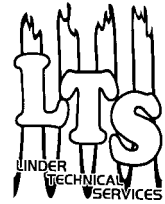


# Networking

Newsletter



**Jim Linder**  
**The Injector "Guru"**

## LOOK AT US GROW!

As of February 1, 2001, we decided to expand Linder Technical Services. The company that occupied 60% of the building we are in decided to relocate to a larger place. In turn, we decided to take their space and expand our business from 1,500 sq. ft to 4,000 sq. ft. The picture to the right shows the new portion of the building.



The extra space will allow us to have an additional classroom that will accommodate 50-75 students. There is enough room in the new classroom to pull a vehicle right into the class.

There will also be a full kitchen and additional restroom facilities.

There will be a library that will contain information for vehicles 1990 and newer along with a computer workstation that will be equipped with Alldata and Mitchell information systems.



The picture to the left shows the new fuel injection lab. Doug Garriott, the fuel injection "wizard" will move from a room that is not much bigger than a closet to an area that is approximately 30 x 15 feet. We will also add two more ASNU fuel injection machines to the injection lab. Doug will also have a smaller room dedicated to core storage and clean-up.



Peggy Goodwin, office manager, is moving to a larger office in the newer side of the building and Michele Winn, the analysis "sleuth" is moving into Peggy's old office. Jim is moving his desk from the corner of the classroom into a more private setting in Doug's old room. By popular demand, a teardrop trailer restoration workshop has been added. The teardrop workshop will be a recreation of the old Gasoline Alley race shops. More pictures of that will follow in future issues.

## Fuel Injection Service Update from the “Wizard”



It has come to my attention that I have never dedicated a newsletter article to the GM Central Sequential Fuel Injection system. We at LTS dedicated much time and effort teaching and writing articles on the older 4.3L vortec system, that when this new system came out, I think we all forgot that it needed to be discussed.



Central Sequential Fuel Injection is used on GM light trucks beginning as early as 1996. It is very similar to the CPI (Central Port Injection) system used on the earlier 4.3L models. Rather than one TBI injector feeding all of the poppet nozzles, there is now one electrical injector for each poppet nozzle. Each is fired sequentially for accuracy and precise metering control.

The CSFI injectors are located in the fuel meter body assembly. Also included in this assembly are the fuel inlet, return, fuel pressure regulator and electrical connector for the injectors. Each injector and poppet nozzle assembly is a single unit and can be service individually.



When an injector energizes, the increased fuel pressure pushes the poppet nozzle's ball off its seat and fuel is supplied to the cylinder. When the injector de-energizes, spring force overcomes the decreased fuel pressure and the ball seats, cutting off fuel supply at the nozzle.

### **SERVICING THE CSFI SYSTEM:**

When removing the fuel meter body from the engine, notice that the body is numbered to indicate poppet nozzle order. These numbers **MUST** match the injector with the poppet nozzle and cylinder. If the lines are installed incorrectly, a driveability problem could result.

To remove a nozzle, squeeze the locking tabs together while lifting it out of the casting socket. The fuel meter body assembly is removed by releasing the bracket lock tab with a flat tip screwdriver.

### **FUEL PRESSURE TESTING ON THE CSFI SYSTEM:**

With the key cycled “ON”, the regulator should control the fuel pressure to the specification of 60-66 psi with the pump running and the engine “OFF”.

Fuel pressure that continues to fall after the engine has stopped or the ignition has been turned “OFF” could be caused by:

- A leaky injector and poppet assembly
- Damaged o-rings
- A leaking fuel pressure regulator valve
- A partially disconnected fuel pulse damper (known as the pulsator) in the fuel tank.

### **COMMON FAILURES:**

\*Internal contamination causes a rich condition (poppets are stuck open) OR damaged fuel tubes can cause a lean condition.

