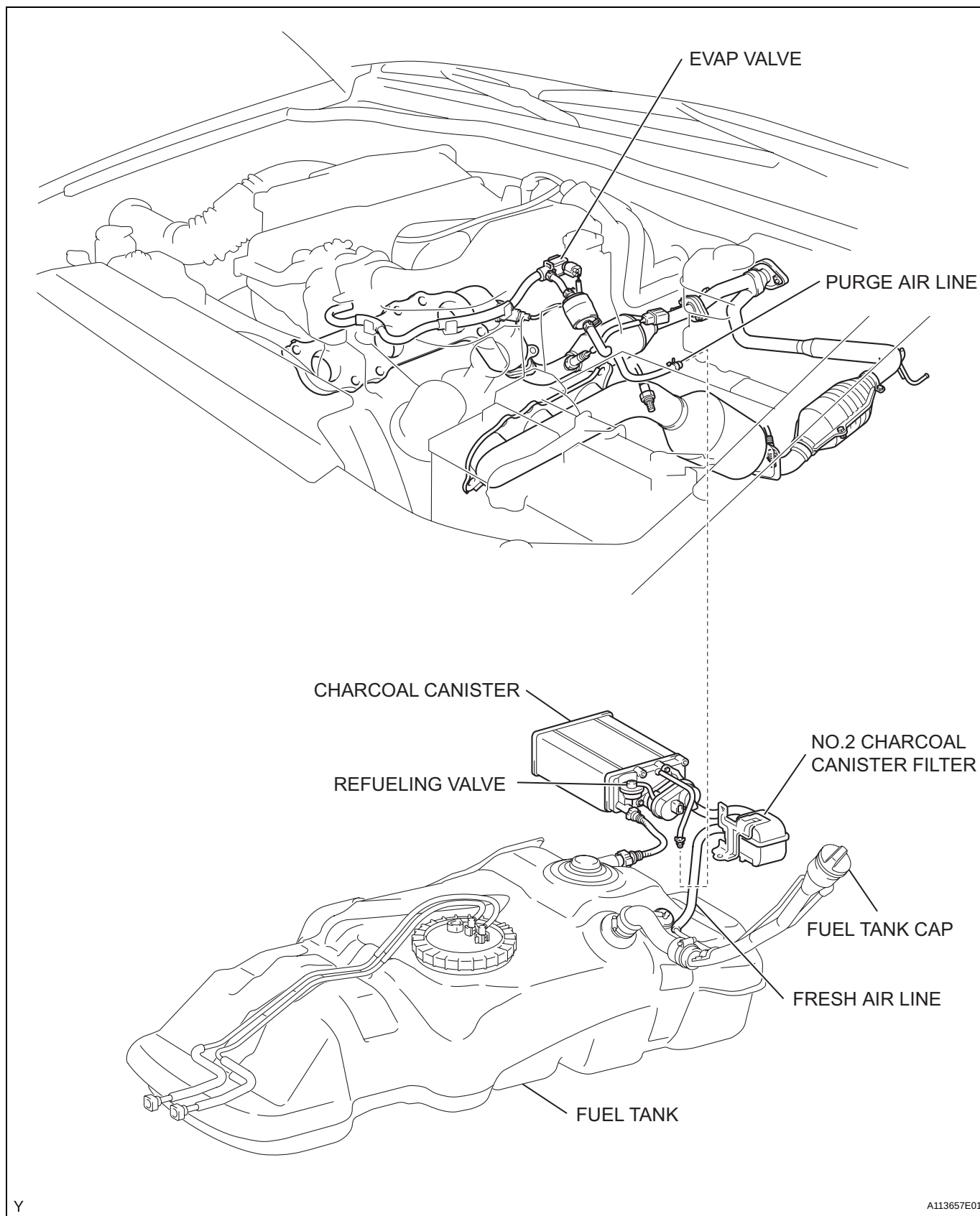
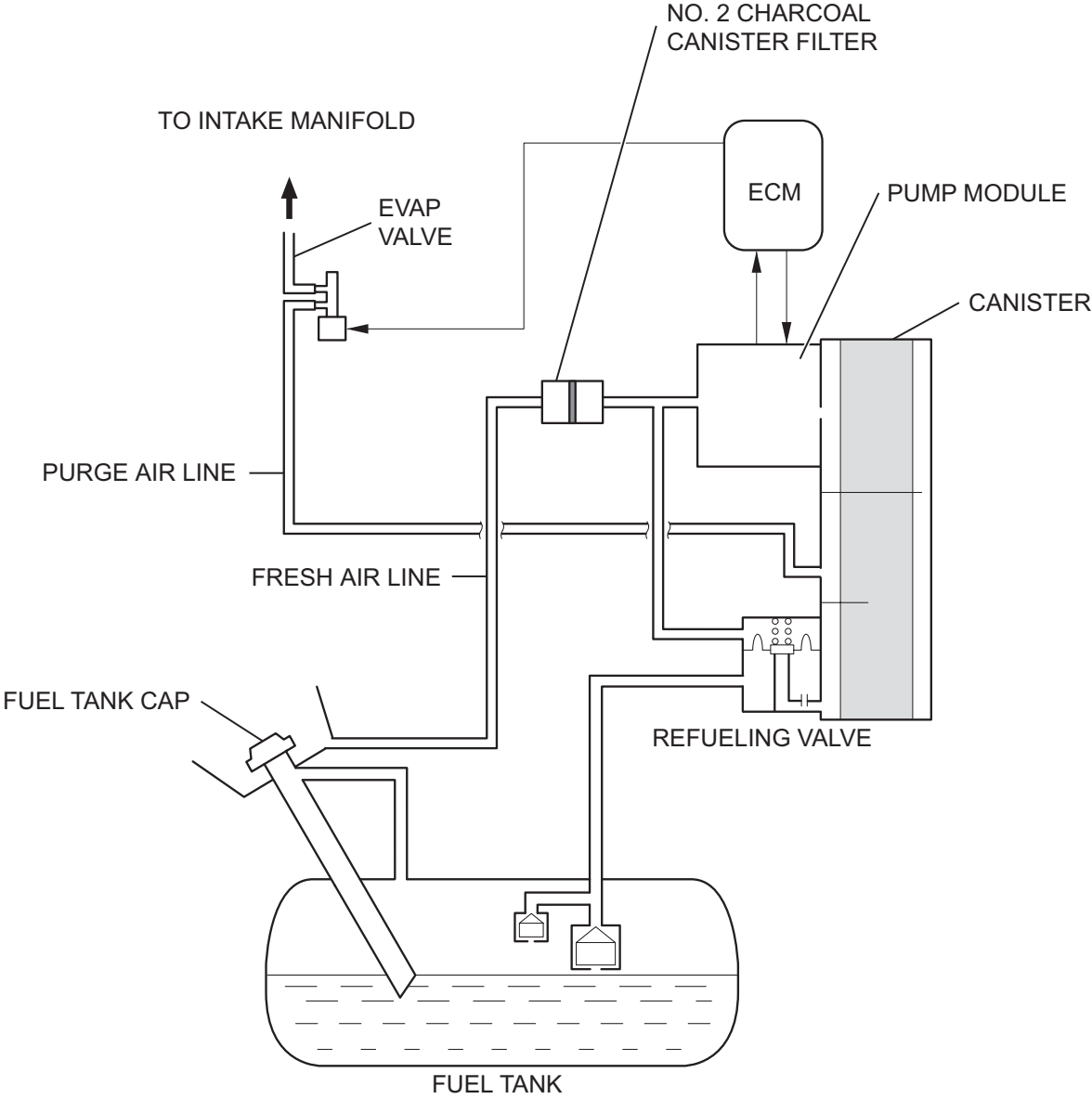


EMISSION CONTROL SYSTEM

PARTS LOCATION

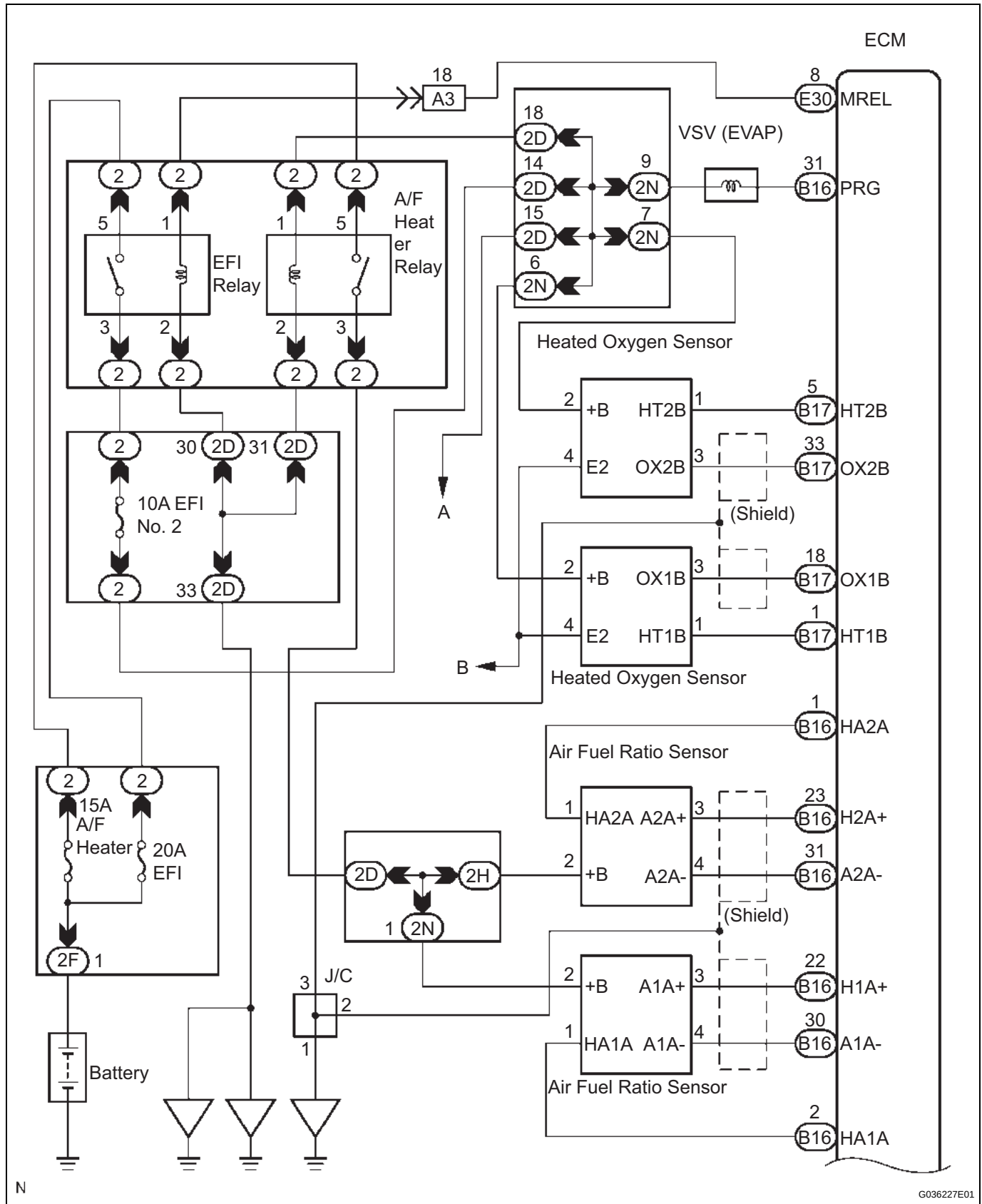


EC

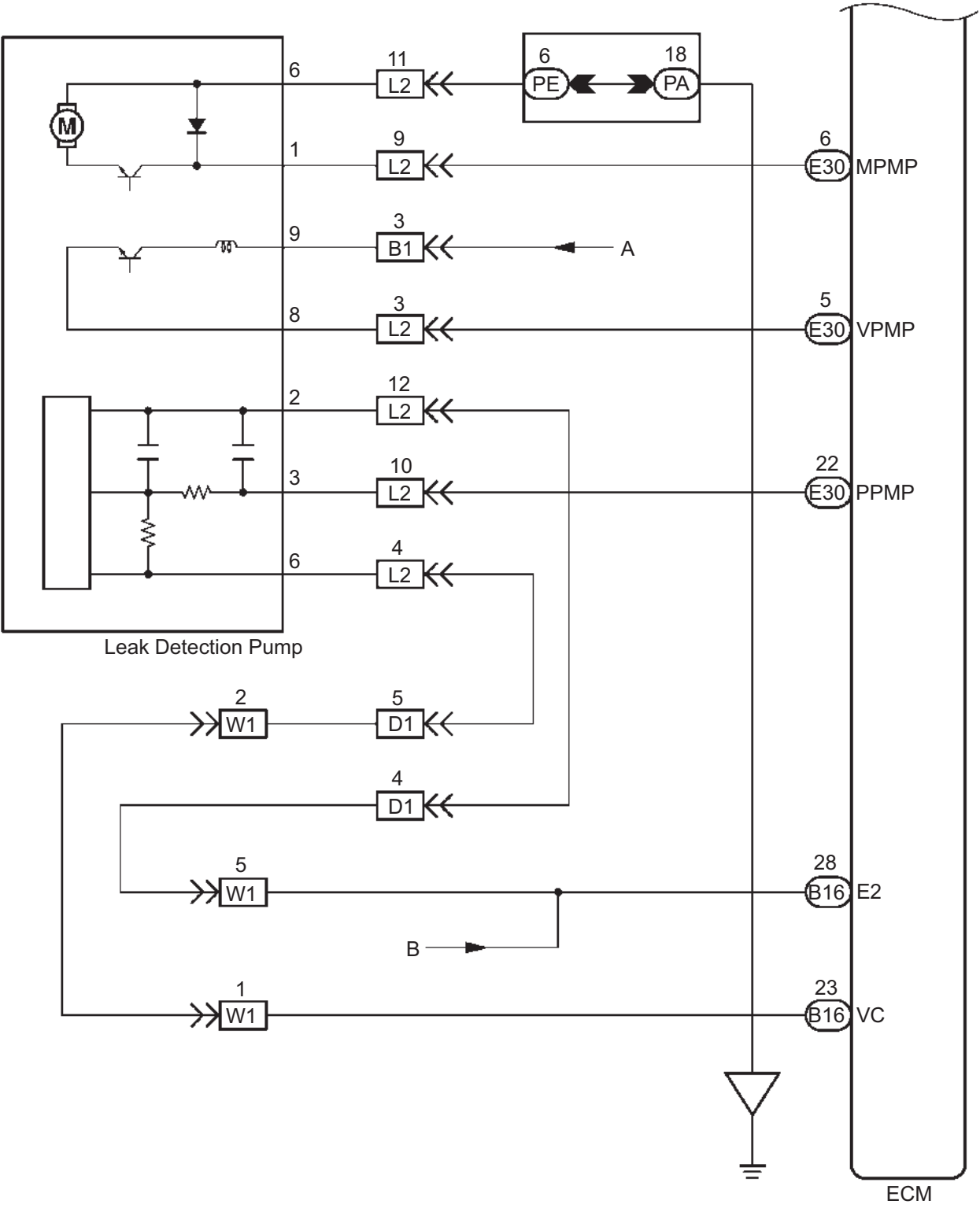


EC

SYSTEM DIAGRAM



EC



EC

ON-VEHICLE INSPECTION

1. INSPECT AIR-FUEL RATIO COMPENSATION SYSTEM

- (a) Measure the voltage between the terminals of the ECM connectors.

Standard

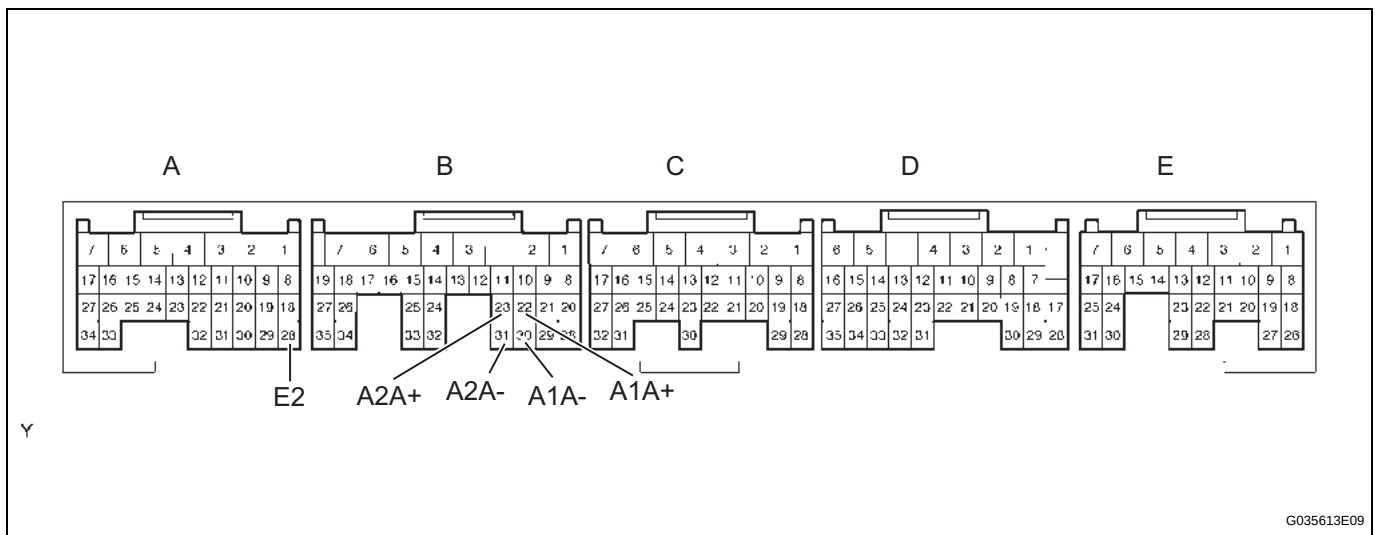
Tester Connection	Condition	Specified Condition
B22 (A1A+) - A28 (E2)	Ignition switch ON	3.3 V
B23 (A2A+) - A28 (E2)	Ignition switch ON	3.3 V
B30 (A1A-) - A28 (E2)	Ignition switch ON	2.9 V
B31 (A2A-) - A28 (E2)	Ignition switch ON	2.9 V

NOTICE:

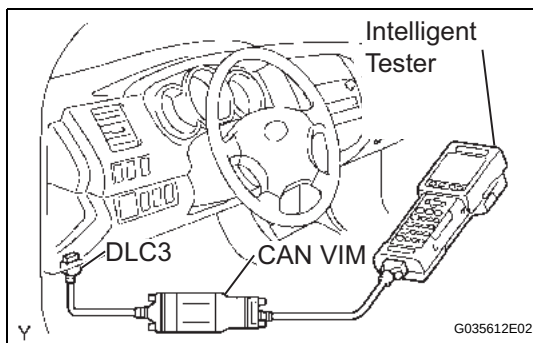
Connect test leads from the back side of the connector. Do not disconnect the connectors from the ECM.

