

<b>DTC</b>	<b>P0441</b>	<b>EVAPORATIVE EMISSION CONTROL SYSTEM INCORRECT PURGE FLOW</b>
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<b>DTC</b>	<b>P0442</b>	<b>EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (SMALL LEAK)</b>
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<b>DTC</b>	<b>P0446</b>	<b>EVAPORATIVE EMISSION CONTROL SYSTEM VENT CONTROL CIRCUIT</b>
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<b>DTC</b>	<b>P0456</b>	<b>EVAPORATIVE EMISSION CONTROL SYSTEM LEAK DETECTED (VERY SMALL LEAK)</b>
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## CIRCUIT DESCRIPTION

### P0441

The VSV for EVAP is used to purge the evaporative emissions from the fuel tank into the intake manifold. Also, it creates a vacuum inside the fuel tank in unison with the operation of the VSV for CCV (canister closed valve) and leak tests are performed using this vacuum. When the VSV for EVAP remains open (opened malfunction), the vacuum inside the fuel tank does not change. When the VSV for EVAP remains open (opened malfunction), the vacuum inside the fuel tank changes according to the operation of the VSV for CCV.

### P0446

The VSV for CCV is open under normal conditions. When the VSV for EVAP is used to purge the evaporative emissions from the fuel tank into the intake manifold, air is drawn from the charcoal canister into the fuel tank. Also, the VSV for CCV has a function that relieves the pressure in the case that the pressure inside the fuel tank has rapidly increased. Also, it creates a vacuum inside the fuel tank in unison with the operation of the VSV for EVAP and leak tests are performed using this vacuum.

When the VSV for CCV remains closed (closed malfunction), the vacuum created inside the fuel tank cannot be relieved. When the VSV for CCV remains open (opened malfunction), it cannot create a large vacuum.

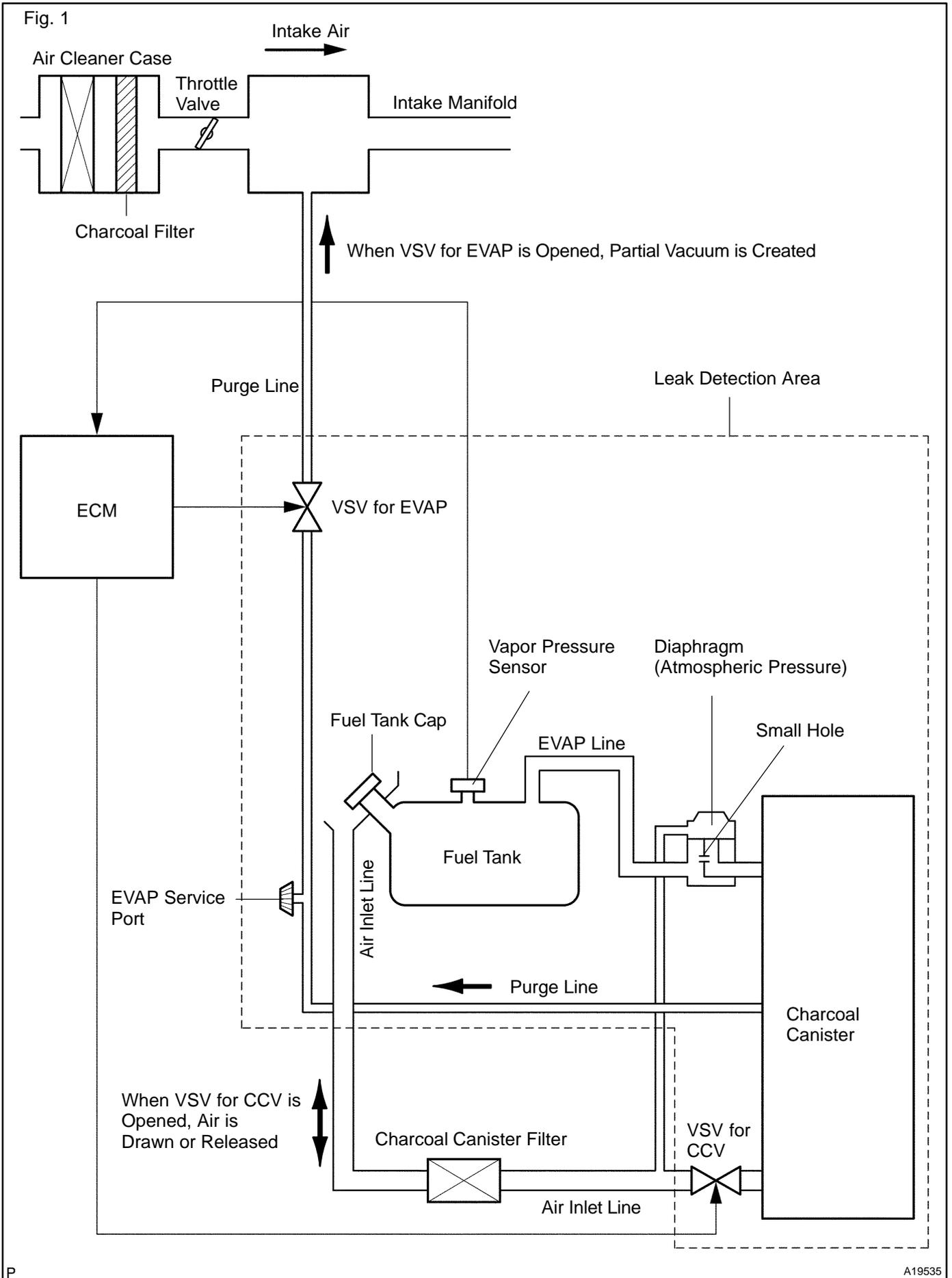
### P0442, P0456

The vapor pressure sensor, VSV for EVAP and VSV for CCV are used to detect abnormalities in the evaporative emission control system.

The ECM judges whether there abnormalities exist in the evaporative emission control system, based on the signals from the vapor pressure sensor.

If evaporative emissions leak from the components specified within the dotted line Fig. 1 or the vapor pressure sensor malfunctions, ECM records DTC P0442 or P0456.

