

PTEN

PROFESSIONAL **TOOL & EQUIPMENT** NEWS

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ENDEAVOR
BUSINESS MEDIA



M18 INFLATOR

BY MILWAUKEE TOOL

TOOL BRIEFING
MOVING FROM
R-134A TO R-1234YF
PAGE 32

DETAILS ON THE COVER PRODUCTS
AND OTHER NEW TOOLS **PAGE 10**

**CATEGORY
SPOTLIGHT:**
THE NEWEST SCAN
TOOLS ON THE MARKET
PAGE 40



▲ Ergonomically designed contoured grip and trigger for comfort



▲ Electric and traditional engine driven compressor compatible



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CONTENTS

MARCH 2022 | VOL 33 | ISSUE 2



11

ON OUR COVER

Milwaukee Tool M18 Inflator

Details on page 10



18



PRODUCTS

10 NEW PRODUCTS

Check out the latest offerings from Electronic Specialties, Rotary Lift, VIM Tools, and more.

36 TOOL REVIEWS

Our review panel tests out four different tools and gives their feedback.

40 CATEGORY SPOTLIGHT

Scan Tools



50

COLUMNS

8 EDITOR'S NOTE

Managing expectations during supply chain shortages.

28 DIAGNOSTIC TECH

Tanner Brandt reviews the difference between direct and indirect TPMS and explains how to diagnose both.

32 TOOL BRIEFING

Christopher Groff examines key factors when choosing a dedicated or dual usage RRR machine.

50 BIG-TIME BOXES

Eric Muir, Brighton Auto Repair, Brighton, Michigan and Whitmore Lake Auto Repair, Whitmore Lake, Michigan

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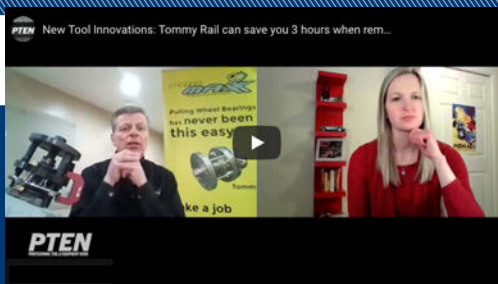
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VIDEO



PTEN editor Amanda Silliker chats with Jeffrey Del Rossa, president of ProMAXX Tool, on how the company's new Tommy Rail saves techs up to three hours when removing wheel bearings.

OPINION



Jay Goninen, president of WrenchWay, reveals the 11 things automotive technicians say they wished they knew before getting into the business.

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LEGISLATION



Automakers are disabling telematics over Right to Repair issues. Kia is the second manufacturer to turn off their proprietary telematics system on vehicles sold in Massachusetts.

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TECH TIPS



Clore Automotive reveals six tips for getting the most from your jump starter, including respecting the duty cycle and thinking "safety first."

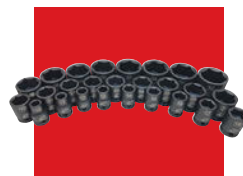
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FEATURED PRODUCTS



ATD Tools

26-pc 1/2" Drive 6-Point Metric Standard Impact Socket Set

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Matco Tools

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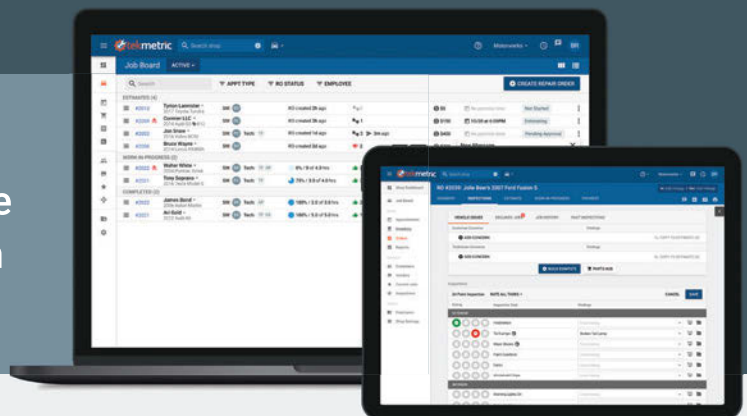


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Managing expectations

With supply chain delays and COVID keeping techs out of your shop, honesty is key with customers.

By Amanda Silliker, Editor
ASilliker@EndeavorB2B.com

The global supply chain crisis is weighing heavily on the auto care industry. At repair shops across the country, small jobs like brakes and suspension work are now taking days to get fixed. There's been oil filter shortages, tire shortages, and brake rotors are currently hit and miss. At one point, the tire situation was so rough that price and availability estimates were only good for 60 minutes.

Some customers have been waiting for months for a part to come in to fix their vehicle, and the remaining healthy technicians at shops are burning out from all the long hours covering for their isolating, COVID-positive colleagues.

While there are so many elements of the supply chain crisis that you cannot control, you can control how you communicate this less-than-ideal situation to your customers. Many of them will be angry, frustrated, annoyed, or a host of other emotions because their vehicle is an essential part of their daily life. But the good news is that most of your customers are not living under a rock and are well aware of the global supply chain problems — it's one thing to read about it in the news and another to experience it first hand.

A good start in navigating these bumpy waters is by fostering trust in your customers. Be honest about how long it is expected for a part to show up — and be honest that that's the manufacturer's best guess, but this is uncharted territory for them too and it could potentially be longer. Be empathetic. Not having a fully functioning vehicle is a terrible thing for many families. Tell your customers you understand how difficult it will be while you wait for the part to come in and be sincere in showing you care. Listen to them as they complain to you about how much of an inconvenience this all is.

PTEN advisory board member Pete Rudloff reminded me that it's smart for a service manager or owner to remember parts shortages aren't always because of the part.

"Sometimes it's the parts house having staffing issues. In that case, a shop may need to send a porter to retrieve a part even though normally the parts seller delivers. Flexibility is important on the shop side," he said.

And make sure to follow-through. When the part comes in, give the customer a call right away to set up their appointment. Do the work well (of course) and continue to express gratitude to the customer for waiting patiently (even if they were not the most patient!).

As far as staffing issues go, Rudloff said many clients understand that your hands are tied when a staff member has a COVID-related absence. At his shop, they simply explain to the customers what's going on and what the proposed timeline is to get their car back on the road.

"In this day and age, most people will understand that auto shops are facing unprecedented challenges. The key to success with people is clear communication and setting realistic expectations," Rudloff said. "I kind of have to believe that's sage advice for any client-driven business today." ❌

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OFFERS REMOTE SENSOR CAPABILITIES

The **MAXXAIR Refrigerant Recovery, Recycling, and Recharging Machine** from **CPS Products** is designed for the future of automotive A/C service with compatibility for both electric compressors and traditional engine driven compressors. It comes Wi-Fi and Bluetooth enabled with remote sensor capabilities and wireless printing. Its patented motor control valves prevent sticking, clogging, and enable a larger opening for increased flow. The MAXXAIR features an industrial design that is built to last. The removable tank ensures scale accuracy during transport. The units are fully upgradable to 50 lb capacity for larger heavy duty systems. **»20**



EMITS UP TO 2,000 LM

The **Streamlight BearTrap Multi-Function Work Light** delivers up to 2,000 lm for automotive and other inspection, identification, and repair uses. Featuring both spot and flood beams, the light can rotate 270 degrees in its frame and clamps to virtually any surface or stands on its own for handsfree task illumination. It also features a magnetic base and a hanging hook for additional handsfree lighting options. Manufactured from thermoplastic construction, it also features a gasket-sealed lens that

is impervious to common automotive chemicals. The light is rechargeable, weighs 2.3 lbs, and measures 7.62" in length, 6.5" in width, and is 3.12" thick. **»21**

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.



AUTOMATICALLY SHUTS OFF TO PREVENT OVERINFLATION

The Milwaukee Tool M18 Inflator is an 18V cordless tire inflator designed to meet the needs for transportation maintenance professionals by providing ideal performance, versatility, and the durability to survive demanding jobsites. With the 150 psi max capability, users can fill tires twice as fast. Additionally, the inflator is equipped with TrueFill auto shut-off technology that has the accuracy to be set at a specific psi which will automatically shut off the tool to prevent overinflation. Coupled with the resistance to auto shop chemicals, the M18 Inflator solves common user frustrations as a durable, versatile solution. **»22**

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NEW PRODUCTS



TEST RANGE OF 100-2,000 CCA

TOPDON's BT Mobile Lite Battery Tester is a lightweight BSC analyzer with a compact handheld design that easily fits within a toolbox. It can be connected to Bluetooth by downloading the free BT Mobile app from the Android or IOS app store. It has a test range of 100-2,000 CCA and has two LED indicators (blue for Bluetooth and green for power). Additionally, the BT Mobile Lite has three protection modes, is easy to operate, and supports multiple languages. **»23**



CAN BE USED WITH MOST CLASS 6 TO CLASS 8 TRUCKS

The **ESCO Sheppard M100 Pitman Arm Puller**, No. 40311, is designed to safely and easily remove pitman arms from the output shaft on Sheppard M100 gearboxes. It can be used with most Class 6 to Class 8 transportation trucks and equipment and eliminates dangerous hammering and cutting torch methods, the company says. It's made from heavy duty constructed casted steel and can be used with an impact gun up to 3/4". **»24**

REAL-TIME BATTERY LIFE INDICATOR

The **Coast XP18R Rechargeable Dual Power Flashlight** offers a turbo mode that emits up to 3,650 lm in addition to standard light modes (low, medium, and high). With Coast's Rechargeable Dual Power technology, the flashlight runs on a Coast ZITHION-X battery (charging cable included) or standard alkaline AA's (purchased separately). Power is monitored in real time with a battery life indicator, enabling users to be ready at all times. Users are also able to transition between a spot and flood beam with a push or pull of a finger via Coast's Slice Focus system. **»25**



FEATURES EZ-SENSOR PROGRAMMING

The **ST-1 TPMS Tool** from **Schrader TPMS Solutions** features EZ-sensor programming and an ID-Sync function for matching scanned IDs to vehicle ECU IDs. The tool triggers OE sensors for all cars in North America, Europe, and Asia. It displays all sensor data (pressure, battery, temperature, ID, frequency) and indicates OE sensor and service kit part numbers. In addition, it provides TPMS ECU relearn procedures and retrieves and decodes TPMS DTC information. The TPMS tool has a 2.8" LCD screen, protective rubber sleeve, is Wi-Fi capable, and comes with a quick-connect cable and carrying case. **»26**

INTERCHANGEABLE KEYS FOR VARIOUS APPLICATIONS

The **GEARWRENCH 33-pc Ratcheting T-Handle Hex Key Set**, No. 83518, features interchangeable keys for a wide range of uses and applications. The keys are made with alloy steel for maximum strength and to resist rotational distortion. The chamfered edges on both ends help guide the key into the fastener smoothly and quickly. The ratcheting handle increases speed when tightening and loosening fasteners and its handle provides a comfort dual material grip to allow for added torque and non-slip use. The set includes a blow molded case for storage and organization. The set meets or exceeds ASME standards. **»27**



SIZES RANGE FROM 20MM TO 46MM

The **Platinum Tech 17-pc Metric 1/2" Drive Jumbo Crowfoot Wrench Set**, No. PLT-99380, is designed to work in tight spaces where ordinary sockets and wrenches may not be able to reach. The set meets or exceeds ANSI standards and is made from drop forged carbon steel for strength and durability. The set offers a full polish chrome finish for corrosion resistance and has a limited lifetime warranty against defects in workmanship and materials. Sizes range from 20mm to 46mm. **»28**



FOR REMOVING GASKETS, SEALS, RUST, AND MORE

The **VIM Tools 2-pc Carbide Scraper Set**, No. CS100, is ideal for removing gaskets, seals, carbon build-up, rust, paint, varnish, glue, and more. Each scraper features a heavy duty, extra-sharp tungsten carbide tip and a durable, wear resistant handle. The set includes the 5/8" Heavy-Duty Carbide Scraper, No. CS101, and 1-1/4" Heavy-Duty Carbide Scraper, No. CS102. Both tools have a blade thickness of .13" and an overall length of 8.3".