HINT:

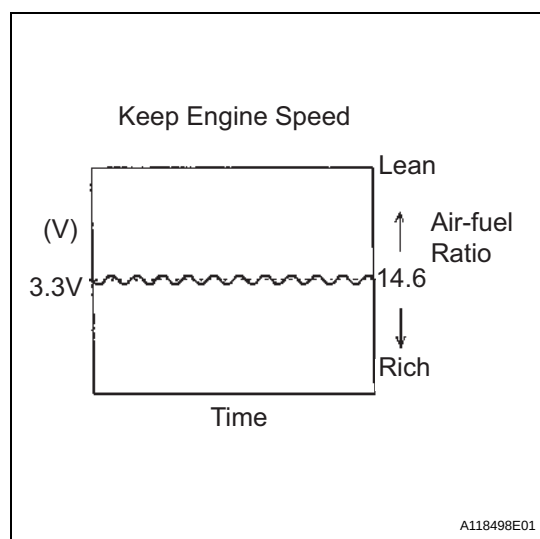
Voltage between the terminals of the ECM is kept constant regardless of the voltage of the A/F sensor.



EC



- (b) Connect the intelligent tester to the DLC3.
 (c) Turn the ignition switch to ON.
 (d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / A/FS B1 S1 and O2S B1 S2.
 (e) Warm up the A/F sensor with the engine speed at 2,500 rpm for approximately 2 minutes.



- (f) Maintain the engine speed at 2,500 rpm and confirm that the display on the intelligent tester, when A/FS B1 S1 is selected, is as shown in the illustration.

HINT:

- The illustration may slightly differ from the display on the intelligent tester.
 - Only the intelligent tester displays the waveform of the A/F sensor.
- (g) Confirm that the waveform displayed on the intelligent tester, when O2S B1 S2 is selected, changes between 0 V and 1 V with the engine speed at 2,500 rpm.

OK:

The voltage output oscillates more than 8 times in 10 seconds.

CAUTION:

- **Perform the check immediately after warming up the engine.**
- **If the voltage variation could not be verified, warm up the heated oxygen sensor again. If it could not be verified even after warming up the sensor again, check the DTC No. (see page 05-498).**

2. INSPECT FUEL CUT OFF RPM

- Increase the engine speed to at least 3,500 rpm.
- Use a sound scope to check for injector operating sounds.
- Check that injector operating sounds stop momentarily and then resume when the accelerator pedal is released.

Fuel cut off rpm:

2,500 rpm

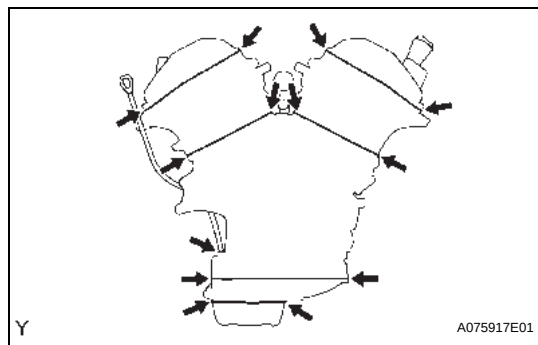
Fuel return rpm:

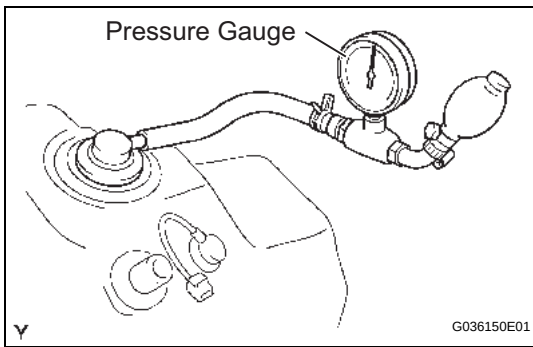
1,400 rpm

3. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

- Check the appearance.
 - Check if the indicated portions of the engine assembly are cracked, leaking or damaged.

HINT:
Disconnection of the engine oil level gauge, oil filler cap, PCV hose, etc. may cause the engine to run improperly. Disconnected, loose or cracked parts in the air induction system between the throttle body and cylinder head will allow air suction and cause the engine to run improperly.
If necessary, repair the engine assembly.





4. INSPECT FUEL CUTOFF VALVE AND FILL CHECK VALVE

- Remove the fuel tank (see page [FU-30](#)).
- Connect the pressure gauge to the vent hose port.
- Install the fuel tank with the vent hose disconnected.
- Fill the fuel tank with fuel.
- Apply pressure at 4 kPa (41 gf/cm², 0.58 psi) to the vent port of the fuel tank.

HINT:

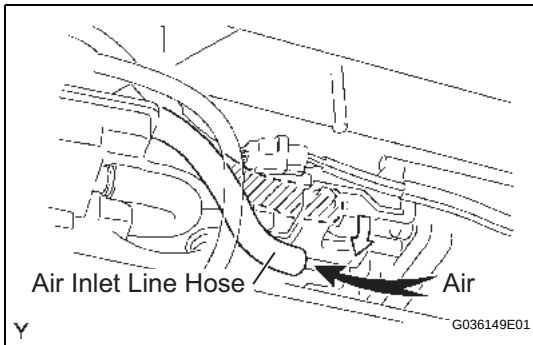
Check the amount of fuel left in the fuel tank.

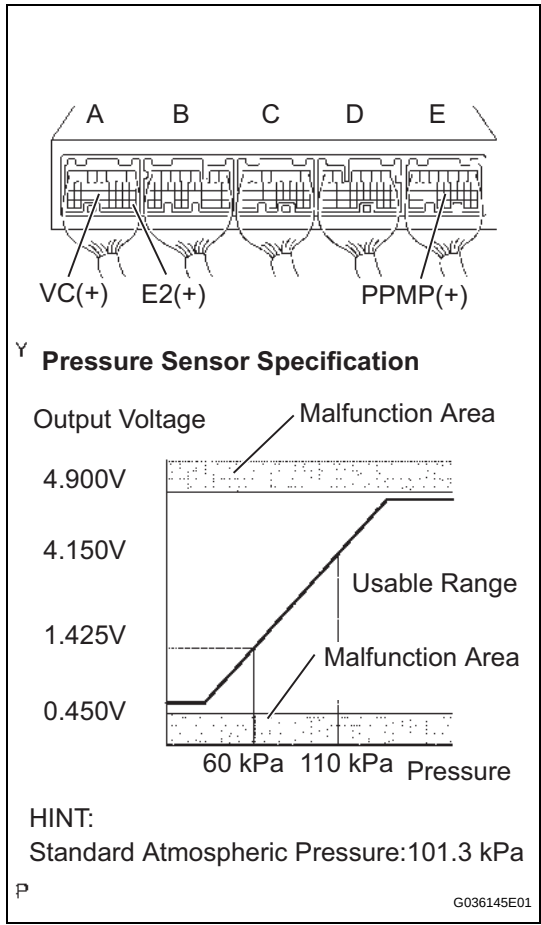
- Remove the fuel tank cap, and check that the pressure decreases.
If the pressure does not decrease, replace the fuel tank assembly.
- Reconnect the vent line hose to the fuel tank.



5. CHECK AIR INLET LINE

- Disconnect the air inlet line hose from the charcoal canister.
- Check that air flows freely into the air inlet line.
If air does not flow freely into the air inlet line, repair or replace the air inlet line.
- Reconnect the air inlet line hose to the charcoal canister.

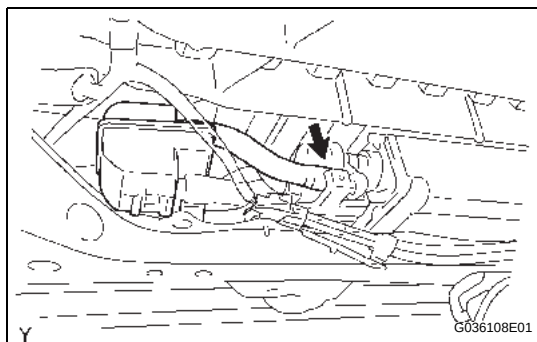
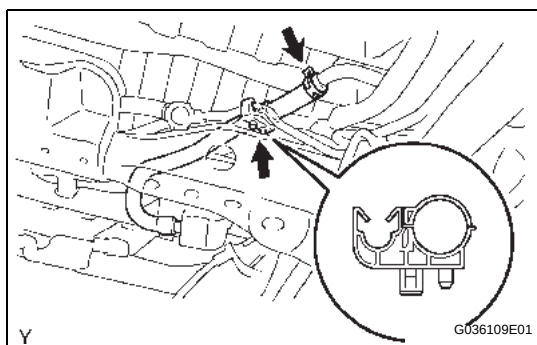
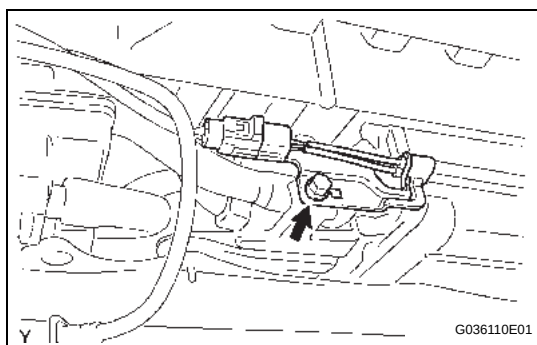




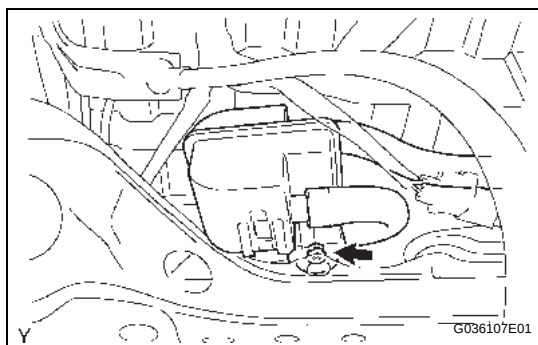
CANISTER

REMOVAL

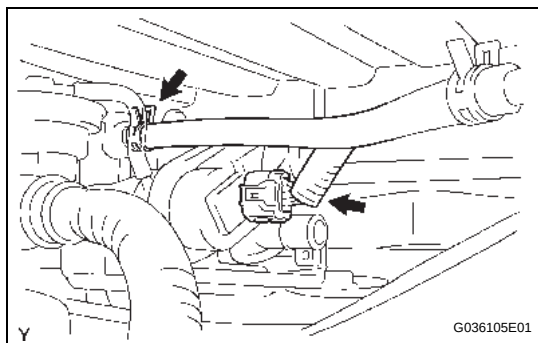
1. **DISCHARGE FUEL SYSTEM PRESSURE**
(See page [FU-1](#))
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
3. **REMOVE FUEL TANK PROTECTOR SUB-ASSEMBLY NO.1**
4. **DISCONNECT FUEL TANK MAIN TUBE AND FUEL TANK RETURN TUBE** (See page [FU-30](#))
5. **REMOVE FUEL TANK ASSEMBLY** (See page [FU-30](#))
6. **REMOVE CHARCOAL CANISTER FILTER NO.2**
 - (a) Remove the bolt, then remove the ABS wire harness clamp from the charcoal canister.



- (b) Release the EVAP pipe from the hose clamp.
 - (c) Disconnect the breather hose from the pipe.
 - (d) Disengage the hose clamp.
-
- (e) Disconnect the breather hose from the charcoal canister.

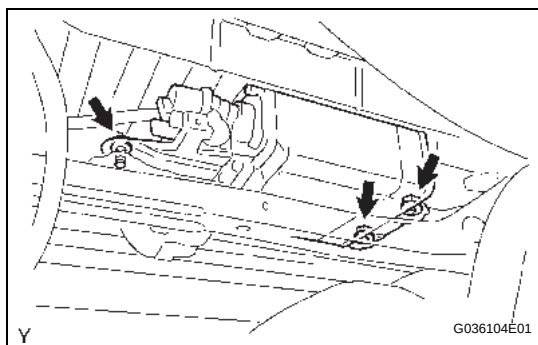


- (f) Remove the nut, then remove the charcoal canister filter No. 2.

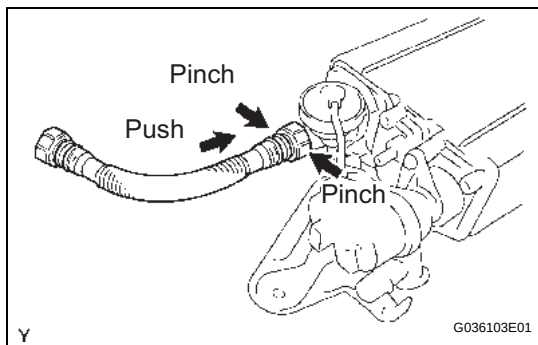


7. REMOVE CHARCOAL CANISTER ASSEMBLY

- (a) Disconnect the connector.
(b) Disconnect the EVAP tube.



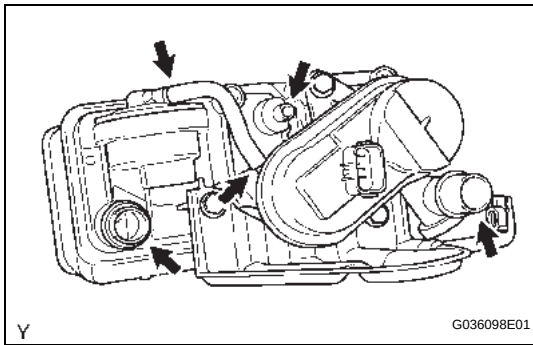
- (c) Remove the bolt and 2 nuts, then remove the charcoal canister.



- (d) Disconnect the fuel tank vent hose.
(1) Pinch the retainer and pull the fuel tank vent hose connector out of the charcoal canister to disconnect the fuel tank vent hose from the charcoal canister.

NOTICE:

- Remove any dirt and foreign objects from the fuel tank vent hose connector before performing the work.
- Do not allow any scratches or foreign objects on the parts when disconnecting, as the fuel tank vent hose connector has the O-ring that seals the pipe.
- Perform the work by hand. Do not use any tools.
- Do not forcibly bend, twist or turn the nylon tube.
- Protect the disconnected part by covering it with a vinyl bag after disconnecting the fuel tank vent hose.
- If the fuel vent connector and pipe are stuck, push and pull them to release.

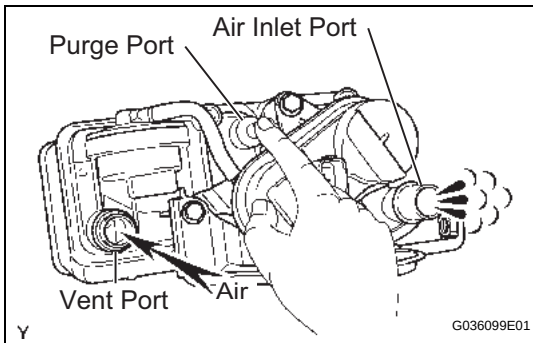


INSPECTION

1. INSPECT CHARCOAL CANISTER ASSEMBLY

- (a) Visually check the charcoal canister for cracks and damage.

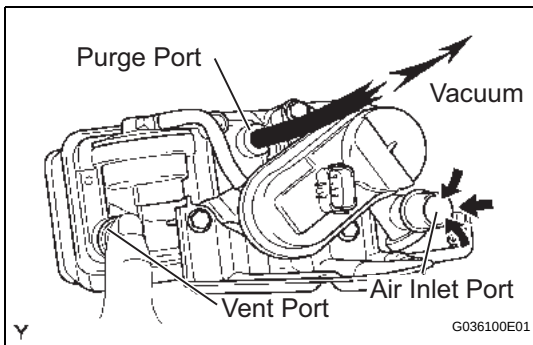
If there is any cracks or damage, replace the charcoal canister assembly.



- (b) Check the charcoal canister operation.

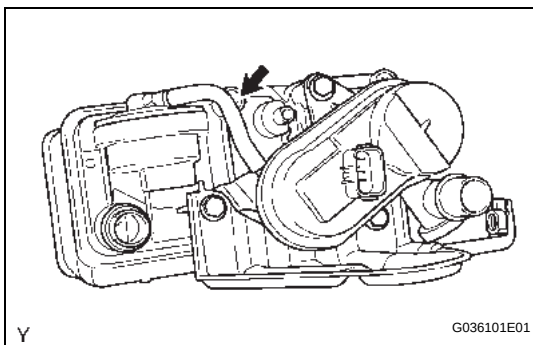
- (1) While holding the purge port closed, blow air at 1.67 kPa (17.0 gf/cm², 0.24 psi) into the vent port, and check that the air flows from the air inlet port.

