

EMISSION CONTROL SYSTEM

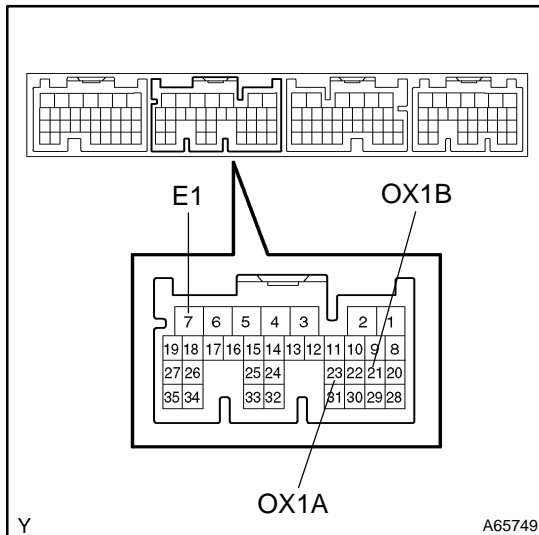
ON-VEHICLE INSPECTION

1204D-01

1. INSPECT AIR-FUEL RATIO COMPENSATION SYSTEM

HINT:

You can also check the system by choosing "DATA MONITOR", then "O₂ SENSOR OUTPUT VOLTAGE" on the monitor of the hand-held tester.



- (a) Connect the hand-held tester to the terminal 23 (OX1A) ⇔ 7 (E1) and 21 (OX1B) ⇔ 7 (E1) of the ECM.

CAUTION:

Connect test leads from the back side of the connector with the ECU connected.

- (b) Warm up the oxygen sensor with the engine speed at 2,500 rpm for approx. 2 minutes.
 (c) Confirm that the voltage changes between 0V to 1V with the engine speed at 2,500 rpm.

OK:

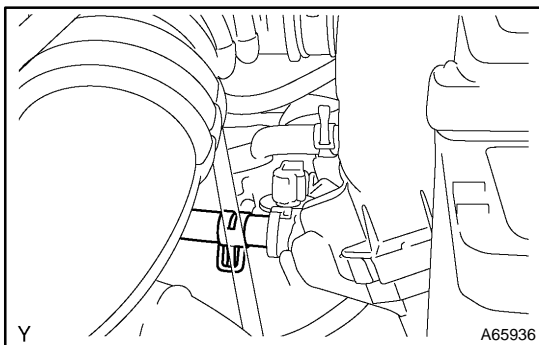
The voltage changes more than 8 times in 10 seconds.

CAUTION:

- Perform the check immediately after the end of the warming up.
- If not confirming the change of voltage, warming up the oxygen sensor again.

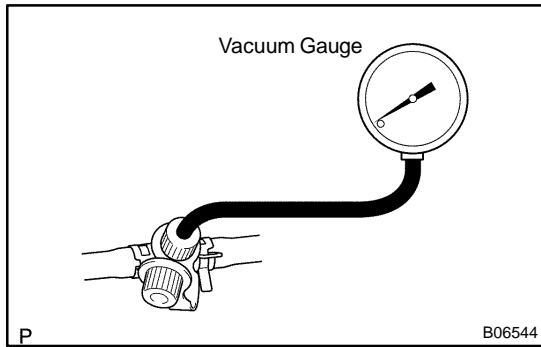
2. INSPECT FUEL CUT OFF RPM

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



3. INSPECT EVAPORATIVE EMISSION CONTROL SYSTEM

- (a) After starting the engine, disconnect the vacuum hose shown in the illustration.
 (b) Confirm vacuum occurs at the vsv port, when choosing "ACTIVE TEST" and "PURGE VSV" according to the display on hand-held tester.
 (c) Finish "ACTIVE TEST", then connect the vacuum hose again.
 (d) After going to "ECM DATA MONITOR" on the hand-held tester, choose "PURGE VSV" to check the operation of the purge VSV.
 (e) After warm up the engine and drive the vehicle, confirm the VSV turns on from off.



