DI8XJ-01

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow

DTC	P0446	Evaporative Emission Control System Vent Control Malfunction

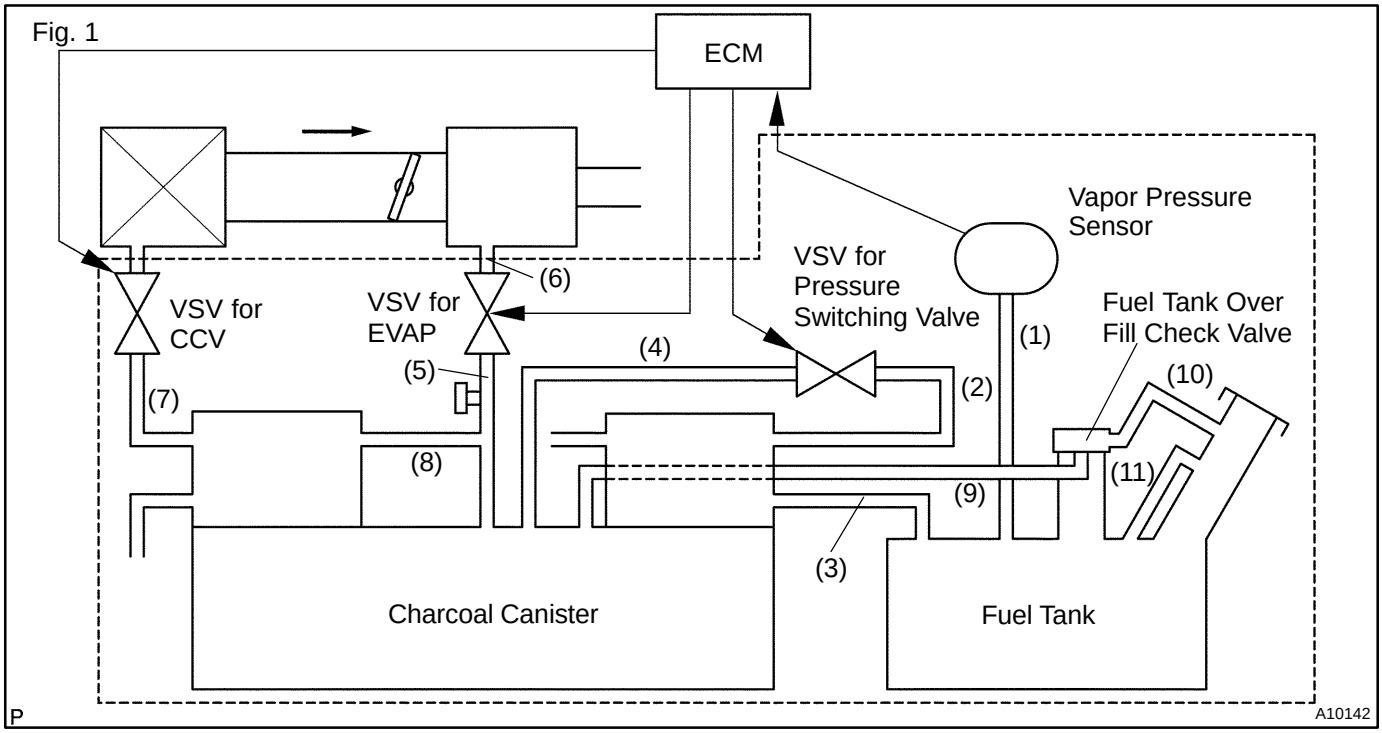
CIRCUIT DESCRIPTION

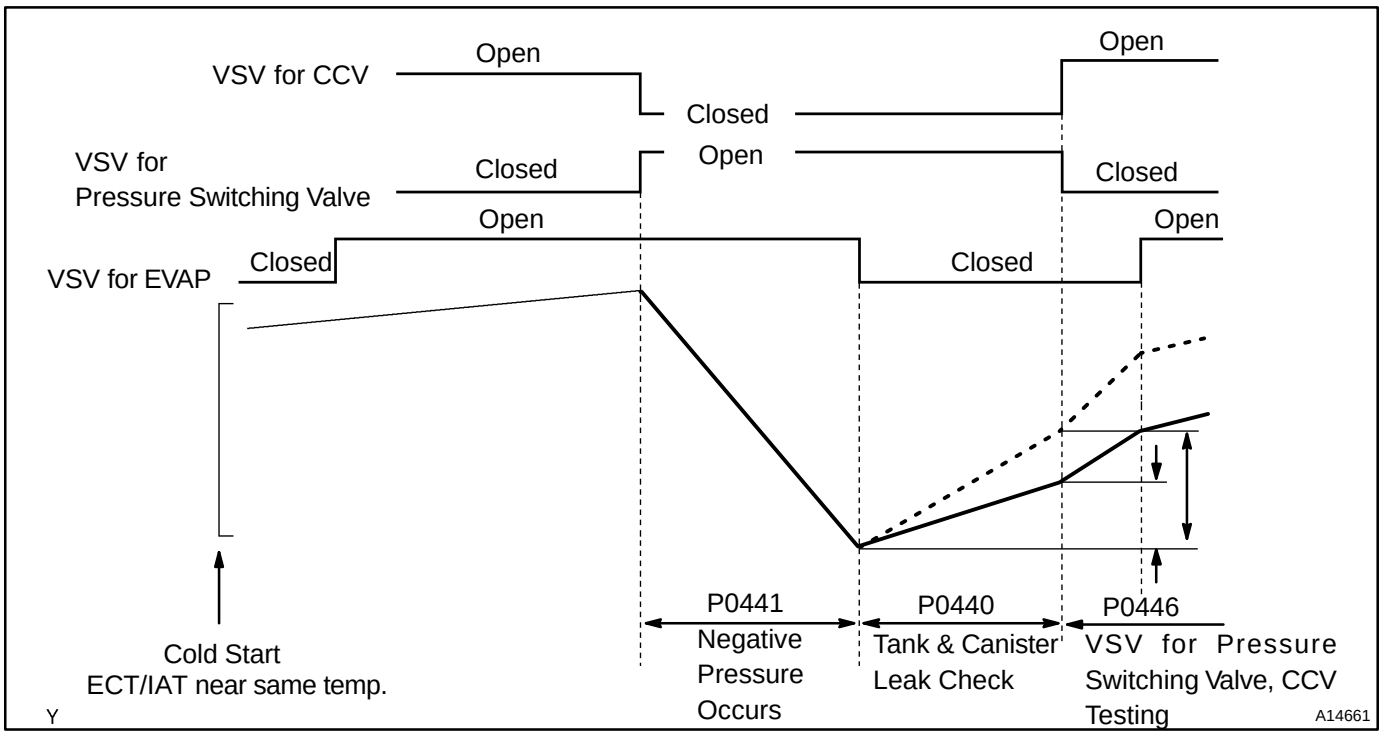
The vapor pressure sensor, VSV for canister closed valve (CCV), VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

DTCs P0441 and P0446 are recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when there is a malfunction in either the VSV for EVAP, the VSV for pressure switching valve, or in the vapor pressure sensor itself.

Fig. 1





DTC No.	DTC Detecting Condition	Trouble Area
P0441	Pressure in charcoal canister and fuel tank does not drop or drop in pressure increased beyond the specified limit during purge control (2 trip detection logic)	• Vacuum hose cracks, holed blocked, damaged or disconnected ((1), (2), (3), (4), (5), (6), (7), (8), (9), (10) and (11) in Fig. 1) • Fuel tank cap incorrectly installed • Fuel tank cap cracked or damaged • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Open or short in VSV circuit for EVAP • VSV for EVAP • Open or short in VSV circuit for CCV • VSV for CCV • Open or short in VSV circuit for pressure switching valve • VSV for pressure switching valve • Fuel tank cracked, holed or damaged • Charcoal canister cracked, holed or damaged • Fuel tank over fill check valve cracked damaged • ECM
P0446	When the vapor pressure rises to a specified point, the ECM opens the VSV for CCV. Pressure will increase rapidly because of the air allowed into the system. No increase or an increase below specified rate of pressure increase indicates a restriction on the air inlet side.	
	The ECM closes the VSV for pressure switching valve. The pressure rise is no longer as great. If there was no change in pressure, the ECM will conclude the VSV for pressure switching valve did not close.	

WIRING DIAGRAM

Refer to DTC P0440 on page DI-73 .

CONFIRMATION READINESS TEST

Refer to DTC P0440 on page DI-73 .

