

EMISSION CONTROL SYSTEM

EC02E-18

PURPOSE

The emission control systems are installed to reduce the amount of CO, HC and NOx exhausted from the engine ((3) and (4)), to prevent the atmospheric release of blow-by gas-containing HC (1) and evaporated fuel containing HC being released from the fuel tank (2).

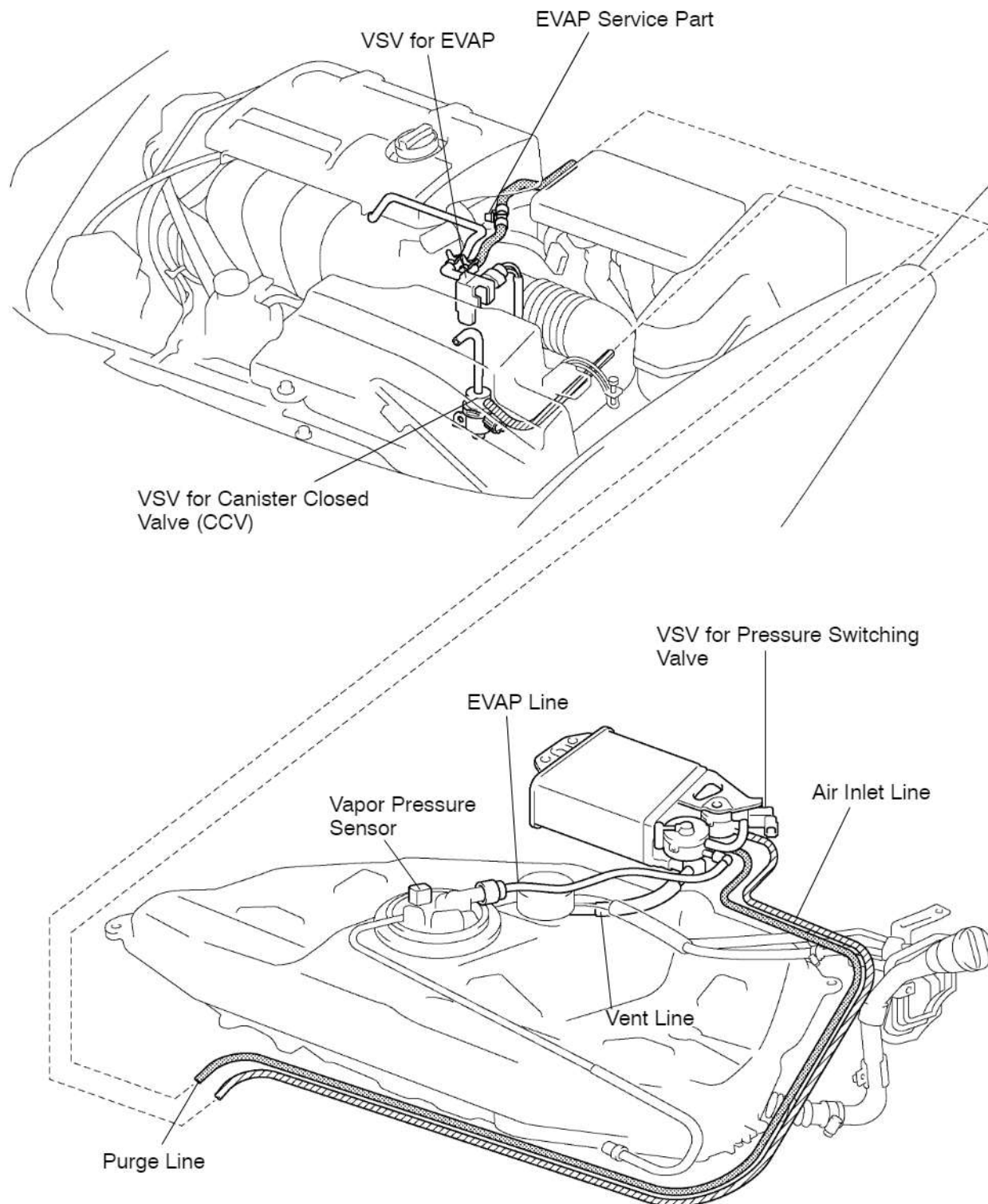
The function of each system is shown in these table.

System	Abbreviation	Function
(1) Positive Crankcase Ventilation	PCV	Reduces HC
(2) Evaporative Emission Control	EVAP	Reduces evaporated HC
(3) Three-way Catalytic Converter	TWC	Reduces HC, CO and NOx
(4) Sequential Multi-port Fuel Injection*	SFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

Remark: *For inspection and repair of the SFI system, refer to the SF section of this manual.