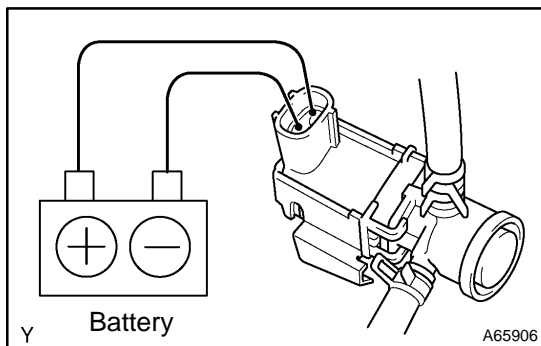
4. INSPECT EVAP SYSTEM LINE

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

(c) TOYOTA Hand-Held Tester:

Forced driving of the VSV for the EVAP.

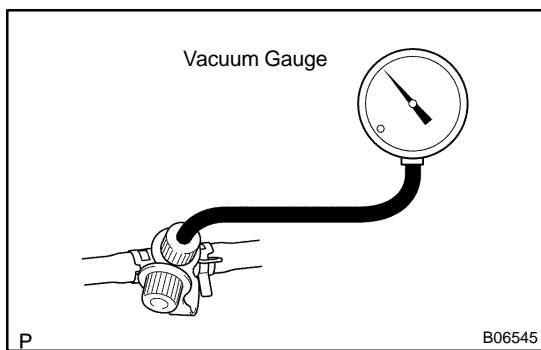
- (1) Connect a TOYOTA hand-held tester to the DLC3
- (2) Start the engine.
- (3) Push the TOYOTA hand-held tester main switch ON.
- (4) Use the ACTIVE TEST mode on the TOYOTA hand-held tester to operate the VSV for the EVAP.



(d) If you have no TOYOTA Hand-Held Tester:

Forced driving of the VSV for the EVAP.

- (1) Disconnect the VSV connector for the EVAP.
- (2) Connect the positive (+) and negative (-) leads from the battery to the VSV terminals for the EVAP.
- (3) Start the engine.



(e) Check the vacuum at idle

Vacuum:

Maintain at 0.368 – 19.713 in.Hg (5 –268 in.Aq) for over 5 seconds.

HINT:

If the vacuum does not change, you can conclude that the hose connecting the VSV to the service port has come loose or is blocked, or the VSV is malfunctioning.

(f) TOYOTA Hand-Held Tester:

Conclude forced driving of the VSV for the EVAP.

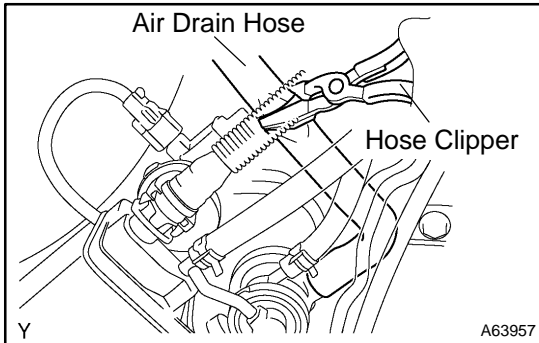
- (1) Stop the engine.
- (2) Disconnect the TOYOTA hand-held tester from the DLC3.

(g) If you have no TOYOTA Hand-Held tester:

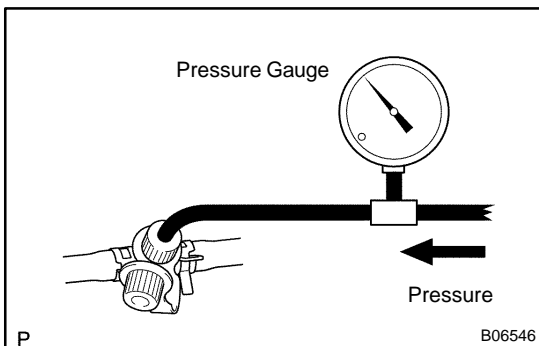
Conclude forced driving of the VSV for the EVAP.

