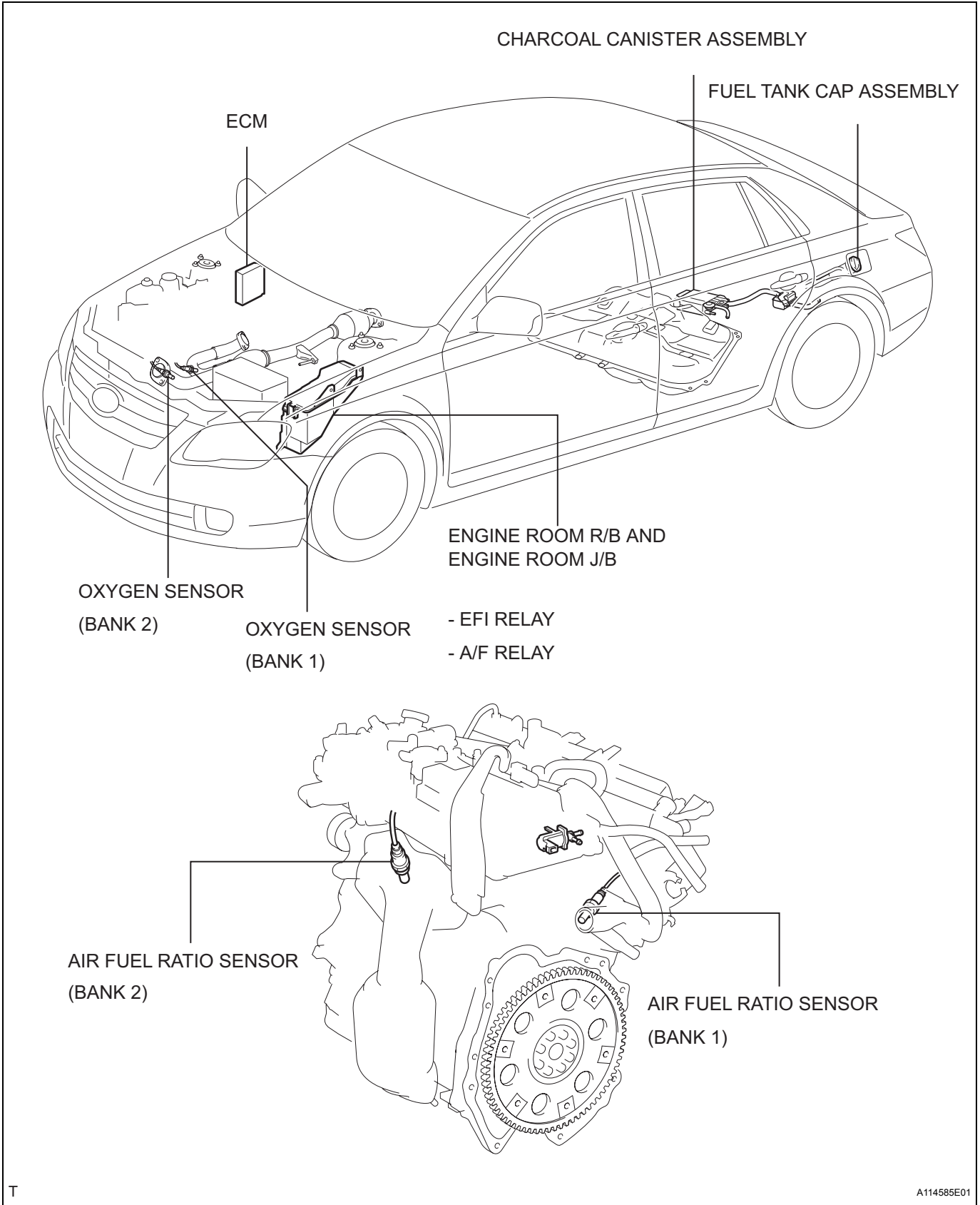


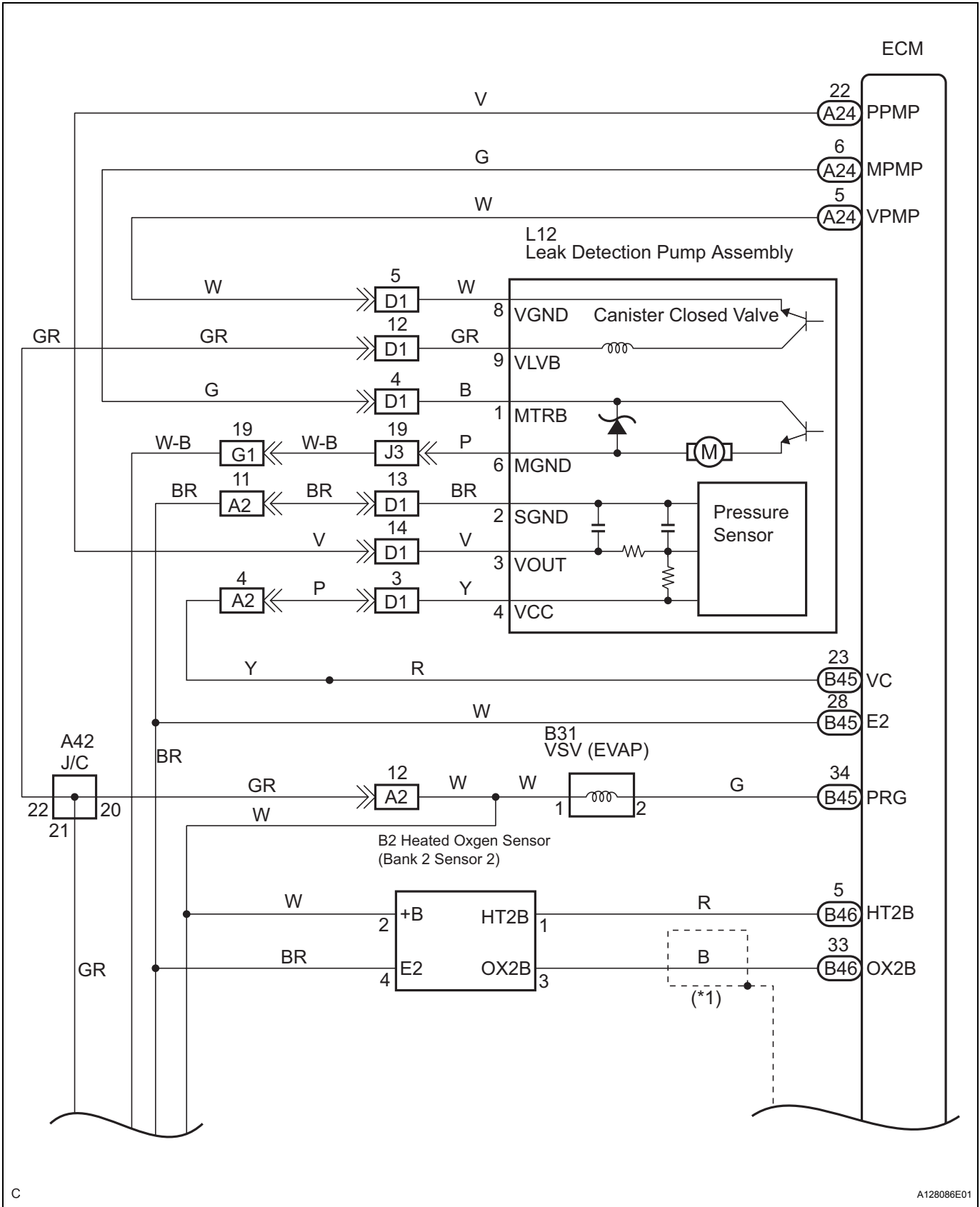
EMISSION CONTROL SYSTEM

PARTS LOCATION

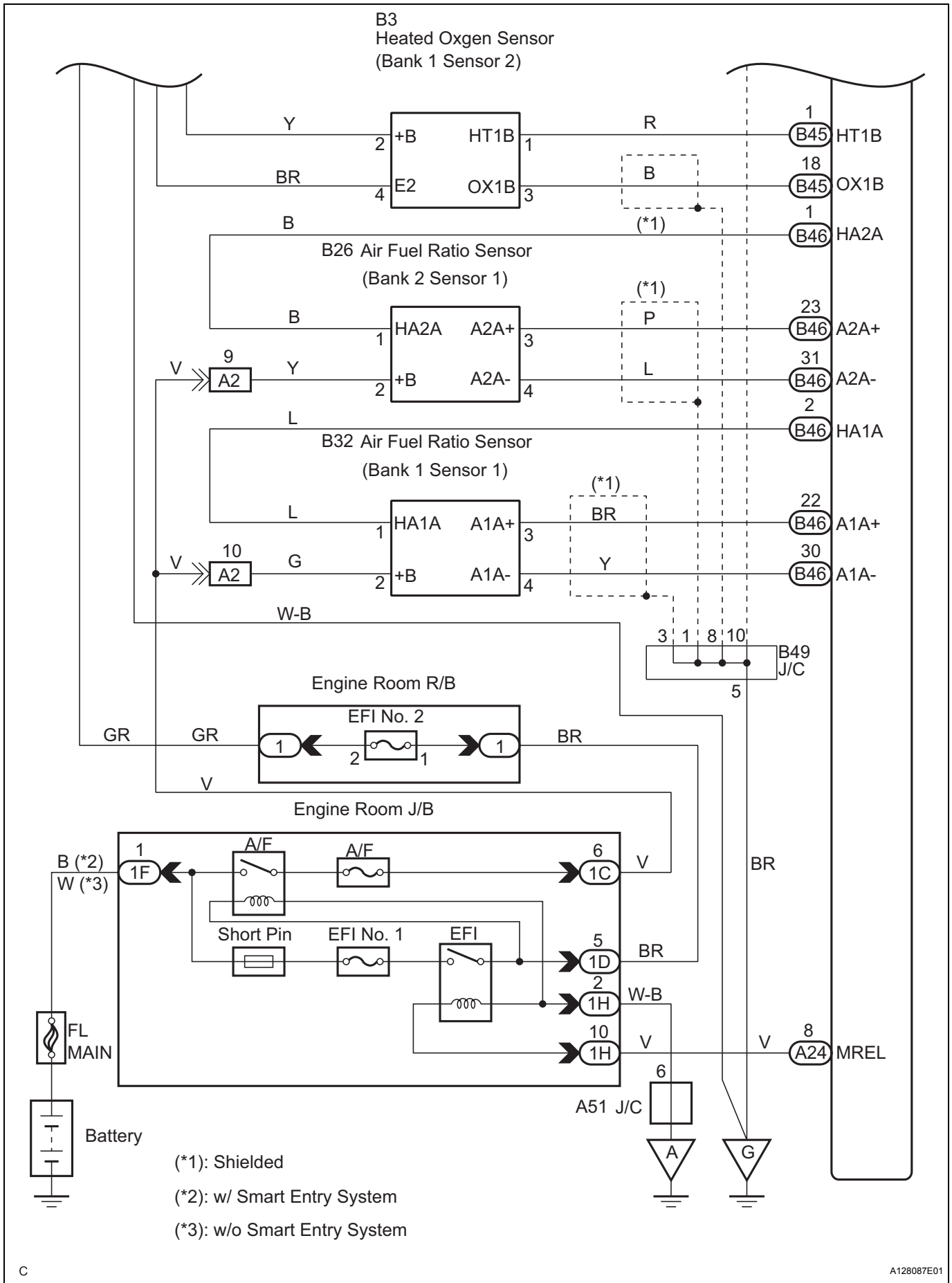


EC

SYSTEM DIAGRAM



EC



EC

ON-VEHICLE INSPECTION

1. INSPECT FUEL CUT-OFF RPM

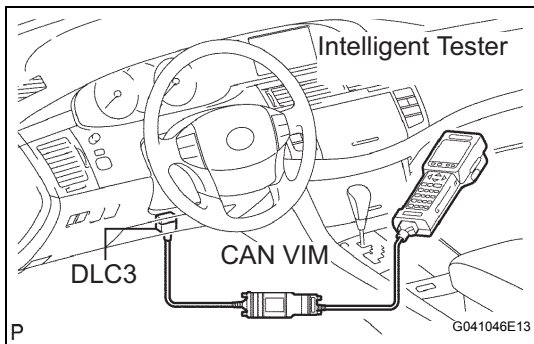
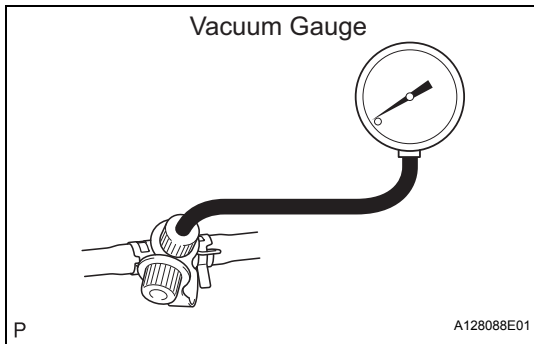
- (a) Increase the engine speed to at least 3,500 rpm.
- (b) Use a sound scope to check for injector operating sounds.
- (c) Check that when the throttle lever is released, injector operation sounds stop momentarily (at 2,500 rpm) and then resume (at 1,400 rpm).

Standard

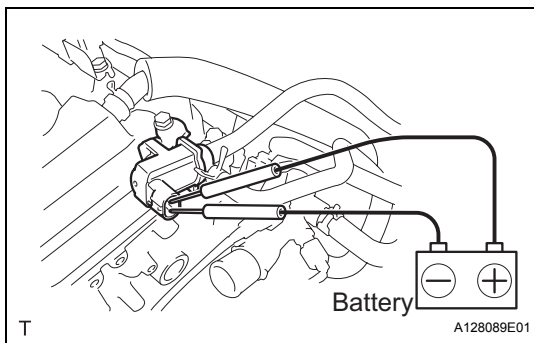
Item	Specified Condition
Fuel cut off rpm	2,500 rpm
Fuel return rpm	1,400 rpm

2. INSPECT EVAP SYSTEM LINE

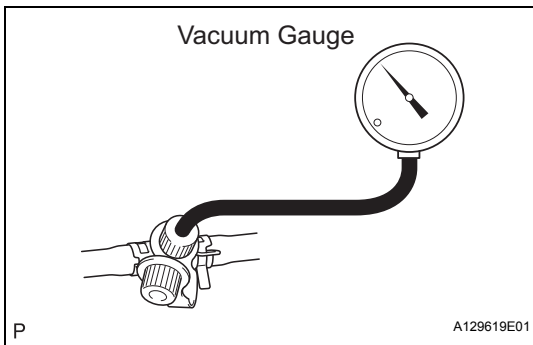
- (a) Warm up the engine to normal operating temperature and stop the engine.
- (b) Install a vacuum gauge (EVAP control system test equipment vacuum gauge) into the EVAP service port on the purge line.



- (c) When using an intelligent tester:
Operation of the VSV for EVAP.
 - (1) Connect an intelligent tester to the Controller Area Network Vehicle Interface Module (CAN VIM). Then connect the CAN VIM to the Data Link Connector 3 (DLC3).
 - (2) Start the engine.
 - (3) Turn the intelligent tester on.
 - (4) Enter the following menus: DIAGNOSIS / ENHANCED OBDII / ACTIVE TEST / EVAP VAV (ALONE)



- (d) When not using an intelligent tester:
Operation of the VSV for EVAP.
 - (1) Disconnect the VSV for EVAP connector.
 - (2) Connect leads from the positive (+) and negative (-) battery terminals to the VSV for EVAP terminals.