»29



SELF-LOCKING RATCHET HANDLE

The **OTC S06 6-Ton Jack Stands** are constructed of a formed and welded steel base for strength, and are ideal for holding step vans, vocational trucks, and smaller heavy duty vehicles even when loaded. The self-locking ratchet handle can't be released under load and features a wide range of locking heights and adjusting positions to provide a universal stand for most vehicles. Additionally, the durable baked enamel finish resists corrosion and the welded foot pads resist sinking into soft ground or asphalt. The jack stands reach a maximum height of 23-11/16" and a minimum height of 15-5/8". Meets both ASME PASE-2019 safety standards for jack stands. »33

THERMALLY STABLE IN EXTREME TEMPERATURES

The **Victor Reinz Reinzsil RTV Silicone** from **Dana Incorporated** is a permanently elastic and universal silicone sealing compound that provides resistance to fluids and extreme temperatures. Reinzsil is an easy-to-apply, fast-curing, and durable sealant that is thermally stable in extreme temperatures and suitable for uneven and rough surfaces. It's also resistant to fluids, including mineral oils and synthetic oils, lubricants, gasoline, diesel oil, greases, water and detergents, and is safe for all sensors. The silicone is ideal for use on two-dimensional flat surfaces where there is a sealing gap, such as gasket intersections and components originally sealed with room-temperature vulcanizing (RTV) by the manufacturer, including intake manifolds, valve covers, and oil pans. »30



TOWER-FREE DESIGN

The **Rotary Lift R1090 Pro 3D Alignment System** features a tower-free design and comes with a portable, space-saving cabinet that requires no dedicated bay, giving shops with limited space the flexibility needed to perform wheel alignments anywhere. The system's three-point tire clamps allow for quick setup, and the automatic lift level with Rotary's On-the-Rack Test Drive program improves cycle time by eliminating the need for difficult and time-consuming rolling compensation. »31

EMITS UP TO 1,600 LMS

The **Fenix Lighting PD36R Rechargeable Flashlight** emits up to 1,600 lms with a distance of 928'. The LED rechargeable flashlight features a high capacity 21700 Li-ion battery, allowing for greater extended runtimes than a standard Li-ion battery. It also has six lighting modes and is IP68 rated for dust and water-proof. Users can charge the flashlight using the USB-C port. »32



CUSTOMER REVIEW:

“ These are really beefy and big. I wouldn't recommend them for anything smaller than a half ton truck or medium SUV. Happy with the purchase. ”

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OFFERS DUAL-VOLTAGE INPUT POWER

The **Forney Industries 220 MP Multi-Process Welder**, No. 410, features a high welding capacity of 1/2" and 220A of welding power, making it ideal for use on steel, stainless steel, cast iron, and aluminum (with spool gun). It offers dual-voltage (120V/240V) input power. Additionally, the welder is rugged and technologically advanced with a digital display, all-metal drive system, and has a three-year warranty. »35

FOR MOST GM, FORD, CHRYSLER, AND MAZDA MODELS



The **Performance Tool A/C and Fuel Line Disconnect Set**, No. W83101, is designed for automotive fuel, A/C, and transmission cooler lines on most GM, Ford, Chrysler, and Mazda models. Disconnect the spring lock couplings simply by pressing the tabs into the opening of the fitting. The off-set handles are angled to access fittings with limited space to work. Made of a tough durable plastic that is resistant to fuels and solvents, it works on quick disconnect couplings on

most domestic and import vehicles. Set includes six sizes: 1/4 (6mm), 5/16 (8mm), 3/8 (9.5mm), 1/2 (13mm), 5/8 (16mm), 3/4 (19mm), and 7/8 inch (22mm). »36



REPAIRS INSIDE AND OUTSIDE THREADS

The **Rotary Thread 15-pc Thread Restoration Master Kit**, No. RTK2.1, is designed to repair and restore all threads, grooves, glands, keyways, gears, and more. The kit repairs inside or outside threads no matter the size, length, or diameter, without having to measure thread pitch, the company says. Each piece can be attached to a drill, die grinder, or Dremel tool. It features an embedded diamond abrasive, tuned for smooth control and easy thread repair. The kit is lightweight and can fix most hard-to-reach areas.

»38

TURNS ON/OFF WITHOUT TOUCHING THE HEADLAMP



The **Saber 200 Lm LED Rechargeable Motion Activated Headlamp**, No. ATD-80250A, features a motion sensing mode to turn light on/off without touching the headlamp. It has a pivoting head to allow users to focus light where needed, a battery charging indicator to show charging progress, two floodlight settings (200 lm and 100 lm), and an auto-

matic shut off and overcharge protection to prolong battery life. It also has a memory function that records the setting after five seconds and is recalled the next time the device is activated. The headlamp is IP65 rated for dust and water resistance as well as IK07 rated for mechanical impact protection. Includes USB type-C charging cord. »37

STREAMLINED ALUMINUM SAFETY TOES



The **Keen Utility Sparta 2 Athletic Work Sneaker** features a two-layer mesh upper to keep the feet cool, Keen.ReGEN midsole technology for all-day cushioning and lightweight performance, and streamlined aluminum safety toes.

The sneakers have an oil and slip-resistant, non-marking rubber outsole that is also EH-rated to provide underfoot protection from live electrical circuits. The Sparta 2 is available in several colorways for men and women. »39

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- Air Pressure - 300 psi

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Autel TS508
All-In-One TPMS
Service Tool
SKU 6010116

ONLY
\$320

- OBD II Style with Screen
- OBD II Cable
- Includes 8 Sensors



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AUTEL

Autel MS906BT
Diagnostic Tester
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- 8.0" Tablet
- Android Based
- Master Cable Set

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STAINLESS STEEL
Spray Washer
SKU 5155051

Ranger

SALE PRICE
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Soap Bucket



- Load Capacity - 500 lbs.
- Tank Capacity - 50 gal.
- Interior Dimensions - 43" x 32"
- Steel Oil Skimming System



Ranger RJS-2TH
Tripod
Jack Stand
SKU 5150125

- Capacity - 4,000 lbs.
- Height - 55" - 87"

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\$162

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Ranger RD-9G
9 Gallon Oil Drain
SKU 5150997

- Capacity - 9 gal.
- Height - 32" - 64"
- Funnel Diameter - 18"

ONLY
\$250

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Ranger RFJ-3TQP
3-Ton Floor Jack
SKU 5150418

ONLY
\$270

- Capacity - 6,000
- Height - 5" - 19.75"
- Chasis Length - 25.5"



Ranger RCD-1500EX
GoCart Vehicle Dolly
EXTENDED (Set of 2)
SKU 5150191

\$405 ~~\$450~~

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- Capacity - 1,500 lbs.
- Tire Width Capacity - 13"
- Tire Diameter Capacity - 19" - 37"

Ranger RP-20FC
Oil Filter Crusher
with Stand
SKU 5150067

SALE PRICE
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Set of 2** SKU 5700236

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BendPak

- Size - 18.5" x 18.5"
- Free-Floating 360° movement

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Wheel Weight
Dispenser
Stand Kit** SKU 5150028

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INCLUDES:

- Dispenser Stand
- Wheel Weights Combo

Ranger



**Ranger
Wheel Weights
Combo Set
(Black & Silver)**
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**Dannmar
DT-50A
Tire Changer**
SKU 5140157

SALE PRICE

\$3,535

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- Int. Rim Clamping - 14" - 26"
- Ext. Rim Clamping - 12" - 22"
- Max. Tire Diameter - 47"

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**Dannmar DB-70
Wheel Balancer**
SKU 5140159

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\$2,230

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- Max. Tire Diameter - 49"
- Wheel Diameter - 10" - 28"
- Wheel Width - 1.5" - 20"

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**Ranger RL-8500
Brake Lathe
with Bench**
SKU 5150066

SALE PRICE

\$8,260

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**INCLUDES
Tool Package**



- Max. Rotor Thickness - 2.5"
- Max. Rotor Diameter - 17"
- Max. Drum Diameter - 28"

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**SUPER
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5 HP Air Compressor**
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- Height - 4" - 29"
- Overall Length - 82"
- Overall Width - 70.5"

Dannmar DMR-6
6K Capacity Portable
Mid-Rise Lift
SKU 5175328

SALE PRICE
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FREE SHIPPING

- Height - 4.75" - 48"
- Overall Length - 81"
- Overall Width - 41.5"

DANNMAR



BendPak HDS-14
Standard Length
Four-Post Lift
SKU 5175170

SALE PRICE
\$7,550



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BendPak

- Max. Rise - 70"
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- Overall Height - 88"

BendPak LR10000
Low-Rise Lift
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\$4,405

- Capacity - 10,000 lbs.
- Max. Rise - 23"
- Width - 85"
- Length - 82.65"

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SALE PRICE
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Frame Cradle Pads
for BendPak 2-Post Lifts
Set of 4 / 60 mm Pin
SKU 5175761



Dannmar D4-12
12K Capacity
Four-Post Lift
SKU 5175317

SALE PRICE
\$5,905

FREE SHIPPING

- Capacity - 12,000 lbs.
- Max. Rise - 68.75"
- Drive-Thru Clearance - 98"

Dannmar D4-12A
12K Capacity Alignment
Four-Post Lift
SKU 5175318

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\$7,295

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- Max. Rise - 68.75"
- Max. 2 Wheel Alignment - 163.5"

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Dannmar D2-10C
10K Capacity
Two-Post Lift
SKU 5175314

SALE PRICE
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Dannmar D2-10A
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BendPak

BendPak XPR-10S
10K Capacity Symmetric
Two-Post Lift
SKU 5175395

SALE PRICE
\$5,090

- Max. Rise - 69"
- Overall Height - 145" / Width - 132" or 145"

FREE SHIPPING

BendPak XPR-10AS
10K Capacity Asymmetric
Two-Post Lift
SKU 5175397

SALE PRICE
\$5,150

- Max. Rise - 69"
- Overall Height - 145" / Width - 137" or 145"

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NEW PRODUCTS



MULTIPLE PIN HOLES FOR QUICK AND EASY ADJUSTMENTS

The **AFF 22-Ton Pin-Style Truck Stand Set**, No. 6422, is designed for supporting trucks, trailers, and equipment in fleet garages, agricultural, industrial, and construction environments. Sold in pairs, the truck stands are made from heavy-gauge steel to provide maximum strength and durability. They have multiple pin holes to allow for quick and easy adjustments, large v-shaped saddle cradles for axles and other components, a large base to provide a stable working platform even on rough terrain, and a carrying handle for convenience and easier positioning. **>>42**



OFFERS DUAL-VOLTAGE 120/230V FLEXIBILITY

The **ESAB EMP 210 MIG/Stick/TIG Welder** is lightweight and offers dual-voltage input power flexibility, offering ideal portability for around the shop. The multi-process MIG/flux cored/stick/lift TIG welding system has a 10-200A output, a stable Lift TIG arc at low amperage for finesse welds, and the power to run Stick electrodes up to 5/32", including 7018. Additionally, it features a large easy-to-read LED display with digital controls for fast and accurate operation and can run off a generator with a 10 kVA output. **>>43**



FOR MORE INFORMATION ON THESE PRODUCTS, CLICK ON "PTEN E-INQUIRY" at **VehicleServicePros.com** OR CIRCLE THE NUMBER ON THE CARD.

