Hi! Renewal
Rick here. Thank you for being a loyal reader of MOTOR Magazine! Remember to renew your subscription on a regular basis so you never miss an issue.
Renew online: www.MOTOR.com/subscriptions
Or call: 847-559-7316
PERFORMANCE AT EVERY LEVEL

NAPA KNOW HOW

- Dependable starting power for any ride
- Reliable reserve capacity to keep drivers safe
- Reinforced internal components to protect performance
- Maintenance-free design for convenience
- Power electronics with two times the cycle life
- Faster recharging delivers premium performance

Content is copyright protected and provided for personal use only - not for reproduction or retransmission. For reprints please contact the Publisher.
Editor’s Report

You may not realize it, but there’s a good chance you’ve diagnosed a few malfunctioning Speedostat systems in your lifetime. Speedo-what, you ask?

Trade Secrets

You use your ears to listen for normal or abnormal sounds while diagnosing vehicles. Why not use your hearing to actually listen to what your customers are saying to you?

Foreign Service

Fuse blocks are found on many late-model Japanese vehicles. Those installed on Honda vehicles are decidedly “friendlier” when replacement becomes necessary.

Driveability Corner

This month Gary looks at modeling a mechanical engine control system with a lab scope for quick, accurate, nonintrusive testing that produces a result with no mechanical disassembly.

TECHNICAL

Trouble Shooter

When Ross Perot talked about “that giant sucking sound,” he wasn’t referring to the Chevy Cruze PCV system. But if he were, he’d probably have a few ideas on how to fix it.

Trade Secrets

You use your ears to listen for normal or abnormal sounds while diagnosing vehicles. Why not use your hearing to actually listen to what your customers are saying to you?

Foreign Service

Fuse blocks are found on many late-model Japanese vehicles. Those installed on Honda vehicles are decidedly “friendlier” when replacement becomes necessary.

Driveability Corner

This month Gary looks at modeling a mechanical engine control system with a lab scope for quick, accurate, nonintrusive testing that produces a result with no mechanical disassembly.

REPORTS

Editor’s Report

You may not realize it, but there’s a good chance you’ve diagnosed a few malfunctioning Speedostat systems in your lifetime. Speedo-what, you ask?

NewsBreak

ASE Renewal App helps technicians extend their certifications, MACS to host the Automotive Software and Electronics Boot Camp, Bartec USA announces new software release and RITE-SYNC process, plus other news of interest to shop owners and technicians.

DEPARTMENTS

F.Y.I. ............................................36
Tools of the Trade .................... 37
Classified ....................................39
Aftermarket Spotlight ..............40
Advertiser Index ........................40

SHOP MANAGEMENT

Matter of Give

Creating an effective apprentice program takes time and organized effort. Using the four-step conceptual guide outlined here, we can contribute more directly to rebuilding our workforce.

Just One More Thing, Mr. Jones: Add-On Services

Customers often bring their vehicles to your shop having a limited number of services in mind. They may be unaware of other convenient and valuable services you also offer.

Cover design: Jessica Nestorovski

Cover photo: CanStockPhoto

Content is copyright protected and provided for personal use only - not for reproduction or retransmission. For reprints please contact the Publisher.
You may not realize it, but there’s a good chance you’ve diagnosed a few malfunctioning Speedostat systems in your lifetime. Speedo-what, you ask?

When mechanical engineer Ralph Teetor received a patent in 1950 for the first modern speed control device, his invention wasn’t called cruise control. In the early days, what we all know today as cruise control was called everything from Speedostat (Teetor’s trademarked name) to Controlmatic to Touchomatic to Pressomatic to Auto-Pilot. It wasn’t until the end of that decade that Cadillac attached to their system the “cruise control” moniker, which is still widely used today.

If we can imagine the confusion that such a variety of names for the same thing may have created 60 years ago, one can only surmise that the explosive growth of ADAS (automated driver assistance systems) and the various names they go by could bewilder even the most tech-savvy consumer or technician. Thankfully, four organizations have agreed on standardized naming, intended to give consumers a better understanding that these technologies are intended to assist and not replace an engaged driver. The groups are quick to point out that these terms are not meant to replace automotive manufacturers’ proprietary names; rather, they’re meant to present clearer and consistent information on window stickers, in owner’s manuals and on marketing materials for generic system components.

Presently, five categories have been created to group technologies by type: Driving Control Assistance, Collision Warnings, Collision Intervention, Parking Assistance and Other Driver Assistance Systems, with plans to continually refine the list with stakeholders and as new systems are introduced. Each category contains several specific systems and their definitions. Driving Control Assistance, for example, includes adaptive cruise control, active driving assistance and lane keeping assistance.

I’ve suggested in previous Editor’s Reports that service repair professionals like you can play a role in helping motorists understand the safety-related systems on their vehicles. Those communications would be most effective if we’re all speaking the same language; this new initiative seems poised to help facilitate just that.

Editor’s Note: The entire list of common names for ADAS features can be viewed at http://bit.ly/ADAS-names.
Imagine if Drew Technologies, The Leader in J2534 Pass-Thru, Developed a Scan Tool...

Oh Wait... We Did!

DrivePRO ES

Call to schedule your demo today!

OpusIVS.com
sales@OpusIVS.com
(877) 945-6442

©2020 Opus IVS. Patent(s) pending. 012120-2

Content is copyright protected and provided for personal use only - not for reproduction or retransmission. For reprints please contact the Publisher.
When Ross Perot talked about ‘that giant sucking sound,’ he wasn’t referring to the Chevy Cruze PCV system. But if he were, he’d probably have a few ideas on how to fix it.

Cause and Effect

I’m working on a 2014 Chevy Cruise with the 1.4L turbocharged engine that has an unstable idle. There’s also an audible hissing/sucking sound from the engine at idle. After raising the hood, I was quickly able to determine that the sucking noise is caused by a vacuum leak emanating from the breather port of the PCV orifice diaphragm cover, which is located on the left side of the camshaft cover. The noise stops when I place a finger over the breather port, and the idle smooths out somewhat. I suspect the PCV orifice diaphragm is damaged, but I don’t want to replace the camshaft cover just yet because the customer has told me that it was replaced several months ago. The PCV orifice diaphragm is an integral part of the camshaft cover and isn’t available separately. Since it’s already failed once before, there must be something else that’s damaging the diaphragm and the noise it’s making is an effect rather than the actual cause. Your thoughts?

Justin Nelson
Fort Wayne, IN

Because the Cruze engine is turbocharged, its PCV system is a bit more complicated than the one on a normally aspirated engine. At idle and under light load conditions, there’s vacuum in the turbo engine’s intake manifold, just like in a normally aspirated engine. Engine vacuum is used to remove any blowby gases from the crankcase and direct them into the intake manifold. But when the turbo spins up under load and begins to produce boost, there’s positive boost pressure present in the manifold. To prevent this positive pressure from leaking out and pressurizing the crankcase, a nonreturn check valve is installed in the intake valve. This valve allows flow in one direction and blocks boost pressure in the opposite direction.

The small nonreturn valve is installed in the intake manifold, and it has a reputation for failing, sticking or disappearing entirely. The engine will continue to run with a missing nonreturn valve, but absence of the valve puts an abnormal strain on the PCV orifice diaphragm. The diaphragm is located on the left side of the camshaft cover and is not available separately. When it fails, you may hear a sucking noise as engine vacuum is drawn into the camshaft cover past the diaphragm vent. A missing nonreturn valve means there’s also a place for boost to escape under load, so the customer may also complain of reduced engine performance. Excessive oil consumption is another symptom of a missing nonreturn valve.

The vacuum leak at the PCV orifice diaphragm represents unmetered air, as it’s being drawn into the engine and ultimately reaching the intake manifold via a route that bypasses the throttle housing. To maintain a stable idle speed and fuel mixture, the engine control module will attempt to adjust fuel trim and throttle opening to compensate. Short-term fuel trim readings will be higher than normal and will trend toward normal when you temporarily block the leaking PCV orifice diaphragm. Raising the idle speed will also improve the short-term readings, as the vacuum leak has less influence at higher engine speeds.

Also check your scan tool for the throttle opening PID at idle. An engine that’s operating normally without a PCV orifice diaphragm leak will show a throttle opening PID of around 8% or more at idle. If the diaphragm is leaking, the control module will attempt to close the throttle as much as possible to compensate for the unmetered air. Expect to see a throttle opening PID of around 2% if the orifice is leaking.
ADVICS (Advanced Intelligent Chassis Systems) is a supplier of ultra-premium OE brake system components that are engineered and manufactured with industry-leading technology and innovation for the aftermarket. With the combined experience of AISIN, DENSO and SUMITOMO ELECTRIC, three of the world’s premier automotive suppliers, the ADVICS journey represents the very best of Japanese quality, global expertise and environmental sustainability for the road ahead.
Trouble Shooter

It’s also worth mentioning that leaking front crankshaft seals have been known to cause abnormal chirping noises on this engine as well. To diagnose the seal, remove the oil dipstick with the engine running. If the noise stops, this indicates a vacuum leak at the front crankshaft seal. Replace the seal and retest. A customer may also comment that he hears the noise for up to 10 seconds after the engine is shut off. This is due to the vacuum in the engine crankcase equalizing with the atmospheric pressure.

For a preliminary confirmation of the presence (or absence) of the intake manifold nonreturn valve, remove the PCV tube from the intake manifold and temporarily close the opening at the manifold port. Start the engine while monitoring the throttle opening PID. Without the unwanted, unmetered air, the throttle opening should rise to 8% or more.

With the engine off, remove the covering from the manifold port, then use a pocket flashlight to illuminate the inside of the port. It may be necessary to remove any excess oil or other deposits from the port with a long cotton swab. If it’s still there, the end of the orange nonreturn valve will be visible toward the firewall side of the port. But your throttle opening PID test will have most likely indicated what you now know for certain: The nonreturn valve has made its exit. What now?

At one time, a genuine GM replacement intake manifold included new fuel injectors and several other parts, along with the nonreplaceable nonreturn valve. While this made it easier to swap things over, it also increased the cost of the job by a few hundred dollars. Perhaps because they were selling so many of them, it’s now possible to purchase from GM just the basic intake manifold without all of the related parts. The intake manifold is also available from aftermarket sources, including Dorman.

