



**Technical Service  
BULLETIN**

November 12, 2004

Title:

**REPAIR MANUAL SUPPLEMENT:  
LEV II EVAP SYSTEM CHECK -  
DTC P0441, P0442, P0446, P0451,  
P0452, P0453, P0455 & P0456**

Models:

'03 – '04 4Runner & Tundra, '04 Camry, Highlander,  
Sienna & Solara

ENGINE  
EG048-04  
REVISED

**TSB REVISION NOTICE:**

January 6, 2005: A change has been made to the diagram in section "A. LEV II SYS CHECK Description" ("CCV Stuck Open" changed to "EVAP VSV Stuck Open"). The previous TSB should be discarded.

**Introduction** This TSB provides detailed instructions for a new LEV II EVAP System Check function using the Diagnostic Tester.

The LEV II System Check allows the Diagnostic Tester to display the fuel tank vapor pressure as the EVAP VSV and the CCV are operated in a specific six-step pattern. Problems with the EVAP system are quickly isolated by observing the change in vapor pressure during each step.

Once the vehicle condition is corrected, the LEV II System Check can also be used to confirm the repair before the vehicle is returned to the customer.

The inspection procedure using the LEV II System Check (LEV II SYS CHECK) is described in this bulletin. This function is available using a Diagnostic Tester with version 11.0a software (or newer).

**Table of Contents**

SECTION	TITLE	PAGE
A	LEV II SYS CHECK Description	3
B	DTC Check	4
C	LEV II SYS CHECK (Diagnostic Tester System Test)	5
D	Air Inlet Restriction Inspection	13
E	EVAP VSV Stuck-Open Inspection	16
F	Leak Check or No Vacuum Drawn on System Inspection	17
G	CCV Diagnostics	22
H	EVAP VSV Diagnostics	25
I	EVAP System Description	30
J	EVAP System DTC Descriptions	33
K	EVAP Monitor Description	35
L	OBD II EVAP Monitor Specifications	39

**Warranty Information**




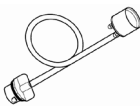
OP CODE	DESCRIPTION	TIME	OFF	T1	T2
N/A	Not Applicable to Warranty	-	-	-	-



**Applicable Vehicles**

- **2003 – 2004** model year **4Runner** vehicles **equipped with 2UZ–FE and 1GR–FE engines.**
- **2003 – 2004** model year **Tundra** vehicles **equipped with 5VZ–FE and 2UZ–FE engines.**
- **2004** model year **Camry** vehicles **equipped with 2AZ–FE, 1MZ–FE and 3MZ–FE engines.**
- **2004** model year **Highlander** and **Sienna** vehicles **equipped with 3MZ–FE engine.**
- **2004** model year **Solara** vehicles **equipped with 2AZ–FE and 3MZ–FE engines.**

**Required SSTs**

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Toyota Diagnostic Tester Kit* 	01001271	1
12 Megabyte Diagnostic Tester Program Card with version 11.0a Software (or later)* 	01002593-005	1
EVAP Tester Kit* 	00002–6872A	1
EVAP Tester Fuel Cap Adapter* 	00002–6872A–FC or 00002–6872A–FCA	1

\* Essential SSTs.

**NOTE:**

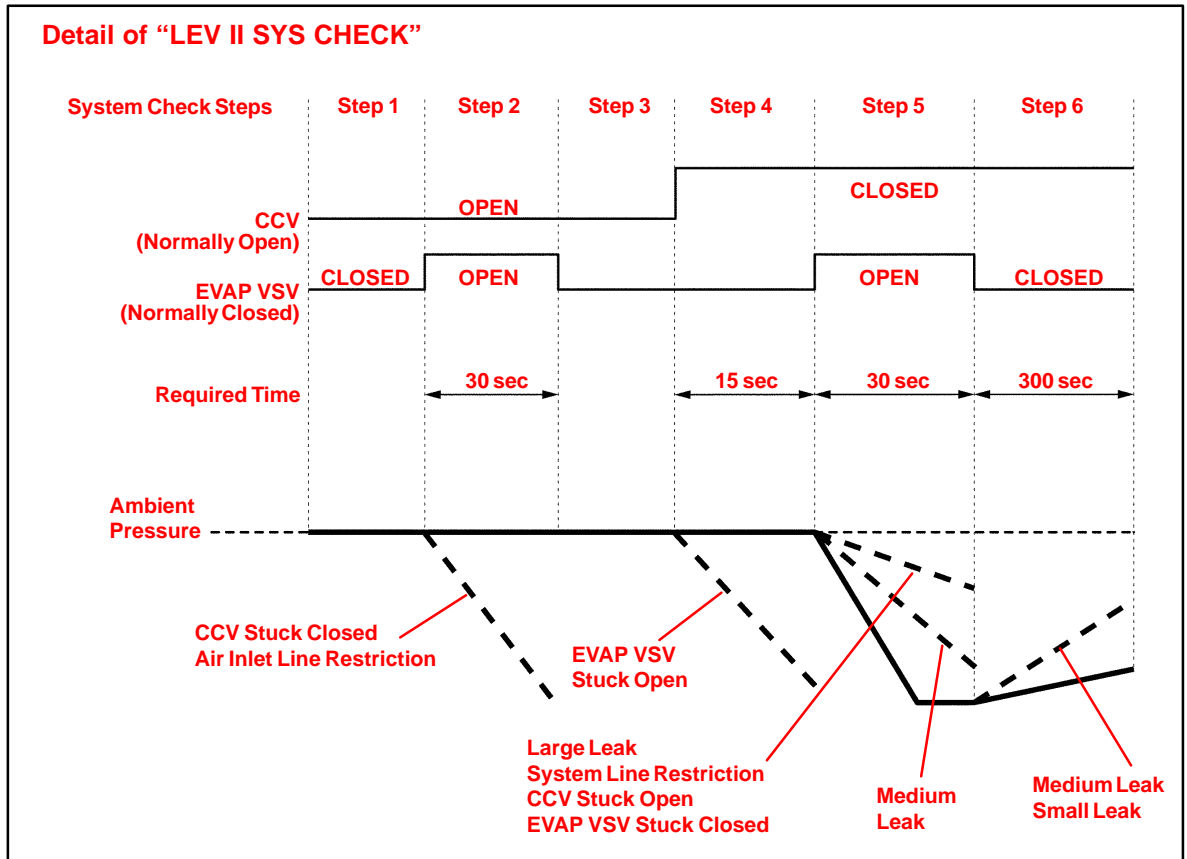
**Additional Diagnostic Tester Kits, Program Cards or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.**

**Terms & Definitions**

TERM	DEFINITION
CCV	Evaporative Emissions Canister Control Valve
Charcoal Canister	Evaporative Emissions Canister
DTC(s)	Diagnostic Trouble Code(s)
ECM (SAE term: PCM)	Engine Control Module (SAE term: Powertrain Control Module)
ECT	Engine Coolant Temperature
EVAP	Evaporative Emissions
EVAP VSV, Purge VSV	Evaporative Emissions Canister Purge Valve
FTP	Fuel Tank Pressure
IAT	Intake Air Temperature
LEV II	Low Emissions Vehicle Phase 2
MIL	Malfunction Indicator Lamp
mmHg–a	Unit of Absolute Pressure (762 mmHg–a at sea level)
mmHg–g	Unit of Gauge Pressure (0 mmHg–g at sea level)
Vapor Pressure Sensor	Fuel Tank Pressure Sensor

**A. LEV II  
SYS CHECK  
Description**

The LEV II System Check allows the Diagnostic Tester to display the fuel tank vapor pressure as the EVAP VSV and the CCV are operated in a specific six-step pattern. Problems with the EVAP system are quickly isolated by observing the change in vapor pressure during each step.



**NOTE:**

The EVAP system pressure can be affected by ambient temperature, atmospheric pressure, and fuel level. This test is most accurate when the following conditions are met.

- The vehicle is at sea level and at an atmospheric pressure of approximately 762 mmHg-a (0 mmHg-g).
- The external fuel tank temperature is between 4 to 35°C (40 to 90°F).
- The fuel level in the fuel tank is approximately 1/4 to 3/4 full.

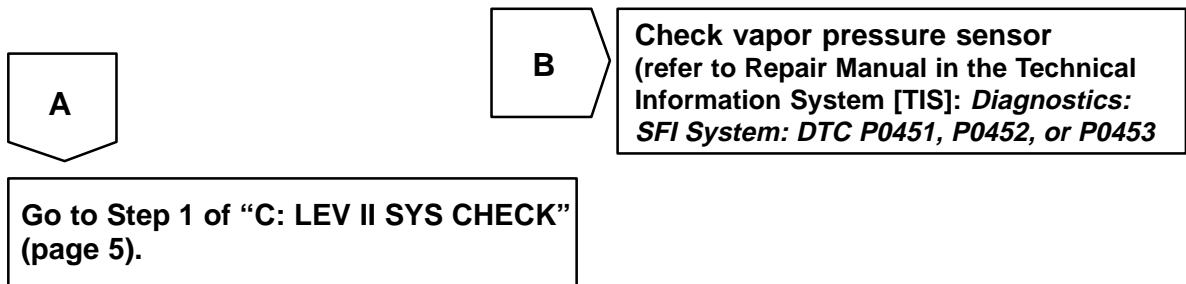
B. DTC Check

<b>1</b>	<b>Check for current and pending DTCs to determine which part of the EVAP system may be malfunctioning.</b>
----------	---

- A. Connect the Diagnostic Tester to DLC3.
- B. Enter the following menus:  
DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING DTCS.
- C. Enter the following menus:  
DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT DTCS.
- D. Make a note of any pending and/or current DTCs.

**RESULT:**

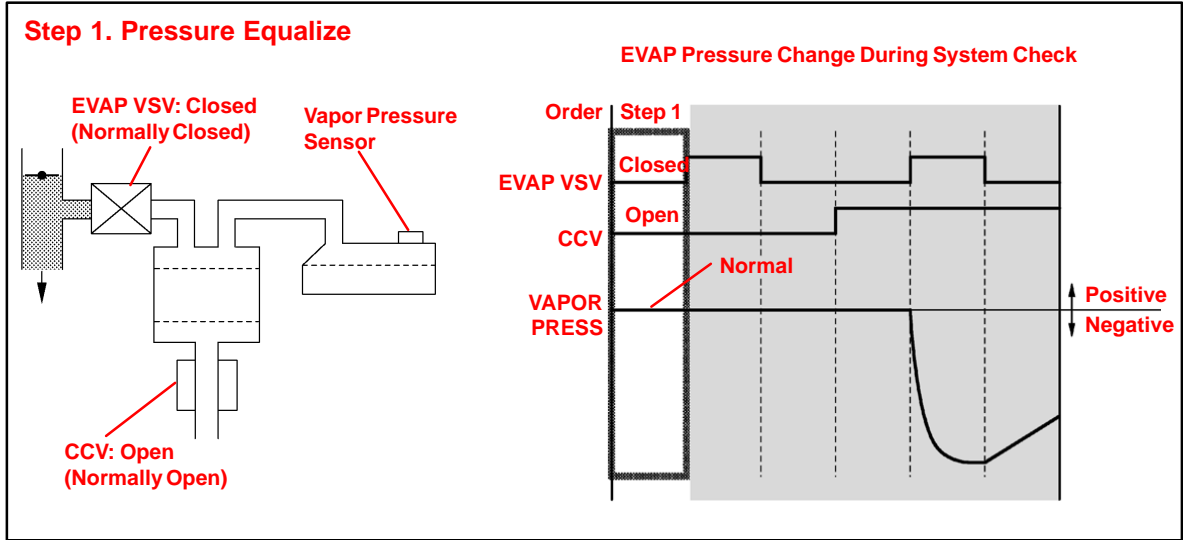
DTC	GO TO
P0441, P0442, P0446, P0455 and/or P0456	A
P0451, P0452 or P0453	B



C. LEV II SYS CHECK

<b>1</b>	<b>Pressure Equalize</b>
----------	--------------------------

In Step 1, the EVAP actuators are at rest and the system pressure should equalize with outside atmospheric pressure. This step ensures the test starts without any vacuum and/or pressure on the system.



- A. Start the engine.
- B. Enter the following menus:  
 DIAGNOSIS / ENHANCED  
 OBD II / SYSTEM CHECK /  
 LEV II SYS CHECK.
- C. Read the vapor pressure sensor value (VAPOR PRESS).
- D. Vapor Pressure should equalize with the atmosphere within 30 seconds.  
 Continue to the next step when pressure is 760 to 764 mmHg-a (-2 to 2 mmHg-g).

