DI17A-04

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow

DTC	P0446	Evaporative Emission Control System Vent Control Malfunction

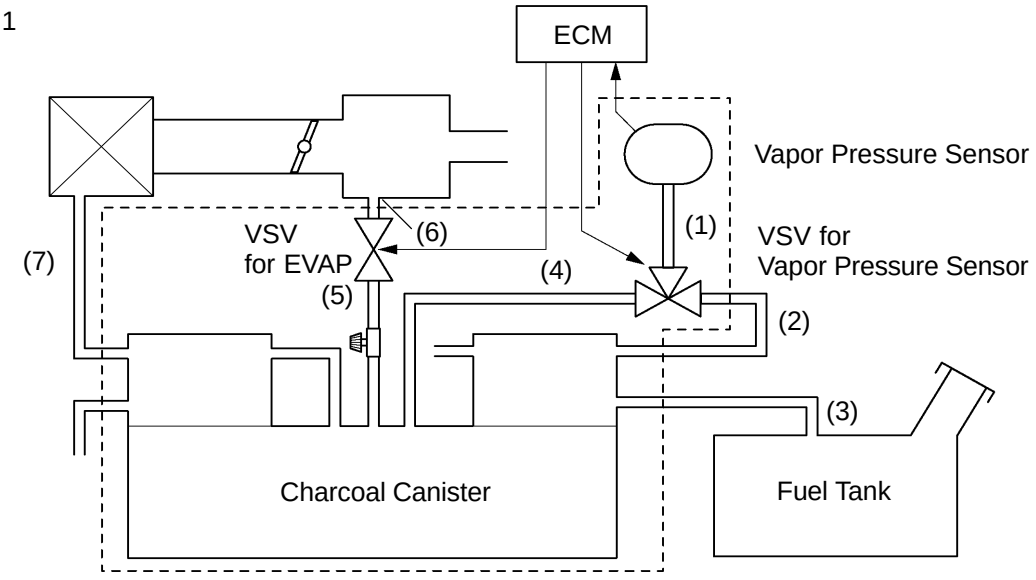
CIRCUIT DESCRIPTION

The vapor pressure sensor and VSV for vapor pressure sensor 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.

DTC 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 vapor pressure sensor, or in the vapor pressure sensor itself.

Fig. 1



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DTC No.	DTC Detection Condition	Trouble Area
P0441	Pressure in charcoal canister does not drop during purge control (2 trip detection logic)	• Vacuum hose cracks, holed blocked, damaged or disconnected ((1), (4), (5), (6) and (7) in Fig. 1) • Open or short in vapor pressure sensor circuit • VSV for vapor pressure sensor • Open or short in VSV circuit for EVAP • VSV for EVAP • Open or short in VSV circuit for vapor pressure sensor • Vapor pressure sensor • Charcoal canister cracks, holed or damaged • ECM
	During purge cut-off, pressure in charcoal canister is very low compared with atmospheric pressure (2 trip detection logic)	
P0446	When VSV for vapor pressure sensor is OFF, ECM judges that there is no continuity between vapor pressure sensor and charcoal canister (2 trip detection logic)	
	When VSV for vapor pressure sensor is ON, ECM judges that there is no continuity between vapor pressure sensor and fuel tank (2 trip detection logic)	
	After purge cut off operates, pressure in charcoal canister is maintained at atmospheric pressure (2 trip detection logic)	

WIRING DIAGRAM

Refer to DTC P0440 on page DI-84 .

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, as freeze frame data records the engine conditions when a 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 VSV for EVAP, charcoal canister and vapor pressure sensor.

TOYOTA hand-held tester:

1	**Check VSV connector for EVAP, VSV connector for vapor pressure sensor and vapor pressure sensor connector for looseness and disconnection.**

NG → **Repair or connect VSV or sensor connector.**

OK

2	**Check vacuum hoses ((1), (4), (5), (6) and (7) 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

3	Check voltage between terminals VC and E2 of ECM connector (See page DI-84 , step 9).

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

OK

4	Check voltage between terminals PTNK and E2 of ECM connector (See page DI-84 , step 10).

OK → Go to step 6.

NG

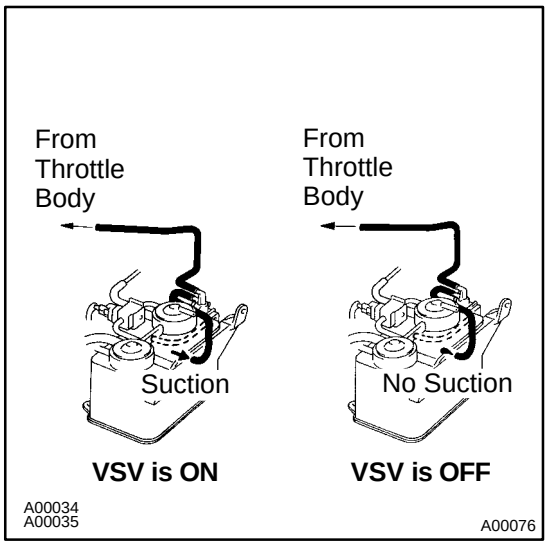
5	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

Replace vapor pressure sensor.

