

DTC	P0440	EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION
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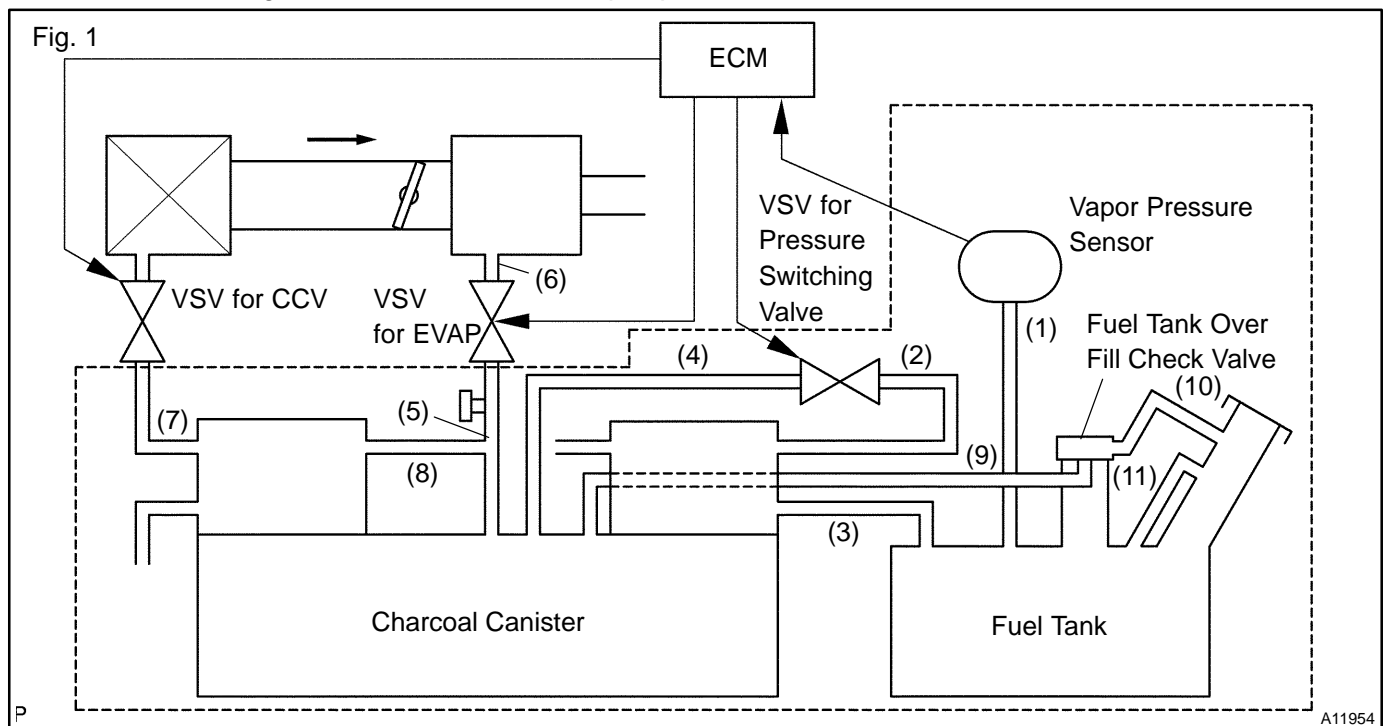
DTC	P0442	EVAPORATIVE EMISSION CONTROL SYSTEM MALFUNCTION
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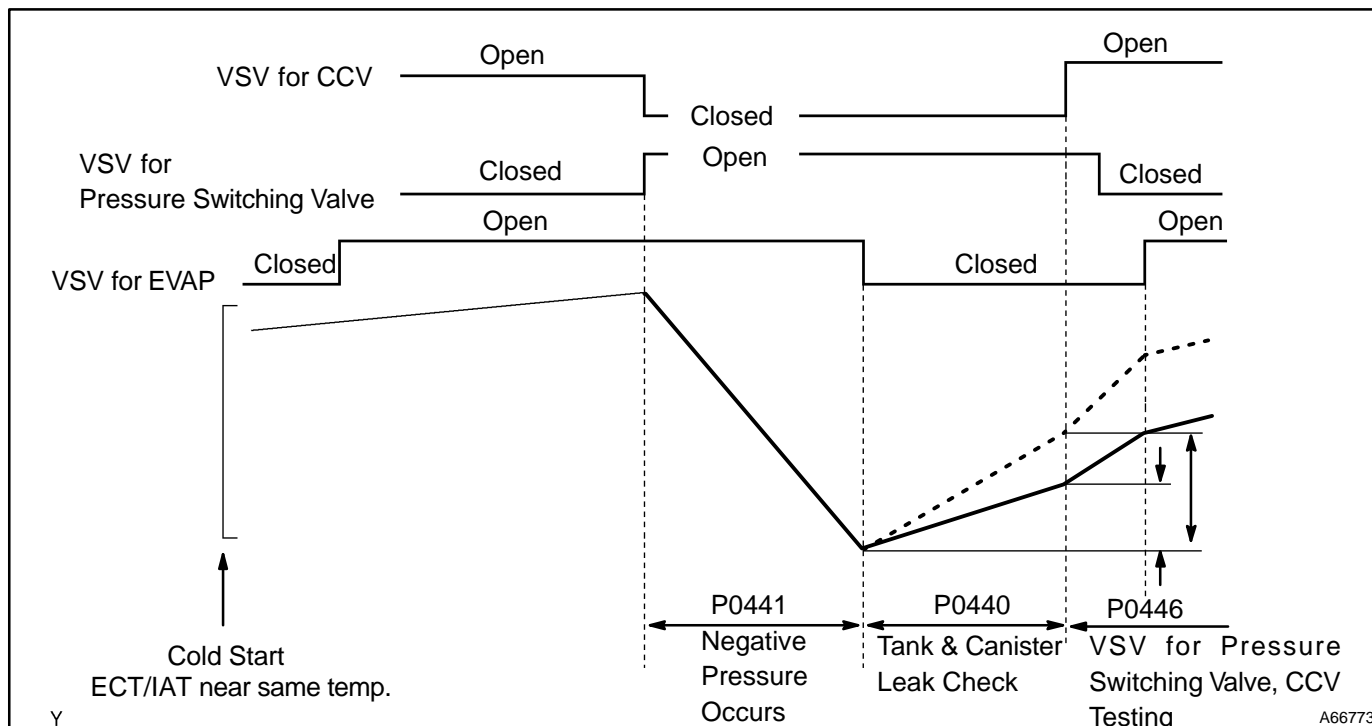
CIRCUIT DESCRIPTION