 - (3) Start the engine.



- (e) Check the vacuum when the engine idles.

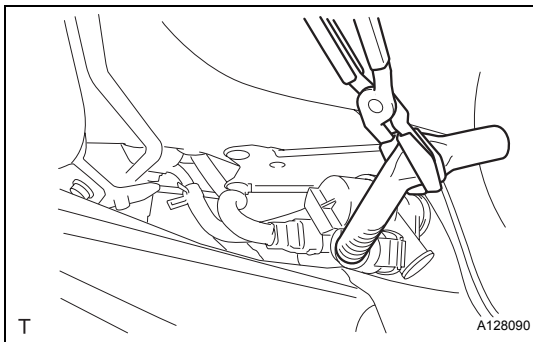
Vacuum:

Maintain between 0.368 and 19.713 in.Hg (5 to 268 in.Aq) for over 5 seconds.

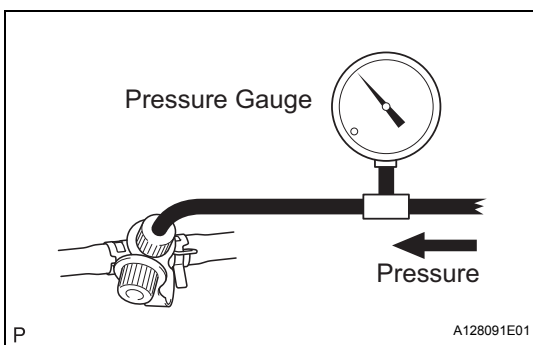
HINT:

If the vacuum does not change, the hose connecting the VSV and the service port is loose or blocked, or the VSV is malfunctioning.

- (f) When using an intelligent tester:
Conclude operation of the VSV for EVAP.
- (1) Stop the engine.
 - (2) Disconnect the intelligent tester from the DLC3.
- (g) When not using an intelligent tester:
Conclude operation of the VSV for EVAP.
- (1) Stop the engine.
 - (2) Disconnect the positive (+) and negative (-) leads of the battery from the VSV for EVAP terminals.
 - (3) Connect the VSV for EVAP connector.
- (h) Disconnect the vacuum gauge from the EVAP service port on the purge line.
- (i) Connect a pressure gauge to the EVAP service port on the purge line.
- (j) Check the pressure.



- (1) Prepare a rubber hose that has an inside diameter of 15 to 18.5 mm.
- (2) Disconnect the atmospheric side hose of the pump module.
- (3) Connect the prepared rubber hose to the pump module, and pinch the rubber hose with the clip to prevent air from entering into the canister passage.



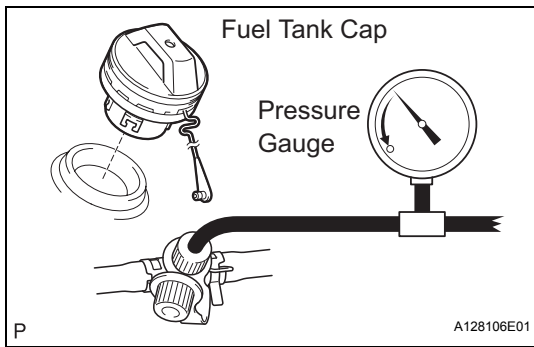
- (4) Apply pressure (13.5 to 15.5 in.Aq, 0.99 to 1.14 in.Hq) from the EVAP service port.

Pressure:

The gauge should still read over 7.7 to 8.8 in.Aq (0.57 to 0.65 in.Hq) for 2 minutes after the pressure is applied.

