
ELECTRONIC FUEL INJECTION

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EFI SYSTEM PRECAUTION

FI0TZ-01

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.
1. **BEFORE WORKING ON FUEL SYSTEM, DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM 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 the event of engine misfire, these precautions should be taken.
 - (1) Check proper connection to the 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 an oxygen sensor.
 - (1) Do not drop the sensor or hit it against an object.
 - (2) The sensor should be free from any 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 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 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.

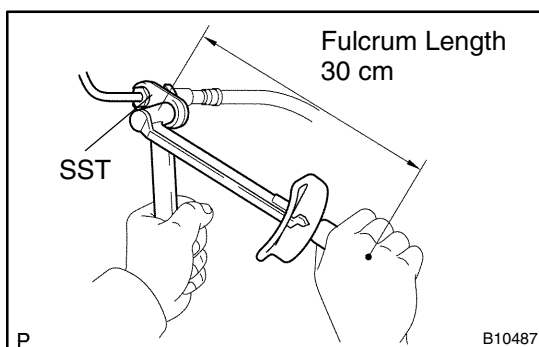
HINT:

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 (–) cables.
- (c) Do not permit parts to receive a severe impact during removal or installation. Handle all the EFI parts carefully, especially the engine ECU.
- (d) Be careful during troubleshooting, as there are numerous transistor circuits and even slight terminal contact can cause further troubles.
- (e) Do not open the engine ECU cover.
- (f) When making the inspection during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting into the EFI parts and wiring connectors.
- (g) Parts should be replaced with an assembly.
- (h) Care should be taken when pulling out and inserting the wiring connectors.
 - (1) Release the lock by pressing it and pull out the connectors.
 - (2) Fully insert the connector and check that it is locked.

8. FUEL SYSTEM

- (a) When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe these procedures:
 - (1) Remove the circuit opening relay (See page FI-33).
 - (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) Loosen the connection slowly.
 - (5) Disconnect the connection.
 - (6) Reinstall the circuit opening relay (See page FI-33).
- (b) When connecting the flare nut with the fuel pipe union, observe these procedures:
 - (1) Apply a light coat of engine oil to the flare nut, and tighten the flare nut by hand.



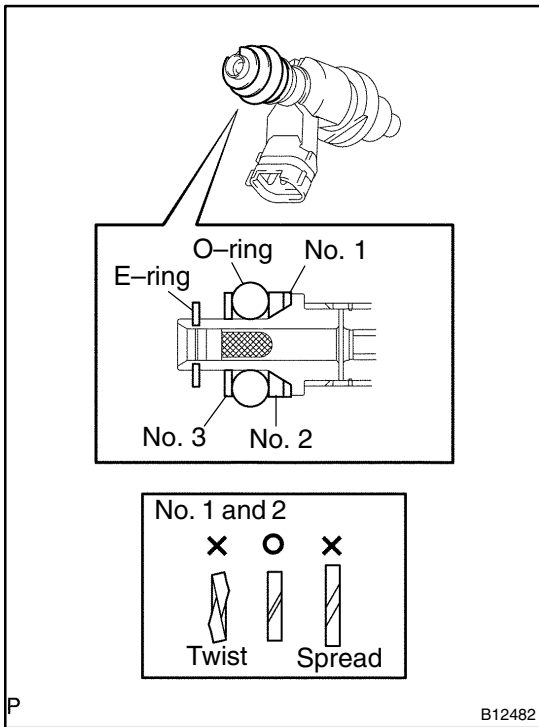
- (2) Using SST, tighten the flare nut to the specified torque.

SST 09631-22020

Torque: 29.4 N·m (300 kgf·cm 22 ft·lbf)

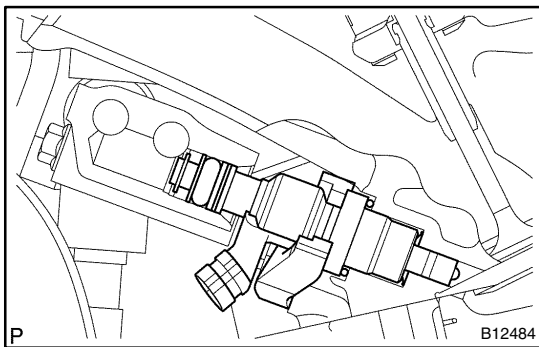
HINT:

Use a torque wrench. The fulcrum length is 30 cm (11.81 in.).

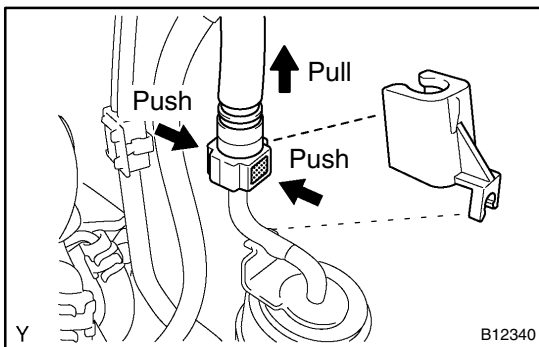


- (c) Observe these precautions when removing and installing the injector:
- (1) Never reuse the E-ring, O-ring and back-up rings.
 - (2) When installing a new No. 1 back-up ring to the injector, do not twist and spread it.
 - (3) When installing a new O-ring to the injector, take care not to damage it in any ways.
 - (4) When installing the injector to the delivery pipe, apply a light coat of spindle oil or gasoline on the O-ring.

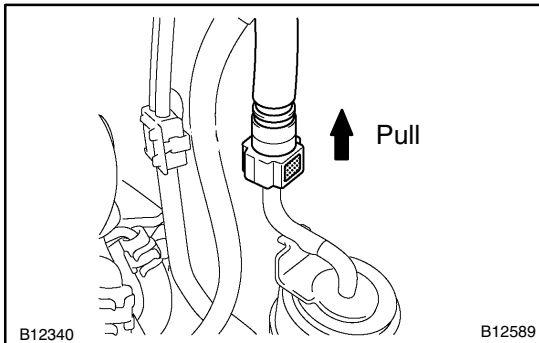
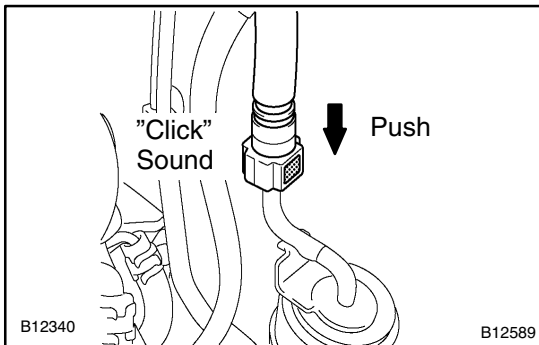
NOTICE:
Never use engine oil, gear oil or brake fluid.



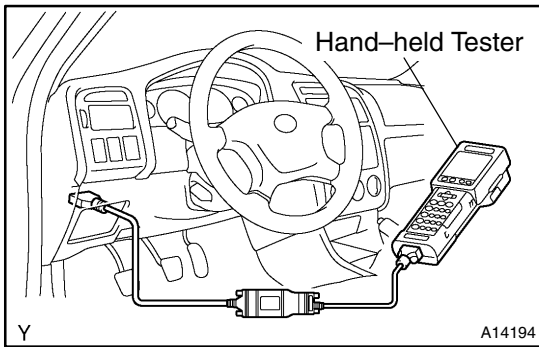
- (d) Install the injector to the delivery pipe and cylinder head as shown in the illustration.



- (e) Observe these precautions when disconnecting the fuel tube connector (quick type):
- (1) Check that there is any dirt like mud in the pipe and around the connector and clean the dirt away before disconnecting them.
 - (2) Be sure to disconnect them with hands.
 - (3) When the connector and the pipe are stuck, push and pull the connector to be free and to disconnect and pull it out. Do not use any tools 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 being damaged and foreign objects mixing in by covering them with a vinyl bag.



- (f) Observe these precautions when connecting the fuel tube connector (quick type):
- (1) Check that there is any damage or foreign objects in the connected part of the pipe.
 - (2) Match the axis of the connector with the axis of the pipe, and push into the connector until the connector makes a "click" sound. In case that the connection is tight, apply little amount of fresh 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 that there is any fuel leak.
- (g) Check that there is no fuel leak after doing maintenance anywhere in the fuel system.
- (1) Operate the fuel pump (See page FI-5).
 - (2) Check that there is no fuel leak from any part of the fuel system.
 - (3) Start the engine, and check that there is no fuel leak from any part of the fuel system.



FUEL PUMP ON-VEHICLE INSPECTION

FI0UJ-01

1. CHECK FUEL PUMP OPERATION

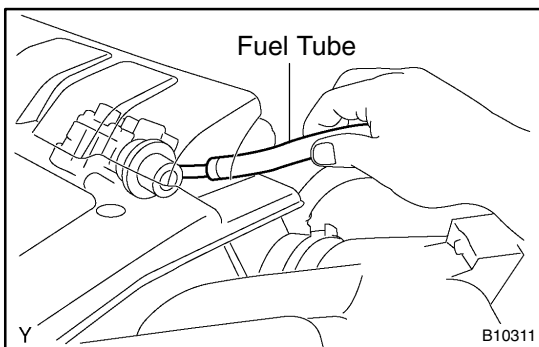
- (a) Connect a hand-held tester to the DLC3.
 - (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON and push hand-held tester main switch ON.

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.

If you have no hand-held tester, connect the positive (+) and negative (-) leads from the battery to the fuel pump connector (See step 3).



- (b) Check that there is pressure in the fuel tube from the fuel filter.

HINT:

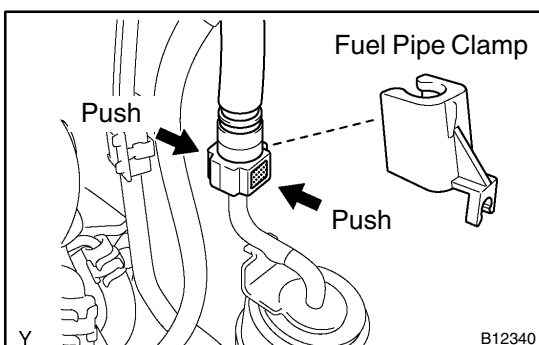
If there is fuel pressure, you can feel the fuel flowing.

If there is no pressure, check the fusible link, fuses, EFI main relay, circuit opening relay, fuel pump, engine ECU and wiring connections.

- (c) Turn the ignition switch OFF and disconnect the hand-held tester to the DLC3.

2. CHECK FUEL PRESSURE

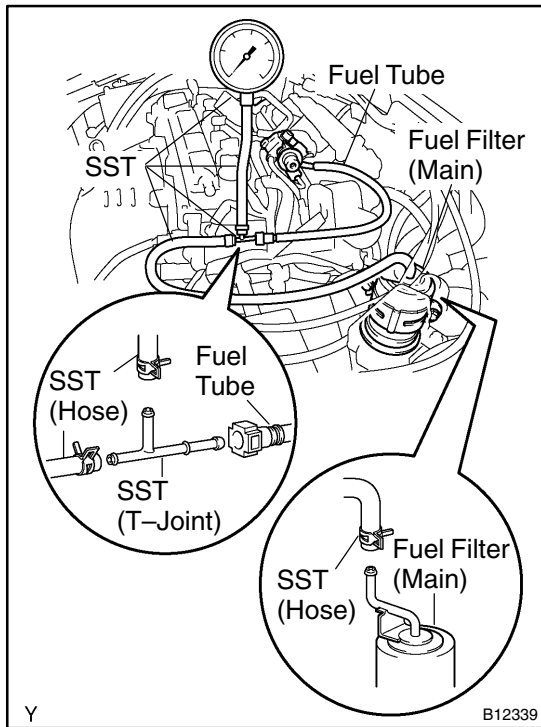
- (a) Check the battery voltage is above 12 V.
- (b) Disconnect the negative (-) terminal cable from the battery.
- (c) Set SST to the engine.
 - (1) Remove the engine cover.
 - (2) Remove the air cleaner cap with the intake air hose.



- (3) Remove the fuel pipe clamp and disconnect the fuel inlet hose from the fuel filter (main).

CAUTION:

- Put a shop towel under the fuel filter (main).
- Loosen the union bolt slowly.
- As there is retained pressure in the fuel line, prevent it from splashing inside the vehicle compartment.

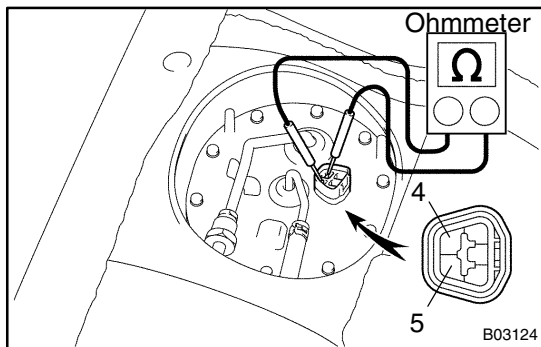


- (4) Set SST as shown in the illustration.
SST 09268-41047 (95336-08070), 09268-45014 (09268-41200, 09268-41220, 09268-41250)
- (5) Wipe off any splashed gasoline.
- (6) Reinstall the air cleaner cap with the intake air hose.
- (d) Start the engine and measure the fuel pressure at idle.
Fuel pressure:
380 – 420 kPa (3.9 – 4.3 kgf/cm², 55 – 61 psi)
- (e) Stop the engine and 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 the pressure is not as specified, check the fuel pump and pressure regulator.
- (f) Disconnect the negative (-) terminal cable from the battery.
- (g) Remove the SST.
SST 09268-41047 (95336-08070), 09268-45014 (09268-41200, 09268-41220, 09268-41250)
- (h) Reconnect the fuel inlet hose to the fuel filter (main) and install the fuel pump clamp.

CAUTION:

Perform the connecting operation of the fuel tube connector (quick type) after observing the precaution (See page FI-1).

- (i) Reconnect the negative (-) terminal cable to the battery.
- (j) Check for the fuel leak (See page FI-1).
- (k) Reinstall the air cleaner cap with the intake air hose.
- (l) Reinstall the No. 2 cylinder head cover.



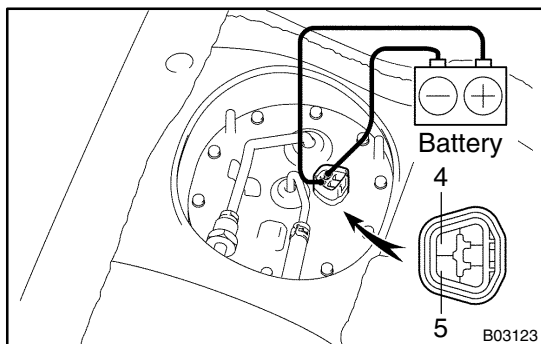
3. INSPECT FUEL PUMP

- (a) Remove the rear seat cushion.
- (b) Remove the service hole cover.
- (c) Disconnect the fuel pump and 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) Reconnect the fuel pump and sender gauge connector.



- (f) Check the fuel pump operation.
 - (1) Connect the positive (+) lead to terminal 4 of the fuel pump connector.
 - (2) Connect the negative (-) lead to terminal 5 of the fuel pump connector.
 - (3) Check the fuel pump operation.

NOTICE:

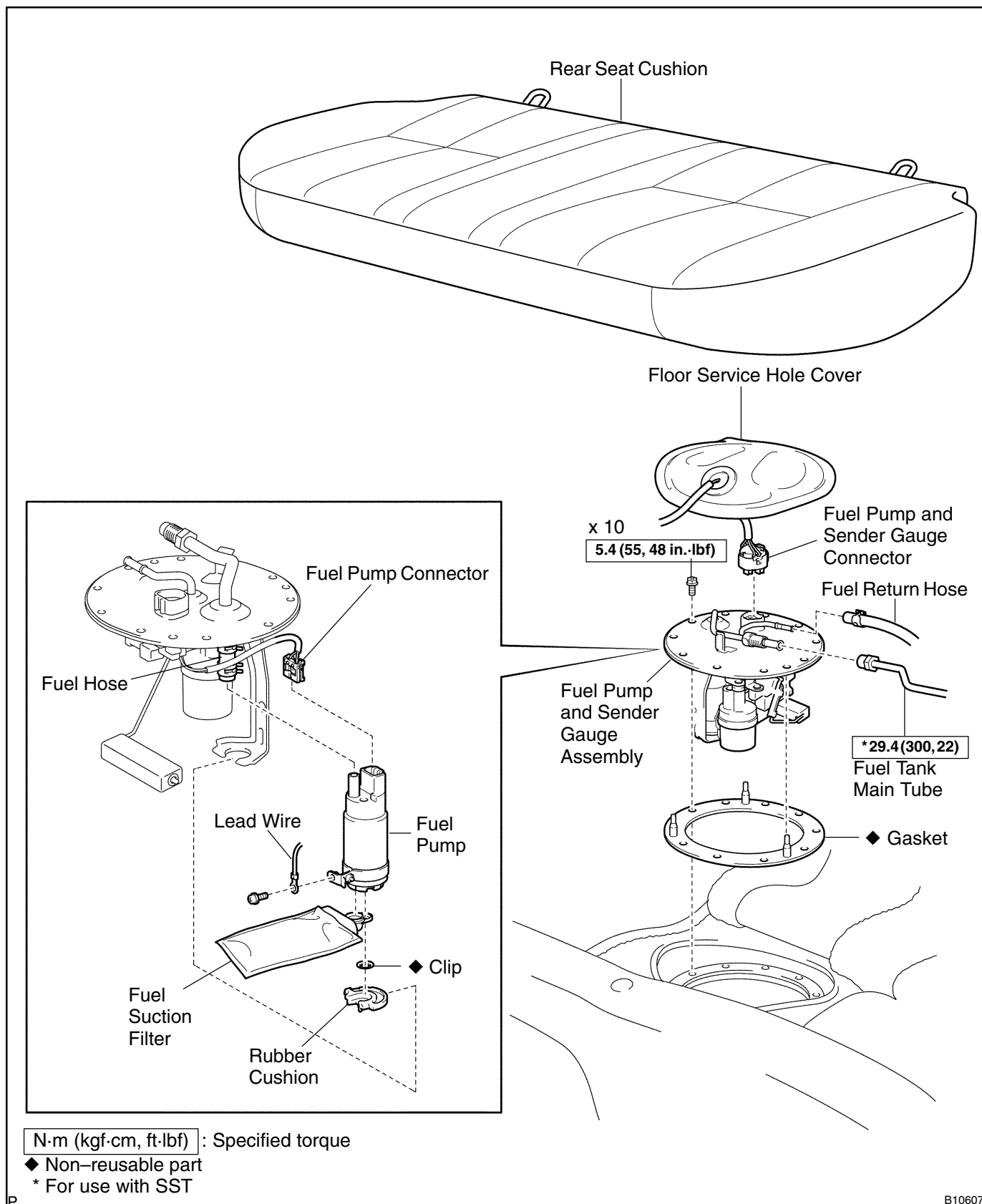
- **These tests must be done quickly (within 10 seconds) to prevent the coil from burning out.**

- **Keep the fuel pump as far away from the battery as possible.**
- **Always do the switching at the battery side.**

If the operation is not specified, replace the fuel pump.