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

The ECM decides whether or not there is an abnormality in the evaporative emission control system by the vapor pressure sensor signal.

DTC P0440 or P0442 is recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when the vapor pressure sensor malfunctions.



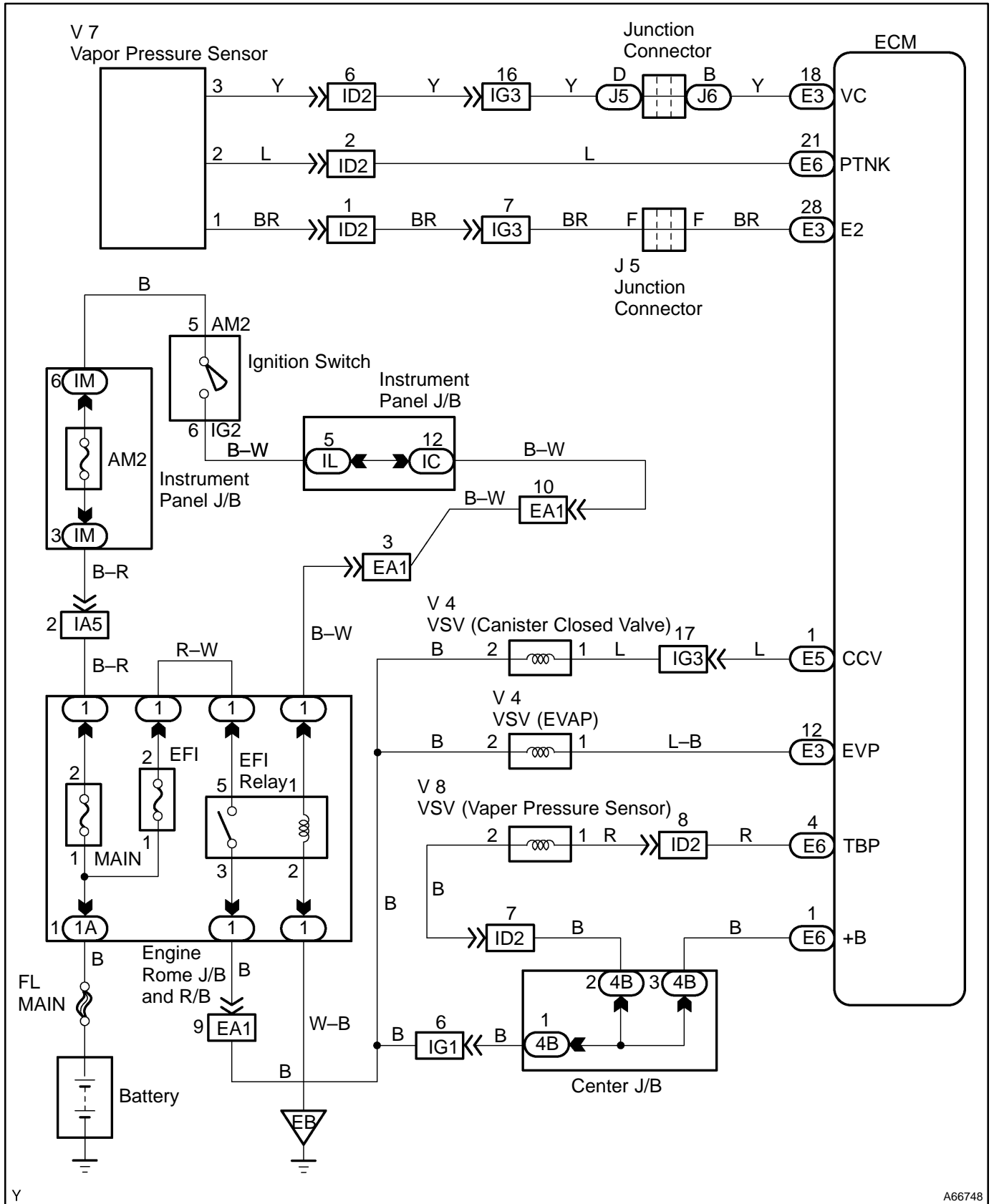


After purge operation, the VSV for EVAP is turned off sealing the vacuum in the system and the ECM begins to monitor the pressure increase. Some increase is normal. A very rapid, sharp increase in pressure indicates a leak in the EVAP system and sets the DTC P0440.

A pressure rise just above normal indicates a very small hole and will set the DTC P0442.

DTC No.	DTC Detecting Condition	Trouble Area
P0440 P0442	Fuel tank pressure is atmospheric pressure after vehicle is driven for 20 min. (2 trip detection logic)	<ul style="list-style-type: none"> • Hose or tube cracked, holed, damaged or loose seal ((3), (5), (7), (8), (9), (10) and (11) in Fig. 1) • Fuel tank cap incorrectly installed • Fuel tank cap cracked or damaged • Vacuum hose cracked, holed, blocked, damaged or disconnected ((1), (2) or (3) in Fig. 1) • Fuel tank cracked, holed or damaged • Charcoal canister cracked, holed or damaged • Open or short in vapor pressure sensor circuit • VSV for CCV • VSV for EVAP • VSV for Pressure Switching Valve • Vapor pressure sensor • Fuel tank over fill check valve cracked or damaged • ECM

WIRING DIAGRAM



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CONFIRMATION READINESS TEST

1. First Trip Procedure

- (a) Vehicle must be cold, ambient temperature approximately between 50°F – 95°F.
- (b) 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

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- (c) Clear DTC's.
 - Disconnect the battery terminal or E.F.I. and ECTS fuses.