DUAL BATTERY BAYS FOR DOUBLE THE RUN-TIME

The **Durofix 1" Cordless Jumbo Impact Wrench**, No. RI60176, features 3,000 ft-lb maximum reverse torque and five stages of pre-set tightening torque: 250, 500, 800, 1,250, and 2,200 ft-lbs. Utilizing 60V Li-ion battery technology and a brushless motor, the tool is designed to provide power, efficiency, less heat, and less maintenance. The impact wrench has an auto-shutoff for stage one to four and offers dual battery bays to double its run-time. It also has an adjustable side handle and two side LEDs. Available with a 2" or 6" extended anvil. **>>44**



REMOVES BROKEN EXHAUST MANIFOLD BOLTS ON DODGE/JEEP V6 3.8L ENGINES

The **ProMAXX Kaiden Exhaust Manifold Repair Kit** is designed to help technicians easily remove broken exhaust manifold bolts on Dodge/Jeep V6 3.8L engines. The kit is designed for Jeep Wrangler, Chrysler Town and Country, Pacifica, and any other vehicle equipped with the 3.8L engine. In addition to precision-engineered guide plates, ProMAXX Tool's exclusive screw-in bushings provide exact alignment with the 3.8L engine cylinder head. Kaiden incorporates splined, slip-nut-styled, non-deforming extractors that are utilized in both a clockwise and counter-clockwise direction. This unlocks the broken bolt remnant without pinching it in the cylinder head. **>>45**



PROGRAMS UP TO 16 SENSORS AT A TIME

The **Mobiletron PT47 TPMS Servicing Tool** from MOREsensor is a professional all-in-one TPMS tool. The tool activates and reads TPMS sensors on most U.S. and European passenger vehicles, displays all sensor data (ID, tire pressure, tire temperature, battery status, etc.), and provides comprehensive indirect, manual, and auto relearn procedure information. The PT47 programs up to 16 sensors at a time and is capable of relearning new sensors through OBD-II port. It also comes with built-in relearn instructions and OE sensor reference. With PT47, user's can program blank sensors by cloning factory sensor's IDs, assign auto-generated ID, or input ID manually. **>>46**



INCLUDES 2", 4" AND 6" CHROME EXTENSIONS

The **Matco Tools 4-pc 1/4" Drive Ratchet and Extension Set** features a nine-position flex head to ensure a locked desired position for optimal access. Precision made and hand assembled in the U.S.A., chrome extensions in the set include 2", 4" and 6" lengths for easy access in confined areas. Available in blue, red, orange, and green ratchet grips. **>>47**



EASY-TO-USE DIGITAL INTERFACE

The **Jackson Safety Freedom Style Auto Darkening Welding Helmet**, No. 47103, provides an ideal view of the welding arc, reduces eye strain, and provides a comfortable welding experience. The auto darkening filter allows welders to adapt to a variety of applications by switching the lens shade range (4/5-13) and transitioning from light to dark in 1/20,000 seconds. With a 1/1/1 optical rating and a patented 370 speed dial, the lightweight helmet weighs only 1.24 lbs and provides optical clarity and a customizable fit. The welding helmet features an easy-to-use digital interface and is ideal for a wide range of grinding, cutting, and welding functions. **>>48**

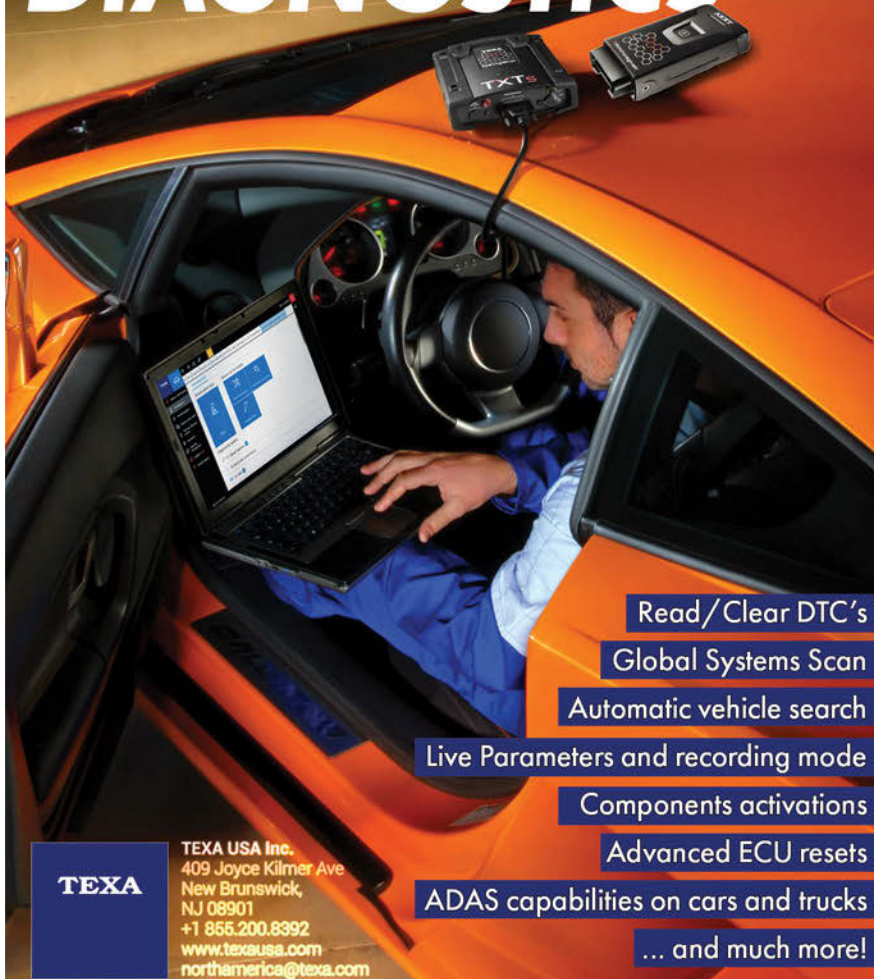


CONSTANTLY SCANS AND ADAPTS TO THE ENVIRONMENT

The **Karcher KIRA CV 60/1 Autonomous Vacuum** is powered by BrainOS and autonomously navigates obstacles and people safely by using several high-optic 3-D and 2-D cameras and Lidar sensors to constantly scan and adapt to the environment, recalculating routes as obstacles are detected. It can be operated autonomously for cleaning large floor spaces or manually for quick spot cleaning. Real-time notifications provide updates to operators when cleaning routes are complete, and reporting tools provide managers with key insights into operational performance metrics. Additional features include a Li-ion battery for longer run times and faster charging speed, as well as a HEPA-rated vacuum bag for optimal health protection.

>>49

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NEW PRODUCTS



REDUCES TIME SPENT CLEANING RIMS

The **Mueller-Kueps Conical Eraser Kit**, No. 282 260/KIT, includes six erasers made from high quality rubber. At 60mm in diameter, the erasers are designed to reduce time spent cleaning rims. Use with an electrical drill, cordless drill or with the Air Eraser, No. 297 013, from Mueller-Kueps. It can be used with multiple speeds on the drill from 500 to 1,000 maximum rpms. If used at proper speed, the eraser will not leave any residue on the rim, the company says. The erasers will not damage or scratch aluminum rims. **>>51**



IDEAL FOR ABSORBING GREASE AND OIL

The **Shopserv Microfiber Towels** from **Hospesco Brands Group** are thin but durable 12" by 12" towels that are ideal for quickly removing dirt, dust, and bacteria from surfaces requiring little to no chemicals. Available in a convenient dispensing box, the microfiber cleaning towels can be kept in areas where cleaning up or wiping down surfaces is a more constant undertaking, assuring maximum efficiency and efficacy. The towels can be used as a disposable towel or can be machine washed for limited reuse. They are made of polyester and polyamide, and they also excel at absorbing grease and oil. **>>52**



FOR MORE INFORMATION ON THESE PRODUCTS, CLICK ON "PTEN E-INQUIRY" at **VehicleServicePros.com** OR CIRCLE THE NUMBER ON THE CARD.

ENABLES FAST REPAIRS

The **Evercoat Light Speed System** uses LED curing to reduce time between application and sanding. Using the Light Speed system, users are able to make fast repairs. The system includes five different products to quickly provide the ideal repair finish. The Light Speed products take the repair from beginning to end using: Light Speed Optex Premium Body Filler, Light Speed LED Cure 440 Express, Light Speed LED Cure High Build Primer, Light Speed LED Cure Lamp, and Light Speed LED Cure Lamp Stand. **>>53**



USES SHOP AIR TO PRESSURIZE THE SOLVENT



The **OEMTOOLS A/C Flush Kit**, No. 37377, is designed to make flushing contaminants such as sealants and oil from A/C system components fast and easy. It uses shop air to pressurize the solvent and thoroughly cleans the system while the attached nozzle directs the solvent without sprayback. It reduces comebacks by removing debris that can stop up the system and cause compressor failure, the company says. The kit includes canister, hose, blowgun, rubber tip, and cylinder cap. **>>54**

PREVENTS CROSS-CONTAMINATION

The **Yellow Jacket TurboRecover Recovery Machine** is a fully automatic operation for fast recovery of Class III, IV, and V refrigerants including R-410A and A2L refrigerants. The twin-cylinder, oil-less compressor and 1.25hp brushless DC motor ensures fast recovery of every system, the company says. Its dual-gauge design allows for monitoring of the system and tank pressures simultaneously and its integrated low-pressure switch automatically powers down the machine when the system reaches 10" of vacuum. The purge circuit clears residual refrigerant from the machine, preventing cross-contamination when changing from one refrigerant to another. With a lightweight design and included shoulder strap, the unit is easy to transport around the shop. **>>55**



MAGNETIC BASE SECURES TO MOST METAL SURFACES

The **Grote Industries BriteZone Handheld LED Work Lamp**, No. BZ421-5, features a digital readout that lets users know precisely what battery charge level is left. The magnetic polymer base secures the lamp to most metal surfaces. The work lamp emits up to 1,800 lm and offers three light patterns (100 percent, 50 percent, and SOS). The rechargeable light charges in 3-1/2 hours and has a run-time of three hours. **>>56**



BONDS METALS, HARD PLASTICS, GLASS, RUBBERS, AND MORE



The **Permatex 500° High Heat Epoxy** is an ideal solution for under hood repairs that need to withstand extremely hot temperatures. The epoxy is formulated to withstand temperatures up to 500 degrees F and is designed to bond and seal against liquids, gasses, and common automotive fluids. It has a holding strength of 2500 psi, sets in 10 minutes, and has a two-hour cure time. Permatex 500° High Heat is available in a syringe, which allows for easy and pinpoint application.

The epoxy bonds metals, hard plastics, ceramics, glass, rubbers, and more.

»57



FOR PRESSURIZED LIQUIDS

The **Exair 1/4 NPT HollowStream Cone Liquid Atomizing Nozzle** is designed to provide a hollow cone spray pattern for pressurized liquids. The nozzle is applied to solve cooling, cleaning, foam breaking, rinsing, and dust suppression applications. The tangential flow design is vaneless, with wide open internal features to resist clogging while producing a uniform distribution in a ring pattern with medium to large droplets. Its right-angle design is compact, works well with liquids containing particulate, and operates up to 250 psi liquid pressure. Stainless steel construction for durability and corrosion resistance. HollowStream nozzles are CE compliant and available in a variety of flow rates.

»58

FULL-POLISH CHROME DESIGN FOR CORROSION RESISTANCE

The **DeWalt 37-pc 3/8" Drive Socket Set with ToughSystem 2.0 Tray** includes 22 sockets, 11 deep sockets, one spark plug socket, two extension bars, and one ratchet. Users are able to access



and maneuver in tight spaces with the durable 72-tooth ratchet's 5-degree arc swing. Each piece within the set features a full-polish chrome design for corrosion resistance and long-term performance. Each socket also offers clear identification with hard stamped markings. For storage and hassle-free transportation, the set is sold inside the ToughSystem 2.0 Shallow Tool Tray which also features a molded insert and compatible lid for security.

»59

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J2534 VCI Dongle
ADAS-Ready
Online Coding
Topology Mapping
200+ Vehicle Database



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COMPATIBLE WITH ANY TYPE OF BARREL

The **Fluoramics 55-Gallon Drum Mixer** is designed to mix barrels of HinderRUST, Tufoil, paints, oils, and other liquids. It fits any drill or mixing motor with 1/2" adjustable chuck. The mixer has four sets of T-style blades that fold to fit through a barrel opening of 1.75" or larger. When the drill spins, the blades unfold (open to 6" wide) to stir the contents at the top, middle, and bottom simultaneously. Made of heavy duty construction with stainless-steel shaft and blades that are welded in place for longevity. Made in the U.S.A. **>>61**



LASTS UP TO 50 TO 60 MINUTES

The **Portasol Medium Power Soldering Iron**, No. Pz50, is completely powered by butane and is ideal for electronics, maintenance, and repair. One butane tank will last up to 50 to 60 minutes at mid-setting. The tool is easy to use and provides 50 watts equivalent (fixed temperature). The ultrasonically welded gas tank provides a safe, reliable butane soldering iron, plus the short distance from the tip to the grip allows the technician closer access to the work surface. It comes fitted with a 2.4mm DF tip let and four additional tip lets, including 1mm, 3.2mm DF, 4.8mm Df, and hot knife tip lets. **>>62**

DELIVERS PRECISE, ACCURATE RESULTS ON MOST SYSTEMS

The **Harbor Freight Icon Master Fuel Injection Service Kit**, No. 64938, is designed to quickly and accurately perform fuel pressure testing, diagnose weak fuel pumps or restricted filters, test for fuel flow and perform leak-down tests. The large impact-resistant dual-pressure gauge reads 0-145 psi and is accurate within +/- 1.6 percent. The fuel injection pump tester comes with high-pressure flex hoses, precision-machined brass fittings, and instructions for quick reference. The kit comes in a storage case that converts into tool-drawer storage trays. **>>63**



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DUAL EVAP/HIGH PRESSURE DIAGNOSTIC SMOKE MACHINES

- For evap, turbo/intake and heavy-duty truck testing
- Diagnose difficult automotive leaks

• INCLUDES INTERNAL COMPRESSOR •

43065 DUAL EVAP/HIGH PRESSURE DIAGNOSTIC SMOKE MACHINE

Accessories included: smoke hose, power cord, full set of block off caps, exhaust cone, evap schrader valve remover/installer, evap service port adapter hose, high intensity smoke illuminating battery powered flashlight, 8 oz smoke producing fluid and bladder for intake testing



NEW

• INCLUDES INTERNAL COMPRESSOR •

43070 DUAL EVAP/HIGH PRESSURE DIAGNOSTIC SMOKE MACHINE WITH TRUCK ADAPTER ACCESSORY KIT

Accessories included: smoke hose, power cord, full set of block off caps, exhaust cone, evap schrader valve remover/installer, evap service port adapter hose, high intensity smoke illuminating battery powered flashlight, 8 oz smoke producing fluid, bladder for intake testing, (2) bladders for heavy duty/truck applications, 6" ring, temperature sensor port adapter, oxygen sensor port adapter and pressure sensor port adapter



NEW



WORKS WITH ALMOST ANY DIGITAL MULTIMETER

The **Electronic Specialties LOADpro and Back Probe Kit**, No. 187, is designed to help technicians diagnose electrical problems. The kit includes LOADpro test leads, LOADpro tip adapters, flexible silicon back probes, spoon probe curved back probes, large crocodile clips, and push-on alligator clips. The test leads allow users to instantly load the circuit to see if current can flow and can work with almost any digital multimeter. LOADpro is able to find high corrosive resistance, shorts to ground, and open circuits quickly and easily by simply just reading the voltage, the company says.

