


## Fuel System

### Special Tool(s)

	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS)  software with appropriate hardware, or equivalent scan tool
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### Principles of Operation

**NOTE:** The following procedure diagnoses a slow-to-fill concern only. For all other concerns, refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.

The fuel tank filler pipe assembly is used to refuel the vehicle. The fuel tank inlet check valve prevents spitback of fuel during and after refueling. The fuel tank stores the fuel. The fuel tank contains a Fuel Pump (FP) module. The **FP** module consists of a fuel level sender and a **FP**. The fuel level sender sends a signal to the fuel gauge informing the driver of how much fuel is in the fuel tank. The **FP** provides fuel to the fuel tubes which supply the fuel rail.

During refueling, the fuel tank vents to the atmosphere through the vent and filler pipes, on vehicles without On-Board Refueling Vapor Recovery (ORVR) systems. In vehicles equipped with **ORVR**, the fuel tank and filler pipe are designed so that when the vehicle is being refueled, fuel vapors in the fuel tank travel to the Evaporative Emission (EVAP) canister, which absorbs the fuel vapors and vents the pressure from the fuel tank during refueling.

### Inspection and Verification



**WARNING:** Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.



**WARNING:** Do not carry personal electronic devices such as cell phones, pagers or audio equipment of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.



**WARNING:** When handling fuel, always observe fuel handling precautions and be prepared in the event of fuel spillage. Spilled fuel may be ignited by hot vehicle components or other ignition sources. Failure to follow these instructions may result in serious personal injury.



**WARNING:** Always disconnect the battery ground cable at the battery when working on an evaporative emission (EVAP) system or fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

**NOTE:** Do not use incandescent lights when inspecting the fuel system. Use only fluorescent or LED lighting.

1. Verify the customer concern by refueling the vehicle and observe the fuel fill rate.

- Inspect to determine if any of the following mechanical concerns apply.

### Visual Inspection Chart

Mechanical
<ul style="list-style-type: none"> <li>● Bent, kinked or damaged fuel tank filler pipe</li> <li>● Bent, kinked or damaged fuel tank filler pipe vent tube (if equipped)</li> <li>● Incorrect routing of the fuel tank filler pipe</li> <li>● Incorrect routing of the fuel tank filler pipe vent tube (if equipped)</li> <li>● Incorrect position of fuel tank filler pipe clamps</li> <li>● Incorrect position of fuel tank filler pipe vent tube clamps (if equipped)</li> <li>● Fuel tank mounted vapor tubes bent or damaged</li> <li>● Evaporative Emission (EVAP) system tubes or hoses bent or damaged</li> <li>● Accident damage to the fuel tank</li> <li>● Accident damage to the vehicle affecting the fuel tank filler pipe-to-body connection</li> <li>● Unauthorized modifications and/or alterations to the vehicle</li> <li>● <a href="#">EVAP</a> system fresh air hose plugged (dirt, spider webbing)</li> </ul>

- If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step.

- NOTE:** Make sure to use the latest scan tool software release.

If the cause is not visually evident, connect the scan tool to the Data Link Connector (DLC).

- NOTE:** The Vehicle Communication Module (VCM) LED prove out confirms power and ground from the [DLC](#) are provided to the [VCM](#).

If the scan tool does not communicate with the [VCM](#):

- check the [VCM](#) connection to the vehicle.
- check the scan tool connection to the [VCM](#).
- refer to [Section 418-00](#), No Power To The Scan Tool, to diagnose no power to the scan tool.

- If the scan tool does not communicate with the vehicle:
  - verify the ignition key is in the ON position.
  - verify the scan tool operation with a known good vehicle.
  - refer to [Section 418-00](#) to diagnose no response from the PCM.
- Carry out the network test.
  - If the scan tool responds with no communication for one or more modules, refer to [Section 418-00](#).
  - If the network test passes, retrieve and record Continuous Memory Diagnostic Trouble Codes (CMDTCs).
- Clear the continuous DTCs and carry out the self-test diagnostics for the [EVAP](#) system using the scan tool.
- If the DTCs retrieved are related to the concern, go to Evaporative Emission (EVAP) System DTC Chart. For PCM-related DTCs, refer to the Powertrain Control/Emissions Diagnosis (PC/ED) manual. For all other DTCs, refer to [Section 419-10](#).
- If no DTCs related to the concern are retrieved, GO to [Symptom Chart](#).