If the result is not as specified, replace the charcoal canister assembly



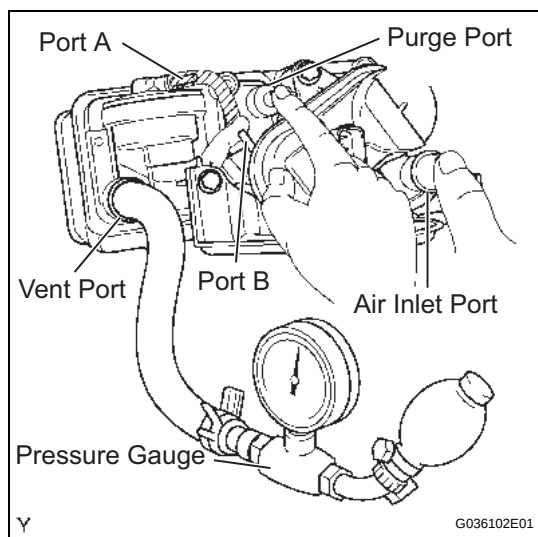
- (2) While holding the vent port closed, apply a vacuum of 1.10 kPa (8.3 mmHg, 0.32 in.Hg) into the purge port, and check that the air flows from the air inlet port.

If the result is not as specified, replace the charcoal canister assembly



- (c) Check for air leakage.

- (1) Remove the air hose between ports A and B.

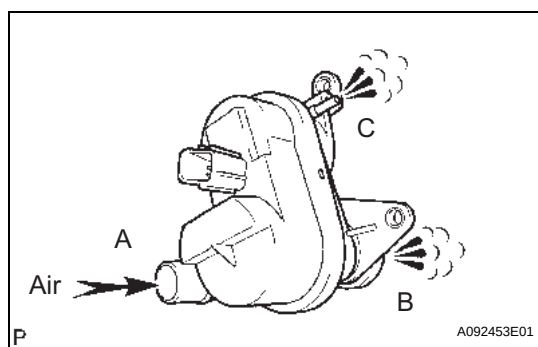


- (2) Connect the pressure gauge to the vent port of the charcoal canister.

SST 09992-00242

- (3) While holding port B, the purge port and air inlet port closed with your fingers, leave port A open and apply pressurized air at 19.6 kPa (0.2 kgf/cm², 2.81 psi) into the vent port. Check that the pressure is retained.

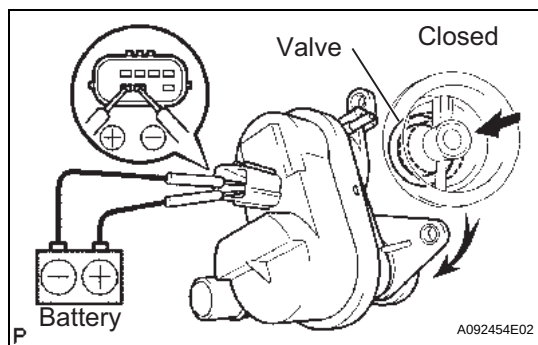
If the result is not as specified, replace the charcoal canister assembly



- (d) Check the leak detection pump.

- (1) Check that air flows from port A to ports B and C.

If the result is not as specified, replace the pump module.



- (2) Apply battery positive voltage across the terminals.

- (3) Check that the valve is closed.

If the result is not as specified, replace the pump module.

INSTALLATION

1. INSTALL CHARCOAL CANISTER ASSEMBLY

- (a) Connect the fuel tank vent hose.
 - (1) Align the fuel tank vent hose connector with the pipe, then push in the fuel tank vent connector until the retainer makes a "click" sound to connect the fuel tank vent hose to the charcoal canister.

NOTICE:

- Check that there are no scratches or foreign objects on the disconnected parts of the fuel tank vent connector and pipe before performing the work.
- After connecting the fuel tank vent hose, check that the fuel tank vent hose is securely connected by pulling the quick connector.

- (b) Install the charcoal canister with the bolt and 2 nuts.
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)
- (c) Connect the EVAP tube.
- (d) Connect the connector.

2. INSTALL CHARCOAL CANISTER FILTER NO.2

- (a) Install the charcoal canister filter No. 2 with the nut.
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)
- (b) Connect the breather hose to the charcoal canister.
- (c) Engage the clamp.
- (d) Connect the breather hose to the pipe.
- (e) Connect the EVAP pipe to the clamp.
- (f) Install the ABS wire harness clamp with the bolt.
Torque: 14 N*m (142 kgf*cm, 10 ft.*lbf)

3. INSTALL FUEL TANK ASSEMBLY (See page [FU-35](#))

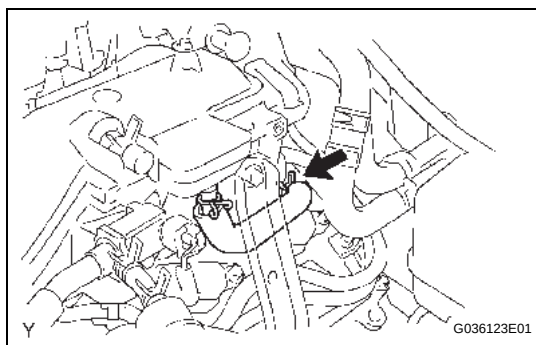
4. CONNECT FUEL TANK MAIN TUBE AND FUEL TANK RETURN TUBE (See page [FU-36](#))

5. INSTALL FUEL TANK PROTECTOR SUB-ASSEMBLY NO.1 (for Off Road Package) (See page [FU-36](#))

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

7. CHECK FOR FUEL LEAKAGE

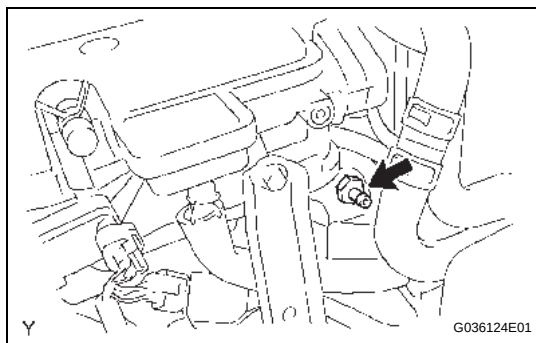


VENTILATION VALVE

REMOVAL

1. REMOVE VENTILATION VALVE SUB-ASSEMBLY
 - (a) Disconnect the ventilation hose.

- (b) Remove the ventilation valve.



INSPECTION

1. INSPECT VENTILATION VALVE SUB-ASSEMBLY

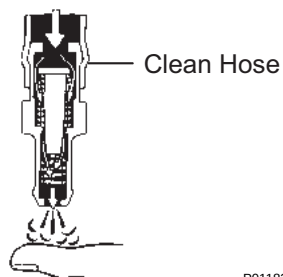
- (a) Check the operation.
 - (1) Install a clean hose as shown in the illustration.
 - (2) Blow air into the cylinder head side and check that the air passes through freely.

CAUTION:

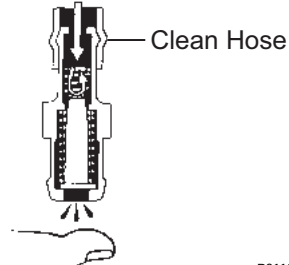
Do not suck air through the ventilation valve. Petroleum substances inside the ventilation valve are harmful.

- (3) Blow air into the intake manifold side and check that the air does not pass through freely. If the operation is not as specified, replace the ventilation valve.

Cylinder Head Side



Intake Manifold Side



INSTALLATION

1. INSTALL VENTILATION VALVE SUB-ASSEMBLY

- (a) Install the ventilation valve.

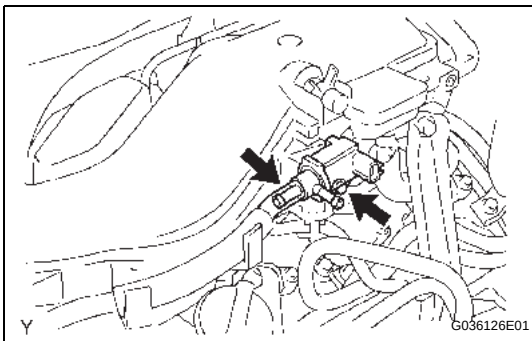
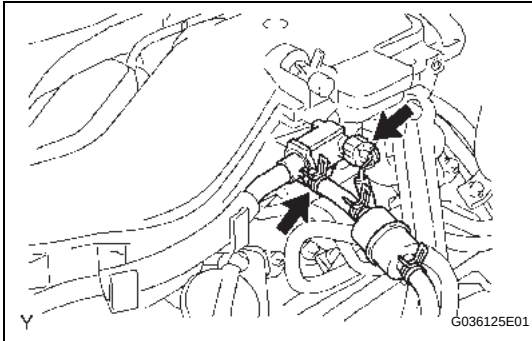
Torque: 27 N*m (275 kgf*cm, 20 ft.*lbf)

- (b) Connect the ventilation hose.

DUTY VACUUM SWITCHING VALVE

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
2. REMOVE V-BANK COVER (See page [ES-414](#))
3. REMOVE DUTY VACUUM SWITCHING VALVE
 - (a) Disconnect the connector.
 - (b) Disconnect the fuel vapor feed hose.



- (c) Remove the bolt, then separate the vacuum switching valve from the intake air surge tank.
- (d) Disconnect the hose, then remove the vacuum switching valve.

EC

INSPECTION

1. INSPECT DUTY VACUUM SWITCHING VALVE
 - (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Standard

Tester Connection	Specified Condition
1 - 2	26 to 30 Ω at 20°C (68°F)

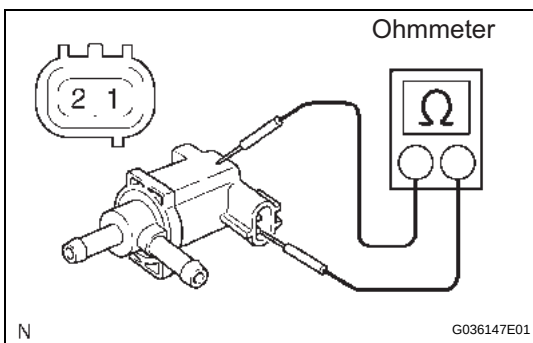
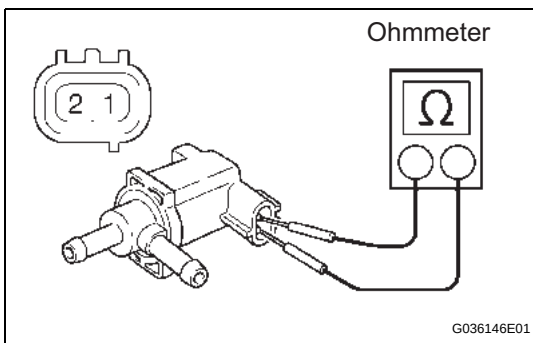
If the result is not as specified, replace the vacuum switching valve No. 1.

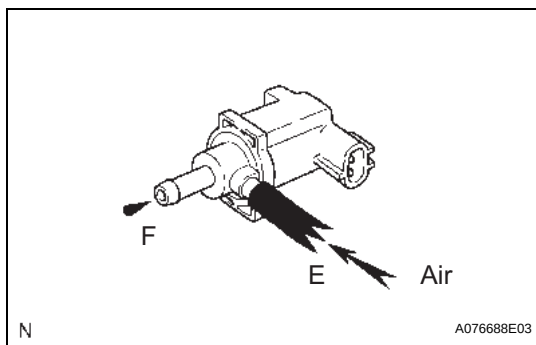
- (b) Check the vacuum switching valve No. 1 for ground.
 - (1) Using an ohmmeter, check the resistance between each terminal and the body.

Standard

Tester Connection	Specified Condition
1 - Body	10 M Ω or higher
2 - Body	10 M Ω or higher

If the result is not as specified, replace the vacuum switching valve No. 1.

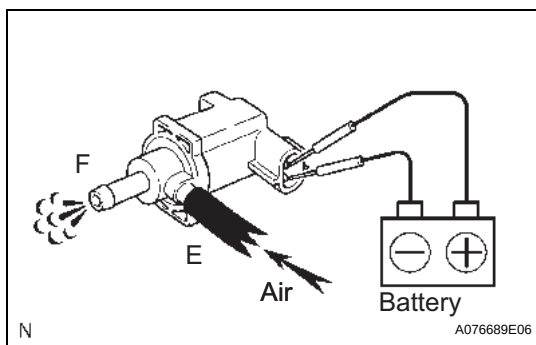




(c) Check the operation.

- (1) Check that air does not flow from port E to port F.

If the operation is not as specified, replace the vacuum switching valve No. 1.



- (2) Apply battery voltage across the terminals.

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

If the operation is not as specified, replace the vacuum switching valve No. 1.

INSTALLATION

1. INSTALL DUTY VACUUM SWITCHING VALVE

- (a) Connect the hose to the vacuum switching valve.
- (b) Install the vacuum switching valve with the bolt.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)
- (c) Connect the vapor feed hose.
- (d) Connect the connector.

2. INSTALL V-BANK COVER (See page [ES-416](#))

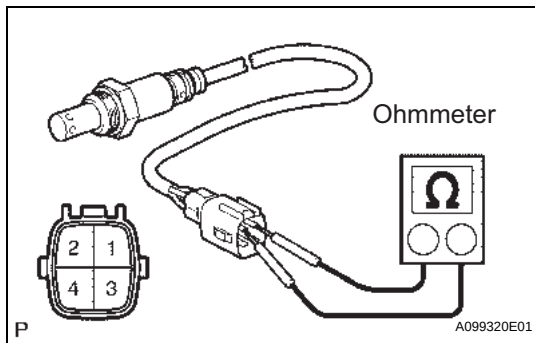
3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

AIR FUEL RATIO SENSOR

REMOVAL

1. **DISCONNECT CABLE FROM BATTERY NEGATIVE TERMINAL**
2. **REMOVE AIR FUEL RATIO SENSOR**
 - (a) Disconnect the 2 air fuel ratio sensor connectors.
 - (b) Remove the 2 air fuel ratio sensors from the exhaust manifold.



INSPECTION

1. **INSPECT AIR FUEL RATIO SENSOR**
 - (a) Check the resistance. (Bank 1 Sensor 1)
 - (1) Using an ohmmeter, measure the resistance between the terminals.
- Standard**

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	1.8 to 3.4 Ω at 20°C (68°F)
1 (HT) - 4 (E1)	10 kΩ or higher

If the result is not as specified, replace the air fuel ratio sensor.

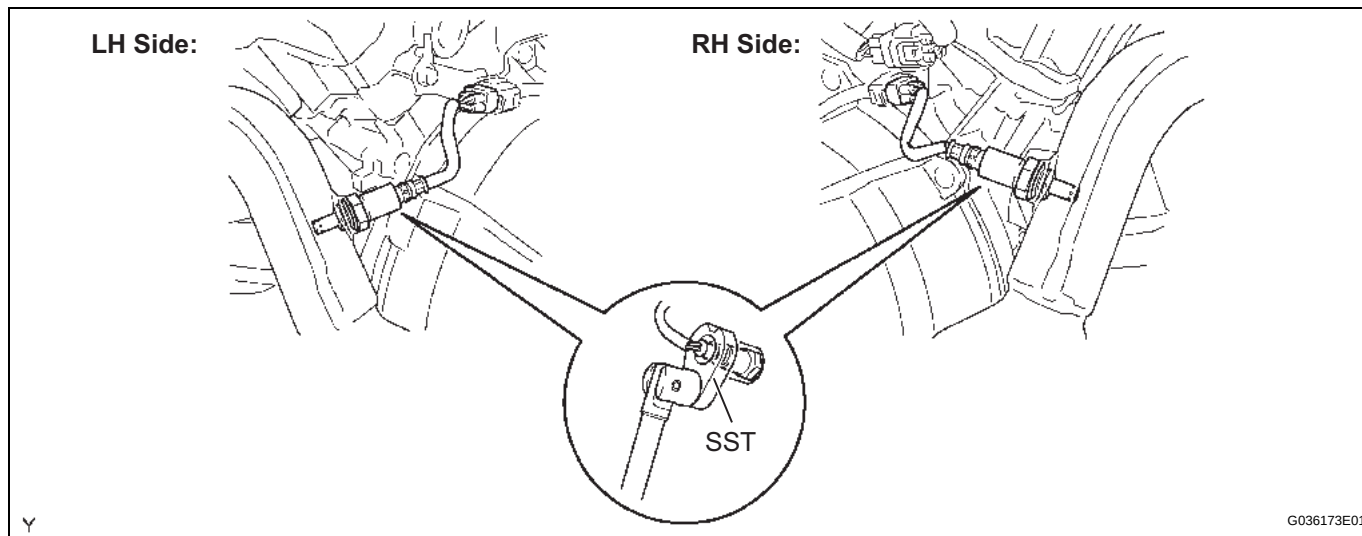
INSTALLATION

1. INSTALL AIR FUEL RATIO SENSOR

- (a) Using SST, install the 2 air fuel ratio sensors onto the exhaust manifold.