»65

TABLET PROVIDES INFORMATION ON THE DEPTH OF CUTS, SPEEDS AND SETTINGS



The **Hunter Engineering BL Series Bench Lathes** now include a tablet, enabling operators to look up the vehicle and access the specifications immediately. The tablet then calculates the distance between the cutting bits on the lathe and compares it live to the specifications. With a user-friendly display, the tablet provides information on the depth of cuts, speeds and settings, as well as offers training videos and helpful animations to guide technicians through various procedures. After a certain number of cuts, the BitMinder function reminds the user when it's time to rotate the bits. »66

TUNGSTEN CARBIDE TIP IS BRAZED TO THE STEEL BLADE

The **Lisle Corporation 1-1/4" Carbide 8" Scraper**, No. 81990, is designed to remove gasket residue from steel and aluminum heads and manifolds, along with carbon build-up and even rust. The carbide scraper features a double-dip grip handle for comfort. It can also be used to clean disc brake caliper slides. The Tungsten carbide tip is brazed to the steel blade. The tip remains very sharp and is precision ground. Use caution when using scraper on aluminum to avoid scratching the surface, the company notes. »67





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NEW PRODUCTS



FOLDS 180 DEGREES

The **KTIXD6174 Rechargeable Foldable COB Worklight**, No. KTIXD6174, emits up to 600 lm and is able to fold 180 degrees. Its top light is also able to swivel/twist 270 degrees. The light offers two power

settings: high and low. With a micro USB charge, the worklight charges in four hours. It has a run-time of 4 hours on high and 8 hours on low. The foldable worklight also has a strong magnetic base and measures 13" in length.

»69

SERVICES MOST MAKES AND MODELS

The **CTA Manufacturing Brake Bleeder Tank and Adapter Set**, No. 7310M, includes 12 master cylinder adapters, one quick coupler, and a pressure bleeder tank to service most makes and models. Simply select the appropriate adapter and securely screw it on the brake master cylinder. Then, attach high pressure air using the included Quick/Nitto connector on top of the connected/screwed in adapter. Gradually increase the air pressure, not exceeding 20 psi. The Nitto fitting size is 1/2". »70



ELECTRICAL HAZARD RESISTANT

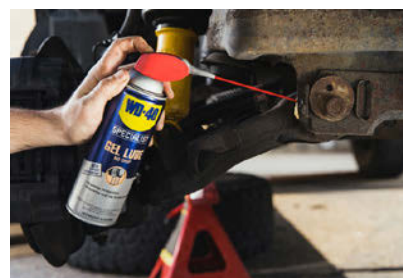
The **Blundstone Wheat Premium Nubuck Extreme Series Pull On Work Boots**, No. 989, combines safety and comfort with a heavy industrial pedigree, a lightweight water-resistant nubuck upper, and elastic sides. The work boots feature a moulded TPU bump cap for added leather protection, a low density shock absorbing polyurethane midsole, a removeable foot-bed with arch support, and an impact resistant steel toe cap. The outsole is heat resistant to temperatures up to 572 degrees F as well as provides slip-resistance and is resistant to most chemicals. The boots are also electrical hazard resistant. »71



GPR-Pro™ Glue Pull Repair System

PROFESSIONAL KIT INCLUDES:

- ✓ Minor dent tabs and heavy damage ring tabs
- ✓ Lift and lateral pull strips allow for complex repairs
- ✓ Opaque Pro glue is ideal for all glue pull applications



NO-DRIP FORMULA STAYS WHERE IT'S SPRAYED

The **WD-40 Specialist Gel Lube**, previously known as Specialist Spray and Stay Gel Lubricant and now in a blue and yellow can, is designed to offer long lasting lubrication and protection that resists water and displaces moisture to prevent rust for up to one year, according to the company. With a no-drip formula, the spray gel lubricant goes on thick and stays where it's sprayed, making it ideal for use on wheel bearings. It's also ideal for use on vertical surfaces like chains and cables, and offers non-flying for moving parts such as gears and bearings. Safe to use on multiple surfaces including metals, plastic, and rubber. »73

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NEW PRODUCTS



SIMULATES REAL-WORLD DRIVE CONDITIONS AND CYCLES



The **Launch Tech USA S2-2 Sensorbox** is a testing module designed to diagnose various sensors, actuators and electrical components that require a higher level of analysis to determine faults. Working in conjunction with a X-431 series diagnostic scan tool, the S2-2 mimics the protocols of the ECM and simulates real-world drive conditions and cycles.

Technicians are able to analyze, in real time, waveforms, cyclical graph data and voltage readings, which can be used to deduce sensor issues, electrical issues or high-level ECM faults. ➤74



Learn more about this tool's features here:
VehicleServicePros.com/21246313



DELIVERS UP TO 1,240 IN-LBS OF MAXIMUM TORQUE

The **Makita 18V LXT Sub-Compact Brushless Impact Driver**, No. XDT18, features a compact and ergonomic design, measuring 5-1/4" and weighing 2.6 lbs. It offers two speed settings and dual LEDs to illuminate the work area. The electronically-controlled BL brushless motor efficiently uses energy to match torque and rpm to the changing demands of the application. The tool delivers up to 1,240 in-lbs of maximum torque and is ideal for working in tight spaces. It is also equipped with Star Protection Computer Controls to protect against overloading, over-discharging, and over-heating. ➤75

LTi HAS THE TOOLS TO GET THE DIFFICULT JOBS DONE!

LT1350 Lug Ripper II

Patent #10,549,355 B1

Don't torch frozen/damaged lug nuts off - just drill out the lug nut threads and the wheel stud ONLY in 11 minutes or less. Easily replace damaged lug nut and wheel stud without damaging rim. LT1350-8 Water Bladder is NOW AVAILABLE AGAIN.



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NEW & IMPROVED LT1350-6 16mm STEP UP COBALT DRILL BIT

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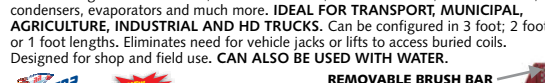
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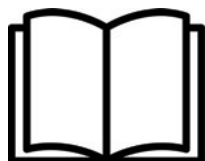
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Direct versus indirect TPMS: How they work and how to diagnose them

No matter the system, ensure you follow service information closely.

By **Tanner Brandt**, Contributing Editor

Vehicles on the road today could have two possible types of tire pressure monitoring systems (TPMS). Either indirect meaning the vehicle has no pressure sensors in the tires or direct where the vehicle has individual sensors in each tire. Let's take a deep dive into each of these systems and learn how they work and how to diagnose them.

DIRECT TPMS

Direct TPMS systems use individual pressure sensors in each tire mounted to the rim. Most of these sensors will be part of the valve stem although some early systems used a sensor mounted to the rim with a large band clamp. The sensors send out either a 315 MHz or 434 MHz signal. The signal is then received by the TPMS module which could be standalone or be built into another module — sometimes it may be built into the door lock receiver module or the radio transceiver module. The tire pressure data is then sent to the various modules that request it.

When servicing vehicles with direct TPMS, it is critical that service information be followed. On some vehicles the system may need to be calibrated when the tires are rotated, and others may ask that the system be reset even after tire pressures are changed. During this service

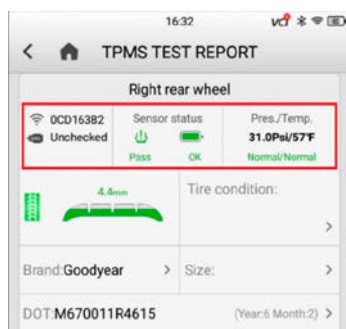


Figure 1: A TPMS report is displayed on the face of a tool being used to capture the sensor's battery state of health (SOH).

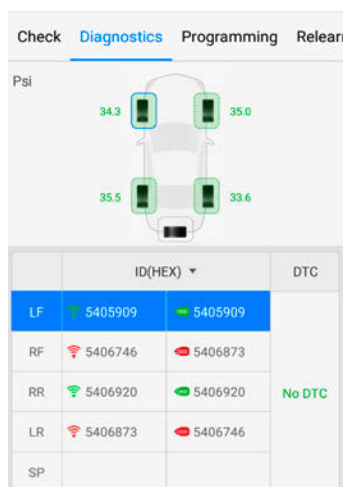


Figure 2: The tool's display indicates a mismatch of the sensor's IDs and location, as compared to where they are located on the vehicle.

I recommend using a tool that shows the battery state of health of the sensors like in Figure 1. Have you ever had a customer that came back after a tire rotation with a low tire light and now the car has a dead sensor? Once that happens, it becomes an "ever since you" scenario. If you look at the TPMS sensor battery level during routine service, you can catch the sensors before they die and let your customer know they need to be replaced.

In my opinion, it's not a bad idea to scan the sensors anytime the vehicle is in for an oil change just to check the batteries.

When a direct TPMS has a fault it's easy to diagnose. If none of the sensors are being seen by the vehicle then we need to use a TPMS tool to check them and verify they are the correct sensor type/frequency and that they have a programmed ID number. Once that is done, if they are not correct or are not reading at all then they need to be replaced. If they are correct but the vehicle is not able to see them, then it could be a problem with the module or its input circuits. The module houses the antenna for the system. If the system is built into the remote door lock module, a simple test with the door lock remote can tell us if that module is functioning. If the door locks don't work either, then we can head directly to the module and check all the inputs. If just one sensor is dead, then it's easy to find with a tool that reads all the sensor information.

One thing I have personally seen is different brand sensors causing intermittent problems. I have seen some sensors that “go to sleep” while the vehicle sits overnight and then don’t wake up until the vehicle is at a certain speed. The tire light will be on when the customer starts the vehicle, but it may go off once up to driving speeds. If you run into this scenario, make sure the sensors are learned into their correct positions first. If the sensors are in the wrong position, like in Figure 2, it can cause you to chase the wrong sensor.

The left column of Figure 2 shows the actual position while the right column shows the position the ID is programmed to in the vehicle data. After this is checked, go for a drive while looking at live data for the sensors, the one that’s not reading pressure correctly is your culprit. To prevent this from happening I like to use OE sensors from companies like Schrader, Continental, and others. If an OE sensor isn’t available, then my go to is the Autel MX-1 TPMS sensors. These sensors combine 315 MHz and 433 MHz into one sensor and have only one SKU for easy inventory. There is nothing wrong with other aftermarket sensor options as well, but I have personally encountered problems that were caused by aftermarket sensors that were the incorrect part number for the application. The sensor was not faulty but was incorrect for the vehicle. When a supplier has many different part numbers, this is more likely to happen when the part numbers are entered into inventory at a parts store. That’s why I prefer OE or Autel’s simple one sensor approach.