- (g) Reconnect the fuel pump and sender gauge connector.
- (h) Reinstall the service hole cover.
- (i) Reinstall the rear seat cushion.

COMPONENTS

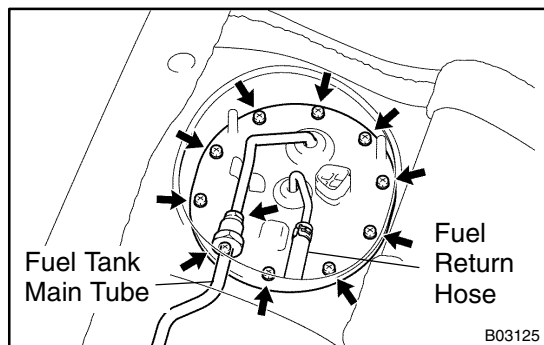


REMOVAL

CAUTION:

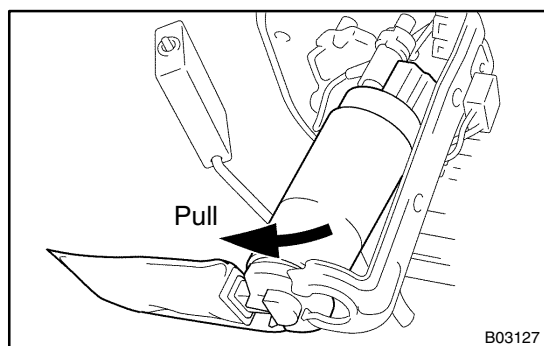
Do not smoke or work near an open flame when working on the fuel pump.

1. REMOVE REAR SEAT CUSHION
2. REMOVE FLOOR SERVICE HOLE COVER
3. DISCONNECT FUEL PUMP AND SENDER GAUGE CONNECTOR



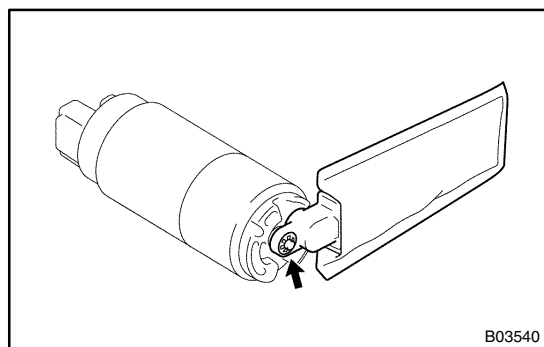
4. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK

- (a) Using SST, disconnect the fuel tank main tube.
SST 09631-22020
- (b) Disconnect the fuel return hose.
- (c) Remove the 10 bolts.
- (d) Remove the fuel pump, sender gauge assembly and gasket.



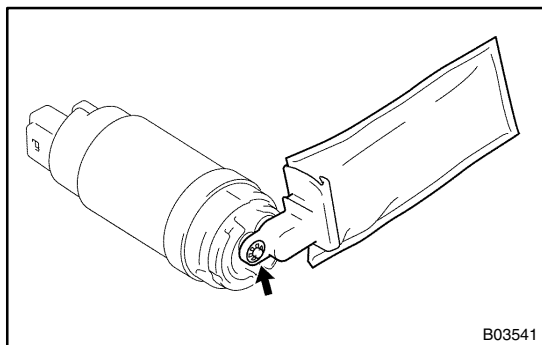
5. REMOVE FUEL PUMP FROM PUMP BRACKET

- (a) Disconnect the fuel pump connector from the fuel pump.
- (b) Remove the screw and disconnect the lead wire from the fuel pump.
- (c) Pull out the lower side of the fuel pump from the pump bracket.
- (d) Remove the rubber cushion from the fuel pump.
- (e) Disconnect the fuel hose from the fuel pump and remove the fuel pump.



6. REMOVE FUEL SUCTION FILTER FROM FUEL PUMP

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

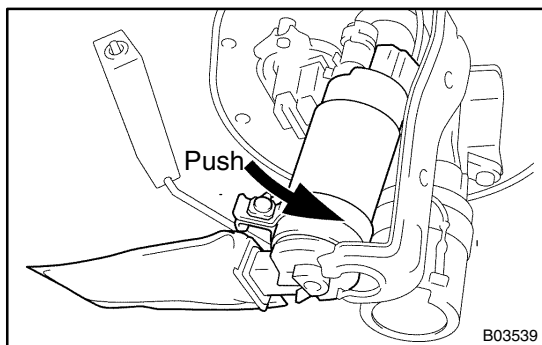


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INSTALLATION

1. INSTALL FUEL SUCTION FILTER TO FUEL PUMP

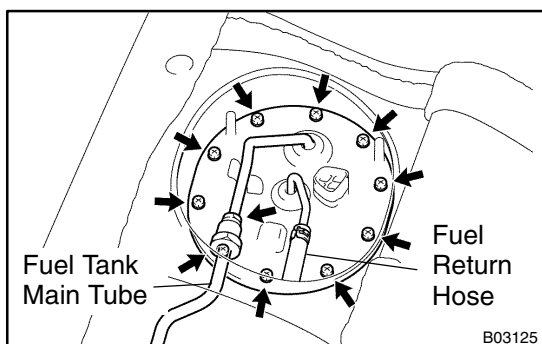
Install a suction filter with a new clip.



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2. INSTALL FUEL PUMP TO PUMP BRACKET

- Connect the fuel hose to the outlet port of the fuel pump.
- Install the rubber cushion to the fuel pump.
- Install the fuel pump by pushing the lower side of the fuel pump.
- Install the lead wire to the fuel pump with the screw.
- Connect the fuel pump connector.



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

- Install a new gasket to the fuel pump bracket.
- Attach the fuel pump and sender gauge assembly to the fuel tank with the 10 bolts.

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

- Using SST, connect the fuel tank main tube (See page FI-1).

SST 09631-22020

4. CONNECT FUEL PUMP AND SENDER GAUGE CONNECTOR

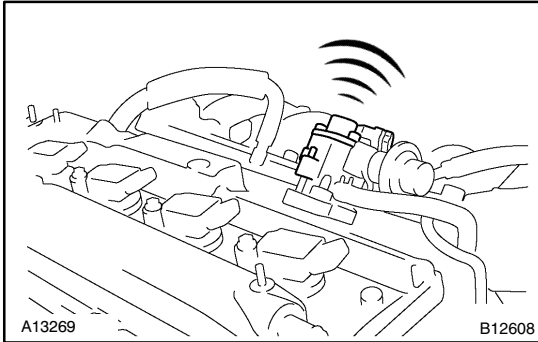
- CHECK FOR FUEL LEAK (See page FI-1)
- INSTALL FLOOR SERVICE HOLE COVER
- INSTALL REAR SEAT CUSHION

FUEL PUMP (High Pressure) ON-VEHICLE INSPECTION

FI0U0-01

1. CHECK FUEL PUMP OPERATION

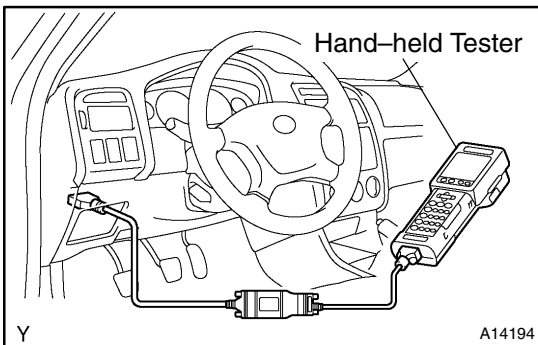
- (a) Remove the No. 1 engine cover.
- (b) Start the engine.



- (c) Using a sound scope, hear the operating noise of the pump.

If there is no sound, replace the pump.

- (d) Stop the engine.
- (e) Reinstall the engine cover.



2. CHECK FUEL HIGH PRESSURE

- (a) Connect a hand-held tester to the DLC3.
- (b) Start the engine.
- (c) Please refer to the hand-held tester operator's manual for further details.
- (d) Check the fuel high pressure at idle to 3,000 rpm.

Fuel high pressure:

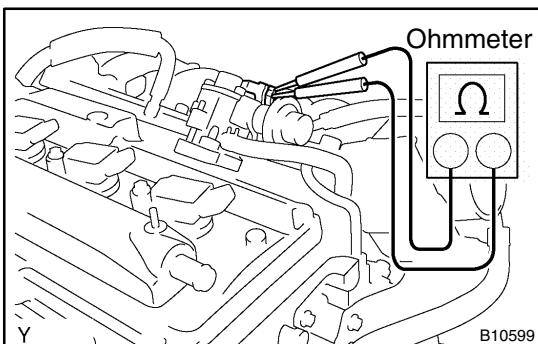
9.5 – 10.5 MPa (97 – 107 kgf/cm², 1,380 – 1,520 psi)

If the pressure is not specified, check the fuel pump, high pressure fuel pump, fuel pressure sensor, wiring and fuel leakage.

- (e) Stop the engine.
- (f) Disconnect the hand-held tester.

3. CHECK FUEL PUMP RESISTANCE

- (a) Remove the engine cover.
- (b) Disconnect the fuel pump connector.



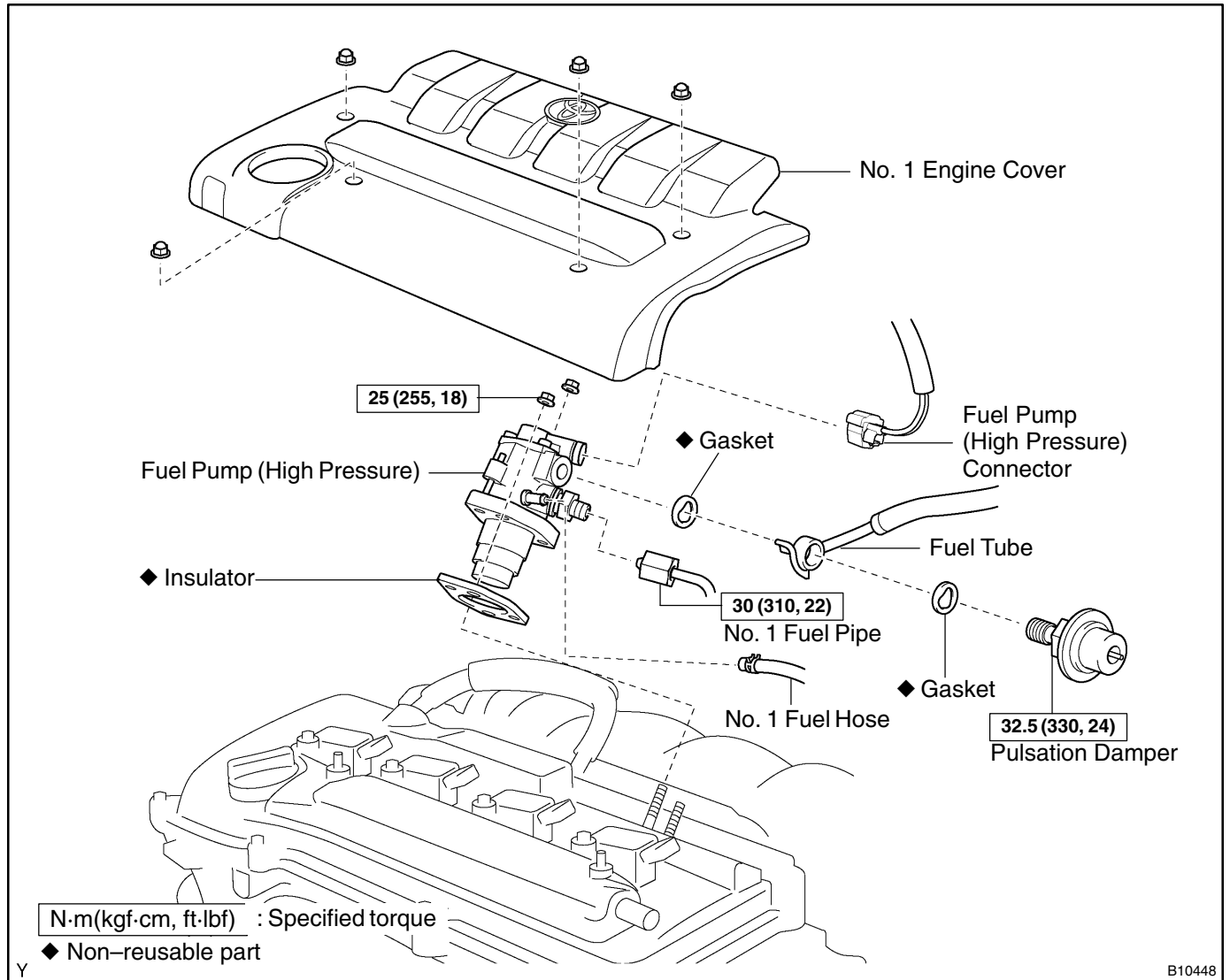
- (c) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 1.19 – 1.39 Ω at 20°C (68°F)

If the resistance is not as specified, replace the fuel pump.

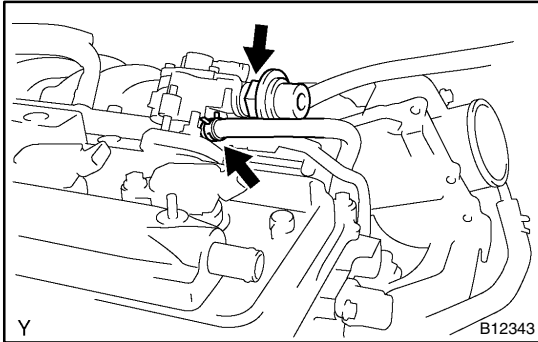
- (d) Reconnect the connector.
- (e) Reinstall the engine cover.

COMPONENTS



REMOVAL

1. REMOVE NO. 1 ENGINE COVER

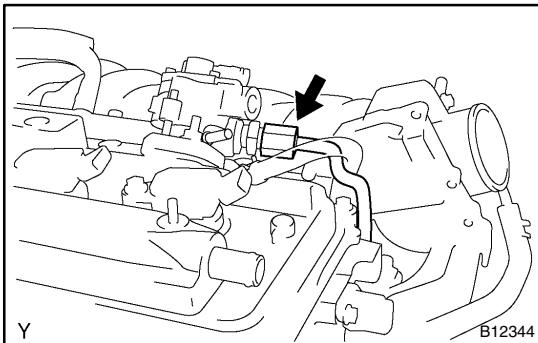


2. DISCONNECT FUEL TUBE

Remove the pulsation damper and 2 gaskets, and disconnect the fuel tube from the fuel pump.

3. DISCONNECT NO. 1 FUEL HOSE

Disconnect the fuel hose from the fuel pump.



4. DISCONNECT NO. 1 FUEL PIPE

Disconnect the fuel pipe from the fuel pump.

5. REMOVE FUEL PUMP

Remove the 2 nuts, fuel pump and insulator.

NOTICE:

Loosen the nuts uniformly.

INSTALLATION

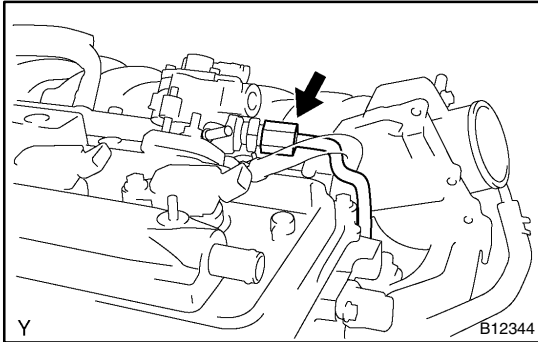
1. INSTALL FUEL PUMP

Install a new insulator and the fuel pump with the 2 nuts.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

NOTICE:

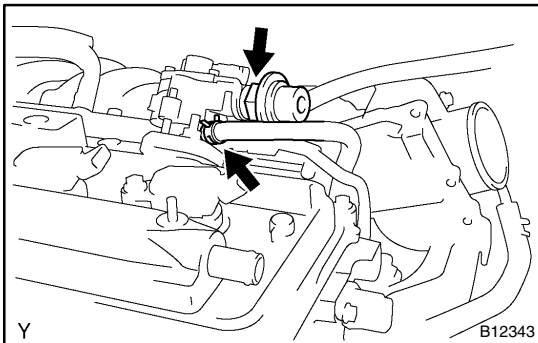
Tighten the nuts uniformly.



2. CONNECT NO. 1 FUEL PIPE

Connect the fuel pipe to the fuel pump.

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)



3. CONNECT NO. 1 FUEL HOSE

Connect the fuel hose to the fuel pump.

4. CONNECT FUEL TUBE

Connect the fuel tube to the fuel pump with 2 new gaskets and install the pulsation damper.