 - 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 min. or more.

NOTICE:

Do not shut off the engine – the results will be invalid.

2. Pass Condition – No Problem Found by the ECM

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

NOTICE:

Do not shut off the engine – the results will be invalid.

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

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NON-CONTINUOUS TESTS	
Time\$01 CID\$01.....	Pass
Time\$02 CID\$01.....	Pass
Time\$02 CID\$02.....	Pass
Time\$02 CID\$03.....	Pass
Time\$02 CID\$04.....	Pass
Time\$04 CID\$00.....	Pass
Time\$04 CID\$02.....	Pass
Time\$05 CID\$01.....	Pass
Time\$06 CID\$01.....	Pass
Time\$07 CID\$01.....	Pass

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- To get there, go to Advanced OBD II, Onboard 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.

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

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3. Fail Condition – Problem Detected by the ECM

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

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NON-CONTINUOUS TESTS

Time$01 CID$01..... Pass
Time$02 CID$01..... Fail
Time$02 CID$02..... Fail
Time$02 CID$03..... Fail
Time$02 CID$04..... Fail
Time$04 CID$00..... Pass
Time$04 CID$02..... Pass
Time$05 CID$01..... Pass
Time$06 CID$01..... Pass
Time$07 CID$01..... Pass
    
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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
    
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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
    
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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
    
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- (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.