SST 09224-00010

Torque: 44 N*m (449 kgf*cm, 33 ft.*lbf)



- (b) Connect the 2 air fuel ratio sensor connectors.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

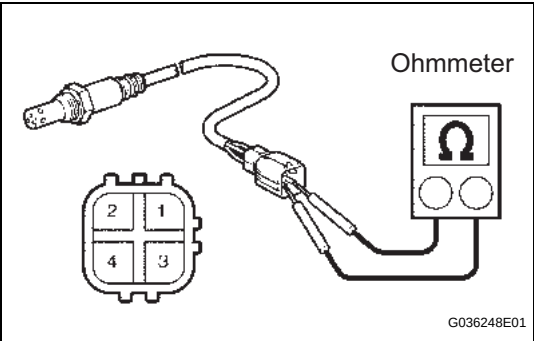
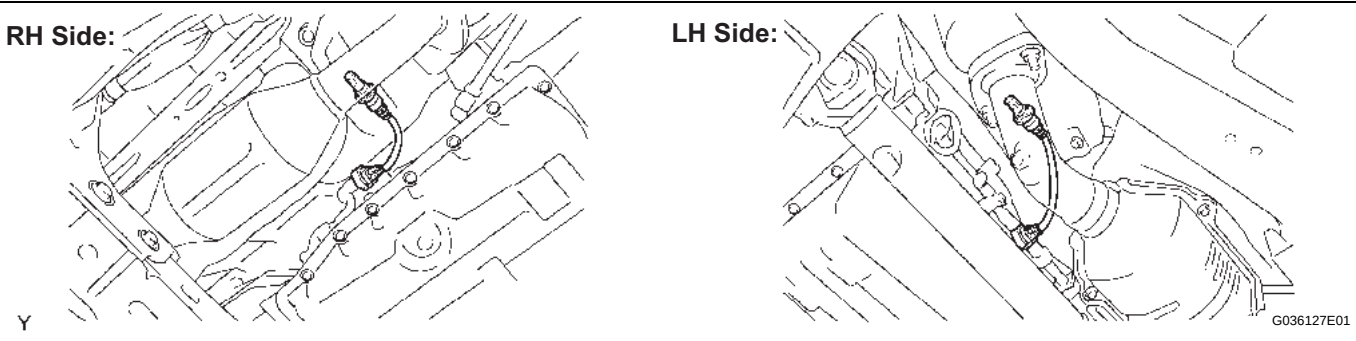
Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

3. CHECK FOR EXHAUST GAS LEAKAGE

HEATED OXYGEN SENSOR

REMOVAL

- 1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
- 2. REMOVE HEATED OXYGEN SENSOR
 - (a) Disconnect the 2 heated oxygen sensor connectors.
 - (b) Remove the 2 heated oxygen sensors from the exhaust pipe.



INSPECTION

- 1. INSPECT HEATED OXYGEN SENSOR
 - (a) Check the resistance. (Bank 1 Sensor 2)
 - (1) Using an ohmmeter, measure the resistance between the terminals.
- Standard**

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
1 (HT) - 4 (E)	10 kΩ or higher

If the result is not as specified, replace the heated oxygen sensor.

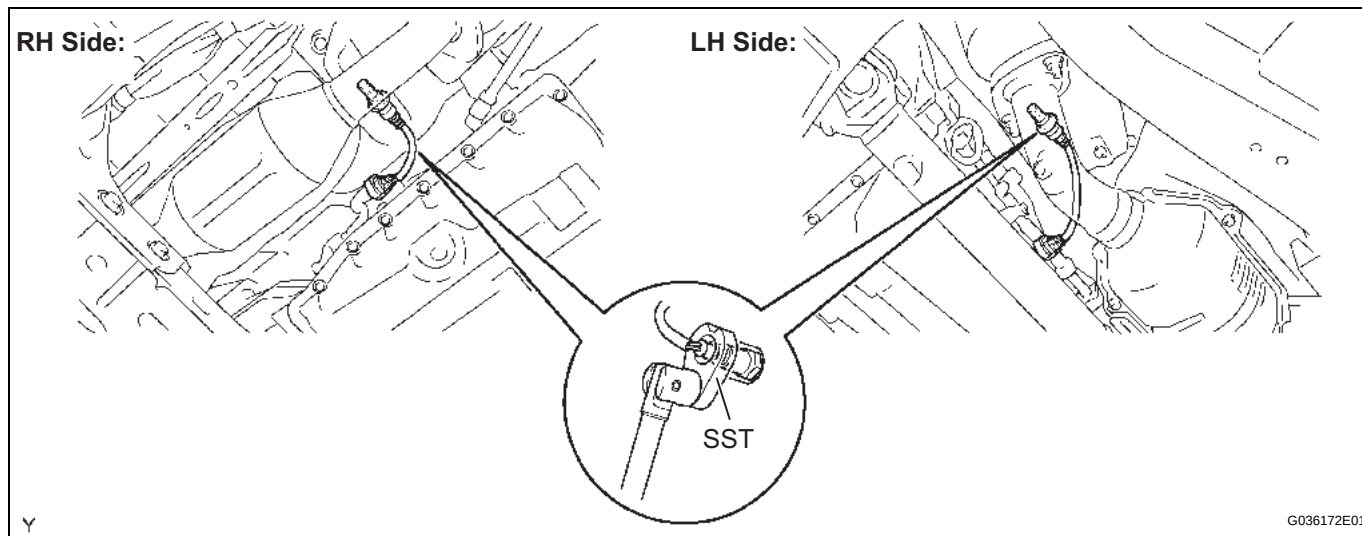
INSTALLATION

1. INSTALL HEATED OXYGEN SENSOR

- (a) Using SST, install the 2 heated oxygen sensors onto the exhaust pipe.

SST 09224-00010

Torque: 44 N*m (449 kgf*cm, 33 ft.*lbf)

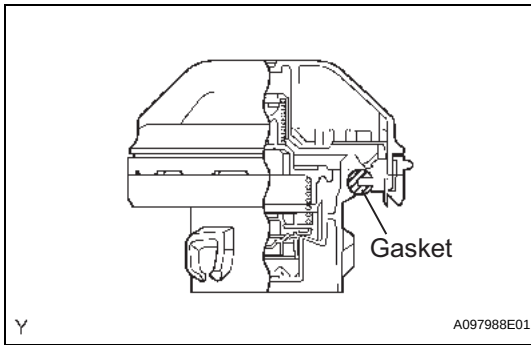


- (b) Connect the 2 heated oxygen sensor connectors.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

3. CHECK FOR EXHAUST GAS LEAKAGE



FUEL TANK CAP

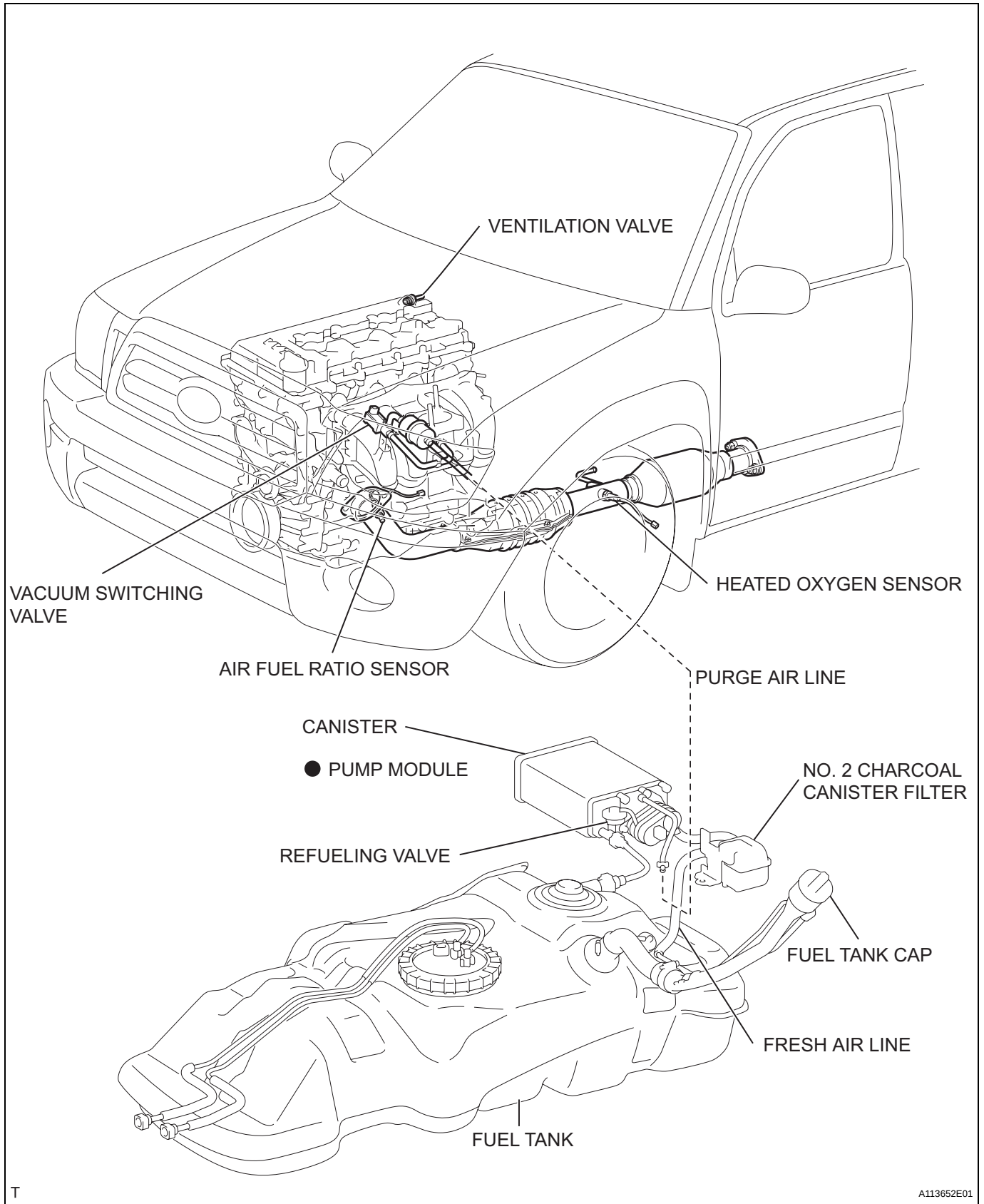
INSPECTION

1. INSPECT FUEL TANK CAP ASSEMBLY

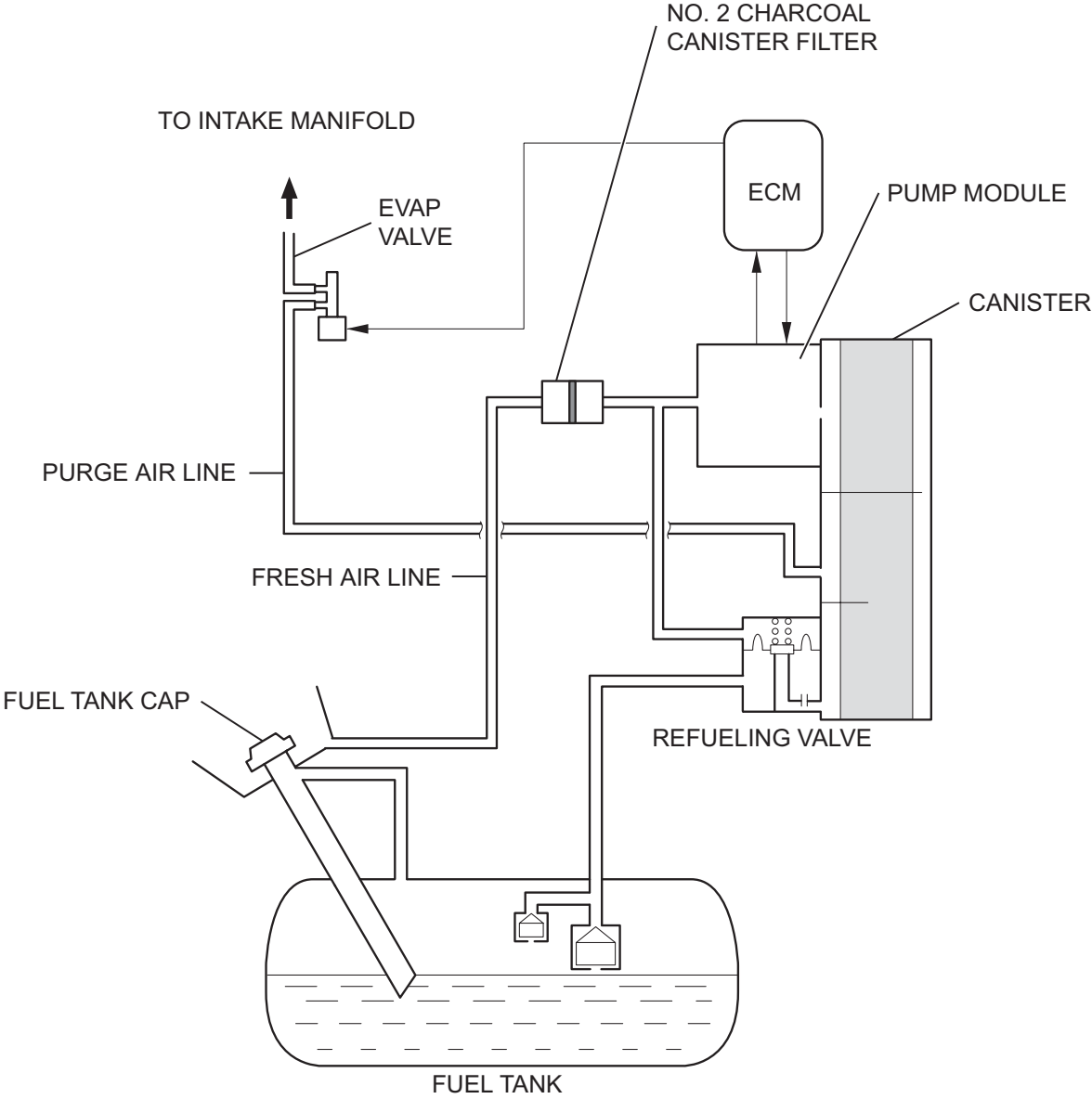
- (a) Check the appearance.
 - (1) Visually check the fuel tank cap and gasket for any deformation and damage.
If necessary, repair or replace the cap and/or gasket.

