

TOP 5

REVENUE GENERATING OPPORTUNITIES



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\$



\$



\$



39  **Reflashing**

42  **Electrical**

46  **TPMS**

50  **A/C Service**

52  **Hybrids**



REVENUE OPPORTUNITIES WITH REFLASHING AND REPROGRAMMING

Significant changes to vehicles over the past several years require a new arsenal of tools to address maintenance and repairs.

by Erica Schueller, Contributing Editor

Beginning with model year 2018, automakers will be required to provide all OBD-II information necessary for diagnosis and repair of vehicles. This includes the OEM software information needed to complete vehicle reflashing.

Reflashing, sometimes referred to as reprogramming, is the process of updating a vehicle's ECU calibration software with an updated version of the software.

"The J2534 market has seen significant changes over the past (several) years," says Glen Eaton, Product Manager, J2534 Products, Drew Technologies. "With later vehicle models having more and more modules and sensors, more manufacturers are providing more ECU programming capabilities and relearn procedures than ever before. Tool manufacturers and OEs alike have made significant improvements in how the tools are made and how the software is written."

Before having access to the necessary information to complete reflashing, independent repair shops would send customers back to the dealership to have this service completed, or they might call a mobile diagnostic technician complete the service.

"Programming has been, and is now even more of, an important tool to add to the shop's toolbox," Eaton says. "What better way to increase a shop's capability and service opportunities than to have their own J2534 tool? Without one, the shop is sending the vehicle elsewhere for that service, or simply



turning away business. Imagine the extra time required to send the vehicle elsewhere, perhaps involving towing as well and holding the customer's vehicle for a longer period of time. Add all the negative aspects together of not owning a J2534 device, then the cost of owning one becomes a no-brainer," says Eaton.

Prior to this standardization, many OEMs would use their own unique software language to communicate with a vehicle's ECU for software updates. "This made diagnostics and reprogramming different for every manufacturer, even individual car platforms within the same manufacturer," says John McNelis, Manager, Sales and Marketing, DG Technologies. "Tool and software developers had to communicate with all of these different formats" prior to the J2534 standard.

▲ J2534 Reflashing with CardAQ-2

Photo: Drew Technologies

In 2004, SAE International J2534 Standard was introduced to "Provide the framework to allow reprogramming software applications from all vehicle manufacturers the flexibility to work with multiple vehicle data link interface tools from multiple tool suppliers," according to the SAE International website.

Essentially, this allows the automotive aftermarket access to any emission-related programming OEM information in a standardized format.

The J2534 standard was solidified with the implementation and adoption of the Right to Repair Memorandum of Understanding (MOU).

The MOU states automakers must be voluntarily compliant (or, in the case



of the state of Massachusetts, mandated) to provide access to OE level data to consumers and the automotive aftermarket. This include access to diagnostic and repair information, at the dealer level, for 2002 and newer vehicles; as well as pass-thru support beginning with 2018 model year vehicles.

However, many automakers have agreed to go above and beyond the minimum requirement from the MOU.

"While the mandate of Right to Repair is for model year 2018 (and beyond) for full module programming and diagnostic capabilities, many OEMs have provided these capabilities as far back as 1996," Eaton says.

What's the actual process for

completing vehicle reflashing? There is some setup involved. Users must first have the necessary equipment on hand – a Windows platform computer connected to a J2534-compliant pass-thru device, which is then connected to the vehicle through the OBD-II port – and obtain access to the OE software to aid in the reflashing.

After setup, users start the reflashing process and follow the computer prompts to complete it.

The OEM subscription information will be the variable which changes for every reflashing event, because it's dependent on how much the OEM charges for this information.

"The user must pay to subscribe to

the OEM service website to access the latest vehicle software calibration files," says John McNelis, Manager, Sales and Marketing, DG Technologies.

And that price tag varies substantially, depending on the vehicle manufacturer. "Many start at \$24.95 per day, but some require an annual subscription ranging from \$750 to \$1,300 per year," he explains.

"This separation of reprogramming and diagnostics for newer cars and older cars is a major factor in the price difference of some interface adapter tools on the market today. Distributors and shop owners should buy and sell tools that will do both. They are more expensive," says McNelis. **PTEN**

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ARTICLE

THE PREVALENCE OF VEHICLE PROGRAMMING

J2534 programming continues to become more commonplace for many aftermarket shops. But how do shops make the most of this service?

How and when should you program computer modules on today's vehicles? First, let's come to agreement on some terms: flash, reflash, program, reprogram and software update are universally used to mean installing or updating software in a module or modules of a vehicle.

To read the full article, visit:

VEHICLESERVICEPROS.COM/10898619

TECH TIP

CONSIDER INTELLIGENT BATTERY CHARGERS WITH A POWER SUPPLY FOR FASTER ROI

When deciding which battery charger or battery service equipment to use or purchase, consider a piece of equipment that provides multiple features.

Read more online:

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TOOL REVIEW

DREW TECHNOLOGIES REMOTE ASSISTED PROGRAMMING (RAP) KIT

The Drew Technologies Remote Assisted Programming (RAP) Kit provides

shop technicians the ability to complete J2534 ECU reprogramming updates and electronically-controlled parts replacements, with no start-up or equipment costs, or specialized training. See more at:

VEHICLESERVICEPROS.COM/20846132



OFFERS CONTROLLED BATTERY CHARGING

The **Midtronics Controlled Charger**, No. MCC-070, offers controlled charging to service different battery types (regular lead acid, AGM, EFB, Li-ion ready), app-driven charging routines and wireless connectivity to support automated software updates. The MCC-070 features J2534 reflashing support, quick fill, and full charging capabilities, on demand current and constant clean voltage to the vehicle battery for the extended period of time required to update the vehicle computer software, selectable voltage levels from 11V to 16V DC (0.1 VDC), pre-programmed applications and a streamlined user interface. The charger has full integration with Midtronics equipment and data system in an advanced battery management solution; also functional as a standalone product.

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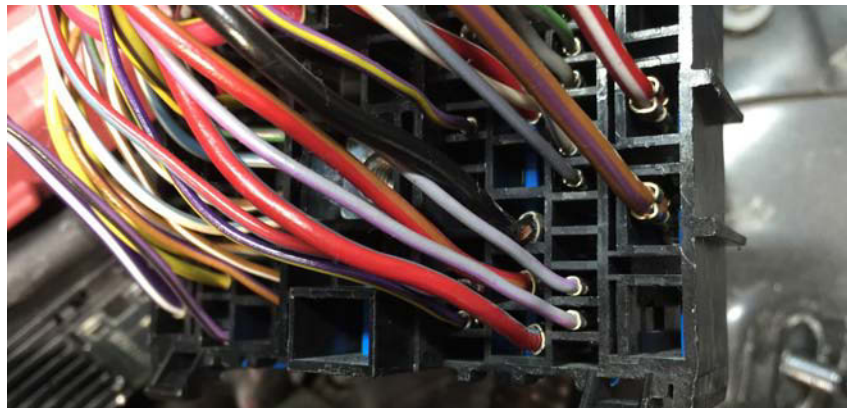
As vehicles become increasingly autonomous, electrical systems become increasingly complex, creating revenue opportunities for repair shops and technicians that learn to complete electrical work well.

by Stefanie Von Rueden, Assistant Editor

Vehicles are reliant on an extensive network of controllers, electronics, wiring, computers and coding that controls everything from fuel management to transmission shifts, ABS, stability control, TPMS sensors and more. This creates a huge revenue opportunity for vehicle repair shops and technicians. According to Justin Fisette of Bosch Automotive Service Solutions, electrical work is a significant revenue opportunity because of the volume of work. “Consumers expect more of their vehicles, and with autonomous driving on the horizon, vehicle repair will center on electronics as drivers put on more miles and vehicles last longer,” Fisette says.

“Many techs shy away from electrical diagnostic testing,” adds Ron Kirsch, a Snap-on private label meter supplier. “It can be a frustrating and time-consuming job if you do not have the right test equipment and experience. Electrical systems and components continue to grow in popularity. Some techs send that type of work to other shops or do not fix the problem correctly. That opens up new opportunities for those that learn how to complete electrical work well.”

Electrical work has grown to be a major repair category, with increasingly complex tools to pinpoint and verify vehicle problems. “In the past, you really only needed a multimeter, circuit tester and maybe a few probes to check wiring connections. Now, specialized test



▲ This image shows the wiring in one of the connectors to the fuse/relay center. Note the black wire which shows heat damage (shrunk insulation, deformed connector).

Photo: B. Hoyland

equipment is needed to fix the vehicle correctly and avoid comebacks. The emergence of hybrids, electric vehicle and high-voltage systems also require more electrical system testing, training and knowledge,” Bosch’s Fisette says.

This rapidly changing and growing repair category can make electrical service difficult. It also proves the value of experienced, knowledgeable technicians. New technology such as automatic emergency braking, lane keep assist, lane departure warning, adaptive cruise control and automated driving technologies rely on electrical systems, and will need to be diagnosed and repaired. These systems and technologies continually evolve to become more efficient, convenient and cost effective.

“More and more electronics on vehicles like cameras, video equipment, evasive action sensors, alarms, etc. will require more electrical repair,” Snap-on’s Kirsch says. “These will require even more sophisticated repair and diagnostic skills.”

Having access to the correct

electrical system diagnostic tools can help increase revenue for the shop or for technicians by helping technicians diagnose vehicles faster. Diagnosing complex electrical systems is one of the hardest parts of electrical system work. Diagnostic equipment helps ensure that technicians are only replacing the parts that need to be replaced, not replacing a part only to find out that it was actually an issue further down the electrical circuit. Tools that include repair info, vehicle data, wiring diagrams, likely fixes and test parameters can help technicians ensure accurate electrical system diagnostics.

Tools that are currently available for electrical system work include battery and charging system testers, battery monitor reset tools, battery chargers, oscilloscopes, digital multimeters, scan tools, specialty electrical system test tools and circuit testers. **PTEN**



Diagnosing and repairing catastrophic electrical issues

A comprehensive repair helps to alleviate comeback concerns and allows shops to see profit-making potential.

by Barry Hoyland, Contributing Editor

Most technicians fall into one of two categories about how to deal with a catastrophic electrical failure (meaning, an electrical issue which causes a fire): they either embrace them, or want to run fast and far away from them.

