Technicians Service Training

INSIDE THIS ISSUE:

Upcoming Seminars:
Dave Crippen

"Solving Diagnostic Repair Issues"

April 23th, 24th, 25th & 26th, 2018

SAVE MONEY by signing up for Membership…

Seminars…$50.00 member price

2019 TST Big Event

Saturday March 30th, 2019 member price $100.00

Check out our YouTube channel tstseminars

Like us Facebook

Editor

"G" Jerry Truglia

"Asian Drivability"

With Asian vehicles being a very large part of the US automotive market, more than likely you are already working on a few of the different brands. This article will describe some of my recent experiences with Asian vehicles, and what I did to diagnosis and repair them. Let's start out with a 2009 Subaru Forester 2.5 DOHC turbo that came in with a complaint of low power.

Since this vehicle had 171k miles, it just may be in need of some normal service. A vehicle check of this Subaru revealed that the Check Engine light was not illuminated and there were no codes stored in any computer system. The vehicle owner's complaint was an intermittent noise from the engine as she was driving. Our normal routine when checking out a vehicle is to always check the basics first since any one of these can potentially cause a problem. Prior to the previous checks and test, we had performed a visual inspection, TSB look up, Identifix search and a system scan of the complete vehicle. Our next step on this Subaru was to check the mechanical condition of the engine by performing a relative compression test using one of our labscopes. Believe it or not we still use our old Fluke 98 labscope since it just turns on by pressing a button and goes right into the relative compression test with a few clicks of a button.

(Con't on page 2)

"Asian Drivability" *(con't from p. 1)*

The test is easy to perform, since all we have to do is connect the labscope leads with a filter to the positive and negative leads of the vehicle's battery post. Once the labscope is connected to the vehicle's battery, the fuel is disabled by either the Clear Flood method or removing the fuel pump relay, followed by cranking the engine over for 30 seconds or so while the test results are being displayed on the screen. We make sure to perform the test two times making sure that the test results are the same whether the results indicate a good or a bad condition. If the test indicates a cylinder problem we then proceed to connect another scope channel so we can sync to the firing order, via number one ignition. The reason to sync the scope is to confirm what cylinder in the firing order (1-3-4-2 in this case) would be identified as the problem cylinder. When we locate the weak cylinder, we request more time from the vehicle owner to perform a dry and wet compression test followed by a cylinder leak down test, so we can pin down the cylinder that has the issue.

Figure 1

Since the Subaru engine's relative compression test was good we could rule out an engine issue and continue to look elsewhere for the noise. We road tested the vehicle and thought that we heard a noise so we returned to the shop and set the vehicle up on the lift. To pinpoint the exact area of the noise, Franklin drove the vehicle on the lift while Bill and I were underneath the Subaru confirming the area the noise seemed to come from. The noise seemed loudest at the turbo, so Bill unbolted the rusty exhaust and here is what he found (Figure 1). As you can see the turbo was in bad shape (Figure 2) and needed to be replaced. To make sure the new turbo would

(Con't on page 6)

What is TST?

TST is a group of dedicated technicians and instructors committed to the continuing education of our fellow technicians. We provide 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 weekday night seminars and the occasional full Saturday seminar. With a **$75.00 yearly membership, the seminars are only $50.00. TST seminars 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 75 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 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 World Pac / Motor Magazine
Bob Pattengale of Bosch
Peter Meier of Motor Age Magazine
Ken Zanders of Illinois Air Team
"G" Jerry Truglia of A.T.T.S. Inc.

Technicians Service Training
11 Lupi Plaza
Mahopac, NY 10541
Phone: (845) 628-6928
Fax: (845) 628-9109
Email:

Info@tstseminars.org

TST on YoutTube...type in tstseminars

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:

(845) 628-6928
www.TSTseminars.org

"Asian Drivability" *(con't from p. 2)*


Figure 2

fail prematurely the oil lines where checked for proper oil flow along with the banjo bolt that connects the line to the turbo. FYI, the banjo bolt does not come with the turbo, so make sure you order it or the new turbo will fail prematurely. Subaru will not warranty the turbo if you don't install that new bolt! So, on this Subaru, we replaced the oil feed tube along with the banjo bolt that connects to right front of the engine head. Remember that the bolt is crucial for proper lubrication since the small filter that is inside it is prone to clog up. Once the repair was completed and an oil change was performed the Subaru was test driven and ready to be billed out.