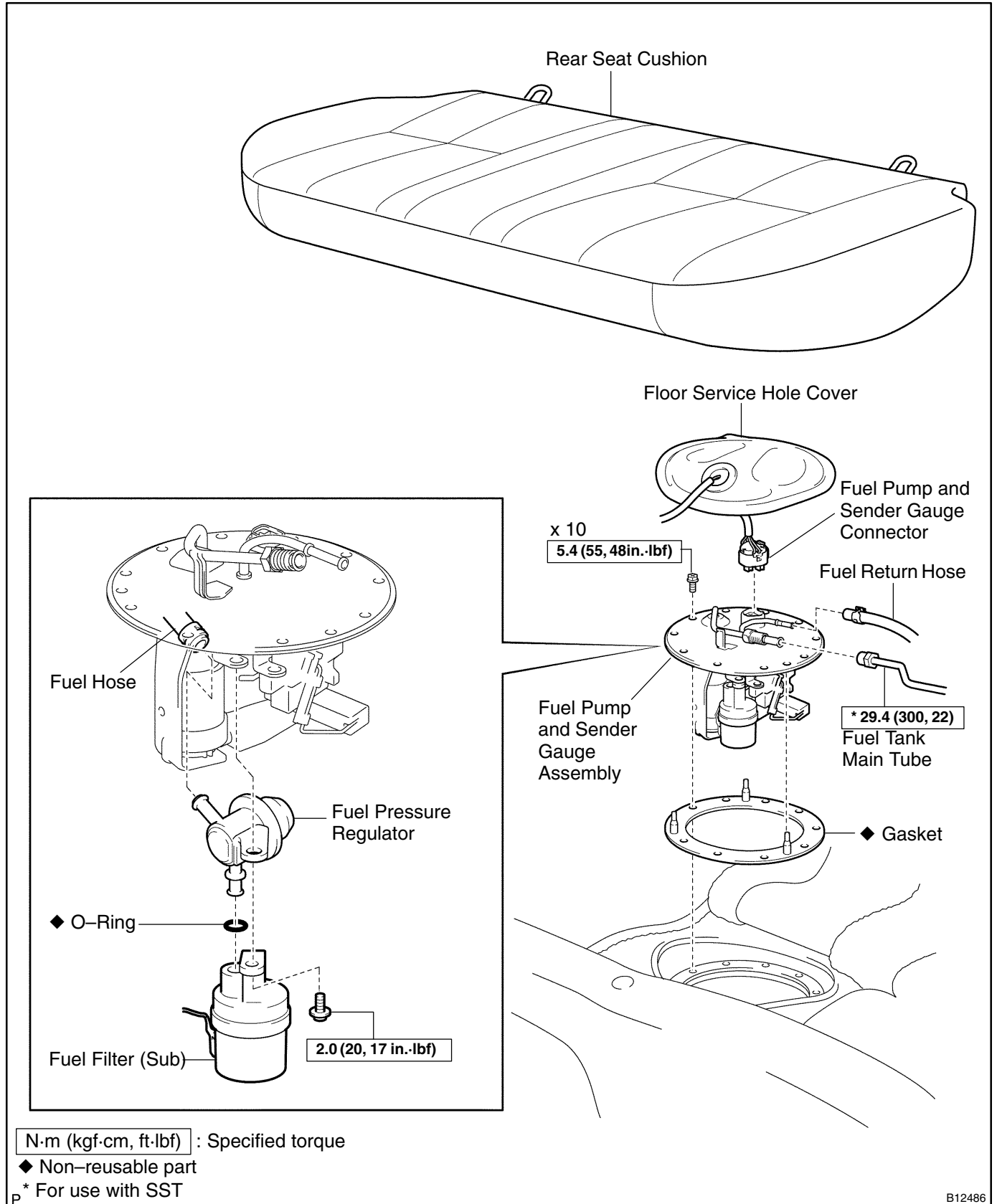
Torque: 32.5 N·m (330 kgf·cm, 24 ft·lbf)

5. CHECK FOR FUEL LEAK (See page FI-1).

6. INSTALL NO. 1 ENGINE COVER

FUEL PRESSURE REGULATOR COMPONENTS

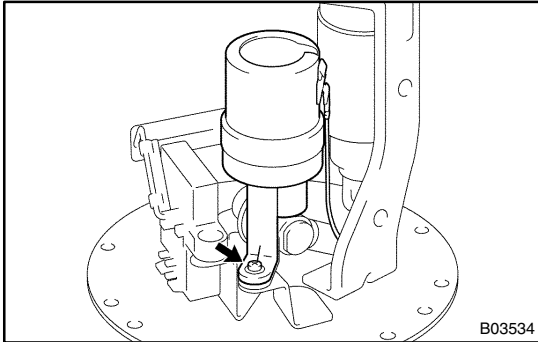
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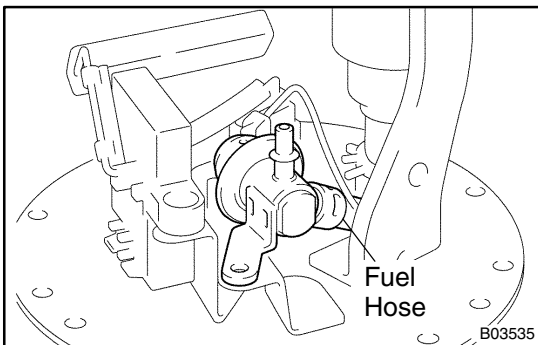
REMOVAL

1. REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK (See page FI-9)



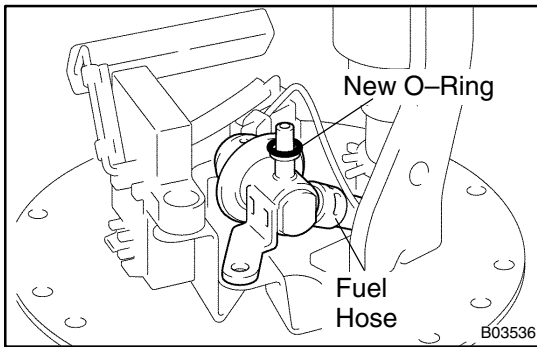
2. DISCONNECT FUEL FILTER (SUB) FROM FUEL PRESSURE REGULATOR

- (a) Remove the screw and pull out the fuel filter.
- (b) Remove the O-ring.



3. REMOVE FUEL PRESSURE REGULATOR

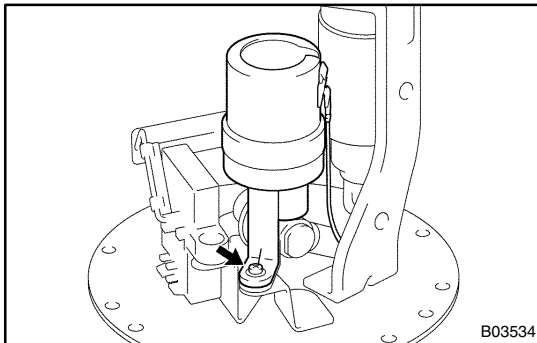
Disconnect the fuel hose and remove the fuel pressure regulator.



INSTALLATION

1. INSTALL FUEL PRESSURE REGULATOR

Connect the fuel pressure regulator to the fuel hose.



2. INSTALL FUEL FILTER (SUB)

- (a) Install a new O-ring to the fuel pressure regulator.
- (b) Apply a light coat of gasoline to the O-ring, and push the fuel filter into the fuel pressure regulator.
- (c) Check that the fuel filter rotates smoothly.
If the fuel filter does not rotate smoothly, the O-ring may be pinched, so remove the fuel filter and perform the above steps (b) and (c) again.
- (d) Install the fuel filter with the screw.

Torque: 2.0 N·m (20 kgf·cm, 17 in.-lbf)

3. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK (See page FI-10)

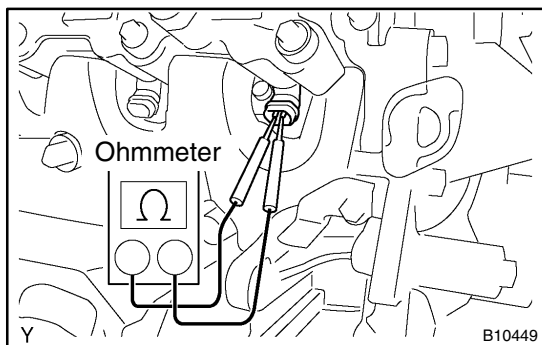
INJECTOR

ON-VEHICLE INSPECTION

SF1LU-01

INSPECT INJECTOR RESISTANCE

- (a) Remove the intake manifold (See page EM-31).
- (b) Disconnect the injector connector.



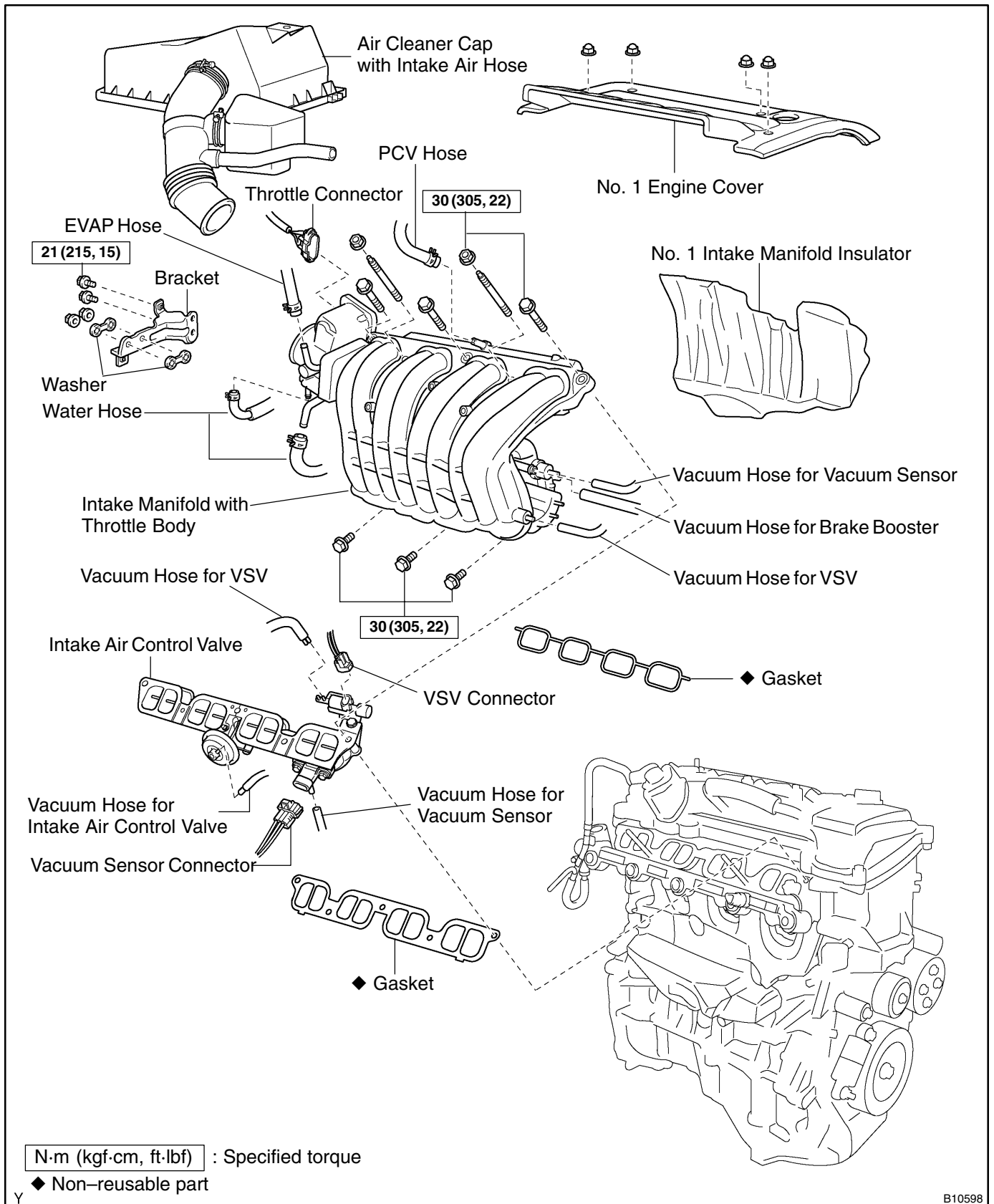
- (c) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 2.55 – 2.85 Ω at 20°C (68°F)

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

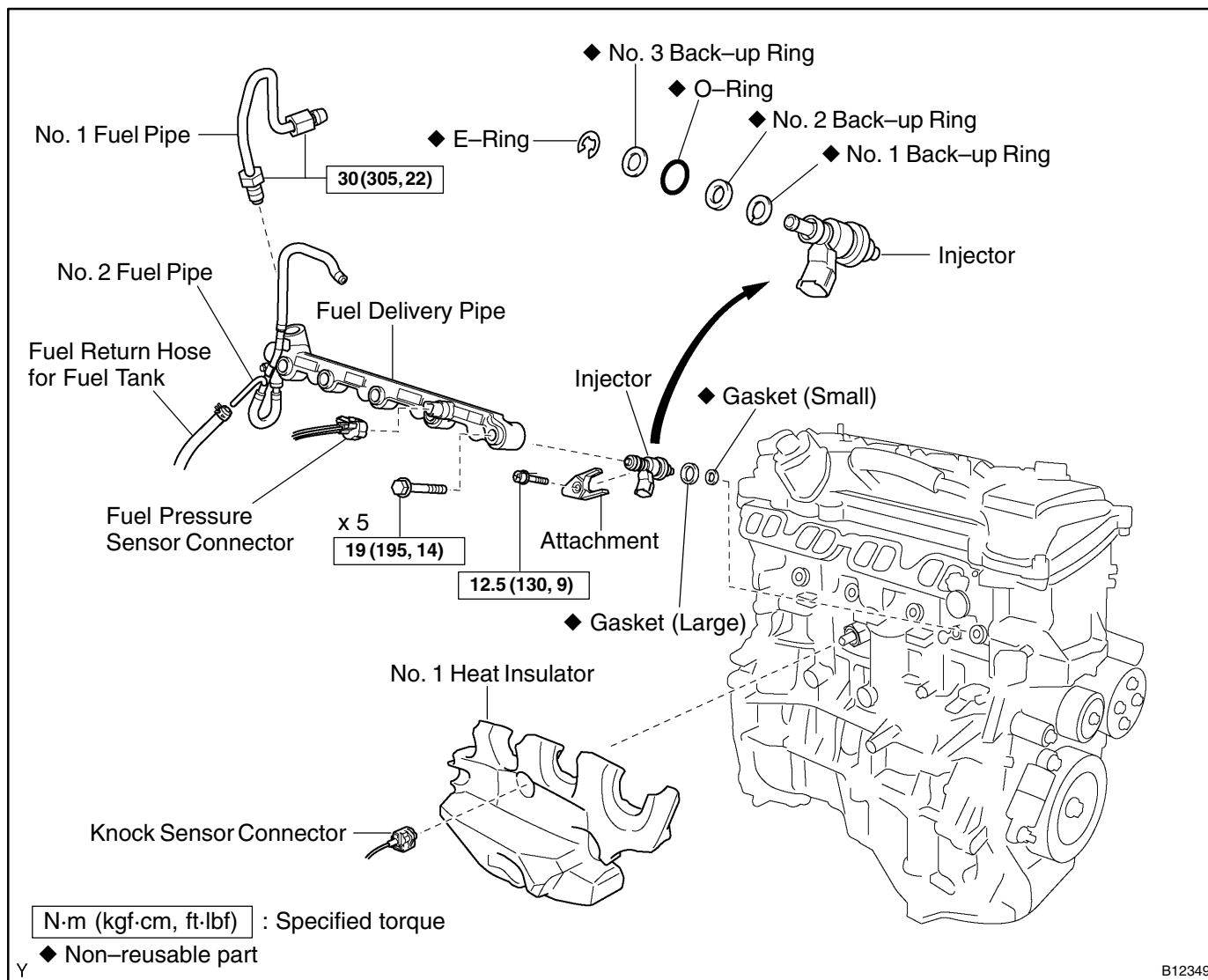
- (d) Reconnect the injector connector.
- (e) Reinstall the intake manifold (See page EM-47).

COMPONENTS



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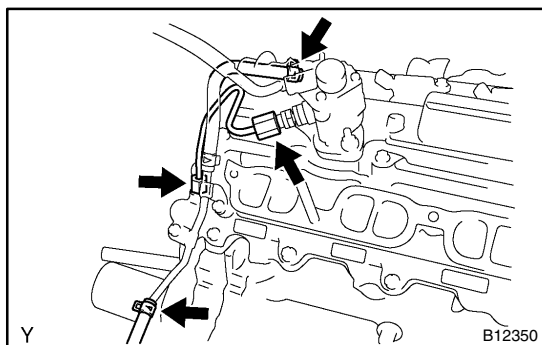
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REMOVAL

1. REMOVE INTAKE AIR CONTROL VALVE
(See page FI-30)
2. DISCONNECT INJECTOR CONNECTORS
3. DISCONNECT KNOCK SENSOR CONNECTOR
4. REMOVE NO. 1 HEAT INSULATOR



5. REMOVE NO. 1 FUEL PIPE

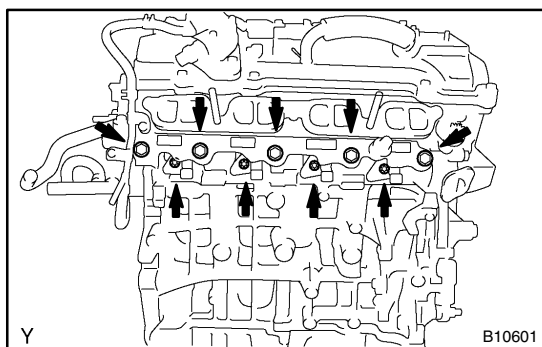
Disconnect the fuel pipe from the fuel pump (high pressure), and remove the fuel pipe from the delivery pipe.

6. REMOVE DELIVERY PIPE AND INJECTORS ASSEMBLY

NOTICE:

Be careful not to give an impact to the injectors.

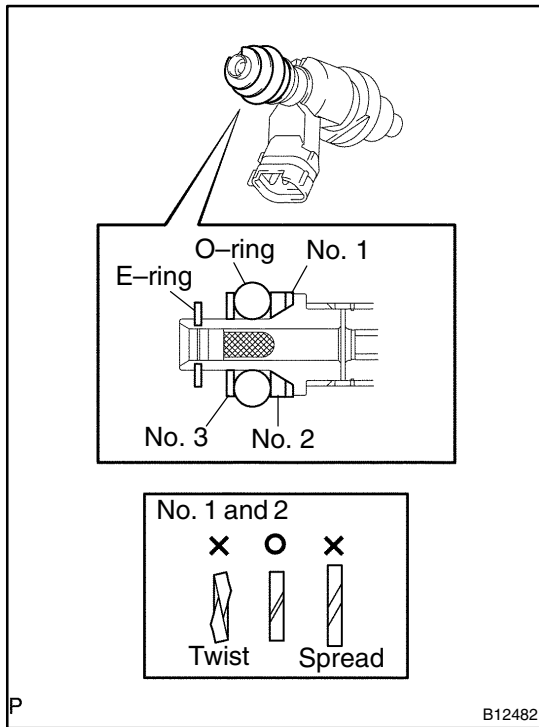
- (a) Disconnect the fuel return hose from the fuel pump (high pressure).
- (b) Disconnect the fuel return hose (from the fuel tank) from the No. 2 fuel pipe.



- (c) Remove the 5 bolts holding the fuel delivery pipe to the cylinder head.
- (d) Using a torx wrench socket (T40), remove the 4 bolts, 4 injector brackets, the delivery pipe and the 4 injectors assembly and 8 gaskets.

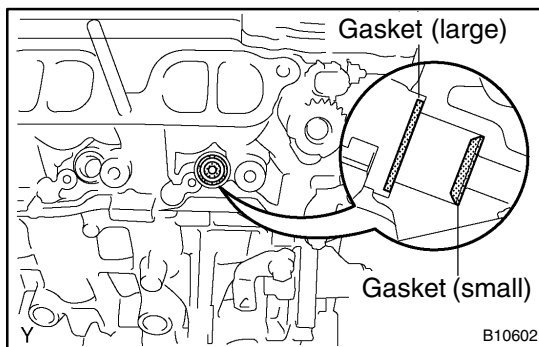
7. REMOVE INJECTORS FROM DELIVERY PIPE

- (a) Pull out the 4 injectors from the delivery pipe.
- (b) Remove the E-ring, 3 back-up rings and O-ring from each injector.



INSTALLATION

1. **INSTALL INJECTORS TO FUEL DELIVERY PIPE**
 - (a) Install new No. 1, No. 2 back-up rings, a new O-ring, a new No. 3 back-up ring and a new E-ring to each injector as shown in the illustration.
 - (b) Apply a light coat of spindle oil or gasoline to the place where the O-ring touches the delivery pipe.
 - (c) Install the 4 injectors to the fuel delivery pipe.



