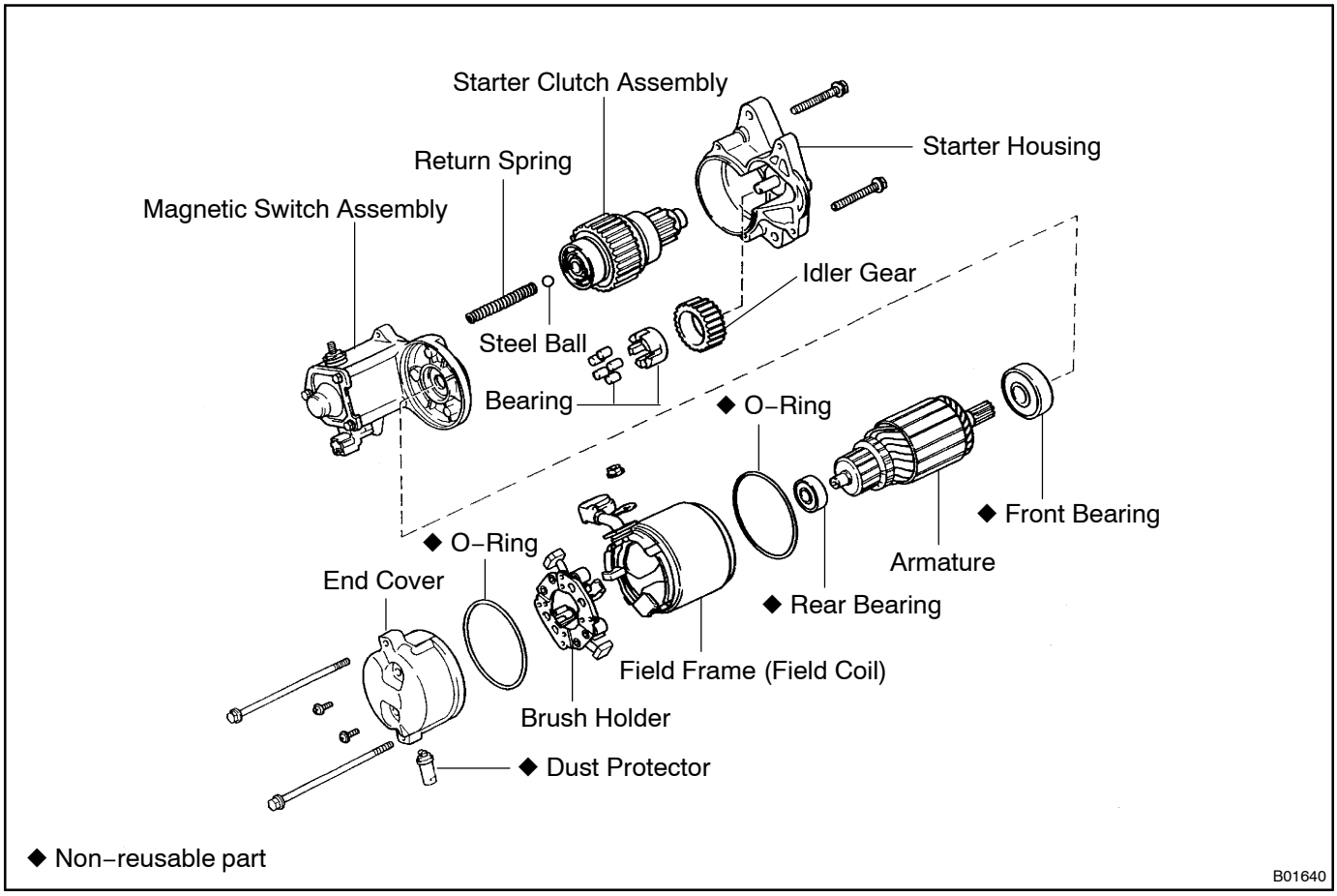
Part tightened	N·m	kgf·cm	ft·lbf
REFRIGERANT LINE			
Condenser x Discharge hose	10	100	7
Condenser x Liquid tube	10	100	7
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Suction line (Block joint)	10	100	7
A/C unit x Liquid and suction tubes	10	100	7
COMPRESSOR AND MAGNETIC CLUTCH			
Compressor x Engine (Bolt)	52	530	38
Compressor x Engine (Nut)	52	530	38
Compressor x Engine (Stud bolt)	26	265	19
PS pump bracket x Compressor x Engine	52	530	38
PS pump bracket x Compressor bracket Engine	58	590	43
Compressor bracket x Engine	39	400	29
Pump stay x Compressor bracket	39	400	29
Compressor bracket x Compressor	58	590	43
Pressure plate x Compressor	13.2	135	9
CONDENSER			
Cap x Condenser	12.3	125	9
CONDENSER FAN			
Radiator x Cooling fan assembly	5	50	44 in.·lbf