Toyota Not Charging

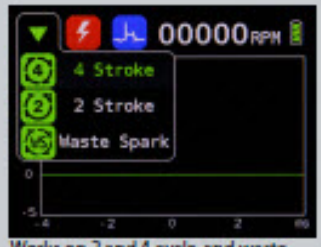
Our next Asian gem at first seemed like a typical alternator failure that needed replacement. Over the years, we have all replaced our share of alternators without encountering any real problems. Well this 2002 Toyota Camry with 222,861 miles on it with the original alternator may change your mind. It's not what you're thinking, it wasn't difficult to remove because of rust or broken bolts, in fact it was an easy removal and install. The problem was that after the alternator was installed in the vehicle it did not seem to charge and the idle seemed low. The white wire at the sensing terminal on the alternator had 11.6 volts at idle, while all the other wires had battery voltage. This is where you start to question the quality of the replacement alternator and your install. Since the alternator was a quality NAPA alternator (Figure 3), that has never let us down in the past and my top tech Bill was

(Con't on page 10)

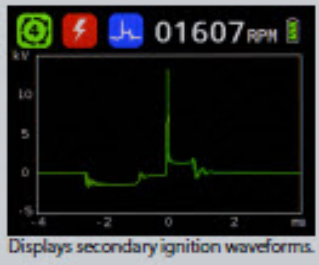

NACE
automechanika
ATLANTA
August 8 – 10, 2018
Georgia World Congress Center, Atlanta, GA
www.NACEAutomechanika.com
America's leading international trade fair for the automotive service and collision repair industry targeting trade visitors from the US & Canada
YOUR FUTURE.
MAINTAIN A COMPETITIVE EDGE – The latest tools and equipment are here.
LIKE IT? BUY IT! WE ARE NOW A SELLING SHOW!
YOUR BUSINESS.
TRAIN AND GET TRAINED – Generate new business with cutting-edge technology.
SEE HANDS-ON DEMONSTRATIONS AND MORE!
YOUR TIME.
BUILD RELATIONSHIPS – Connect with all segments of the market here.
JOIN US FOR SPECIAL NETWORKING EVENTS AND RECEPTIONS!
Register for your Expo Pass Today!
automechanika2018.expotracker.net
Stay Connected!
@AutomechanikaUS
@NACEAutomechanika
ASA
UBM
messe frankfurt

GTC505
Engine Ignition Analyzer

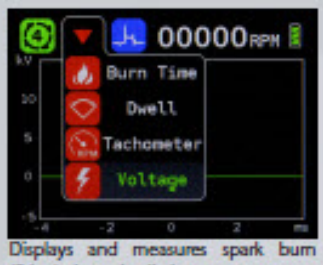
Complete ignition system diagnostic:



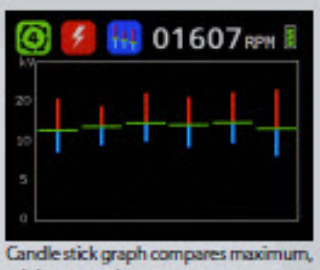
Works on 2 and 4 cycle, and waste spark ignition systems engines.



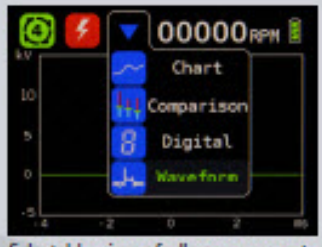
Displays secondary ignition waveforms.



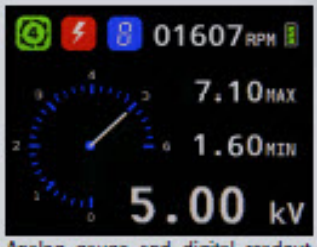
Displays and measures spark burn (firing) time, dwell time, current ramp time, RPM, and spark plug peak voltage.



Candle stick graph compares maximum, minimum and average measurements of several cylinders.



Selectable view of all measurements modes as chart, compare graph, analog gauge / digital readout and waveforms.



Analog gauge and digital readout with maximum and minimum.

Quick, powerful and easy to use

- Plug the appropiate sensor pick-up into the flexible probe
- Select the engine's cycle (4-stoke, 2-stroke, or waste spark)
- Select the measurement type and display format
- Place the pick-up on top of the ignition module, or over the spark plug wire
- The GTC505 will automatically detect and adjust all parameters to provide accurate measurements and clear graphs

Useful for troubleshooting:

- Non-starts
- Misfires
- Intermittent problems
- Primary and secondary coil circuits faults
- Fouled or damaged spark plugs
- Damaged spark plug wires


Specially designed pick-ups for coil on plug ignition modules (left) and spark plug wires (right).

Chart mode used for detecting intermittent or infrequent failures and misfires.

General Technologies Corp. #121-7350 72nd Street Delta, BC V4G 1H9 - Canada
Toll Free: 800-440-5582 / Tel: 604-952-6699 / Fax: 604-952-6690 **www.gtc.ca / info@gtc.ca**

GTC
WWW.GTC.CA

FEATURED PRODUCTS

A Family of Targeted G.D.I. Fuel System Products

Offer solutions for your customer's G.D.I. deposit problems!

The Run-Rite® G.D.I. Fuel System Cleaning Kits contain products that were specifically formulated to address the unique needs of G.D.I. engines, while still providing the same high level cleaning required on P.F.I. engines. Safe for use on: Gasoline Direct Injection, Port Fuel Injection and Turbos & Inter-coolers. Recommended every 15,000 miles or annually. The G.D.I. Preventive Maintenance Kit is recommended in between annual services, every 7,500 miles, to maintain optimum G.D.I. engine performance.