INDIRECT TPMS

Now, let’s look at indirect TPMS. Early systems looked at the difference in wheel speed via the ABS sensors to determine when a tire was low. As the tire loses air the circumference becomes smaller resulting in the wheel speed increasing. When that is recognized by the ABS module, a low tire light is displayed. The problem these systems had was they could only tell if one, two, or three tires were low, but they couldn’t tell if all four were low. This is because if all four tires gradually lost air, then they would all be the same circumference. Luckily for us, the indirect TPMS being used on new vehicles is substantially different from the earlier versions. Now, the system is integrated into the VSA modulator-control unit and uses the following inputs to monitor and compare tire characteristics to determine when one or more tires are significantly underinflated; VSA/ABS wheel speed sensors, Yaw and G sensor, brake pressure, steering angle, and outside temperature (measured from the front bumper) are all used.

From these inputs, the system calculates tire pressures. To determine tire pressure loss, the system uses these two methods: wheel speed differential and peak tire resonance. Wheel speed differential is calculated by performing a diagonal comparison between the front and rear wheels, a comparison between the two front and two rear wheels, and a comparison between the two right and two left wheels. ➔

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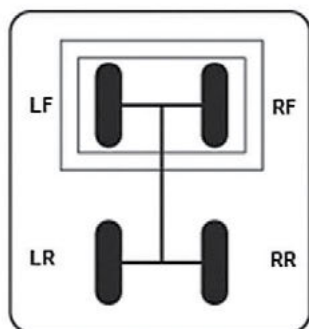


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Monitor the Peak Resonance Frequency Value of the Two Front Tires



Peak Resonance Drops as Tire Pressure Drops

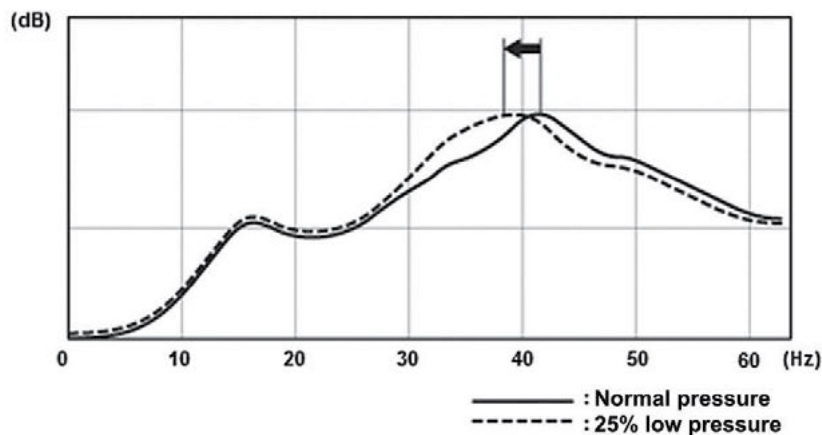


Figure 3: This graph displays a comparison of peak tire resonance between a tire pressurized to specification and one that is 25 percent lower.

Peak tire resonance is basically the frequency that each tire is putting out and it is being measured by spectrum analysis of the wheel speed sensor data. To explain how this is calculated let's look at an excerpt from Honda's OE service info: "Peak resonance values are learned during calibration and become the reference values for pressure monitoring. When using the frequency resonance method, the TPMS module compares the peak resonance values between all four tires and the two front tires. If the present values have dropped below a 25 percent pressure threshold, the low tire pressure/TPMS indicator turns ON. Resonance frequency is corrected based on the outside air temperature sensor information, because resonance frequency is changed by the outside air temperature."

To better understand this relationship, look at Figure 3.

Because of this, they can tell if just one or all four tires are low as long as the system is calibrated properly. With these systems you **MUST** read service information and perform the calibration exactly as written. In one document published by Honda they state that the system could enter calibration on a new car when the pre-delivery service is performed, if the tires were not set to the correct pressure, then the vehicle will learn the pressures

at say 65 psi instead of at the tire placard pressure. Honda says to perform calibration, the tires must be set to the tire placard pressure only and the calibration should be performed any time the tire pressure is adjusted, or the tires are rotated or replaced. The tires must also be the correct size, same make/model on all four corners, and tread depth must also match (there is no tread depth spec difference given but it states tires must not be different tread depths).

Now, let's look at diagnosing these systems. If the vehicle has a fault, first we need to look at the tire pressures, tire sizes, and tread depths. A variation in tread depth could potentially be a problem. Documenting things like this during routine service is a good idea as a CYA procedure as well. I use the Autel TBE200 and ITS600 to document this information for the customer.

After tires are checked, we need to make sure that the ambient temperature sensor is reading correctly and make sure there are no ABS or VSC system faults. To do this we would use a tool like the Autel MS909 to complete a system scan of all the modules. Then we would find the ambient sensor PID in live data. If the vehicle has an outside temperature read out that can be used as well to verify. After this it's a good idea to take the

vehicle for a short drive and graph the wheel speed sensors to verify they are reading correctly. In the Autel MS909 you would go into the ABS module, select all 4-wheel speed sensors, and then select the graph merge option to look at all the sensors together on one graph. I prefer graphing data in comparison to looking at numerical data because if there is a drop out, it's easier to catch.

Sometimes the factory scan tools offer faster refresh rate and better graphing so if you have access to those tools then that is the best option for graphing data. Through the research I did for this article (thanks to my good friend Chris Roberds) I was also alerted to a problem where a steering angle fault can turn on the low tire light. If the steering angle is off more than two degrees while driving straight, the tire light may turn on. According to several SAE documents and patents on indirect TPMS, these systems can measure steering torque and decide if a tire is low. The documents explain this in detail, but the manufacturers are vague about what methods are being used. Knowing that the Honda system will turn on the low tire light when steering angle is off, one can only assume the steering torque measurement might be used. A change in steering angle calibration could happen from a brush with a



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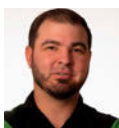
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curb or maybe the steering angle reset was not carried out after an alignment.

When it comes to servicing these systems always replace all the tires at the same time, always use the OE size, always fill to the tire placard spec, and always perform the steering angle and TPMS calibrations when instructed by service information. ❌



TANNER BRANDT is an industry-leading diagnostics specialist and the CEO of Autodiag Clinic. By trade, he is an automotive diagnostic technician and technical trainer. Brandt has spent his career focused on researching automotive systems and strives to diagnose problems efficiently and accurately. When he isn't working on vehicles he is finding ways to pass along his knowledge and expertise to others through training and consulting. Brandt works with various companies throughout the automotive industry on solving problems, beta testing diagnostic equipment, and helping companies break into the automotive industry.

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Moving from **R-134a** to **R-1234yf**

More and more independent shops are beginning to see R-1234yf systems in for service or repair. It's important to examine a variety of factors when choosing a dedicated or dual usage machine.

By Christopher Groff, Contributing Editor



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Warmer months are fast approaching, bringing with them a myriad of air conditioning services and repair opportunities. Early usage of R-134a began in 1992, with full-scale adoption by the 1995 model year. Shops, technicians, and customers have had over 25 years of experience with this refrigerant. As with all things, though, changes come, and the industry has been transitioning over to R-1234yf. More shops are beginning to see these new refrigerant systems coming through their bays and realizing that they may not be adequately trained or equipped to evaluate and service them

properly. Let's start with a quick primer on the main differences and then delve into equipment selection and an examination of best practices to ensure you can provide the best service to your customers.

R-1234yf and R-134a systems are very similar, though one needs to consider slight design differences when servicing, diagnosing, and repairing systems. R-1234yf has a reduced cooling capacity compared to R-134a systems, generally between five percent to 25 percent lower. Combining this reduced cooling ability with more minor charges in a system means less leeway when it comes to system health. Small leaks, dirty condensers, or evaporators will reduce cooling and lead to



▲ Figure 1 - Chrysler IHX. Note how the design combines the liquid and suction (vapor) lines.

customer complaints much sooner than a conventional R-134a system. This leads to more service opportunities and dictates a new level of system analysis to ensure a proper first-time repair.

The significant difference in an R-1234yf system is the addition of a component known as an inline heat exchanger (IHX). The heat exchanger is located within the accumulator within most orifice tube systems. Expansion valve systems generally bundle the IHX into a separate part which is easily identifiable due to the dual inlet and outlet fittings on each end. The heat exchanger is simply two tubes, so replacement is not needed during regular service or repair unless there has been some damage.

The IHX operates under the same principles as any other heat exchanger, such as a radiator or intercooler. Liquid refrigerant leaves the condenser; it passes through the inside chamber of this exchanger, while the cooler refrigerant gas flows out of the evaporator and through the outer chamber of the IHX on its way to the compressor (Figure 1). This creates a sub-cooling effect and helps counteract the reduced cooling capacity of R-1234yf.

CHOOSING A RECOVERY/RECYCLING/RECHARGING SYSTEM

Now that we have a solid knowledge base to work from let's start with the machine. There are a few options for machines beginning with the overall unit design. There are both single units and combination units. Single units are generally available at a lower price point and have a smaller footprint, ideal for shops where storage and working space are at a premium. The combination units are essentially two machines in one, allowing

for the service of R-134a or R-1234yf on a single platform at a substantially higher price. The downside to utilizing a combination machine is the length of time to switch from one refrigerant to another, the process usually taking between 10-15 minutes depending on the machine purchased.

The newest machines, at least those that are SAE J2843 compliant, operate a bit differently than the standard R-134a machines of the past and require more time and patience when performing a service. The significant points are:

- Specialized couplers and fittings for R-1234yf.
- The internal filter drier will need to be replaced after recovering 150 lbs of refrigerant; otherwise, the machine will prevent further operation until filter replacement.

- The unit must have an internal refrigerant identifier or a USB port to connect a separate unit.

- It will not allow recovery of contaminated refrigerant.

- It will not recharge the system if it detects a leak.

The machines are essentially fully automatic, with a few caveats referenced above. The first is contaminated refrigerant. The machine begins recovery by performing a refrigerant identification. Suppose the contents of the system are less than 98 percent pure R-1234yf. In that case, a separate recovery tank/machine will need to be connected to the designated service port on your machine to continue the evacuation of the system. This is an essential requirement to consider when purchasing a machine, as there will be additional costs.

TOOLS USED:

- SNAP-ON VERUS EDGE
- SNAP-ON POLARTEK DUAL MACHINE, NO. EEAC334B
- POWER PROBE DUAL ZONE DIGITAL WIRELESS THERMOMETER, NO. TEMPKIT
- SNAP-ON REFRIGERANT LEAK DETECTOR, NO. ACT900
- MASTERCOOL 50W/12V UV LIGHT, NO. 53312
- MILWAUKEE TOOL M12 THERMAL IMAGER, NO. 2260-21
- NU-CALGON EVAP FOAM NO RINSE CLEANER, NO. 4171-75



▲ Figure 2 - Snap-on PolarTek EEAC334B dual machine.



▲ Figure 3 - Leaking condenser. Small leak at tank to core.



▲ Figure 4 - L Foaming evaporator/condenser coil cleaner.

The second significant difference is that the machines will not charge a system if it fails a vacuum decay leak test. When preparing to charge the system, the machine pulls a vacuum and monitors vacuum decay, the presence of which indicates a leak. If no leak is detected, the machine performs a partial system charge. A series of prompts then guide the tech through an evaporator leak test. The test begins by turning the blower on low with only the floor vents selected. The leak detector probe is then inserted into the center floor duct as far as possible. If no leak is found, the tech hits the appropriate button and will be asked if an auxiliary evaporator is present; if so, an additional leak test is performed. Once all leak tests are passed, the machine performs a full system charge and prints a slip indicating the amount of refrigerant recovered and charged.

CASE STUDY: GRADUAL LOSS OF A/C

Each shop will experience different types of A/C complaints and failures depending on their customer demographic and geographic location. Shops located in hot climates will be performing service year-round and likely see higher failure rates of specific components or systems due to the high-stress environment they operate in, while more northern shops may experience service of systems that are ignored for all but the hottest few months of the year. I would categorize system leaks as the primary repair, followed by compressor failures in my corner of the country.

This Silverado came in after frustration at needing refrigerant recharges yearly, sometimes more often. Based on the complaint and the previous work described by the customer, it was clear

that we were likely looking for a leak. A complete system scan was performed using a Snap-on Versus Edge while monitoring vent temperatures in park with the Power Probe Dual Zone Digital Wireless Thermometer. This gives the tech a chance to feel the system's cooling capabilities in a relatively static environment, which can then be compared to operation on the road. No DTCs were found, and temperature sensor readings corresponded with a lack of cooling ability.