GM has not released information to indicate that they’ve made any significant changes to the nonreturn valve design to address these failures. Dorman claims to have improved their design to include a retaining pin, which is said to prevent future nonreturn valve failures. Regardless of which part you decide to install, be sure to include a new PCV tube assembly as well. This assembly includes another check valve at the turbo end, which has also been known to fail. The plastic tubing also becomes brittle over time and may break the first time you attempt to move or disconnect it.

As a final note, my research uncovered several alternative fixes for Cruze nonreturn valve failures. These fixes involve rerouting the PCV flow and eliminating the need for the disappearing nonreturn valve. A separate one-way valve routed to the throttle body is used instead. While you have to give credit for the ingenuity of these solutions, which claim to completely eliminate the possibility of a repeat failure, it’s also important to mention that they haven’t been vetted or certified by the relevant authorities. I’ll leave it to you to judge the wisdom of installing one on a customer’s engine.
ULTIMATE POWER!  MAXIMUM PERFORMANCE!

INTRODUCING
THE THROTTLE &
ADD-ON TRUCK MODULE

X-431 Throttle is the newly developed high-end comprehensive diagnostic equipment with charging base based on the Android 7.1 system, supports dual 5GHz WIFI communication, has a wide coverage of models, strong diagnostic capabilities, accurate detection data and other characteristics.

The perfect storage for your ADAS calibration set & calibration targets.

X-431 ADAS CARTS

EACH ITEM SOLD SEPARATELY

THE FUTURE IS HERE!
DO THE REPAIRS RIGHT! KEEP THE REVENUE STREAM IN HOUSE!

X-431 ADAS, the Advanced Driver Assistance System Calibration Tool, was originally released by LAUNCH and can be used with Launch diagnostic tools.

X-431 ADAS SYSTEMS
- LDW  |  Rear Collision Warning
- AVM  |  Blind Sport Warning
- ACC  |  NVG CALIBRATION
*Optional

PRODUCT FEATURES

- Easy to use Interface
- Military Tough Design
- Android 7.1 Processor
- Dual Band WIFI
- 2 hour Quick Charge Tech
- Bluetooth Technology
- 13 MP Rear Camera
- OBD 1 Kit Included

LAUNCH
1820 S. Millikan Ave. Ontario, CA 91761
1-877-592-6249
www.launchtechusa.com

For reprints please contact the Publisher.
You use your ears to listen for normal or abnormal sounds while diagnosing vehicles. Why not use your hearing to actually listen to what your customers are saying to you?

S
ome years ago, I had the good fortune to meet the TV psychologist Dr. Joyce Brothers at a book signing in New York City. She was called the “face of American psychology” by the Washington Post and she actively gave psychological advice on TV shows and through newspaper columns.

My wife was a psychiatric nurse, and I was sure if I got home from a gathering and told her Dr. Brothers was there but I did not speak to her, she would not be pleased. So when such an opportunity arose, I made my way through the crowd and introduced myself by telling Dr. Brothers about my wife. It seemed as if we bonded instantly. I was thrilled to be chatting with the famous Dr. Brothers and got a chance to ask her about dealing with people. She said, “Listening, not imitation, may be the sincerest form of flattery.” She explained that whenever you don’t pay attention to what others have to say, you send the message that you don’t value them. But when you listen to others, you communicate that you respect them. Even more, you show that you care.

As we chatted, Dr. Brothers and I eventually got onto the subject of success. She told me success is a state of mind. If you want success, start thinking of yourself as a success. “The person interested in success has to learn to view failure as a healthy, inevitable part of the process of getting to the top,” she said. That made sense to me and I’ve tried to keep that in mind whenever things were not going well and I was feeling quite a bit less than successful.

It dawned on me, as we talked, that I was not a very good listener. I promised myself from that day forward I would strive to be a good listener, especially to my customers in the shop. When I got home and told my wife about meeting Dr. Brothers, she was thrilled and asked me all about it. A few days later my wife presented me with Dr. Brothers’ book How to Get Whatever You Want Out of Life. I still refer to it every once in a while. It helps remind me to listen.

In retrospect, I think it has paid off over the years. Let me tell you about a fellow I’ll call “Barney,” who had been a regular customer for many years. Barney loved to talk whenever he brought his car in for repairs. Often I would just half listen as he babbled on and on but, remembering my conversation with Dr. Brothers, I thought to myself, I’m going to take her advice and actually listen to Barney.

Barney said his car sometimes did not seem to have the power it should have when he drove in bright sunlight. He said...
AUTEL UPDATES PROVIDE LATEST OE-LEVEL COVERAGE FOR US/ASIAN/EUROPEAN VEHICLES (1996+) INCLUDING SUPERCARS

MAXI SYS MS906TS
- Bi-Directional Control
- Most Affordable Pre/PostSCAN
- Complete TPMS Service
- 1YR FREE Software/1YR Warranty

MAXI SYS MS908S
- Bi-Directional Control
- Advanced Coding & Adaptations
- ADAS Application Upgrade Ready
- 1YR FREE Software/1YR Warranty

MAXI SYS ELITE
- Bi-Directional Control
- Advanced Coding & Adaptations
- ADAS Application Upgrade Ready
- 2YR FREE Software/2YR Warranty
- Docking/Charging Station / 2 VCIs

MAXI IM IM608
- Bi-Directional Control
- Advanced Coding/ECU Coding
- MaxiFlash JVCI/ECU Programmer
- 1YR FREE Software/1YR Warranty
- XP400 Key Programmer

MAXI SYS MS908CV
- Bi-Directional Control
- Advanced Coding & Adaptations
- Heavy Duty Class 1- Class 9
- 1YR FREE Software/1YR Warranty
- New Deutsch 6-Pin & 9-Pin Probe Set

AUTEL COM • MAXITPMS.COM • MAXISYSADAS.COM
Phone: (855) 288-3587 • USSUPPORT@AUTEL.COM
Follow Us @AutelTools

©2020 Autel US Inc., All Rights Reserved

Content is copyright protected and provided for personal use only - not for reproduction or retransmission.
For reprints please contact the Publisher.
Trade Secrets

it always ran well on cloudy days and he never had the problem at night. He told me he had mentioned it before, but this time I was listening.

It happened to be a bright, sunny day and I asked that we take a ride. I got behind the wheel and everything seemed fine, so I asked Barney to explain the problem once more. As I listened, I shifted the car into low and Barney said, “See, there it is!” As it turned out, the glare on bright, sunny days kept Barney from seeing the digital shift indicator, and he had been driving around in low gear. Listening allowed me to solve Barney’s problem. Frankly, I learned a lesson and discovered a weakness about myself I wanted to correct.

I recall another time when Dr. Brothers’ advice served me well. The editor of MOTOR said he wanted my column about a new wrecker in the December issue to be illustrated on the front cover. The idea was to have Santa Claus in his sleigh being rescued by a shiny new state-of-the-art wrecker. We arranged for the shoot to be done at Clove Lake stables in Staten Island, NY, where there was a perfect hill for the shot. Everything was going fine; the camera was set up and all the actors were in place when a small herd of goats wandered onto the set. Everyone tried to chase them away, but the harder they tried, the more the goats seemed to gather around the sleigh. The photographer was getting angry. The publisher, who was dressed as Santa, also was getting angry, and the owner of the stable was having no luck getting rid of the goats.

Then old Gus, one of the fellows who cleaned out the horse manure from the stables, hobbled over to me. Gus had been watching the scene with great amusement. He said, “Bob, there is a way to get those goats out of there.” I thought for a moment that this old guy was a little nutty, but I listened. He whispered, “I wouldn’t do it for the boss, but I like you and I’d be glad to get those goats out of there if you asked me.” I said, “Gus, I would be very grateful if you could get those goats out of the shot.” Then Gus took a handful of feed out of the pocket of his ragged overalls, walked over to the goats and led them out of the shot, much to the amazement of his boss, me and the whole MOTOR crew. The cover came out just the way we wanted.

The Trade Secret is that it’s always a good idea to focus your attention. In blunt terms, shut up and listen. Taking the time to listen to your customers, your employees and your family can do wonders for your own ability to make smart decisions and brighten your image. Often we tend to want to make our point without really hearing others’ points of view. Controlling the urge to interrupt with a smart reply may be, as Dr. Brothers pointed out, “the sincerest form of flattery.”

I welcome your comments on this or any automotive topic. E-mail bcerullo@motor.com.

Famous TV psychologist Dr. Joyce Brothers once told me, ‘Listening, not imitation, may be the sincerest form of flattery.’
NO MORE GUESSWORK

Exclusive Laser-Spot™ technology precisely targets weight placement locations, helping to achieve the perfect balance every time. No guesswork. No re-spins. Ranger makes it that easy.

3D Quick-Touch™ Data Entry

Dual Laser-Spot™ Technology

Includes FREE Wheel Weight Starter Kit

MRP $3,420
FREE SHIPPING*

1-800-253-2363 • bendpak.com/laser

*Free shipping on Ranger products to the 48 contiguous states.
© 2020 BendPak Inc. Ranger Products is a registered trademark of BendPak.

For reprints please contact the Publisher.
A technician-friendly style of fusible block has become commonplace on Honda vehicles. Here’s what you need to know about it. A fusible block or multifuse is a long, slim component containing several fuses. For example, I’ve seen Toyota fusible blocks holding as few as five or as many as 10 fuses. Spade terminals run along the lower edge of a typical fusible block. When you slide the part into a fuse box, the spades engage corresponding terminals deep inside that fuse box.

I began discussing import fusible blocks in my October 2019 column. Toyota was a good starting point because it sells the most foreign cars in America and its vehicles use lots of fusible blocks. Of course, Honda is the second most popular import here, and a wide range of its models also have multifuses. The Honda and Toyota versions look alike. But Honda’s are more tech-friendly because, overall, they’re easier to R&R.