STARTER

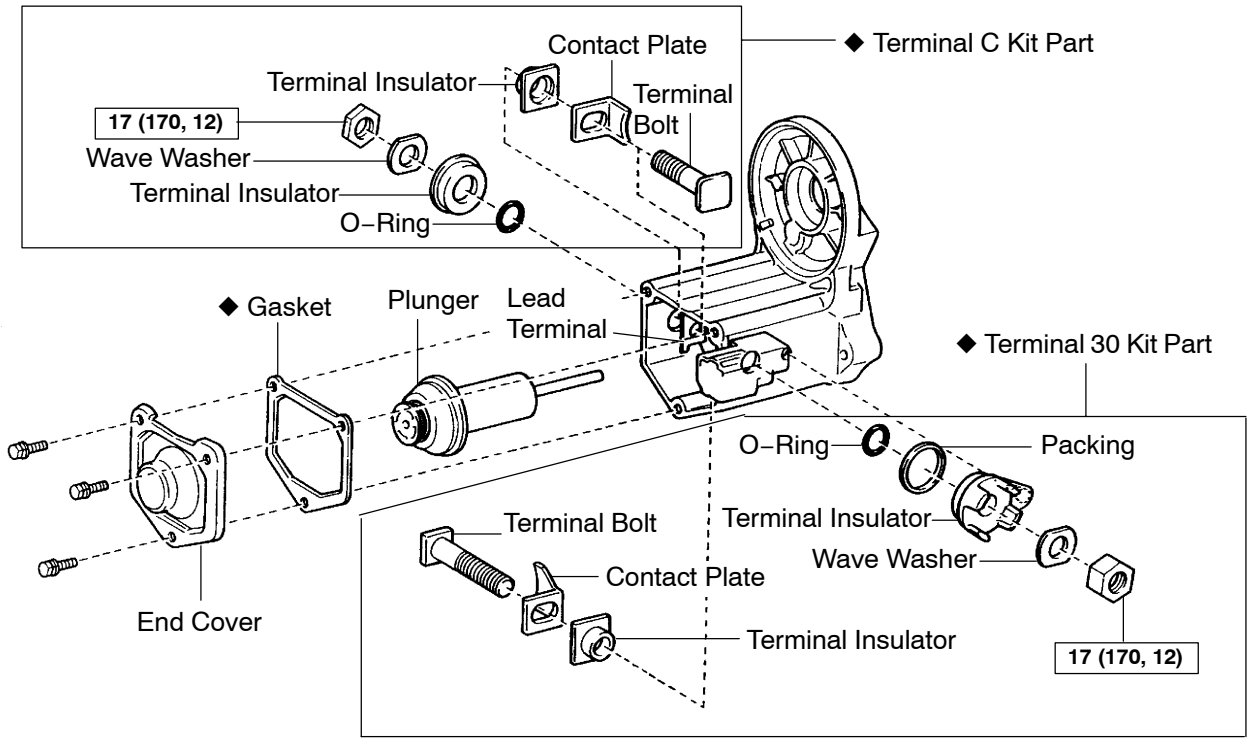
COMPONENTS

ST04Y–03





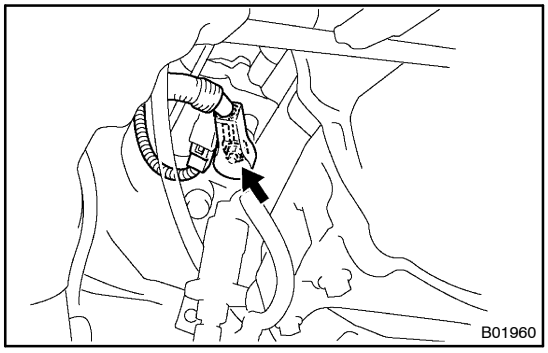
Magnetic Switch Assembly



ST04Z–03

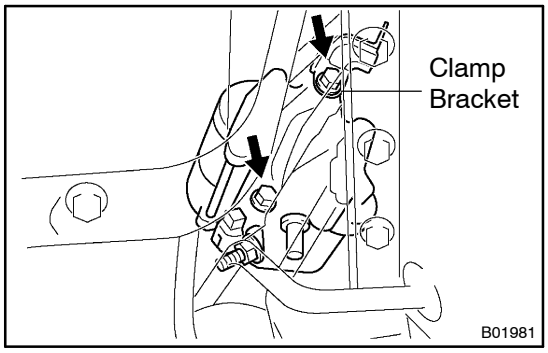
REMOVAL

REMOVE STARTER



(a) Remove the rubber cap and nut, and disconnect the starter wire.

(b) Disconnect the starter connector.

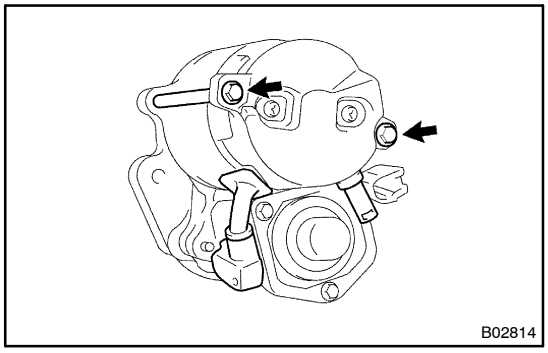


(c) Remove the 2 bolts and starter.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

HINT:
At time of the installation, place refer to the following item.
When installing the upper bolt, tighten it together with the clamp bracket.

ST050–03

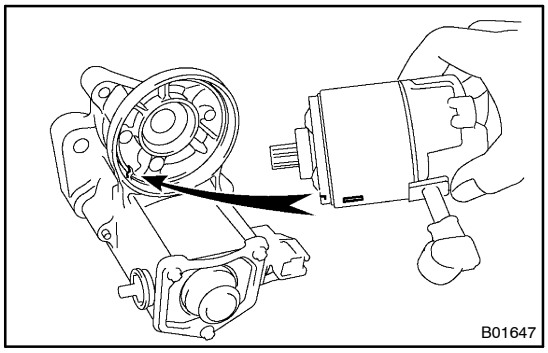
DISASSEMBLY



1. REMOVE FIELD FRAME AND ARMATURE

(a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

(b) Remove the 2 through bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)



(c) Pull out the field frame together with the armature.