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

4. Second Trip Procedure

- (a) Vehicle must be cold, ambient temperature approximately between 50°F – 95°F.
- (b) Go to Readiness Tests screen.
- (c) 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.

NOTICE:
Do not shut off the engine – the results will be invalid.

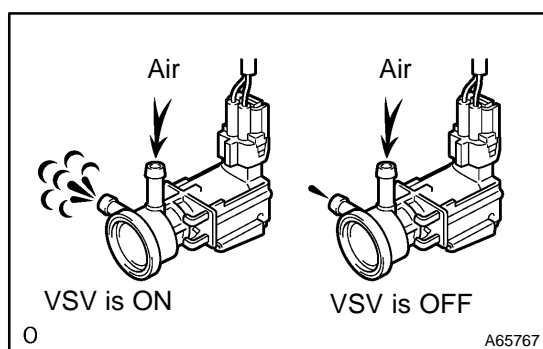
- (d) If Readiness Tests changes to COMPL, the EVAP evaluation monitor has operated. Check for any stored DTC's.
 - If a DTC has stored, the problem has been detected and confirmed by the ECM.
 - If no DTC was found, the EVAP monitor operated but no problem was detected.

INSPECTION PROCEDURE

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.
- Ask the customer whether, after the MIL came on, the customer found the fuel tank cap loose and tightened it. Also ask the customer whether the fuel tank cap was loose when refuelling. If the fuel tank cap was loose, it was the cause of the DTC. If the fuel tank cap was not loose or if the customer was not sure if it was loose, troubleshoot according to the following procedure.
- Read freeze frame data using 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 vapor pressure sensor.

1 PERFORM ACTIVE TEST BY HAND-HELD TESTER



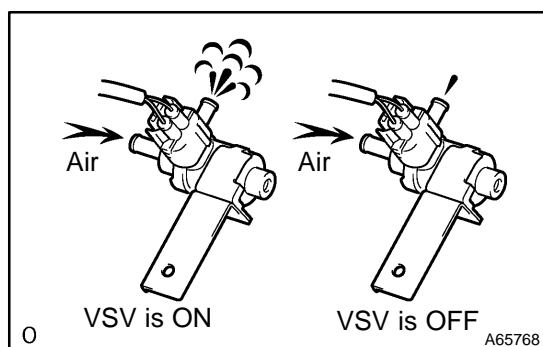
- Select the ACTIVE TEST mode on the hand-held tester.
- Disconnect the vacuum hose from the VSV for the EVAP.
- Start the engine.
- Select the item "EVAP VSV(ALONE)" in the ACTIVE TEST and operate the shift solenoid valves.
- When the VSV for the EVAP is operated by the hand-held tester, apply the disconnected hose to your finger to check the suction.

Result:

VSV is ON: Disconnected hose sucks.

VSV is OFF: Disconnected hose does not suck.

- Select the item "INTAKE CTL VSV1" in the ACTIVE TEST and operate the shift solenoid valves.



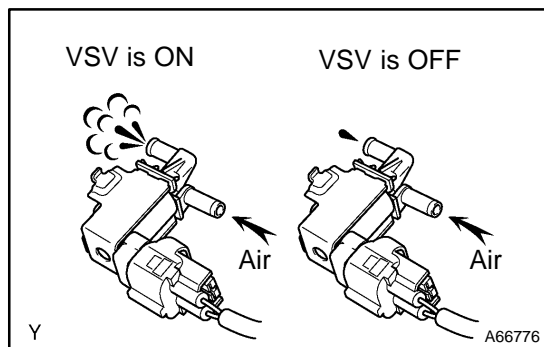
- Check the VSV for CCV operation when it is operated by the hand-held tester.

Result:

VSV is ON: Disconnected hose sucks.

VSV is OFF: Disconnected hose does not suck.

- Select the item "TANK BYPASS VSV" in the ACTIVE TEST and operate the shift solenoid valves.



- (i) Check the VSV for pressure switching valve operation when it is operated by the hand-held tester.
Result:
VSV is ON: Disconnected hose sucks.
VSV is OFF: Disconnected hose does not suck.

NG → **REPAIR OR REPLACE**

OK

2 | PERFORM ACTIVE TEST BY EVAPORATIVE EMISSIONS LEAK(EVAP SYS CHECK)

- (a) Connect the hand-held tester to the DLC3.
- (b) Select the "EVAP SYS CHECK" mode on the hand-held tester.
- (c) Perform "EVAP SYS CHECK".

