

PTEN

PROFESSIONAL **TOOL & EQUIPMENT** NEWS

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Volume 34, Number 1

ENDEAVOR
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ZEUS+

SIMPLIFIES YOUR DIAGNOSTIC
PROCESS AND GUIDES YOU
THROUGH THE RIGHT REPAIR
BY SNAP-ON

TOOL BRIEFING
TIPS ON TACKLING
ELECTRICAL ISSUES
PAGE 20

DIAGNOSTIC TECH
TOP DIAGNOSTIC
TOOLS FOR 2023
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DETAILS ON THE COVER PRODUCTS
AND OTHER NEW TOOLS **PAGE 8**



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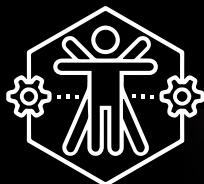
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VIDEO



In this video, Eric Moore, fleet manager at Griffin Pavement Striping in Columbus, Ohio, reviews the Clore Automotive 12V Heavy Duty Power Supply and Battery Charger.
VehicleServicePros.com/21293805

ON THE ROAD



From the show floor to panelist discussions, the global acceleration of electric vehicles and autonomous vehicles has undoubtedly taken off. While taking center stage at CES 2023, here are some key takeaways.
VehicleServicePros.com/21292348

AROUND THE SHOP



As vehicles become more complex having the right scan tool (or two or three) is becoming more essential. Whether looking to upgrade, or to add to your arsenal, here's a quick look at the most clicked on/viewed scan tools that were added in 2022 on VehicleServicePros.com.
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READER FAVORITES



Here's a look back at some of the most popular Big-Time Boxes that crossed the pages of PTEN last year. From massive toolbox set-ups to the simplicity of a single tool cart, we've seen a variety of organization styles. Which set-up would you want for your shop?
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SHOP OPERATIONS

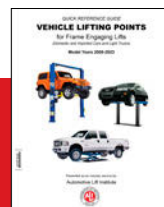


As people across the country reduce their spending, they are more likely to repair vehicles than to replace them, offering auto repair shops the opportunity to actually increase business. With the right strategies, you may find that it's entirely possible for your shop to not only survive an economic recession – but thrive and grow.
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FEATURED PRODUCTS



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Release 65.0/5.0
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JohnDow Industries
Oil Container Drainer
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Car crashes cost each American \$1,035 per year

The cost to repair crashed cars escalated to \$340 billion in 2019.

By **Brendan Baker**, Editor
BBaker@EndeavorB2B.com

The costs totaled out to just over \$1,000 per person, whether involved in an accident or not, according to a recent NHTSA study.

Seeing the costs involved, it's no wonder that body shops are so busy these days. There were more than 23 million vehicles damaged during this study's timeframe. The report also states that 36,500 people were killed and 4.5 million people injured, as well. All signs that there's still a way to go for road safety.

Somewhat surprisingly, those not directly involved in crashes pay for about three-quarters of all crash costs through higher insurance premiums, taxes, and other hard-to-calculate factors such as travel delays, increased fuel consumption, and environmental impacts. These costs totaled over \$261 billion.

Some say the current body shop business model is broken due to how much influence (or control) the insurance companies have over the entire process, from what a shop can charge for a headlight to replacement panels. While the growing number of fatalities is worrisome, technology can make cars safer and more dangerous at the same time.

Distracted driving is the biggest cause of accidents but not the most fatalities. Impaired

driving (alcohol) is still the most deadly with a higher chance of fatality. Technology can also be to blame for the higher costs to repair with more driver assistance features (ADAS), and overall increased use of computer modules (chips) in vehicles. This means that a mild fender bender can cost several times more because shops must replace multiple sensors (parking, lane assist, etc.), and other safety-related systems.

About 22.9 million vehicles were damaged in motor vehicle crashes in 2019; 19.3 million or 84 percent of these vehicles were damaged in incidents that incurred property damage only.

This report indicates that the total cost from traffic crashes in 2019 of \$340 billion is approximately 40 percent higher than its previous estimate of \$242 billion in 2010. The difference in these estimates is attributable to a number of factors, including inflation (17 percent), shifts in the severity of crashes and the nature of injury outcomes, and a revised basis for measuring unit costs.

The report also examined crash costs for various roadway types and crash configurations. Among its findings, accidents on interstate highways were responsible for roughly 12 percent of the cost, while the more frequent but less serious accidents at

intersections account for 53 percent of the cost. It's just a fact of life in our society that fender benders occur so often, but it is clear that the costs are rising to repair vehicles, and the potential for fatalities is still a big factor in the equation.

With OEMs introducing more safety systems such as ADAS and other crash avoidance systems, the methods and tools to repair these vehicles are significantly more complex than even a decade ago, yet we are still trying to get people to wear seatbelts on a regular basis in 2023. Go figure. ✕

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FEATURED NEW PRODUCTS



AVAILABLE IN 18" AND 13" SIZES

The **Milwaukee Tool M12 FUEL Bandfiles**, Nos. 2482-20 and 2483-20, are available in both 18" and 13" sizes and are designed to deliver fast spot weld removal. The bandfiles feature two speed adjustment settings (high 3,600 sfm and low 1,800 sfm), a lock-on button, a variable speed trigger, forward and reverse functionality, and are resistant to belt slip. Both are also equipped with a 360-degree tool-free arm rotation to improve access in hard-to-reach applications. When equipped with an M12 Redlithium XC 4.0 battery, users can remove up to 50 spot welds using the 18" bandfile and up to 40 spot welds with the 13" bandfile on a single charge.

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LIFTS BOTH INTERNAL COMBUSTION AND ELECTRIC VEHICLES

The **BendPak AP Series Two-Post Lifts** make lifting internal combustion and electric cars, trucks, and vans safer, easier, and more efficient. The lifts offer patent-pending features, including nested arms, an automatic swing arm restraint system, and an automatic safety lock system. The AP Series includes three 10,000-lb capacity models. The standard 10AP has a 73" lifting height and an overhead beam height of 145". The 10AP-168 also has 73" of lifting height plus a crossbar

that's positioned 2' higher to accommodate high-roof cargo vans. The 10APX is a high-rise model, offering 79.5" of lifting height with a 157" top beam. The 10APX-181 has a 79.5" lifting height and increases the top beam height to 181". All are ALI certified.

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BUILT-IN MOISTURE SEPARATOR

The **Fornair 2.5 CFM Air Compressor** from **Forney Industries** is a portable and easy-to-use electric air compressor designed to ensure maximum efficiency and performance of air tools and plasma cutting equipment. Operating at 1.0hp with 120 psi maximum rating and 61 dB rated noise level, the Fornair air compressor is so quiet that it allows a normal conversation to take place, says the company. With an auto on/off option, the unit automatically refills the air compressor when the tank pressure drops below a certain limit. Additionally, it features an oil-free pump, two carry handles, 4-gallon steel tank construction, dual quick connect couplers, and a built-in moisture separator.

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FOR MORE INFORMATION ON THESE PRODUCTS,
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Kicking off the New Products section each month, our Featured New Products page includes brand new products showcased on the cover that are available to the automotive market.



FEATURES A FULLY DETACHED WIRELESS FOUR CHANNEL SCOPE

The **Snap-on ZEUS+** provides the information needed to diagnose, repair and manage any issue, simplifying the workflow and increasing efficiency on every job. Features a streamlined design with a fully detached wireless four channel scope for mobility, ample storage for capturing intermittent glitches, a 12" optically bonded color touchscreen display, an eight megapixel camera, and an integrated stylus with a flashlight built in. The software includes advanced graphing features to help technicians easily navigate through data, a guided component test meter for verifying component failure, fast boot up and one-touch code scan and clear.

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FEATURES A 3/4" BORE SIZE

The **Ingersoll Rand 135MAX Heavy Duty Air Hammer** is ideal for vehicle, truck, bus, and heavy machinery repair. Weighing in at 4.5 lbs, the 135MAX HD Air Hammer delivers 2,600 bpm, with a 3" piston stroke. It also has a feather-touch trigger for jobs that require light handling. Featuring a 3/4" (19mm) bore size, the air hammer is available in a convenient kit that includes five chisels and the air hammer in a carrying case or as an individual tool.

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INCLUDES A VARIETY OF SIZES

The **SP Tools USA 12-pc Screwdriver Set with EVA Foam Tray**, No. SP34003G, is designed to fit into technicians toolboxes by utilizing its EVA foam holding trays. The set includes a variety of sizes from stubby, for confined workspaces with limited access, to extra long, for increased torque and extended reach. The handles are made from polypropylene and the shafts are made from SVCM steel, offering extra strength and durability to get the job done effortlessly. Precision made magnetic tips ensure ideal fastener control. The EVA foam housing measures 22.5" by 10.5" by 1.25".

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INCLUDES NEW WIRE-TO-WIRE FEATURE

The latest **Mitchell 1 ProDemand Advanced Interactive Wiring Diagrams Update** now includes a wire-to-wire feature, saving technicians time as they navigate electrical issues on today's vehicles. Previously, technicians often had to jump from a wire in one diagram to the related content for a component in a separate diagram to get the full picture of a circuit. With the new wire-to-wire feature, ProDemand takes technicians to the specific wire in a companion diagram with the trace already highlighted. The history navigation arrows can easily take them back to where they started with the original trace highlighted.

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Looking for a **Full Service DPF Tool** for Commercial Vehicles?

If you're looking for a mid-line code scanner to diagnose medium to heavy duty commercial vehicles and you don't want to break the bank, then look no further!
Introducing the all-new HD Code Pro.

The **HD Code Pro** is slotted right in between our HD Code II and our more professional line of scan tools, such as the HD Pro III and HD Pro Tab. It is the perfect triage tool for reading & clearing codes and performing quick & easy DPF resets and regens - but even more, with the HD Code Pro, now you can also perform SCR, Ash and Soot Level Resets, along with Service Maintenance Resets. It is now a full DPF service tool!



FEATURES & BENEFITS

- Commercial Vehicle Coverage with Heavy Duty and Medium Duty Truck Emissions Service Capabilities (DPF / DEF / SCR)
- Coverage for Detroit, Cummins, International, Isuzu, Mack/Volvo, Hino/UD, Fuso, Paccar, Mercedes, Caterpillar, Perkins, John Deere and more!
- Mitsubishi ECU Reset function to properly perform DPF Regeneration
- ECU Data and ECU Resets to Clear Emission Codes
- DPF / SCR / ASH level and Soot level resets
- DEF Coverage
- NOX, NOX Sensor/ Doser Valve/ DPF Pressure Sensor Test and Resets
- EGR Test and Reset
- Detroit: Register New DPF Filter
- Read & Clear Codes and View/Graph Live Data
- Fuel Trim / Fuel content Resets
- Oil & Maintenance Reset for Heavy duty through Medium duty
- Built-in Printer

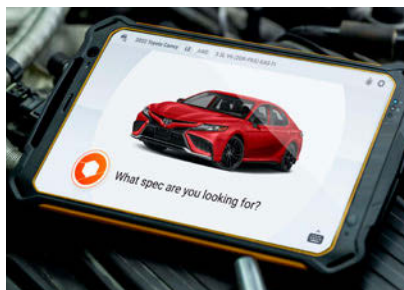


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OFFERS A HANDSFREE DATA LOOKUP EXPERIENCE

Ortho is a voice assistant and purpose-built to drive efficiency in auto repair. Ortho is a fast and convenient way to access trusted repair and maintenance data. Powered by MOTOR's OEM database and housed inside a rugged tablet, Ortho offers a handsfree, fast data lookup experience. By simply saying "Hey Ortho" and asking a question, technicians get access to hundreds of specs (e.g., torques, measurements), fluid details (e.g., capacities, types), diagrams (e.g., mounting points), and maintenance intervals, all specific to the vehicle in the bay. Ortho includes a free trial and offers a flexible subscription or monthly pricing models for individuals and shops.

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PROVIDES A PERMANENT REPAIR

The **AGS Plastic Bumper and Trim Restorer** is designed to give plastic bumpers, fenders, cladding, and trim a factory look. The Plastic Bumper and Trim Restorer is a permanent repair. No re-application is needed, the company says. Exclusive technology imbeds the coating into the plastic, making it impervious to sun, harsh weather, and car washes.

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FOR CUMMINS, CAT, AND MACK ENGINES

The **Oni Tools Universal Cylinder Liner Puller Kit**, No. ONI300T, is designed to directly replace OEM part numbers PT-6400-C, M50010-B, 3376015, ZTSE2536, and PT-6410-5. The universal liner extractor set works on wet liners from 3-7/8" to 6-1/4" bore, up to 15" deep, with a minimum wall thickness of .148". It's used to safely and correctly remove the cylinder liners while avoiding damage to the cylinders block. The kit is made from heavy duty steel structure machined and finished with powder coating to resist corrosion and ensure a long-term and reliable performance.

