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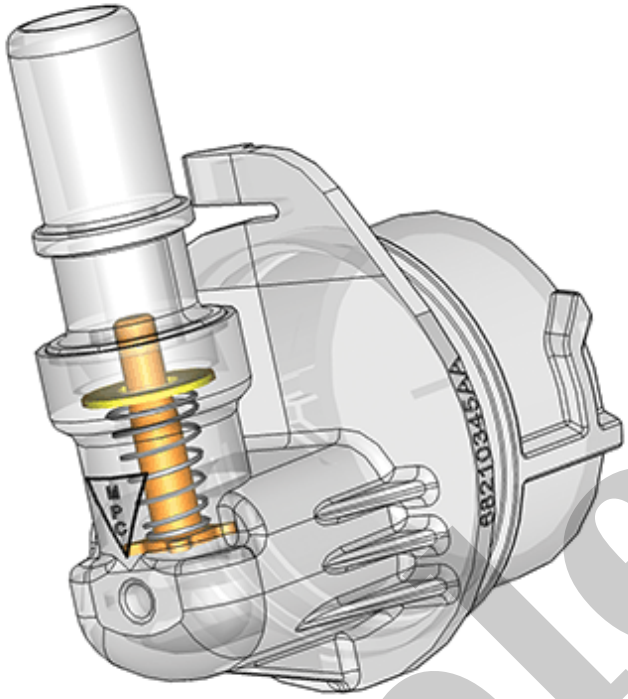
2013 JEEP Wrangler Unlimited OEM Service and Repair Workshop Manual

Go to manual page



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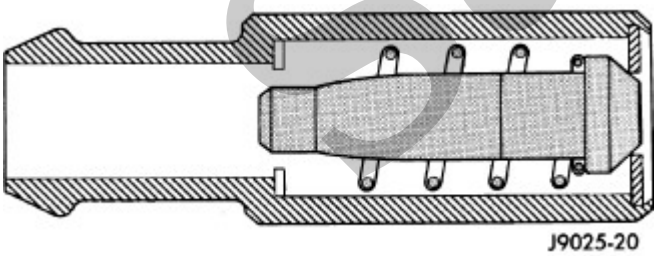
The PCV Valve contains a spring loaded plunger. The plunger meters the amount of crankcase vapors routed into the combustion chamber based on intake manifold vacuum.

NOTE

Shown below are the typical views of the PCV Valve operation.

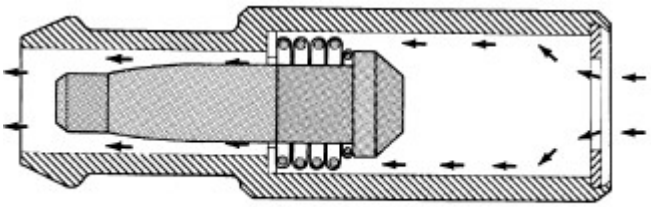
Engine Off or Engine Backfire No Vapor Flow



J9025-20

When the engine is not operating or during an engine backfire, the spring forces the plunger back against the seat. This prevents vapors from flowing through the valve.

High Intake Manifold Vacuum Minimal Vapor Flow



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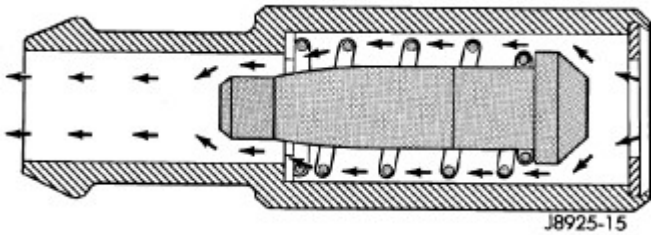
When the engine is at idle or cruising, high manifold vacuum is present. At these times manifold vacuum is able to completely compress the spring and pull the plunger to the top of the valve. In this position there is minimal vapor flow through the valve.

Moderate Intake Manifold Vacuum Maximum Vapor Flow



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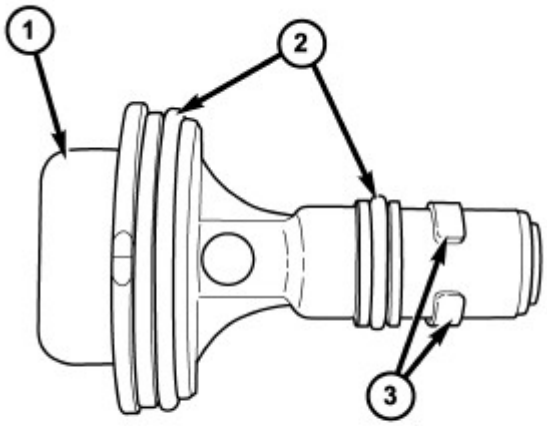
During periods of moderate intake manifold vacuum the plunger is only pulled part way back from the inlet. This results in maximum vapor flow through the valve.