A glance at the data PID for the pressure sensor on the high side hose indicated a pressure of 150 psi, about 100 psi lower than expected at a 90 degrees F ambient temperature. This further confirmed an undercharged system. Now that I had enough data, our Snap-on EEAC334B recovery/recycle machine (Figure 2) was hooked up, and recovery began. The system was found to be approximately 0.60 lbs undercharged. Before recharging, a vacuum test was performed and passed. The system was recharged with R-134a containing UV dye. The Actron 900 refrigerant sniffer was used to attempt to pinpoint a leak location quickly, but no precise results were achieved.

After approximately an hour of running, the system was checked thoroughly with a Mastercool UV light, and the leak was located in the condenser (Figure 3). The sniffer was then placed in the location but showed no signs of leakage. This truck was a perfect example of a leak small enough to be hard to detect but large enough to cause a severe drop in A/C performance. It was a quick and straightforward diagnosis that proves no one test fits all when it comes to leaks, and as such, a passed vacuum test or sniffer failing to pick up a leak doesn't guarantee that a leak isn't present.

SCROLL COMPRESSOR

One of my favorite things to do when teaching is to use examples of how a solid understanding of the basics empowers a technician to handle almost any job that comes their way. This short case study focuses on our shop's scroll compressor, which was too hot to continue working. This wouldn't be unusual as it is located in a sea box behind the shop, but I installed a box fan to remedy that particular situation. It was remarkable to shut down on high head pressure on a 14 degrees F day. Not one who especially enjoys cold weather and having a shop full of techs waiting on air pressure to continue working, a quick diagnosis needed to be reached.

A quick examination of the compressor and some rudimentary temperature checks using my hand to determine "hot" or "not" showed that my discharge line was quite hot, and the outlet of the intercooler was excessively hot as well. I grabbed my Milwaukee Tool thermal imager to verify my quick test as well as to prove that there was less than 10 degrees F of temperature differential across the exchanger. This pointed to a lack of cooling through the heat exchanger. I grabbed a can of EVAP Foam evaporator core cleaner (one of the tricks I picked up during my short time in commercial HVAC repair), immediately dropped the discharge temperature to an acceptable level, and all was right with the world as the shop continued with its work (Figure 4).

What does this have to do with automotive A/C systems? Well, a heat exchanger is a heat exchanger, be it an evaporator, condenser, IHX, or air-to-air cooler. By understanding base principles, we can pinpoint the effects of a clogged exchanger in a car, truck, dozer, or air compressor.

Automotive technology and systems are constantly changing, and we need to learn and adapt to stay at the top of our game. This entails investment in proper tooling and education. Once we make those investments, we can consistently perform at a high level. This leads to improved mastery of our trade and satisfied customers. That seems like a pretty good motivation to continue investing in ourselves as technological and system advancements require knowledgeable and dedicated technicians to keep them in peak operating condition. ❌



CHRIS GROFF is a technician with Lykon Automotive in Pennsylvania and runs the Science of Diagnostics channel on YouTube. Groff began in the industry 15 years ago with an independent repair shop before attending the Pennsylvania College Of Technology for Caterpillar diesel. After working with heavy duty trucks and John Deere equipment, he was drawn back to the automotive repair segment by ADAS and the continued advancement of technology.
cgroff@scienceofdiagnostics.com

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AIRCAT 115 Degree Angle Die Grinder

Reviewed by John Baumgardt III, owner/operator at Baumgardt's Auto Repair in Fillmore, Indiana.

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

A: The angle of this grinder helped me get into areas that a straight or a 90 degree die grinder wouldn't. It has tons of power and is pretty quiet as well.

Q: What types of jobs did you use this tool for?

A: I used it to cut loose a few small welds at the firewall up under the dash of a drag car, various other cutting and grinding on a log-splitter project I'm trying to get finished up before it gets too cold, and cleaning up some rusty engine parts for a head gasket job. Oh, and chopping the exhaust off an old Chevy truck to get it ready for some new dual pipes.

Q: What kind of setup was involved before using the product?

A: Screw on an air fitting, a few drops of oil and a couple squeezes of grease into the side of the head and it was ready for a 1/4" accessory.

PRODUCT DESCRIPTION

The AIRCAT 115 Degree Angle Die Grinder, No. 6295, features a .6hp motor and the company's silencing technology. The rotational rear exhaust with internal silencing reduces noise level to 87 dBA. In addition, the tool has a conveniently located spindle lock to provide quick and easy accessory changes as well as a speed control switch at the top of the tool for added control. The 6295 offers 18,000 rpm and a standard 1/4" Erickson-style collet. It weighs 1.65 lbs and measures 7.8" in length. The tool is ideal for working in tight or challenging spaces. **»»93**

Q: How easy was it to use?

A: It was simple to use. The flapper trigger had a safety feature that I would normally remove but this one actually worked well and I could easily release it as I was ready for the power. You can rotate a collar at the base and adjust where the exhaust blows out instead of just blowing straight back along your hose. It has tons of power if you're using it for a grinder or cutoff tool, but you might want to choke it down just a bit if you're doing any resurfacing. You can control the speed with the trigger but this cat likes to run. The composite body is great. I ran this thing full blast for 15 minutes and my hand didn't get cold like it does after just a few minutes with my others.

Q: How was its packaging? Did it come with any accessories?

A: I opened the glossy black and red box and found the grinder nestled in its own black AIRCAT cloth pouch. It came with the wrench (only needs one) to change out the accessories, pocket guide to wet your appetite for your next AIRCAT purchase after you try this baby out, manual packet, and a thank you card welcoming you to AIRCAT ownership (which I personally think is pretty cool).

Q: Was there a manual included?

A: Yes, the manual was easy to read and understand. It also came warranty registration card, tips to keep you cat purring, and a list of factory authorized service centers for parts or repair.

Q: What features did you like?

A: I like being able to control where the exhaust is going. I really like the button that locks the head so you only need one wrench to change out the accessory, because using two wrenches and trying to hold the tool is a



pain. The composite body letting by hand stay warm is pretty darn cool too.

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

A: This tool is great. Outside of it being bidirectional I can't think of anything to make it better.


Q: Have you used a previous version of this tool?

A: This is the first 115 degree grinder I've used, but the one wrench and the composite body are definitely an improvement over any of my others. I'm definitely interested in replacing my others with AIRCATs.

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

A: Being able to get into that awkward spot saved time and that means being able to move on to the next project faster.

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

A: I give it a nine. It was a great tool. Lightweight composite body, adjustable exhaust deflector, quiet. Button locking head allowing one tool accessory changes. It would be great if it was bi-directional to be able to better control the debris. 



JOHN BAUMGARDT III is the owner/operator of Baumgardt's Auto Repair in Fillmore, Indiana. He has been a professional auto tech for about 20 years. He attended the two-year Auto

Mechanics program at Lancaster Vocational High School. Previously, Baumgardt worked at AAMCO Transmissions and earned about a dozen AAMCO certificates. He believes it's important to provide an honest, quality service that people can depend on.

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



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ESAB Rogue ET 200iP Pro

Reviewed by Mike Robinson, technician/welder
at MAS in Lansing, Michigan.

Q: How did the tool save you time?

A: The welder is very quick to setup and saves previous setup settings to get you back to welding quickly. It's also a dual voltage machine, meaning no matter where you go you can complete the job, saving time not looking for a certain plug-in to connect to. It can also run off a generator.

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

A: The tool's time savings on setup and ease of portability allows you to go out in the field quickly and have no worries about running back and forth for other equipment. It saves many man hours of wasted time. Whether you need to TIG weld stainless pipe or do some stick welding, this machine has it covered with plenty of power.

PRODUCT DESCRIPTION

The ESAB Rogue ET 200iP Pro is a high frequency start TIG machine. The easy-to-use welder is designed with a durable housing that is IP23S rated. Weighing only 21.2 lbs, the welder features an ergonomic handle, carrying strap and long extension cables for portability. In addition to offering ideal arc characteristics in TIG and Stick mode, it provides several TIG parameters that can be easily adjusted including gas pre flow, start current, ramp up time, ramp down time, finish current, and post flow. It also offers a pulse feature with background current control and frequency adjustments up to 500 Hz for better heat input control. ➤94

Q: How easy was it to use?

A: The welder is very easy to use if you have welded before. Setup is super simple and adjusting the settings to what is needed is also very simple using the digital display.

Q: How was its packaging? Did it come with any accessories?

A: It came well packaged and with just about everything you need to start welding. It came with a very nice flexible TIG torch and some tungsten and cups to get you started. You will need a bottle of Argon, but the welder does come with a nice regulator and hose for the gas. The TIG torch has the controls on it, so the foot control is not necessary to start welding, but a foot control can be purchased separately. Best part is that any accessory you may want is easy to find, although you won't need many as this is a well-equipped bundle.

As far as the stick welding goes, it came with a nice stinger that is really hard to beat for an included accessory. Honestly, some of the nicest accessories I have ever seen are included with this welder. All the accessories are rated to the maximum output of this welder at 200A. It also came with the 120V/230V power adaptor which is a nice addition when 230V may not be available.

Q: Was there a manual included?

A: Yes, a manual was included. It was very easy to understand and comes in multiple languages. It goes over all the settings and how to adjust the welder, for example hot start and arc force which can be handy on thicker material.

Q: What features did you like?

A: The adjustments and its digital easy-to-read display were among my favorites. One



thing that really puts this above other similar units is its compact size. It's very easy to transport. It also has a quality fan for keeping it cool. I have never tripped the over temp safety on the unit thanks to the fan. When you weld with this machine you can tell it's a quality machine. Arc is very stable. High frequency start is also a huge benefit, and it offers lift TIG start.

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

A: Not much I would change on this machine as it works very well for multiple job applications. For welding steel and stainless steel, the unit is very budget friendly.

Q: Have you used a previous version of this tool?

A: I have used similar machines, but they all weighed more and had a bigger footprint than this machine. With the pulse capabilities using TIG mode, you can set your pulse settings through a wide range for ultimate control. Not many other machines offer something of this caliber in such a small lightweight package. ✖



MIKE ROBINSON is a Master Certified Technician with ASE, State of Michigan, and services vehicles all across Michigan. Robinson has been an automotive technician for over 23 years. He was also a professional welder and fabricator and has a passion for metalwork. Robinson is a member of Trained by Techs and fully believes in continuous training.

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

Lock Technology Shockit Socket O2 Sensor Removal Kit

Reviewed by Stephanie Stanke, owner of Wooster's Garage in Weston, Wisconsin.

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

A: The tool made applying force to loosen the oxygen sensor much easier to accomplish without spending too much time or effort or rounding off the nut.

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

A: The tool saved the cost of using an oxy/acetylene torch, the extra cost of time/labor to pay the technician, and finally the tool kit comes with a thread repair accessory that can repair the threads instead of replacing the part when thread damage occurs.

Q: What types of jobs did you use this tool for?

A: We use this tool for any time an oxygen sensor looks like it may be seized into place. Also, there are some vehicles that have extremely limited access to use a wrench on the oxygen sensor and the long punch helps reach.

Q: What kind of setup was involved before using the product?

A: The setup for this tool is very minimal. The tech just needs to insert the punch into the air hammer, install the socket onto the oxygen



sensor, place the punch tip into divots on the socket, and pull the air hammer trigger.

Q: How easy was it to use?

A: The tool is very simple to use.

Q: How was its packaging? Did it come with any accessories?

A: The main tool kit is compact, so the tool fits nicely into my toolbox drawer. The additional accessories that can be purchased separately from the tool kit are a significantly longer punch and a shorter punch. The longer punch is definitely a must-have along with the tool kit. The longer punch helps in quite a few cases.

Q: Was there a manual included?

A: A manual was included with the tool kit. The manual is limited with wording on step-

by-step instructions, but this tool is quite simple to use without instructions. There are a couple pictures of the socket installed and the punch in place as a demonstration to refer to.

Q: What features did you like?

A: The best feature is probably the reason the tool was made. Many oxygen sensors in our region (Wisconsin) are very rusted and can sometimes be near impossible to remove, but with this tool, the sensors break free more often and easier than when using a simple wrench. Also, the punches are made to lock into the air hammer so the punch doesn't twist while in use.

