



Poor Performance Fuel System Diagnostics

When a vehicle exhibits a poor performance condition, a dynamic fuel system diagnosis may be needed to determine if the fuel pump is capable of providing sufficient gasoline at the correct pressure. Improper fuel pressure or volume can cause many poor performance complaints.

Performing a dynamic test will provide the technician with the means to monitor fuel pressure and delivery to diagnose inadequate pressure and/or volume concerns. Most running tests consist of monitoring fuel pressure while the engine is idling with no load in neutral or park. There may be instances where deficiencies in fuel delivery will not surface when performing pressure testing without the engine being under load. For this reason, it may be necessary (if no problem is found during this no-load testing) to repeat the pressure testing while driving the vehicle under load.

WARNING: Gasoline vapors may be retained in a fuel pump after the gasoline is drained. Bench testing the fuel pump can be extremely hazardous and should not be attempted.

Poor Performance Test Procedure

This diagnostic procedure should be performed when there are performance-based driveability concerns that are not directly related to any specific Diagnostic Trouble Code (DTC). This diagnostic procedure should be performed if directed to do so by a particular test procedure or if no DTCs are stored in memory. If DTCs are present, those codes should be diagnosed first. Before beginning, ensure that the battery is fully charged (minimum of 12.6 volts DC) and the charging system is functioning properly.



Poor Performance Fuel System Diagnostics (cont.)

All steps are to be followed in the exact order as they are listed.

Step	Action	Yes	No
Tools Required: <ul style="list-style-type: none"> • Fuel Pressure Gauge • Appropriate Fuel Pressure Gauge Adapters • DMM • Handheld Vacuum Pump • Vacuum Gauge 			
1	<input type="checkbox"/> Disable the fuel pump electrical circuit. Crank the engine in an attempt to start the engine and to relieve residual pressure. If it starts, allow it to run until it stalls and attempt to restart the vehicle for several seconds to ensure that it will not start. NOTE: If removing a fuse, ensure the fuse does not power another system that may prevent the vehicle from starting.	Go to step 2.	-----
2	<input type="checkbox"/> Install a suitable Fuel Pressure Gauge using the appropriate adapters according to manufacturer's procedures. <input type="checkbox"/> "Tee" a Vacuum Gauge into the manifold vacuum source for the Fuel Pressure Regulator. Be sure to install the gauge as not to disable the vacuum to the Fuel Pressure Regulator. <input type="checkbox"/> Install the DMM in place of the Fuel Pump Fuse using appropriate terminal adapters as not to damage fuse block terminals. <input type="checkbox"/> Set up the DMM to read DC amperes on the 40-amp scale.	Go to step 3.	-----
3	<input type="checkbox"/> Start the vehicle and allow it to idle for 2 minutes to allow the Battery and Charging System to stabilize. <input type="checkbox"/> Note and record the manifold vacuum reading on the Vacuum Gauge. Manifold vacuum should be present. <input type="checkbox"/> Note and record the pressure reading on the Fuel Pump Gauge. <input type="checkbox"/> Note and record the amperage reading on the DMM. <input type="checkbox"/> Compare fuel pressure and fuel pump amperage readings to manufacturers specifications. If amperage specifications cannot be located, use Typical Fuel Pump Amperages table. Does the pressure and amperage readings meet specifications?	Go to step 4.	Go to Fuel Pressure/ Amperage Diagnostic Table
4	<input type="checkbox"/> Disconnect the vacuum line at the Fuel Pressure Regulator. <input type="checkbox"/> Visually inspect the vacuum port of the Fuel Pressure Regulator and the vacuum hose for the presence of raw gasoline. Is raw gasoline detected?	Fuel Pressure Regulator diaphragm ruptured. Replace Regulator and then go to step 3.	Go to step 4a.

Poor Performance Fuel System Diagnostics (cont.)

Step	Action	Yes	No				
4a	<ul style="list-style-type: none"> <input type="checkbox"/> With vacuum hose still removed from the Fuel Pressure Regulator, block it so that a vacuum leak is not created. Note the reading on the Fuel Pressure Gauge. <p style="text-align: center;">Did the fuel pressure increase 1 PSI for every 2 inHG of vacuum above the fuel pressure recorded in step 3?</p> <p>Examples: Engine Vacuum from step 3. Fuel Pressure Increases</p> <table style="margin-left: 40px; border: none;"> <tr> <td style="padding-right: 20px;">20 inHG↔</td> <td>10.0 PSI</td> </tr> <tr> <td>18 inHG↔</td> <td>9.0 PSI</td> </tr> </table>	20 inHG↔	10.0 PSI	18 inHG↔	9.0 PSI	Go to step 4b.	Fuel Pressure Regulator defective. Replace regulator and then go to step 3.
20 inHG↔	10.0 PSI						
18 inHG↔	9.0 PSI						
4b	<ul style="list-style-type: none"> <input type="checkbox"/> Install the hand vacuum pump on the Fuel Pressure Regulator Vacuum port. <input type="checkbox"/> Apply vacuum to the Fuel Pressure Regulator in 2 inHG increments. <input type="checkbox"/> Note the pressure drop on the Fuel Pressure Gauge at each 2 inHG interval. <p style="text-align: center;">Does fuel pressure drop 1 PSI for each 2 inHG increment?</p>	Go to step 5.	Fuel Pressure Regulator spring weak. Replace regulator and then go to step 3.				
5	<ul style="list-style-type: none"> <input type="checkbox"/> Turn ignition OFF to stop engine. <input type="checkbox"/> Observe fuel pressure for several minutes. The pressure may drop slightly and then stabilize. <p style="text-align: center;">Does fuel pressure hold steady for at least one minute after stabilizing?</p>	Go to step 6.	Go to step 5a.				
5a	<ul style="list-style-type: none"> <input type="checkbox"/> Block off the Fuel Pressure Regulator return line. <input type="checkbox"/> Turn ignition to ON without starting the engine. Wait 3 seconds and turn ignition OFF. Repeat until fuel pressure is at normal system pressure. <input type="checkbox"/> Observe fuel pressure for several minutes. <p style="text-align: center;">Does fuel pressure now hold steady for at least one minute after stabilizing?</p>	Fuel Pressure Regulator defective. Replace regulator and then go to step 3.	Test for external fuel leaks and leaking check valve in the fuel pump. Repair as needed. Go to step 3.				
6	<ul style="list-style-type: none"> <input type="checkbox"/> Disconnect the vacuum pump from the Fuel Pressure Regulator vacuum port. <input type="checkbox"/> Remove the vacuum gauge from the Fuel Pressure Regulator manifold vacuum source. <input type="checkbox"/> Reinstall vacuum line to the Fuel Pressure Regulator. <input type="checkbox"/> Bleed the pressure from the system using process used in step 1. <input type="checkbox"/> Open the fuel line and direct fuel flow into a graduated container capable of measuring more than one pint. <input type="checkbox"/> Energize the fuel pump and collect a sample for a specific period. <p style="text-align: center;">Does the flow match the manufacturer's specification (if available), or does a minimum of 16 ounces flow within 15 seconds?</p>	Fuel Pressure and Delivery OK at idle. If performance issues continue, perform a dynamic pressure test with the engine under load. Procedure complete.	Fuel Pump unable to displace proper volume of gasoline. Replace Fuel Pump and then go to step 3.				