Having a full understanding of what is necessary to perform a complete diagnosis, a comprehensive repair and verifying full functionality will not only help alleviate comeback concerns, but will allow you to see the profit-making potential in electrical repair.

The worst electrical failures you will see are fires where the damage is so severe you may not be able to determine the component that started the fire. In these cases, it will be necessary to repair the damage that is visible and test every component that is connected or driven by wiring or other components within the same system. An example of this would be testing any and all solenoids and actuators in the system to assure none of them are shorted or open, and they all function properly.

Step 1: Determine the extent of damage

Determining the extent of the damage will allow you to plan the best way to perform the repair.

If wiring harness damage is extensive, it may be more cost-effective to replace either part or the whole harness, rather than splice in numerous wires. Either way, it will be necessary to use your vehicle information source to access the wiring diagram, component locator and system specifications. The wiring diagram will not only assist in providing information such as wire color, routing and connections, but also details about what other components may have been affected or even the cause of the fire. A component locator will assist you in finding the exact location of components, splices and

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ground locations in order to perform necessary tests.

System and component specifications will allow you to test individual components to determine if they are functioning and have not been damaged in the fire.

Testing solenoids to assure resistance is within specifications can be done with your digital multimeter. Solenoids should also be tested by removing them from the vehicle and bench testing them to make sure they open and close completely when applying power and ground. These tests can be easily accomplished with a Power Probe which allow you to apply power and ground with the flip of switch.

Another critical step in determining the extent of damage is to inspect all connectors. This step starts with a visual inspection of the housing and pins to see if there is any discoloration or deformities. It is also necessary to use a pin tension tool to make sure heat has not weakened the ability of a terminal to form a tight connection to its' mating pin. These tools are made up of a male pin that has the same diameter of the original connector and is used by sliding it into the female terminal to make sure sufficient drag is felt. Terminals that do not have the correct tension will create heat and a subsequent failure and will require replacement.

Step 2: Repair wiring damage

Take these steps into consideration when forming your repair plan:

Once you have determined the extent of the damage including which parts and wires will need replacing, you will need to determine the best way to perform the wiring repairs. This includes making the determination if a complete new or used harness would be preferred over repairing the existing one.

If connector mating pins require removal from their housing, use a connector pin removing tool to remove pins from their mating housings. These tools



▲ *Wire stripped too far will not seat into the crimp housing, and will also leave the wire un-insulated, possibly causing a short.*



▲ *Image of a terminal that has been over-crimped. Notice where the insulator is spread out at the crimp.*

will allow you to remove the pins without damaging the pin or housing in order to be reused.

Pay attention to the routing of harnesses prior to removal to make sure any splices will be made in areas that are not too close to components or in a curved area.

If only a small area of wiring is damaged, you may be able to cut out the burned sections and use splice connectors and crimp them in. Personally, I am not a fan of crimp splice connectors unless they are the ones that are filled with solder and also use a built-in heat shrink compound. These connections provide a secure water-tight connection that will remain trouble-free.

If there is extensive damage requiring multiple wire splices, it is usually better to remove the harness completely from the vehicle. With the harness removed you will be able to lay it out and install splices in a staggered position. If all the splices are laid out at the same point, the spliced area becomes a much larger diameter than original and may be difficult to work with. With the wiring harness removed from the vehicle it is also much easier to install protective loom and tape.



▲ *When crimping connectors, make sure to crimp to the correct torque. Crimping too tight will damage the wire, and too loose will create a poor connection. Pictured here is a pair of Matco Tools terminal crimping pliers.*

There are many wire stripping tools available. Some are straight, while others have an angled head in order to facilitate working in tight areas. There are two things to remember when stripping wire insulation: make sure none of the wire strands are removed in the process, and do not strip too much insulation away. If a crimp connector is used, too much or too little insulation will create a poor connection.

When crimping connectors make sure to crimp to the correct torque. Too tight will damage the wire, too loose will create a poor connection.

In my opinion, it is better to solder connections and use a heat shrink protective tubing to create a moisture barrier. Repairing with soldered connections will also minimize the overall bulk of the repair, and at the same time assure a quality repair. Be careful when soldering to not overheat the wire or use too much solder. Doing either will cause the wire next to the solder joint to become too stiff, and the wire may break.

Step 3: Test the system

Once all wiring splices, pins and connections have been repaired it is time to verify functionality.

Instead of connecting the battery



and starting the car, connect just the ground cable to the battery. Place a 20A fuse between the battery positive cable and the positive battery post. In most cases a 20A fuse will be more than sufficient to carry enough current to bring keep-alive memory components.

If the fuse blows, there is likely still a short in the system. If the fuse holds, turn the key to the “run” position and recheck. If the fuse still does not blow, remove it and connect the battery cable fully. There are battery connectors available that have a sliding lever which will allow you to disconnect the battery if there is an issue. These can be installed to test if the system is working correctly, and allow you to flip the lever to disconnect the battery quickly if necessary.

Once the vehicle is running, test the charging system and all lights, and install your scan tool to verify no fault codes are present. If everything tests okay, road test the vehicle in a drive cycle format which will allow the computer monitors to be completed, making sure all those components are functioning correctly. **PTEN**

PREHEAT FUNCTION IMPROVES STARTING IN EXTREMELY COLD TEMPERATURES

With 700 Peak Amps and 330 Start Assist Amps of starting power, the **Booster PAC 12 Volt Jump Starter and Power Supply**, No. ES580, from **Clore Automotive**, can tackle a wide



variety of starting tasks in numerous application environments, including automotive, marine, light truck, agricultural and fleet starting. It incorporates numerous features to make jump starting safer for the operator and vehicle being serviced, including reverse polarity protection, backfeed protection, overvoltage protection, short circuit protection and overheat protection. It also features a PreHeat function to improve starting capabilities in extreme cold temperatures – simply switch this function on and the unit will preheat the battery and alert the operator when the unit is ready to jump start the vehicle. The ES580 utilizes a UL-approved lithium battery. It features two USB outlets to power small electronics.

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WEIGHS LESS THAN 2 LBS

The **Allstart Boost 550 Jump Starter** features a 12,000mAh high capacity, high power lithium battery for jump starting vehicles and charging devices. The unit offers 300 cranking amps and weighs less than 2 lbs. This jump starter can charge up to a V8, 5.4L gas engine. The unit is made with flame retardant material, features overheating protection and is equipped with AI Technology for fast device charging.

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TECH TIP



THE TOP THREE BATTERY TESTING TECHNICAL QUESTIONS SOLVED

Be sure to enter all information into the tester accurately. Entering an incorrect battery type, chemistry, rating type, or rating value can cause incorrect test decisions.

Read more online: **VEHICLESERVICEPROS.COM/12243757**

VIDEO



PICO AUTOMOTIVE PARKING SENSOR TEST

The **Pico Technology Ultrasonic Parking Sensor Detector**, No. TA329, is designed to make testing a vehicle's proximity sensors quick and easy. According to the company, this detector picks up ultrasonic signals in its immediate vicinity.

Watch the video at: **VEHICLESERVICEPROS.COM/20973607**



AVAILABLE IN THREE MODELS

The **Associated Equipment 12V and 24V Booster Pack**, No. 6296, is a single, heavy duty unit that offers up to 3,400 peak amps in 12V mode. The 6296 is designed for jump starting cars, pickups, trucks, RVs and tractor trailers. Additional features include a built-in LED worklight, two 12V adapters and a battery status indicator. The pack includes heavy duty 44" DC leads and a charger with overcharge protection.

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PROFESSIONAL TPMS SERVICE BOOSTS THE BOTTOM LINE

by Vesna Brajkovic, Assistant Editor

When the Tire Pressure Monitoring System (TPMS) warning light comes on the dash, there are many possible reasons, all of which are critical to correct in order to maintain a safe system.

"Safety is the most important benefit of TPMS, which means shops must continue to focus on the role that proper tire inflation plays in the operation of the vehicle," ATEQ's Sheila Stevens, marketing coordinator, says.

So, when a customer comes into the shop for service, an important first step may be educating the customer on the importance of tire pressure to reduce accidents, and furthermore lead to fuel savings and improved gas mileage.

“Businesses that are successful selling TPMS [services] are typically the ones that can explain what it is and demonstrate their expertise,” Bartec USA CEO Scot Holloway says. “Tire shops that show, through proper inspection procedures, what’s really going on with their customer’s wheel and tires and TPMS sensors are able to sell the sensor service.”

Stevens agrees that communicating a need for proper maintenance and sharing knowledge with customers is the driving factor behind selling TPMS service in a shop.

"When a TPMS sensor, valve or service kit is necessary to install, customers who learn from an informed service pro more willingly opt in for TPMS service," Stevens says. "The customer profits from great service, which can translate into repeat business. Therefore, shops can boost their bottom line with professional TPMS service."

Although expertise and experience



▲ A timeline and evolution of TPMS.

Photo: ATEQ TPMS Tools

is important in any repair, tire shops that specialize in TPMS aren't the only repair shops that can benefit from this revenue opportunity, says Autel's Marketing Director Daniel Bemiss. There are several levels of TPMS service that can be performed by service and body shops.

“TPMS tools that offer easier to pinpoint system faults translate into easier to perform TPMS service,” Bemiss explains. “Suddenly more shops can complete normal TPMS repairs in-house and only require tire shop help for the more complicated tire repairs or replacement programming.”

Repair recommendations

In order to integrate TPMS into regular service, start by inspecting and testing the system's function every time the vehicle is in for service, recommends Bartec's Holloway.

“Like regular tread inspection, testing the TPMS is a great place to start when discussing TPMS service with the customer,” Holloway says. “Test Before You Touch’ is a great place to start in order to maximize revenue; it also is a great way to reduce liability. Sensors that have stopped functioning can often times take many miles and/or

days before they show themselves as a “flashing light” on the instrument panel.

"By testing the customer's sensors before any work begins, you can easily discover non-functioning sensors. Instead of potentially 'eating the cost' of a failed sensor after the job's complete, you now have the opportunity to sell them a replacement sensor," Holloway says.

While TPMS sensors have a battery that will generally last a long time untouched, unless damaged or plugged up with sealant, there are other TPMS components that may require more regular attention, Holloway says.