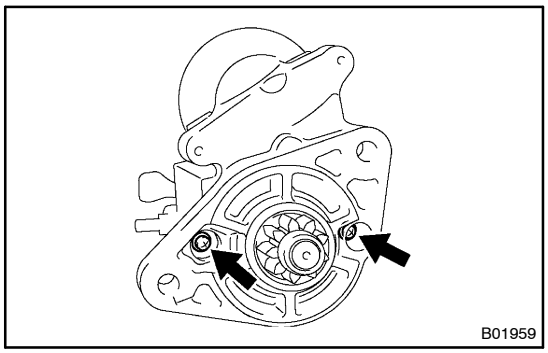
HINT:

Align the protrusion of the field frame with the groove of the magnetic switch.

(d) Remove the O–ring from the field frame.

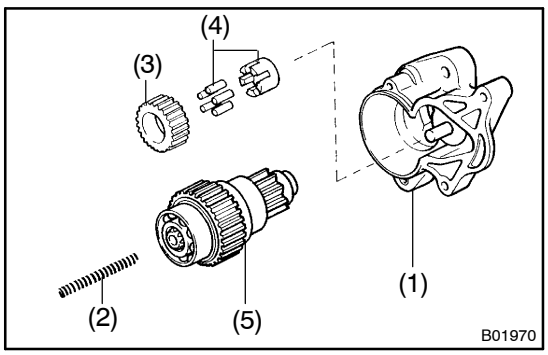
HINT:

At the time of installation, please refer to the following items. Use a new O–ring.

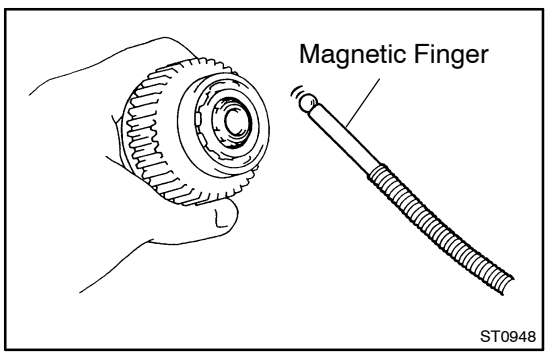


2. REMOVE STARTER HOUSING, CLUTCH ASSEMBLY AND GEAR

(a) Remove the 2 bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

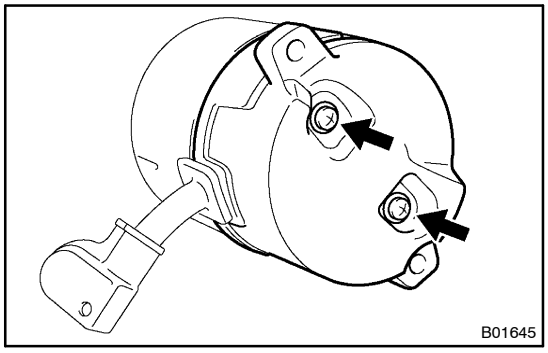


(b) Remove these parts from the magnetic switch:
(1) Starter housing
(2) Return spring
(3) Idler gear
(4) Bearing
(5) Clutch assembly



3. REMOVE STEEL BALL

Using a magnetic finger, remove the steel ball from the clutch shaft hole.



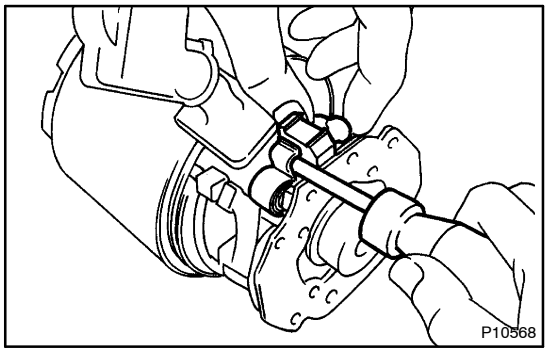
4. REMOVE BRUSH HOLDER

(a) Remove the 2 screws and end cover from the field frame.
Torque: 1.5 N·m (15 kgf·cm, 13 in.·lbf)

(b) Remove the O–ring from the field frame.

HINT:

At the time of installation, please refer to the following items. Use a new O–ring.



(c) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder. Disconnect the 4 brushes, and remove the brush holder.

NOTICE:

Check that the positive (+) lead wires are not grounded.

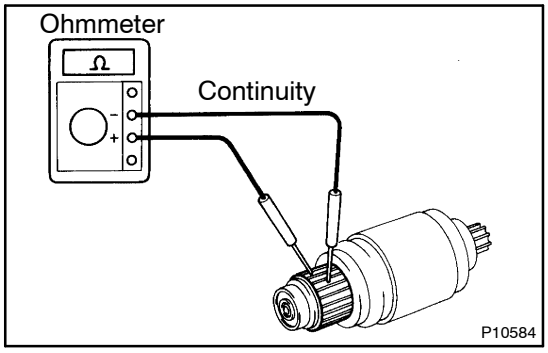
5. REMOVE ARMATURE FROM FIELD FRAME

ST051–05

INSPECTION

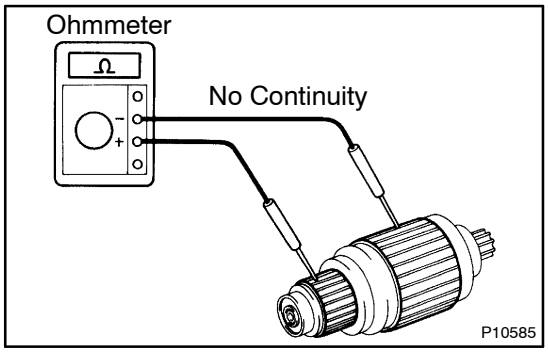
1. INSPECT ARMATURE COIL

(a) Check the commutator for open circuit.
Using an ohmmeter, check that there is continuity between the segments of the commutator.