### DTC Chart

#### Evaporative Emission (EVAP) System DTC Chart

DTC	Description	Action

P0446	Evaporative Emission System Vent Control Circuit	<a href="#">GO to Pinpoint Test A .</a>
P0451	Evaporative Emission System Pressure Sensor/Switch Range/Performance	<a href="#">GO to Pinpoint Test A .</a>
P0452	Evaporative Emission System Pressure Sensor/Switch Low	<a href="#">GO to Pinpoint Test A .</a>
P0453	Evaporative Emission System Pressure Sensor/Switch High	<a href="#">GO to Pinpoint Test A .</a>
P0454	Evaporative Emission System Pressure Sensor/Switch Intermittent	<a href="#">GO to Pinpoint Test A .</a>
P1450	Unable to Bleed up Fuel Tank Vacuum	<a href="#">GO to Pinpoint Test A .</a>
P1451	Evaporative Emission System Vent Control Circuit	<a href="#">GO to Pinpoint Test A .</a>
P260F	Emission System Monitoring Processor Performance	<a href="#">GO to Pinpoint Test A .</a>

## Symptom Chart

### Symptom Chart

Condition	Possible Sources	Action
<ul style="list-style-type: none"> <li>Slow to fill</li> </ul>	<ul style="list-style-type: none"> <li>Fuel tank filler pipe</li> <li>Fuel tank filler pipe vent tube, if equipped</li> <li>Evaporative Emission (EVAP) system</li> <li>Fuel tank inlet check valve (part of the fuel tank)</li> <li>Fuel level vent valve, if equipped (part of the Fuel Pump (FP) module)</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">GO to Pinpoint Test A .</a></li> </ul>
<ul style="list-style-type: none"> <li>All other fuel system concerns</li> </ul>	<ul style="list-style-type: none"> <li>Fuel system components</li> </ul>	<ul style="list-style-type: none"> <li>REFER to the Powertrain Control/Emissions Diagnosis (PC/ED) manual.</li> </ul>

## Pinpoint Test

### Pinpoint Test A: Slow to Fill

#### Normal Operation

Under normal operation, fuel should flow at a steady rate through the fuel tank filler pipe into the fuel tank. As fuel enters the fuel tank, air is vented through the filler pipe or the On-Board Refueling Vapor Recovery (ORVR) system.

#### This pinpoint test is intended to diagnose the following:

- Fuel tank filler pipe vent tube, if equipped
- Fuel tank filler pipe
- Evaporative Emission (EVAP) system
- Fuel tank inlet check valve (part of the fuel tank)
- Fuel level vent valve, if equipped