DISPLAY:

A	B	C
Scan tool detects a leak on the fuel tank side.	Scan tool detects a leak on the canister side.	Scan tool does not detect a leak in the EVAP system.

B → **Go to step 7**

C → **CHECK VACUUM HOSE**

A

3 | CHECK FUEL TANK CAP ASSY(TOYOTA GENUINE PARTS)

- (a) Replace to toyota genuine parts.
- (b) After replace, perform "EVAP SYS CHECK" by hand-held tester. (Go to step 2)

OK → **Go to step 4**

NG

REPLACE TO TOYOTA GENUINE PARTS

4 | CHECK FUEL TANK CAP FOR CORRECTLY INSTALLED

- (a) Correctly install fuel tank cap.
- (b) After install, perform "EVAP SYS CHECK" by hand-held tester. (Go to step 2)

OK → **Go to step 5**

NG

CORRECTLY INSTALL FUEL TANK CAP

5 INSPECT FUEL TANK CAP ASSY (See page 12-7)

- (a) Replace to fuel tank cap assy.
- (b) After replace, perform "EVAP SYS CHECK" by hand-held tester. (Go to step 2)

OK → Go to step 6

NG

REPLACE FUEL TANK CAP ASSY

6 CHECK FUEL TANK INLET PIPE SUB-ASSY

- (a) Remove the fuel tank cap.
- (b) Visually inspect the fuel inlet pipe for damage.
- (c) After repair or replace, perform "EVAP SYS CHECK" by hand-held tester. (Go to step 2)

NG → REPLACE FUEL TANK INLET PIPE SUB-ASSY

OK

REPAIR OR REPLACE VACUUM HOSE

7 CHECK FUEL HOSE(VSV FOR PRESSURE SWITCHING VALVE-CHARCOAL CANISTER)

- (a) Check for proper connection of the fuel tank and fuel EVAP pipe, fuel EVAP pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
- (b) Check the hose and tube for cracks, hole and damage.

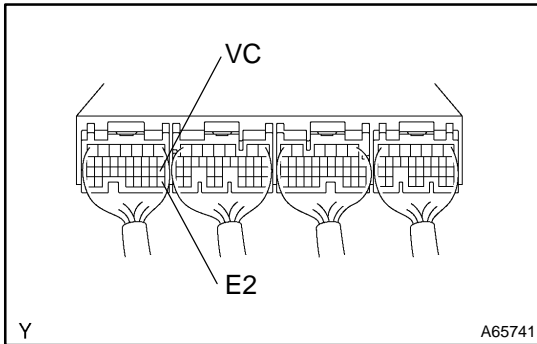
NG → REPAIR OR REPLACE

OK

8 CHECK CHARCOAL CANISTER ASSY

NG → REPLACE CHARCOAL CANISTER ASSY

OK

9 INSPECT ECM(CHECK VOLTAGE)

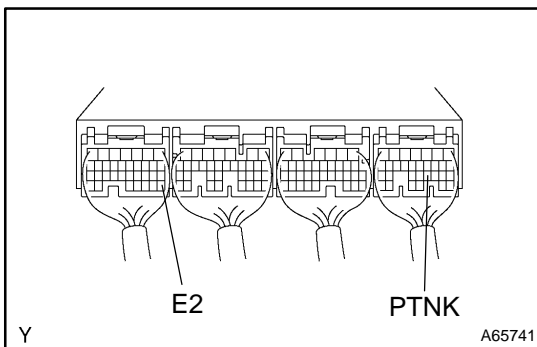
- (a) Turn the ignition switch ON.
- (b) Measure voltage between terminals VC and E2 of ECM E2 connector.

Voltage: 4.5 – 5.5 V

NG

CHECK AND REPLACE ECM

OK

10 INSPECT ECM(CHECK VOLTAGE)

- (a) Remove the fuel tank cap.
- (b) Turn the ignition switch ON.
- (c) Measure the voltage between terminals PTNK of the ECM E6 connector and E2 of the ECM E3 connector.

Voltage: 3.0 – 3.6 V

OK

Go to step 12

NG

11 CHECK HARNESS AND CONNECTOR(VAPOR PRESSURE SENSOR-ECM)

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE VAPOR PRESSURE SENSOR ASSY**12 CHECK FUEL TANK AND FUEL TANK OVER FILL CHECK VALVE FOR CRACKS AND DAMAGE**

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REPLACE FUEL TANK ASSY

OK

IT IS LIKELY THAT VEHICLE USER DID NOT PROPERLY CLOSE FUEL TANK CAP