PARTS LAYOUT AND SCHEMATIC DRAWING LOCATION

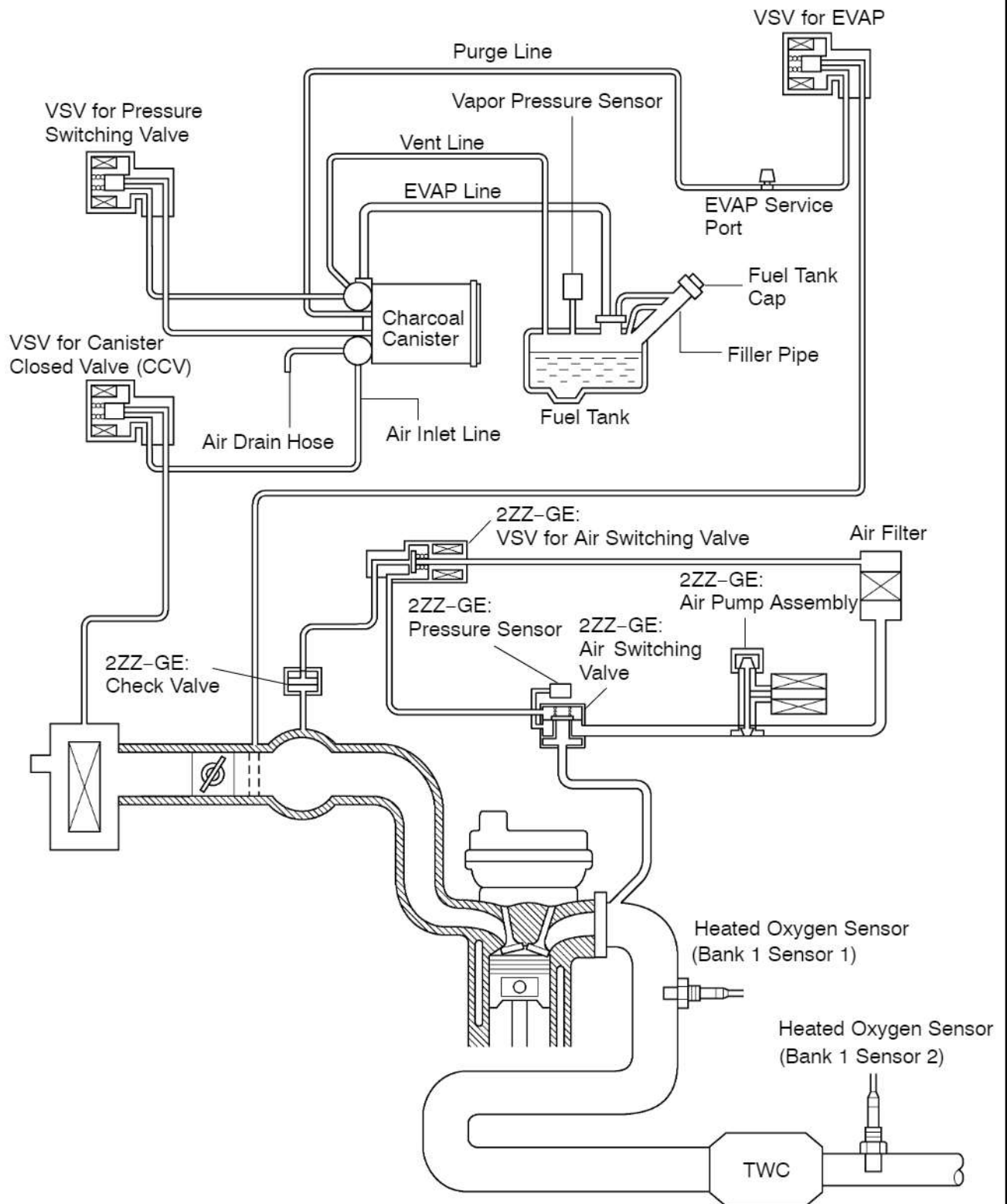
EC02F-34



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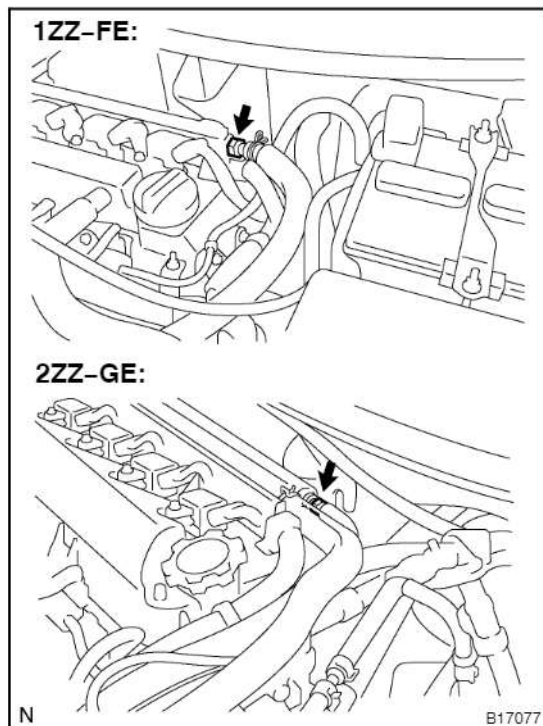
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DRAWING



N

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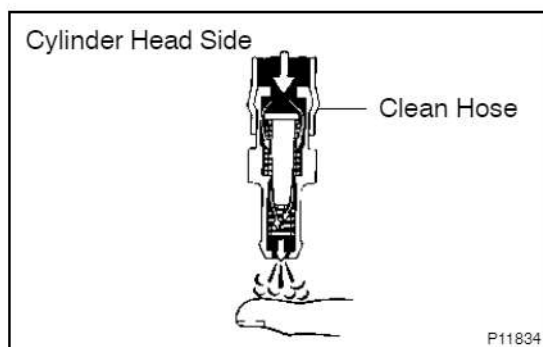


POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM INSPECTION

EC02H-20

1. REMOVE PCV VALVE

- Disconnect the PCV hose from the PCV valve.
- Remove the PCV valve.



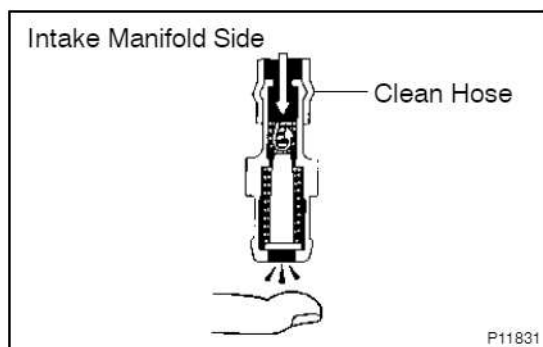
2. INSTALL CLEAN HOSE TO PCV VALVE

3. INSPECT PCV VALVE OPERATION

- 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 harmful.

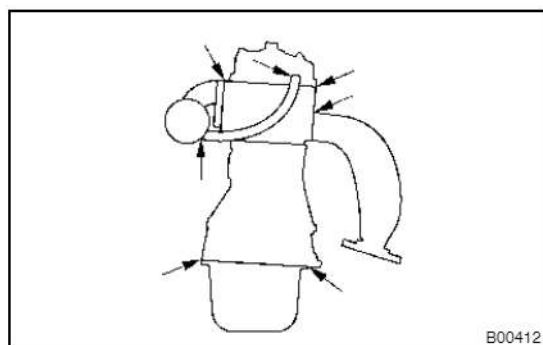


- Blow air into the intake manifold side, and check that air passes through with difficulty.