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CUSTOMER REVIEW:
“Finally an affordable aftermarket universal liner puller without compromising quality!”



PROVIDES 200A OF POWER

The **H&S AutoShot HSM200 PRO MultiMIG Welder**, No. HSW-6422, provides 200A of power for MIG, TIG, and stick applications on either a 115V or 230V line. The welder features voltage, wire speed, amperage, and full Synergic scroll-down settings for steel, aluminum, and silicone bronze on a 5" LCD display. AC TIG functions allow the user to weld any metal with three wave forms for aluminum TIG welding. The spool gun selection switch, euro-connect flange for torch and spool gun, and high-frequency start foot pedal connector are standard. Package includes: MIG, torch, TIG torch with foot pedal, electrode holder, ground clamp, MIG wire, TIG torch kit, and dual gauge regulator with hose.

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SERVICES TIRE RIMS FROM 10" TO 30" IN DIAMETER

The **Coats 90C Center Clamp Tire Changer** features a center locking-clamp design that is easy to use, fast, and helps prevent metal-to-metal contact with customer wheels. It also comes standard with a leverless duckhead mount/demount tool and auxiliary bead sealer. The leverless duckhead acts as a traditional helper device and eliminates traditional tire tools that can mar the surface due to application difficulty, the company says. The Coats Auxiliary Bead Sealer (ABS) is designed to tap into the tire changers surge tank, providing additional bead seating volume. The ABS also assists with sealing difficult applications. The 90C is capable of servicing tire rims from 10" to 30" in diameter.

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WORKS AS A FULL DPF SERVICE TOOL

The **CanDo HD Code Pro** is a mid-line code scanner that will diagnose light to heavy duty commercial vehicles. The scanner reads and clears codes as well as performs simple DPF resets and regens. In addition, the scanner allows users to perform SCR, ash and soot level resets along with service maintenance resets, making this a full DPF service tool. The scanner features a built-in printer and covers Detroit, Cummins, International, Isuzu, Mack/Volvo, Hino/UD, Fuso, Paccar, Mercedes, Caterpillar, Perkins, John Deere, and more. Includes one year of free updates.

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MADE OF HEAT-TREATED S2 STEEL

The **OEMTOOLS 13-pc Star Bit Socket Set**, No. 22977, comes in many sizes, including (1/4" drive) T8, T10, T15, T20, T25, T27, T30, (3/8" drive) T40, T45, T47, T50, T55, and (1/2" drive) T60. The long-lasting bits are made of heat-treated S2 steel while the reinforced chrome vanadium steel sockets are designed to give extra turning power. The bits are made with fully refined hard chrome plated finish and zinc phosphate to prevent rust and corrosion. The precision-made set exceeds ANSI standards and comes in a sturdy blow molded case for convenient and organized storage.

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DESIGNED FOR R-1234YF VEHICLES

The **TEXA Konfort 760 Touch A/C Recovery Machine** is designed for R-1234yf vehicles. The unit comes stocked with airtight oil bottles and features fully automatic service management, a scale locking/unlocking device, and a refrigerant weight accuracy check. The Konfort 760 also sports a 10" color multi-touchscreen display, Wi-Fi connectivity, and a Bluetooth module which allows users to connect the station with several accessories such as an A/C efficiency kit. The Konfort 760 Touch also comes with a built-in thermal printer and a dedicated app so operators can follow the service and charging procedures remotely from their phone.

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BLADE MEASURES 10-1/2"

The **Lisle Corporation Pistol Grip Wire Inserter**, No. 83550, is designed for easy insertion of metal or fiber cutting wire through polyurethane. The tip has a slotted end to push and a hole to pull wire through the windshield bonding. It also allows wire to be inserted closer to the pinch weld. The blade measures 10-1/2" long to reach into tight spaces.

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DESIGNED WITH 3/8" AIR INTAKE THREAD

The **Titan Professional Tools High Flow Air Blow Gun**, No. 19393, is designed with 3/8" air intake thread. When used with thread sealant tape, this high-volume air gun allows for greater air flow and higher psi, with adjustable pressure between 25 to 230 psi. The gun is designed with a unique non-slip-aluminum ergonomic handle, and the tapered high-flow tip can be directed towards hard-to-reach areas. The product includes 1/4" series plug with 3/8" NPT male thread with pre-applied thread sealant, and it meets OSHA standards.

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FAST-DRYING AND PAINTABLE

The **Bulldog Multi-Bond Adhesive** from **Klean-Strip** is a multi-surface adhesive that provides a strong, flexible bond for various jobs around the shop. Bulldog's precision applicator lays down professional grade adhesive that grips, creating a permanent bond on virtually any surface. Bulldog can be used for repairs including attaching accessories, seam sealing, and minor crack repair on metal, fiberglass, and plastic surfaces. The adhesive is fast drying and paintable. It doesn't contain solvents and is non-flammable.

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NEW PRODUCTS



AVAILABLE IN NON-VACUUM AND VACUUM VERSIONS

The **Dynabrade Nitro Series 11" Diameter Random Orbital Sander** features a proportionate 3/4" diameter orbit to assure a swirl-free finish on a variety of surfaces. It's able to quickly remove heavy oxidation and correct surface imperfections on large areas. With a 1hp, 2,800 rpm motor, the sander offers higher torque and power than its previous model. Its soft grip, insulated handle reduces cold air transmission to the operator while its side handle can be positioned for right or left-handed operation. Additionally, its rear exhaust is designed to move air away from the operator. Includes a weight-mated hook-face sanding pad to further reduce vibration and enables quick abrasive changes. Available in non-vacuum (No. NS11) and vacuum (No. NS11V) versions.

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FOG AND UV PROTECTED

The **Brass Knuckle Slingshot Safety Glasses**, No. BKFLEX-4050AFP, feature BK-Anti-Fog+ technology for fog protection and eliminate 99.99 percent of damaging UV rays. The safety glasses have shatterproof lenses, extra-chunky molded nosepieces for added comfort, earpieces that fit snugly at the ears without putting the squeeze on temples, and are lightweight to prevent nose divots and keep the glasses in place.

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COMPACT DESIGN AT 12" HIGH

The **Makita USA 40V Max XGT Cordless Work Light**, No. ML009G, delivers bright illumination, versatility, and convenience. The ML009G has three modes of operation that provide 10,000 lm on high, 4,000 lm on medium, and 2,000 lm on low. The ML009G offers up to 14 hours of continuous illumination with two 4.0Ah 40V Max XGT batteries on low. The worklight is dust and water-resistant (IP65 rated), and can be mounted on an optional tripod light stand individually or with two worklights. A convenient carrying handle folds down when needed.

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DESIGNED TO REDUCE FATIGUE

The **Vessel Ball Grip Ratchet Screwdriver with 10-pc Bit Set and Bit Belt**, No. 2200MBH120K01, features a bit size of 1-3/16" and offers a smooth operation with its 36-teeth gear design. The ratchet mechanism has forward, reverse, and stationary positions on the dial. The Ball Grip ratchet style is designed to reduce fatigue when using to insert a lot of screws. The kit includes a SL#6, T10, T15, T20, T25, T30, SQ2, PH1, PH2, and PH3 bit. The ratchet screwdriver can also be used as a stubby screwdriver and the Impact Torsion bits can be used with power tools.

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FOLDS COMPLETELY IN HALF

The **Matco Tools Pro-Charge Wireless Rechargeable Folding 850 lm Worklight**, No. PCFOLD, is a versatile worklight that offers three light sources, including a 400-850 lm main light, 400 lm back light, and a UV top flashlight for leak detection. The light folds completely in half with its 400 lm light and top UV flashlight still functional while folded. The worklight can easily recharge wirelessly using the company's Single or Dual Smart Charge Pads (sold separately) or charge with a USB-C cable (not included). Once charged, the battery will last from 2.5 to 5 hours of use. The worklight features three battery level display lights, an extendable hanging hook, a strong base magnet, and rear charging pad locating magnets.

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INCLUDES FIVE-SIDED TORX PLUS PROFILE SOCKETS

The **CTA Manufacturing 16-pc 5-pt EPR Torx Socket Set**, No. 1220, includes five-sided Torx Plus profile sockets, from 6EPR to 32EPR. The socket set is made from satin finish chrome vanadium and packed in an EVA foam tray for convenient storage in toolboxes. The sockets, also referred to as Pentalobe sockets, include three different sizes: 25 mm, 1/4" square drive (6EPR, 7EPR, 8EPR, 10EPR, and 11EPR), 37mm, 3/8" square drive (12EPR, 14EPR, 16EPR, 18EPR, and 20EPR), and 45mm, 1/2" square drive (22EPR, 24EPR, 26EPR, 28EPR, 30EPR, and 32EPR).

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WITHSTANDS TEMPS UP TO 2,000 DEGREES F

The **VersaChem Tailpipe Repair Kit** is a heavy duty, high-temperature permanent tailpipe repair kit. Designed to withstand extreme temperatures up to 2,000 degrees F, this kit can be used for small or heavy duty repairs. The 8-pc kit includes a temperature resistant bandage, all steel exhaust clamp, 2 oz. of putty, metal wire screen, alcohol wipes, gloves, sandpaper, and a putty spreader. Available Q1 2023.

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KEEPS POWER STEERING SEALS SOFT AND PLIABLE

The **Bar's Leaks Power Steering Stop Leak Concentrate**, No.1630, is designed to stop leaks in seals and O-rings caused by normal power steering system wear and age. The non-corrosive, non-clogging, and non-foaming formula works on rack and pinion units, gear boxes, and pumps. It keeps power steering seals soft and pliable. It also works with all domestic, import, and heavy duty power steering fluids, including petroleum, mineral oil, synthetics, and ATF automatic transmission fluid. One bottle treats up to 3 qt. of fluid.

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PROTECTS AGAINST DAMAGE

The **Boots-R-Us Protective Cover for Milwaukee Tool M18 1/2" Impact Wrench - 2767**, No. JB-62B, offers protection against damage, while also protecting the serial number that may be needed in case of product warranty issues. The boot is custom fit and built to last. Available in red, blue, and black. Made in the U.S.A.

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"Very versatile small charger."

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- Extends Life and Performance of Vehicle Batteries



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NEW PRODUCTS



OFFERS PRE-INSTALLED EXTENDED FUNCTIONS

The **Launch Tech X-431 Torque Link** is designed to assist technicians and repair shops with productivity and accuracy. The Android 10-based scan tool has added features, including X-431 FIX repair database (Driven by Motor), SmartLink VCI, upgraded 4G/128GB storage, optional HD add-on subscription, J2534 Pass-Thru programming, FCA/SGW compliance, and more. Additionally, X-431 Torque Link offers pre-installed extended functions, such as ADAS calibration system, battery and starting system, oscilloscope, video scope, TPMS, and immobilizer diagnostics.

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INCREASED TPMS COVERAGE FOR AFTERMARKET SENSOR BRANDS

The **ATEQ Q4 2022 Software Release** includes new vehicle model coverage, updated OE sensor information, increased TPMS coverage for aftermarket sensor brands, and new aftermarket TPMS sensor brands. New versions are now available for VT67, VT57, VT56, VT47, VT37, and VT36. One notable addition is Launch Tech's LTR sensor is now available on all ATEQ TPMS tools. Additionally, the latest release offers updated coverage from over 25 aftermarket sensors.

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OFFERS 360-DEGREE ROTATION

The **Coxreels Mounting Brackets for 100 Series**, No. SMK-702, is a swivel bracket accessory for the 100 Series Hose Reels and the V-100 Series Vacuum Reels. Built in the U.S.A. of heavy gauge steel, the SMK-702 wall mount swivel brackets feature 360-degree rotation, with multiple locking positions via an easy-to-use ergonomic pin lock. The bracket allows the user to point the reel in the direction where the hose is needed, improving the experience and function during payout and rewind. The full-length vertical bearing and stability thrust bearing provides smooth and long-lasting rotation. The SMK-702 comes in two sizes, SMK-702-8 and SMK-702-12.5.

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HAS A LIFTING CAPACITY OF 6,000 LBS

The **BADLAND 3 Ton Off-Road Jack** from **Harbor Freight** is ideal for lifting mid-size trucks, SUVs, ATVs, and UTVs. The jack features a lifting capacity of 6,000 lbs and dual piston Rapid Pump technology to lift vehicles quickly and efficiently. Built for durability and rugged conditions, the jack has solid steel axles with sealed ball bearings for smooth operation, 7-1/16" thick aluminum side plates, and stainless-steel hardware. A rear axle wheel lock keeps the jack in place while working on a vehicle, and a locking adjustable height extension includes a rubber pad to protect against marring. Meets or exceeds ASME/PASE.