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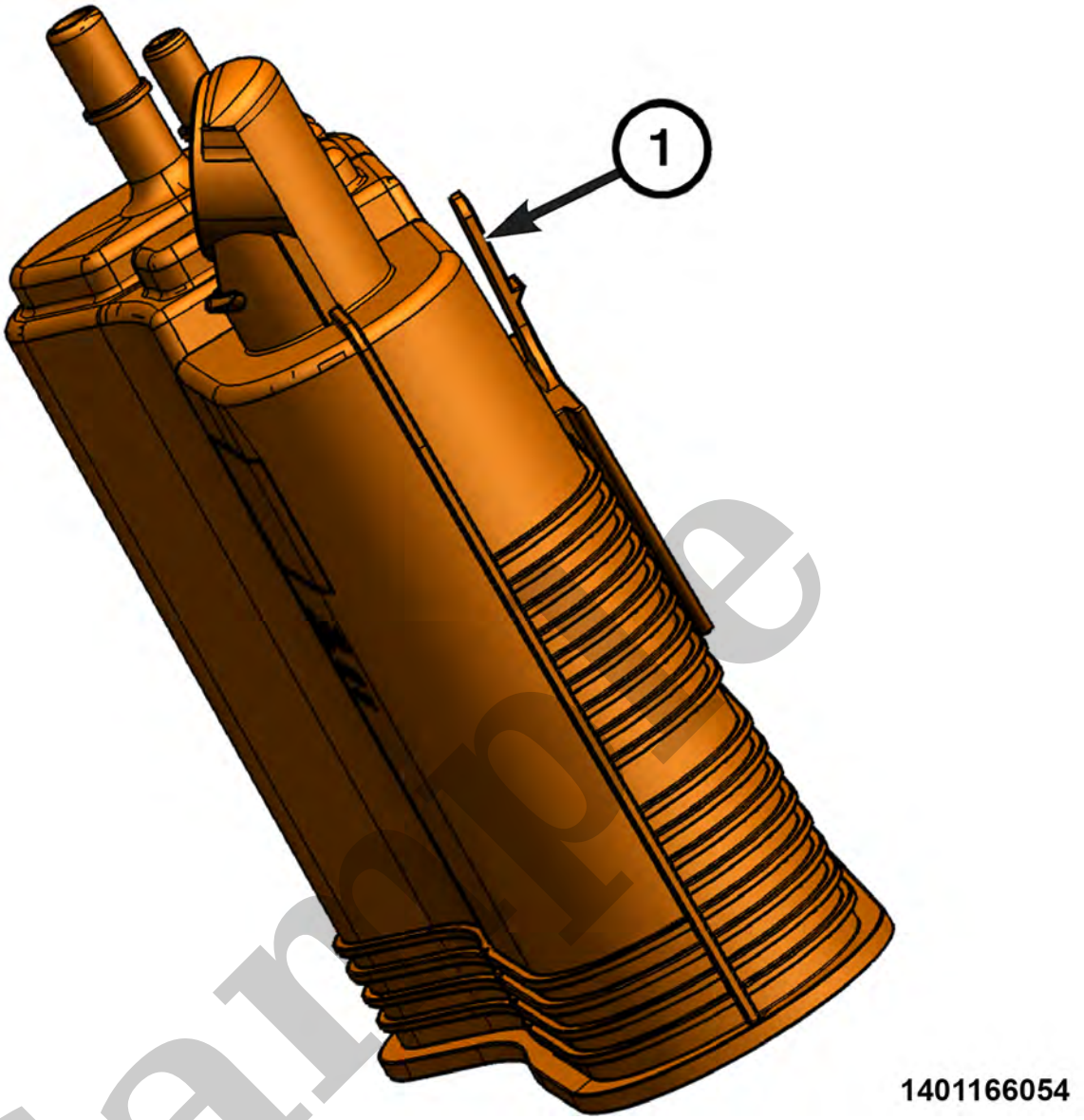
1 - PCV Valve
2 - PCV Valve O-rings
3 - Locating Tabs

3. Rotate PCV valve counterclockwise 90 degrees then pull up and remove the PCV valve from intake manifold.
4. Check the condition of the two PCV valve O-rings, replace if necessary.