Readers have asked me why automakers use fusible blocks in the first place. I suspect that speedier assembly is the reason: It’s faster to install a fusible block than individual fuses. But that being said, you’ll still find traditional mini fuses alongside fusible blocks inside Honda and Toyota underhood fuse panels. Furthermore, a fusible block costs substantially more than a traditional mini fuse does and may cause considerable headaches during electrical diagnosis—more on those factors in a moment.

Meanwhile, Honda multifuses seem to be out of sight, out of mind to many techs. For one thing, all the Honda multifuse applications I’ve found are buried inside underhood fuse boxes, and some techs may not open these fuse boxes very often. For another, we all sometimes just overlook things. I’ve dug into some underhood Honda fuse boxes while searching for an injector and/or primary ignition circuit fuse. If I found the correct fuse, I would substitute a current loop for it and connect an inductive amps probe to the loop. This way, I could scope all the injectors or coils simultaneously. (Refer back to the May 2018 Foreign Service for additional details on this technique.) I’ve encountered various multifuses and then forgotten all about them until I researched this month’s topic.

Checking out some Hondas shows how much multifuses have overtaken traditional ones. Here are just a few examples: The Accord is Honda’s highest-volume vehicle. The 2003-07 models have one multifuse, while the 2013-17s have two of them. However, the 2018-20 Accords are equipped with four multifuses. The 2009-15 Pilots have one multifuse but the 2016-19 models have three of them. Civics from 2006-15 use one multifuse and the 2016-20 models have two. The 2007-11 CR-Vs have one multifuse and the 2015-
20 models have two. Odysseys from 2005-10 have one multifuse while the 2011-17 models have two of them. To say the least, then, the Honda applications for this newfangled fuse format are extensive.

**Multifuse Maneuvers**

You may recall that replacing a Toyota fusible block could be a tedious exercise that requires disassembling an entire underhood fuse box (see my November and December 2019 columns). Fortunately, changing a blown Honda multifuse is a snap. First, remove the one or two bolts from it with an 8mm or 10mm socket. Next, unlatch the little locking tab at the end of the multifuse assembly with a pocket screwdriver or slim seal pick. Now lift the part out of the fuse box. To install, patiently guide the new multifuse down into the fuse box opening and then seat it into place. Reinstall that little bolt or those bolts and tighten correctly. A typical torque spec for them is 28 in.-lbs. (2.4 ft.-lbs.).

Honda specialists emphasized several additional details about the multifuse. First and foremost was that reversed booster cables have been the most common cause of blown multifuses. Experience has shown that reversing the jumper cables usually pops the main fuse, so the vehicle has no power whatsoever. Predictably, someone who has jump-started vehicles in the past may be skeptical when you explain that his carelessness not only blew a fuse, but an expensive one at that.

The experience of one Honda ace is enlightening. He told me that over the last two years, he has replaced several multifuses that contained the blown main fuse. The retail cost of the new multifuses ranged from about 45 to 70 bucks. Those numbers may stun someone who assumes that a “fuse” is a nickel & dime item at the local auto parts palace. Consequently, a cold compress and/or smelling salts may become part of this unwelcome transaction.

Second, a fusible block or multifuse may complicate a shorted-circuit diagnosis. For example, suppose an electrical component is internally shorted or a power supply wire is pinched to ground somewhere. Obviously, either condition is going to pop the circuit’s fuse. If the fuse is a traditional one, replacing it several times during a diagnosis isn’t expensive by any means. What’s more, a tech could quickly and easily substitute a little circuit breaker for that fuse while troubleshooting the circuit. But performing the same substitution here is a hassle due to the shape and size of the multifuse assembly—not to mention the awkward location of the fuse terminals down inside the fuse box.

Third, the multifuse or fusible block setup may prevent you from easily isolating a circuit during a battery drain diagnosis. Obviously, you can’t remove one fuse at a time when the suspect circuit is among those protected by a multifuse. Furthermore, I don’t see any easy way to measure voltage drop across each fuse inside a fusible block.

By all means, stop by next month because I’ll have some suggestions on coping with a fusible block or multifuse during these kinds of diagnoses. Meanwhile, keep the coffee on and the snow blower primed. I’ll look for you here next time.
One big challenge for the modern-day technician is diagnosing mechanical systems in a timely fashion. Today, it can take four to eight or more hours to get “mechanical” answers when we suspect something is amiss and need to disassemble the engine or transmission to verify our diagnosis.

In addition, consider that in the good old days, back when telephones had rotary dials and TVs still had knobs, we didn’t have the added complexity of variable valve timing curves, nor variable valve lift systems, VTEC, Valvetronic or other high-tech systems that control today’s engines. And then there’s active cylinder deactivation, turbocharging and variable intake runner control to consider.

The vehicle is misfiring… Are all of these systems also working properly?

Being asked to quickly check the mechanical engine to diagnose a common drivability problem such as a misfire, surge, stall or any related DTC is a tall order these days. Yet, we’re expected to be able to do this both quickly and accurately. So the question is, can we successfully get to some of these “mechanical” answers with a scanner alone?

Sure, sometimes. But when using a scanner only, are we really verifying that internal problem and actually diagnosing where the problem is in the assembly based on that scan data alone? No, we’re not!

Because mechanical systems are often electronically controlled, it’s sometimes not enough confirmation to believe what we see on the scanner when making expensive diagnostic calls. From time to time we need to “see” what’s going on inside that transmission or inside that engine before we can decide how to proceed.

In previous Driveability Corner columns we’ve shown the increasing diagnostic value of the characterizing or modeling method when looking at things like cam timing codes, variable valve timing phaser issues and misfire-causing valve leakage. But what about the actual systems that control the cylinder, or interact with the cylinder for fuel economy or emissions purposes? Can we successfully model these systems? Indeed, we can.

Consider the following case where a technician effectively used modeling of the mechanical control systems to diagnose a problem inside an engine quickly and accurately, without removing a single cover.

A Chevy Avalanche presented at his shop with an intermittent P0304 (Cylinder 4 Misfire). The customer stated that the vehicle would just “drop out and start shaking” and did so quite often, but rarely at steady-state cruising speeds. The vehicle also acted up while idling, sitting at a traffic light or under acceleration. He further stated the truck ran perfectly when cold, misfiring only at higher operating temperatures.

To save you the blah-blah description of the preliminary checking of coils, plugs and such, we’ll jump right to the second test performed by the tech. Because the cylinder went completely “dead hole” when it misfired,
Driveability Corner

During the event, injection is shut off, but the spark plug continues to fire so that it remains hot when the fuel suddenly turns on again. This is to prevent fouling of the plug upon reactivation of fuel injection.

Fig. 2 shows the cylinder after the repair. Capturing the after-repair waveform is the strategic part of characterizing or modeling a system. It’s great to have a capture of the failure, but even better to also capture a known-good or after-repair waveform. This provides a complete (broken to fixed) future reference for us to use to our diagnostic advantage. Often we don’t look at that other cylinder or device and, worse, don’t take the time to capture the after-repair waveform, all in the name of flat rate hurry-up.

Notice this time (Fig. 3), when deactivation is commanded on (about a third of the way into the screen), we see the third compression spike, indicating the cylinder is deactivated (center area). When the lifter is released by the PCM (at two-thirds of the screen) in one cycle of the engine, the lifter bleeds off and comes back to life, restoring full cylinder operation and output.

The fix for this Avalanche was a new LOMA solenoid manifold and an oil change, to freshen up the oil. The beauty of the diagnosis was that the problem was physically seen and verified quickly and accurately, facilitating good flat rate time and a profitable ticket, with no diagnostic runaround for the customer.

The technician was so excited to have learned these techniques, and proud at how much time and money he and the customer had saved by him deploying physical testing when the scanner wasn’t magically giving up the answer.

Remember, virtually all mechanical and electronically controlled mechanical subsystems can be checked out successfully using characterizing and modeling techniques. The more you explore, the more you’ll learn, and the more accurate your diagnostics will become.

Thanks for reading this month’s column. Join us again in April when we explore the direct effects of fuel and oil carbon depositing on our diagnostics. It will be an eye-opener!
NO SUCH THING AS “TOO TALL”

Model shown XPR-10AXLS
MRP $4,320
*FREE SHIPPING

Super-Tall Rise

For technicians challenged to work under a lift all day, common injuries stem from poor working posture and improperly fitted equipment. BendPak’s NEW 10,000-lb. capacity XPR-10XLS and XPR-10AXLS two-post lifts feature over 80 inches of lifting height to absolutely tower above other lifts. Make all jobs easier and support the long-term health of taller techs. Plus, get the best warranty and after-sale support that only comes with BendPak.
A MATTER OF GIVE & TAKE: FOSTERING APPRENTICES

BY SARAH KENNEDY

Creating an effective apprentice program takes time and organized effort. Using the four-step conceptual guide outlined here, we can contribute more directly to rebuilding our workforce.

Despite all the talk in recent years about a chronic technician shortage, we’re seeing some pretty positive movement in the industry from the top down. There are many resources currently available to young technicians; in 2018, for instance, TechForce Foundation launched its FutureTech Success campaign and was tasked with awarding $2.5 million in scholarships and grants, according to their website. TechForce Foundation is aggressively supported by many large industry players—Nissan, Infiniti, Mercedes-Benz—not to mention large oil companies, technical institutes and major parts retailers.

The National Automobile Dealers Association launched a Workforce Initiative in 2019, saying that the industry needs to fill 76,000 positions each year to account for new vehicle technology and those exiting the workforce. They’re also warmly supported by industry corporations and institutions.

For years now, OEMs have increased funding in their recruitment, training and retention strategies, and for the most part they have succeeded, claiming the majority of the technician workforce in 2019 (according to the U.S. Bureau of Labor Statistics).

All this money is wonderful and needed, of course, but what will truly, positively influence high schoolers and secondary education graduates to
enter and remain in the field is daily, real-life mentorship. Jim Morton, owner of Morton’s Automotive Technical Services and an industry educator, lamented on his Facebook page that the two scholarships made available to young techs to attend VISION 2018 received only seven applicants.

Where are the in-field mentors? Where are the shop owners, lead techs and service managers tasked with supporting these kids? For those of us unable to compete with dealerships’ salary and benefits packages, we need to build apprentice programs. We can’t just keep sitting in our offices and posting ads, hoping the number of applicants magically grows with the help of “other people.”

