



## LPG Fuel System Diagnosis

### Fuel System Description

The Engine Control Module (ECM) receives information from various engine sensors in order to control the operation of the fuel control solenoid valves (FTV) and the low-pressure lock-off (LPL) solenoid. The LPL solenoids prevent fuel flow unless the engine is cranking or running. LPG is stored in the tank and delivered under pressure to the system as a liquid. During key on, the LPL receives a two (2) second prime pulse from the ECM which allows LPG to flow from the tank through fuel filter and fuel lines to the low pressure regulator (LPR) at pressures up to 312 psi.

In the (LPR) the fuel is vaporized and the pressure reduced in two stages. The first stage reduces the pressure to approximately 4.5 psi. The second stage reduces the pressure to approximately negative 1.5" of water column.

The fuel is then drawn from the secondary chamber of the LPR by the vacuum generated by air flowing through the mixer. This vacuum signal is also used to generate lift for the mixer air valve. This vacuum signal is most commonly referred to as air valve vacuum. In the mixer, the fuel mixes with the air entering the engine. This air/fuel mixture is then drawn into the engine for combustion.

### Diagnostic Aids

This procedure is intended to diagnose a vehicle operating on LPG. If the vehicle will not continue to run on LPG, refer to Hard Start for preliminary checks. Before proceeding with this procedure, verify that the vehicle has a sufficient quantity of fuel and that liquid fuel is being delivered to the LPR. Also, ensure that the manual shut off valve on the LPG tank is fully opened and that the excess flow valve has not been activated.

### Tools Required:

- 7/16 Open end wrench (for test port plugs)
- Straight Blade screw driver
- DVOM Fluke 88 or equivalent.

#### Duty Cycle Monitoring Tool

- Fuel System Analyzer (FSA), or DVOM Fluke 88 or equivalent.

#### Diagnostic Scan Tool

- Hand held PDA or equivalent.

#### Pressure Gauges

- Water Column Gauge / Manometer or equivalent.
- 0-10 PSI Gauge

### Test Description

The numbers below refer to step numbers on the diagnostic table.

5. This step will determine if the fuel control solenoid (FCS) and fuel supply system are functioning properly. The vacuum on the secondary test port will be approximately -1.0 “ to -2.0” w.c. If the vehicle has a hard start or poor idle, check for proper operation of the idle control solenoid (ICS).
6. This step checks the base mechanical LPR output pressure by disabling all fuel control devices.
9. This step checks for proper air valve operation.
19. This determines if fuel is available from the fuel tank supply system.

### LPG Fuel System Diagnosis

Step	Action	Value(s)	Yes	No
1	Were you referred to this procedure by a DTC diagnostic chart?	—	Go to <i>Step 3</i>	Go to <i>Step 2</i>
2	Perform the On Board Diagnostic (OBD) System Check.  Are any DTCs present in the ECM?	—	Go to the applicable DTC Table	Go to <i>Step 3</i>
3	Verify that the LPG fuel tank has a minimum of 1/4 tank of fuel, that the manual valve is open and the tank quick connect is fully engaged  Does the vehicle have fuel?	—	Go to <i>Step 4</i>	—
4	1. Connect a water column gauge or a manometer to the secondary test port of the low pressure regulator (LPR). 2. Start the engine and allow it to reach operating temperature.  Does the engine start and run?	—	Go to <i>Step 5</i>	Go to <i>Step 8</i>
5	With the engine idling, observe the pressure reading for the LPR secondary pressure.  Does the fuel pressure fluctuate rhythmically <b>OUTSIDE</b> the specified range?	-1.0” to -2.0” w.c.	Go to <i>Step 25</i>	Go to <i>Step 6</i>