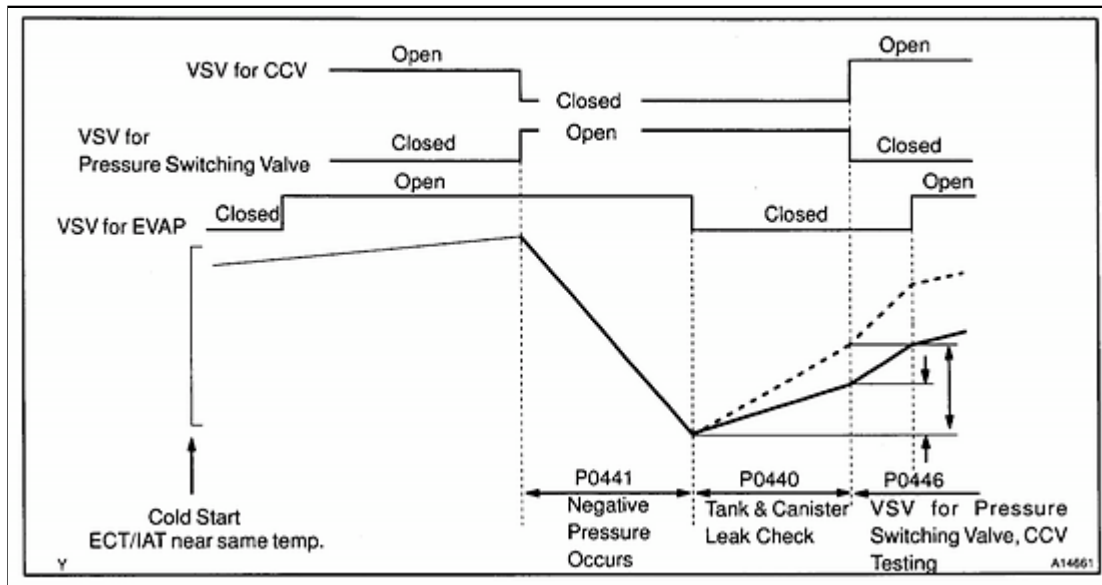
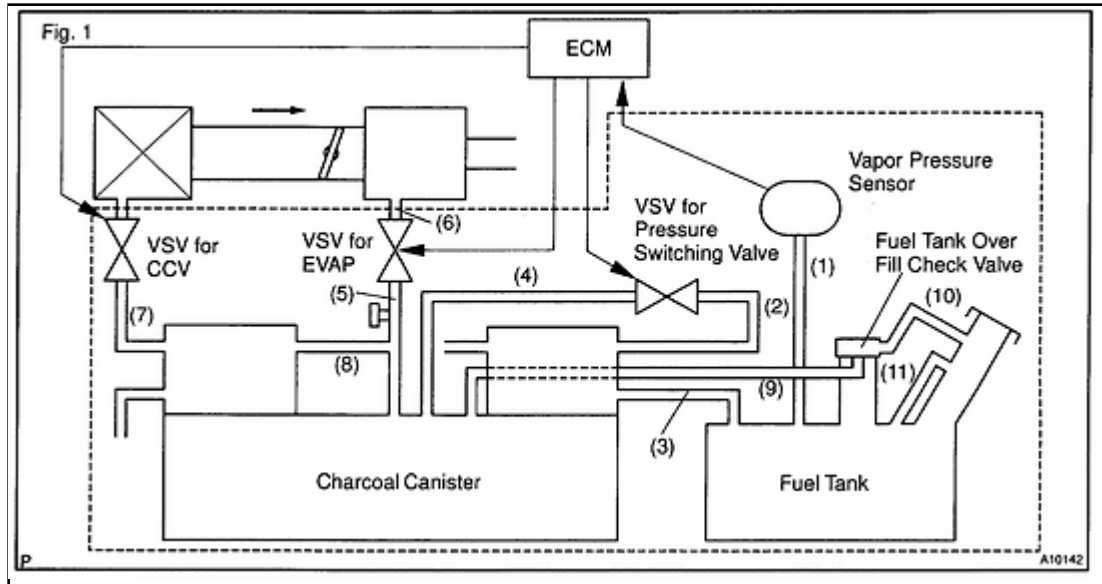