- (1) Stop the engine.

- (2) Disconnect the positive (+) and negative (-) leads from the battery from the VSV terminals for the EVAP.
- (3) Connect the VSV connector for the EVAP.
- (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) Close off the air drain hose at the marked position of the canister with a hose clipper or similar instrument.

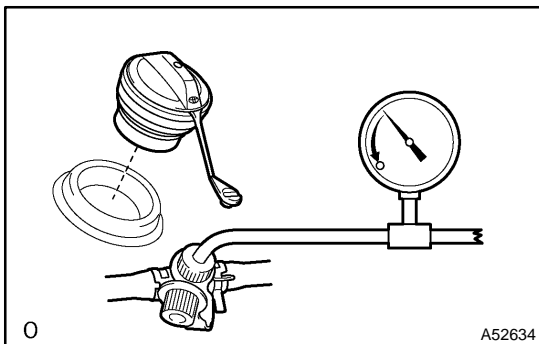


- (2) Add the pressure (13.5 – 15.5 in. Aq) from the EVAP service port.

Pressure:
2 minutes after the pressure is added, the gauge should be over 7.7-8.8 in.Aq.

HINT:

If you can not add pressure, you can conclude that the hose connecting the VSV – canister – fuel tank has slipped off or the VSV is open.

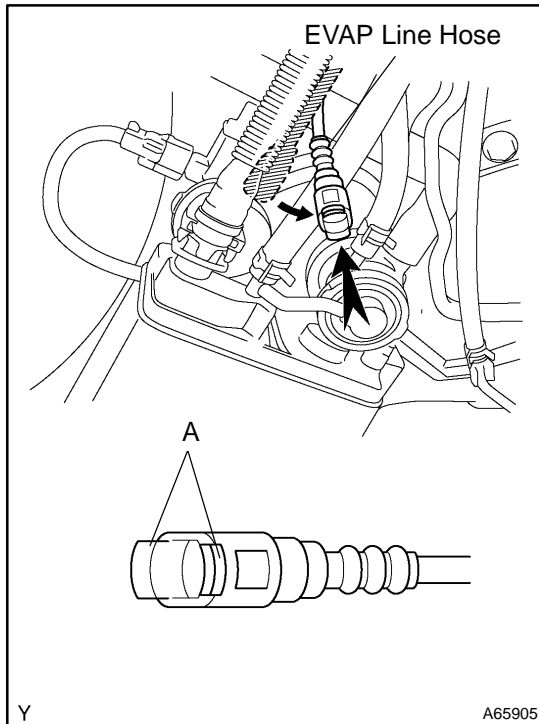


- (3) Check if the pressure decreases when the fuel tank cap is removed while adding pressure.

HINT:

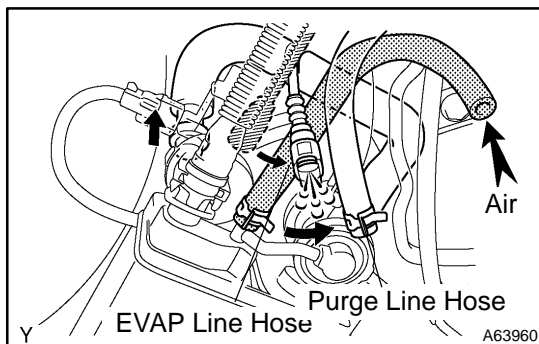
If the pressure dose not decrease when the filler cap is removed, then you can conclude that the hose connecting the service port to the fuel tank is blocked, etc.

- (k) Disconnect the pressure gauge from the EVAP service port on the purge line.



5. CHECK AIRTIGHTNESS IN FUEL TANK AND FILLER PIPE

- (a) Disconnect the EVAP line hose from the charcoal canister.
 - (1) Pinch portion A.
 - (2) Pull out the connector.
 - (b) Pressurize and make the internal pressure in the fuel tank 4 kPa (41 gf/cm², 0.58 psi).
 - (c) Check that the internal pressure of the fuel tank can be hold for 1 minute.
 - (d) Check the connected portions of each hose and pipe.
 - (e) Check the installed parts on the fuel tank.
- If there is no abnormality, replace the fuel tank and filler pipe.
- (f) Reconnect the EVAP line hose to the charcoal canister.



