
ELECTRONIC FUEL INJECTION

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EFI SYSTEM PRECAUTION

FI0UO-01

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 negative (–) terminal cable is removed from the battery. Therefore, if necessary, read the diagnosis 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) In event of engine misfire, these precautions should be taken.
 - (1) Check proper connection to battery terminals, etc.
 - (2) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
 - (3) When cleaning the engine compartment, be especially careful to protect the electrical system from water.
- (b) Precautions when handling oxygen sensor.
 - (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 allow air suction and cause the engine to run out of tune.

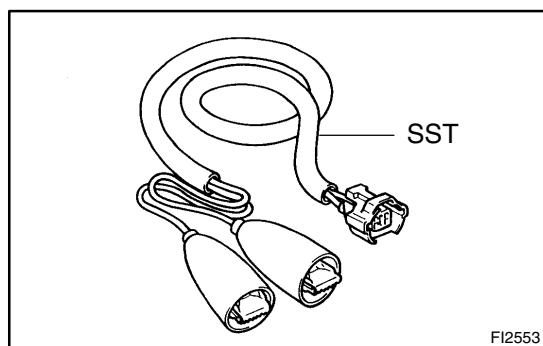
7. **ELECTRONIC CONTROL SYSTEM**

- (a) Before removing EFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch to LOCK or disconnecting the negative (–) terminal cable from the battery.

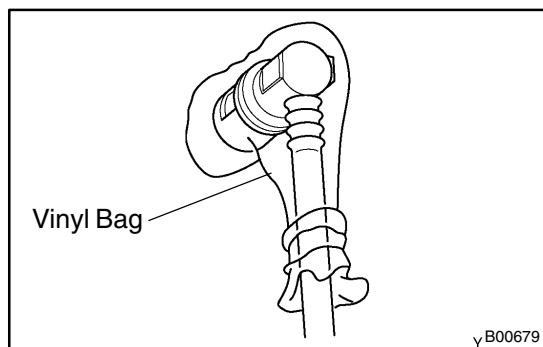
HINT:

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 (–) cables.
- (c) Do not permit parts to receive a severe impact during removal or installation. Handle all EFI parts carefully, especially the engine ECU.
- (d) Be careful during troubleshooting as there are numerous transistor circuit, and even slight terminal contact can cause further troubles.
- (e) Do not open the engine 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 should be taken 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.

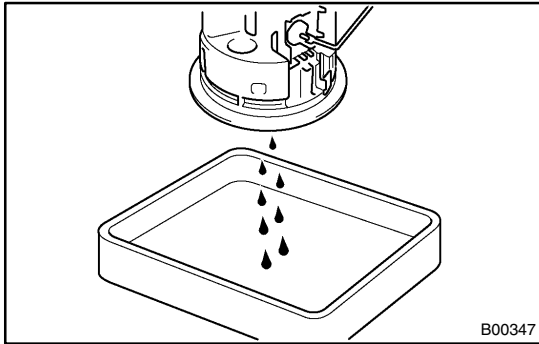


- (i) Use SST for inspection or test of the injector or its wiring connector.
SST 09842–30070

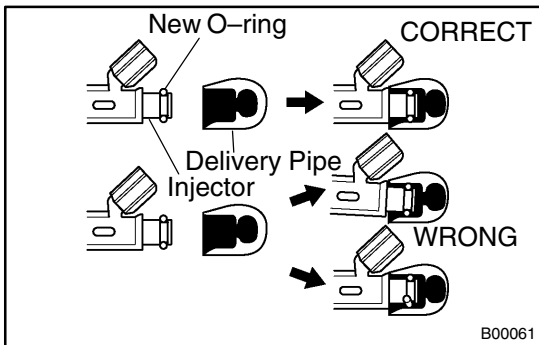


8. FUEL SYSTEM

- (a) When disconnecting the high fuel pressure 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 to LOCK.
 - (3) Disconnect the fuel tube (See page FI–11).
 - (4) Drain the fuel remained inside the fuel tube.
- (5) Prevent the disconnected fuel tube from damaging and mixing foreign objects by covering them with a vinyl bag.

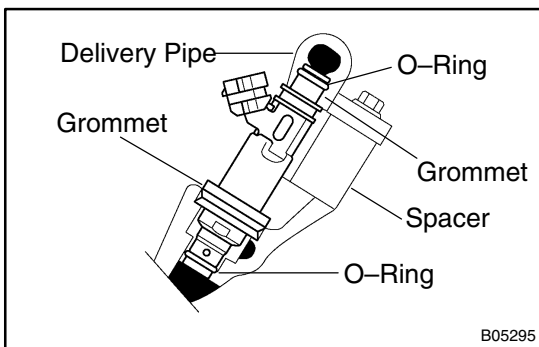


- (6) Put a container under the connection.



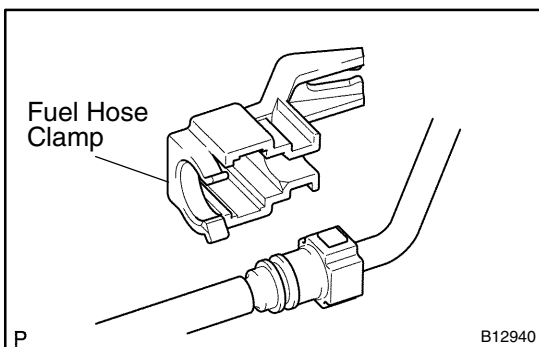
- (b) Observe these precautions when removing and installing the injectors.

- (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.



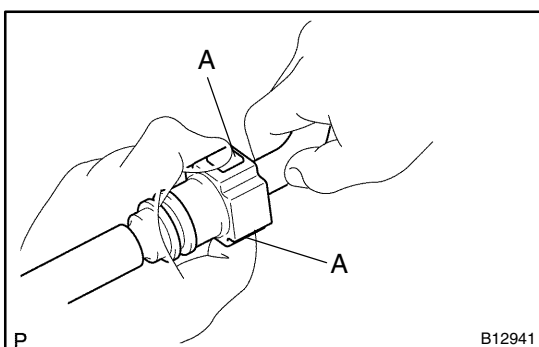
- (c) Install the injector to the delivery pipe and intake manifold, as shown in the illustration.

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.

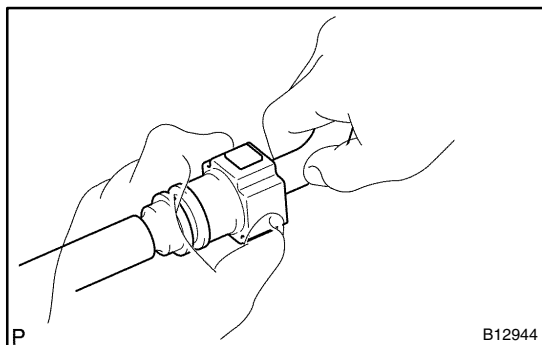


- (d) Observe these precautions when disconnecting the fuel tube connector.

- (1) Remove the fuel pipe clamp.
- (2) Check if there is any dirt like mud on the pipe and around the connector before disconnecting them and clean the dirt away.

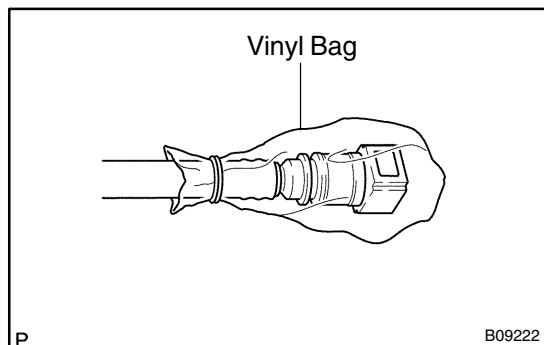


- (3) Disconnect the connector from the hose while pinching part A with fingers as shown in the illustration.

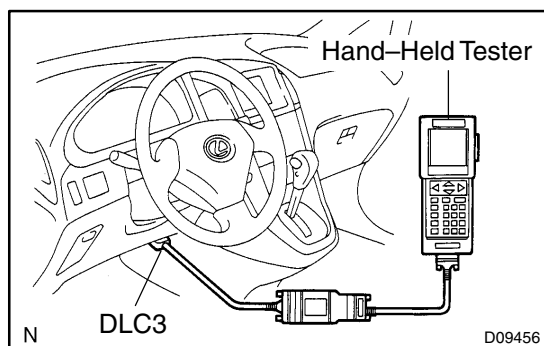
**HINT:**

When the connector and the pipe are stuck, pinch the fuel pipe between the hands, 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.

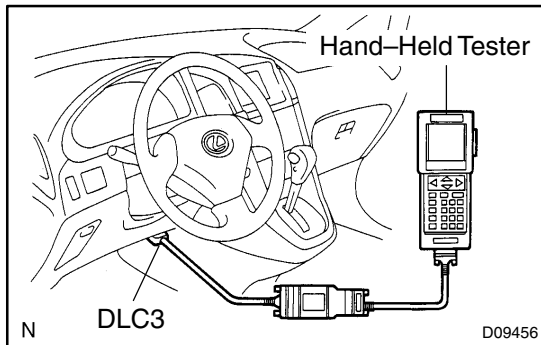


- (e) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.

- (1) Connect the hand-held tester to the DLC3.
- (2) Turn the ignition switch ON and push 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-5)
- (6) Check that there are no leaks from any part of the fuel system.
- (7) Turn the ignition switch to LOCK.
- (8) Disconnect the hand-held tester from the DLC3.



FUEL PUMP ON-VEHICLE INSPECTION

FI0UP-01

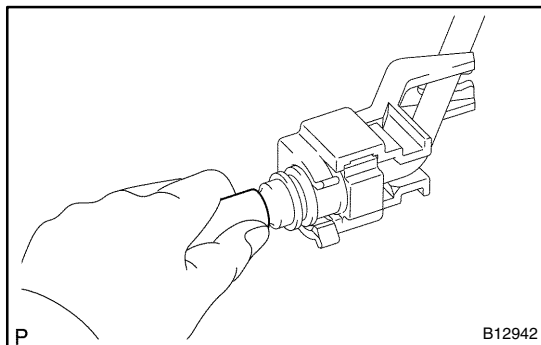
1. CHECK FUEL PUMP OPERATION

- Connect the hand-held tester to the DLC3.
- Turn the ignition switch ON and hand-held tester main switch ON.

NOTICE:

Do not start the engine.

- Select the active test mode on the hand-held tester.
- Please refer to the hand-held tester operator's manual for further details.
- If you have no hand-held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See step 7)



- Check that there is pressure in the fuel inlet pipe from the fuel filter.

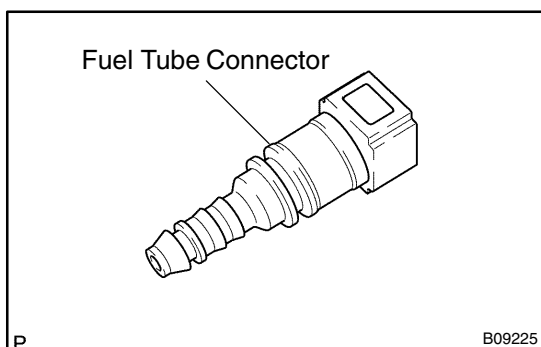
HINT:

If there is fuel pressure, you will hear the sound of fuel flowing. If there is no pressure, check the fusible link, fuses (AM2 30A, IGN 5A), EFI main relay, fuel pump and wiring connections.

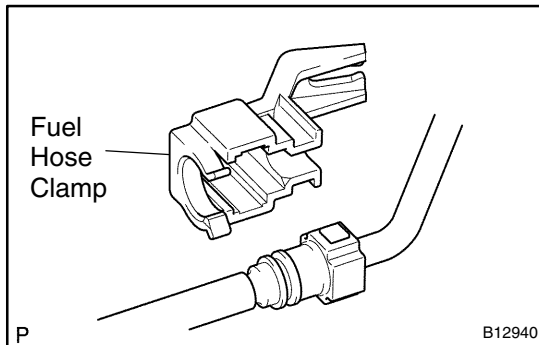
- Turn the ignition switch to LOCK.
- Disconnect the hand-held tester from the DLC3.

2. CHECK FUEL PRESSURE

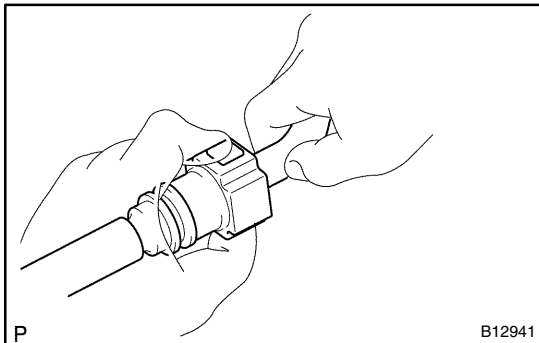
- Check the battery positive voltage is above 12 V.
- Disconnect the negative (–) terminal cable from the battery.



- Purchase the new No.1 fuel pipe and take out the fuel tube connector from its pipe.
Part No. 23801–20040



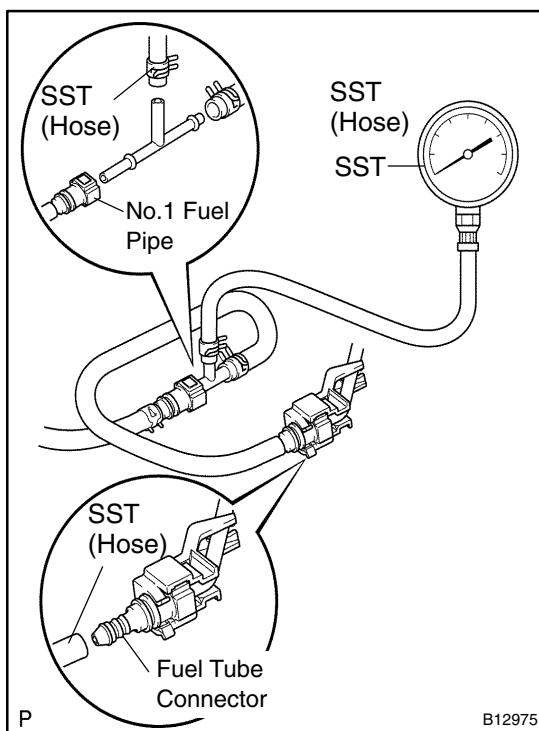
- (d) Remove the fuel hose clamp.



- (e) Disconnect the No.1 fuel pipe (fuel tube connector) from the fuel filter outlet.

CAUTION:

- Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.
- As there is retained pressure in the fuel pipe line, prevent it from splashing inside the engine compartment.



- (f) Install SST (pressure gauge) as shown in the illustration by using SST and fuel tube connector.
SST 09268-41047, 09268-41250, 09268-45012
- (g) Wipe off any splattered gasoline.
- (h) Reconnect the negative (–) terminal cable to the battery.
- (i) Connect the hand-held tester to the DLC3.
(See step 1.)
- (j) Measure the fuel pressure.

Fuel pressure:

301 – 347 kPa (3.1 – 3.5 kgf/cm², 44 – 50 psi)

If pressure is high, replace the fuel pressure regulator.

If pressure is low, check the fuel hoses and connections, fuel pump, fuel filter and fuel pressure regulator.

- (k) Disconnect the hand-held tester from the DLC3.
- (l) Start the engine.
- (m) Measure the fuel pressure at idle.

Fuel pressure:

301 – 347 kPa (3.1 – 3.5 kgf/cm², 44 – 50 psi)

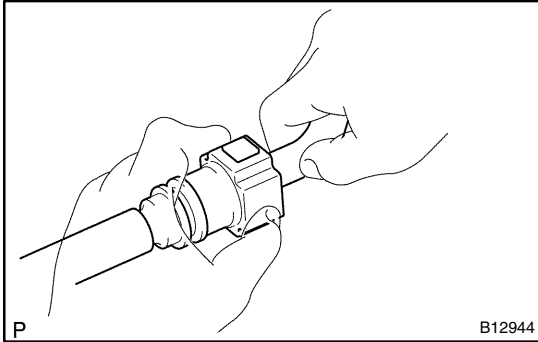
- (n) Stop the engine.
- (o) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.

Fuel pressure: 147 kPa (1.5 kgf/cm², 21 psi) or more

If pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.

- (p) After checking fuel pressure, disconnect the negative (–) terminal cable from the battery and carefully remove the SST and fuel tube connector to prevent gasoline from splashing.

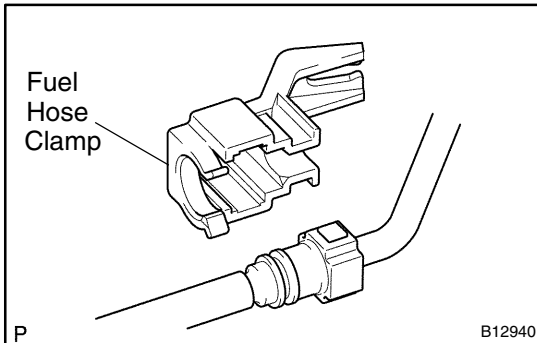
SST 09268-41047, 09268-41250, 09268-45012



(q) Reconnect the No.1 fuel pipe (fuel tube connector).

CAUTION:

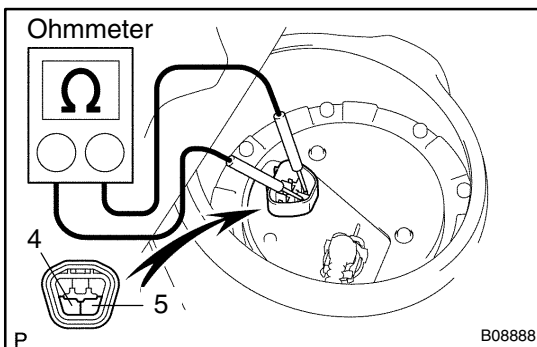
Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.



(r) Install the fuel hose clamp to the fuel filter.

(s) Reconnect the negative (–) terminal cable to the battery.

(t) Check for fuel leakage.



3. INSPECT FUEL PUMP

(a) Remove the LH rear seat.

(b) Remove the rear seat side garnish.

(c) Turn over the floor carpet.

(d) Remove the floor service hole cover.

(e) Disconnect the fuel pump & sender gauge connector.

(f) 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.

(g) 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 or lead wire.

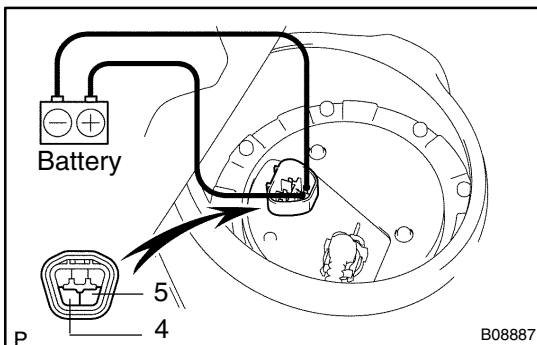
(h) Reconnect the fuel pump & sender gauge connector.

(i) Reinstall the floor service hole cover.

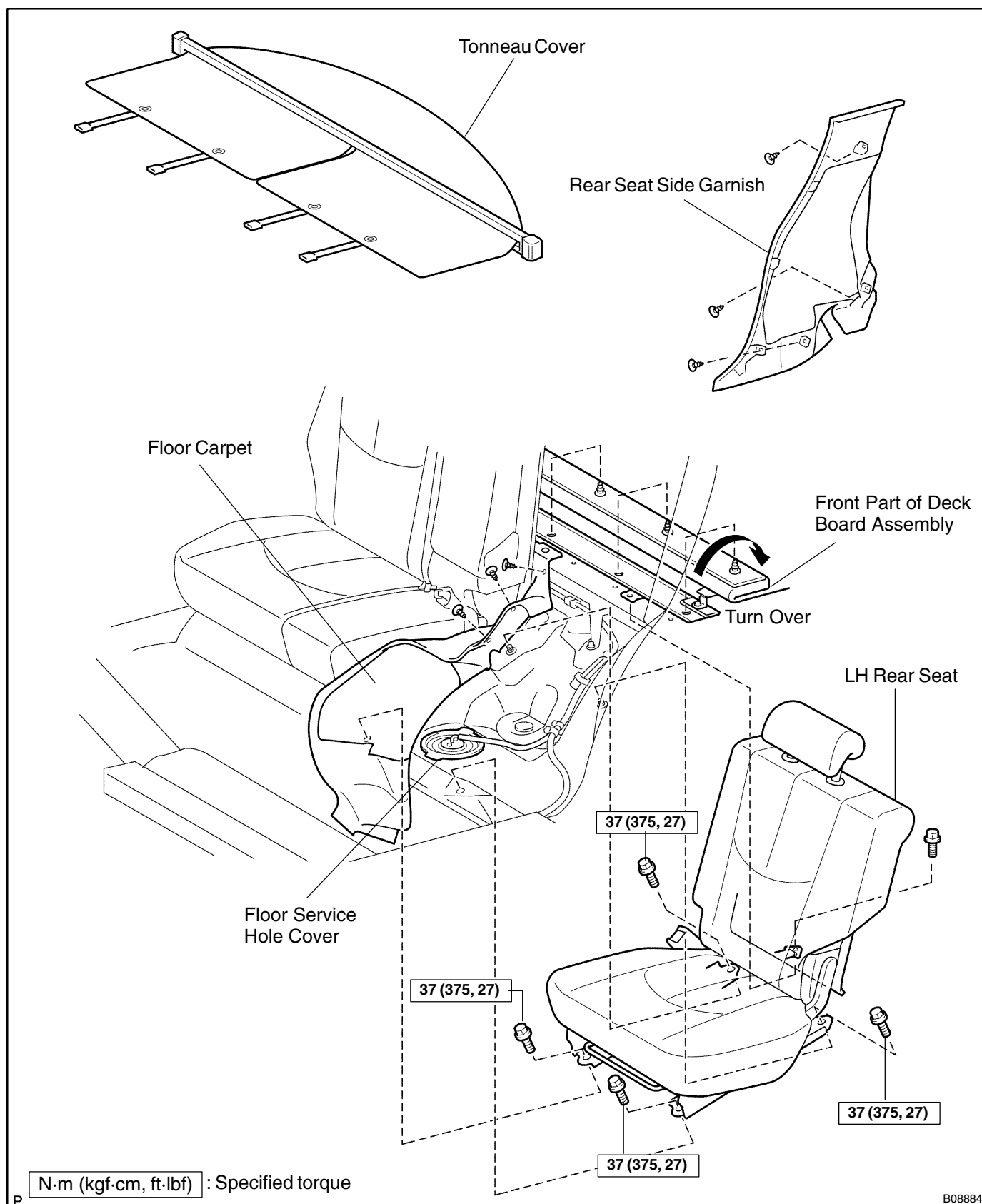
(j) Install the floor carpet.

(k) Reinstall the rear seat side garnish.