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AVAILABLE IN MULTIPLE DIFFERENT FLOW RATES

The **Exair TurboBlast Safety Air Gun** is capable of producing up to 23 lbs of force with a simple press of a button trigger and is the ideal solution for blowoff applications. The TurboBlast features a cast aluminum handle with a rugged elastomer grip that's UV resistant, chemical resistant, and insulated from heat or cold. All models include an integrated nozzle guard for safety. Models are available with an adjustable gate valve to control blowing force on the fly, or without the gate valve. The TurboBlast is CE compliant, meets OSHA standards, and is available in multiple different flow rates and extensions up to 6' long.

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Watch this product in action here: VehicleServicePros.com/21290278

SAFE TO USE IN ALL COOLING SYSTEMS

The Rislone Hy-per Cool Radiator Cleaner and Super Flush

is formulated to remove damaging coolant deposits that build up over time and cause engine overheating. It also neutralizes acids and helps prevent the formation of scale deposits for longer system life. Its Heavy Duty Xtreme Clean formula cleans the entire cooling system, removing solder bloom, oily residue, rust, and scale. Rislone Hy-per Cool Radiator Cleaner and Super Flush is fast, easy, and safe to use in all cooling systems. It removes deposits and coolant gel for a complete cleaning in about 30 minutes, the company says. Made in the U.S.A.



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PERFORMS CALIBRATIONS DIRECTLY ON DRIVESAFE PLATFORM

The **Opus IVS QuickADAS** enables a vehicle repair facility to directly perform calibrations on the DriveSafe diagnostic platform from the ADAS Checklist. With this latest software upgrade, key productivity enhancements include eliminating the need to move off the tool for ADAS calibrations. The functionality presents ADAS calibration requirements including targets and part numbers on-screen in the diagnostic tool that enables the shop to immediately perform the necessary calibrations using the DriveSafe tool's proprietary capability which they then can upload the results into the CCC work file for the vehicle.

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OFFERS MULTIPLE MOUNTING OPTIONS

The **TOPDON PulseQ EV Charging Station** offers versatility, adaptability, and smart technology. The PulseQ is compatible with most American AC electric vehicles because of the SAE J1772 (Type 1) plug, eliminating most brand barriers to EV owners. The compact design and multiple mounting options save space, and it can be mounted outside. The charging station's interface can be accessed and adjusted through an app to set charging sessions during off-hours and to monitor the charging process.

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DESIGNED FOR SOFT METAL FLARE NUTS

The **Mac Tools Flare Nut Wrench Sets**, Nos. SFND5SAE, SFND6MM, and SFND8SAE, feature a 270-degree wraparound on box end, allowing torque to be transmitted on five sides to prevent fastener distortion. The wrenches are designed for soft metal flare nuts and are available in three sets: 5-pc SAE Flare Nut Set, No. SFND5SAE; 6-pc MM Flare Nut Set, No. SFND6MM; and 8-pc SAE Flare Nut Set, No. SFND8SAE.

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STEEL DENT REPAIR AND GLUE PULLING STATION

The **Dent Fix Equipment MAXI Extended**, No. DF-505/DXE, is a steel repair station designed to hold tools in one station and is able to be rolled to different bays in the shop. A lockable cabinet with foam fitted inserts keeps the tools organized and accounted for. The MAXI Extended is ideal for multiple weld-on pulling, no-heat glue pulling, and metal shaping options to repair damage in automotive steel panels and rockers. It's able to perform heavy duty pulls without any welding or removing of parts, paint, or protective coatings. The five-drawer cart includes metal shaping tools, six hammers, seven dollies, body file, and a fender puller. Made in the U.S.A.

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FEATURES A SPRING RATCHET LOCKING MECHANISM

The **Lang Tools 2-pc Internal/External Retaining Ring Pliers Set**, No. 1487, features a spring ratchet locking mechanism that securely holds snap ring tension, a thumb release allowing smooth and controlled tension release, and a cushion grip for comfort. The internal ring size ranges from 3-1/16" to 6-1/4", and the external ring size ranges from 3-1/2" to 6-1/2". The pliers set includes two sets of replaceable tips (size .120") that come in straight, bent 45-degree, and bent 90-degree angles.

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Watch this product in action here: VehicleServicePros.com/21290280

IDEAL FOR REMOVING STICKERS, SILICONE ADHESIVES, AND MORE

The Permatex Fast Orange Citrus Blaster

Adhesive Remover is designed to remove sticky messes. The unique gel formula penetrates deep into the mess, softening it and loosening its grip on the surface below. It can be used on both interior and exterior vehicle surfaces without fear of damage. Ideal for removing stickers, silicone adhesives, fresh road paint, asphalt, bugs, tar, and more. Available Q1 2023.

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ELIMINATES BEARING AND HUB DAMAGE

The **OTC Hub Seal Puller Set**, No. 5085-S, eliminates bearing and hub damage that can occur when a punch and hammer is used to remove the seal. An extra long 28" handle provides leverage, and the unique pulling head design quickly and easily removes the seal in one piece. Removes hub seals on trailer and truck axles, including truck steering axles and also includes a larger size replaceable head (No. 600053) for hub oil seal removal on seals with 4-5/8" I.D. and larger. The head screws onto the handle of the hub seal puller for more applications and leverage.

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INCLUDES ALL NECESSARY TOOLING

The **ProMAXX 2011-2020 Dodge/Jeep 3.6L V6 Exhaust Manifold Repair Kit**, or Sara ProKit, allows technicians to make on-the-truck exhaust manifold repair (EMR) for the Dodge/Jeep FCA Pentastar 3.6L V6 from 2011 to 2020. The kit comes with all necessary tooling including drill bits, tap, bushings, and fasteners. The 3.6L EMR kit is field-tested by experienced technicians and proven to shorten removal times to approximately 15 minutes per bolt, the company says. The kit quickly bolts right onto the cylinder head and uses the company's trademarked Extractorless repair application to speed up repair times and eliminate broken extractors.

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INCLUDES A TWO-SPEED 220V CONVERTER MOTOR

The **Hunter Engineering TXC51C Tire Changer** combines the benefits of a center clamp model with the useability and familiarity of a traditional swing arm changer. The result is significantly enhanced wheel protection, eliminating slippage risk. The 51C features a Hunter-exclusive lower locking disc that can be used for rebreaking, lifting, and demounting the bottom bead. It also includes Hunter's exclusive FastBlast inflation system which allows easy inflation of challenging truck and SUV tires by a single technician, handsfree. Additionally, the tire changer includes a two-speed 220V converter motor and the PowerOut bead loosener.

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Mechanical Repair Shops

It's YOUR Time for ADAS >>>

Every problem is an opportunity in disguise, the old saying goes. Mechanical repair shop owners faced with the growing number of Advanced Driver Assistance System (ADAS)-equipped vehicles coming into their repair bays may want to take note of the adage.

But, first, they must rid themselves of the misconception that the repairs and services they perform don't affect the functioning of the components and cameras integral to ADAS. Any engine or transmission repair or replacement that involves the removal of the front grill housing a radar or camera unit will necessitate a calibration once the grill is reinstalled. Further, most vehicle manufacturers' position statements recommend an ADAS calibration after any alignment that changes a vehicle's thrust angle or ride height. The simple truth is if your shop is doing alignments or a host of any number of repairs, your shop should be doing ADAS calibrations.

With 99 million ADAS-equipped vehicles already on North American roads and 210 million projected by 2030, ADAS calibrations will likely become a commonplace last step in mechanical repair services.

So, general repair shops must face the same "problem" as collision and glass shops have since safety systems became popular options on brand models: **How to handle vehicles needing ADAS calibration after the repair?** The shops that choose to sublet calibrations to dealerships and others lose the revenue from the calibration, the time associated with scheduling and moving the vehicle, and the assurance of quality care that comes with key-to-key, in-shop service control.

The Autel MaxiSYS IA900WA, an industry-first all-in-one wheel alignment system, and ADAS calibration frame,

presents a new, comprehensive approach to vehicle servicing, the type required by today's sophisticated vehicles. The IA900WA guides the technician through an all-systems diagnostic, a digital chassis and tire inspection, a four-wheel alignment, and ADAS calibration.



MAXISYS IA900WA

Compatible with any standard, four-wheel alignment rack, the IA900WA offers alignment coverage for U.S., Asian and European vehicles, 1996 and newer. The system guides the user through the process with illustrated alignment instructions, live readings, and action steps. Alignment readings displayed on a mounted 24-inch touch-screen monitor mirror those on the Ultra ADAS tablet, enabling the technician to manipulate the vehicle and monitor the adjustment effects freely.

Regarding ADAS calibration systems, Autel offers the industry's most expansive vehicle and safety-system camera and component coverage. To grasp how innovative the IA900WA system is, one only must look at the most time-consuming and laborious part of any ADAS calibration, the pre-calibration vehicle-to-target positioning. It takes, on average, 40 minutes to align and center a vehicle using mechanical aids like lasers, mirrors, plumb bobs, and chalk. The IA900WA, which employs six-high resolution tracking cameras, targeted wheel clamps, and location software, transforms the frame into a rapid yet precise centering and positioning unit, enabling technicians to accomplish target-to-vehicle placement in as little as three minutes.

The shop owner's major investment decisions often involve three questions: **Do I need it?; Can I Use it?; Am I able to afford it?** ADAS will continue to grow, whether prompted by government mandates or consumer interest. If it's not already here, there will come a time when every vehicle you touch will have ADAS. How you deal with that fact will be integral to the success of your business.

Can I Use it? This question is a two-partner: First, **can my technicians and I learn to use this system efficiently**, or is it so overly complicated that any level of comfortable usability seems years away? Autel designs its hardware and software to be used by knowledgeable and conscientious technicians. With that said, the IA900WA offers a detailed, process-driven approach to complete vehicle servicing that guides the technician to perform each needed task step-by-step. Second: **Is my shop large enough to perform ADAS calibrations?** Eighty-eight percent of the most popular and, therefore, the most-often calibrated systems, forward-facing and blind spot monitoring calibrations, can be executed in a typical sixteen-by-thirty-foot repair bay.

And the final question, **Can I afford the investment?** The IA900WA comes in three packages, and each caters to your shop's evolving needs. Choose from the Alignment-only unit package, Alignment with Lane Departure Warning targets and patterns, or Alignment with All (ADAS) Systems calibrations capability. Each package is available with the Ultra ADAS tablet. Shops using the IA900WA have realized a return on investment in as little as a month. Considering the national average for a four-wheel alignment is \$134, and the average calibration cost is \$350, depending on your shop's volume, the potential is there for your shop to realize the same return. Visit the ADAS page on Autel.com and work the numbers out for your shop with our Return-on-Investment calculator.

Increased profits may be your ADAS problem's most alluring disguise.

ALIGNMENT **WITHOUT LIMITS**

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AUTEL[®] MAXISYS[™]

MAXIMIZE PROFITABILITY
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At the Cost of a Typical Alignment System

IA900WA

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QUOTE



1 DIAGNOSTICS

All Systems and Module Health Check
Including Steering and Suspension.



2 DIGITAL INSPECTION

Text or Email All Customized Reports
Instantly to Your Customer.



3 ALIGNMENT

3D Wheel Alignment with Any
Electronic Component Reset.



4 ADAS CALIBRATION

Step-by-Step Illustrated Instructions
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RECOUP YOUR INVESTMENT IN AS LITTLE AS 30 DAYS CALCULATE YOUR REVENUE POTENTIAL

*Return on investment varies by service volume.



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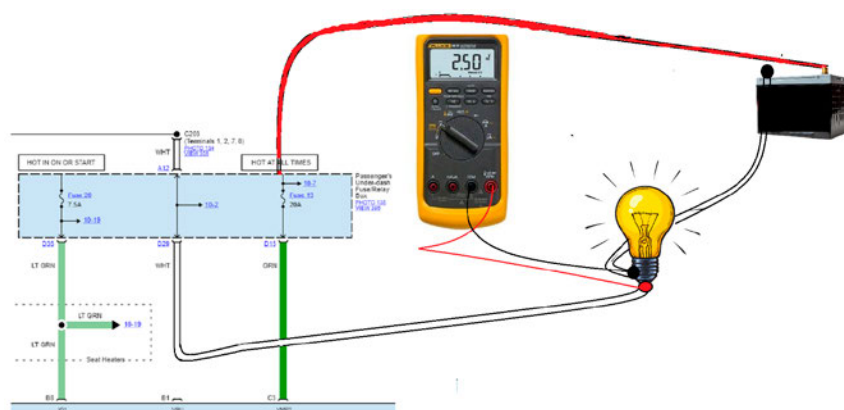
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Tackling electrical challenges

Maximize your proficiency using the right "tools" to boost accuracy and efficiency.

By **Brandon Steckler**, Technical Editor



▲ A DVOM was used to trace the wire to fuse block that supplies voltage to the RPSD terminal B1.

As automotive technicians today, we face hundreds (if not thousands) of electrical challenges each year. Of course, some faults are more difficult to find than others, and we have all been down the path where we get our butts handed to us. But maximizing our proficiency through practice will lead to maximizing accuracy and efficiency.