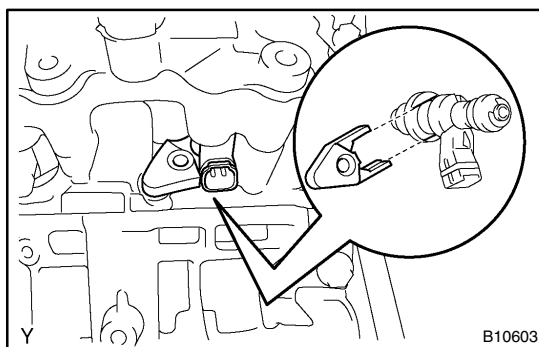
2. **INSTALL INJECTORS AND DELIVERY PIPE ASSEMBLY**

- (a) Insert 2 new gaskets into each injector hole of cylinder head.

NOTICE:

Check the gasket (small) direction as shown in the illustration.

- (b) Attach the fuel delivery pipe and the injectors assembly to the injector hole of the cylinder head.



- (c) Attach the injector bracket to the injector as shown in the illustration.

- (d) Using a torx wrench socket (T40), install the injector bracket with the bolt.

Torque: 12.5 N·m (130 kgf·cm, 9 ft·lbf)

- (e) Install the 5 bolts holding the fuel delivery pipe to the cylinder head.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

- (f) Install the fuel return hose (from fuel tank) to the No. 2 fuel pipe.

- (g) Install the fuel return hose to the fuel pump (high pressure).

3. **INSTALL NO. 1 FUEL PIPE**

- (a) Temporarily connect the fuel pipe to the fuel delivery pipe and fuel pump (high pressure).

- (b) Tighten the 2 union nuts.

Torque: 30 N·m (305 kgf·cm, 22 ft·lbf)

4. **INSTALL NO. 1 HEAT INSULATOR**

5. **CONNECT KNOCK SENSOR CONNECTOR**

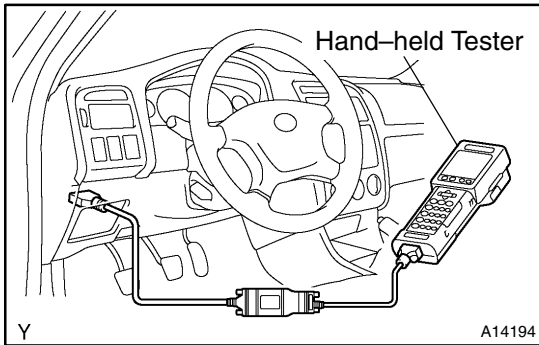
6. **CONNECT INJECTOR CONNECTORS**
7. **INSTALL INTAKE AIR CONTROL VALVE (See page FI-30)**
8. **CHECK FOR FUEL LEAK (See page FI-1)**

THROTTLE BODY ON-VEHICLE INSPECTION

SF09P-15

1. **CHECK THROTTLE CONTROL MOTOR OPERATION**
 - (a) Turn the ignition switch ON.
 - (b) When stepping the accelerator pedal, check that hear the sound of operating the motor is heard.

If no sound, check the accelerator pedal position sensor, wiring and engine ECU.



2. INSPECT SYSTEM OPERATION

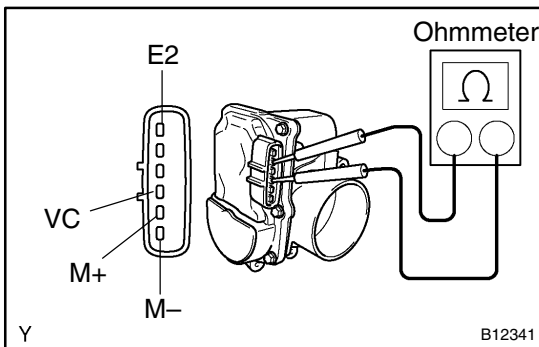
NOTICE:

Perform the inspection without electrical load.

- (a) Connect a hand-held tester to the DLC3.
- (b) Please refer to the hand-held tester operator's manual for further details.
- (c) When stepping the accelerator pedal at full open, check that the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA shows the standard value.

Throttle value opening percentage: 60 % or more

If the operation is not specified, check the accelerator pedal position sensor, wiring and engine ECU.



3. CHECK THROTTLE CONTROL MOTOR RESISTANCE

- (a) Disconnect the connector.
- (b) Using an ohmmeter, measure the resistance between the terminals.

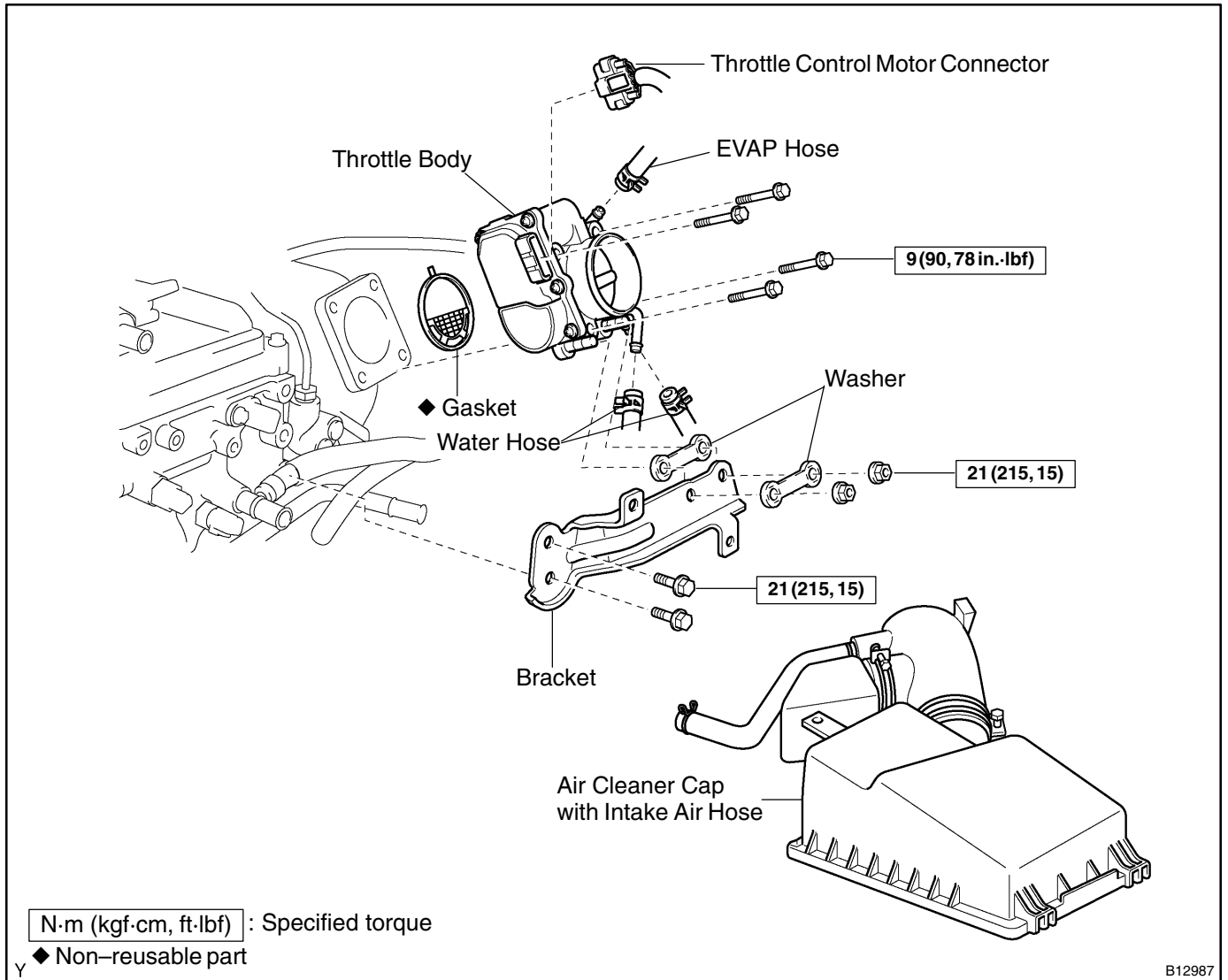
Resistance:

M+ – M-	0.3 – 100 Ω at 20 °C (68 °F)
VC – E2	1.25 – 2.35 kΩ at 20 °C (68 °F)

If the resistance is not specified, replace the throttle body.

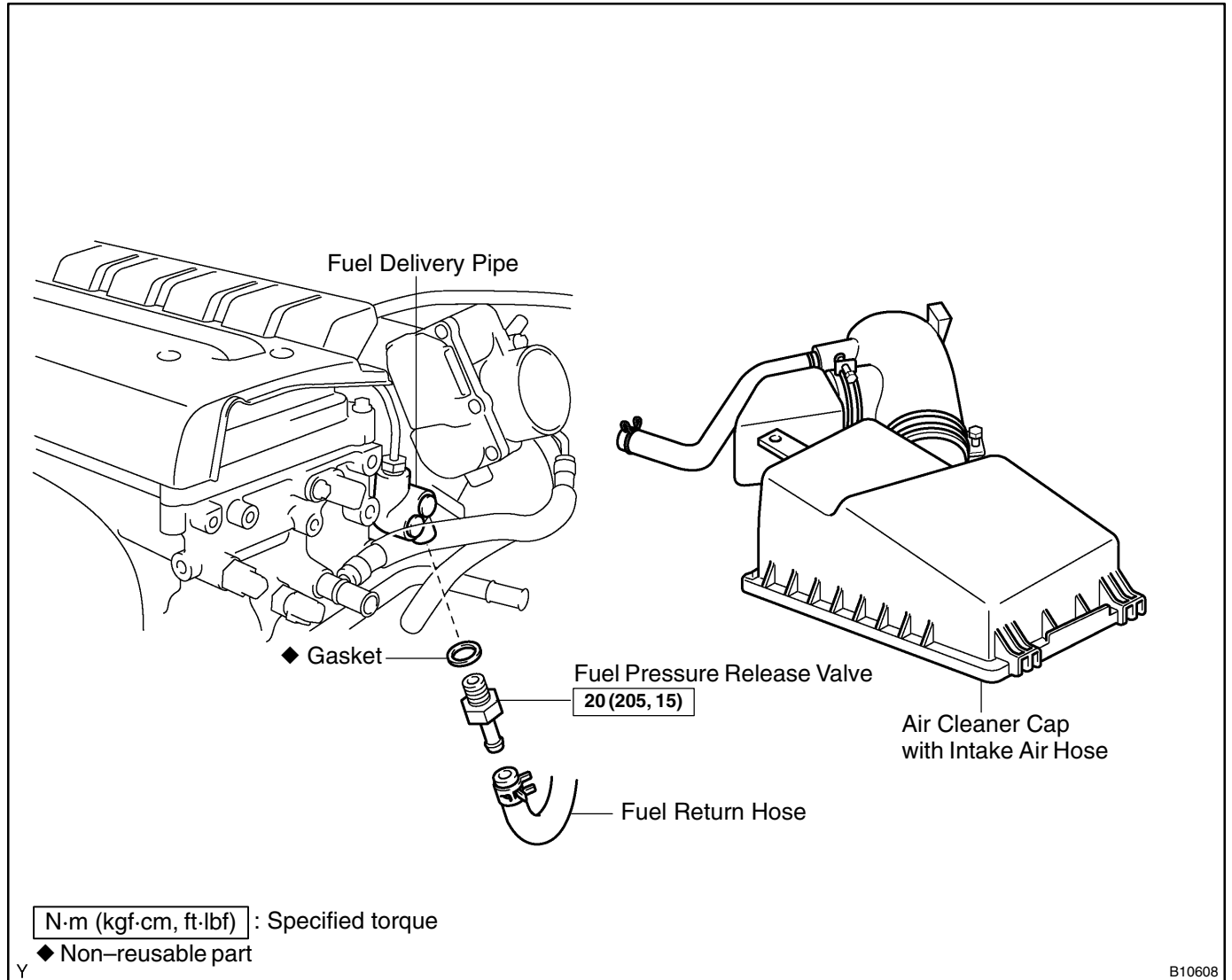
4. CHECK IDLE SPEED (See page EM-13)

COMPONENTS



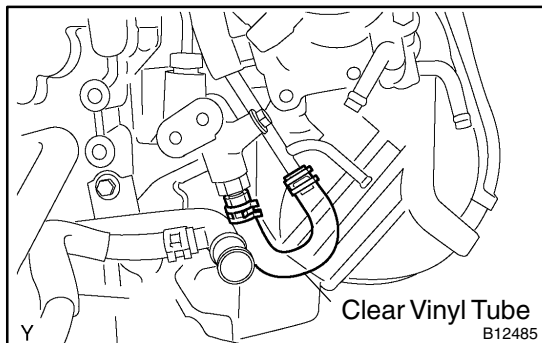
FUEL PRESSURE RELEASE VALVE COMPONENTS

FI0U4-01



INSPECTION

1. REMOVE FUEL PRESSURE RELEASE VALVE
2. INSPECT FUEL PRESSURE RELEASE VALVE
 - (a) Remove the air cleaner cap with the intake air hose.



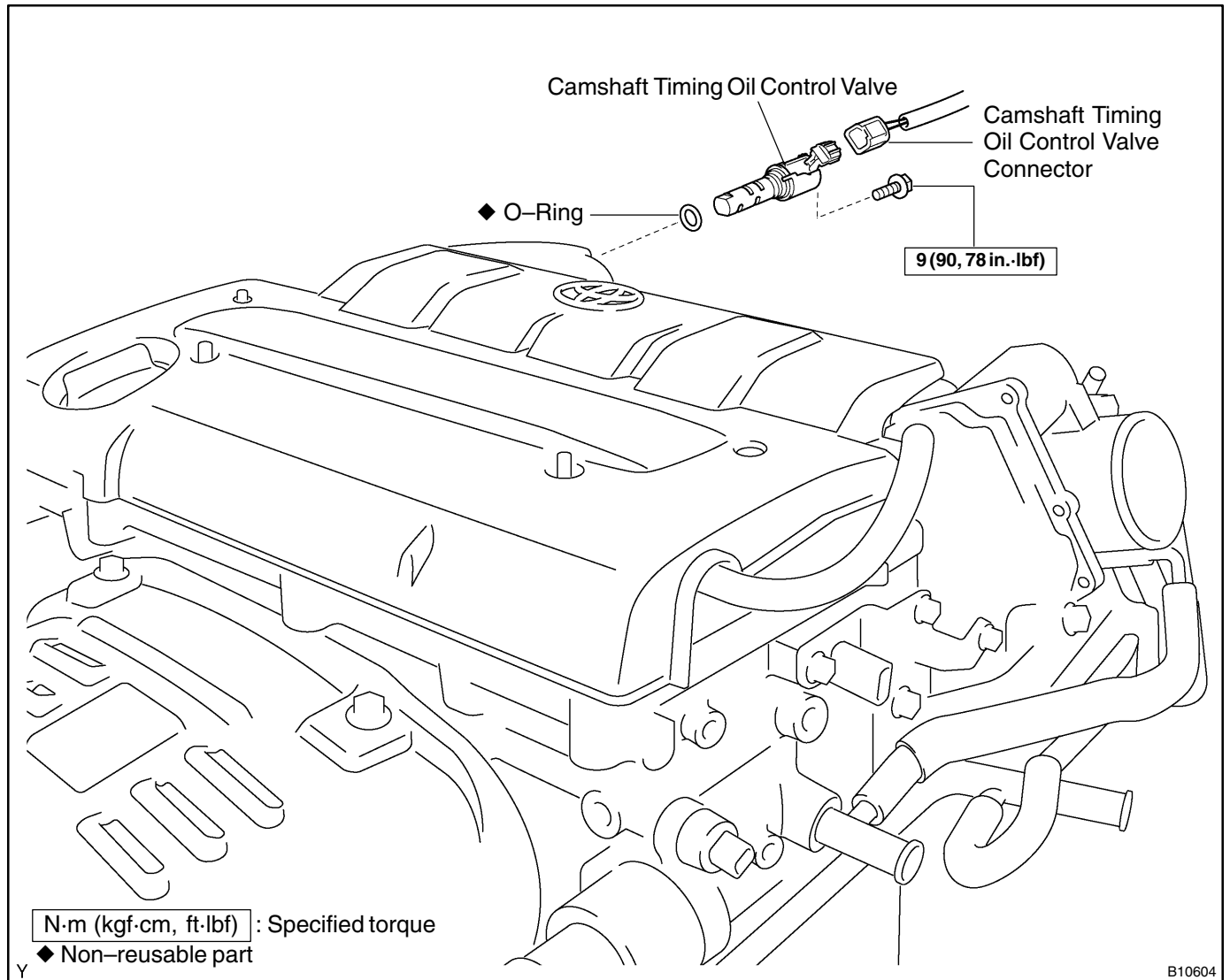
- (b) Replace the fuel return hose with a clear vinyl hose.
 - (c) Reinstall the air cleaner cap with the intake air hose.
 - (d) Start the engine and stop the engine after few minute.
 - (e) Check for the fuel leak visually.

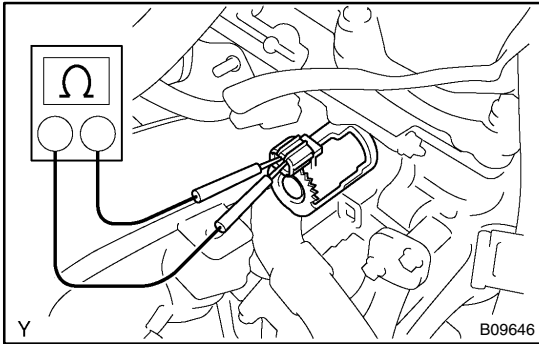
If there is a large amount of fuel leak, replace the fuel pressure release valve.

- (f) Remove the air cleaner cap with the intake air hose.
 - (g) Replace the vinyl hose with the fuel return hose.
 - (h) Reinstall the air cleaner cap with the intake air hose.
3. REINSTALL FUEL PRESSURE RELEASE VALVE
4. CHECK FOR FUEL LEAK (See page FI-1)

CAMSHAFT TIMING OIL CONTROL VALVE COMPONENTS

SF1LR-01





INSPECTION

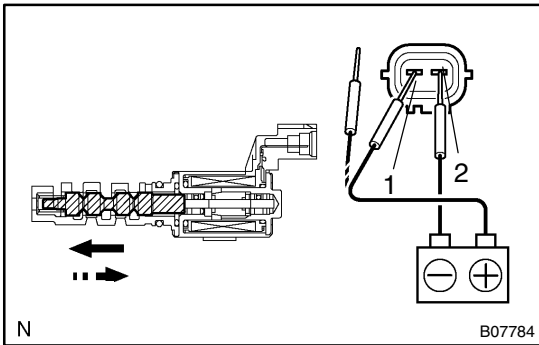
1. INSPECT OIL CONTROL VALVE RESISTANCE

- (a) Disconnect the oil control valve connector.
- (b) 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.

- (c) Reconnect the oil control valve connector.