**LEVII SYSTEM CHECK**  
 Step 1. Pressure Equalize

EVAP VSV ..... CLOSE  
 CCV ..... OPEN

VAPOR PRESS  
 .... 762 mmHg-a  
 Time 030 seconds

Press [RIGHT]

**Sample Screen**

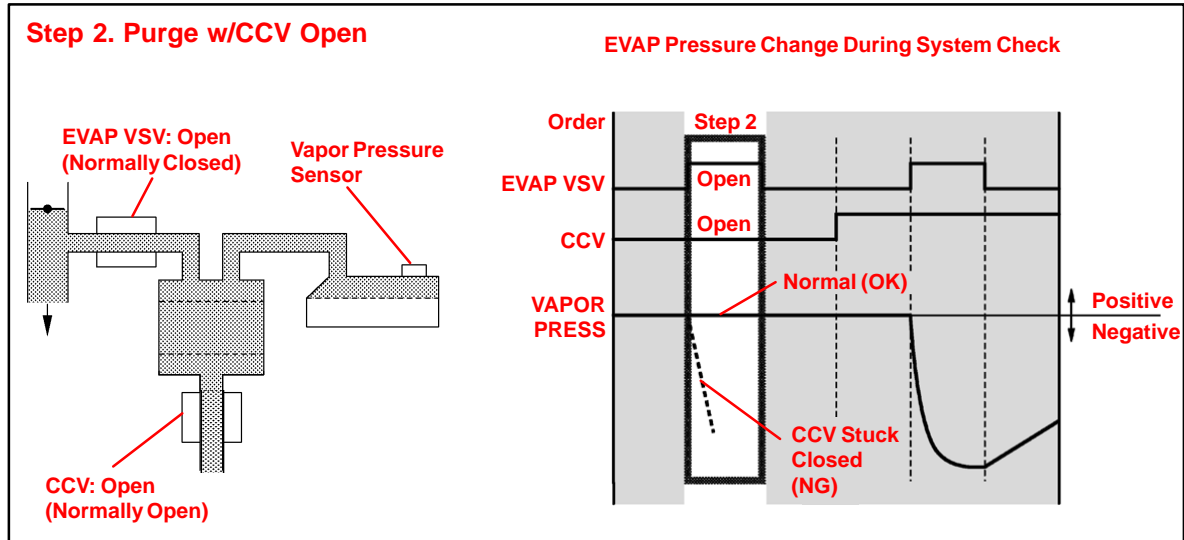
**NEXT**

**Press the right arrow key on the Diagnostic Tester to go to the next step.**

**C. LEV II SYS CHECK**  
(Continued)

<b>2</b>	<b>Purge w/CCV Open</b>
----------	-------------------------

During Step 2, while the engine is running, the ECM (PCM) energizes/de-energizes (duty cycles) the EVAP VSV and a vacuum is applied to the entire system. The LEV II system uses a high flow CCV. Since the CCV is open, there should be little or no drop in system pressure.



**CHECK:**

Wait for 30 seconds. Read the vapor pressure sensor value (VAPOR PRESS).

**LEVII SYSTEM CHECK**  
Step 2. Purge w/CCV Open

EVAP VSV ..... OPEN  
CCV ..... OPEN

VAPOR PRESS  
... 761 mmHg-a  
Time 030 seconds

Press [RIGHT]

**Sample Screen**

VAPOR PRESS VALUE	CONCLUSION	GO TO
753 to 762 mmHg-a (-9 to 0 mmHg-g)	No trouble found in this step	OK
732 to 752 mmHg-a (-30 to -10 mmHg-g)	CCV stuck closed or air inlet line restriction	NG

**OK**

**NG**

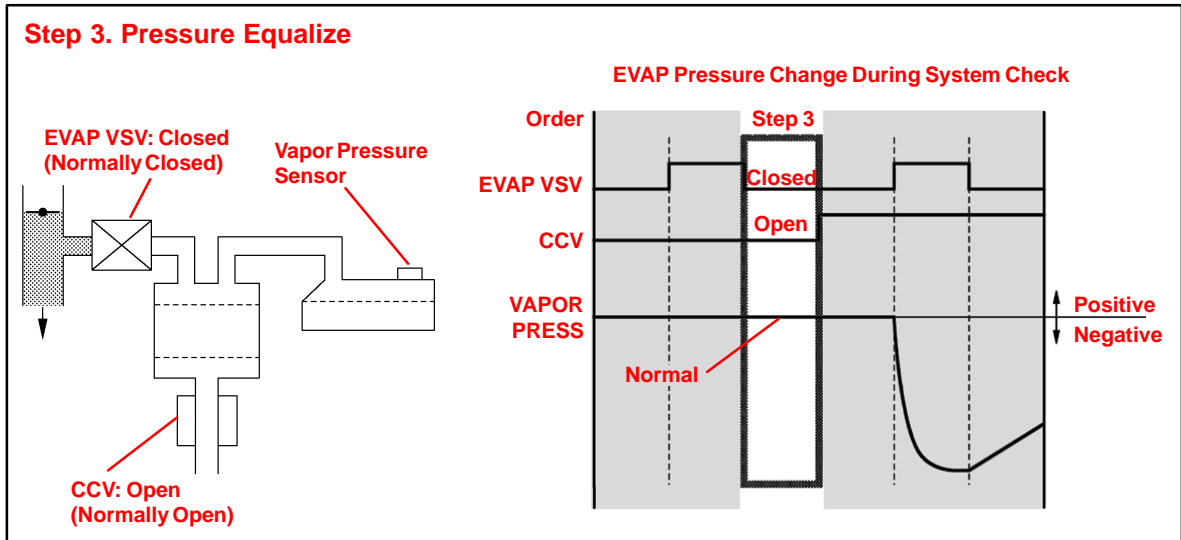
**Go to "D. Air Inlet Restriction Inspection" (page 13).**

**Press the right arrow key to go to the next step.**

**C. LEV II SYS CHECK**  
(Continued)

<b>3</b>	<b>Pressure Equalize</b>
----------	--------------------------

During Step 3, the ECM (PCM) closes the EVAP VSV shutting off vacuum to the system. The CCV remains open, therefore allowing fresh air into the system. The system should equalize to atmosphere within 30 seconds.



- A. Read the vapor pressure sensor value (VAPOR PRESS).
- B. The vapor pressure value should be 760 to 764 mmHg-a (-2 to 2 mmHg-g) (equal to ambient pressure) within 30 seconds.
- C. Continue to the next step.

**LEVII SYSTEM CHECK**  
Step 3. Pressure Equalize

EVAP VSV ..... CLOSE  
CCV ..... OPEN

VAPOR PRESS  
.... 762 mmHg-a  
Time 030 seconds

Press [RIGHT]

Sample Screen

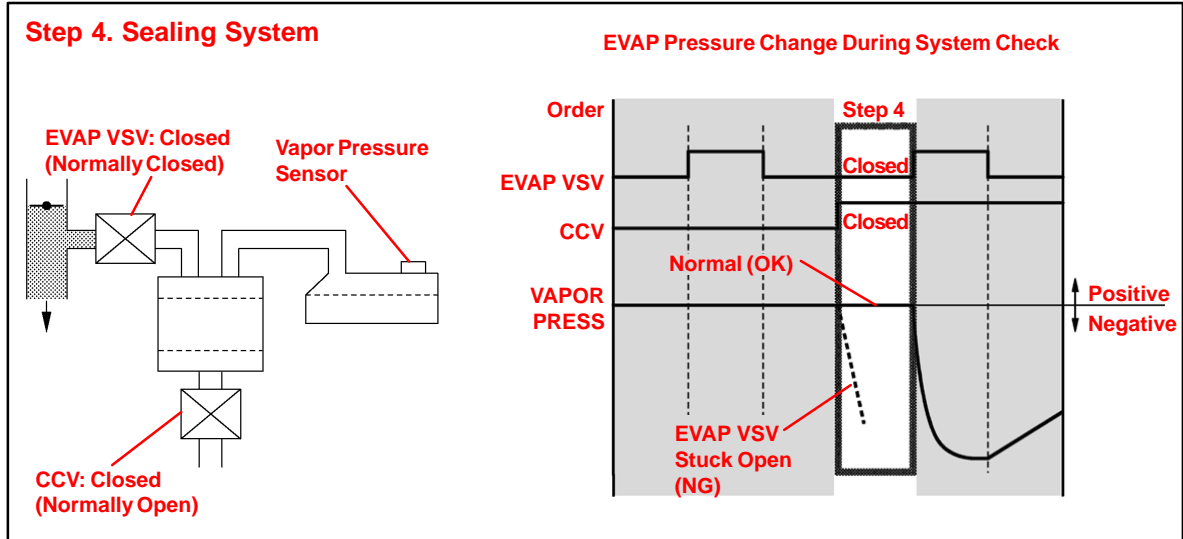
**NEXT**

Press the right arrow key to go to the next step.

**C. LEV II SYS CHECK**  
(Continued)

<b>4</b>	<b>Sealing System</b>
----------	-----------------------

During step 4, the CCV is closed and the system is sealed. Since the EVAP VSV is closed, there should be no drop in system pressure.



**CHECK:**

Wait 15 seconds and check the vapor pressure sensor value (VAPOR PRESS).

**LEVII SYSTEM CHECK**  
Step 4. Sealing System

EVAP VSV ..... CLOSE  
CCV ..... CLOSE

VAPOR PRESS  
..... 762 mmHg-a  
Time 015 seconds

Press [RIGHT]

Sample Screen

VAPOR PRESS VALUE	CONCLUSION	GO TO
758 to 768 mmHg-a (-4 to 6 mmHg-g)	No trouble found in this step	OK
732 to 757 mmHg-a (-30 to -5 mmHg-g)	EVAP VSV stuck open	NG

**OK**

**NG**

**Go to "E. EVAP VSV Stuck-Open Inspection" (page 16)**

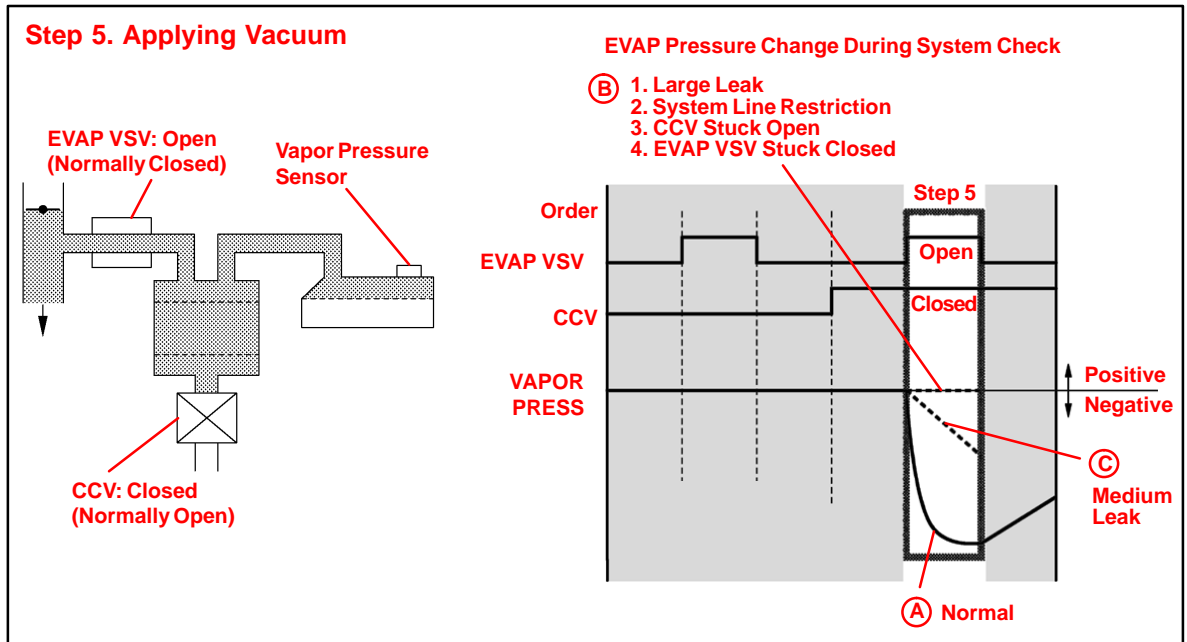
**Press the right arrow key to go to the next step.**

C. LEV II SYS CHECK  
CHECK  
(Continued)

<b>5</b>	<b>Applying Vacuum</b>
----------	------------------------

During step 5, vacuum is applied to the EVAP system. The fuel tank’s interior should develop negative pressure within 30 seconds (see example “A” in the diagram below). If the pressure does not decrease sufficiently within 30 seconds, (for example, “B” in diagram below) this indicates a leak or restriction in the system.

A moderate drop in pressure (for example, “C” in diagram below) indicates that a medium leak is occurring in the system.



**CHECK:**

Wait for 30 seconds. Read the vapor pressure sensor value (VAPOR PRESS).

**NOTE:**  
Fuel level should be between 1/4 to 3/4 of a tank for proper vacuum testing.

**LEVII SYSTEM CHECK**  
Step 5. Applying vacuum

EVAP VSV ..... OPEN  
CCV ..... CLOSE

VAPOR PRESS  
.... 740 mmHg-a  
Time 030 seconds

Press [RIGHT]

Sample Screen

**NOTE:**

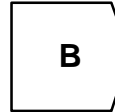
- If the pressure drops to 740 mmHg-a (-22 mmHg-g) at any point during this test, the Diagnostic Tester will close the EVAP VSV to prevent system damage.