Picture yourself as a technician seeing many new vehicles and having to seamlessly mate state-of-the-art mobility-assist systems with the latest factory-installed technologies. My good friend, Bob Leonard, calls this a typical workday, as he is a technician for Mobility Works, a company dedicated to enabling freedom, with stores across the country.

THE TASK AT HAND

Leonard was presented with a vehicle complaint that some of the mobility-assist acces-

sories were not functioning. He was issued a repair order for a 2013 Honda Odyssey with the complaint of the right-side power sliding door being inoperable. Without the functionality of the door, the ramp and the kneel-system will not function.

Like many of today's vehicles, even this 2013 minivan has dozens of computers that communicate on networks to accomplish tasks. Any number of individual faults can cause symptoms like the one described above. We need to get to the root cause of the symptom, but how?

If the OE-side isn't difficult enough to decipher, now Leonard has to wonder if the fault has something to do with the "conversion-side" of the system. Stepping back from the vehicle and evaluating the situation, Leonard decided to use logic instead of guesswork. Here is what he knows to be factual:

- Power sliding-door, ramp, and kneel systems are managed by the electronic control system.

- Can be activated via key FOB, interior mechanical switches, or touchscreen interface display.
- The ramp/kneel system won't function without proper door position feedback.
- The conversion module drives the ramp/kneel systems but is initiated by the OE-system.

As noted in the bullets above, it is quite clear that the "conversion-systems' components" have to work in tandem with the OE-system and its components. So, is the fault on the OE-side or the conversion-side?

With the engineering of the mobility-assist systems, included was a procedure to bypass the conversion system temporarily. This enabled Leonard to remove the conversion system from the equation to determine if the operation of the right power sliding door (RPSD) was restored. The ramp and the kneel features would not function without the proper operation and position feedback of the RPSD. Leonard focused his efforts on the malfunctioning RPSD only.

With the conversion system bypassed, the RPSD still did not function. So Leonard went to work on the OE side of the vehicle. Splitting the system in this fashion eliminates wasted time and effort.

Leonard went to work on the power sliding door system as if the van had no conversion system whatsoever. He performed a full-vehicle scan and discovered no DTCs or any lack of communication between the scan tool and the RPSD control unit. This forced him to follow factory troubleshooting procedures with only the symptom as a reference. The factory flowchart eventually led to replacing the RPSD control unit with a "known-good" controller. This isn't typically an option in the aftermarket world. A brand-new Honda factory RSPD control unit was installed, and as expected, the fault remained.

DISAPPOINTMENT BECOMES THE DRIVING FORCE

The problem with following troubleshooting flow charts is that they don't always lead to the root cause of the fault. For instance, following the flowchart to the ECU, techs should verify connector/terminal integrity

» TOOLS USED:

- SERVICE INFO (INCLUDING SYSTEM DESCRIPTION + OPERATION FOR THE ADDED ACCESSORIES)
- DVOM
- CIRCUIT LOADING DEVICES
- FLASHLIGHT
- FUSED JUMPER WIRES
- OE CAPABLE SCAN TOOL/J2534 DEVICE (OR FACTORY SCAN TOOL/ INTERFACE)

and adequate voltage/ground supply before condemning. With the connector separated from the ECU, the technician makes the measurements with the DVOM. This is exactly what Leonard did, and the outcome of the test indicated no outside circuit fault present. This led to replacing the RPSD control unit, per flowchart instructions.

What this flow chart failed to address is that available voltage or adequate ground supply is not a valid test. If the test results indicate insufficient supply, then, of course, "bad" is bad. But an open-circuit test like that is not an accurate stressor of the circuit being tested. A test conducted in this matter can only truly indicate the continuity of the circuit. However, it cannot determine the circuit's ability to support current flow.

It goes back to the old anecdote regarding the resistance of a copper cable with 100 strands of wire composing it. If one were to slice 99 strands of the cable, the resistance of the cable would still measure the same (as before the cable was tampered with). However, if one were to use that same single-strand cable to complete a starter motor supply circuit, one would realize quickly that the cable does not support the required current to operate the starter motor. The tech would likely discover how that cable makes a handy fusible link as the insulation vaporizes to smoke!

Unfortunately, Leonard realized the hard way that the prescribed test lacked the information he needed to make an accurate diagnosis. He had missed something,



▲ The rear floor was removed to inspect the mating of the original and conversion-harness.

and it had just hit him like a ton of bricks. He realized that the test he performed did not test the system under normal operating conditions. To accurately test the system's voltage and ground supply integrity meant to test it when the circuit is functioning. The problem is—the circuit doesn't function!

THE LOADED VOLTAGE DROP TEST

This all relates to the principles described

by Ohm's Law. As current flow increases in a circuit, so too does the voltage dropped across a resistor. In other words, if there is no current flow present, the voltage will not drop across any resistor—either intended loads or unwanted resistance—in a circuit. To conduct this test means to have the circuit energized or functioning.

This power sliding door system didn't respond to any switched-input or command.

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Clamp Probe Set

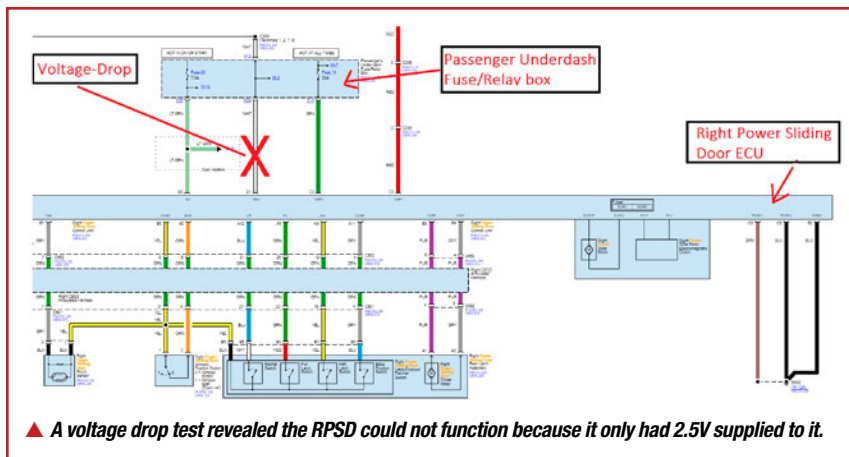
Cat. No. 21200

Originally designed to allow a lone technician to test for voltage drop on top battery posts; its handsfree operation is a useful diagnostic tool when a third hand is needed.

- Works with standard 4mm banana plugs
- Probe swivels and adjusts in height to test where you need it
- Works great for testing recessed connections
- Clamp tips for added grip
- Available individually as the 21215 (black) and 21216 (red)



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Therefore, a voltage drop test couldn't be conducted. However, if one were to load the circuit manually, a test for true circuit integrity can accurately be determined, and this may uncover the reason the system is not functioning.

Leonard chose a load similar in current consumption to the circuit to be tested. The white wire leading from the under-dash fuse block supplies voltage to the RPSD control unit at terminal B1. Although it cannot be seen in the picture, the voltage originates from the underhood fuse block across a 10A fuse. Leonard chose an 1157 bulb to see if he could force the fault to the surface. If this circuit managed a lot more current (like that of a starter motor), the test load would have to be heavier to stress the circuit's wiring properly, as this test is intended to do.

With the connector removed from the RPSD control unit, the 1157 lightbulb was substituted (as the load) and was supplied a known-good ground to allow the bulb to operate. This test used the existing RPSD control unit's voltage supply circuit to energize the light bulb. As the bulb illuminated (dimly), a voltage-drop measurement was taken across it. Knowing that this bulb should be the only load in this series circuit, one would expect the bulb to drop all of the voltage (approximately 12.5V), and illuminate brilliantly if the circuit is functioning as designed. However, this bulb is only dropping 2.5V. The result of the test tells us a few things:

- 10V dropped somewhere before the bulb (in the power supply circuit).

- Further disassembly is required to pinpoint the source of the voltage drop.
- The wiring diagram will help determine the most logical place to begin disassembly.

DESTINED FOR DISASSEMBLY

The last thing a diagnostician wants to do is disassemble anything for testing. That is, unless it is justified. The results of the loaded voltage drop test Leonard conducted conclusively pointed to a significant high-resistance fault on the voltage supply side of the system. More importantly, there is no doubt where he has to disassemble for further testing (no wasted time, no guesswork). The significance is Leonard will not have to backpedal, as he is assured to find the source of the fault if he simply trusts and follows the test result.

However, an excellent strategy he will employ will be to reference the wiring diagram to determine the component locations. Using this information, along with how the vehicle has been altered to accommodate the mobility-assist features, should allow him to focus his further efforts and avoid wasted time. This is working smarter, not harder.

The modifications to the original vehicle wiring harness occur below the floor of the second-row seating. The voltage source circuit in question comes from the passenger side kick panel. The RPSD control unit is located in the right-rear quarter panel. Leonard chose to remove the interior second-row floor to inspect the harness where the mating of the original and conversion harness are made. Upon

accessing the harness, another unexpected discovery was made. The vehicle appeared to be taking on water.

The wires making up the harness were separated to allow Leonard to inspect the circuit in question. To his delight, an ugly green corroded section of wire was exposed due to its submersion in the water-logged floor. The corroded wire was exposed because the insulation was compromised during the installation process. The wire appeared to be sliced by either a razor blade or some other sharp object.

Leonard "jumped-voltage" past the bad spot in the harness and proved the system to function before making the necessary repairs. This is never a bad idea, as sometimes more than one fault exists simultaneously. It is better to know ahead of time than to commit to repairing a single fault, only leading to a partial fix of the symptom.

Reflecting on what happened makes it quite simple to understand if we revisit the original wiring diagram. The red "X" is where he found the voltage drop. By substituting a bulb (so he could energize the circuit), it was seen that the bulb dropped only 2.5V (leaving 10V being dropped/wasted elsewhere in the supply side of the circuit). Thinking of it like this may simplify further: The right power sliding door control unit could not function because it only had 2.5V supplied to it.

Leonard discovered that a door seal was displaced, which caused the water intrusion. It was properly mated to the body of the van, and the damaged section of the wire was isolated, replaced, and properly sealed. The existing wire harness was placed in conduit, properly routed, and secured to prevent future issues. The van's conversion system was fully restored to proper functionality, and the customer left happy. ❌



BRANDON STECKLER

is the technical editor of *Motor Age* magazine. He holds multiple ASE certifications.

He is an active instructor and provides telephone and live technical support, as well as private training, for technicians all across the world.

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WRENCHERS™

Top Diagnostic Tools for 2023

Training will help you gain the most value out of any tool or piece of equipment.

By **Scott Brown**, PTEN Technical Editor

As a diagnostic tech myself, I'm always on the lookout for new tools that can help me do my job more efficiently. I usually find this to be an extremely challenging task because many of the tools I've been using for years are highly effective at carrying out diagnostic or investigative tasks I come across. However, there are tools I acquire that don't get used very often, but in certain situations, the tool can provide extremely valuable information that enables our shop to proceed toward the goal of finding the cause of the problem.

In most cases, a new tool will require new knowledge. For example, if you were to acquire a multi-channel lab scope and wanted to use it to identify engine valve-to-piston timing problems, then you, of course, would not only need to have good foundational knowledge around engine mechanicals, but you would also need to know how to set up and scale a pressure transducer and any other inputs you wanted to monitor. You would then need to know what data to collect and analyze, and document your findings to support your diagnostics. So, my suggestion is that with any new tool that you add to your arsenal, you will need to attain the necessary knowledge for achieving success.

The following is a list of the top tools that I admire – consisting of some tools that I currently use and find highly valuable and some I may be acquiring in the future. Some are new, and some have been around for a while and may be hard to obtain. However, all are highly effective, in my humble opinion, so please stay with me, and let's check these out. Additionally, with more electrified vehicles entering the marketplace, we'll also explore some new tools to consider adding to your arsenal.

VISUAL TOOLS – INSPECTION CAMERAS

Sometimes you need to do a visual inspection that is nearly impossible without major disassembly. I've used multiple borescopes over the years, which I usually find extremely challenging. We've probably all seen the ultra-high-end scopes



▲ **FLIR VS80**

used in the medical field and wondered why we couldn't get that level of quality. Well, we all know the obvious reasons for this. One caution I'd like to mention here is that you want to avoid sticking the camera into a hot environment since this can result in its destruction! Here are a couple of cameras whose specifications impress me.

FLIR VS80 - HIGH-PERFORMANCE VIDEOSCOPE

In addition to their specialty with forward-looking Infra-red, FLIR has brought to market a new videoscope called the VS80. The videoscope is outfitted with 1024 by 600 high-resolution 7" touchscreen display and is available in seven different kits with the option to purchase waterproof, ultra-slim probes that can be easily swapped in and out. Probe options include a 4.5mm diameter two-way articulating probe; a four-way articulating probe; a plumbing spool probe with a 25m cable; single HD and dual HD visible camera probes; a standard definition probe; and a general-purpose thermal camera probe.