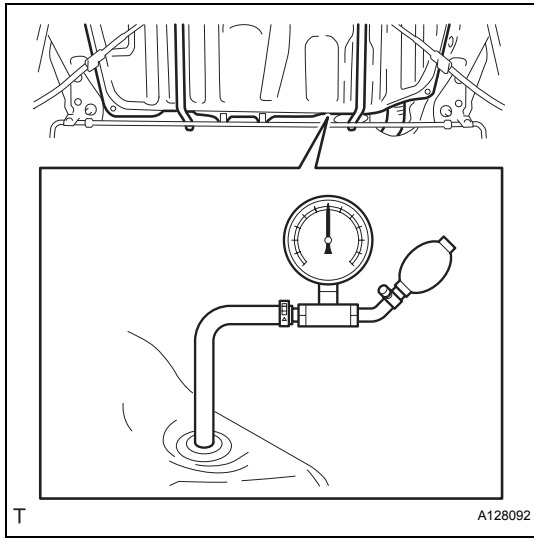
HINT:

If the pressure cannot be applied, the hose connecting the VSV, charcoal canister and fuel tank has slipped off or the VSV is open.



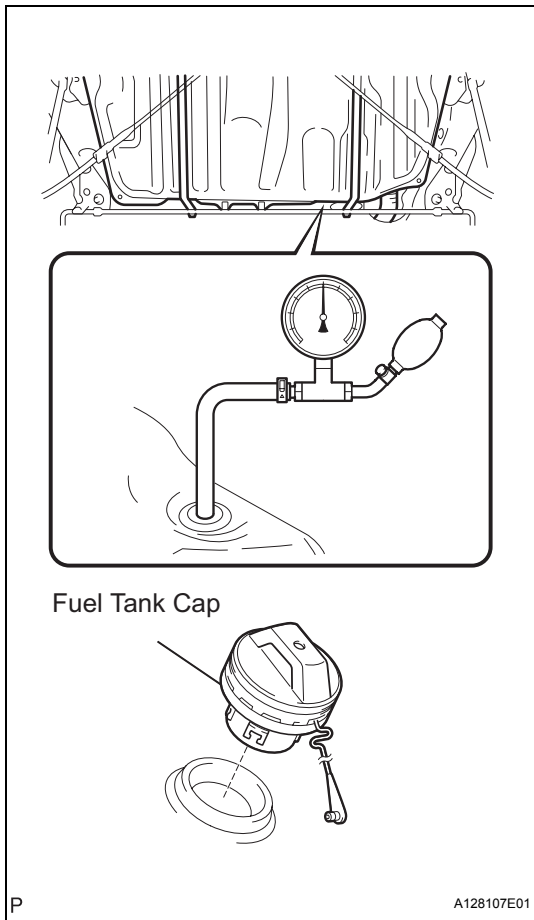
- (5) Check if the pressure decreases when the fuel tank cap is removed while applying pressure.
HINT:
If the pressure does not decrease when the filler cap is removed, the hose connecting the service port and the fuel tank may be blocked.
- (k) Disconnect the pressure gauge from the EVAP service port on the purge line.

3. CHECK AIR TIGHTNESS IN FUEL TANK AND FILLER PIPE



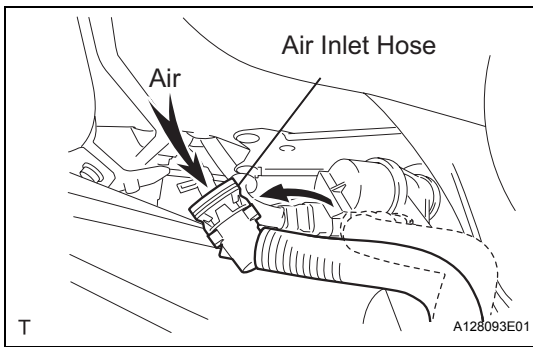
- (a) Disconnect the vent line hose from the fuel tank.
- (b) Connect the pressure gauge to the fuel tank.
- (c) Apply pressure to the fuel tank to create an internal pressure of 4 kPa (41 gf/cm², 0.58 psi).
- (d) Check that the internal pressure of the fuel tank is maintained for 1 minute.
- (e) Check the connected portions of each hose and pipe.
- (f) Check the installed parts on the fuel tank.
If any malfunctions, damage or other problems are found, replace the fuel tank and filler pipe.
- (g) Reconnect the vent line hose to the fuel tank.

4. INSPECT FUEL CUT OFF VALVE AND FUEL CHECK VALVE



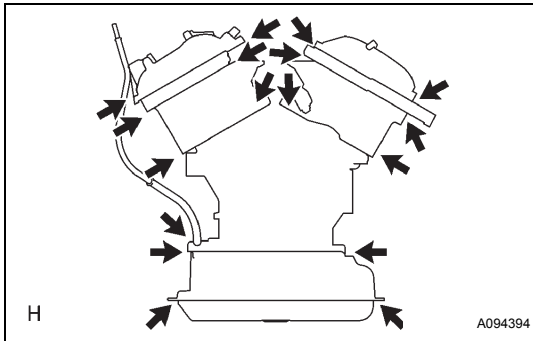
- (a) Disconnect the vent line hose from the fuel tank.
- (b) Connect the pressure gauge to the fuel tank.
- (c) Fill the fuel tank with fuel.
- (d) Apply pressure of 4 kPa (41 gf/cm², 0.58 psi) to the vent port of the fuel tank.
HINT:
Check the amount of fuel in the fuel tank. When the fuel tank is full, the float valve of the fill check valve is closed and no air can pass through.
- (e) Remove the fuel tank cap, and check that the pressure drops.
If the pressure does not drop, replace the fuel tank assembly.
- (f) Reconnect the vent line hose to the fuel tank.

EC



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.



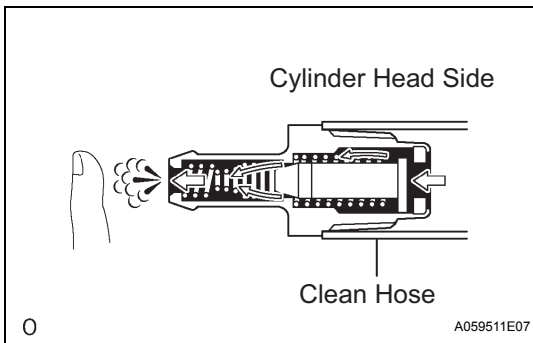
6. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

- (a) Check for cracks, leaks or damage.

HINT:

Removal or problems with the engine oil dipstick, oil filler cap, PCV hose and other components may cause the engine to run improperly. Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will allow air suction and cause the engine to run improperly.

If necessary, replace any damaged parts.



INSPECTION

1. INSPECT VENTILATION VALVE SUB-ASSEMBLY

- (a) Install a clean hose to the ventilation valve.
- (b) Check ventilation valve operation.
 - (1) Blow air into the cylinder head side, and check that air passes through easily.

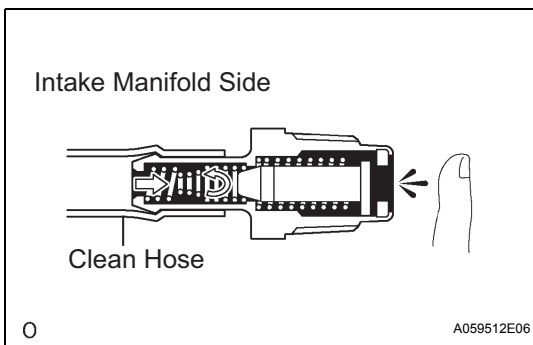
CAUTION:

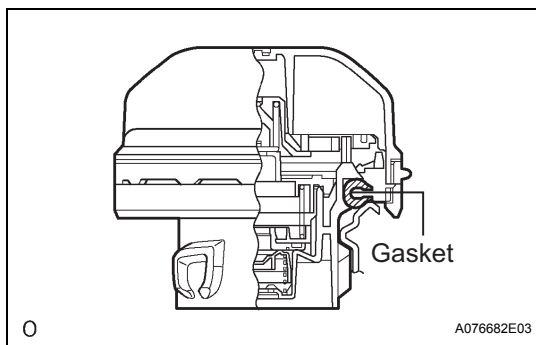
Do not suck air through the valve.

Petroleum substances inside the valve are dangerous to your health.

- (2) Blow air into the intake manifold side, check that air passes through with difficulty. If operation is not as specified, replace the ventilation valve.

