Countries:	CANADA, MEXICO, UNITED STATES	**Document ID**:	IK1500112
Availability:	ISIS, FleetISIS, NotSIR	**Revision**:	1
Major System:	Fuel system	**Created**:	9/11/2025
Current Language:	English	**Last Modified**:	12/12/2025
Other Languages:	NONE	**Author**:	Nick Zipadelli
Viewed:	175		

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Title: PSI 8.8L Propane (LPG) Fuel System Overview and Pressure Testing

Applies To: All PSI 8.8L LPG vehicles

Change Log

Please refer to the change log text box below for recent changes to this article:

12/12/2025 - Updated tooling with alternative part number.
11/19/2025 - Initial Article Release.

Attention

Only properly trained and LPG-certified personnel should perform work on PSI LPG fuel systems. Dealer-approved essential PSI LPG tools must be used when servicing LPG vehicles. Failure to follow these guidelines may result in serious injury, death, or damage to the fuel systems.

Description

This article will guide the reader through steps to help gain a general understanding of the LPG Gen 1 and Gen 2 fuel supply systems, as well as proper fuel system checks to obtain boost pressure.

Symptoms

Diagnostic Trouble Codes & Dashboard Indicator Lights:

DTC/Light	Description
Wait-to-start light	The Wait-To-Start light may stay on when the purge cycle is not completed.

Customer Observations or Concerns:

- Wait-to-start light will not turn off.

Special Tools / Software

Tool Description	Tool Number	Comments
Fuel Pressure Gauge	15-127-02	Liquid-filled pressure gauge (connect to Schrader valve)
Pressure Gauge	15-132-01-36	Connect to the 80 percent level spit valve
Alternative Dual Combination Gauge	Z108273	Please note that this gauge must be obtained directly from PSI, as it is not available through standard parts channels

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WARNINGS

WARNING! To prevent property damage, personal injury, and / or death, park vehicle on a hard, flat surface, turn the engine off, set the parking brake, and install wheel chocks to prevent the vehicle from moving in either direction.

WARNING! To prevent property damage, personal injury, and / or death, if the vehicle must be raised, do not work under the vehicle supported only by jacks. Jacks can slip or fall over.

WARNING! To prevent personal injury and / or death, always wear safe eye protection when performing vehicle maintenance.

WARNING! To prevent property damage, personal injury, and / or death, keep flames or sparks away from vehicle and do not smoke while servicing the vehicle's batteries. Batteries expel explosive gases.

WARNING! To prevent property damage, personal injury, and / or death, remove the ground cable from the negative terminal of the battery box before disconnecting any electrical components. Always connect the ground cable last.

WARNINGS:

- **Skin contact with propane may result in frostbite, since propane boils at -44°F (-42°C).**
- **Propane is heavier than air and will collect in low-lying areas.**
- **Inhaling a high concentration of propane vapors can displace oxygen in the lungs.**
- **Always contact the local Authority Having Jurisdiction (AHJ) for ventilation requirements.**
  - **The AHJ is the organization, office, or individual responsible for enforcing the requirements of the code.**

Fuel System Overview:

Purge Cycle Overview - PSI 8.8L LPG Fuel System :

- The PSI 8.8L LPG fuel system utilizes liquid propane injection and does not operate on propane vapor. Therefore, all propane vapor must be purged from the fuel lines before the system can function properly.
  - **NOTE: If the purge cycle does not complete properly on a Generation 2 vehicle, the ECM cuts the fuel pulses to the injectors to prevent potential damage.**
- During the purge cycle, the "Wait-to-start" lamp remains illuminated to inform the operator that the fuel system is currently purging vapor from the lines.

🔄 **Purge Cycle Operation** 🔄**:**

- The purge cycle is controlled by both the ECM (Engine Control Module) and the BCM (Body Control Module).
  - The BCM manages the "Wait-to-Start" indicator and prevents the engine from cranking by locking out the starter until the purge cycle is complete.
  - The ECM controls the following components:
    - Boost pump
    - Scavange pump
    - Return and supply lock-off valves
- It can be normal to hear clicking or chattering sounds from the lock-off valves during the purge cycle. This is typically caused by the ECM rapidly opening and closing the valves to accelerate fuel pressure buildup.