INSTALLATION

Follow the removal procedure in reverse for general reassembly of the components on the vehicle. The steps listed below are calling out specific procedures that should be followed during installation.

- Clean the PCV valve mounting surface of the intake manifold opening.
- Lubricate the O-rings with clean engine oil.



1 - Retaining Bracket

6. Remove the vapor canister from the retaining bracket.
7. If required, remove the ESIM switch from the vapor canister (Refer to Emissions Control/Evaporative Emissions/SWITCH, Evaporative Emissions System Monitor/Removal and Installation).

INSTALLATION

Follow the removal procedure in reverse for general reassembly of the components on the vehicle.

Refer To List:

List 1

- 09 - Engine, 2.0L / Fuel System / Standard Procedure
- 09 - Engine, 3.6L / Fuel System / Standard Procedure

EVAP SYSTEM COMPONENTS	
4 - Charcoal Canister	14 - Multi-Function Control Valve (MFCV) in the Fuel Delivery Flange - Internal Tank Vents
5 - Canister Tube (Fuel Tank to Canister)	15 - Grade Vent Valve (GVV) Tube (GVV to MFCV)
6 - Purge Tube - Noise Muffler (Purge Solenoid to Canister)	16 - Grade Vent Valve (GVV) - Internal Tank Vents
7 - Purge Solenoid	17 - Fuel Tank
8 - Manifold Hose (Purge Solenoid to Engine Manifold)	18 - Inlet Check Valve (ICV)
9 - Recirculation Tube (Fuel Tank to FTP Sensor)	19 - Hose – Fuel Filler Tube to ICV
10 - Fuel Tank Pressure (FTP) Sensor	

FUNCTIONAL DESCRIPTION - CHARCOAL CANISTER

A maintenance free vapor canister is used on all vehicles. The Charcoal Canister is filled with granules of an activated carbon mixture. Fuel vapors entering the Charcoal Canister are absorbed by the charcoal filter until they can be drawn into the Intake Manifold during purging and burned by the engine.