6	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 of 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 10.

NG

7	Check vacuum hoses between throttle body 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

8	Check operation of VSV for EVAP (See page SF-40).

OK	Go to step 9.

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.

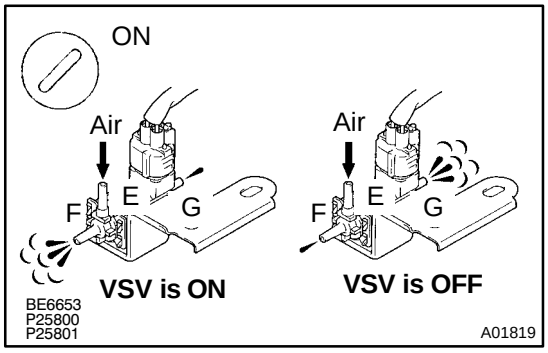
9	**Check for open and short in harness and connector between EFI main relay (Marking:EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page IN-28).**

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

OK

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

10	**Check VSV for vapor pressure sensor.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push the OBD II scan tool or 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.

PREPARATION:

VSV is ON:
Air from port E flows out through port F.
VSV is OFF:
Air from port E flows out through port G.

OK → **Go to step 13.**

NG

11	**Check operation of VSV for vapor pressure sensor (See page SF-41).**

OK → **Go to step 12.**

NG

Replace VSV and charcoal canister, and then clean vacuum hoses between charcoal canister and VSV for vapor pressure sensor, and VSV for vapor pressure sensor and vapor pressure sensor.

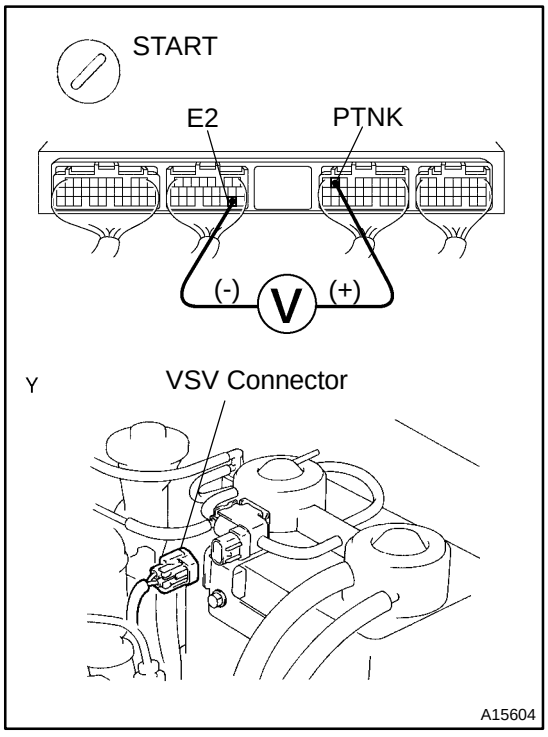
12	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for vapor pressure sensor, and VSV for vapor pressure sensor and ECM (See page IN-28).**

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

OK

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

13	**When VSV connector for vapor pressure sensor is disconnected and VSV for EVAP is ON, measure voltage between terminals PTNK and E2 of ECM connector.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Disconnect the VSV connector for the vapor pressure sensor.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(d) Start the engine.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connector using the TOYOTA hand-held tester when the VSV for the EVAP is ON.

OK:

Voltage: 2.0 V or less

OK → **Go to step 15.**

NG

14	**Check vacuum hoses between charcoal canister and VSV for vapor pressure sensor, and vapor pressure sensor and VSV for vapor pressure sensor.**

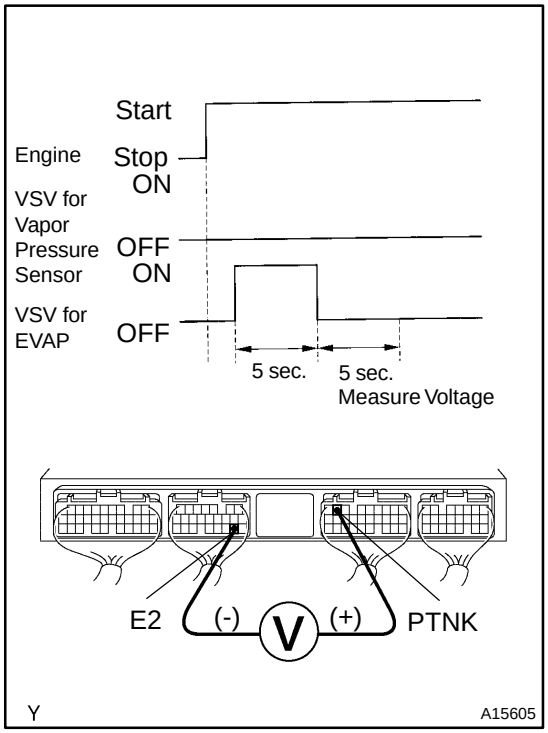
CHECK:

(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 charcoal canister.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Remove the fuel tank cap.
(c) Disconnect the VSV connector for the vapor pressure sensor.
(d) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(e) Start the engine.
(f) The VSV for the EVAP is ON by the TOYOTA hand-held tester and remains on for 5 sec.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connector 5 sec. after switching the VSV for the EVAP from ON to OFF.