"The valve stem (which the sensor is attached to) needs regular maintenance or replacement," Holloway says. "Aluminum valve stems are attached to the wheel via a threaded nut and various sealing pieces. The threads on the nut have a special coating to prevent galvanic corrosion. These pieces, the nut, the valve core all corrode and decay over time. It is always advised that every time the tire is taken off the wheel, these 'service items' be replaced."



Maximizing profit

Time spent on repairs goes hand-in-hand with revenue.

"An advanced TPMS tool can save owners time and money in the shop and keep customers safe on the road," ATEQ's Stevens says. "TPMS tools have come a long way since the beginning of TPMS, from a magnet, to a sensor activation tool, to an advanced TPMS tool with on-screen display, OBDII and advanced functions. The return on

investment of advanced TPMS tools can save shop owners thousands per year."

Stevens outlines the time spent on services with advanced TPMS tools:

- Scan VIN to identify vehicle make, model, year (2 seconds)
- Read four TPMS sensors (26 seconds)
- Find DLC location / OBDII registration from on-screen display locator (15 seconds)
- Enter VIN and print out test report

(3 seconds)

- OBD relearn procedure with step-by-step instructions (2 minutes or less)

Autel's Bemiss says easier to use TPMS tools, like ones with a single screen overview of the whole system, offer quicker identification of TPMS faults, therefore also leading to quicker repair time.

"Cutting down repair management time is the key to maximizing technician billable hours," Bemiss says. **PTEN**

Three keys to a successful TPMS job

The tools to get the work done right

A TPMS activation tool – This tool sends the signal to perform the "wake up" function in a relearn process. A quality TPMS activation tool will feature a digital display to show a sensor's ID number, pressure and temperature information, as well as battery state.

A scan tool/diagnostic tool – While some TPMS tools have these functions built in, others don't. Depending on the vehicle make, a scan tool/

diagnostic tool will allow the technician to read and clear codes, as well as read and write sensor IDs. Certain vehicles manufactured after 2009 or 2010 have datastream and additional test functions that a scan tool can read. A very few TPMS tools have the ability to do more than read and clear or read and write.

A reliable information source – This may be the most important component to a successful TPMS job. A quality

information source is needed to inform the tech on:

- How the vehicle's TPMS works.
- How the relearn process works.
- The read and write process.
- Whether or not a drive is required.
- Whether or not there is a reset switch or button.

Source: Information provided by Autel North America **PTEN**



INTEGRATED TPMS SENSOR TESTING AND ACTIVATION

Proper tire inspection includes measuring remaining tread, the wear pattern and tire pressure. To limit liability, the TPMS sensor can also be tested. **Bartec's Tech200Pro** collects important safety information and sends it wirelessly to a tablet, PC or workstation. The Tech200Pro communicates with Bartec's TPMS Desktop or can be configured to work with existing P.O.S. systems.

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POSITION VDO REDI SENSORS

The **Anglo American Tools Hazet Tire Sensor Mounting Tool**, No. HZ668-1, is designed to position small, rounded VDO REDI Sensors into their rubber containers. Once the sensor is placed inside the tool, a simple push action will move the VDO REDI Sensor through the tool's enclosure, which then spreads the rubber container open and guides the sensor inside. The HZ668-1 offers precise positioning with one-handed operation. The tool can be used to help monitor and maintain both car and truck tires.

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RESISTANT TO DUST AND WATER

The **Doran TPMS Display Gauge** offers a 2" round, backlit LCD display. The TPMS display gauge receives updated tire pressures and temperatures for each wheel position, along with visual alarms for Level I Low pressure, Level II Low pressure, Fast Leak, High Temperature and High pressure. The gauge is resistant to dust and water, sealed to IP67 specifications and has an operating temperature up to 185 degrees F.

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EASY-TO-USE, ICON-BASED INTERFACE

The **Matco MAXTPMS Activation/Program Tool**, No. MDMAXTPMS, is a TPMS programming tool with built-in manual procedures. The tool features an easy-to-use icon-based interface with bright color display to guide users through replacing and servicing TPMS sensors. For multi-brand repair shops that require a mix of universal programmable and OE sensors, the MAXTPMS can activate and read OE TPMS sensors as well as program leading universal programmable aftermarket sensors. In seconds, the MAXTPMS displays all sensor data, including ID, tire pressure, tire temperature and battery status. The MAXTPMS is frequently updated with new vehicle and sensor coverage, and is compatible with existing Maximus scan tools.

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INDIVIDUAL COMPONENTS AVAILABLE SEPARATELY

The **Steelman TPMS Tool Kit**, No. 99466, offers fast and accurate sensor and service. The 10-pc kit comes complete in blow molded case, and individual components are available separately.

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COLOR SCREEN TPMS TOOL

The **Autel MaxiTPMS Tool**, No. TS408, is a color screen TPMS tool that is a direct replacement for Autel's TS401. The TS408 features updates to the tool software and power, free lifetime updates, new TPMS sensor relearn and MX-Sensor programming options, according to the company.

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FEATURES OBDII CAPABILITY

The **31 Incorporated X-tra Seal Smart Sensor** is a two sensor solution (315MHz and 433.92MHz) and offers 95 percent vehicle coverage. Both rubber snap-in and aluminum clamp-in valve options are available. The Smart Sensor Pro+ Tool is not only a programming and cloning tool, but a fully functional TPMS programming and diagnostic tool with OBDII capability. The tool can be used for diagnosing TPMS issues as well as relearning the vehicles TPM system. One of the benefits of the Smart Sensor Universal/Programmable sensors is that when the OEs introduce a new sensor protocol, the protocol can be loaded on to the Smart Sensor Pro+ Tool (via the internet).

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TECH TIP



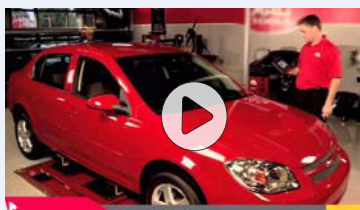
PLACARD PRESSURE AND TPMS

The Tire Pressure Monitoring System is a safety system that warns the driver of a low tire pressure condition. It also warns the driver in the event of a system failure.

Read more online:

VEHICLESERVICEPROS.COM/20970980

VIDEO



MAC TOOLS DIAGNOSTIC ET6200 TPMS

Did you know you can use your Mentor Touch Scout to register and activate TPMS sensors? Since 2007, light duty vehicles sold in the US are required to have Tire Pressure Monitoring Systems.

To watch the video, visit:

VEHICLESERVICEPROS.COM/12162115



TOP 5 REVENUE GENERATING OPPORTUNITIES

TPMS Service

ICON-BASED INTERFACE

The Hamaton H46 TPMS Programming Tool

features an easy-to-use colored icon-based interface to help guide users through replacing and servicing TPMS sensors. The H46 displays all sensor data, including ID, tire pressure, tire temperature and battery status. With the addition of the optional OBD-II module, users can reset the ECU in less than 2 minutes, according to the company. The H46 is designed to support all known programmable TPMS sensors and is frequently updated with new features and up-to-date vehicle and sensor coverage.

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COVERS DOMESTIC, EUROPEAN AND ASIAN VEHICLES

The ATEQ VT56 Comprehensive TPMS Service Tool provides complete TPMS management with coverage for domestic, European and Asian vehicles. It has a VIN barcode scanner to select a vehicle's make, model and year in seconds. The tool includes features such as built-in tool training, TPMS reset procedures, sensor part numbers, OBD-II locations and Wi-Fi connection to transfer job data to a PC.

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STORE AND ORGANIZE TPMS SERVICE KITS

Designed specifically for the storage and organization of TPMS service kits, valves and tools, the JohnDow Dynamic TPMS Smart Cart, No. DY-TPMS45, consists of 45 tip-out storage bins and nine hanging storage bins mounted on a heavy duty mobile cart. This 58" tall cart is a heavy duty steel design with a durable powdercoat finish. The cart's storage capacity can be expanded using a combination of nine individual components consisting of three flip out bins.

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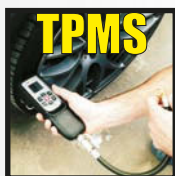
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THE DEMAND FOR A/C SERVICE IS HEATING UP

It pays to educate yourself on current 1234yf protocol, as well as significant equipment updates.

by Sara Scullin, Editor

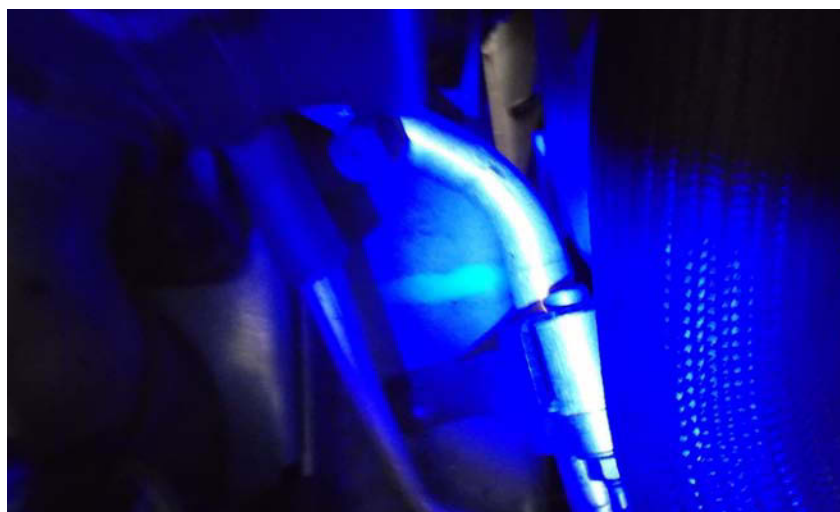
Summer may be a hot time for A/C service, but it's not the only time vehicle aftermarket shops can make money on this type of repair. HVAC systems are a fixture of most vehicles on the road today, and they can be a great revenue generator. So it is important that shop owners stay up-to-date on newly available tools and equipment in the world of A/C, as well as the current regulations pertaining to this service category.

"The rapid expansion of 1234yf in new vehicles, the cost of the new refrigerant and high-voltage compressors in electric and hybrid vehicles will impact how technicians service AC systems in the near future," says Justin Fisette of Bosch Automotive Service Solutions.

Marion Posen, VP Member Relations and Marketing Mobile Air Conditioning Society Worldwide (MACS) adds that starting January 1, 2018 the sale of most refrigerants will be restricted to 608 and 609-certified technicians. This means distributors must keep refrigerant sales records and verify purchasers are (or employ) 608-609-certified technicians.