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

4. REMOVE CLEAN HOSE FROM PCV VALVE

5. REINSTALL PCV VALVE

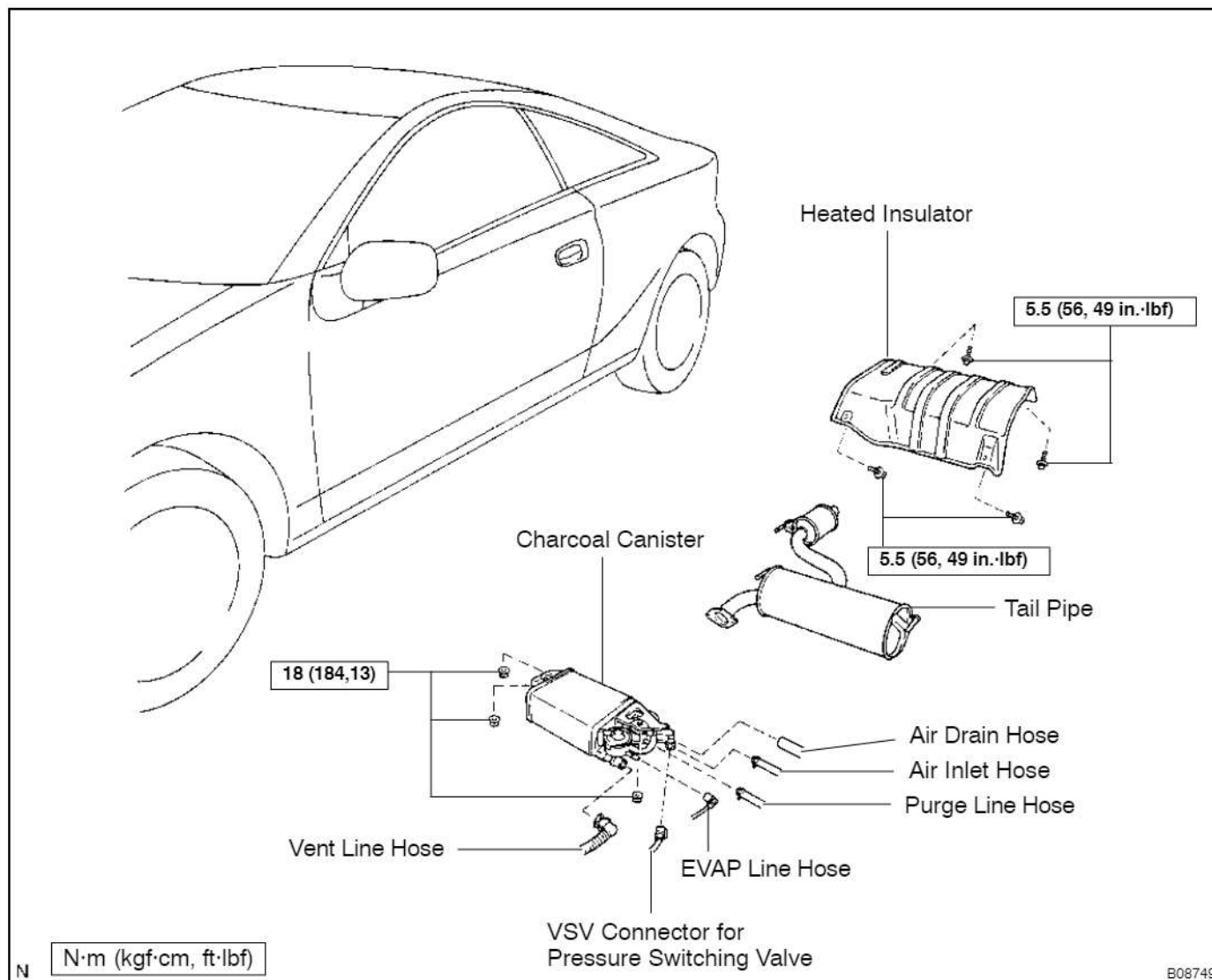


6. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

Check for cracks, leaks or damage.

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM COMPONENTS

EC02-15



INSPECTION

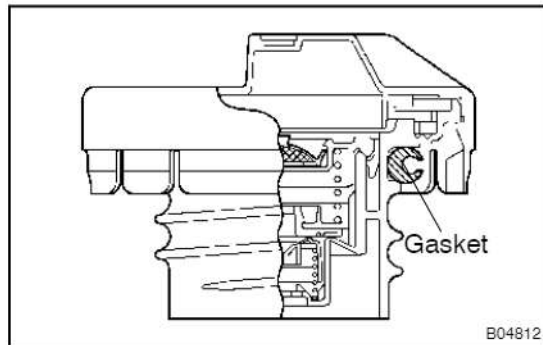
1. **REMOVE EXHAUST TAIL PIPE AND HEATED INSULATOR (See page EM-117)**

2. **INSPECT LINES AND CONNECTORS**

Visually check for loose connections, sharp bends or damage.

3. **INSPECT FUEL TANK FILLER PIPE**

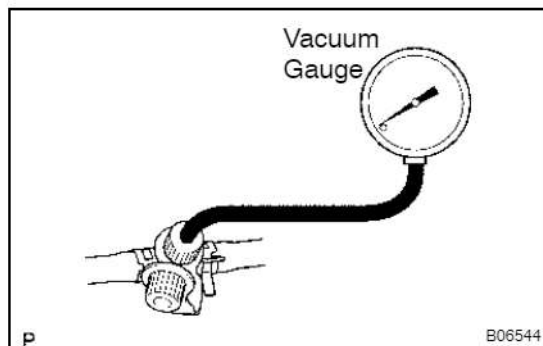
Visually check for deformation, cracks or fuel leakage.



4. **INSPECT FUEL TANK CAP**

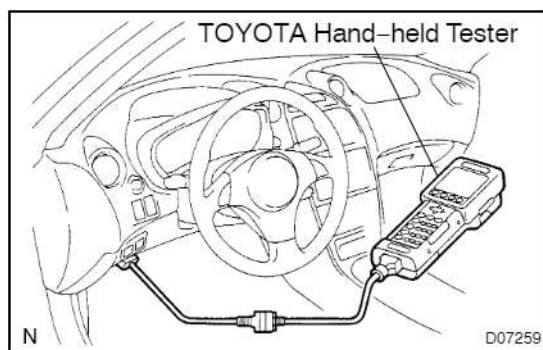
Visually check if the cap and/or gasket are deformed or damaged.

If necessary, repair or replace the cap.