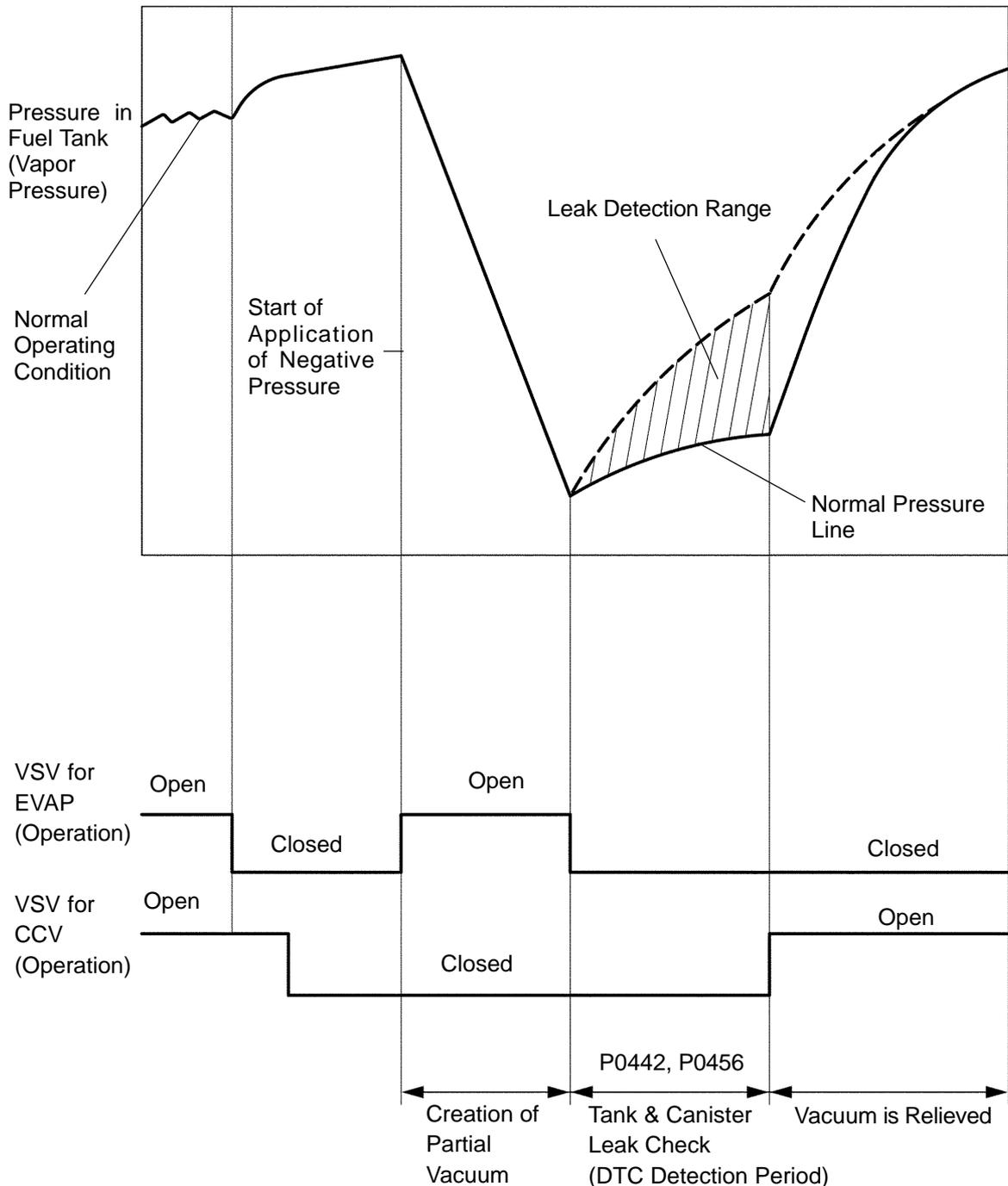
DTC No.	DTC Detection Condition	Trouble Area
P0441	Pressure in charcoal canister and fuel tank does not drop during purge control (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Vacuum hose cracks, holed blocked, damaged or disconnected</li> </ul>
	During purge cut-off, negative pressure incoming in the charcoal canister and fuel tank will not stop. (2 trip detection logic)	
P0446	When VSV for CCV is ON, pressure in charcoal canister and fuel tank is maintained at atmospheric pressure (2 trip detection logic)	<ul style="list-style-type: none"> <li>• Fuel tank cap incorrectly installed</li> <li>• Fuel tank cap cracked or damaged</li> <li>• Open or short in vapor pressure sensor circuit</li> </ul>
P0442 P0456	<p>After cold engine start.</p> <p>After VSV for EVAP operation, the VSV for EVAP is turned off sealing the vacuum in the system and the ECM begins to monitor the pressure increase.</p> <p>Some increase is normal. A very rapid, sharp increase in pressure indicates a leak in the EVAP system and sets the DTC P0442.</p> <p>This monitoring method is also able to distinguish what is called the small or very small leak detection. (DTC P0456)</p> <p>A pressure rise just above normal indicates a very small hole. (2 trip detection logic)</p>	<ul style="list-style-type: none"> <li>• Vapor pressure sensor</li> <li>• Open or short in VSV circuit for EVAP</li> <li>• VSV for EVAP</li> <li>• Open or short in VSV circuit for CCV</li> <li>• VSV for CCV</li> <li>• Fuel tank cracked, holed or damaged</li> <li>• Charcoal canister cracked, holed or damaged</li> <li>• Fuel tank over fill check valve cracked or damaged</li> <li>• ECM</li> </ul>



**Leak Check**

Initial Condition

- Cold Start
- Engine Coolant Temp./Intake Air Temp. nearly Same



VSV for EVAP is Open: ON  
 VSV for CCV is Open: OFF

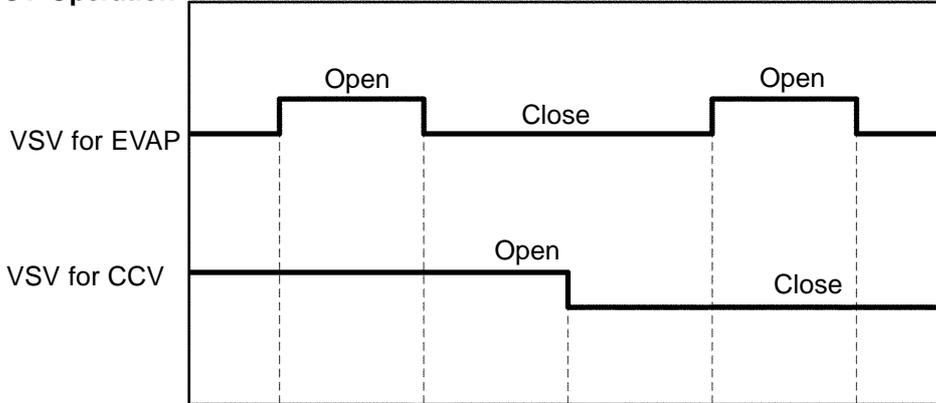
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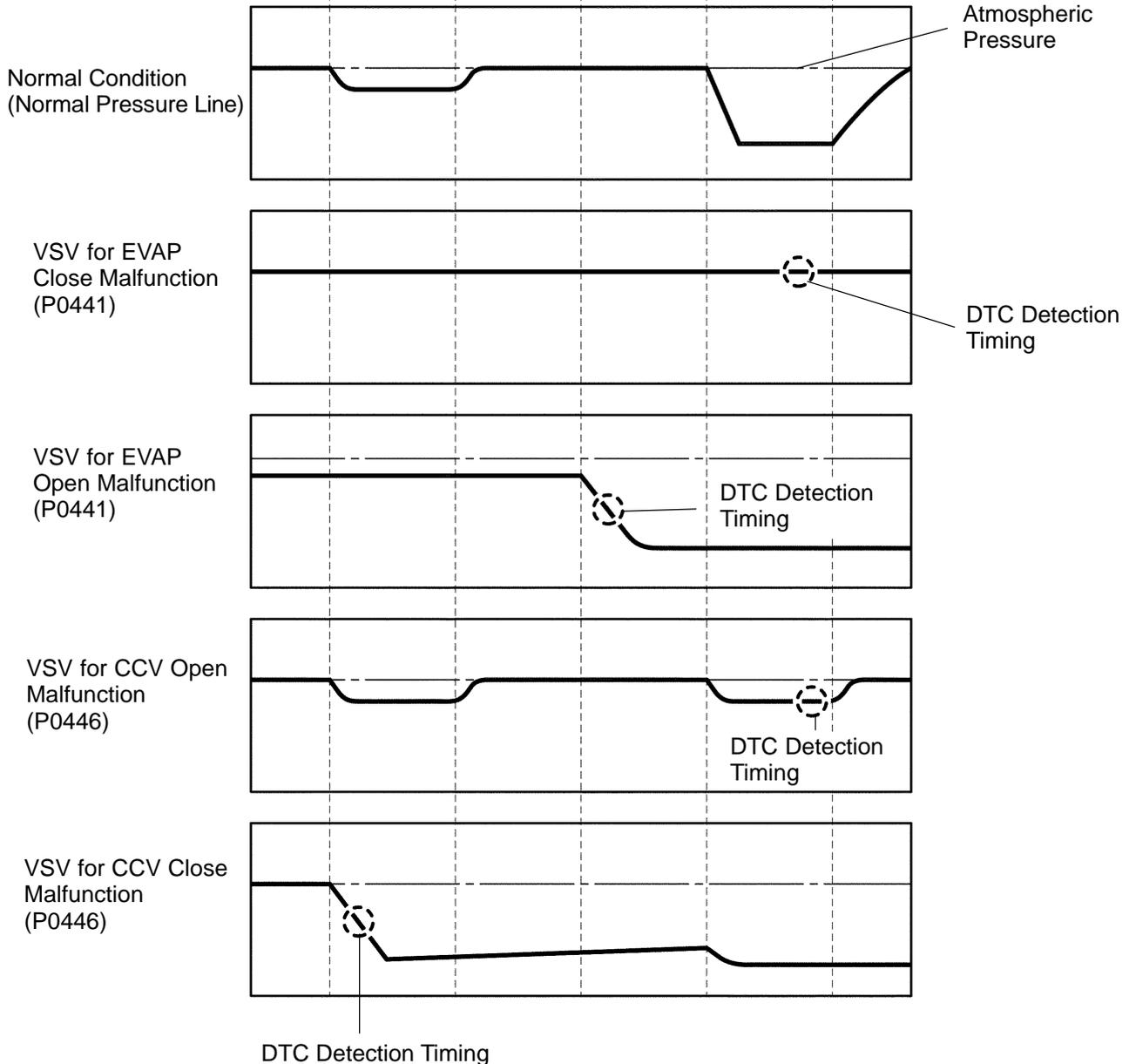
VSV Malfunction Condition and DTC Detection Timing

