CIRCUIT DESCRIPTION

The vapor pressure sensor, canister closed valve (CCV), and pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

DTCs P0441, P0446 and P2418 are recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when there is a malfunction in either the EVAP VSV, the pressure switching valve, or in the vapor pressure sensor itself.
CCV
Open
Closed

Pressure Switching Valve
Closed
Open

EVAP VSV
Closed

Gross Leak (P0455)

(ex. Fuel tank cap loose)
(ex. Disconnect of vacuum hose)

Cold Start
ECT/AT near same temp.

P0441, P0446, P0455, P2418
Negative Pressure Occurs

P0442, P0456
Tank & Canister Leak Check

P0446
CCV Testing

P0448
Pressure Switching Valve Testing

DTC Detecting Condition

Pressure in charcoal canister and fuel tank does not drop during purge control (2 trip detection logic)

During purge cut-off, pressure is very low compared with atmospheric pressure (2 trip detection logic)

No rise in the fuel tank pressure when commanding the CCV open after an EVAP leak test

A high negative pressure (vacuum) does not occur in the system when commanding the EVAP VSV open and CCV closed with the pressure switching valve open

No changing in the fuel tank pressure when commanding the pressure switching valve closed for the check after the EVAP leak test

A high negative pressure (vacuum) does not occur in the system when commanding the EVAP VSV open and CCV closed with the pressure switching valve open

Trouble Area

• Vacuum hose cracked, holed, blocked, damaged or disconnected (1), (2), (3), (4), (5), (6), (7), (8), (9) and (10) in Fig.1
• Fuel tank cap incorrectly installed
• Fuel tank cap cracked or damaged
• Open or short in vapor pressure sensor circuit
• Vapor pressure sensor
• Open or short in VSV circuit for EVAP
• EVAP VSV
• Open or short in VSV circuit for CCV
• CCV
• Open or short in VSV circuit for pressure switching valve
• Pressure switching valve
• Fuel tank cracked, holed or damaged
• Charcoal canister cracked, holed or damaged
• ECM

Typical DTC output of each trouble part

Trouble part

Small Leak

Medium Leak (ex: Vacuum hose loose)

Large Leak (ex: Fuel tank cap loose)

EVAP VSV

Open Malfunction

Close Malfunction

CCV

Open Malfunction

Close Malfunction

Pressure Switching Valve

Open Malfunction

Close Malfunction

Typical DTC output (**1)

P0442 and/or P0456

P0455

P0441, P0446, P0455 and P2418

P0441

P0441, P0446, P0455 and P2418

P0448

P2418

P2418
When EVAP VSV (Vapor to Inlet manifold) stuck closed is detected, the Pressure Switching Valve and EVAP VSV (Vapor to Inlet manifold) is closed. The ECM also closes the DTC flag.

DTC is set. ECM switches to a pressure switching valve is malfunctioning. The ECM will turn on the MIL and a DTC is set.

- The ECM detects a pressure switching valve. Stuck Open EVAP VSV (Vapor to Inlet manifold) closed. Switch the pressure switching valve (EVAP VSV) to a closed position by commanding the ECM to close the EVAP VSV (Vapor to Inlet manifold) to open. This condition of the EVAP VSV (Vapor to Inlet manifold) is detected. The ECM will turn on the MIL and a DTC is set.

- The ECM detects a pressure switching valve. Stuck Open EVAP VSV (Vapor to Inlet manifold) closed. Switch the pressure switching valve (EVAP VSV) to a closed position by commanding the ECM to close the EVAP VSV (Vapor to Inlet manifold) to open. This condition of the EVAP VSV (Vapor to Inlet manifold) is detected. The ECM will turn on the MIL and a DTC is set.

- ECM waits for the MIL and a DTC is set. The ECM follows the ECU diagnostics prior to closing the EVAP VSV (Vapor to Inlet manifold) to open. The ECM waits for the MIL and a DTC is set.

- ECM waits for the MIL and a DTC is set. The ECM follows the ECU diagnostics prior to closing the EVAP VSV (Vapor to Inlet manifold) to open. The ECM waits for the MIL and a DTC is set.
## MONITOR STRATEGY

<table>
<thead>
<tr>
<th>DTCs</th>
<th>P0441</th>
<th>EVAP VSV malfunction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P0446</td>
<td>Canister close valve stuck closed</td>
</tr>
<tr>
<td></td>
<td>P2418</td>
<td>Vapor pressure sensor</td>
</tr>
<tr>
<td>Related sensors/components</td>
<td>Pressure switching valve malfunction</td>
<td></td>
</tr>
<tr>
<td>Frequency of operation</td>
<td>Once per drive cycle</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>P0441: 99 sec.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P0445: 10 sec.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>P2418: 10 sec.</td>
<td></td>
</tr>
<tr>
<td>MIL operation</td>
<td>2 drive cycles</td>
<td></td>
</tr>
<tr>
<td>Sequence of operation</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

## TYPICAL ENABLING CONDITIONS

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>See &quot;List of disable a monitor&quot; (on page DI-337)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The same as that for DTC P0442</td>
<td></td>
</tr>
</tbody>
</table>