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 first troubleshoot DTC P0441, P0446, P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 next.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

TOYOTA hand-held tester:

1	**Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister (See page DI-73 , step 1).**

NG → **Repair or replace.**

OK

2	**Check that fuel tank cap is TOYOTA genuine parts (See page DI-73 ,step 2).**

NG → **Replace to TOYOTA genuine parts.**

OK

3	**Check that fuel tank cap is correctly installed (See page DI-73 , step 3).**

NG → **Correctly install fuel tank cap.**

OK

4	**Check fuel tank cap (See page DI-73 , step 4).**

NG → **Replace fuel tank cap.**

OK

5	Check filler neck for damage (See page DI-73 , step 5).

NG → Replace filler pipe.

OK

6	Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister (See page DI-73 , step 6).

NG → Repair or connect VSV or sensor connector.

OK

7	Check hose and tube between fuel tank and charcoal canister (See page DI-73 , step 7).

NG → Repair or replace.

OK

8	Check VSV connector for EVAP, VSV connector for CCV, VSV connector for pressure switching valve and vapor pressure sensor connector for looseness and disconnection.

NG → Repair or connect VSV or sensor connector.

OK

9	**Check vacuum hoses ((8), (9), (10) and (11) in Fig. 1 in circuit description).**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK ↓

10	**Check voltage between terminals VC and E2 of ECM connector (See page DI-73 , step 9).**

NG → **Check and replace ECM (See page IN-28).**

OK ↓

11	**Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-73 , step 10).**

OK → **Go to step 13.**

NG ↓

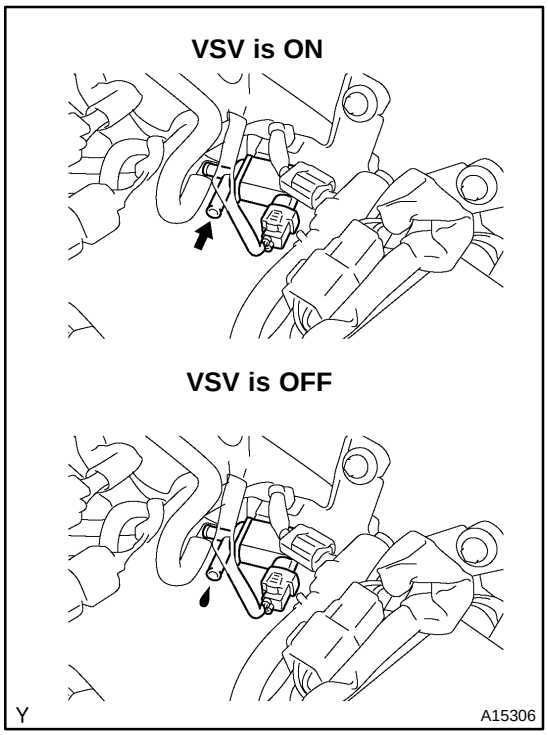
12	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK ↓

Replace vapor pressure sensor.

13	Check purge flow.



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(c) Disconnect the vacuum hose for the VSV for the EVAP from the charcoal canister.
(d) Start the engine.

CHECK:

When the VSV for the EVAP is operated by the TOYOTA hand-held tester, check whether the disconnected hose applies suction to your finger.

OK:

VSV is ON:
Disconnected hose applies suction to your finger.
VSV is OFF:
Disconnected hose applies no suction to your finger.

OK → **Go to step 17.**

NG

14	Check vacuum hose between intake manifold and VSV for EVAP, and VSV for EVAP and charcoal canister.

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK

15	Check operation of VSV for EVAP (See page SF-39).

OK → **Go to step 16.**

NG

Replace VSV and charcoal canister, and then clean vacuum hoses between throttle body and VSV for EVAP, and VSV for EVAP and charcoal canister.

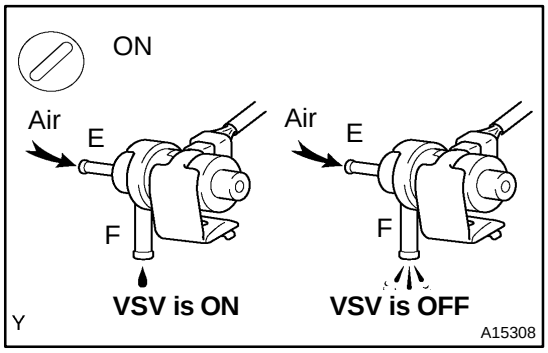
16	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

17	**Check VSV for CCV.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Disconnect the vacuum hose for the VSV for the CCV from the charcoal canister.
(c) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
(d) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

CHECK:

Check the VSV operation when it is operated by the TOYOTA hand-held tester.

