

Technicians Service Training

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Module Diagnostics

John Anello

January 9-12, 2012

Transmission Diag for Regular Shops

Wayne Colonna

February 6-9, 2012

Editor

Jerry "G" Truglia

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2000 Chevy 2500 Van 5.7L Van No-Start

So, we get a van from a do-it-yourselfer that has installed his own engine. The van ran fine for months and then it barely made it home one day. Since then, the van refused to start. The monster-sized van made itself nice and cozy in our bay, and decided it wanted to stay for a while.



We started with the basics. First, we tried starting in order to hear how it sounded. It just continued cranking, but refused to fire up. TSBs were checked. The battery was charged. Fuel Pressure was at 63 psi and the Fuel Pump turned at 9.5 amps. The engine had spark. It had RPM (and a new CAM and CKP sensor.) This narrowed it down to a mechanical issue with the engine.

(Con't on page 3)

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Currently there are **TST chapters in Connecticut, Massachusetts, New Jersey, New York** and membership continues to grow. For more information you can call

TST headquarters at:

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Technicians Service Training



www.TSTseminars.org

What is TST?

TST is a group of dedicated technicians and instructors committed to the continuing education of our fellow technicians. We provide once a month training seminars to technicians at a reasonable price. TST brings our members nationally known instructors and state of the art training.

Our Goal & Mission Statement

- *Keep our fellow technicians up to date with the latest technology.*
- *Provide training seminars for a reasonable price.*
- *Deliver information that the technician can use now.*
- *Keep technicians informed of information affecting our industry.*
- *Increase consumer awareness of what a good technician is.*

Why join TST?

TST membership includes special pricing on once a month week-day night seminars and the occasional full Saturday seminar. With a **\$75.00 yearly membership, the monthly seminars are only \$65.00.** **TST classes are NOT sales or product seminars.** The instructors that TST brings in are all “hands-on” industry experts with up to date, cutting edge knowledge that you can use in your shop the next day. That’s 65 dollars for a seminar in which you are able to learn something useful, for fixing those tough jobs that we all see on a regular basis. Our instructors are masters at making the complex understandable. Membership also includes a Monthly Newsletter full of real world technical articles, diagnostic case studies, and solutions to the kinds of problems you see in your bays each week.

The following are some of TST’s regular instructors:

Bernie Thompson of ATS

John Thornton of Autotrain Inc.