Starting in 2020, let’s convert this rapidly growing, supportive movement into a real increase of young technicians in our shops, so there are plenty of qualified, intentional technicians to go around—for OEMs and independents alike. Once we look to correct the cultural shift toward four-year degree programs and help students find their way back into trades, it’s absolutely crucial for all shops to create in-house mentorship programs, now, if we want our trade to stay in human hands. Using the simple, four-principle conceptual guide discussed here, we can start to rebuild the workforce ourselves: recruit, support, train, retain.

Finding Structure In the Chaos

I recently spoke with a successful shop owner who explained her very relatable journey through Apprenticeland.

“The only way to find technicians is to steal them or grow them,” said Amy Mattinat matter-of-factly. She’s the owner and operator of Auto Craftsmen in Montpelier, VT. As a former president of Women in Auto Care, her clarity, surefootedness and, well, true grit have moved mountains in the industry. She cannot stress enough to her clarity, surefootedness and, well, true grit have moved mountains in the industry. She cannot stress enough that the conversation needs to change.

We’re in a crisis; it isn’t about to happen, it’s here, and we need to band together and talk about how to universally mentor people into the industry. She has spent many years recruiting, training and attempting to convert young staff into full-blown technicians.

Amy’s had an apprentice on staff in one form or another for years. Currently, apprentice Scott Baker is tasked with daily to-dos in addition to on-the-job training. “My apprentice does tires, oil changes and we also do undercoating. He always has something to do. In the summertime, he’s in charge of cutting the grass, he gets all the loaner cars parked in the right places and in the right direction, gets the metal out of the shop, helps keep it clean, all that kind of stuff,” she explained. “Right now, I have him doing only five sets of tires a day, and that’s during tire season; most shops would have him do eight or nine. Then I have him slowing down; we offer a free winterization, which is check the battery, check the coolant, look the car all over, in exchange for a Toy for Tots. He’s learning how to really look things over—and he’s getting very good at it—which then helps him establish a really great relationship with the master techs because they get that work,” she said. “Once he gets to a point where I’m comfortable having him do more mechanical work, then we’ll have only four sets of tires a day.”

This idea of managing the new guy’s time to allow for diversifying skill sets is essential in growing your own. Put an express lube tech on the line and force him or her to do 20 oil changes every day and nothing else and you’d be silly to expect growth.

Both of Amy’s master technicians embrace assistance from Scott. “I’ve always told him if you’re ever slow, which doesn’t happen very often, you’re to go hang out with the master techs—help them out. For the production guy, it’s a win-win; if he has extra hands and things are happening faster, he’s making more money. And my clock guy’s a very good teacher,” she said. “Eventually I’ll have to hire another person to take over the undercoating and help with tires once Scott’s doing more mechanical stuff.”

Amy hopes to participate in more structured, officially endorsed programs moving forward. Her feeling now is that rather than various entities in the industry working separately to grow the technician pool, there should be a widely distributed program guide. “I’ve been to many panel discussions where you’ve got all these guys sitting up there on stage and they’re talking about apprentice programs and how they’re doing it and blah blah blah...” she said. “And I reached my hand up and asked, Where’s the booklet? Why aren’t you passing it out? Where are my instruction sheets on how to do this? And they were like, ‘Uh, we’re working on it.’”

Because of the lack of an industry-wide guide, Amy has recently turned to NAPA AutoCare’s new technician apprentice program. “What I have learned is that NAPA did something together with ASE and they have this new apprentice program which was launched in late August [2019]. I started looking into NAPA more. I sat down with my apprentice, who has been my tire guy and my undercoater for a year now. He has a great attitude and he has the aptitude; he’s never had the opportunity.”

For this and other benefits membership offers, Auto Craftsmen became a NAPA AutoCare Center. The program offers apprentices a completely structured online curriculum. “Scott can take the classes here at the shop when it’s slow and stay on the clock. If he wants to get done faster, he can do them at home and on the weekends because it’s all online,” Amy said.

NAPA AutoCare Centers that apply to the program are also offered a heavily discounted tool set—impacts included—meant to be purchased by shop owners and provided to the student. This solves the issue of how to train entry-level staff without forcing them to purchase thousands of dollars...
WHEN BALANCING SAFETY AND PRODUCTIVITY, BENDPAK GOES THE DISTANCE.

LONG-REACH ARMS PROVIDE BETTER CENTER-OF-GRAVITY LOADING

When servicing trucks and vans with extremely long wheelbases, longer-reach arms deliver a more stable lifting solution. The lengthy triple-telescoping arms on BendPak’s new ALI Certified XPR-12CL-LTA extend to 72” long – that’s six feet in length and over one foot longer than almost any other lift or brand in its class. And with rugged BendPak dependability combined with a 16-piece adapter set, you’ll realize that balancing safety* and worker productivity has never been so perfectly matched. For more information visit www.bendpak.com/LTA or call 1-800-253-2363.

© 2019 BendPak Inc. BendPak is a registered trademark.

For reprints please contact the Publisher.
When servicing trucks and vans with extremely long wheelbases, longer-reach arms deliver a more stable lifting solution. The lengthy triple-telescoping arms on BendPak's new ALI Certified XPR-12CL-LTA extend to 72" long – that's six feet in length and over one foot longer than almost any other lift or brand in its class. And with rugged BendPak dependability combined with a 16-piece adapter set, you'll realize that balancing safety* and worker productivity has never been so perfectly matched. For more information visit www.bendpak.com/LTA or call 1-800-253-2363.

- 12,000-lb. lifting capacity
- Dual direct-drive hydraulic cylinders
- Oversized 53" tall carriage for superior strength and durability

*Always read and follow all safety warnings that accompanied your lifting equipment at the time of purchase. More information regarding vehicle lift safety is available directly from BendPak or from the Automotive Lift Institute.
Amy Mattinat (left), owner of Auto Craftsmen in Montpelier, VT, mentors apprentices through professional and personal hurdles. She believes that both technical and emotional support are essential in growing the technician workforce. Also shown is Nikki Saldi, Auto Craftsmen’s service advisor-in-training.

Scott Baker, in coveralls and shown with the Auto Craftsmen team, was offered a structured apprentice program at the shop after serving as their tire tech and undercoater for a year. He’s charged with completing daily shop tasks and online training, plus shadowing the master techs. He’ll be attending VISION Hi-Tech Training & Expo next month.

of tools on credit. “My deal with him is I buy the toolbox, you get to use it. You finish the complete program... it’s all yours. You can be like one week away, one class away and you don’t finish? Then it’s mine,” Amy explained. “So that’s an incredible incentive.”

NAPA’s program isn’t perfect for everyone, and Amy has diverged in some areas based on her personal experience with mentoring new staff. They have structured pay increases as the student progresses in the program, but Amy feels the program’s base is far too low. “I don’t ever start anybody unless they’re getting paid at least 15, because ten dollars an hour is not livable wage. In their program, after they come into a new unit they start increasing their pay. The way I set mine up here at the shop is, as you get your ASE certifications, your pay increases,” Amy said.

NAPA’s program also encourages shop owners to put the apprentice on flat rate as soon as they finish the program. “I think that’s setting him up for failure,” Amy said, “because when they get through the apprentice program, it’s kind of like they graduate from UTI; they know a little bit of everything but they don’t know nuthin’. You don’t want to put them on production because if they’re being conscientious, they’re going to be too slow, or you’re setting them up to be pushed into making mistakes. Plus, the big talk right now in the industry is getting rid of production completely. I have only one guy on production just because that’s where he makes the most money.”

Amy creates pay plans tailored to each individual staff member. “We’re in a technician shortage; you really need to sit down with every single employee and come up with a plan that works for them and you,” she explained. So, there are some kinks in the program, according to Amy, and some aspects she doesn’t philosophically agree with. But it’s better than walking blind and alone through the trenches. Until we have something of a standard when it comes to apprentice programs, we can follow general guidelines and create something that each of us can use in our shops.

Recruit

In our experience at Auto Emporium, we’ve never had trouble finding applicants for our apprentice program, in contrast with our search for master techs. We typically use our staff, customers and Indeed.com to search for candidates. There always seems to be a plethora of applicants on Indeed who have a year, maybe two at the local quick lube and are looking for a better opportunity. These are people in their late teens and early twenties who have some experience outside the trade and have chosen the automotive world because they’re hopeful for the growth opportunities. Or, customers and our team members may know someone who likes to tinker and doesn’t know where to start professionally.

What should you look for in an ap-
make them feel that they are wanted.”

“There are a lot of young people coming in, at least to secondary education, that have been kind of ‘beat down’ by life,” explained John Croft, “whether it’s prior education because they don’t know how to deal with an individual who isn’t ‘hands-on,’ who doesn’t learn traditionally through a book. They learn better in their interest of digging in. A lot of these kids started working when they were 16 years old, probably in fast food. The management isn’t the best; may-

Support
Independent shops have had extreme difficulty in offering technicians a living wage with full benefits. It’s highly, highly competitive out there, but what I hear consistently when we interview is that all technicians—at whatever level—leave their jobs due to lack of supportive management. In their advanced technical skill, they’re overworked; as porters, express lube or tire staff, they’re overlooked.

“My students tell me that they want to feel like they belong to something, something worthwhile. I’m not just a number. I’m a human being, a regular individual, and I want to be treated accordingly,” said John Croft, who spent 17 years working in his parents’ shop before joining the instructing staff at the University of Northwestern Ohio (UNOH). For 11 years running he’s been having open conversations with his students about the industry they’re about the enter.

“Some of the larger dealerships—I’ve had students who currently work there—feel like they’re just a number, there is nothing that’s personal between management and them. There’s an opportunity for independents to bring these young men and women into their environment and...
be they weren’t treated well.” This is where John stresses the importance of creating an environment that reinforces apprentices, that emphasizes that they’re a part of something important, that they are important.

“Let’s say they get into this field, an independent shop, and they need something different in that manager,” John posed. “If they don’t get it, they just see the place as no different from the fast food place they were working at two years ago. Let’s face it; there isn’t anything exciting about being a lube tech. It’s a place to start off, but these kids want to grow into something that is meaningful, that gives them a feeling of pride and self-worth.”

