MARCH 1999

LTS Networking

The Official Newsletter of LINDER TECHNICAL SERVICES

TECH TRAINING

AUTOMOTIVE INDUSTRY MEETINGS

For the 1999 year we have scheduled the *first* Wednesday evening of each month as "Industry Night."

The January meeting was snowed out but the February & March meetings were nothing short of WOW!

February's meeting was held at Ivy Tech on East Washington Street and kicked off with a short group discussion introducing Mac Vandenbrink 'The Ignition Guru". Mac held everyone's attention as he led a group discussion on Ignition Systems and used a 1999 Olds Cutlass hooked up to an older version scope "2500 Allen Unit" and performed cylinder balance, coil stress tests and even placed the vehicles front 02 sensor on the scope screen for all to see an analyze!

Ivy Tech also had some of the latest COP (coil on plug) vehicles on display for discussion and hands on performance testing. Meeting was ended at approximately 9:30 and many stayed later to discuss various ignition testing among themselves.

Next months meeting is set for Wednesday, April 7th again at Ivy Tech with the topic *"Ford ECM Programming."* These meetings are a no-charge meeting and are conducted at the Ivy Tech Facility Automotive Department, East Washington Street.

Make it a point to attend the next meeting!

What:	**Technical Industry Meeting**
Where:	**Ivy Tech Automotive GM Classroom**
When:	**Wednesday, April 7th**
Time:	**6:30 - 9:30 PM**
Topic:	**Ford ECM Programming**
cost:	**$ FREE -- BE THERE.**

TOOL TIME:

LTS has also scheduled the first Monday of every month to be "TOOL TIME".

TOOL TIME is a technician product review evening at our Gasoline Alley shop and the tools to be reviewed are set by the attendance from month's prior. This month's tool time features the P.R.I. INC SENSOR SIMULATOR.

This tool is displayed, discussed and used in a hands-on session. Many new uses and functions will be discussed. These sessions are not sales pitches and most times the manufacturer doesn't even know we are dissecting their tool.

TOOL TIME starts at 6:30 and runs to 9:30 each evening. Come early and get involved! This is a no charge session also.

RANDY'S CASE STUDY

1990 Cadillac Eldorado

4.5 L PFI 48,812 miles

VIN **1G6EL1331LUXXXXXX**

COMPLAINT: Vehicle travels down the road at 50 mph without using the accelerator pedal. It did NOT do this before YOUR tune-up!

HISTORY: The 4.5 and 4.9 Cadillac engines have an in-depth idle relearn procedure that must be followed to ***HELP*** this condition. GM released a bulletin for this condition in '94.

PROCEDURE: Key on, enter diagnostic mode (off and warmer), key off, wait 20 seconds and repeat 3 times. Let engine idle w/o A/C for 18 minutes. Idle in gear for 1 minute. Idle in gear with A/C for 1 minute, then turn the key off and wait 20 seconds.

CAUSE: During a routine service the throttle plates were cleaned, causing the learned values stored in the PCM to operate the ISC as if the deposits were still present. We suggest NOT cleaning the throttle plates on these engines during regular maintenance procedures. The relearn TSB will only drop the speed to 20 mph, not cure the condition completely! Only weeks of driving will cure the complaint.

FUEL PUMPAMPERAGE DRAW TEST

The fuel pump amperage draw test can be a useful test when diagnosing fuel pump concerns. The tests are broken up below depending on the type of engine you are working on.

High amperage usually indicates a bound fuel pump. Low amperage usually indicates a problem in the wiring.