A little leg-work up front can set automotive repair professionals on the road to offering this much sought after fix. Fisette says shops will need to invest in a new machine and manual oil injectors, to start. After that, he recommends technicians take a Section 609 refresher course from MACS to fully understand the differences and service needs for a 134a versus 1234yf system.

"The 1234yf service also takes longer



▲ In order to spot UV dye, you must use the UV glasses and light. Photo: B. Hoyland

than 134a systems, so shops and techs should be aware of the extended time needed to service vehicles when scheduling service and communicating to customers,' says Fisette.

In addition to regulatory updates, A/C tool and equipment brands, like Robinair, are offering products that can "sniff out" and pinpoint the tiniest of leaks (leak detectors), and also avoid cross-contamination between refrigerants and systems (refrigerant identifiers).

Fisette says that many of today's A/C machines have fully automatic operation and can be programmed to recover, test and recharge systems while a technician is working on another part of the vehicle or another vehicle altogether. This allows for more billable hours while the service is being performed.

The rise of electric, electric hybrid and plug-in vehicles are also likely to impact A/C service down the road.

Says Fisette: "High-voltage AC

systems use a different oil than 12V systems, requiring the use of a separate machine to avoid cross-contamination of the different oils. High-voltage systems use POE ester oil, which is non-conductive. Cross-contamination of PAG and POE oils can damage a high-voltage compressor or compromise the system's safety.

"Technicians will need to familiarize themselves with high-voltage systems and compressors, which might require additional training or retaking a Section 609 certification class that has been updated with new standards and info for the changes in AC systems."

If you don't currently offer A/C service to your customers, now might be a good time to reconsider, as adding A/C system service and repair to your shop will increase revenue and complement other services you already provide. **P**TEN



Detecting a passive A/C system leak

by Barry Hoyland, Contributing Editor

Vehicle: 2011 Cadillac SRX

Symptom: Air conditioning system does not cool

Tools Used:

- Service Information
- RRR (Recover/Recycle/Recharge) machine with vacuum test capabilities
- Electronic leak detector
- UV dye kit
- Bullseye Leak Detector

This vehicle was brought in with an air conditioning system that was not cooling properly. The initial inspection showed that the compressor was not operating.

Step 1: Confirm basic operating conditions are present

The basic components for compressor operation are:

Mechanical (the compressor), electrical (power to the compressor) and pressure (amount of refrigerant).

This vehicle, like most late-model vehicles, utilizes the BCM (Body Control Module) and PCM (Powertrain Control Module) to supply power to the A/C compressor. The control modules look for a request from the switch as well as various temperature sensors and inputs from other sensors to make sure the pressures within the system meet certain requirements in order to activate the compressor. This is done in part to make sure damage to the A/C system will not occur if oil is not flowing through the system. Oil flows through the system via the refrigerant. So if the refrigerant is low, essential lubrication cannot occur.

To read the full article, visit: VEHICLESERVICEPROS.COM/12146324

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The **Mastercool Refrigerant Recovery Machine**, No.

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TECH TIP



CONFIRM SAE EQUIPMENT COMPLIANCE WITH A CLICK OR TWO

Read more online: VEHICLESERVICEPROS.COM/20851676

VIDEO



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The Yellow Jacket Mantoath Wireless Digital P/T Gauge uses a wireless connection to provide actual pressures, temperatures, superheat and subcooling. To watch the video, visit:

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HANDLING HYBRIDS FOR HIGHER REVENUE

With a few specialized tools and some training, auto repair shops and technicians can capitalize on this growing repair category.

by Stefanie Von Rueden, Assistant Editor

With the recent focus on reducing greenhouse gas emissions and improving fuel economy for passenger cars and trucks, hybrid vehicles are becoming increasingly prevalent. The Center for Advanced Automotive Technology said that there are currently over 4 million hybrid and electric vehicles on the road in the U.S. This growing category poses a revenue opportunity for independent repair shops and technicians looking to expand their current customer base.

According to respondents of the 2017 PTEN Aftermarket Profile, only 34 percent of respondents currently complete hybrid work in their shops. The biggest barrier to collecting revenue from this repair category is training. Hybrid electric vehicles use high voltages that can cause injury if manufacturer safety procedures and general shop safety procedures are not followed. According to Fluke, a conventional vehicle's electric system is between 12 and 14V, while a hybrid vehicle ranges from 12 to 650V. Potentially dangerous voltages exist at the high voltage cables, high-voltage batteries, capacitors and the electric motor-generators. But, if you are willing to invest in training on hybrid vehicle repair, you can offer repair services that many other repair shops do not offer.

Hybrid repair requires a few specialized tools. When selecting a digital multimeter for testing hybrid vehicles, it is important to consider the CAT rating. A higher CAT number means a tool is



Photo: Bigstock

rated for an electrical environment with more power and energy transients, Fluke says. A digital multimeter for use on hybrid vehicles should be a CAT III or CAT IV rating of at least 1,000V.

Because hybrids use high voltages, it is important to use class "O" rubber insulating gloves with leather over-protectors when working on the high voltage systems. The rubber gloves are an important safety measure to prevent accidental electrocution, and the leather overprotectors protect the rubber gloves from damage such as punctures and cuts.

Another hybrid vehicle repair consideration is servicing the A/C system. Some hybrid vehicles have higher voltage systems that use a different oil type than traditional A/C systems, which leads to cross-contamination concerns when servicing multiple vehicles. Fortunately, there are RRR machines that work with both standard and hybrid vehicles, such as the Robinair 1234YF A/C Service Machine, which includes an integrated identifier to sample refrigerant prior to recovery.

According to Jim O'Hara, vice president of marketing at Clore Automotive, hybrids use a 12V battery in conjunction with the high voltage battery pack. "If the 12V battery is dead, the vehicle will not power up or start. Our battery chargers can be used to charge the 12V battery to keep it in optimal condition, avoiding future no-start situations."

Repair shops should already have most or all of the battery testing equipment needed to service the 12V battery, including battery testers, battery chargers and jump starters. These are items that shops may already be using to service conventional vehicles. Notably, most hybrid vehicles utilize an AGM battery. "For shops that have not invested in AGM-compatible equipment, it is necessary to do so if they want to service hybrids," Clore's O'Hara says.

If shops are willing to invest in hybrid training for their technicians and a few specialized tools for hybrid vehicle repair, they will be able to expand their customer base by servicing hybrid customers that many other repair shops are not equipped to handle. **PTEN**



Hybrid vehicle servicing hazards

There are a number of safety precautions to consider when servicing hybrid vehicles.

by David A. Kolman, Contributing Editor

Hybrid vehicles bring with them new dangers to the technicians who have to work on them. While hybrid vehicle manufacturers designed these vehicles with an eye on fuel efficiency, Peter Zaidel, product manager, KPA, notes that the manufacturers also focused on the safety of service technicians.

KPA (www.kpaonline.com) is a nationwide leader in environmental and safety compliance programs for vehicle and equipment dealers.

He recommends sharing these fundamental safety basics for serving hybrids with service technicians:

1. How to identify a vehicle as a hybrid.

Almost all hybrids share three common identifiers, says Zaidel. They

are: Hybrid badging on the body of the vehicle, typically the rear right section and under-hood identifiers, including the extra motor and the inverter; the "Ready" indicator inside the vehicle in the ignition area; and orange high-voltage power cables.

2. How to determine if the hybrid vehicle is really turned off.

"This may be the single most important safety factor for service technicians working in a shop where there are hybrid vehicles, because the hybrid system is silent when running on battery," Zaidel points out. "Hybrid systems can automatically turn themselves off and on, switching between the high-voltage battery and the gasoline engine, so it is easy for the technician to be

unpleasantly surprised that a vehicle thought to be 'off' is in fact 'on.'"

He advises that technicians should observe the following service protocols: A hybrid is not necessarily powered off until it is verified that the vehicle is powered down; keep vehicle keys a safe distance from the hybrid (more than 20' as many hybrids have a keyless ignition, with on/off sensitivity up to 20' away from the vehicle) and always check the vehicle dashboard hybrid indicator to ensure the vehicle is truly "off" before any kind of work is performed on it.

3. How to protect one's self from high voltage.

While the amount of voltage and amperage in hybrid vehicles is enough to be fatal if a technician comes in contact with the high-voltage circuits, the high-voltage system does not ground to the body or the chassis, but rather is isolated from the vehicle body completely, says Zaidel. A technician would have to touch pole-to-pole or become part of the circuit for an injury to occur.

To read the full article, visit:

VEHICLESERVICEPROS.COM/12256989

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TECH TIP

SAFETY TO CONSIDER WHEN MEASURING VOLTAGES OF HYBRIDS

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Read more online:

VEHICLESERVICEPROS.COM/10915349



TECH TIP



WHAT CAN CAUSE LIMITED PERFORMANCE IN A HYBRID VEHICLE?

While performance may not be the first thing that comes to mind when you hear the word "hybrid" it is likely that you will eventually have one in your shop with a complaint of reduced performance.

Read more online:

VEHICLESERVICEPROS.COM/12009619

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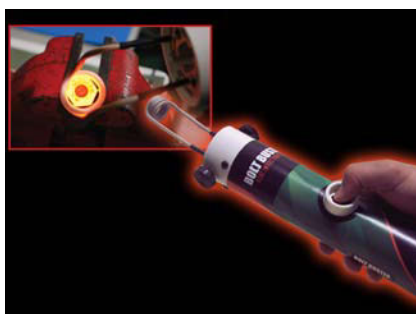
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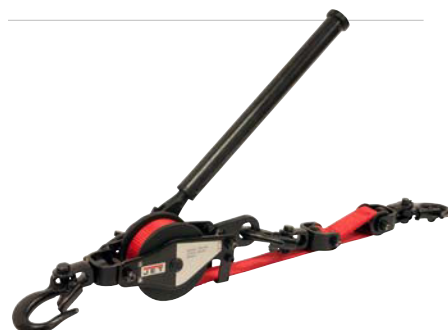
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Diagnose and repair difficult brake issues

It's easy to get complacent with routine repairs, but there are always going to be unique circumstances that come up.

By Barry Hoyland, Contributing Editor

Every once in a while, a vehicle will come in with an issue that seems common, but after you perform all the normal service steps it turns out the issue is far from normal.