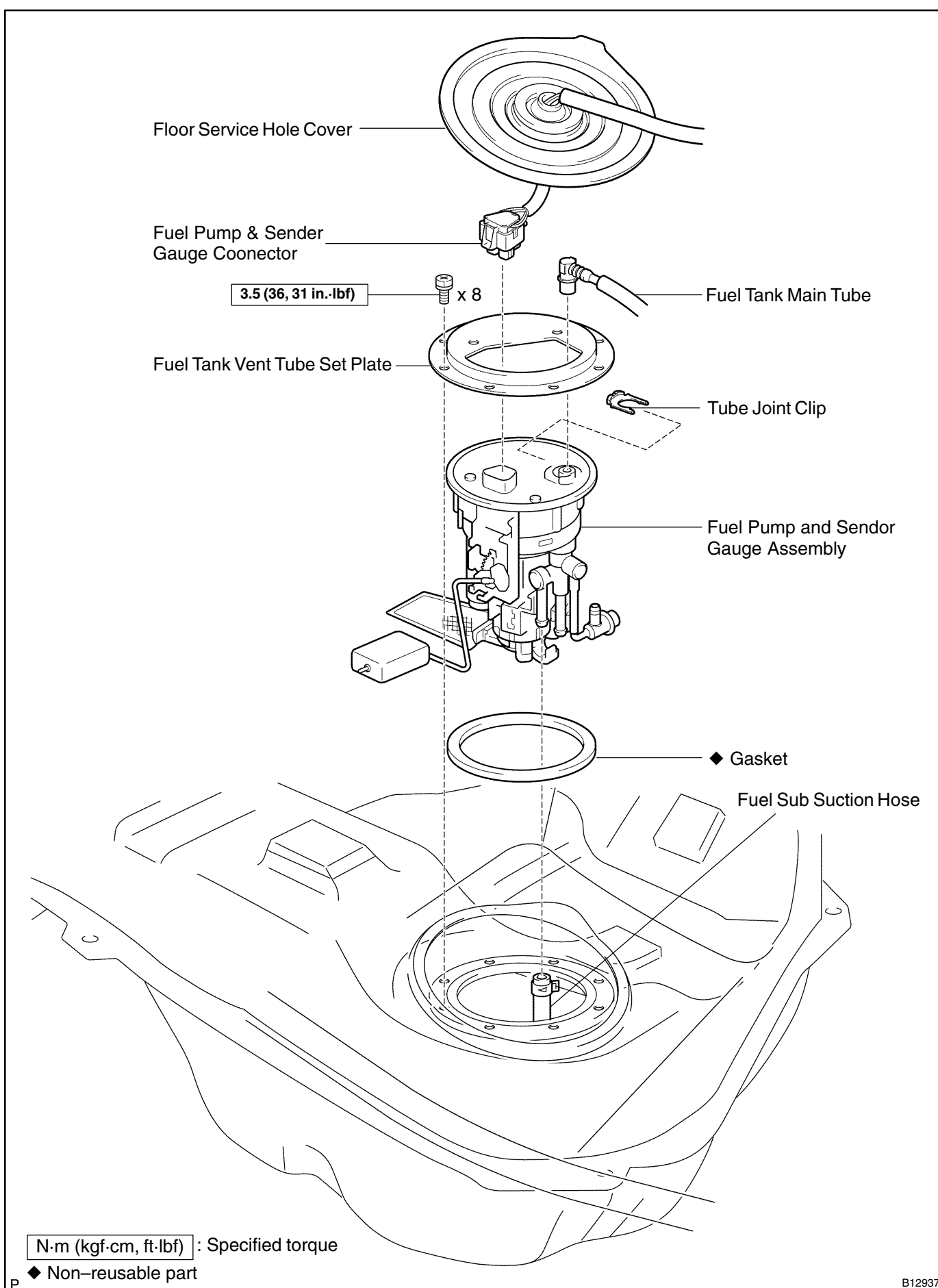
(l) Reinstall the LH rear seat.



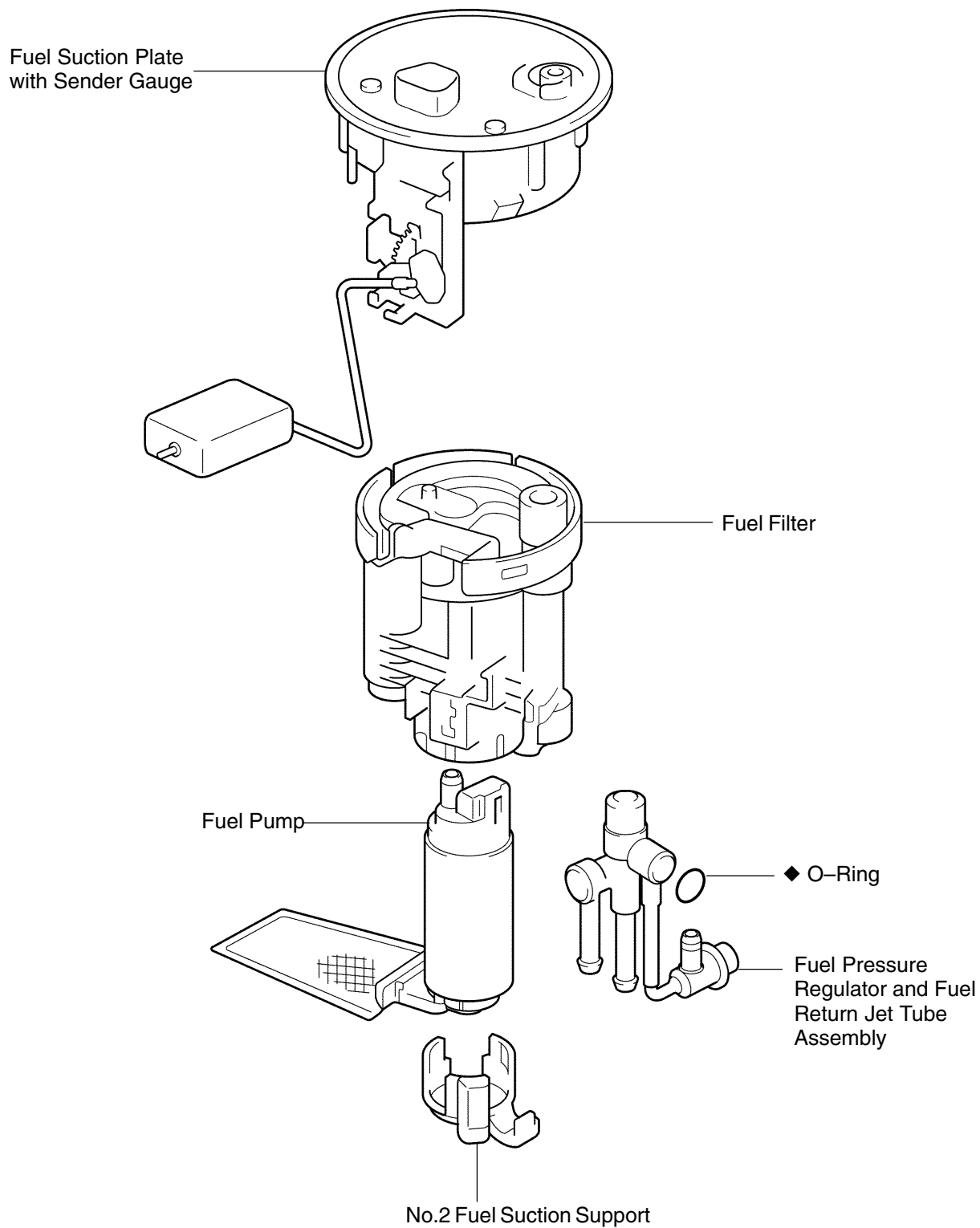
COMPONENTS

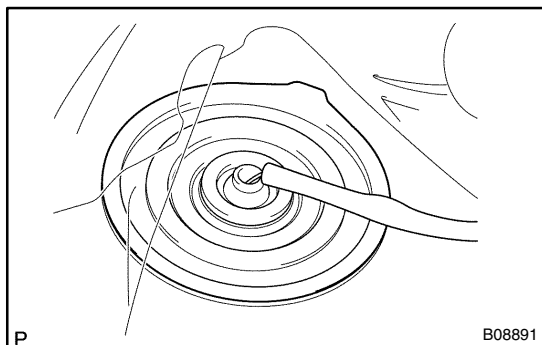


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REMOVAL

CAUTION:

Do not smoke or work near an open flame when working the fuel pump.

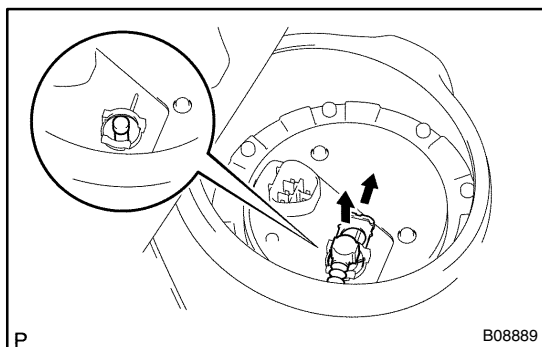
1. REMOVE LH REAR SEAT
2. REMOVE REAR SEAT SIDE GARNISH
3. TURN OVER FLOOR CARPET
4. REMOVE FLOOR SERVICE HOLE COVER

Remove the 3 cap nuts and service hole cover.

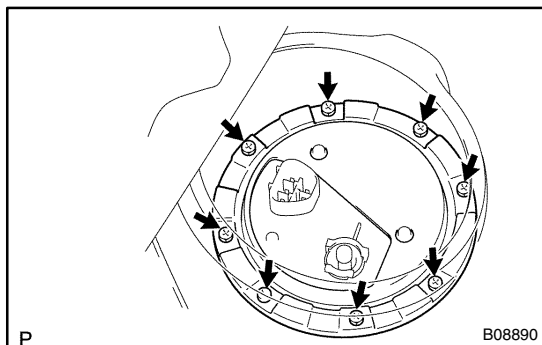
5. DISCONNECT FUEL PUMP & SENDER GAUGE CONNECTOR
6. DISCONNECT FUEL TANK MAIN TUBE (FUEL TUBE CONNECTOR) FROM FUEL SECTION PLATE

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.

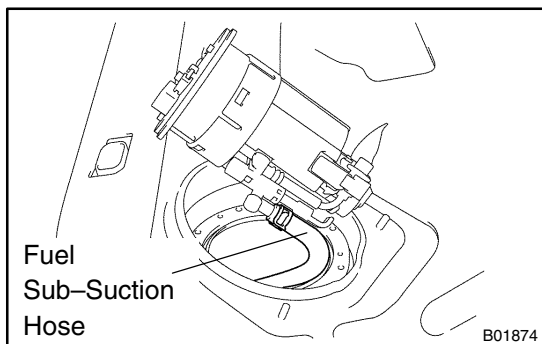


- (a) Remove the tube joint clip.
- (b) Pull out the fuel main tube.
- (c) Plug the port of the fuel suction plate with a clean rubber cap.



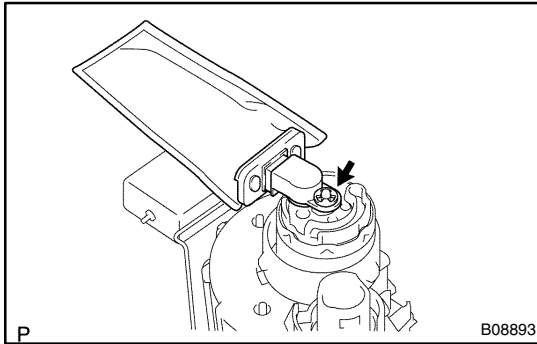
7. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK

- (a) Remove the 8 bolts and fuel tank vent tube set plate.

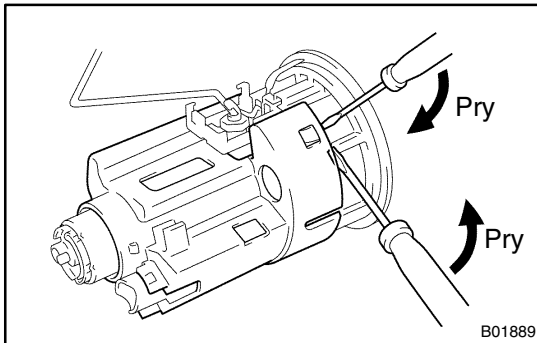


- (b) Lift up the fuel pump and sender gauge assembly, and disconnect the fuel sub-suction hose from the fuel return jet tube and remove the fuel pump, sender gauge assembly and gasket.

8. REMOVE NO.2 FUEL SUCTION SUPPORT
9. REMOVE FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY

**10. REMOVE FUEL SUCTION FILTER**

- (a) Remove the clip.
- (b) Pull out the suction filter.

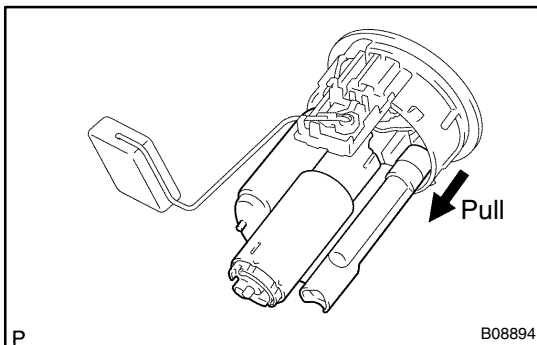
**11. REMOVE NO.1 FUEL SUCTION SUPPORT**

- (a) Using 2 screwdrivers, disconnect the 4 snap claws from the claw holes and remove the fuel suction support.

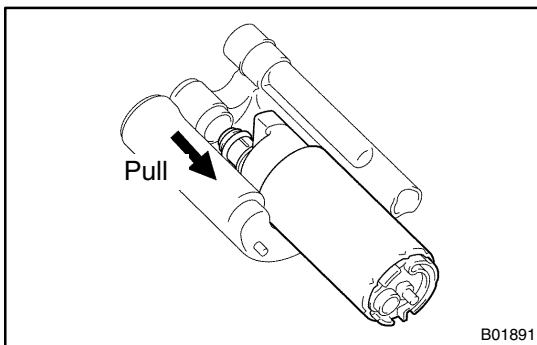
NOTICE:

Be careful not to damage the suction support and suction plate.

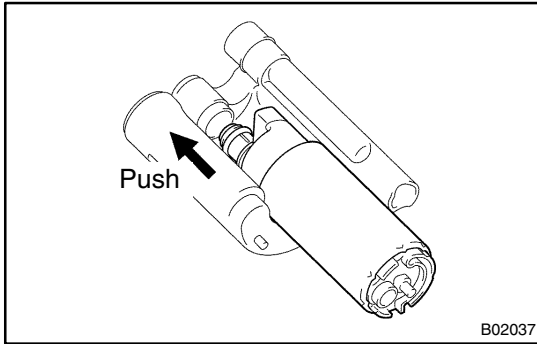
- (b) Remove the No.2 fuel filter cushion.

**12. REMOVE FUEL FILTER AND FUEL PUMP ASSEMBLY**

- (a) Disconnect the fuel pump connector from the fuel pump.
- (b) Pull out the fuel filter and fuel pump assembly.
- (c) Remove the No.1 fuel filter cushion.
- (d) Remove the O-ring from the fuel port of the fuel suction plate.

**13. REMOVE FUEL PUMP FROM FUEL FILTER**

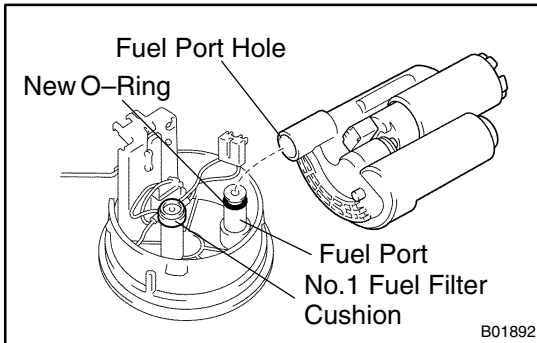
Pull out the fuel pump.



INSTALLATION

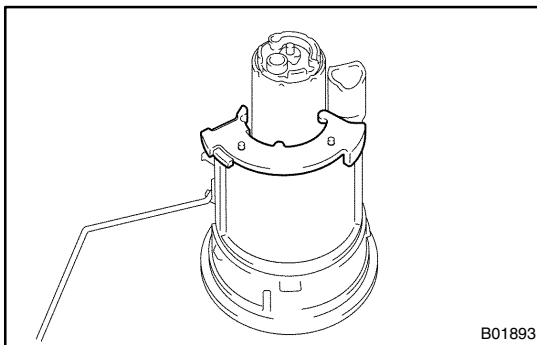
1. INSTALL FUEL PUMP TO FUEL FILTER

Push in the fuel pump.



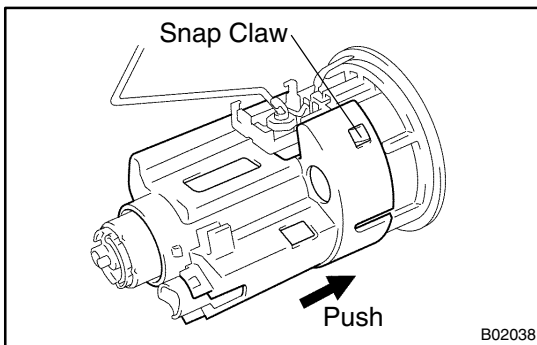
2. INSTALL FUEL FILTER AND FUEL PUMP ASSEMBLY

- Install the No.1 fuel filter cushion to the fuel suction plate.
- Apply a light coat of gasoline to a new O-ring, and install it to the fuel port of the fuel suction plate.
- Align the fuel port of the fuel suction plate with the fuel port hole of the fuel filter.
- Push in the fuel filter.
- Connect the fuel pump connector.

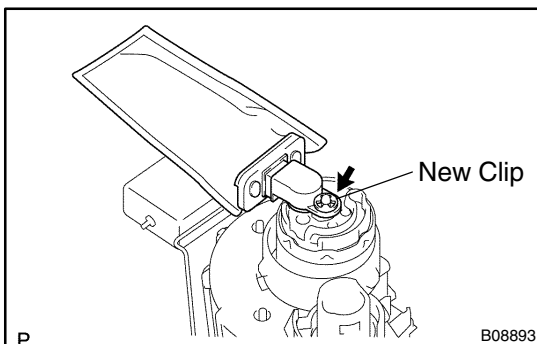


3. INSTALL NO.1 FUEL SUCTION SUPPORT

- Install the No.2 fuel filter cushion the fuel filter.



- Push the fuel suction support, and attach the 4 snap claws to the claw holes.

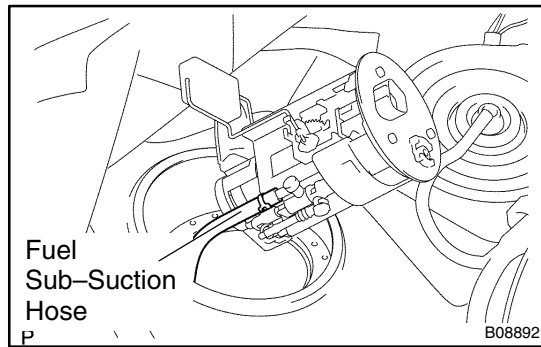


4. INSTALL FUEL SUCTION FILTER

Install the suction filter with a new clip.

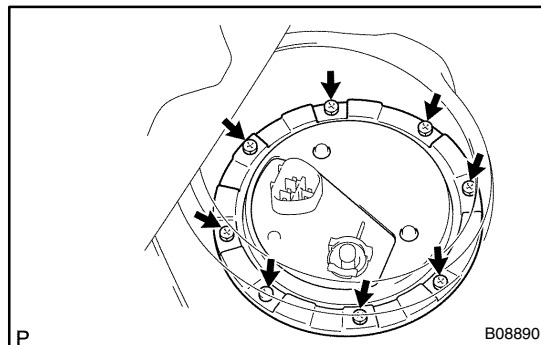
5. INSTALL FUEL PRESSURE REGULATOR AND FUEL RETURN JET TUBE ASSEMBLY

6. INSTALL NO.2 FUEL SUCTION SUPPORT

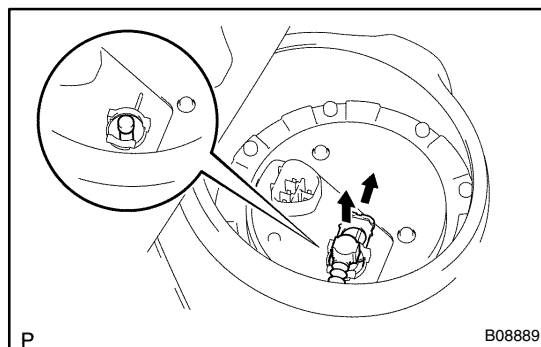


7. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK

- (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: 3.5 N·m (36 kgf·cm, 31 in.-lbf)

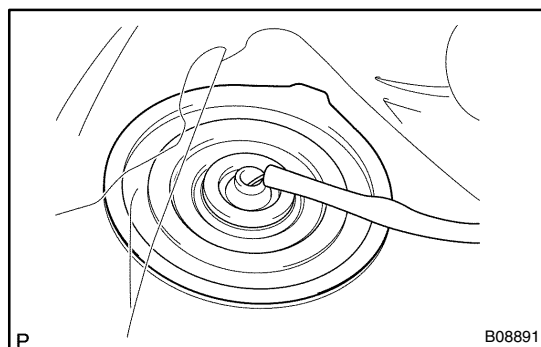


8. CONNECT FUEL TANK MAIN TUBE (FUEL TUBE CONNECTOR) TO FUEL SUCTION PLATE

- (a) Attach the fuel tube connector to the port of the fuel suction plate.
- (b) Install the tube joint clip.

9. CONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

10. CHECK FOR FUEL LEAKS (See page FI-1)



11. INSTALL FLOOR SERVICE HOLE COVER

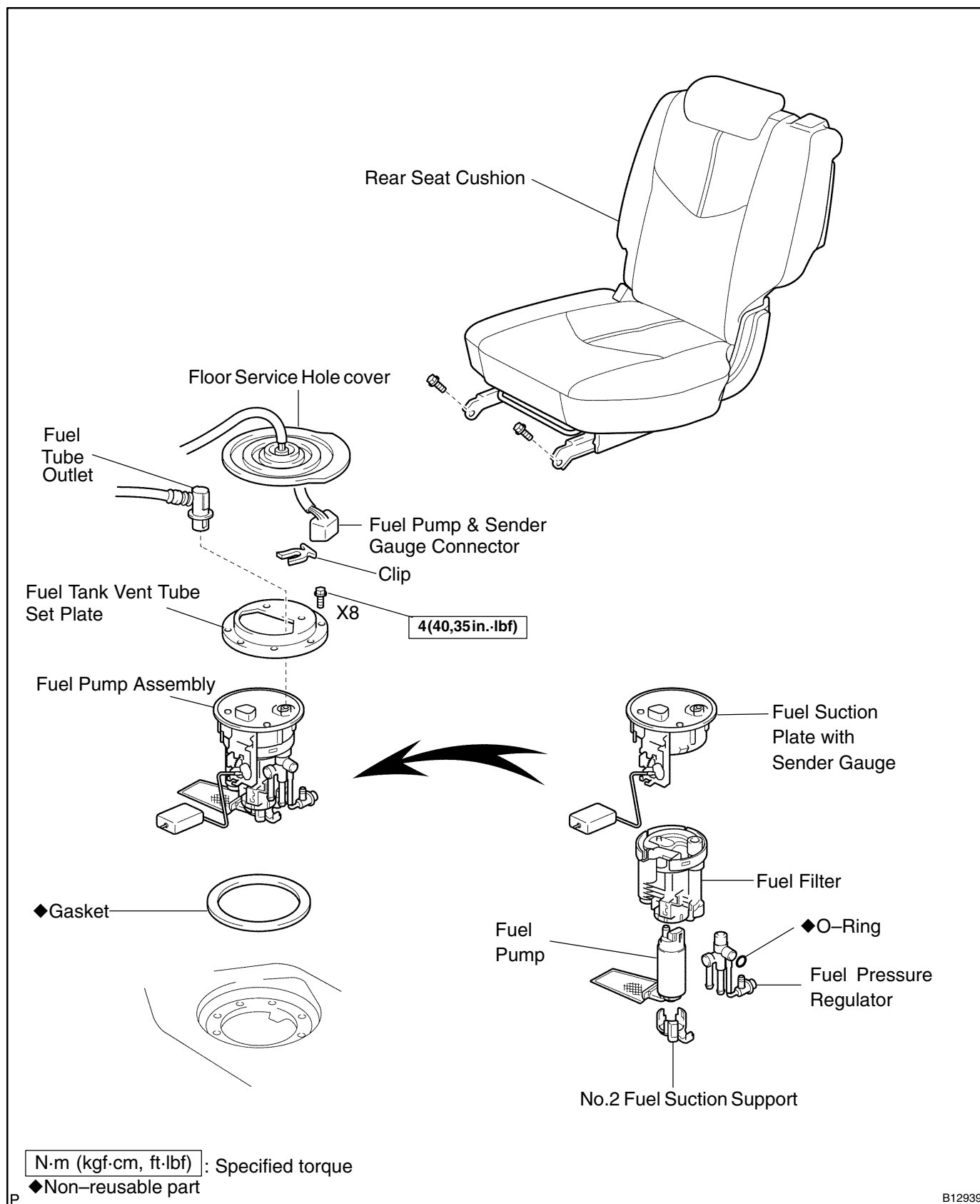
12. INSTALL FLOOR CARPET

13. INSTALL REAR SEAT SIDE GARNISH

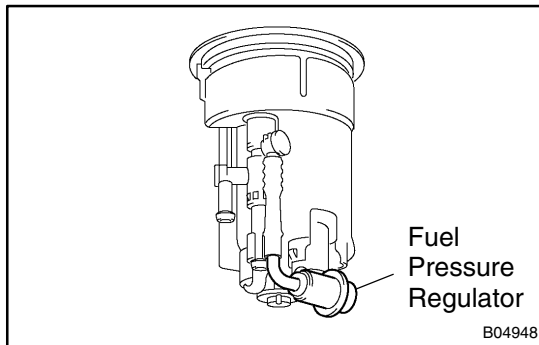
14. INSTALL LH REAR SEAT CUSHION

FUEL PRESSURE REGULATOR COMPONENTS

FIOUT-01

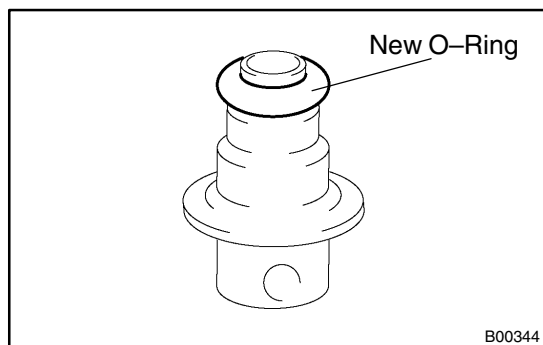


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REMOVAL

1. **REMOVE FUEL PUMP ASSEMBLY FROM FUEL TANK**
(See page FI-11)
2. **REMOVE NO. 2 FUEL SUCTION SUPPORT**
(See page FI-11)
3. **REMOVE FUEL PRESSURE REGULATOR**
 - (a) Pull out the fuel pressure regulator.
 - (b) Remove the O-ring from the fuel pressure regulator.



INSTALLATION

1. INSTALL FUEL PRESSURE REGULATOR

- (a) Install the O-ring to the fuel pressure regulator.

HINT:

Apply a light coat of gasoline to a new O-ring, and install it to the fuel pressure regulator.

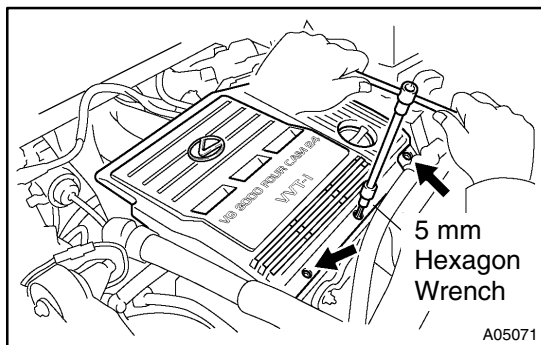
- (b) Connect the fuel pressure regulator from the fuel filter.

2. INSTALL NO. 2 FUEL SUCTION SUPPORT

(See page FI-13)

3. INSTALL FUEL PUMP ASSEMBLY FROM FUEL TANK

(See page FI-13)

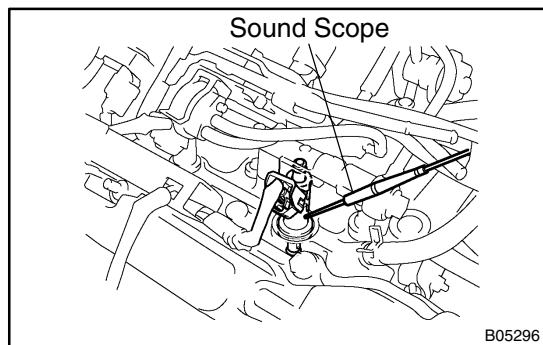


INJECTOR ON-VEHICLE INSPECTION

FI0UW-01

1. REMOVE V-BANK COVER

- Using a 5 mm hexagon wrench, remove the 2 cap nuts.
- Disconnect the 2 clips, and remove the V-bank cover.

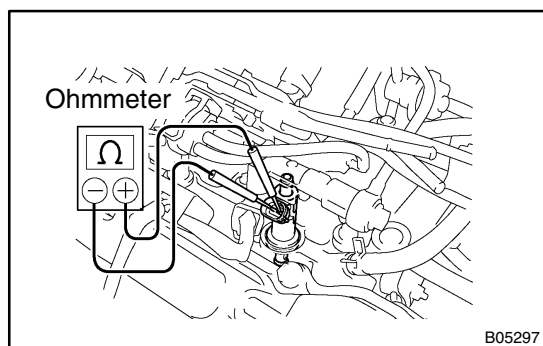


2. INSPECT INJECTOR OPERATION

Check operation sound from each injector.

- With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine speed.
- If you have no sound scope, you can check the injector operating vibration with your finger.

If no sound or unusual sound is heard, check the wiring connector, injector or injection signal from the engine ECU.



3. INSPECT INJECTOR RESISTANCE

- Disconnect the injector connector.
- 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.

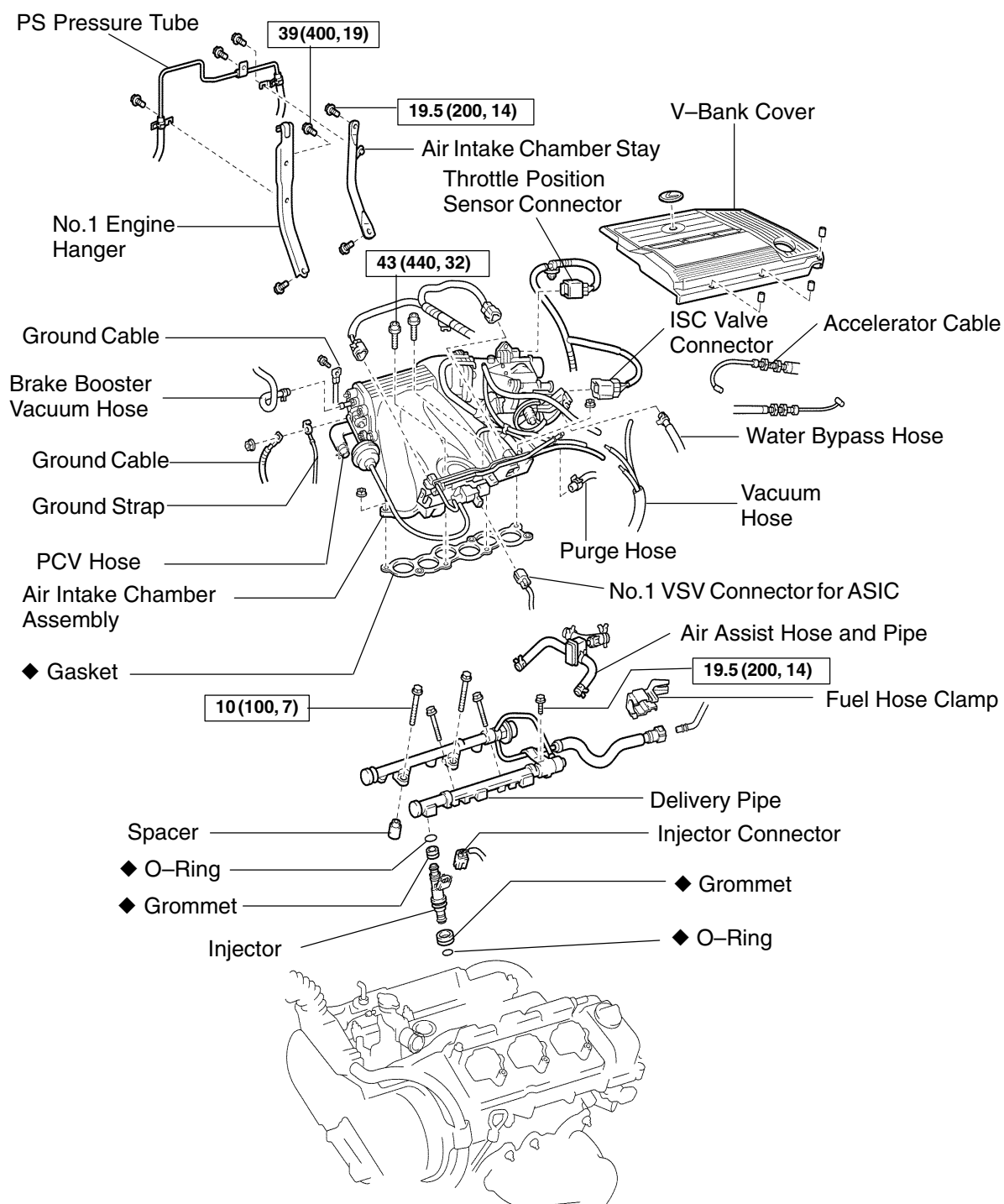
- Reconnect the injector connector.

4. REINSTALL V-BANK COVER

HINT:

For fixing the V-bank cover, push on the cover until a "click" is felt.

COMPONENTS



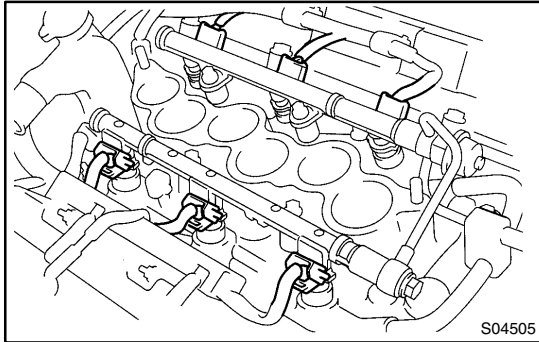
N·m (kgf·cm, ft·lbf) : Specified

◆ Non-reusable part

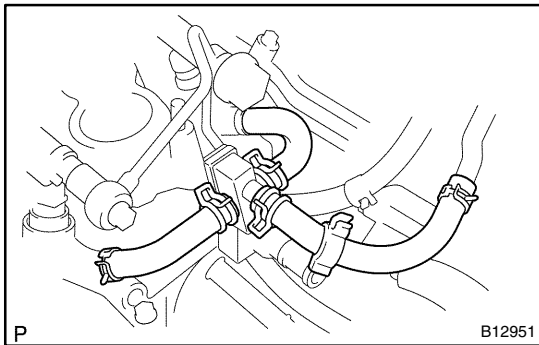
B12945

REMOVAL

1. REMOVE AIR CLEANER HOSE
2. REMOVE AIR INTAKE CHAMBER ASSEMBLY
(See page EM-33)

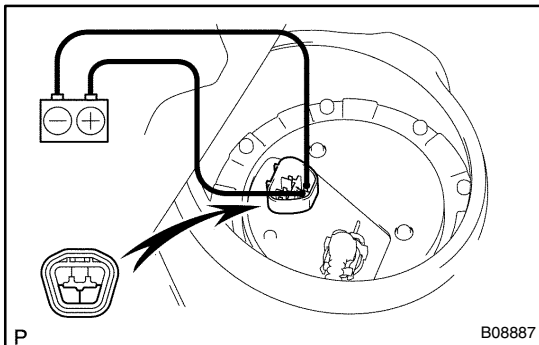


3. DISCONNECT INJECTOR CONNECTORS



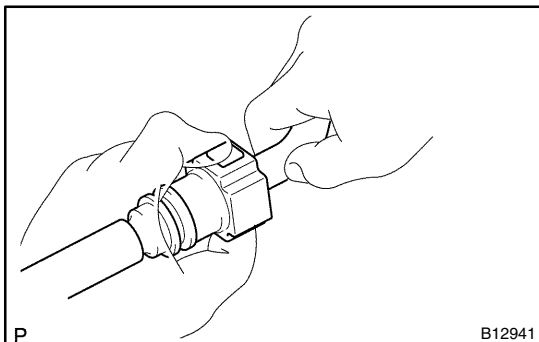
4. REMOVE AIR ASSIST HOSES AND PIPE

- (a) Disconnect the air assist pipe from the bracket on the No.1 fuel pipe.
- (b) Remove the air assist hoses from the intake manifold.



5. DISCONNECT FUEL INLET PIPE

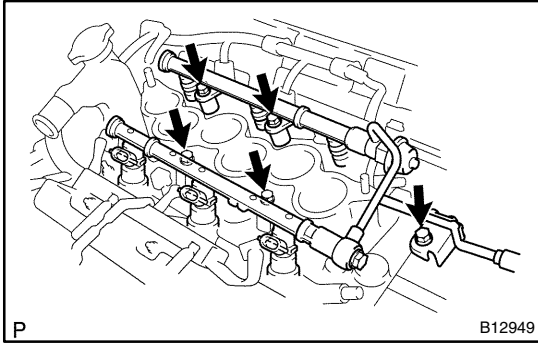
- (a) Remove the fuel hose clamp.



- (b) Disconnect the fuel inlet pipe (fuel tube connector) from the fuel filter.

CAUTION:

- Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.
- As there is retained pressure in the fuel pipe line, prevent it from splashing inside the engine compartment.

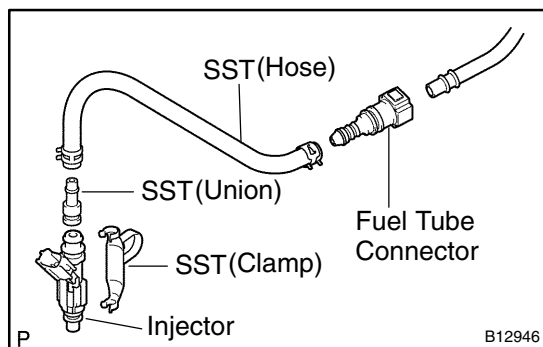


6. REMOVE DELIVERY PIPES AND INJECTORS

NOTICE:

- **Be careful not to drop the injectors when removing the delivery pipes.**
- **Pay attention to put any hung load on the injector to and from the side direction.**

- (a) Remove the 5 bolts and delivery pipes together with the 6 injectors and fuel pipe.
- (b) Remove the 4 spacers from the intake manifold.
- (c) Pull out the 6 injectors from the delivery pipes.
- (d) Remove the 2 O-rings and 2 grommets from each injector.

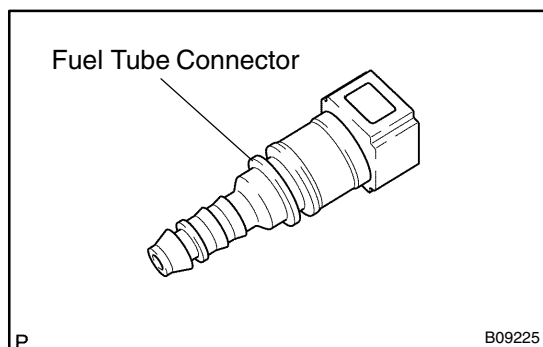


INSPECTION

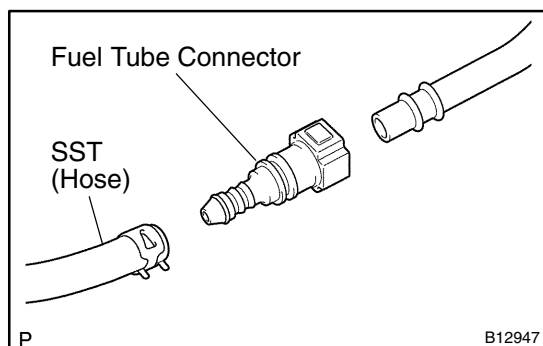
1. INSPECT INJECTOR INJECTION

CAUTION:

Keep injector clear of sparks during the test.



- (a) Purchase the new No. 1 fuel pipe and take out the fuel tube connector from its pipe.
Part No. 23801-20040



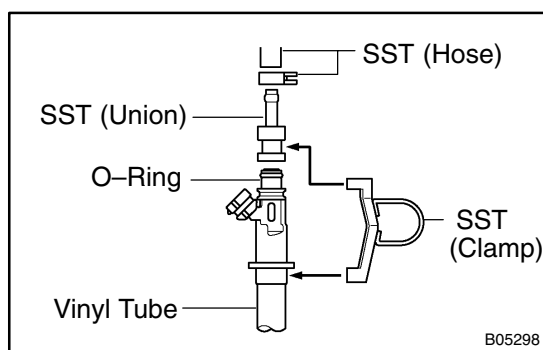
- (b) Connect SST (hose) and fuel tube connector to the fuel filter outlet.
SST 09268-41047

CAUTION:

Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.

HINT:

Use the vehicle's fuel filter.

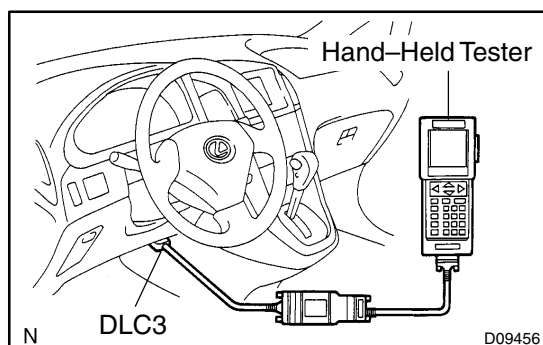


- (c) Install the grommet and O-ring to the injector.
(d) Connect SST (union and hose) to the injector, and hold the injector and union with SST (clamp).
SST 09268-41047 (09268-41100, 09268-41300)

- (e) Put the injector into a graduated cylinder.

HINT:

Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.



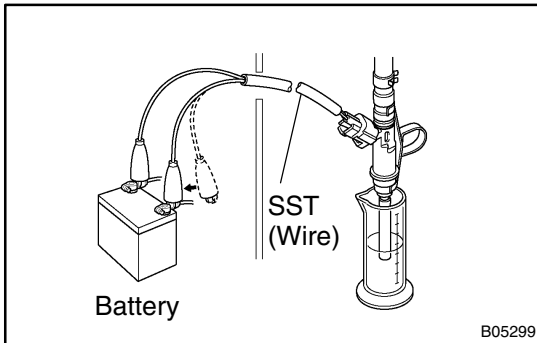
- (f) Connect the hand-held tester to the DLC3.
(g) Turn the ignition switch ON and hand-held tester main switch ON.

NOTICE:

Do not start the engine.

- (h) Select the active test mode on the hand-held tester.
(i) Please refer to the hand-held tester operator's manual for further details.

- (j) If you have no hand-held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page FI-5).



- (k) 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.

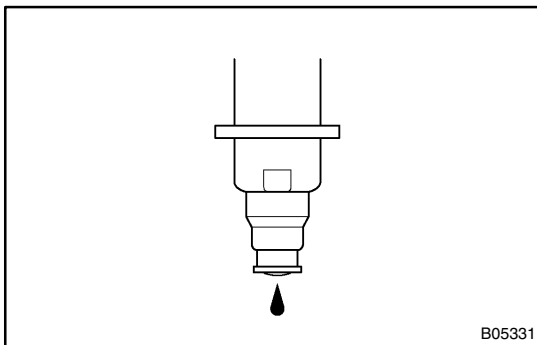
SST 09842-30070

Volume: 60 – 73 cm³ (3.7 – 4.5 cu in.) per 15 sec.

Difference between each injector:

13 cm³ (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.

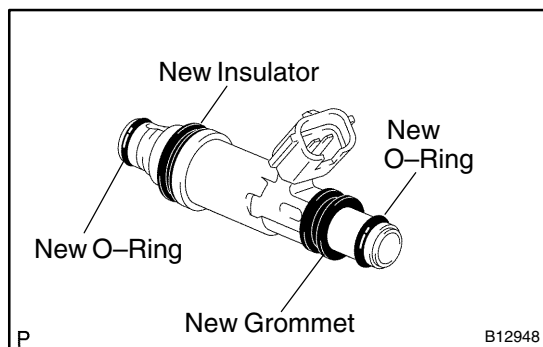
SST 09842-30070

Fuel drop: 1 drop or less per 12 minutes

- (b) Turn the ignition switch to LOCK.
 (c) Disconnect the negative (–) terminal cable from the battery.
 (d) Remove the SST and fuel tube connector.
 SST 09268-41047, 09842-30070

CAUTION:

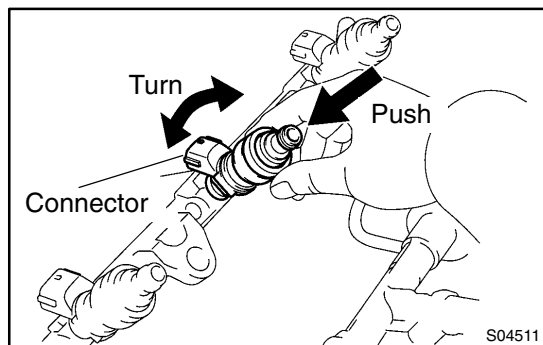
- **Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.**
 - **As there is retained pressure in the fuel pipe line, prevent it from splashing inside the engine compartment.**
- (e) Disconnect the hand-held tester from the DLC3.



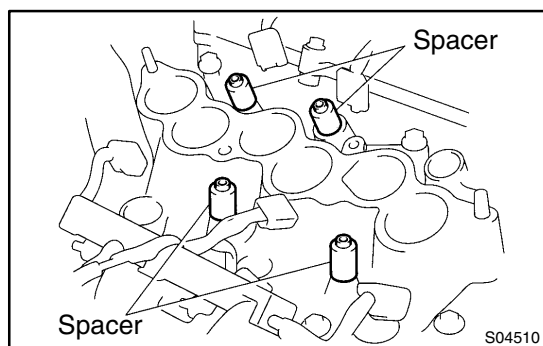
INSTALLATION

1. INSTALL INJECTORS AND DELIVERY PIPES

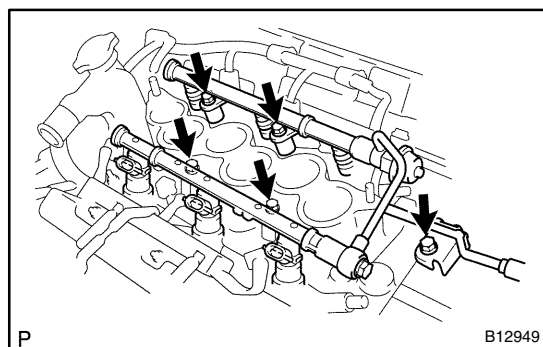
- Install new insulator and grommet to each injector.
- Apply a light coat of spindle oil or gasoline to 2 new O-rings and install them to each injector.