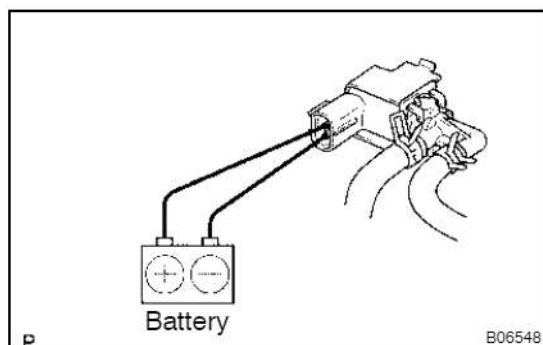


5. **INSPECT EVAP SYSTEM LINE**

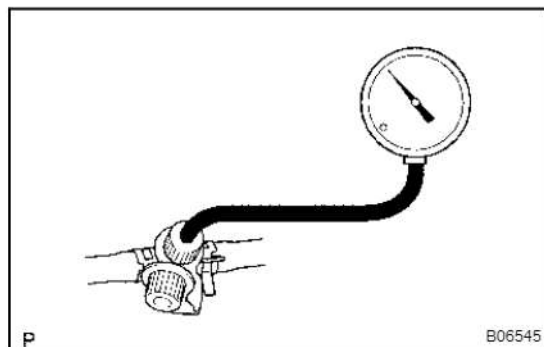
- (a) Warm up the engine and stop the engine.
Allow the engine to warm up to normal operating temperature.
- (b) Install a vacuum gauge (EVAP control system test equipment vacuum gauge) to the EVAP service port on the purge line.



- (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.

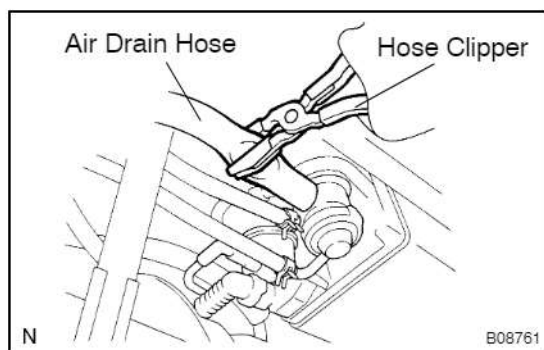
Vacuum:

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

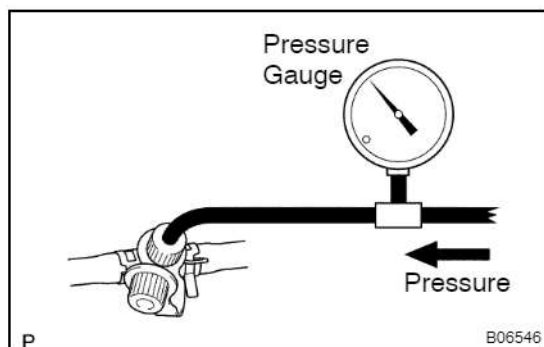
HINT:

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) If you have 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, and 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.



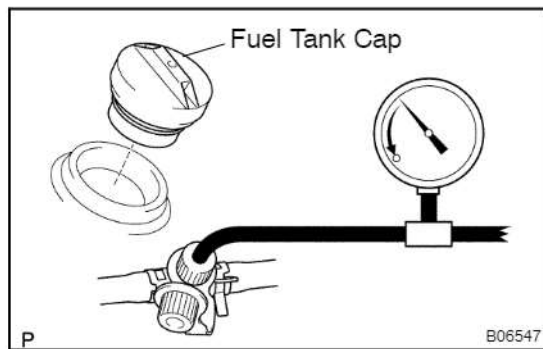
- (2) Add the pressure (13.5 – 15.5 in.Aq) from the EVAP service port.

Pressure:

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

HINT:

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

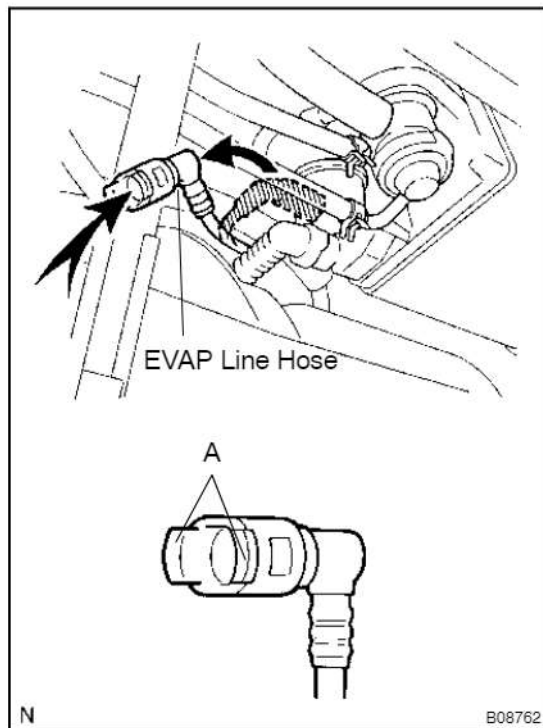


- (3) Check if the pressure decreases when the fuel tank cap is removed while adding pressure.

HINT:

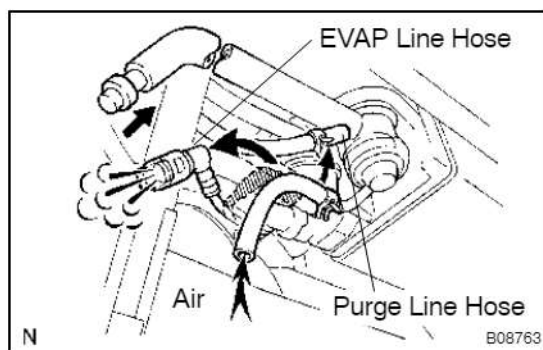
If the pressure does not decrease when the filler cap is removed, then you can conclude that the hose connecting the service port to the fuel tank is blocked, etc.

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



6. 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 held 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.



7. INSPECT FUEL CUTOFF 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.

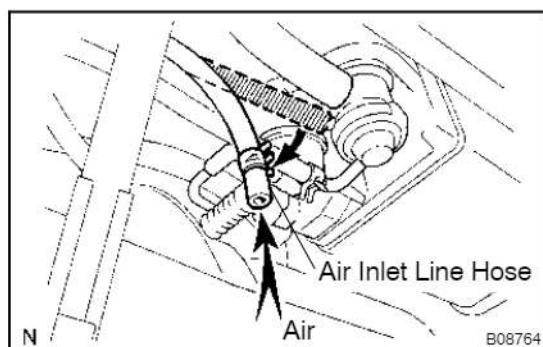
HINT:

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 stuck in the vent line hose and EVAP line hose.