ALLDATA[®] COLLISION

2001 Toyota Truck 4 Runner Limited 4WD V6-3.4L (5VZ-FE)
A L L Diagnostic Trouble Codes (DTC) Testing and Inspection,
P Code Charts: P0446

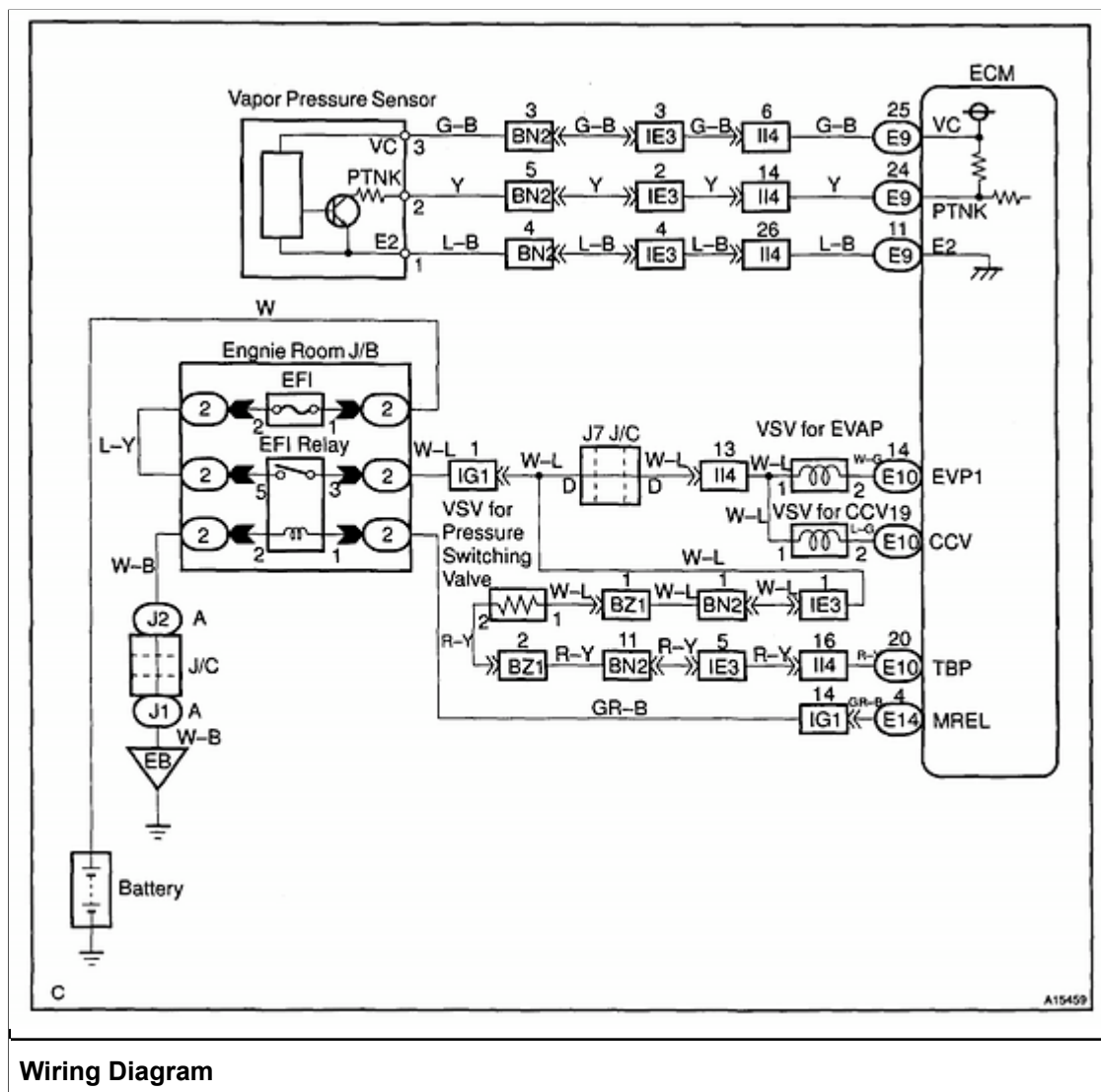
CIRCUIT DESCRIPTION

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
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.	• 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
	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.	• 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
DTC Detecting Condition		

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, 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.