2. INSPECT CAMSHAFT OIL CONTROL VALVE OPERATION

- (a) Remove the bolt, camshaft oil control valve and O-ring.
- (b) Connect the positive (+) lead to terminal 1 and the negative (-) lead to terminal 2 from the battery, 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

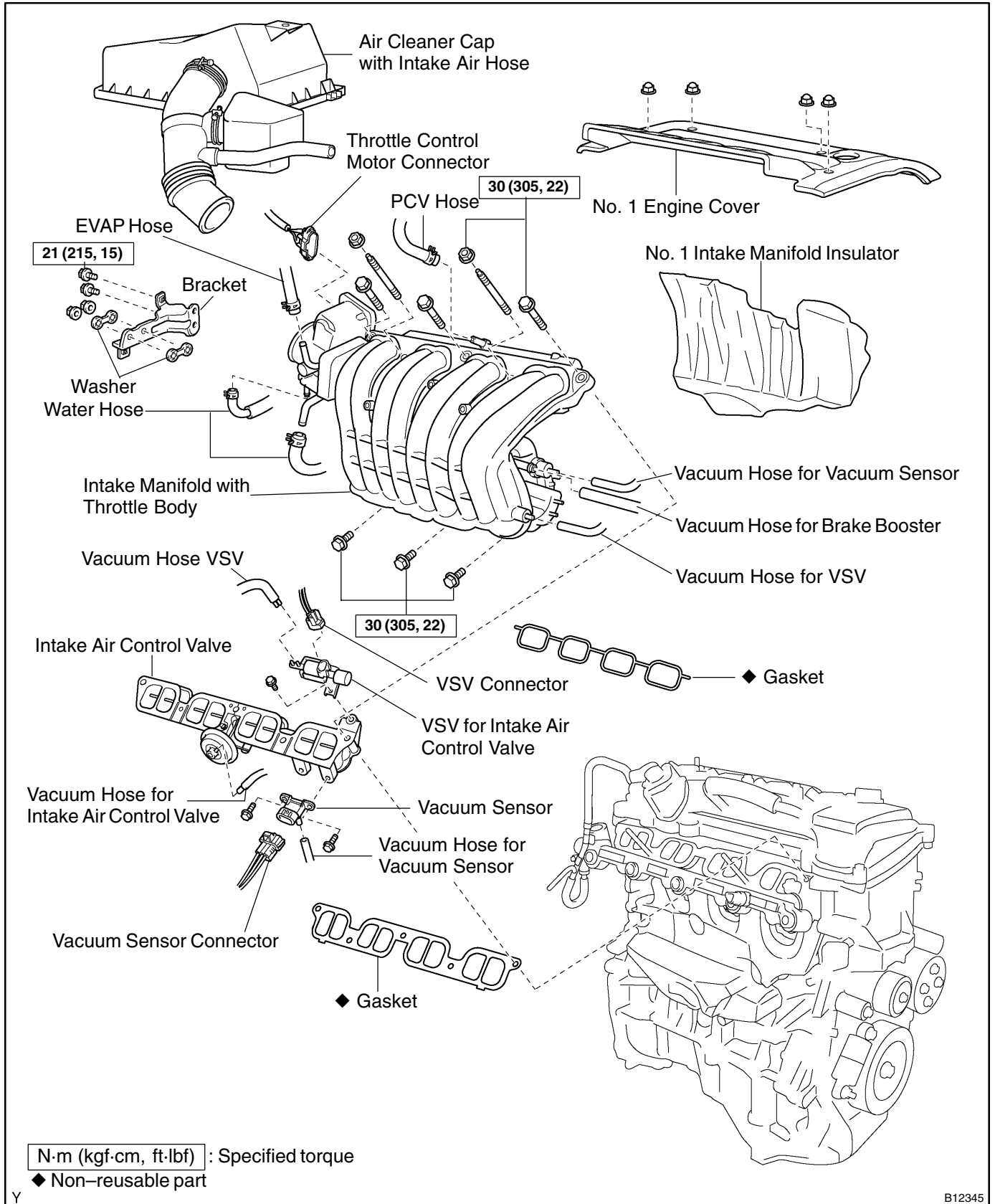
If the operation is not as specified, replace the valve.

- (c) Install a new O-ring to the camshaft oil control valve.
- (d) Apply a light coat of engine oil to the O-ring and reinstall the camshaft oil control valve with the bolt.

Torque: 9 N·m (90 kgf·cm, 78 in.·lbf)

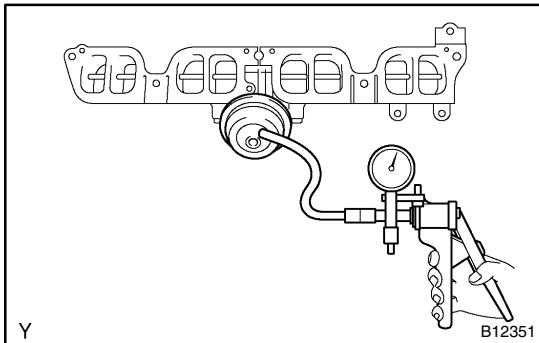
INTAKE AIR CONTROL VALVE COMPONENTS

FIGURE-01



INSPECTION

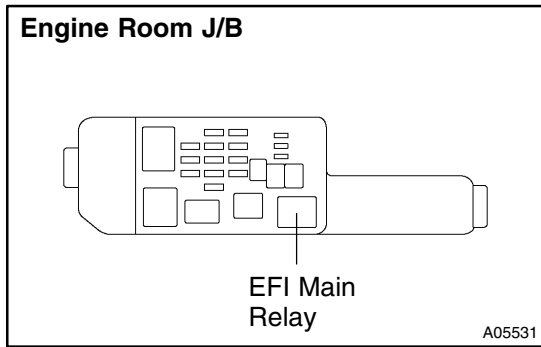
1. **REMOVE INTAKE MANIFOLD** (See page EM-31)
2. **REMOVE INTAKE AIR CONTROL VALVE**
3. **REMOVE VSV FOR INTAKE AIR CONTROL VALVE**
 - (a) Disconnect the VSV connector.
 - (b) Remove the bolt and VSV.
4. **REMOVE VACUUM SENSOR**
 - (a) Disconnect the vacuum sensor connector.
 - (b) Remove the 2 bolts and vacuum sensor.



5. **INSPECT INTAKE AIR CONTROL VALVE OPERATION**
 - (a) Check that the air control valve smoothly and fully closes by applying 35 kPa (265 mmHg, 10.43 in.Hg) of vacuum to the actuator.
 - (b) When the vacuum released, check that the air control valve quickly and fully opens.

If it is abnormal, replace the intake air control valve.

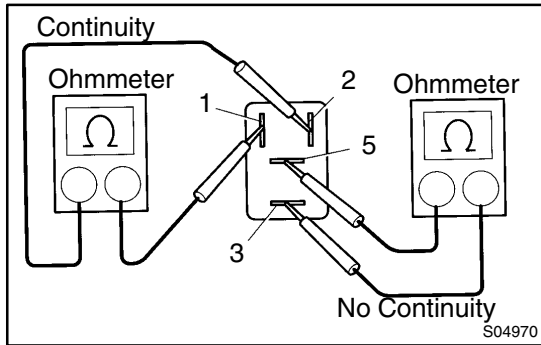
6. **REINSTALL VACUUM SENSOR**
 - (a) Reinstall the vacuum sensor with the 2 bolts.
 - (b) Reconnect the vacuum sensor connector.
7. **REINSTALL VSV FOR INTAKE AIR CONTROL VALVE**
 - (a) Reinstall the VSV with the bolt.
 - (b) Reconnect the VSV connector.
8. **REINSTALL INTAKE AIR CONTROL VALVE**
Install a new gasket and the intake air control valve.
9. **REINSTALL INTAKE MANIFOLD** (See page EM-47)



EFI MAIN RELAY INSPECTION

SF09Z-17

1. REMOVE EFI MAIN RELAY (Marking: EFI)



2. INSPECT EFI MAIN RELAY

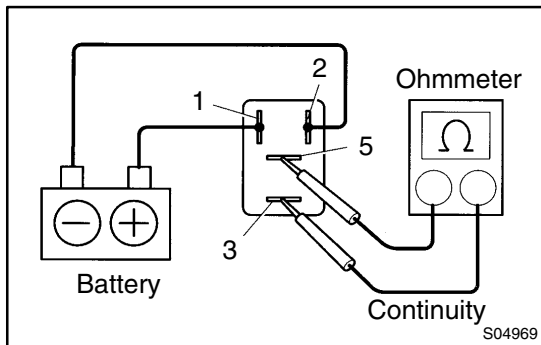
(a) Inspect the relay continuity.

- (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.

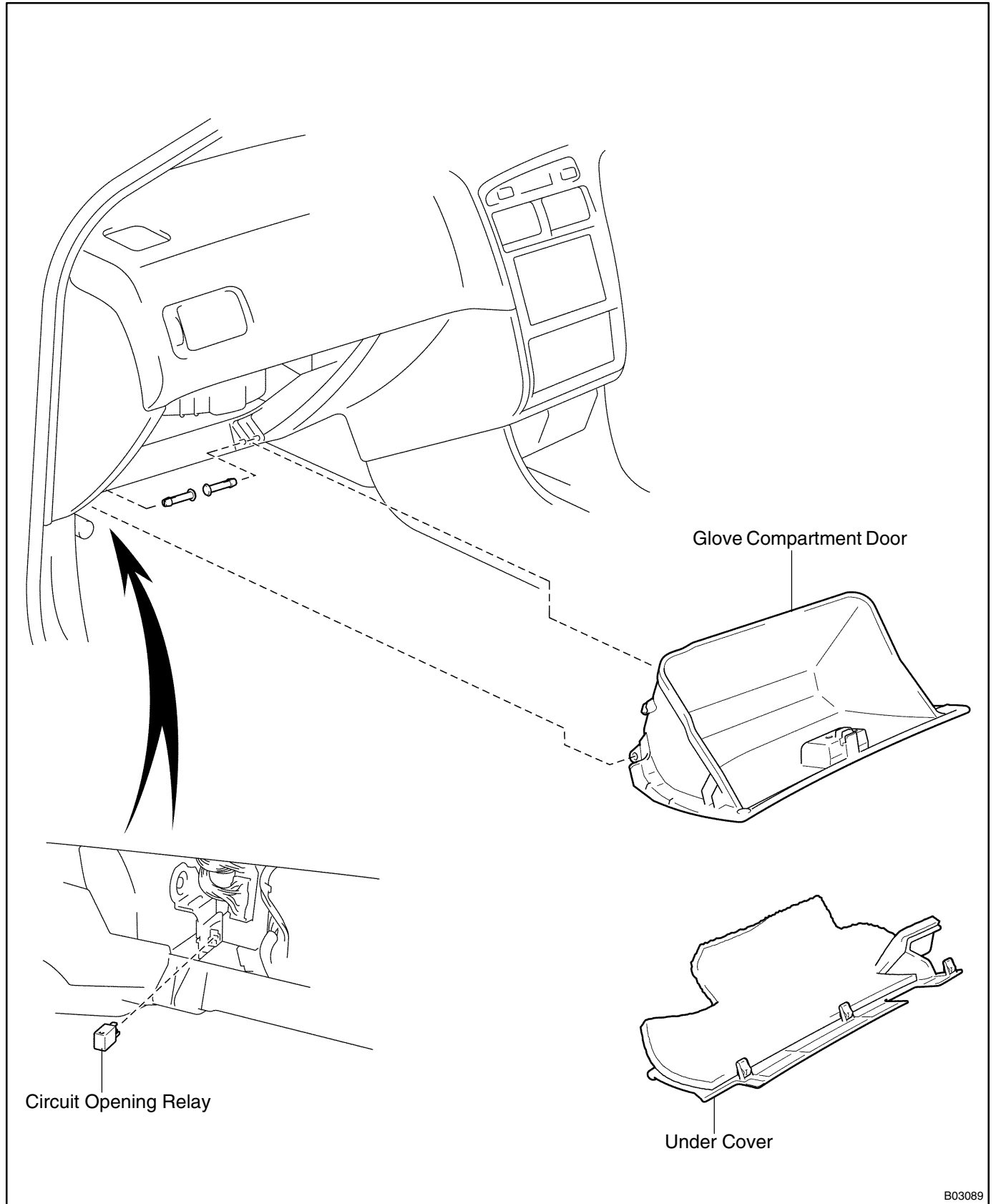
- (1) Apply battery voltage across terminals 1 and 2.
- (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

3. REINSTALL EFI MAIN RELAY

CIRCUIT OPENING RELAY COMPONENTS

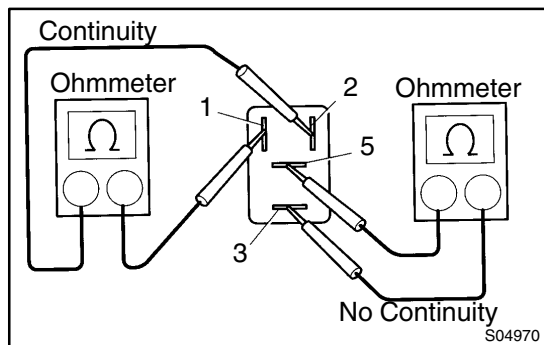
FIGURE-01



B03089

INSPECTION

1. REMOVE CIRCUIT OPENING RELAY FROM PASSENGER SIDE J/B



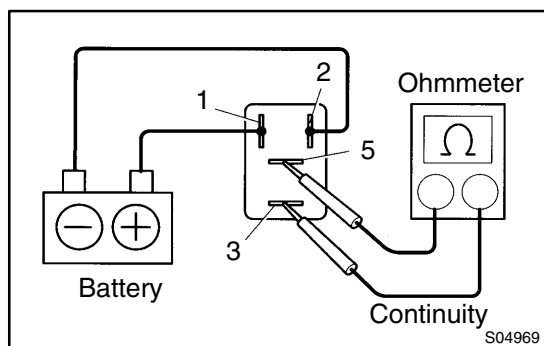
2. INSPECT CIRCUIT OPENING RELAY CONTINUITY

- (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.

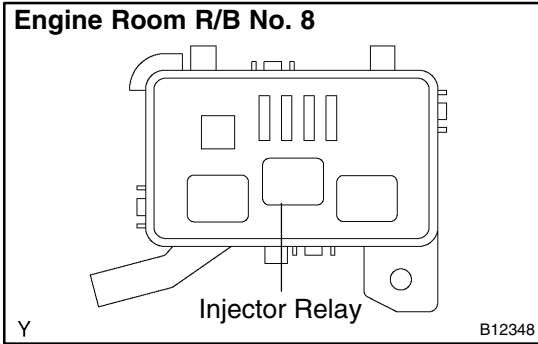
If there is continuity, replace the relay.



- (b) Inspect the relay operation.
 - (1) Apply battery 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.

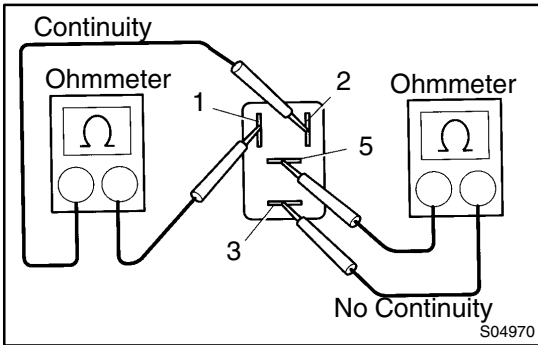
3. REINSTALL CIRCUIT OPENING RELAY



INJECTOR RELAY INSPECTION

FI0U9-01

1. REMOVE INJECTOR RELAY (Marking: INJ)

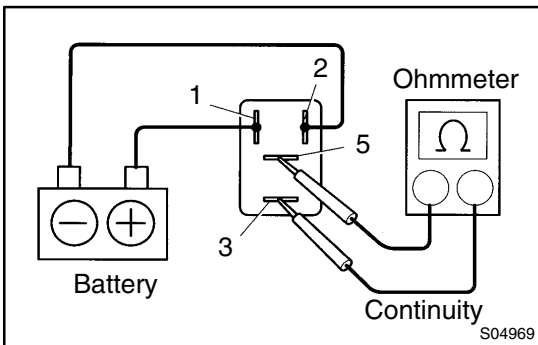


2. INSPECT INJECTOR RELAY

- (a) Inspect the relay continuity.
 - (1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.
 - (2) Check that there is no continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

If there is continuity, replace the relay.