You may think that uneven brake wear and a sticking brake would be taken care of with a normal brake service and replacement of the calipers. This VW had been sent to us from a shop that had repaired or replaced all the common parts that typically cause such an issue.

In cases like this, where parts have been replaced by another shop, diagnosis may be more complicated because you do not have the original worn parts to assist you in determining what the possible cause of the issue may be. Additionally, you cannot be sure the parts that have been replaced were of high quality, or were even the correct ones. Compounding these possibilities is a chance the work itself was not performed correctly.

1 OBTAIN INFORMATION

As always, information is the key to a successful repair. Obtain details such as when the issue occurs. This could mean the time of day, how long the vehicle has been driven, how long it has been since it was driven, how often or intermittent it happens, and when the problem first started.

Beyond repair history, having access to specifications, repair procedures and TSBs is necessary to complete a quick and accurate diagnosis and repair. With the abundance of vehicle information avail-



able (and the great job the vehicle information providers are doing to make it available) it may be preferable to rely on more than one source to get as much data as possible.

On this vehicle we used Mitchell 1, IdentiFix and IATN to look for TSBs, specifications, and to check to see if there had been other vehicles with similar issues. There were no specific TSBs, but we did find a couple of interesting items we will point out later in this article.

Since this vehicle came from another shop, a complete history was not available to us without speaking to the vehicle owner directly, so we would need to rely on the information the other shop provided.

The other shop said the vehicle originally came in for brake service and the customer stated the rear brakes had been

▲ After the alignment is done, a technician can use a bi-directional scan tool to complete a steering angle reset. This scan tool from Autel, the MaxiSYS commercial vehicle diagnostics scan tool, No. MS908CV, performs enhanced system diagnostics on more than 60 commercial light duty, medium duty and heavy duty vehicle brands. It is built on the MaxiSYS Android-based platform and comes with the compact size J2534 MaxiFlash Elite to perform pass-thru programming function and complete an array of tool-guided maintenance services, then diagnose manufacturer specific systems.

replaced somewhat recently and seemed to smell at times. They found the left rear brake pads excessively worn, and the rotor showed signs of overheating. Not finding any current issues, they replaced the rear calipers and rotors, checked the parking brake and bled the system.

After about 5,000 miles, the customer returned complaining the brakes still smelled. The shop checked the brakes and found the left rear brake excessively worn



VEHICLE:
2013 VW Beetle

ISSUE: Uneven side-to-side brake wear on the rear of the vehicle caused by left rear brake sticking after driving

TOOLS USED:

- Vehicle Information
- Thermal imaging camera
- Bi-directional scan tool
- Brake caliper pad push tool
- Dial indicator
- Brake pressure gauge set
- Lab scope
- 4-wheel alignment machine

again. This time the shop spent a considerable amount of time researching to see if there were any TSBs or posts of similar issues on other cars. They also spent some extra time trying to duplicate the issue and found that occasionally, there was a slight dragging of the brake after it had been driven.

They determined at this time the best course of action would be to replace the calipers again, as well as the brake hose to the rear wheels. A test drive after this repair indicated no issue, so they released the car to the customer, only to have it return in a few weeks with the same problem.

Getting frustrated now, the shop started replacing other components that may cause the problem, such as the ABS module and master cylinder, all with no success. Their next step was reaching out to us for assistance.

DIAGNOSE THE ISSUE

Diagnoses always begin by duplicating the concern on the vehicle. We drove the vehicle for about 20 miles, then used our thermal imaging camera to see if there was a temperature difference between the left and right brake rotors. We saw a higher temperature of about 100 degrees F on the left rear rotor, and the other three wheels within 20 degrees F of each other.

Now that we've confirmed the issue seems to only occur at the left rear wheel, we can start testing specific components.

We connected our scan tool to check for codes in any of the modules, especially



▲ This image illustrates using a dial indicator to check for hub or rotor run out.

“ Since this vehicle came from another shop, a complete history was not available to us without speaking to the vehicle owner directly, so we would need to rely on the information the other shop provided.

the ABS system. Having none, we then checked for any irregularities in the data stream. The data stream appeared to be normal, but we thought it would be best to drive the vehicle for an extended road test while looking at the ABS data to see if anything showed up. Observing data on the road test showed no faults.

Next we decided to look at the rear brakes a little closer, and check to see if the issue was being caused by the parking brake mechanism. We removed the calipers and used our caliper pad push tool to reset the calipers and to make sure there was no binding of the calipers or the parking brake lever.

We have seen hub runout issues cause ABS issues before, so we used a dial indicator to make sure there was neither excessive runout of the rotor nor play in the hub.


Not finding any signs of a problem, we

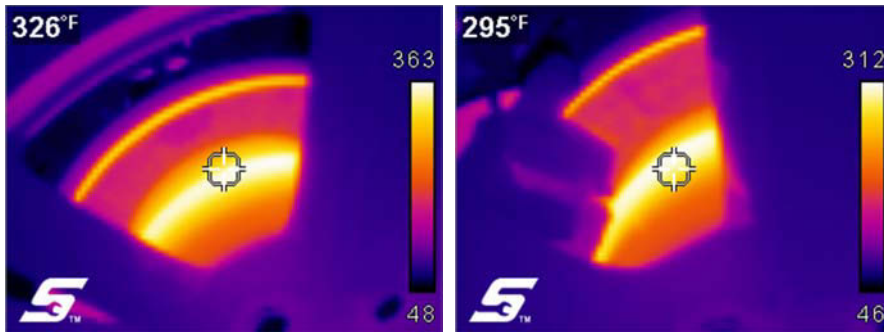
remounted the calipers and connected a brake pressure gauge to the vehicle. A brake pressure gauge comes in handy when you have an issue like this, but you need to understand that it is used as a comparative tool.

As is the case with most pressure tests, a brake pressure tester is used to compare readings on that specific vehicle, under the current conditions. It is extremely difficult to find a pressure specification for applied brake or residual pressure on most vehicles, but when connected from one wheel to another, or front to rear, it is easy to see if there is a pressure imbalance in the system.

When we tested this VW, we found there was a slight amount of pressure on the left rear wheel with the brakes released, and no pressure on the right rear.

Now that we know the issue is caused by pressure in the system, we can start looking at the potential causes. We were fairly certain the problem was with a fault in the ABS system, but we needed to determine the root cause.

Even though we were pretty sure there was not a problem with the wheel speed sensors, history suggested we check them with a lab scope anyway. Connecting a lab scope to both the rear sensors and rotating the wheels at the same speed should 



▲ Technicians can use a thermal imaging camera to check temperature of the rotor after driving. In this repair scenario, the left rear rotor (left) is almost 30 degrees hotter than the right rear brake rotor. There is more heat on the left side than on the right due to the sticking brake.

show both signals matching exactly. Our tests confirmed no problem with the sensors.

3 THE REPAIR

We decided it best to bleed the ABS system since the other shop said they had replaced the module. ABS bleed procedures are specific to the year, make and model of the vehicle; there is not a “one-size-fits-all” process.

Due to this, it is best to return to your vehicle information source for the procedure. Remember we said we found a couple of interesting items when we searched the information database? What we found was some specific information relating to the bleed procedure reliant on the steering angle sensor adjusted properly prior to bleeding the system.

Like many newer vehicles, the steer-

ing angle may cause brake pressure to be applied to an individual wheel during a traction control or ABS event in order to maintain steering control. The angle of the steering is one of the inputs into the control module that determines whether it is necessary to apply brake pressure to maintain control.

The best way to reset the steering angle sensor is to perform a four-wheel alignment on the vehicle. After the alignment is done, use your scan tool to complete a steering angle reset. According to the specific repair information on this vehicle, it is required to set the alignment and perform the reset when the steering wheel is in the center of its tilt range. The reason this needs to be done is as the steering wheel tilts up or down, the wheel angle changes slightly.

After the alignment and steering angle

reset, we manually bled the brakes using the specified procedure along with our scan tool.

Another piece of information we found was, after bleeding the system the vehicle manufacturer suggests driving the vehicle safely while performing an ABS stop. You should feel the brake pedal shudder and the light come on during this process.

Once this is done, re-bleed the system using the same procedure that was used to originally bleed the system. To be honest, we perform this ABS verification on every vehicle we do any brake service on.

4 VERIFY THE REPAIR

In order to verify this repair, we will need to drive it under the same conditions that we used to cause the original problem. In this case, it involved an extensive test drive to see if there was any excess heat or drag on the brake. After the test drive, we checked each brake for consistent heat using the thermal imaging camera. This test showed even temperature at every wheel. Next, we checked to see if there was excess drag on any wheel. Each wheel spun equally, indicating no issue. Just to play it safe, we drove the vehicle again and used the brakes excessively to build a lot of heat. Additional testing found no issues with either brake drag or uneven heat.

The vehicle was returned to the other shop with the instruction to have the owner return for periodic checks over a short period of time to make sure the problem did not return. Checking with the other shop confirmed the issue did not return.

To sum it up, it is somewhat easy to get complacent with seemingly routine repairs. When problems occur, we rely on our experience with similar faults to correct issues when they occur, but there are always going to be unique circumstances that come up. Using every piece of information at your disposal, keeping an open mind, and going the extra mile will almost always resolve anything that comes up. PTEN

◀ A scanned image of alignment information found through iATN referencing the alignment procedure for resetting the steering angle sensor.

2. Toe adjustment – Steering Wheel Off Center (SWOC)

Front and rear toe adjustment procedures are located in the repair manual under, Repair Manual > Chassis > Suspension, Wheel, Steering > 44 Wheels, Tires, Wheel Alignment > General Information.

When performing wheel alignment, the steering column must be adjusted to the center tilt position. This is due to steering wheel off set of up to 1.2 degrees from center tilt position of the steering column to the full up or the full down tilt position. See illustration 4 & 5 below.

Tip:

The tools shown in figure 4 & 5 were used to demonstrate the steering wheel off set. These are not dealer required tools.



Steering wheel in the fully up tilt position and off set to the right.

Figure 4



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TOP 10 TOOLS



A shop owner's top tool list

Based in Sussex, Wis., this shop owner uses his 26 years of automotive industry experience to serve his customers.

By Stefanie Von Rueden, Assistant Editor

SHOP OWNER: John Lemberger

LOCATION: Sussex, Wis.