EMISSION CONTROL SYSTEM

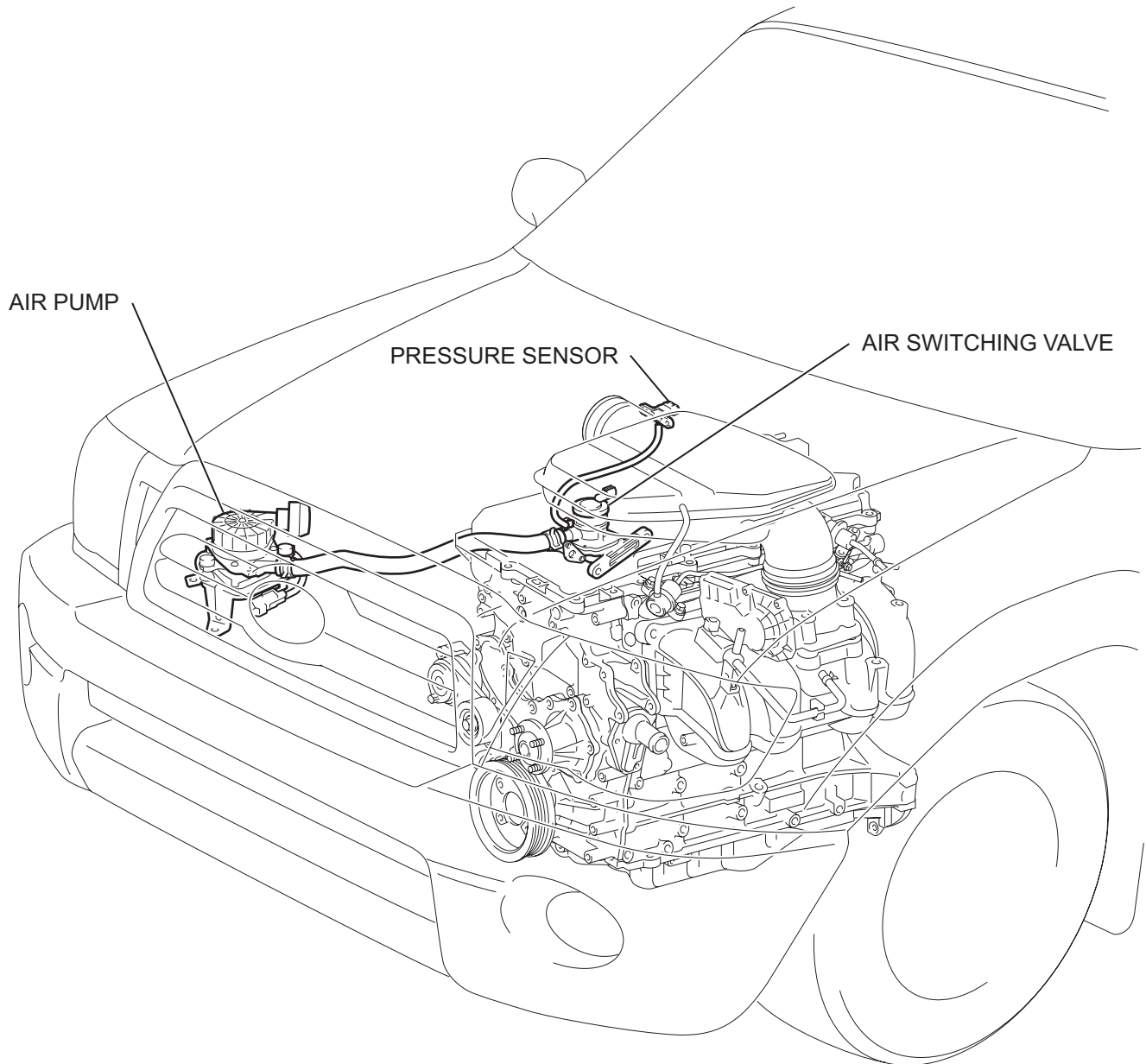
PARTS LOCATION



EC

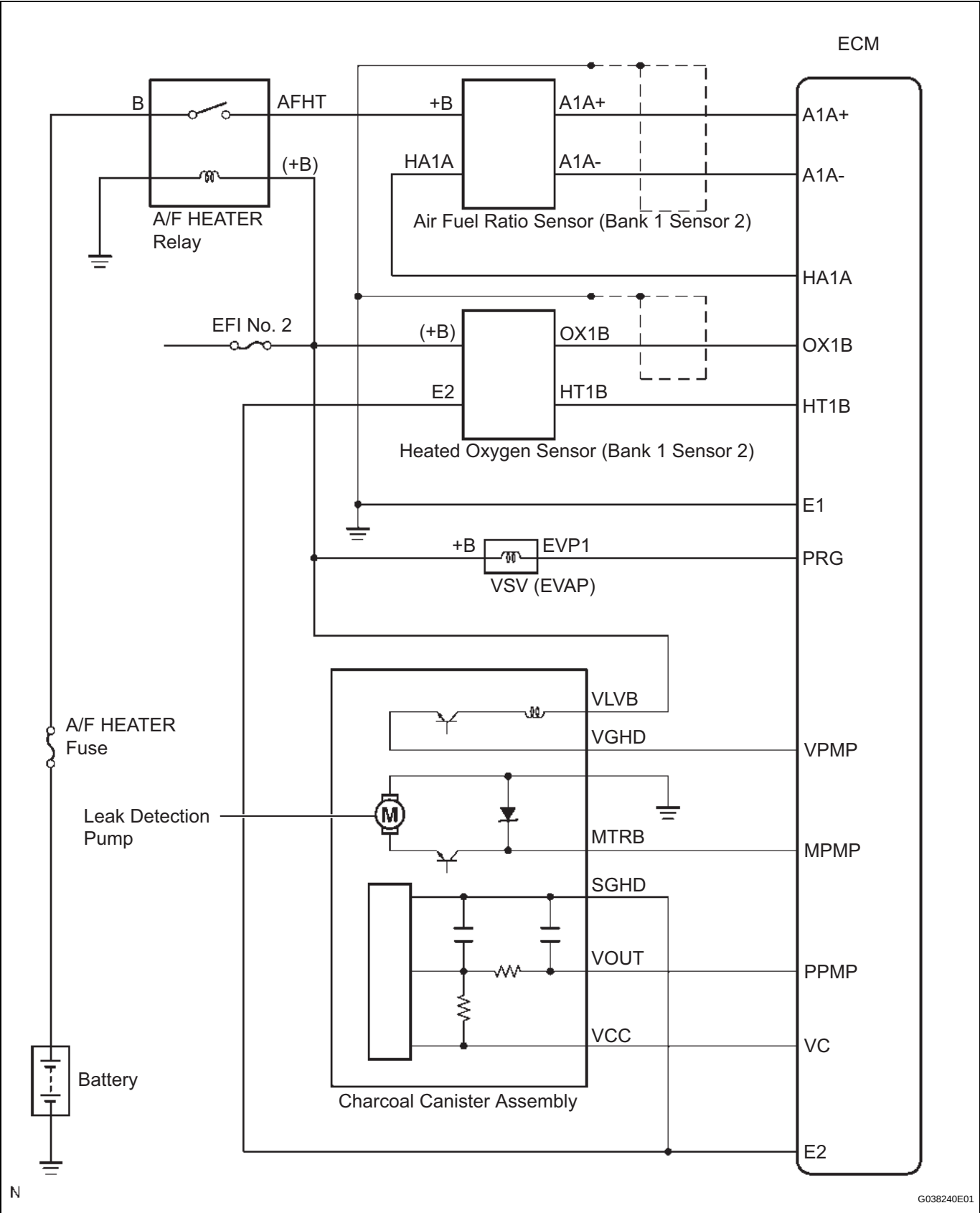


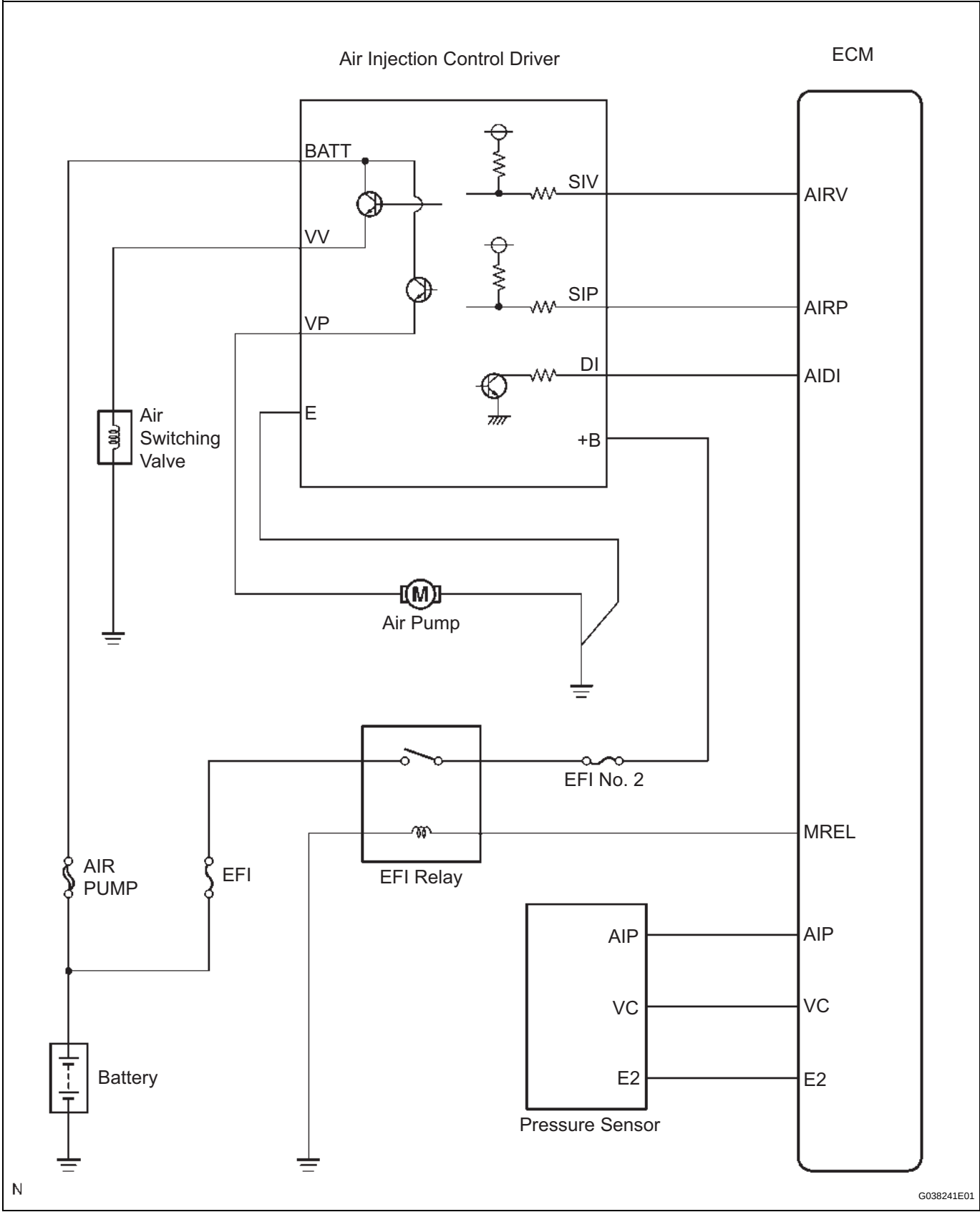
EC



EC

SYSTEM DIAGRAM





ON-VEHICLE INSPECTION

1. INSPECT AIR-FUEL RATIO COMPENSATION SYSTEM

- (a) Measure the voltage between the terminals of the ECM connectors.

Standard

Tester Connection	Condition	Specified Condition
A21 (A1A+) -A28 (E2)	Ignition switch ON	3.3 V
A31 (A1A-) -A28 (E2)	Ignition switch ON	2.9 V

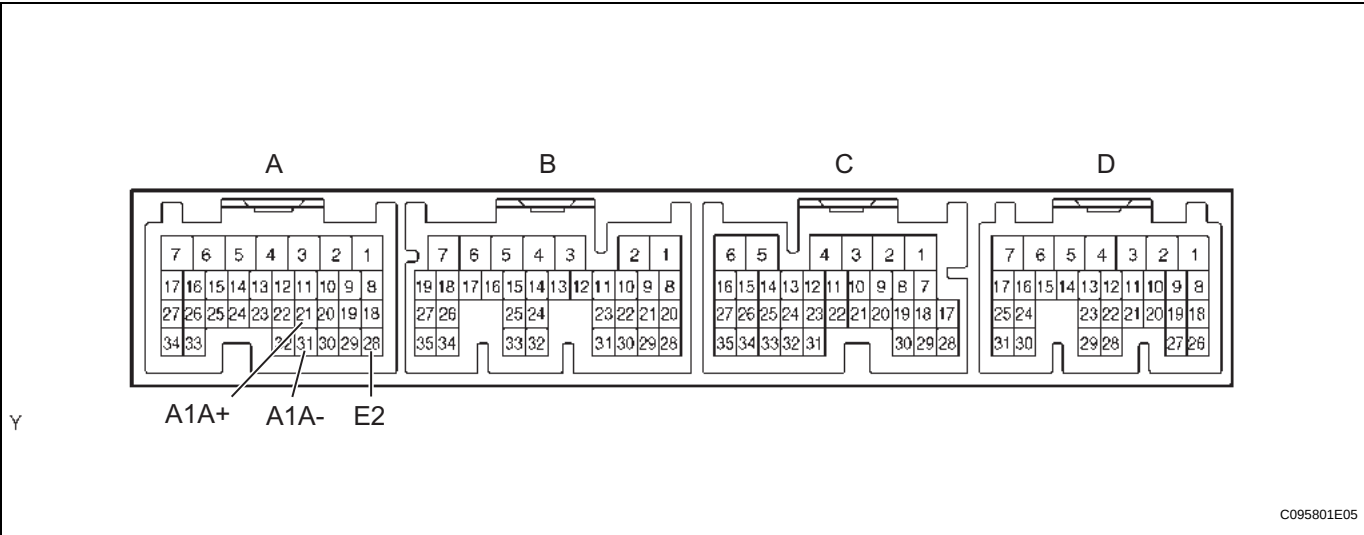
NOTICE:

Connect test leads from the back side of the connector. The connectors should not be disconnected from the ECM.

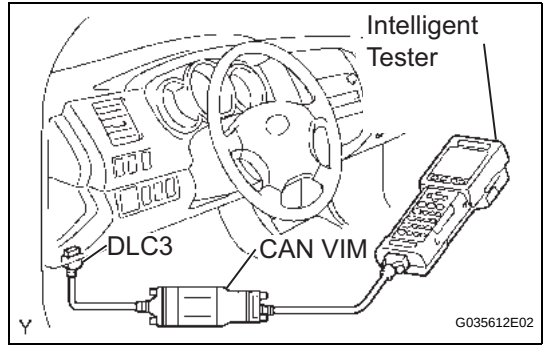
HINT:

Voltage between the terminals of the ECM is kept constant regardless of the voltage of the A/F sensor.

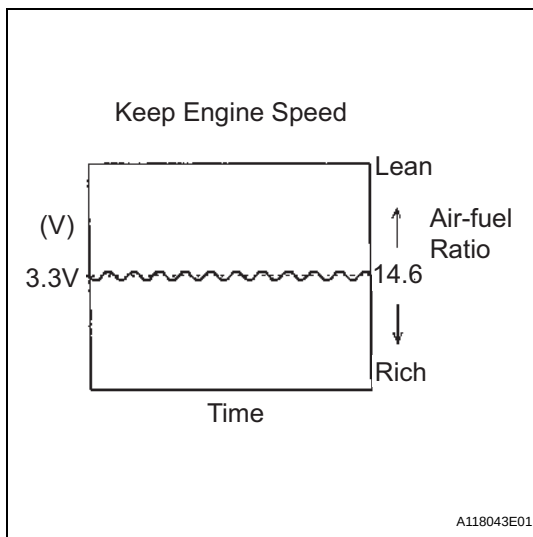
EC



C095801E05



- (b) Connect the intelligent tester to the DLC3.
- (c) Turn the ignition switch to ON.
- (d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DATA LIST / A/FS B1 S1 and O2S B1 S2.
- (e) Warm up the A/F sensor with the engine speed at 2,500 rpm for approximately 2 minutes.



- (f) Keep the engine speed at 2,500 rpm and confirm that the display, when A/F S1 is selected, is as shown in the illustration.

HINT:

- The illustration may slightly differ from the display on the intelligent tester.
- Only the intelligent tester displays the waveform of the A/F sensor.

- (g) Confirm that the display, when O2S B1 S2 is selected, changes between 0 V and 1 V with the engine speed at 2,500 rpm.

OK:

The voltage output oscillates more than 8 times in 10 seconds.

CAUTION:

- Perform the check immediately after warming up the engine.
- If the voltage variation could not be verified, warm up the heated oxygen sensor again. If it could not be verified even after warming up the sensor again, check the DTC No. (see page 05-61).

2. INSPECT FUEL CUT OFF RPM

- Increase the engine speed to at least 3,500 rpm.
- Use a sound scope to check for injector operating sounds.
- Check that injector operating sounds stop momentarily and then resume when the accelerator pedal is released.

Fuel cut off rpm:

2,500 rpm

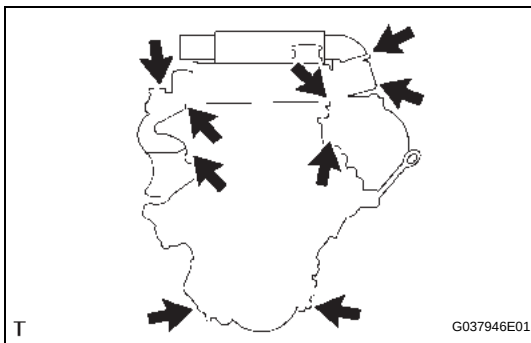
Fuel return rpm:

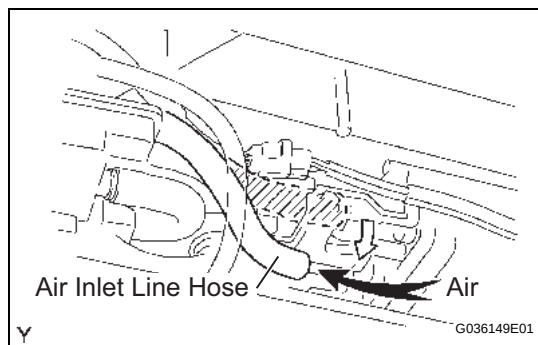
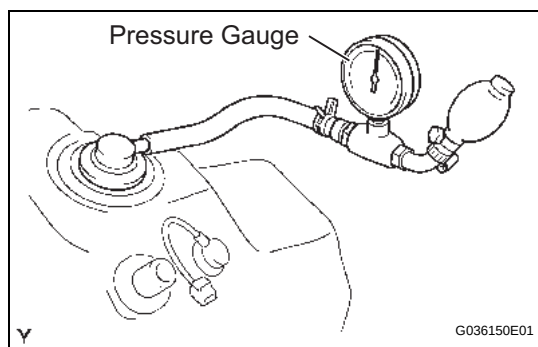
1,200 rpm

3. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

- Check the appearance.
 - Check if the indicated portions of the engine assembly are cracked, leaking or damaged.

HINT:
Disconnection of the engine oil level gauge, oil filler cap, PCV hose, etc. may cause the engine to run improperly. Disconnection, slack or cracks in the air induction system parts between the throttle body and cylinder head will allow air suction and cause the engine to run improperly.
If necessary, repair the engine assembly.





4. INSPECT FUEL CUTOFF VALVE AND FILL CHECK

- (a) Remove the fuel tank (see page [FU-30](#)).
- (b) Connect the pressure gauge to the vent hose port.
- (c) Install the fuel tank with the vent hose disconnected.
- (d) Fill the fuel tank with fuel.
- (e) Apply pressure of 4 kPa (41 gf/cm², 0.58 psi) to the vent port of the fuel tank.

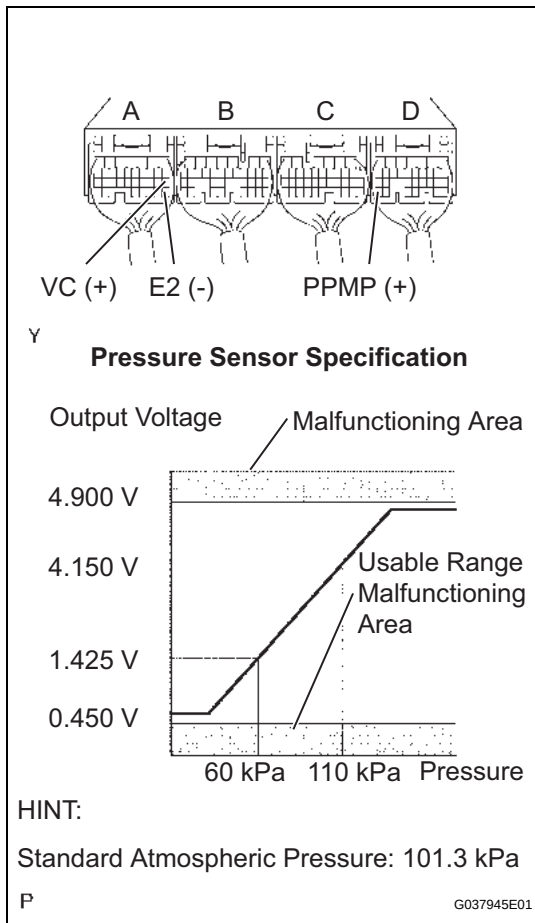
HINT:

It is necessary to check the amount of fuel in the fuel tank.