When someone applies to an apprentice program, he’s making an intentional step into the field. There’s a reason why he applied. He’s looking for something. If you make sure he finds in you what he needs—a mentor—you’ll be amazed at his growth. “I’m 52 and I’ve had a mentor for the last 25 years,” John says. “It gives you someone who you trust enough who will tell you the things you need to hear when you don’t want to hear them. But you know it’s coming from someone who legitimately cares about your success.”

Different forms of mentorship come into play during an apprentice program. Structure, accountability and assistance—both physical and financial—all are equally important. To expect an entry-level tech to walk out to a tool truck and sign half his paycheck away for the next five years is simply cruel. Create a shop tool set meant only for apprentices and task them with caring for it. Keep an inventory log and check it regularly. As Amy Mattinat promises her apprentice, if ever you offer that person a full technician position, include the tools—he’s earned it. Policies here are fine; the tools are the shop’s to retain if the apprentice quits or is let go, for instance.

I highly recommend leadership training for you and your management staff. This means service managers, lead technicians and anyone appointed to work closely with others. It also means seeking training outside the industry. Local motivational seminars and management classes are readily available all over the place, and most are very affordable. Being open and excited about the goals of the shop and allowing the apprentice to be mentored by multiple people on staff will increase his or her enthusiasm for the job. “Communication is extremely important; the manager or owner needs to communicate their vision,” John Croft explained. “This is where we’re going and we would love for you to come along with us.”

Train

There are countless resources for basic technical training these days. A popular choice is the VISION High-Tech Training & Expo in Overland Park, KS. Any Mattinat highly encourages everyone in the shop to attend, including apprentices, as they offer beginner, intermediate and advanced technical classes, in addition to management and educator training. There are a variety of local resources available to you if an expo is logistically out of reach. Parts retailers offer evening courses and usually include a hot meal. Of course, if you hire an enrolled student, you’ll have him part time while he attends classes.

The word training cannot be confined to the technical; apprentices should be exposed to more philosophical and financial education as well. Some apprentices, as John Croft said, have it hard when they leave your shop and go home. Getting them into a classroom that discusses teamwork, personality types, personal finance—the list is endless—will help apprentices immensely as they enter adulthood.

Our shop sends staff to the Ohio State University Leadership Center. Their classes couldn’t be less about cars, but our staff rubs shoulders with department heads and executive leaders from an array of industries and boy do they return inspired. Mentorship, after all, is about encouraging protégés to become their best selves. If they succeed, we succeed.

Beyond the occasional class or expo outside the shop, the most important training happens in your facility. Entry-level techs cannot be left to sink or swim on the shop floor. Shadowing, followed by small, repeatable tasks are where to begin. Apprentices should always be paired with more advanced technicians. In fact, you should have your master tech help you interview apprentices, which creates buy-in to training them as a team.

An apprentice should never be too busy for training; if one is booked up with oil changes and inspections for weeks on end, slow the schedule down a bit and allow for blocks of shadowing...
or online courses. Apprentices should be given responsibility from the beginning, tasked with taking pride in the shop’s cleanliness and organization—making sure the oil filter cabinet is stocked and light bulbs are where they should be, for instance. Neglected areas of the shop can be remedied with dedicated attention, not hard-earned skill.

As an apprentice gains skill, if he shows interest in a particular task or repair, you have a new expert in that zone. Make sure the rest of the staff knows and respects this newfound passion. Everyone has a job and a make/model they love, and ones they absolutely loathe. Helping apprentices identify their bread and butter and teaching them how to tackle their make/model demons will create a confident, well-rounded technician.

Retain
Converting an apprentice to a mechanic and ultimately to a technician takes great, measured effort by the apprentice and the mentor. But what if you invest in an employee and he or she leaves? We all know the answer is something along the lines of risking creating a squatter; with apprentice programs, the opposite is true. If you do not invest in them, they will almost assuredly leave as soon as something perceivably better comes along. If you hire a person at $10 an hour or less, throw him to the wolves and punish him for mistakes, misunderstandings or lack of training, there’s a lot out there for him that’s better than your shop.

Aside from poor management, many technicians stick with OEM jobs or leave the industry entirely due to income issues. Creating a fair pay plan, one that does not initially rely on production, is the best way financially to retain an apprentice.

“They want to do a good job, they want to work and they want to get paid for that,” John Croft explained of his students. “They don’t want to be someplace for eight hours, bill only two hours and walk out of there making $21 for the day. It’s not fair for me to ask my employee to shoulder the same risk—oh, and by the way, and to be on hook for $15,000 worth of tools.”

Using your key performance indicators (KPIs), create a budget for an apprentice program, starting them at a livable hourly wage with a clear list of expectations and timed goals, with increases in wage or bonuses as they progress. Meet regularly with your apprentice to praise growth and address hurdles. Pay should increase so as to reward the apprentice and allow you to assign more profitable work. Soon enough they should be doing the factory-scheduled maintenance and minor parts replacement that make all the training very much worth it to your bottom line. Once they have some independent skill sets, offer them a base hourly rate iced with a flat rate bonus, for instance. According to Amy Mattinat, meeting with each team member and determining what will work best for them should include your apprentice. There are any number of ways to incentivize fairly and profitably.

Health insurance is becoming increasingly costly, and finding a plan that suits the needs of aging staff is hard enough, which, according to Amy, is yet another reason she became a NAPA AutoCare shop. NAPA and similar membership programs offer group medical plans that may outshine what shop owners are able to secure themselves. We at Auto Emporium have even offered our staff the option of finding an individual or family plan on the open market and we would take care of a fair portion of the premium.

Finally, retention is as much about what apprentices get from working uniquely with you as about their take-home pay. Knowing an apprentice’s hobbies, favorite color and dog’s name; handing out gas cards on a good week; providing coolers packed with beer and steaks for a long summer weekend; and a daily “Thank you for your help!” just cannot be assigned a value.

Fair wages, provided start-up tools, health insurance and, perhaps most importantly, structured, reliable mentorship are the ways to rebuild our workforce from the ground up. Whether you use a consultant-designed apprentice program or build your own, the hope is that with the large and growing effort in the industry to make our trade more visible and accessible to high school students and graduates, our in-shop efforts will keep entering technicians proudly employed with us for many productive years.

Photo courtesy Auto Emporium Inc.

Auto Emporium Inc’s apprentice, Jason Smith, was recruited by our production manager. He was an express lube technician at dealerships for several years but was not offered any growth opportunities. Our apprentice program attracts many applicants.
JUST ONE MORE THING, MR. JONES:
ADD-ON SERVICES

By Sam Bell

Customers often bring their vehicles to your shop having a limited number of services in mind. They may be unaware of other convenient and valuable services you also offer.
There are lots of good shops in our industry. How can you make yours stand out among them? As you are well aware, there are several major trends currently affecting the repair industry. A lot of baby boomer technicians like me have reached retirement age or soon will. As they leave, they’ll take a great deal of institutional knowledge with them. The average vehicle age in the U.S. is now 11.8 years and rising. Over the past decade or more, vehicles have become increasingly reliable, although routine preventive maintenance is still required. Unfortunately, these vehicles have also become increasingly complex, so when they do break down, they’re as likely to need a software update as a more traditional mechanical repair.

So whether you’re a shop owner or a technician, ongoing professional education is a must. If you’re still struggling to attain a professional level of competence, that should be your primary focus.

Meanwhile, consumer expectations today are high. At a minimum, customers want their vehicles fixed right the first time, every time, on time and on budget! It has to be the job of someone at your shop to manage those expectations from the outset. The details of how best to accomplish that are better left to another article; for now, suffice it to say that the best rule is to underpromise and overdeliver. This will include factoring in additional costs for the things most likely to go wrong, rather than blithely assuming that Mr. Murphy will take a vacation and that everything that can go right, will go right.

The rest of this article assumes that you’re already competitive in the required fundamental elements of competence, and that you’ve already learned to underpromise and overdeliver. Yet even once you’re at the
ness, it’s entirely possible the likely higher rents in that second district may cancel out the increased business volume in some cases, so you should do your homework if you’re considering relocating your business. That’s a huge—and hugely disruptive—decision, and one not to be taken lightly.

Traditional economics used to suppose that price would be the deciding factor in selecting a shop for most consumers. I think it’s still an important part of the value equation, but perhaps not as big a part as it once was. I learned decades ago that while you can always count on a loss-leader oil change special to bring you some new customers, you can also count on those same “customers” to leave you as soon as your special promotion is over. The trick, then, is not so much to engage in a race-to-the-bottom price war as it is to battle it out on the value front where you can compete for the better-heeled customers.

Differentiating your shop from the competition often comes down to matters of simple convenience. Location, of course, is a primary concern, as every real estate agent in the world will tell you—three times! All other things being equal, a garage in a run-down part of town that lacks any convenient amenities—a coffee shop, say, or a pleasant place to eat a packed lunch—will have a harder time attracting customers than an equally competent shop located in a vibrant walking district. In all fairness, it’s entirely possible the likely higher rents in that second district may cancel out the increased business volume in some cases, so you should do your homework if you’re considering relocating your business. That’s a huge—and hugely disruptive—decision, and one not to be taken lightly.

Traditional economics used to suppose that price would be the deciding factor in selecting a shop for most consumers. I think it’s still an important part of the value equation, but perhaps not as big a part as it once was. I learned decades ago that while you can always count on a loss-leader oil change special to bring you some new customers, you can also count on those same “customers” to leave you as soon as your special promotion is over. The trick, then, is not so much to engage in a race-to-the-bottom price war as it is to battle it out on the value front where you can compete for the better-heeled customers.

Here are a few ideas for add-on special services that may help tilt the value equation in your direction.

Many years ago, I saw a sign by the customer service desk of our local Saab dealership: “Five dollar fine for any mechanic leaving grease on steering wheel.” It seemed to me that it should be self-evident to anyone in any customer service industry that giving a customer a product back after service should not result in their getting grease all over themselves or their clothes! Yet, apparently, this was a sufficiently widespread phenomenon at that particular service department that a sign was needed.