Run-Rite® 2-Step G.D.I. Fuel System Cleaning Kit

Part #7017 *12 kits/case*

Contains one bottle G.D.I. Fuel System Cleaner and one can Direct Injection Deposit Cleaner.

Run-Rite® 3-Step G.D.I. Fuel System Cleaning Kit

Part #1077 *8 kits/case*

Contains one bottle G.D.I. Fuel System Cleaner, one can Direct Injection Deposit Cleaner and one bottle G.D.I. Oil System Treatment.

Run-Rite® G.D.I. Preventive Maintenance Kit

Part #1501 *12 kits/case*

Contains one bottle of Sledgehammer and a Fuel Shot.

BATTERY

Run-Rite® Battery Maintenance Kit

Part #6210 *12 kits/case*

- 2-step kit containing Battery Wash and Battery Corrosion Protectant

RE-INTRODUCING

iQ3 Performance Oil

Part #7300 *12 bottles/case*

- Engineered for higher performance, reduced emissions & increased fuel economy.
- 1 quart

1-800-872-8921 **www.Run-Rite.com**

"Asian Drivability" *(con't from p. 6)*

working on it, neither one was likely the problem. This is where information systems come into play, in this case when we encounter something like this we go directly to Identifix. If there is no information in Identifix we go to iATN, Mitchell, Alldata, Motologic, YouTube and Google. As we searched Identifix we found the problem that we encountered listed right on their main page of our search. They provided the following test procedures: 1.) Voltage drop the White wire to see why it is only 11.6 volts. Run a jumper wire between the battery and the White wire at the alternator and re-check to see if the alternator will charge. 2.) Clean the battery terminal connections and clean the battery cable ends at the transmission and the body connections. 3.) Check the alternator and try a new source if the new alternator is faulty. We performed the recommended procedures and found all of them to be in specification. We followed the Identifix suggestion of performing a throttle body cleaning procedure as described. Once we were finished with the cleaning the idle returned to normal and the alternator was charging normal. Now it seems hard to believe that a dirty throttle body could cause a charging and low idle issue. Remember that you don't know what you don't know, we learn something new every day, and we certainly did.

Figure 3

2016 Mazda CX-5 Crash Related Issues

The next vehicle came in from one of the body shops we do work for that had nine body, (Figure 4), one network and one chassis

(Con't on page 11)

"Asian Drivability" *(con't from p. 10)*

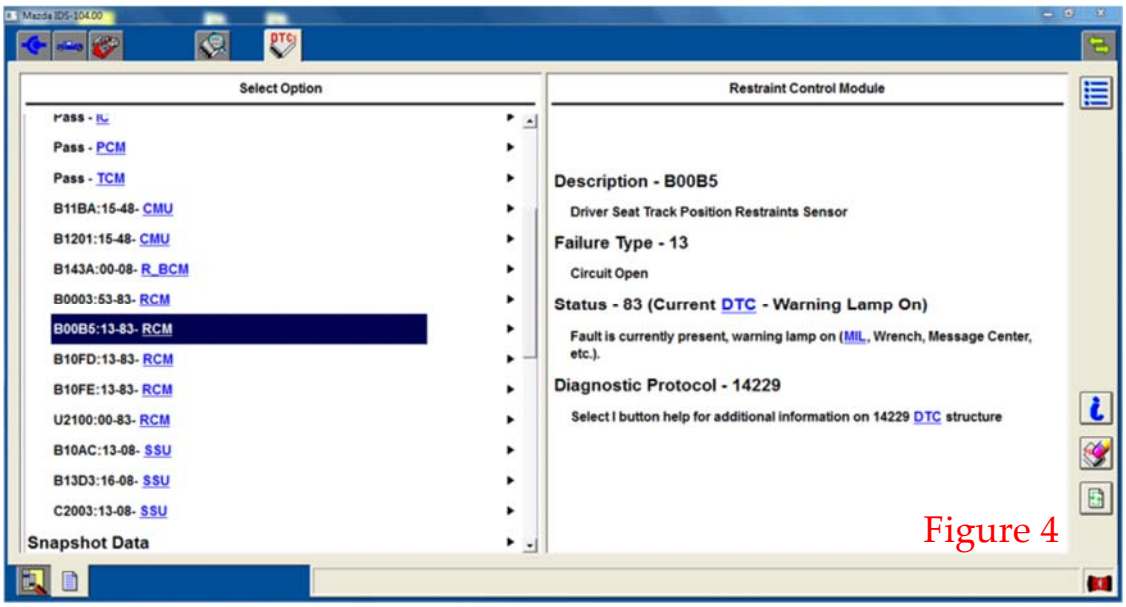


Figure 4

DTC. The vehicle was a 2016 Mazda CX-5 with 8,800 miles that was involved in a collision and had been repaired. The dash had the airbag, seat belt and a couple of more icons illuminated. Knowing that the vehicle was new, we decided that the only scan tool that would capable to perform a complete and accurate vehicle scan would be the Mazda IDS. We needed to perform a test on the SRS system then initialize components and perform other resets that only would be available with factory software.