VSV for EVAP is Open: ON  
VSV for CCV is Open: OFF

VSV Operation



Pressure in Fuel Tank



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## CONFIRMATION READINESS TEST

### First Trip Procedure

- (a) The vehicle must be cold, and the ambient temperature must be approximately between 50°F - 95°F.
- (b) The Intake Air Temp. (IAT) and the Engine Coolant Temp. (ECT) sensors have almost the 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 .....	N/A

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- (c) Clear the DTCs.
  - Disconnect the battery terminal or remove the EFI and ETCS fuses.
  - Readiness tests will show INCMPL (incomplete).
- (d) Drive the vehicle according to the LA#4 driving cycle. Note the state of the Readiness Tests. They will change to COMPL as the EVAP 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.**

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 .....	N/A

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**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.**

NON-CONTINUOUS TESTS	
Time\$01 CID\$01 .....	Pass
Time\$01 CID\$02 .....	Pass
Time\$02 CID\$01 .....	Pass
Time\$02 CID\$02 .....	Pass
Time\$02 CID\$03 .....	Pass
Time\$02 CID\$04 .....	Pass
Time\$02 CID\$05 .....	Pass
Time\$04 CID\$01 .....	Pass
Time\$04 CID\$02 .....	Pass
Time\$04 CID\$10 .....	Pass
Time\$04 CID\$20 .....	Pass
Time\$08 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 EVAP 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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**Fail Condition - Problem Detected by the ECM**

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

NON-CONTINUOUS TESTS	
Time\$01 CID\$01 .....	Pass
Time\$01 CID\$02 .....	Pass
Time\$02 CID\$01 .....	Fail
Time\$02 CID\$02 .....	Fail
Time\$02 CID\$03 .....	Fail
Time\$02 CID\$04 .....	Fail
Time\$02 CID\$05 .....	Fail
Time\$04 CID\$01 .....	Pass
Time\$04 CID\$02 .....	Pass
Time\$04 CID\$10 .....	Pass
Time\$04 CID\$20 .....	Pass
Time\$08 CID\$01 .....	Pass

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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.

CONTINUOUS TESTS	
ECU: \$10 (Engine)	
Number of Tsts: 3	
P0441	
EVAP Control System Incorrect Purge Flow	
P0442	
EVAP Emission Control System Leak Detected	
P0446	
EVAP Control System Vent Control Malfunction	

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- (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.**

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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**Second Trip Procedure**

- (e) The vehicle must be cold, and the ambient temperature must be approximately between 50°F - 95°F.
- (f) Go to Readiness Tests screen.
- (g) 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.**

CONTINUOUS TESTS	
ECU: \$10 (Engine)	
Number of Tsts: 3	
P0441	
EVAP Control System Incorrect Purge Flow	
P0442	
EVAP Emission Control System Leak Detected	
P0446	
EVAP Control System Vent Control Malfunction	

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- (h) 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 (Purge Flow), P0446 (VSV for CCV), P0451, P0452 or P0453 (Evaporative Pressure Sensor) is output with DTC P0442 or P0456, first troubleshoot DTC P0441, P0446, P0451, P0452 or P0453. If no malfunction is detected, troubleshoot DTC P0442 or P0456 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 the hand-held tester or the 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.

### HINT:

DTC output of each trouble part.

DTC output	Trouble part	Trouble chart	
P0441 only	Open Malfunction of VSV for EVAP	Execute step from 7 to 10	Check and replace of VSV for EVAP
P0446 only	Open Malfunction of VSV for CCV	Execute step from 11 to 15	Check and replace of VSV for CCV
P0442 and/or P0456	Very small or small or medium leak	Execute step from 2	
P0441 and P0442 and P0446	Large leak (for example fuel tank cap loose) or VSV malfunction (open malfunction of VSV for CCV or close malfunction of VSV for EVAP)	Execute step from 3*	

\*: In most cases, troubleshooting can be completed by checking if the fuel tank cap is not loose and repairing the VSV for CCV and VSV for EVAP.

**Hand-held tester:****1 READ OUTPUT DTC**

- (a) Read the output DTC.  
 (b) Troubleshoot the problems, according to the DTC output.

HINT:

If trouble area is known by the DTC, proceed to the applicable part.

DTC output	Troubleshoot	Proceed to
<ul style="list-style-type: none"> <li>• P0442 (small leak)</li> <li>• P0456 (very small leak)</li> <li>• P0442 and P0456</li> <li>• Other DTC combination</li> </ul>	Go to step 2	A
P0441 only (VSV for EVAP malfunction)	Execute step from 7 to 10	B
P0446 only (VSV for CCV malfunction)	Execute step from 11 to 15	C
P0441 and P0442 and P0446	Go to step 3	D

**B** Go to step 7

**C** Go to step 11

**D** Go to step 3

**A**

**2 PERFORM SYSTEM CHECK MODE(EVAP LEAK TEST)**

**GO**

**3 INSPECT FUEL TANK CAP ASSY(CHECK THAT FUEL TANK CAP IS GENUINE PARTS)**

**NG** REPLACE TO GENUINE PARTS

**OK**

**4 CHECK FUEL TANK CAP FOR CORRECTLY INSTALLED**

**NG** CORRECTLY INSTALL FUEL TANK CAP

**OK**

**5 INSPECT FUEL TANK CAP ASSY (See page 12-8 )**

**NG** REPLACE FUEL TANK CAP ASSY

**OK**

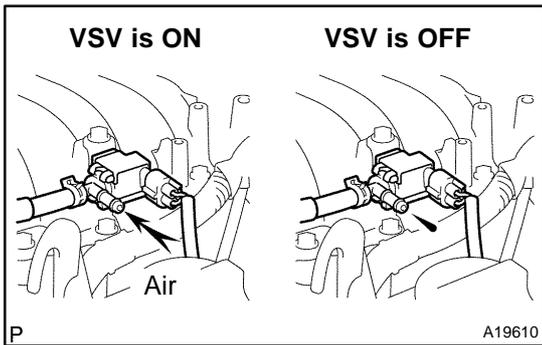
**6 CHECK FILLER NECK FOR DAMAGE**

- (a) Remove the fuel tank cap.
- (b) Visually inspect the filler neck for damage.

**NG** → **REPLACE FUEL TANK INLET PIPE SUB-ASSY**

**OK**

**7 PERFORM ACTIVE TEST BY HAND-HELD TESTER(VSV FOR EVAP PURGE FLOW)**



- (a) Disconnect the vacuum hose for the VSV for EVAP from the charcoal canister.
- (b) Start the engine.
- (c) Select the item "DIAGNOSIS/ENHANCED OBD II/ACTIVE TEST/EVAP VSV" (press the right or left button).
- (d) When the VSV for EVAP is operated by the hand-held tester, check whether the disconnected hose applies suction to your finger.