Most dealerships and independent shops eventually learned that giving a customer back a vehicle dirtier than when it came in was a bad idea. Still later, many dealerships realized they could increase customer satisfaction by utilizing one of their used-car prep workers to do at least a rudimentary cleanup after service. In more recent years, many dealerships have added an in-house carwash, often in fulfillment of new conditions in their franchise agreements. They know that people buy the sizzle,
not the steak. In fact, surveys have shown that customers are more likely to overlook a new squeak, rattle or groan after service if their vehicle was returned freshly washed.

I’m not saying you’ll have to add a carwash to stay in business! But if there’s already such a facility in your area, you may want to see if you can make a deal. As a bulk customer, you should be able to negotiate a rate that might be low enough to make it worthwhile to simply add it in as part of a major service interval, for example. If logistics and manpower constraints prevent you from doing this directly, it might still be worthwhile to see if you could work out a coupon deal allowing your customer to get it done at his or her convenience.

For that matter, if there’s a suitable site and enough traffic and market demand in your neighborhood, you actually might want to think about adding a carwash to your car care empire, both as a stand-alone additional profit center (see the photo on page 28) and as an adjunct service provider enhancing your existing operations. In my area, where there’s no such available site, several mobile wash and detail services have sprung up to meet market demand. Here again is an opportunity for you to negotiate a bulk price, enabling you to offer additional cosmetic care to keep your customers happy.

How much should you charge? You could simply raise your base hourly rate by enough to cover your additional costs (both out-of-pocket and internal) plus make a reasonable profit. In this way, you don’t itemize the price of the cleaning separately, but throw it in as an included extra. While it’s equally valid to itemize it as a subcontracted service with a specified price, I think in the long run it’s both easier and more profitable to build it into your rate schedule if you can. Shop owners who eventually do decide to raise their rates almost invariably tell me afterward that no one complained, or even seemed to notice, for that matter.

Many luxury brand service departments offer free loa ner vehicles as well as pick-up and delivery services. Of course, we all know there’s no such thing as a free lunch, and those “free” services are already wrapped into the initial purchase price. Still, there’s no denying their convenience. Can you compete with the dealership once the vehicle’s out of warranty? The answers might surprise you!

Let’s say, for example, that you’ve developed a reputation as the go-to shop for Lexus and BMW in your area. What happens when something goes wrong? You’ll get the call. Many luxury brand service departments are now offering quick loaner vehicles as part of their service agreements. While this might sound like a great perk for customers, did you ever stop to think about what this means for you? How will you make money on that service? What if you had to pay for the cost of the vehicle? Would you still offer it as part of your service agreements? 

The SAE J2843 standard for R-1234yf refrigerant includes a gross leak test procedure that specifies a J2913 detector.
Here are a few other ideas you might want to think about if you’re looking to add on a specialty area:

**Trailer/tow packages.** If you’re good at tow package installations and you want more of that kind of work, let the whole world know! As with any other subspecialty, you should tout your professionalism and expertise. Packages and services should generally include wiring, plus engine and/or transmission cooling considerations such as auxiliary coolers. Heavy loads can require additional braking and suspension capacity, too, so make sure everything is up to snuff.

**RV service.** Many shops can’t service RVs because of equipment or space limitations. If neither of these limitations is a problem for you and you want more RV work, let people know. RVing families may want you to drop everything else in your life to take care of their emergencies, so it’s really important to be upfront about issues of scheduling, cost and capabilities. But if you can play the hero’s part, you may make friends for life.

**Sound and security.** Factory-installed sound systems keep getting better and better, but for some customers, too much is never enough! To service this crowd, you’ll need to understand not just the dash work, but add-on power electrical systems as well. *Tip:* Critically, learn at least a little about network communications, too. I’ve had to diagnose several vehicles whose engine performance issues turned out to stem from a CAN bus fault caused by an undertrained sound system installer. Many sound shops also offer additional electronics services like antitheft or remote-start systems.

**Rearview cameras.** It’s clear these can save lives. There are numerous kits available, and you should do some research from time to time to make sure you’re offering your customers a quality package. Most installations can be done in less than an hour, although in-dash systems can take quite a bit longer. Camera installations may also make a good adjunct to any of the specialties enumerated above. Note that some wireless camera systems may suffer from a time-delay lag. You may want to avoid these, as they may falsely show a clear path that has now been obstructed.

**Convertible tops.** This is not a high-growth market, but it’s one for which there is often demand. You need to be good at electrical work, hydraulics and sometimes a bit of upholstery as well.

**Lighting.** Do neon and other effects, off-road light bars or LED lighting conversions light you up? In some areas these make a nice specialty add-on service, and in some cases can become your core business.

**Speed shop.** This appeals to a lot of technicians. While there will always be a market for deep engine modifications, much of the real work here today involves reprogramming the PCM. Be aware, though, that “chipping” a vehicle that has a license plate generally constitutes tampering and may be punishable by up to five years of imprisonment and a substantial fine. Modifications of this sort should be reserved for vehicles intended for off-road and track use only.

**Steering, suspensions and wheels.** These offer additional areas for tweaking. But beware here, too: Modern automatic stability control systems may not tolerate certain modifications or may not work as originally intended. You must do your homework and then thoroughly test the results. Always insist on a signed release of liability before undertaking any modification work or delivering a modified vehicle back to its owner. Consult with both your lawyer and your insurance agent.

If you’re not focusing primarily on the core business, you might consider offering some combination of various alternatives. These might include a shuttle service, whether all the way home or to a convenient neighborhood center, shopping area, coffee shop, transit station, etc. You can offer this as an on-call service, on a schedule or even as a continuous circulator, though the last could be a bit expensive.

If you need to hire additional workers to provide such services, you may find your best value in a retired individual who’s looking for a little supplemental income. You may also benefit from using this driver to pick up? In some areas these make a nice specialty add-on service, and in some cases can become your core business.

If you need to hire additional workers to provide such services, you may find your best value in a retired individual who’s looking for a little supplemental income. You may also benefit from using this driver to pick
up critically needed parts from your suppliers when you can’t wait for their next delivery. This same driver might also be able to take care of the car wash runs discussed earlier.

Another idea is to offer customer pick-up within a confined service area. This can be done in conjunction with road tests on vehicles already in the shop or, in many areas, by using Uber, Lyft or similar ride-hailing services to send one of your techs (or that retiree) to make the pickup. (Obviously, you’re incurring some costs in sending your tech off-premises, so once again you’ll have to find a way to make it profitable.)

Shared mobility service providers—essentially car share providers—may offer an easy alternative for the customer who absolutely cannot be without wheels. Effectively, this works like a car rental. Again, you may be able to work out a bulk rate, or even to barter a bit of maintenance, particularly if the provider co-locates with you in your parking lot.

I have a friend who does fleet maintenance for a local limo livery firm located near his shop. Over the years, he has gotten to know the company’s owners and many of their drivers quite well. He has occasionally asked them to chauffeur select customers back home while he works on their vehicles, and even to pick them up afterwards...though never during prom season! He says that over the years, he’s done them as many favors as they’ve done him, so it all works out. Meanwhile, his customers get to enjoy an occasional treat.

Other Services
If your location and/or local economic climate preclude you from trying any of the ideas mentioned here, you can still offer value enhancements such as wi-fi and a coffee station. If you have a large enough waiting area, you might also offer TV. Screens are addictive, though, so
EXPERT WITNESS/FORENSIC SERVICES

Technicians operating at a sufficiently high level are in demand as expert witnesses in a wide variety of cases involving automobiles. You do need to be a bona fide expert to qualify. It’s rarely enough to be merely experienced; additional third-party credentials such as ASE certifications, state licenses, etc., are generally required.

You must also be comfortable on the witness stand, so this is not for everyone. If you’re easily provoked, if you find it insulting to be cross-examined, this is not for you. But if you’re good at explaining even the most technical details in a way that the general public can easily comprehend, and if you can remain unruffled under questioning, this may be a good sideline.

The trick is to come across as competent and confident without being cocky. As an expert, your job is to analyze the facts, then utilize your expertise to form and express an opinion to aid the judge and jury to understand what happened. You’re not an advocate for either side in a dispute, merely an independent authority. Keep a careful record of your observations, and supplement it with photos as required. It’s also usually required that you be able to write up the results of your inspections, tests or examinations and what conclusions you’ve drawn from those. Voice-to-text software can make this task much easier.

If you’ve got the chops, post ’em up! My rate board’s “Expert Testimony” listing has engendered many questions over the years, giving me an opportunity to toot my own horn in an acceptable way. The “Electrical Troubleshooting” rate’s $30/hr. surcharge over my general rate is a way to make up for the lack of significant parts markup from most such repairs. A shop’s rates should reflect the local economy.

less onerous, but do proofread the results very carefully.

How much should you charge for such work? You should consider several factors, such as the loss of billable labor and parts profits on service work you could have been doing during that time, the general disruption to your routine and the loss of billable time due to travel or waiting to testify. In my case, these considerations have generally led me to charge about three to four times my general hourly rate for inspections, testing and reporting, with fees for actual testimony a bit higher. Many experts bill in minimum half-day or full-day increments for actual testimony (including depositions) and include local travel time plus a reasonable allowance for mileage and expenses.

I’ve made several thousand dollars a year for many years providing such services in cases as widely varied as proving suicide to disproving attempted murder, although most matters have been much more mundane. More typical issues might involve identifying the cause of a sudden brake failure or determining whether an improper service procedure caused a subsequent transmission failure.

If you have a rate board, be sure to post your “Expert Witness & Report” rate. Customers seeing this will often ask a few questions, giving you an opportunity to do a little bragging in an acceptable way. The value to your shop is likely to come primarily from the enhancement of its reputation for expertise, rather than from the additional income.
A WEB-BASED AUTOMOTIVE INFORMATION LIBRARY

MOTOR E-TECH

Data is available in the following categories, each of which can be licensed individually:

- Air Bag
- Air Conditioning Service
- Component Locations
- Crash Estimating
- Engine Performance & Driveability
- Interior Panel
- Parts & Labor
- Specifications & Maintenance
- Technical Service Bulletins
- Wiring Diagrams

You may also purchase the General Repair package, which includes all data sets, except Crash Estimating.