Wiring Diagram

CONFIRMATION READINESS TEST

First Trip Procedure

- Vehicle must be cold, ambient temperature approximately between **50 °F - 95 °F**.
- Intake Air Temp. (IAT) and Engine Coolant Temp. (ECT) sensor almost same value.

READINESS TESTS	
MISFIRE MON.....	AVAIL
FUEL SYS MON.....	AVAIL
COMP MON.....	AVAIL
CAT EVAL.....	INCMPL
HTD CAT EVAL.....	N/A
EVAP EVAL.....	INCMPL
2nd AIR EVAL.....	N/A
A/C EVAL.....	N/A
O2S EVAL.....	INCMPL
O2S HTR EVAL.....	INCMPL
EGR EVAL.....	INCMPL

A15402

c. Clear DTC's.

- Disconnecting the battery terminals or EFI fuse.
- Readiness tests will show INCMPL (incomplete).

d. Drive the vehicle according to LA#4 drive cycle. Note the state of Readiness Tests. They will change to COMPL as the evaluation monitors operate and if the system passes. This procedure may take approximately **20 minutes** or more.

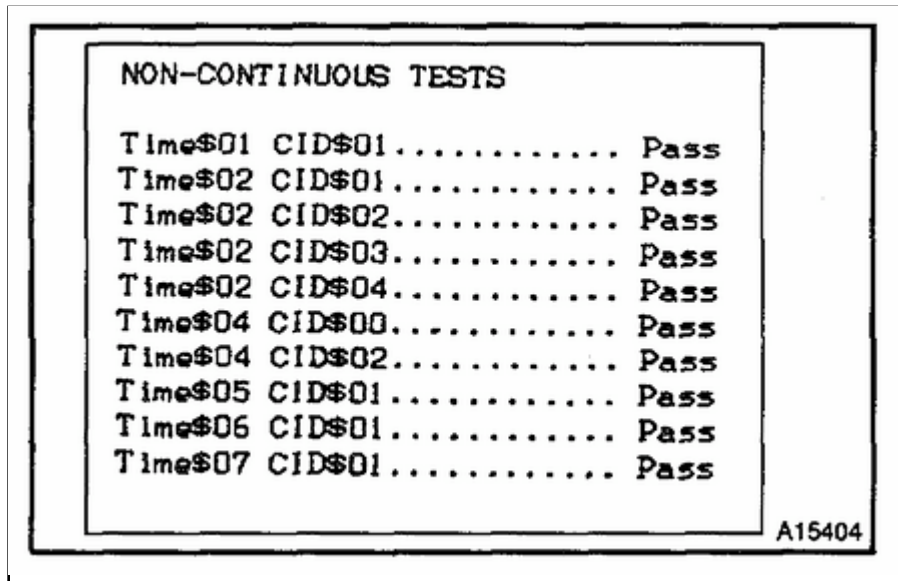
READINESS TESTS	
MISFIRE MON.....	AVAIL
FUEL SYS MON.....	AVAIL
COMP MON.....	AVAIL
CAT EVAL.....	COMPL
HTD CAT EVAL.....	N/A
EVAP EVAL.....	COMPL
2nd AIR EVAL.....	N/A
A/C EVAL.....	N/A
O2S EVAL.....	COMPL
O2S HTR EVAL.....	COMPL
EGR EVAL.....	COMPL

A15403

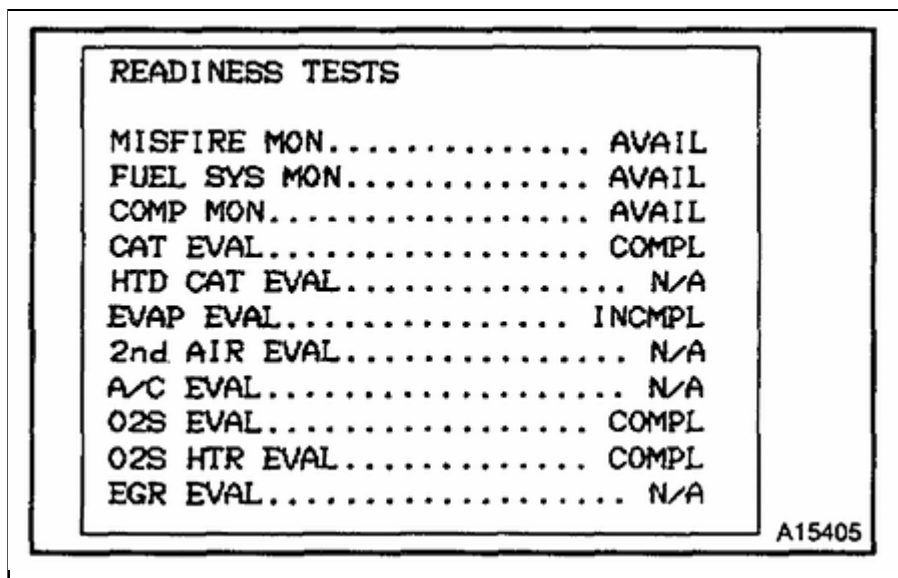
NOTE: Do not shut off the engine - the results will be invalid. Pass Condition - No Problem Found by the ECM