**Standard:**

Tester operation	Specified condition
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 11**

**NG**

**8 CHECK HOSE AND TUBE(INTAKE MANIFOLD - VSV FOR EVAP, VSV FOR EVAP - CHARCOAL CANISTER)**

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

**NG** → **REPAIR OR REPLACE HOSE AND TUBE**

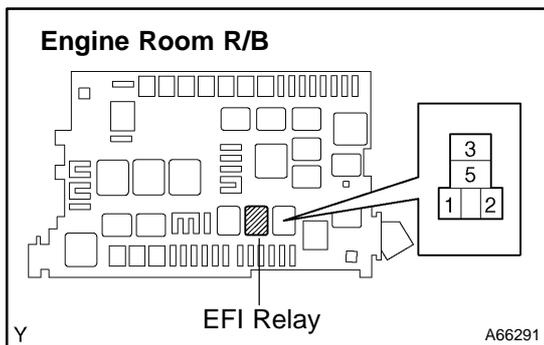
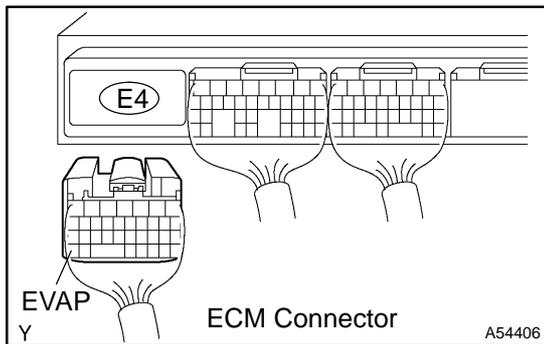
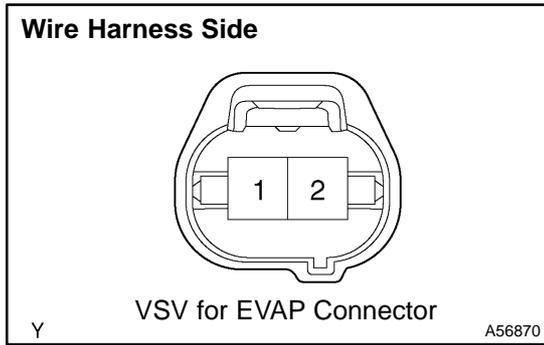
**OK**

**9 INSPECT VACUUM SWITCHING VALVE ASSY NO.1(CHECK OPERATION OF VSV FOR EVAP) (See page 12-8 )**

**NG** → **REPLACE VACUUM SWITCHING VALVE ASSY NO.1**

**OK**

**10 CHECK HARNESS AND CONNECTOR(VSV FOR EVAP - ECM, VSV FOR EVAP - EFI RELAY)**



- (a) Check the harness and connector between the VSV connector for EVAP and ECM connector.
- (1) Disconnect the VSV connector for EVAP.
  - (2) Disconnect the E4 ECM connector.
  - (3) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
VSV for EVAP (1) ↔ EVAP (E4-34)	Continuity

**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
VSV for EVAP (1) or EVAP (E4-34) ↔ Body ground	No continuity

- (b) Check the harness and connector between the VSV connector for EVAP and EFI relay.
- (1) Inspect the EFI No.2 fuse.
    - Remove the EFI No.2 fuse from the engine room R/B.
    - Check continuity of the EFI No.2 fuse.

**Standard: Continuity**

- (2) Disconnect the VSV connector for EVAP.
- (3) Remove the EFI relay from the engine room R/B.
- (4) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
VSV for EVAP (2) ↔ EFI relay (3)	Continuity

**Standard (Check for short):**

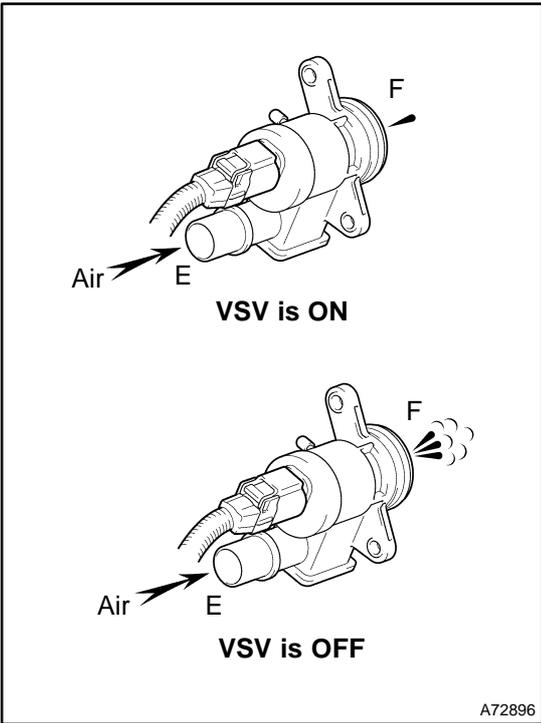
Symbols (Terminal No.)	Specified condition
VSV for EVAP (2) or EFI relay (3) ↔ Body ground	No continuity

**NG** → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

**OK**

**CHECK AND REPLACE ECM (See page 01-35 )**

**11 PERFORM ACTIVE TEST BY HAND-HELD TESTER(VSV FOR CCV)**



- (a) Disconnect the vacuum hose for the VSV for CCV from the charcoal canister.
- (b) Start the engine.
- (c) Select the item "DIAGNOSIS/ENHANCED OBD II/ACTIVE TEST/CAN CTRL VSV" (press the right or left button).
- (d) Check the VSV for CCV operation when it is operated by the hand-held tester.

**Standard:**

Tester operation	Specified condition
VSV is ON	Air does not flow from ports E to F
VSV is OFF	Air from port E flows out through port F

**Result:**

VSV operation	Output DTC	Proceed to
NG	—	A
OK	P0446 output	B
	P0446 does not output	C

**B** → Go to step 15

**C** → Go to step 16

**A**

**12 CHECK VSV FOR CCV(CHECK FOR LEAKAGE BETWEEN VSV FOR CCV AND CHARCOAL CANISTER)**

- (a) Check that the VSV for CCV is correctly installed.
- (b) Check the O-ring.

**NG** → REPAIR OR REPLACE

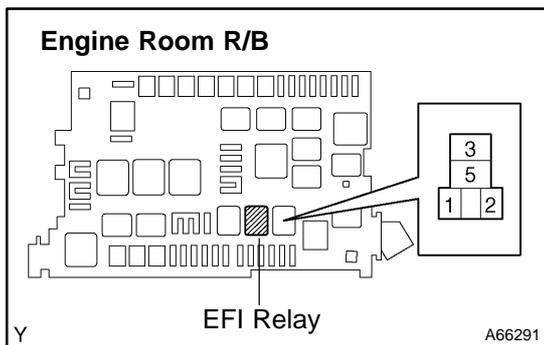
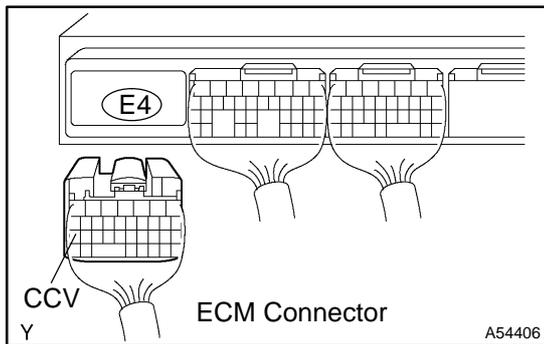
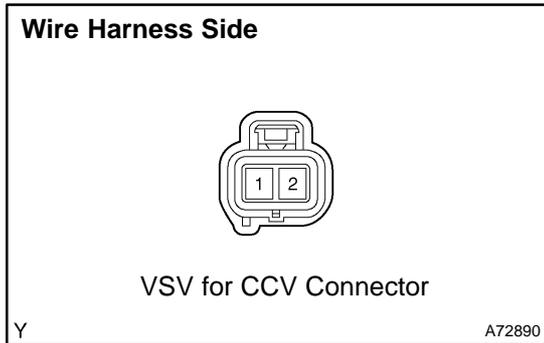
**OK**

