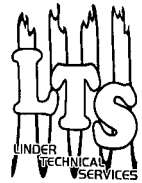


Networking

Newsletter



Upcoming Industry Events

Automotive Aftermarket Industry Week is coming up the first week in November. As always, the Linder Technical crew will be there for the entire week. Tuesday night, Nov. 2, will be our annual cookout at our rental house in Henderson, NV. More details will be posted on iATN industry events forum soon. During the first part of the week, the SEMA (Specialty Equipment Manufacturers Association) and AAPEX (Automotive Aftermarket Products Expo) shows will be running all day. Thursday evening kicks off ASA's CARS (Congress of Automotive Repair & Service) show that lasts thru Saturday evening. Linder Technical will have a booth at the ASA show and Jim will be teaching a brand new class titled: "It's all about spark" on Friday morning. Other technical classes will be held on Friday and Saturday including:



- € Diagnostic Strategies w/ Exhaust Gas Analysis by Glenn Young
- € Work Smarter by Being Smarter by Jorge Menchu
- € GM All Wheel and 4-Wheel Drive Controls by Ralph Dahlen
- € Ford 7.3L Powerstroke Diagnostics by Mike Cleary
- € Mode 06 Diagnostics by John Forro

In addition to these great technical classes, several management seminars will be available as well. For more information on the ASA show, go to www.CARSONline.org For more information on the SEMA or AAPEX shows, go to www.semashow.com or www.aapexshow.com

The Team A.V.I. Conference on Sanibel Island, Florida is coming up January 13-15, 2005. For those of you who wish to escape the winter blues, this is a perfect opportunity! Jim and Michele attended the conference last year and had a blast! Paul and his crew at A.V.I. know just how to treat their guests and there was just the right amount of training hours vs. time to check out the sights, lay at the pool or head to the beach. This year there will be 3 technical seminars:



- € Engine / Transmission Insights by Wayne Colona who is President of ATSG
- € Diagnosing Air/Fuel Sensors by John Thornton
- € Fuelish Tips by Jim Linder. This will be an all new segment to the first 20 Fuelish Tips that were released last year.

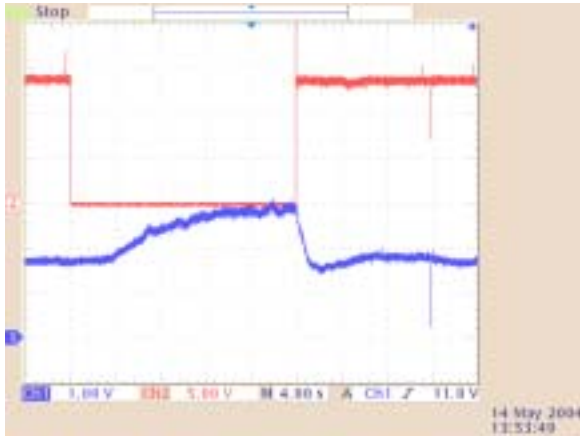
For more information on the A.V.I Conference, call 800-718-7246 or go to their website at: www.auto-video.com

Don't forget the iATN convention is Sept. 24-26, 2004. Jim and Doug will be attending and teaching the newest version of their Fuelish Tips class on Friday and again on Saturday. John Thornton and Tom Roberts will also be on hand conducting technical seminars. Registration officially closed on September 2, but it might not be too late to give them a call and try to get a spot at the convention. For more information, go to www.iatn.net.



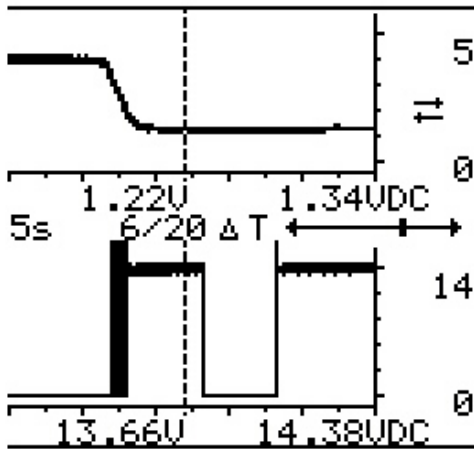
The Linder Technical crew hopes to meet up with you somewhere soon!!!

Analysis from the Guest “Sleuth”, John Thornton



When we left off last month, John was in the middle of trying to diagnose a P0400 (EGR flow malfunction) on a 1997 Mitsubishi Eclipse Spyder. He had manually activated the EGR itself and heard a change in engine rpm and also done a quick W.O.T. snap to check the response of the manifold pressure sensor in relationship to TPS. It seemed to be operating normally.

Again, the EGR solenoid is pictured at the top in red and the pressure sensor is on the bottom in blue. John manually grounded the EGR solenoid while the engine was at idle. This was disturbing. It took almost 6 seconds for the manifold pressure sensor to respond after the EGR solenoid was manually pulled to ground. John could “hear” the delay.



Here’s what happened next:

- € The code was cleared and the vehicle was road tested to see if the EGR monitor would run
- € The PCM checked for EGR flow on deceleration often during the test drive
- € A pending code P0400 was set
- € Turning the engine off and then back on allowed the MIL to illuminate during the 2nd test drive

This time our picture shows the pressure sensor on the top and EGR solenoid on the bottom. Trying to keep you on your toes! As you can see from the picture to the left, on decel, the PCM grounded the EGR solenoid (commanding EGR flow). There was very little change in the manifold pressure sensor. On decel, manifold pressure sensor voltage was 1.22 – 1.34 volts with no EGR flow. The PCM checks for EGR flow in about a 0.95 second window. This is how long the EGR solenoid is grounded. This seems to be a consistent time based on John’s test drives and observing the monitor running.

