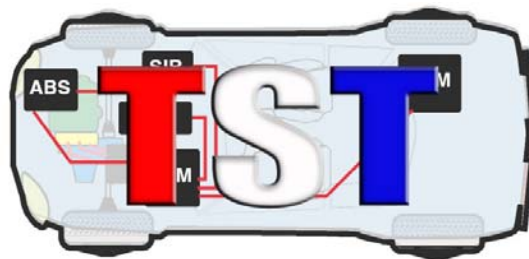


December 2012



Technicians Service Training

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Upcoming Seminars:

January 14, 15, 16, 17, 2013

Ken Zanders *Top Ten DTC*

March 23, 2013 *TST Big Event*
Instructors John Thorton and Dave De-courcey

May 13, 14, 15, 16 2013 *Instructor Dave Crippen*

TST Round Table Every 3rd Thursday at 8 pm EST

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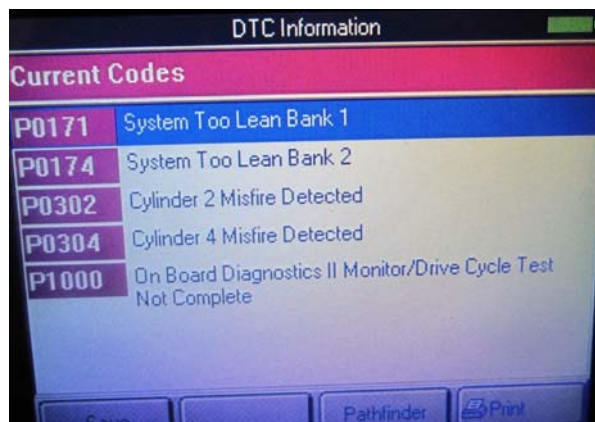
Editor

Jerry "G" Truglia

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Fuel Trim Out Of The Park

The problem vehicle that came in to the shop was a 2005 Ford Crown Victoria 4.6L V8 that had a complaint of a sometimes hard to start. The owner of this Ford does not drive it all that much since he retired, in fact this vehicle only has 25K on the clock. So since the battery was the original we decided to start our diagnosis right there. Not so hard, right? Just routine service, well you know sometimes the easy stuff just comes back to bit you. The first test that we performed



was the standard load test where we programmed in half of the CCA (Cold Cranking Amps) in to our load tester. If the battery is good the voltage should not go below 9.6 volts or it's bad. No surprise that this battery failed the test big time, with the voltage dropping down to 8.1 volts. Next we charged the battery up to perform a starter and alternator test so we could rule those component out, we found that the starter and alternator were good but the battery failed again.

(Con't on page 3)

*Technicians Service Training***11 Lupi Plaza****Mahopac, NY 10541****Phone:** (845) 628-6928**Fax:** (845) 628-9109**Email:****Info@tstseminars.org**

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Information contained in this newsletter is intended for use by professional auto repair technicians familiar with approved vehicle repair procedures. The authors are not responsible for physical injury or property damage resulting from the incorrect application of information or procedures outlined in this volume.

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



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 A.T.T.S. Inc.

Fuel Trim Out Of The Park (con't from p. 1)

So it looked like a simple fix by just replacing the battery.

A few weeks after we performed the service we received a call that the Check Engine Light was now illuminated on this Crown Vic. As you can expect the owner was thinking that we had something to do with his bright glowing MIL. All we did was install new battery, but as the saying goes once you touch it you own it. We had the customer bring the vehicle in so we could check it out and see what caused the MIL to illuminate. After hooking up our scan tool we found



Engine RPM	647	rpm
Vehicle Speed	0	mph
Throttle Position	21	%
Short Term FT Bank 2	-18.0	%
Short Term FT Bank 1	-18.8	%
Spark Advance	17	deg
Man Absolute Press	9.45	iHg
Long Term FT Bank 2	20.3	%
Long Term FT Bank 1	23.4	%

Frame: 1 Press Left Arrow to Freeze Data

Record Graph To Top More

what was causing the MIL to be on. The PCM had stored the following DTCs, P0171, P0174, P0302, P0304 and P1000. With two DTCs indicating lean codes (P0171/P0174), the two misfire DTCs (P0301/P0304) could just be a result of the engine's lean condition. We knew that we had something that was affecting both banks since the lean DTCs were present. After checking the datastream we found what we were looking for, both Short (STFT) and Long Term Fuel Trim (LTFT) values that were out of the park. Since the datastream confirmed the P0171/P0174 DTCs I knew that I had to concentrate on something that was causing both banks to run lean. The other important information that was provided via scan tool data was that the PCM was trying to make a STFT fuel adjustment. Now granted we have a long way to go in order to drop the numbers on LTFT from 20/ 23 down to normal range, about a plus (+) or minus (-) 6.