After we performed the vehicle scan we identified the problems and tried to perform coding and resets that are commonly performed. On this new Mazda, the coding and reset functions would not reset the airbag, seat belt or other systems or extinguish the illuminated lights. The only way we could reset all the DTCs, and let the computers realize that the new parts were installed, was to go into the scan tool programing functions. This was a change from the normal way that we usually get the vehicle back to proper operation. We now had to change direction and go into module configuration and (Figure 4) find the As Built Data (Figure 5) to complete the operation. This is a similar function that is used by Ford Motor company since they both use the same scan tool manufacturer. Once we completed the programming we were able to perform a seat belt calibration, steering wheel, audio pack, crash event, driver seat track, driver/passenger side peripheral sensor, to name a few, resets.

The lesson learned with this vehicle is that on some of

(Con't on page 14)

"Asian Drivability" (con't from p. 11)

these newer vehicles you may need to have the OE scan tool and the ability to think out of the box. When no directions are available on how to reset a system or component you have to draw down on your past experience and come up with a different approach. By trying something different than just a reset or calibration that refused to work, led me to reprogramming the modules that restored this Mazda to new condition. With so many different scan tools and OE's that using many different methods, you need to take your time and carefully explore all the functions in their scan tools or you won't fix the vehicle.

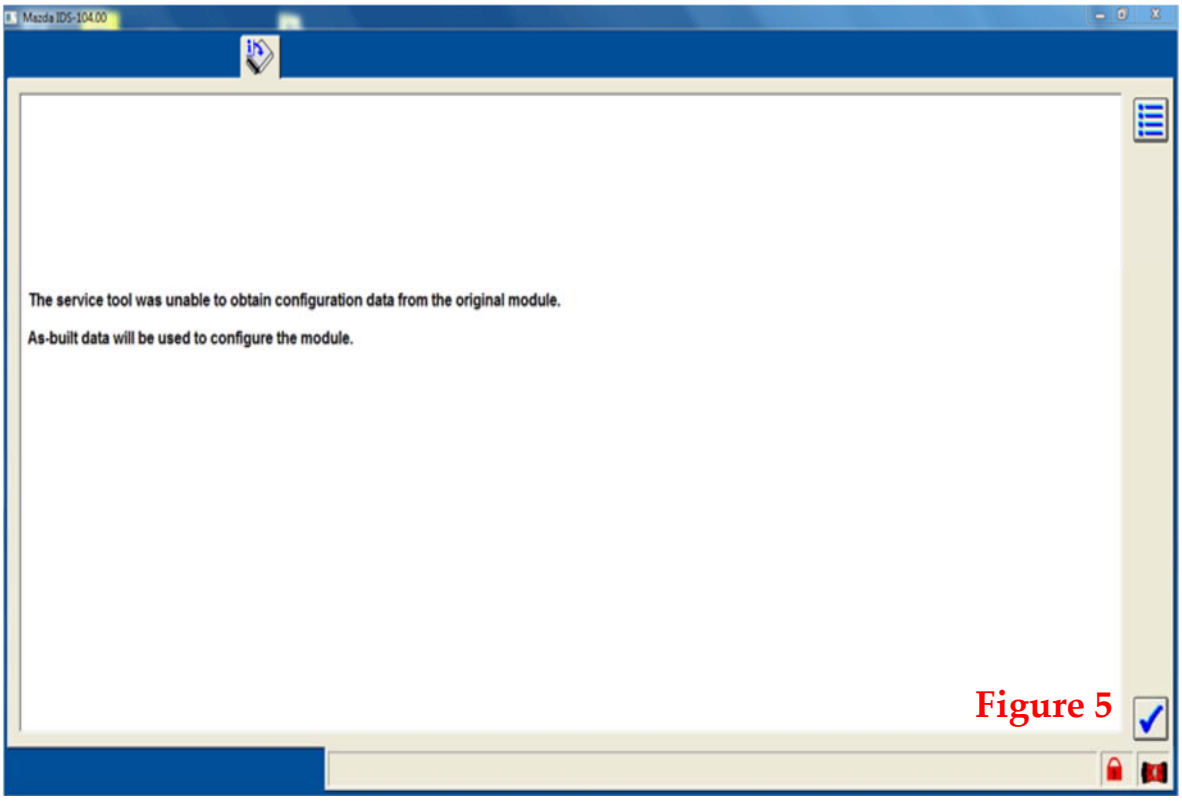


Figure 5

Hyundai Accent Illuminated MIL

A 2009 Hyundai Accent 1.6 L with 79k on it came in with an illuminated MIL. The vehicle was already to a local shop for a tune up that replaced the plugs, coils, air filter and performed and injection cleaning service. The vehicle owner did not understand why the vehicle was still illuminating the MIL so she decided to have us diagnosis it. After checking the vehicle out, we found that the wrong spark plugs were installed so we suggested that they be replaced with the OE plugs for starters. We also found a TSB in ALLDATA (Figure 6) that pertained to engine misfire, stating a P0300 to P0304 could all be displayed as a result of a software issue. We recommended to the vehicle owner that

