



Electric Fuel Pumps

There are two basic types of electric fuel pumps including, in-tank and external. In-tank pumps draw fuel from the bottom of the tank and push it through a supply tube to the carburetor, throttle body, or fuel rail (depending on application). These pumps come in two designs: modular and non-modular. The modular type has a plastic reservoir that houses the fuel pump, strainer, fuel gauge sender and other components. This style is replaced as a complete assembly. In a non-modular unit, the fuel pump is serviced separately. External pumps are typically bolted to the vehicle frame and draw fuel from a pickup tube within the tank. Depending on the vehicle, the pump may be located near the tank or close to the engine. External pumps are mounted on rubber bushings to isolate them from road shock, and prevent noise from being transmitted to the passenger compartment.

Can a fuel pump generate good pressure and still be bad?

Yes. Consider a fully charged battery. Although it may generate sufficient electrical pressure (voltage) to illuminate a test light, it doesn't necessarily mean that it can flow the current (amperage) required to crank the engine. The same is true for a fuel pump. Just because it can generate enough pressure to trigger a gauge, doesn't mean it can flow the amount of fuel required to run the engine. That's why it is so important to measure fuel volume when assessing the condition of the pump.

What is the best way to check fuel volume?

Connect a pressure gauge to the service port and place the bleeder hose into a clean graduated container. Next, activate the fuel pump using a fused jumper wire or scan tool. Now, open the shut-off valve for the bleeder hose to allow fuel to flow into the container. A good pump will typically deliver one pint of fuel within 30 seconds. However, always check the appropriate service manual for exact specifications.

What is 'deadhead' pressure?

This is the term used for maximum pump output pressure. Deadhead pressure is achieved by clamping off the fuel return line and operating the pump with the engine off. If the pump is good, the pressure will exceed the upper limit of the fuel system's normal operating range. On some systems, this will be almost twice that of normal pressure, while on others, deadhead pressure will only be slightly higher. Checking deadhead pressure is helpful for isolating the cause of low fuel system pressure. If deadhead pressure is low, the most likely cause is a clogged fuel strainer or a defective pump. Be aware that checking deadhead pressure places a tremendous load on the pump. Consequently, the pump should be turned off as soon as maximum pressure has been achieved.

Are pressure and volume tests always conclusive regarding the condition of the fuel pump?

No. Unfortunately, some fuel pumps will pass these tests and yet cause an intermittent starting problem. This condition is typically the result of a worn commutator bar on the armature. If the pump motor stops at that particular spot when the engine is turned off, current will not flow between the brush and commutator the next time the pump is activated. In some cases, tapping the fuel tank may create enough of a vibration to get the pump working.



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Is it true that using a lab scope is the best way to evaluate the condition of a fuel pump?

Yes. By analyzing a fuel pump waveform, you can quickly identify problems that would otherwise go undetected using conventional pressure and volume tests. A good fuel pump waveform consists of a series of small uniform humps. Any spikes indicate problems with the brushes and/or commutator segments. The scope also displays the average current. Low current readings are indicative of electrical problems, such as brush and commutator wear, a poor ground, or high-resistance connections. Excessive fuel pump current indicates that the pump is being overloaded. This may be the result of a restricted fuel filter, a clogged strainer, or blocked return line. Check the appropriate service manual for fuel pump current specifications.

Could a fuel pump cause a 'cold start' problem even though the engine runs well and starts fine when hot?

Yes. To begin with, a cold engine requires more fuel and higher secondary voltage to start. This is because fuel does not vaporize well at low temperatures, and because cold engine oil offers more resistance to crankshaft rotation. When a fuel pump has brush, armature, and/or bearing wear, it may not be able to operate at the rpm necessary to generate adequate fuel flow. Replacing the fuel filter may temporarily alleviate the problem, since a new filter will reduce the resistance in the fuel supply circuit. However, assuming that all other causes of a cold starting problem have been eliminated, replacing the fuel pump is a good idea.

Is it always necessary to remove the fuel tank in order to replace an in-tank pump?

No. Some vehicles have a removable panel in the luggage compartment that provides access to the top of the fuel tank. This allows the pump to be replaced with the tank in the vehicle. Before removing the fuel tank to replace a pump or other related components, always check for the presence of an access panel first.