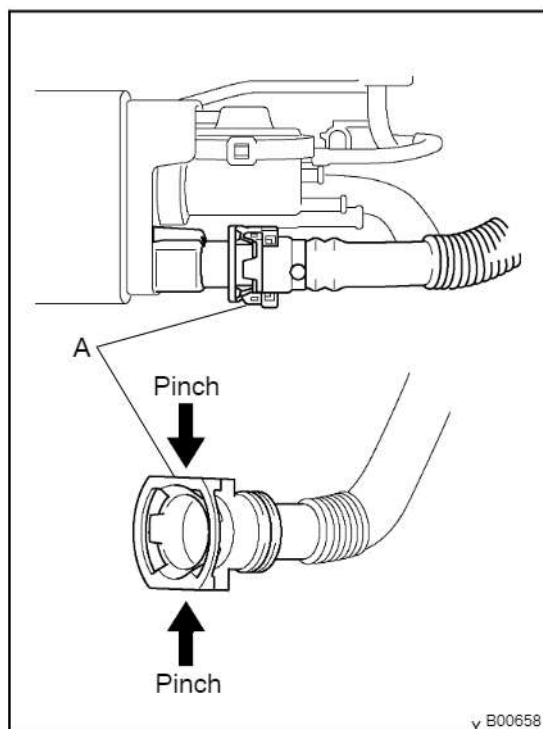
If there is nothing stuck in them, replace the fuel cut off valve and fill check valve.

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



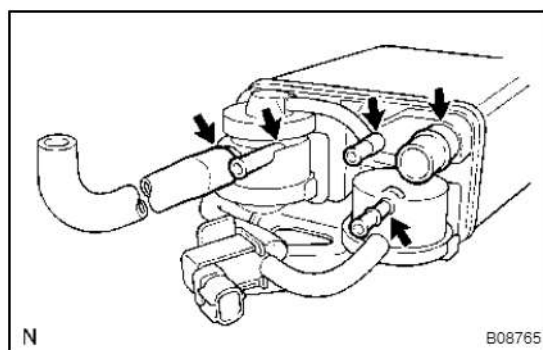
8. CHECK AIR INLET LINE

- (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.



9. REMOVE CHARCOAL CANISTER ASSEMBLY

- (a) Disconnect the VSV connector.
- (b) Disconnect the purge line hose, EVAP line hose and air inlet line hose from the charcoal canister.
- (c) Disconnect the vent line hose from charcoal canister.
 - (1) Push the connector deep inside.
 - (2) Pinch portion A.
 - (3) Pull out the connector.
- (d) Remove the 3 nuts and charcoal canister assembly.

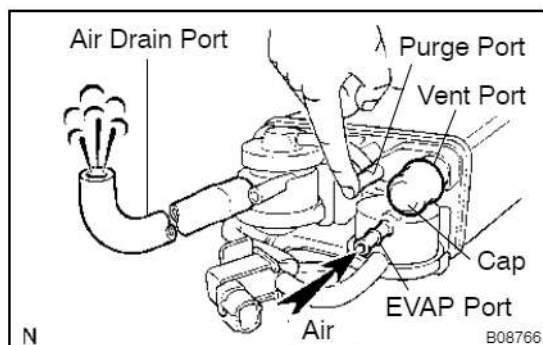


10. INSPECT CHARCOAL CANISTER

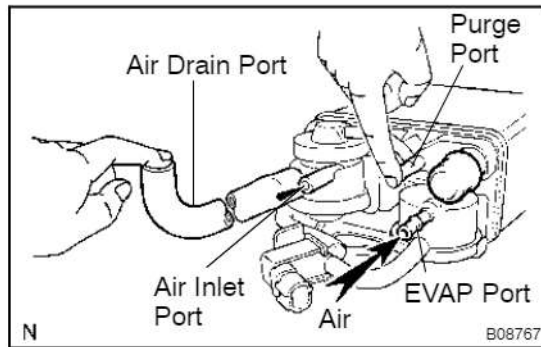
- (a) Visually check the charcoal canister for cracks or damage.

HINT:

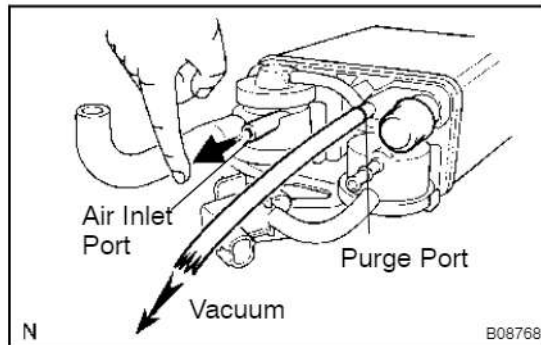
Be sure to check the areas indicated by the allow marks. These areas are especially prone to cracking.



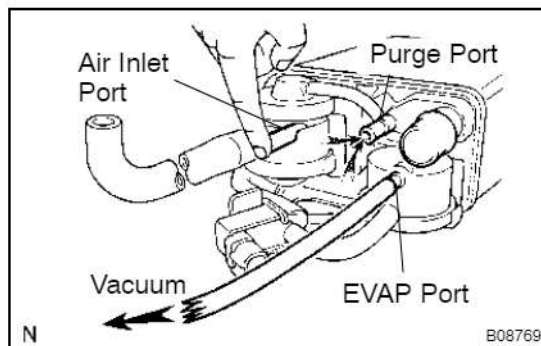
- (b) Inspect the charcoal canister operation.
 - (1) Plug the vent port with a cap.
 - (2) While holding the purge port closed, blow air (1.76 kPa, 18 gf/cm², 0.26 psi) into the EVAP port and check that air flows from the air drain port.



- (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 a problem is found, replace the charcoal canister.

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

11. **INSPECT VSV FOR EVAP**
(See page SF-61)
12. **INSPECT VSV FOR CANISTER CLOSED VALVE (CCV)**
(See page SF-63)
13. **INSPECT VAPOR PRESSURE SENSOR**
(See page SF-69)
14. **REINSTALL CHARCOAL CANISTER ASSEMBLY**

THREE-WAY CATALYTIC CONVERTER (TWC) SYSTEM INSPECTION

EC02K-12

1. CHECK TWC FOR DENTS OR DAMAGE

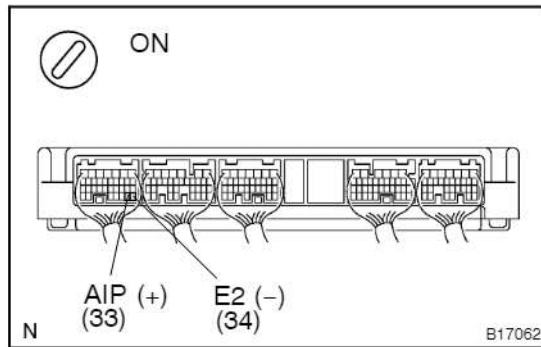
If any port of the heat insulator is damaged or dented to the extent that it contacts the three-way catalytic converter, repair or replace it.