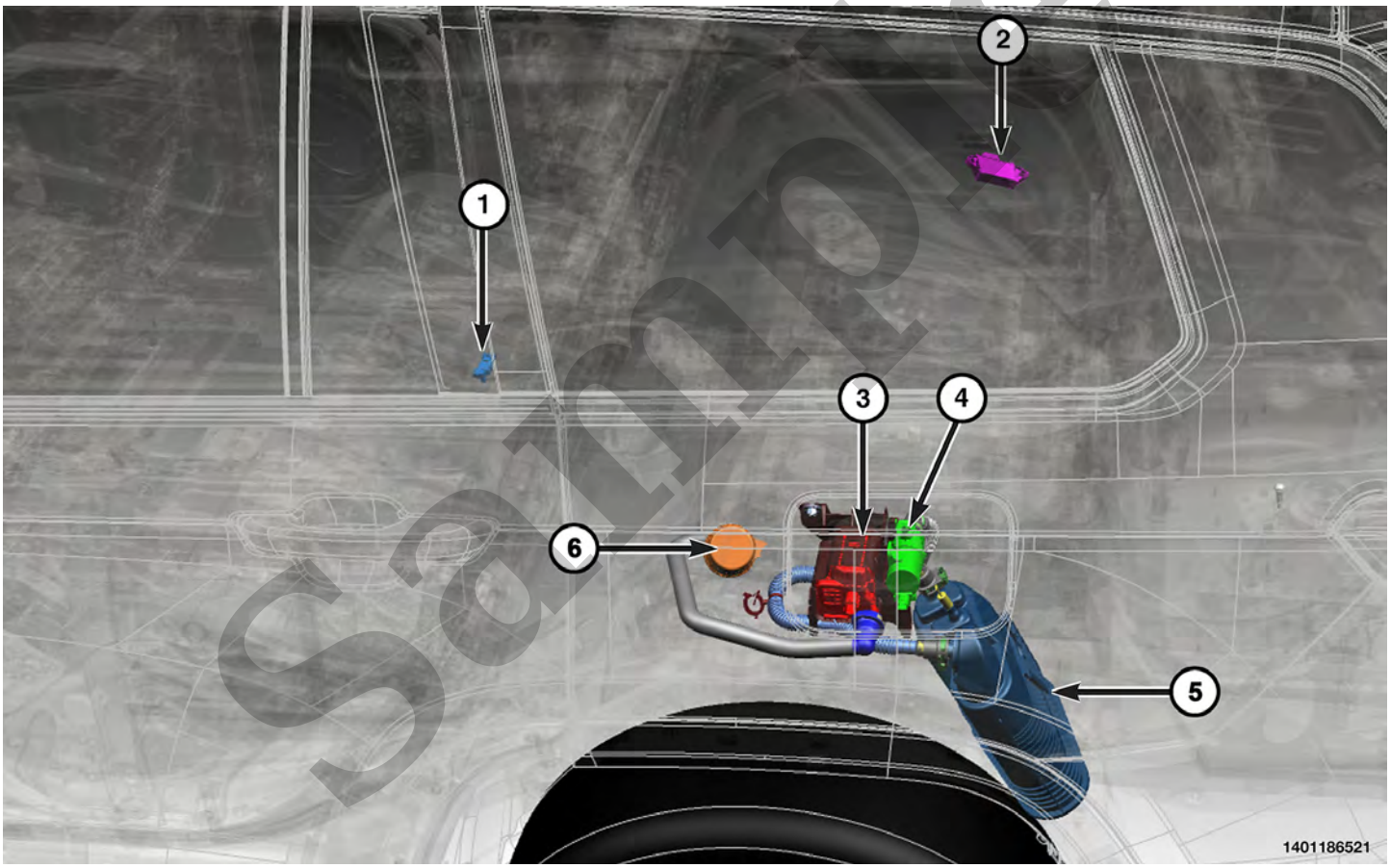
FUNCTIONAL DESCRIPTION - EVAPORATIVE SYSTEM INTEGRITY MODULE (ESIM) AND SWITCH

YOUR CURRENT VEHICLE

Evaporative Emissions

EVAPORATIVE EMISSIONS

DESCRIPTION



The Evaporative Emissions system consists of the following components:

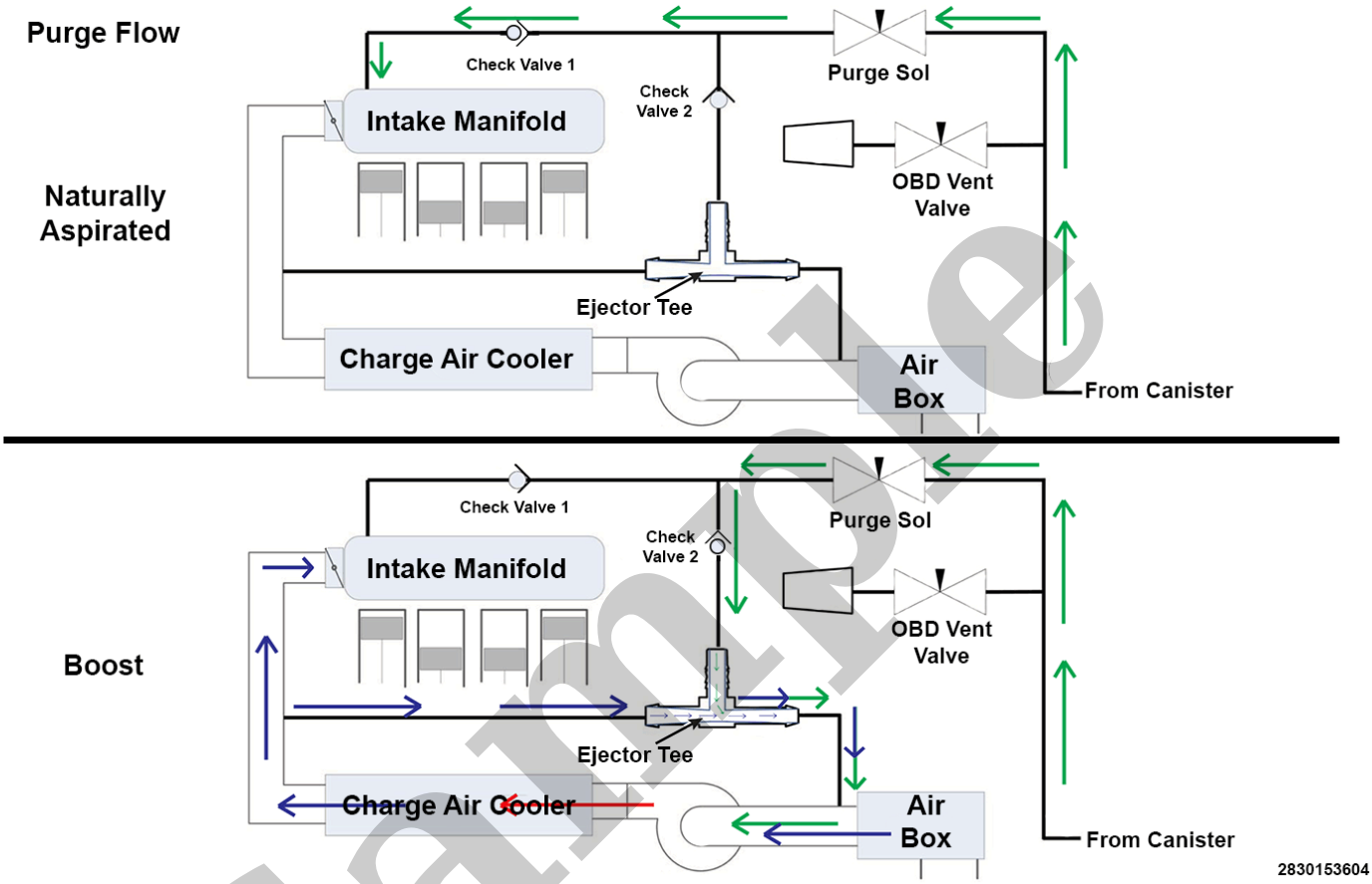
Component Index

1.	Fuel Tank Pressure (FTP) Sensor
2.	Fuel Control Module
3.	Evaporative Leak Check Module (ELCM)

FUNCTIONAL DESCRIPTION - CHARCOAL CANISTER

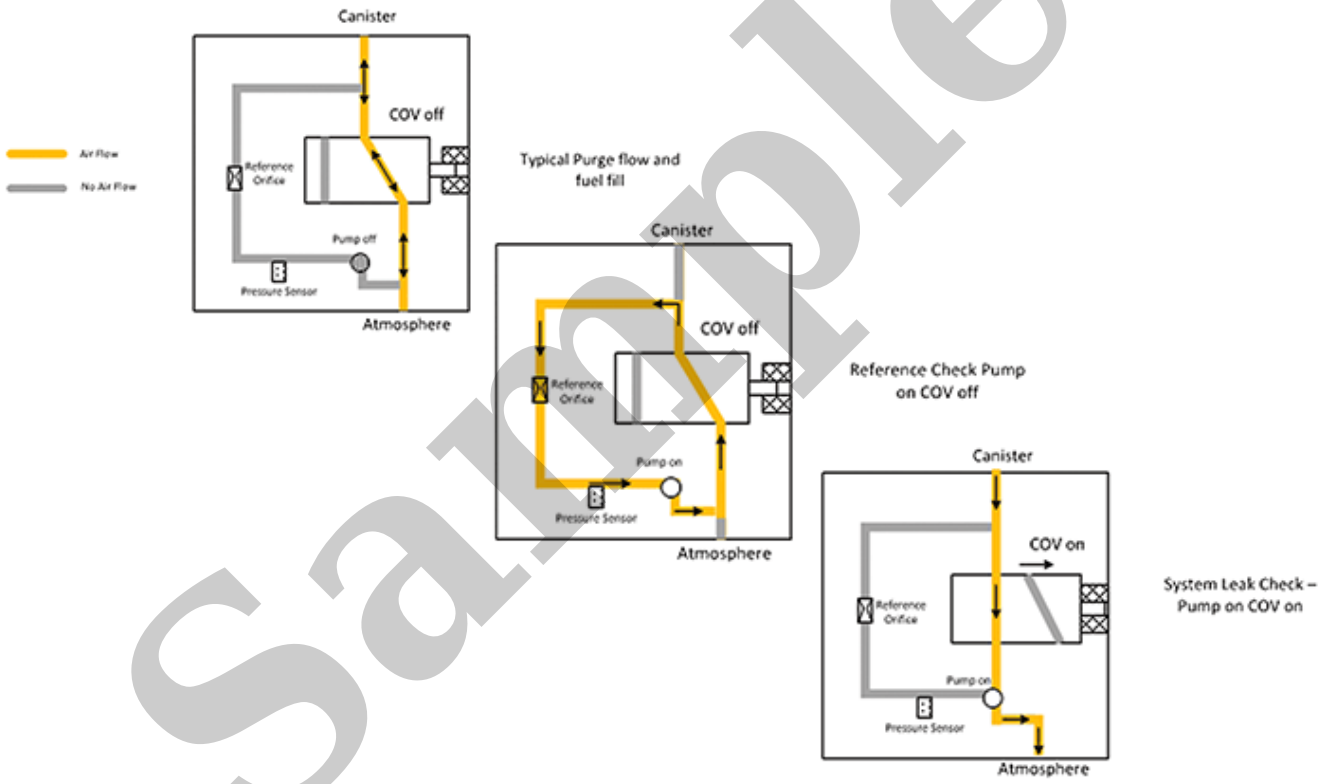
A maintenance free vapor canister is used on all vehicles. The Charcoal Canister is filled with granules of an activated carbon mixture. Fuel vapors entering the Charcoal Canister are absorbed by the charcoal filter until they can be drawn into the Intake Manifold during purging and burned by the engine.