If there is no continuity between any segment, replace the armature.

(b) Check the commutator for ground.
Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.



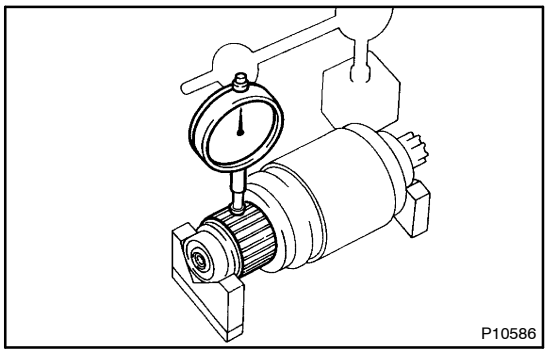
If there is no continuity, replace the armature.

2. INSPECT COMMUTATOR

(a) Check the commutator for the dirty and burnt surfaces.

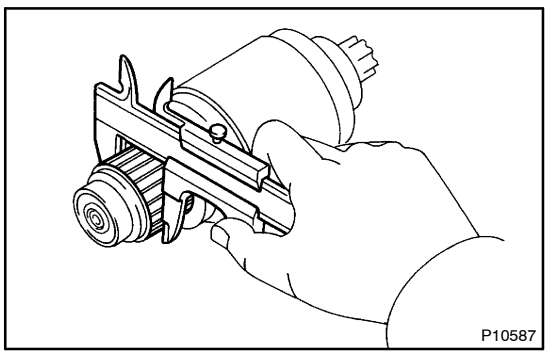
If the surface is dirty or burnt, correct it with sandpaper (No.400) or on a table.

(b) Check for the commutator circle runout.
(1) Place the commutator on V–blocks.
(2) Using a dial gauge, measure the circle runout.
Maximum circle runout: 0.05 mm (0.0020 in.)



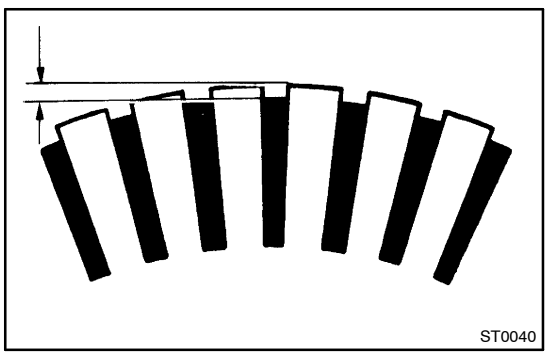
If the circle runout is greater than maximum, correct it on a lathe.

(c) Using a vernier caliper, measure the commutator diameter.
Standard diameter: 30.0 mm (1.181 in.)
Minimum diameter: 29.0 mm (1.412 in.)

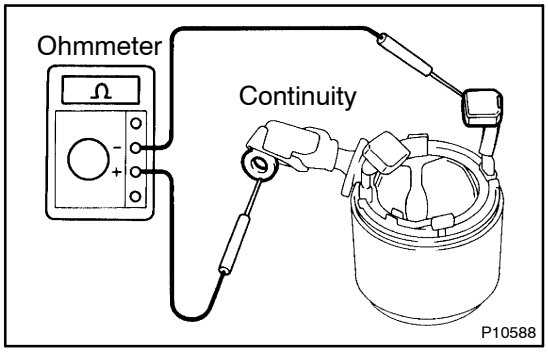


If the diameter is less than minimum, replace the armature.

(d) Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.
Standard undercut depth: 0.6 mm (0.024 in.)
Minimum undercut depth: 0.2 mm (0.008 in.)



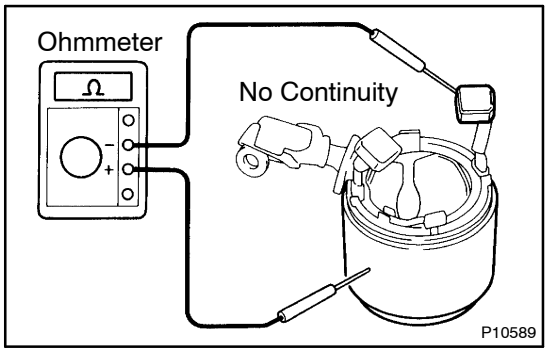
If the undercut depth is less than minimum, correct it with a hacksaw blade.



3. INSPECT FIELD COIL

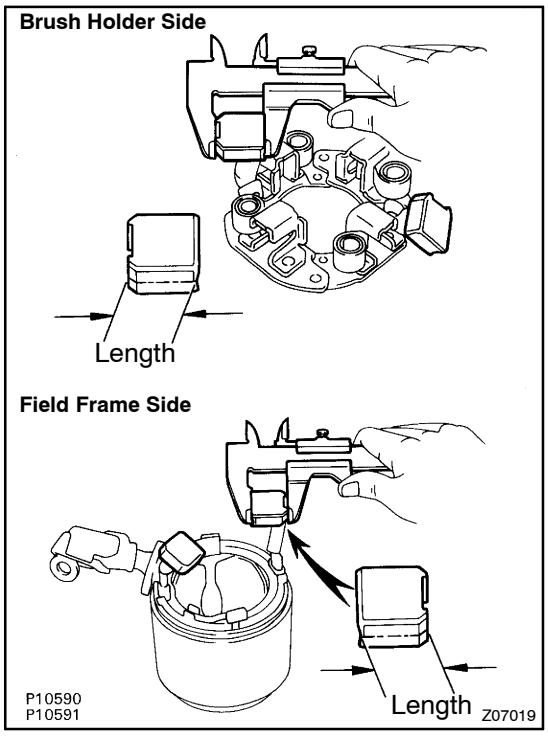
(a) Check the field coil for open circuit.
Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

If there is no continuity, replace the field frame.