💡 **Purpose of the Purge Cycle** 💡**:**

- The purge cycle serves to:
  - Remove propane vapor from the fuel lines.
  - Deliver liquid propane to the fuel injectors.
  - Prime the fuel system before startup.
- The ECM monitors fuel pressure using:
  - The fuel pressure sensor at the LPDM (Applicable for Gen 1)
  - The fuel pressure sensor at the fuel distribution block (Applicable for Gen 2)
- Once a sufficient rise in fuel pressure is detected, the purge cycle is considered complete, and the engine will be allowed to start.

How to Obtain Boost Pressure:

- To properly obtain boost pressure, two measurements must be taken using two separate pressure gauges.
  - The first pressure reading should be taken at the Schrader valve located on the LPDM (Generation 1) or the fuel distribution block Schrader valve (Generation 2).
  - The second reading must be taken from the 80% level Spit valve on the LPG fuel tank.
- Boost pressure is calculated by subtracting static tank pressure from the liquid line pressure.

EXAMPLE:

If the static tank pressure is 100 PSI (measured at the 80% level spit valve), and the liquid line pressure is 150 PSI (measured at the Schrader Valve, either at the LPDM or the fuel distribution block), then the boost pressure is 50 PSI.

150 PSI (liquid line) – 100 PSI (tank) = 50 PSI boost pressure.

Specifications:

- **Gen 1 Boost Pressure Specification**
  - **45 PSI or more over static tank pressure KOER at idle.**
- **Gen 2 Boost Pressure Specification**
  - **50 PSI or more over static tank pressure KOER at idle.**

Considerations:

- **NOTE: LPG fuel tanks are only filled to 80% of their capacity. This allows room for fuel expansion and accounts for pressure fluctuations caused by changes in temperature.**
  - **The static pressure inside the fuel tank will vary based on ambient air temperature - as temperature increases, so does the static tank pressure.**
  - **NOTE: If the fuel system has been recently evacuated, it is essential to purge all nitrogen gas from the fuel tanks during the refilling process. Failure to perform this procedure may result in poor purging of the system or hard-starting conditions. The 80 percent liquid spit valve should remain open during the duration of filling the fuel tanks with propane.**

Characteristics of Propane:

- Propane is produced while processing natural gas or crude oil. In nature, propane exists as a gas.
- When cooled to -44°F (-42°C) or pressurized for storage, propane condenses into a liquid.
- Propane expands at a very high rate when it changes from a liquid to a vapor.
    - When heated above -44°F, 1 part-per-million of **liquid propane** will instantly expand to become 270 parts-per-million of **propane vapor**.
- Propane is normally colorless, odorless, and tasteless. A strong, unpleasant-smelling chemical is added to it to aid in detection. This results in propane smelling like rotten eggs, a skunk's spray, or a dead animal.