**13 INSPECT CHARCOAL CANISTER ASSY(CHECK OPERATION OF VSV FOR CCV) (See page 12-8)**

**NG** → REPLACE CHARCOAL CANISTER ASSY

**OK**

**14 CHECK HARNESS AND CONNECTOR(VSV FOR CCV - ECM, VSV FOR CCV - EFI RELAY)**



- (a) Check the harness and connector between the VSV connector for CCV and ECM connector.
- (1) Disconnect the VSV connector for EVAP.
  - (2) Disconnect the E4 ECM connector.
  - (3) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
VSV for CCV (1) ⇔ CCV (E4-27)	Continuity

**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
VSV for CCV (1) or CCV (E4-27) ⇔ Body ground	No continuity

- (b) Check the harness and connector between the VSV connector for CCV and EFI relay.
- (1) Inspect the EFI No.2 fuse.
    - Remove the EFI No.2 fuse from the engine room R/B.
    - Check continuity of the EFI No.2 fuse.

**Standard: Continuity**

- (2) Disconnect the VSV connector for CCV.
- (3) Remove the EFI relay from the engine room R/B.
- (4) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
VSV for CCV (2) ⇔ EFI relay (3)	Continuity

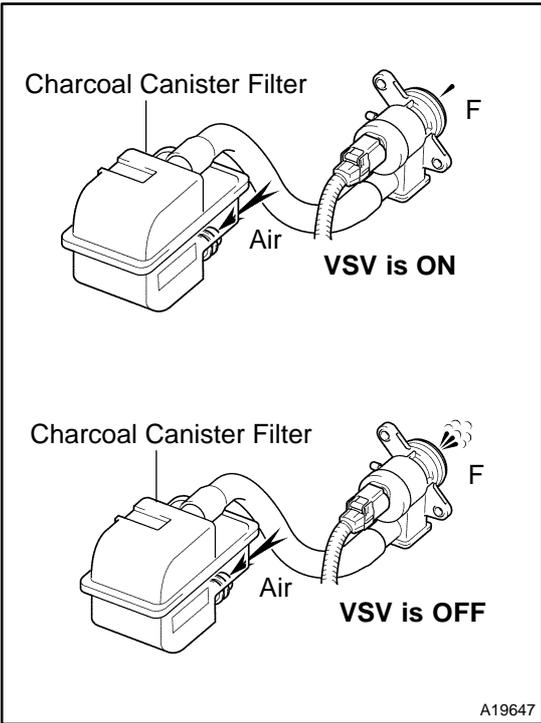
**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
VSV for CCV (2) or EFI relay (3) ⇔ Body ground	No continuity

**NG** → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

**OK**

**15 PERFORM ACTIVE TEST BY HAND-HELD TESTER(VSV FOR CCV)**



- (a) Disconnect the vacuum hose for the VSV for CCV from the charcoal canister.
- (b) Turn the ignition switch ON.
- (c) Select the item "DIAGNOSIS/ENHANCED OBD II/ACTIVE TEST/CAN CTRL VSV" (press the right or left button).
- (d) Check the VSV for CCV operation when it is operated by the hand-held tester.

**Standard:**

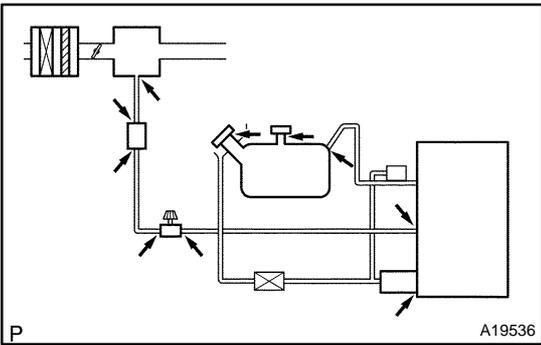
Tester operation	Specified condition
VSV is ON	Air does not flow from charcoal canister filter port to port F
VSV is OFF	Air from charcoal canister filter port flows out through port F

**NG** → **REPLACE CHARCOAL CANISTER FILTER NO.2**

**OK**

**CHECK AND REPLACE ECM (See page 01-35 )**

**16 CHECK FOR EVAPORATIVE EMISSIONS LEAK**



- (a) Check whether hose close to the fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister.
  - (1) Check for cracks, deformation and loose connection of the following parts:
    - Fuel tank
    - Charcoal canister
    - Fuel tank filler pipe
    - Hoses and tubes around fuel tank and charcoal canister

**NG** → **REPAIR OR REPLACE EVAPORATIVE EMISSIONS LEAK PART**

**OK**

**17 CHECK HOSE AND TUBE(INTAKE MANIFOLD - VSV FOR EVAP, VSV FOR EVAP - CHACOAL CANISTER)**

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

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REPAIR OR REPLACE HOSE AND TUBE

OK

**18 CHECK HOSE AND TUBE(FUEL TANK - CHARCOAL CANISTER)**

- (a) Check for proper connection of the fuel tank and fuel EVAP pipe (See page 12-3 ), 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 HOSE AND TUBE

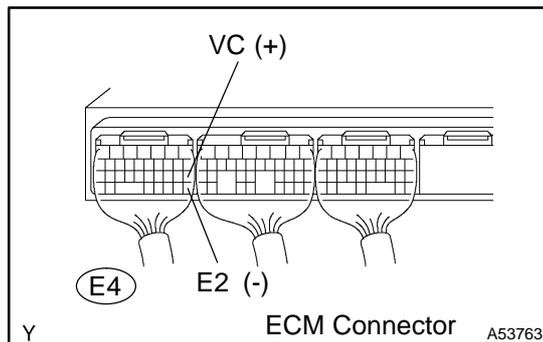
OK

**19 INSPECT CHARCOAL CANISTER ASSY(CRACKS, HOLE AND DAMAGE)  
(See page 12-8 )**

NG

REPLACE CHARCOAL CANISTER ASSY

OK

**20 INSPECT ECM(VC VOLTAGE)**

- (a) Turn the ignition switch ON.
- (b) Measure the voltage between the terminals of the E4 ECM connector.

**Standard:**

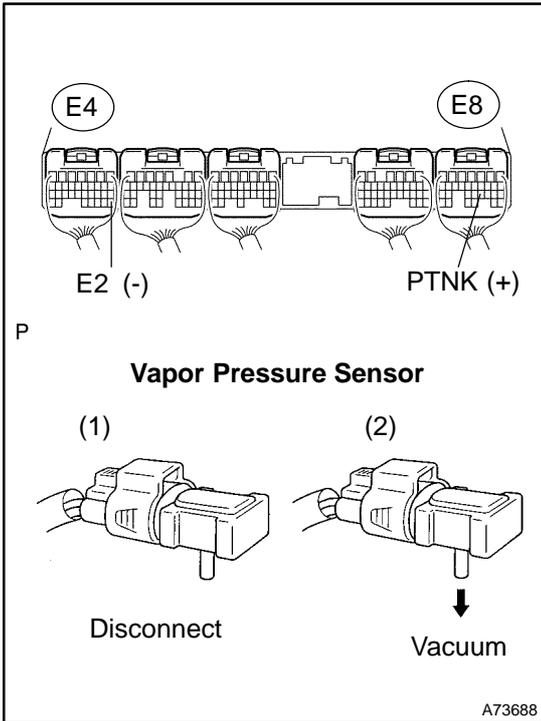
Symbols (Terminal No.)	Specified condition
VC (E4-18) ↔ E2 (E4-28)	4.5 - 5.5 V

NG

**CHECK AND REPLACE ECM  
(See page 01-35 )**

OK

**21 INSPECT ECM(PTNK VOLTAGE)**



- (a) Turn the ignition switch ON.
- (b) Measure the voltage between the terminals of the E4 and E8 ECM connectors.
  - (1) Disconnect the vacuum hose from the vapor pressure sensor.