**OR:**

- If the pressure drops to 735 mmHg-a (-27 mmHg-g) the Diagnostic Tester will abort the LEV II SYS CHECK.  
This usually happens when the fuel level in the tank is above 3/4 full.  
Recheck proper fuel level, then restart the LEV II SYS CHECK.

**C. LEV II SYS CHECK**  
(Continued)

VAPOR PRESS VALUE	CONCLUSION	GO TO
732 to 742 mmHg-a (-30 to -20 mmHg-g)	No trouble found in this step	A
743 to 768 mmHg-a (-19 to 6 mmHg-g)	Medium to large leak, EVAP line restriction, EVAP VSV stuck closed or CCV stuck open	B



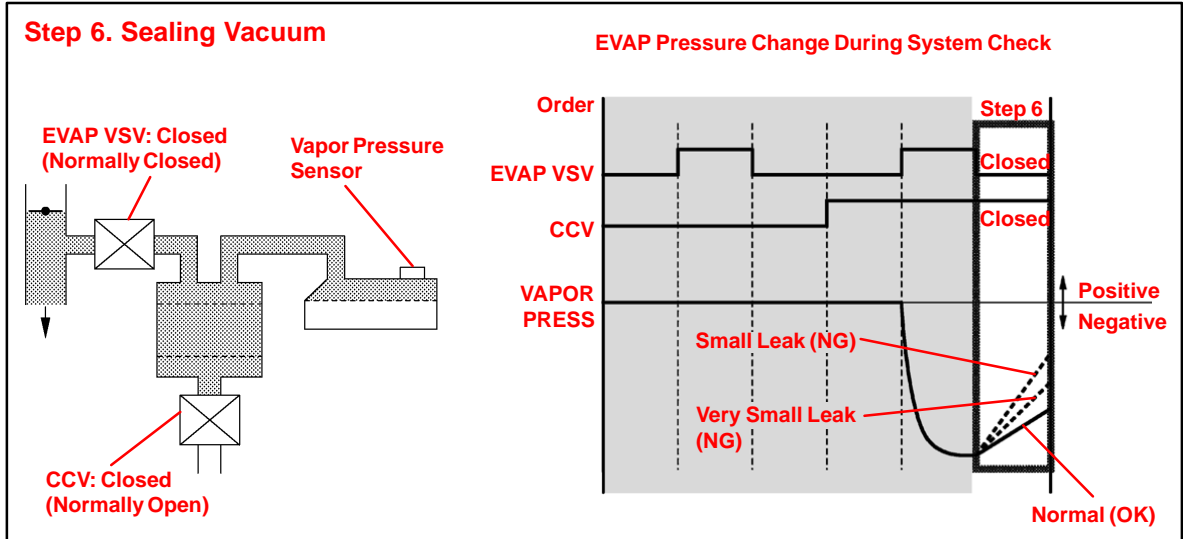
**Go to “F. Leak Check or No Vacuum Drawn on System Inspection” (page 17).**

**Press the right arrow key to go to the next step.**

**C. LEV II SYS CHECK**  
(Continued)

<b>6</b>	<b>Sealing Vacuum</b>
----------	-----------------------

During step 6, the EVAP system is sealed and the change in fuel tank interior pressure is monitored.



**CHECK:**

Wait 300 seconds (5 minutes) and check the vapor pressure.

**LEVII SYSTEM CHECK**  
**Step 6. Sealing Vacuum**

EVAP VSV ..... CLOSE  
CCV ..... CLOSE

VAPOR PRESS  
..... 752 mmHg-a  
Time 300 seconds

Press [RIGHT]

**Sample Screen**

VAPOR PRESS VALUE	CONCLUSION	GO TO
732 to 758 mmHg-a (-30 to -4 mmHg-g)	No trouble found in this step	OK
759 to 768 mmHg-a (-3 to 6 mmHg-g)	Small leak or very small leak	NG



**Go to "F. Leak Check or No Vacuum Drawn on System Inspection" (page 17).**

**C. LEV II SYS  
CHECK**  
(Continued)

**No leak detected and VSV operation is normal.**

Before returning the vehicle to the customer, perform the following:

- A. Clear all DTCs.
- B. Perform a drive pattern test and confirm that no pending DTCs are recorded.
- C. Make sure the monitors pass.

**D. Air Inlet Restriction Inspection**

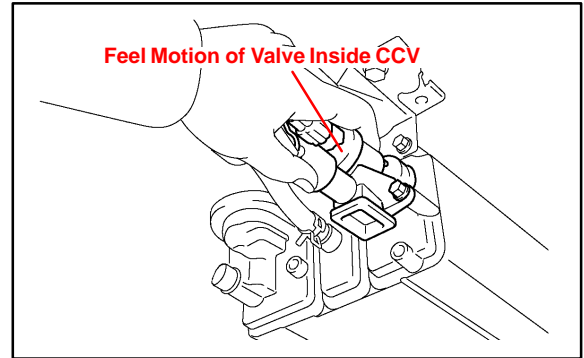
**NOTE:**

Before starting this procedure, perform the “LEV II SYS CHECK” (see page 5).

<b>1</b>	<b>Perform CCV Active Test using the Diagnostic Tester.</b>
----------	---

**PREPARATION:**

- A. Turn the ignition switch ON.
- B. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / ACTIVE TEST /  
CAN CTRL VSV.
- C. Then press the right or left  
arrow key to activate the CCV.

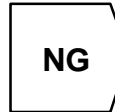


**CHECK:**

Operate the CCV through the ACTIVE TEST and touch the CCV with your hand. Check that the motion of the valve inside the CCV can be felt.

**OK:**

Motion of valve inside CCV can be felt.

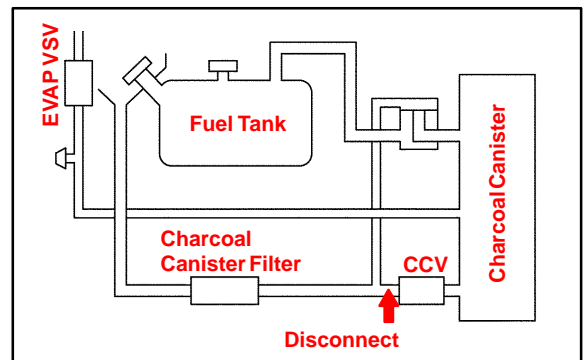


Go to “G. CCV Diagnostics” (see step 2 on page 22).

<b>2</b>	<b>Determine source of air flow restriction.</b>
----------	--

**PREPARATION:**

- A. Turn off the engine.
- B. Disconnect the air inlet line from CCV.
- C. Remove and reinstall fuel tank cap to release system pressure.
- D. Restart the engine.



**D. Air Inlet Restriction Inspection**  
(Continued)

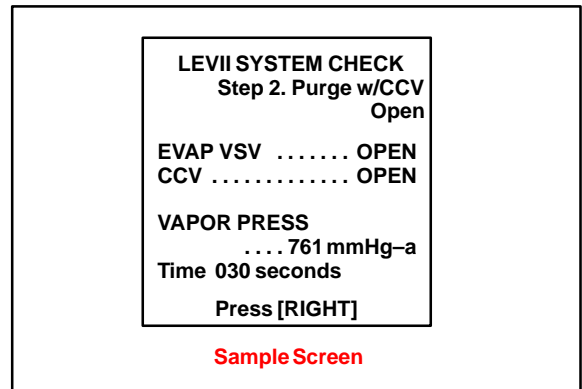
E. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / SYSTEM CHECK /  
LEV II SYS CHECK.

F. Advance to “Step 2. Purge w/CCV Open.”

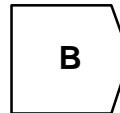
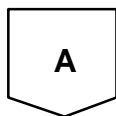
**CHECK:**

A. After waiting 30 seconds, check the vapor pressure sensor value.

B. Reconnect the air inlet line to CCV.



VAPOR PRESS VALUE	CONCLUSION	GO TO
732 to 751 mmHg-a (-30 to -11 mmHg-g)	A restriction is present in the CCV, or the charcoal canister.	A
752 to 762 mmHg-a (-10 to 0 mmHg-g)	A restriction is present in either the air inlet line or canister filter.	B

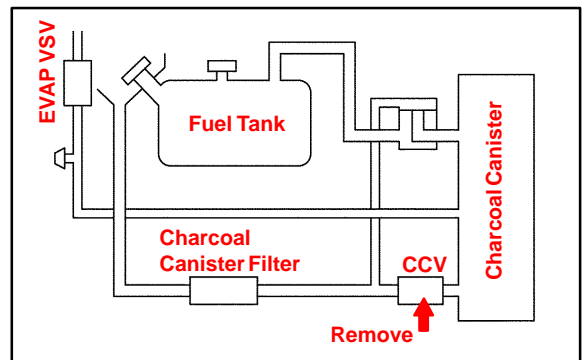


**Replace Charcoal Canister Filter and repeat Active Test “LEV II SYS CHECK” to verify proper system operation (see page 5).**

<b>3</b>	<b>Determine if air flow restriction is in CCV or the charcoal canister.</b>
----------	--

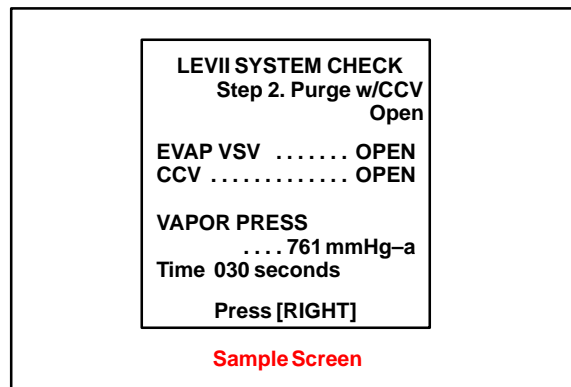
**PREPARATION:**

- A. Turn OFF the engine.
- B. Remove the CCV from the charcoal canister.
- C. Remove and reinstall fuel tank cap to release system pressure.
- D. Restart the engine.



**D. Air Inlet Restriction Inspection**  
(Continued)

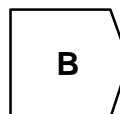
- E. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / SYSTEM CHECK /  
LEV II SYS CHECK.
- F. Advance to “Step 2. Purge w/CCV Open.”



**CHECK:**

- A. After waiting 30 seconds, check the vapor pressure sensor value.
- B. Reconnect the air inlet line to charcoal canister filter.

VAPOR PRESS VALUE	CONCLUSION	GO TO
752 to 762 mmHg-a (-10 to 0 mmHg-g)	CCV is stuck closed.	A
732 to 751 mmHg-a (-30 to -11 mmHg-g)	A restriction is present in the charcoal canister.	B



**Replace charcoal canister, and repeat Active Test “LEV II SYS CHECK” to verify proper system operation (see page 5).**

**Go to “G. CCV Diagnostics” (see step 2 on page 22).**

**E. EVAP VSV  
Stuck–Open  
Inspection**

**NOTE:**  
Before starting this procedure, perform the “LEV II SYS CHECK” (see page 5).

**1** Determine if stuck–open EVAP malfunction is electrical or mechanical.

**PREPARATION:**

- A. Advance to “Step 4. Sealing System.”
- B. Disconnect the EVAP VSV electrical connector.

**HINT:**  
The EVAP VSV is normally closed. If the EVAP VSV is functioning normally, disconnecting the VSV connector will keep the VSV closed.

**LEVII SYSTEM CHECK**  
Step 4. Sealing System

EVAP VSV ..... CLOSE  
CCV ..... CLOSE

VAPOR PRESS  
..... 762 mmHg–a  
Time 015 seconds

Press [RIGHT]

**Sample Screen**

- C. Wait 30 seconds.
- D. Check the vapor pressure sensor value.
- E. Remove and reinstall fuel tank cap to release system pressure.

VAPOR PRESS VALUE	CONCLUSION	GO TO
732 to 751 mmHg–a (–30 to –11 mmHg–g)	EVAP VSV is stuck open.	A
752 to 762 mmHg–a (–10 to 0 mmHg–g)	EVAP VSV circuit has a malfunction.	B

A

B

**Reconnect EVAP VSV electrical connector. Go to “H. EVAP VSV Diagnostics” (page 25).**

**Replace EVAP VSV and repeat “LEV II SYS CHECK” to verify proper system operation (page 5).**

**F. Leak Check  
or No Vacuum  
Drawn on  
System  
Inspection**

**NOTE:**

Before starting this procedure, perform the “LEV II SYS CHECK” (see page 5).

<b>1</b>	<b>Check that fuel tank cap is correctly installed.</b>
----------	---

**CHECK:**

- A. Check that the fuel tank cap is correctly installed.
- B. Check that the fuel tank cap meets OEM specifications.
- C. Check that the fuel tank cap and fuel tank cap gasket are not damaged.