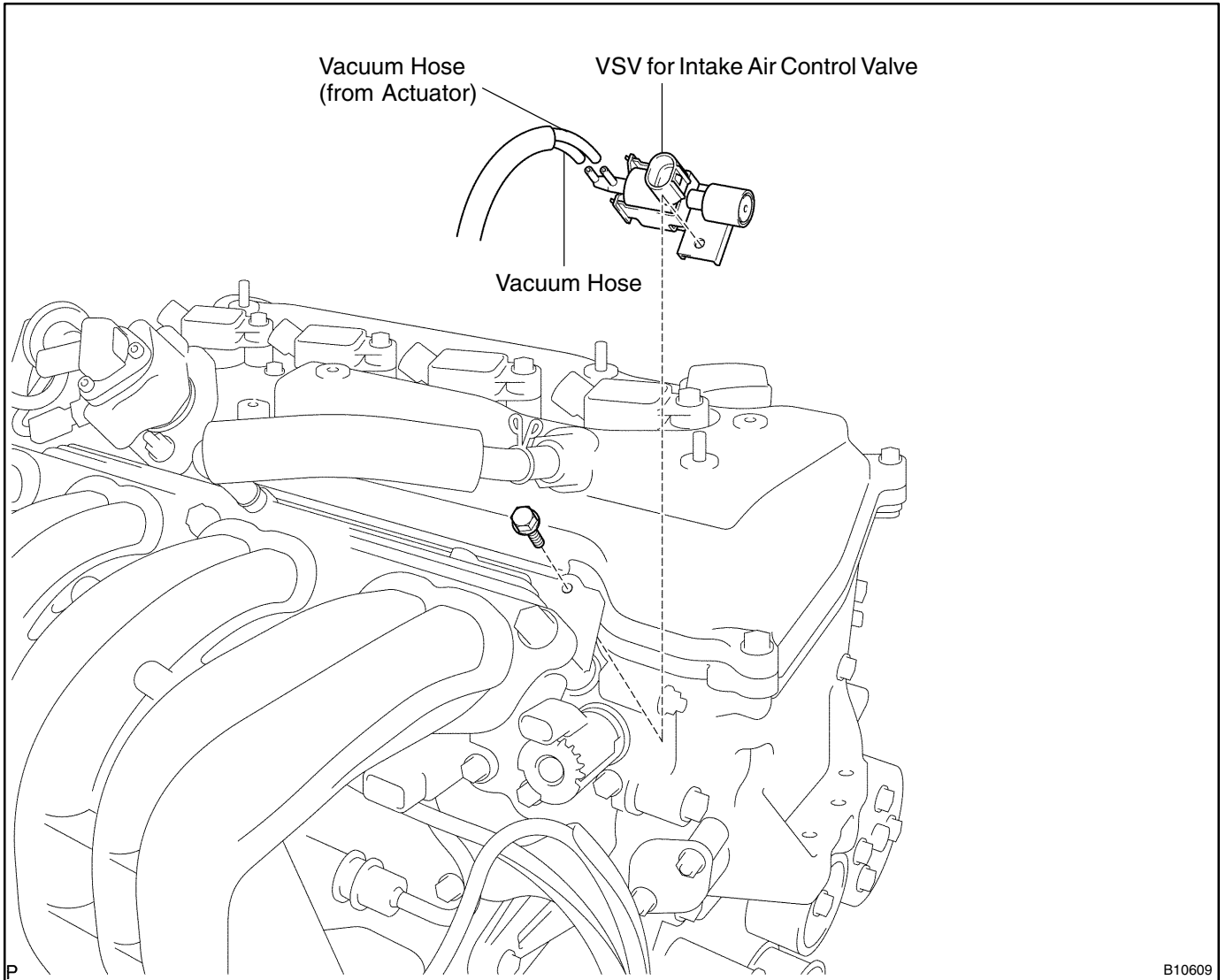
- (b) Inspect the relay operation.
 - (1) Apply battery voltage across terminals 1 and 2.
 - (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

3. REINSTALL INJECTOR RELAY

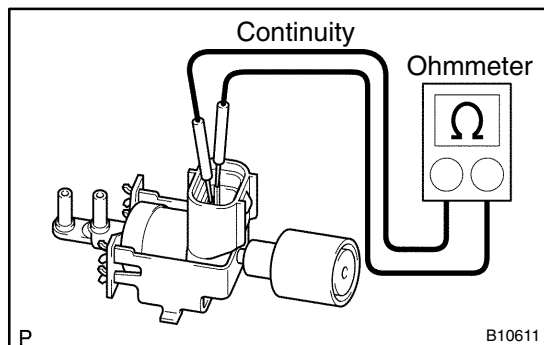
VSV FOR INTAKE AIR CONTROL VALVE COMPONENTS

FIGUA-01



INSPECTION

1. REMOVE VSV

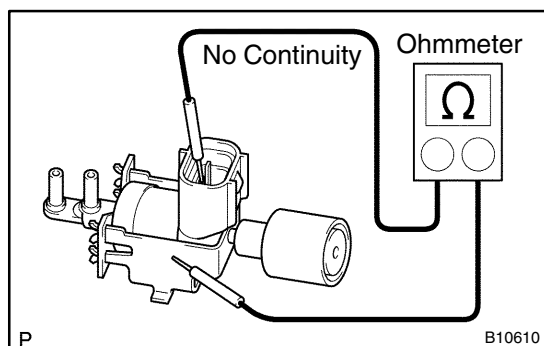


2. INSPECT VSV

- (a) Inspect the VSV for open circuit.
Using an ohmmeter, check that there is continuity between the terminals.

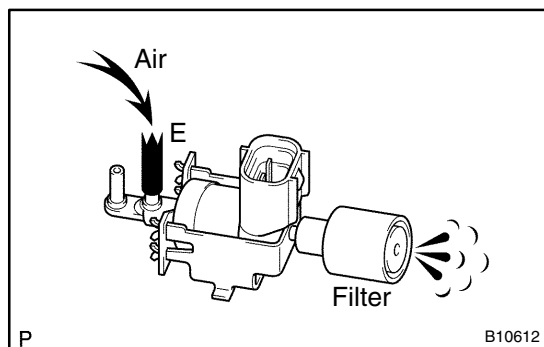
Resistance: 33 – 39 Ω at 20°C (68°F)

If there is no continuity, replace the VSV.



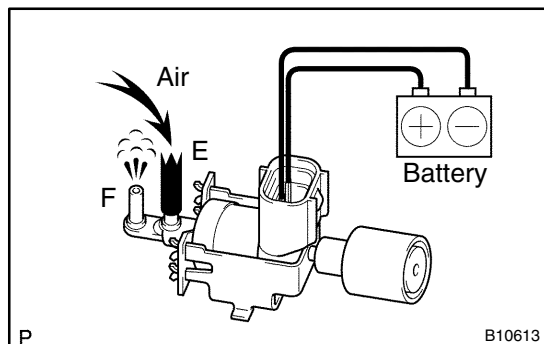
- (b) Inspect the VSV for ground.
Using an ohmmeter, check that there is no continuity between each terminal and the body.

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 voltage across the terminals.

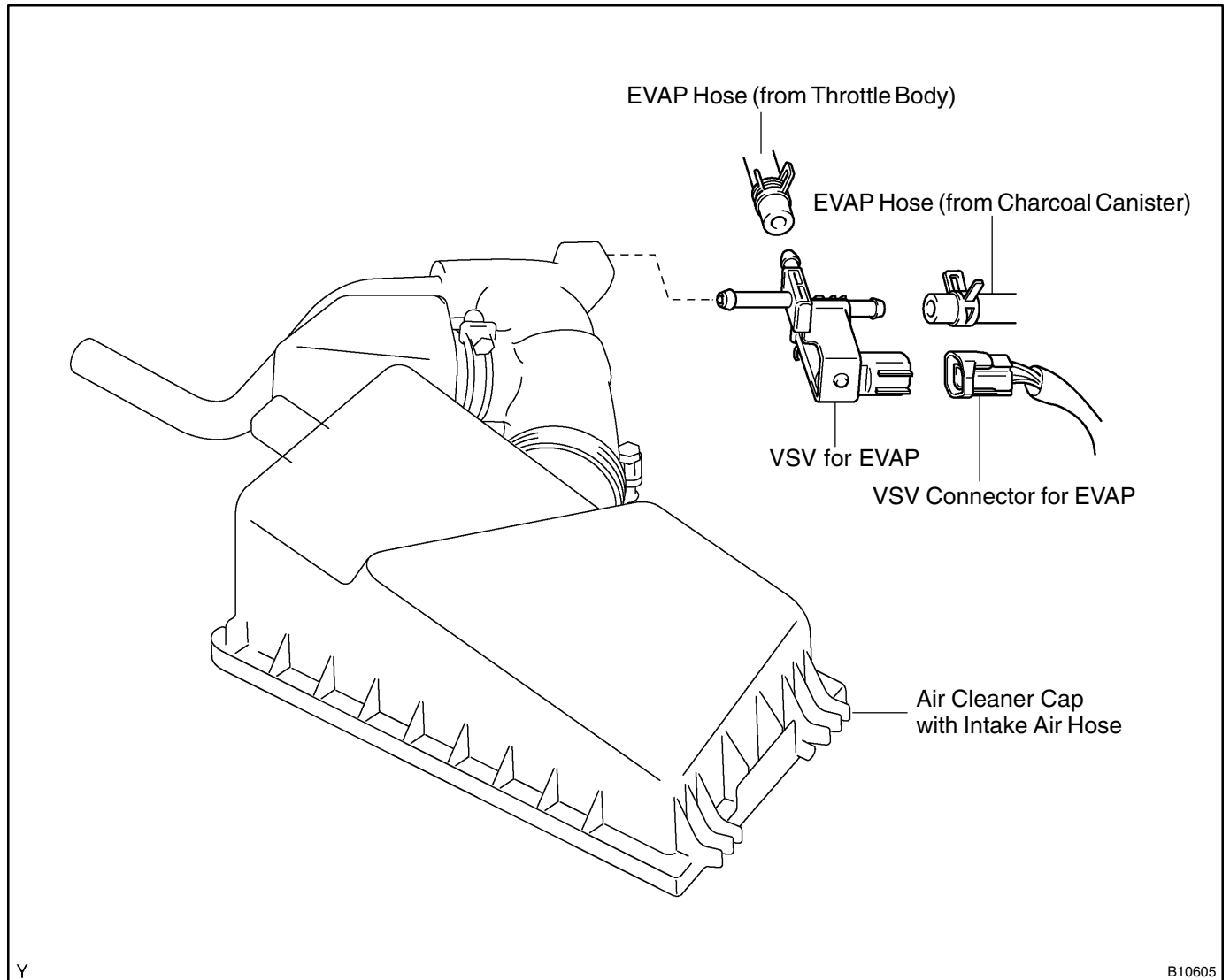
- (3) Check that air flows from port E to port F.

If it is not as specified, replace the VSV.

3. REINSTALL VSV

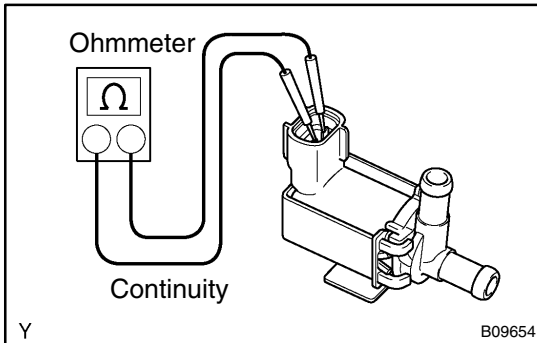
VSV FOR EVAPORATIVE EMISSION (EVAP) COMPONENTS

FI0PC-03



INSPECTION

1. REMOVE VSV



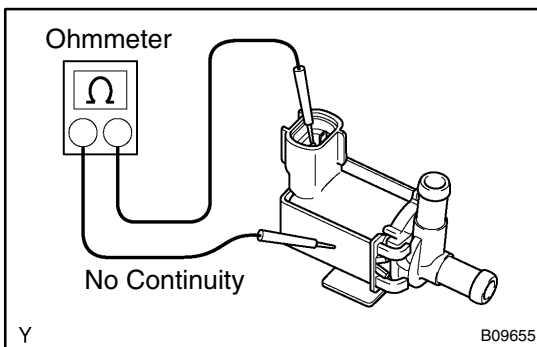
2. INSPECT VSV

- (a) Check the VSV for open circuit.

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

Resistance: 30 – 34 Ω at 20°C (68°F)

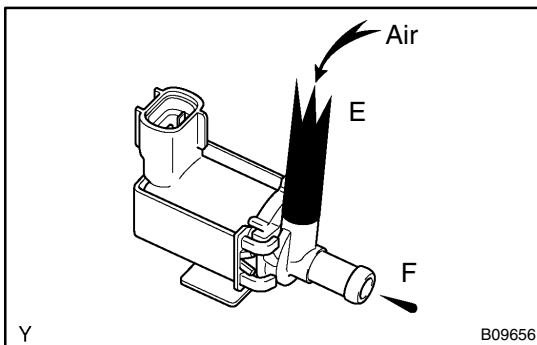
If there is no continuity, replace the VSV.



- (b) Check the VSV for ground.

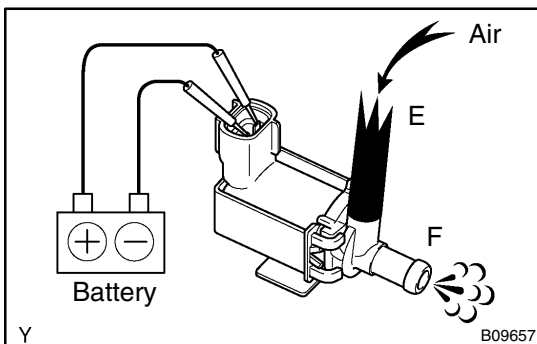
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



- (c) Check the VSV operation.

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



- (2) Apply battery voltage across the terminals.

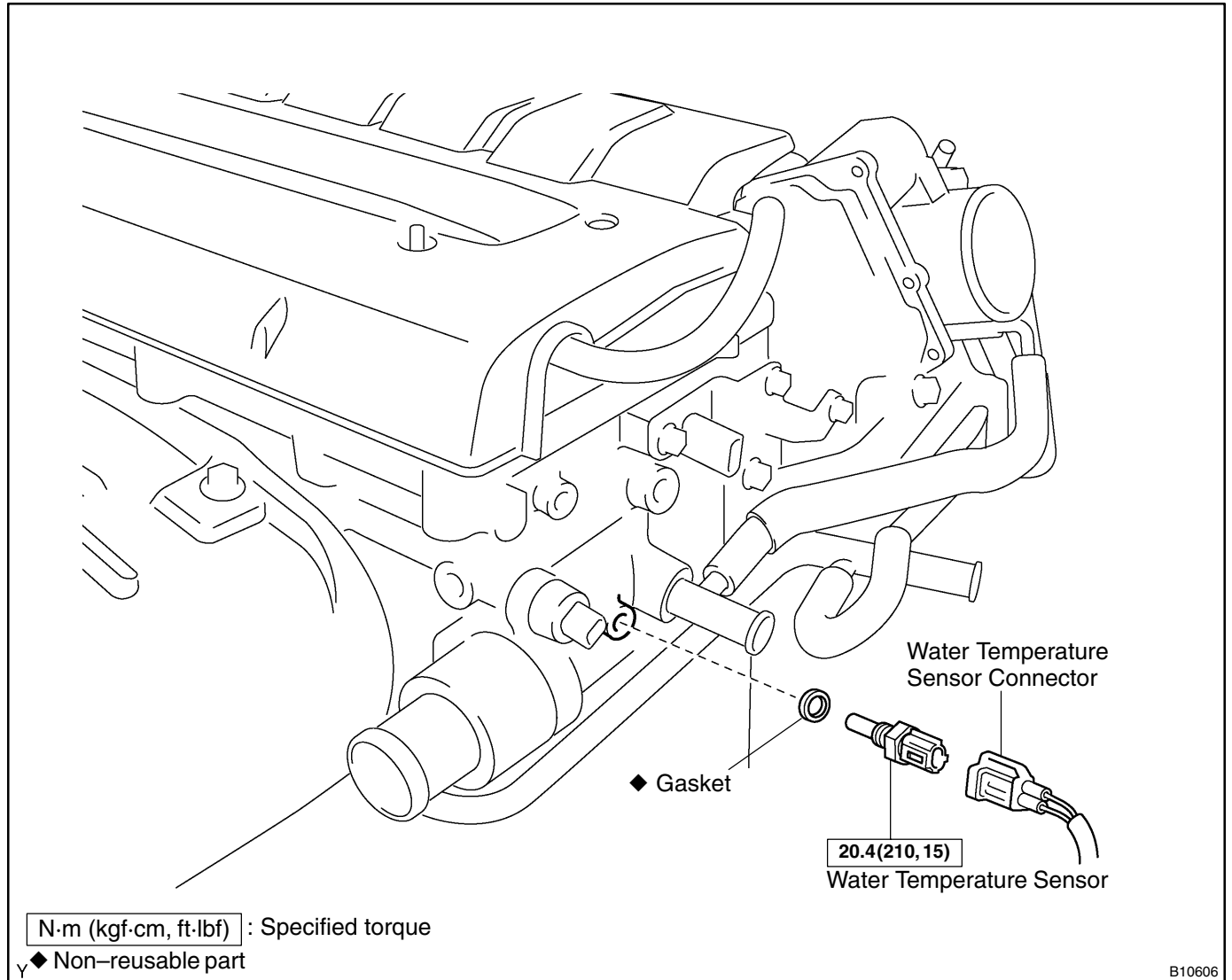
- (3) Check that air flows from port E to port F.

If it is not as specified, replace the VSV.

3. REINSTALL VSV

WATER TEMPERATURE SENSOR COMPONENTS

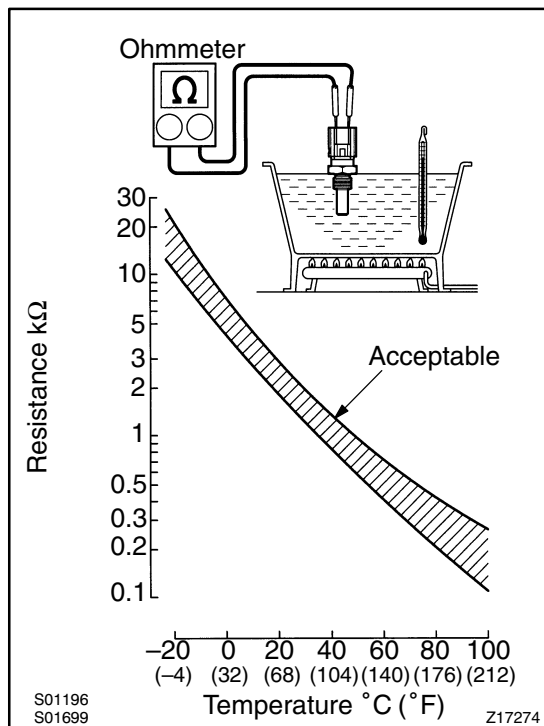
FI0PD-03



B10606

INSPECTION

1. DRAIN ENGINE COOLANT
2. REMOVE WATER TEMPERATURE SENSOR



3. INSPECT WATER TEMPERATURE SENSOR RESISTANCE

Using an ohmmeter, measure the resistance between terminals 1 (E2) and 2 (THW).