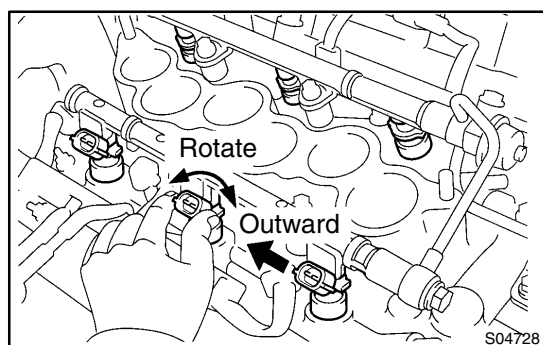
- Apply a light coat of spindle oil or gasoline on the place where a delivery pipe touches an O-ring of the injector.
- While turning the injector clockwise and counterclockwise, push it to the delivery pipes. Install the 6 injectors.
- Position the injector connector outward.



- Place the 4 spacers in position on the intake manifold.



- Apply a light coat of spindle oil or gasoline on the place where a intake manifold touches an O-ring of the injector.
- Place the delivery pipes and fuel pipe together with the 6 injectors in position on the intake manifold.
- Temporarily install the 4 bolts holding the delivery pipes to the intake manifold.
- Temporarily install the bolt holding the fuel pipe to the intake manifold.

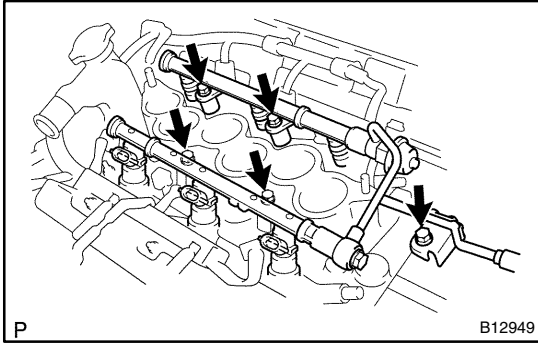


- Check that the injectors rotate smoothly.

HINT:

If injectors do not rotate smoothly, the probable cause is incorrect installation of O-rings. Replace the O-rings.

- Position the injector connector outward.

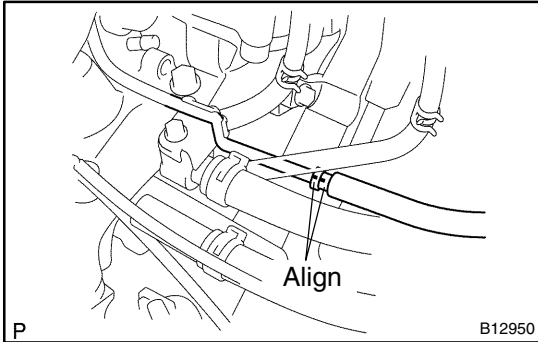


- (m) Tighten the 4 bolts holding the delivery pipes to the intake manifold.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

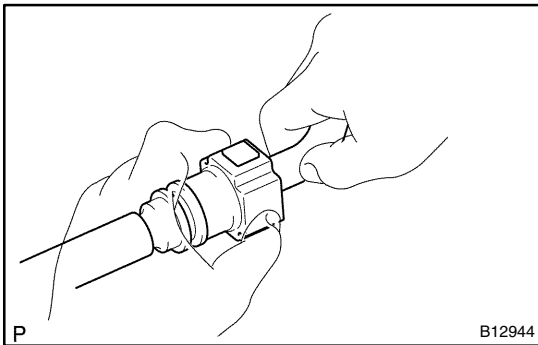
- (n) Tighten the bolt holding the fuel pipe to the intake manifold.

Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)



2. CONNECT FUEL INLET PIPE

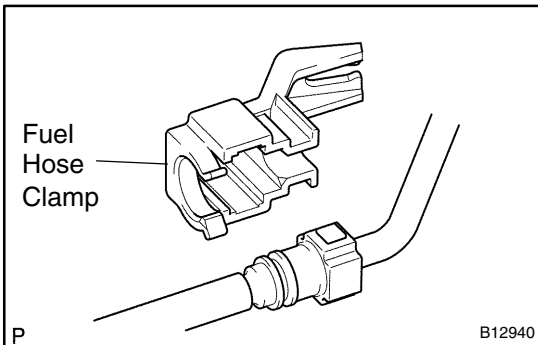
- (a) Align the alignment marks (white paint) on the fuel inlet pipe.



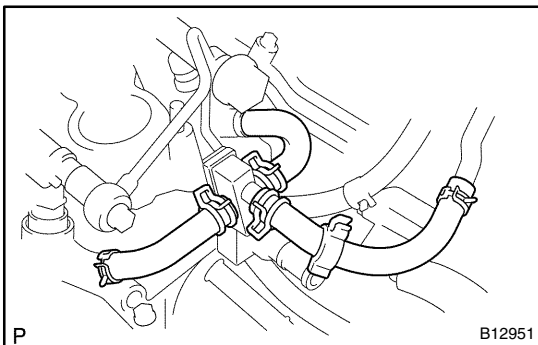
- (b) Connect the fuel inlet pipe (fuel tube connector) to the fuel filter.

CAUTION:

Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.



- (c) Install the fuel hose clamp to the fuel filter.



3. INSTALL AIR ASSIST HOSES AND PIPE

- (a) Connect the air assist hoses to the intake manifold.
(b) Install the air assist pipe to the bracket on the No. 1 fuel pipe.

4. CONNECT INJECTOR CONNECTORS

5. INSTALL AIR INTAKE CHAMBER ASSEMBLY

(See page EM-60)

6. INSTALL AIR CLEANER HOSE

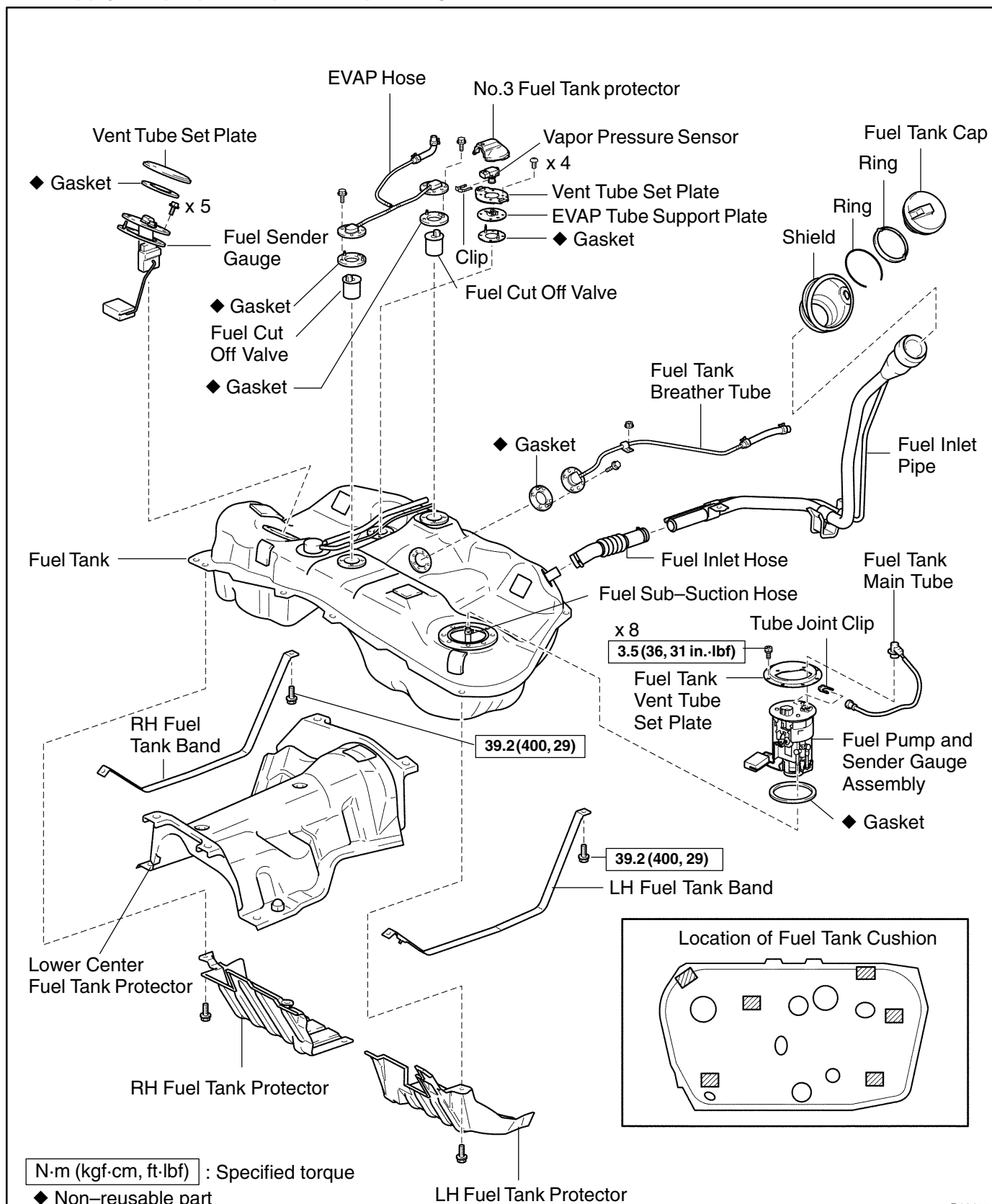
7. CHECK FOR FUEL LEAKS

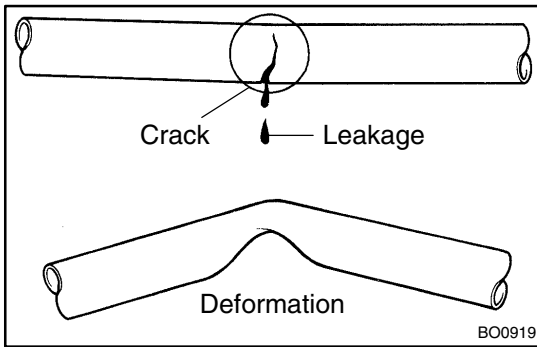
FUEL TANK AND LINE COMPONENTS

F10V1-01

CAUTION:

- Always use new gaskets when replacing the fuel tank or component parts.
- Apply the proper torque to all parts tightened.



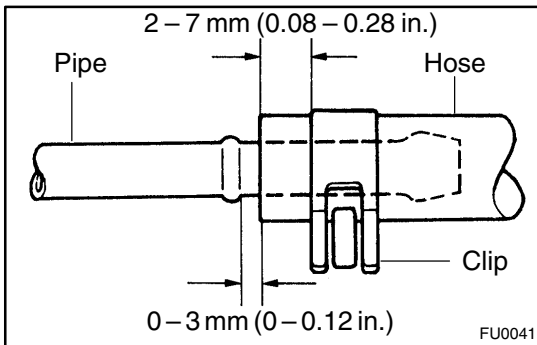


INSPECTION

INSPECT FUEL TANK AND LINE

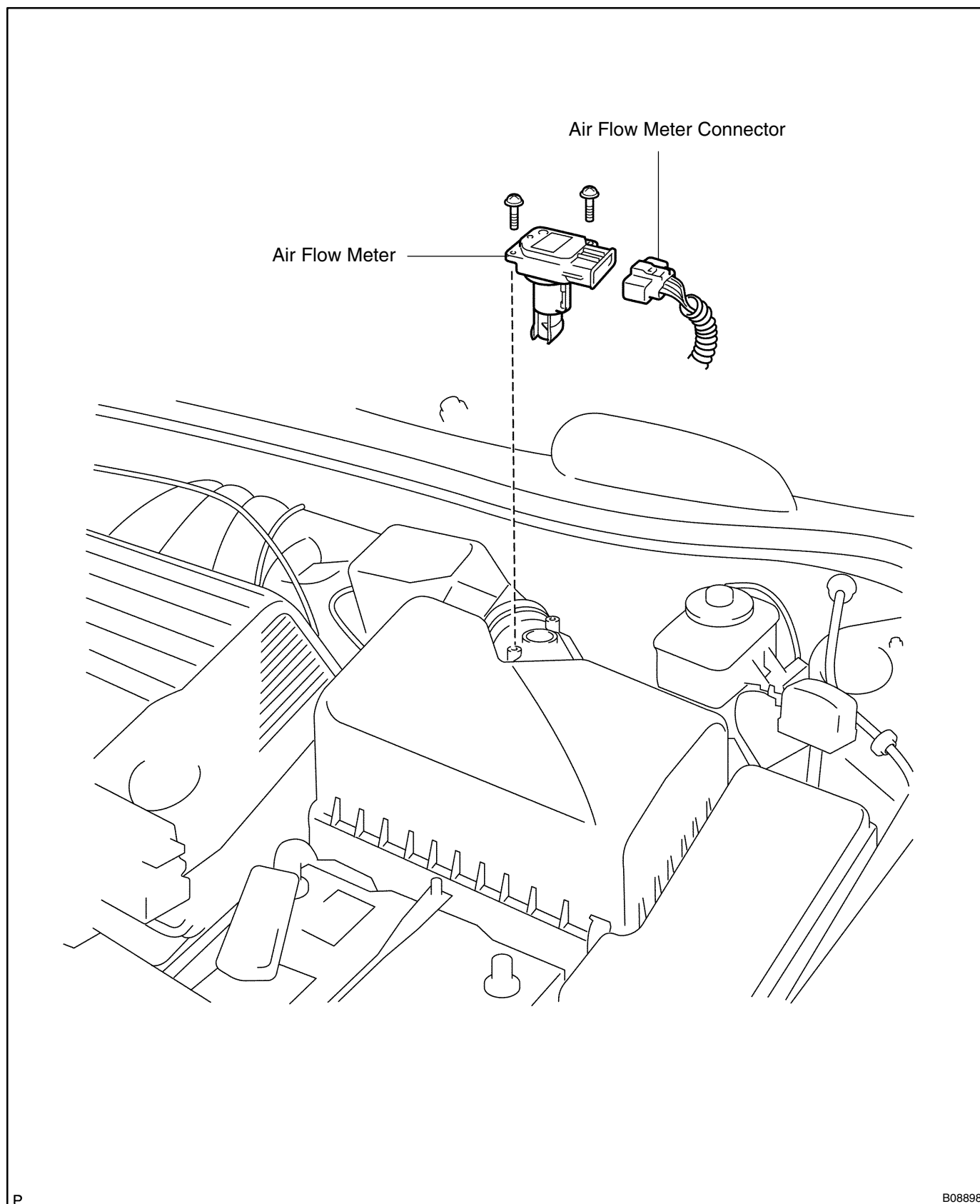
- (a) Check the fuel lines for cracks or leakage, and all connections for deformation.
- (b) Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.
- (c) Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.
- (d) Check the filler neck for damage or fuel leakage.
- (e) Hose and pipe connections are as shown in the illustration.

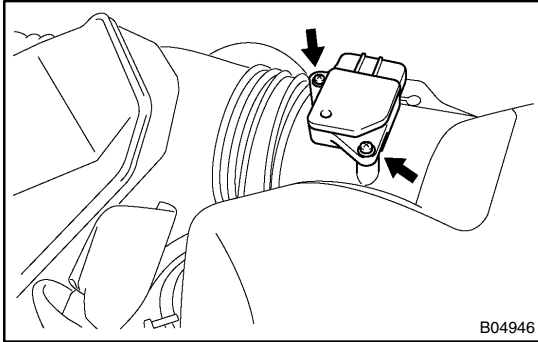
If a problem is found, repair or replace the parts as necessary.



AIR FLOW METER COMPONENTS

F10V3-01





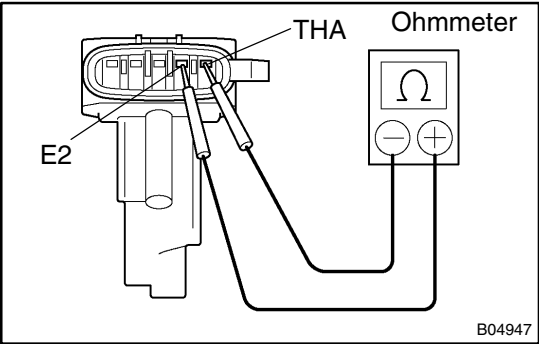
REMOVAL

REMOVE AIR FLOW METER

- (a) Disconnect the air flow meter connector.
- (b) Remove the 2 screw, air flow meter and gasket.

HINT:

At the time of installation, please refer to the following items.
Use a new gasket.

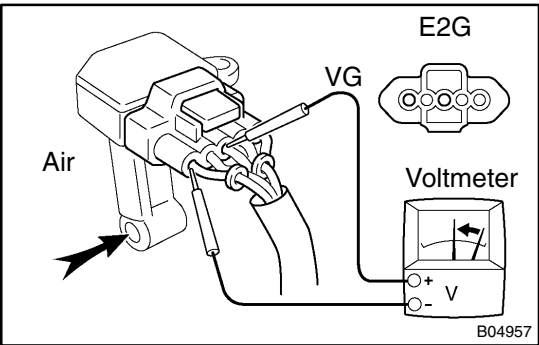


INSPECTION

1. INSPECT AIR FLOW METER RESISTANCE

Using an ohmmeter, measure the resistance between terminals THA and E2.

Terminals	Resistance	Temperature
THA – E2	14.6 – 17.8 k Ω	–20°C (–4°F)
THA – E2	2.21 – 2.69 k Ω	20°C (68°F)
THA – E2	0.29 – 0.35 k Ω	60°C (140°F)



If the resistance is not as specified, replace the air flow meter.

2. INSPECT AIR FLOW METER OPERATION

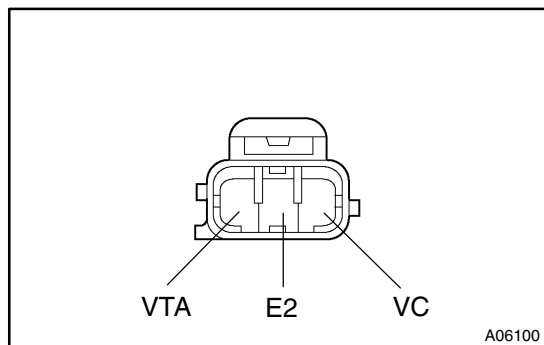
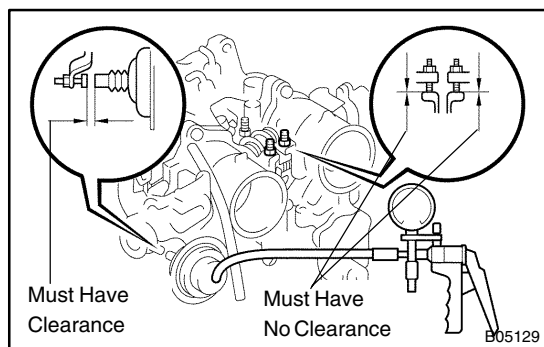
- Connect the air flow meter connector.
- Turn the ignition switch ON.
- Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (–) tester probe to terminal E2G.
- Blow air into the air flow meter, and check that the voltage fluctuates.

If operation is not as specified, replace the air flow meter.

- Turn the ignition switch LOCK.
- Disconnect the air flow meter connector.

INSTALLATION

Installation is in the reverse order of removal (See page FI-29).



THROTTLE BODY ON-VEHICLE INSPECTION

F10V7-01

1. INSPECT THROTTLE BODY

Check that the throttle linkage moves smoothly.

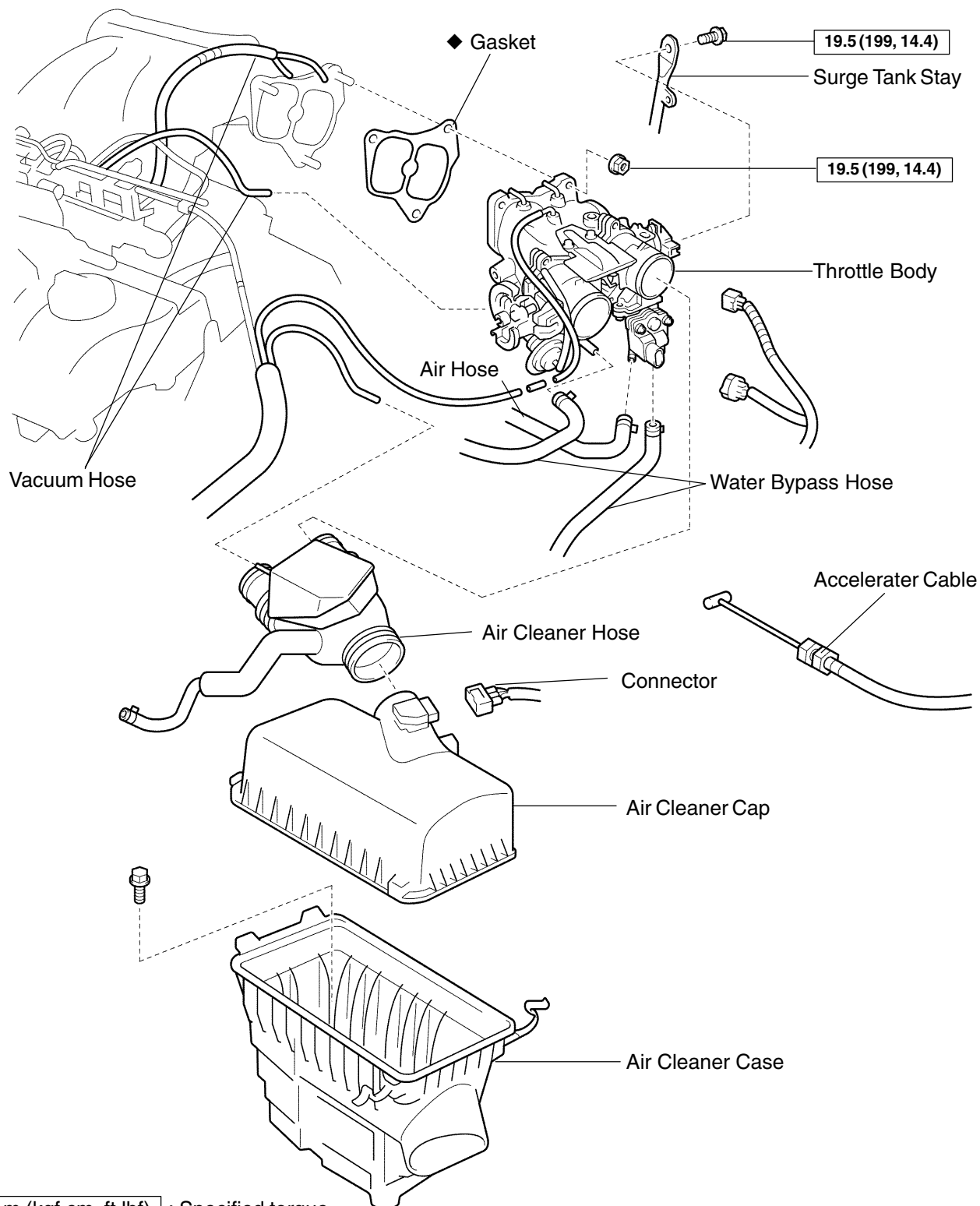
2. INSPECT THROTTLE POSITION SENSOR

- (a) Check that there is no clearance between each throttle stop screw and the throttle lever when applying the negative pressure (53.3 kPa (400 mmHg)) to the throttle opener using the mighty pack.
- (b) Apply vacuum to the throttle opener.
- (c) Disconnect the sensor connector.
- (d) Using an ohmmeter, measure the resistance between each terminal.