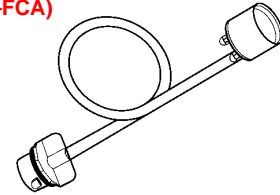
**OK:**

Fuel tank cap is properly fastened and meets OEM specification.

**EVAP Tester Kit  
(P/N00002-6872A)**

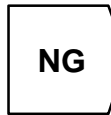


**EVAP Tester Fuel Cap Adapter  
(P/N 00002-6872A-FC or  
00002-6872A-FCA)**



**HINT:**

- When using EVAP Tester Fuel Cap Adapter:  
Use the Fuel Cap Adapter to check if pressure is leaking as a result of the fuel tank cap.
- If the fuel tank cap is not properly fastened, the EVAP system will be unable to maintain enough negative pressure (vacuum). The ECM (PCM) may interpret the pressure leak as a system malfunction and set a DTC.
- For each step in the LEV II SYS CHECK, the vapor pressure sensor should be within the given standard values.



**Correctly install fuel tank cap. Restart LEV II SYS CHECK (see page 5).**

**F. Leak Check or No Vacuum Drawn on System Inspection**  
(Continued)

<b>2</b>	<b>Check for filler neck damage.</b>
----------	--------------------------------------

**PREPARATION:**

Remove the fuel tank cap.

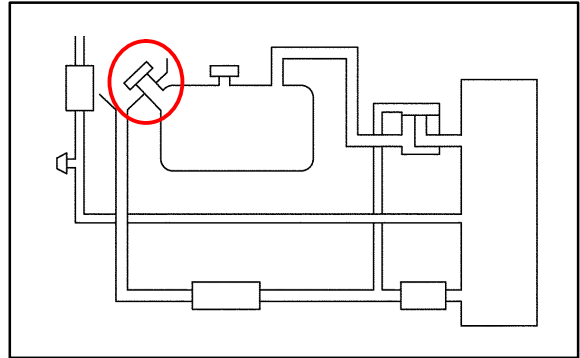
**CHECK:**

Visually inspect the filler neck for damage.

**OK:**

**No damage**

Reinstall the fuel tank cap.



**Replace fuel tank inlet pipe (filler neck).**

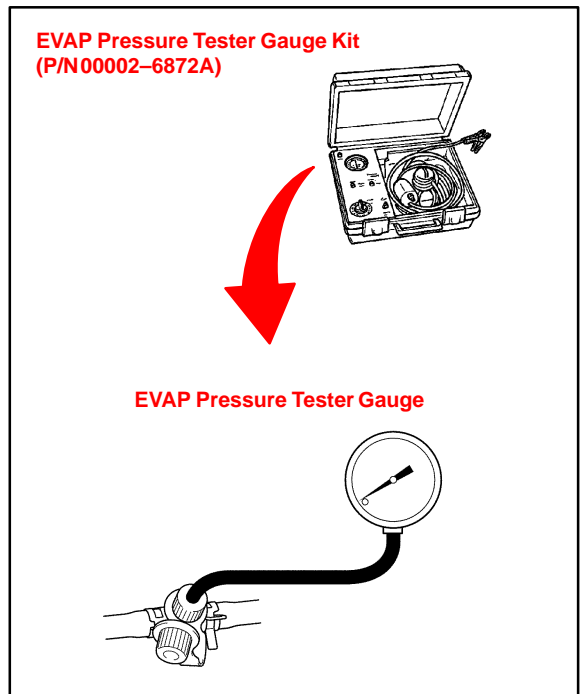
<b>3</b>	<b>Confirm EVAP VSV will open.</b>
----------	------------------------------------

**HINT:**

The EVAP Pressure Tester Gauge Kit is useful for detecting when the EVAP VSV is stuck closed.

**Check EVAP VSV Operation.**

- A. Connect the EVAP Pressure Tester Gauge (EVAP control system test equipment vacuum gauge) to the EVAP service port on the purge line.
- B. Start the engine.
- C. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / EVAP VSV.
- D. Activate the EVAP VSV through the ACTIVE TEST. Read the pressure gauge and check that negative pressure is present.



**F. Leak Check or No Vacuum Drawn on System Inspection**  
(Continued)

VAPOR PRESS VALUE	CONCLUSION	GO TO
732 to 761 mmHg-a (-1 to -30 mmHg-g)	EVAP VSV is functioning properly.	OK
762 mmHg-a (0 mmHg-g)	No negative pressure or pulsation. EVAP VSV is stuck closed.	NG

**OK**

**NG**

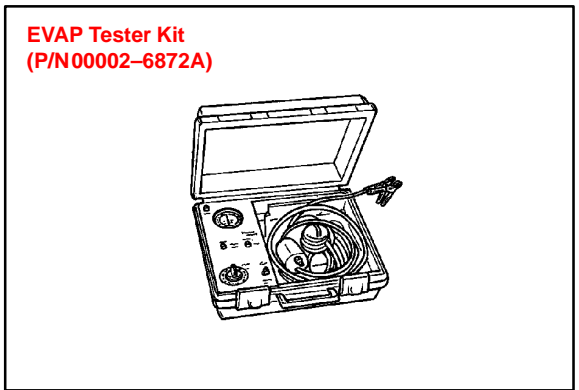
**If no negative pressure or pulsation is present, the EVAP VSV is most likely stuck closed. Proceed to “H. EVAP VSV Diagnostics” (page 25).**

<b>4</b>	<b>Check for EVAP leak using the EVAP Tester Kit.</b>
----------	---

**CAUTION:**  
Do not add more than 797 mmHg-a (35 mmHg-g) of pressure. The EVAP system will be damaged.

**CHECK:**

- A. Ignition switch is ON but the engine is not running.
- B. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / CAN CTRL VSV. Press the right arrow key.
- C. Close the CCV (CCV is ON).
- D. From the EVAP service port, apply 786 to 790 mmHg-a (24 to 28 mmHg-g) of pressure. Do not apply pressure continuously for more than 45 seconds. Once pressure is added, maintain the pressure and seal the system.
- E. After waiting 2 minutes, read the pressure gauge and record the values.



**NG**

**OK**

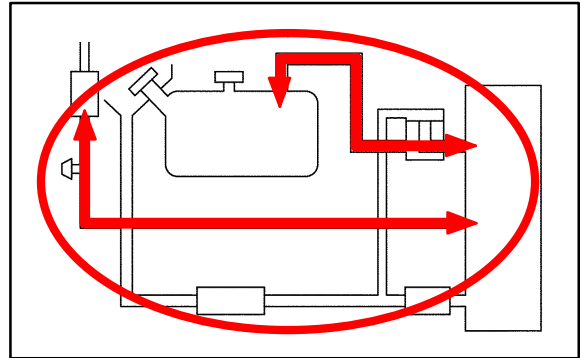
**System is operating normally.**

**F. Leak Check or No Vacuum Drawn on System Inspection**  
(Continued)

<b>5</b>	<b>Check hose and tubes between EVAP VSV and charcoal canister, and fuel tank and charcoal canister.</b>
----------	--

**CHECK:**

- A. Check that the vacuum hoses are connected correctly.
- B. Check that the vacuum hoses are not loose or disconnected.
- C. Check the vacuum hoses and tubes for cracks, holes, damage, or blockage.



**Repair or replace defective or damaged hose or tube.**

<b>6</b>	<b>Eliminate CCV as source of leakage by clamping air inlet line between the charcoal canister filter and the CCV.</b>
----------	--

**CHECK:**

- A. Ignition switch is ON but the engine is not running.
- B. Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / CAN CTRL VSV. Press the right arrow key.
- C. Close the CCV (CCV is ON).



- D. From the EVAP service port, apply 786 to 790 mmHg-a (24 to 28 mmHg-g) of pressure. Do not apply pressure continuously for more than 45 seconds. Once pressure is added, maintain the pressure and seal the system.
- E. After waiting 2 minutes, read the pressure gauge and record the values.

Check that the CCV is not stuck open and does not have leakage.

VAPOR PRESS VALUE	CONCLUSION	GO TO
762 mmHg-a (0 mmHg-g)	CCV is not leaking.	OK
786 to 790 mmHg-a (24 to 28 mmHg-g)	Positive pressure increase. CCV open.	NG



**If positive pressure is present, the CCV is not closing. Proceed to "G. CCV Diagnostics" (page 22).**

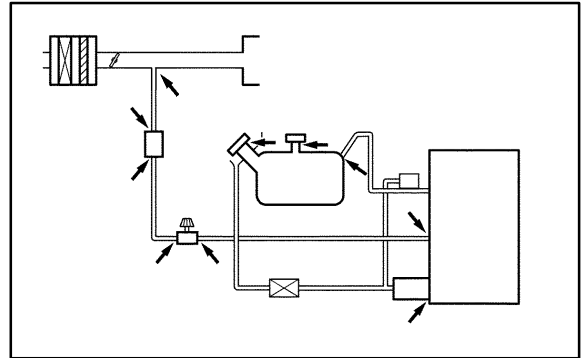
**F. Leak Check or No Vacuum Drawn on System Inspection**  
(Continued)

<b>7</b>	<b>Identify area of EVAP leak.</b>
----------	------------------------------------

**CHECK:**

Check if any hoses close to the fuel tank have been modified, and check if there are signs of any accident damage near the fuel tank or the charcoal canister.

- Check for cracks, deformation or loose connections of the following parts:
  - Fuel tank
  - Charcoal canister
  - Fuel tank filler pipe
  - Hoses and tubes around fuel tank
  - Charcoal canister



**OK**

**NG**

**Repair or replace defective or damaged components.**

<b>8</b>	<b>Inspect charcoal canister for leaks, disconnected hoses, damage, or obvious concerns.</b>
----------	--

**OK**

**NG**

**Replace charcoal canister.**

<b>9</b>	<b>Inspect fuel tank for leaks, disconnected hoses, damage, or obvious concerns.</b>
----------	--

**CHECK:**

- A. Check that the hose, tube and attached parts are connected correctly.
- B. Check the fuel tank for cracks, holes and damage.

**OK**

**NG**

**Repair or replace defective or damaged parts.**

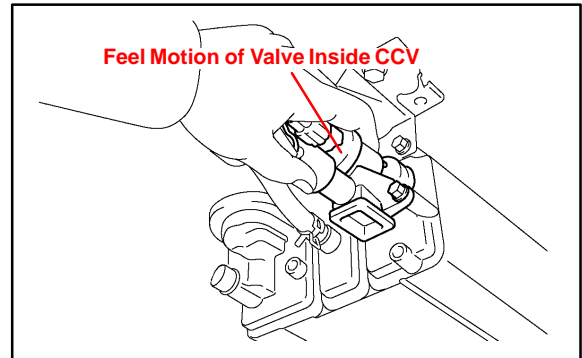
<b>System is operating normally.</b>
--------------------------------------

**G. CCV  
Diagnostics**

1

**Perform CCV Active Test using the Diagnostic Tester.**
**PREPARATION:**

- A. Turn the ignition switch ON.
- B. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / ACTIVE TEST /  
CAN CTRL VSV.
- C. Then press the right or left  
arrow key.
- D. Operate the CCV through the  
ACTIVE TEST and touch the CCV  
with your hand.


**CHECK:**

Check that the motion of the valve inside the CCV can be felt.

**OK:**

Motion of valve inside CCV can be felt.

OK

NG

**Go to step 3 (page 23).**

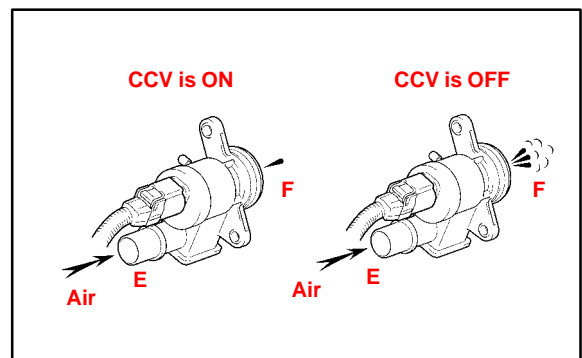
2

**Check CCV Flow.**
**NOTE:**

The CCV is normally OPEN. When the CCV is energized, the valve closes.

**PREPARATION:**

- A. Remove the CCV.
- B. Turn the ignition switch ON.
- C. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / ACTIVE TEST /  
CAN CTRL VSV.
- D. Then press the right or left  
arrow key.



