

# SECTION 11

## Fuel Delivery Systems

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## Fuel Delivery Systems

### FUEL DELIVERY SYSTEM DIAGNOSTICS WITH MECHANICAL FUEL PUMP

**CAUTION: USE CARE TO PREVENT COMBUSTION FROM FUEL SPILLAGE**

DRIVEABILITY SYMPTOM MENU	
201	CRANKS NORMALLY BUT WON'T START
202	STARTS NORMALLY BUT WON'T RUN (STALLS)
203	CRANKS NORMALLY BUT SLOW TO START
205	MISSES UNDER LOAD
207	HESITATES OR STALLS ON ACCELERATION
208	BACKFIRE (INDUCTION OR EXHAUST)
209	LACK OF POWER
210	SURGES AT STEADY SPEED
220	GAS SMELL

#### Pre-checks

- Inspect all hoses, fuel lines & fuel tanks for deformities, kinks & leaks.
- Check fuel pump for fuel leaks.
- Check for adequate fuel supply in fuel tank.

## Fuel Delivery Systems

### INTEGRITY CHECK (MECHANICAL FUEL PUMPS)

TEST STEP		RESULT	ACTION TO TAKE
<b>FDM1</b>	<b>PRESSURE AND CAPACITY (VOLUME) TEST</b>		
	<ul style="list-style-type: none"> <li>● Check fuel pressure and capacity at the fuel filter inlet. Save ALL sample fuel for FDM3. Use a clear plastic container that is fuel resistant and a pressure gauge that reads a minimum of 10 psi and attached specifications. (Refer to Footnotes 2 and 3).</li> <li>● For 1.9L engines check fuel pump pushrod length specification (3.88 to 3.90 inches) prior to fuel pump replacement.</li> <li>● For 2.3L HSC engines check fuel pump pushrod length (2.45 to 2.47 inches) prior to fuel pump replacement.</li> </ul> <p>NOTE: For NO-START ENGINE CONDITION perform FDM1 at cranking speed. See 10 second cranking specifications for minimum pressure and volume.</p>	Pressure and volume NOT OK ▶  Pressure OK Volume not OK ▶  Pressure and volume OK ▶	GO to <b>FDM2</b> .  REPLACE fuel pump and REPEAT <b>FDM1</b> . If OK, GO to <b>FDM3</b> .  GO to <b>FDM3</b> .
<b>FDM2</b>	<b>AUXILIARY FUEL SUPPLY TEST</b>		
	<p>Use an AUXILIARY fuel container and repeat capacity (volume) check, FDM1. Use a container approved for fuel storage.</p> <p>A. For 1.9L engines check fuel pump pushrod length specification (3.88 to 3.90 inches) prior to fuel pump replacement.</p> <p>B. For 2.3L HSC engines check fuel pump pushrod length (2.45 to 2.47 inches) prior to fuel pump replacement.</p>	Volume OK ▶  Volume NOT OK ▶	GO to <b>FDM5</b> .  REPLACE fuel pump. GO to <b>FDM1</b> .
<b>FDM3</b>	<b>FUEL CONTAMINATION TEST</b>		
	Examine the sample fuel carefully (including the bottom of container) in a clear container for particles or other liquids contaminates, such as water.	NO contamination ▶  Contamination (any amount) FOUND ▶	GO to <b>FDM4</b> .  GO to <b>FDM6</b> .
<b>FDM4</b>	<b>FUEL FILTER TEST</b>		
	<ul style="list-style-type: none"> <li>● REPEAT pressure and capacity test AFTER the in-line fuel filter. If the fuel filter is integral to the carburetor, inspect the fuel filter for contamination. Tap filter (inlet side down) on a clean surface.</li> </ul>	Filter OK ▶  Filter clogged or contaminated ▶	Fuel delivery system OK.  REPLACE FUEL FILTER. GO to <b>FDM5</b> .
<b>FDM5</b>	<b>FUEL LINE TEST</b>		
	<p>Disconnect fuel line at fuel tank and fuel pump inlet.</p> <ul style="list-style-type: none"> <li>● Check fuel for restrictions by applying house air (not to exceed 20 to 25 psi).</li> <li>● Check for improper gas fill cap (vacuum/pressure) and fuel tank ventilation.</li> </ul>	Fuel line OK ▶  Fuel line NOT OK ▶	GO to <b>FDM6</b> .  SERVICE as required and GO to <b>FDM1</b> .

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## INTEGRITY CHECK (MECHANICAL FUEL PUMPS)

TEST STEP		RESULT	ACTION TO TAKE
<b>FDM6</b>	<b>FUEL TANK TEST</b>		
	<ul style="list-style-type: none"> <li>● Lower fuel tank and flush tank and fuel lines. Replace ALL fuel filters. Check sender unit filter.</li> </ul>	Fuel tank OK <span style="float: right;">▶</span>  Fuel tank NOT OK <span style="float: right;">▶</span>	GO to <b>FDM4</b> .  SERVICE as required and GO to <b>FDM4</b> .