If the EVAP evaluation monitor shows COMPL, go to the Non-Continuous Test screen.

NOTE: Do not shut off the engine - the results will be invalid.

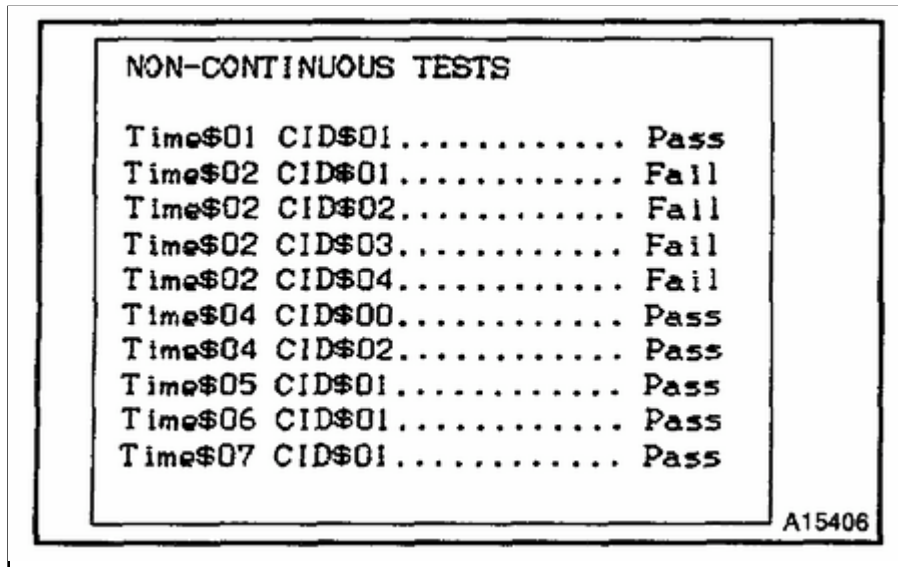


- To get there, go to Advanced OBD II, On-board Tests, Non-Continuous Tests.
- If all of the tests in the time \$02 category Tests show Pass, the evaluation monitor has operated and no problem was detected.

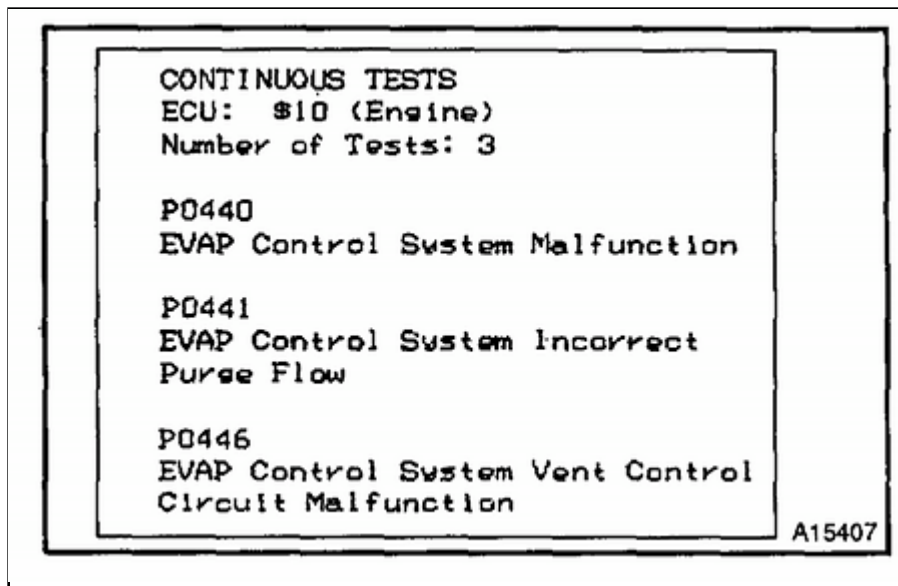


Fail Condition - Problem Detected by the ECM

If the EVAP evaluation monitor shows INCMPL, go to the Non-Continuous Test screen.