Based on all John’s test so far, the code is legitimate. There is no real change in the manifold pressure sensor voltage when the EGR was commanded “ON” during deceleration. So, what can we conclude so far?

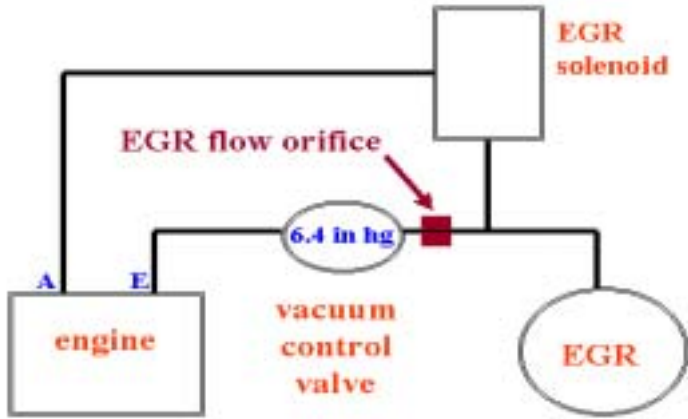
Based on all John’s test so far, the code is legitimate. There is no real change in the manifold pressure sensor voltage when the EGR was commanded “ON” during deceleration. So, what can we conclude so far?

- € The problem doesn’t seem to indicate restricted EGR passages based on our results from manually activating the EGR valve
- € It took about 6 seconds for EGR to occur when the EGR solenoid was manually grounded.
- € The PCM checks for EGR flow during a window that is just shy of 1 second
- € Could there be a restriction in the vacuum lines to the EGR valve?

Let’s take another look at John’s simplified drawing of this EGR system. Notice what has been added to the picture this time. (See picture on top of page 3) There was a black, plastic vacuum splice in the vacuum control valve hose going to the EGR valve. John thought there might be a restriction in this splice. As he pulled it off, a slight bulge was evident in this vacuum hose. When he squeezed this bulge, it felt like there was a BB inside.

Continued on page 3.....

Analysis (Continued from page 2)

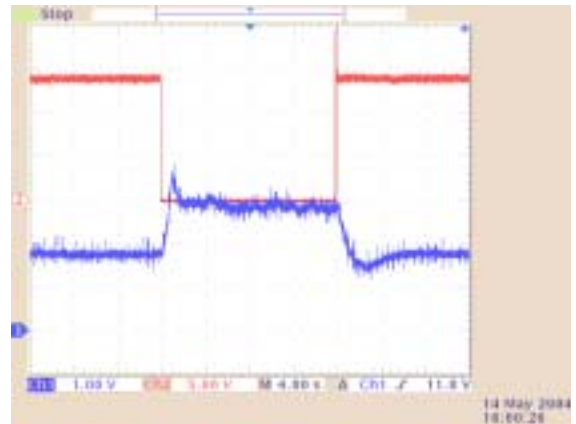


(Notice we've added an EGR flow orifice. This was not pictured on the original Mitsubishi system diagram)

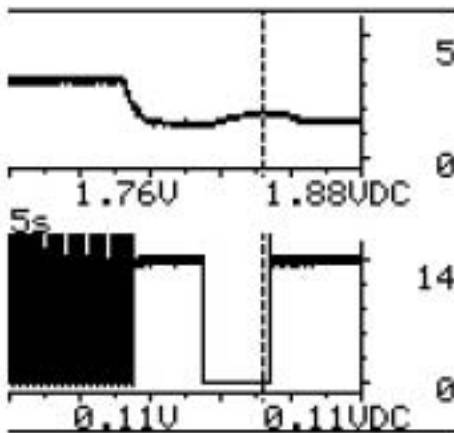
After slicing open this short vacuum hose, a brass orifice was found to be buried in this hose. This orifice looked like a very small version of a carb main jet. This orifice was almost completely plugged. A cutting torch cleaning tool was used to open the restriction.



This is a picture of an EGR flow orifice. As you can see, it resembles a carburetor jet.



Now let's look at how the manifold pressure sensor responds after cleaning out the hose. Once again, the picture shows the EGR solenoid on top in red and the pressure sensor on the bottom in blue. Now the response is much faster than the 6 seconds measured previously. The response rate appears to be around 1 second.



The test drive was repeated after cleaning the EGR flow orifice. A noticeable voltage change can be seen. While the spec is still unknown, it would seem that the P0400 was fixed. The EGR monitor only ran a couple of times. It would not run again unless the ignition key was cycled off. Prior to the repair, the PCM was trying to run the EGR monitor frequently.

Special THANKS to John Thornton for providing us with this in-depth EGR case study!!!

LINDER TECHNICAL SERVICES

4-D GASOLINE ALLEY
INDIANAPOLIS INDIANA 46222

Phone: (317) 487-9460
Fax: (317) 487-1868
Toll Free: (888) 809-FUEL (3835)
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KNOWN GOOD SPRAY PATTERNS

This picture illustrate known good injector spray patterns. Not all injectors have a conical spray as thought. Spray patterns differ by application and design.



Injector identification from left to right:

Toyota (Denso) = Dual intake valve engine.

G.M. (Multec) = 3.4L "X" engine.

Chrysler (Siemens) = 3.8L "L" engine. Injector has a direction spray that is being directed at a 15-degree angle towards picture.

Ford (Bosch) = Deposit Resistant Injector (DRI) with 4-laser cut discharge holes.

BMW (Bosch) = Pintle style discharge tip.

G.M. (Multec) = Stamped Spray Tip design, multi-hole discharge.

G.M. (Multec) = Multi-hole discharge.

G.M. (Multec) = Multi-hole discharge.