Wayne Colonna of ATSG

Jorge Menchu the “Labscope Guru,” AES Wave

John Anello of Auto Tech On Wheels

Mark Warren of Motor Magazine

Bob Pattengale of Bosch

Peter Meier of Motor Age Magazine

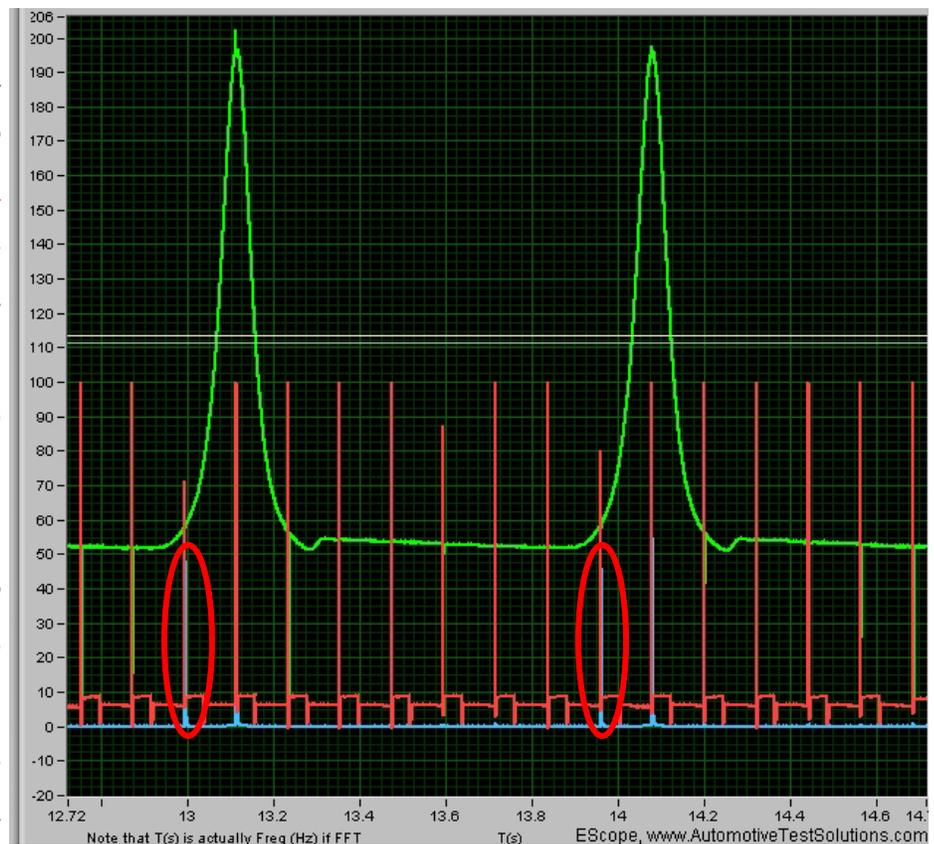
Ken Zanders of Illinois Air Team

Jerry “G” Truglia of National Instructor & owner of A.T.T.S. Inc.

2000 Chevy 2500 Van 5.7L Van No-Start (con't from p. 1)

So, we decided to investigate whether or not there was a timing issue. Looking at cranking compression using a pressure transducer, everything mechanically seemed to be good including the timing. We also connected to the ignition coil and the number 1 injector. The injector and coil appeared to be firing correctly, but the ignition coil seemed to have a “double tap.” It appeared to pre-ignite before the main spark.

Engine compression (green) appeared to peak in time with **fuel (red)**. **Spark (blue)** appeared to fire not always at the right time, as you can see in the circle.



So, we revisited the possibility that there was an ignition issue. The distributor assembly appeared to be installed incorrectly, so

we called up the parts store and replaced it. However, we turned the key and the new one did not make a difference, so we returned it. To be honest, we did this with the cap and rotor too. None of the parts made a difference, even though the old ones appeared to be in poor shape from all the fruitless starting attempts.

(Con't on p. 7)

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Jim Bradanini
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QUOTE

Hey: To all my tool carrying friends,

I just switched Brian's tool insurance from Farmers to Pro-TEC and I am now only spending \$350 a year for \$70,000 of insurance on hand tools, welder, air compressor, tool boxes, etc...we were spending \$747 every six months.

Anyway, I figured whoever needs insurance on your tools against theft, flood, fire, etc.... blanket coverage. The people are really nice and you can do it over the phone. You don't have to have a tool inventory list, though you will need one if you have a claim so do one up front anyway.

They offer \$50,000 for \$250 but we upped it to \$70,000 for \$350. <http://www.mechanicsinsurance.com>. The guys name is Jim Bradanini and his email address is: JimB@cpminsurance.com. Their phone is 203-439-2810. I had left a message and he got back to me within the hour.

Thank you so much for making your process so smooth and painless, kind and professional.