VIVIDIA ME-610I - OASIS SCIENTIFIC

The ME-610i or ME-620 works with either an Android or Apple smartphone or tablet to view or record high-resolution



▲ Vividia ME-601i



▲ CarDAQ-Plus 3 Oscilloscopes – the visual voltmeter

(1280 by 720 pixels) images or videos using their free app USee. A 6mm flexible probe with an articulating tip can be helpful with examining areas normally not easily accessible. The unit also has a controllable LED light that surrounds the lens allowing the technician to control exposure. I've been using a couple of different borescopes that produce varying results and come up short in many areas. I see an upgrade in this category coming soon.

SCAN TOOL DIAGNOSTICS – LOOKING TO THE FUTURE

Modern vehicles are increasingly being equipped with faster network protocols to support the growing number of electronic systems and features that are being integrated into them. These systems and features include things like advanced driver assistance

systems (ADAS), infotainment systems, connected navigation systems, and more. With these advanced networks, your scan tool interfaces need additional circuitry to communicate properly.

While CAN-FD is already supported within the GM MDI2, the Ford VCM2 is not. If you're servicing late-model GM or Ford vehicles, you may want to look at their next-generation interfaces. Ford has recently released the VCM3, which supports newer protocols, but due to the chip shortage, both tools have scarce availability. One solution is to look at the CardDAQ-Plus 3 from Opus. The CarDAQ-Plus 3 has some advanced future-proof features, such as supporting 4-CAN channels plus CAN-FD, in addition to being J2534 compliant. Additionally, the Mongoose Pro from Opus has also filled the void for some of those affected by chip shortages.



▲ eScope Elite PicoScope 4425a – 4-Channel PC-Based Scope



▲ Autel MS909EV

AUTOMOTIVE TEST SOLUTIONS – ESCOPE ELITE 4 OR 8 CHANNEL PC-BASED SCOPE

Both scopes have excellent features that can help a technician find the underlying cause of a difficult problem. Whether you're going in-cylinder to check camshaft/crankshaft synchronization problems, identifying injector or ignition problems, or any multitude of electrical challenges, the oscilloscope is a great asset. But as I mentioned at the beginning of this article, training is key to understanding how to leverage these advanced tools.

GODIAG BREAKOUT BOX – AESWAVE.COM

The GODIAG GT100+ ECU Jumper Cable with Banana Plugs allows technicians to connect to and power up one or more modules when performing module diagnostics, programming, or immobilizer work with the GODIAG GD100+ OBD2

Breakout Box. There may be situations where you need to isolate a module by powering it up separately on the vehicle. The GODIAG GD100+ can be a tremendous help in this situation. Additionally, the connections discussed below can be used to connect the CANBUS circuits while performing certain diagnostic tests. According to AESwave.com, the ECU cable for the GODIAG BOB was customized “to include 4mm banana plugs that make adapting to terminal connections easy, especially when combined with the uTest Advanced Terminal Kit or similar breakout leads.” Also, the DB25 jumper cable features 37 color coded and labeled leads that are grouped together by function to make it easier to find the correct one. Each jumper lead terminates to a 4mm shrouded banana plug.

ELECTRICAL RELAY CIRCUIT ANALYSIS

When performing diagnostics on various power circuits controlled via a relay, I usually operate within one or more of the power distribution centers on the vehicle. This usually provides us quick access to the problem circuit on the vehicle without major disassembly. I have a tool that I've been using for over a decade that has helped me make quick diagnostic decisions that I'll talk about below.

UACTIVATE FROM AESWAVE.COM

The uActivate comes with various adapters that plug directly into the same socket your relay-controlled circuit under test consumes. It makes quick work for checking relay controls, power, and ground, and provides one with various test points. I was informed about the latest version of this tool and was able to get my hands on one recently. This tool is new and improved in several areas, and I'm impressed. One of the cooler parts of the tool is that it provides a high-current loop that allows one to connect a



▲ GODIAG GT100+

current probe along with shrouded banana jack connections allowing one to monitor, measure, and activate circuits on the vehicle under test.

EV TOOL REQUIREMENTS

Love them or hate them, EVs will need service, and even if you're already servicing these vehicles, there are some new tools you may want to familiarize yourself with. As you'll see below, you'll also need to consider how to address infrastructure charging complaints as well.

AUTEL – INTELLIGENT EV DIAGNOSTICS FOR HYBRID AND BATTERY ELECTRIC VEHICLES (BEVS) MS909EV/ULTRA EV

Autel has recently introduced a new platform that takes hybrid/BEV diagnostics to a new level. From the diagnostic port, most hybrids and BEVs have diagnostic info available but in most cases, that data is limited. Autel's new offering brings forward a new EV diagnostic capability. Under the New Energy menu, one has all the modern vehicle scan functions, including the network topology layout and new battery cell data that can help with a health assessment. Additionally, the Battery Pack Test menu includes a high-voltage system block diagram, which provides guided pathways for the technician to remove the vehicle connection to the Battery Management System (BMS) and connect the scan tool to the new EV Diag. Box. This interfaces directly with power, ground, and communication circuits to produce a more granular dataset, including battery state of charge, health, total voltage, pack voltage delta, temperature, and more.



▲ AESWave.com uActivate V2



▲ Fluke FEV100

This information can help the technician gain a deeper knowledge of the high-voltage battery pack and controls.

EV CHARGER DIAGNOSTICS

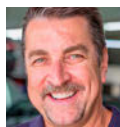
The future will likely introduce problems where a vehicle cannot charge properly, and there may not be anything wrong with the vehicle. So how can one test a charger to see if it works properly? Fluke has introduced a new Electric Vehicle Service Equipment (EVSE) diagnostic tool that can help you analyze infrastructure chargers.

FLUKE FEV100

This tool can simulate the presence of a vehicle and can perform various tests on the electrical circuits, including available voltage, pilot signal, GFCI functionality tests, and test the various charging states of the vehicle through a selectable knob on the tool. Additionally, the tool provides two female banana jack plugs where a properly rated DVOM can be connected for measurement.

FINAL THOUGHTS

There is no doubt that vehicles will continue to evolve and grow more complex, presenting the diagnostician with ever-increasing challenges. Thank goodness we have companies out there continuing to innovate and bring solutions to the market that help us save time and receive great returns on our investments. ❌



SCOTT BROWN is an ASE Master Certified L1 Technician and has over 37 years of professional service industry experience. He is an independent shop owner in Southern California and is engaged at various levels within the industry. He has a deep understanding of the challenges technicians experience at the service level and is continuously striving to move the industry forward through education and networking. Brown found Diagnostic Network (diag.net) after 22 years of service at iATN, where he retired as company president in 2018.

sbrown@vehicleservicepros.com

Is your shop ready for a service EVolution?



The auto industry is investing more than \$1 trillion into shifting new vehicle production from internal combustion power to electric. Forecasters estimate EVs could account for up to one third of the North American market by 2029. And with dozens of electric models from domestic and import brands already on the road, chances are good that if you haven't yet had an EV in your shop, you will soon enough.

Whether you're planning to handle battery swaps or just routine EV maintenance, investing in technical training and equipment will ensure you're ready when the time comes.

How to lift

Most EVs are designed with their high-voltage batteries under the vehicle. The battery packs are large – taking up most of the undercarriage – and heavy. As a result, the OEM-recommended lifting points are often on the far edges of the vehicle frame.

To safely lift an EV, you'll need a vehicle lift with sufficient rated capacity and the capability to engage with the lifting points. Leading equipment manufacturer BendPak, Inc. has re-engineered its two-post lifts to meet the challenges of EV service.

The new BendPak AP Series two-post lifts feature a patent-pending swing arm design that offers greater extension and retraction than ever to reach even the most difficult lifting points. And their low profile means you can access both in-close and far-out lifting points without damaging vehicle ground effects.

For extra strength and peace of mind, BendPak strategically increased the high-strength steel used in critical load-holding components and invented an Automatic Swing Arm Restraint System (ASARS) designed to prevent dangerous, unplanned movement of the lift arms. ASARS offers twice as much holding grip as traditional systems and can withstand more than 2,000 pounds of side force if an improperly spotted vehicle shifts during service.

AP Series lifts are the most customizable, versatile two-post lifts BendPak has ever made, providing excellent return on investment. They offer the convenience of wide or narrow installation and their BI-METRIC swing arms enable a single lift to be used for both symmetric and asymmetric lifting. A choice of heights can accommodate cars, SUVs and even high-roof cargo vans — regardless of powertrain.

How to lower

To ergonomically remove a high-voltage battery pack, you'll want to invest in a lifting table. BendPak's new Mobi-EVSTM battery pack and powertrain lifting system makes it easy to lift, lower and position high-voltage batteries, as well as internal combustion engines, transmissions, fuel tanks, transaxle assemblies and more. Its compact design and easy-glide swivel casters let this space-saving scissor lift move effortlessly throughout the shop.

The Mobi-EVS delivers wireless, rechargeable electric/hydraulic operation which improves operator efficiency by eliminating the need for a manual hand crank or foot pump. Its twin-cylinder design provides maximum load stability for lifting and lowering, while an automatic safety lock system secures a massive 4,000 pounds at working heights up to 75". The Mobi-EVS also comes standard with an impact-resistant UHMW protective cover on the lift table.

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How do you plan to service **EV battery** packs?

The BendPak EV2400SL is a push-around full-rise scissor lift table that is perfectly suited for EV battery pack replacement. With its compact design, this space-saving scissor lift can be easily transported anywhere in the workplace, making it ideal for multi-bay facilities or workplaces with confined areas. To learn more visit www.bendpak.com/EVLIFT.

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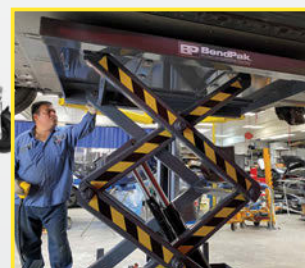
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Curien Round Terminal Pin Kit and Back Probe Lead Set

Reviewed by Jaime Lazarus, retired technician from Ocala, Fla.

The Back Probe Lead Set saves time because it's one component – an alligator clip lead. It's not two (or more) separate components that, when assembled, become an alligator clip lead. When compared to the latter, readings are more accurate too.

The Round Pin Terminal Set (RPTS) saves time when it's necessary to probe connectors or components carefully and accurately. These can replace several test leads, which can deliver unreliable meter readings over time.

The RPTS is probably the last set of round test terminals you'll buy. It took a few moments to figure out how to use the components, but no time at all to use the lead.

The RPTS came boxed with little packaging waste, has identifiable spaces for all components, and fits neatly in a toolbox.

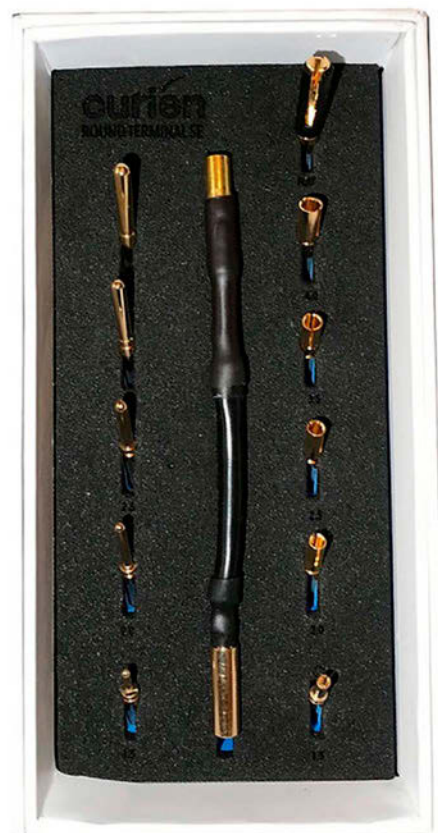
The Back Probe Lead Set (BPLS) is



longer than most leads, so a technician has more mobility when testing electrical circuits. The RPTS is gold-plated solid brass, so they're sturdy, very electrically conductive, and non-tarnishing (which can affect the meter readings).

The BPLS could be improved by crimping the alligator clip to the wire insulation, thereby relieving any strain on the wire conductor (and extending the life of the lead).

The RPTS could be improved with the inclusion of more "spade" type terminal test components of various sizes. The one that is included is too large for many of today's applications. I'd also suggest insulating the outsides of the female terminals.



PRODUCT DESCRIPTION

The **Curien Round Pin Terminal Connector Set** is ideal for connecting directly to sensors, ECM's, or other connectors to slide directly into the circuit connector without attempting to back probe the wiring and/or damage the terminal fit of the connector or seals after users are done. The male and female sizes are: 1.5mm, 2.0mm, 2.5mm, 3.5mm, and 4.0mm. The set also includes a female spade slot adapter to fit male spade connectors and a 3" flexible extender to allow users to connect to pins in deep connectors.