1. If all Tests show Pass, the following may have occurred.
 - The EVAP evaluation monitor did not operate.
 - The EVAP evaluation monitor did not finish.
 - The ECM withheld judgement.
2. If one or more of the tests in the time \$02 category show Fail, the EVAP evaluation monitor did operate and the ECM detected a problem.



3. Go to Continuous Tests screen. This is the only place DTC's are listed for the first trip.

NOTE: The DTC listed may not be valid A second trip is needed to confirm the DTC.

READINESS TESTS	
MISFIRE MON.....	AVAIL
FUEL SYS MON.....	AVAIL
COMP MON.....	AVAIL
CAT EVAL.....	COMPL
HTD CAT EVAL.....	N/A
EVAP EVAL.....	COMPL
2nd AIR EVAL.....	N/A
A/C EVAL.....	N/A
O2S EVAL.....	COMPL
O2S HTR EVAL.....	COMPL
EGR EVAL.....	COMPL

A15403

Second Trip Procedure

- Vehicle must be cold, ambient temperature approximately between **50 °F - 95 °F**.
- Go to Readiness Tests screen.
- Drive the vehicle according to LA#4 drive cycle. Note the state of EVAP evaluation monitor. This procedure may take approximately **20 minutes** or more.

NOTE: Do not shut off the engine - the results will be invalid.

CONTINUOUS TESTS	
ECU: \$10 (Engine)	
Number of Tests: 3	
P0440	
EVAP Control System Malfunction	
P0441	
EVAP Control System Incorrect Purge Flow	
P0446	
EVAP Control System Vent Control Circuit Malfunction	

A15407

d. If Readiness Tests changes to COMPL, the EVAP evaluation monitor has operated. Check for any stored DTC's.

- If a DTC has stored, the problem has been detected and confirmed by the ECM.
- If no DTC was found, the EVAP monitor operated but no problem was detected.

INSPECTION PROCEDURE

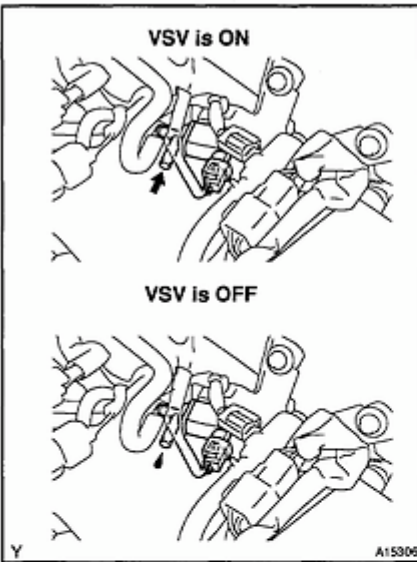
1	Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister (See DTC P0440 / P0442, step1).
OK	
NG	Repair or replace.
2	Check that fuel tank cap is TOYOTA genuine parts (See DTC P0440 / P0442, step 2).
OK	
NG	Replace to TOYOTA genuine parts.
3	Check that fuel tank cap is correctly installed (See DTC P0440 / P0442, step 3).
OK	
NG	Correctly install fuel tank cap.
4	Check fuel tank cap (See DTC P0440 / P0442, step 4).
OK	
NG	Replace fuel tank cap.
Steps 1 - 4	

5	Check filler neck for damage (See DTC P0440 / P0442, step 5).
OK	
NG	Replace filler pipe.
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 DTC P0440/P0442, step 6).
OK	
NG	Repair or connect VSV or sensor connector.
7	Check hose and tube between fuel tank and charcoal canister (See DTC P0440 / P0442, step 7).
OK	
NG	Repair or replace.
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.
OK	
NG	Repair or connect VSV or sensor connector.
Steps 5 - 8	