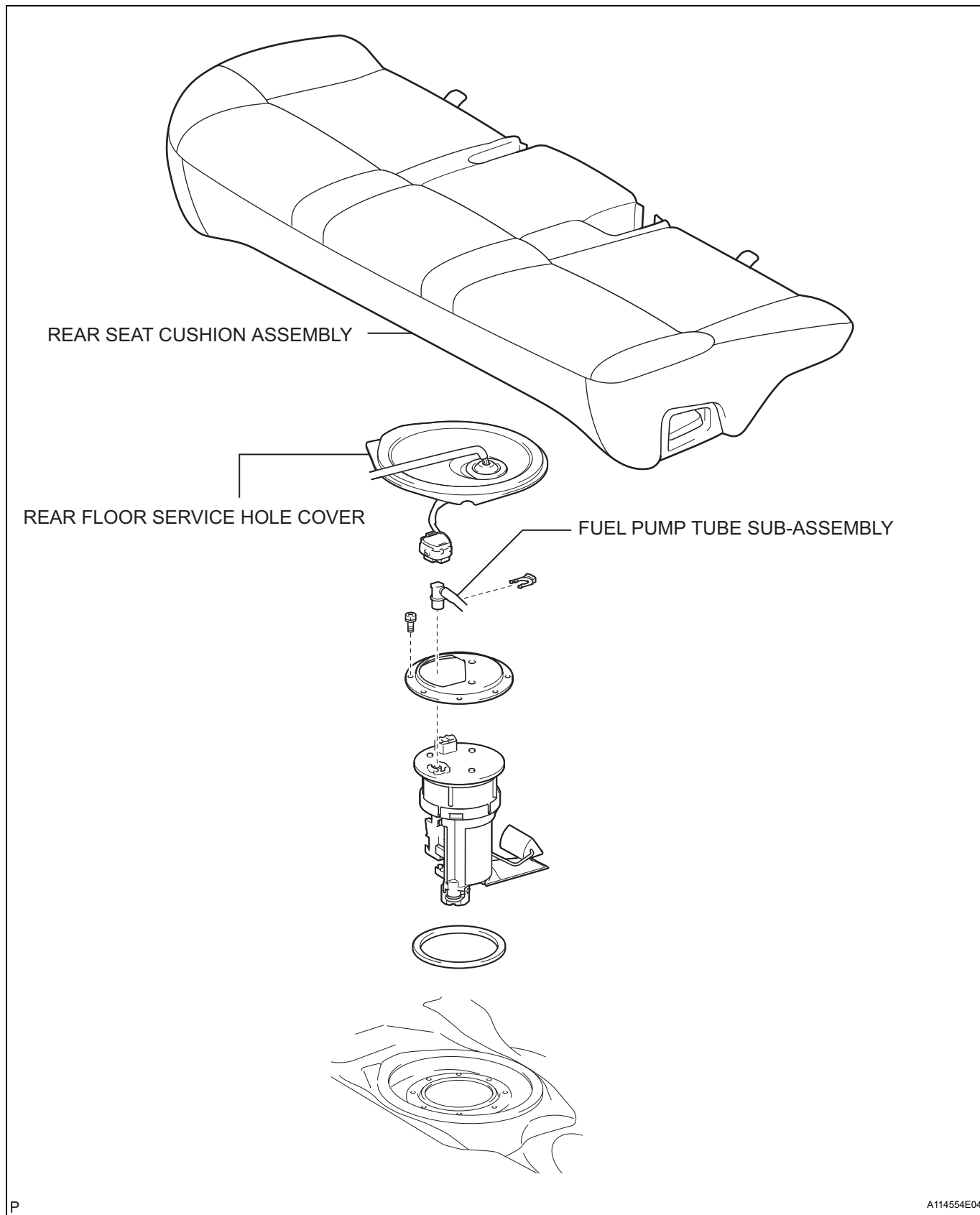
- (c) Remove the clean hose from the ventilation valve.



**2. INSPECT FUEL TANK CAP ASSEMBLY**

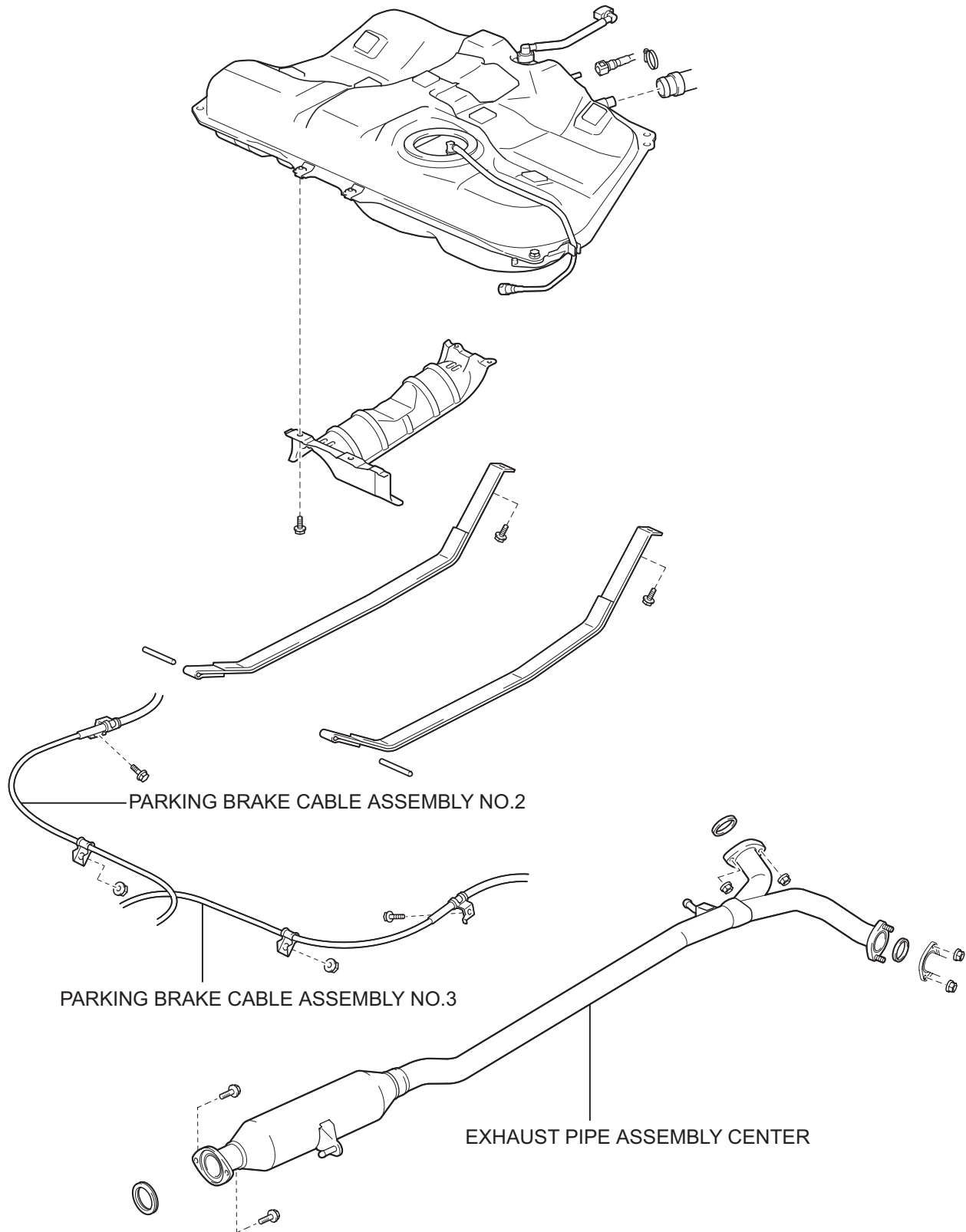
- (a) Visually check if the cap and gasket are deformed or damaged.