**G. CCV**  
**Diagnostics**  
(Continued)

**CHECK:**  
Operate the CCV through the ACTIVE TEST.

**OK:**

TESTER OPERATION	SPECIFIED CONDITION
CCV is ON	Air does not flow from ports E to F
CCV is OFF	Air flows from ports E to F

**OK**

**NG** Replace CCV.

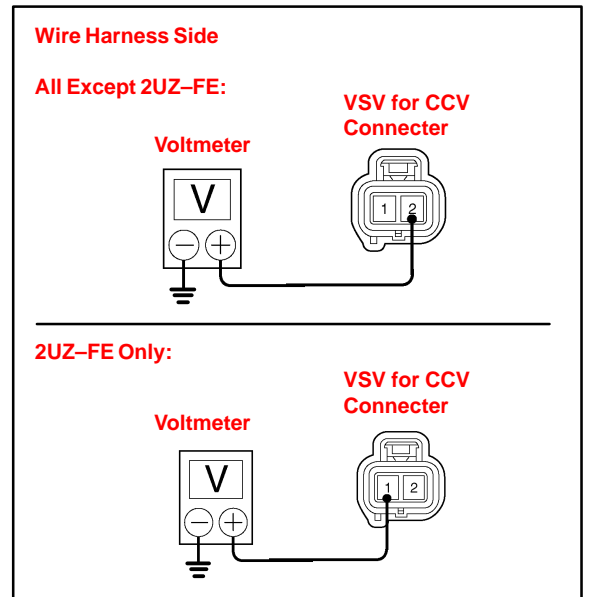
CCV is normal.

<b>3</b>	<b>Check CCV power supply.</b>
----------	--------------------------------

**PREPARATION:**

- A. Disconnect the CCV connector.
- B. Turn the ignition switch ON.

**CAUTION:**  
Be careful not to damage the connector. Front probe with a test terminal or jumper wire using minimal contact pressure to prevent damage to the terminal.



**CHECK:**  
Measure the voltage between the specified terminal of the CCV connector and chassis ground.

**OK:**

TESTER CONNECTION	SPECIFIED CONDITION
CCV (2) – Chassis ground	9 to 14 V

**OK**

**NG** Check and repair CCV power source circuit. (Refer to Electrical Wiring Diagram in the Technical Information System (TIS), applicable model and model year: *System Circuits:Engine Control Circuit*.)

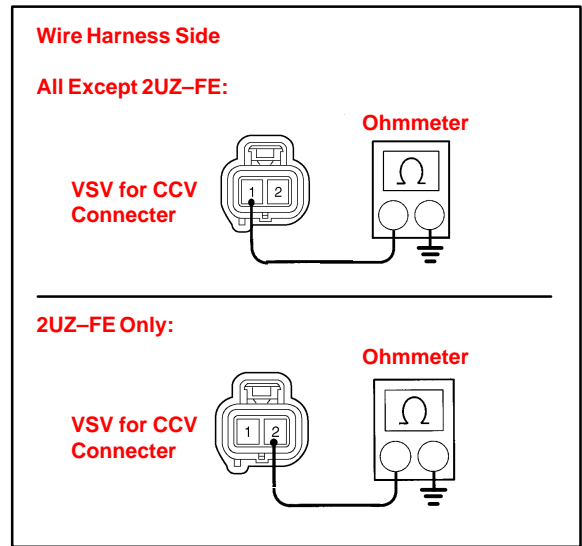
**G. CCV  
Diagnostics**  
(Continued)

<b>4</b>	<b>Check CCV control circuit wire harness and connector.</b>
----------	--

**PREPARATION:**

- A. Disconnect the CCV connector.
- B. Turn the ignition switch ON.
- C. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / ACTIVE TEST /  
CAN CTRL VSV.
- D. Then press the right or left  
arrow key.

**CAUTION:**  
Be careful not to damage the connector.



**CHECK:**

Operate the CCV through the CAN CTRL VSV ACTIVE TEST, and measure the resistance between the CCV connector and the chassis ground.

**OK:**

The resistance value drops (below 1 kΩ) when the VSV is turned ON.

TESTER CONNECTION	SPECIFIED CONDITION
CCV (1) – Chassis ground	VSV is ON: Resistance drop (Below 1 kΩ)
	VSV is OFF: Resistance rise (10 kΩ or higher)

**NG**

**OK**

**Go to step 2 (page 22).**

<b>5</b>	<b>Check for open or short in harness and connector between ECM (PCM) and CCV.</b>
----------	--

**OK**

**NG**

**Repair or replace harness and/or connector.**

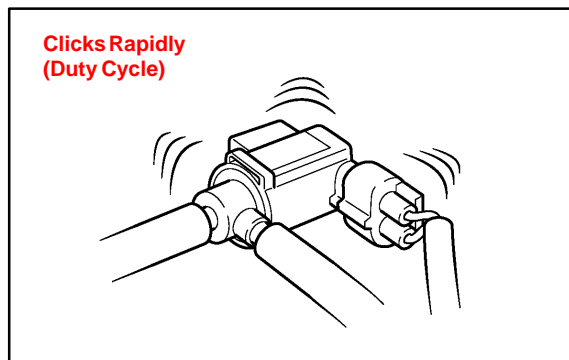
**Check and replace ECM (PCM).**

**H. EVAP VSV  
Diagnostics**

<b>1</b>	<b>Perform EVAP VSV Active Test using the Diagnostic Tester.</b>
----------	--

**PREPARATION:**

- A. Turn the ignition switch ON.
- B. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / ACTIVE TEST /  
EVAP VSV (Alone).
- C. Press the right or left arrow key.

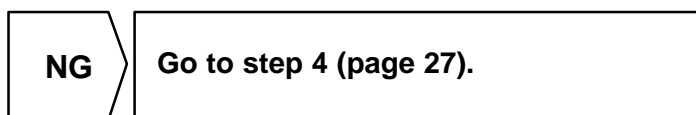


**CHECK:**

Operate the EVAP VSV through the ACTIVE TEST and listen or feel for clicking sounds from the EVAP VSV.

**OK:**

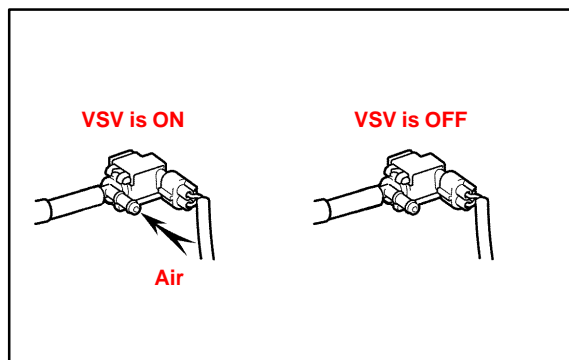
**Duty cycle (rapid clicks) are heard/felt from the EVAP VSV.**



<b>2</b>	<b>Check EVAP VSV Flow.</b>
----------	-----------------------------

**PREPARATION:**

- A. Disconnect the vacuum hose of the EVAP VSV from the charcoal canister.
- B. Start the engine.
- C. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / ACTIVE TEST /  
EVAP VSV (Alone).
- D. Press the right or left arrow key.



**CHECK:**

Operate the EVAP VSV through the ACTIVE TEST and check if the VSV applies vacuum to your finger.

**H. EVAP VSV  
Diagnostics**  
(Continued)

**OK:**

TESTER OPERATION	SPECIFIED CONDITION
VSV is ON	VSV is open, and VSV port applies vacuum to your finger
VSV is OFF	VSV is closed, and VSV port applies no vacuum to your finger

**NG**

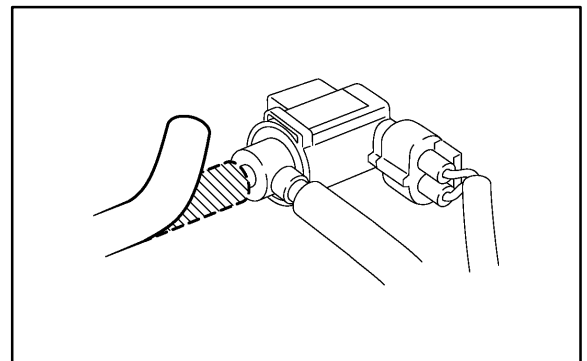
**OK**

**EVAP VSV is normal.**

**3 Check hose and tubes between EVAP VSV and intake manifold.**

**CHECK:**

- A. Check that the vacuum hoses are connected correctly.
- B. Check that the vacuum hoses are not loose or disconnected.
- C. Check the vacuum hoses and tubes for cracks, holes, damage, or blockage.



**OK**

**NG**

**Repair or replace defective or damaged hose or tube.**

**Replace EVAP VSV.**

**H. EVAP VSV  
Diagnostics  
(Continued)**

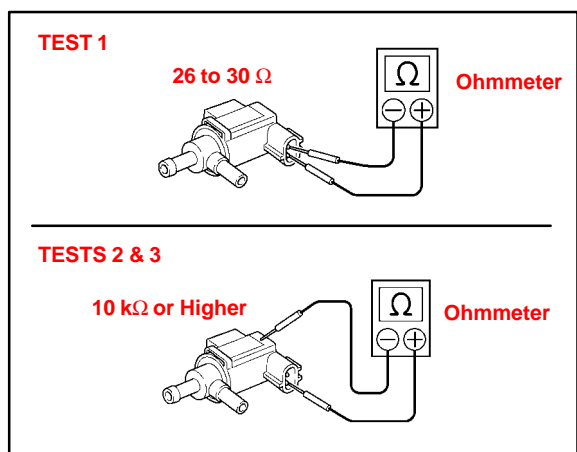
<b>4</b>	<b>Inspect EVAP VSV Windings.</b>
----------	-----------------------------------

**CHECK:**

Measure the resistance.

**OK:**

TEST	TESTER CONNECTION	SPECIFIED CONDITION
1	1 – 2	26 to 30 Ω at 20°C (68°F)
2	1 – VSV Body ground	10 kΩ or higher
3	2 – VSV Body ground	



**OK**

**NG** Replace EVAP VSV.

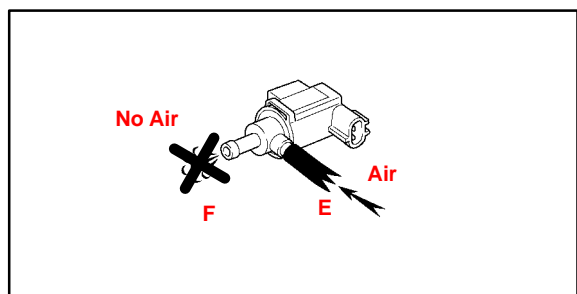
<b>5</b>	<b>Bench test EVAP VSV.</b>
----------	-----------------------------

**A. CHECK:**

Check that air does not flow from port E to port F.

**OK:**

Air does not flow from port E to port F.



**B. PREPARATION:**

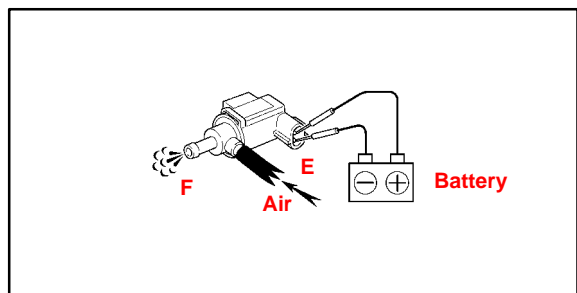
Apply battery positive voltage (12 V) across the terminals.

**CHECK:**

Check that air flows from the port.

**OK:**

Air from port E flows out through port F.



**OK**

**NG** Replace EVAP VSV.

**H. EVAP VSV  
Diagnostics**  
(Continued)

<b>6</b>	<b>EVAP VSV Power Supply.</b>
----------	-------------------------------

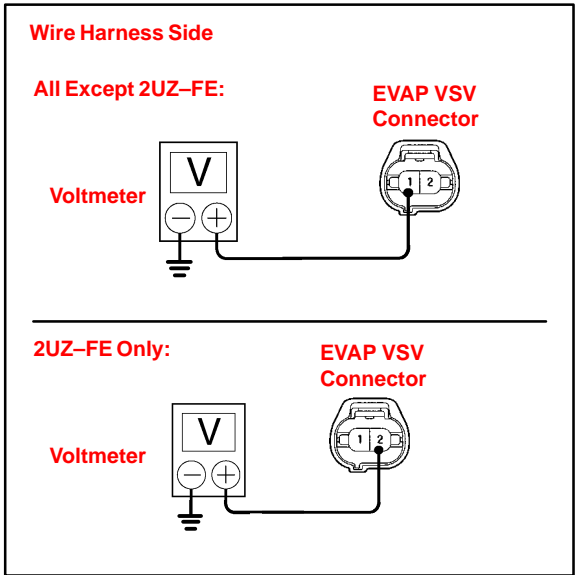
**PREPARATION:**

- A. Disconnect the EVAP VSV.
- B. Turn the ignition switch ON.

**CAUTION:**  
Be careful not to damage the connector.

**CHECK:**

Measure the voltage between the specified terminal of the EVAP VSV connector and body ground.



**OK:**

ENGINE	TESTER CONNECTION	SPECIFIED CONDITION
All Except 2UZ-FE	EVAP VSV (1) – Chassis ground	9 to 14 V
2UZ-FE Only	EVAP VSV (2) – Chassis ground	9 to 14 V



**H. EVAP VSV  
Diagnostics  
(Continued)**

<b>7</b>	<b>Check EVAP VSV control circuit wire harness and connector.</b>
----------	---

**PREPARATION:**

- A. Disconnect the EVAP VSV.
- B. Turn the ignition switch ON.
- C. Enter the following menus:  
DIAGNOSIS / ENHANCED  
OBD II / ACTIVE TEST /  
EVAP VSV (Alone).
- D. Then press the right or left  
arrow key.