**Standard (1):**

Symbols (Terminal No.)	Specified condition
PTNK (E8-21) ↔ E2 (E4-28)	2.9 - 3.7 V

- (2) Using the MITYVAC (Hand-Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

**NOTICE:**

The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

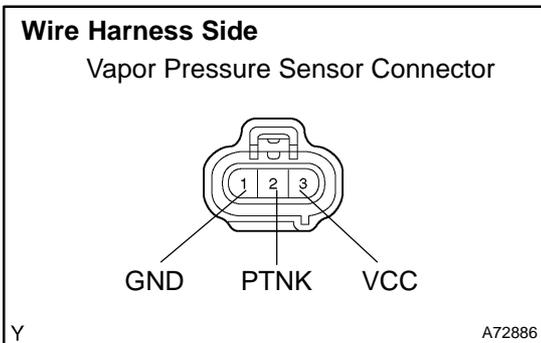
**Standard (2):**

Symbols (Terminal No.)	Specified condition
PTNK (E8-21) ↔ E2 (E4-28)	0.5 V or less

**OK** → Go to step 23

**NG**

**22 CHECK HARNESS AND CONNECTOR(VAPOR PRESSURE SENSOR - ECM)**



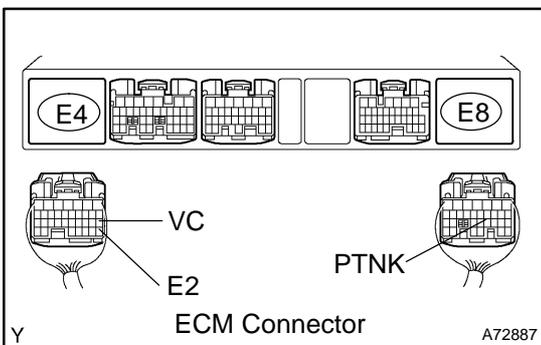
- (a) Disconnect the vapor pressure sensor connector.
- (b) Disconnect the E4 and E8 ECM connectors.
- (c) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
PTNK (2) ↔ PTNK (E8-21)	Continuity
GND (1) ↔ E2 (E4-28)	
VCC (3) ↔ VC (E4-18)	

**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
PTNK (2) or PTNK (E8-21) ↔ Body ground	No continuity
VCC (3) or VC (E4-18) ↔ Body ground	



**NG** → REPAIR OR REPLACE HARNESS OR CONNECTOR

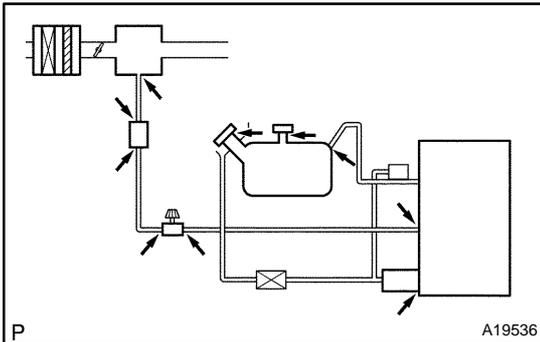
**OK**

**REPLACE VAPOR PRESSURE SENSOR ASSY**

**23 INSPECT FUEL TANK ASSY(CRACKS AND DAMAGE)****NG** → **REPLACE FUEL TANK ASSY****OK****IT IS LIKELY THAT VEHICLE USER DID NOT PROPERLY CLOSE FUEL TANK CAP****OBD II scan tool (excluding hand-held tester):****1 INSPECT FUEL TANK CAP ASSY(CHECK THAT FUEL TANK CAP IS GENUINE PARTS)****NG** → **REPLACE TO GENUINE PARTS****OK****2 CHECK FUEL TANK CAP FOR CORRECTLY INSTALLED****NG** → **CORRECTLY INSTALL FUEL TANK CAP****OK****3 INSPECT FUEL TANK CAP ASSY (See page 12-8 )****NG** → **REPLACE FUEL TANK CAP ASSY****OK****4 CHECK FILLER NECK FOR DAMAGE**

- (a) Remove the fuel tank cap.
- (b) Visually inspect the filler neck for damage.

**NG** → **REPLACE FUEL TANK INLET PIPE SUB-ASSY****OK**

**5 CHECK FOR EVAPORATIVE EMISSIONS LEAK**

- (a) Check whether hose close to the fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister.
- (1) Check for cracks, deformation and loose connection of the following parts:
- Fuel tank
  - Charcoal canister
  - Fuel tank filler pipe
  - Hoses and tubes around fuel tank and charcoal canister

**NG****REPAIR OR REPLACE EVAPORATIVE EMISSIONS LEAK PART****OK****6 CHECK HOSE AND TUBE(FUEL TANK - CHARCOAL CANISTER)**

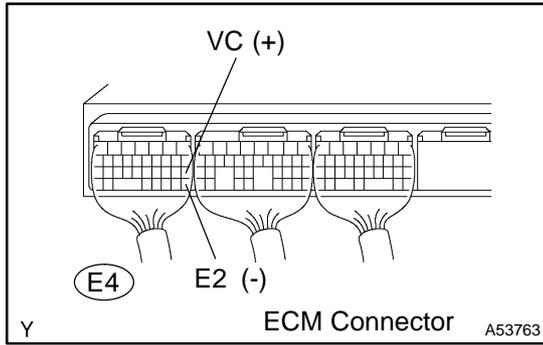
- (a) Check for proper connection of the fuel tank and fuel EVAP pipe (See page 12-3), fuel EVAP pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
- (b) Check the hose and tube for cracks, hole and damage.

**NG****REPAIR OR REPLACE HOSE AND TUBE****OK****7 CHECK EACH VSV CONNECTOR FOR LOOSENESS AND DISCONNECTION(VSV FOR EVAP, VSV FOR CCV AND VAPOR PRESSURE SENSOR)****NG****REPAIR OR CONNECT VSV AND SENSOR CONNECTOR****OK****8 CHECK HOSE AND TUBE(INTAKE MANIFOLD - VSV FOR EVAP, VSV FOR EVAP - CHARCOAL CANISTER)**

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

**NG****REPAIR OR REPLACE HOSE AND TUBE****OK**

**9 INSPECT ECM(VC VOLTAGE)**



- (a) Turn the ignition switch ON.
- (b) Measure the voltage between the terminals of the E4 ECM connector.

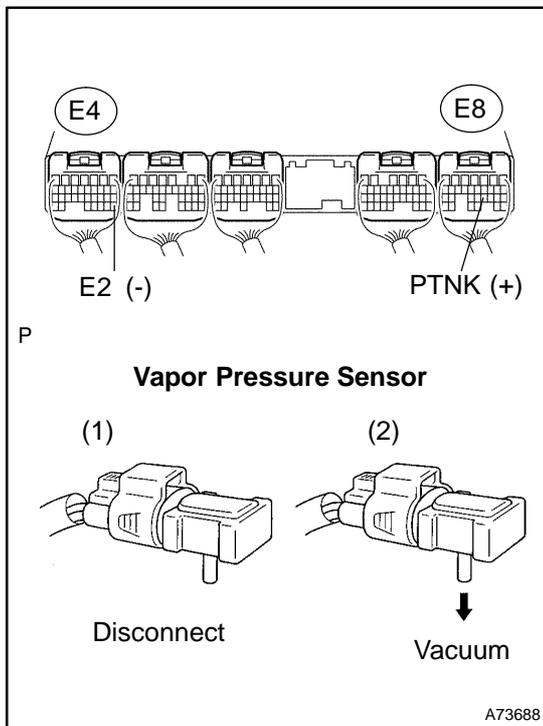
**Standard:**

Symbols (Terminal No.)	Specified condition
VC (E4-18) ↔ E2 (E4-28)	4.5 - 5.5 V

**NG** **CHECK AND REPLACE ECM (See page 01-35)**

**OK**

**10 INSPECT ECM(PTNK VOLTAGE)**



- (a) Turn the ignition switch ON.
- (b) Measure the voltage between the terminals of the E4 and E8 ECM connectors.
  - (1) Disconnect the vacuum hose from the vapor pressure sensor.