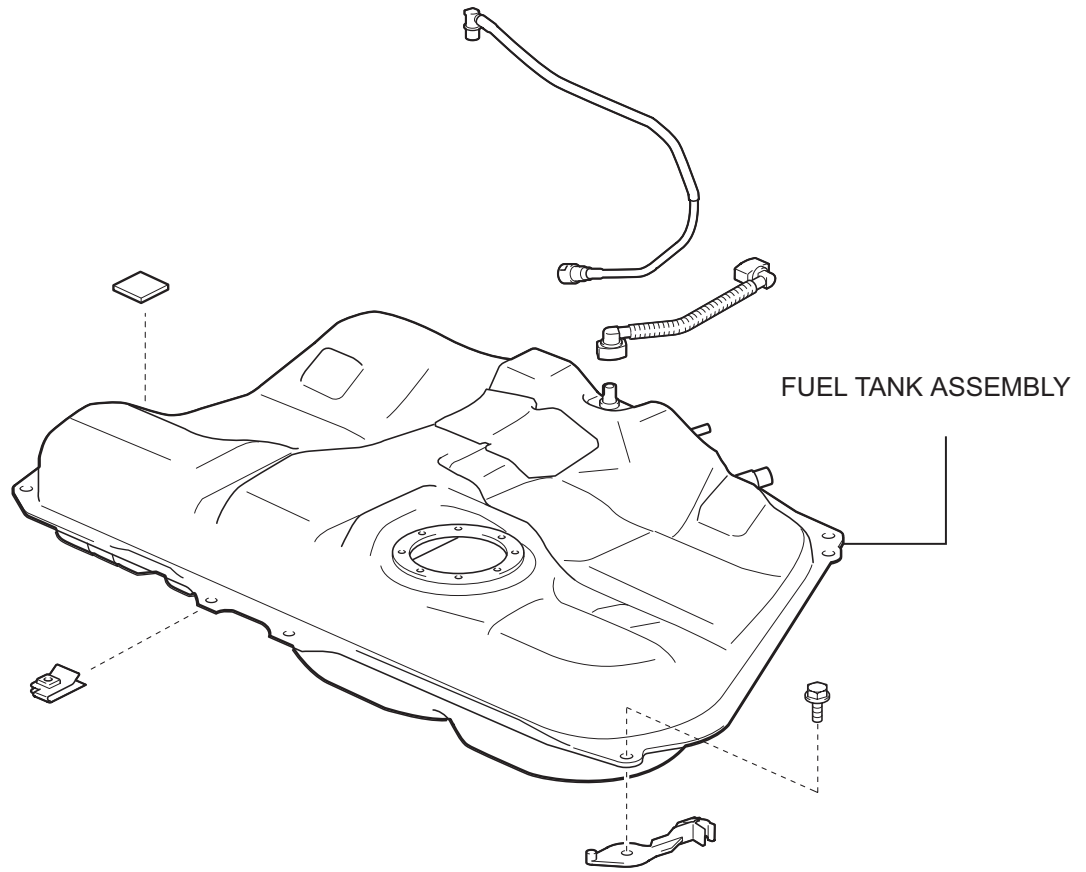
CANISTER COMPONENTS



EC

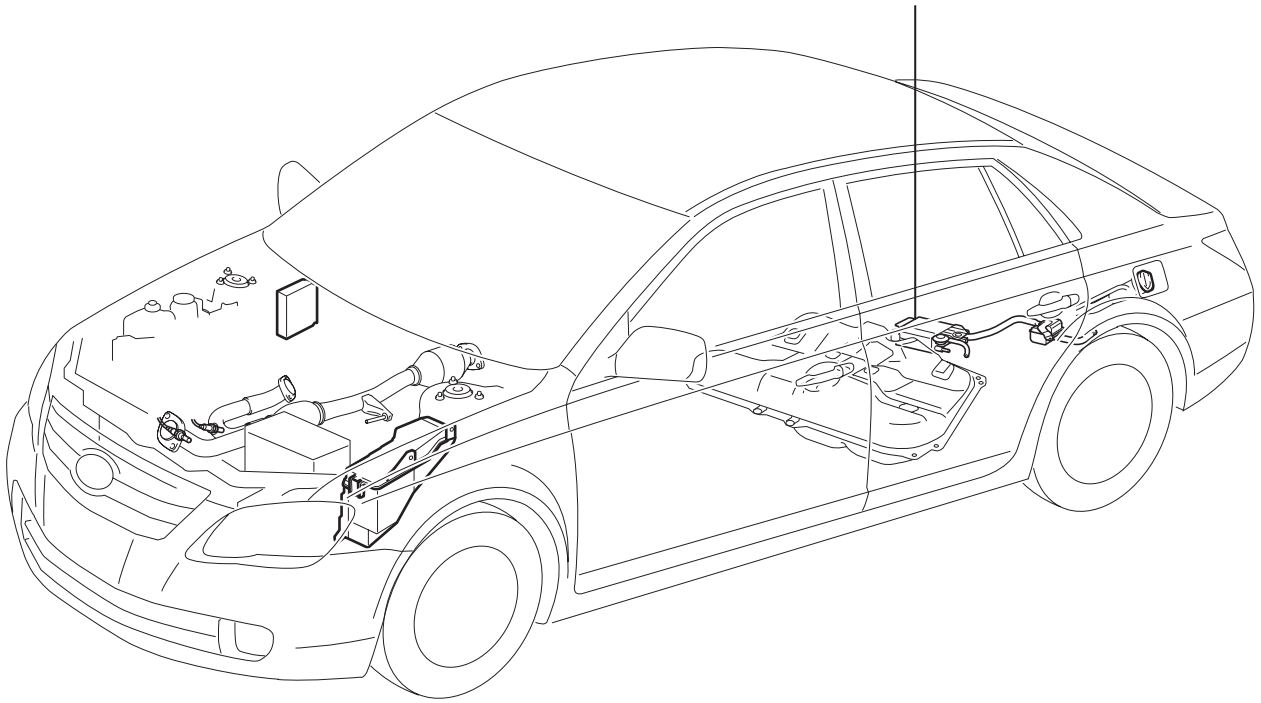
EC



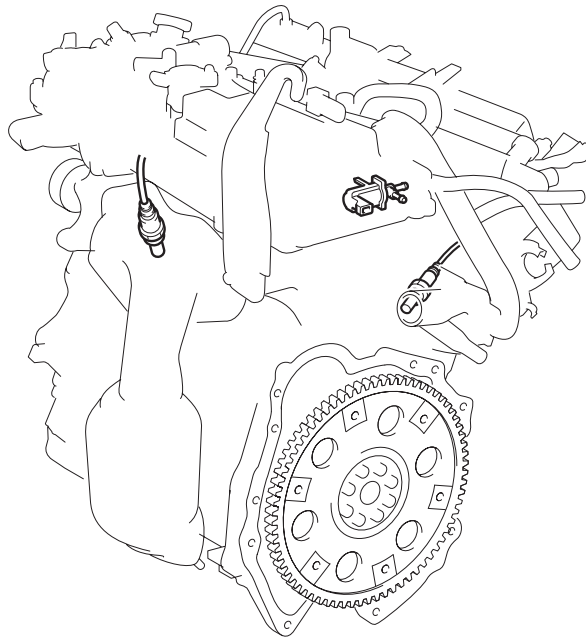


EC

CHARCOAL CANISTER ASSEMBLY



EC

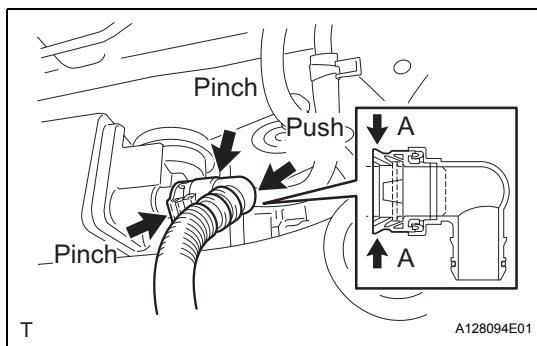


T

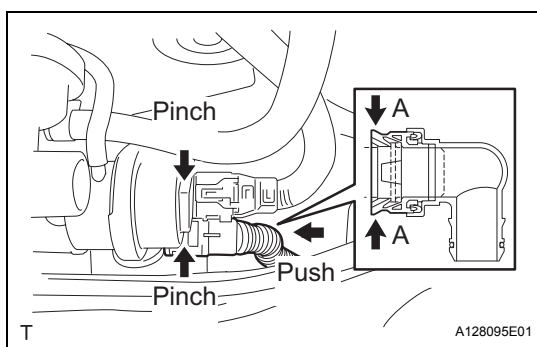
REMOVAL

1. PREVENT GASOLINE FROM SPILLING OUT
2. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL
3. REMOVE REAR SEAT CUSHION ASSEMBLY (See page [SE-68](#))
4. REMOVE REAR FLOOR SERVICE HOLE COVER (See page [FU-26](#))
5. SEPARATE FUEL PUMP TUBE SUB-ASSEMBLY (See page [FU-26](#))
6. DRAIN FUEL
7. REMOVE EXHAUST PIPE ASSEMBLY CENTER
8. DISCONNECT PARKING BRAKE CABLE ASSEMBLY NO.2 (See page [FU-35](#))
9. DISCONNECT PARKING BRAKE CABLE ASSEMBLY NO.3 (See page [FU-35](#))
10. REMOVE FUEL TANK ASSEMBLY (See page [FU-35](#))
11. REMOVE CHARCOAL CANISTER ASSEMBLY

EC

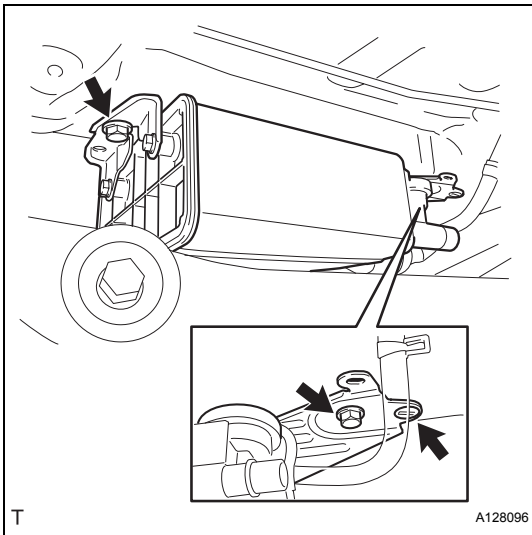


- (a) Disconnect the fuel tank vent hose from the charcoal canister.
 - (1) Push the connector deep inside.
 - (2) Pinch portion A.
 - (3) Pull out the connector.



- (b) Disconnect the charcoal canister filter sub-assembly from the charcoal canister.
 - (1) Push the connector deep inside.
 - (2) Pinch portion A.
 - (3) Pull out the connector.
- (c) Disconnect the vapor pressure sensor connector.
- (d) Disconnect the wire harness clamp.
- (e) Disconnect the purge line hose from the charcoal canister.

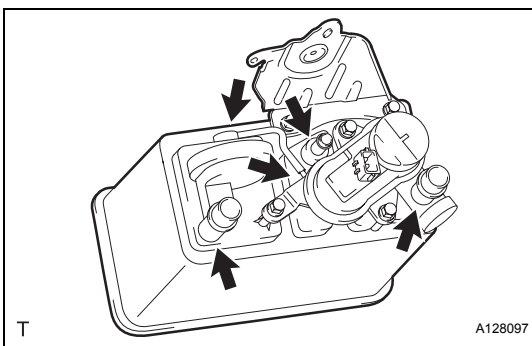
(f) Remove the 2 bolts, clip and charcoal canister.



INSPECTION

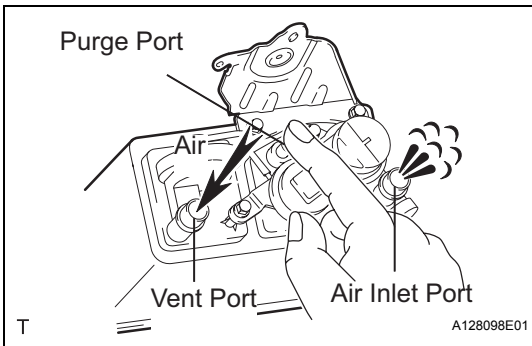
1. INSPECT CHARCOAL CANISTER ASSEMBLY

(a) Visually check the charcoal canister for cracks or damage.
If cracks or damage are found, replace the charcoal canister assembly.