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 DTC P0440 / P0442, step 9).****NG****Check and replace ECM.****OK****11 Check voltage between terminals PTNK and E2 of ECM connectors (See DTC P0440 / P0442, step 10).****OK****Go to step 13.****NG****12 Check for open and short in harness and connector between vapor pressure sensor and ECM.****NG****Repair or replace harness or connector.****OK****Replace vapor pressure sensor.****Steps 9 - 12**

13 Check purge flow.**PREPARATION:**

- Connect the TOYOTA hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
- Disconnect the vacuum hose for the VSV for the EVAP from the charcoal canister.
- 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:**

- Check that the vacuum hose is connected correctly.
- Check the vacuum hose for looseness and disconnection.
- Check the vacuum hose for cracks, hole, damage and blockage.

NG

Repair or replace.

OK

Steps 13 - 14

15 Check operation of VSV for EVAP.

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.

Step 15

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.

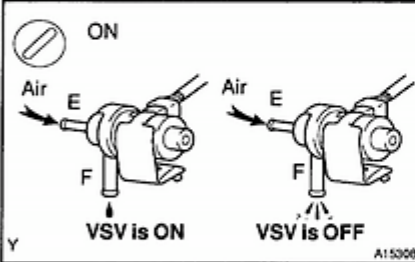
NG

Repair or replace harness or connector.

OK

Check and replace ECM.

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.

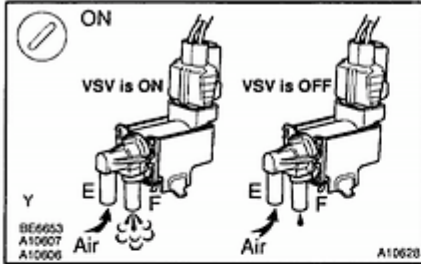
OK

Go to step 21.

NG

Steps 16 - 17

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.
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.
NG Repair or replace harness or connector.	
OK	
Check and replace ECM.	
Steps 18 - 20	

21 Check VSV for pressure switching valve.**PREPARATION:**

- Connect the TOYOTA hand-held tester to the DLC3.
- Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
- 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.

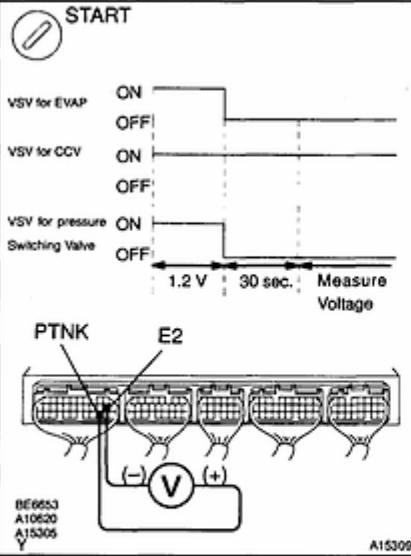
OK**Go to step 24.****NG****22 Check operation of VSV for pressure switching valve.****OK****Go to step 23.****NG**

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.

Steps 21 - 22**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.****NG****Repair or replace harness or connector.****OK****Check and replace ECM.****Step 23**

24

Check fuel tank.

**PREPARATION:**

- Remove the grove compartment.
- Connect the TOYOTA hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
- Start the engine.
- The VSV for the CCV is ON by the TOYOTA hand-held tester.
- 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:**

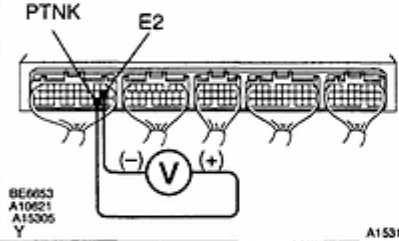
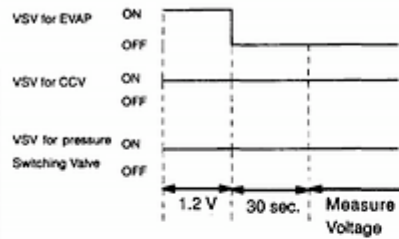
When there is no sharp change of the voltage with the voltage of more or less 1.2 V

NG

Replace fuel tank.