(b) Check the field coil for ground.
Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

If there is continuity, replace the field frame.

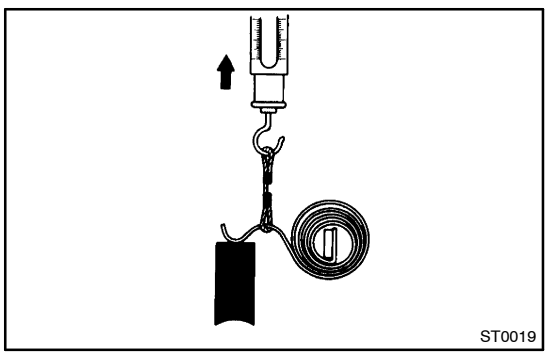


4. INSPECT BRUSHES

Using a vernier caliper, measure the brush length.

Standard length: 15.5 mm (0.610 in.)
Minimum length: 8.5 mm (0.335 in.)

If the length is less than minimum, replace the brush holder and field frame.

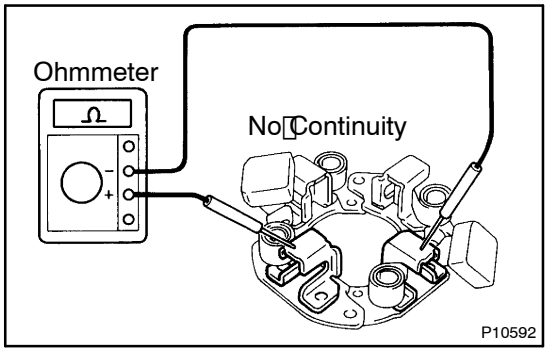


5. INSPECT BRUSH SPRINGS

Check the brush spring load. Take the pull scale reading the instant the brush spring separates from the brush.

Standard spring installed load:
17.6 – 23.5 N (1.8 – 2.4 kgf, 3.9 – 5.3 lbf)
Minimum spring installed load:
11.8 N (1.2 kgf, 2.6 lbf)

If the installed load is less than minimum, replace the brush springs.



6. INSPECT BRUSH HOLDER

Check the brush holder insulator. Using an ohmmeter, check that there is no continuity between the positive (+) and negative (–) brush holders.

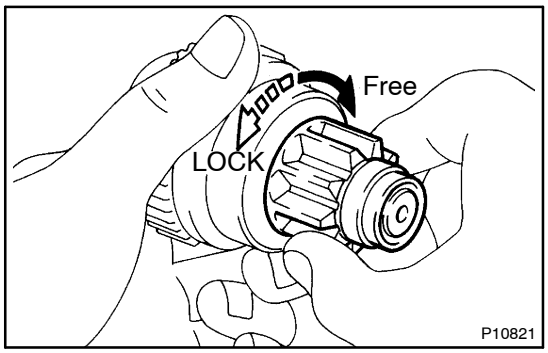
If there is continuity, repair or replace the brush holder.

7. INSPECT CLUTCH AND GEAR

(a) Check the gear teeth on the pinion gear, idle gear and the clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

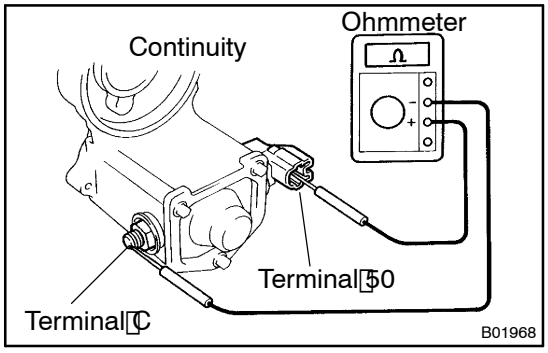
If damaged, also check the drive plate ring gear for wear or damage.



(b) Check the clutch pinion gear.

Rotate the pinion gear counterclockwise, and check that it turns freely. Try to rotate the pinion gear clockwise and check that it locks.

If necessary, replace the clutch assembly.

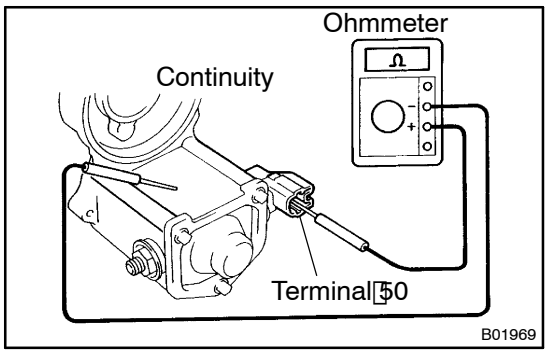


8. INSPECT MAGNETIC SWITCH

(a) Check the pull–in coil for open circuit.

Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, check and replace the magnetic switch.



(b) Check the hold–in coil for open circuit.