6. INSPECT FUEL CUT OFF VALVE AND FILL CHECK VALVE

- (a) Disconnect the purge line hose and EVAP line hose from the charcoal canister.
- (b) Plug the cap to the air drain hose.
- (c) Pressurize 4 kPa (41 gf/cm², 0.58 psi) to the purge port and check that there is ventilation through the EVAP line hose.

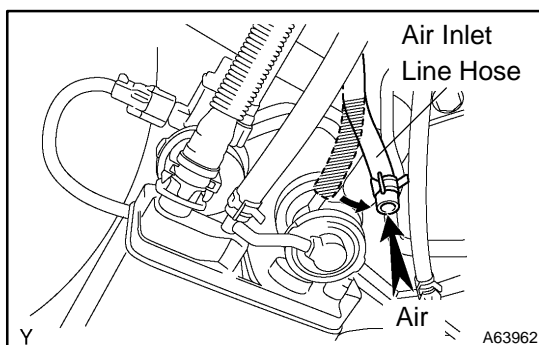
HINT:

In the condition that the fuel is full, as the float valve of the fill check valve is closed and has no ventilation, it is necessary to check the fuel amount (volume).

- (d) Check if there is anything struck in the vent line hose and EVAP line hose.

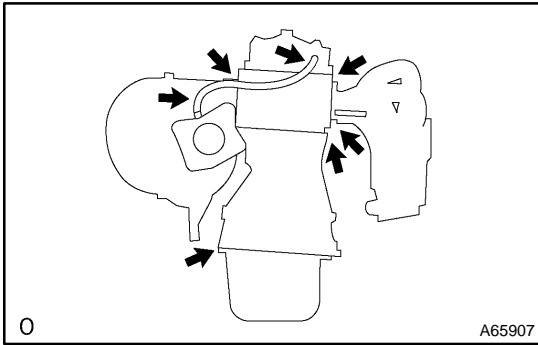
If there is no stuck in hoses, replace the fuel cut off valve and fill check valve.

- (e) Reconnect the purge line hose and EVAP line hose to the charcoal canister.



7. CHECK AIR INLET LINE

- (a) Disconnect the air inlet line hose from the charcoal canister.
- (b) Check that there is ventilation in the air inlet line.
- (c) Reconnect the air inlet line hose to the charcoal canister.

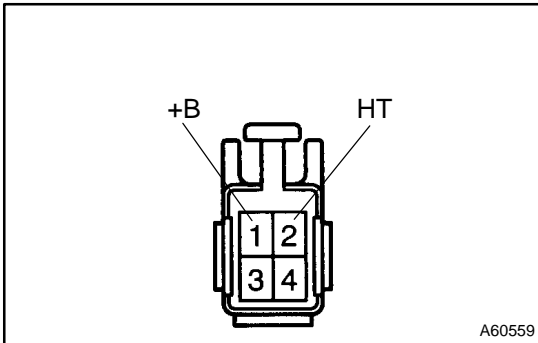


8. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

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

HINT:

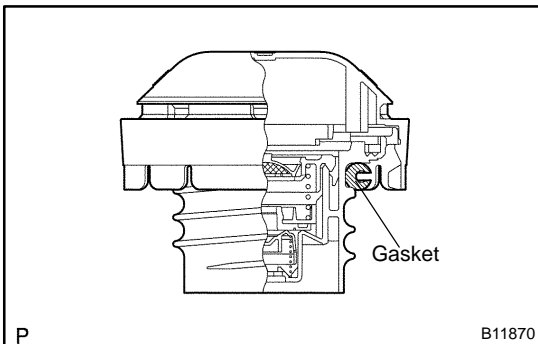
Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of turn. Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will allow air suction and cause the engine to run out of turn.



9. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSOR

- (a) Disconnect the oxygen sensor connector.
 (b) Using an ohmmeter, measure the resistance between the terminals HT and +B.

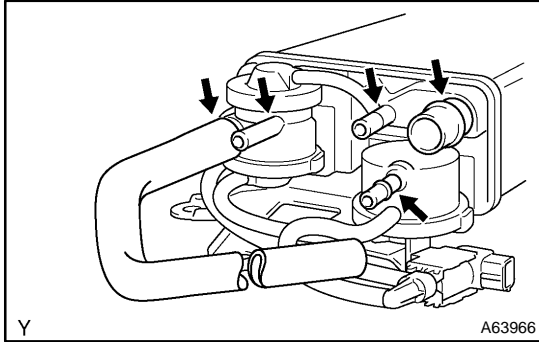
Resistance: 11 – 16 Ω at 20°C (68°F)



10. INSPECT FUEL TANK CAP

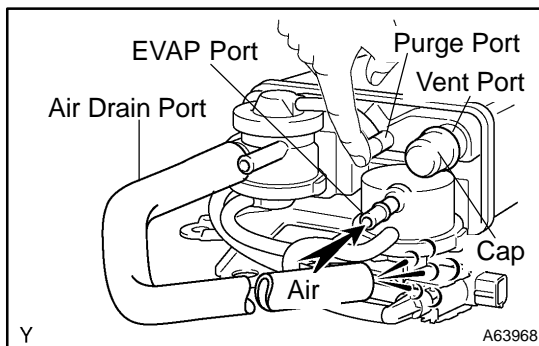
- (a) Visually check if the cap and/or gasket are deformed or damaged.

INSPECTION



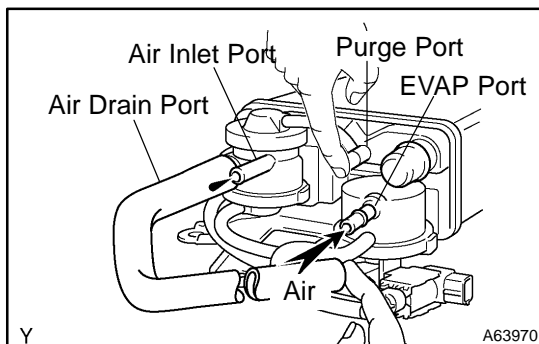
1. CHARCOAL CANISTER ASSY

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

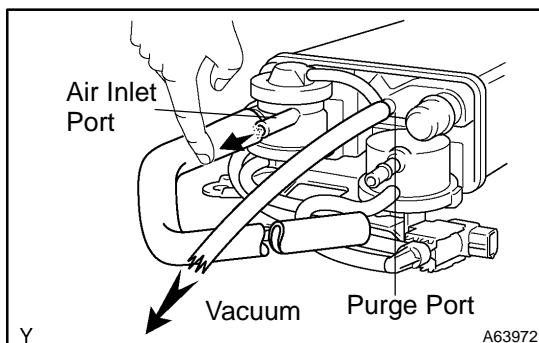


- (b) Inspect the charcoal canister operation.

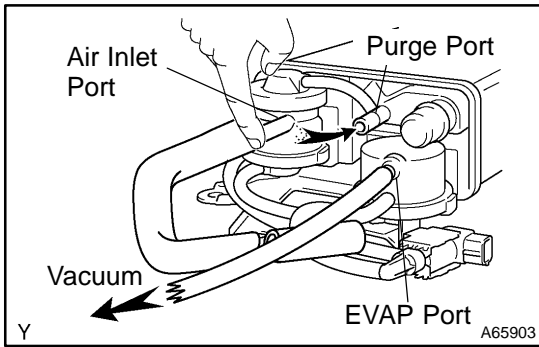
- (1) Plug the vent port with the cap.
- (2) While holding the purge port closed, blow air (1.76 kPa, 18 gf/cm², 0.26 psi) into the EVAP port and check that air flows from the air drain port.