Pay only for the data you need. Access it when you need it.

Visit MOTOR.com, or call us at 1.800.4A.MOTOR!

Content is copyright protected and provided for personal use only - not for reproduction or retransmission. For reprints please contact the Publisher.
ASE Renewal App Helps Techs Extend Certifications

The ASE Renewal App program allows ASE Certified technicians to extend their certification expiration dates by one year without having to go to a test center. The program tests technical knowledge through an app on users’ phones, tablets or computers, and is available only to technicians who are already certified in the automobile series of tests (A1-A9).

Participants in the program commit only a few minutes per certification area per month to answering questions, so it takes an average of eight months to extend certifications by a year. More than a hundred technicians have done so already.

Learning is a strong emphasis of the program. Question content focuses on the leading-edge technology on modern vehicles or issues that technicians typically have difficulty diagnosing.

“The ASE Renewal App program is about giving technicians options for how they manage their professional certifications,” said Tim Zilke, ASE president and CEO. “We are grateful to the 100 early adopters of the program, who provided crucial feedback that will improve the ASE Renewal App. They are truly an elite group of professionals who are focused on excellence in their careers.”

For more information about the program, visit ASEP Renewal App.com.

For technicians looking to earn ASE certification (or to get recertified), ASE winter registration is now open through March 31. More than 54 ASE certification tests are available.

Those registering will have 90 days to schedule an appointment to take the selected ASE tests, whether registering on the first day of the registration period or the last. ASE tests are conducted days, nights and weekends at nearly 500 secured, proctored test centers.

ASE testing is available throughout the year, and ASE offers free online study guides to help with the test preparation process. For more information and to register for ASE certification testing visit ase.com.

Lastly, ASE announced that technicians taking certain ASE automobile certification tests—Suspension & Steering (A4), Brakes (A5), Electrical/Electronic Systems (A6) or Auto Maintenance and Light Repair (G1)—will have the option to see each question in a split-screen, Spanish/English format. No special registration procedure will be needed to access the Spanish translation, which is built into the test delivery screen.

All ASE tests will continue to have the searchable English-to-Spanish Glossary of technical terms. In addition, anyone for whom English is a second language may bring a standard, published English-to-foreign language dictionary to use at the test center.

In 2020, only the listed four certification and recertification tests will have the new bilingual feature. However, ASE anticipates that a Spanish translation of the other automobile series tests required for Master status will be available at a future date.

Bartec USA: New Tool Software Release 61, RITE-SYNC Process

Bartec USA recently announced Release 61, its latest software update available for the Tech400SD, Tech-300 Pro, Tech500 and Tech400Pro tools. The company also rolled out RITE-SYNC, a tool-controlled process unique to Bartec TPMS tools and the Bartec RITE-SENSOR.

According to the company, when Bartec’s RITE-SENSOR and the RITE-SYNC process are used, the TPMS service is just like working with an OE, single-part replacement. “One thing that is common to all TPMS service is that whenever a new sensor is installed, a TPMS relearn is required,” said Scott Holloway, Bartec CEO. “RITE-SYNC combines the sensor programming step with the relearn step, making the process last, accurate and repeatable.”

RITE-SYNC is only one part of Release 61. The software upgrade also adds coverage for Schrader’s EZ-Sensor, JohnDow’s Pro-Select, Hof’s IntelliSens and SMP’s Qwik Sensor. It also marks the return of the Alligator sens.it for the four Bartec tools mentioned above.

The latest tool software can be accessed by logging in to your current tool account at tools.bartecusa.com.

Icahn Rebrands Tech Training Facility at Alfred State College

Icahn Automotive recently celebrated the opening of a rebranded technical training facility at Alfred State College of Technology with refreshing and inspirational wall graphics messages such as “Find out how far you can go,” “Find your own path,” “Find the tools you need” and “Find your path.”

Alfred State’s automotive technology program is NATEF Master Certi-
supported promising future automotive technicians through scholarship, partnerships with schools and continuing education opportunities, in an effort to fill the projected automotive technician gap. Throughout the course of the initiative in 2019, Icahn Automotive has made investments in dozens of technical training schools across the nation and awarded $50,000 in scholarships to students studying at automotive trade schools.

**MACS to Host Auto Software, Electronics Boot Camp**

To successfully tackle today’s and tomorrow’s repair jobs, auto repair shops need to learn relevant new skills related to electronics, computer software wiring and coding. That’s why the Mobile Air Conditioning Society (MACS) Worldwide is sponsoring the Automotive Software and Electronics Boot Camp with Dr. Mark Quarto at its training center in Lansdale, PA, March 23-27, 2020.

This is the second year in a row that MACS is hosting the camp, and they’re doing it in partnership with FutureTech Auto. The camp received the 2019 ATMC/ASE excellence in training award last year.

Hybrid/electric propulsion and ADAS technologies are requiring technicians to become creative and skilled in nonmechanical aspects of today’s vehicles, says MACS. Even modern HVAC systems have experienced advances in power electronics with the use of high-voltage electric heating, air conditioning and heat pump components.

The intense five-day training experience will allow participants to go back to their shops having gained knowledge in a number of areas, among them:
- The differences and specific functions of software, firmware and hardware systems.
- How to build microcontroller-based control applications and hardware interface tools that can be used for monitoring, analyzing and/or diagnosing most automotive systems.
- How electronic devices can be used to augment vehicle circuits and the scan tool for testing or diagnosing system faults.
- How to write software programs to perform specific diagnostic and testing routines that can be used with or without a scan tool.
- How to create microcontroller systems that can be built for use with a scan tool or on-board vehicle system to manipulate systems operation for the purpose of circuit analysis and diagnostics without the need for purchasing expensive test tools.

To register for the Automotive Software and Electronics Boot Camp, visit [https://www.futuretechauto.com/macbootcamp.html](https://www.futuretechauto.com/macbootcamp.html), or call 360-207-7770. To learn more about MACS Worldwide, visit [www.macsww.org](http://www.macsww.org).

**Insight on Cell Phone Usage at Independent Repair Shops**

The automotive market research firm IMR Inc. ([automotiveresearch.com](http://automotiveresearch.com)) recently released its latest findings regarding cell phone usage in bays at independent repair shops. Research shows that 99.6% of automotive repair technicians own a cell phone, with nearly half (46.4%) also owning a tablet or iPad. Of these devices, 57% will end up in the technician’s working bay as a part of their daily toolkit.

More than 87% of technicians actively use their cell phones for work in the bay to access the following: technical information, technician manuals, catalog information, parts manufacturer websites for technical or product information, ordering parts and watching training or instructional videos and content.

Overall, more cell phones are used in repair shops with one to three bays across all categories, while technicians in shops with eight or more bays use their cell phones less overall, but approximately 20% more for ordering parts.

The research also shows that when using social media platforms, technicians are most active on Facebook and YouTube, followed by Twitter, Instagram and LinkedIn.

“Smartphones and tablets play such an important role in how so many industries are doing business,” said Bill Thompson, president, IMR Inc. “The automotive aftermarket is by no means immune to this trend. Technicians have more access than ever to the important information they need to provide excellent service, and it’s critical for parts manufacturers, distributors and shop owners to understand how reaching technicians is changing in this digital age.”

---

Content is copyright protected and provided for personal use only - not for reproduction or retransmission. For reprints please contact the Publisher.
KYB recently introduced a new road-testing app and updated its website. The app helps service providers communicate with their customers about shocks and struts. It offers a good way to rate wear of those components and can send Vehicle Condition Reports directly to a customer’s phone or e-mail address, allowing technicians to recommend a sale with confidence. The KYB Road Testing App can be downloaded at no charge and is available for Apple and Android devices. The updated www.kyb.com website has been made more user-friendly and includes new videos, simple graphic icons, electronic catalogs by product category and 360° product images.

Continental Commercial Vehicles & Aftermarket recently expanded two of its product lines. Its new VDO Fuel Module (Part No. FP22066SS) extends application coverage on 2014-18 RAM 2500 and 3500 models, representing nearly 218,000 vehicles in operation (VIO). All SKUs in the line are vehicle-specific, to ensure OE fit and performance. For more information, visit www.usa.vdo.com. In the company’s TPMS line, the addition of the new VDO REDI-Sensor Multi-Application Sensor SE 1000S expands total coverage to more than 128 million 2014 and newer VIO. Designed to follow OE relearn procedures, the new sensor is compatible with all major scan tools and is ready to install right out of the box. Log on to www.redi-sensor.com for more information.

US Motor Works has released the booklet “Success in Fuel Delivery Systems – Fuel Pump Modules,” which provides an overview of the automotive fuel system, with focus on the fuel pump/fuel pump module. It offers information to help technicians avoid common causes of fuel system failure as well as best practices for fuel pump replacement, and can assist in determining the possible causes and validity of a warranty claim on an automotive fuel pump. The electronic version of the booklet can be found at usmotorworks.com; the printed version can be requested through customer service.

A new formula, LX4 Lubricity Extreme, has been added to Hot Shot’s Secret’s Everyday Diesel Treatment (EDT), which counteracts the negative effects of Ultra-Low Sulfur Diesel (ULSD), including loss of power, lubricity and fuel economy for diesel engines. LX4 Lubricity Extreme, which is also sold separately as a stand-alone product, is claimed to improve diesel fuel lubricity by up to 56%, according to tests by the company. For more information, visit www.hotshotsecret.com.

The new Training Solutions YouTube channel allows professional service technicians to view Snap-on Diagnostics’ training videos 24 hours a day, seven days a week. Through short instructional sessions on specific topics, technicians can learn how to navigate the features and functionality of their Snap-on tools and quickly get answers on different aspects of tool operation. Visitors can subscribe to the new channel to stay up-to-date on the latest content as it’s added. Training videos are also available on the Snap-on tools and repair information website, http://diagnostics.snapon.com.