OK

Step 24

25 Check charcoal canister.**START****PREPARATION:**

- Remove the grove compartment.
- Connect the TOYOTA hand-held tester to the DLC3.
- Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
- Start the engine.
- The VSV for the CCV and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester.
- 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

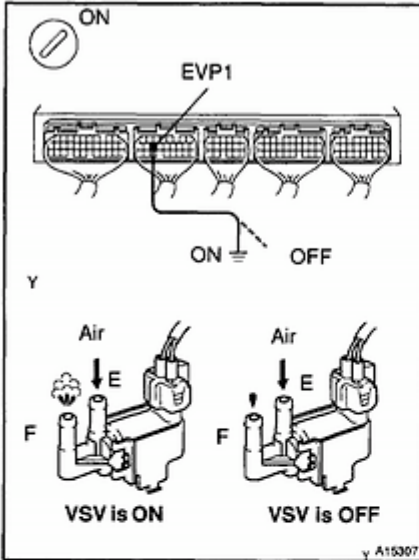
NG**Replace charcoal canister.****OK****26 Remove charcoal canister and check it.****NG****Replace charcoal canister.****OK****Steps 25 - 26****27 Check fuel tank over fill check valve.****NG****Replace fuel tank over fill check valve or fuel tank.****OK****Check and replace charcoal canister.****Step 27**

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 DTC P0440 / P0442 , step 1).
OK	
NG	Repair or replace.
2	Check that fuel tank cap is TOYOTA genuine parts (See DTC P0440 / P0442 , step 2).
OK	
NG	Replace to TOYOTA genuine parts.
3	Check that fuel tank cap is correctly installed (See DTC P0440 / P0442 , step 3).
OK	
NG	Correctly install fuel tank cap.
4	Check fuel tank cap (See DTC P0440 / P0442 , step 4).
OK	
NG	Replace fuel tank cap.
Steps 1 - 4	

5	Check filler neck for damage (See DTC P0440 / P0442 , 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 DTC P0440/ P0442 , step 6).
	NG Repair or connect VSV or sensor connector.
	OK
7	Check hose and tube between fuel tank and charcoal canister (See DTC P0440 / P0442 , 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
Steps 5 - 8	

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 DTC P0440 / P0442, step 9).
NG Check and replace ECM .	
OK	
11	Check voltage between terminals PTNK and E2 of ECM connectors (See DTC P0440 / P0442, step 10).
OK Go to step 13.	
NG	
12	Check for open and short in harness and connector between vapor pressure sensor and ECM.
NG Repair or replace harness or connector.	
OK	
Replace vapor pressure sensor.	
Steps 9 - 12	

13 Check VSV for EVAP.**PREPARATION:**

- Remove the glove compartment.
- Turn the ignition switch ON.

CHECK:

Check the VSV function.

- Connect between terminal EVP1 of the ECM connector and body ground (ON).
- Disconnect between terminal EVP1 of the ECM connector and body ground (OFF).

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 16.

NG

14 Check operation of VSV for EVAP.

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.

Steps 13 - 14

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.

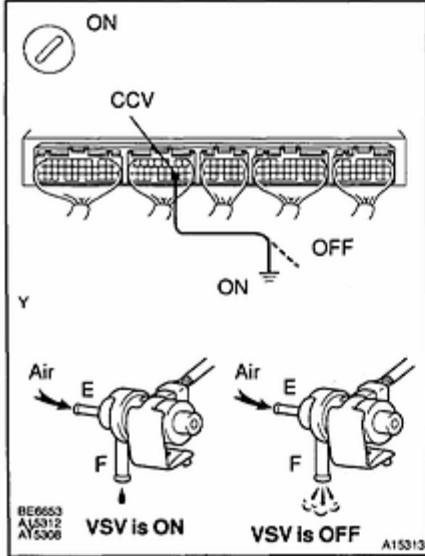
NG

Repair or replace harness or connector.

OK

Check and replace ECM.

Step 15

16 Check VSV for CCV.**PREPARATION:**

- (a) Remove the groove 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.****OK****Go to step 18.****NG**

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

Steps 16 - 17

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.