- (3) While holding the purge port and the air drain port closed, blow air (1.76 kPa, 18 gf/cm², 0.26 psi) into the EVAP port and check that air does not flow from the air inlet port.



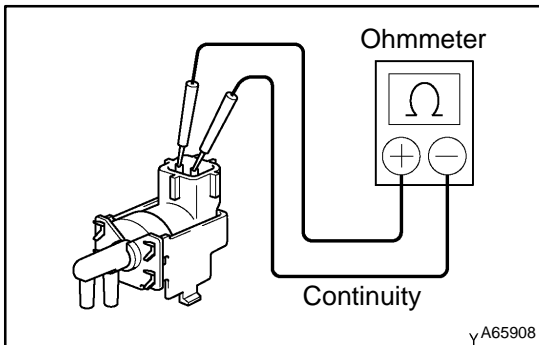
- (4) Apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the purge port, check that the vacuum does not decrease when the air inlet port is closed, and check that the vacuum decreases when the air inlet port is released.



- (5) While holding the air inlet port closed, apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the EVAP port and check that air flows into the purge port.

If operation is not as specified, replace the charcoal canister.

- (6) Remove the hose and cap from vent port.

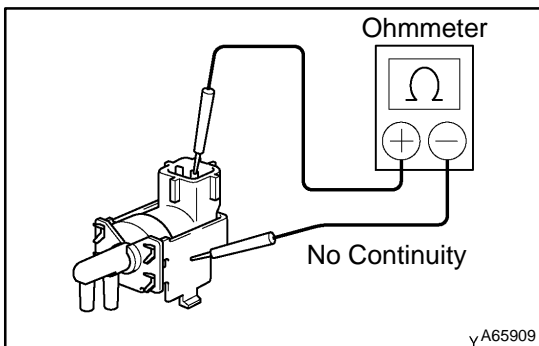


- (c) Inspect VSV for Pressure Switching Valve

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

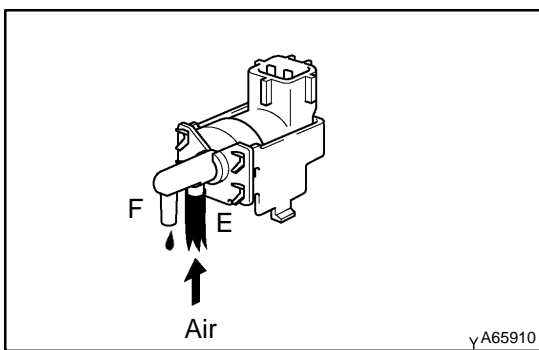
Resistance: 37 – 44 Ω at 20°C (68°F)

If there is no continuity, replace the VSV.

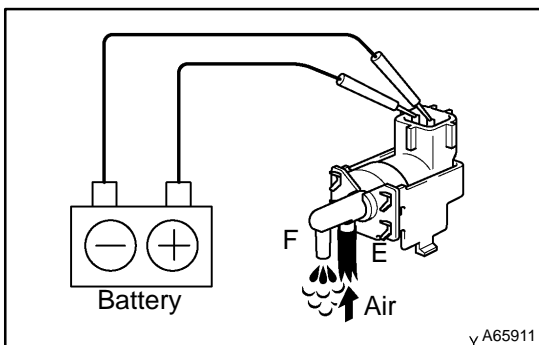


- (2) Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



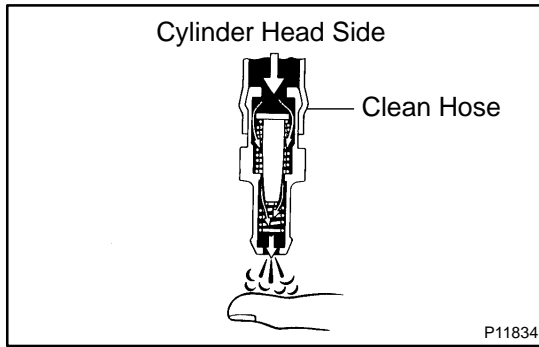
- (3) Check that air does not flow from ports E to F.