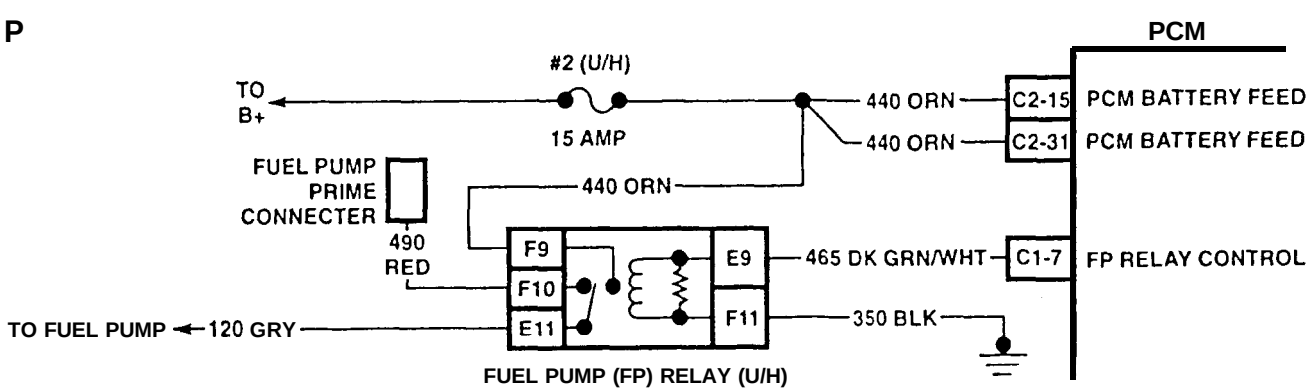
1. Make sure the key is in the OFF position.
2. Disconnect the fuel pump relay if not equipped with a prime connector.
3. Set the DVOM to the amps scale and connect one test lead to battery power. Connect the other test lead to the prime lead/fuel pump side of the relay cavity.

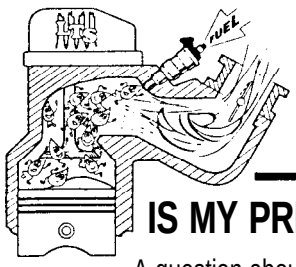
The following data is "rule-of-thumb" as to what is good and what is not: T.B.I. engines, 2 to 4 amps; P.F.I. engines, 4 to 6 amps; C.P.I. engines, 8 to 9 amps.

5.7L Engine

Pictured is the 1996 VIN P. Consult your service manual for other models.

VIN P





FUEL INJECTION SERVICE UPDATE

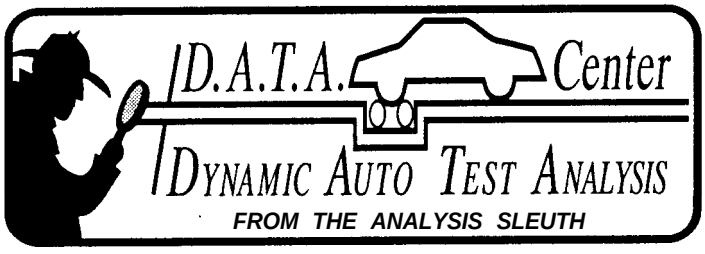
FROM THE INJECTION WIZARD

IS MY PRESSURE LOW?

A question about fuel pressure on a 1998 Camaro had me do a little research. The engine in question was the LS1(Vin G) 5.7L, 346 cu. in. V-8. The technician felt he had low fuel pressure and was unable to find a spec. to compare with. Here is what I found out.

First of all, this vehicle uses a "returnless" or "demand' fuel system. This means that only one fuel line, the supply line is connected to the fuel rail and no return line from the rail is used. This is done to reduce fuel heating and therefore reducing evaporative hydrocarbon emissions, There is a return line from the filter area to a regulator, which is located in the tank at the sender unit. Since no vacuum is routed to regulator, the system pressure according to GM should be constant between 55-60 psi. Pressure will drop after the pump stops running but the system should hold some pressure (a minimum of 5 psi) for at least 10 minutes. If the regulator is found faulty, it can be replaced separately. You will notice on the fuel rail, where the regulator is typically mounted a dampener. The dampener absorbs the fuel pulses when the injectors open. There is service port available at the rail for fuel system testing. The Camaro had a clogged filter do to a local gas station having water in their tank.

Looking for this information I found a couple of other nice to know facts. The sequential injection system uses the newer style Bosch disc type injector. The injector resistance specification is a minimum of 12.2 ohms @ 70 deg. F. Also sequentially fired is the ignition system. It uses the "coil-near-plug" electronic ignition, which has a coil for each sparkplug. The firing order is I-8-7-2-6-5-4-3; this looks familiar so don't get fooled.



TALES FROM THE TEST LANE

I *converted my hand-held scope into a "DIS Problem Solver"*

First of all, I want to say, I utilize hand-held scopes daily. Second, like you, I've found that for ignition analysis on DIS, at best most will only identify a wide-open plug wire. Of course I must go from cylinder to cylinder to find it. Now comes DIS parade adapters. However, with parade, compression and waste spark are superimposed. Now I still have a plug wire scope but don't have to hook to one wire at a time. All of this for $500-$1100.00. Instead, to convert to a "problem-solving" tool, I utilized the DIScover II. The DIScover II converts any ignition scope to a very comprehensive "problem-solver". But first, before examples, how about a quick description of operation...