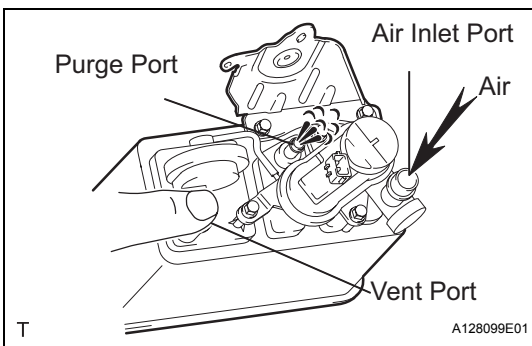


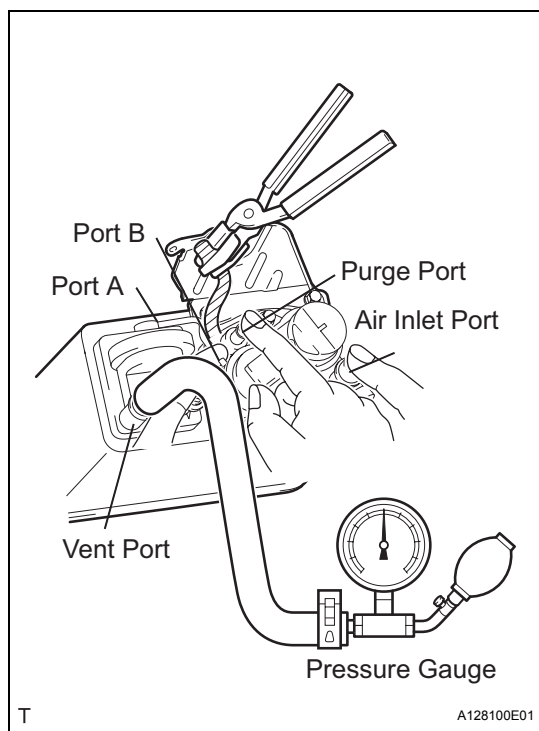
(b) Check charcoal canister operation.

(1) With the purge port closed, blow 1.67 kPa (17.0 gf/cm², 0.24 psi) of air into the vent port, and check that air flows from the air inlet port.
If the result is not as specified, replace the charcoal canister assembly.



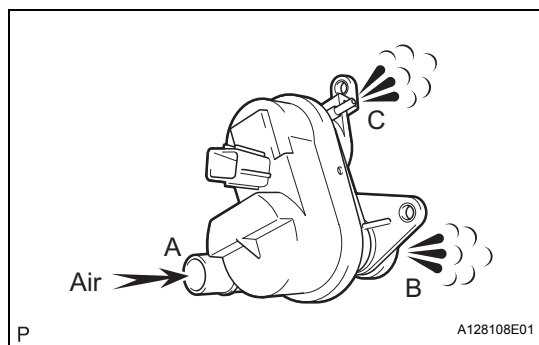
(2) With the vent port closed, blow 1.10 kPa (11.2 gf/cm², 0.16 psi) air to the air inlet port, and check that air flows from the purge port.
If the result is not as specified, replace the charcoal canister assembly.



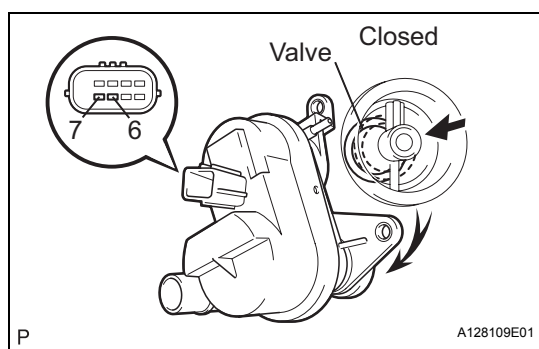


- (c) Check for air leakage.
- (1) Remove the air hose between ports A and B.
 - (2) Connect the pressure gauge to the vent port of the charcoal canister.
SST 09992-00242
 - (3) While holding port B, with the purge port and the air inlet port closed and port A open, apply pressurized air 19.6 kPa (0.2 kgf/cm², 2.81 psi) into the vent port, then confirm that the pressure is retained for 1 minute.
If the result is not as specified, replace the charcoal canister assembly.

EC



- (d) Check the leak detection pump.
- (1) Remove the detection pump from the charcoal canister.
 - (2) Check that air flows from port A to B and then C.
If the result is not as specified, replace the charcoal canister assembly.

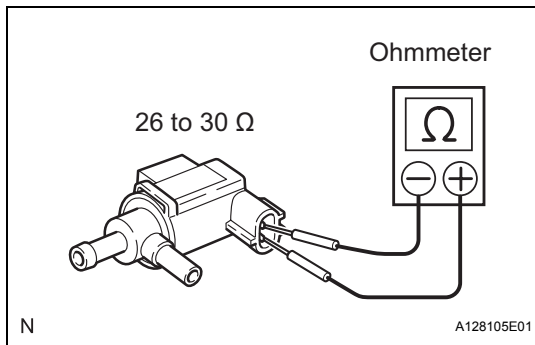


- (3) Connect the positive (+) lead to terminal 7 and the negative (-) lead to terminal 6.
- (4) Check that the valve is closed.
If the result is not as specified, replace the charcoal canister assembly.
- (5) Install the detection pump.

INSTALLATION

1. **INSTALL CHARCOAL CANISTER ASSEMBLY**
 - (a) Install the 2 bolts, clip and charcoal canister.
Torque: 36 N*m (367 kgf*cm, 27 ft.*lbf)
 - (b) Connect the purge line hose to the charcoal canister.
 - (c) Connect the wire harness clamp.
 - (d) Connect the vapor pressure sensor connector.
 - (e) Connect the charcoal canister filter sub-assembly to the charcoal canister.
 - (f) Connect the fuel tank vent hose to the charcoal canister.
2. **INSTALL FUEL TANK ASSEMBLY (See page [FU-38](#))**
3. **INSTALL PARKING BRAKE CABLE ASSEMBLY NO.3 (See page [FU-40](#))**
4. **INSTALL PARKING BRAKE CABLE ASSEMBLY NO.2 (See page [FU-40](#))**
5. **INSTALL EXHAUST PIPE ASSEMBLY CENTER**
6. **CONNECT FUEL PUMP TUBE SUB-ASSEMBLY**
7. **ADD FUEL**
8. **CONNECT BATTERY NEGATIVE TERMINAL**
9. **CHECK FOR FUEL LEAKS**
10. **CHECK FOR EXHAUST GAS LEAKS**
11. **INSTALL REAR FLOOR SERVICE HOLE COVER**
12. **INSTALL REAR SEAT CUSHION ASSEMBLY (See page [SE-76](#))**
13. **PERFORM SYSTEM INITIALIZE**

Some systems need initialization when disconnecting the battery terminal.



VACUUM SWITCHING VALVE (for EVAP)

INSPECTION

1. INSPECT EVAP VSV

- (a) Check the VSV for open circuit.
 - (1) Measure the resistance.

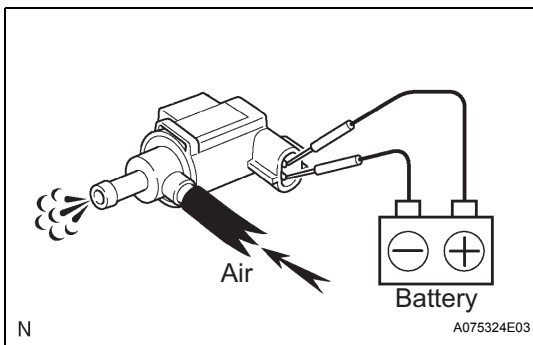
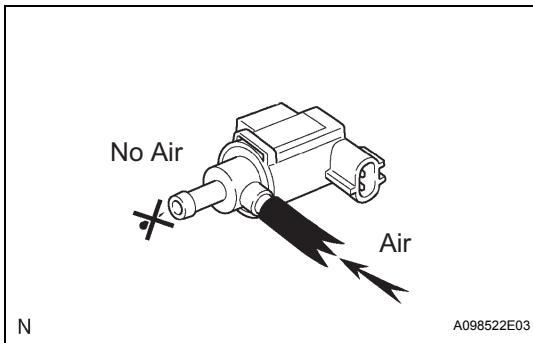
Resistance

Tester Connection	Specified Condition
1 - 2	26 to 30 Ω at 20°C (68°F)
1 - Body ground 2 - Body ground	10 k Ω or higher

If the resistance is not as specified, replace the VSV assembly.

- (b) Check VSV operation.