Jo



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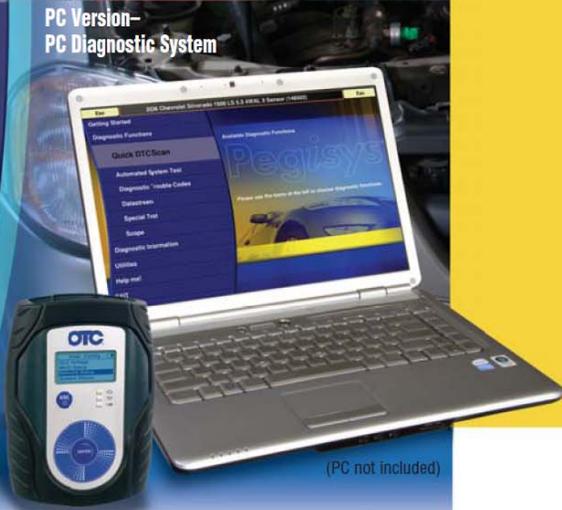
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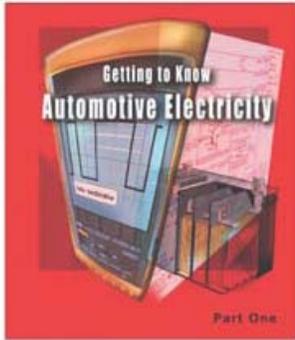
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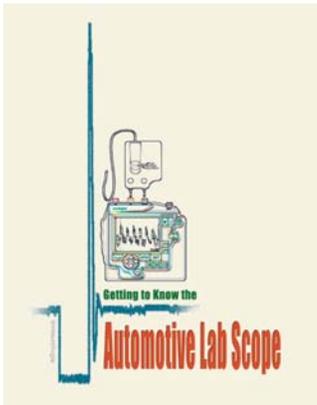
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Chevy 2500 Van 5.7L No Start (con't from p. 3)

So, we had to explore other avenues that were not timing related, because the cranking compression appeared to reflect good timing and we could not find any problem getting spark. We decided to check relative compression, and it was uneven. Relative compression is not as accurate as a real compression test so we pulled out the only plug we had relatively easy access to in order to do a standard compression test and look at spark plug condition. *Compression was good but the plug was fouled with fuel.*

We then checked the motor oil and saw that it was flooded with gasoline. We confirmed this by lighting the dipstick on fire. The basics had to be covered first, because the cylinders were washed down. So, we changed the oil and the plugs, and used STP oil treatment in the cylinders to build up compression. Sometimes, doing things like checking the oil right off the bad can save you a lot of time.



With confidence we turned the key again. The engine tried to start up now, but it now made a horrible metallic scream. It sounded like a bad flywheel, but we inspected the whole component and it checked out. The engine then stopped starting because all this testing wore down the starter. So, we replaced it and the engine did exactly what it was doing before, screaming away and not starting.

(Con't on page 9)

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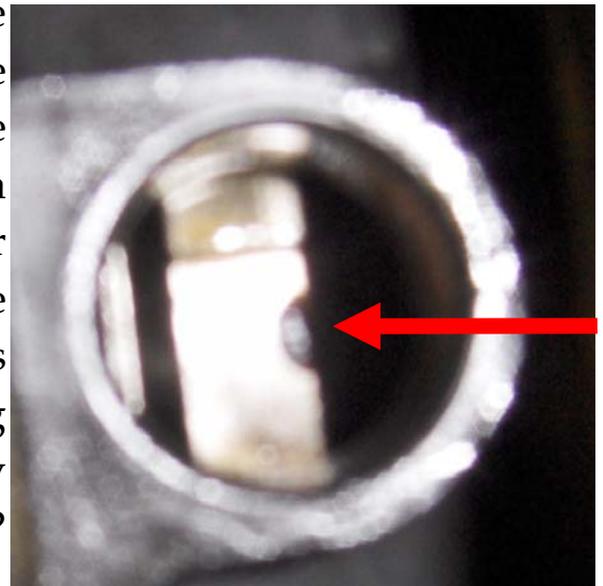
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Chevy 2500 Van 5.7L No Start (con't from page 7)

In desperation, we looked at TSBs again and found one that dealt with “No, Hard, or Slow Start...Grinding or Unusual Noises During Crank.”

How did we miss this? We slapped in a new Delphi CKP sensor, hoping it would save the day. Again, no dice.

So, we were right back on square one. The only thing we found strange all this time was that ignition double tap. So, we double checked the CKP and CAM sensors with a scope and found no problems whatsoever with the sensors. Then, as luck would have it, we found a speck on the Crankshaft's reluctor/toner wheel. Was the timing being thrown off the whole time because of a tiny stupid spec being picked up by the CKP? Maybe it is the source of the double tap!



