



Upgrade Your Carbureted Fuel System for Fuel Injection!

Are you thinking about converting your carbureted vehicle to fuel injection? One of the hurdles you'll encounter is modifying your fuel delivery system to support the new fuel injection. Carburetors typically require fuel pressure in the 4-7 PSI range where fuel injection systems typically need 40 PSI or more.

Most carbureted systems use a mechanical fuel pump, driven off the engine, usually by a lever activated by a special cam on the camshaft. Unfortunately, these pumps are designed to pump at a low pressure and, by the nature of their design, the fuel is delivered in pulses. All of this is fine for a carbureted engine, since the float bowls act as a buffer that absorbs the pulsing action of the pump.

Because fuel injected engines require much higher pressure that's also constant, electric pumps are the norm. These pumps run full speed whenever the engine is running. They are capable of much greater pressure than is required by the fuel injection system so, in order to maintain the proper pressure; a pressure regulator is integrated into the system.

The pressure regulator that's used in most fuel injection systems maintains a steady pressure by sending any excess fuel back to the fuel tank. So, as long as the fuel pump is capable of supplying as much or more fuel than the engine is capable of using under the heaviest loads, the fuel pressure at the injectors will always be stable.

So how do you modify your fuel delivery system to support that new fuel injection system? The first step is to get rid of the mechanical pump. We normally remove the mechanical pump from the engine altogether and cover the resulting opening in the block with a fuel pump block-off plate such as our mrg-1515 for small-block Chevy's from Mr. Gasket.

An electric fuel pump will have to be added to move the fuel through the system. There are two types of electric

pumps: the in-tank pump and the in-line pump.

In-tank pumps are what you'll find on most vehicles that have factory fuel injection. They are the quietest and are kept cool by the fuel in the tank. This is the most difficult pump to use in a conversion, however. In order to use an in-tank pump, a bracket to hold the pump in the tank must be fabricated. Other options are to buy a new tank for your vehicle that is designed to use an in-tank pump or find a tank from a fuel-injected vehicle that fits your vehicle. We have a variety of in-tank pumps that can be adapted to various applications.

In-line pumps are the easiest option and they work very well. In our shop we use tons (well maybe not *tons*) of these in fuel injection conversions and engine swaps. We sell even more over the counter. Our Walbro GSL392 is an excellent in-line pump for most vehicles.

The next thing that needs to be done is to run supply and return fuel lines. For the typical fuel injection applications, we recommend using a minimum 3/8" fuel line for the supply and at least 5/16" for the return line. Often, it's possible to reuse the existing fuel line as either the supply or return line. Chances are, however, you'll need to run at least one of the lines. We recommend using hard line (aluminum, steel, or stainless steel) as much as possible. The aluminum line that we have on the web site is perfect for this. It's durable and easy to flare and bend and also works great with our Fragola fittings.

One of the trickier parts of installing the return line is connecting it to the fuel tank. Most tanks have vent tubes but these don't typically make a good connection point for a return line. First, they often have baffles to prevent gas from sloshing into the vent line. These create a restriction to the flow of fuel and can cause fuel in the return line to back up, eventually causing the fuel pressure in the system to increase. The other problem is that they are normally located

at the top of the tank and, when the gas falls from the top of the tank to the fuel level, it will create a lot of vapor.

When we need to install a return line on a tank that doesn't have a provision for one, we normally modify the fuel sender access plate to accommodate a return line. To do this, we remove the sending unit assembly from the tank and then disassemble the electrical connection(s). We then drill a hole through the plate and braze a tube in the hole. The tube needs to be sized so that, when the sending unit assembly is reinstalled, the end of the tube is about 3/4 of the way to the bottom of the tank. The portion of the tube that protrudes through the top of the plate will normally have to be bent at a 90° angle. It's best to bend and cut the tube to the appropriate configuration before brazing it into place.

Another option to brazing a tube into the plate is to use one of our Fragola bulkhead fittings. A bulkhead fitting is designed to pass through a steel plate and uses nuts to secure the fitting to the plate. A bulkhead fitting can be installed in the sending unit access panel with tubing attached to both ends of the bulkhead fitting.

Something to keep in mind when installing the tube on the inside of the tank: make sure that the tube does not interfere with the motion of the sending unit arm. Check that the arm can move through its full range of motion. If interference occurs, it can create false readings at the fuel gauge!

Finally, you'll need to connect your hard lines to the engine. You always need flexible line between the frame and the engine, or wherever else there is motion. You can use rubber fuel injection hose or braided stainless steel hose with AN fittings are another option.

If you're thinking of doing a fuel injection conversion and need advice on how to get started, feel free to call the shop (480-921-2500) or check out the frequently asked questions section of our web-site at www.aztpi.com!