(Con't on page 20)

AE TOOLS & COMPUTERS

At AE Tools & Computers we help the aftermarket repair facility do everything the OEM dealer can do with regards to diagnostics. We give them the ability to keep their customer's vehicles in their bays through completion of the repair. This generally starts with a phone consultation to determine the TRUE needs of the individual repair facility. We do not want to just sell another tool. We want to sell the tool that meets the needs of the repair shop that we are servicing. We are selling Solutions.

YOU'VE GOT TECH SUPPORT

Simply call us when you have questions or problems. We will log in remotely to help you through the issues you are having. This support is REAL. This is not cable replacement support. Anyone can do that. We are actually helping you with the things that get the lights to go out on the dash, so you can deliver the car to the customer, get paid and move on to the next job.

HAVE QUESTIONS? TALK TO A REAL PERSON!

913.856.6678

LIVE SUPPORT HOURS MONDAY - FRIDAY 8 AM - 6 PM CST

SUPPORT@AETOOLS.US

WWW.AETOOLS.US

WHAT MAKES OUR LAPTOPS SO SPECIAL?

"Asian Drivability" (con't from p. 14)

we update the software to get her computer up to date. We prepared the vehicle for the update program by first making sure that everything was working properly on the vehicle and making sure to shut off everything so the computer programming would not be interrupted. Next, we installed a battery maintainer, connected the Drew Tech M box to our laptop and the vehicle's OBD II connector then downloaded the Hyundai J2534 (Figure 7) software. Once the software was installed we made sure to check for DTC along with checking the

