

1986 GM 'F' BODY LB9 ADJUSTABLE FUEL PRESSURE REGULATOR

It has become common practice to remove the original fuel pressure regulator and replace it with an aftermarket adjustable unit. While the advantages of being able to adjust fuel rail pressure are not certain, adjustment does give the opportunity to change open-loop fuel flow if necessary. The only situation in which a setting outside the OEM specification may be necessary is after considerable modification to the rest of the system. That said, the cost of purchasing and adjustable regulator may be wasted. Instead of purchasing such a device, the original regulator can be converted to an adjustable type with little difficulty.

Since the regulator must be removed in either case, that labor would be equal. For an additional hour of labor, the adjustment hardware can be added. The cost of the hardware is less than \$1.00, unless you use exotic parts (stainless steel nuts and bolts, extra steel ball), in which case the cost may approach \$2.00.

Tools Required:

T-10 Torx driver;
Pliers;
1/16" pin punch and hammer;
1/4" drill and bit;
Flat mill file;
Acetylene torch;
Brazing rod;
400 Sandpaper;
Spray primer;
Spray paint, black (or preferred color);

Materials Required:

Teflon tape or thread sealant compound;
(1) 1/4-20 UNC x 1/2" hex bolt;
(I used a hex head for easier access to adjust the bolt when installed in the vehicle)
(1) 1/4-20UNC x 1" or longer bolt or screw;
(3) 1/4-20 UNC jamb nut.
(1) 0.310" or larger steel ball

OR
(1) 0.900-1.1" flat slug
(A 3/4" knockout from a steel electrical box)

DISASSEMBLING THE REGULATOR

Once the regulator is off the vehicle, the six screws on the spring cap should be removed. Since the Torx bolt holding this cover in place are designed to be tamper-proof, you'll either need a tamper-proof Torx bit, or alter the screws to make them "fully-tamperable". Using the 1/16" pin punch and hammer, set the punch on the center rejection pin in the head of a screw, and lightly tap the pin flat. This will allow a standard Torx driver to engage the screw. Do this carefully to avoid damage to the flutes in the recess. If a screw is stubborn, it can be loosened by grabbing the head with a small pair of pliers to start its movement.

Remove all the screws evenly to allow the spring to relax as the cover opens. Take care to make certain the gaskets/diaphragms are not sticking to either surface and tearing. Once the screws are removed, the cap should lift off. The spring/diaphragm assemble should be cleaned, then stored in a manner that will not damage the highly polished valve face on its lower side. The valve seat in the regulator body requires the same caution.

MODIFICATION

The spring cap should have a small indentation at its center. Using this as a center, drill a 1/4" hole from the inside of the cap.



The factory powder coat finish should be cleaned from the outside of the spring cap where the jamb nut will be located. This will assure a good seal and secure attachment when brazing. It is necessary to maintain this seal since the spring cap must also hold vacuum without leaking.

Using a 3/4" socket as a drift inside the cap, place the cap in a bench vise or press. Apply enough pressure to dish the center of the spring cap outward at least 1/8".

Insert the 1/4" x 1" (or longer) bolt with the jamb nuts locked inside and outside the spring cap. This will locate the nut for brazing in exactly the right place.

I selected a jamb nut because of its lower profile and wider face area for good adhesion when brazing. When satisfied with the location and fit, braze the outer nut in place using a relatively small tip on low heat.

When the assembly cools, remove the 1/4" screw and inner jamb nut. If you were not careful with brazing the nut in place, you may have to file or grind the excess bronze away from the screw to back it out.



File the excess material to get a smooth finish. Clean off any flux and sand the brazed area and any burned powder coat material to a smooth finish.



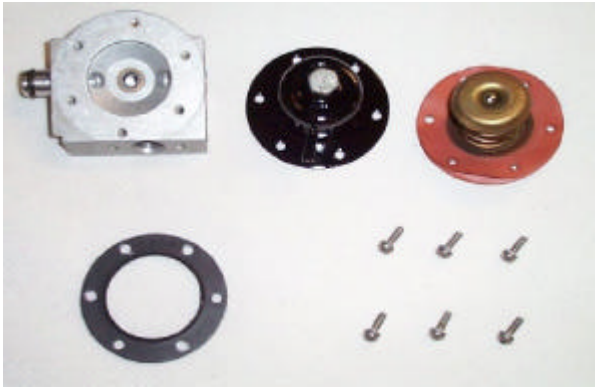
Prime the outside of the spring cap. When it has dried, sand with 400 grit paper to a smooth finish. Reprime and sand as necessary for a smooth finish.



When the primer is dried and sanded smooth, apply your favorite color heat and fuel resistant paint.

ASSEMBLY AND ADJUSTMENT

Once the paint is dried and you are assured of a good seal on the spring cap. Reassemble the regulator in the reverse order of disassembly.



Alternately tighten the cover screws to seat the gaskets/diaphragms evenly between the spring cap and base. Tighten the screws snugly, but be careful not to over torque them. Remember that the base is die cast material.



I installed a 0.310" steel ball in the recess of the regulator to receive the pressure of the screw without contacting the rod in the spring assembly. When the assembly is complete, seal the 1/4" x 1/2" hex bolt with Teflon tape or a liquid thread sealant, such as Permatex thread sealer. This will assure a good seal in the spring cap to retain vacuum.

IMPORTANT! If you use a ball that is less than 0.300" it will contact the rod in the center of the spring. This rod must be allowed to move freely to regulate fuel pressure. I selected a 0.310" ball because it contacts the inner recess of the spring retainer and still allows the inner rod to move freely. If you do not have confidence in the ball being able to withstand the spring pressure without failure, you should install a flat disc about 1-1/16" in diameter to distribute the adjustment screw pressure across the spring retainer. Doing this will increase the spring pressure at minimum adjustment, thereby raising the minimum fuel pressure. This can be counteracted by raising the position of the top of the spring can an equal amount. A press with drifts works well for this. Adjust the spring can height as little as possible because of the limited clearance for the regulator adjustment screw when installed in the engine.



Replace the completed regulator on the vehicle. With the adjustment bolt backed out all the way, the regulator pressure should be just as it was before the conversion. To increase the fuel rail pressure, turn the adjustment screw inward. Monitor your adjustment with a fuel pressure gauge. A little adjustment should be all that's necessary, 1-2 PSIG at a time. You can verify your results with a scanner monitoring the oxygen sensor output at wide-open throttle, or your timeslips at the track.

Remember, the pressure change will only make a difference at wide-open throttle. At any other time, the ECM will adjust the injector pulse rate to achieve the correct oxygen sensor reading regardless of fuel pressure. Unnecessarily high pressure will only make your in-tank fuel pump work harder than it should, potentially shortening its useful life. If you think changing the regulator was fun, wait until you have to replace the fuel pump.

Happy motoring.