Fuel Injector Replacement

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The OE Rochester factory installed fuel injectors on all ’90 to ’92 LT5’s are susceptible to solenoid coil damage from ethanol fuel additive. This usually happens after about three years of exposure to ethanol. The fuel injectors used in ’93 and up factory installations were improved to be compatible with ethanol. I have never seen solenoid coil failure of a ’93 and up LT5 fuel injector.

The root cause of the fuel injector failure is electrical shorting of the turns of wire in the magnetic solenoid coil of the fuel injector. Fuel leaks past an internal seal into the area containing the coil and attacks the insulation on the wire. When the insulation breaks down, the turns of the solenoid coil short together. When exposed to heat, more turns short, and the electrical resistance of the injector goes down as the engine warms up.

As the first few close together turns short, the lower resistance increases the current, which opens the injector valve more for a given pulse width. During this initial failure, extra fuel is delivered. The engine tolerates the extra fuel fairly well; the overage of fuel does not get burned because the oxygen runs out during the combustion process. The unburned fuel gets dumped out in the exhaust. In scanner data, these slugs of fuel can be seen as vertical lines in the oxygen sensor voltage imposed on the normal smooth sinusoidal oxygen sensor voltage. As the current requirement goes up in the solenoid coil, the ECM can no longer drive the injector fully and it delivers less fuel than commanded. Eventually, as the resistance drops to about 6 ohms, the injector stops working and the engine develops a misfire.

The typical operational characteristic of the engine is that the engine runs fairly well after a cold start and then starts to run rough as the engine warms up. As the fuel injector failure progresses the engine will develop a misfire when hot.

A diagnostic test can be performed to identify shorted fuel injector solenoid coils. It is available at: http://www.zr1specialist.com/HAT%20Web/articles/FI%20Resistance.htm

The OE Rochester fuel injectors for all LT5’s are susceptible to clogging with rust if they are exposed for a long lime to water in the fuel. The rust usually clogs the fuel flow. With a lower likelihood, the rust can hold a fuel injector open.

We use Accel fuel injectors for replacement. They are available from Summit Racing as part number ACC-150821 for a package of eight. Get two packages. Grind off the electrical connector alignment tab on the primary fuel injectors. Remove the lower o-rings when installing them on a ’90 – ’92 engine.

It can be difficult to refill the cooling system if it gets air locked. To avoid a problem, remove the pressure cap on the black surge tank and drain only two quarts of coolant from the radiator drain.

Carefully remove the plenum. You can leave the throttle cables connected and lay the plenum assembly upside down on a thick towel on the windshield.

Two new fuel rail hose connector o-rings GM PN 14104675, discontinued by GM, will be needed as well as two plenum gaskets GM PN 10168684, also discontinued by GM. They are available from Jerry's Gaskets at www.JerrysGaskets.com

Tighten the plenum and fuel line connector bolts to 19 lb. ft.

Before starting the engine, the engine control system's learned fuel trim data for the old injectors must be erased. Remove the negative battery cable for 10 seconds to accomplish the reset.

When the plenum is off there is an opportunity to fix oil leaks and vacuum leaks.

Tighten the injector housing bolts to 19 lb. ft. Tighten the crankcase vent box cover bolts. They have 8 mm heads. Only six can be reached, however they can reduce oil leakage a lot if they are tightened to 89 lb. in. Tighten the ventilation hoses. They look like coolant hoses. Tighten the four hose clamps.

The procedure to repair vacuum leaks is listed here:
http://www.zr1specialist.com/HAT%20Web/articles/Finding%20and%20Fixing%20Vacuum%20Leaks.htm