Let's review what can cause such high LTFT numbers. Now, STOP believing everything you read on the internet and don't make the awful mistake thinking that all Fords have problems with their Mass Air Flow Sensor. We need to remember before condemning a part you need to test and stop guessing that the part is bad.

(Con't on p. 7)

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Jim Bradanini
Program Administrator

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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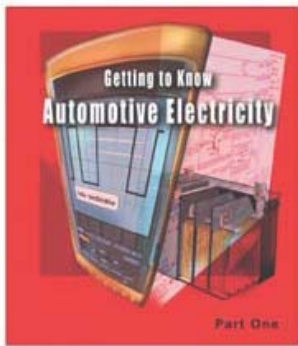
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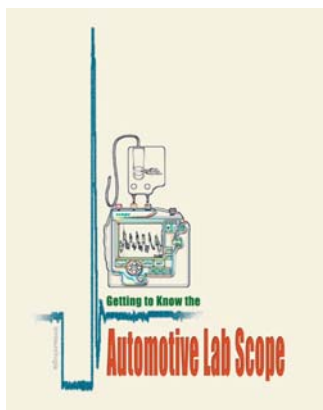
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Fuel Trim Out Of The Park (con't from p. 3)

Yes I know many techs have encountered a bunch of bad MAF sensors, but sorry to say that you would be dead wrong condemning this one. So with the MAF checking out OK, what next? How about a major vacuum leak? Would that affect both banks? Well maybe, but once again that was not the cause of this problem. Our next step was to go with something that can affect both banks, fuel delivery. A fuel delivery problem can be a result the following;

1. A voltage drop at the fuel pump or in the circuit
2. A clogged fuel filter or restriction
3. A bad fuel pump

Deciding to narrow this Fuel Trim problem down was not going to be hard. I was going to use a very simple test called current ramping. We perform this test by using an amp clamp and labscope on to the fuel pump circuit. You may ask why should we current ramp? There are two simple reasons: (1) it's the *quickest* way to see how a fuel pump is running and (2) it's the *easiest* way to see how a fuel pump is running. Quick and easy is good, right? If you are not familiar with fuel pump current ramping or just a bit rusty at using your amp clamp and scope. Well, don't worry whether you are a pro or a novice, because with just a little background we will have you understanding and testing fuel pumps like a pro.

What tools do we need to current ramp? Two tools: (1) an Amp Clamp that allows us to read amperage without taking wires apart and (2) a lab scope that allows us to look at electricity like a meter in the form of a picture.

(Con't on page 9)

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Fuel Trim Out Of The Park (con't from page 7)

The best option is to locate the fuel pump relay circuit and figure out which terminals are the fuel pump's power and ground. If there is something else in the circuit that is controlled by the relay, like ignition or injectors, then go directly to the power or ground wire for the fuel pump directly and clamp at that point. In most cases you can work smart and easy by connecting right to pin 30 (battery power) and pin 87 (load) at the fuse/relay box, in order to get a scope waveform. Use a suitable fused jumper wire and connect it to pin 30 and pin 87.

Now that you have located the correct source to the fuel pump, you should set your equipment up properly to get the best possible waveform. First let's take a look at how to set up the most common amp clamps.

1. Make sure the 9 volt battery in the amp clamp is good.
2. Select 100 mV/A. This is the best setting to use for the finest resolution on your labscope.
3. Connect your amp clamp to your scope and zero it.
4. On your lab scope select 100 mV per division or 1 V per screen.