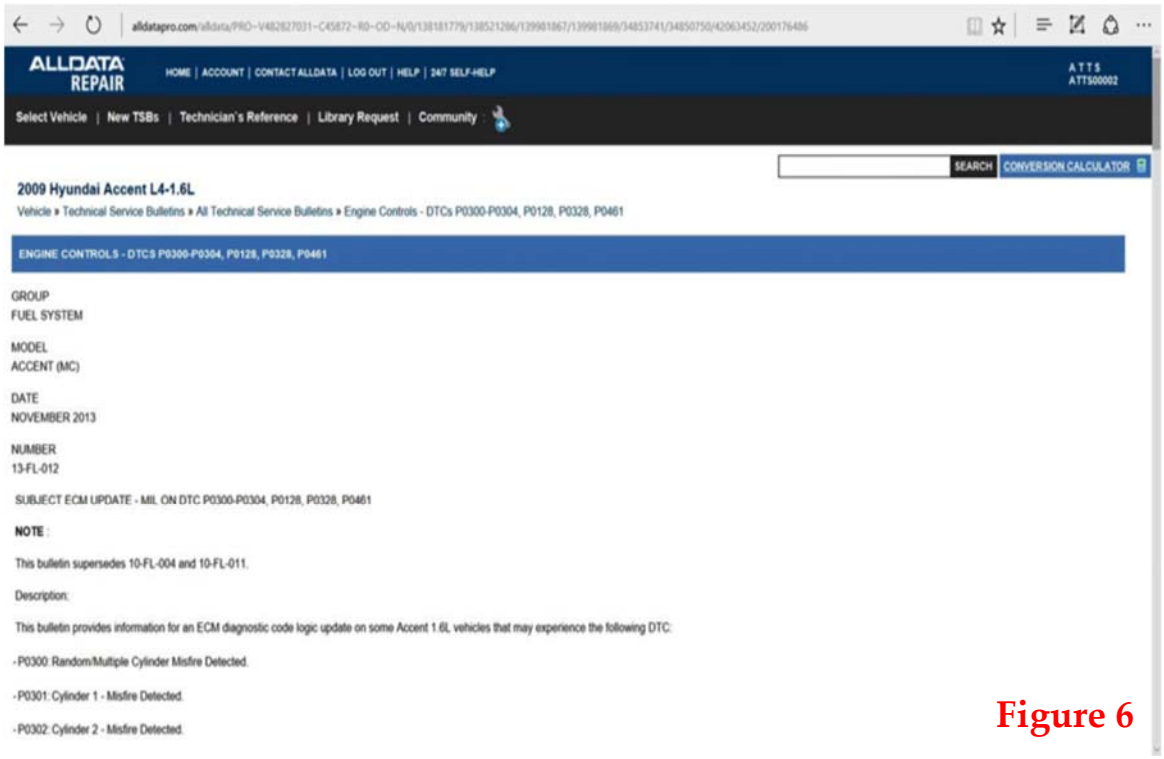


Figure 6

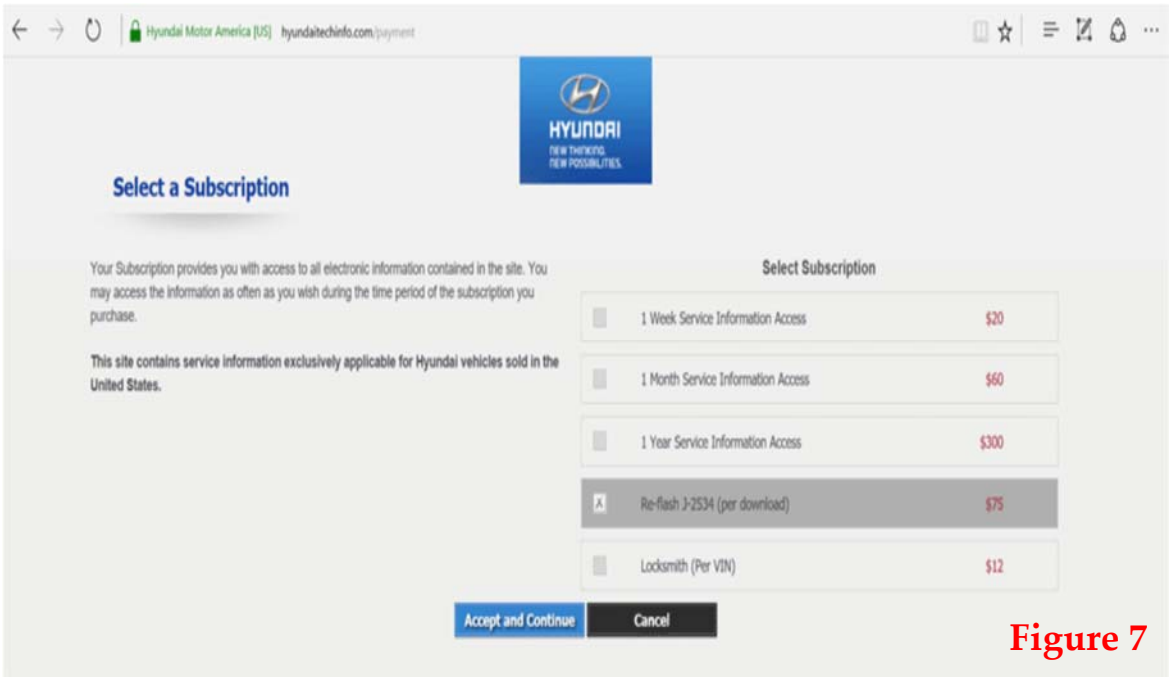


Figure 7

(Con't on page 21)

"Asian Drivability" *(con't from p. 20)*

Drew Tech Tool Box to see if there are any special procedures such as crank/cam relearn that would be required. The procedure went well so we disconnected the equipment and test drove the vehicle. We reconnected the scan tool to confirm that there were no DTCs, misfires, or Mode 6 failures. We explained the repairs to the vehicle owner and provided her with pictures of the reprograming confirmation screen and the TSB. Now the vehicle was ready to hit the road with its happy owner.

Kia Sedona P0430 Catalytic Inefficiency

A 2005 Kia Sedona 3.5L came in with a P0430 Catalytic Inefficiency DTC due to a few issues. Remember the cat just doesn't decide to die, rather it's been poisoned for a while before failing.

In the case of this Sedona we found that the LTFT was at -19 on both banks that logged high numbers at idle and in the middle of the Fuel Trim graph on our ES-can. We also found that MAF sensor voltage at idle was 0.9 V when the specification is 1.2 V so we performed a Volumetric

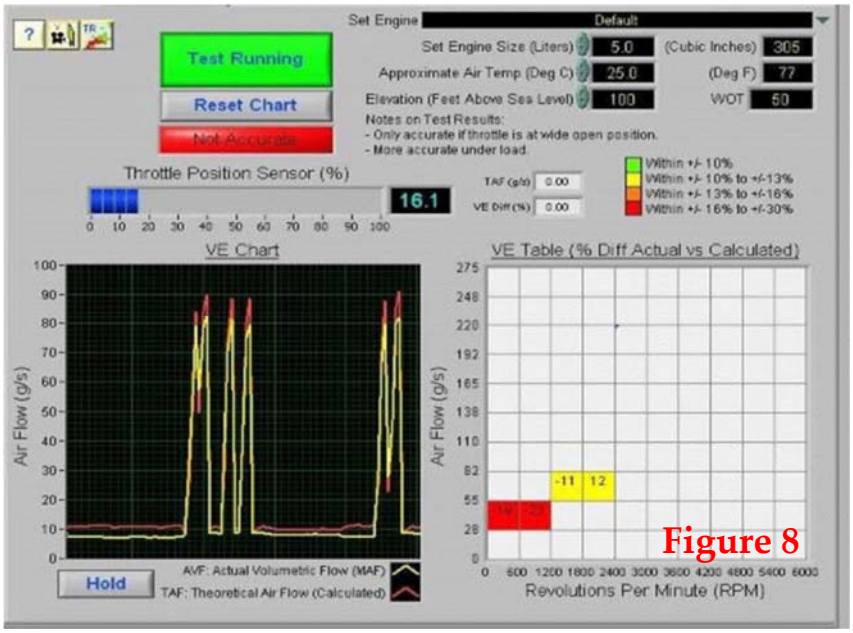


Figure 8

(Con't on page 22)