The **Curien Back Probe Lead Set**, No. BPLS101, is ideal for back probing and getting readings on sensors, connectors, and other sensitive and hard-to-reach areas. The set includes a 10' green 18-gauge copper lead with alligator clip and gold plated 4mm banana jack and six 2" steel T-pins. The 10' cable allows for Curien's N2 to be placed strategically for optimal safety while going for test rides or other functional testing. Made in the U.S.A.

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I used the RPTS to perform conductivity tests on a wiring harness while using the BPLS as one of my meter leads during the test.

The RPTS I'd rate at an eight and the BPLS a nine. Both products are above average quality, but both have some room for improvement. ⊗



JAIME LAZARUS retired in 2020 after 41 years in the transportation repair sector. Throughout his career, he filled such positions as lube tech, mechanic, technician, shop-owner, inventor, automotive technologies instructor, and published author.

This product was given to the reviewer free of charge from the manufacturer.



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Milwaukee Tool Flex Head Ratchets

Tool reviewed by Brin Kline, owner of Assured Auto Works in Melbourne, Fla.

Using these locking flex head and tight swing ratchets saves the user quite a bit of time over conventional ratchets without the same features. The flexibility of the flex head design, not having to turn the ratchet far before getting a new bite, and the slim head are a perfect combination for a ratchet.

The features of this ratchet help improve the efficiency of a job, and increased efficiency drives profit. No setup was needed. Just remove the tool from the packaging and start using the tool.

These ratchets came attached to a plastic card meant to be hung and displayed on a rack or pegboard display. Appropriate pressure is required to remove the ratchet from the plastic card, it's not so easy that they would come off in shipping or when displayed in retail stores, yet not so difficult to be an inconvenience.

Every one of these ratchets claims to have a 4-degree arc swing, and I believe it.

PRODUCT DESCRIPTION

The **Milwaukee Tool 3/8" Drive 9" Flex Head Ratchet** has a 4-degree arc swing that provides technicians the adaptability to work in spaces with different angles. The ratchet head can be locked into nine positions or left unlocked for free movement during use. The slim profile head and flush directional and locking levers offer accessibility in tight spaces. The all-chrome finish makes cleaning the flex head ratchet easy. Also available in 12".
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You can barely turn the ratchet drive before hearing the click from the ratchet gears locking into place. I also like the locking flex head. It's very helpful because you're no longer forced to approach the fastener straight on, but these ratchets have the added benefit of being able to easily lock the head into one of seven to 11 desired positions (depending on the ratchet). The switches for changing the direction of rotation and for locking and unlocking the flexible head are easy to use and in a good location. The ratchets just feel sleek and robust.

I like the laser etching on the tool, but I'd prefer if the "on and off" lettering and the lock and unlock symbols were embossed instead.

On a couple of the ratchets, the finish was not perfect. It'd take a very picky person to notice or be concerned. I think they look and feel great, and I suspect that it'd be rare that anyone would have a problem with the finish. Even though they feel like

a work of art, at the end of the day, they are still tools.

We used these ratchets for wheel alignments, brake repairs, wheel bearing, and drive axle replacement jobs.

I have used similar types of ratchets. When comparing these with brands with higher price points, I'd say they did very well.

On a scale from one to 10, I would give these ratchets a nine. Overall, I love them, and they have features that I look for in a hand ratchet. They feel like a good quality tool, and I believe they will be good enough to pass on through generations. ✖

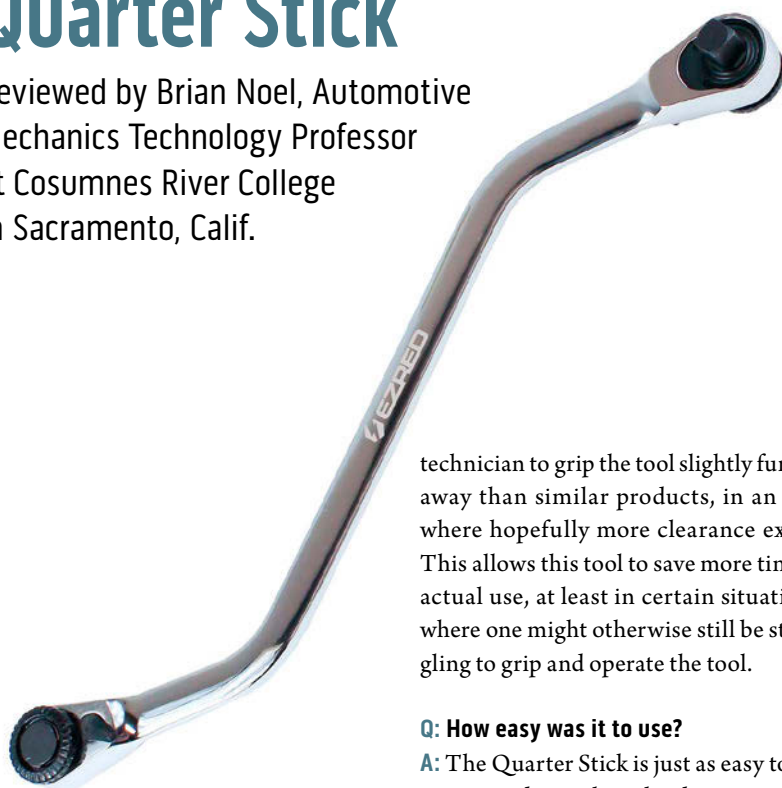


BRIN KLINE is the owner of Assured Auto Works in Melbourne, Florida, an automotive general repair business with a mobile diagnostic and module programming division. He has been in the automotive industry for 27 years. He also teaches for Carquest Technical Institute and Trained by Techs, is a member of ASA's Mechanical Operations Committee, and president of the Automotive Service Association of Florida.

This product was given to the reviewer free of charge from the manufacturer.

EZRED 8" S-Shaped Quarter Stick

Reviewed by Brian Noel, Automotive Mechanics Technology Professor at Cosumnes River College in Sacramento, Calif.



Q: How did the tool function as far as saving you time?

A: This tool has been a time saver in its intended types of applications. Its size and shape not only help access fasteners within tight confines, but also allow the

technician to grip the tool slightly further away than similar products, in an area where hopefully more clearance exists. This allows this tool to save more time in actual use, at least in certain situations, where one might otherwise still be struggling to grip and operate the tool.

Q: How easy was it to use?

A: The Quarter Stick is just as easy to use as any traditional ratchet but provides a unique form factor that can be beneficial for accessing fasteners in tight areas or without a clear line of sight.

Q: How does this tool compare to other tools you've used like it?

A: The offset of this tool as well as its length provide advantages in terms of access around obstructions and leverage that are not provided by similar tools.

Q: What features did you like?

A: The knurled wheel on the backside of each ratcheting mechanism provides an easy way to help manually rotate the socket or bit being used until there is sufficient friction to allow the ratcheting mechanism to work consistently.

Q: What types of jobs/repairs did you use this tool for? Please provide a few specific examples.

A: This tool worked well for accessing A/C compressor hardware in a cramped

location between the compressor and the frame rail. It also provided a nice balance between leverage and accessibility for various tasks in tight under-hood confines. The tool also worked well for accessing interior trim fasteners located in close quarters, such as screws holding instrument cluster trim where one must work through or around the steering wheel, fasteners on the top of the dashboard with the windshield sloping over the top, etc.

Q: Is there any way you could think to improve or add to this tool?

A: The offset built into each end of the tool via its S shape works well in general, but a fixed offset will never work perfectly in every possible application. Having the ability to vary this offset would increase access in certain circumstances, but the additional bulk generated by such a mechanism might outweigh some of the advantages.

Q: Is there anything you had questions or concerns about in regard to the tool?

A: Exhaust work is one of the areas specifically targeted in the tool's marketing, and while it could certainly be useful in accessing exhaust manifold fasteners, I question its long term durability when used in such an application given that it uses a 1/4" drive ratcheting mechanism that seems as though it may have already been scaled down some from typical dimensions to make the tool more compact. ❌

PRODUCT DESCRIPTION

The **EZRED 8" S-Shaped Quarter Stick**, No. 4SS8, features a compact design to allow easy access inside tight corners. The tool is forged from chrome vanadium steel, and is ideal for exhaust work, body work, dashboards, motorcycles, inside fan cowl, and other hard-to-reach areas. With a 1/4" square socket and magnetic bit drive, the tool works for most general-purpose fastener-driving, and requires only 5 degrees to move fasteners.

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BRIAN NOEL is a full-time Automotive Mechanics Technology Professor at Cosumnes River College in Sacramento, CA. He teaches the Ford ASSET program as well as a variety of traditional automotive courses. Noel is a Ford Senior Master Technician, ASE Master Automobile Technician, ASE Advanced Level Specialist, and CA BAR certified SMOG inspector, repair technician, and instructor. He also holds a Bachelor of Science degree in Career and Technical Studies from California State University, Sacramento, and is working towards a Master's degree in Educational Technology, also from California State University, Sacramento.

This product was given to the reviewer free of charge from the manufacturer.



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OEMTOOLS Brake Caliper Piston Rewind Tool Set

Reviewed by Mario Rojas, lead diagnostic tech at Autobahn Performance in Oakland Park, Fla.

Q: How did the tool/equipment function as far as saving you time?

A: It performed well, and saved me time from hooking up an air compressor since I usually use a hydraulic tool. Plus, the universal puck saves me the hassle of picking one out from an assortment of options.

Q: How has using this tool impacted your shop's profitability?

A: Efficiency always equals profitability. This tool increases efficiency.

Q: Did it come with any accessories?

A: It comes as a three-piece set – the main winding tool, the universal puck, and the lever.

Q: How does this tool compare to other tools you've used like it?

A: This is a simple improvement over the conventional tools available.



PRODUCT DESCRIPTION

The **Brake Caliper Piston Rewind Tool Set**, No. 35058, is designed with a spring tension and built-in retainer plate to streamline installation into one smooth step. This tool includes the standard 2-pin adapter as well as a 3/8" drive 2- and 3-pin universal adapter. The removable T-handle can be repositioned mid-process without the risk of slipping out of its housing, allowing the user to adjust to maintain a secure grip on the rewind tool. The spring-loaded thrust bolt eliminates the need to have separate tools for clockwise and counterclockwise rear brake caliper piston rotation jobs.

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Q: What types of jobs/repairs did you use this tool for? Please provide a few specific examples.

A: I used this tool while retracting rear calipers on several vehicles that require the technician to do so in order to complete a rear brake job.

Q: What features did you like?

A: There are many features I like about this tool. There is a 3/8" female insert so that I can use my personal ratchet on the tool to wind the brakes or use the provided lever. The tool is spring loaded, so I don't have to hook up an air compressor hose like I normally would with a hydraulic unit. Nor do I have to take up the slack by tightening a nut every time I wind the brakes back. Plus, the universal puck allows me to simply clock the pins into the correct position and get to work.

Q: On a scale of 1 to 10, how would you rate this tool overall? Why?

A: I would give this tool a 10 for its ease of use, time-saving capabilities, being packed with features, and requiring almost zero maintenance. ☒



MARIO ROJAS is an L1 ASE Master certified Diagnostic Technician from Miami, Florida. He first began working on cars as a way to supplement his income until

finally stepping into the industry full-time in 2013. He's now working at Autobahn Performance, a shop that specializes in European vehicles. Rojas also shares some of his work on his Youtube channel, Super Mario Diagnostics, in the hopes that his audience will appreciate what it takes to troubleshoot and repair the modern automobile, and to steer everyone into continued training.

This product was given to the reviewer free of charge from the manufacturer.

CATEGORY SPOTLIGHT

BATTERY & ELECTRICAL SERVICE TOOLS

If you're familiar with the brutality of winter, then you know the importance of having battery and electrical service tools on hand. From jump starters and battery testers to battery chargers/maintainers and relay testers, it's that time of year to keep them within arm's reach. With EVs on the rise, it wouldn't be a bad idea to consider stocking your toolbox with insulated tooling as well. Here are some battery and electrical service tools that have recently crossed our desks.



FOR INDOOR OR OUTDOOR INSTALLATION

The **Bosch EV300 Level 2 EV Charging Station** is UL listed, tested to all applicable industry standards, easy to install, and requires low maintenance. Ideal for both indoor and outdoor installation, the compact charger provides 32A capacity and charges up to six times faster than with a standard level 1 EV cord. With a shorter 16' cable, the EV300 is recommended for areas with limited space to install. The charging station is flexible with the option to also be used as a plug-in charger. The EV300 includes a tamper-resistant mounting bracket and industry standard NEMA 14-50 plug. Its SAE J1772 charging connector is compatible with all EVs in North America.