**Standard (1):**

Symbols (Terminal No.)	Specified condition
PTNK (E8-21) ↔ E2 (E4-28)	2.9 - 3.7 V

- (2) Using the MITYVAC (Hand-Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

**NOTICE:**

**The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).**

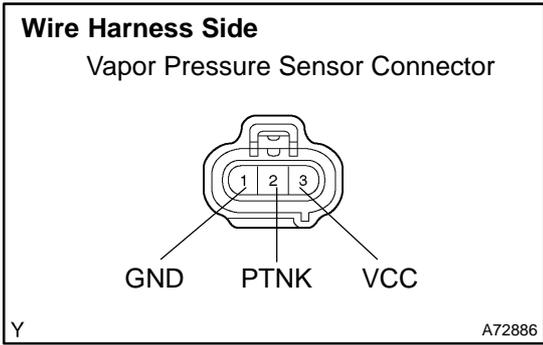
**Standard (2):**

Symbols (Terminal No.)	Specified condition
PTNK (E8-21) ↔ E2 (E4-28)	0.5 V or less

**OK** **Go to step 12**

**NG**

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



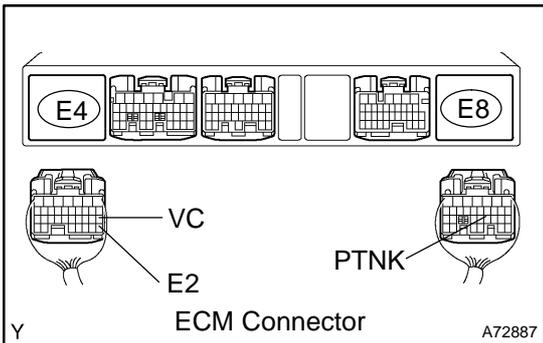
- (a) Disconnect the vapor pressure sensor connector.
- (b) Disconnect the E4 and E8 ECM connectors.
- (c) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
PTNK (2) ⇔ PTNK (E8-21)	Continuity
GND (1) ⇔ E2 (E4-28)	
VCC (3) ⇔ VC (E4-18)	

**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
PTNK (2) or PTNK (E8-21) ⇔ Body ground	No continuity
VCC (3) or VC (E4-18) ⇔ Body ground	

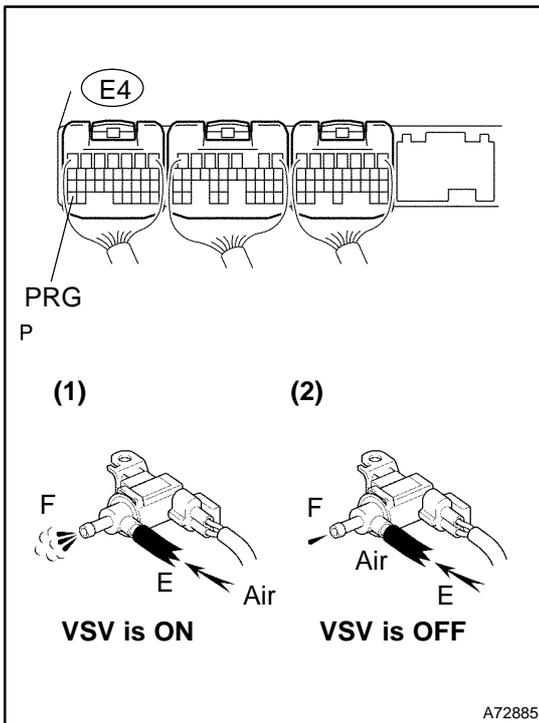


**NG REPAIR OR REPLACE HARNESS OR CONNECTOR**

**OK**

**REPLACE VAPOR PRESSURE SENSOR ASSY**

<b>12</b>	<b>INSPECT VACUUM SWITCHING VALVE ASSY NO.1(FUNCTION OF VSV FOR EVAP)</b>
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- (a) Turn the ignition switch ON.  
 (b) Check the VSV function.  
 (1) Connect between the terminal PRG of the ECM connector and body ground (ON).

**Standard (1):****Air from port E flows out through port F.**

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

**Standard (2):****Air does not flow from port E to port F.**

OK	Go to step 15
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NG
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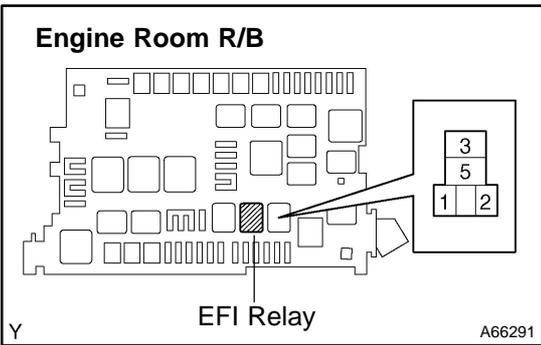
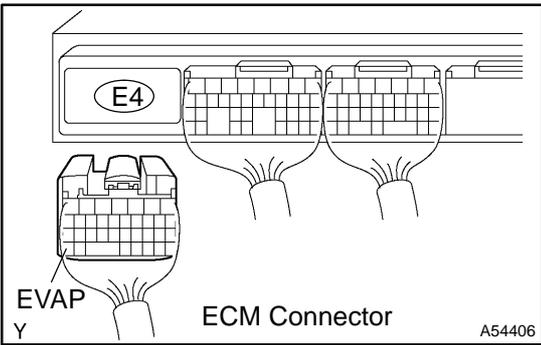
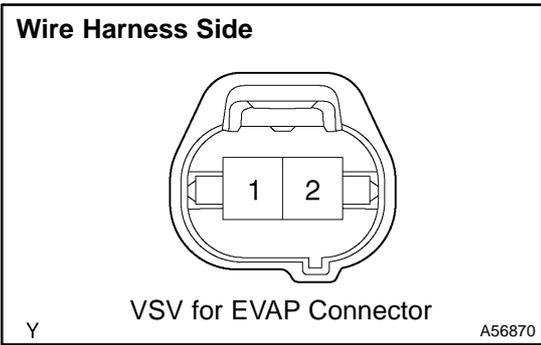
<b>13</b>	<b>INSPECT VACUUM SWITCHING VALVE ASSY NO.1(OPERATION OF VSV FOR EVAP) (See page 12-8 )</b>
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OK	Go to step 14
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NG
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<b>REPLACE VSV AND CLEAN VACUUM HOSES, AND THEN CHECK CHARCOAL CANISTER</b>
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**14 CHECK HARNESS AND CONNECTOR(VSV FOR EVAP - ECM, VSV FOR EVAP - EFI RELAY)**



- (a) Check the harness and connector between the VSV connector for EVAP and ECM connector.
- (1) Disconnect the VSV connector for EVAP.
  - (2) Disconnect the E4 ECM connector.
  - (3) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
VSV for EVAP (1) ↔ EVAP (E4-34)	Continuity

**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
VSV for EVAP (1) or EVAP (E4-34) ↔ Body ground	No continuity

- (b) Check the harness and connector between the VSV connector for EVAP and EFI relay.
- (1) Inspect the EFI No.2 fuse.
    - Remove the EFI No.2 fuse from the engine room R/B.
    - Check continuity of the EFI No.2 fuse.