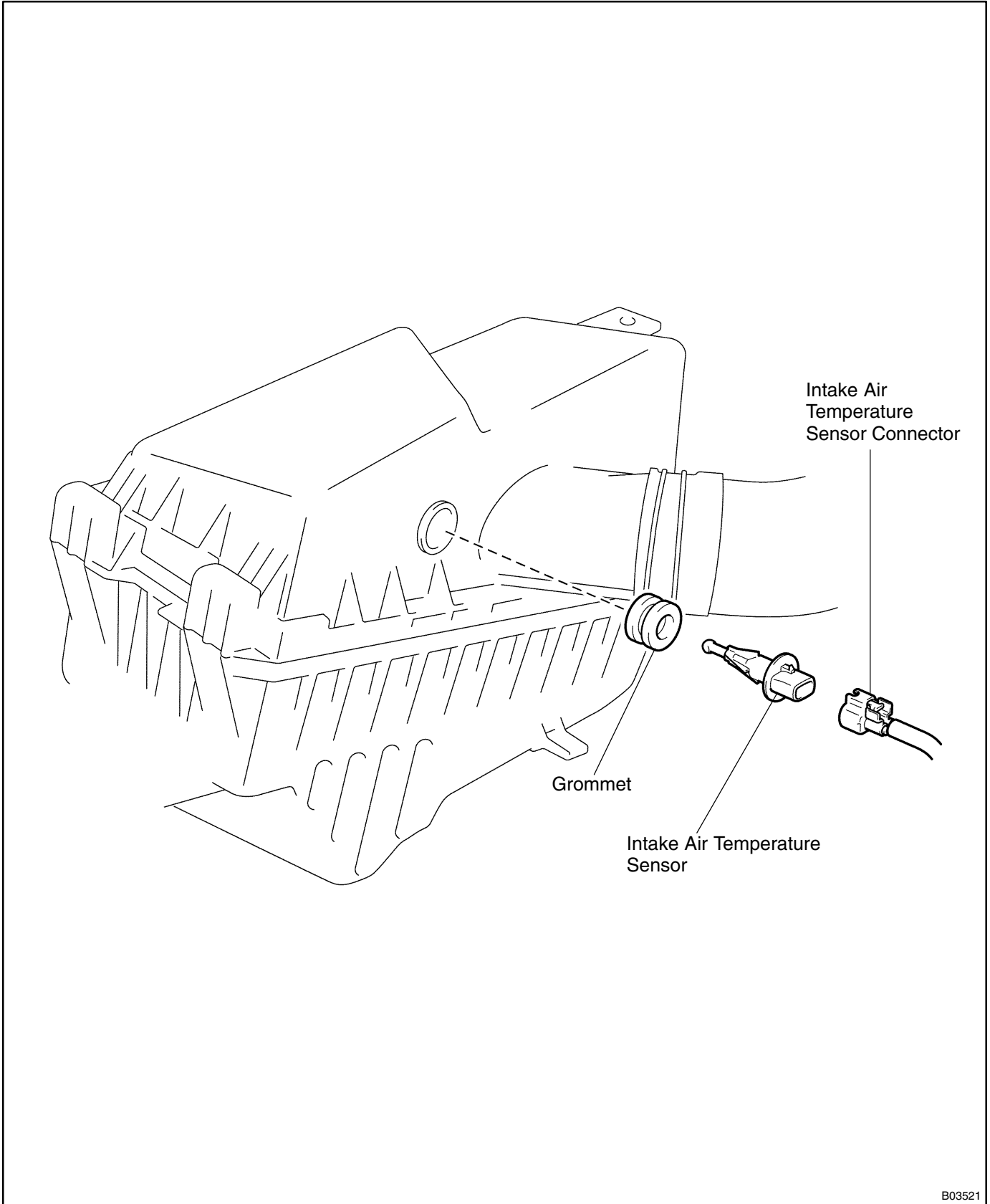
Resistance: Refer to the graph

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

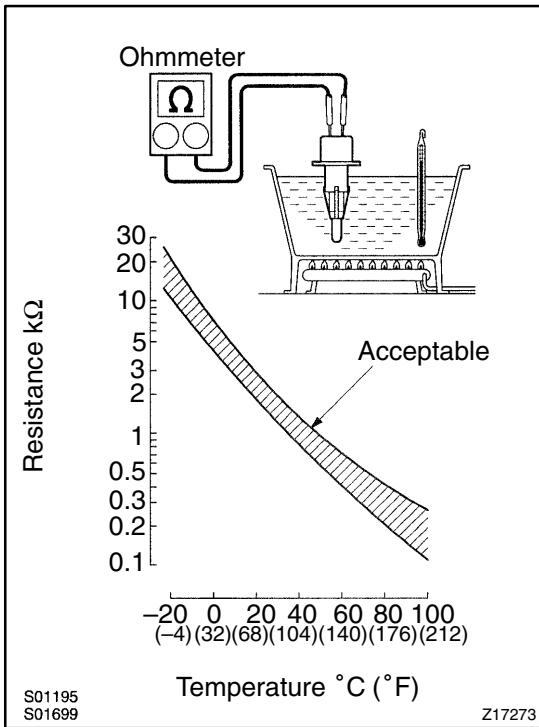
4. REINSTALL WATER TEMPERATURE SENSOR
5. REFILL WITH ENGINE COOLANT

INTAKE AIR TEMPERATURE SENSOR COMPONENTS

FI050-04



B03521



INSPECTION

1. REMOVE INTAKE AIR TEMPERATURE SENSOR
2. INSPECT INTAKE AIR TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

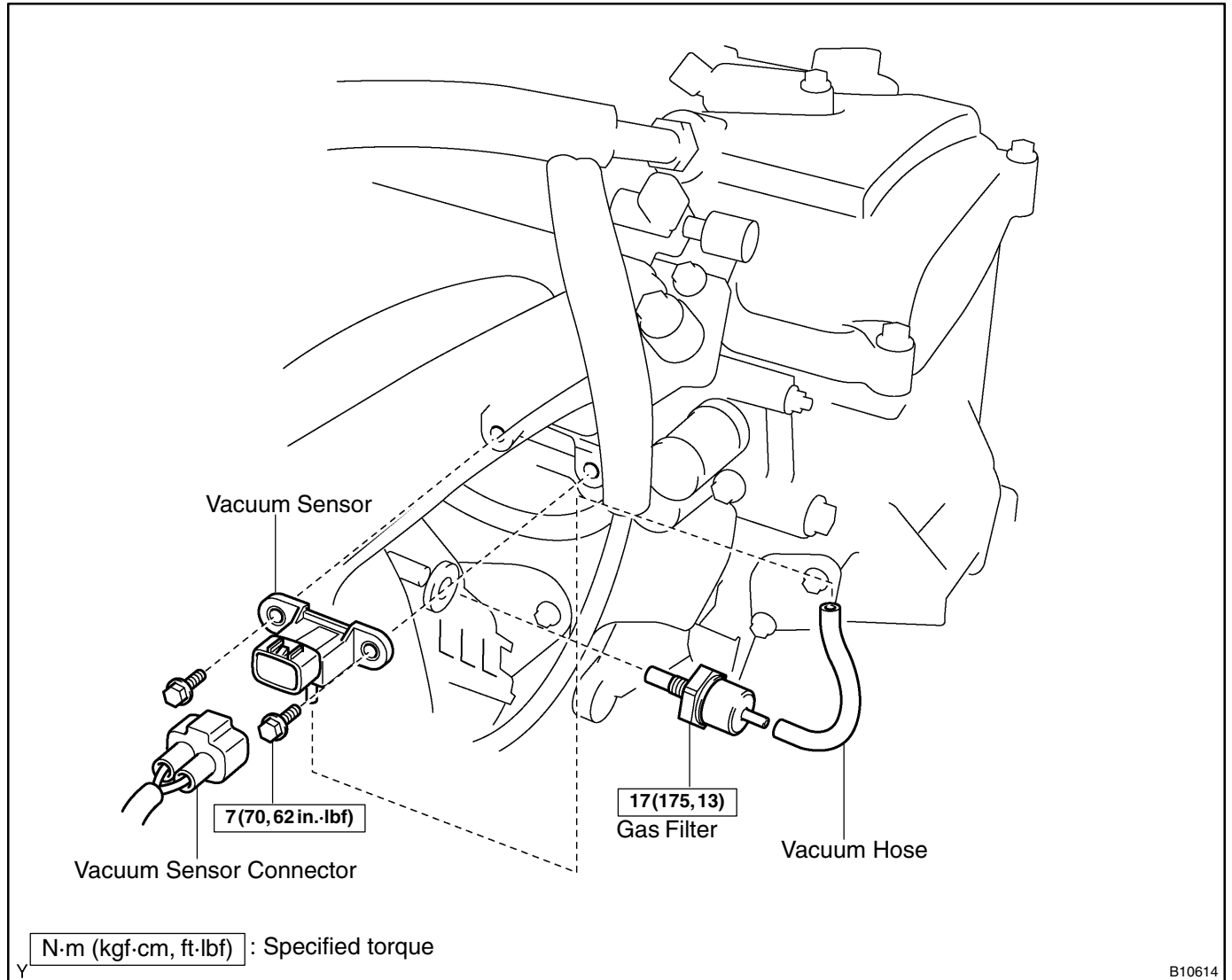
Resistance: Refer to the graph

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

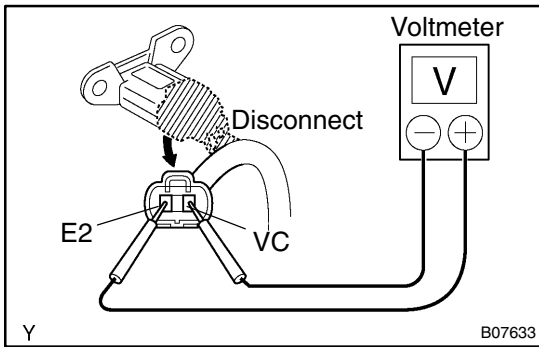
3. REINSTALL INTAKE AIR TEMPERATURE SENSOR

VACUUM SENSOR COMPONENTS

FI0UC-01



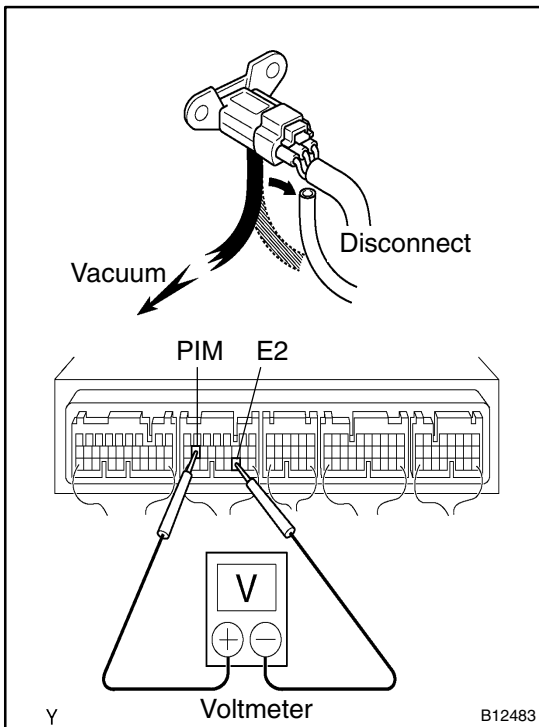
B10614



INSPECTION

1. INSPECT POWER SOURCE VOLTAGE OF VACUUM SENSOR

- (a) Disconnect the vacuum sensor connector.
- (b) Turn the ignition switch ON.
- (c) Using a voltmeter, measure the voltage between connector terminals VC and E2 of the wiring harness side.
Voltage: 4.5 – 5.5 V
- (d) Turn the ignition switch OFF.
- (e) Reconnect the vacuum sensor connector.



2. INSPECT POWER OUTPUT OF VACUUM SENSOR

- (a) Turn the ignition switch ON.
- (b) Disconnect the vacuum hose from the vacuum sensor.
- (c) Connect a voltmeter to terminals PIM and E2 of the engine ECU, and measure the output voltage under ambient atmospheric pressure.
- (d) Apply vacuum to the vacuum sensor in 13.3 kPa (100 mmHg, 3.94 in.Hg) to 66.7 kPa (500 mmHg, 19.69 in.Hg) for each segment.
- (e) Measure the voltage drop from the above step (c) for each segment.

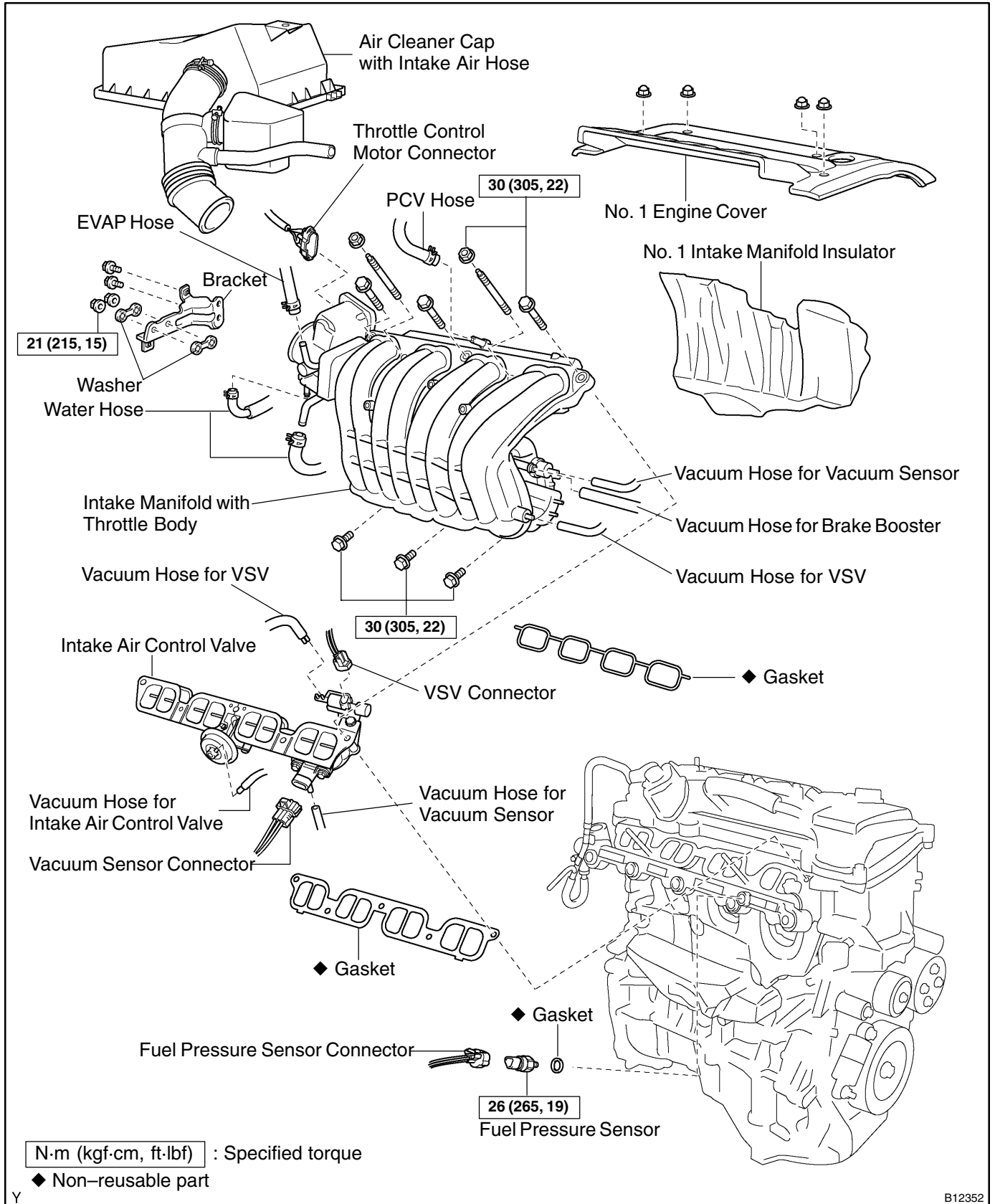
Voltage drop:

Applied vacuum kPa (mmHg, in.Hg)	Voltage drop V
13.3 (100, 3.94)	0.1 – 0.3
26.7 (200, 7.87)	0.7 – 0.9
40.0 (300, 11.81)	1.1 – 1.3
53.5 (400, 15.75)	1.5 – 1.7
66.7 (500, 19.69)	1.9 – 2.1

- (f) Turn the ignition switch OFF.
- (g) Reconnect the vacuum hose to the vacuum sensor.

FUEL PRESSURE SENSOR COMPONENTS

FI0UK-01



Y

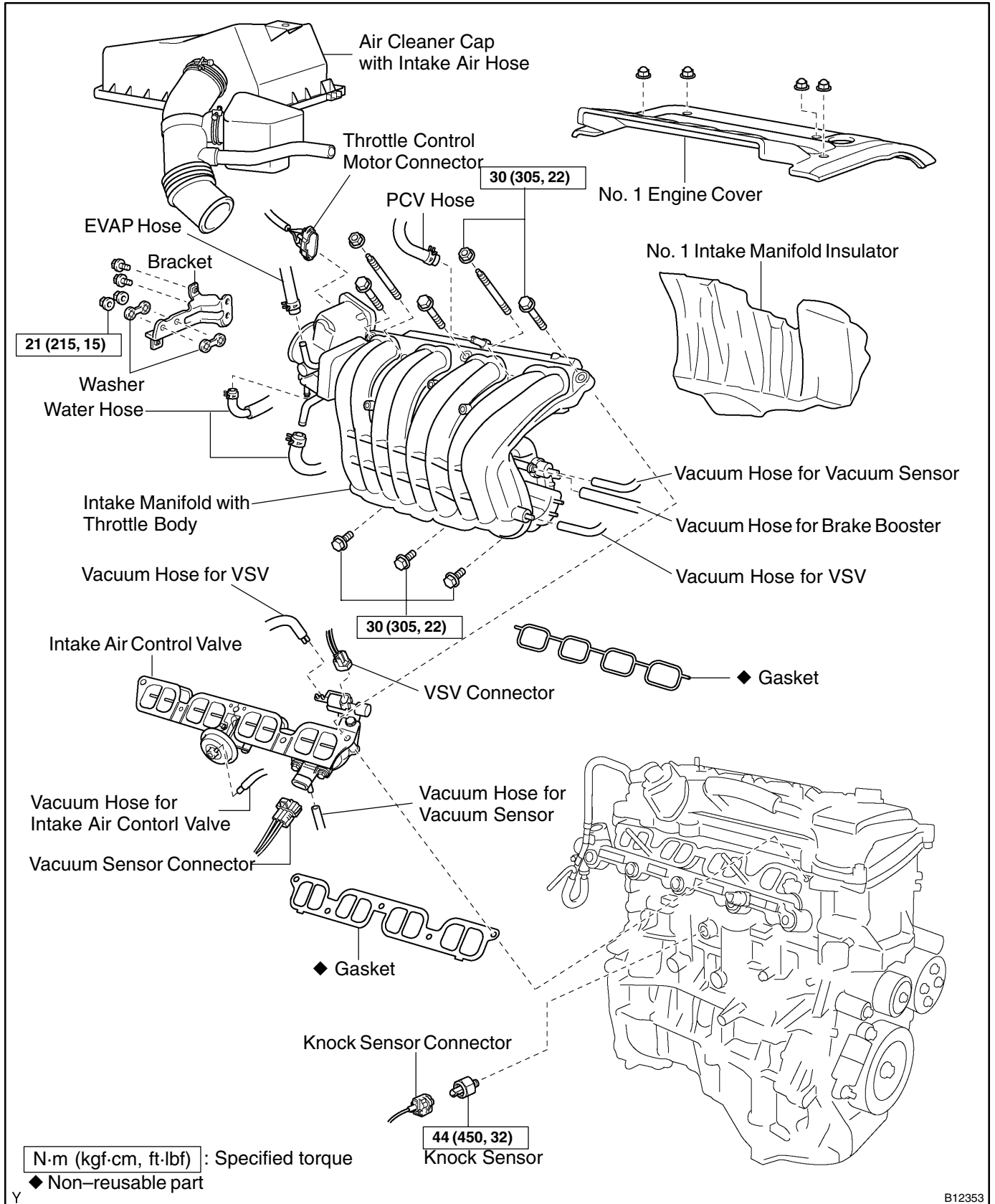
B12352

INSPECTION

INSPECT FUEL PRESSURE SENSOR (See page DI-60)