- (f) Remove the fuel tank cap, and check that the pressure drops.
If the pressure does not drop, replace the fuel tank assembly.
- (g) Reconnect the vent line hose to the fuel tank.

5. CHECK AIR INLET LINE

- (a) Disconnect the air inlet line hose from the charcoal canister.
- (b) Check that air can flow freely into the air inlet line.
If air cannot flow freely into the air inlet line, repair or replace it.
- (c) Reconnect the air inlet line hose to the charcoal canister.



6. INSPECT LEAK DETECTION PUMP (Pressure Sensor)

- (a) Measure the power source voltage of the ECM connectors.

Standard

Tester Connection	Condition	Specified Condition
A18 (VC) - A28 (E2)	Ignition switch ON	4.5 to 5.5 V

If the voltage is not as specified, check the ECM, leak detection pump and wire harness.

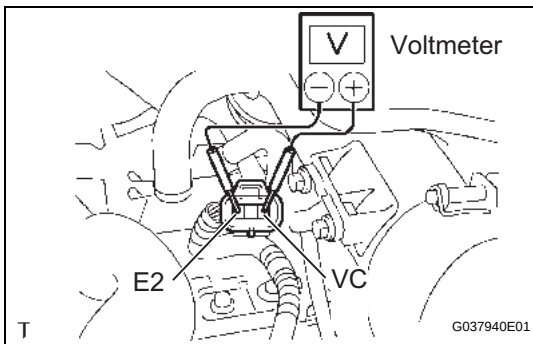
- (b) Measure the power output of the ECM connectors.

- (1) Remove the fuel tank cap.

Tester Connection	Condition	Specified Condition
D31 (PPMP) - A28 (E2)	Ignition switch ON	1.425 to 4.150 V

If the voltage is not as specified, check the ECM, leak detection pump and wire harness.

- (2) Install the fuel tank cap.

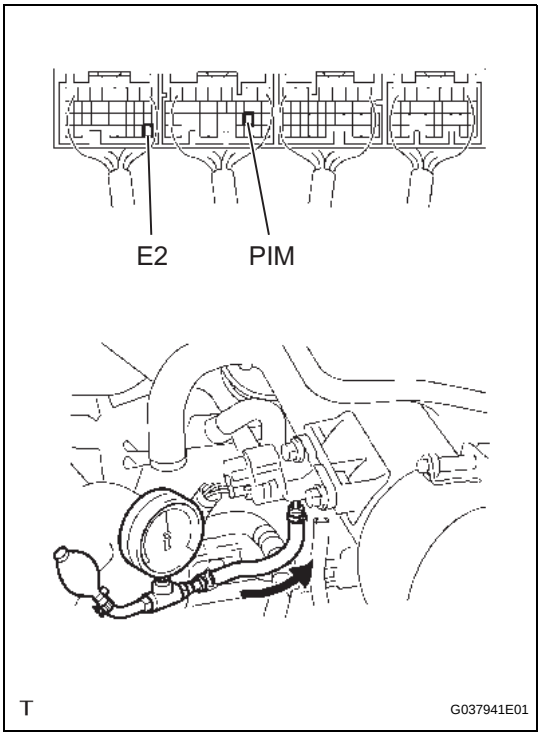


7. INSPECT PRESSURE SENSOR

- (a) Check the power source voltage.
- (1) Disconnect the pressure sensor connector.
 - (2) Turn the ignition switch to ON.
 - (3) Using a voltmeter, measure the voltage between terminals VC and E2.

Voltage:

4.5 to 5.5 V



- (b) Check the supply power.
 - (1) Using SST (turbocharger pressure gauge), apply air to the turbo pressure sensor at the pressures shown in the table below.
SST 09992-00242
 - (2) Connect a voltmeter to terminals PIM and E2 of the ECM and measure the output voltage under ambient atmospheric pressure.

Voltage Increase

Applied Pressure [kPa (kgf/cm2, psi)]	Voltage Increase [V]
19.6 (0.20, 2.84)	0.1 to 0.4
39.2 (0.40, 5.69)	0.4 to 0.7
58.8 (0.60, 8.53)	0.7 to 1.0
78.5 (0.80, 11.4)	1.0 to 1.3
98.0 (1.00, 14.2)	1.3 to 1.6

8. INSPECT AIR PUMP ASSEMBLY

- (a) Check the operation (see page 05-372).

AIR PUMP

REMOVAL

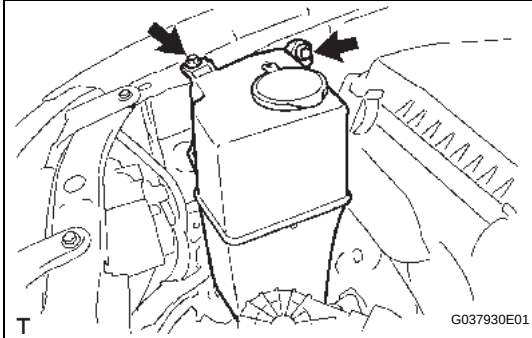
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

2. REMOVE AIR PUMP ASSEMBLY

- (a) Remove the 2 bolts, then separate the washer jar.

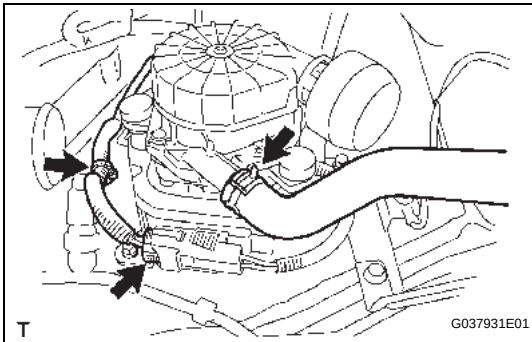
HINT:

Perform the above procedure to make space for removing the air pump assy.

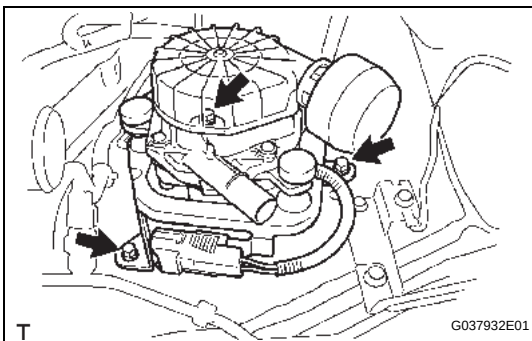


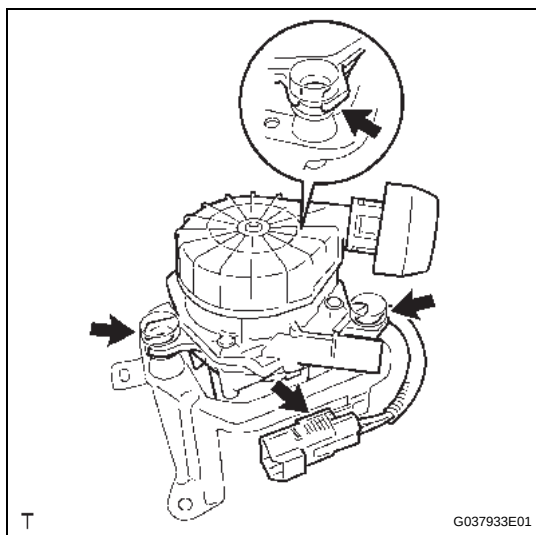
- (b) Disconnect the air injection system No. 1 hose.

- (c) Disconnect the air pump connector and wire harness clamp.



- (d) Remove the 3 bolts, then remove the air pump with bracket.





- (e) Disconnect the air pump connector clamp.
- (f) Disengage the 3 fittings of the air pump insulator, and remove the air pump from the bracket.

INSPECTION

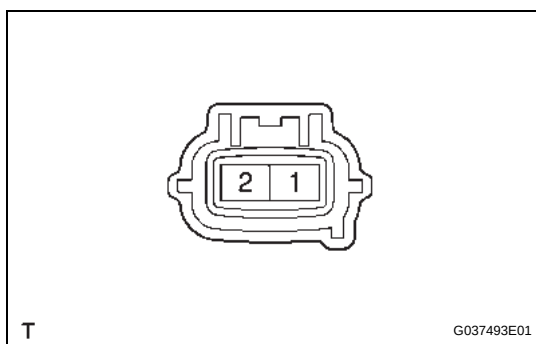
1. INSPECT AIR PUMP ASSEMBLY

- (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Resistance:

0.4 to 1.0 Ω at 20°C (68°F)

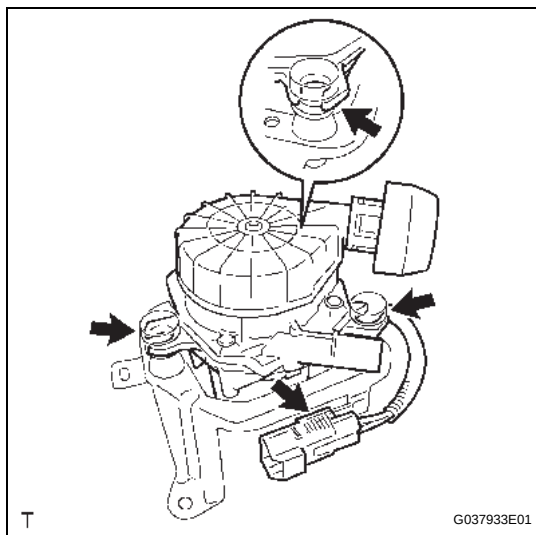
If the result is not as specified, replace the air pump.



INSTALLATION

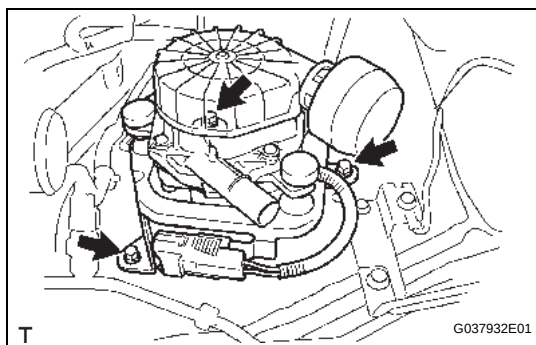
1. INSTALL AIR PUMP ASSEMBLY

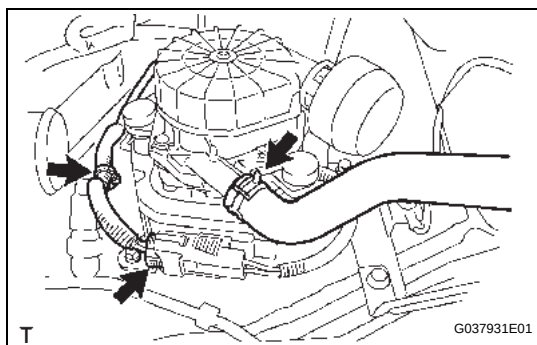
- (a) Engage the 3 fittings of the air pump insulator, and install the air pump onto the bracket.
- (b) Connect the air pump connector clamp.



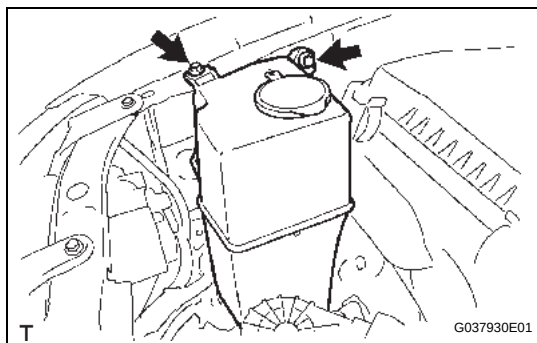
- (c) Install the air pump with bracket with the 3 bolts.

Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)





- (d) Connect the air pump connector and wire harness clamp.
- (e) Connect the air injection system No. 1 hose.



- (f) Install the washer jar with the 2 bolts.
Torque: 6 N*m (56 kgf*cm, 49 in.*lbf)

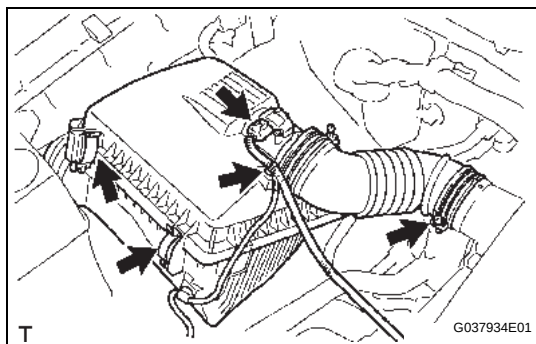
2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

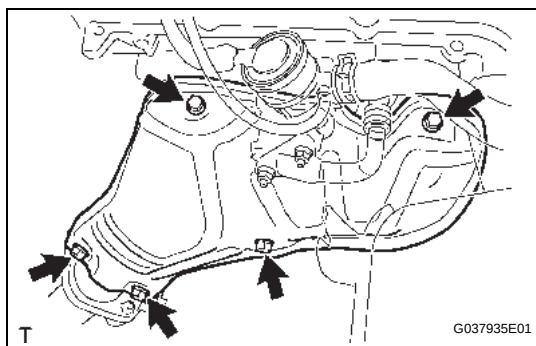
AIR SWITCHING VALVE

REMOVAL

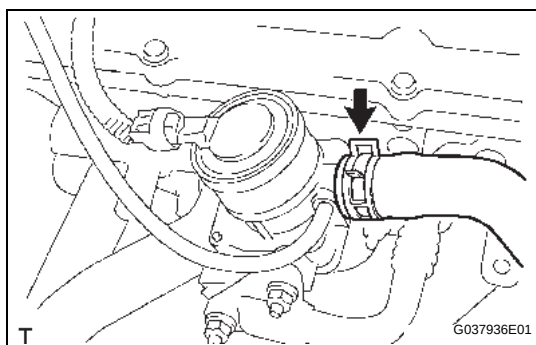
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE INTAKE AIR CONNECTOR** (See page [ES-452](#))
3. **REMOVE AIR CLEANER CAP SUB-ASSEMBLY**
 - (a) Disconnect the mass air flow meter connector.
 - (b) Disconnect the wire harness clamp.
 - (c) Loosen the hose clamp bolt, then disconnect the air cleaner hose No. 1.
 - (d) Disconnect the 2 air cleaner clamps.
 - (e) Remove the air cleaner cap together with the air cleaner hose No. 1.



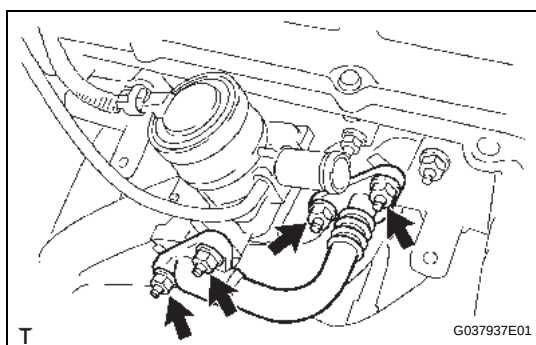
4. **REMOVE NO.1 EXHAUST MANIFOLD HEAT INSULATOR**
 - (a) Remove the 5 bolts, then remove the exhaust manifold heat insulator No. 1.

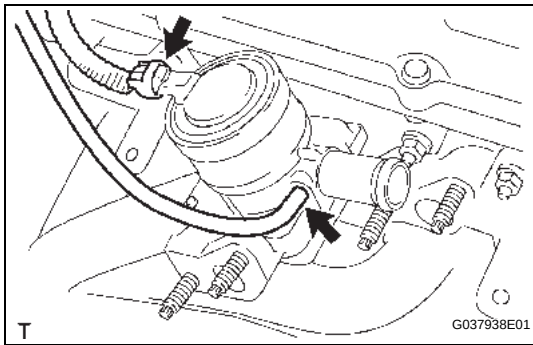


5. **DISCONNECT AIR INJECTION SYSTEM NO.1 HOSE**
 - (a) Disconnect the air injection system No. 1 hose from the air switching valve.

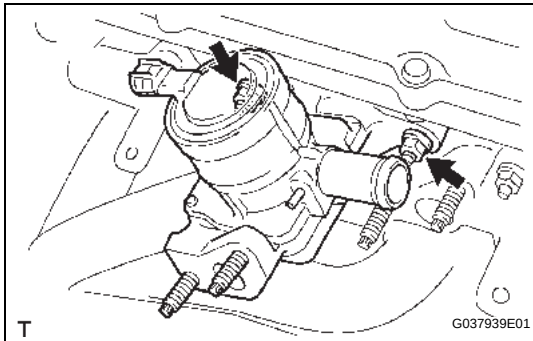


6. **REMOVE INTAKE PIPE INSULATOR**
 - (a) Remove the 4 nuts, then remove the intake pipe insulator.
 - (b) Remove the 2 gaskets.

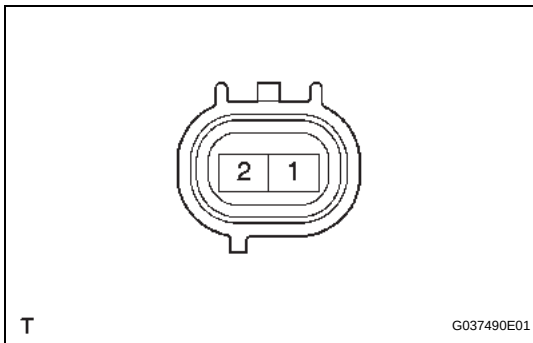




- 7. REMOVE AIR SWITCHING VALVE ASSEMBLY**
- Disconnect the vacuum hose.
 - Disconnect the air switching valve connector.



- Remove the 2 nuts, then remove the air switching valve.
- Remove the gasket.