Throttle valve condition	Between terminals	Resistance
Fully closed	VTA – E2	0.2 – 6.3 kΩ
Fully open	VTA – E2	2.0 – 10.2 kΩ
–	VC – E2	2.5 – 5.9 kΩ

- (e) Reconnect the sensor connector.

COMPONENTS

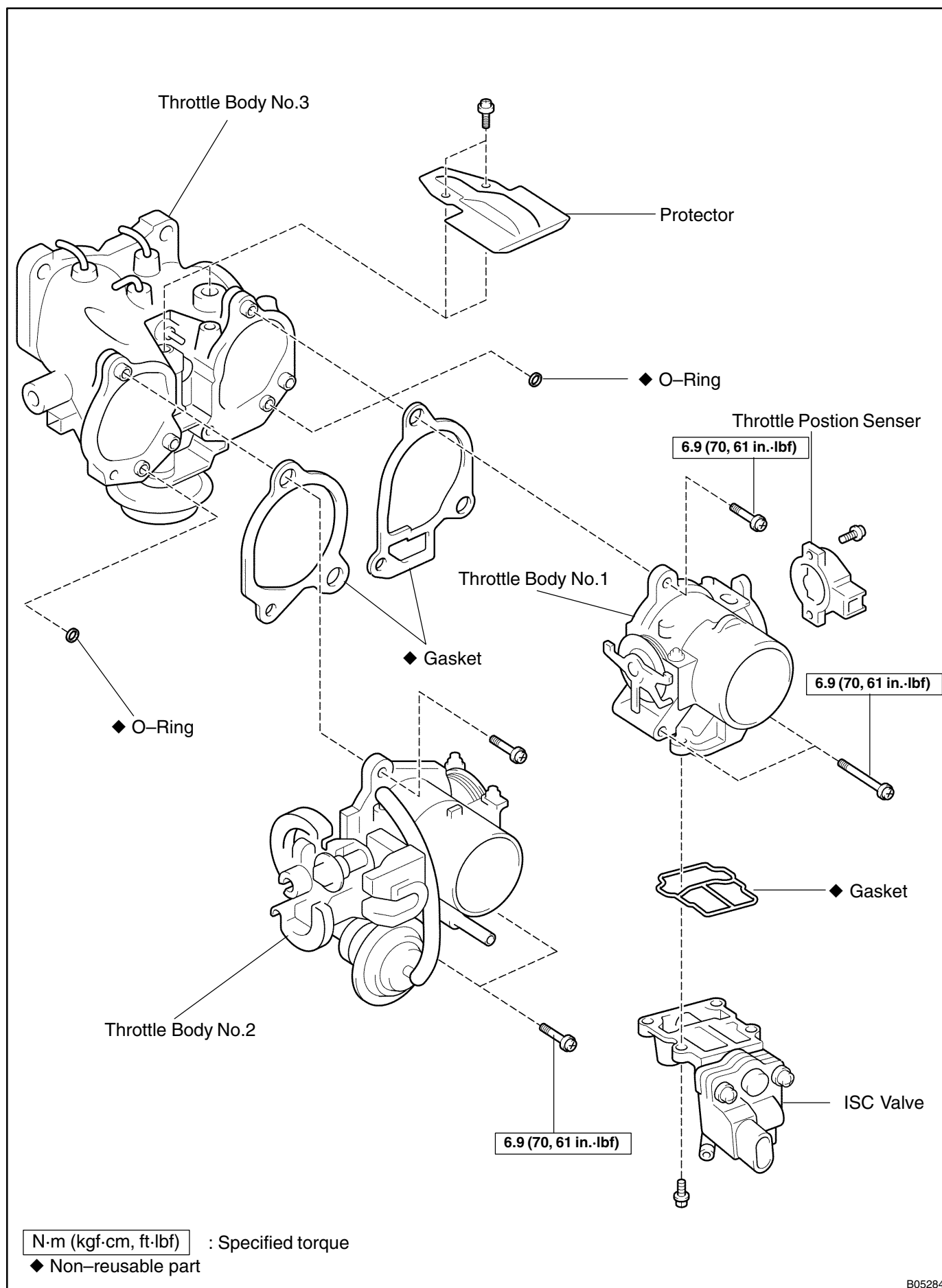


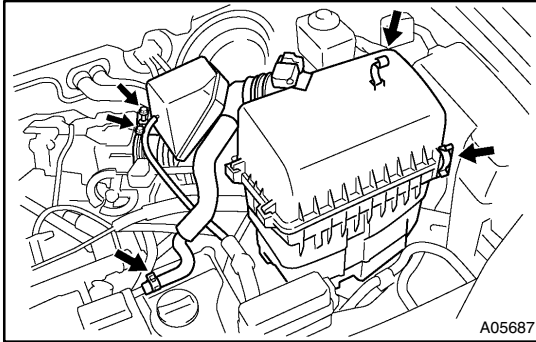
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

P

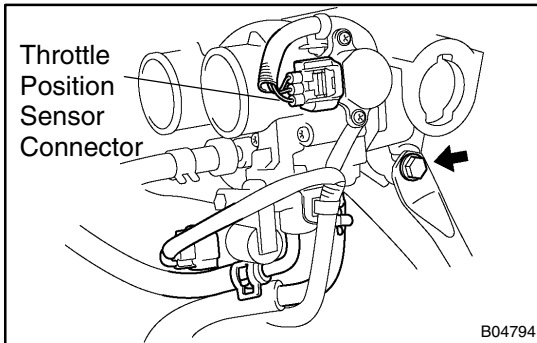
B12952



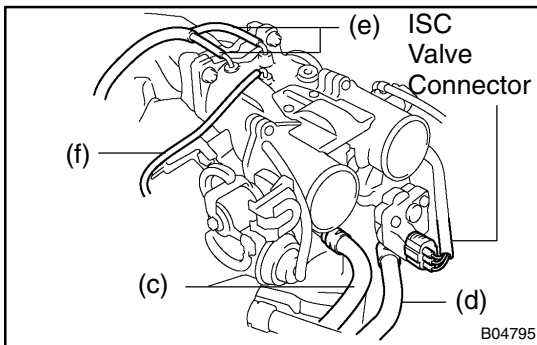


REMOVAL

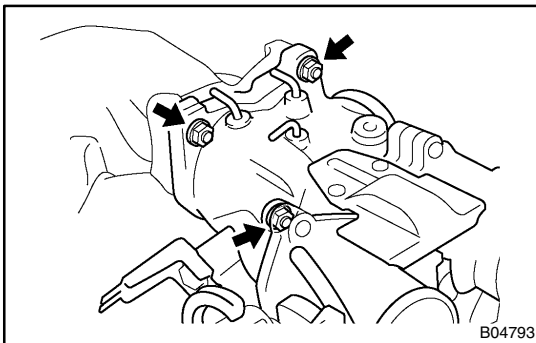
1. **DRAIN ENGINE COOLANT**
2. **DISCONNECT ACCELERATOR CABLE**
3. **DISCONNECT THROTTLE CABLE**
4. **REMOVE AIR CLEANER HOSE**
 - (a) Disconnect the PCV hose.
 - (b) Loosen the 2 hose clamps, and remove the air cleaner hose.



5. **REMOVE THROTTLE BODY**
 - (a) Disconnect the throttle position sensor connector.



- (b) Disconnect the ISC valve connector.
- (c) Disconnect the water bypass hoses.
- (d) Disconnect the air assist hose.
- (e) Disconnect the 2 fuel vapor feed hoses.
- (f) Disconnect the vacuum hose.

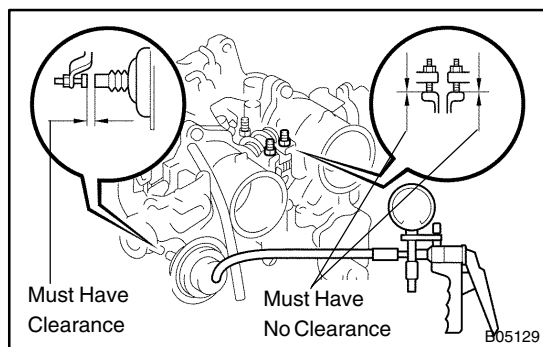


- (g) Remove the 3 nuts, throttle body and gasket.

HINT:

At the time of installation, please refer to the following items.
Place a new gasket on the air intake chamber.

Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)



INSPECTION

NOTICE:

In case of changing, removing or installing the throttle body or ISC valve, must do this.

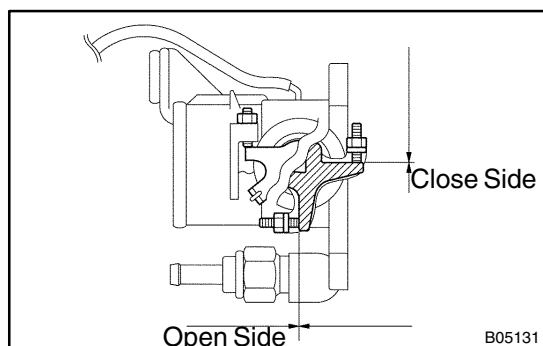
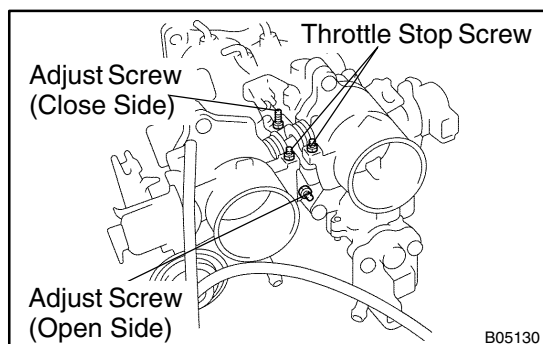
1. THROTTLE BODY INSPECTION

- (a) Check that there is no clearance between each throttle stop screw and the throttle lever when applying the negative pressure (53.3 kPa (400 mmHg)) to the throttle opener using the MITYVAC.

Standard: Must have no clearance.

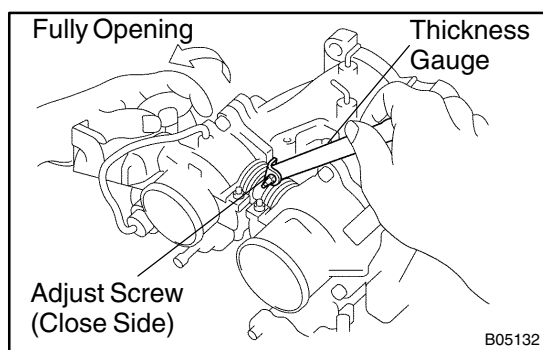
NOTICE:

As the throttle stop screw is precisely adjusted, so do not adjust it.



- (b) Under the condition of (1), check visually that there is a clearance between each adjust screw and the throttle lever on No. 1 side.

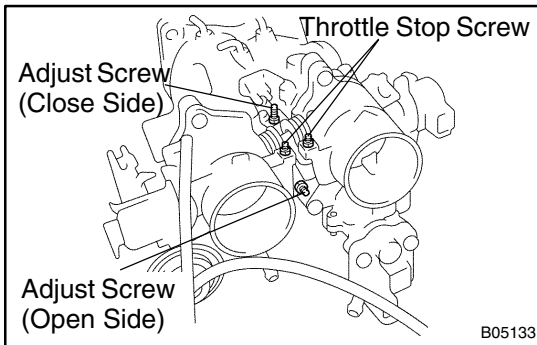
Adjust Screw	Reference Value
Close Side	About 0.13 mm
Open Side	About 0.22 mm



- (c) Measure the clearance between the adjust screw on the close side when fully opening the throttle lever on No. 2 side by hand and the throttle lever on No. 1 side with a thickness gauge.

Standard value: 0.25 – 0.45 mm

In case of being out of standard value, perform the adjustment of (2).



2. THROTTLE BODY (BALANCE) ADJUSTMENT

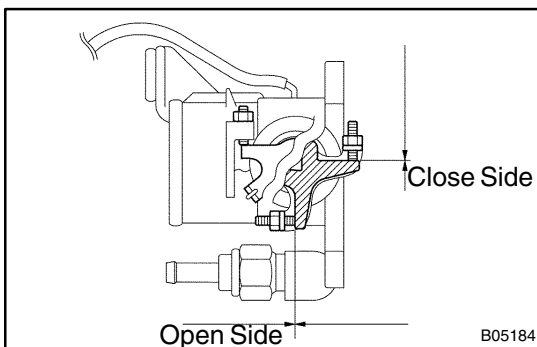
NOTICE:

Do not adjust the throttle stop screw and throttle opener.

- (a) Beforehand checking
Recheck 1 – (1)
- (b) Adjustment of the adjust screw on the open side
 - (1) Loosen the lock nut and screw using the hexagon wrench (width of two planes 2 mm), make clearance between the screw tip and the throttle lever on No. 1 side.
 - (2) Turn the screw to the screw torque direction gradually, and stop it at the position where to touch the lever at the very moment.

NOTICE:

If turning it too much to the torque direction, No. 1 lever goes off from the throttle stop screw causing the adjustment failure.



- (3) Turn it back from the position where it touches the lever to the screw loosening direction.

Standard:

Turn it back by rotating 1/4.

- (4) Torque the lock nut.
- (c) Adjustment of the adjust screw on the close side
 - (1) Loosen the lock nut and screw, and make clearance between the screw tip and the throttle lever on No. 1 side.
 - (2) Turn the screw to the screw torque direction gradually, and stop it at the position where to touch the lever at the very moment.

NOTICE:

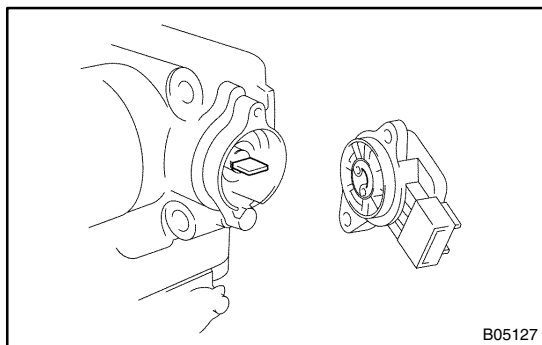
If turning it too much to the torque direction. No. 2 lever goes off from the throttle stop screw causing the adjustment failure.

- (3) Turn it back from the position where it touches the lever to the screw loosening direction.

Standard:

Turn it back by rotating 1/2 – 3/4.

- (4) Torque the lock nut.
- (d) Completion checking
Check 1 – (3).



INSTALLATION

NOTICE:

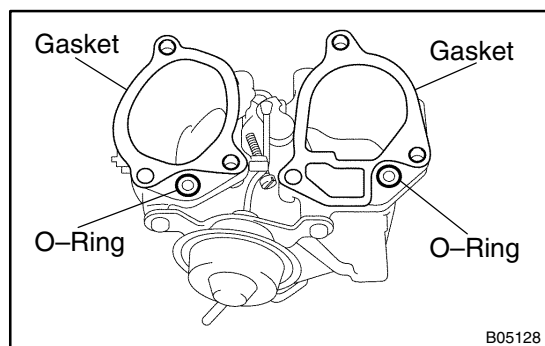
- Do not give a shock to the throttle position sensor.
- Do not disassemble or adjust the throttle opener.

1. INSTALLATION OF THE THROTTLE POSITION SENSOR

Installation is in the reverse order of removal

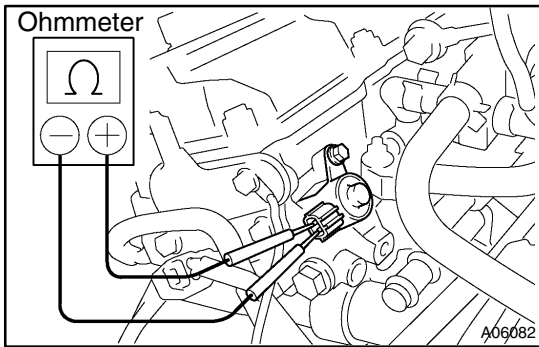
(See page FI-35).

- (a) Check that the throttle valve is fully open.
- (b) Insert the sensor to the throttle body with it turned clockwise by 30 to 60° against the fully – open valve position.
- (c) By turning the sensor counterclockwise, torque the sensor.



2. INSTALLATION OF THE THROTTLE BODY NO. 1 AND NO. 2

Set the gasket and O-ring as shown in the illustration to the illustration to the lift.



CAMSHAFT TIMING OIL CONTROL VALVE

FI0VC-01

ON-VEHICLE INSPECTION

INSPECT OIL CONTROL VALVE RESISTANCE

- (a) Remove the V-bank cover.
- (b) Remove the intake air connector.
- (c) Disconnect the oil control valve connector.
- (d) Using an Ohmmeter, measure the resistance between the terminals.

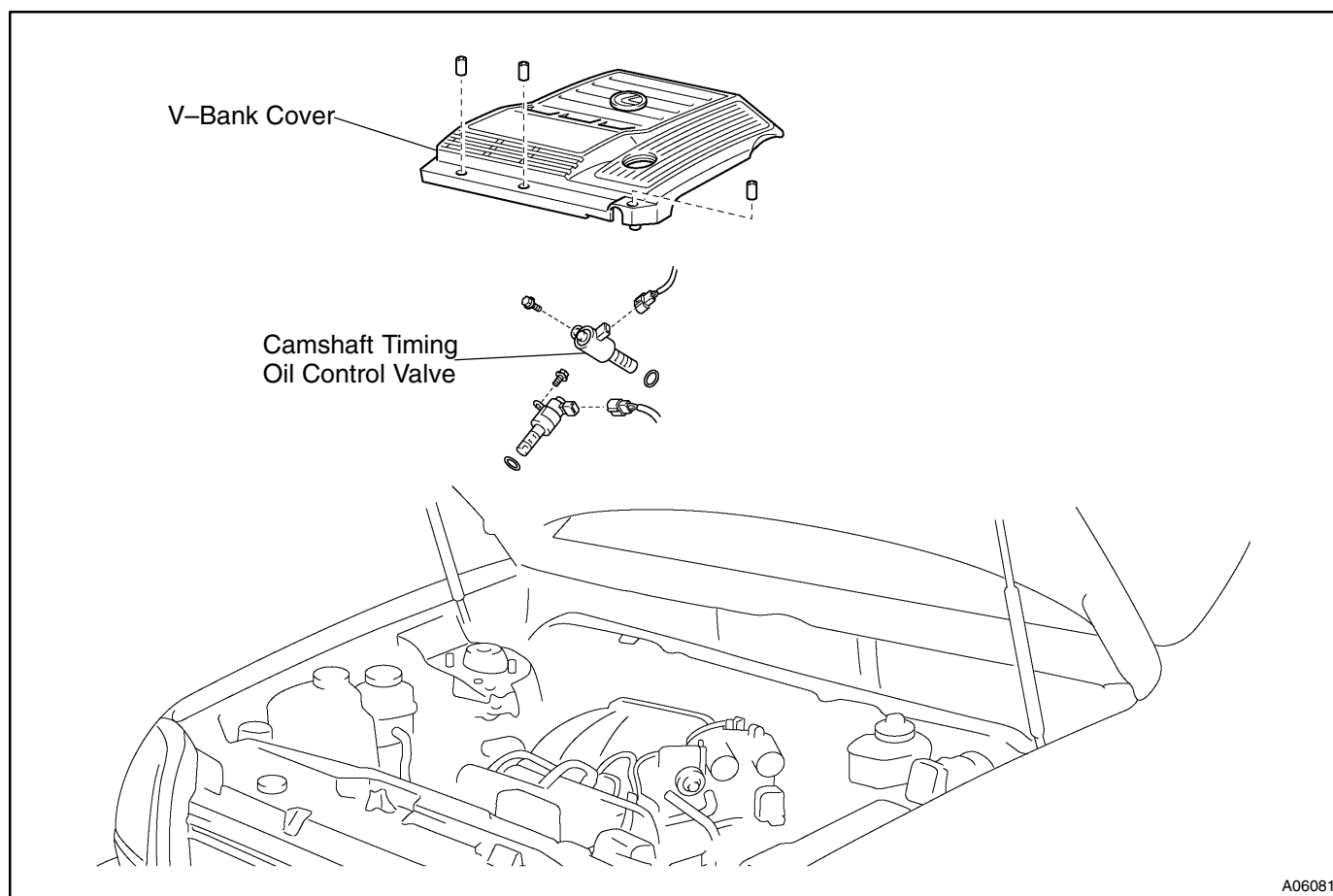
Resistance:

6.9 – 7.9 Ω at 20°C (68°F)

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

- (e) Reconnect the oil control valve connector.
- (f) Reinstall the intake air connector.
- (g) Reinstall the V-bank cover.

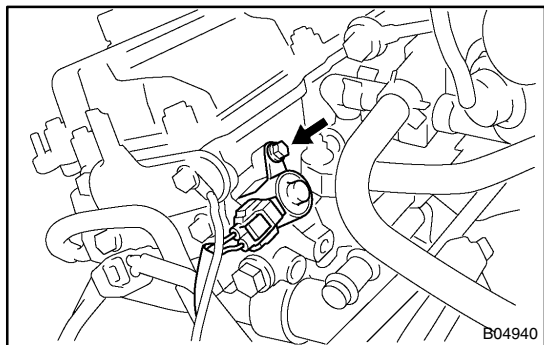
COMPONENTS



A06081

REMOVAL

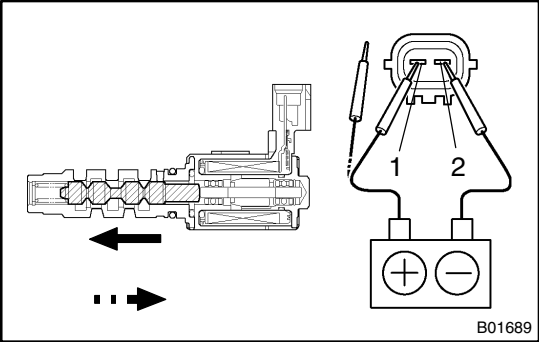
1. REMOVE V-BANK COVER
2. REMOVE INTAKE AIR CONNECTOR
3. DISCONNECT THROTTLE BODY FROM INTAKE MANIFOLD (See page FI-52)



4. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE
 - (a) Disconnect the engine wire from the wire clamp on the LH timing belt rear plate.
 - (b) Disconnect the 2 camshaft oil control valve connectors.
 - (c) Remove the bolt, camshaft oil control valve and O-ring. Remove the 2 camshaft oil control valves.
Torque: 8 N·m (80 kgf·cm, 66 in.-lbf)
 - (d) Remove the O-ring from the each camshaft oil control valve.