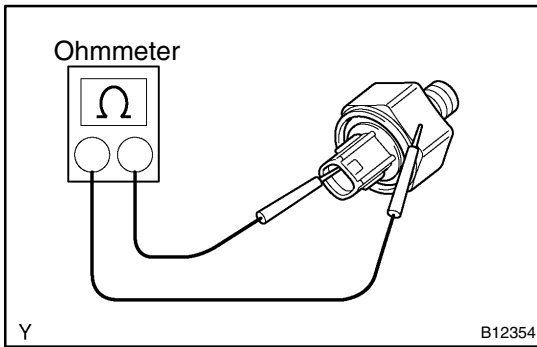
KNOCK SENSOR COMPONENTS

FIGUM-01



Y

B12353



INSPECTION

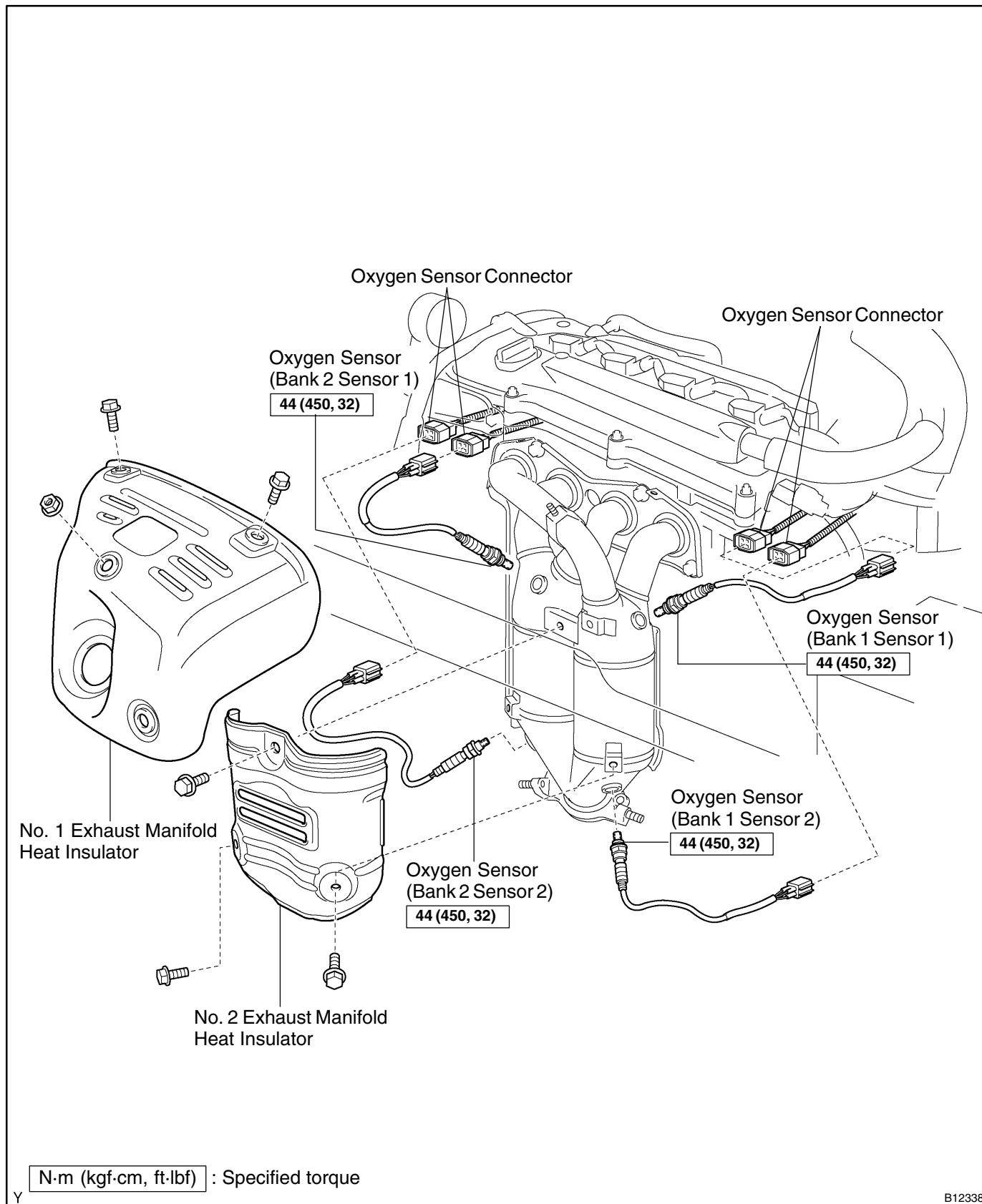
INSPECT KNOCK SENSOR

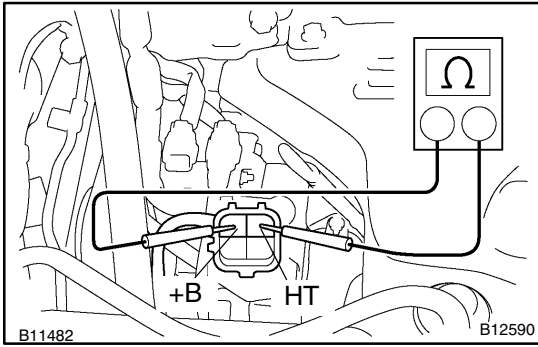
Using an ohmmeter, check that there is continuity between the terminal and body.

If there is continuity, replace the sensor.

OXYGEN SENSOR COMPONENTS

FI0UD-01





INSPECTION

INSPECT HEATER RESISTANCE OF OXYGEN SENSORS

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

Resistance:

20°C (68°F)	11 – 16 Ω
800°C (1,472°F)	23 – 32 Ω

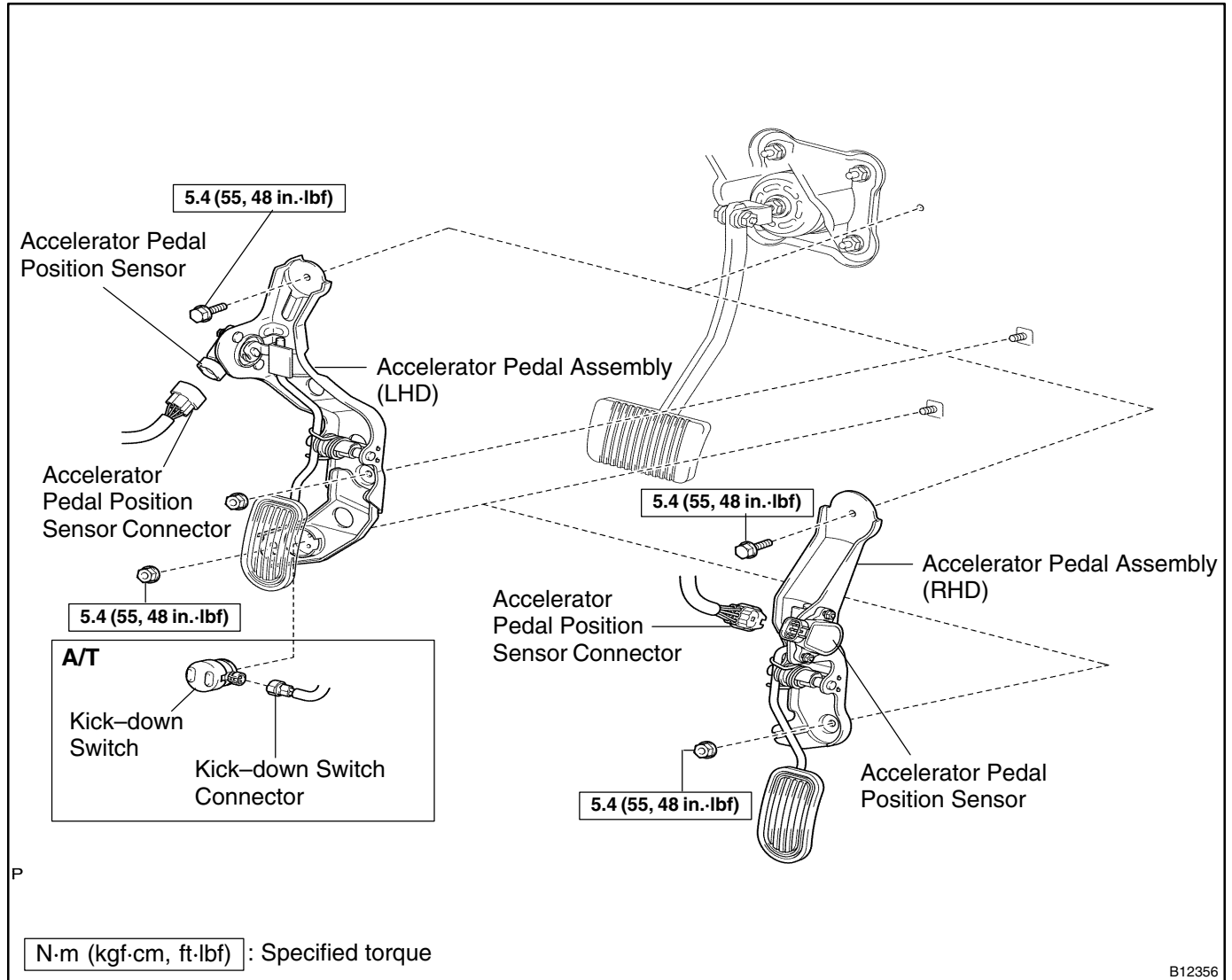
If the resistance is not as specified, replace the sensor.

Torque: 44 N·m (450 kgf·cm, 31 ft·lbf)

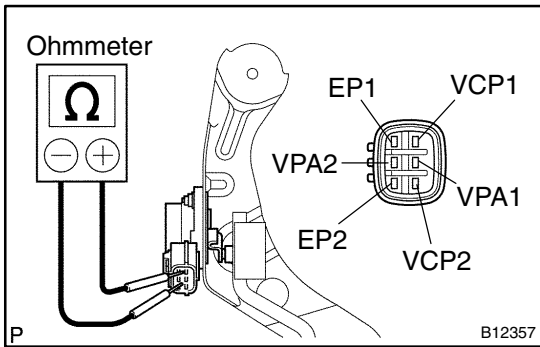
- Reconnect the sensor connector.

ACCELERATOR PEDAL POSITION SENSOR COMPONENTS

FIGUF-01



B12356



INSPECTION

INSPECT ACCELERATOR PEDAL POSITION SENSOR

Using an ohmmeter, measure the resistance between the terminals.

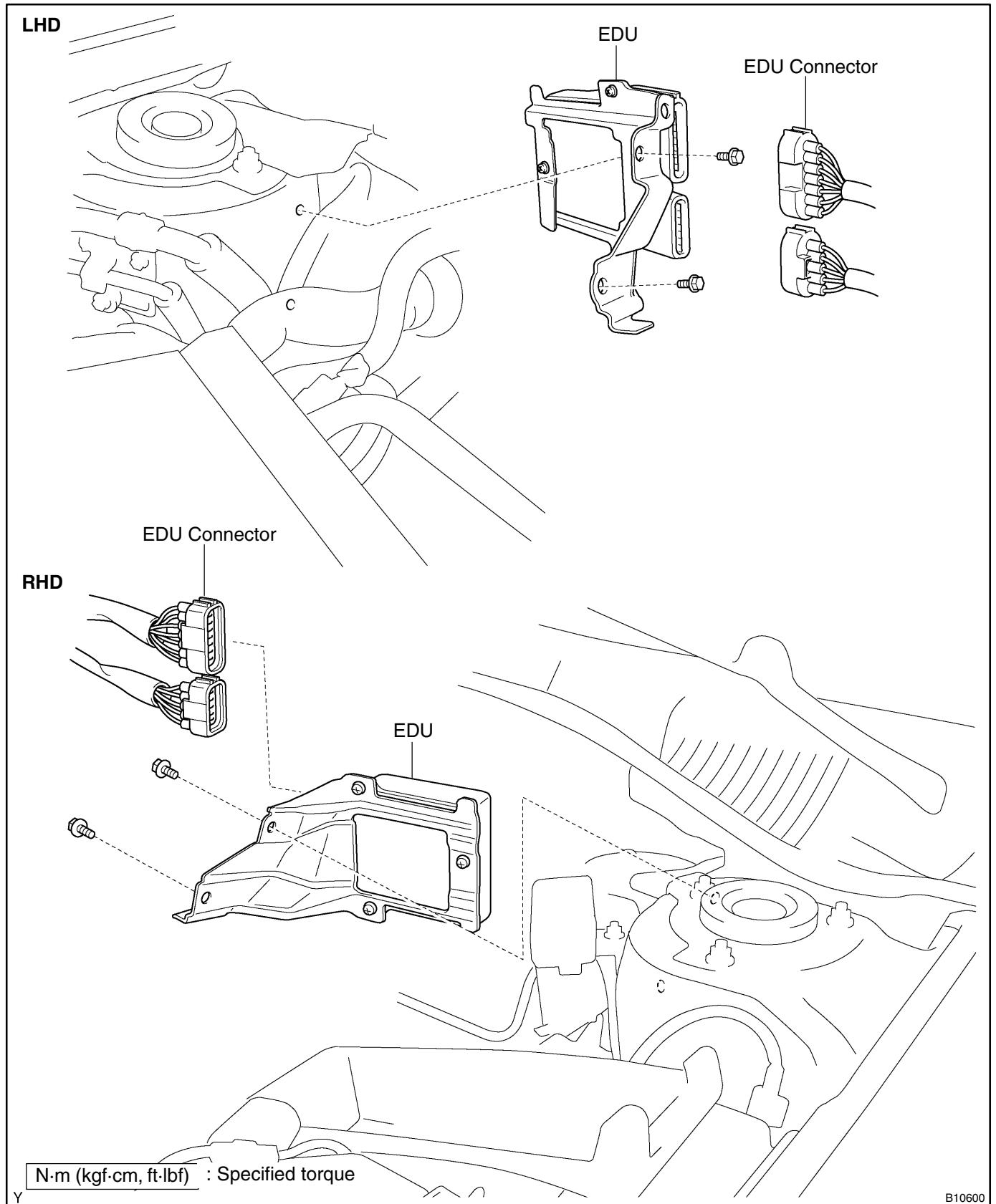
Resistance:

VCP1 – EP1	2.25 – 4.75 kΩ
VCP2 – EP2	2.25 – 4.75 kΩ
VPA1 – VPA2	1 MΩ or more

If the resistance is not specified, replace the accelerator pedal assembly.

ELECTRONIC DRIVER UNIT (EDU) COMPONENTS

FI0UH-01

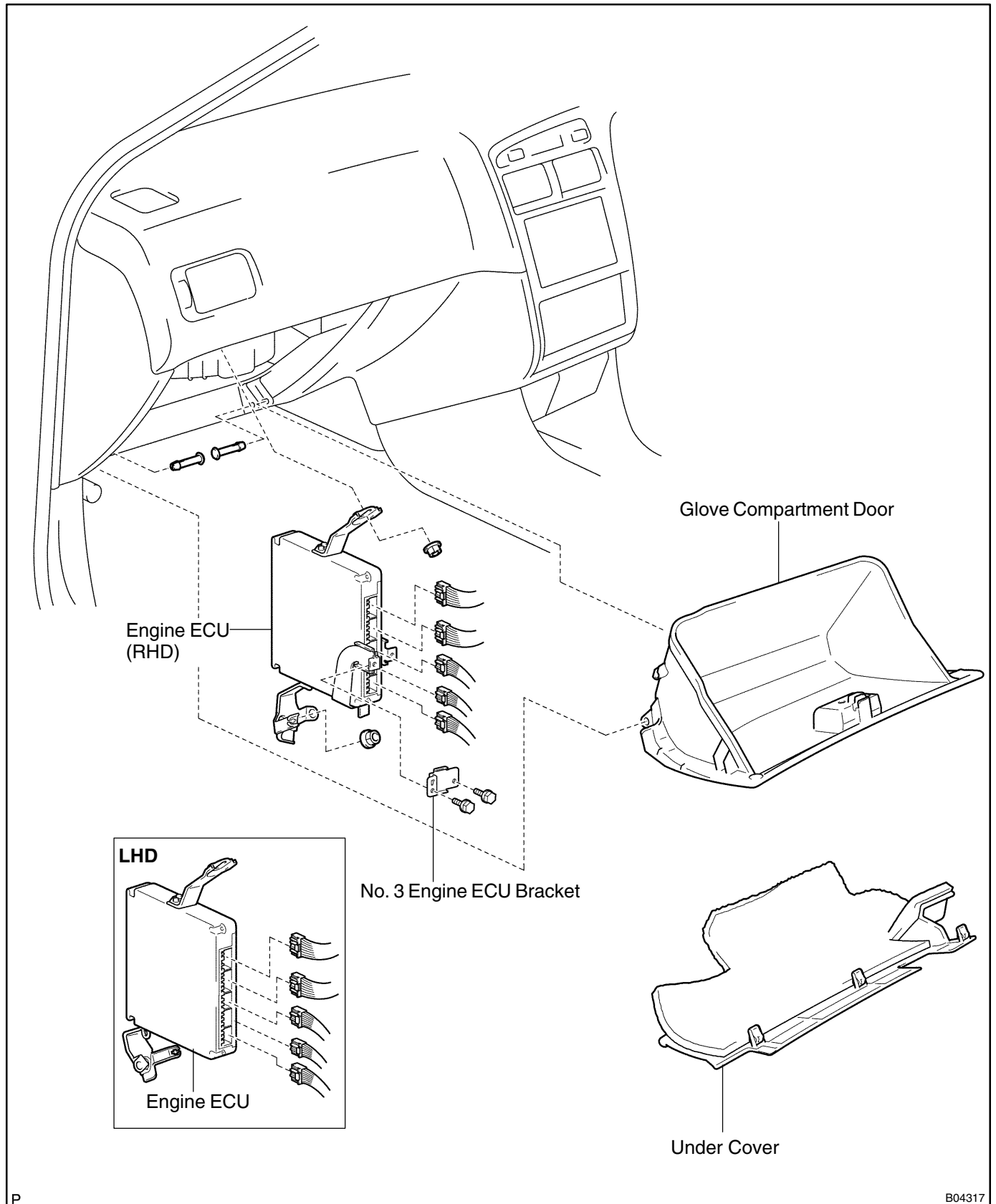


INSPECTION

INSPECT EDU (See page DI-98)

ENGINE ECU COMPONENTS

FI029-06



INSPECTION

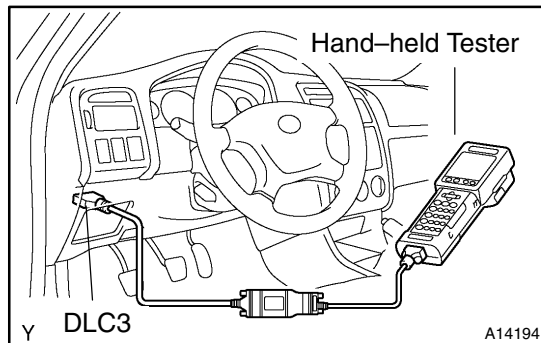
INSPECT ENGINE ECU (See page DI-132)

FUEL CUT RPM INSPECTION

SF1LT-01

1. WARM UP ENGINE

Warm up the engine to the normal operating temperature.



2. CONNECT HAND-HELD TESTER

- (a) Connect a 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 RPM

- (a) Increase the engine speed to at least 3,500 rpm.
- (b) Check the injector operating noise.
- (c) When the accelerator pedal is released, check that the injector operation noise stops momentarily and then resumes.

HINT:

Measure with the A/C OFF.

Fuel cut return rpm:

M/T	1,200 rpm
A/T	1,400 rpm

4. DISCONNECT HAND-HELD TESTER