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

A: At this time, I cannot think of any improvements to an already great idea of a tool. I would recommend every shop have it onhand for when the time comes that it is needed. ✕

PRODUCT DESCRIPTION

The Lock Technology Shockit Socket O2 Sensor Removal Kit, No. LT994, is designed to easily remove O2 sensors when ratchets, wrenches, and sockets don't fit. Use air hammer power to access, loosen, and remove frozen and obstructed O2 sensors. The kit features a low-profile design for limited access and a long profile design for deep recessed Ford, Toyota, and Lexus applications. The kit also removes NOx sensors on Kenworth, Cummins, International, Detroit, and Volvo diesel truck engines. It has a non-slip, self-centering air hammer angled punch for limited access applications. Additionally, it has a 18mm dual sided tap/bottoming die for O2 sensor and mounting hole threads and dual ear socket design for 90 degree rotation without repositioning the socket. »125



STEPHANIE STANKE is the owner and operator of Wooster's Garage in Weston, Wisconsin. The garage focuses not only on automotive repair and service but also on educating consumers on their basic vehicle needs so they feel confident in making necessary decisions for their vehicles. Wooster's Garage opened shop during the 1920s, and Stanke is carrying on a fifth-generation family business legacy as its current owner.

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



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Hunter Engineering ADASLink

Reviewed by Scott Brown, owner/technician
at Connie & Dick's Auto Service Center Inc.
in Claremont, California.

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

A: This is a new product to address wheel alignment and ADAS calibration requirements. The tool coupled with the latest Hunter Engineering Hawkeye Elite wheel alignment system does a remarkable job of not only handing off the ADAS calibration procedure to the scan tool/ADAS calibration equipment but also produces a comprehensive report that documents what was done to the vehicle and why.

Q: How easy was it to use?

A: Once the alignment machine is properly tied to the ADASLink tablet, all you need to do is follow the instructions provided, but you still need to have access to service information systems so you can carry out specific procedures called out within the workflow by the ADASLink.

Q: How was its packaging? Did it come with any accessories?

A: The tablet is the Bosch ADS625x coupled with a wireless VCI. It comes with a nice



docking station that hosts and charges the tablet and VCI.

Q: What features did you like?

A: I love the fact that the Hunter alignment machine sends a procedures requirement list to the ADAS link tool, and when the tech hits the "Requested Procedures List" on the ADASLink, it provides a list of vehicles to connect to in order to carry out the ADAS calibration procedures. Once that's done, the Hunter Aligner automatically couples the alignment report with the ADAS calibration documentation and the DTC pre-post scan report. Additionally, we use Shop-Ware shop management software and when you have the VCI tied to your system, pre- and post-scan information flow right into the notes section of the repair order automatically. This is a very cool time-saving feature, especially because we perform a full health scan check on pretty much every vehicle that comes into the shop.

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

A: While in certain modes within the scan tool, I found a screenshot button to be very helpful so that I can help train fellow technicians, but some screens don't have that screenshot button. Also, on the calibration success screen, it would be nice to have the time, date, and VIN so that any screenshots taken could carry better context.

Q: What types of jobs did you use this tool for?

A: We used this on a 2021 Toyota Highlander

Hybrid to perform the radar and windshield camera dynamic calibration. Once the alignment was complete, we road-tested the vehicle as instructed by the tool and carried out the dynamic calibration. Once we returned to the shop, we performed the post-scan and after the results were uploaded, the wheel alignment machine was ready to produce the report.

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

A: I give it a 9.5. This tool coupled with a compatible Hunter Alignment machine and the DAS3000 ADAS calibration station should be able to properly calibrate most ADAS systems found in the market. For cases where a dynamic is only required, the tablet can ride along with the technician which will provide instructions and feedback during the drive. Since this is a software-driven tool, I trust that it will improve with time making the tool even more intuitive. ✖



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 founded Diagnostic Network after 22 years of service at iATN, where he retired as company president in 2018.

PRODUCT DESCRIPTION

The ADASLink Diagnostic Scan Tool from Hunter Engineering is designed to help technicians setup and calibrate ADAS quickly. The 10" full scan tool is powered by Bosch and is not limited only to ADAS. It is pre- and post-scan ready and FCA secure gateway compatible. Additionally, dynamic (driving) ADAS calibration coverage is included while static (fixture) ADAS calibration is available with DAS 3000. It's for use in any bay, with or without Hunter aligner.

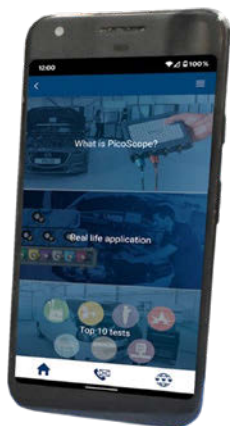
»95

*Note: This product was loaned to the reviewer free of charge for the purpose of conducting this review.

CATEGORY SPOTLIGHT

SCAN TOOLS

Many techs agree diagnostics is the best part of the job. Using the right scan tool is a necessity but how do you know which one to buy? It's a huge investment, so take the time to analyze the features, subscription costs, and available customer support, and make the right purchase for your shop. Plus, new technologies are always emerging with scan tools, so we've rounded up a few recent innovations on the following pages. Now start scanning!



OFFERS TIPS ON HOW TO USE PICO SCOPE

The PicoScope Automotive App from Pico Technology is designed to provide new users everything they need to understand PicoScope no matter the level of their diagnostic experience. The app allows users to learn about the different kits available, the use of their top ten guided tests, and tips on how to use PicoScope. Other key features include how to get started with PicoScope, waveform analysis, popular case studies, training videos, and real-life workshop applications. **»124**



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USERS ARE ABLE TO UPDATE THE SOFTWARE AND ADD LICENSES

The **TEXA USA AXONE NEMO 2 Truck** features a 12" capacitive screen protected by Gorilla Glass, making it visible in bright sunlight. Its Windows 10 Enterprise operating system is powered by an Intel Pentium quad-core N5000 processor with 8GB DDR4 RAM and 250GB SSD storage. It's Wi-Fi and Bluetooth enabled and has two cameras, useful to create detailed customer reports and to take pictures. The AXONE NEMO 2 is



engineered to military standards, making it resistant to impacts and falls. It offers coverage including: live data, DTC codes with descriptions, troubleshooting, wiring diagrams and repair procedures, interactive bidirectional,

advanced resets, injector coding, ADAS calibrations, and more. Users are able to update the software and add licenses. **»96**

COMPATIBLE WITH MANY LIGHT, MEDIUM, AND HEAVY DUTY VEHICLES

The **Autel MaxiSYS MS909CV Commercial Vehicle Diagnostics Tablet** is compatible with more than 80 models of light, medium, and heavy duty vehicles. With a 9.7" wireless, Android-based touchscreen, it performs extensive diagnostics, including the ability to read/erase codes, view and graph live data, and perform active tests. The tablet includes a Bluetooth-enabled VCI/J2534 Pass-Thru programmer, MaxiBAS B200 battery starting/charging system test device, and a multimeter. The tablet also includes ADAS calibration software for Class 3 to 5 vehicles and Class 6 to 8 vehicles with dynamically calibrated systems. The MS909CV includes one year of free software updates. **»97**





FOR MOTORCYCLES AND RECREATIONAL VEHICLES

The **MOTO Pro Scan Tool** from **CanDo** is a comprehensive, full-functionality scan tool for motorcycles and recreational vehicles. With today's modern motorcycles having computer systems controlling not only the engine, but brakes, transmissions and much more, it's now imperative to have a scan tool that can access these systems and make diagnostics and repair much faster, the company says. The MOTO Pro covers all major manufacturers from Europe, Asia, and North America. Personal watercraft is also covered, as are recreational vehicles, such as ATVs and Side-by-Sides. **>>98**



FCA SECURE GATEWAY COMPATIBLE

The **ADASLink Diagnostic Scan Tool** from **Hunter Engineering** is designed to help technicians set up and calibrate ADAS quickly. The 10" full scan tool is powered by Bosch and is not limited only to ADAS. It is pre- and post-scan ready and FCA secure gateway compatible. Additionally, dynamic (driving) ADAS calibration coverage is included, while static (fixture) ADAS calibration is available with DAS 3000. It's for use in any bay, with or without a Hunter aligner. **>>100**



ALLOWS USERS TO EVALUATE PERFORMANCE WITH COMPARATIVE DATA

The **Snap-on TRITON-D10** scan and scope tool is ideal for shop owners and general technicians that need scope functionality, intuitive diagnostic testing, and system verification from a single source for more all-around certainty, even on complex repairs. TRITON-D10 allows users to dig deep into vehicle systems and evaluates performance with comparative data, and Snap-on's Fast-Track Intelligent Diagnostics helps to streamline the diagnostic process. In addition, the tool features rugged hardware designed specifically for the shop, fast two second boot-up, and a 10" capacitive touchscreen display. **>>99**



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CATEGORY SPOTLIGHT

Scan Tools



INCLUDES ACCESS TO INNOVA'S KNOWLEDGE BASE

The **Innova 5610 CarScan Pro** is a scan tool designed to help technicians find and fix problems more efficiently. More than a stand-alone tool, it includes access to Innova's RepairSolutions2 knowledge base of over 60 million verified fixes. With 5610, users receive vehicle-specific inspection reports with fixes, guided diagnostics, and troubleshooting information.

Advanced features include oil life, brake pad life, battery voltage, TPMS status, and live data. Fixes for body and chassis codes and full network scan results are available for supported vehicles. Factory and NHTSA recalls, TSBs, service maintenance, and predictive diagnostics help shops alert customers of potential issues.

» 102

DISPLAYS FULL TROUBLE CODE DEFINITIONS

The **Electronic Specialties Code Buddy Pro+**, No. 904, is a code scanner that pulls/erases trouble codes and displays the live data stream. It reads hard, pending, and historic codes, and full trouble code definitions are displayed for easy identification. Other capabilities include I/M readiness, which can be used for emissions pre-tests and other emissions-related repairs. Also features the ability to retrieve vehicle VIN, CIN, and CVN numbers. The Code Buddy is small and portable. For a repair shop, it can be deployed to quickly pull trouble codes before deploying the shop's full capability scanner. » 103



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FEATURES 28 MAINTENANCE RESETS

The **Thinkcar Platinum S20** features a large 13.3" screen, OEM full system diagnostics, 28 maintenance resets, and bidirectional functionality. Upgrades from the Platinum S10 include passenger car plus heavy duty coverage, quad-core processor, 256GB memory, magnesium alloy exterior, web browser, email, and square point of sale app. The included oscilloscope, TPMS communicator, video scope, and EZ Battery tester combined with ADAS support make the S20 a versatile tool. » 104

CUSTOMER REVIEW:

“ This new auto diagnostics tool is beyond my expectations. It is fast, well put together, and has all the tools I need to provide top notch service. ”

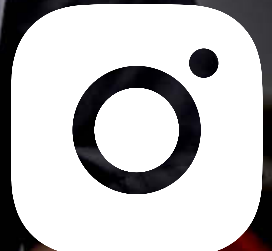


OFFERS ADAS COVERAGE FOR 2022 VEHICLES

The **Bosch ADS 4.15 and 4.16 Software Update** offers coverage for 2022 vehicles for domestic and foreign brands including GMC, Nissan, and Hyundai. It also includes more content for all 2021 Mercedes models and additional ECU applications for 2021 Fords. The update is for the ADS 325 (3925), ADS 525X (3945), 625 (3970), and 625X (3975). Additionally, the latest ADS software version supports all camera, radar and surround-view systems for all vehicles Bosch covers as well as offers new pre- and post-scan reporting capabilities. Bosch ADS users with a current subscription can install the updates after automatically receiving the download. » 105

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CATEGORY SPOTLIGHT

Scan Tools



JALTEST SOFTWARE 22.1 UPDATE

The **Cojali Jaltest Software 22.1** Update includes 28 new brands, 809 new models, and 4,179 new systems. New troubleshooting guides (now SMART guides) of the most common error codes have been added which are available in the module

of troubleshooting guides by symptom and associated with diagnostics errors. Other notable features include a quick system scan, new functionalities to improve the user experience as well as new images of component, technical data, and location have been added. The 22.1 update also includes 3,106 new systems with technical information and 793 new systems with wiring diagrams. **» 106**



SUPPORTS J2534 INTERFACE STANDARDS

iSCAN SF Scan Tool from **Autoland Scientech** is designed to bring big power to a shop in a small format (SF). The iSCAN SF comes in two different configurations. The iSCAN SF Euro kit's integrated diagnostic software covers European and supercar while the iSCAN SF Full kit's integrated diagnostic software covers domestic, Asian, European, supercar, and medium duty truck. The iSCAN SF offers advanced bidirectional controls, coding, programming, integrated J2534, and Support On Demand (SOD).