HINT:

At the time of installation, please refer to the following items.
Use a new O-rings.



INSPECTION

INSPECT OIL CONTROL VALVE OPERATION

Connect positive ⊕ lead to terminal 1 of connector and negative ⊖ lead to terminal 2, then check the movement of the valve.

When battery positive voltage is applied.	Valve moves in  direction.
When battery positive voltage is cut off.	Valve moves in  direction.

If operation is not as specified, replace the oil control valve.

INSTALLATION

Installation is in the reverse order of removal (See page FI-41).

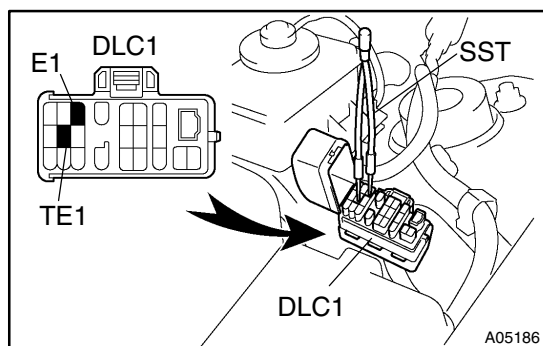
IDLE SPEED CONTROL (ISC) VALVE

F10VH-01

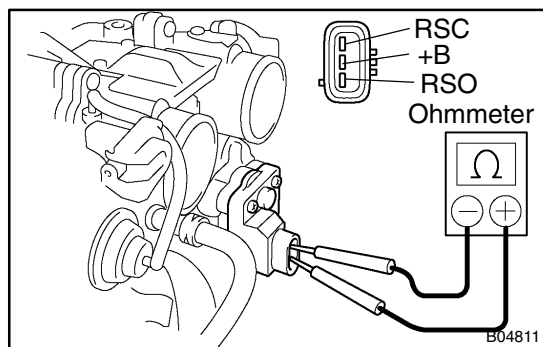
ON-VEHICLE INSPECTION

1. INSPECT ISC VALVE OPERATION

- (a) Initial conditions:
- Engine at normal operating temperature
 - Idle speed checked correctly
 - Transmission in neutral position
 - A/C switch OFF



- (b) Using SST, connect terminals TE1 and E1 of the DLC1.
SST 09843-18020
- (c) After engine speed is kept at approx. 1,000 rpm for 5 seconds, check that it returns to idle speed.
If the engine speed operation is not as specified, check the ISC valve, wiring and engine ECU.
- (d) Remove the SST from the DLC1.
SST 09843-18020



2. INSPECT ISC VALVE RESISTANCE

NOTICE:

"Cold" and "Hot" in the following sentences express the temperature of the coils 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).

- (a) Disconnect the ISC valve connector.
- (b) Using an ohmmeter, measure the resistance between terminal +B and other terminals (RSC, RSO).

Resistance:

Cold: $17.0 - 24.5 \Omega$

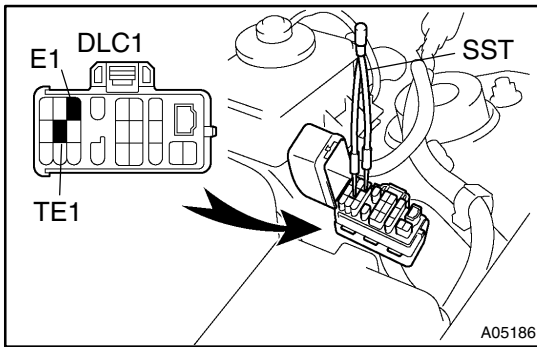
Hot: $21.5 - 28.5 \Omega$

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

- (c) Reconnect the ISC valve connector.

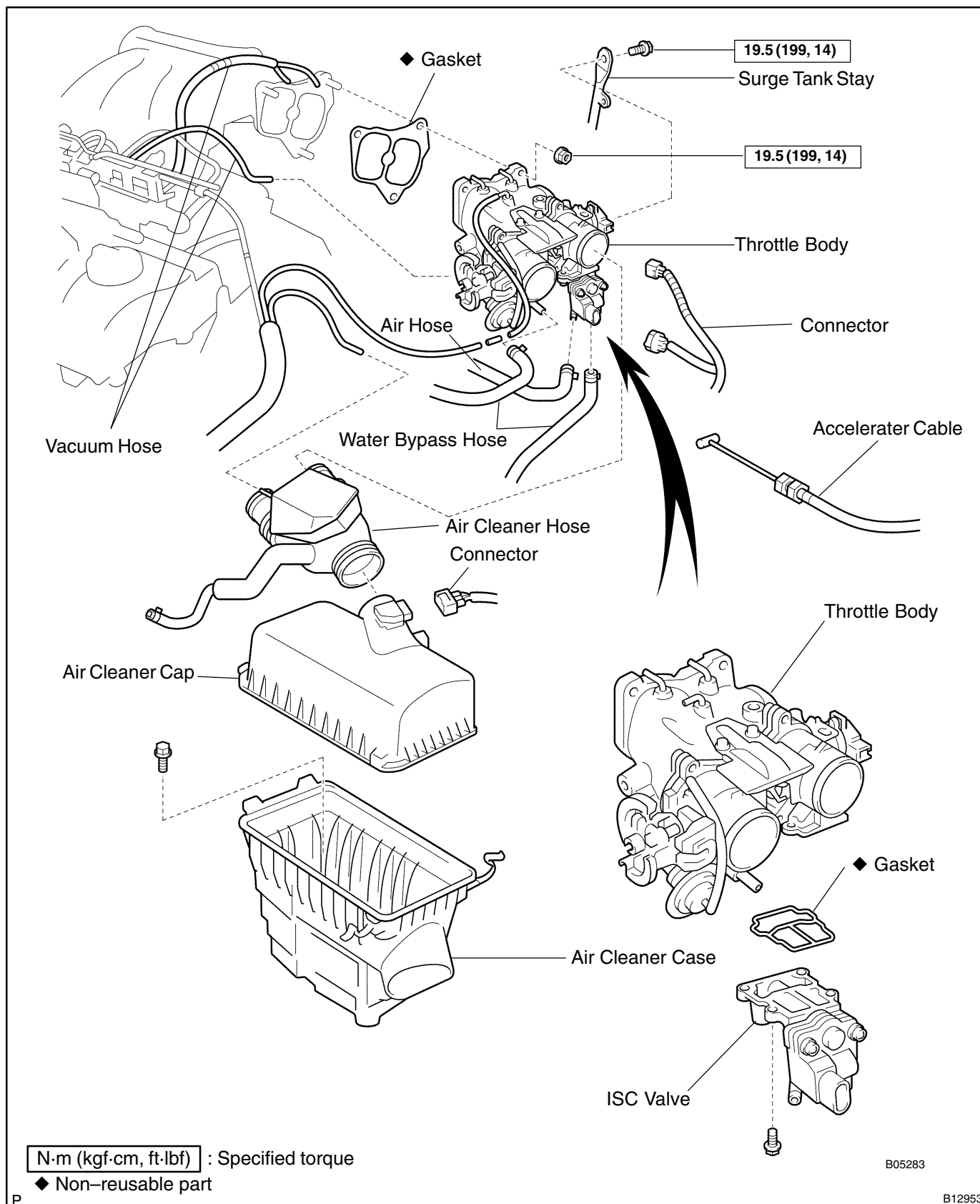
3. INSPECT AIR ASSIST SYSTEM

- (a) Initial conditions:
- Engine at normal operating temperature
 - Idle speed checked correctly
 - Transmission in neutral position
 - A/C switch OFF



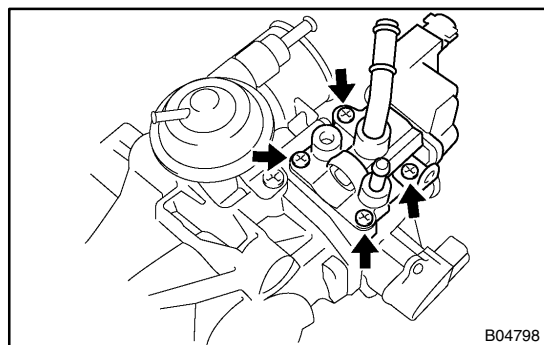
- (b) Using SST, connect terminals TE1 and E1 of the DLC1.
SST 09843-18020
- (c) After engine speed is kept at 900 – 1,300 rpm for 10 seconds, check that it returns to idle speed.
- (d) Stop the engine.
- (e) Disconnect the air assist hose from the air pipe, and block off the ISC valve exit and the entry to the pipe.
- (f) Start the engine and check that the idle speed reaches 500 rpm or below (the engine may stall).
If the idle does not reach 500 rpm or below, check for a leak between the air assist hoses, pipe and injectors.
- (g) Remove the SST from the DLC1.
SST 09843-18020
- (h) Reconnect the air assist hose to the ISC valve.

COMPONENTS



REMOVAL

1. REMOVE THROTTLE BODY (See page FI-35)

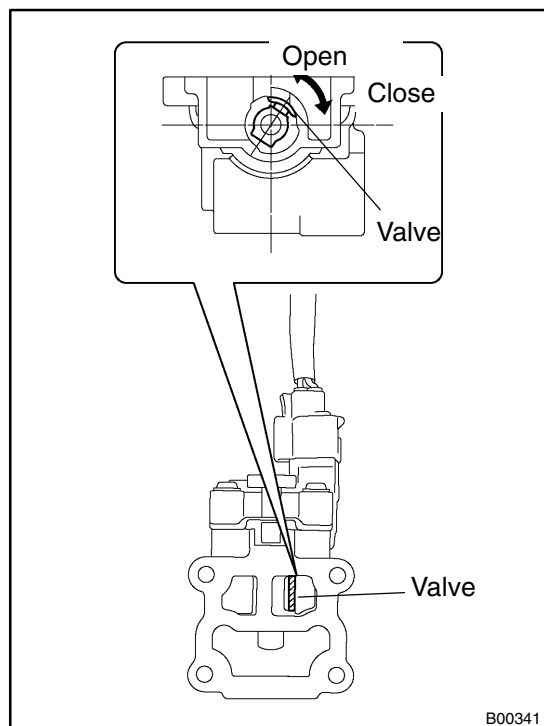


2. REMOVE ISC VALVE

Remove the 4 screws, ISC valve and gasket.

HINT:

At the time of installation, please refer to the following items.
Place a new gasket on the throttle body.



INSPECTION

INSPECT ISC VALVE OPERATION

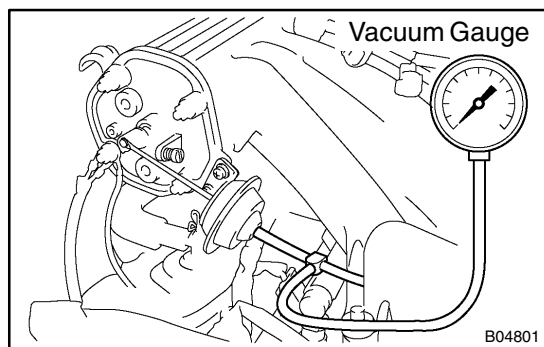
- Check that the ISC valve is halfly opened.
- Connect the ISC valve connector to the ISC valve.
- Turn the ignition switch ON.
- Check that the ISC valve moves in 0.5 seconds by order of fully colse, fully open and halfly open.

If operation is not as specified, replace the ISC valve.

- Turn the ignition switch OFF.
- Disconnect the ISC valve connector from the ISC valve.

INSTALLATION

Installation is in the reverse order of removal (See page FI-47).



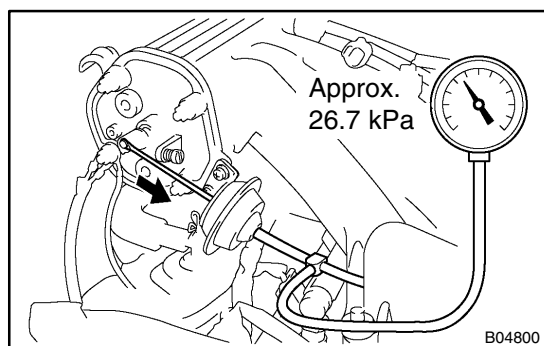
ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS)

F10VM-01

ON-VEHICLE INSPECTION

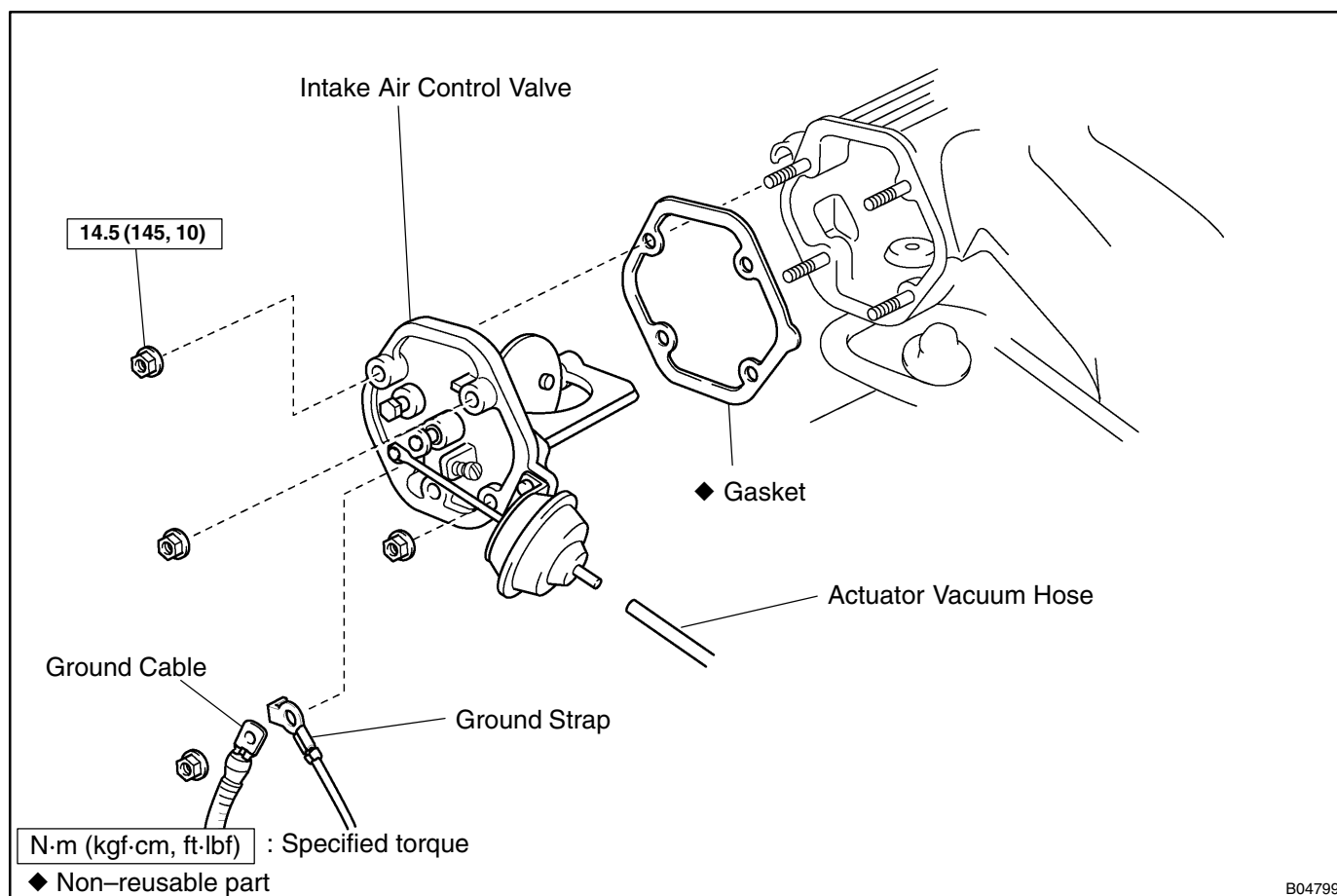
INSPECT INTAKE AIR CONTROL VALVE

- (a) Using a 3-way connector, connect vacuum gauge to the actuator hose.
- (b) Start the engine.
- (c) While the engine is idling, check that the vacuum gauge needle does not move.



- (d) Rapidly depress the accelerator pedal to fully open position and check that the vacuum gauge needle momentarily fluctuates up to approx. 26.7 kPa (200 mmHg, 7.9 in.Hg). (The actuator rod is pulled out.)

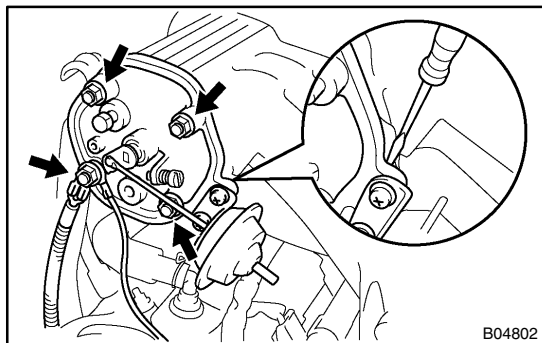
COMPONENTS



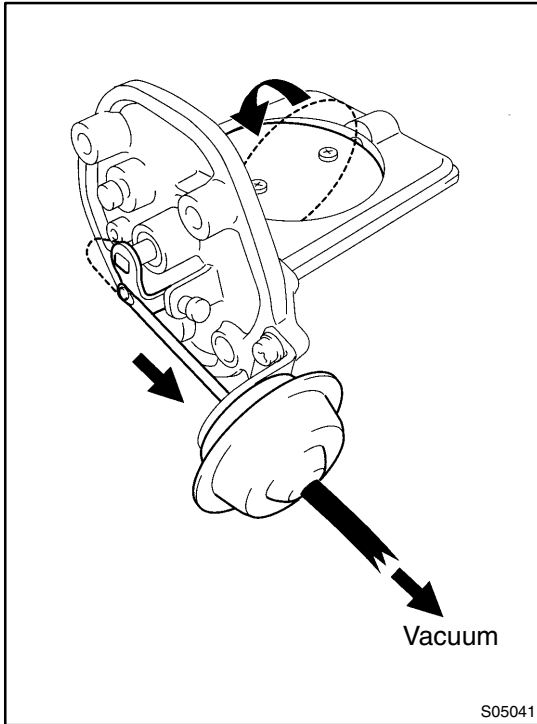
B04799

REMOVAL

1. DISCONNECT ACTUATOR VACUUM HOSE
2. DISCONNECT DLC1 FROM DLC1 BRACKET



3. REMOVE INTAKE AIR CONTROL VALVE
 - (a) Remove the 4 nuts and DLC1 bracket, and disconnect the ground strap and cable.
 - (b) Remove the intake air control valve by prying a screwdriver between the intake air control valve and air intake chamber.
 - (c) Remove the gasket.

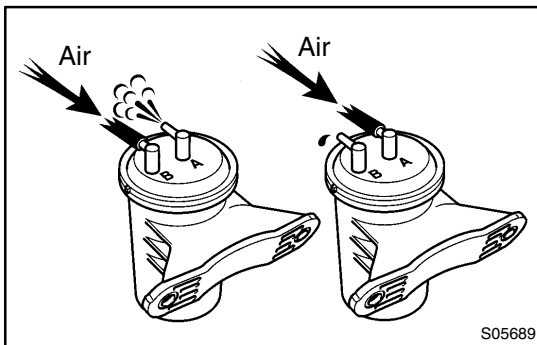


INSPECTION

1. INSPECT INTAKE AIR CONTROL VALVE

- (a) With 26.7 kPa (200 mmHg, 7.9 in.Hg) of vacuum applied to the actuator, check that the actuator rod moves.
- (b) One minute after applying the vacuum in (a), check that the actuator rod does not return.

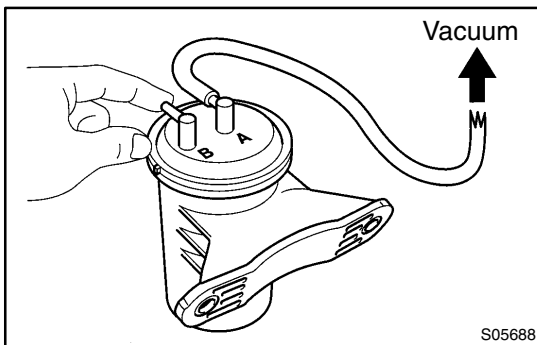
If the operation is not as specified, replace the intake air control valve.



2. INSPECT VACUUM TANK

LOCATION: The LH side member under the battery tray.

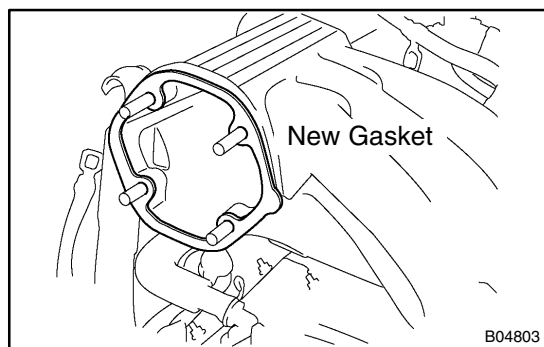
- (a) Check that air flows from port B to port A.
- (b) Check that air does not flow from port A to port B.



- (c) Plug port B with your finger, and apply 26.7 kPa (200 mmHg, 7.9 in.Hg) of vacuum to port A, and check that there is no change in vacuum after one minute.

If the operation is not as specified, replace the vacuum tank.

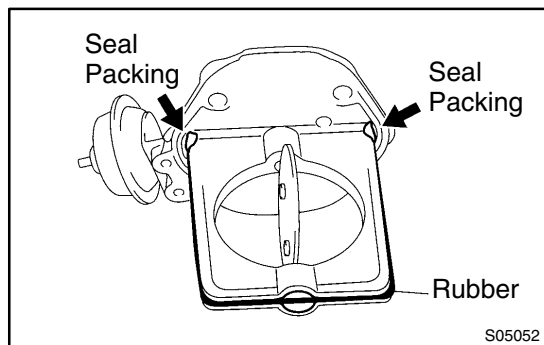
3. INSPECT VSV (See page FI-62)



INSTALLATION

1. INSTALL INTAKE AIR CONTROL VALVE

- (a) Install a new gasket to the air intake chamber.



- (b) Apply a light coat of engine oil to the rubber portions.

- (c) Apply seal packing to the positions of the intake air control valve shown in the illustration.

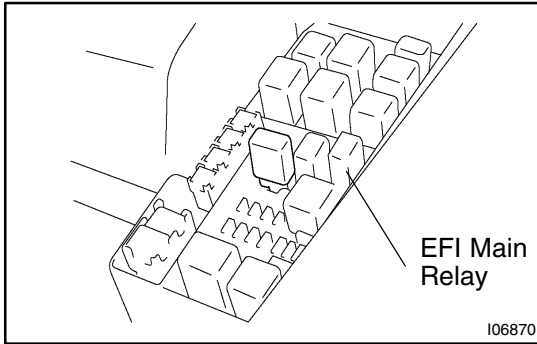
Seal packing: Part No. 08826-00080 or equivalent

- (d) Install the intake air control valve, DLC1 bracket, ground strap and cable with the 4 nuts.