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## SPECIFICATIONS (MECHANICAL FUEL PUMP SYSTEMS)

ENGINE	PRESSURE (psi) ① ② ⑤	MIN. VOLUME FLOW ① ③	NO START ENGINE CONDITION ONLY	
			10 SECOND CRANKING SPECS. FOR MIN. PRES. (psi) & VOL. (pt) ② ④	
2.0L	5.0-7.0	1 pt. in 25 sec.	5.0	0.25
1.9L-2V	4.5-6.5	1 pt. in 30 sec.	4.5	0.2
2.3L, OHC & HSC	5.0-7.0	1 pt. in 25 sec.	5.0	0.25
2.8L	4.5-6.5	1 pt. in 30 sec.	4.5	0.2
3.8L-2V	6.0-8.0	1 pt. in 20 sec.	6.0	0.3
4.9L	5.0-7.0	1 pt. in 20 sec.	5.0	0.2
5.0L	6.0-8.0	1 pt. in 20 sec.	6.0	0.3
5.8L	6.0-8.0	1 pt. in 20 sec.	6.0	0.3
7.5L	6.0-8.0	1 pt. in 20 sec.	6.0	0.3

### FOOTNOTES

- ① Engine at operating temperature, manual transmission in NEUTRAL, automatic transmission in PARK, parking brake engaged and engine at curb idle speed.
- ② Close off the fuel return line, if so equipped. Fuel return lines are found at the fuel pump fuel filter, carburetor or on the fuel flow sensor on vehicles equipped with tripminder.
- ③ Inside diameter of the smallest passage in the test equipment flow circuit must not be smaller than 0.220 inch.
- ④ A steady 10 seconds of cranking time required with a fully charged battery.
- ⑤ Before taking a pressure reading, operate the engine and purge the fuel system into the fuel pump tester container for approximately five seconds.

\*For additional information refer to Shop Manual Sections 24-30, 24-50 and 24-51.

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## Fuel Delivery Systems

### FUEL PRESSURE REGULATOR DIAGNOSTICS (EFI SYSTEMS)

TEST STEP		RESULT	ACTION TO TAKE
<b>FDE1</b>	<b>DE-PRESSURIZE SYSTEM</b>		
	<ul style="list-style-type: none"> <li>● Remove fuel tank cap.</li> <li>● Install tool T80L-9974-A or equivalent at the Schrader (fuel relief) Valve on the fuel rail.</li> <li>● Continue on to FDE2.</li> </ul>		
<b>FDE2</b>	<b>DIAPHRAGM INTEGRITY CHECK</b>		
	<ul style="list-style-type: none"> <li>● Start engine, run for 10 seconds.</li> <li>● Turn engine off for 10 seconds.</li> <li>● Repeat above Steps (This is to activate fuel pump and pressurize the fuel rail).</li> <li>● Remove vacuum line at the fuel pressure regulator valve.</li> <li>● Observe if fuel exits the regulator at the vacuum port.</li> </ul>	Yes <span style="float: right;">▶</span>  NO <span style="float: right;">▶</span>	REPLACE fuel pressure regulator. Check oil for fuel contamination. CHANGE oil and filter if signs of fuel are present (smell of fuel in oil or oil with water-like texture).  GO to FDE3.
<b>FDE3</b>	<b>PRESSURE CHECK-REGULATOR VALVE</b>		
	<ul style="list-style-type: none"> <li>● Reconnect vacuum line at fuel pressure regulator valve.</li> <li>● Start and run engine for 30 seconds.</li> <li>● Turn engine off.</li> <li>● Fuel pressure must not drop more than 34 kPa (5 psi) after 60 seconds.</li> </ul>	Within specification <span style="float: right;">▶</span> Not within specification <span style="float: right;">▶</span>	GO to FDE4.  CHECK for line leaks (both fuel and vacuum).
<b>FDE4</b>	<b>VALVE SEAT LEAKAGE CHECK</b>		
	<ul style="list-style-type: none"> <li>● Relieve pressure in fuel rail.</li> <li>● Remove fuel pressure regulator valve.</li> <li>● Inspect gasket and O-ring for cracks and cuts.</li> <li>● Connect vacuum gauge to the fuel return tube (7/32-inch diameter tube is centered on baseplate).</li> <li>● Apply 20 inches Hg. of vacuum.</li> <li>● Vacuum must not drop below 10 inches Hg. in 10 seconds.</li> </ul>	OK <span style="float: right;">▶</span>  Not OK <span style="float: right;">▶</span>	REINSTALL fuel pressure regulator. REFER to other drive/symptom problems (Section 2).  REPLACE fuel pressure regulator.

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