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

- (5) Check that air flows from ports E to F.

If operation is not as specified, replace the VSV.

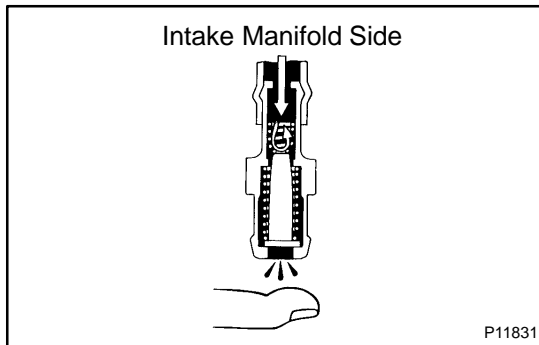


2. VENTILATION VALVE SUB-ASSY

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

CAUTION:

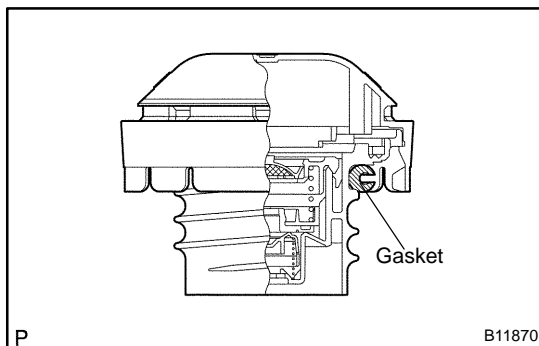
Do not suck air through the valve. Petroleum substances inside the valve air harmful.



- (2) Blow air into the intake manifold side, and check that air passes through with difficulty.

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

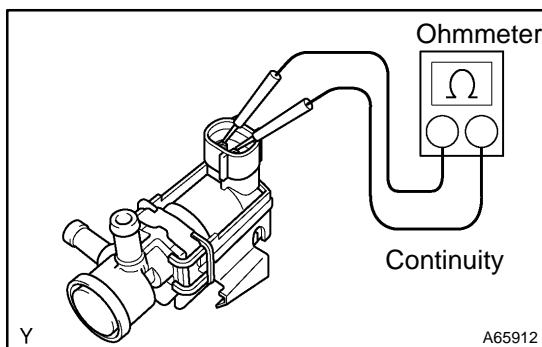
- (c) Remove clean hose from the PCV valve.



3. FUEL TANK CAP ASSY

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

If necessary, repair or replace the cap.

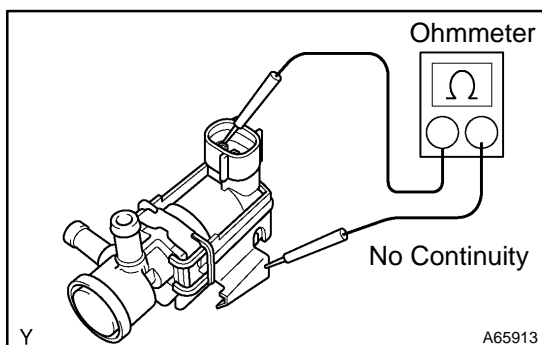


4. VACUUM SWITCHING VALVE NO.1

- (a) Inspect VSV for evaporative emission (EVAP).
 - (1) Using an ohmmeter, check that there is continuity between the terminals.

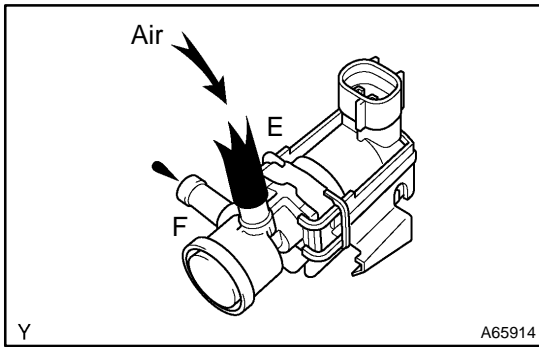
Resistance: 27 – 33 Ω at 20°C (68°F)

If there is no continuity, replace the VSV.