SHOP: Paul's Certified Auto Repair, LLC

John Lemberger has worked in the automotive industry for 26 years. He is ASE certified in Engine Performance, Engine Repair, Brakes and Steering & Suspension. Lemberger says his shop does a little of everything except rebuilding transmissions and bodywork. When he's not working in the shop, he enjoys watching NASCAR, college and NFL football, as well as camping and touring micro-breweries in Milwaukee and surrounding areas.



Want to show off YOUR Top 10 Tools?
For more information, email
Editor@VehicleServicePros.com.

- 1** This diagnostic system uses a wireless scanner, wireless scope and touchscreen display to allow technicians to hook up to the vehicle in multiple places and simultaneously view live data and meter readings. "I use this tool every day for various repairs," Lemberger says. "It is easy to use and easy to navigate."
Circle 149 on card, or enter at "e-inquiry" on VehicleServicePros.com
- 2** "I worked at our shop for 25 years and hand wrote multiple repair orders," Lemberger says. "When I took our shop over, the first major change I made was to this shop program, and it has made my life and my office administrator's life a whole lot easier. [This program] saves a lot of time and got us more organized."
Circle 150 on card, or enter at "e-inquiry" on VehicleServicePros.com
- 3** Although Samsung does not market specifically to the automotive industry, Lemberger uses Samsung tablets daily in his shop. "My techs each have one," he says. "It saves them time looking up specs and diagrams. They can do it right at the car they are working on."
- 4** This subscription-based online resource offers vehicle diagnostics, factory scheduled maintenance plans and OEM service repair and information. Lemberger says he has used the site for about 10 years, and finds that it makes it easy to diagnose vehicles and offers simple and direct procedures.
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- 5** This service offers OEM repair information and experience-based knowledge from SureTrack. "I just started using this at the beginning of the year, and the more I use it, the more I like it. It is right up there with the Identifix site."
Circle 152 on card, or enter at "e-inquiry" on VehicleServicePros.com
- 6** The OTC Encore offers an AutoDetect System that searches several on-tool and internet databases to provide the most likely fix based on more than 30 million vehicle-specific and experience-based fixes. Lemberger says he used to use Snap-on scanners before he was shown this tool. "It boots up fast, and I really like the way this tool breaks everything down into the separate tests, and separates the data stream into groups that are relative to each other. This tool was pretty inexpensive for what it can do."
Circle 153 on card, or enter at "e-inquiry" on VehicleServicePros.com
- 7** The multimeter offers both automatic and manual ranging, and features a large, easy-to-read LCD display with low battery indication. Lemberger says it is a straightforward tool, and that there will always be a need for it.
Circle 154 on card, or enter at "e-inquiry" on VehicleServicePros.com
- 8** The Motorvac Cool Smoke produces a high-density smoke with no warm-up time required, and does not require the use of nitrogen or other inert gases. Lemberger uses an older version of this tool, and finds that it is simple to use and makes finding leaks a lot easier.
Circle 155 on card, or enter at "e-inquiry" on VehicleServicePros.com
- 9** Lemberger uses an older version of this system, the WA140. He says, "When we purchased this machine, we were farming out around 80 alignments a year. The first year we had it, we tripled our alignment count. This piece of equipment has been very reliable, accurate and easy to use."
Circle 156 on card, or enter at "e-inquiry" on VehicleServicePros.com
- 10** The Contender offers gauge guards, built-in check valves and built-in flashback arrestors. "Living in Wisconsin and working on older rusty cars, you always need a good torch set," Lemberger says.
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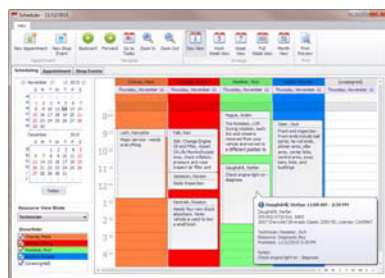
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1



2

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3

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5

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6

OTC ENCORE



7

BLUE-POINT
DIGITAL COMPACT
AUTO RANGING
MULTIMETER



8

MOTORVAC COOL
SMOKE EVAP
LEAK DETECTION
SYSTEM



9

HUNTER ENGINEERING
HAWKEYE ELITE
ALIGNMENT SYSTEM



VICTOR
CONTENDER
WELDING
EQUIPMENT

10



Cal-Van Tools

Universal Caliper Turn and Push-Back Tool

The reviewer appreciated that this tool could be used on almost any caliper.

by Vesna Brajkovic, Assistant Editor



For Barry Hoyland, owner of VSSCA (Vehicle Service Solutions) in Las Vegas, Nevada, the Cal-Van Tools Universal Caliper Turn and Push-Back Tool is just that, universal.

Hoyland used the tool for several applications. He performed both rear brake caliper resets, as well as front disc caliper compression, on a Mazda, GMC 1500, Cadillac SRX and Ford Escape.

"I like the tool's adjustability to be used on almost any caliper, whether it is a small car or a large truck, on front or rear brakes," Hoyland says.

Overall, he says, the tool requires no set-up, comes with an easy-to-understand instruction sheet, and is easy to use.

To prepare for use Hoyland says he just

set the pin spacing and uses either the hex or ratchet head to turn the shaft.

"This tool has both a hex head and the ability to use a 3/8" drive ratchet to turn the shaft, making it quick and easy to use," Hoyland says.

"Multiple angles and pin settings allow the tool to be used on multiple applications, both on front and rear brakes. It is universal enough that it allows you to push, pull and twist the caliper to reset it," Hoyland says this feature sets the Cal-Van tool apart from similar offerings.

Another feature that stood out to this Las Vegas technician was the fact that the the Universal Caliper Turn and Push-Back Tool requires no additional accessories. He says it is "all-inclusive with very few parts." In his view, this makes for a

PRODUCT DESCRIPTION:

The Cal-Van Tools Universal Caliper Turn and Push-Back Tool, No. 727, features two pivoting pins on a detachable head that allows the unit to engage almost any different caliper configuration. This tool replaces the large multi-piece kits and needs less storage space, the company says. The tool also has a 3/8" drive in the end for use with any 3/8" ratchet. By reversing the detachable head the tool can also accommodate work on front disc brakes.

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more straightforward, stream-lined tool that is easy to keep track of.

Hoyland did suggest Cal-Van perhaps include a small cable to hold the existing pieces together. But overall, he had no other concerns or questions about the product.

Overall Hoyland gave the tool high marks. In summary, he likes "the universal aspect of the tool, while having a very small number of pieces" to work with. **PTEN**

Powerbuilt 8-pc 1/4" and 3/8" Drive Zeon Socket Set

The reviewer appreciated the way these sockets gripped damaged fasteners.

by Stefanie Von Rueden, Assistant Editor

When a socket won't grab onto rounded nuts and bolts, it creates a frustrating situation for technicians. Phil Fournier, owner of Phil's Auto Clinic in Hemet, Calif., appreciated that these sockets were able to grip damaged fasteners.

"Sockets that work on regular as well as worn bolts or nuts are the ones to use all the time, rather than having to return to the toolbox to get another," Fournier says.

Fournier used these sockets for engine removal and installation on a 2012 Prius, head gaskets and timing chain on a 2006 Cadillac STS and many other similar types of jobs. "The design of the sockets is great for gripping the top of an already damaged fastener," he says.

The sockets were packaged in plastic shrink wrap. There was no manual included, but there was none needed. "It's safe to assume a technician knows how to use a socket," Fournier says. "They're sockets. They were very easy to use."

Initially, Fournier was concerned about the quality of the sockets. He says he's bought off-brand sockets before and had the chrome chip off in pieces that would cut into the tips of his fingers whenever he used them. "These sockets, though they didn't appear to be top quality, so far are holding up well. There is no chrome flaking and the steel seems to be of good quality. There is no visible wear at present," Fournier notes.

"I have not heard of this tool company before, and I'm not aware of any other ver-

PRODUCT DESCRIPTION:

The tools in the Powerbuilt 8-pc 1/4" and 3/8" Drive Zeon Socket Set, No. 941322, feature a uniquely designed broaching that allows the sockets to grab onto 85 percent rounded or damaged nuts and bolts, according to the company. These sockets are designed to give users a clean removal every time. Sizes include 1/4" drive sockets sizes 6mm, 8mm, 10mm and 12mm, and 3/8" drive sockets sizes 13mm, 14mm, 15mm and 19mm. The set come on a sliding card and includes a lifetime warranty. This set is also available in an SAE set that includes 1/4" drive sockets sizes 1/4", 5/16", 3/8" and 7/16", and 3/8" drive sockets sizes 1/2", 9/16", 11/16" and 3/4".

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sions [of this tool set]. My only concern would be about the life of the chrome plating. Since I've only had these for three months, I can't judge longevity, which of course is very important to a lifelong mechanic. Only time will tell for certain."

Overall, Fournier appreciated that these sockets could grab rounded nuts and bolts, and that the sockets have held up to regular use. "So far, the internal design of the socket is superior to other expensive hand tools that are well known." **PTEN**



Clore Jump-N-Carry 12 Volt Jump Starter and Power Supply

The reviewer liked that this unit was ready to go out of the box, and appreciated its “worry-free” reverse polarity protection.

by Sara Scullin, Editor

The Clore Jump-N-Carry JNC318 Jump Starter supplies a convenient and powerful boost for everything from passenger vehicles to diesel trucks.

Lou Fort, lead technician and owner at K.A.R.S. Inc. in Huntington, Ind., found the unit handy for most of his quick power needs. He even used it with an inverter to power a laptop on extended road testing, and to power his technicians’ iPhones. He appreciated that the jump starter was ready to use immediately.

“A simple push of the status button is all that’s needed when used as a power supply. The LED lamp requires one to push the lamp button,” says Fort.

He points out the packaging was top-notch. “The 318 came in a very nice, side zippered, divided case inside a rather stylish cardboard box. The box is covered with information, pictures and list of contents.” The box also called attention to a repair service coupon to get the unit repaired or replaced post initial warranty period.

Fort adds, “I chuckled at the coupon’s statement ‘Simply return your JNC318 (or all its parts, properly and safely packaged). Clore knows ‘oops’ happens and [they] are okay with that.”

The PreHeater was a standout feature for the K.A.R.S technicians. To test this function, Fort did a little experimenting.