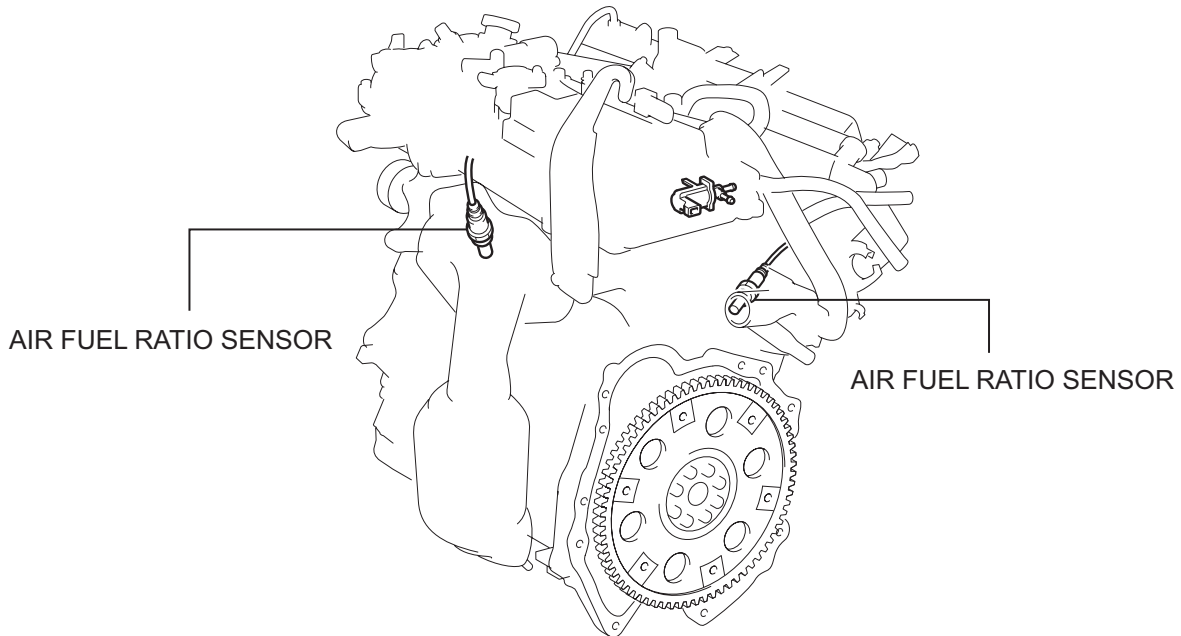
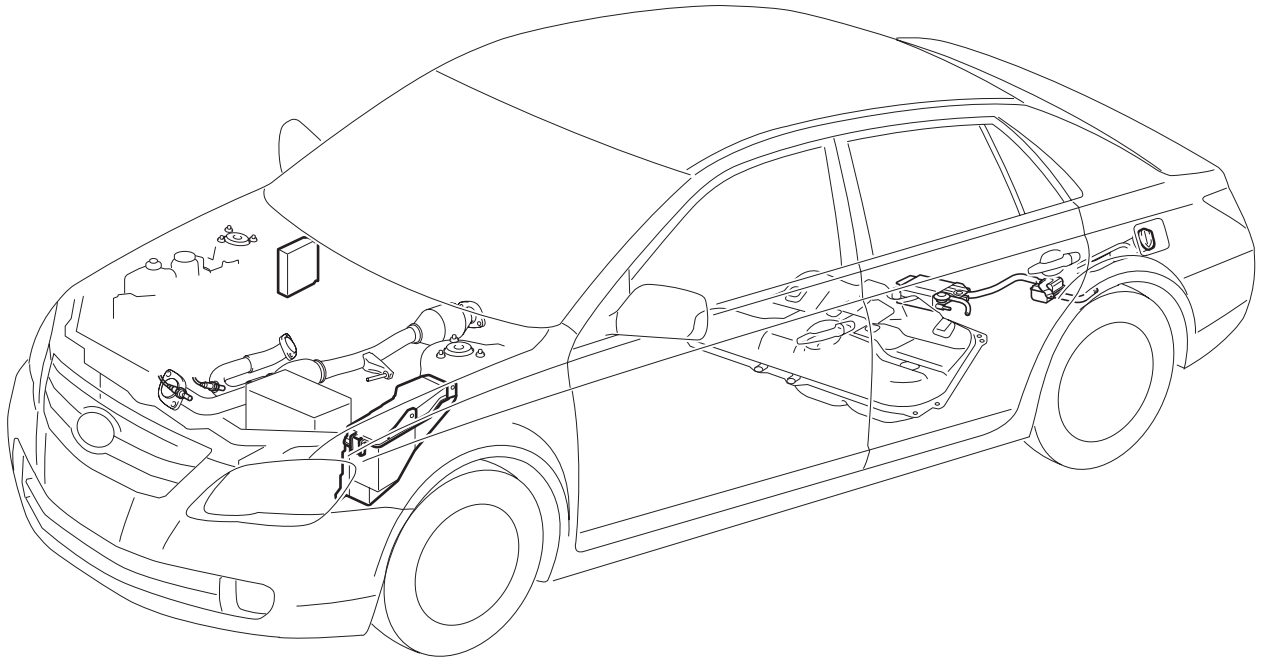
- (1) Check that air does not flow from the port as shown in the illustration.



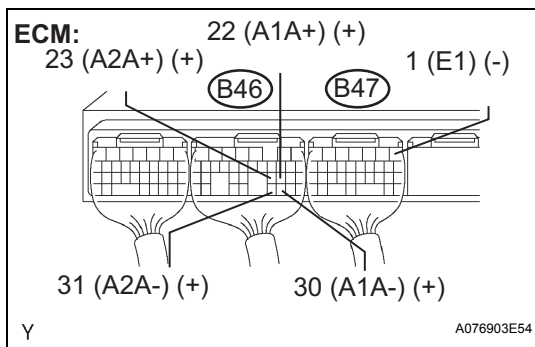
- (2) Apply battery positive voltage across the terminals.
- (3) Check that air flows from the ports.
If the result is not as specified, replace the VSV assembly.

AIR FUEL RATIO SENSOR

COMPONENTS



EC



ON-VEHICLE INSPECTION

1. INSPECT AIR-FUEL RATIO SENSOR

- (a) Measure the voltage of the ECM connectors. (See page [ES-33](#))

Voltage

Tester Connection	Condition	Specified Condition
B46-22 (A1A+) - B47-1 (E1)	Ignition switch on (IG)	3.3 V
B46-30 (A1A-) - B47-1 (E1)	Ignition switch on (IG)	3.0 V
B46-23 (A2A+) - B47-1 (E1)	Ignition switch on (IG)	3.3 V
B46-31 (A2A-) - B47-1 (E1)	Ignition switch on (IG)	3.0 V

HINT:

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

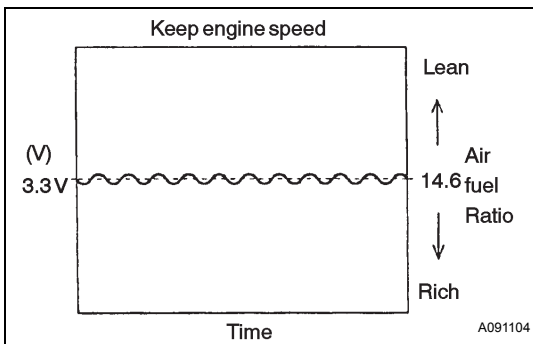
NOTICE:

Connect test leads to the connector's backside. The connectors should not be disconnected from the ECM.

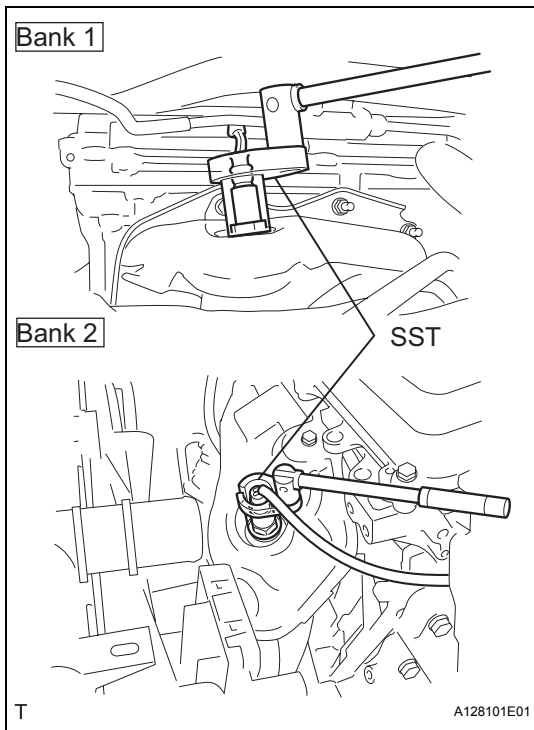
- (b) Connect the intelligent tester to the DLC3.
 (c) Select "DATA MONITOR". Then select "A/FS B1 S1", "A/FS B2 S1" and "O2S B1 S2" to display the monitors.
 (d) Warm up the A/F sensor with the engine speed at 2,500 rpm for approximately 2 minutes.
 (e) Maintain engine speed at 2,500 rpm and confirm that the displays of "A/FS B1 S1" and "A/FS B2 S1" are as shown in the illustration.

HINT:

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



EC

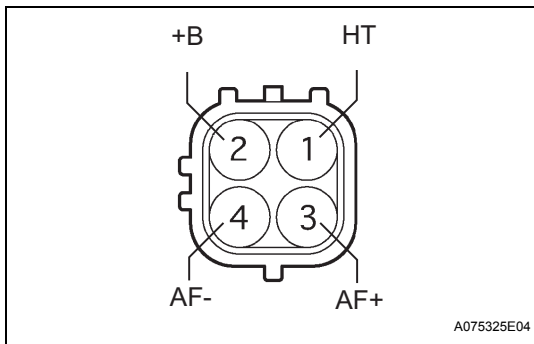


REMOVAL

1. REMOVE AIR FUEL RATIO SENSOR

- (a) Disconnect the 2 air fuel ratio sensor connectors.
- (b) Remove the 2 air fuel ratio sensors from the front pipe assembly.