How to tell if the waveform is good or bad is not that hard, especially if you can compare the signal to a known good. It's a great idea to save waveforms on good running vehicles for comparison in the future. If the amperage was below normal it could indicate that we have a voltage drop in the circuit or a bad pump, if the circuit has normal or above the amperage that would rule out a voltage drop problem.

Setting up the amp clamp and scope thing to know;



(Con't on page 12)

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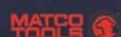


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2. Do you find the seminars useful?

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We need your support:

**Thank you,
G Truglia**

Fuel Trim Out Of The Park (con't from page 9)

1. Set the amp clamp to the 100 mV/A which equals 100 mV and is equal to 1 amp.
2. Set your labscope up to 100 mV per division or 1 volt per screen
3. With the 100 mV you can read up to 10 amps on the scope
4. When testing some fuel pump you will need to change your scope voltage settings to 200 mV so you can read up to 20 amps. Do not change the amp clamp settings.
5. Remember that a labscope does not reads amps it simply converts voltage to amperage.
6. Each vertical line that we have displayed on the scope equals one amp.
7. Now the labscope is ready to read accurate current reading from the fuel pump.
- 8.

Take a look at this OTC/MAC Tools labscope and count up the vertical lines. Note that the labscope is set to 0.1V (100 mV) and starts its counting amperage up at the A (Look at the lower left conner above the SAVE RECALL). The A is where zero amps starts and each vertical line above it equals (1) one amp.



Make sure to go to the top peaks of the waveform in order to come up with the correct amperage reading. See, who said it's hard to current ramp and come up with an accurate amperage reading?

(Con't on page 16)

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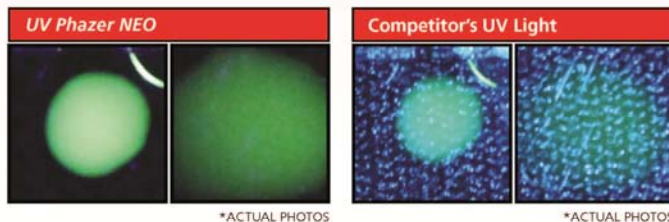
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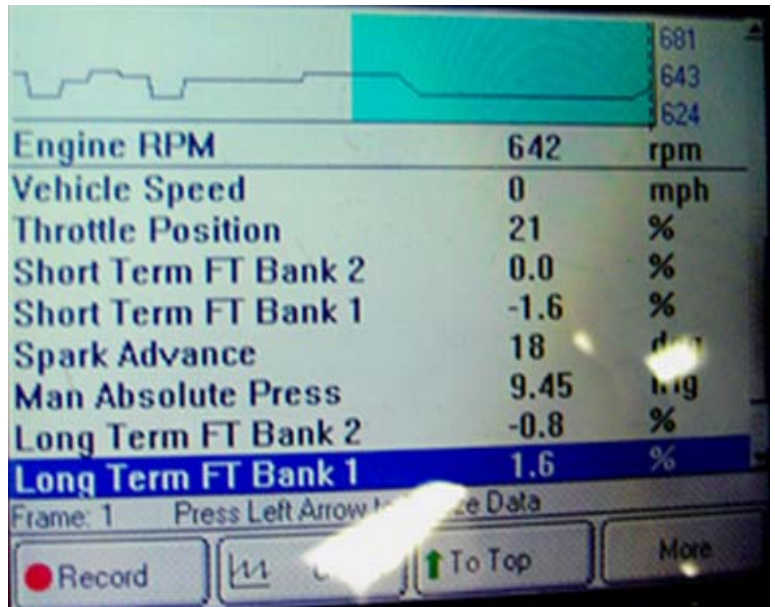
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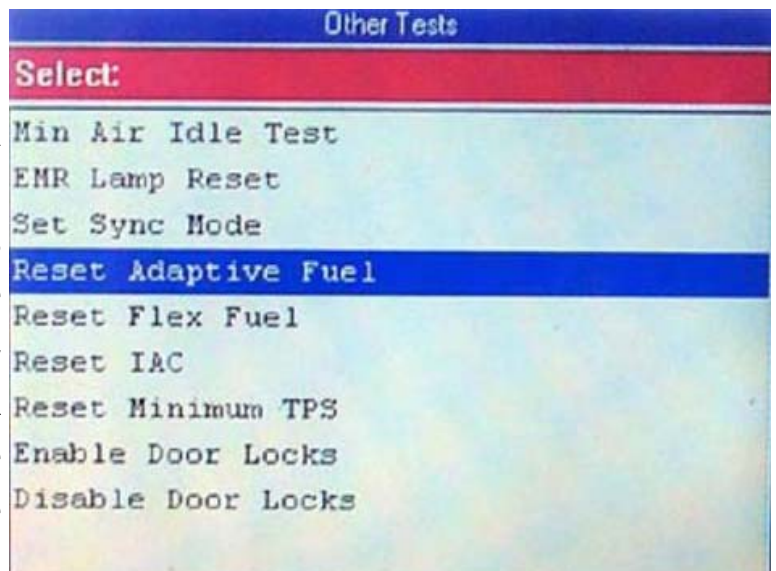