### PINPOINT TEST A: SLOW TO FILL

Test Step	Result / Action to Take
A1 CARRY OUT INSPECTION AND VERIFICATION	

<ul style="list-style-type: none"> <li>Carry out Inspection and Verification.</li> <li><b>Was the cause of the concern found?</b></li> </ul>	<p><b>Yes</b> REPAIR or INSTALL new components to correct the concern.</p> <p><b>No</b> GO to <a href="#">A2</a>.</p>
<p><b>A2 CHECK THE SYSTEM FOR ANY <a href="#">EVAP</a> DTCs</b></p>	<p><b>Yes</b> REFER to Powertrain Control/Emissions Diagnosis (PC/ED) manual to diagnosis the <a href="#">EVAP</a> system.</p> <p><b>No</b> GO to <a href="#">A3</a>.</p>
<ul style="list-style-type: none"> <li>Connect the scan tool.</li> <li>Check the system for any of the following <a href="#">EVAP</a> DTCs: P0446, P0451, P0452, P0453, P0454, P1450, P1451 and P260F.</li> <li><b>Are any of these DTCs present?</b></li> </ul>	
<p><b>A3 MONITOR THE <a href="#">FTP</a> WHILE FILLING THE FUEL TANK</b></p>	<p><b>Yes</b> GO to <a href="#">A5</a>.</p> <p><b>No</b> GO to <a href="#">A4</a>.</p>
<ul style="list-style-type: none"> <li>Monitor the Fuel Tank Pressure (FTP) reference value while filling the fuel tank. Refer to the Reference Values in the Powertrain Control/Emissions Diagnosis (PC/ED) manual.</li> <li><b>Is <a href="#">FTP</a> within specification?</b></li> </ul>	
<p><b>A4 MONITOR THE <a href="#">FTP</a> WHILE FILLING THE FUEL TANK WITH THE <a href="#">EVAP</a> SYSTEM DISCONNECTED</b></p>	<p><b>Yes</b> INSPECT the <a href="#">EVAP</a> system for blockage or restrictions. REPAIR the blockage or restriction. If the blockage or restriction cannot be repaired, INSTALL new <a href="#">EVAP</a> system components.</p> <p><b>No</b> GO to <a href="#">A5</a>.</p>
<ul style="list-style-type: none"> <li>Disconnect the fuel tank-to- <a href="#">EVAP</a> canister quick connect coupling at the <a href="#">EVAP</a> canister.</li> <li>Monitor the <a href="#">FTP</a> reference value while filling the fuel tank. Refer to Powertrain Control/Emissions Diagnosis (PC/ED) manual.</li> <li><b>Is <a href="#">FTP</a> within specification?</b></li> </ul>	
<p><b>A5 CHECK THE FUEL TANK FILLER PIPE ASSEMBLY FOR BLOCKAGE OR RESTRICTION</b></p>	<p><b>Yes</b> If possible, REPAIR the blockage or restriction. If the blockage or restriction cannot be repaired, INSTALL a new fuel tank filler pipe or fuel tank filler pipe vent tube.</p> <p><b>No</b> GO to <a href="#">A6</a>.</p>
<ul style="list-style-type: none"> <li>Remove the fuel tank filler pipe assembly. Refer to <a href="#">Section 310-01</a>.</li> <li>Inspect the fuel tank filler pipe and fuel tank filler pipe vent tube (if equipped) for a blockage or restriction.</li> <li><b>Is the fuel tank filler pipe or fuel tank filler pipe vent tube (if equipped) blocked or restricted?</b></li> </ul>	
<p><b>A6 CHECK THE FUEL TANK INLET CHECK VALVE</b></p>	<p><b>Yes</b> If possible, REPAIR the restrictions. If the restriction cannot be repaired, INSTALL a new fuel tank. REFER to <a href="#">Section 310-01</a>.</p> <p><b>No</b> GO to <a href="#">A7</a>.</p>
<ul style="list-style-type: none"> <li>Inspect the fuel tank inlet check valve for restriction or sticking.</li> <li><b>Is the fuel tank inlet check valve restricted or sticking?</b></li> </ul>	
<p><b>A7 CHECK TO MAKE SURE THAT THE FUEL LEVEL VENT VALVE IS FUNCTIONING CORRECTLY</b></p>	<p><b>Yes</b> Fuel level vent valve is OK. RETEST the system for normal operation.</p> <p><b>No</b> INSTALL a new <a href="#">FP</a> module. REFER to <a href="#">Section 310-01</a>.</p>
<ul style="list-style-type: none"> <li><b>NOTE:</b> The fuel level vent valve, if equipped, is part of the <a href="#">FP</a> module.</li> <li>Remove the <a href="#">FP</a> module. Refer to <a href="#">Section 310-01</a>.</li> <li>Inspect the fuel level vent valve for foreign material at the bottom drain hole.</li> <li>Invert the <a href="#">FP</a>. Watch for a movement and a click noise.</li> </ul>	

• Was a movement/click noise witnessed?

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