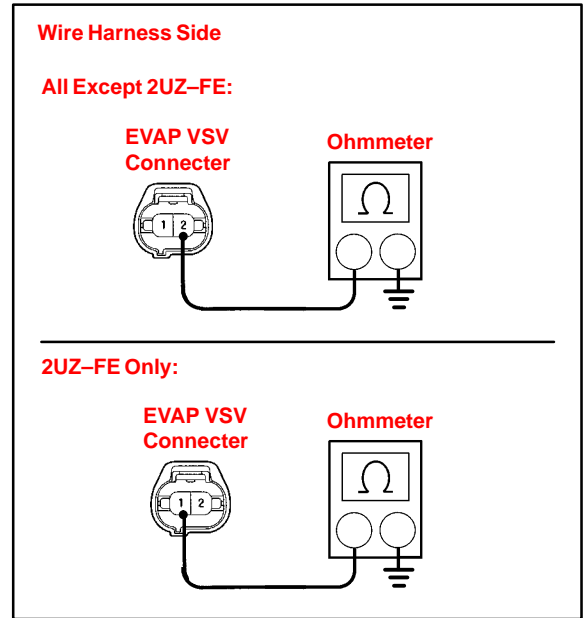
**CAUTION:**  
Be careful not to damage the connector.

**CHECK:**

Operate the EVAP VSV through the EVAP VSV ACTIVE TEST, and measure the resistance between the EVAP VSV connector and the body ground.

**OK:**

The resistance value drops when the VSV is turned ON.



TESTER CONNECTION	SPECIFIED CONDITION
All Except 2UZ-FE: EVAP VSV (2) – Chassis ground	VSV is ON: Resistance drop (Below 1 kΩ)
	VSV is OFF: Resistance rise (10 kΩ or higher)
2UZ-FE Only: EVAP VSV (1) – Chassis ground	

<b>NG</b>	<b>OK</b>	<b>Go to step 2 (page 25).</b>
-----------	-----------	--------------------------------

<b>8</b>	<b>Check for open or short in harness and connector between ECM (PCM) and EVAP VSV.</b>
----------	---

<b>OK</b>	<b>NG</b>	<b>Repair or replace harness and connector.</b>
-----------	-----------	---

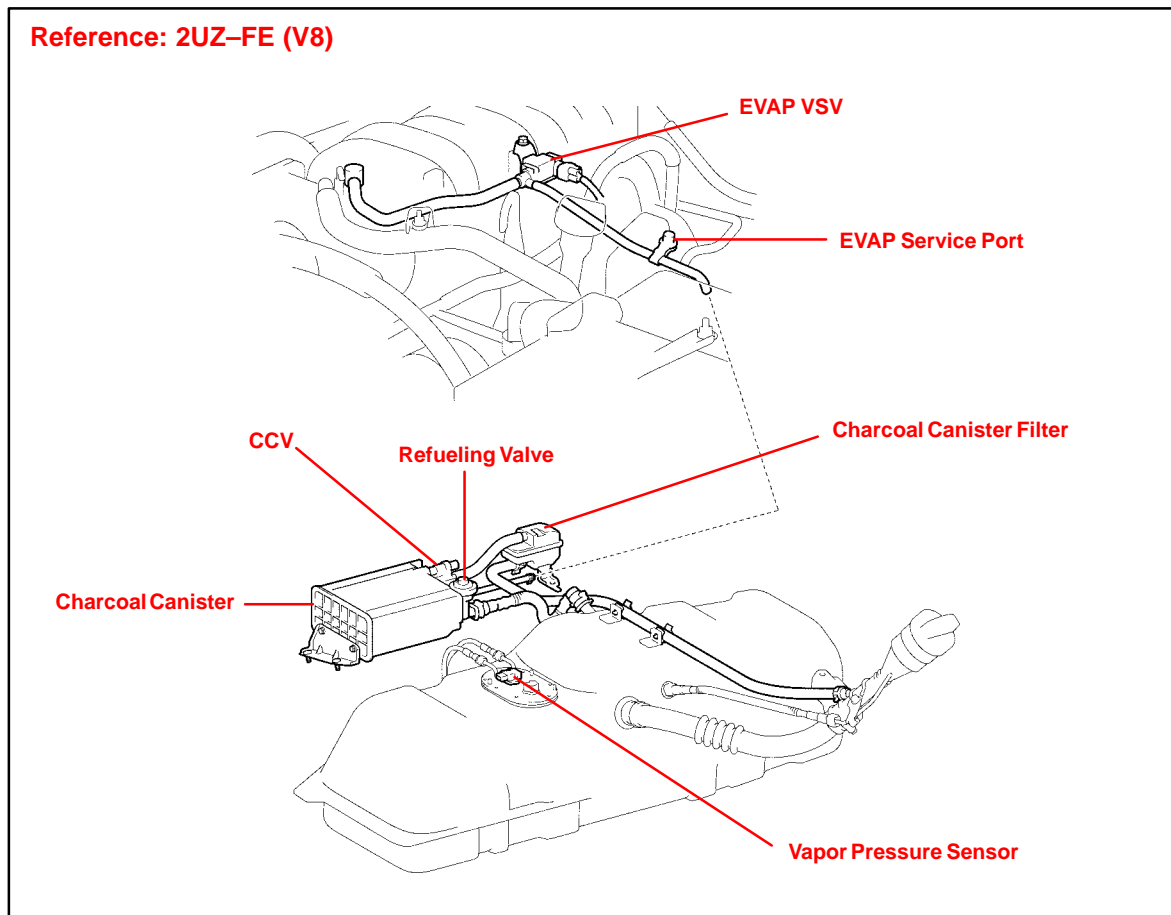
**Inspect ECM (PCM) for obvious damage or loose pins/connections.**

<b>OK</b>	<b>NG</b>	<b>Repair or replace pins/connections.</b>
-----------	-----------	--

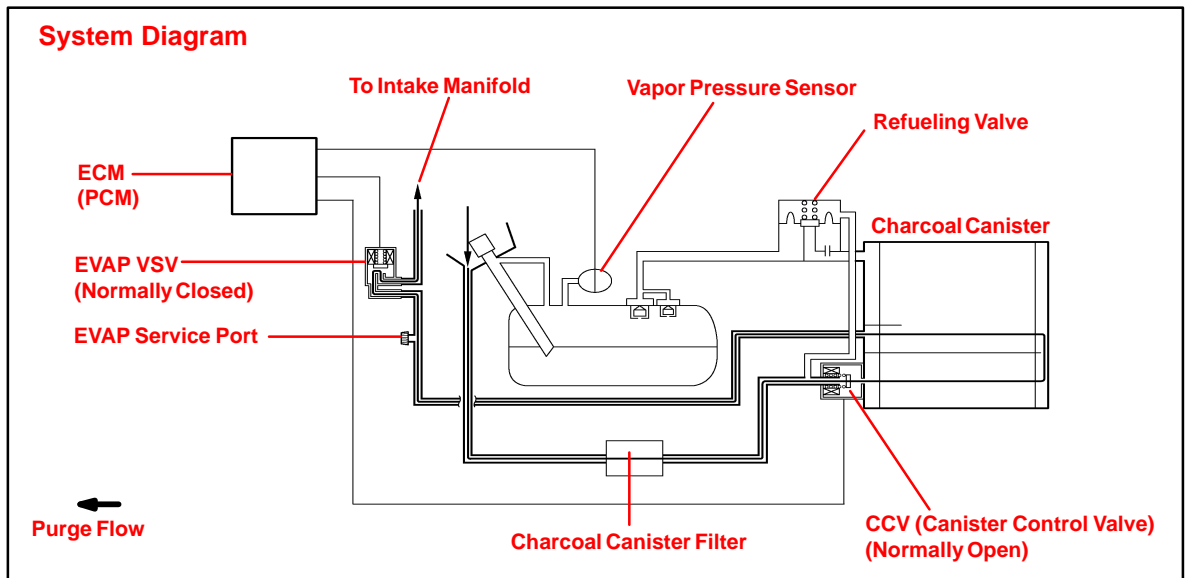
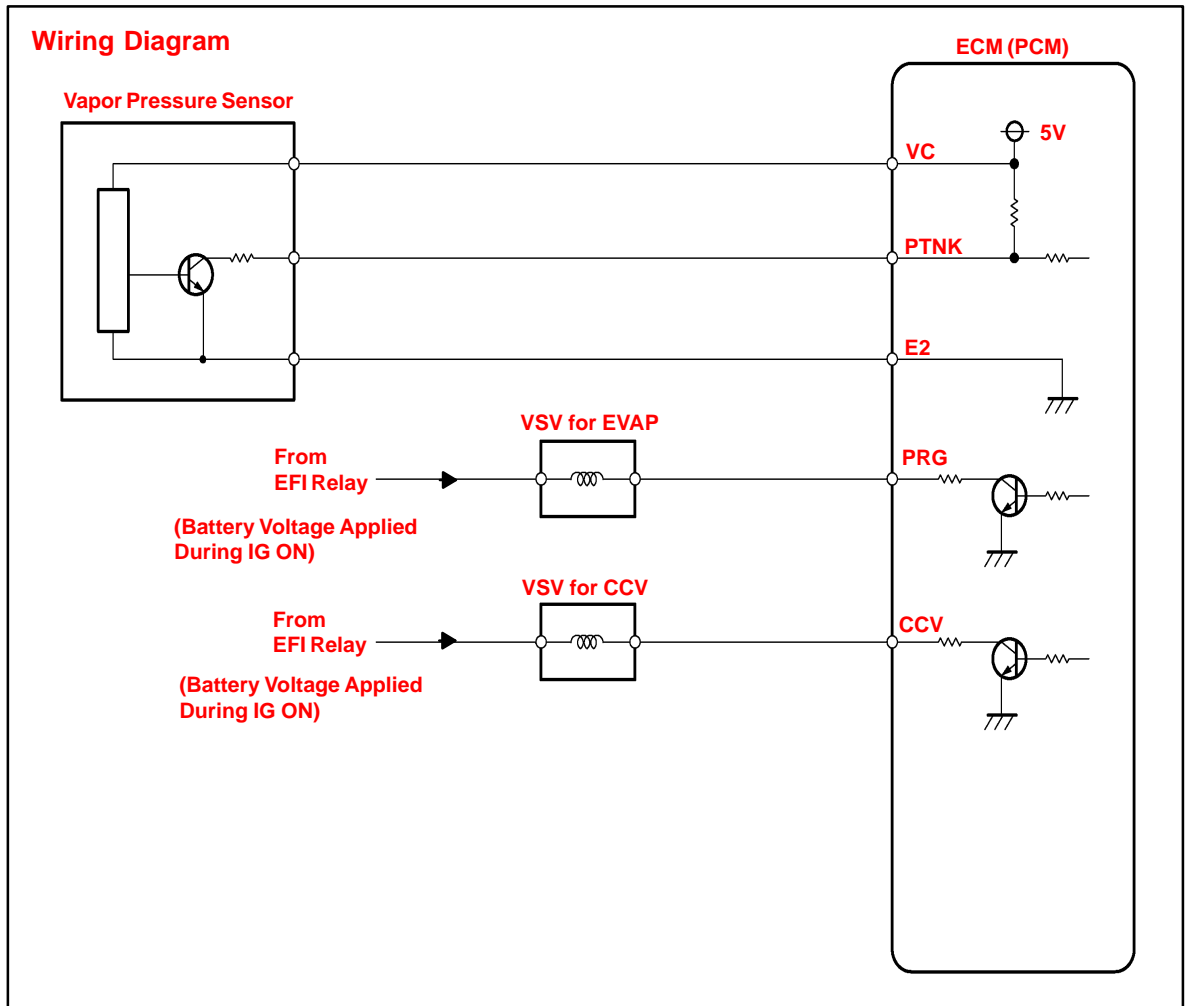
**Replace ECM (PCM).**

I. EVAP System Description

Reference: 2UZ-FE (V8)



I. EVAP System Description  
(Continued)



**I. EVAP System Description**  
(Continued)

This EVAP system contains the following components:

COMPONENT	OPERATION
Canister	Contains activated charcoal to absorb evaporative emissions that are created in fuel tank.
EVAP VSV (Normally Closed)	Opens or closes line between canister and intake manifold to control EVAP purge flow. When EVAP VSV is opened, the system purges fuel vapor absorbed by canister to intake manifold. ECM (PCM) changes duty-cycle of purge VSV ground circuit to control purge volume <b>(ON is open, OFF is closed)</b> .
Refueling Valve	Controls EVAP pressure from fuel tank to canister. Valve has diaphragm, spring and restrictor. When fuel tank pressure increases, valve opens. When EVAP is purging, valve closes and restrictor prevents high vacuum from affecting pressure in fuel tank. When valve opens, refueling is possible.
Service Port	Used for connecting vacuum gauge for inspecting EVAP system.
Canister Control Valve (CCV) (Normally Open)	Vents and seals EVAP system. <b>When CCV is turned ON, EVAP system is closed.</b> When CCV is turned OFF, EVAP system is vented. When vacuum is created, purge VSV is opened and CCV is closed.
Vapor Pressure (Fuel Tank Pressure) Sensor	Indicates pressure as voltage. ECM (PCM) supplies 5 V to sensor. ECM (PCM) detects EVAP system pressure by checking change in voltage.