“I decided to play around and stuck [the unit] in the freezer overnight. As soon as it took it out I turned the heater on, it took just a few seconds to get a ‘Green’ light indicating it was ready to go.”

He also attempted to jump start a vehicle as soon as the unit was removed from the freezer. “It didn’t have any problem doing so, and didn’t seem to make any difference between using or not using the ‘PreHeater,’” says Fort.

Note: The manual clearly instructs users to store the unit at a temperature above 50 degrees Fahrenheit.

Two items Fort felt could be improved upon were the smart clamps — he felt it was difficult at times to get a good connection on side post terminals — and the “one-and-done” jump starts. “[After a jump], if the unit being jumped has a functioning charging system the led in the smart clamps will change ... to a flashing green. Once that happens you will not be able to get a second boost for the power pack until you reset, unhook and rehook, both of the clamps.” Fort concedes that having backfeed protection is important

PRODUCT DESCRIPTION:

The Jump-N-Carry 12 Volt Jump Starter and Power Supply, No. JNC318, from Clore Automotive, combines jump starting power with numerous features designed to deliver utility and convenience. Features include PreHeat capability for improved performance in extremely cold temperatures, USB outlets to power small electronics, 12V power supply capability and a high intensity LED worklight. With 700 peak amps and 330 start assist amps of starting power, the JNC318 can tackle a wide variety of starting tasks in numerous application environments, including automotive, marine, light truck, agricultural and fleet starting.

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to both safety and unit life.

Overall, Fort was impressed with the JNC318’s power capacity and performance.

“Just for fun I left the lamp on overnight; I made sure the 318 was at 100 percent charge prior, to see how much juice would be left in the morning. When I checked it some 11

hours later the status indicator was showing 92 percent ... and it still jump-started a 2011 Silverado that didn’t have enough juice to wake up the dash.”

Though he’s used similar products in the past, Fort notes this is the first unit he’s used that had a digital status display and connection indicator in the jump cables’ “magic box”.

Overall, Fort gave this product a nine out of ten.

“The JNC318 is proving to out jump my other packs. I would easily say it will do no less than double the jumps between charges. This of course will vary over time and the condition of equipment being jump started, but I am pleased.”

“The end result is the JNC318 saved the day,” says Fort. **PTEN**

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CATEGORY SPOTLIGHT

POWER TOOLS



FOR METRIC AND SAE APPLICATIONS

The **Astro Pneumatic 3/8" Capacity Pneumatic Rivet Nut Setting Kit**, No. PRN1, is suitable for metric and SAE applications. The kit includes eight mandrels/nosepieces in M4, M5, M6, M8, M10, 1/4", 5/16" and 3/8" sizes. The tool instantly sets rivet nuts with the pull of the trigger, and it quickly un-threads set rivet nuts by operating free spinning rear wheel. Capable of 2,680 lbs of instant air-hydraulic pulling force, the tool offers a max capacity of M10 (3/8") steel and aluminum rivet nuts and M6 (1/4") stainless rivet nut. The 3.59-lb tool has a tool stroke of 6.5mm and an air consumption of 3 cfm.

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MAKES BLIND RIVETS EASILY AND QUICKLY

The **ACDelco Cordless Li-Ion 18V Rivet Tool**, No. ARV20104, is fully automatic and the 18V battery platform is designed to make hundreds of rivets on a single charge. The patented Electronic Torque Control (ETC) system makes sure all the rivets conform to the same tension and creates a uniform flange. The spent mandrel ejection mechanism releases mandrels automatically after the rivet is made. The ARV20104 features an ergonomic design and compact, durable housing. This cordless automatic riveting tool makes for easy and quick rivets without having to manually use a pop rivet gun or deal with air hoses, according to the company.

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PULLING FORCE OF 2,373 LBS

The **Arconic Marson BT-2 Cordless Rivet Tool** is designed for a variety of applications, including trailers, construction, signs and more. The BT-2 offers a capacity of 3/32" to 3/16", a pulling force of 2,373 lbs and a 14.4V battery back.

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FEATURES A THREE-POSITION SIDE HANDLE

The **Ryobi Tools 18V ONE+ Angle Grinder**, No. P421, delivers 6,500 RPM and features a 4 1/2" grinding wheel, on-board wrench storage and a GripZone overmold combined with a three-position side handle. The grinder is sold as a bare tool, and works with any 18V ONE+ battery. An upgrade to lithium-ion or LITHIUM+ batteries is an option for lighter weight and better performance, according to the company.

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KICKBACK CONTROL AND LONGER TOOL LIFE

The **Bosch Power Tools Brushless Compact 18V EC Tough 1/2" Drill/Driver** and **18V EC Brushless Compact Tough 1/2" Hammer Drill/Driver**, Nos. DDS183 (pictured) and HDS183 18V EC, both feature kickback control, longer tool life with greater run-time and no maintenance, heavy duty all-metal chucks, 531 in-lbs of torque, two drilling speeds, and the hammer drill features 28,500 bpm.

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SMALL, LIGHTWEIGHT AND EFFECTIVE

The **Rupes Skorpion III orbital sander** is small, lightweight and effective. It includes a motor that provides an exceptional power-to-weight ratio with reduced air consumption. It also minimizes tool noise and vibration. An ergonomic lever with a rubber insert has been added for better grip and more comfortable operation. The Skorpion III is available with three orbit options: a 3mm orbit for fine applications, a 6mm orbit that balances material removal and finish quality, and a 9mm orbit designed for rapid material removal applications.

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WITH FRICTION RING ANVIL KIT

The **Makita 18V LXT High-Torque Impact Wrench**, No. XWT08, is a cordless option to corded and pneumatic tools for turning stubborn lug nuts and large diameter bolts. The 18V LXT brushless High-Torque 1/2" Impact Wrench has 1,180 ft-lbs of breakaway torque and is engineered for demanding applications. The brushless motor delivers longer runtime, increased power and speed, and longer tool life for consistent performance without a power cord or air hose.

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BACK FACING 360-DEGREE AIRFLOW

The **Exair Soft Grip Back Blow Safety Air Gun** is designed to blow debris and liquids from pipe or hose inside diameters, channel, bores, holes, internal threads and other internal part features. The array of holes on the nozzle provides a forceful back facing 360-degree airflow. The nozzle offers a small profile that will fit inside opening as small as 7/8", and is effective on diameters of up to 4". The airflow exiting the nozzle is quiet and cannot be blocked, and the air gun is OSHA and CE compliant.

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COMPACT DESIGN FOR TIGHT SPACES

The **Legacy Manufacturing Flexzilla Pro Mini Impact Wrench Kit**, No. AT8505FZ, includes the Flexzilla Pro Mini Impact Wrench, Flexzilla Pro High Flow Couplers and Plugs and a Flexzilla Pro Air Hose. The Mini Impact Wrench features 800 ft-lbs of nut-busting breakaway torque, a maximum torque of 550 ft-lbs and a compact design ideal for tight spaces. The air hose offers reusable anodized aircraft aluminum fittings, extreme all-weather flexibility and the hose lays flat and won't kink under pressure. This kit is designed to be an easy Push-to-Connect system.

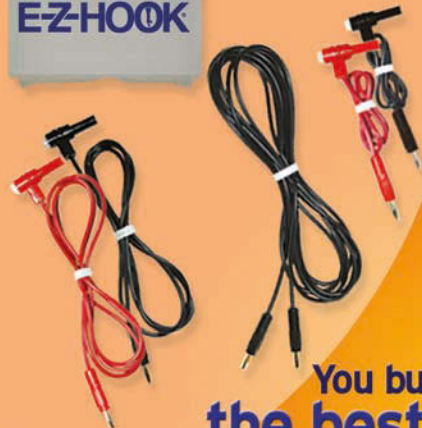
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FREE SPEED OF 10,000 RPM

The **JET 1/2" Compact Impact Wrench**, No. JAT 107, offers a maximum torque of 500 ft/lbs, and a free speed of 10,000 rpm. The tool also offers an ergonomically designed grip that the company says absorbs vibration and reduces hand fatigue. Additional features include three-position forward and reverse power settings, a twin hammer impact mechanism and a lightweight aluminum construction that reduces weight.



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DESIGNED FOR WORK IN TIGHT SPACES

The **Milwaukee M12 Cordless 1/4" Lithium-Ion Ratchet**, No. 2456-20, is designed to offer maximum performance and productivity in a sub-compact tool for auto mechanics, maintenance and repair professionals, according to the company. This ratchet offers a powerful 12V motor that produces up to 30 ft-lbs of torque and 250 rpm. The ratchet is 10-3/4" long and weighs 1.9 lbs, and features a 3/4" low-profile head designed for work in tight spaces.



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INSTALLS FASTENERS THROUGH A 1/4" DIAMETER

The **FSI PT-4500H cordless riveter** uses industry standard Huck style nose assemblies to install most industrial quality blind rivets and lockbolts (Huck MG and C6LB styles) through a 1/4" diameter. Powered by a slide-on 18V Li-Ion battery pack with fuel gauge, the PT-4500H's brushless motor drives a mechanical ball screw gear system that provides pull forces up to 5,000 lbs. Providing nearly a 1" stroke capability with speed comparable to most shorter stroke air operated riveters, the PT-4500H reduces cycle times even when using extended grip rivets, and a removable rivet stem collector is provided to eliminate potential foreign object damage from spent mandrels in the work area. Special rotating adapters and nose assemblies such as right angle, offset, extended straight and closed edge distance versions adapt to the riveter. Weighing less than 5.75 lbs with a standard nose assembly attached, the PT-4500H also includes an LED lighting system for use in dimly lit areas.

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OFFERS THREE-POSITION FLEXIBLE HEAD

The **SP Air Reversible Flex Head Cut-Off Tool**, No. SP-7231R, offers a three-position flexible head designed to provide greater access in tight work places. The tool features a cushion grip handle, rear exhaust, safety throttle lever, built-in power regulator, graduated trigger, direct drive motor and metal guard. The tool cuts muffler clamps and hangers, sheet metal, radiator hose clamps, bumper bots and steel rods up to 3/4".

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DESIGNED TO GET INTO TIGHT SPACES

The **Monster 3/8" Angle Impact Wrench**, No. MST7015, was designed to get into tight spaces and be lightweight. Weighing 3.9 lbs, the MST7015 provides 160 ft-lbs of torque at 7,000 rpm. Monster products are available exclusively through the mobile tool distributor channel.