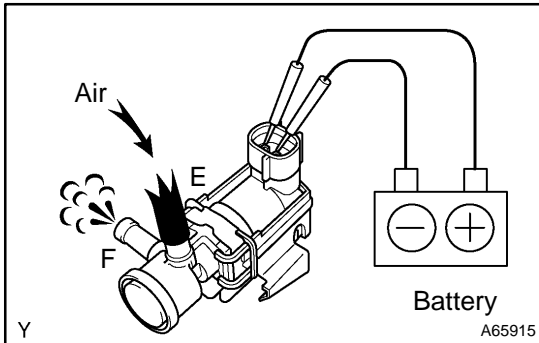


- (2) Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



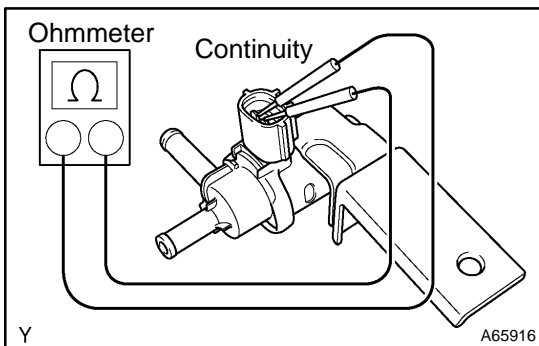
(3) Check that air flows from ports E to F.



(4) Apply battery positive voltage across the terminals.

(5) Check that air does not flow from ports E to F.

If operation is not as specified, replace the VSV.



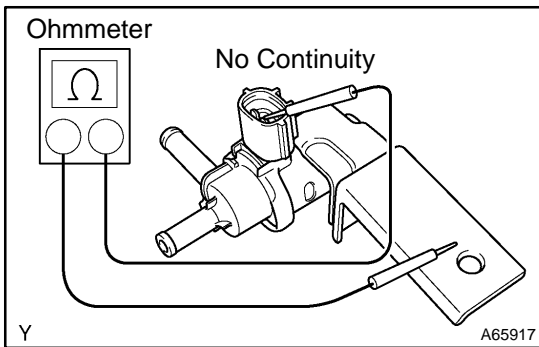
5. VACUUM SWITCHING VALVE ASSY NO.1

(a) Inspect VSV for Canister Closed valve (CCV).

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

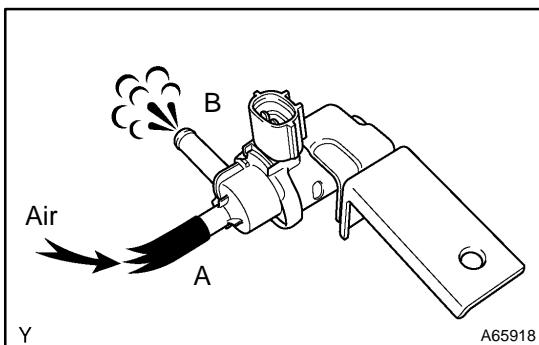
Resistance: 25 – 30 Ω at 20°C (68°F)

If there is no continuity, replace the VSV.

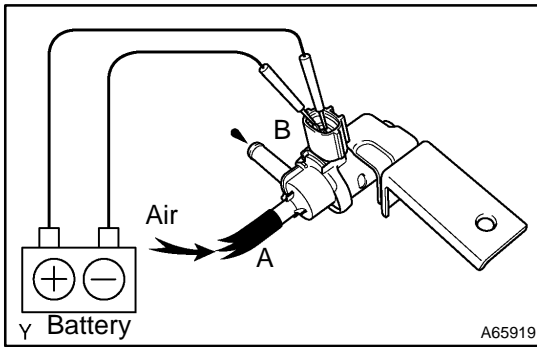


(2) Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



(3) Check that air flows from ports A to B.



- (4) Apply battery positive voltage across the terminals.
 - (5) Check that air does not flow from ports A to B.
- If operation is not as specified, replace the VSV.