## Fuel Injection Service Update (cont.)



### COMMON FAILURES (cont.)

\*Rough idle after start-up when the vehicle has sat overnight.....GM has issued a bulletin (87-65-07-A) addressing this problem. The problem affects 1996-1999 GM light trucks with 4.3L, 5.0L or 5.7L engines. This condition is caused by deposit build-up on the ball-to-seat face and may cause a poppet to stick closed which deprives that cylinder of fuel. It usually only affects one poppet at a time and it is not uncommon for the poppet to free itself and resume normal operation. The bulletin describes the service methods needed when these poppets stick closed and includes the use of a scan tool for fuel injector balance testing and a fuel pressure gauge.

\*Once the units have been replaced or have begun working properly, it is suggested that you add a 20-ounce bottle of port fuel injection detergent to the fuel tank. (GM part# 12345104) According to Bulletin # 99-06-04-006, the ONLY solvent that will have any effect on the deposits occurring on poppet nozzles is the GM approved detergent.

\*Caution: These units have been known to leak fuel from the injector upper area into the harness, up through the wiring and into the PCM/VCM unit. The customer complaint is usually the smell of gasoline from the engine compartment. Current GM warranty policy is 3 years/36,000 with an 8 year/80,000 mile warranty on the PCM. This problem was the focus of an e-mail discussion on iATN from Toby Jacobsen from Longview, Washington. "Customer said he drove over to a friends house and when it came time to leave, the truck would not start. Cranks over just fine. We started checking for spark....no spark. Scanned for codes, had crank sensor, tps, cam sensor, O2, too many codes! Had power to injector coil, but still no spark. Tested cam, crank, tps and all were OK. Referred to Mitchell flow chart, did all the tests and found a bad PCM. Got the new PCM from the dealer, and lo and behold, the bottom two PCM harness connectors were swollen and smelled of gas. Traced the harness back to the injector housing assembly. Opened the old PCM and it had a shallow amount of gas in it. Some how fuel migrated from the injector connector to the PCM."

## Analysis from the "Sleuth", Michele Winn



At the end of last month's analysis article, I mentioned that Jim had enlisted me (willing or not) to put fuel injection on his 1966 Chevy Truck. It has always been a mission of mine to never work on anything with a carburetor, especially if it's older than me! Nevertheless, this project has become my "baby", so I'll take you along as I muddle through the process. Hopefully we will all learn something!

### Why?

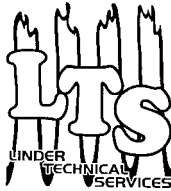
Anytime you start a major project like this, there are bound to be a few questions.

- *Why would you replace the carburetor with a fuel injection system?* Well, the first reason is because the Rochester 2-G carburetor on the truck has cold start problems and a hesitation. Secondly, we're in the fuel injection business, so why not?
- *Why would you put fuel injection on such an early model engine. Why not go to a junk yard and find a late-model application?* We are trying to develop a kit that will apply to older vehicles that already have a solid engine. There is no need to the trouble to R&R an engine if the one in the vehicle is mechanically solid. Also, you will still be able to use the factory air cleaner and it will look original.

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**The TBI project will be  
continued next  
month.....**

## Analysis from the “Sleuth” (cont.)

### Vehicle preparation

A Full System Test was done using the Allen SEA to confirm engine basics.

Problems Found: Fluctuating engine vacuum  
Ignition Problem – worn points  
Exhaust Leak

Dave’s Muffler repaired the exhaust leak and installed “shorty” headers. Ignition was temporarily adjusted, but will be converted to late-model HEI. The vacuum issue was caused by a cracked cylinder head. The truck was taken to Marsh Garage and the cylinder heads were replaced. Note: the vacuum gauge reading after cylinder head replacement was 19” and very steady.

### Concerns

1. *Fuel Supply:* pump location, filtration and return line. The fuel pump we will be using is very reliable as long as it is used in conjunction with an inlet filter. We also want to install a 0-15 lb. fuel pressure gauge in the dash.
2. *Intake manifold.* The existing 2-barrel manifold leaks antifreeze around the water neck. In its place, we will install a new 4-barrel 180-degree intake. The 180-degree intake was chosen over a 360-degree intake because we wanted more torque.
3. *Harness location.* The wiring harness can be placed either under the hood (there is plenty of room) or under the glove box inside the cab of the truck.