FUNCTIONAL DESCRIPTION - EJECTOR TEE



operating properly. During purging the delta pressure change in the ELCM pressure sensor is monitored to make a pass/fail determination for the purge performance diagnostics.

- **Vacuum Pump** - Used during the engine off leak testing for the 0.020" reference check and to lower the system pressure to a vacuum for leak testing. The PCM controls the vacuum pump operation through a 12 volt high side driver control.
- **Change-Over Valve (Spring loaded, normally closed)** - Closes the system off and allows ambient air to be drawn through the 0.020" reference orifice and measured during the phase 1 reference orifice check to determine a pass/fail threshold. The change-over valve is energized during leak testing which closes off the passage to atmosphere and opens to the evaporative system for leak testing diagnostics to be performed (see figure below). The PCM controls the change-over valve operation through a low side driver control. The change-over valve is also closed during purge performance diagnostics on PHEV vehicles.



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Typical High Side Driver and Fault Detection: This type of driver circuit is generally used for relay control, controlling a solenoid or a similar type of driver device. The Powertrain Control Module (PCM) provides 12 volts to operate the device when switched on. The PCM also provides fault detection for the device, wiring and internal driver. In the example below, the PCM uses an internal pull up diagnostic resistor and calibrated voltage reference (V-Ref) as a comparator for fault detection.

- During a refueling event, after the Fuel Door Release Switch is pressed, the PCM monitors the fuel tank pressure using the FTPS reading. The FTIV Solenoid is energized (opened) if the fuel tank pressure is too high venting the excessive vapors to the Charcoal Canister. The FTPS reading is monitored to determine when to unlock the fuel door.
- During normal operation the FTPS is used to monitor fuel tank pressure to regulate against excessive pressure or vacuum build-up in the fuel tank.

FUNCTIONAL DESCRIPTION - FUEL DOOR RELEASE SWITCH

The **Fuel Door Release Switch** is hard-wired to the BCM and is the input that begins the refueling process. When the BCM receives a pressed signal from the switch it sends a wake up command to the Powertrain Control Module (PCM) along with a corresponding fuel refill bus message. The Fuel Door Release Switch signal is a 12.0 volt supply signal. The switch has two internal resistors and operates similar to a multiplex switch. The PCM determines any voltage reading above 3.0 volts (but less than the open circuit threshold) to be **not pressed** and any voltage reading under 2.0 volts (but not less than the circuit low threshold), to be **pressed** . A voltage reading between 2.0 volts and 3.0 volts is considered to be an irrational signal.

FUNCTIONAL DESCRIPTION - FUEL DOOR UNLOCK SOLENOID

During refueling, when the PCM determines that the fuel tank has been sufficiently depressurized the Fuel Door is unlocked using the **Fuel Door Unlock Solenoid** and refueling can begin. f there are no Fuel Door Unlock Solenoid faults present, the BCM supplies 12.0 volts to the **Fuel Door Unlock Solenoid** . The PCM controls the operation of the solenoid through a **Low Side Driver** . The PCM also monitors the Fuel Door position to determine if it is opened or closed. This is done by monitoring the status signal input from the **Fuel Door Position Switch** which is integrated with the Fuel Door Unlock Solenoid

FUNCTIONAL DESCRIPTION - PURGE SOLENOID