Diagnostic Steps

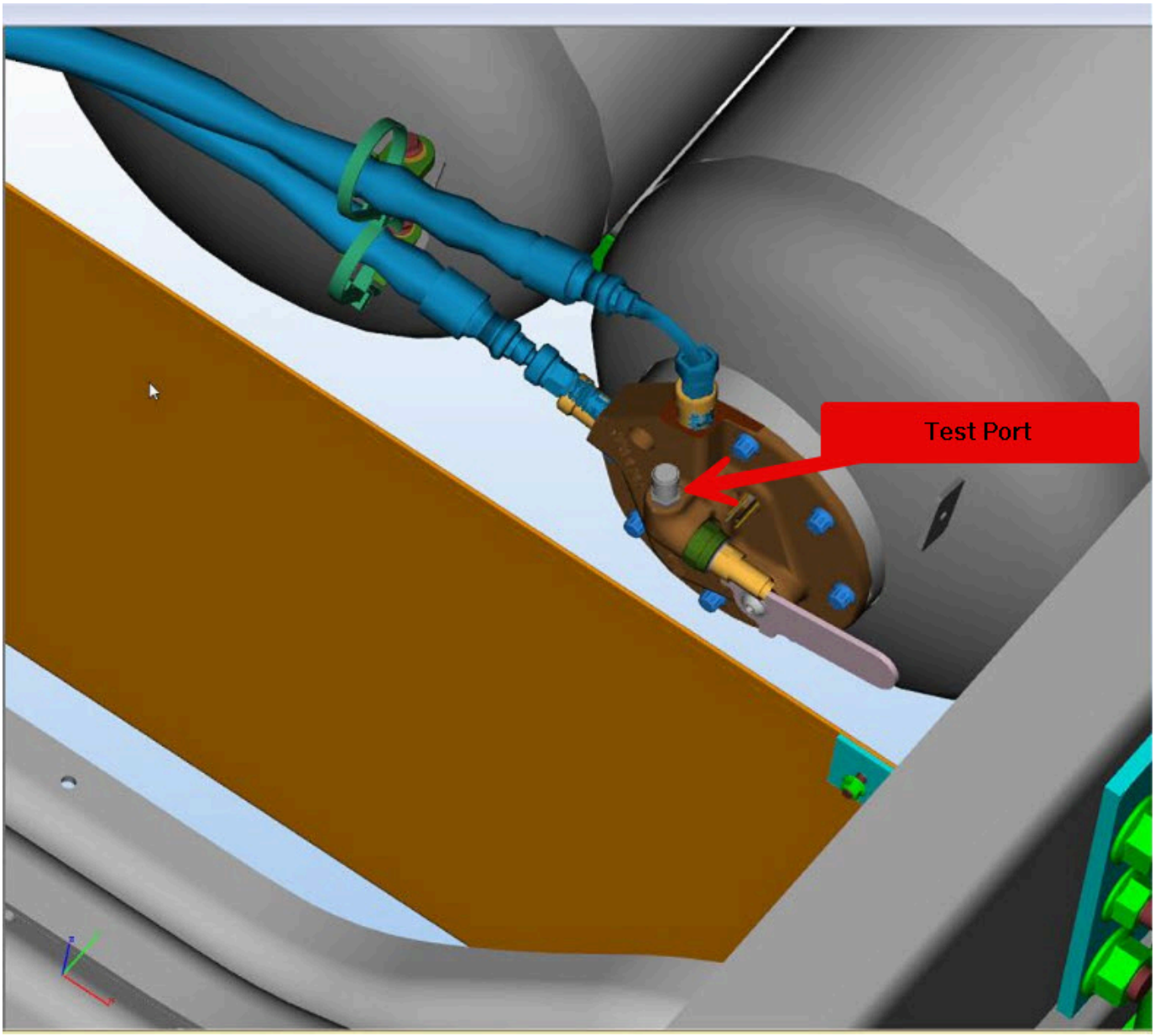
Step	Confirm Fuel Level	Decision
#1	**Check the mechanical fuel gauge located on the driver's side of the fuel tank. Reference Figure #1 below for an example.** Is the mechanical gauge above the 1/3rd mark, and below the full mark?	**Yes, the fuel level is within the testing specification.** Proceed to step 2.
		No, the fuel level is over full. Perform 3.11 Fuel Level Monitoring System Diagnosis as outlined in the Generation One or Generation Two PSI Propane Engine Diagnostic manual.
		No, the fuel level reading is below 1/3rd. Add propane to the fuel tanks so the fuel level is greater than 1/3rd.
		No, the fuel level is empty. Confirm fuel float part number per PSI bulletin PSI112016. If the PSI bulletin has been followed and confirmed correct, but the reading is still empty, add propane to the fuel tanks so the fuel level is greater than 1/3rd.