Fuel Trim Out Of The Park (con't from page 12)

The labscope is displaying 7 amps on this vehicle's fuel pump which is higher than what the reading should be. The reading could indicate a bad fuel pump due to the armature binding or a restriction in the fuel system. I always like checking the easiest and cheapest component first and in this case that's the fuel filter. We replaced the fuel filter that looked to be the original and re-checked our current reading. The amperage of the fuel pump was now down to 5.5 amps, its normal range.



Take a look at the scan tool datastream PIDs, STFT and LTFT. This is after we cleared the DTCs and reset Fuel Trim / Adaptive Fuel in order to get a quick and accurate reading. Resetting Fuel Trim is an important step before reading datastream or sending the vehicle out the door.



(Con't on page 18)

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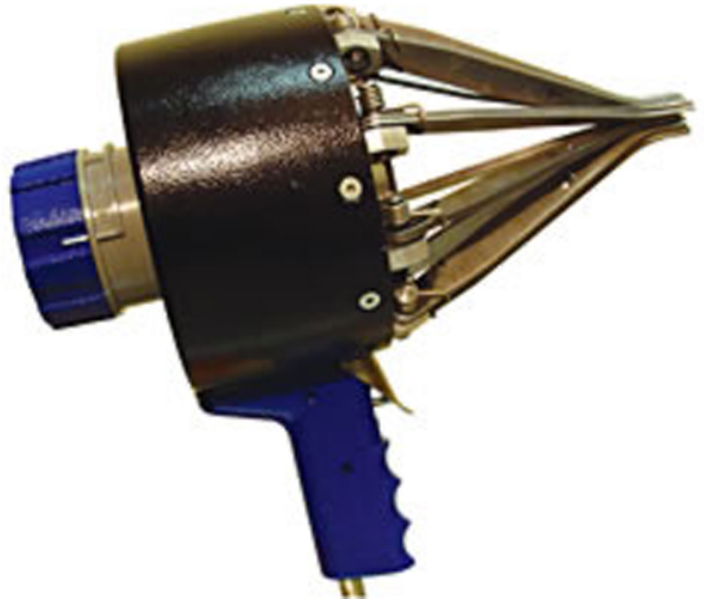
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Fuel Trim Out Of The Park (con't from page 16)

The reset should always be done when a Fuel Trim related repair, such as a clogged fuel filter, defective fuel pump or other fuel system repair is completed. If not, the vehicle may not idle correctly or properly perform. If the vehicle or scan tool does not support resetting Fuel Trim you will have to remove the key from the ignition, remove the battery terminals from the battery post and connect a one ohm/one watt resister to bring down the PCMs capacitors/memory.



Now that our problem Crown Vic is fixed and the Fuel Trim is back in the park we can move on to another vehicle.

Article by G Truglia,

ASE CMAT, CMTT, CMST, L1, CNG & TST Founder, President

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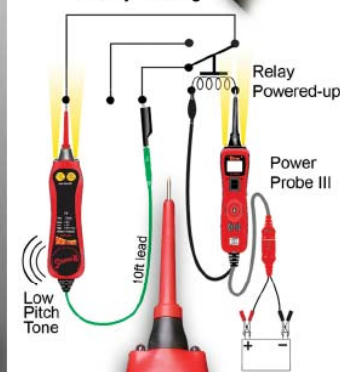
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