When predetermined conditions (closed loop, etc.) are met, the EVAP VSV is opened and fuel vapor stored in the canister is purged to the intake manifold. The ECM (PCM) changes duty-cycle to the VSV to control purge flow volume. Purge flow volume is determined by the intake manifold pressure. Atmospheric pressure is allowed into the canister through the CCV to ensure that purge flow is maintained when negative pressure (vacuum) is applied to the canister.

**J. EVAP  
System DTC  
Descriptions**

**Summary of DTCs:**

DTC	MONITOR ITEM	POSSIBLE TROUBLE AREA
P0441	<ul style="list-style-type: none"> <li>•EVAP VSV stuck closed</li> <li>•EVAP VSV stuck open</li> </ul>	<ul style="list-style-type: none"> <li>•Fuel cap incorrectly installed</li> <li>•EVAP leak</li> <li>•EVAP line blocked</li> <li>•EVAP VSV circuit</li> <li>•CCV circuit</li> <li>•Fuel cap</li> <li>•ECM (PCM)</li> </ul>
P0442	EVAP leak (0.04 inch diameter)	<ul style="list-style-type: none"> <li>•Fuel cap incorrectly installed</li> <li>•EVAP leak</li> <li>•Fuel cap</li> </ul>
P0446	<ul style="list-style-type: none"> <li>•CCV stuck closed</li> <li>•CCV stuck open</li> </ul>	<ul style="list-style-type: none"> <li>•Fuel cap incorrectly installed</li> <li>•EVAP leak</li> <li>•EVAP line blocked</li> <li>•EVAP VSV circuit</li> <li>•CCV circuit</li> <li>•Fuel cap</li> <li>•ECM (PCM)</li> </ul>
P0451 P0452 P0453	Vapor pressure sensor	Vapor pressure sensor circuit (refer to repair manual)
P0455	EVAP gross leak	<ul style="list-style-type: none"> <li>•Fuel cap incorrectly installed</li> <li>•EVAP leak</li> <li>•EVAP VSV circuit</li> <li>•CCV circuit</li> <li>•Fuel cap</li> </ul>
P0456	EVAP leak (0.02 inch diameter)	<ul style="list-style-type: none"> <li>•Fuel cap incorrectly installed</li> <li>•EVAP leak</li> <li>•Fuel cap</li> </ul>

**J. EVAP System DTC Descriptions**  
(Continued)

MALFUNCTION AREA	DTC SET							
	P0441	P0442	P0446	P0451	P0452	P0453	P0455	P0456
EVAP VSV Stuck Closed	●		●				●	
EVAP VSV Stuck Open	●							
EVAP Small Leak (0.04 inch)		●						
CCV Stuck Closed			●					
CCV Stuck Open	●		●				●	
Vapor Pressure Sensor Malfunction				●				
Vapor Pressure Sensor Low Output					●			
Vapor Pressure Sensor High Output						●		
EVAP Gross Leak	●						●	
EVAP Small Leak (0.02 inch)		●						●

**NOTE:**

- A drive cycle is **NOT** a key cycle.
- A drive cycle represents a completed EVAP monitor.

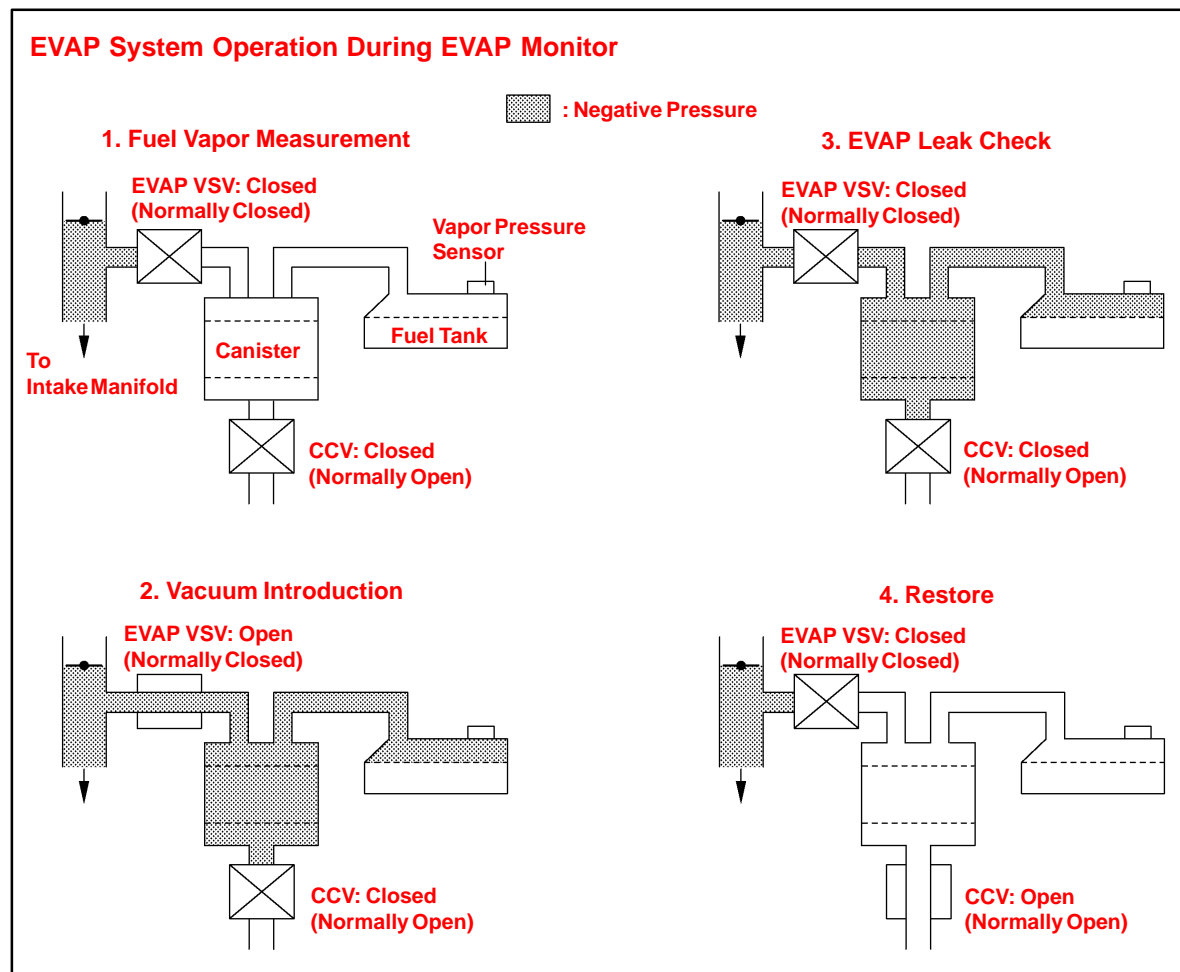
- If a failure is detected, a pending DTC is set and the drive cycle is referred to as trip 1.
- If the same failure is not detected in the next drive cycle, the pending DTC will be erased.
- If two consecutive drive cycles fail, the pending DTC will remain, the MIL will illuminate and a current DTC will be set.
- If 3 consecutive drive cycles pass the monitor, the MIL will turn OFF.
- If 40 consecutive drive cycles pass the monitor, the current DTC will be erased and stored as a history DTC.

**Determine if DTC fault is current or intermittent.**

PENDING DTC	CURRENT DTC	POSSIBLE MALFUNCTION
● (DTC)	● (DTC)	Current malfunction is occurring in system. High chance that cause of malfunction will be found during diagnosis.
● (DTC)	○ (No DTC)	Malfunction was detected during the last drive cycle. Cause of malfunction may be found during diagnosis.
○ (No DTC)	● (DTC)	Malfunction was not detected last drive cycle. Condition is intermittent and is usually caused by fuel tank's cap being loose. Otherwise, cause of malfunction may be difficult to find during diagnosis.

**K. EVAP Monitor Description**

**EVAP Monitor**



ORDER	OPERATION	DESCRIPTION
1	Fuel vapor measurement	EVAP VSV is turned OFF (closed) and EVAP pressure is measured. If EVAP pressure is not stable, EVAP monitor is canceled to prevent inaccurate monitor.
2	Vacuum introduction	EVAP VSV is turned ON (opened) and CCV is turned ON (closed). As a result, negative intake manifold pressure (vacuum) is introduced to EVAP system.
3	EVAP leak check	EVAP VSV is turned OFF (closed) to seal EVAP system. EVAP pressure increase is measured for 5 seconds when EVAP pressure is between -20 mmHg and -17 mmHg. If increase is large, ECM (PCM) concludes EVAP system has leak.
4	Restore	CCV is turned OFF (open) to finish EVAP monitor.

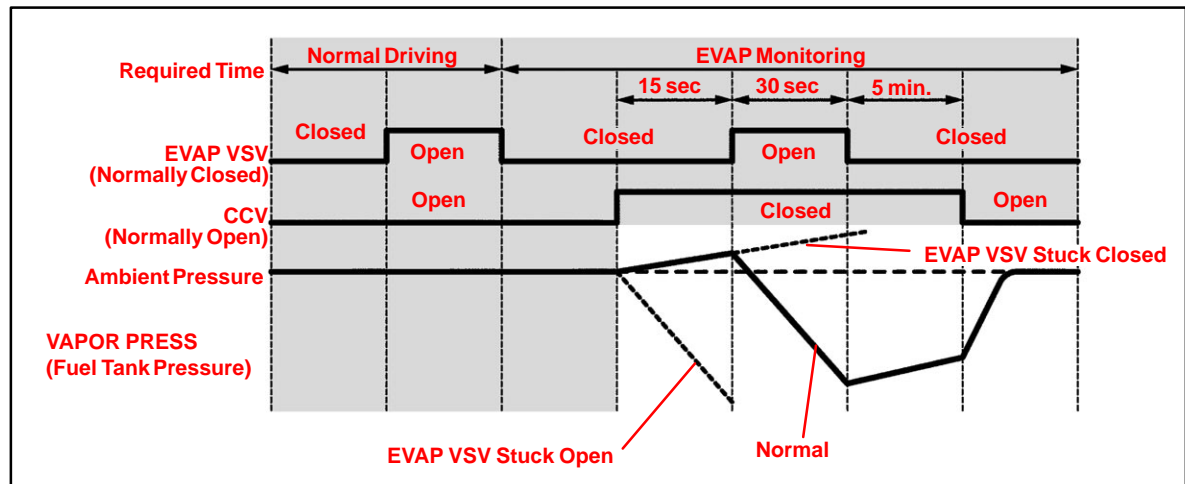
**K. EVAP Monitor Description**  
(Continued)

The EVAP monitor's purpose is to check for EVAP leaks, EVAP VSV and CCV malfunctions. The monitor performs the check by first introducing the intake manifold's negative pressure (vacuum) to the EVAP system. Then, the monitor records change in the EVAP system's pressure levels. The monitor runs when the following conditions are met:

- The engine is in a state of cold soak. During cold soak, the ECT and IAT are nearly equal and both are within 4 to 35°C (40 to 90°F).
- The vehicle is stopped and the engine is idling, or the vehicle is being driven at a steady speed.
- The EVAP pressure is stabilized (pressure in fuel tank is atmospheric).

Refer to the diagram on page 35, "EVAP System Operation During EVAP Monitor," for further details on the EVAP monitor processes.

