

Additional Safety for Electric Fuel Pumps

By Larry Klusza, 2023

Whether for EFI or carburetor use, electric fuel pumps can be of great value. However, they bring their own safety challenges that must be addressed appropriately. One aspect of electric fuel pump use deserves special mention. Outside of a crash, fire is about the worst outcome you can have and is potentially deadly if you are somehow rendered unconscious in the event of an accident. With EFI, for example, we're dealing with electric pumps that can pump at least 255 Liters per hour. That converts to over 67 gallons per hour or over 2 fluid ounces per second, *every second*, until the tank runs dry (Yikes!).

Electric fuel pumps used in carbureted applications have no real safety features. Generally, it's either on or off via the vehicle ignition circuit. Many have installed an oil pressure activated switch in the fuel pump power circuit so that in the event the engine loses oil pressure it will shut off the pump, thereby stopping the engine and hopefully preventing any internal damage. Additionally, if the fuel line is ruptured, the engine stops due to fuel starvation and the drop in oil pressure will shut the pump off as well, preventing or limiting a fire.

While the carbureted application has no built-in safety features, the ECU in your EFI system does. For EFI, when you turn the ignition to the "on" position, the unit will pressurize the system and give a priming shot of fuel. It's the equivalent of pumping the gas pedal to squirt some fuel and set the choke on a carburetor.

Once this happens, the unit will then shut the pump off to avoid the strain of maintaining pressure until such time as you crank and start the engine. The pump comes back on as the ECU detects engine speed above 300-400 rpms. Usually this happens so fast that the engine doesn't know the difference.

Having the computer associate engine rpm with fuel pump power is an effective safety feature in the following scenario: Say you're driving along and get into an accident. The accident is severe enough that your fuel line is ruptured and starts spewing fuel. Obviously, the engine will stall from fuel starvation. When the ECU reads engine rpms below 300 – 400 rpm, it shuts off the fuel pump. Great! But there is another situation that no one in the aftermarket addresses but that auto makers do.

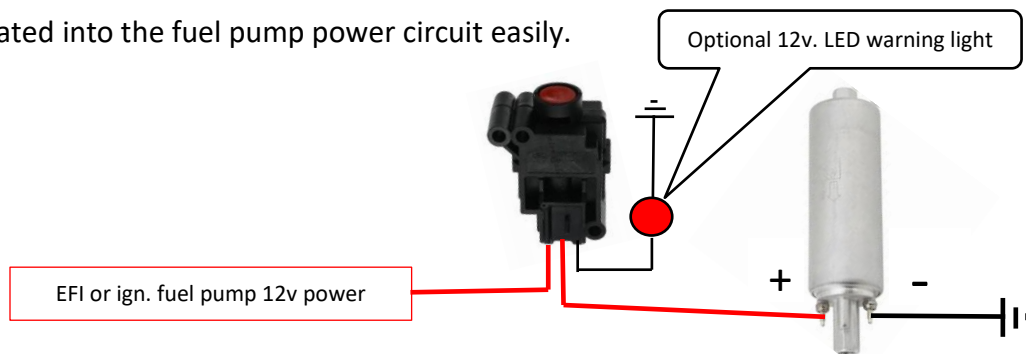
Consider this second scenario: You're driving along, perhaps using cruise control, and get into an accident. The impact is enough to knock you senseless or even unconscious, but the engine continues to run because the fuel line has remained intact. As your foot (or cruise control) remains on the throttle, your now unconscious self and your car go careening off the road into the woods, into buildings or over pedestrians, under power and at speed – with potentially deadly results. Auto makers address that possibility with the inclusion of an *Inertia Switch*.

The inertia switch is installed between the 12-volt power supply and the fuel pump. It functions like a household circuit breaker. When it experiences a sharp enough impact, it trips and breaks the circuit powering your fuel pump, which then kills the engine. It's also very easy to add one to any installation that uses an electric fuel pump, even if you already use the oil pressure cut-off switch. They genuinely complement each other.

Although you may find another switch suitable for use, my personal favorite is a Ford unit, PN: [XF3Z9341AA](#) I've used one every time I've done EFI. Recently, I included one in my '70 GTO when I installed my Holley Sniper Quadrajet EFI system. It's located under the dash, near the fuse box.

The readily available pigtail connector ([Pico 5756PT](#)) is a nice bonus and makes incorporating the switch a breeze. It also comes with a smaller gauge third wire for use with an optional warning light to indicate if the switch is tripped whenever the ignition switch is turned to the "on" position. You can even trip the switch manually with a small, flat-blade screw driver for diagnostic purposes. It prevents the EFI system from flooding the engine with shots of fuel every time the key is cycled.

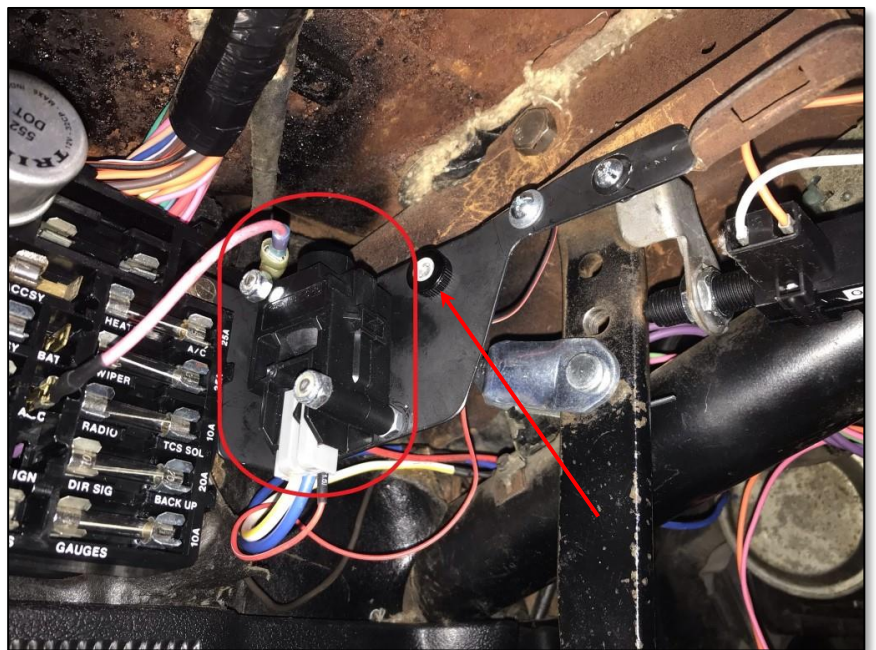
It can be integrated into the fuel pump power circuit easily.



Here's mine. I also mounted a small but extremely bright red LED to the panel (arrow).

You can put it anywhere inside the car but they're usually placed somewhere near the firewall. Though not pretty, I made my bracket to take advantage of existing holes.

Personally, I'd skip the no-name knockoffs and any "used" switches from eBay. I do like using the genuine Ford version because it's designed to take the amperage found in an electric fuel pump circuit without the necessity of a relay. I don't know about the no-name knockoffs.



You can test the switch by pressing the red button on top, holding it upright and giving it a sharp slap as when you're clapping your hands. Do it hard enough, and you can see and hear it trip. Simply reset the switch by pressing the red button again.

If you're already using an oil pressure switch in your electric fuel pump circuit to protect your engine, complimenting it with an inertia switch is an easy thing to do. It works in carbureted and EFI installations. Either way, an inertia switch will add an additional layer of safety for you, your passengers, and your classic car easily and without breaking the bank.