2. CHECK EXHAUST PIPE CONNECTIONS FOR LOOSENESS OR DAMAGE

3. CHECK EXHAUST PIPE CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE

4. CHECK HEAT INSULATOR FOR DAMAGE

5. CHECK FOR ADEQUATE CLEARANCE BETWEEN EXHAUST SYSTEM AND HEAT INSULATOR ON THE BODY



SECONDARY AIR INJECTION SYSTEM (2ZZ-GE)

ON-VEHICLE INSPECTION

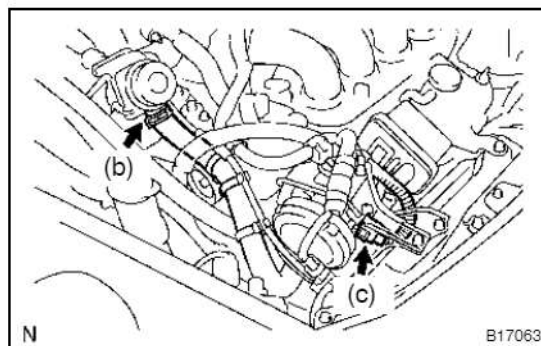
ECONE-03

1. INSPECT PRESSURE SENSOR

- Turn the ignition switch to the ON position.
- Measure the voltage between terminals AIP and E2 of the ECM connector.

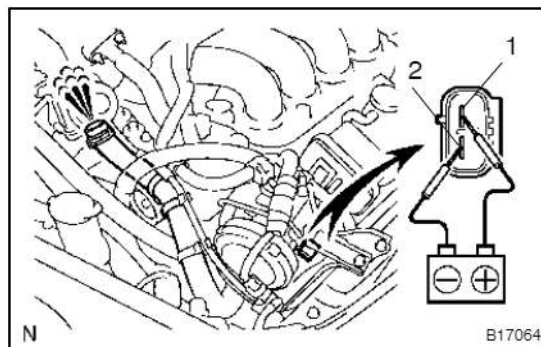
Voltage: 1.0 to 2.2 V

- REMOVE UPPER FRONT FENDER APRON SEAL
- REMOVE UPPER RADIATOR SUPPORT SEAL
- DISCONNECT HOSE



5. CHECK OPERATION AIR PUMP ASSEMBLY

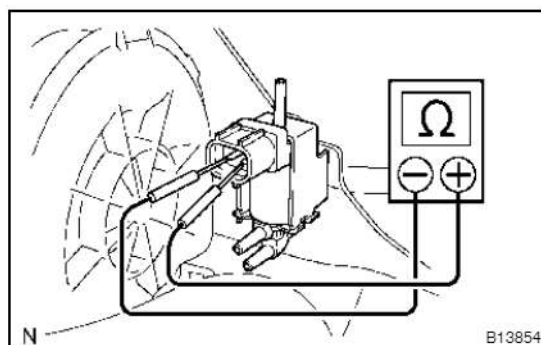
- Using a plier, grip the claws of the hose clip and slide the clip along the air hose.
- Disconnect the air hose.
- Disconnect the air pump connector.



Test conditions:

- Water temperature: -15°C - 45°C (5°F - 113°F)
 - Engine running: Below 7,100 rpm
 - Battery voltage: Above 10.5 V
 - DTC: No displayed
- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2 then check that air flow from the air hose.

If operation is not as specified, replace the air pump assembly.

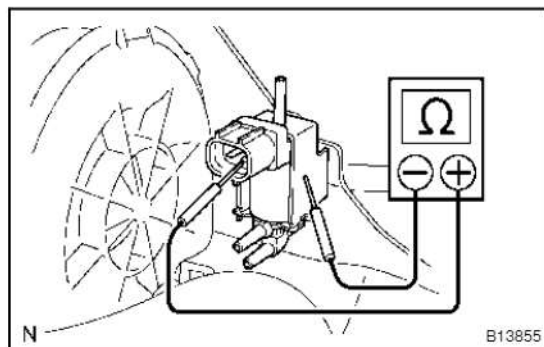


6. INSPECT VSV FOR OPEN CIRCUIT

- Disconnect the 3 hoses.
- Remove the screw and VSV for air pump.

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

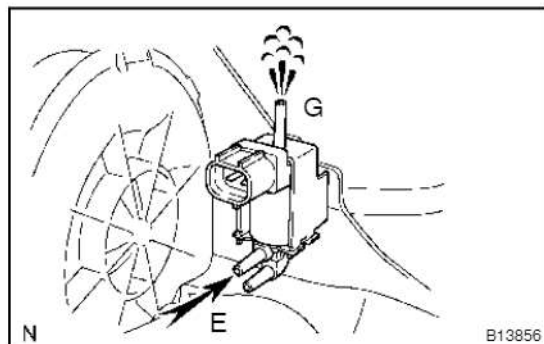
Resistance: 37 - 44 Ω at 20°C (68°F)



7. INSPECT VSV FOR GROUND

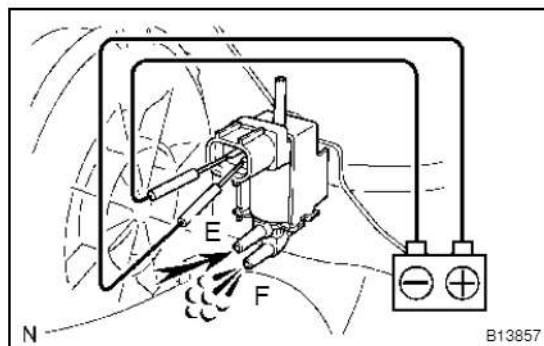
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



8. INSPECT VSV OPERATION

- (a) Check that air flows from ports E to G.