OK:

Voltage: 2.5 V or less

NG → **Replace charcoal canister.**

OK

16	**Remove charcoal canister and check it (See page EC-5).**

NG → **Replace charcoal canister.**

OK

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

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

1	**Check VSV connector for EVAP, VSV connector for vapor pressure sensor and vapor pressure sensor connector for looseness and disconnection.**

NG → **Repair or connect VSV or sensor connector.**

OK

2	**Check vacuum hoses ((1), (4), (5), (6) and (7) 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

3	**Check voltage between terminals VC and E2 of ECM connector (See page DI-84 , step 9).**

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

OK

4	**Check voltage between terminals PTNK and E2 of ECM connector (See page DI-84 , step 10).**

OK → **Go to step 6.**

NG

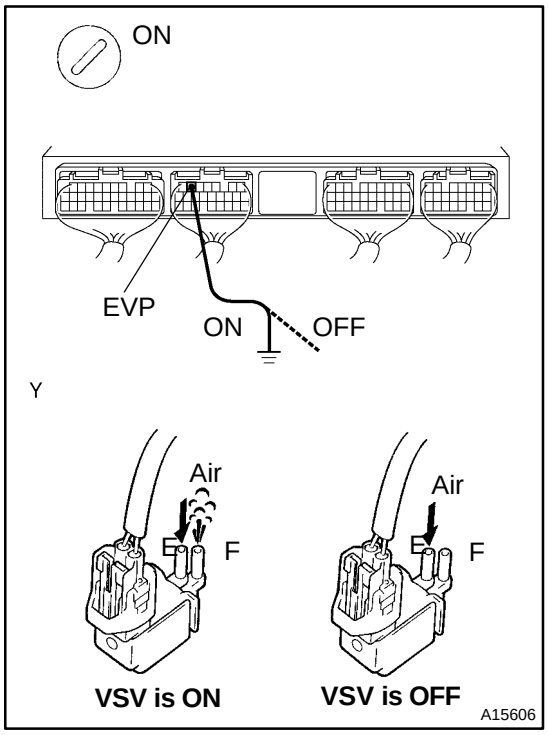
5	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).**

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

OK

Replace vapor pressure sensor.

6	**Check VSV for EVAP.**



PREPARATION:

(a) Remove the glove compartment (See page SF-49).

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

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

(2) Disconnect between terminal EVP 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 9.**

NG

7	**Check operation of VSV for EVAP (See page SF-40).**

OK → **Go to step 8.**

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.

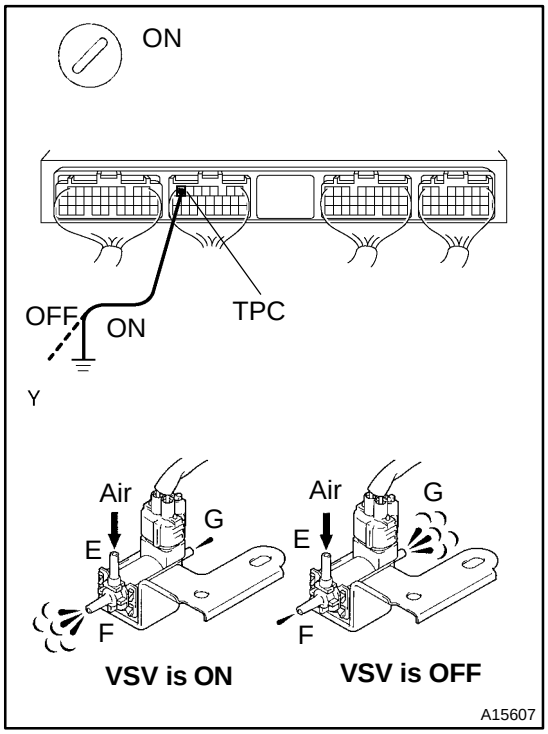
8	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page IN-28).**

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

OK

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

9	**Check VSV for vapor pressure sensor.**



PREPARATION:

(a) Remove the glove compartment (See page SF-49).

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

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

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

OK:

(1) VSV is ON:
Air from port E flows out through port F.
(2) VSV is OFF:
Air from port E flows out through port G.

OK → **Check and replace charcoal canister (See page EC-5).**

NG

10	**Check operation of VSV for vapor pressure sensor (See page SF-41).**

OK → Go to step 11.

NG

Replace VSV and charcoal canister, and then clean vacuum hoses between charcoal canister and VSV for vapor pressure sensor, and VSV for vapor pressure sensor and vapor pressure sensor.

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

NG → Repair or replace harness or connector.

OK

Check and replace ECM.