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LOW MAINTENANCE AND LOW VIBRATION

Chicago Pneumatic CP66 Nutrunners offer high power, low maintenance and low vibration. These nutrunners weigh as little as 8.3 lbs and are equipped with a sturdy stabilizing arm to aid operator comfort. These tools are designed for flange-related and other bolting applications and are designed to provide a more durable, powerful and safer alternative to an impact wrench. With models capable of delivering 96, 1,900 or 3,100 ft-lbs of torque, these nutrunners are designed to deliver the right amount of torque to tighten or loosen bolts ranging from 20mm to 45mm.

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SEALED HOUSING AND ERGONOMIC GRIP

TorcUP's RAPTOR Non-Impacting Pneumatic Torque Wrench comes in five models with a torque range of 78 ft-lbs to 5,990 ft-lbs, and has continuous and repeatable torque capabilities with an accuracy of +/- 5 percent. The RAPTOR's patented gear technology is designed to offer greater durability and lower operational temperatures. These features in combination with the wrench's sealed housing and ergonomic grip have ensured operator efficiency, comfort and safety, according to the company.

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HEAVY DUTY FLEET MAINTENANCE AND INDUSTRIAL MRO WORK

The **AIRCAT 3/4" Impact Wrench Kit**, No. 1770-XLK, from **Florida Pneumatic**, provides 1,600 ft-lbs of loosening torque. Its refined design twin hammer increases blow frequency and efficiency. Additional features include: a power management switch with three power settings, molded-in buffers protect from side impact, and ergonomic grip and trigger provide operating comfort. The 1770-XLK is designed for heavy duty fleet maintenance and industrial MRO work.

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35MAX ULTRA-COMPACT IMPACT TOOL REVIEW

The **Ingersoll Rand Ultra-Compact Impact Tools**, Nos. 35MAX and 15QMAX, are pneumatic tools that technicians and operators can use to quickly loosen or tighten a variety of fasteners in confined spaces. The 35MAX and 15QMAX Impact Tools feature high power-to-weight ratios, easy-to-operate regulator dials with three power settings and push button forward and reverse capabilities. The 35MAX Ultra-Compact impact tool has a 1/2" square drive and 450 ft-lbs of maximum reverse torque. The 15QMAX impact offers a 3/8" square drive and 380 ft-lbs of maximum reverse torque, along with premiere quiet technology to reduce the amount of noise the tool creates. Both tools weigh 2.4 lbs and are 4.6" long.

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To watch a video demo of this product, go to:
VehicleServicePros.com/12210149

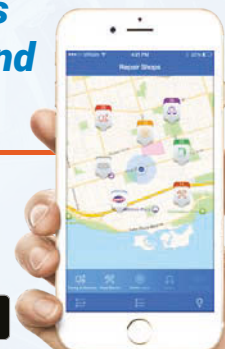


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TOOL REVIEW

INGERSOLL RAND POWERSOCKET

Ingersoll Rand PowerSockets provide the torque to loosen hard-to-remove fasteners, bolts and lug nuts, without the need for additional tools. The PowerSocket fits directly on the square drive of a 1/2" impact tool and provides more torque than standard impact sockets, the company says. The PowerSocket is now available in 17mm, 18mm, 19mm, 21mm, 22mm, 24mm, 26mm and 27mm metric sizes, as well as 3/4", 7/8" and 15/16" standard sizes. Read the review at: VEHICLESERVICEPROS.COM/20837748



TOOL REVIEW

MAKITA 18V LXT SUB-COMPACT BRUSHLESS COMBO KIT

The **Makita 18V LXT Sub-Compact Brushless Combo Kit**, No. CX200RB, combines 12V handling with 18V performance, run-time and compatibility, according to the company. An 18V battery from any Makita LXT tool will power the 18V Sub-Compact driver-drill and impact driver. The kit includes an ultra-compact two-speed brushless driver-drill that weighs 2.8 lbs, and a variable speed brushless impact driver with two speed settings that weighs 2.6 lbs. Read the review at: VEHICLESERVICEPROS.COM/20860994



ASK THE EXPERT

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BIG TIME BOXES

READERS OFFER A PROUD LOOK AT THEIR AWESOME TOOL STORAGE SYSTEMS.



On the grid

This three-bay setup features customized tool organizers.

by Vesna Brajkovic, Assistant Editor

When Evan Smith transferred into a new division at Schlumberger, he and his new three-bay Matco setup had to relocate from North Dakota to Colorado. After hunkering the toolbox down on a flatbed trailer, one bigger than UHAUL was able to offer, it had quite the journey.

But when the Matco box touched down on Colorado soil, Smith says there wasn't but a few sockets and ratchets out of place.

"Other than that, everything was in the same exact spot that I left it in Willingston [North Dakota]," he says.

That's because every tool in this Matco RevelX Series toolbox, which includes a hutch and two side lockers, is locked into place using a customized organization system unique to Matco Tools.

Known as the Tool Grid, each drawer is lined with what looks like a horizontal peg board with specialized components that can be screwed in anywhere to customize organization and snap tools into place.

OWNER:

Evan Smith

Schlumberger Technology Corp.
Platteville, CO

Smith uses this modular grid to set up his drawers by function, and carries over a lot of his other organization habits from his boss at his first job.

"It's a weird system that I have compared to a lot of people I work with," Smith says of the way he organizes. "It's mostly drive tools in the top, and then anything that is a plier, and all the wrenches, all kind of separated based on the functions that they do."

The two side lockers have six additional drawers in total and house miscellaneous items and blow molded tool kits. Smith also has a mini fridge in one of the side lockers.

There is also a power outlet and USB ports on the front of the box, and the power drawer and hutch both have power strips which include USB ports for charging.

▲ Smith uses a modular grid to set up his drawers by function.

Smith upgraded to this RevelX after trading in his Matco 6S with side lockers, which he purchased from Matco distributor Dan Hoover.

Overall, Smith is happy with his box. As a technician working on mostly equipment electronics, he says a lot of his tools don't get as much use as they should, so at this point it's just about organization.

"With the way I set it up there's not a whole lot of room for expansion," Smith says. "It's pretty much as big as it's gonna get. As far as organization, it's always little by little."

While there is some room to grow into the box, any extra space in the 17 drawers of this bold black and electric green toolbox filled with tools and equipment will be taken up by spare parts. **PTEN**

Want to see more photos of Smith's box?
Visit: VehicleServicePros.com/20982641



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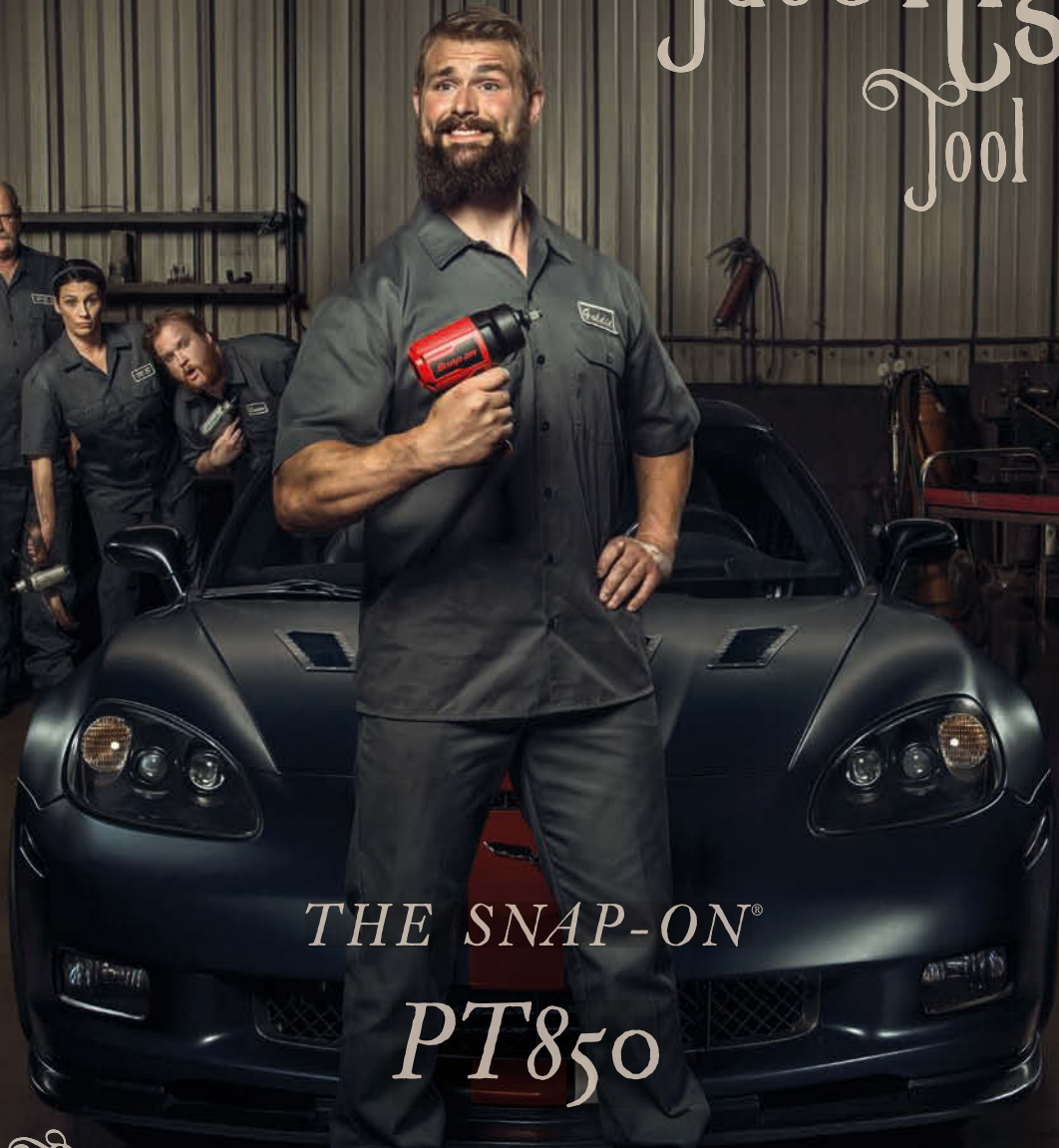
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