## TYPICAL MALFUNCTION THRESHOLDS

### P0441

<table>
<thead>
<tr>
<th>Detection Criteria</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>A or B</td>
<td></td>
</tr>
<tr>
<td>(a) and (b)</td>
<td></td>
</tr>
<tr>
<td>(a) Fuel tank pressure at the vacuum introduction start</td>
<td>$-1.6 \text{ kPa} \ (-12 \text{ mmHg}, -0.47 \text{ in. Hg})$ or more</td>
</tr>
<tr>
<td>(b) Difference between the fuel tank pressure at the vacuum introduction start and completion</td>
<td>Less than $0.9 \text{ kPa} \ (7 \text{ mmHg}, 0.27 \text{ in. Hg})$</td>
</tr>
<tr>
<td>(a) and (b)</td>
<td></td>
</tr>
<tr>
<td>(a) Difference between &quot;minimum&quot; fuel tank pressure before the leak check and the fuel tank pressure at 14 sec. after the leak check</td>
<td>$0.5 \text{ kPa} \ (3.5 \text{ mmHg}, 0.15 \text{ in. Hg})$ or more</td>
</tr>
<tr>
<td>(b) Fuel tank pressure at 14 sec. after the leak check</td>
<td>Less than $-3.7 \text{ kPa} \ (-28 \text{ mmHg}, -1.1 \text{ in. Hg})$</td>
</tr>
</tbody>
</table>

### P0446

<table>
<thead>
<tr>
<th>Detection Criteria</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1: CCV stuck closed</td>
<td>Not changing</td>
</tr>
<tr>
<td>Fuel tank pressure when the CCV is opened after an EVAP leak check</td>
<td>Not changing</td>
</tr>
<tr>
<td>Case 2: EVAP VSV stuck closed</td>
<td>Not changing</td>
</tr>
<tr>
<td>Fuel tank pressure after the EVAP VSV is opened and manifold vacuum is introduced to the fuel tank</td>
<td>Not changing</td>
</tr>
</tbody>
</table>
3. **INSPECT VSV**
   
   (a) Inspect the VSV for open circuit.
   
   Using an ohmmeter, check that there is continuity between the terminals.
   
   Resistance: 30 – 34 Ω at 20°C (68°F)
   
   If there is no continuity, replace the VSV.
   
   (b) Inspect the VSV for ground.
   
   Using an ohmmeter, check that there is no continuity between each terminal and the body.
   
   If there is continuity, replace the VSV.
   
   (c) Inspect the VSV operation.
   
   1. Check that air does not flow from ports E to F.
   
   2. Apply battery positive voltage across the terminals.
   
   3. Check that air flows from ports E to F.
   
   If operation is not as specified, replace the VSV.

4. **REINSTALL VSV**

5. **REINSTALL V–BANK COVER**
1. INSTALL V-BANK COVER

3. REPOSITION (see page SF-70)

5. INSTALL INTAKE AIR CONNECTOR Pipe

7. INSTALL FUEL FILTER ASSEMBLY (see page SF-10) 

9. INSTALL INLET ASSEMBLY (see page SF-09) 

11. INSTALL INTAKE Air CONNECTOR Pipe

Preparation:
(1) Check that all hoses from port E to the filter
(2) Using battery test voltmeter across the battery
(3) Inspect the VSA assembly
(4) Inspect the VSA for ground
(5) If there is no continuity, replace the VSA
(6) Inspect VSA

ASSEMBLY: 33 - 39 fl oz 20°C (68°F)

PROTECTION: 60°C (140°F)

USE ELECTRIC ENCLOSURE
(7) Inspect the VSA for air leakage
(8) Remove V-bank cover
(9) DISCONNECT INLET AIR CONNECTOR Pipe
(10) REMOVE UPPER AND LOWER INTAKE MANIFOLDS
(11) DISCONNECT THROTTLE BODY FROM INTAKE

2007/04/17
VSV FOR CANISTER CLOSED VALVE (CCV)

COMPONENTS

V-Bank Cover

VSV for Canister Closed Valve (CCV)
REINSTALL CHARCOAL CANISTER ASSEMBLY

1. REMOVE VSV

2. Disconnect Charcoal Canister Assembly

3. Apply battery positive voltage across the terminals (2)

4. Reconnect the VSV.

5. Reorient the VSV, if necessary, to ensure airflow from points E to G.

6. Inspect the VSV.

If there is continuity, replace the VSV.

If there is no continuity, replace the VSV.

Precaution: 50°F to 20°C (90°F to 68°F) within the emission control system.

WARNING: Check that there is no continuity.

7. Remove the VSV from the body.

8. Disconnect Charcoal Canister Assembly.

9. Reinstall the VSV on the circuit.
1. Apply battery voltage across the terminals.
2. INSPECT VSV/REINSTALL VSV.
   (a) Check that air flows with difficulty from port B to A.
   (b) Check that air flows from port B to A.
   (c) Inspect the VSV operation.
   (d) Inspect the VSV for ground.
   (e) Check that there is no continuity between each terminal.
   (f) Check that there is no continuity between each terminal.
   (g) Using an ohmmeter, check that there is continuity between terminals.
   (h) Resistance: 20.0 Ω at 20°C (68°F)

2007/04/17