OK:

VSV is ON:
Air does not flow from port E to port F.
VSV is OFF:
Air from port E flows out through port F.

OK → **Go to step 21.**

NG

18	**Check vacuum hose between VSV for CCV and charcoal canister.**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole damage and blockage.

NG → **Repair or replace.**

OK

19	**Check operation of VSV for CCV (See page SF-40).**

OK → **Go to step 20.**

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for CCV.

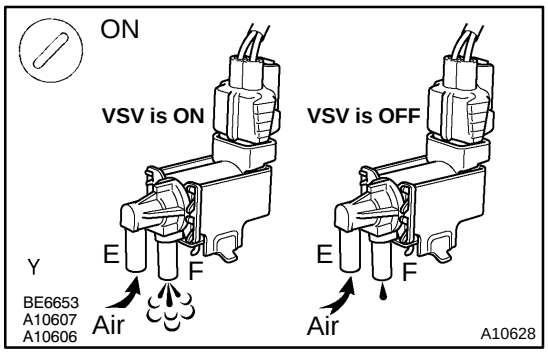
20	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

21	Check VSV for pressure switching valve.



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

CHECK:

Check the VSV operation when it is operated by the TOYOTA hand-held tester.

OK:

VSV is ON:
Air from port E flows out through port F.
VSV is OFF:
Air does not flow from port E to port F.

OK	Go to step 24.

NG

22	Check operation of VSV for pressure switching valve (See page SF-42).

OK	Go to step 23.

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and fuel tank.

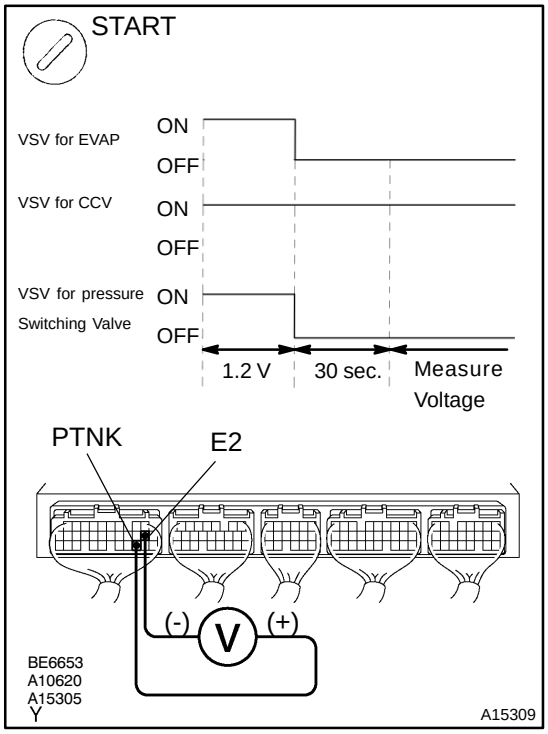
23	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for pressure switching valve, and VSV for pressure switching valve and ECM (See page IN-28).

NG	Repair or replace harness or connector.

OK

Check and replace ECM (See page IN-28).

24	Check fuel tank.



PREPARATION:

(a) Remove the grove compartment.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(d) Start the engine.
(e) The VSV for the CCV is ON by the TOYOTA hand-held tester.
(f) The VSV for the EVAP and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connectors 30 sec. after switching the VSV for the EVAP and the VSV for the pressure switching valve from ON to OFF.

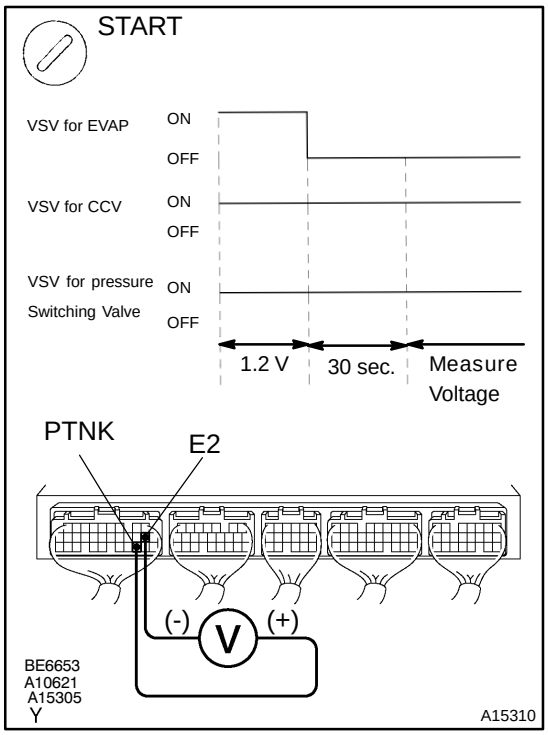
OK:

Voltage:
When there is no sharp change of the voltage with the voltage of more or less 1.2 V

NG → **Replace fuel tank.**

OK

25	Check charcoal canister.



PREPARATION:

(a) Remove the grove compartment.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(d) Start the engine.
(e) The VSV for the CCV and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester.
(f) The VSV for the EVAP is ON by the TOYOTA hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connectors 30 sec. after switching the VSV for the EVAP from ON to OFF.

OK:

Voltage:
When there is no sharp change of the voltage with the voltage of more or less 1.2 V

NG	Replace charcoal canister.

OK

26	Remove charcoal canister and check it (See page EC-6).

NG	Replace charcoal canister.

OK

27	Check fuel tank over fill check valve (See page EC-6).

NG	Replace fuel tank over fill check valve or fuel tank.

OK

Check and replace charcoal canister (See page EC-6).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister (See page DI-73 , step 1).

NG → Repair or replace.

OK

2	Check that fuel tank cap is TOYOTA genuine parts (See page DI-73 , step 2).

NG → Replace to TOYOTA genuine parts.

OK

3	Check that fuel tank cap is correctly installed (See page DI-73 , step 3).

NG → Correctly install fuel tank cap.

OK

4	Check fuel tank cap (See page DI-73 step, 4).

NG → Replace fuel tank cap.

OK

5	Check filler neck for damage (See page DI-73 , step 5).

NG → Replace filler pipe.

OK

6	Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister (See page DI-73 , step 6).

NG → Repair or connect VSV or sensor connector.

OK

7	Check hose and tube between fuel tank and charcoal canister (See page DI-73 , step 7).

NG → Repair or replace.

OK

8	Check VSV connector for EVAP, VSV connector for CCV, VSV connector for pressure switching valve and vapor pressure sensor connector for looseness and disconnection.

NG → Repair or connect VSV or sensor connector.

OK

9	**Check vacuum hoses ((8), (9) , (10) and (11) in Fig. 1 in circuit description).**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole damage and blockage.

NG → **Repair or replace.**

OK

10	**Check voltage between terminals VC and E2 of ECM connector (See page DI-73 , step 9).**

NG → **Check and replace ECM (See page IN-28).**

OK

11	**Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-73 , step 10).**

OK → **Go to step 13.**

NG

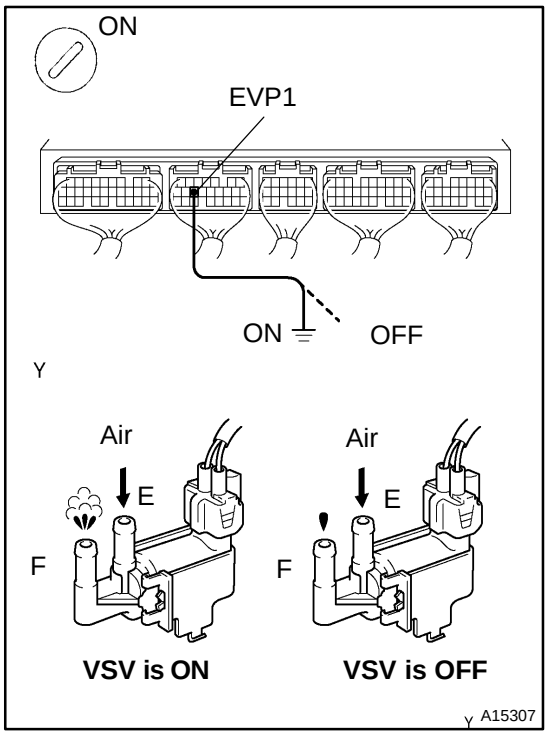
12	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Replace vapor pressure sensor.

13	Check VSV for EVAP.



PREPARATION:

(a) Remove the glove compartment.

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

(1) Connect between terminal EVP1 of the ECM connector and body ground (ON).

(2) Disconnect between terminal EVP1 of the ECM connector and body ground (OFF).

OK:

(1) VSV is ON:
Air from port E frows out through port F.
(2) VSV is OFF:
Air does not flow from port E to port F.