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

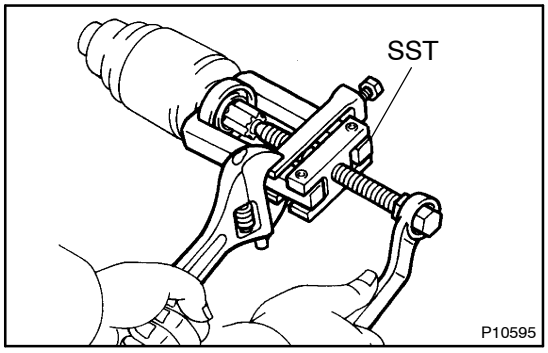
If there is no continuity, replace the magnetic switch.

9. INSPECT BEARING

Turn the bearing by hand and while apply inward force.

If resistance is felt or bearing sticks, replace the bearing (See page ST–9).

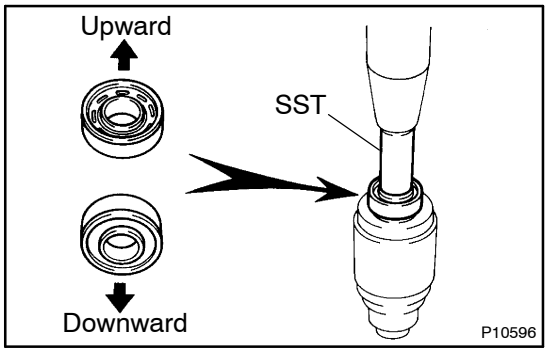
ST052–05



REPLACEMENT

1. REPLACE FRONT BEARING

(a) Using SST, remove the bearing.
SST 09286–46011

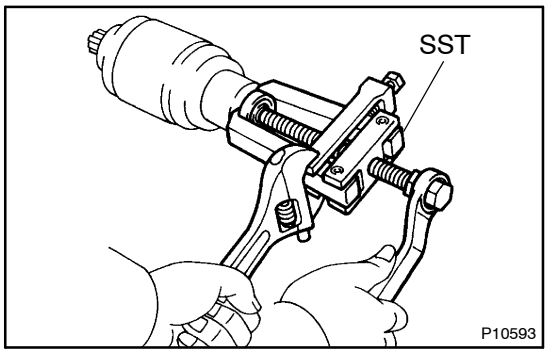


(b) Using SST and a press, press in a new bearing.

NOTICE:

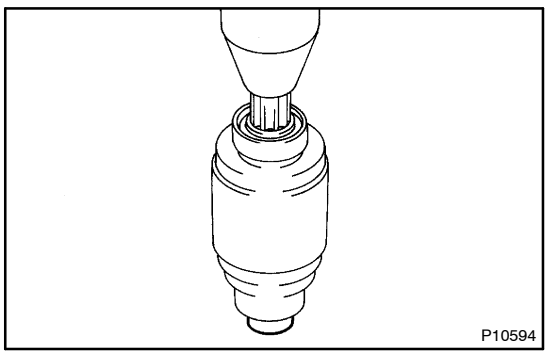
Be careful of the bearing installation direction.

SST 09820–00031

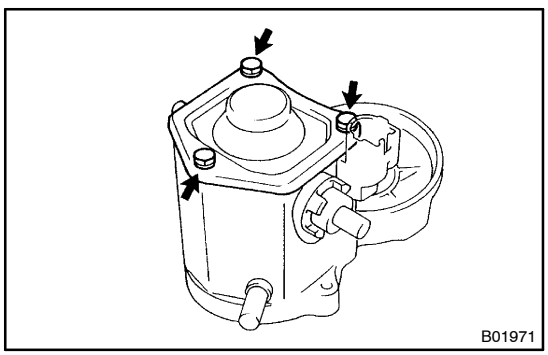


2. REPLACE REAR BEARING

(a) Using SST, remove the bearing.
SST 09286–46011

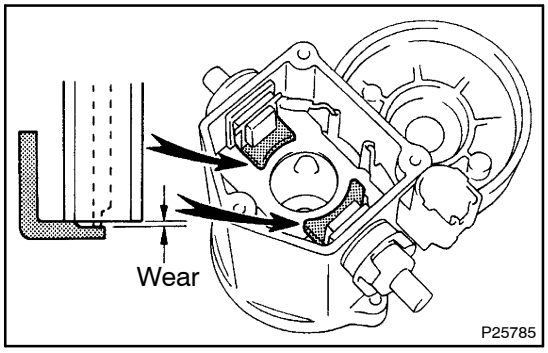


(b) Using a press, press in a new rear bearing.



3. REPLACE MAGNETIC SWITCH TERMINAL PARTS

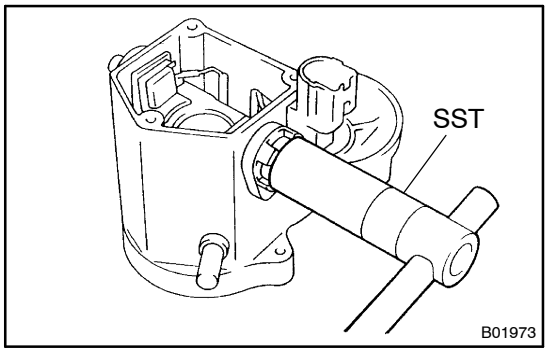
(a) Remove the 3 bolts, end cover, gasket and plunger.



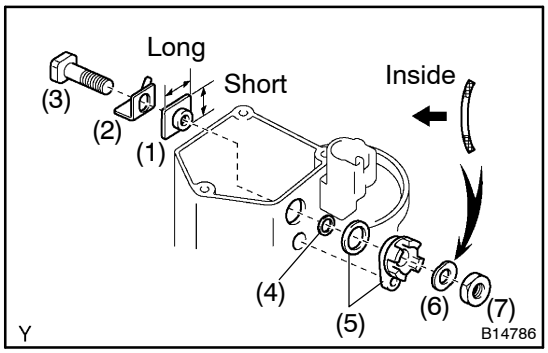
(b) Using vernier calipers, measure the contact plate for depth of wear.