Rancho recently expanded its performance suspension lineup to include a new 3-in. suspension system for 2014-20 Ford F-150 pickup trucks. The bolt-on system includes a set of durable, tubular upper control arms, two sway bar spacers with mounting hardware, 1½-in. rear blocks, two “Level It” Rancho RS9000XL front leveling struts and two rear RS9000XL rear shocks (coil springs not included). Visit www.GoRancho.com for further details.

MAHLE Motorsport recently released its “Application Guide 2020,” which features complete details of the company’s selection of PowerPak and PowerPak Plus piston kits for a broad range of domestic and import street and track applications. The 40-page guide includes information on preparing rings and proper ring gap measurement, ring filing and ring alignment. To download a copy of the guide, log on to MahleMotorsports.com or call 888-255-1942.

Advance Auto Parts recently acquired the DieHard brand from Transform Holdco (Transformco), which gives Advance the right to sell DieHard batteries and enables the company to extend the DieHard brand into other automotive and vehicular categories. The deal also allows Transformco to sell DieHard brand batteries through its existing channels pursuant to a supply agreement with Advance, which has also granted Transformco license to develop, market and sell DieHard-branded products in nonautomotive categories.
**Tools of the Trade**

**Electronic Tire Inflator**

The ACCURA MK4 is a new electronic tire inflator that combines the toughness and sturdiness of an analog unit with the accuracy and ease of use of a digital inflator. It features a sleek shape for greater user comfort and control, plus a large, backlit LCD screen for easy reading in dimly lit areas. According to the manufacturer, the tool can be easily toggled between different pressure calibrations (psi, bar and kPa), and features high-performance inflation and deflation rates for enhanced productivity. **PCL USA**

**New Hex Bit Sockets**

Available with midlength or extra-long bits, these Chrome Hex Bit Sockets are said to provide improved access to hard-to-reach hex fasteners. Each socket features an S2 steel insert for maximum strength, chamfered bits to prevent fastener stripping, heat-treated socket bases for improved durability and hand-stamped identification lines to distinguish between SAE and metric variants. The sockets can be purchased individually or in sets and are available in both 3/8- and ½-in. drives in both SAE and metric versions. **GEAR-WRENCH**

**Filter Wrench Set**

Designed to facilitate the removal of the filter element on vehicles equipped with oil and/or fuel filter canisters, this offset filter wrench set (Part No. 40600) features seven different-size low-profile, six-point wrenches with an offset 3/8-in. square drive for easier clearance into hard-to-reach spaces. According to the manufacturer, all wrenches in the set are laser-etched for easy size identification and come packaged in a rugged, blow-molded storage case. **Lisle**

**Disposable Cleaning Towels**

SCRUBS In-A-Bucket are durable premoistened, dual-textured cleaning towels that effectively remove dirt, grease, oils, adhesives, epoxies and grime from hands and arms, tools and work surfaces without the use of water. The towels feature a pleasant citrus scent and, according to the supplier, are gentle enough to prevent skin dryness or irritation. They’re available in 30- and 72-towel buckets as well as a case of 100 individually wrapped packets. **Permatex**

**Premium Brake Rotors**

Designed especially for rust-prone areas of the country such as the Snow Belt and coastal regions, Element3 Coated Rotors come with a proprietary RPT finish on the braking surface and cooling vanes that helps resist corrosion and prevents rust-induced performance issues. According to the company, the new rotors provide best-in-class braking performance, maximize brake pad friction life and eliminate the issue of uneven rotor surfaces, which can lead to excessive lateral runout and subsequent brake pedal pulsation problems. **Raybestos**

**Heavy-Duty Impact Gun**

Engineered for heavy-duty service operations, the 2175MAX 1-in. drive impact wrench can provide up to 2000 ft.-lbs. of reverse torque for handling the most demanding disassembly chores. It features a lightweight, chemically resistant composite housing; an adjustable side handle; built-in power regulator to manage speed and torque; and a swivel hose connection to prevent tangles. The tool can be ordered with either a standard-length or 6-in. extended anvil. **Ingersoll Rand**
New TPMS Sensor
Designed to be used in conjunction with the company’s vast array of TPMS tools, the new RITE-SENSOR fully programmable, multifrequency TPMS sensor can be used as a replacement sensor on basically any vehicle on the market, according to the manufacturer. It helps reduce shop inventory, eliminates technician confusion, comes standard with both rubber and aluminum valve stems and can be programmed quickly and easily via software available through the company’s website.

Bartec USA

Tire Safety Aid
For technicians who do lots of wheel service work, the WHS4 Wheel Hanger Set (Part No. WHS4) comprises four separate tools that hold a wheel in place during removal or installation of lugnuts or bolts while eliminating the cumbersome task of trying to balance the wheel at the same time. All four pieces in the set feature a 10mm hex, have various thread sizes and can be installed by hand, wrench or air ratchet.

Snap-on Tools

Ford Truck Replacement Fuel Tank
Designed for 2009-14 and 2017-19 Ford F-150 Crew Cab pickup trucks with the 6½-ft. bed, this 50-gal. replacement fuel tank is suitable for owners who want to maximize their fuel capacity and driving range. Made of tough 12-gauge aluminized steel, the new tank fits into the same space as the stock tank without modifications, includes baffles to prevent fuel sloshing and comes with a powdercoated black finish for corrosion resistance. All straps and mounting hardware are included.

Transfer Flow

New Wi-Fi Borescope
The new CP7670 Wi-Fi enabled borescope has a unique camera that’s compatible with all smart devices, including smartphones and tablets. Using an app that can be downloaded from the company, the scope gives technicians the ability to view, store and play back photos and videos for quick inspection and analysis. Additional features include a long, flexible cable for easy access into hard-to-reach areas, plus four tube-mounted LEDs with eight brightness settings for optimal viewing. The tool is waterproof to IP67 standards and comes equipped with a mirror, magnet and hook.

Actron

Compact Tire Changer
The monty 1675 Swing Arm Tire Changer features a compact design and quick and easy setup, making it suitable for handling passenger car, light truck and high-performance wheel and tire assemblies, says the maker. The unit comes standard with the company’s patented smartSpeed technology, which minimizes tire damage by automatically optimizing the torque and speed applied to the wheel during mounting. Additional features include precision-cast shoes and jaws for slop-free clamping; heavy-duty, simple-to-operate pneumatic valves for increased functionality; a unique bead breaker control system that obviates the need for users to straddle the assembly during bead breaking; and an integrated pressure limiter that stops airflow once 55 psi has been reached to prevent tire overinflation.

Hofmann

High-Performance Fog Lamp Bulbs
Available for most domestic vehicle applications, Philips X-tremeUltinon Fog Lamps are direct plug & play replacements for standard halogen H8, H11 and H16 bulbs. According to the company, the new bulbs improve visibility by producing a white light that’s 200% brighter than standard fog lamps while matching perfectly with the color of xenon and LED headlights. A patented SafeBeam technology helps eliminate glare to other drivers by creating the same beam pattern as standard halogen lamps. Application coverage includes Buick, Cadillac, Chevrolet, Chrysler, Dodge, Ford, GMC, Jeep and Lincoln models.
Classified Rates

1"  2"  3"  4"

1X $175 $335 $495 $655
6X $160 $310 $460 $605
12X $140 $265 $395 $500

Do you need to update your subscription info?
Go to MOTOR.com/subscriptions or call:
(847) 559-7316

Content is copyright protected and provided for personal use only - not for reproduction or retransmission. For reprints please contact the Publisher.
DRIVE REVENUE WITH UNMANNED INSPECTION

Quick Check Drive® is Hunter Engineering’s unmanned alignment inspection system that provides instant alignment readings and requires no human involvement. Each Quick Check Drive® is equipped with eight cameras and 32 laser sensors that scan a vehicle’s tires as they drive past. Quick Tread Edge® is Hunter’s latest drive-over tire tread depth measuring tool that delivers detailed tire condition diagnosis in less time and with added edge wear detection. With Hunter’s unmanned inspection system, service providers can discover more opportunities and drive alignment and tire sales. www.hunter.com

VERSATILE MOHAWK 10-18K LB. 2-POST LIFTS

Increase your shop versatility with a Mohawk 2-post lift, designed and manufactured to service not only cars and trucks, but also turf maintenance equipment! Easily convert your Mohawk 2-post with our Turf Maintenance Kit to instantly increase your potential customer base! Call: 800-833-2006. Visit: MOHAWKLIFTS.COM. Industry-leading 25-YEAR warranty.

TEXTAR BRAKE DISCS

Textar, the world’s leading manufacturer of OE brake pads, offers a range of German engineered, high-carbon brake discs for European applications. Utilizing the know-how that comes from over 100 years of developing OE brake pads, engineers at Textar have developed a perfectly matched brake disc to ensure the ultimate vehicle braking performance. This new range of high-quality brake discs are manufactured to precise German specifications and are available at WORLD-PAC. www.worldpac.com

Request for Entries

MOTOR Magazine’s Top 20 Tools Award recognizes those tool and equipment manufacturers who, through innovative features on new products, help technicians diagnose and repair vehicles correctly—the first time.

Visit www.motor.com/top-20-tools for complete details!

ADVERTISER INDEX

www.advisaft ruinarket.com............5
www.autel.com..............................9
www.bartecusa.com......................29
www.bendpak.com ......11, 17, 20-21
www.drewtech.com .....................3
www.harborfreight.com ..............15
www.hunter.com ...................31, 40
www.iatn.net.............................10
www.launchtechusa.com .............7
www.mohawklifts.com..........23, 40
www.motor.com ......................33, IBC
www.napaonline.com ..................IFC
www.sptool.com ......................13
www.worldpac.com .................40, BC

For reprints please contact the Publisher.
THE INDUSTRY’S MOST COMPLETE AUTOMOTIVE INFORMATION PROVIDER

DIAGNOSTIC CODES  PART NUMBERS

SERVICE PROCEDURES  MAINTENANCE SCHEDULES

ILLUSTRATIONS & DIAGRAMS  LABOR TIMES

SPECIFICATIONS  RECALLS & BULLETINS

Find the right parts, labor and service information quickly and easily. Contact MOTOR today!

CONTACT@MOTOR.COM • 1-800-4-MOTOR • MOTOR.COM
QUALITY NEVER GOES OUT OF STYLE