Torque: 14.5 N·m (145 kgf·cm, 10 ft·lbf)

2. CONNECT DLC1

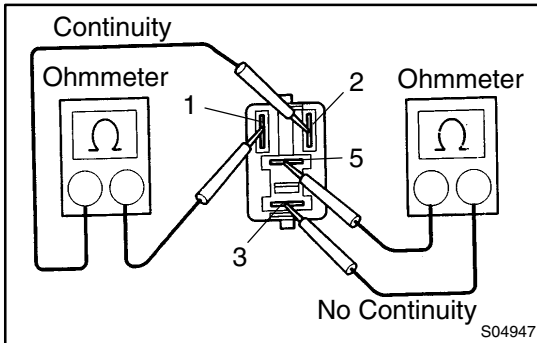
3. CONNECT ACTUATOR VACUUM HOSE



EFI MAIN RELAY INSPECTION

F10VR-01

1. REMOVE EFI MAIN RELAY (Marking: EFI)



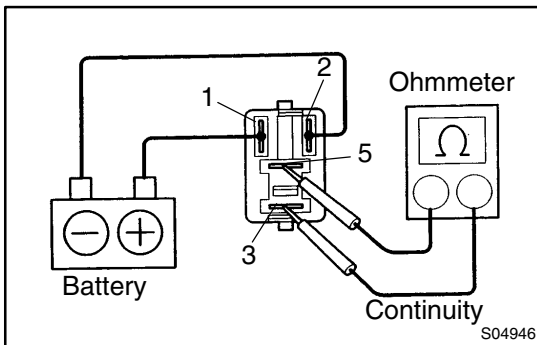
2. INSPECT EFI MAIN RELAY CONTINUITY

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

- (b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



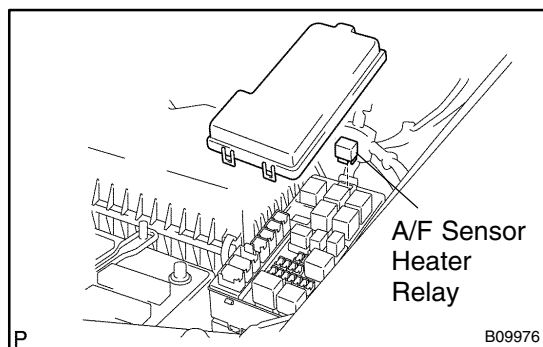
3. INSPECT EFI MAIN RELAY OPERATION

- (a) Apply battery voltage across terminals 1 and 2.

- (b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

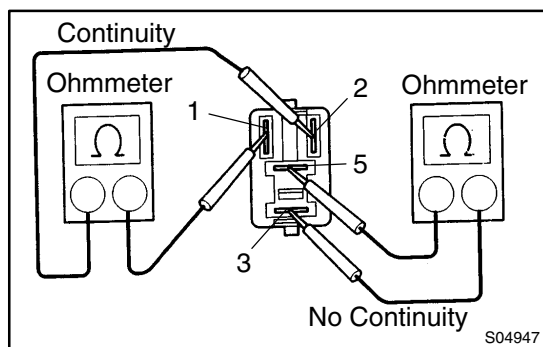
4. REINSTALL EFI MAIN RELAY



A/F SENSOR HEATER RELAY INSPECTION

F10VS-01

1. REMOVE RELAY BOX COVER
2. REMOVE A/F SENSOR HEATER RELAY (Marking: A/F HTR)



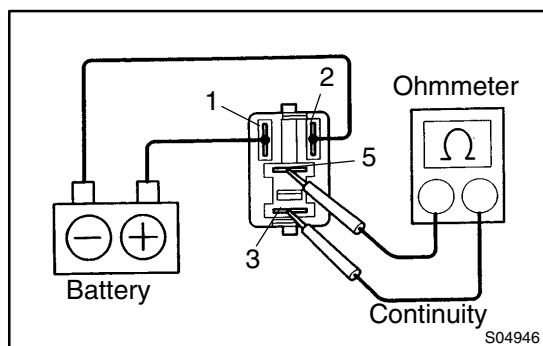
3. INSPECT A/F SENSOR HEATER RELAY CONTINUITY

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

- (b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.

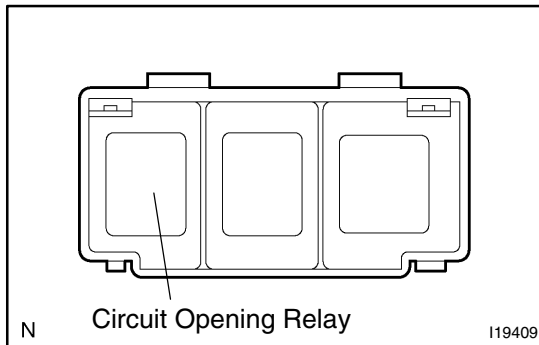


4. INSPECT A/F SENSOR HEATER RELAY OPERATION

- (a) Apply battery voltage across terminals 1 and 2.
- (b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

5. REINSTALL A/F SENSOR HEATER RELAY
6. REINSTALL RELAY BOX COVER

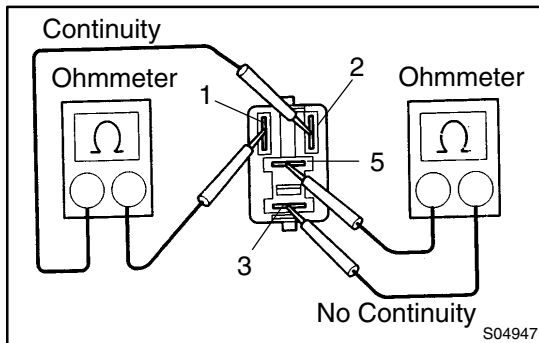


CIRCUIT OPENING RELAY INSPECTION

F10VT-01

1. REMOVE CIRCUIT OPENING RELAY (Marking: CIR OPN)

Remove the circuit opening relay from R/B No.1.



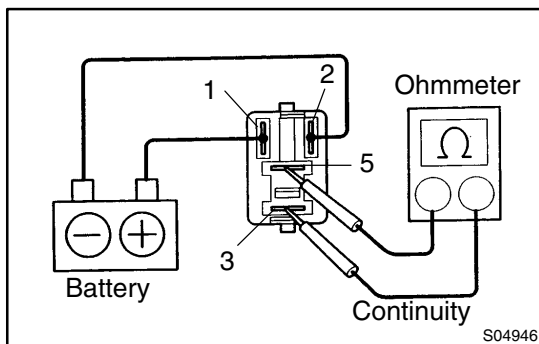
2. INSPECT CIRCUIT OPENING RELAY CONTINUITY

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

- (b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



3. INSPECT CIRCUIT OPENING RELAY OPERATION

- (a) Apply battery voltage across terminals 1 and 2.

- (b) 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 RELAY

FI0YU-01

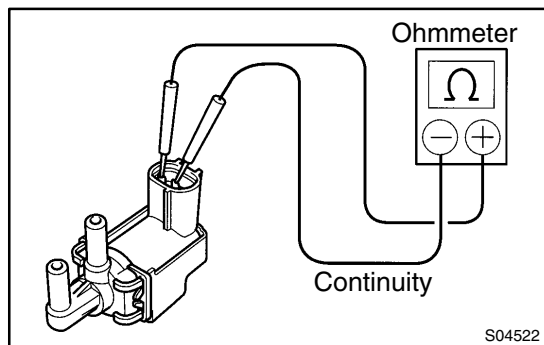


INSPECTION

1. REMOVE V-BANK COVER, COVER AND EMISSION CONTROL VALVE SET

2. REMOVE VSV

- Disconnect the 2 EVAP hoses from the VSV.
- Remove the screw and VSV.

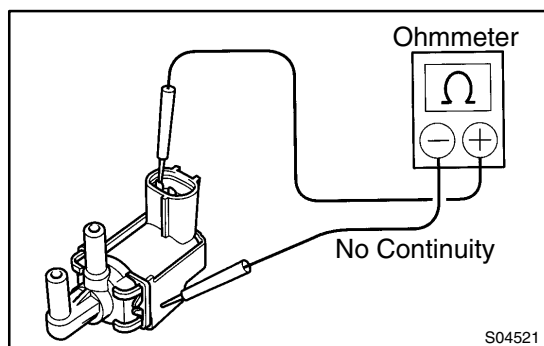


3. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 27 – 33 Ω at 20°C (68°F)

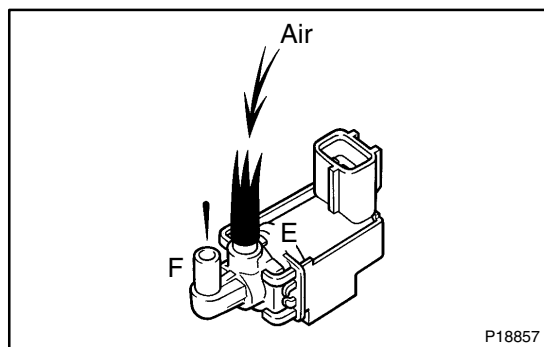
If there is no continuity, replace the VSV.



4. INSPECT VSV FOR GROUND

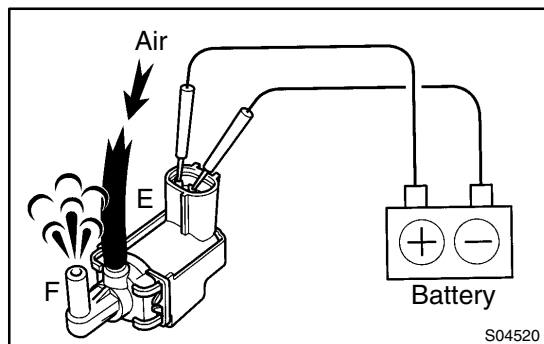
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



5. INSPECT VSV OPERATION

- Check that air flows with difficulty from port E to port F.



- Apply battery voltage across the terminals.

- Check that air flows from port E to port F.

If operation is not as specified, replace the VSV.

6. REINSTALL VSV

- Install the VSV with the screw.

- Connect the 2 EVAP hoses to the VSV.

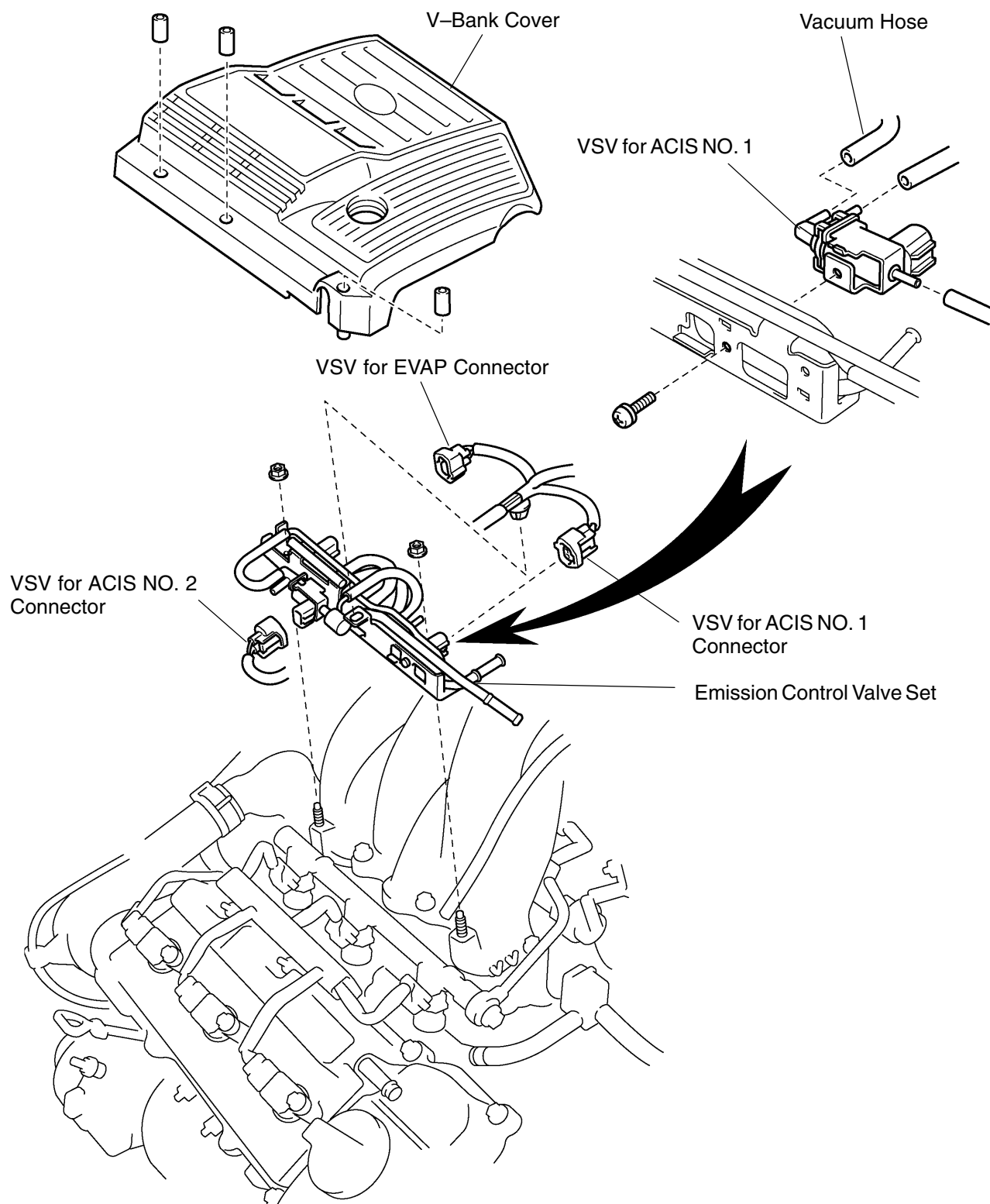
7. REINSTALL EMISSION CONTROL VALVE SET

8. REINSTALL V-BANK COVER

VSV FOR ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS) COMPONENTS

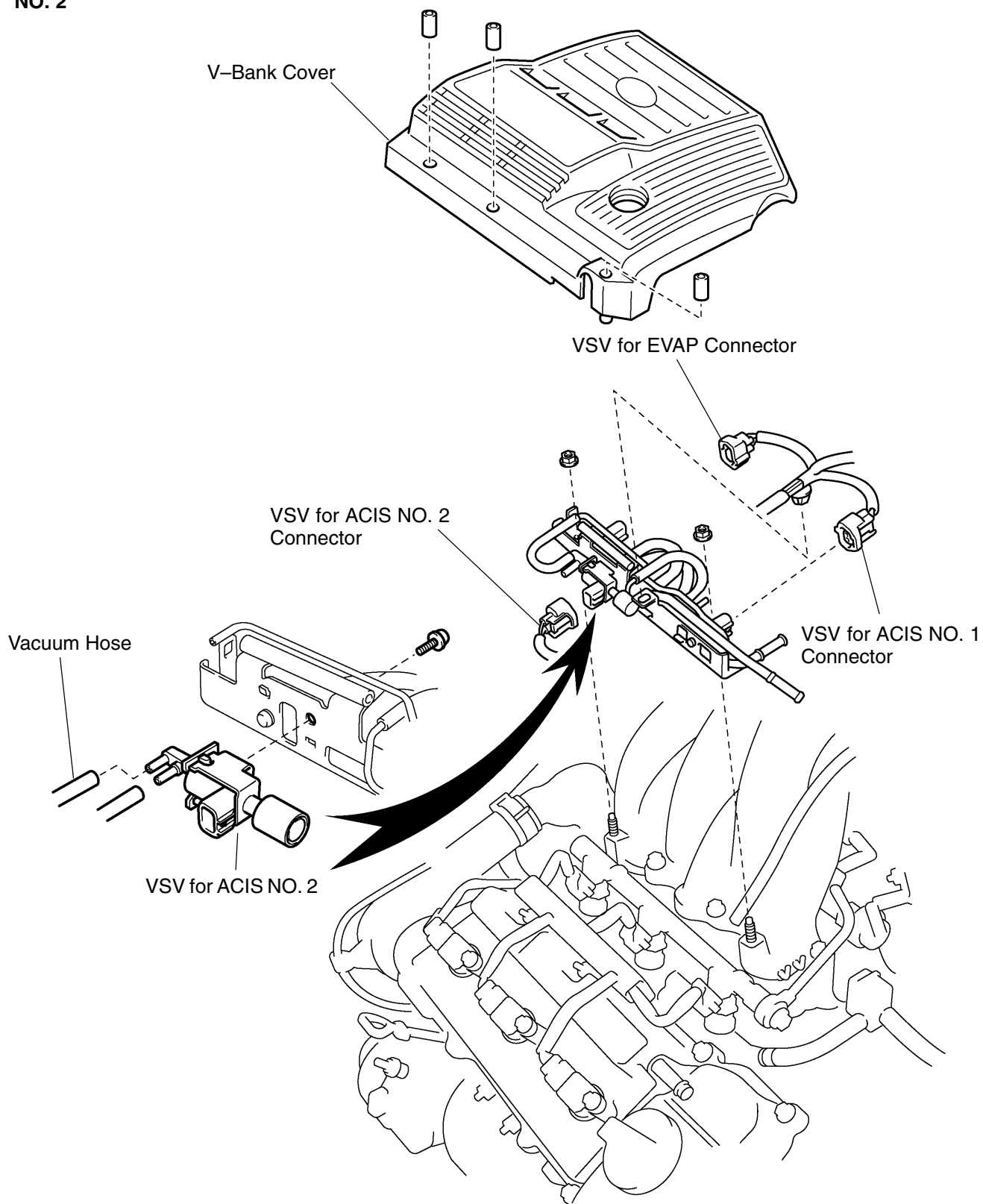
F10VW-01

NO. 1



B04804

NO. 2



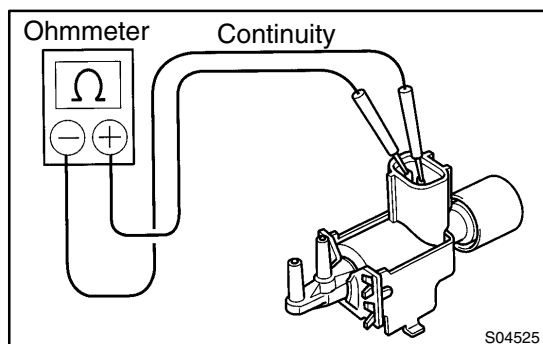
B04806

INSPECTION

1. REMOVE V-BANK COVER, AND EMISSION CONTROL VALVE SET

2. REMOVE VSV

- Disconnect the 2 vacuum hoses from the VSV.
- Remove the screw and VSV.

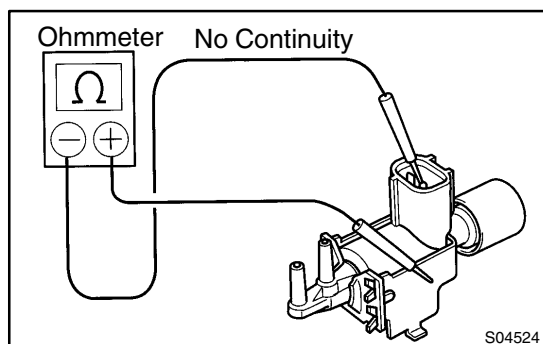


3. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between each terminals.

Resistance: 33 – 39 Ω at 20°C (68°F)

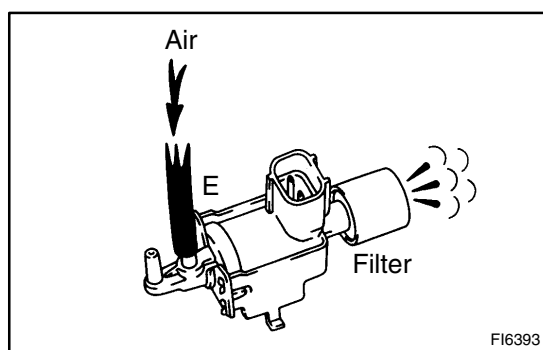
If there is no continuity, replace the VSV.



4. INSPECT VSV FOR GROUND

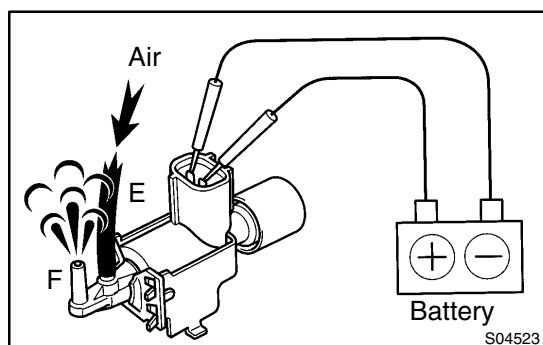
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



5. INSPECT VSV OPERATION

- Check that air flows from port E to the filter.



- Apply battery voltage across the terminals.

- Check that air flows from port E to port F.

If operation is not as specified, replace the VSV.

6. REINSTALL VSV

- Install the VSV with the screw.

- Connect the 2 vacuum to the VSV.

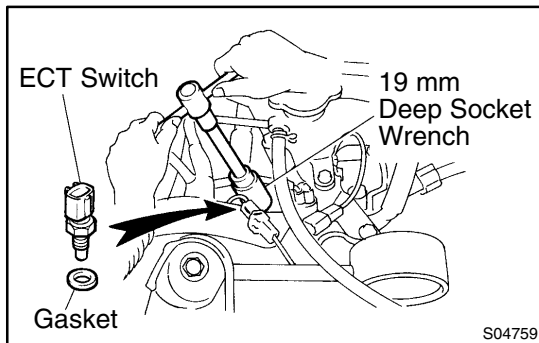
7. REINSTALL EMISSION CONTROL VALVE SET

8. REINSTALL V-BANK COVER

WATER TEMPERATURE SENSOR INSPECTION

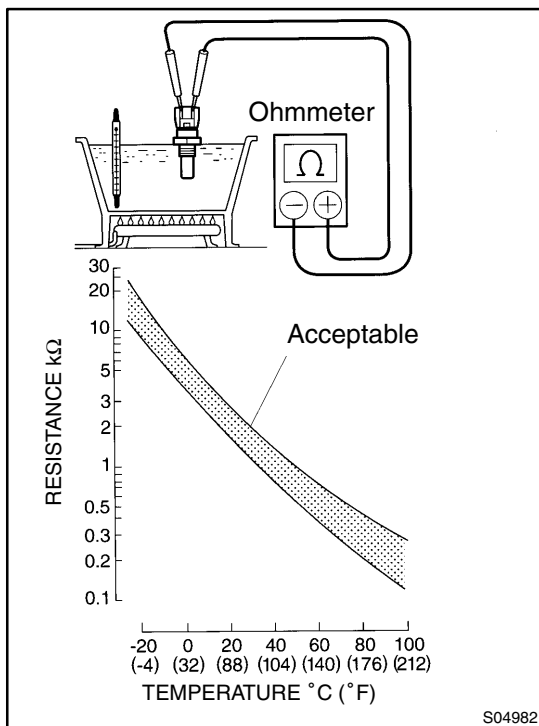
F10VY-01

1. DRAIN ENGINE COOLANT



2. REMOVE WATER TEMPERATURE SENSOR

- Disconnect the water temperature sensor connector.
- Using a 19 mm deep socket wrench, remove the water temperature sensor and gasket.



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

- Install a new gasket to the water temperature sensor.
- Using a 19 mm deep socket, install the water temperature sensor.