Here's why: The CKP sensor counts the parts on the reluctor wheel that pop out in order to determine timing. If there is a speck in between, it might throw off its count. But, it could not be that easy. After cleaning it off, it would not start, sounding just like it did before.

(Con't on page 12)

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Chevy 2500 Van 5.7L No Start (con't from page 9)

Questions:

1. Do you want seminars to continue in your area?

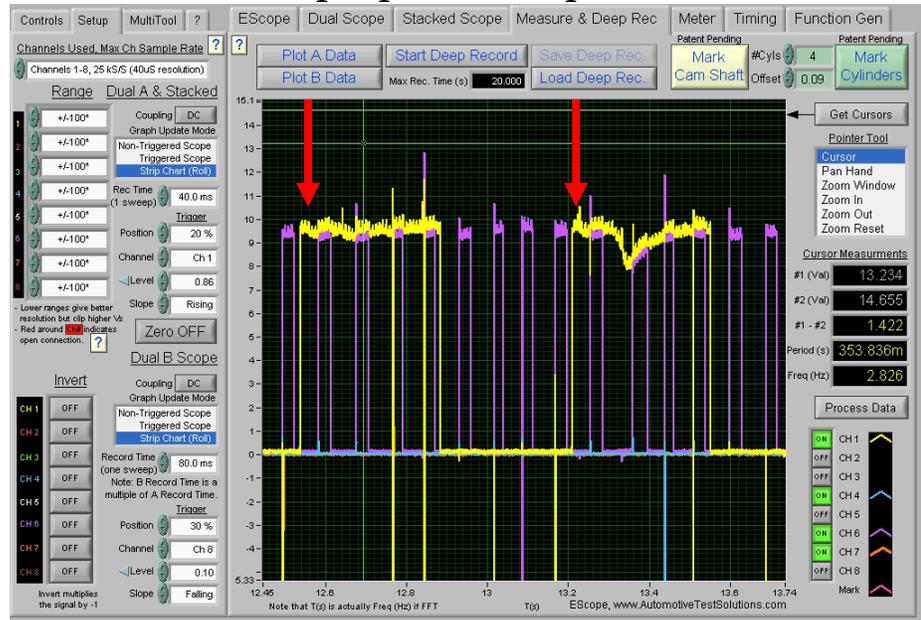
2. Do you find the seminars useful?

Please ask a fellow technician to come and check-out our seminars so we can continue to bring you the best available information each month.

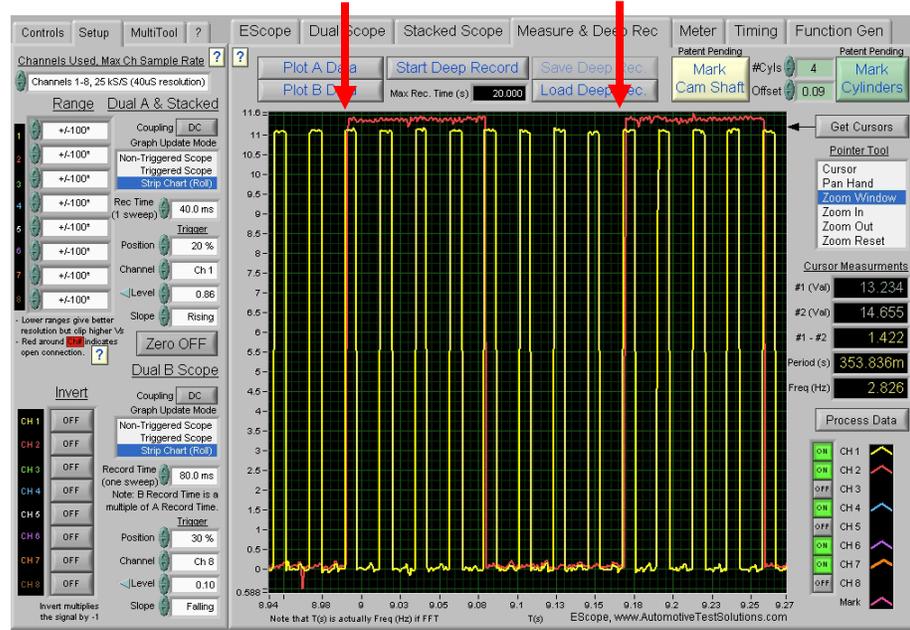
We need your support:

Thank you, G Truglia

Using help from mobile tech Adam Varney of Northeast Auto Doctors we were able to pinpoint our problem.