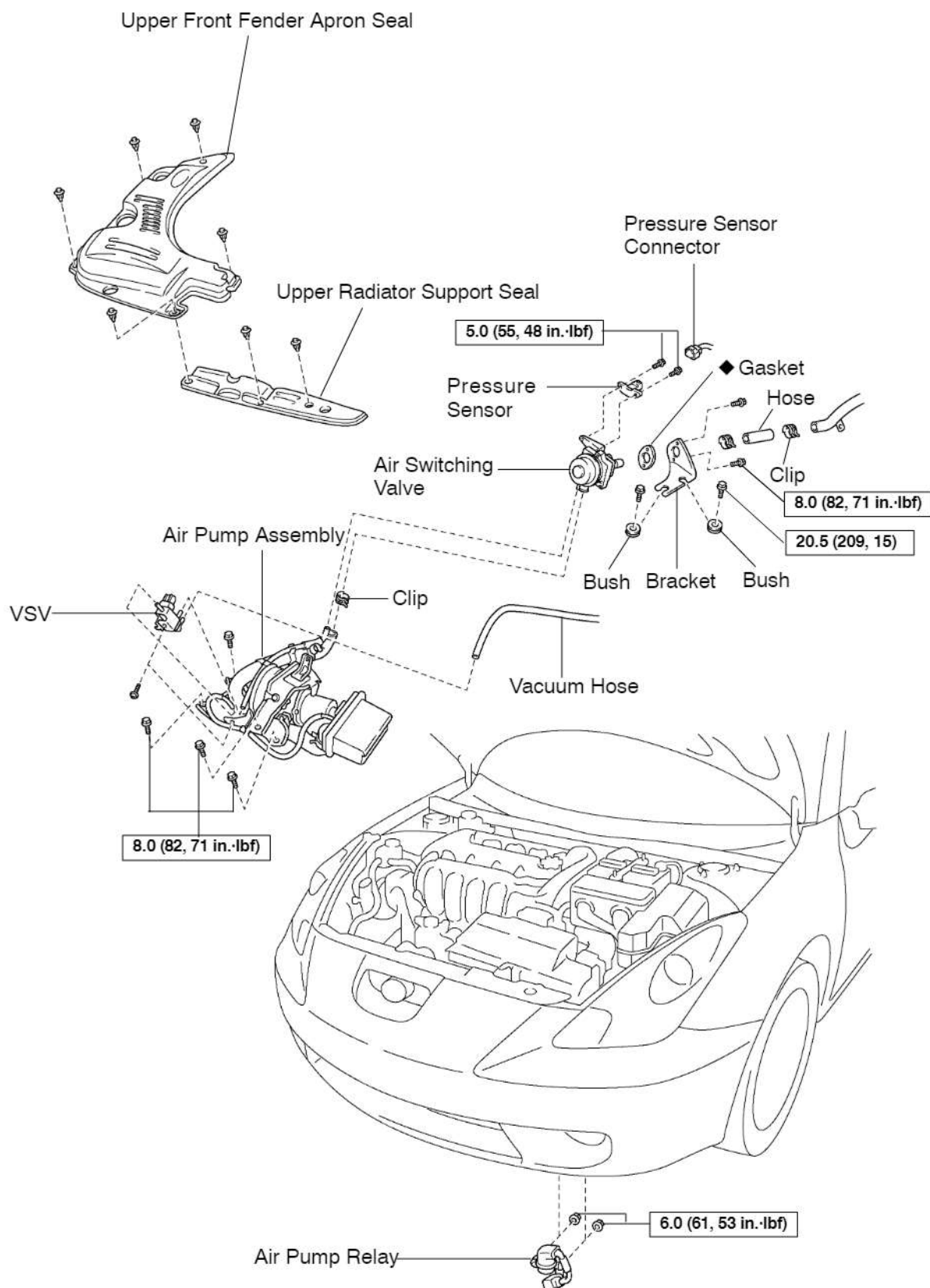


- (b) Apply battery positive voltage across the terminals.

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

If operation is not as specified, replace the VSV.

COMPONENTS



N

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

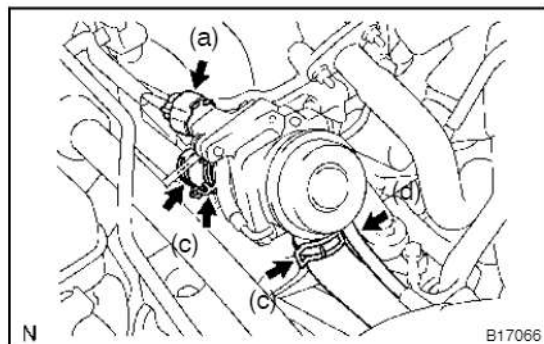
◆ Non-reusable part

2005 CELICA (RM1131U)

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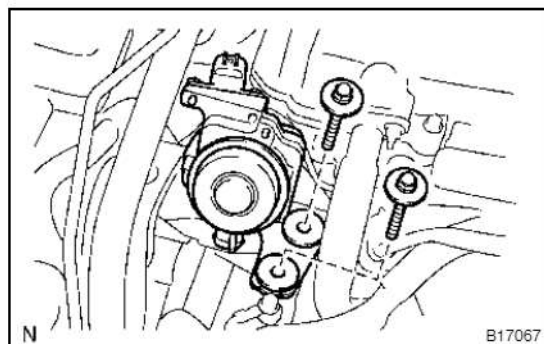
REMOVAL

1. REMOVE UPPER FRONT FENDER APRON SEAL
2. REMOVE UPPER RADIATOR SUPPORT SEAL

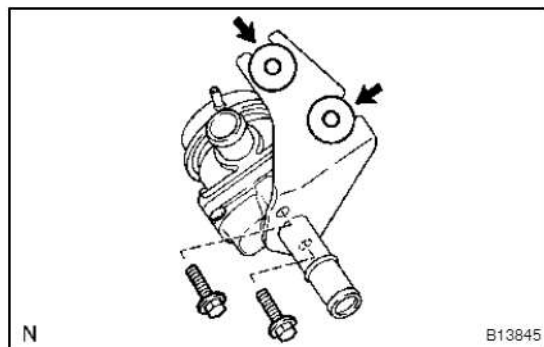


3. REMOVE AIR SWITCHING VALVE

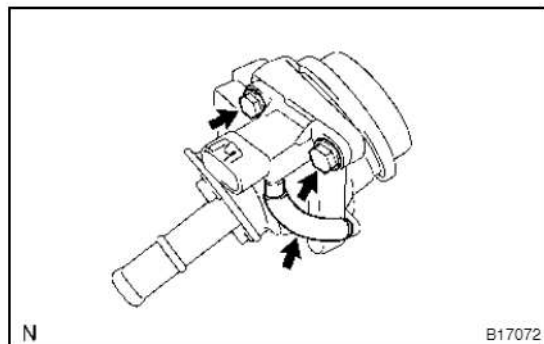
- (a) Disconnect the pressure sensor connector.
- (b) Using a plier, grip the claws of the hose clips and slide the clips along the hoses.
- (c) Disconnect the 2 air hoses.
- (d) Disconnect the vacuum hoses.