Figure #1: Mechanical Fuel Gauge

Step	Connect fuel pressure gauges	Decision

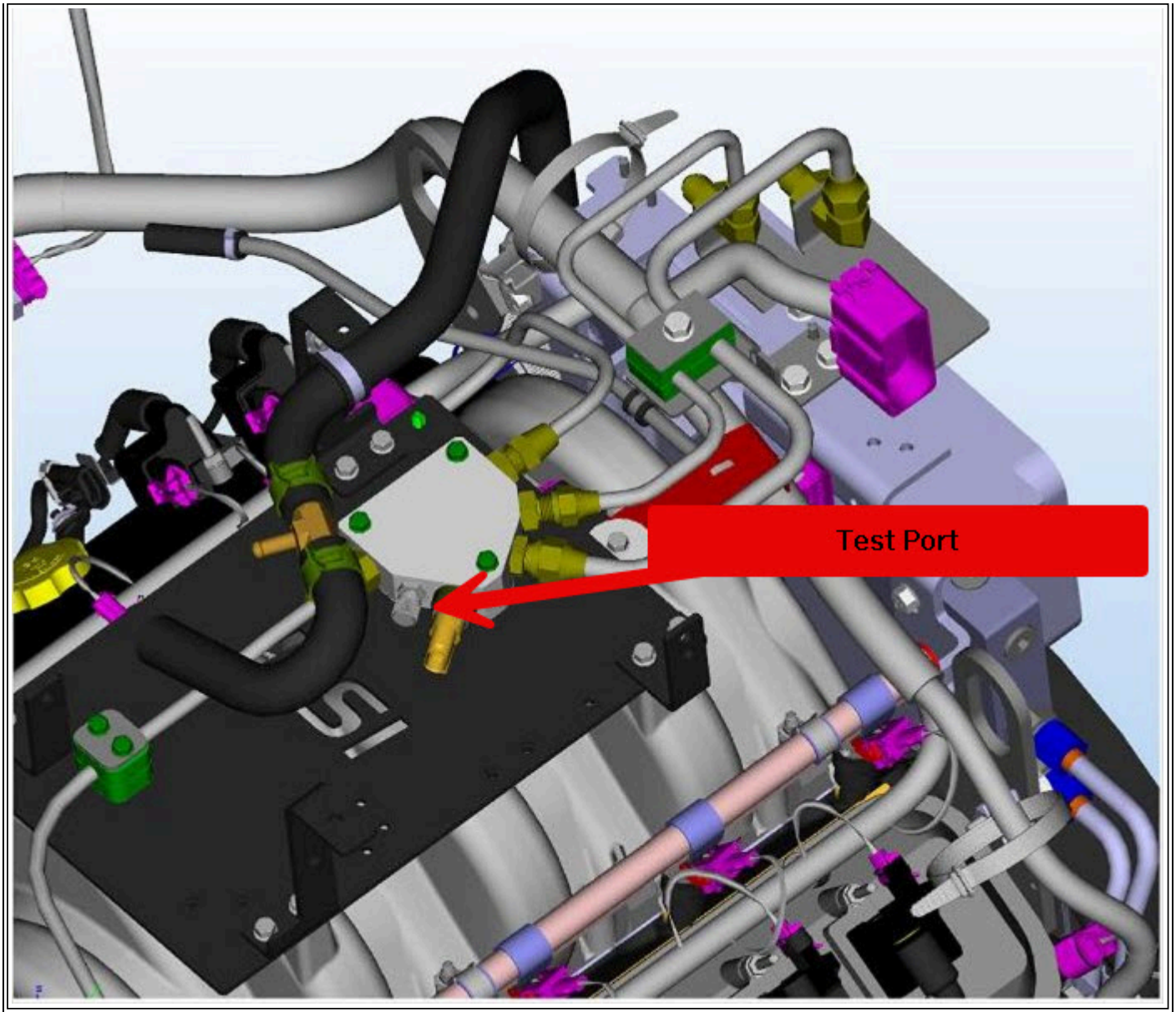
#2	**Connect the pressure gauge part number 15-132-01-36 to the 80% level Spit valve located at the driver's side fuel tank, underneath the tank cover. This should be the smaller fitting.**
	
	• **GEN 1 VEHICLES:**
	  ◦ **Connect the fuel pressure gauge 15-127-02 to the LPDM (Liquid Propane Delivery Module) (See Figure #2).**
	
	• **GEN 2 VEHICLES:**
	  ◦ **Connect the fuel pressure gauge 15-127-02 to the Schrader valve located on the fuel distribution block (See Figure #3).**
	
	Record the pressures KOER (Key On Engine Running).
	