Here's the Cam-Crank correlation on our truck. Notice the CAM waveform (yellow) beginning just after the CKP waveform (purple).



Here's a known good Cam-Crank correlation on the same van. Notice how the CAM waveform (red) starts exactly at the CKP waveform (yellow). (Con't on page 16)

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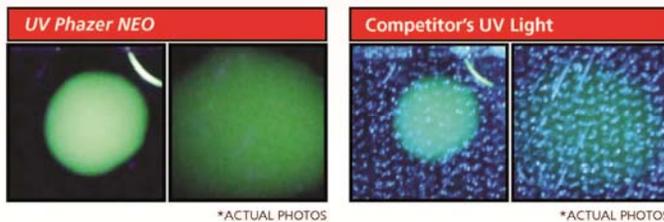
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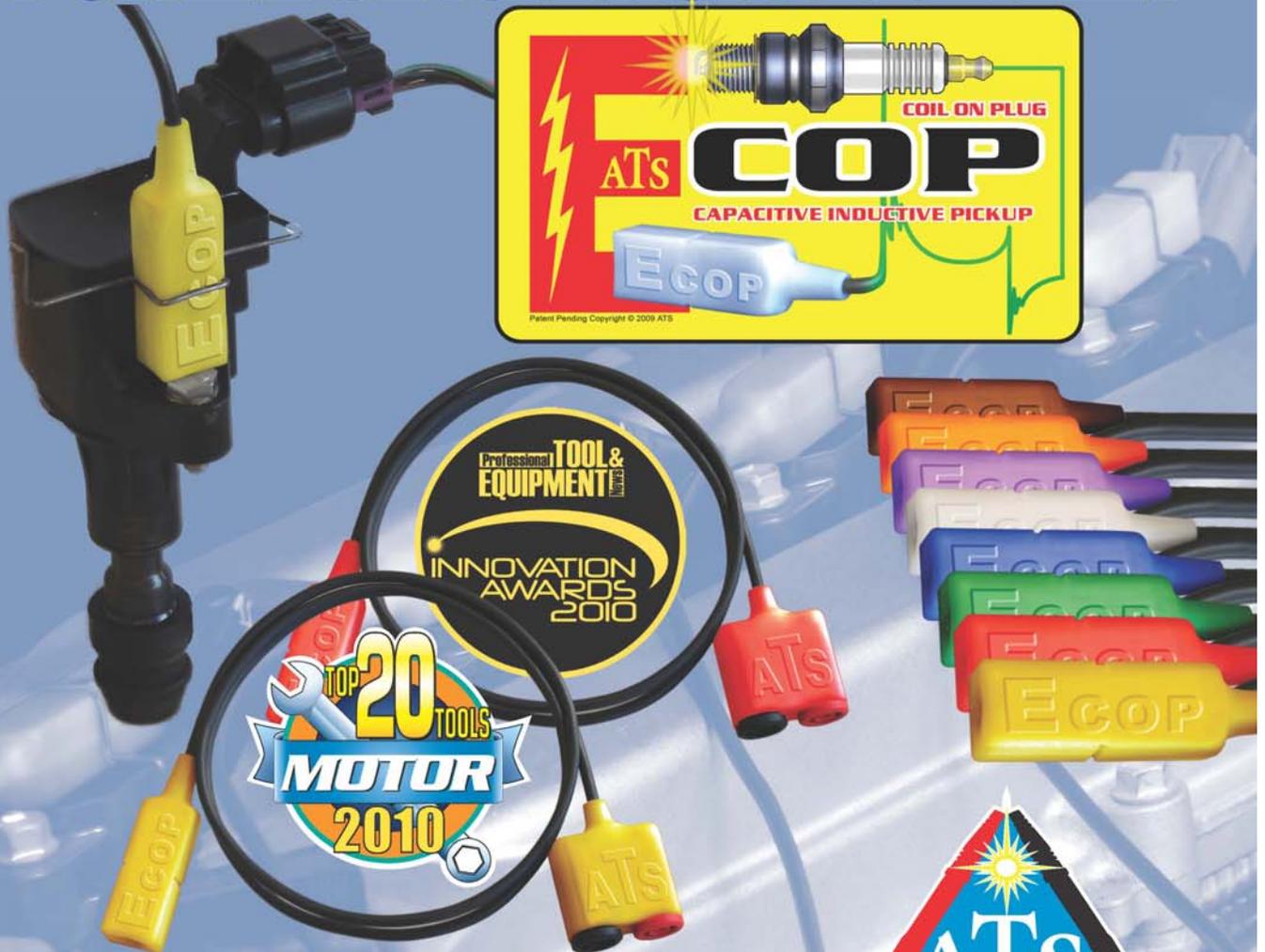