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RATED TO 1,000V AC

The **Wiha Tools 26-pc Insulated EV Essential Tool Kit** includes individually tested, 1,000V AC rated, insulated VDE screwdrivers, sockets, ratchets, extension bars, wrenches, pliers, cutters, a cable stripping knife, and tweezers. The tools feature a SoftFinish cushion grip handle with a slip guard design, exact fit precision machined tips for reduced cam-out, and induction hardened cutting edges and jaws for ideal sharpness and longevity. They also endure a rigorous heat-treatment process for maximum strength. The tools come in a sturdy plastic shell case with dedicated tool compartments for secure storage and organization as well as custom-fit trays with finger-recesses for easy tool retrieval.

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ENABLES HANDSFREE OPERATION

The **Tool Aid Clamp Probe Set**, No. 21200, is designed to allow a technician to test for voltage drop on top battery posts. The probe enables handsfree operation and works with standard 4mm banana plugs. Its probe swivels and adjusts in height to test where needed. The 21200 is ideal for testing recessed connections and is available individually as the No. 21215 (black) and No. 21216 (red). Includes clamp tips for added grip.

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COMBINES A PULLER AND AN INSERTION HEAD

The **Lisle Corporation 2-pc Fuse Puller and Terminal Cleaner**, No. 55040, are double-ended tools designed to remove corrosion in blade fuse applications on both mini and ATO sizes. Combines a puller for removing the blade fuse from the fuse box, and an insertion head to clean the female contact points of the circuit without damage. Made from nylon plastic for strength and durability.

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Watch this product in action here: VehicleServicePros.com/21279059



TESTED TO 10,000 VAC

The **Cementex Automotive Electric Service Tool Kit**, No. ITS-12B-AES, is an ideal base of insulated tools for use with hybrid and electric vehicles as well as troubleshooting and repair to EV charging stations. Stored in a standard toolbox, this tool kit includes double-insulated diagonal cut, needle nose, slip joint, crimping, and water pump pliers as well as a variety of double-insulated cushion grip screwdrivers. Cementex double-insulated tools are made in the U.S.A., tested to 10,000 VAC, rated for 1,000 VAC/1,500 VDC when working on energized parts, and marked with the (double-triangle) international safety symbol. These tool combinations can be customized to fit a customer's needs.

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FOR MOST COMMON BATTERIES

The **OEMTOOLS 6-pc Battery Service Kit**, No. 25110, contains the tools needed for service and maintenance for most common batteries. The kit includes a battery terminal puller, four-way post cleaner, 5/16" and 10mm battery terminal wrench, battery nut pliers, extended 5/16" battery terminal wrench, and a side terminal brush. All tools are packed into a heavy duty, roll-up sleeve for easy storage, organization, and transport.

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PROTECTS SENSITIVE VEHICLE SETTINGS

The **CTEK CS FREE** is a portable battery charger and maintainer with adaptive boost technology. This technology analyzes a battery to give it the correct power it needs to safely and quickly charge a battery while protecting sensitive vehicle settings. The multi-functional charger/maintainer is four products in one portable unit: adaptive boost safe start - that can start a dead battery in just 15 minutes, battery charger, smart maintainer, and hi-tech power bank. Users can have portable charging and power to go wherever it's needed.

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Watch this product in action here:
[VehicleServicePros.com/21284210](https://www.VehicleServicePros.com/21284210)



FEATURES A FULLY AUTOMATIC OPERATION

The **Clore Automotive Updated Pro-Logix 12V 1.5A Underhood Battery Charger/Maintainer**, No. 1002, from Solar combines a fully automatic operation, a permanent mount design, and the ability to properly charge virtually any lead acid battery type, including conventional, AGM, gel cell, spiral wound, deep cycle, and marine batteries. The updated 1002 utilizes advanced microprocessor-controlled logic to deliver a fully automatic, precisely controlled charging routine to optimally charge and maintain each battery serviced. Additionally, it features over-voltage protection, reverse polarity protection, and battery fault detection as well as includes three output options: clamps, rings, or 12V male adapter.

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SUPPORTS MULTIPLE BATTERY TYPES

The **Cobra Battery Charger**, No. 2A, switches between charging and maintenance modes to keep batteries ready to go all year round. Capable of both 6V and 12V charging, the battery charger supports multiple battery types, including lead acid, wet cell, gel cell, AGM, and lithium batteries. Its modular cable connections also allow for easy swapping between the included battery clamps and ring terminals with built-in safety protections to keep both the user and vehicle battery safe.

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AUTO-SHUTOFF FEATURE TO CONSERVE BATTERY LIFE

The **Allstart Updated Micro-Boost Jump Starter and Charger**, No. 540, features a new compact and rugged design and offers 15 percent more power than the company's previous 540 model. It's ideal for use on virtually all V6 gas powered engines. The unit weighs under a pound, is able to charge devices fast with a quick charge output, and automatically shuts off to conserve battery life. Additionally, it has jump start clamps with 100 percent copper inserts and anti-spark protection as well as a bright, multi-function LED flashlight. The Micro-Boost power unit includes smart start cables, a USB to micro USB cable, a carrying pouch, and a user manual.

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SMART SYSTEMS DETECTION

The **OTOFIX BT1 Battery Tester** provides a comprehensive battery diagnostics and repair solution that fits in the palm of the user's hand. Featuring a smart 5.5" touchscreen, the BT1 is able to examine battery and electrical systems as well as register a new battery. The battery tester also features OTOFIX's cloud services to access the latest support issues and solutions, advanced testing methods, BMS reset, and smart systems detection. It has a voltage range from 1.5V to 36V and a CCA range of 100 to 3,000A.

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CATEGORY SPOTLIGHT

Battery and Electrical Service Tools



A UNIVERSAL DIAGNOSTIC LIGHT TESTER FOR TRAILERS

The **Innovative Products of America Smart MUTT X**, No. 4105, is a universal, remote-controlled, diagnostic light trailer for all North American trailers.

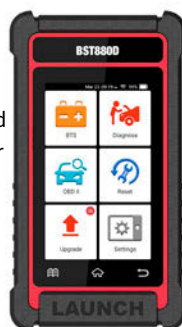
The unit is ideal for semi, RV, utility, boat, and horse trailer-type connections. It's able to test five of the most common trailer types, including 7-way flat (spade), 7-way round, 6-way round, and 5 pin and 4 pin connections. The Smart MUTT X is microprocessor controlled and can be electronically switched to different trailer-type modes. Each mode optimizes system programming by pin type to simplify and speed up inspections. It includes a large processor for future expandability and a 12-button remote.

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INTEGRATES BATTERY TESTING AND VEHICLE DIAGNOSIS

The **BST880D Handheld Tool** from **Launch Tech** can test battery and charging systems in addition to OBD system access. It's equipped with AUTOVIN detect and live data monitoring, able to diagnose four systems, and supports CCA, BCI, CA, MCA, EN, JIS, DIN, IEC, SAE, GB battery standards, gel, AGM, and lead acid battery types. It also includes six service functions: TPMS reset, oil reset, brake reset, ABS bleeding, electronic throttle relearn, and battery reset.

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EASES STRAIN ON HANDS

The **Olsa Tools Ratcheting Wire Crimper** eases strain on hands thanks to large, non-slip handles that are designed to ensure a strong and comfortable grip. The ratcheting action allows the user to pause mid-crimp to get a better grip and will release automatically once the crimp is complete. It also conveniently enables users to secure a wire connector in the jaw before inserting the stripped wire into the barrel. Works with color-coded red, blue, and yellow terminals for 22 - 10 AWG wires.

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New Relay Buddy!

194 Super Relay Buddy®



- Full 7 Amp load during the test
- Relay voltage drop monitored
- **Test results displayed as red, green or yellow for caution**

- Tests 7 different 12 volt relays
- More effective test finds intermittently bad relays

195 Super Relay Buddy® Pro Kit

- Kit includes adapters for expanded test coverage - **10 different 12V relays**



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HAS AN INTUITIVE, USER-FRIENDLY INTERFACE

The **E-XTEQ E-Maximus** is available in two options: a battery pack charger and a rescuer. Both are compatible with worldwide power circuits, have Wi-Fi connectivity for wireless updates, and job data transfers through Argo's cloud-based system and exportable service records. They each also provide an intuitive, user-friendly interface with an icon driven menu and navigation knob for ease of use.

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INSULATED UP TO 1,000V

The **GEDORE VDE Tool Assortment Hybrid**, No. 2979063, is a comprehensive kit for repair and maintenance work on all hybrid and electric vehicles. All tools are insulated up to 1,000V according to EN 60900/IEC 60900 (up to AC 1,000V and DC 1,500V). The tools also comply with the Equipment and Product Safety Act (GSPG) according to the testing and certification office. The kit includes 3/8" VDE screwdriver bit sockets, cable cutters, various pliers, and more.

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COMPATIBLE WITH ALL EV AND HYBRID PLUG-IN VEHICLES

The **Autel MaxiCharger AC Wallbox Commercial**, No. MCC50AHI, is a 240V-50A Level 2 charger compatible with all EV and hybrid plug-in vehicles. It features a contemporary design in silver, a touch-screen LCD, and is designed to be installed indoors or outdoors.



The unit offers adjustable charging up to 50A and features a 25' long universal (J1772) charging cable and hardware installation. Wi-Fi, Bluetooth, 4G and ethernet options available.

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DELIVERS 15A PORTABLE POWER

The **Milwaukee Tool M18 Carry-On 3600W/1800W Power Supply**, No. 2845-20, features a lightweight and compact design for portability. The push button delivers an instantaneous start, reaching 3,600 starting watts/1,800 running watts to power items from 15A tools to sensitive electronics. By using four M18 batteries, the power supply provides emissions-free power to the jobsite. Quiet operation and a compact form allow users to carry the unit in confined spaces, scissor lifts, and utility carts. It also has USB-C PD and USB-A ports to charge devices.

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MEASURES CURRENT AND PULSE WIDTH MODULATION

The **Power Probe PPTAMP and PPTPWM Adapters** are designed to cut diagnostic times and increase diagnostic accuracy. The PPTAMP allows any Power Probe circuit tester to read current. When a component powers up, users can monitor its current to determine the health of that component up to 20A and as low as one milliamp. The PPTPWM allows any Power Probe circuit tester to use pulse width modulation, a feature used to control new vehicle components with an adjustable duty cycle.

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CATEGORY SPOTLIGHT

Battery and Electrical Service Tools



DELIVERS 1,200 CRANKING AMPS

The **Weego 120 Jump Starter** delivers 1,200 cranking amps and features a bypass button that allows users to jump a completely dead battery. It's rated for all gas engines and diesel engines up to 15L. With the included 30" detachable clamps, users can access remote batteries and posts more easily. The Weego 120 can also detect low voltage and provide support to raise and maintain the voltage of a vehicle's 12V battery to a level safe for jump starting. It also doubles as a portable power source for recharging USB devices and 12V tools. The reinforced case is IP65 rated for water, dust and dirt resistance.

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ABLE TO TEST SEVEN DIFFERENT 12V RELAYS

The **Electronic Specialties Super Relay Buddy**, No. 194, is designed to provide an indication of the general health and functioning of the most common 4/5 pin 12V relays. It cycles the relay several times while loading the switch contacts to detect any excessive resistance. The tool incorporates a full 7A load into the automated test sequence and is able to test seven different 12V relays. In addition to displaying green for good and red for fail, the Super Relay Buddy has a third test result, yellow for caution. The yellow/caution result is displayed when the voltage drop through the tested relay is significant, but still within operating range of the relay.

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HAS A MAXIMUM CHARGING RATE OF 80A

The **Carlyle Tools Wheeled Battery Charger**, No. CWC1224V80A, is a heavy duty shop charger for busy service operations, providing high output 12V and 24V operation with three functional modes. It provides high-rate battery charging, high-output engine starting assistance, and power supply mode for service support. The battery charger combines a fully automatic operation and the ability to properly charge multiple battery types, including flooded, AGM, spiral wound, deep cycle, and marine batteries. Plus, with a maximum charging rate of 80A (12V mode), it can also work on battery packs found in Class 8 equipment.

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NO SEQUENCING REQUIRED

The **Snap-on 12V Engine Starter Plus with AGM**, No. EEJP700, is a rotary switch engine starter designed to make automotive technician jobs easier by connecting and starting 12V vehicles, with no sequencing required. For added safety, it can also detect reverse polarity. The case features convenient magnetic holders for clamps that have crank assist of 550A from a high output sealed 33 Ah AGM internal battery. It also features a USB charging port, an easy-to-use interface, field replaceable battery, and long reach 65" high flow 2-gauge welding wire cables.

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CAN JUMP START BOTH 12V PETROL OR DIESEL ENGINES

The **SP Tools USA HD Diesel 1600A Jump Starter /Jump Box**, No SP61073, is a compact, high-density jump starter that can supply a lot of power in a short time to start both 12V gas or diesel engines up to 10L in capacity. The jump pack is equally suitable to jump-start motorcycles, ride-on mowers, cars, outboard motors, etc. While not being used as a jump starter, it can be used to power or charge low-voltage accessories and USB-compatible electronics. The storage case with EVA insert includes 14 interchangeable tips and cords to connect to most devices, extra heavy duty cable clamps, and chargers.