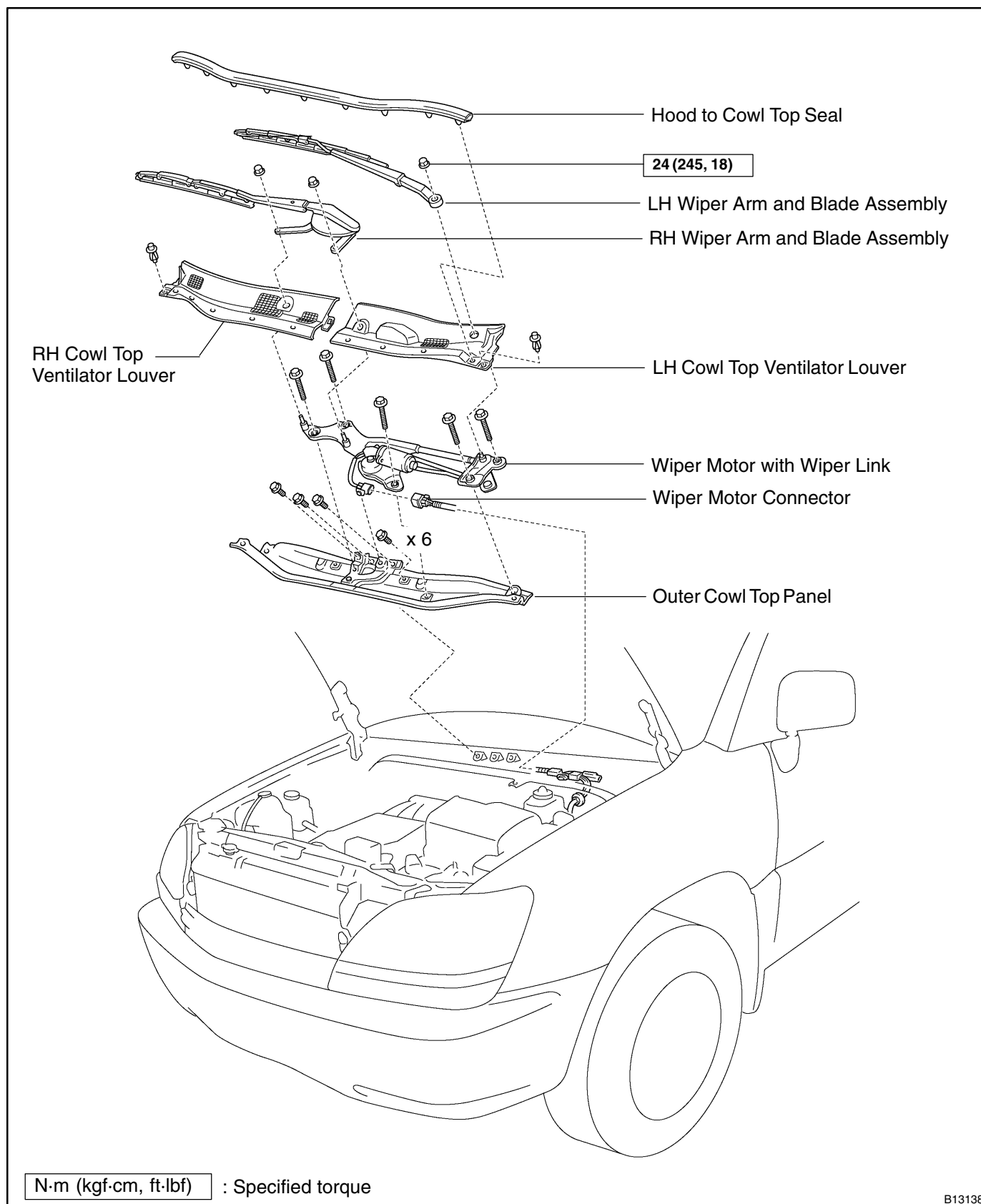
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

- Connect the water temperature sensor connector.

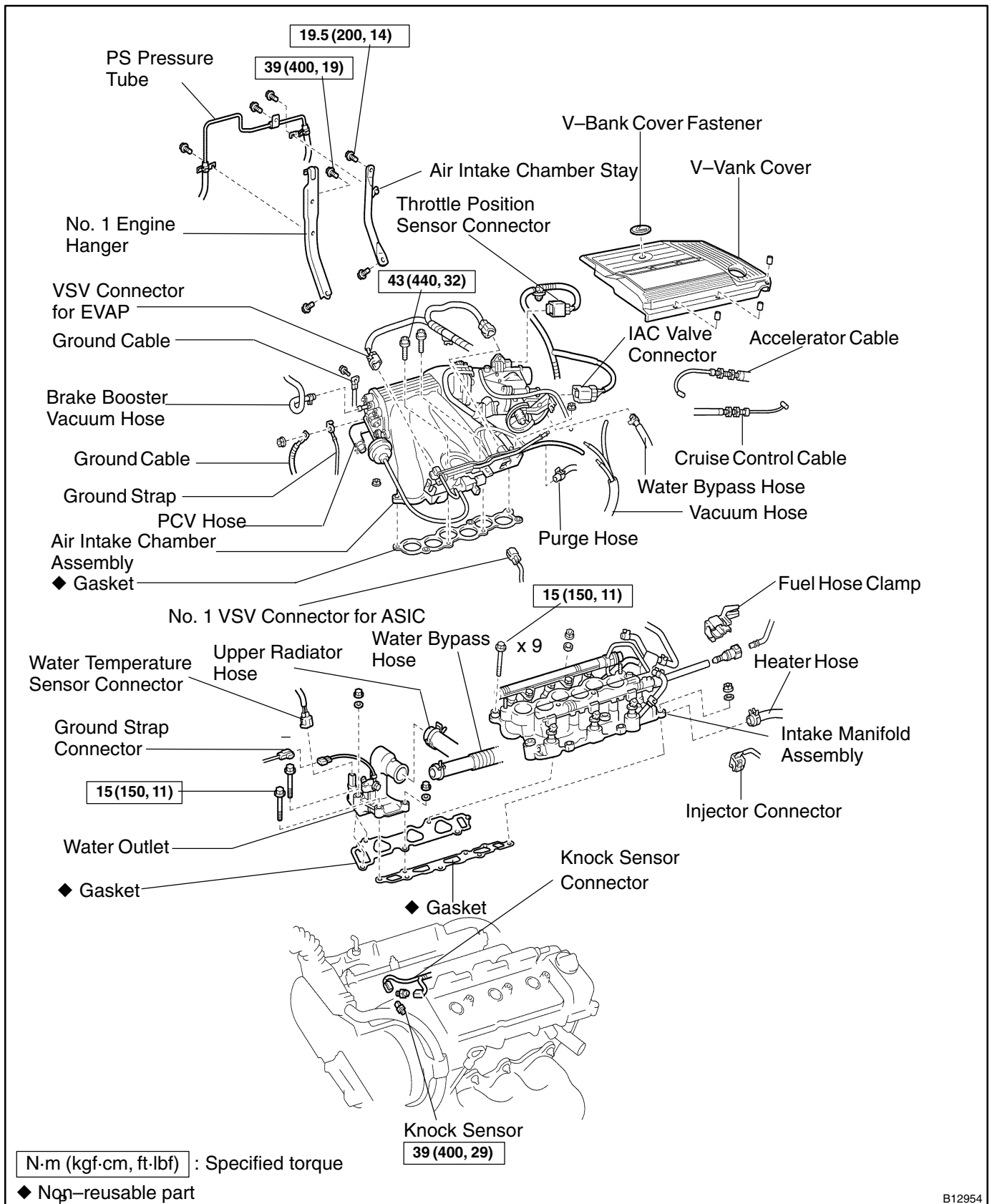
5. REFILL WITH ENGINE COOLANT

KNOCK SENSOR COMPONENTS

F10VZ-01



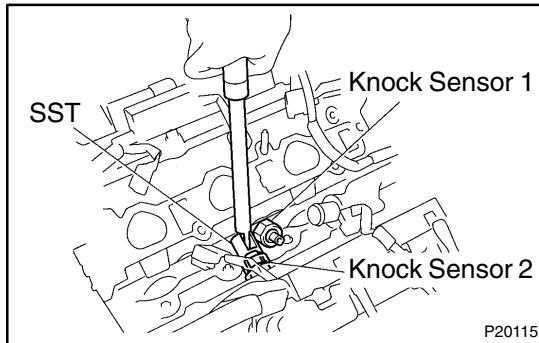
B13138



B12954

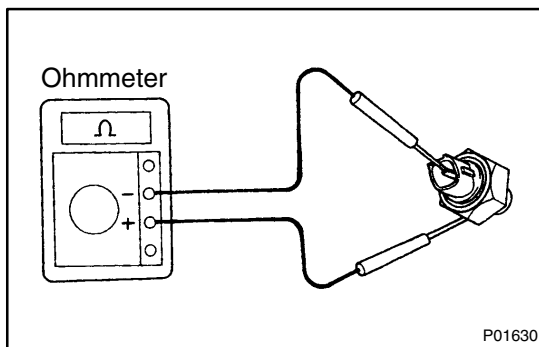
INSPECTION

1. REMOVE AIR CLEANER HOSE
2. REMOVE RH ENGINE MOUNTING STAY
3. REMOVE INTAKE MANIFOLD ASSEMBLY AND WATER OUTLET (See page EM-33)



4. REMOVE KNOCK SENSORS

- (a) Disconnect the knock sensor connector.
- (b) Using SST, remove the knock sensor.
SST 09817-16011



5. INSPECT KNOCK SENSORS

Using an ohmmeter, check that there is no continuity between the terminal and body.

If there is continuity, replace the sensor.

6. REINSTALL KNOCK SENSORS

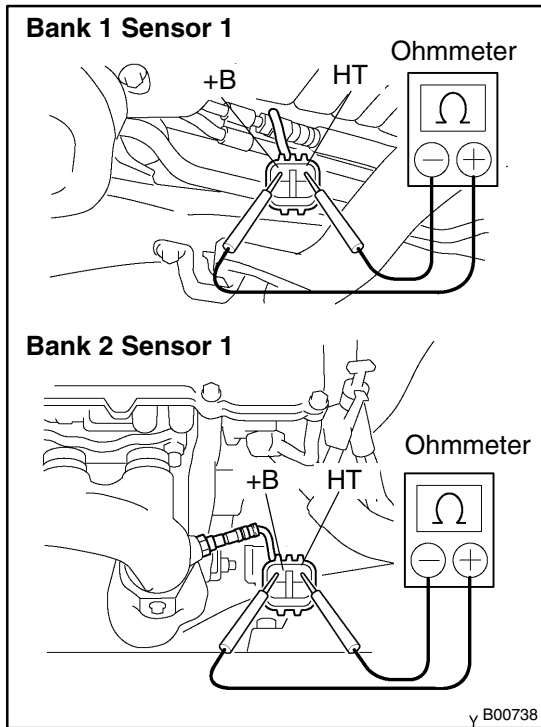
- (a) Using SST, install the knock sensor.
SST 09817-16011

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

- (b) Connect the knock sensor connector.

7. REINSTALL WATER OUTLET AND INTAKE MANIFOLD ASSEMBLY (See page EM-60)

8. REINSTALL RH ENGINE MOUNTING STAY
9. REINSTALL AIR CLEANER HOSE



AIR-FUEL RATIO (A/F) SENSOR INSPECTION

FI0W1-01

INSPECT HEATER RESISTANCE OF A/F SENSORS

- Disconnect the A/F sensor connector.
- Using an ohmmeter measure the resistance between terminals +B and HT.

Resistance: 0.8 – 1.4 Ω at 20°C (68°F)

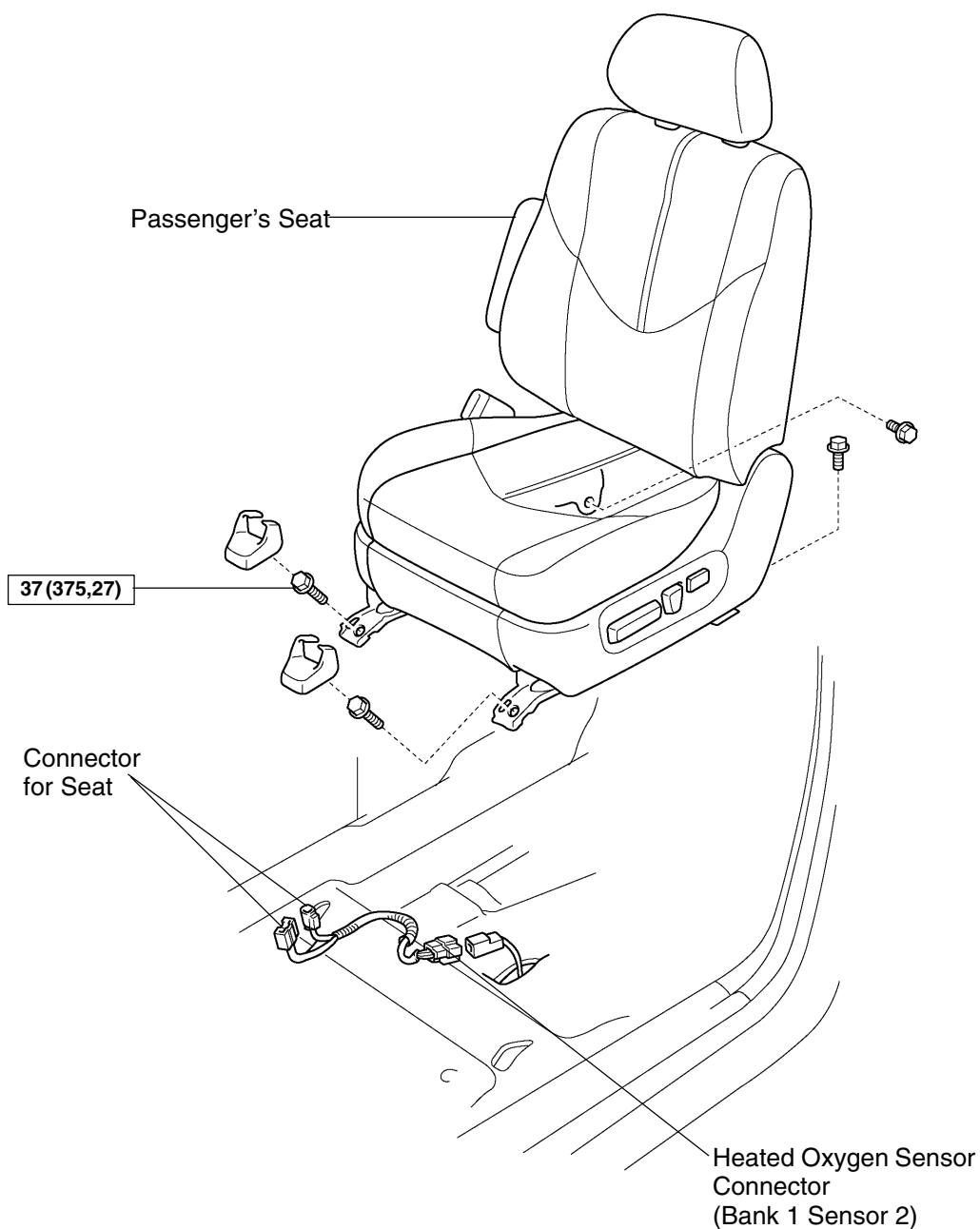
If the resistance is not as specified, replace the sensor.

Torque: 44 N·m (440 kgf·cm, 31 ft·lbf)

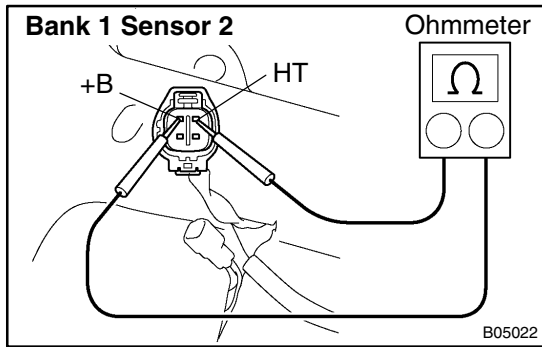
- Reconnect the A/F sensor connector.

OXYGEN SENSOR (Bank 1 Sensor 2) COMPONENTS

FI0W2-01



B05024



INSPECTION

INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSOR (Bank 1 Sensor 2)

- (a) Remove the driver's seat.
- (b) Take out the floor carpet.
- (c) Disconnect the oxygen sensor connector.
- (d) Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 11 – 16 Ω at 20°C (68°F)

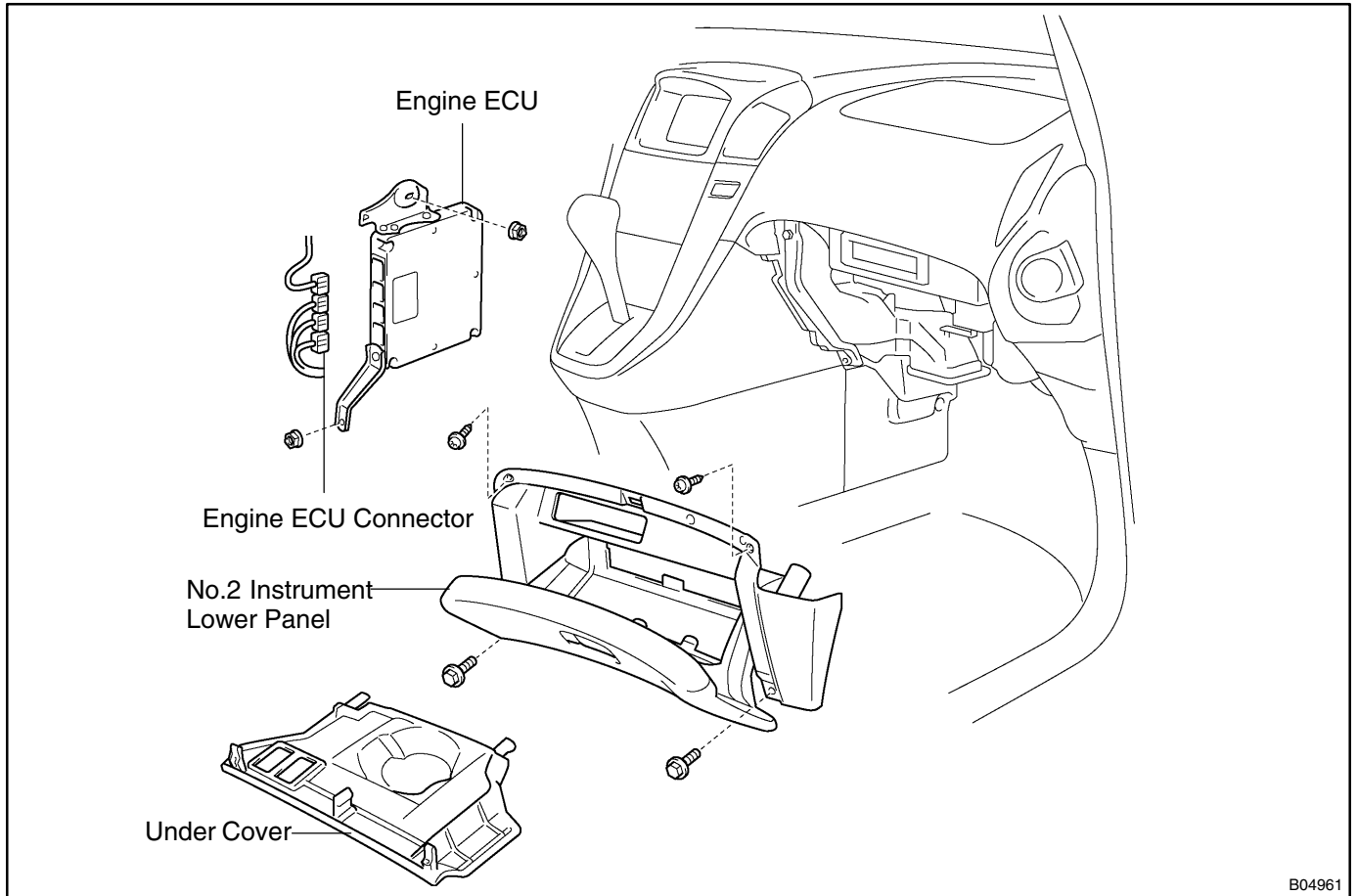
If the resistance is not as specified, replace the sensor.

Torque: 44 N·m (440 kgf·cm, 31 ft·lbf)

- (e) Reconnect the oxygen sensor connector.
- (f) Reinstall the floor carpet.
- (g) Reinstall the driver's seat.

ENGINE ECU COMPONENTS

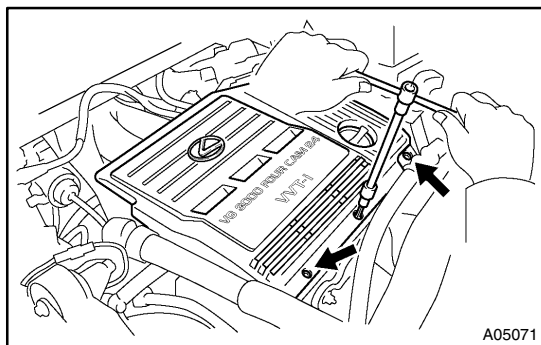
FI0W4-01



B04961

INSPECTION

1. REMOVE ENGINE ECU
2. INSPECT ENGINE ECU (See page DI-19)
3. REINSTALL ENGINE ECU



FUEL CUT RPM INSPECTION

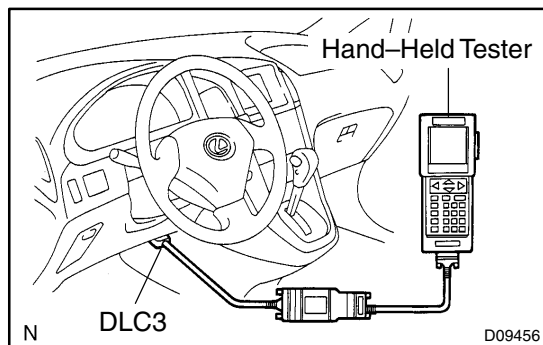
FI0W6-01

1. REMOVE V-BANK COVER

- Using a 5 mm hexagon wrench, remove the 2 cap nuts.
- Disconnect the 2 clips, and remove the V-bank cover.

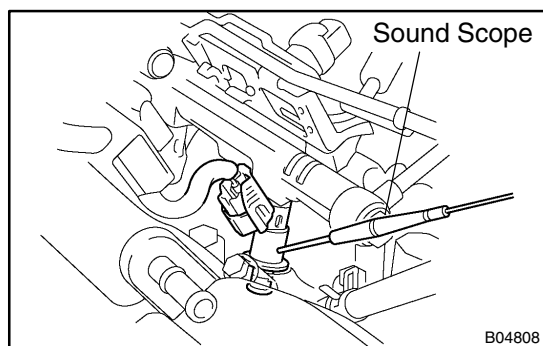
2. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.



3. CONNECT HAND-HELD TESTER OR OBDII SCAN TOOL

- Connect the hand-held tester or OBDII scan tool to the DLC3.
- Please refer to the hand-held tester or OBDII scan tool operator's manual for further details.



4. INSPECT FUEL CUT OFF PRM

- Increase the engine speed to at least 3,500 rpm.
- Use a sound scope to check for injector operating noise.
- 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: 1,200 rpm

5. DISCONNECT HAND-HELD TESTER OR OBDII SCAN TOOL

6. REINSTALL V-BANK COVER

HINT:

For fixing the V-bank cover, push on the cover until a "click" is felt.