"Asian Drivability" (con't from p. 21)

Efficiency test (Figure 8) on the EScan. The test failed.
If you don't have the EScan, just look at any generic scan tool and select the Calculated Load PID, select graphing, followed by pressing the pedal to the metal. When WOT is obtained (I do a rolling start and graph the PID, waiting to catch it at the 1-2 shift) you can expect to see at least 90 percent or better if the MAF and intake system is functioning properly. Since we know that extra fuel is what kills the catalytic converter, we now found our defective part that was causing the problem.
We installed a new MAF sensor, but the converter still failed the test. We called the vehicle owner and explained the converter also needed to be replaced, he agreed so we replaced it. Now the vehicle would have a better chance of passing the OBD II emission inspection.
Unfortunately, even after replacing the parts the vehicle still had a problem with a high negative Fuel Trim on both banks. We know normally that only mechanical conditions cause the PCM to issue a command to reduce the amount of fuel being delivered to the engine. We had to continue looking for any mechanical problems that could be the cause such as high fuel pressure, bad fuel pressure regulator, leaking injectors, open EVAP purge valve, timing issues or even a bad computer. The first place for us to start was checking fuel pressure to make sure it was at 39 psi, which it was. Now we moved on to the EVAP Purge solenoid making sure that it would open and close all the way while watching STFT readings. The test results for the EVAP solenoid were also good, so we now moved on to test the fuel injectors.
We decided to perform a hydrocarbon per cylinder test since it the easier of the two injector tests that we can use on this engine. We removed the ignition coil, wire and spark plug to each cylinder and inserted out gas analyzer probe in the cylinder (engine off) while observing the HC readings. We found that two of the cylinders where particularly out of range with a reading of 2,000 PPM HC versus 100 PPM HC in the other cylinders. With the HC reading at 2000 PPM in those two cylinders it indicated that the injectors were either leaking or not spraying the fuel properly causing puddling.
To confirm the previous test results, we decided to

(Con't on page 23)

"Asian Drivability" (con't from p. 22)

perform an injector balance test. The injector balance test requires a fuel pressure tester that was previous installed on the fuel test port along with a special injector tester that is connected directly to the fuel injector. The next step was making sure the tester was set to the 500 ms (Figure 9) setting, while pressing the activation button on the tool. We observed the pressure drop reading on the fuel gauge and recorded the results. After the initial pressure drop the ignition key was cycled so the fuel pressure could build back up to the normal limit before repeating the test. After the second test, we started the engine up to prevent hydrostatic lock and came up with the same two cylinders that had the high HCs. The two bad injectors dropped the fuel pressure over 2 PSI while the maximum reading is 1.5 PSI. The other four injectors dropped the fuel pressure by 1 PSI and passed the test.

Figure 9

Since we have a fuel injector flow bench we were able to test the injectors for volume while confirming the results of the previous test. The two failed injectors were not spraying the fuel in a conical pattern but rather in a stream. We removed the small injector screens from the top of the injectors and ultrasonically cleaned the injectors. After the injectors were finished being cleaned we installed new injector screens and flow tested all injectors for proper spray pattern and volume. Now that all the injectors were spraying the properly it was time to reinstall them in the engine and check the fuel trim numbers again.

(Con't on page 24)

"Asian Drivability" *(con't from p. 23)*

The trim numbers were still out of range, although better at a -14 reading for both banks. Ruling all the mechanically components out we had to look elsewhere. Checking TSBs, we located a PCM update that displayed the PCM calibration that were several software updates out of date. We tried three different J2534 programming tools to perform the software update but the PCM refuse the request each time. Just to make sure we did not miss anything we checked powers and grounds making sure they were all in specification. Now our only choice in getting the fuel trim numbers back to normal was to install a new computer in the vehicle and program it with the latest software. With the new computer and software installed the vehicle ran perfect. The vehicle passed the inspection and ran the way it was designed.

Article By
"G" Truglia
TST Founder and President
ASE World Class Triple Master
L1, L3, F1, A9, X1 C1, Technician

TST 2018 15th Annual BIG EVENT

TST would like to Thank You for being a part of the Signal LARGEST Technician Training event in one room.

The TST 2018 BIG EVENT is the FIRST "Go Green" - (No Paper Manuals) - Technician Training Event in the COUNTRY.