	Is the boost pressure within specification?
	
	See Boost Specification Chart
	
	See Obtaining Boost Pressure
	
	NOTE: If liquid propane fuel is found at this fitting while opening, then the fuel tanks are overfull. A problem with the fuel stop fill valve is suspected and would need to be investigated before any further fuel pressure diagnostics can resume.
		Yes.
		
		Retest with the engine at operating temperature (engine oil temperature at or above 185°F).
		
		If boost pressure remains within specification, end fuel pressure diagnostics. Reference appropriate symptom diagnostics for the symptom that the vehicle is experiencing.
		
		No.
		
		Proceed to step 3.

Figure #2



Gen 1 LPDM Schrader Valve Pressure Port Location

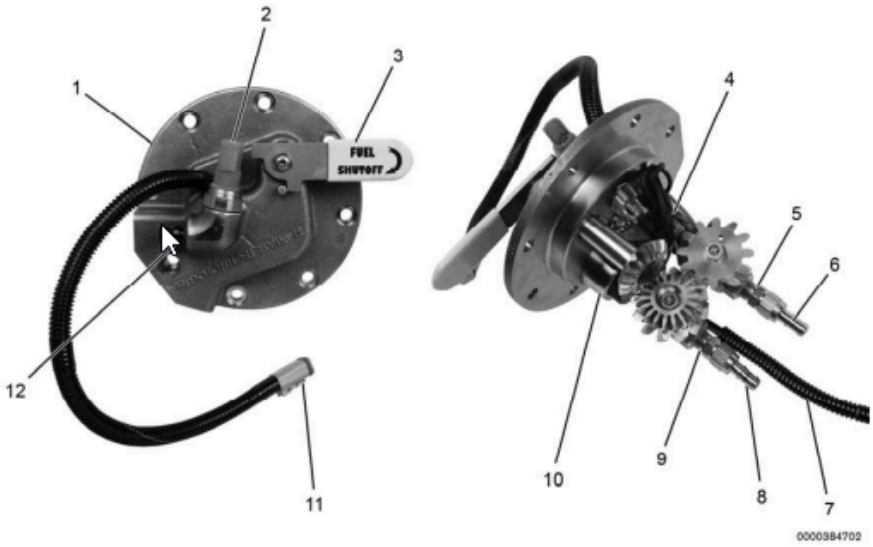
Figure #3



Gen 2 Fuel Distribution Block Schrader valve pressure port location.

Step	Inspect the mechanical shut-off valve(s)	Decision
#3	**Confirm that the mechanical shut-off valves are fully open.** • **For generation one fuel systems, please refer to Figure #4.** • **For generation two fuel systems, please refer to Figure #5.** Are the mechanical shut-off valve(s) fully open? **NOTE: Generation Two fuel systems have two mechanical shut-off valves. One on the supply lock-off valve and one on the return lock-off valve.**	**Yes.** Proceed to step 5. **No.** Proceed to step 4.