SST 09224-00010



INSPECTION

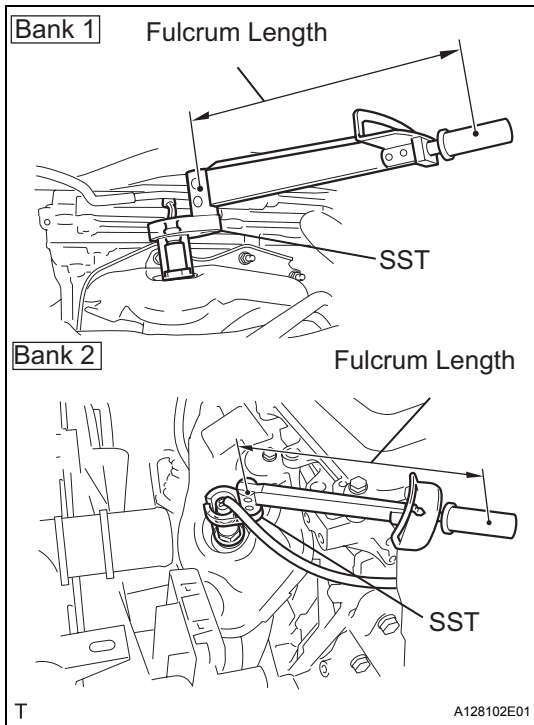
1. INSPECT AIR FUEL RATIO SENSOR

- (a) Measure the resistance between terminals 1 (HT) and 2 (+B).

Resistance

Condition	Specified Condition
20 °C (68°F)	1.8 to 3.4 Ω

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



INSTALLATION

1. INSTALL AIR FUEL RATIO SENSOR

- (a) Install the 2 air fuel ratio sensors to the front pipe assembly.

SST 09224-00010

Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf)

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

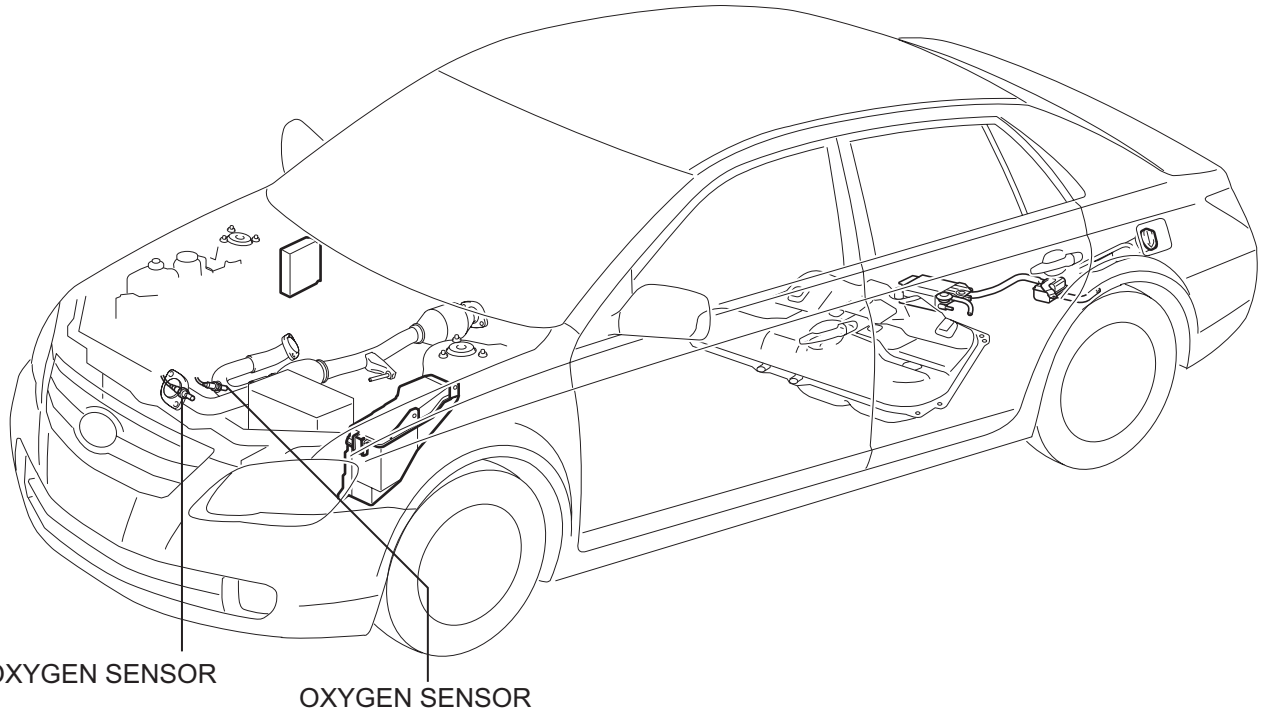
NOTICE:

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

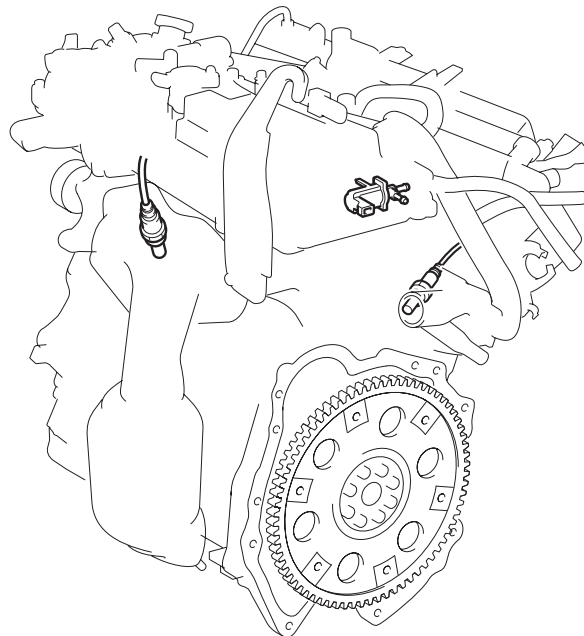
- (b) Connect the 2 air fuel ratio sensor connectors.

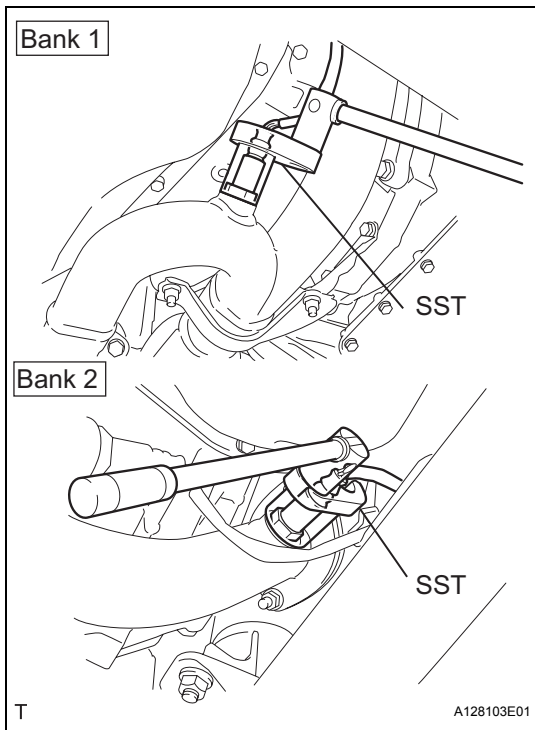
HEATED OXYGEN SENSOR

COMPONENTS



EC

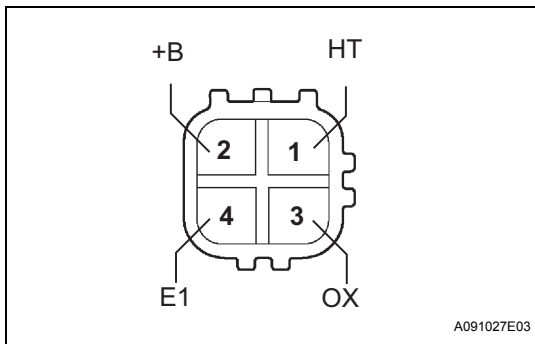




REMOVAL

1. REMOVE OXYGEN SENSOR
 - (a) Disconnect the 2 oxygen sensor connectors.
 - (b) Remove the 2 oxygen sensors from the front pipe assembly.

SST 09224-00010



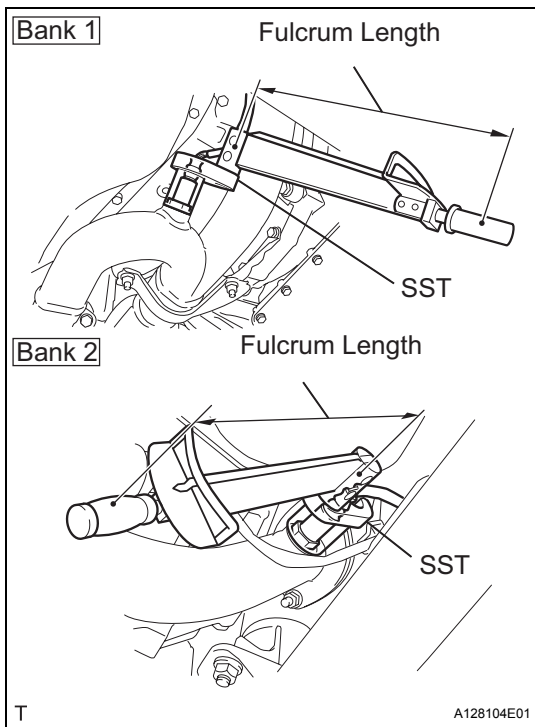
INSPECTION

1. INSPECT OXYGEN SENSOR
 - (a) Measure the resistance between terminals 1 (HT) and 2 (+B).

Resistance

Condition	Specified Condition
20°C (68°F)	11 to 16 Ω

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



INSTALLATION

1. INSTALL OXYGEN SENSOR
 - (a) Install the 2 oxygen sensors to the front pipe assembly.

SST 09224-00010

Torque: 44 N*m (449 kgf*cm, 32 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 2 oxygen sensor connectors.