Maximum wear: 0.9 mm (0.035 in.)

If the depth of wear is greater than the maximum, replace the contact plate.



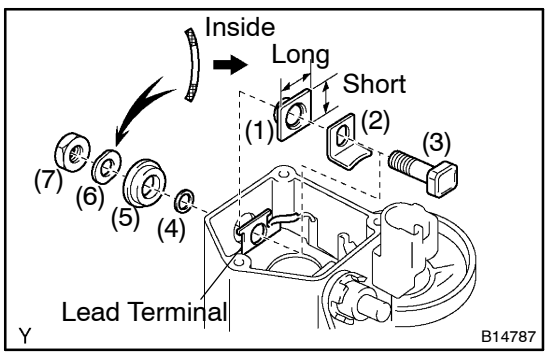
(c) Using SST, remove the terminal C and 30 kit parts.
SST 09810–38140



(d) Temporarily install new terminal 30 kit parts.
(1) Terminal insulator (inside)
(2) Contact plate
(3) Terminal bolt
(4) O–ring
(5) Packing and terminal insulator (outside)
(6) Wave washer
(7) Terminal nut

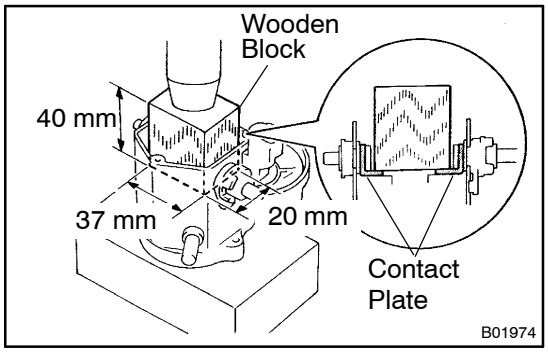
NOTICE:

Be careful to install the terminal insulators and wave washer in the correct direction.



(e) Temporarily install new terminal C kit parts.
(1) Terminal insulator (inside)
(2) Contact plate
(3) Terminal bolt
(4) O–ring
(5) Terminal insulator (outside)
(6) Wave washer
(7) Terminal nut

NOTICE:
Be careful to install the terminal insulators in the correct direction.



(f) Tighten the terminal nut

(1) Put a wooden block on the contact plate and press it down with a hand press.

Dimensions of wooden block:
20 x 37 x 40 mm (0.79 x 1.46 x 1.57 in.)
Press force:
981 N (100 kgf, 221 lbf)

NOTICE:

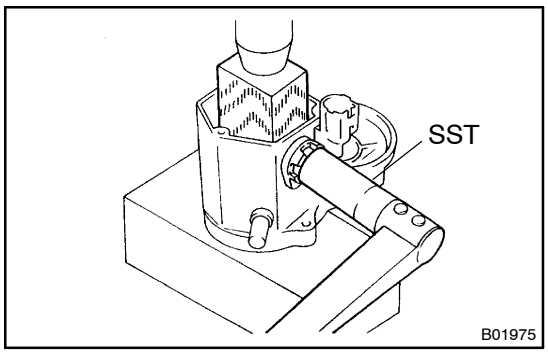
- **Check the diameter of the hand press ram. Then calculate the gauge pressure of the press when 981 N (100 kgf, 221 lbf) of force is applied.**
  Gauge pressure:

$$(\text{kgf/cm}^2) = \frac{100\ \text{kgf}}{\left(\frac{\text{Ram diameter (cm)}}{2}\right)^2 \times 3.14\ (\pi)}$$

$$(\text{psi}) = \frac{221\ \text{lbf}}{\left(\frac{\text{Ram diameter (in.)}}{2}\right)^2 \times 3.14\ (\pi)}$$

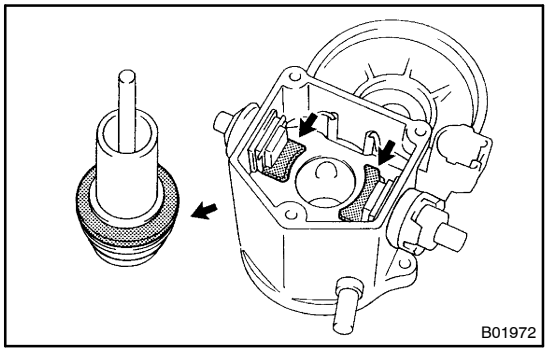
(kPa) = (kgf/cm^2) x 98.1
(kPa) = (psi) x 6.9

- **If the contact plate is not pressed down with the specified pressure, the contact plate may tilt due to coil deformation or the tightening of the nut.**



(2) Using SST, tighten the nuts to the specified torque.
SST 09810–38140
Torque: 17 N·m (173 kgf·cm, 13 ft·lbf)

NOTICE:
If the nut is over tightened, it may cause cracks on the inside of the insulator.



(g) Clean the contact surfaces of the remaining contact plate and plunger with a dry shop rag.

(h) Reinstall the plunger, new gasket, end cover and lead clamp with the 3 bolts.
Torque: 2.5 N·m (26 kgf·cm, 22 in.·lbf)

ST053–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page ST–4).

HINT:

Use high–temperature grease to lubricate the bearings and gears when assembling the starter.