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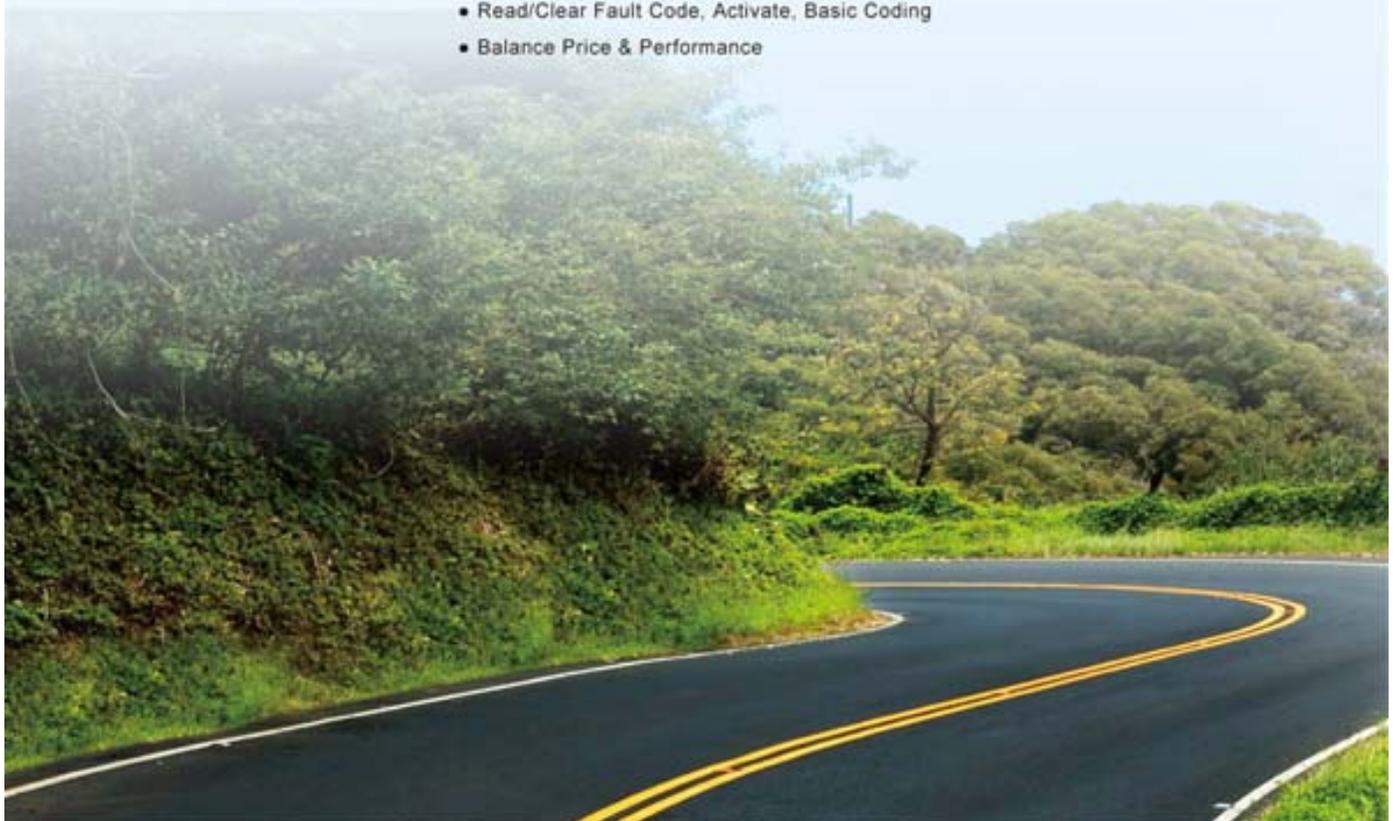
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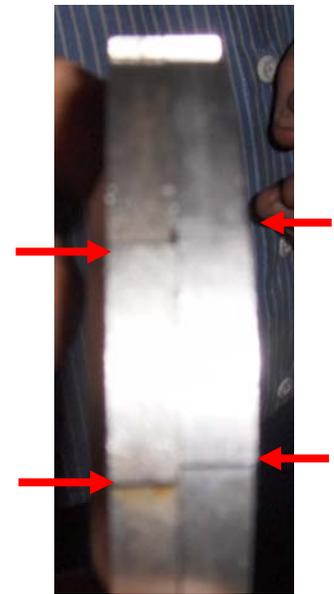
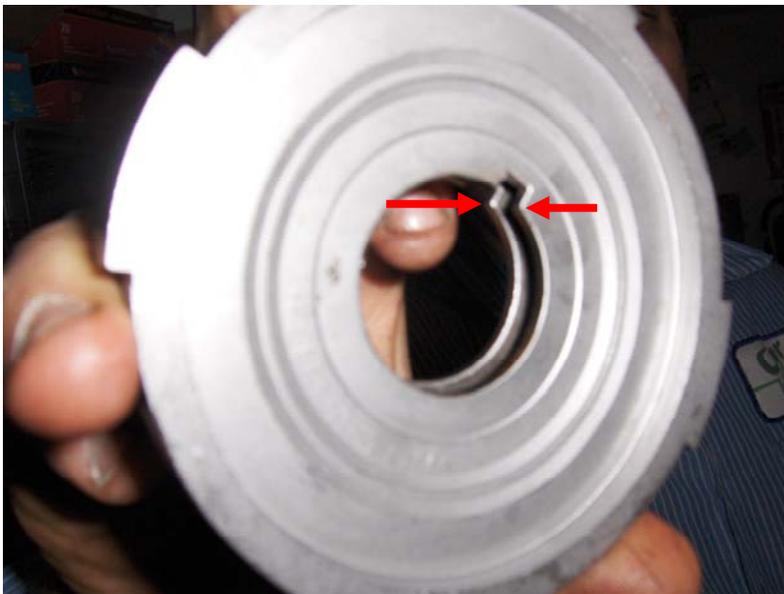