**P0441 (EVAP VSV)**



The EVAP VSV has the following uses:

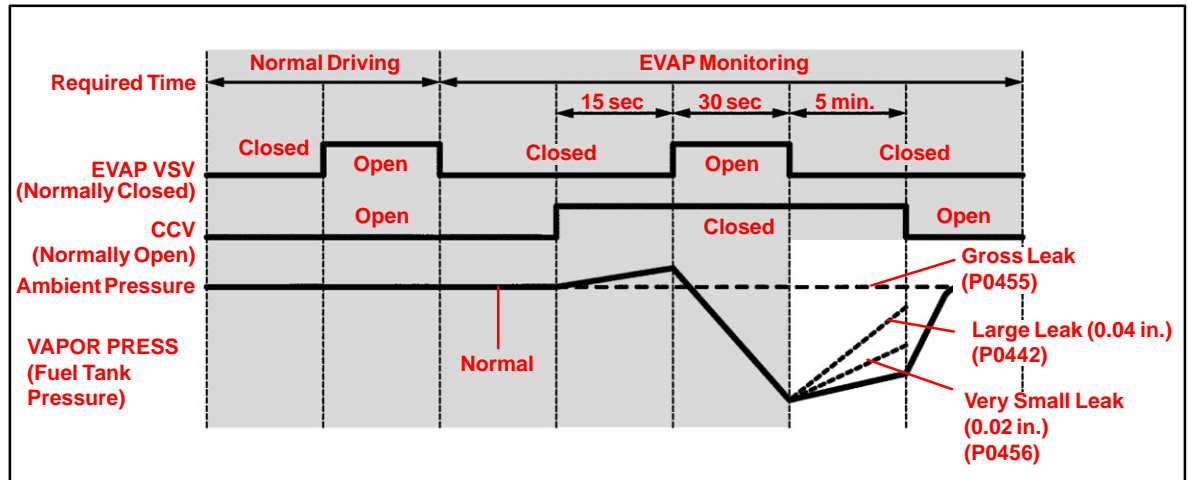
1. Purge the evaporative emissions from the fuel tank to the intake manifold.
2. Works with the CCV to create negative pressure (vacuum) inside the fuel tank and performs leak test diagnostics.

Opening or closing malfunctions in the EVAP VSV prompt the ECM (PCM) to set DTC P0441. The ECM (PCM) checks if the EVAP VSV is "stuck closed." The ECM (PCM) commands the EVAP VSV to open while the CCV is closed. Under these circumstances, a negative pressure (vacuum) should develop in the fuel tank. If no negative pressure develops, the ECM (PCM) determines that the EVAP VSV is closed despite the open command. The ECM (PCM) will turn on the MIL and output DTC P0441.

The ECM (PCM) also checks if the EVAP VSV is "stuck open." The ECM (PCM) commands the EVAP VSV to close while the CCV is closed and the fuel tank is at atmospheric pressure (762 mmHg-a / 0 mmHg-g). Under these circumstances, the fuel tank should remain at atmospheric pressure. If negative pressure develops in the fuel tank, the ECM (PCM) determines that the EVAP VSV is open despite the close command. The ECM (PCM) will turn on the MIL and output DTC P0441.

**K. EVAP Monitor Description**  
(Continued)

**P0442, P0455 and P0456 (EVAP Leak)**



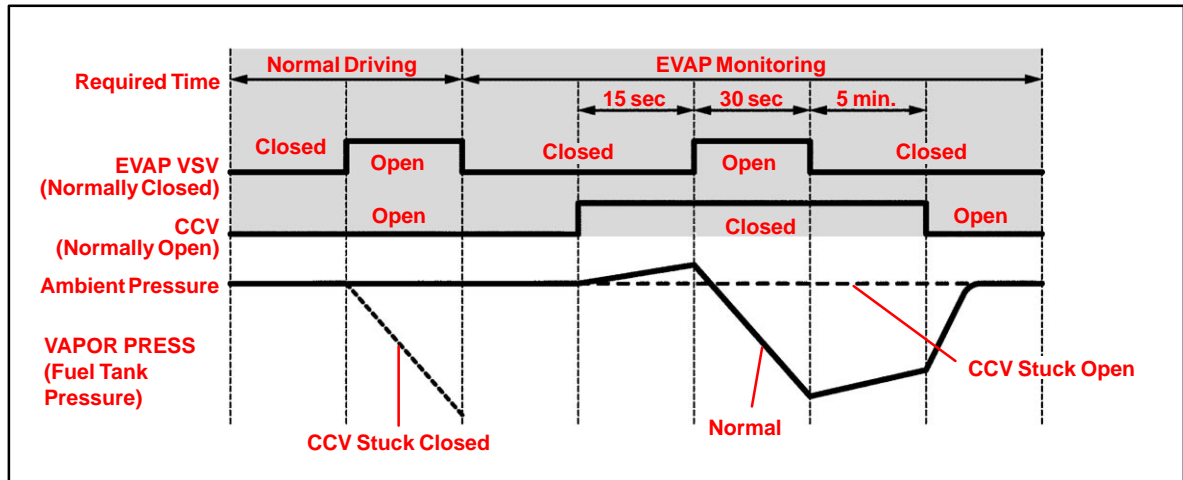
A leak in the EVAP system prompts the ECM (PCM) to set DTC P0442, P0455 or P0456. The ECM (PCM) checks if the EVAP has leaks. First, the ECM (PCM) opens the EVAP VSV while the CCV is closed. After a sufficient amount of time has passed, a high negative pressure (vacuum) will develop in the fuel tank as air is drawn into the intake manifold. The EVAP VSV is then closed. The ECM (PCM) then monitors the pressure increase (loss of vacuum) in the fuel tank. If the pressure rises beyond a specified amount, the ECM (PCM) determines that the system has a leak, turns on the MIL and outputs a DTC.

The ECM (PCM) has separate DTCs for small and large leaks:

1. DTC P0442 is set when the internal fuel tank pressure has a large increase and the EVAP system has a small leak.
2. DTC P0455 is set when the EVAP system has a gross leak. The ECM (PCM) tries to create negative pressure (vacuum) in the fuel tank by opening the EVAP VSV while the CCV is closed. However, the fuel tank pressure does not decrease beyond a specified threshold (see section L: OBD II EVAP Monitor Specifications, page 39).
3. DTC P0456 is set when the internal fuel tank pressure increases slightly and the EVAP system has a very small leak.

**K. EVAP  
Monitor  
Description  
(Continued)**

**P0446 (CCV)**



The CCV is normally open. The CCV has the following uses:

1. Allows free flowing fresh air into the EVAP system while the EVAP VSV purges the evaporative emissions from the fuel tank into the intake manifold. The EVAP VSV draws fuel vapors from the fuel tank into the charcoal canister.
2. Relieves pressure inside the fuel tank when the pressure has suddenly risen.
3. Along with the EVAP VSV, creates negative pressure (vacuum) inside the fuel tank for leak testing diagnostics.

The ECM (PCM) checks if the CCV is “stuck closed.” The ECM (PCM) commands the CCV to open while the EVAP VSV is open. If high negative pressure (vacuum) develops in the fuel tank and stays for more than 4 seconds, the ECM (PCM) determines that the CCV remains closed despite the open command. The ECM (PCM) would then turn on the MIL and output a DTC. The engine coolant temperature is not related to the output of this DTC.

The ECM (PCM) also has a method for checking if the CCV is “stuck open.” The ECM (PCM) commands the CCV to close while the EVAP VSV is open. If a sufficient amount of negative pressure does not develop in the fuel tank, the ECM (PCM) determines that the CCV remains open despite the close command. The ECM (PCM) would then turn on the MIL and output a DTC.

**L. OBD II EVAP  
Monitor  
Specifications**

**Monitor Strategy**

Required Sensors/Components (Main)	EVAP VSV and CCV
Required Sensors/Components (Related)	Vapor Pressure Sensor, Mass Air Flow Meter, Intake Air Temperature Sensor, Engine Coolant Temperature Sensor, Vehicle Speed Sensor, Throttle Position Sensor
Frequency of Operation	Once per driving cycle
Duration	90 seconds
MIL Operation	None

**Typical Enabling Condition**

The monitor will not run if any of these DTCs are set	P0011, P0012, P0021, P0022 (VVT system) P0100, P0101, P0102, P0103 (Mass Air Flow Meter) P0115, P0116, P0117, P0118 (Engine Coolant Temperature Sensor) P0120, P0121, P0122, P0123, P0220, P0222, P0223 (Throttle Position Sensor) P0130, P0133, P0150, P0153, P2195, P2196, P2197, P2198 (Heated Oxygen Sensor) P0171, P0172, P0174, P0175 (Fuel Trim) P0300 – P0308 (Misfire) P0335 (Crankshaft Position Sensor) P0340 (Camshaft Position Sensor) P0451, P0452, P0453 (Vapor Pressure Sensor) P0500 (Vehicle Speed Sensor)
Altitude	Lower than 2,400 m (8,000 feet)
Battery voltage	11 V or higher
EVAP VSV and CCV	Not being operated by Diagnostic Tester Active Test
EVAP purge control	Executing
Time after engine start	5 seconds to 50 minutes
Either of the following conditions (a) or (b) is met	
(a) Vehicle condition	Cruising by steady speed (for 20 seconds or more)
(b) Vehicle condition	Stopping and engine idling (for 90 seconds or more)
Refuel	Not refueled with engine running
ECT at engine start & IAT at engine start	-7 to 11°C (-12.6 to 20°F)
ECT at engine start (P0456 monitor)	4.4 to 32°C (40 to 90°F)
ECT at engine start (except P0456 monitor)	4.4 to 35°C (40 to 95°F)
IAT at engine start (P0456 monitor)	4.4 to 32°C (40 to 90°F)
IAT at engine start (except P0456 monitor)	4.4 to 35°C (40 to 95°F)
IAT	10°C (50°F) or higher
Fuel Tank Pressure (FTP) before vacuum introduction	Minimum change
Fuel level	Less than 90 %

**L. OBD II EVAP  
Monitor  
Specifications  
(Continued)**

**Typical Malfunction Thresholds**

**P0441: EVAP VSV Stuck Closed**

Fuel Tank Pressure (FTP) change during Vacuum Introduction	Less than 5.25 mmHg (0.7 kPa) [Highlander (3MZ-FE), Sienna, 4Runner, Tundra] Less than 7 mmHg (0.93 kPa) [Camry and Solara]
--	--

**P0441: EVAP VSV Stuck Open**

Duration that the following condition is met:	4 seconds or more
Fuel Tank Pressure (FTP) before Vacuum Introduction	-10 mmHg (-1.33 kPa) or less

**P0442: EVAP 0.04 inch Leak**

All the following conditions are met:	
Fuel Tank Pressure (FTP) change for 5 seconds from -20 mmHg	More than 1.2 mmHg (0.16 kPa)
Fuel Tank Pressure (FTP) change for 5 seconds from -17 mmHg	More than 1.2 mmHg (0.16 kPa)
Minimum Fuel Tank Pressure (FTP) during Vacuum Introduction	Less than -18 mmHg (-2.4 kPa)

**P0446: CCV Stuck Closed**

Duration that the following conditions are met:	4 seconds or more
Accumulated EVAP purge volume	0.5 gram or more
Fuel Tank Pressure (FTP)	Less than -12.75 mmHg (-1.7 kPa)

**P0446: CCV Stuck Open**

EVAP VSV Stuck Closed	Detected
-----------------------	----------

**P0455: EVAP Gross Leak**

Fuel Tank Pressure (FTP) after Vacuum Introduction	More than -7 mmHg (-0.93 kPa)
--	-------------------------------

**P0456: EVAP 0.02 inch Leak**

Both of the following conditions are met:	
Fuel Tank Pressure (FTP) change for 5 seconds from -20 mmHg	More than 0.525 mmHg (0.07 kPa) [4Runner] More than 0.6 mmHg (0.08 kPa) [Others] More than 0.675 mmHg (0.09 kPa) [Sienna and Camry (2AZ-FE PZEV)]
Fuel Tank Pressure (FTP) change for 5 seconds from -17 mmHg	More than 0.525 mmHg (0.07 kPa) [4Runner] More than 0.6 mmHg (0.08 kPa) [Others] More than 0.675 mmHg (0.09 kPa) [Sienna and Camry (2AZ-FE PZEV)]

**L. OBD II EVAP  
Monitor  
Specifications**  
(Continued)

**Monitor Result (Mode 06 Data)**

The Monitor Result (Mode 06) allows the Diagnostic Tester and any other generic OBDII scan tool to display the test values that were used for the emission–related components malfunction judgment. The test values are stored when the monitor is finished and are cleared when the ignition switch is OFF.

- TID (Test Identification Data) is assigned to each emissions–related system.
- TLT (Test Limit Type):  
If TLT is 0, the component is malfunctioning when the test value is higher than the test limit.  
If TLT is 1, the component is malfunctioning when the test value is lower than the test limit.
- CID (Component Identification Data) is assigned to each test value.
- Unit Conversion is used to calculate the test value indicated on generic OBDII scan tools.

**Test Identification Data (TID) \$02**

TLT	CID	UNIT CONVERSION	DESCRIPTION OF TEST DATA	DESCRIPTION OF TEST LIMIT
1	\$01	Multiply by 0.183 [mmHg]	Test value of EVAP VSV stuck closed: Determined by fuel tank pressure change during vacuum introduction	Malfunction criterion
0	\$02	Multiply by 0.0655 [seconds]	Test value of EVAP VSV stuck open: Determined by abnormal state continuation time	
0	\$03	Multiply by 0.0655 [seconds]	Test value of canister closed valve (CCV): Determined by abnormal state continuation time	
0	\$04	Multiply by 0.0458 [mmHg]	Test value of 0.04 inch leak: Determined by fuel tank pressure change	
0	\$05	Multiply by 0.0458 [mmHg]	Test value of 0.02 inch leak: Determined by fuel tank pressure change	