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CUSTOMER REVIEW:

"I was very skeptical about this unit because it was so compact. But it really packs a big punch. I used it to start a diesel truck that had 8V battery charge showing. It turned over like it had brand new batteries in the truck. Very impressed."

CATEGORY SPOTLIGHT



Battery and Electrical Service Tools



FOR BNC-INTERFACED OSCILLOSCOPES

The **Pico Technology TA487 IEPE Signal Conditioner** is an adapter that allows any PicoScope the ability to measure and capture signals from a large selection of piezo-electric IEPE sensors. Using the TA487 is as simple as connecting an integrated electronics piezo-electric (IEPE) sensor and the included USB cable into the TA487, and then attaching the TA487 to a PicoScope or any BNC oscilloscope to capture data from the piezo-electric sensor. The TA487 provides a safe constant current power source to the sensor, allowing it to work over long cable lengths while still providing a good signal to noise ratio.

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CATEGORY SPOTLIGHT

Battery and Electrical Service Tools

MEASURES VOLTAGE, MICROAMPS, RESISTANCE, AND MORE

The **UEi Test Instruments Wireless TRMS Clamp Meter with 3-Phase and Imbalance Motor Tests**, No. DL599, measures capacitance, voltage, microamps, circuit continuity, resistance, and temperature via K-Type thermocouples. It can test 3-Phase motor rotation, unbalanced load, mini-splits, circuits in Molex plugs, and diode malfunctions. The DL599 features auto volts and amp selection, a built-in magnet with hanging strap, auto/manual ranging, input jack lock, test lead storage, an over molded grip, auto calibration, auto power off, and a low battery indicator. Includes a free app, silicone test leads, back probe leads, alligator clips, two thermocouples, four batteries, pouch, and a manual.

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TESTS ALL 12V LEAD-ACID BATTERIES

The **ATD Tools Battery Charging and Starting System Diagnostic Tester**, No. ATD-5494, is designed to test all 12V lead-acid batteries, including AGM and gel. It detects and alerts bad cells and surface charge, and has a 100-1,700 CCA range. The tester also has a 5V to 33V operating range, 12V starter test with cranking voltage, 12V charging test with load and ripple test, and 24V starting and charging test in voltmeter mode. Additionally, the tool displays the battery capacity percent and a color-coded bar graph.

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ABLE TO JUMP START 10-CYLINDER GAS OR DIESEL ENGINES

The **Schumacher Electric ProSeries 4000 Peak Amps 12V Lithium Portable Jump Starter**, No. DSR164, features a heavy duty design and dual internal lithium batteries that deliver 4,000 peak amps of power, enabling the device to jump start 10-cylinder gas or diesel engines in the shop or on the road. It incorporates both pre-heating technology for jump starting in cold climates and pre-boost technology for deeply discharged batteries. It also offers a front-facing worklight with three lighting modes, and is able to charge USB devices. The included copper cables are 4-gauge and measure 30" in length. Also included is an AC wall charger, 12V DC car charger, and a user manual.

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OFFERS A SMART CHARGING MODE

The **TOPDON TB6000PRO Battery Tester and Charger** combines two battery tools in one. It features a nine-step smart charging mode, which can display a pre- and post-report showing accurate data comparison. The expert mode function gives users the ability to adjust more values within its nine steps, including current, voltage, pulse current, duration, and customize different modes to their desired settings. With Bluetooth compatibility, users can monitor the status of a charge using an app. The TB6000PRO is compatible with all types of 6V and 12V lead-acid batteries and 12V lithium batteries, including LI, wet, gel, MF, CAL, EFB, and AGM.

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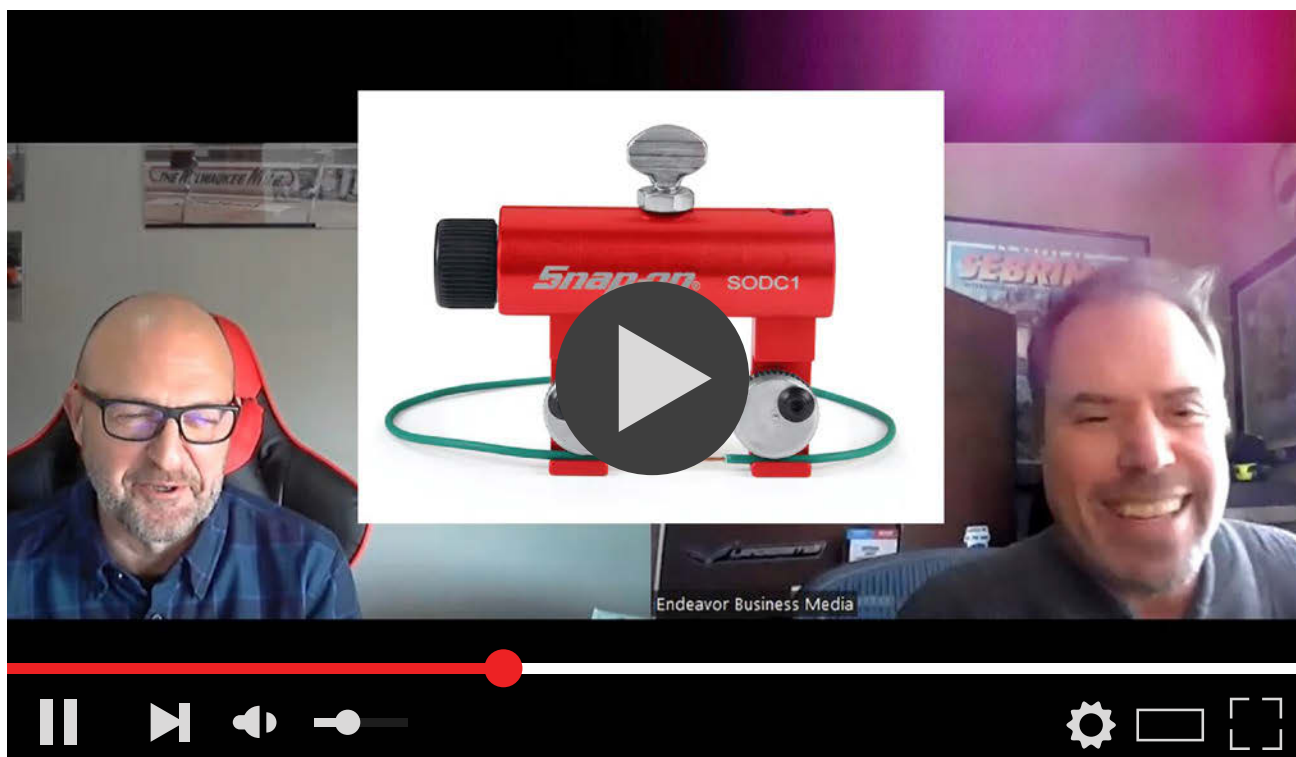
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Snap-on's Innovation Award for the SODC1 Soldering Clamp

A conversation with Snap-On's Brand Manager, Michael DeKeuster



PTEN editor Brendan Baker recently sat down with Snap-on brand manager, Michael DeKeuster, to discuss their 2022 Innovation Award for the SODC1 soldering clamp. DeKeuster says the clamp came to them by way of Thexton, who presented the idea initially. "With all of the soldering irons that we have sold, this was a logical complement to that," says DeKeuster. "As a technician is using a soldering iron to repair a harness or doing some stereo work, you really need your hands free to hold that iron and the solder, and something needs to keep the wires together. I can think of things like Apple's air pods, Bluetooth earpieces, and cup holders that hold your coffee while you drive. All those things are hands-free, right? So now we have a hands-free soldering clamp to add to the mix."

PTEN is the only publication to feature the prestigious "Innovation Awards." Every year since 1999, the Innovation Awards highlight the newest and most innovative products introduced to the automotive aftermarket. For 2022, PTEN received 121 submitted product entries in 23 categories. We will be featuring each category winner in a monthly video on our YouTube channel *PTEN (Professional Tool & Equipment News)*. To view a full list of winners online, visit: VehicleServicePros.com/2022IAWinners.



The Innovation Awards honor companies that take their products to another level and offer unique features that make a technician's job easier. If you would like to submit a product to be considered for the 2023 Innovation Awards, entries will be accepted starting in February. Visit: VehicleServicePros.com for more information.



Watch our interview with Snap-on at
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A wall of Revels

To get his toolboxes painted to match, this technician had to get in contact with Matco Tool's vice president.

By Emily Markham, Associate Editor

Shop foreman of Anthem Automotive in Atlanta, Ga., Mike Berg, or as many may know him from his YouTube channel, *The Flat Rate Master*, has what he dubs “a wall of Revels.”

The “wall” consists of a Matco Revel and a Matco Revel X with a locker in between. Each toolbox is a triple bank with a hutch on top, and measures around 6' 3" tall while altogether spanning about 15' long (locker included). The toolboxes are a now discontinued Matco color – crinkle black with an orange trim.

In fact, the color was discontinued before Berg even got his Revel, only two years after obtaining the Revel X. With the appearance of his toolbox, Berg's favorite

»»» OWNER

Mike Berg

Shop: Anthem Automotive

Location: Atlanta, Ga.

feature, he talked with his tool dealer. And his tool dealer talked with his district manager, and they both wrote letters and sent some of Berg's YouTube videos to a bunch of people at Matco, going all the way up to Matco's vice president, to get his Revel painted to match the rest of his setup.

Berg jokes that he was able to get his toolbox painted that way because he's a YouTuber, and his background had to match.

Though overall very similar, the two Revels do have some differences. The first being that the Revel does not have a small

drawer at the top like the Revel X. Berg was also able to get the Revel with a stainless-steel top – an option he didn't have for the X. Additionally, though fixed now, the casters on the Revel were a bit shorter than the X's, so Berg had to replace those to make the whole setup level.

Like with many technicians, Berg's reasoning behind purchasing the Revel X six years ago was his expanding tool collection. Now, with the two Revels, the locker, and the matching Matco JSC770 roll cart, his tools all have a home.

The Revel X primarily houses hand tools and power tools. Berg also uses the small drawer at the top to hold some paperwork and a few personal items such as his keys. Additionally, the toolbox has a drawer for foodstuff like plates and forks as well as a “tool graveyard” where Berg stores tools he doesn't use much anymore.

The Revel, on the other hand, is home to mostly specialty tools, and in the hutch, Berg keeps things more playful. It has a model toolbox from Matco that matches his Revels, a collection of new hats, and a “wall of fame” made up of stickers from all his YouTuber friends.

One of those YouTube friends Thomas EXOVCDs was actually the one who gave Berg the Flat Rate sign on his locker. Moving inside the locker, Berg has remote-controlled lights from Snap-on so he can see, and stores his bulk items and some chemicals along with lights he uses for filming YouTube videos.

After 30 years working as a technician, Berg has a good idea of what a “good” toolbox is. He says that “drawer layout, durability, warranty, and longevity” are the most important factors to take into account when looking to purchase a toolbox. And though Berg isn't looking to add any new toolboxes to his “wall” anytime soon, he thinks an additional locker or two could make their way into the lineup. ❌

Want to see more photos of Berg's box? Visit: [VehicleServicePros.com/21293323](https://www.VehicleServicePros.com/21293323)



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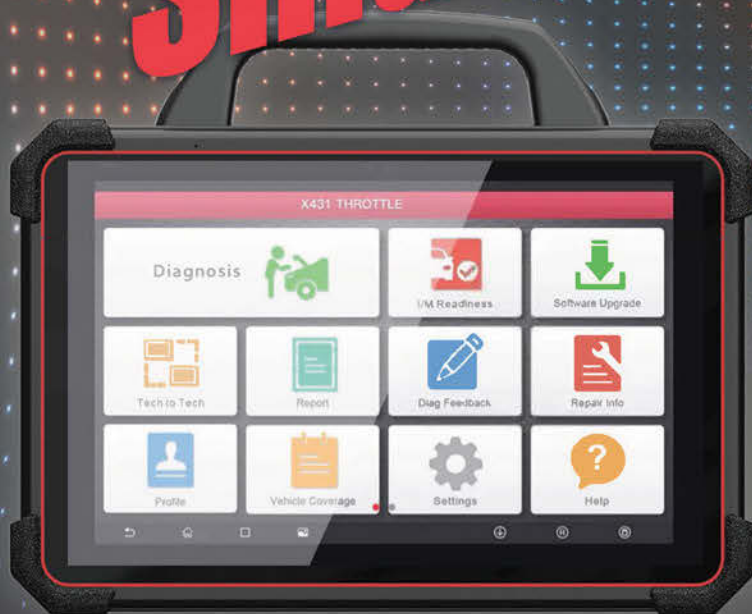


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