- (e) Remove the 2 bolts and air switching valve.
Torque: 20.5 N·m (209 kgf·cm, 15 ft·lbf)

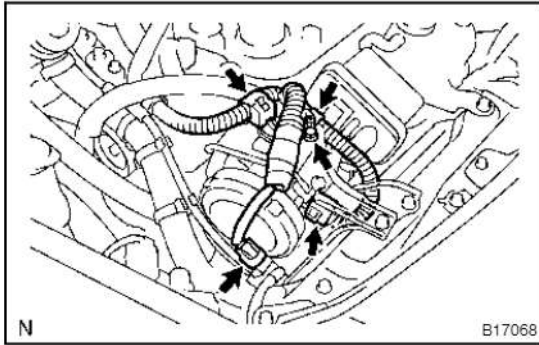


- (f) Remove the 2 bolts and bracket.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)
- (g) Remove the 2 bushes.

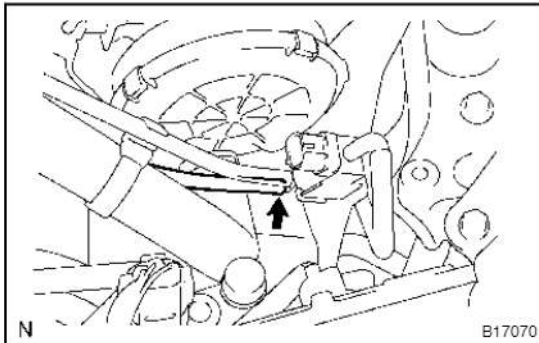


4. REMOVE PRESSURE SENSOR

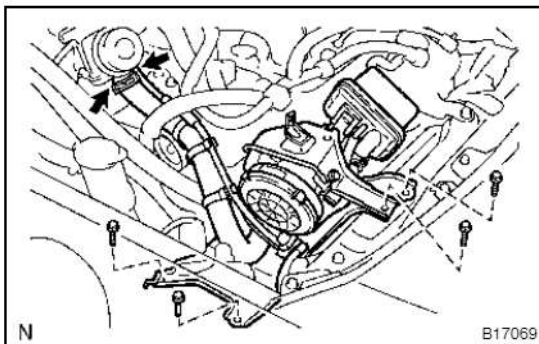
- (a) Remove the vacuum hose.
- (b) Remove the 2 bolts and pressure sensor.
Torque: 5.0 N·m (55 kgf·cm, 48 in·lbf)

**5. REMOVE AIR PUMP ASSEMBLY**

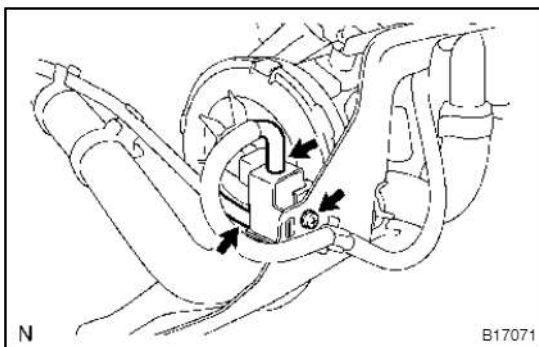
- (a) Disconnect the wire harness from the air pump bracket.
- (b) Remove the bolt and disconnect the ground cable.
- (c) Disconnect the connectors.



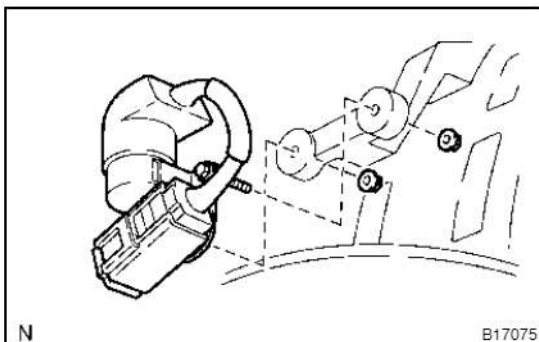
- (d) Disconnect the vacuum hose from the F port of VSV.



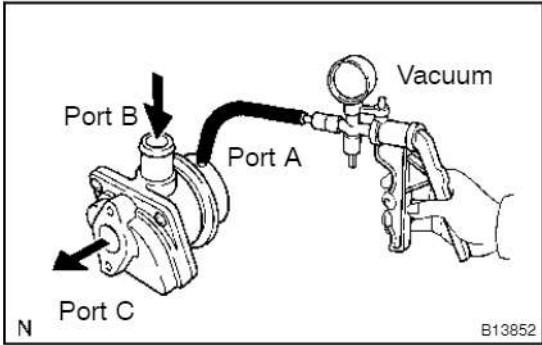
- (e) Remove the 4 bolts and air pump assembly.
Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

**6. REMOVE VSV**

- (a) Disconnect the 2 vacuum hoses.
- (b) Remove the bolt and VSV.

**7. REMOVE AIR PUMP RELAY**

- (a) Disconnect the air pump relay connector.
- (b) Remove the 2 nuts and air pump relay from the body bracket.

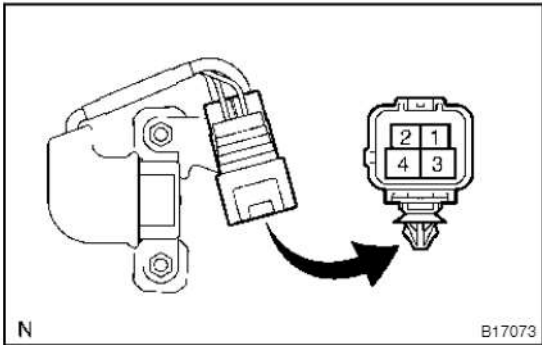


INSPECTION

1. INSPECT AIR SWITCHING VALVE

- Apply vacuum (28 kPa (286 gf/cm², 4.07 psi) to port A, blow air into port B and check that air is discharged from port C.

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



2. INSPECT AIR PUMP RELAY

- Using an ohmmeter, check the continuity between each terminals.

Terminal No.	Specified Condition
1 ↔ 2	Continuity
3 ↔ 4	No Continuity

- Check that there is the continuity between the terminal 3 and the 4 when battery voltage applied between the terminal 1 and terminal 2.

If operation is not as specified, replace the air pump relay.

INSTALLATION

Installation is in the reverse order of removal (See page EC-15).