ST054–05

TEST

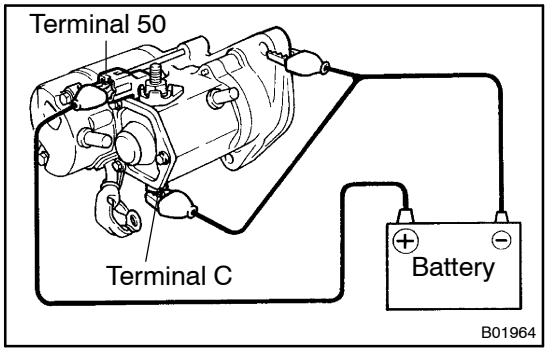
NOTICE:

These tests must be done within 3 to 5 seconds to avoid burning out the coil.

1. DO PULL–IN TEST

(a) Disconnect the field coil lead wire from terminal C.

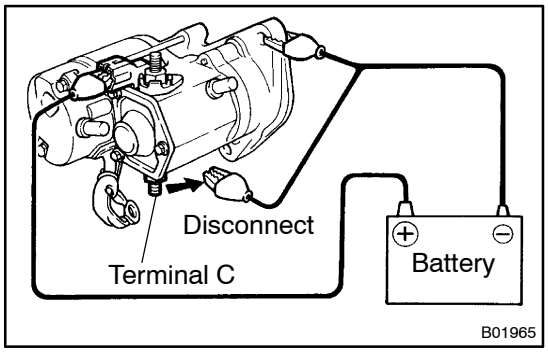
(b) Connect the battery to the magnetic switch as shown. Check that the pinion gear moves outward.



2. DO HOLD–IN TEST

While connected as above with the pinion gear out, disconnect the negative (–) lead from terminal C.

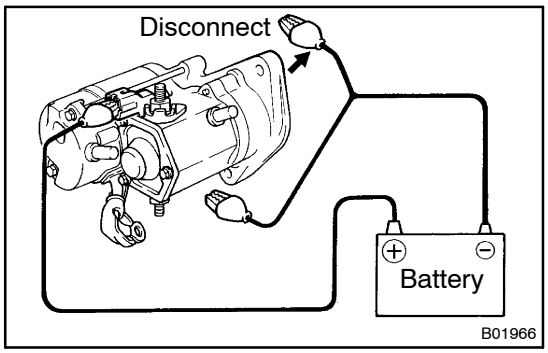
Check that the pinion gear remains out.



3. INSPECT CLUTCH PINION GEAR RETURN

Disconnect the negative (–) lead from the starter body.

Check that the pinion gear returns inward.

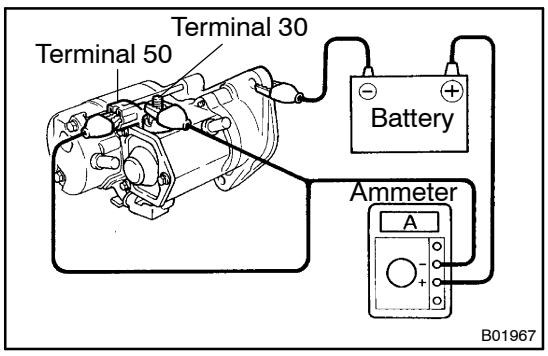


4. DO NO–LOAD PERFORMANCE TEST

(a) Connect the battery and ammeter to the starter as shown.

(b) Check that the starter rotates smoothly and steadily with the pinion gear moving out. Check that the ammeter shows the specified current.

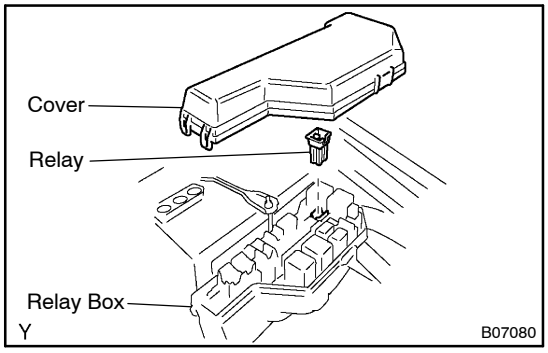
Specified current: 90 A or less at 11.5 V



ST055–01

INSTALLATION

Installation is in the reverse order of removal. (See page ST–3)



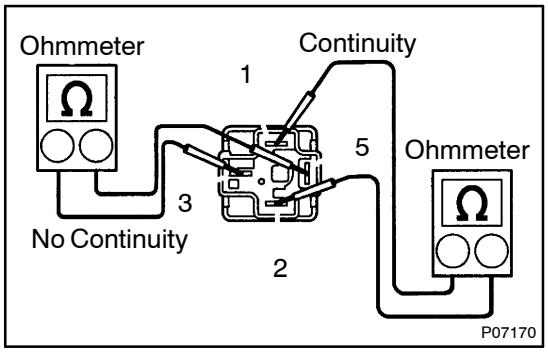
STARTER RELAY

ST056–04

INSPECTION

INSPECT STARTER RELAY

(a) Inspect the relay continuity.

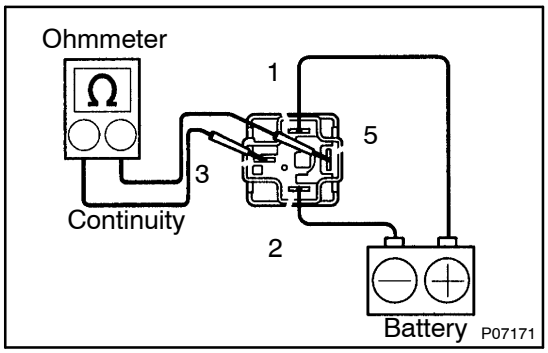


(1) Check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



(b) Inspect the relay operation.

(1) Apply battery positive voltage across terminals 1 and 2.

(2) Check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.