OK → **Go to step 16.**

NG

14	Check operation of VSV for EVAP (See page SF-39).

OK → **Go to step 15.**

NG

Replace VSV and clean vacuum hoses between throttle body and VSV for EVAP, and VSV for EVAP and charcoal canister, and then check charcoal canister.

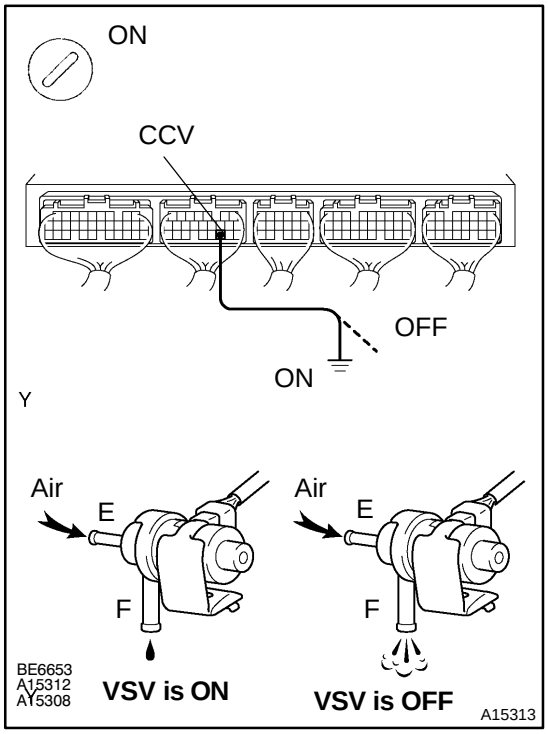
15	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page IN-28).

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

16	Check VSV for CCV.



PREPARATION:

(a) Remove the grove compartment.

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

(1) Connect between terminal CCV of the ECM connector and body ground (ON).

(2) Disconnect between terminal CCV of the ECM connector and body ground (OFF).

OK:

VSV is ON:
Air does not flow from port E to port F.
VSV is OFF:
Air from port E flows out through port F.

OK	Go to step 19.

NG

17	Check operation of VSV for CCV (See page SF-40).

OK	Go to step 18.

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for CCV.

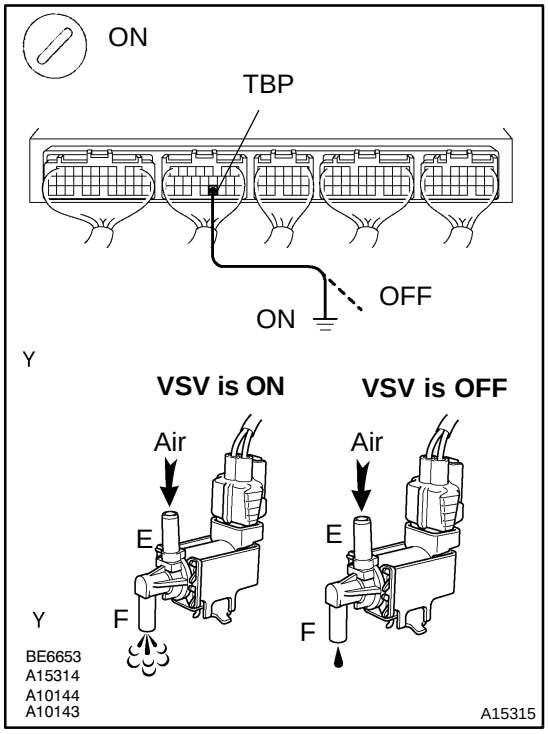
18	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

19	**Check VSV for pressure switching valve.**



PREPARATION:

(a) Remove the grove compartment.

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

(1) Connect between terminal TBP of the ECM connector and body ground (ON).

(2) Disconnect between terminal TBP of the ECM connector and body ground (OFF).

OK:

(1) VSV is ON:
Air from port E flows out through port F.
(2) VSV is OFF:
Air does not flow from port E to port F.

OK → **Go to step 22**

NG

20	**Check operation of VSV for pressure switching valve (See page SF-42).**

OK → **Go to step 21.**

NG

Replace VSV and charcoal canister, and then clean vacuum hoses between charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and fuel tank.

21	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for pressure switching valve, and VSV for pressure switching valve and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

Check and replace ECM (See page IN-28).

22	Check fuel tank over fill check valve (See page EC-6).

NG → Replace fuel tank over fill check valve or fuel tank.

OK

Check and replace charcoal canister (See page EC-6).