**Standard: Continuity**

- (2) Disconnect the VSV connector for EVAP.
- (3) Remove the EFI relay from the engine room R/B.
- (4) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
VSV for EVAP (2) ↔ EFI relay (3)	Continuity

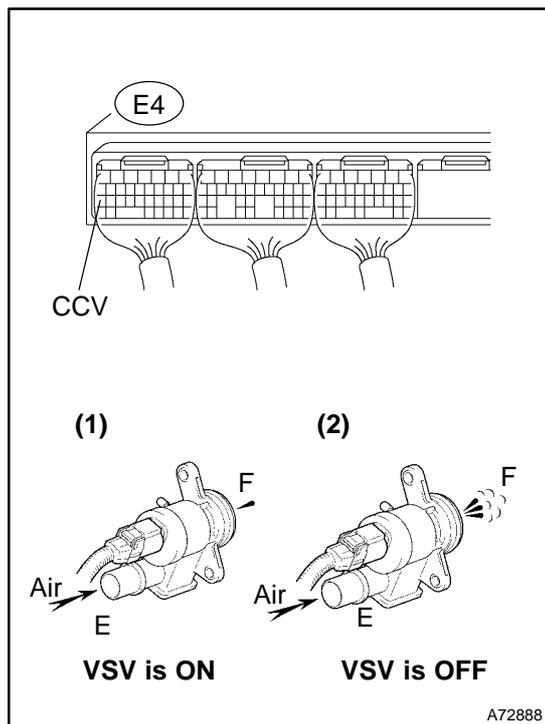
**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
VSV for EVAP (2) or EFI relay (3) ↔ Body ground	No continuity

**NG** → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

**OK**

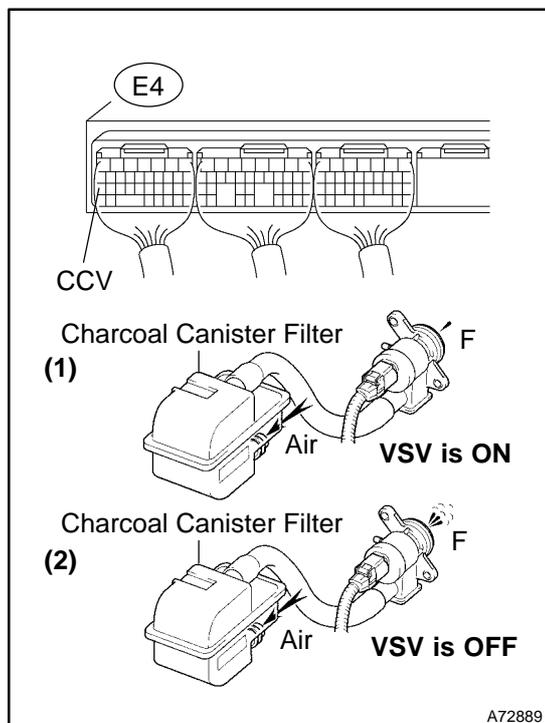
**CHECK AND REPLACE ECM (See page 01-35 )**

**15 CHECK VSV FOR CCV(FUNCTION OF VSV FOR CCV)**


- (a) Turn the ignition switch ON.
- (b) Check the VSV function.
  - (1) Connect between the terminal CCV of the ECM connector and body ground (ON).

**Standard (1):****Air does not flow from port E to port F.**

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

**Standard (2):****Air from port E flows out through port F.**
**OK** → Go to step 19
**NG**
**16 INSPECT CHARCOAL CANISTER FILTER NO.2(CHECK THAT CHARCOAL CANISTER FILTER IS NOT CLOGGED)**


- (a) Turn the ignition switch ON.
- (b) Check the VSV function.
  - (1) Connect between the terminal CCV of the ECM connector and body ground (ON).

**Standard (1):****Air does not flow from charcoal canister filter port to port F.**

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

**Standard (2):****Air from charcoal canister filter port flows out through port F.**
**NG** → REPLACE CHARCOAL CANISTER ASSY
**OK**

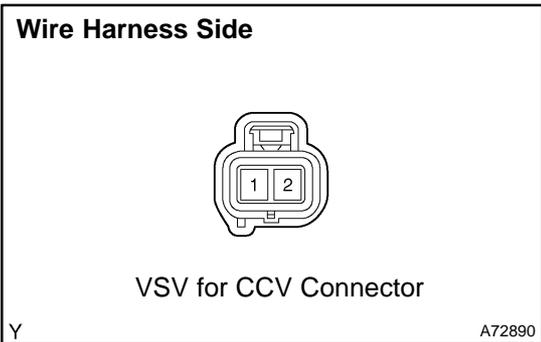
**17 INSPECT CHARCOAL CANISTER ASSY(CHECK OPERATION OF VSV FOR CCV)  
(See page 12-8 )**

**OK** → **Go to step 18**

**NG**

**REPLACE VSV AND CHARCOAL CANISTER, AND THEN CHECK LEAKAGE**

**18 CHECK HARNESS AND CONNECTOR(VSV FOR CCV - ECM, VSV FOR CCV - EFI RELAY)**



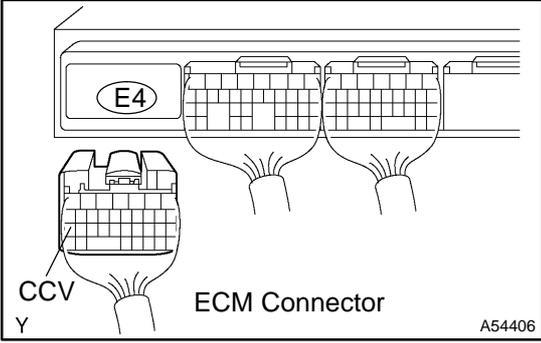
- (a) Check the harness and connector between the VSV connector for CCV and ECM connector.
- (1) Disconnect the VSV connector for EVAP.
  - (2) Disconnect the E4 ECM connector.
  - (3) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
VSV for CCV (1) ↔ CCV (E4-27)	Continuity

**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
VSV for CCV (1) or CCV (E4-27) ↔ Body ground	No continuity



- (b) Check the harness and connector between the VSV connector for CCV and EFI relay.
- (1) Inspect the EFI No.2 fuse.
    - Remove the EFI No.2 fuse from the engine room R/B.
    - Check continuity of the EFI No.2 fuse.

**Standard: Continuity**

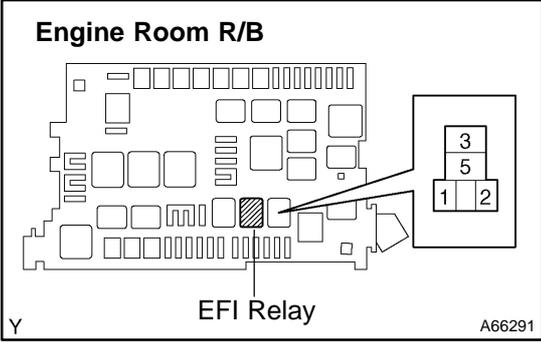
- (2) Disconnect the VSV connector for CCV.
- (3) Remove the EFI relay from the engine room R/B.
- (4) Check the continuity between the wire harness side connectors.

**Standard (Check for open):**

Symbols (Terminal No.)	Specified condition
VSV for CCV (2) ↔ EFI relay (3)	Continuity

**Standard (Check for short):**

Symbols (Terminal No.)	Specified condition
VSV for CCV (2) or EFI relay (3) ↔ Body ground	No continuity



**NG** → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

**OK**

**CHECK AND REPLACE ECM (See page 01-35 )**

19	CHECK FUEL TANK OVER FILL CHECK VALVE
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NG
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REPLACE FUEL TANK ASSY
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OK
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CHECK AND REPLACE CHARCOAL CANISTER ASSY
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