THANK YOU TO ALL OUR TST SPONSORS

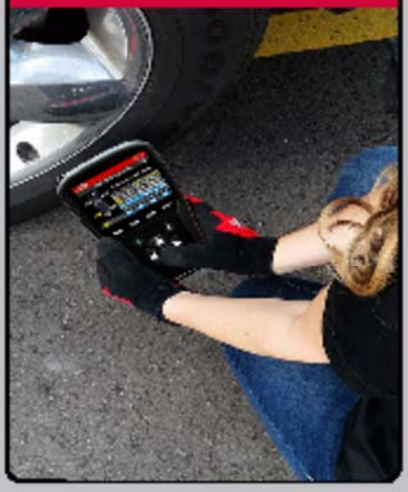
ATEQ

FACTS ABOUT TPMS

- Before TPMS, flat tires and blow outs contributed to more than 78,000 crashes, 10,000 injuries and 400 fatalities each year
- During normal driving conditions, tires lose 1.5 psi each month
- TPMS reduces the chances of having one or more severely under inflated tires by 56%

1 Scan VIN barcode for Make, Model, Year selection

2 Trigger each sensor to read all sensor information



3 Relearn TPMS with step-by-step instructions

DIAGNOSE TPMS WITH AN ATEQ TPMS TOOL - KEEP YOUR CUSTOMERS SAFE ON THE ROAD

ateq-tpms.com

eSCOPE ELITE4™

Electronic Lab Scope 4 Channel

eSCOPE ELITE4 (ESL3100)

eSCOPE ELITE4
with Surface Pro 4 Tablet
(ESL3000)

eSCOPE ELITE4
Handle Articulation

eSCOPE ELITE4 - 4 Channel scope

- **Capture All Data:** ATS' unique circular buffer system does not drop data.
- **Ultra Sharp Waveforms:** No need for filters that can mask data. ATS designs our scopes so the signal is accurate and clean.
- **Dual Time Base:** This allows two different frequencies to be displayed on one screen with two different scope displays, simultaneously.
- **Pull Down Circuit:** A Controlled pulse that sinks power from vehicle circuit to ground. Control circuits like ignition coils, fuel injectors and solenoids.
- **TTL Output:** Sends a 0-5v square wave signal out of scope. Turn on devices such as ignition coil drivers, test vehicle's circuits, and test vehicle's circuits for loading.
- **Automatic Test Lead Connection Detection:** This unique feature allows you to know the scope lead has a good connection. "Red"= Bad connection. "Green"= Good connection. It's that easy!
- **Patented Overlay Technology:** ATS' unique programming overlays an engine cycle grid over your waveforms.
- **Automatic voltage attenuator:** Just change the voltage setting and the scope does the rest.
- **Deep Record Function:** No time, voltage, or trigger setup needed.
- **Pressure Transducers:** Drives four pressure transducers at once.

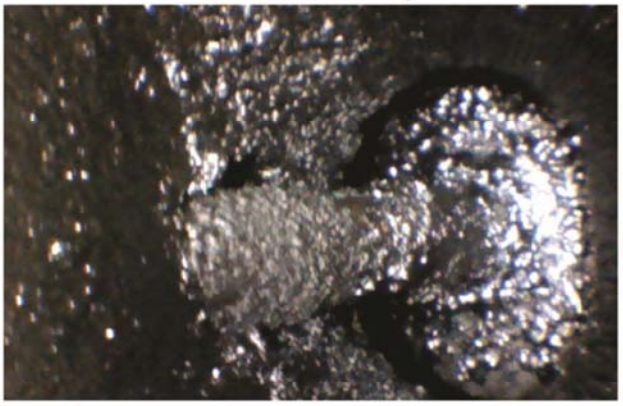
ATS AUTOMOTIVE Test Solutions **www.atsnm.com** **1.800.572.6112**

Finally...

A Cleaning Solution That Actually Works!

1.6L Turbo Mini Cooper at 83,000 miles

Before Cleaning



After Cleaning

3C Intelligent Induction Cleaner

Patent Pending

3C Intelligent Induction Cleaner (Patent Pending) removes heavy carbon deposits from the internal combustion engine's induction system in just 20 minutes.

Air Assist Injection Nozzle (Patent Pending) delivers chemical in small droplets that are suspended and carried to the carbon deposits by the engine's air flow. This air assisted nozzle is superior to any other nozzle available for carbon removal.

Chemical Layering (Patent Pending) removes more carbon because it alters the application of chemical mixtures between chemical A and Chemical B in on/off cycles, then washes the induction system with Chemical C.

Micro-Burst Injection Technology (Patent Pending) delivers the maximum amount of chemical during the cleaning process while still allowing the engine to run well.

3C Chemical A, 3C Chemical B, 3C Chemical C (Patent Pending) are laboratory proven to remove more carbon weight from different carbon types than any other commercially available induction carbon cleaning chemical, while having a low HMIS heath rating of (2).

ATS CHEMICAL atschemicals.com 800.572.6112