» 107



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The **TOPDON Phoenix Smart Diagnostic Tool** performs online programming and coding as well as allows users to access other vehicle modifications for Volkswagen, BMW, Porsche, Toyota, and more. It supports five different protocols, provides access to the FCA Secure Gateway, and features topology mapping. Its modular diagnostics and communication interface consists of a rugged, heavy-duty VCI dongle equipped with J2534, DoIP, CanFD, D-PDU, and RP1210 protocols. Its interface also includes step-by-step guided procedures based on code for Volkswagen, Audi, Skoda, and Seat vehicles. The Phoenix Smart provides a comprehensive database of over 200 vehicle models, intelligent diagnoses, and a wide array of maintenance functions. **» 109**



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CATEGORY SPOTLIGHT



Scan Tools

INCLUDES ENHANCED 21MY COVERAGE

The **AutoEnginuity Giotto Version 19.2** for the Windows platform improves the enhanced 21MY coverage as well as improves enhanced BMW, Land Rover, Porsche, and VAG system tests. For BMW and GM, highlights include added CBS for 21MY vehicles. For Chrysler, 21MY enhanced support has been finalized and ADAS for long range radar sensor module radar learning has been added. For Nissan/Infiniti, QX55 22MY model support has been added. For Land Rover, 18MY+ ABS system tests, power steering soft-lock ends stops reset system test, seat occupancy reset system test, and IMPA camera calibration system test have been added. Version 19.2 includes additional improvements for Porsche and VAG. **» 110**



TECH TIP: Use a scan tool for vehicle maintenance

Over the last decade or so, I've encouraged all of you to give your customers the full benefit of your training and experience. I've repeatedly explained the need to perform a thorough visual inspection and how important it is to advise your customer of anything you find that requires attention. Not just for the added business - that's secondary. The main reason for doing so is a matter of ethics, doing what is right for your customer, and giving them the full benefit of your training and expertise. Today, that need goes beyond the visual.

We, too, should incorporate a full-system scan in our normal inspection process, similar to our collision cousins. Doing so allows us to keep the customer informed and to help them make good decisions regarding their vehicle's upkeep. Performing a full system scan requires a scan tool with enhanced, that is OE specific, software and it takes very little time. The report can be downloaded and shared with the consumer in person, by email or by text message. Be sure to keep a copy for your customer records!

- Pete Meier, Contributing Editor

STEEL VISION

Stepped Tip Drill Bit Sets

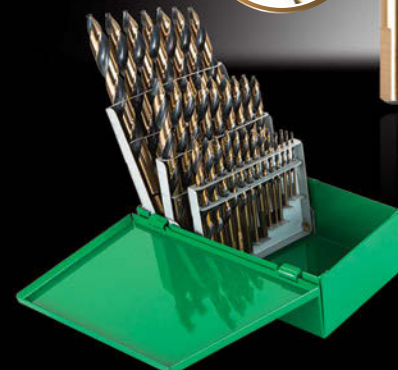
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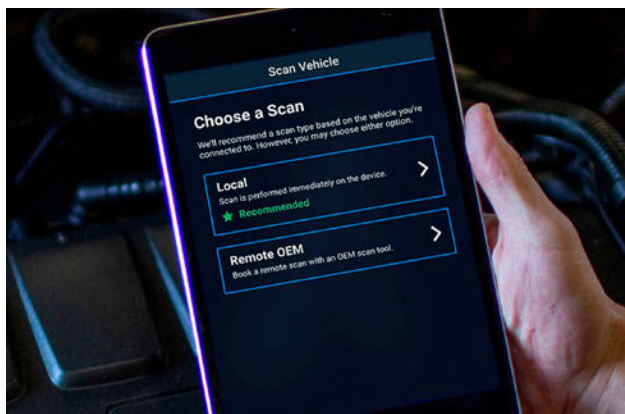
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CATEGORY SPOTLIGHT

Scan Tools



AN ALL-IN-ONE SOLUTION FOR SCANNING, DIAGNOSTICS, AND CALIBRATIONS

The **asTech Duo** is designed to be an all-in-one solution for scanning, diagnostics, and calibrations, simplifying vehicle repair for professionals in the automotive collision, mechanical, and dealership sectors. Users have access to both remote OEM scans and local OEM-compatible scans, all within the same asTech device.

» 112

INCLUDES A FOUR-CHANNEL OSCILLOSCOPE AND BATTERY ANALYZER

The **Matco Tools Maximus 4.0 Scan Tool** features a 13.3" screen, FCA security gateway access, CAN FD, battery analyzer, four-channel scope, carline software, and MaxFix. The included Bluetooth battery tester enables technicians to identify battery system issues quickly. Technicians can also receive Tech 2 Tech Remote diagnosis with the ability to consult and collaborate with expert technicians remotely for information sharing and identifying complex issues and repairs. » 114



CUSTOMER REVIEW:

“ The 4.0 has been a great addition to my shop. The scope has been awesome, the battery tester works great, updates are fast, ID's vehicles quickly, no complaints here. ”

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FEATURES BUILT-IN VOLTAGE MONITORING

The **ET9200 Series Scan Tools** from **Mac Tools** features three wireless tools to fit virtually any job and skill level. The ET9200PRO, ADVANCED, and ELITE scan tools are designed by technicians, for technicians. Asian, domestic and European diagnostic coverage is standard on all three models, in addition to AutoID, Wi-Fi access, Bluetooth connectivity, built-in voltage monitoring, front and rear cameras, and a limited lifetime warranty. The tools are optimized with a lightweight design, extended battery life, and enhanced processor. The quick-connect VCI provides a complete wireless experience, utilizing the new "hot" button navigation for quick access to critical functions. The Google Play store is also available, where users can add accessories such as the Bluetooth battery tester, video scope, and chassis ear. » 115



FOR MORE INFORMATION ON THESE PRODUCTS,
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CATEGORY SPOTLIGHT



Scan Tools

IDEAL FOR THE COLLISION REPAIR INDUSTRY

Opus IVS DriveSafe + IVSTrio is a diagnostic tool ideal for the collision repair industry. IVSTrio includes QuickScan, an aftermarket vehicle scan that delivers results in two to four minutes; True-OE, authentic OE scans and OE scan reports run by Opus IVS expert technicians using OEM-licensed software; and IVSRepair, a full aftermarket multi-brand diagnostic software with live data, bidirectional controls, system tests, and ADAS calibration functions.

» 116



INCLUDES COVERAGE AND BIDIRECTIONAL TEST ADDITIONS FOR MAJOR OEMS

Noregon's latest scan tool update, **JPRO Professional 2021 v3**, includes coverage and bidirectional test additions for major OEMs such as Cummins and Caterpillar, plus additional support for medium-duty vehicles. Additionally, this update offers improved capabilities to diagnose and repair emerging driver assistance systems. JPRO Professional 2021 v3 also provides customers with enhanced capabilities for parameter adjustments. Active subscribers can update JPRO via a prompt in the application when they have an active internet connection, or manually update online. » 118

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part #187

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CATEGORY SPOTLIGHT

Scan Tools



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SUPPORTS REPLACEMENT COPIES OF KEY FOBBS

The **X-431 IMMO Pad** from **Launch Tech** is a comprehensive key and module programming device that supports Asian, Domestic, and European vehicle applications for OBD-II diagnostics, bidirectional controls, and module replacement and re-programming. The



X-431 IMMO Pad works in conjunction with X-431 professional line scan tools including Turbo, Torque, Throttle, and Throttle III. In addition to ECM, TCM, and other module replacement, the IMMO Pad also supports replacement copies of key fobs. **» 120**

ADDED 24 DIFFERENT CAR LINES

The second **G-scan Software Update** for 2021 from **CAS** has 24 different car lines added or updated to its G-scan scan tool database. The release includes the majority of the 2021 models for Chrysler/Jeep/Dodge. The software update also includes a large amount of Isuzu truck coverage and over 20 other car lines.

Expansion areas include diagnostics, maintenance functions, and ADAS calibrations. Customers under a current subscription are able to update their G-scan immediately to take advantage of all the latest additions and enhancements. **» 121**



CHOOSING THE RIGHT SCAN TOOL

Service technicians need to have a good foundational knowledge base around how a particular scan tool works and what the limitations are. For example, some tools may be very quick to connect to a vehicle and access the specific data the technician is laser-focused on. However, that specific tool may not be good at performing other functions, such as running a full vehicle scan or health check and producing a comprehensive report. Some tools are excellent at logging every action performed on the vehicle, which can be used to document how much time went into the analysis on the vehicle, in addition to providing module part numbers and software version levels.

The different tools on the market all have their strengths and weaknesses, and technicians need to be aware of each tool's capabilities in order to get to the bottom of a problem. Some tools can only read generic OBD-II standardized information, which might be fine, however, there could be more generic data the tool can't display. The same goes for tools possessing the ability to display OEM proprietary data: Some are more capable than others and your mileage may vary.

-Scott Brown, Technical Editor

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The box that keeps on growing

Since *PTEN*'s last chat with Eric Muir, he's added around 10' of toolbox storage to his previous 21' long setup.

By Emily Markham, Associate Editor

When we last checked in with Eric Muir in 2014, he was the co-owner of Brighton Auto Service with a 21' long Mac Tools toolbox setup. Now, Muir is the owner of two automotive repair shops – Brighton Auto Repair in Brighton, MI and Whitmore Lake Auto Repair in Whitmore Lake, MI. He's also added about another 10' of toolbox storage to his setup, and that's not including the second toolbox setup he has at the Whitmore Lake shop.

THE START OF IT ALL

When Muir signed up for the vocational automotive program in high school, he initially took it as a “blow-off class,” and then found he actually liked it enough to make a career out of it. From there, he went to the ITT Technical Institute and got his degree, and then spent an additional year at Indiana Purdue University before moving back to Michigan to start working. Muir now has an LI Advanced Technician certification, ASE Master Technician certification, ASE Heavy Duty Truck Master certification, and Michigan Master Technician certification.

WHY MAC TOOLBOXES?

Muir's current Mac Tools toolbox setup began to take shape about 25 years ago. At

»»» OWNER

Eric Muir

Shops: Brighton Auto Repair and Whitmore Lake Auto Repair

Locations: Brighton, MI and Whitmore Lake, MI

the time, Muir had talked to two different tool dealers about purchasing a larger toolbox, but the “no hassle” nature of the Mac Tools distributor won him over in the end and Muir's been buying toolboxes from him ever since.

“He's my go-to guy,” Muir says.

So much so that when Muir heard the tool dealer would be retiring in a year or so, he decided to buy an additional triple bank toolbox and triple bank hutch for his setup. The tool dealer's retirement wasn't Muir's only reason though, he also needed more space to store his abundance of diagnostic tools and equipment.

At the Brighton shop, Muir's setup is around 32' long and consists of five side cabinets, two hutches, one triple bank upper toolbox, one triple bank lower toolbox, and two double bank toolboxes, not including the addition on the way. But that's not all, with two shops, Muir also has a second setup at Whitmore Lake. This setup consists of two side cabinets and a double bank toolbox.

Aside from his toolbox's size and many storage options, Muir's favorite part of the toolbox are the side cabinets. In each side

cabinet, the technician has a bunch of pull-out drawers, each containing an individual laptop or scan tool so Muir can easily pull them out when needed. Moving inside the toolbox, Muir notes his favorite tool is “anything Autel” and says he has around 10 Autel scanners.

To keep his setup organized, Muir keeps his most used tools toward the top and his lesser-used tools, typically his specialty tools, toward the bottom.

TIME FOR A CHANGE

About seven years ago, Muir decided it was time to move on from Brighton Auto Service. Though the ASE Master Tech had spent 25 years of his career there, he decided it was time to open his own shop. A shop where he could focus on all the new technology coming into the industry and prepare himself for the future.

Five years after opening Brighton Auto Repair, Muir opened a second shop in his hometown, Whitmore Lake. Both shops specialize in diagnostics and automotive programming. Muir notes that they do almost all the programming for most of the repair facilities and body shops in town. He jokes that they're the “last stop shop” if they can't fix it, good luck! ☒

Want to see more photos of Muir's box?
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- Efficient combustion, odorless, no fumes
- Directly light the flammable gas with the continuous spark ignition
- Safety shutdown on gas/flame/fan failure and overheat
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- Air Flow: 500m3/h
- Heats up to 1,500 square feet
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- Includes regulator and hose
- CSA certified



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not included

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- Reflectors dia. 8.3 inches
- Provides radiant infrared heat
- Tank/cylinder not included
- CSA certified

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