Figure #4

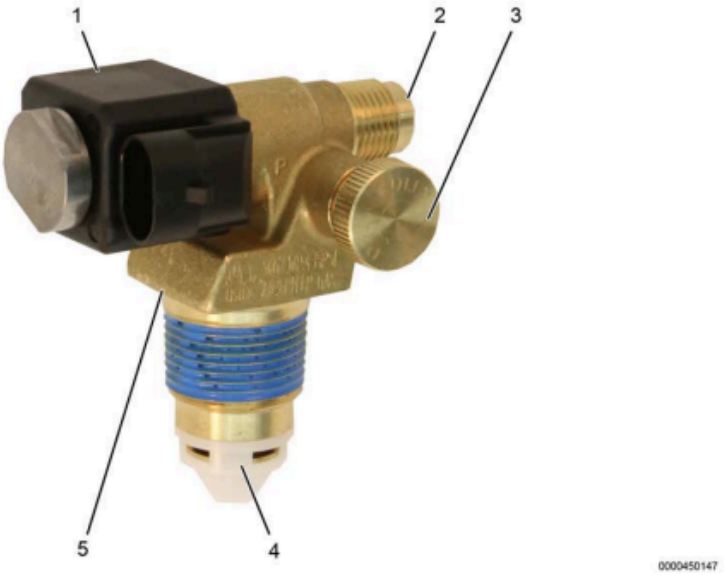


1. LPDM
2. Fuel Supply Pressure / Temperature Sensor
3. Quarter Turn Safety Shutoff Valve
4. Fuel Supply Lock-off Valve
5. Fuel Supply Excess Flow Valve (EFV)
6. Fuel Supply Inlet
7. Fuel Pump Harness
8. Fuel Return Outlet
9. Fuel Return Excess Flow Protection Valve
10. Fuel Return Lock-off Valve
11. LPDM 4-pin Connector
12. Schrader Valve Test Port

Item #3: Emergency Shutoff Valve - Should be fully opened.

Figure #5

2019 PSI 8.8L Propane Engine



1. Solenoid Valve for Lock-off
2. Fuel Outlet
3. Shutoff Valve
4. Fuel Inlet & Excess Flow Valve (EFV)
5. Electro-Mechanical Fuel Valve

Item #3: Emergency Shutoff Valve - Should be fully open.

Step	Sweep the Lockoff valve(s)	Decision
#4	**Close the lock-off valve(s).** **Re-open slowly to avoid tripping the EFVs (Excess Flow Valves) until fully open:** Does the engine run?	**Yes.** Proceed to step 5. **NOTE: If the engine did not run previously, but runs after sweeping the lock-off valve(s), then step 2 should be performed again.**
		No. Perform Section 3.9 Fuel System Diagnostics as outlined in the Generation One or Generation Two PSI 8.8L Propane Engine Diagnostic Manual.

Step	Confirm the EFVs have not been tripped	Decision
#5	**EFVs can be tripped during recent fuel repairs, such as fuel rails, lines, boost or scavenge pumps, or fuel filter replacements.** **Close the emergency shut-off valve(s). Listen and feel for any clicking. If clicking is present, that is an indication that the EFVs have been tripped.** Were the EFVs tripped? **NOTE: It is paramount to open the valves slowly to avoid tripping the EFVs (Excess Flow Valves).** **If a clicking sound is heard or felt when opening the valves, it indicates that the EFVs have tripped.**	**Yes.** Reset EFVs and re-perform step 2.
		No. Proceed to step 6.

Step	Check Fuel System Amperage Draw	Decision
#6	**Connect an amp clamp to the A side of the fuel system fuse KOER (Key On Engine Running).** Is the amperage below 14 amps?	**Yes.** Perform Section 3.9 Fuel System Diagnostics as outlined in the Generation One or Generation Two PSI 8.8L Propane Engine Diagnostic Manual.

	NOTE: More than 14 amps can indicate a restriction in the fuel system, a failed supply lock-off valve, return lock-off valve, or a weak boost or scavange pump. The higher amperage amount is typically caused by the pump having to work harder and draw more from the circuit.	**No.** Perform Section 3.9 Fuel System Diagnostics as outlined in the Generation One or Generation Two PSI 8.8L Propane Engine Diagnostic Manual. If no electrical faults are found within the 3.9 fuel system diagnostics, open a Technical Service Case file. Provide the full step-by-step results from the diagnostics performed, with numerical readings where applicable, from both the 3.9 diagnostics and this article.

Warranty Information

Warranty Claim Coding:

Refer to the Warranty Coding Manual for Group and Noun Codes.

Standard Repair Time(s):

Refer to the SRT Manual for Repair Times

Other Resources

Master Service Information Site