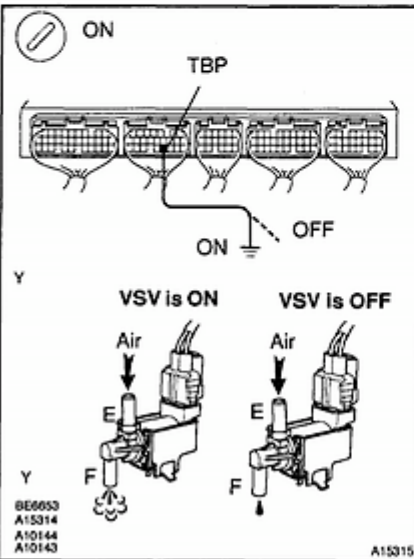
NG

Repair or replace harness or connector.

OK

Check and replace ECM.

19 Check VSV for pressure switching valve.



PREPARATION:

- Remove the groove compartment.
- Turn the ignition switch ON.

CHECK:

Check the VSV function.

- Connect between terminal TBP of the ECM connector and body ground (ON).
- Disconnect between terminal TBP of the ECM connector and body ground (OFF).

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 22

NG

Steps 18 - 19

20 Check operation of VSV for pressure switching valve.

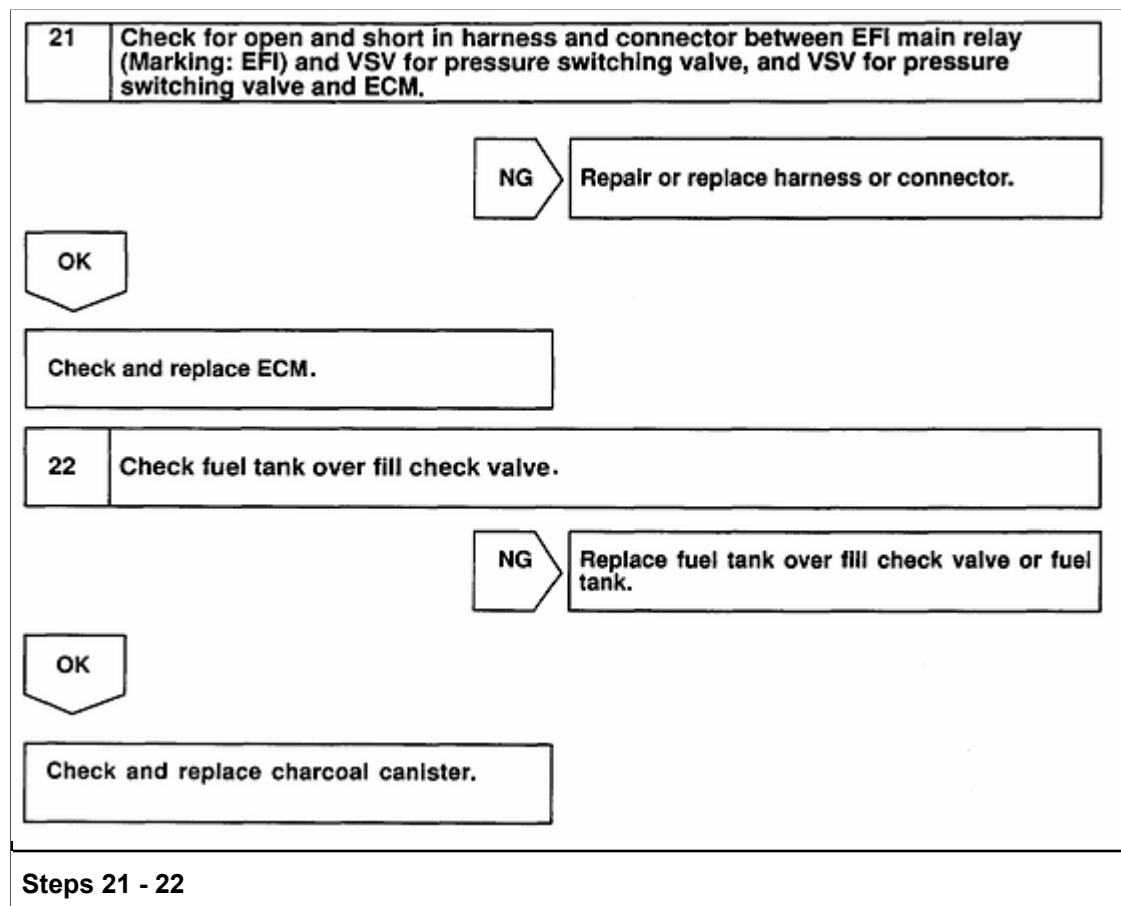
OK

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.

Step 20

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