Chevy 2500 Van 5.7L No Start (con't from page 12)

There was indeed a timing problem! It was time to inspect the timing chain. When we took the timing cover off, guess what just flopped off without us exerting any force on it whatsoever. The Crank Reluctor/Tone Wheel!

We knew it was installed improperly on the remanufactured motor. So, we bought a new one from the dealer and was surprised to see that the part was much different. They did not line up at all.

As you can see in the pictures, we are lining them up properly. The parts were obviously machined differently.



The moral of the story? Sometimes you can do everything right, check the TSBs, and do all the basic stuff; but sometimes you have to dig real deep. Known good waveforms are very important, and some very good resources are out there.

The Challenge

One of the greatest aspects of being an automotive service technician is that each and every day you go to work there is always something new. Even though your days might not be the same, the one thing that's always the same is "The Challenge." I'll get to that in a bit

The vehicle in question is a 1994 Chevrolet Lumina 3.8 L Vin L engine with 118,000 miles. The concern was the transmission would shift late, the engine would idle erratically and the check engine light would come on. *(Con't on p. 18)*

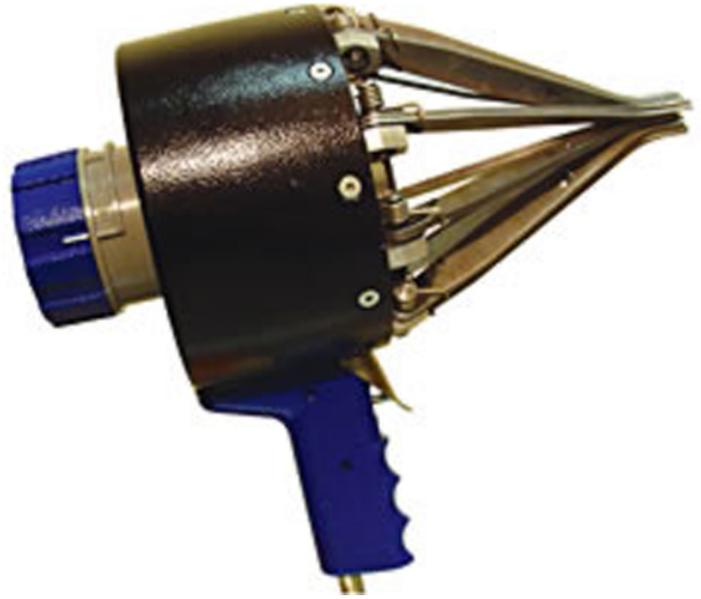
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Seeing is Believing (con't from p. 16)

The technician working on the car stated he had a code P0122. That is a code for Throttle position sensor low voltage. Based on how the system works a Throttle Position Sensor that gives the PCM an incorrect reading would allow the transmission to shift late.



The technician replaced the TPS and the vehicle ran fine. We replace TPSs all the time when we have an intermittent TPS fault...but this time they replaced it three times and it did not fix the issue (*and yes, they used an OEM sensor.*)

After replacing the sensor with the OEM sensor the vehicle returned a couple months later with the same concern. This is *"The Challenge."* It makes you ask yourself, "What did I miss, what didn't I 'see?'" I hooked up my scan tool to look at the data the sensor was displaying and the voltage was low. The correct spec for this throttle position sensor at key on engine off is 0.33-0.46 volts. My reading was 0.06 volts. Next, I disconnected the throttle position sensor and checked the 5-volt reference from the PCM at the "A" terminal of the connector. The reference voltage was correct. Checking the sensors ground at terminal "B" proved adequate.

So, what am I missing? Based on my interpretation of how the system works it seemed like the sensor has failed again, but my reference voltage and my ground were good. I removed the sensor from the side of the throttle body to do a bench test (which on this vehicle is no picnic) and lo and behold this is what I saw. The backside of the throttle position sensor was covered in antifreeze, the white powdery substance. The antifreeze was seeping out of the throttle body which has a couple of coolant hoses going into it. On this car, it was almost impossible to see.



Upon removal of the throttle position sensor you could "see" traces of dried coolant residue where the sensor was mounted, but the coolant loss wasn't enough to alert the technician that a coolant leak was present. Unless he was being *really* observant, of course.

Article by Ed Hazzard, TST Associate



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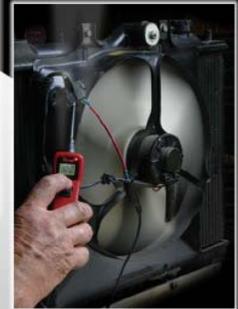
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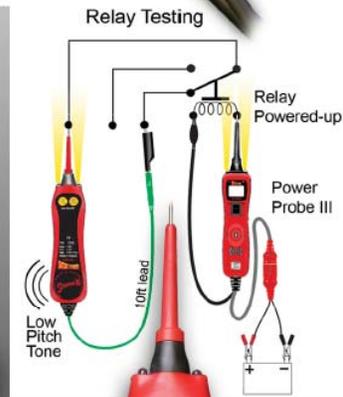


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