INSPECTION

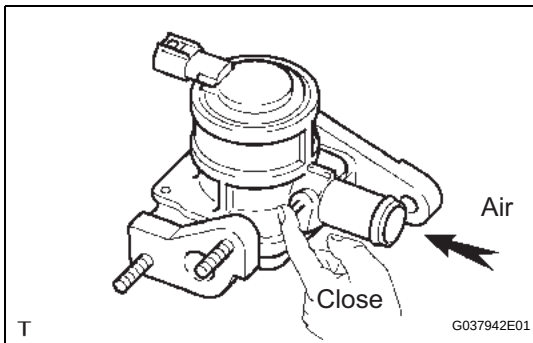
1. INSPECT AIR SWITCHING VALVE ASSEMBLY

- Check the resistance.
 - Using an ohmmeter, measure the resistance between the terminals.

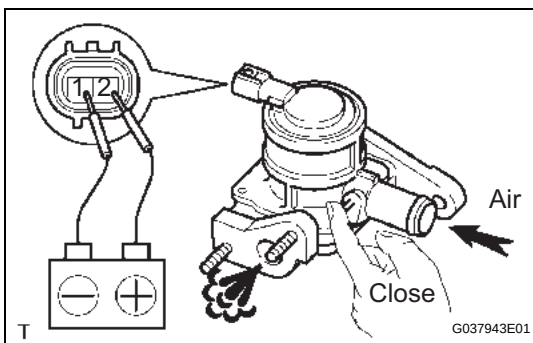
Resistance:

4.5 to 5.5 Ω at 20°C (68°F)

If the result is not as specified, replace the air switching valve.



- Check the operation.
 - Check that air does not flow from the port.



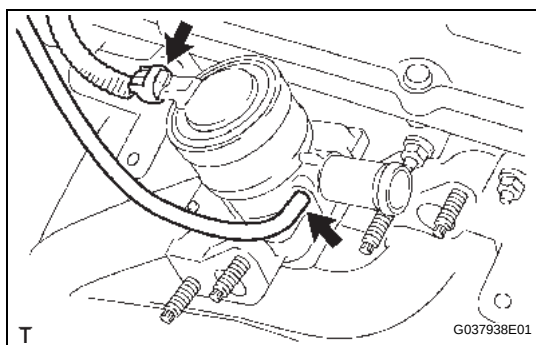
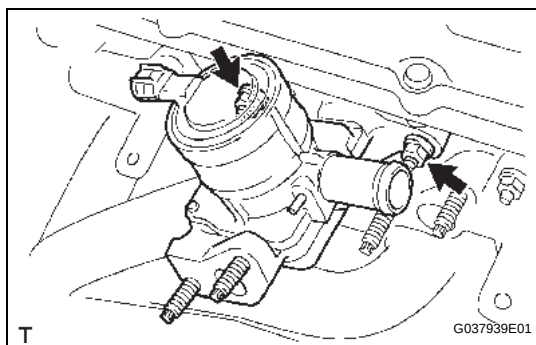
- Apply battery positive voltage across the terminals.
- Check that air flows from the port. If the operation is not as specified, replace the air switching valve.

INSTALLATION

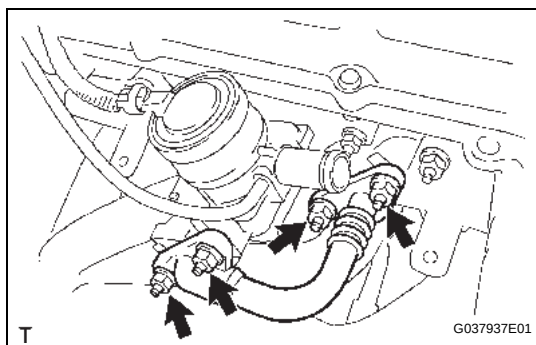
1. INSTALL AIR SWITCHING VALVE ASSEMBLY

- Install a new gasket onto the cylinder head.
- Install the air switching valve with the 2 nuts.

Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)



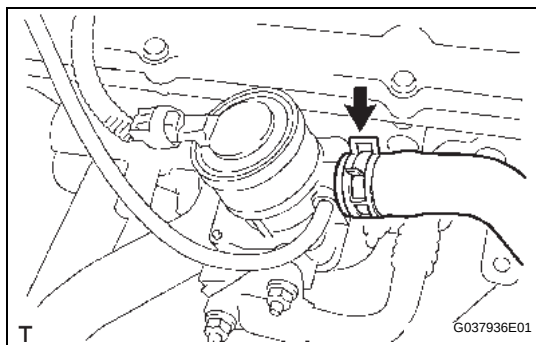
- Connect the air switching valve connector.
- Connect the vacuum hose.



2. INSTALL INTAKE PIPE INSULATOR

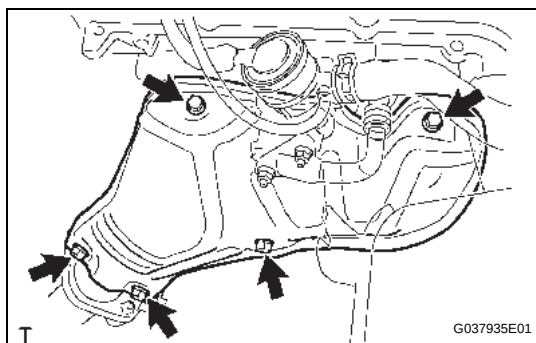
- Install 2 new gaskets onto the cylinder head and air switching valve.
- Install the intake pipe insulator with the 4 nuts.

Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)



3. CONNECT AIR INJECTION SYSTEM NO.1 HOSE

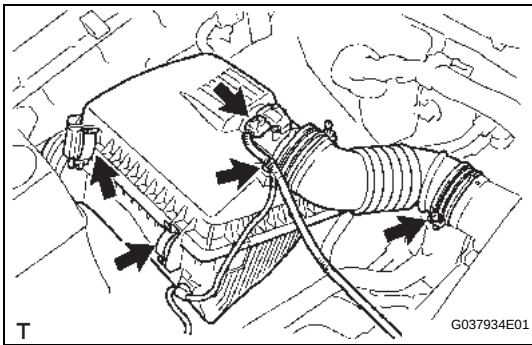
- Connect the air injection system No. 1 hose to the air switching valve.



4. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.1

- Install the exhaust manifold heat insulator No. 1 with the 5 bolts.

Torque: 12 N*m (122 kgf*cm, 9 ft.*lbf)

**5. INSTALL AIR CLEANER CAP SUB-ASSEMBLY**

- (a) Install the air cleaner cap together with the air cleaner hose No. 1.
- (b) Connect the 2 air cleaner clamps.
- (c) Tighten the hose clamp bolt, then connect the air cleaner hose No. 1.
- (d) Connect the wire harness clamp.
- (e) Connect the mass air flow meter connector.

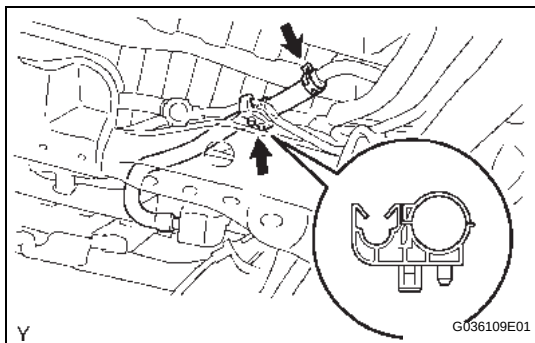
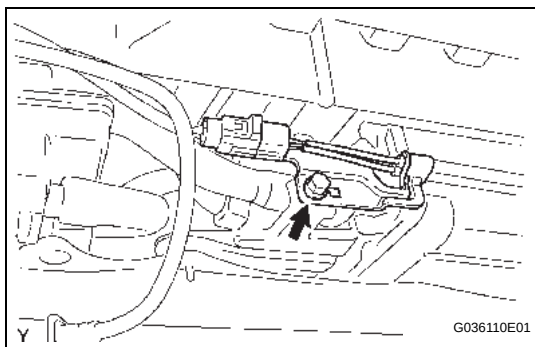
6. INSTALL INTAKE AIR CONNECTOR (See page [ES-455](#))**7. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

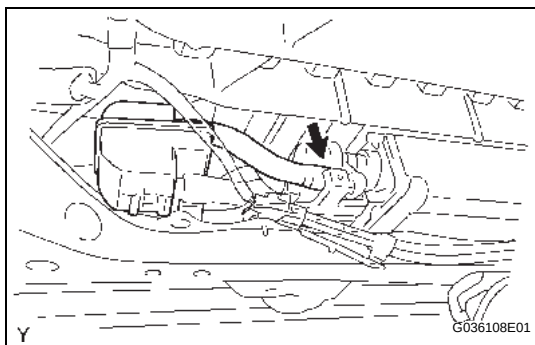
CANISTER

REMOVAL

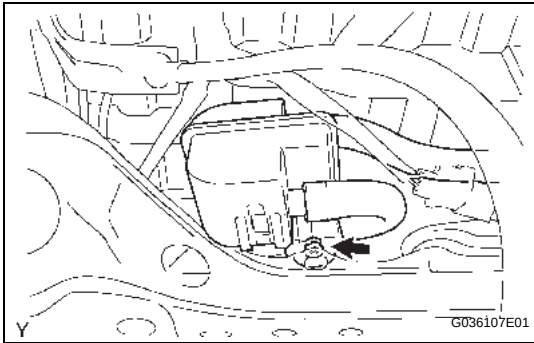
1. **DISCHARGE FUEL SYSTEM PRESSURE**
(See page [FU-1](#))
2. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
3. **DISCONNECT FUEL TANK MAIN TUBE AND FUEL TANK RETURN TUBE** (See page [FU-30](#))
4. **REMOVE FUEL TANK ASSEMBLY** (See page [FU-31](#))
5. **REMOVE CHARCOAL CANISTER FILTER NO.2**
 - (a) Remove the bolt, then remove the ABS wire harness clamp from the charcoal canister.



- (b) Release the EVAP pipe from the hose clamp.
- (c) Disconnect the breather hose from the pipe.
- (d) Disengage the hose clamp.



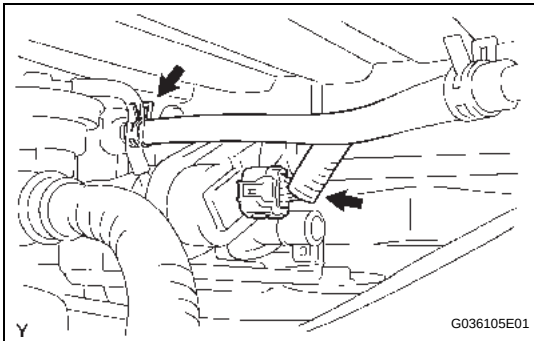
- (e) Disconnect the breather hose from the charcoal canister.



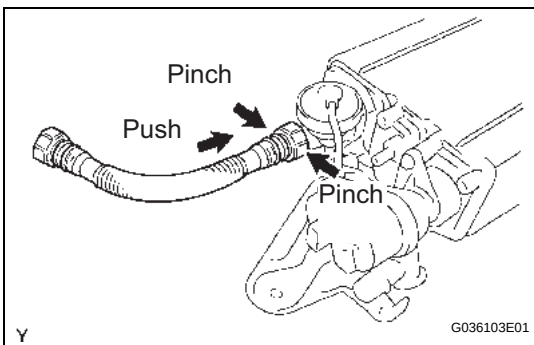
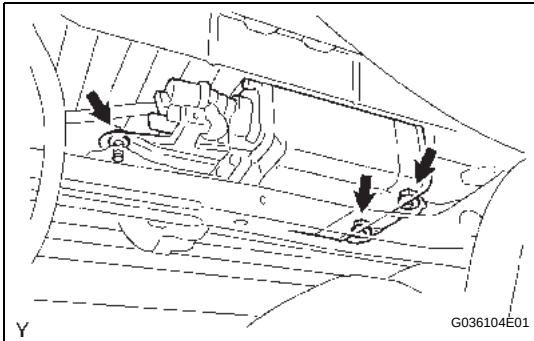
- (f) Remove the nut, then remove the charcoal canister filter No. 2.

6. REMOVE CHARCOAL CANISTER ASSEMBLY

- (a) Disconnect the connector.
(b) Disconnect the EVAP tube.



- (c) Remove the bolt and 2 nuts, then remove the charcoal canister.



- (d) Disconnect the fuel tank vent hose.
(1) Pinch the retainer and pull the fuel tank vent hose connector out of the charcoal canister to disconnect the fuel tank vent hose from the charcoal canister.

NOTICE:

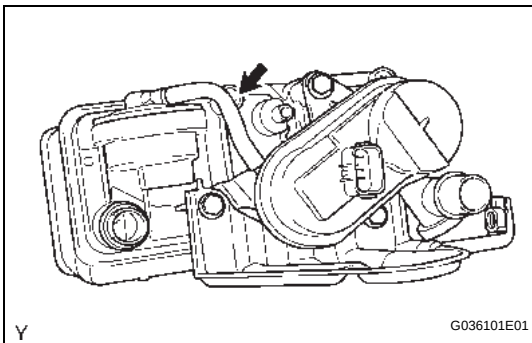
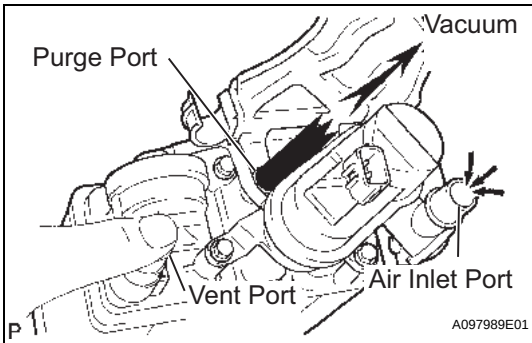
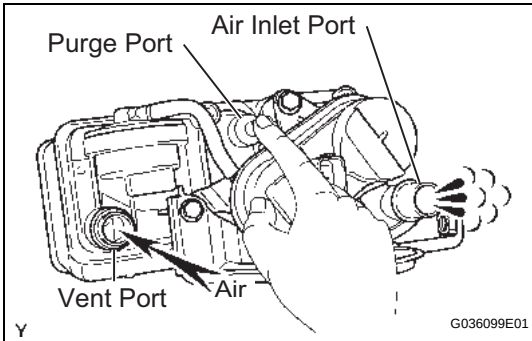
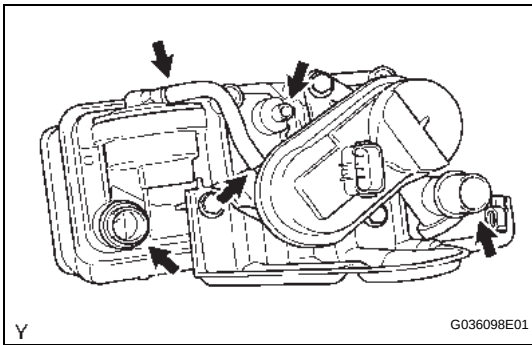
- Remove any dirt and foreign objects from the fuel tank vent hose connector before performing the work.
- Do not allow any scratches or foreign objects on the parts when disconnecting, as the fuel tank vent hose connector has the O-ring that seals the pipe.
- Perform the work by hand. Do not use any tools.
- Do not forcibly bend, twist or turn the nylon tube.
- Protect the disconnected part by covering it with a vinyl bag after disconnecting the fuel tank vent hose.
- If the fuel vent connector and pipe are stuck, push and pull them to release.

INSPECTION

1. INSPECT CHARCOAL CANISTER ASSEMBLY

- (a) Visually check the charcoal canister for cracks and damage.

If cracks and damage are found, replace the charcoal canister Assy.



- (b) Check the charcoal canister operation.

- (1) While holding the purge port closed, blow air of 1.67 kPa (17.0 gf/cm², 0.24 psi) into the vent port, and check that the air flows from the air inlet port.

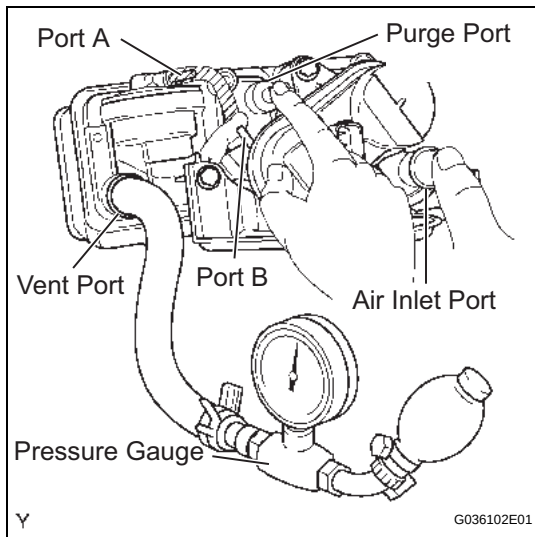
If the result is not as specified, replace the charcoal canister Assy.

- (2) While holding the vent port closed, apply a vacuum of 1.10 kPa (8.3 mmHg, 0.32 in.Hg) into the purge port, and check that the air flows from the air inlet port.

If the result is not as specified, replace the charcoal canister Assy.

- (c) Check for air leakage.

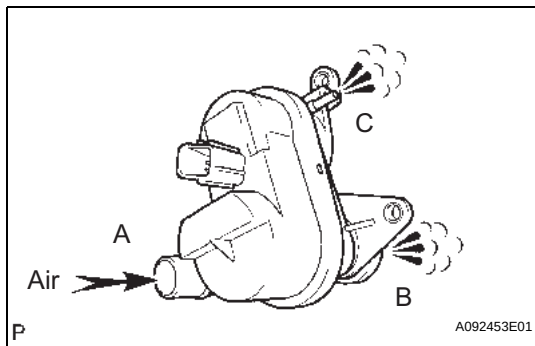
- (1) Remove the air hose between ports A and B.



- (2) Connect the pressure gauge to the vent port of the charcoal canister.