1) The "Box" utilizes a direct connection to the secondary ignition circuit. This is accomplished by 'Teeing" into the plug wires at the ignition coils, Average hookup time is I-3 minutes. Even on 2.8/3.1 GM. Of course on these engines it is only difficult to replace the coils, not snap on the plug wires!
2) Now that I'm connected to the secondary circuit, cylinder kill is simply achieved by throwing a switch. I can manually kill them or I can have the "Box" kill them in timed mode so that I may perform a cylinder balance with gasses, When a cylinder is killed, the spark is routed through the "Boxes" hookup cables, through a neon bulb, then to ground. A neon bulb is provided per cylinder.
3) On the other side of the neon bulbs are calibrated spark gaps to ground fixed at 22 kV. So now if the car has an open plug wire, the neon light will light up and the spark occurs inside the "Box". With this, I don't even need a scope to find the open plug wire! All I need to do is start the engine.
4) Aside of the tests I perform without a scope, when I do hook my scope to the "Box" I may display ignition patterns in three ways...
   A: I may look at compression and waste superimposed to compare kV demand.
   B: I may separate compression and waste spark for the same plugs on the same screen for the negative side of the coil.
   C: I may do the same for the positive side of the coil.

What is the advantage of looking at compression and waste spark on the same screen? Well, now I can see the plug fire under two different conditions. What can I see? Let's first establish that kV demand is determined by the greatest gap in the circuit combined with the conductivity of that gap (air/fuel ratio t compression).

When I see a plug for a given cylinder fire on the burn stroke and the exhaust stroke, I can compare and contrast the kV requirements for each firing event. If it requires 10 kV to fire on the burn stroke and 3 kV to fire on the exhaust stroke, then the common denominator is compression. Now let's say that a different cylinder requires 10 kV on the burn stroke and 6 kV on the exhaust stroke. What could be the problem? Well, judging from the other cylinders, I know that the plug gap (minus air/fuel ratio and compression) only requires 3 kV on the exhaust stroke. The diagnosis becomes a logical deduction that there is a small break in the plug wire upstream of the spark plug. You would never see this looking at compression alone since the kV demand of the plug under compression outweighs the small break in the wire. Of course there is always the snap throttle test where on decel the hydrocarbon spike eliminates the plug gap. But by the time My scope loses sync and then regains it, I'm back at idle again! Stop by the shop and try it out for yourself. You'll be amazed. For more information on the DIScover II unit call Mike at Linder Technical Services.

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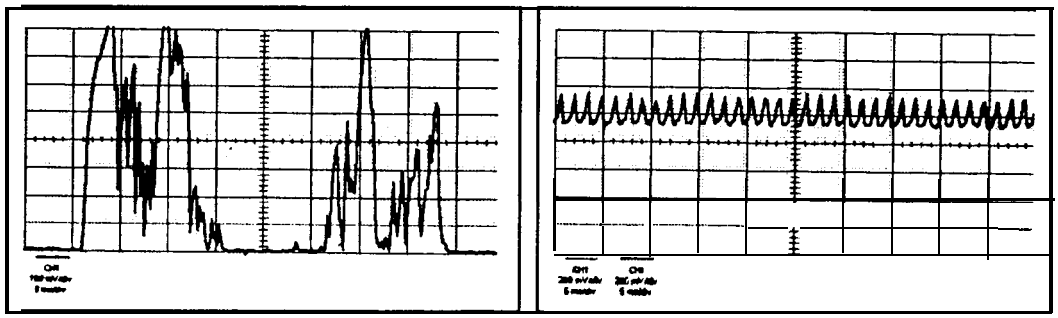
FROM THE DATA GROUP

A Really Bad Fuel Pump Waveform??



performance problem. Technician used a current probe and lab scope on fuel pump feed wire. See fuel pump waveform in picture to left.

***This has got to be one of the worse fuel pump waveforms I have ever seen!! New* pump waveform is seen on right waveform. Note current draw of approximately 8.0 amps (ground is first line up from bottom) and rapid speed of motor with sharp voltage to commutator transitions due to the horizontal brush set up of this Carter/Chrysler design pump. (A smaller commutator area moves past the brush contact area much faster than a vertical brush such as Delco etc with a horizontal brush contract area etc)**

Waveform compliments Marsh Garage, Indianapolis, Indiana