SST 09992-00242

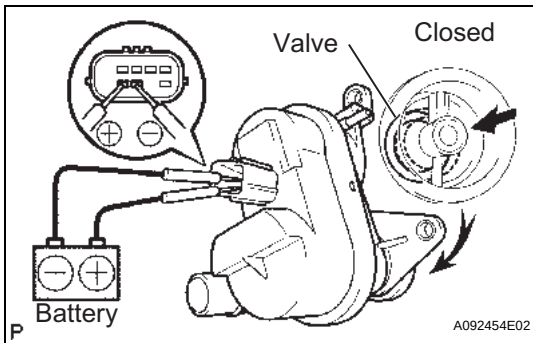
- (3) While holding port B, the purge port and air inlet port closed and port A open, apply pressurized air of 19.6 kPa (0.2 kgf/cm², 2.81 psi) into the vent port. Then confirm that the pressure is retained.
If the result is not as specified, replace the charcoal canister Assy.



- (d) Check the leak detection pump.

- (1) Check that air flows from port A to ports B and C.

If the result is not as specified, replace the charcoal canister (pump module).



- (2) Apply battery positive voltage across the terminals.

- (3) Check that the valve is closed.

If the result is not as specified, replace the charcoal canister (pump module).

INSTALLATION

1. INSTALL CHARCOAL CANISTER ASSEMBLY

- (a) Connect the fuel tank vent hose.
 - (1) Align the fuel tank vent hose connector with the pipe, then push in the fuel tank vent connector until the retainer makes a "click" sound to connect the fuel tank vent hose to the charcoal canister.

NOTICE:

- Check that there are no scratches or foreign objects on the disconnected parts of the fuel tank vent connector and pipe before performing the work.
- After connecting the fuel tank vent hose, check that the fuel tank vent hose is securely connected by pulling the quick connector.

- (b) Install the charcoal canister with the bolt and 2 nuts.
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)
- (c) Connect the EVAP tube.
- (d) Connect the connector.

2. INSTALL CHARCOAL CANISTER FILTER NO.2

- (a) Install the charcoal canister filter No. 2 with the nut.
Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)
- (b) Connect the breather hose to the charcoal canister.
- (c) Engage the clamp.
- (d) Connect the breather hose to the pipe.
- (e) Connect the EVAP pipe to the clamp.
- (f) Install the ABS wire harness clamp with the bolt.
Torque: 14 N*m (142 kgf*cm, 10 ft.*lbf)

3. INSTALL FUEL TANK ASSEMBLY (See page [FU-35](#))

4. CONNECT FUEL TANK MAIN TUBE AND FUEL TANK RETURN TUBE (See page [FU-36](#))

5. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

6. CHECK FOR FUEL LEAKAGE (See page [FU-7](#))

VENTILATION VALVE

INSPECTION

1. INSPECT VENTILATION VALVE SUB-ASSY

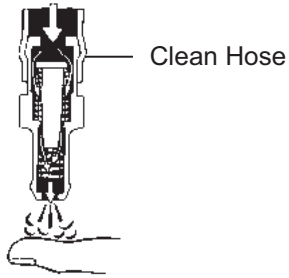
(a) Check the operation.

- (1) Install a clean hose as shown in the illustration.
- (2) Blow air into the cylinder head side and check that the air passes through freely.

CAUTION:

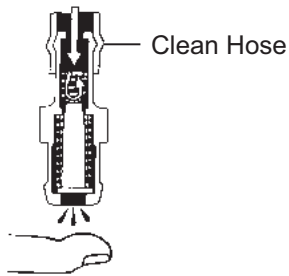
Do not suck air through the ventilation valve. Petroleum substances inside the ventilation valve are harmful.

Cylinder Head Side



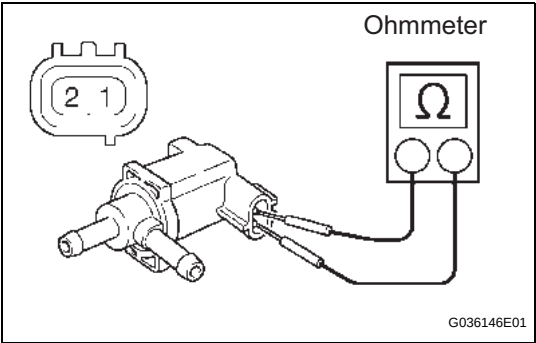
A118044E01

Intake Manifold Side



A118045E01

- (3) Blow air into the intake manifold side and check that the air does not pass through freely. If the operation is not as specified, replace the ventilation valve.



DUTY VACUUM SWITCHING VALVE

INSPECTION

1. INSPECT DUTY VACUUM SWITCHING VALVE

- (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Standard

Tester Connection	Specified Condition
1 - 2	26 to 30 Ω at 20°C (68°F)

If the result is not as specified, replace the duty vacuum switching valve.

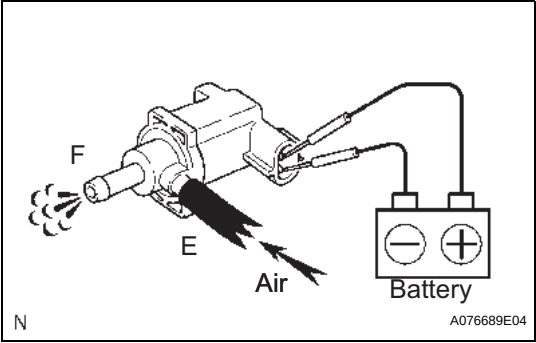
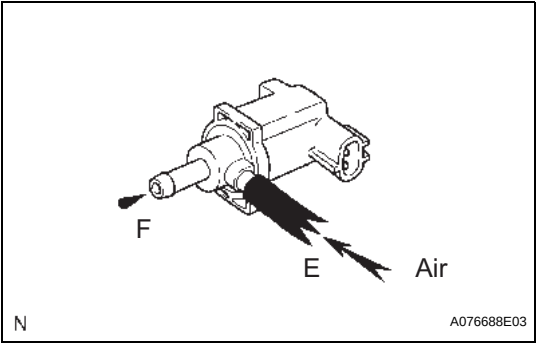
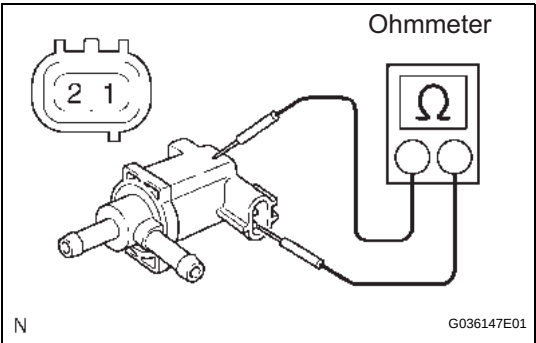
- (b) Check the vacuum switching valve No. 1 for ground.
 - (1) Using an ohmmeter, check the resistance between each terminal and the body.

Standard

Tester Connection	Specified Condition
1 - Body	10 MΩ or higher
2 - Body	10 MΩ or higher

If the result is not as specified, replace the duty vacuum switching valve.

- (c) Check the operation.
 - (1) Check that air does not flow from port E to port F.
- If the operation is not as specified, replace the duty vacuum switching valve.

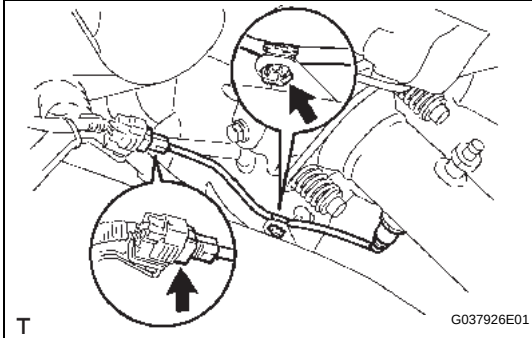


- (2) Apply battery voltage across the terminals.
 - (3) Check that air flows from port E to port F.
- If the operation is not as specified, replace the duty vacuum switching valve.

AIR FUEL RATIO SENSOR

REMOVAL

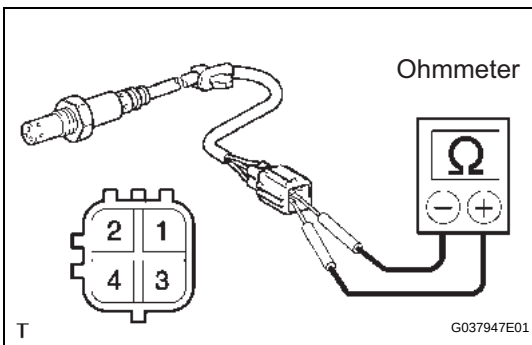
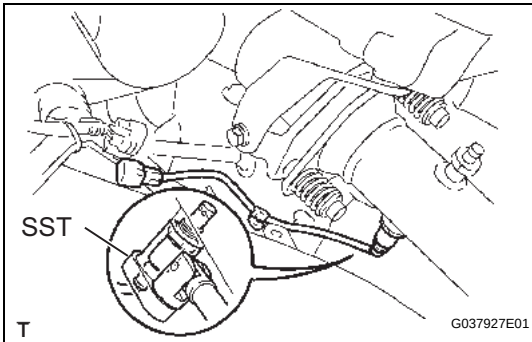
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**



2. **REMOVE AIR FUEL RATIO SENSOR**

- (a) Disconnect the air fuel ratio sensor connector.
- (b) Disconnect the wire harness clamp.

- (c) Using SST, remove the air fuel ratio sensor.
SST 09224-00010



INSPECTION

1. **INSPECT AIR FUEL RATIO SENSOR**

- (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Standard

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	1.8 to 3.4 Ω at 20°C (68°F)
1 (HT) - 4 (AF-)	10 k Ω or higher

If the result is not as specified, replace the air fuel ratio sensor.

INSTALLATION

1. **INSTALL AIR FUEL RATIO SENSOR**

- (a) Using SST, install the air fuel ratio sensor.

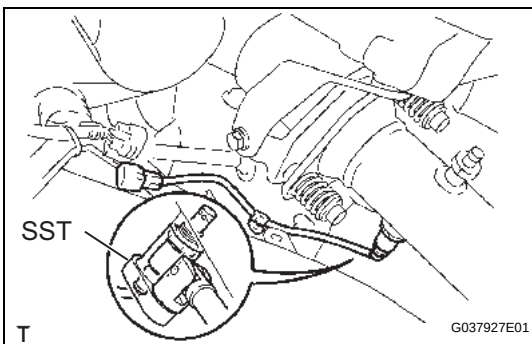
SST 09224-00010

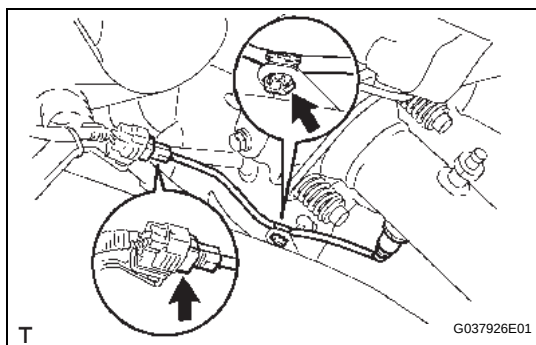
Torque: 44 N*m (449 kgf*cm, 33 ft.*lbf)

40 N*m (408 kgf*cm, 30 ft.*lbf) with SST

NOTICE:

Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).





- (b) Connect the wire harness clamp.
- (c) Connect the air fuel ratio sensor connector.

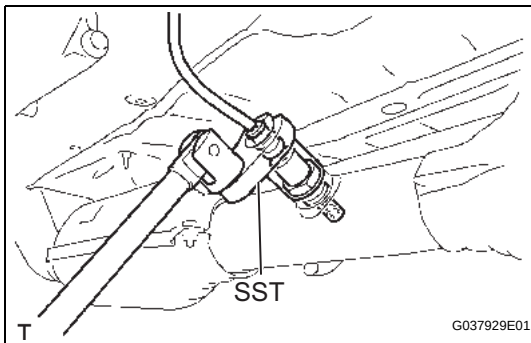
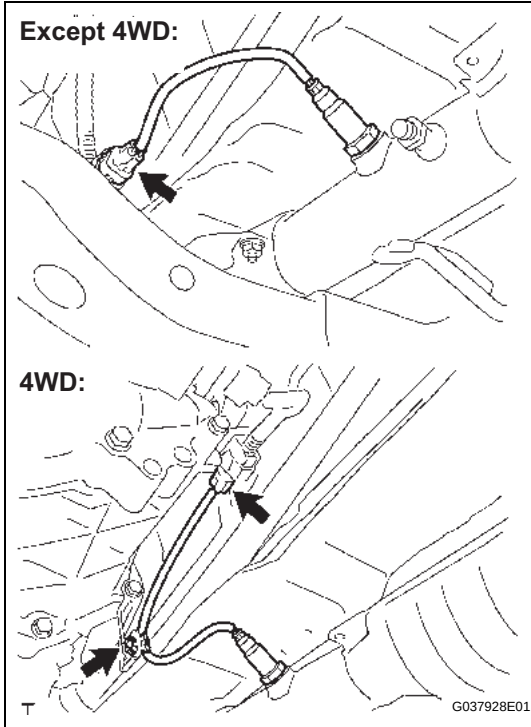
**2. CONNECT CABLE TO NEGATIVE BATTERY
TERMINAL**

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

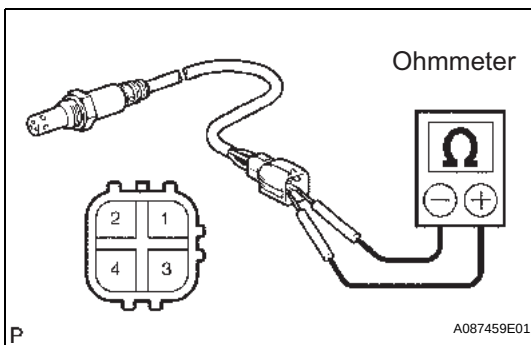
HEATED OXYGEN SENSOR

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE HEATED OXYGEN SENSOR**
 - (a) Disconnect the heated oxygen sensor connector.
 - (b) Disconnect the wire harness clamp. (4WD DRIVE TYPE)



- (c) Using SST, remove the heated oxygen sensor.
SST 09224-00010

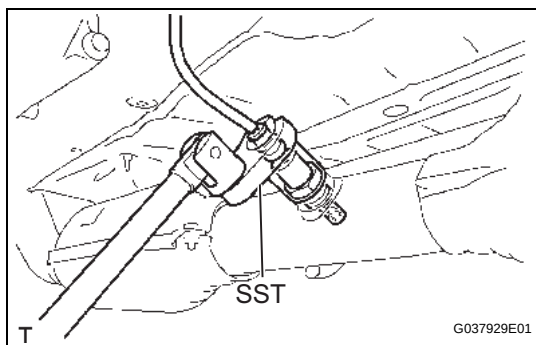


INSPECTION

1. **INSPECT HEATED OXYGEN SENSOR**
 - (a) Check the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.
- Standard**

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
1 (HT) - 4 (E)	10 k Ω or higher

If the result is not as specified, replace the heated oxygen sensor.



INSTALLATION

1. INSTALL HEATED OXYGEN SENSOR

- (a) Using SST, install the heated oxygen sensor.

SST 09224-00010

Torque: 44 N*m (449 kgf*cm, 33 ft.*lbf)

40 N*m (408 kgf*cm, 30 ft.*lbf) with SST

NOTICE:

Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

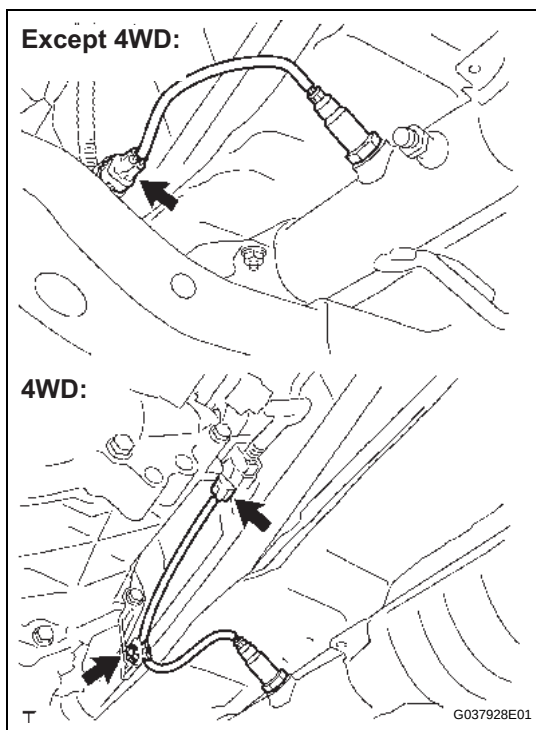
- (b) Connect the wire harness clamp. (4WD DRIVE TYPE)

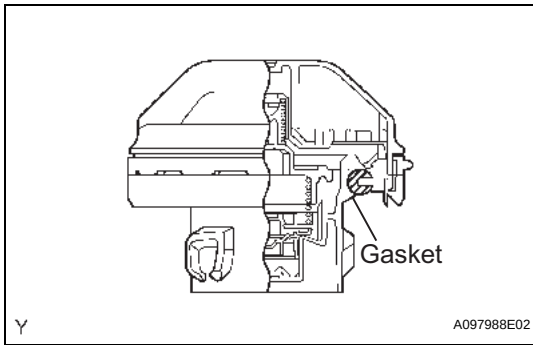
- (c) Connect the oxygen sensor connector.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

3. CHECK FOR EXHAUST GAS LEAKAGE





FUEL TANK CAP

INSPECTION

1. INSPECT FUEL TANK CAP ASSEMBLY

- (a) Check the appearance.
 - (1) Visually check whether the fuel tank cap and gasket are deformed or damaged.
If necessary, repair or replace the cap and/or gasket.